Installation and Operation
Instruction Manual ELIX PV200 MPPT

Table of Contents

1. GENERAL WARNINGS

Be sure to carefully read the instructions and warnings in this manual before installing and operating the water heater. The information contained in this manual is intended to familiarize you with the water heater, the rules of its correct and safe operation, and the minimum requirements for its maintenance and servicing. Furthermore, you are obliged to make this manual available to the qualified persons who will install and potentially repair the appliance.

These instructions should always be kept near the appliance for future reference. Compliance with the rules here described is part of the measures for the safe use of the product and is considered part of the warranty conditions.

1.2. SAFETY INSTRUCTIONS

ATTENTION! This appliance must be installed by an authorized person and the installation must comply with the standards of EN60335-1, EN60336-2-21. Improper installation and connection of the appliance may make it hazardous for the health and life of consumers. It may cause grievous and permanent consequences, including but not limited to physical injuries and/or death. Improper installation and connection of the appliance may also lead to damage to the consumers' property/damage and/or destruction/,or to that of third persons, as a result of, but not limited to flooding, explosion and/or fire.

ATTENTION! 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.

WARNING! Be sure to fill the water heater with water before connecting it to the electrical supply! Failure to comply with the electrical connection conditions affects the safety of the appliance, whereby the water heater must not be operated.

WARNING! Once installed the hot water tank is powered by DC&AC of power supply, both must be isolated before working on the appliance.

2. TECHNICAL SPECIFICATION

MODEL	ELIX Solar PV150	ELIX Solar PV200
Volume	150 L	200 L
Inner tank material	Enameled BTC340R steel	Enameled BTC340R steel
Outer tank material	Anti-corrosion steel	Anti-corrosion steel
Rated pressure	0.8 MPa	0.8 MPa
Tank diameter	520 mm	520 mm
Insulation thickness	54 mm	54 mm
Total height	1308 mm	1688 mm
Net weight	45 kg	55 kg
Water temperature setting range	30℃~75℃	30℃~75℃
Auto-reset thermostat	75℃	75℃
Non-self-resetting thermal cut-out	90℃	90℃

AC HEATING ELEMENT				
Voltage	230V		230V	
Heating power	2000W		2000W	
DC HEATING ELEMENT				
Resistance (Ω)	6.48	6.48	6.48	4.80*
Max.Open circuit voltage (V)	110	110	110	110

* The table includes two types of heating elements were utilized: 36V/200W and 36V/270W.
Standard water heater package is equipped with a 36V/200W heating element.

2.1. Solar Panels Safety

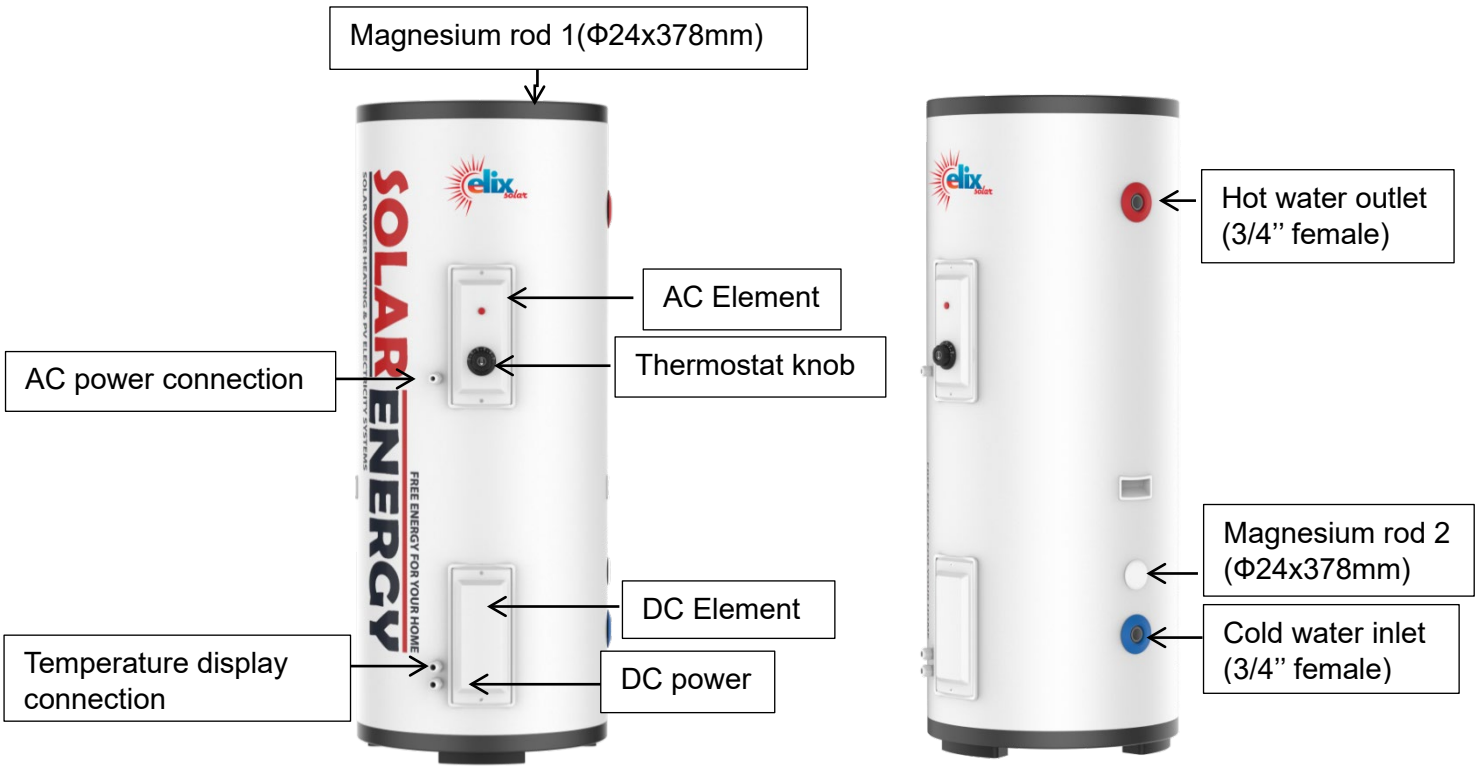
IMPORTANT!

- The DC heating element has a fixed resistance Rdc = 6,48 Ohm
- Open circuit voltage from all solar panels combined **(V_{oc_total})** must be less than **110V!** **$V_{oc\_total} < 110V$**
- In case V_{oc_total} > 110V, damage will be caused. Such defects will not be considered a warranty claim.

Recommended solar panels setups for you Elix PV water heater can be found in section 5 of this manual.

3. PRODUCT COMPONENTS

3.1. Hot Water Storage Tank



3.2. Accessories

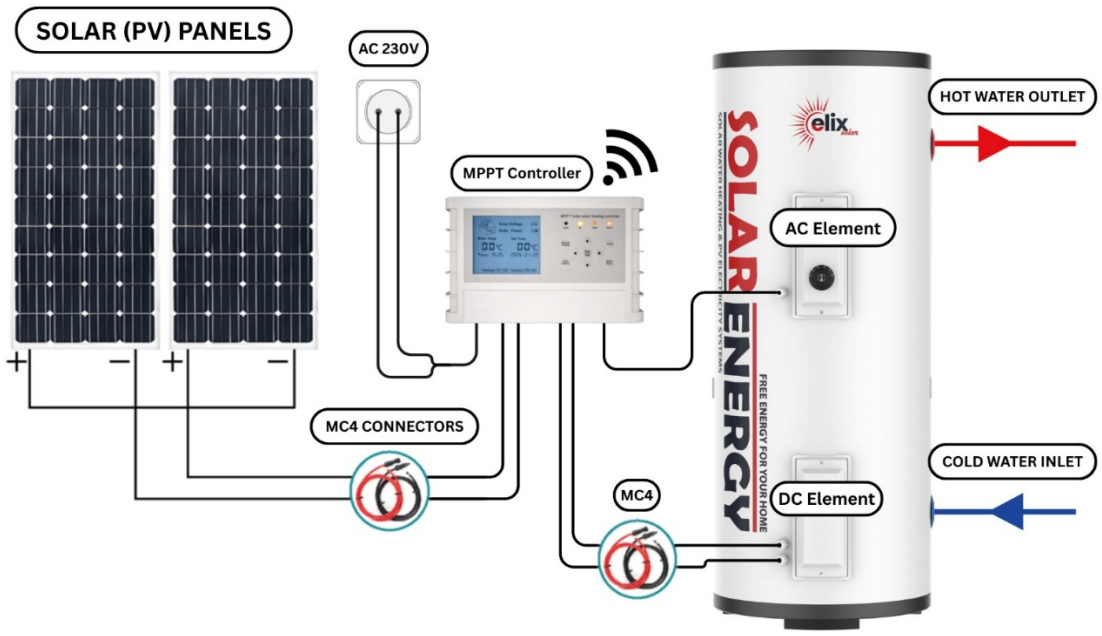
MC4 Connector

MPPT Adapter

Safety valve

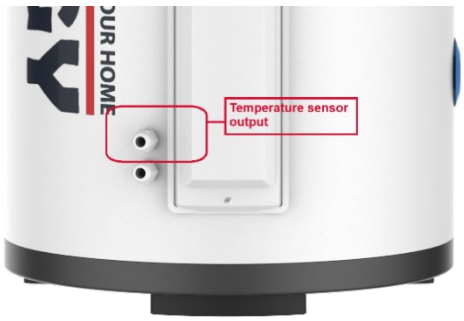
4. INSTALLATION INSTRUCTION

4.1 Installation Schematic Diagram



MPPT

To improve the heating efficiency from solar panels, our water heater **is compatible with the MPPT adapter**, model SWHC-2K-E.
Water heaters supplied with an MPPT controller already include a built-in temperature sensor. The sensor cable exits through the upper DC wiring port of the unit.



4.2. Installation of Photovoltaic Panels

The installation of photovoltaic panels on the roof needs to be combined with the roof structure, which is generally divided into flat roof and pitched roof. The specific installation steps are as follows:

4.2.1. Preliminary Preparation

1. **Site Survey:** Assess the lighting conditions, load-bearing capacity, surrounding obstructions, and other factors at the installation location to determine the optimal installation area.
2. **Design Planning:** Design the photovoltaic panel arrangement and tilt angle (to maximize sunlight reception) based on the site conditions, and develop a wiring plan.
3. **Material and Tool Preparation:** Gather materials such as photovoltaic panels, brackets, cables, screws, and tools such as a drill, wrench, and multimeter.

4.2.2. Mounting the Bracket

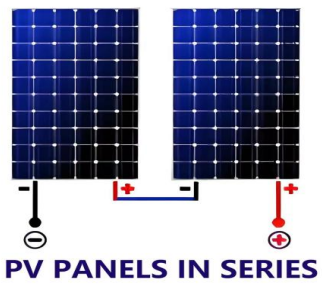
Secure the bracket according to the design requirements. Ensure the bracket is level and stable, and can withstand the pressure of the photovoltaic panels and the elements (e.g., wind and snow).

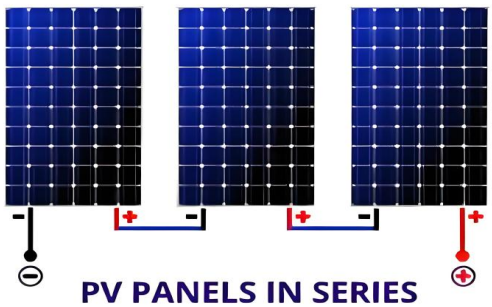
4.2.3. Mounting the Photovoltaic Panels

Secure the photovoltaic panels one by one to the bracket, tightening them with screws and other fasteners. Ensure the panels are aligned and have adequate gaps between them for heat dissipation.

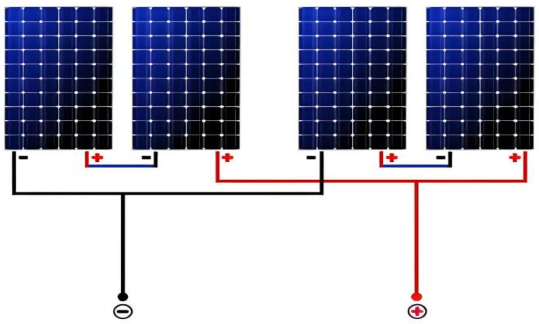
4.2.4 Photovoltaic Panels Connection

1. **Photovoltaic panels in series:** Connect the photovoltaic panels in series by MC4 connector, depending on the system voltage and max.power requirements (Figures below as reference).





2. **Photovoltaic panels in series/parallel:** Connect the photovoltaic panels in series/parallel by MC4 connector, depending on the system voltage and max.power requirements(Figures below as reference).



4.2.5 Inspection and Commissioning

Check that all wiring connections are secure and correct, and that there are no short circuits or leakage.

4.3. Installation of Hot Water Storage Tank

150L and 200L hot water storage tanks have large capacity and are heavy, so special attention must be paid to floor load-bearing capacity, water pressure, and circuit load. The specific steps are as follows:

4.3.1. Preliminary Preparation

1. **Confirm the installation location:** Choose a flat, load-bearing surface with a suitable power outlet (with leakage protection) and water inlet and outlet connections nearby.
2. **Check accessories:** Verify that all accessories, including hot water storage tank, water inlet and outlet pipes, safety valve, sealing ring, and wrench, are present.

4.3.2. Positioning Hot Water Storage Tank

Place the water heater firmly in the selected location and adjust the level. Ensure the unit is stable and does not wobble.

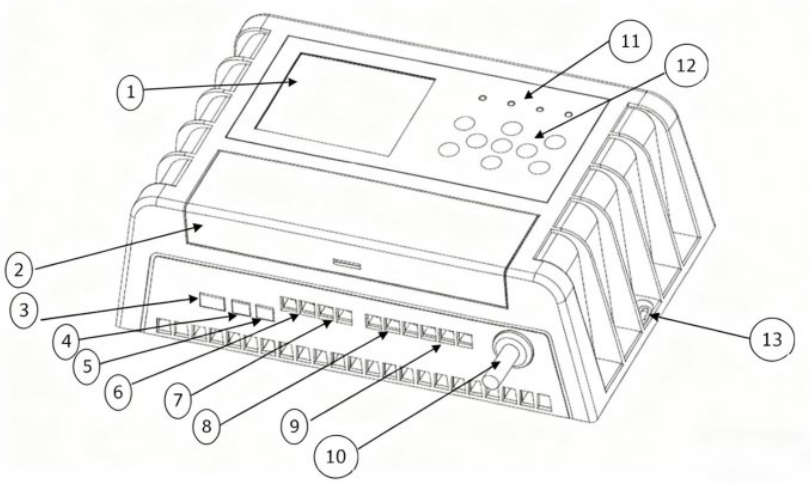
4.3.3. Water Pipes connection

1. **Prepare:** Turn off your home's main water supply and locate the hot and cold water inlets (usually marked "Hot" and "Cold" on the hot water storage tank).
2. **Installing the Safety Valve:** First connect the safety valve to the cold water inlet (note the orientation, with the pressure relief port facing downward). Wrap the joints with Teflon tape to seal (Figure as reference).
3. **Connecting the Water Pipes:** Use a wrench to connect the cold water pipe to the safety valve and the hot water pipe to the hot water outlet of the hot water storage tank, ensuring the joints are tight and leak-proof.

4.3.4. Testing and Venting

1. **Turn on the water supply:** Slowly open the main water supply and the hot water faucet to allow water to fill the inner tank and expel any air from the inner tank (until water flows continuously from the faucet without bubbles).
2. **Check for leaks:** Carefully inspect all connections for leaks and retighten if necessary.

4.4. Connection MPPT controller



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.

4.4.1. 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. 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.

4.4.2. 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

4.4.3. Heating element selection

Solar output: heating element power is not more than110V/1867W

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

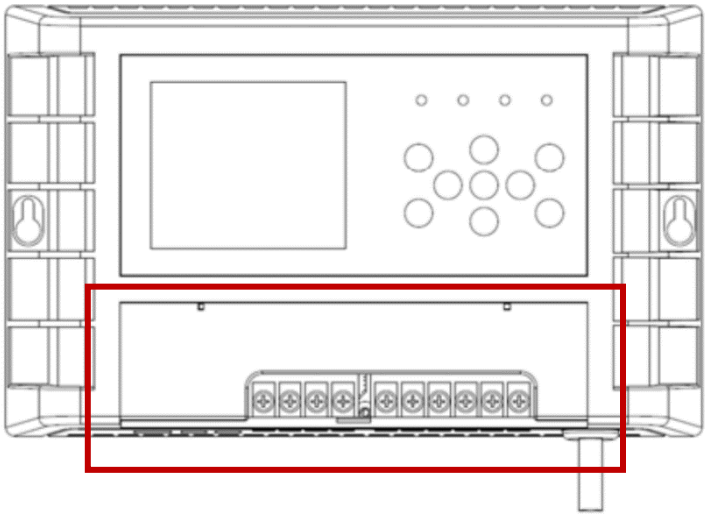
The controller is required to be perpendicular to the mounting surface, If the installation angle deviates from the vertical direction by more than 45 degrees, it will cause poor heat dissipation of the controller, which may affect the power output of the controller.

4.4.4. Remove the wiring cover

Warning: Electricity, danger!

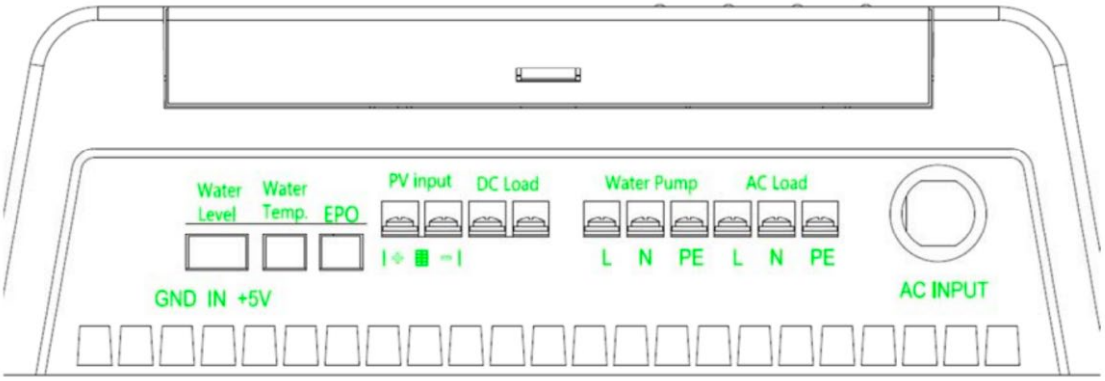
Before removing the wiring cover, please make sure that the controller is disconnected from all power sources, and let the controller stand for more than 5 minutes to ensure that the residual power inside the controller is discharged to a safe level. Any live operation will put the operator in a dangerous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

Remove the wiring cover as shown in the figure below:



Warning: Risk of electric shock!

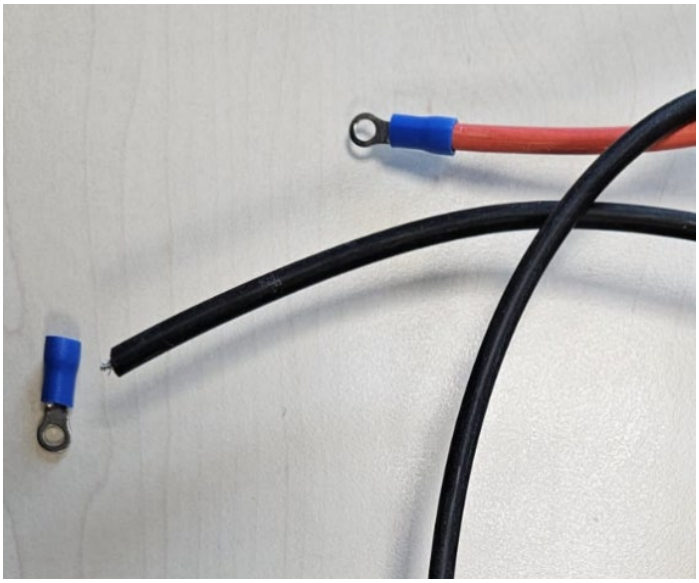
The maximum open circuit voltage of the solar panel array should not exceed the maximum value of 110V specified by the controller. Before installation, make sure that the solar panel and the cable are disconnected.



4.4.5. Connections

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

1. 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.
2. 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.

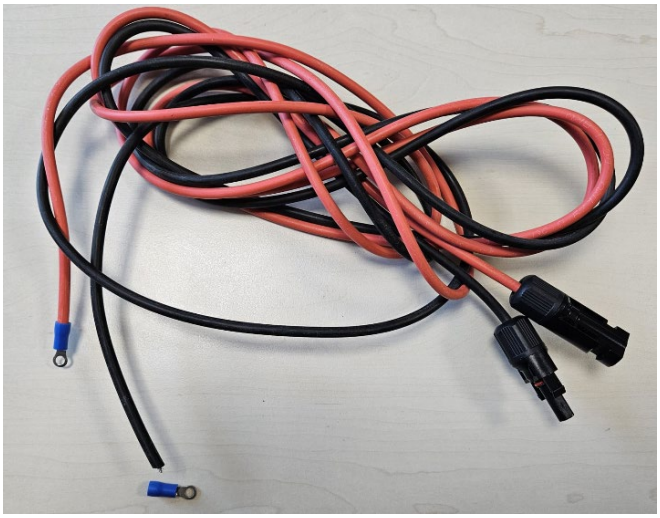


Warning! Note that the positive and negative poles of the solar panel cannot be reversed!

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!

3. **Solar panels connection:**
    a. Connect the solar panel + (positive) wire to the “PV input +” terminal on the controller.
    b. Connect the solar panel - (negative) wire to the “PV input -” terminal on the controller.

4. **DC heating element connection:**
    a. Connect MC4 cable from MPPT package kit to the DC wire (MC4) of the water heater.
    b. On the other end of the cable, place and electrically secure with OT terminals.
    c. Connect the DC element wire to the “DC(PV) Load” terminal of the controller. Please select the DC heating element with the correct power.



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

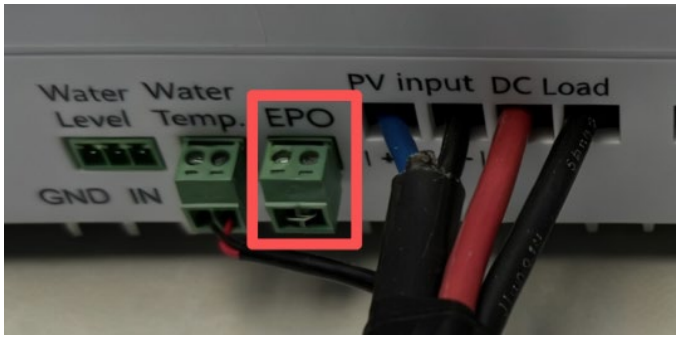
5. Water temperature sensor connection:

Water heaters marked **“MPPT”** are already equipped with a temperature sensor installed in the water heater body.

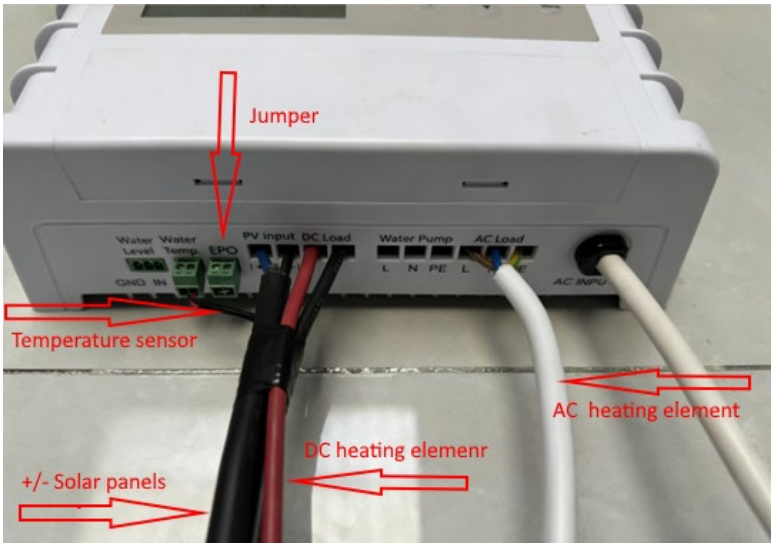
In this case, simply connect the wire from the terminal exiting the **top socket** (located above the solar panel input socket) to the **“Water Temp.”** terminal on the MPPT adapter.

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

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



4.4.6. The wires connecting diagram



5. How to calculate max. heating power of heating element?

5.1. How to calculate max. heating power (*P_dc*)?

$$\mathbf{P\_dc} = \frac{(V\_mp\_total)^2}{R\_dc} \text{ (W)}$$

- **V_mp_total** - max. power voltage from all pv panels combined
- **R_dc** - DC heating element resistance (**R_dc = 6.48**)

5.2. Max. heating power of heating element Calculations Example:

1. Let's assume we have **three 435W panels** with following characteristics:

- Max. power voltage **V_mp** - 29.48V
- Open circuit voltage **V_oc** - 34.72V
- DC heating element resistance **R_dc** – 6.48

2. We decide to connect these three panels **in series** to get highest V_mp_total:

3. First, we need to check if the V_oc_total of this panel's configuration is within safe limits:

- **V_oc_total** = 34.72 + 34.72 + 34.72 = 104.16 (V)
- **V_oc_total < 110V** => this configuration is safe

4. Finally, we calculate how much heat power we can get from this setup of panels:

$$\mathbf{P\_dc} = \frac{3 * \mathbf{V\_mp}^2}{\mathbf{R\_dc}} = \frac{88.44^2}{6{,}48} = \underline{\mathbf{1207\ (W)}}$$

3 × 435 W solar panels provide a total electrical output of 1305 W. This electrical energy is converted by the water heater into **1207 W** of thermal (heating) energy under perfect sunlight conditions (STC).

6. Recommended solar panels setup:

Two Longi LR7-72HVH-640M (640W) solar panels (or similar panels) in series connection:

- DC MPP heating power: **1215 W**

4 Examples for Most Popular Solar Panels				
PV Panel option *	435W *	550W *	450W *	720W *
Max. power voltage (from PV Datasheet)	29.48V	41.96V	30.04V	42.07V
Open circuit voltage (from PV Datasheet)	34.72V	49.9V	35.91V	50.17V

Calculated heating power of DC element				
PV panel quantity for best performance	3	2	3	2
Total DC voltage	88.44V	83.92V	90.12V	84.14V
Total Open circuit voltage	104.16V	99.8V	107.73V	100.34V
DC Heating power	1207W	1086W	1253W	1474W

* The table includes sample data for 435W, 450W, 550W and 720W panels.
Users can substitute any panel from the available product range by applying the appropriate calculations based on the panel's specifications.

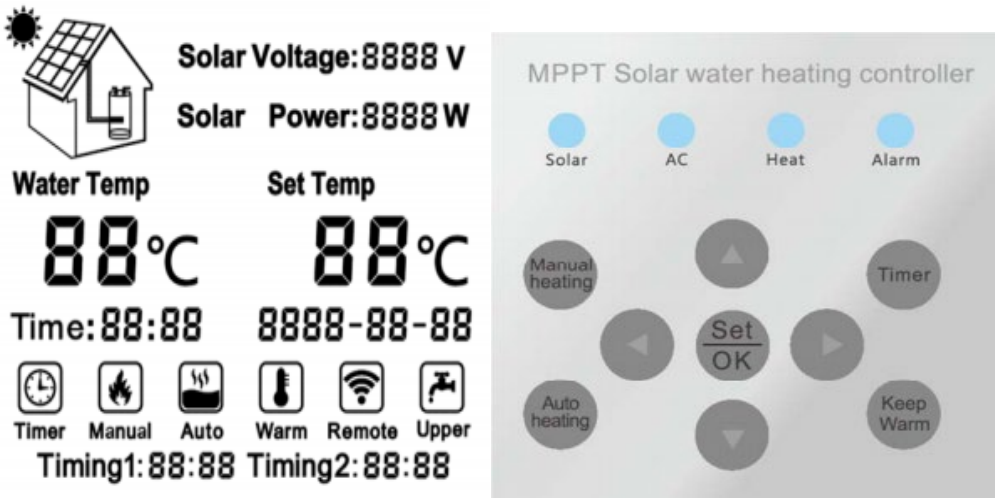
7. Operation instructions

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

7.1. 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.5.4

7.2. Control panel



7.3. Temperature setting

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

7.4. Working mode setting

● Press“ 

” and When“ 

”is displayed, It’s DC mode. Only DC heating element works.

● Press“ 

” and When“ 

”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“ 

” and When“ 

”is displayed, It’s Hybrid mode. Both DC and AC heating elements work together.

● Press“ 

” and When“ 

”is displayed, It’s Timer mode. Only AC heating element works.

7.5. Time and Date setting

● Press “ 

” first and then press “ 
”or“ 
”to set the time and date by “ 
”or“ 
”.

7.6. Timing setting

● Press “ 

” first and then press “ 
”or“ 
”to set the timing 1 and timing 2 by “ 
”or“ 
”.

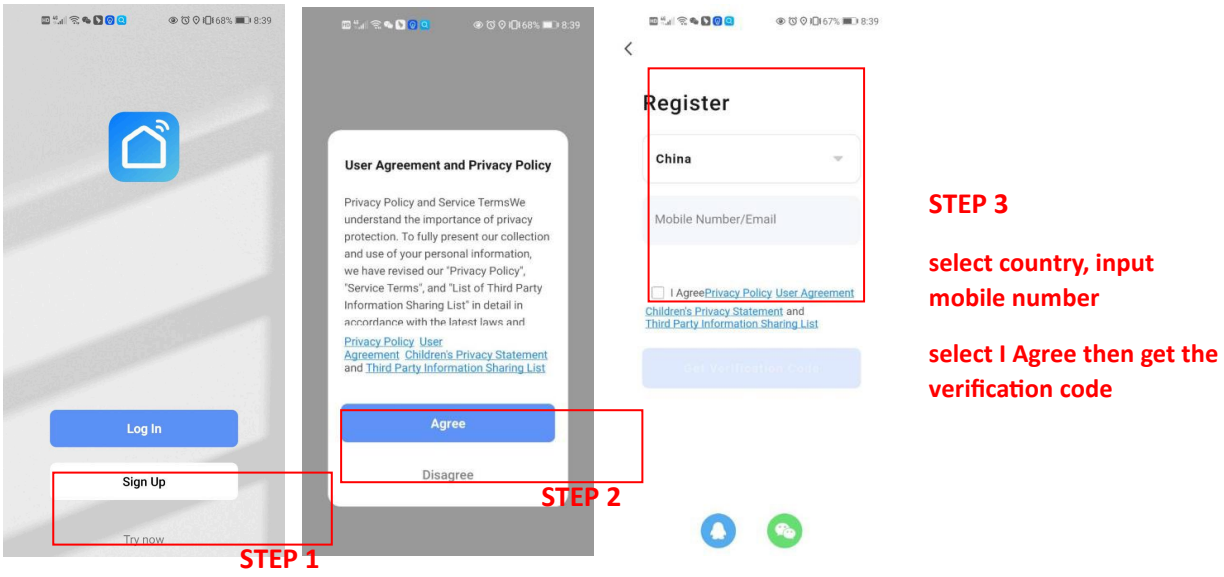
8. WiFi function

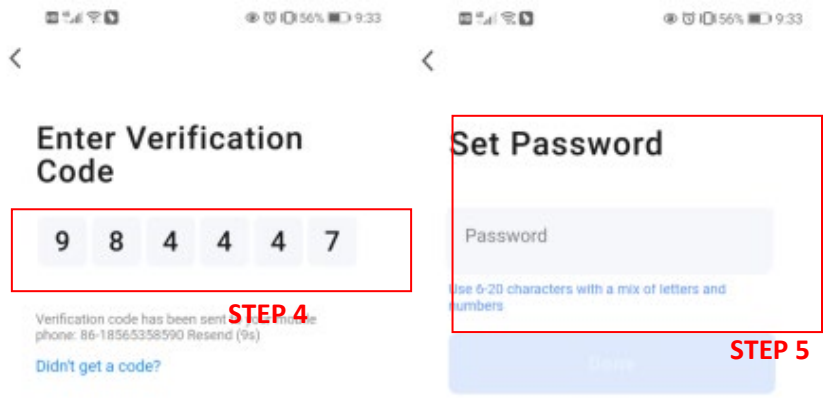
8.1. Download and Install the App

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)

8.2. Sign up

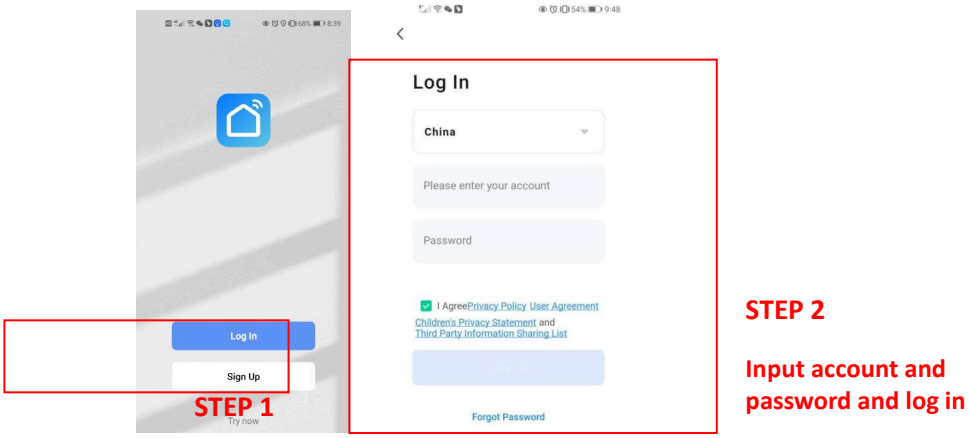
After installation, press the " " icon and open the Smart Life app, sign up, refer to following steps:





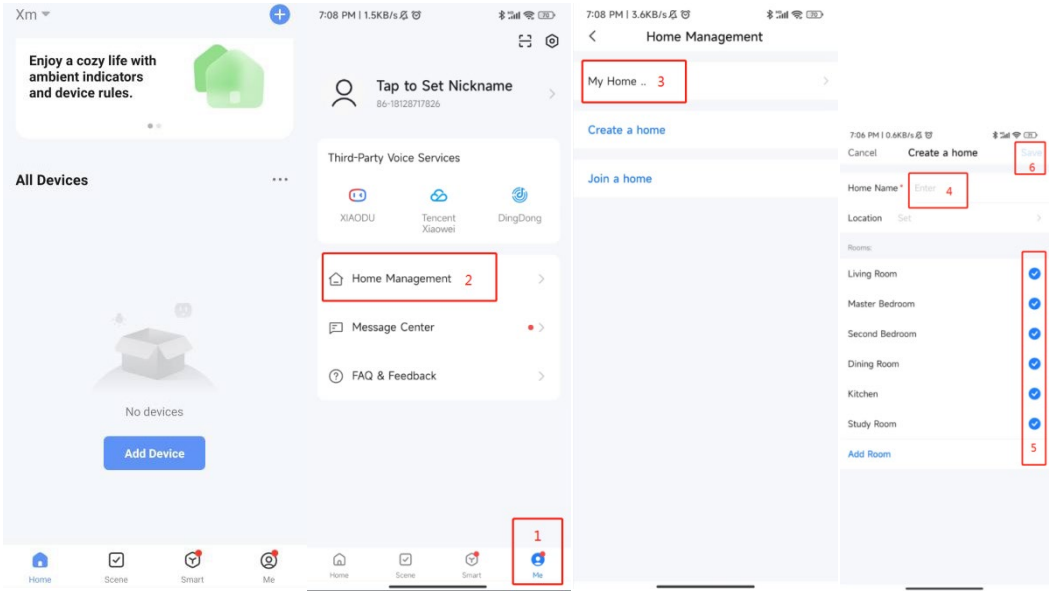
8.3. Log in,

Refer to following steps:



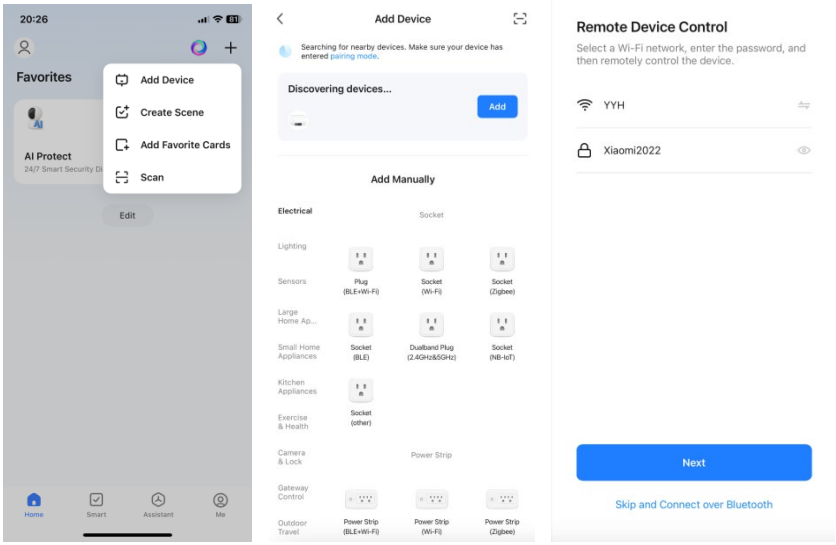
8.4. Create a Home

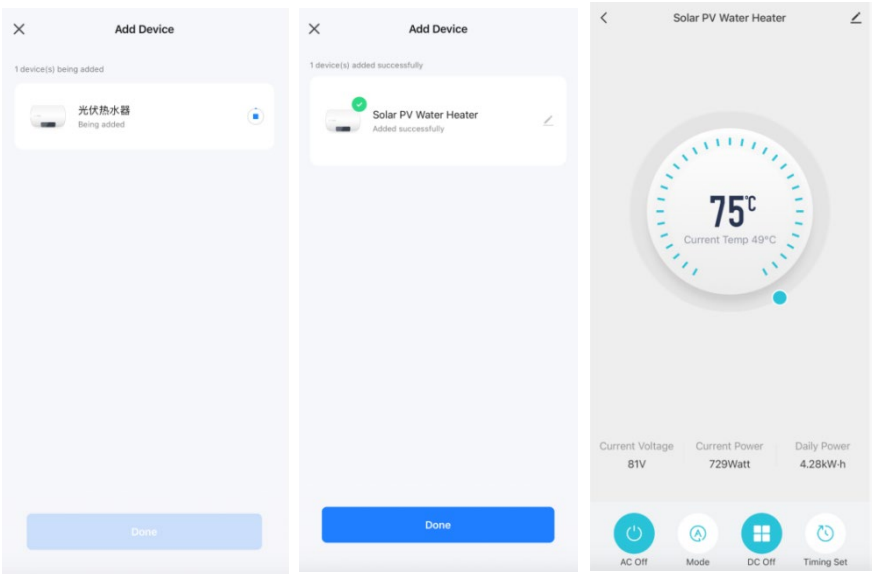
After signing up, should create " home ", refer to following process:
Home Management → Set home name → Set location → Add room →Save



8.5. Connection to the WIFI

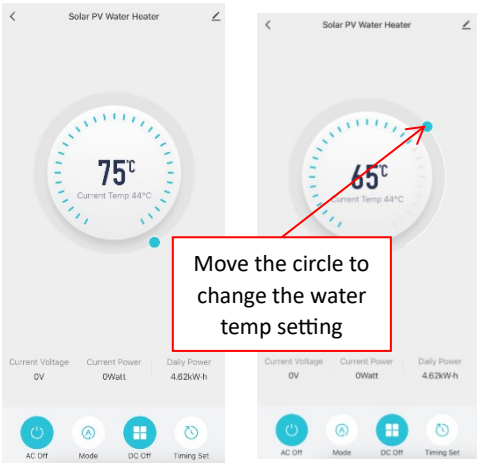
1. Press and hold the two keys  and  for 5s, enter into manual intelligent distribution network connection, within 3 minutes, wait for connecting, the symbol "  " will flash, after three minutes, exit connecting automatically if failed in connecting.
2. Connect the mobile phone to a Wi-Fi hotspot. Ensure the hotspot has internet access. 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.

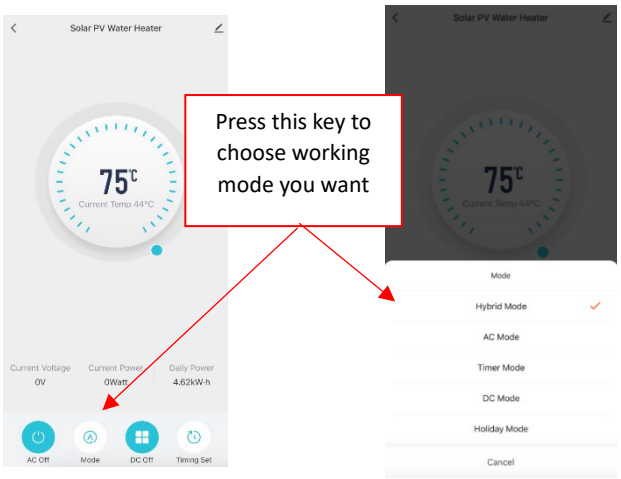




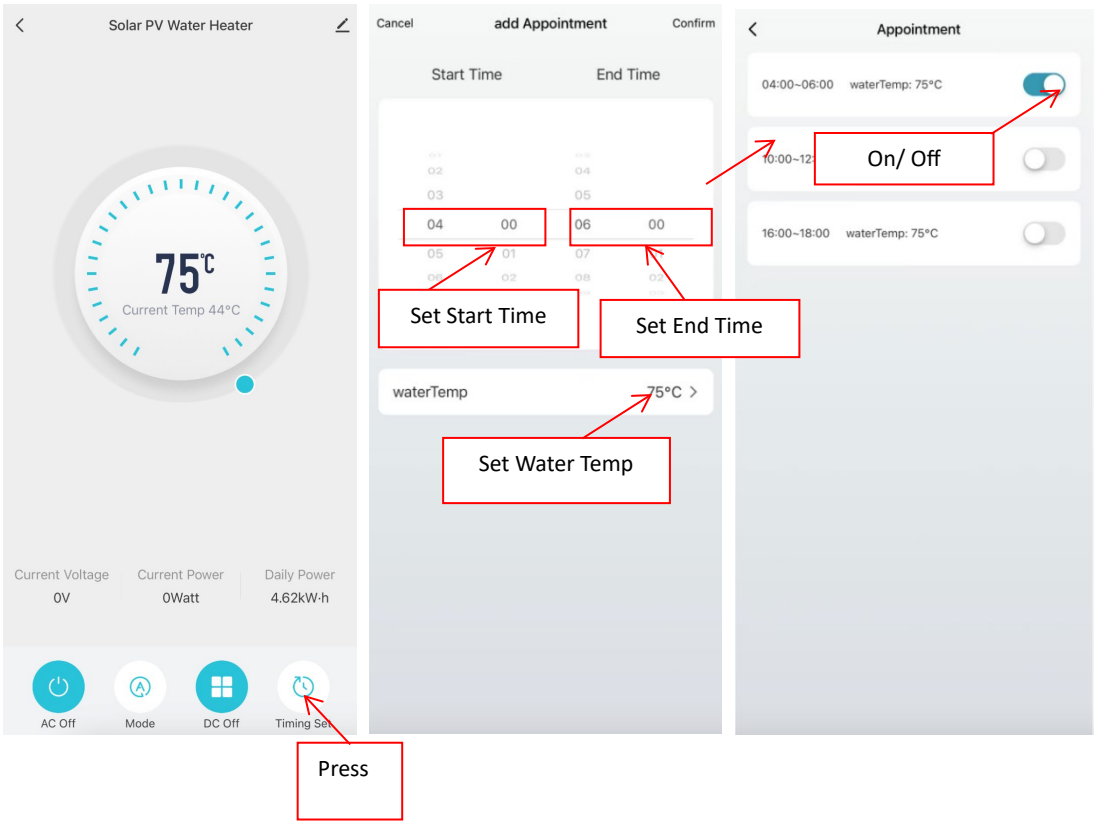
8.7. Operation

8.7.1. Set water temperature and mode change





8.7.3. Set a timer



9. MAINTENANCE

9.1. Rust protection magnesium anode

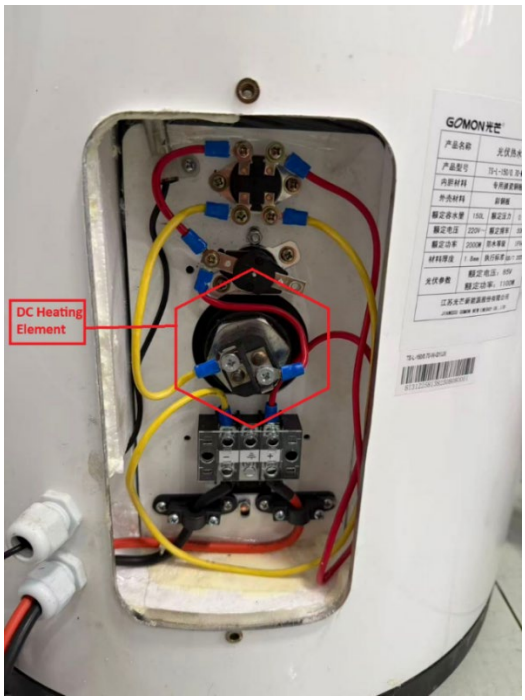
The magnesium anode protects the water tank's inner surface from corrosion. For double protection, models PV-150 and PV-200 use two magnesium rods. Ø24mm, length: 378 mm, Flange - DN20 (3/4"), M12
In view of the long-term and accident-free use of your water heater, the manufacturer recommends periodic inspections of the magnesium anode's condition by a qualified technician and replacement whenever required, and this could be performed during the appliance's technical preventive maintenance.

9.2. Check/Replacement of magnesium anode

1. The first replacement of the magnesium anode must be made no later than 24 months after installation of the solar photovoltaic water heater.
2. Regular periodic maintenance and timely replacement of the magnesium anode are mandatory to maintain the manufacturer's warranty.
3. Replacement of the anode must be accompanied by keeping the document confirming the purchase of the anode in the warranty card of the solar photovoltaic water heater.

9.3. DC Heating Element replacement

The water heater is equipped with a DC heating element with a nominal power rating of **1100 W (36 V / 200 W).**
It can be replaced with a higher-power element rated at **1500 W (36 V / 270 W).**
If required, the replacement is performed by the customer.



10. WARRANTY

1. The warranty for the device is only valid under the following conditions:

- the appliance is installed according to the instruction manual.
- the appliance is only used for its intended purpose and in accordance with the assembly and use instructions.

2. The warranty includes the correction of all manufacturing defects that may occur during the warranty period. Only the professionals authorized by the seller are allowed to carry out the repairs. The warranty does not cover damages:

- improper transport,
- improper storage,
- improper use,
- unsuitable water parameters (pH value >8.5),
- improper electrical voltage that deviates from the rated voltage,
- the freezing of the water,
- extraordinary risks, accidents or another force majeure,
- failure to follow the assembly and use instructions,

- in all cases when an unauthorized person tries to repair the appliance.
- exceeding the open-circuit voltage (Uoc) of 110V may damage the display. Such damage will not be covered under warranty.

3. In the aforementioned cases, the damage will be repaired against payment. The warranty of the device does not apply to parts and components of the device that are worn out during its normal use, nor to parts that are degraded during normal use, to lights and signal lamps, etc., to discoloration of external surfaces, to changes in the shape, dimensions and arrangement of parts and components that have been subjected to an effect that does not correspond to the normal conditions of use of the device. Missed benefits, material and non-material damage resulting from the temporary impossibility of using the equipment during the period of its repair and maintenance are not covered by the warranty of the device.

4. Warranty Period

● 5 years for water tank

● 2 years for electronic components.

11. CONTACT ELIX NEW ENERGY:

ASK METAL Ltd | Ventspils 63b, Riga, LV-1046 | +37129510526 | export@elix.lv | www.elix.lv