







## AC ELWA® with PLA (3-phase Meter/Controller)

### Electric PV Excess Energy Hot-Water System



### Assembly- and Operation Manual

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## Intended Use

The electrical device PV excess-energy hot water system AC ELWA (referred to as AC ELWA) is intended for stationary installation in hot water storage or buffer tank storage. The device is controlled by external control signals and adjusts its heating power from zero to 3000 W accordingly.



You can use the AC ELWA also with Universal Interface!

The PLA Meter/Controller is incorporated in the power distribution immediately after utility meter fuses. It is suitable for single-phase and three-phase systems. The neutral conductor shall be connected in any case.

Any other use than described above may damage the device, moreover, this involves dangers such as short circuit, fire, electric shock, etc. The safety instructions and the information on handling in this manual and in the application instructions shall be followed!

The product complies with the applicable National and European requirements. Company and product name are trademarks of my PV GmbH. All rights reserved.

## Delivery

- Electric photovoltaic excess-energy hot water system AC ELWA
- Connection plug for control cable connection between AC ELWA and PLA Meter/Controller
- IP21 cover
- Operating instructions

## **safety instructions**

The installation must be carried out exclusively by the authorized expert.

When installing and connecting the relevant standards must be observed.

Warranty does not cover any damages caused by failure from disregarding these operating instructions.

A permanent earthing of the hot water tank is mandatory.

Never switch the unit on when the heating element is not surrounded and cooled by water.

The housing must not get damp or wet, it is only suitable for dry indoor areas. Danger of fatal electric shock!

Do not install device in ammonia-contaminated environments.

Do not install in dusty environment.

The ventilation holes of the housing don't have to be closed.

Orientation of the device (horizontal heater, power cord below) must be maintained.

The PLA Meter/Controller must be mounted on a standard 35 mm DIN rail.

Avoid storage and operation temperatures  $> 40^{\circ}\text{C}$  and  $< 5^{\circ}\text{C}$ , do not expose to direct sunlight.

The AC ELWA must be connected to a nominal voltage of 230 VAC.

The circuit breaker of the grid connection for AC ELWA must be rated 13 A to 16 A, AC ELWA can be adjusted accordingly.

The PLA Meter/Controller must be connected to 1 x 230 V AC or 3 x 230 VAC with Neutral. The allowed fusing of the mains connection may be max. 65 A.

The safety thermostat responds to  $98 \pm 3^{\circ}\text{C}$  and the unit switches off permanently.

In commercial institutions, the accident prevention regulations of the professional associations must be observed for electrical systems and equipment.

This unit can be used by children ages 8 and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning the safe use of the equipment and understand the resulting risks. Children should not play with the appliance. Cleaning and user maintenance shall not be undertaken by children without supervision.

## **Liability and warranty exclusion**

A liability and warranty exclusion applies to:

- any damage or injury caused by improper handling or failure to observe the safety and operating
- consequential damages

- Unauthorized remodeling, disassembly or other interventions in the device, modification of the product
- Damage caused by calcium deposits on heating element.

## Installation of AC ELWA

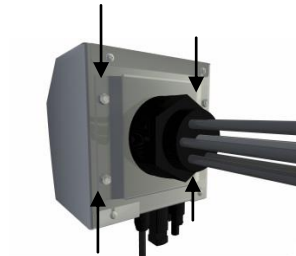
The installation must be carried out exclusively by the authorized personnel. The hot water storage tank must be drained properly before installing the AC ELWA. AC ELWA is designed for horizontal installation in hot water tank with 1 ½ inch thread. The unheated zone of the built-in heating element is 90 mm from sealing surface. The length of the mounting socket must not exceed 90 mm. The pre-assembled O-ring seal has to be used; it must not be treated with lubricants. The plastic thread must not be sealed with hemp or other sealants.

During mounting you have to screw without any effort until the seal rests lightly. Make sure that the O-ring is clean in the groove of the plastic part. Tighten the heater with a spanner nominal width 60 mm. The tightening torque must not exceed 80 Nm.

**⚠** In no case the heater may be tightened by turning the metal case!

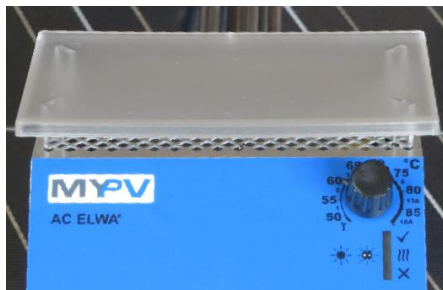
If the device does not stand up straight (power cord down) after tightening, it can easily be turned to the left or right for about 180 °.

Then tighten the 4 lock nuts of the mounting plate of the heater to fix the unit in its straight position:



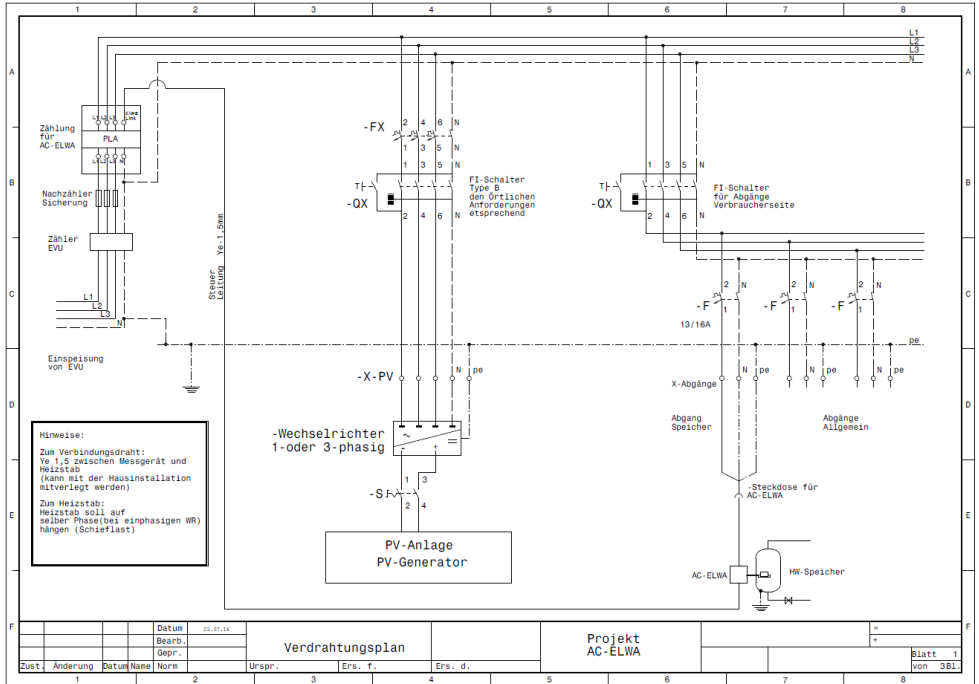
When refilling the water tank ensure that the heating elements are completely surrounded by water. Subsequently, the tank must be checked for leakage.

**⚠** After mounting the supplied IP21 cover is to be attached!





## Electrical connection scheme



## Electrical connection AC ELWA

To ensure proper operation of the control line to PLA (data modulation), the AC ELWA has to be connected with the correct polarity at the socket.

The power plug is marked with "N". The "N" side of the plug must be connected to the "N" pole of the socket (check with voltage meter).

AC ELWA has to be connected to a 13 or 16A circuit breaker socket.



The PE conductor of the socket must be present!

Pay attention to other loads on the line circuit, this may trip the circuit breaker!



## Electrical connection PLA


Remove the fuses after the utility meter before connecting.

There are at least one phase (single - phase at utility meter) and the neutral conductor to connect.

Observe local regulations!

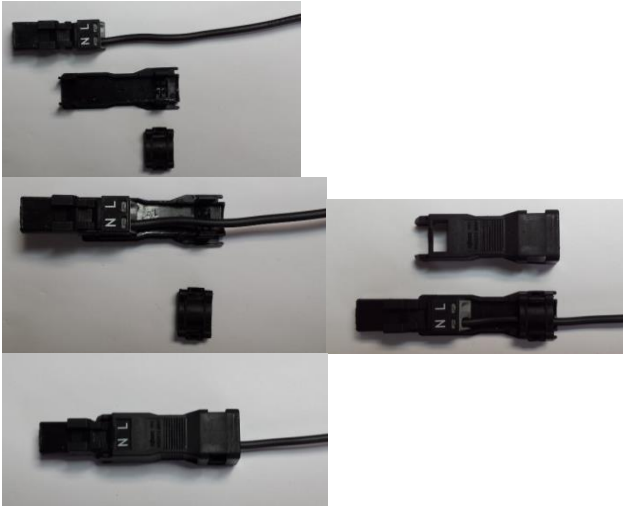
## Control line between AC ELWA and PLA


The control cable between AC ELWA and PLA may be installed in AC wiring conduits. There is no separate installation necessary (local regulations must be observed!)

 The strain relief of the connector must be mounted. Exposed areas of the control line need double insulation! The entry of the control line in the wall socket must comply with local regulations (strain relief).

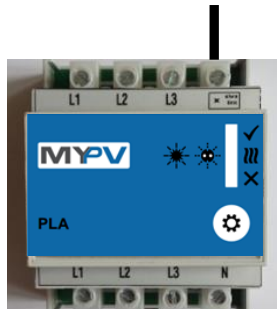
The control cable for PLA is attached to the two-pin plug to the AC ELWA. (0,5 - 1,5 mm<sup>2</sup>). The poles (L and N) on the connector are short-circuited inside the unit, so that a redirect to other AC ELWAs (up to 6) is possible.

Installation of the plug:



 The labels L and N on the connector have no meanings! Never connect the control wire with L or N of the wall socket!

Connection of the control line at the PLA:



## Electrical connection of several AC ELWAs in a system

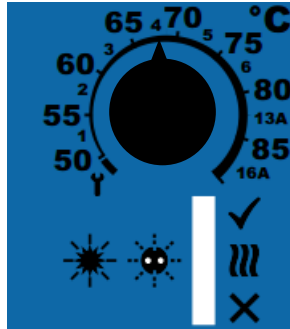
All AC ELWAs (max. 6) should be connected to appropriate AC circuits.

Warning: any AC ELWA can take up to 3 kW!

It is recommended to divide the ELWAs on the 3 phases.

Note: More than 6 ELWAs can be controlled with the Universal Interface via RS485.

## Controls and displays AC ELWA

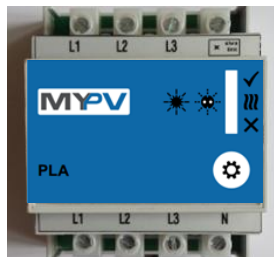


- temperature adjustment knob
- 1-6 ... AC ELWA number in the operation of multiple devices on a PLA
- 13A/ 16A ...circuit protection
- LED green
- LED yellow
- LED red

## Operating, display and connecting elements PLA

### TOP: Load side (Load circuits, PV-system)

L1out L2out L3out data connection to PLA



- LED green
- LED yellow
- LED red
- Configuration button

L1in L2in L3in Nin

### BOTTOM: utility grid side (electricity-meter of energy supplier, fuses of electricity-meter)

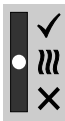
## Indicators



Startup



Standby



Heating with excess-energy



Heating for hot water ensuring (reheating)



Heating terminated temperature reached



Setup Mode



No control signal



fault

## Symbols



LED on



LED flashes



LED off

## Factory settings AC ELWA

- AC ELWA number 1
- 16A fuse for the power outlet of the AC ELWA
- automatic hot water ensuring disabled

## Factory settings PLA

- Boost-Backup off
- Stratification charge with more than one AC ELWA

## Commissioning AC ELWA - PLA

1. Activate the main switch of the house after you install the PLAs again.
2. Select the desired storage temperature at the knob of AC ELWA.
3. Insert the plug of the AC ELWA.
4. The connection between PLA and AC ELWA builds up independently.
5. At the PLA and the AC ELWA either flashes
  - ▶ green LED (standby, no excess) or
  - ▶ yellow LED lights (surplus is used).


As long as the red LED on the AC ELWA and PLA lights, no communication has been established. Check control wire.

6. When the desired temperature is reached AC ELWA
  - ▶ LED lights green: Device switches off.

## Set AC ELWA circuit protection (13A/ 16A)

The AC ELWA can produce up to 3,000 W (16 A). For 13 A fused circuits the power can be limited to 2,500 W.

Configure the device as follows

1. Disconnect power plug
2. Set the temperature knob to wrench icon. 
3. Insert power plug




- ▶ all 3 LEDs flash (Setup mode is active)
- 4. Set temperature control knob to "13A"
  - ▶ LEDs run from top to bottom: green, yellow, red, green ... ..
- 5. Value is saved automatically if the control knob is left unchanged for 5 seconds
  - ▶ all three LEDs flash rapidly for 2 seconds, setting is saved.
- 6. Set temperature control knob to the desired temperature value.

The setting can be undone. Repeat same procedure as above, (adjusted to 16 A mark)

### Set AC ELWA device number

The AC ELWA is factory configured to operate as a single device. If several units are operating in a system together, the other AC ELWAs has to be configured as following:

1. Disconnect power plug
2. Turn temperature control knob to "wrench icon".Symbol 
3. Insert power plug
  - ▶ all 3 LEDs flash (Setup mode is active)
4. Set temperature control knob to the desired number
  - ▶ Yellow LED flashes to indicate number (see table)

| AC ELWA number: | LED green | LED yellow | LED red |
|-----------------|-----------|------------|---------|
| 1               | Flash     | off        | off     |
| 2               | off       | Flash      | off     |
| 3               | Flash     | Flash      | off     |
| 4               | off       | off        | Flash   |
| 5               | Flash     | off        | Flash   |
| 6               | off       | Flash      | Flash   |


5. Value is saved automatically if the control knob is left unchanged for 5 seconds
  - ▶ all three LEDs flash rapidly for 2 seconds, setting is saved.
6. Set the temperature control knob to the desired temperature value.

The setting can be undone. Repeat same procedure as above.

### Set boost-backup of AC ELWA (automatic hot water ensuring)

The AC ELWA can ensure hot water even with no excess energy. Initially, this function is disabled.

The device must be configured as follows:

1. Disconnect power plug
2. Turn temperature control knob to „wrench icon“ 
3. Connect the mains plug again

- ▶ all 3 LEDs flash (Setup mode is active)
4. Set the temperature control knob to a ° C mark. The setting value corresponds to the temperature of the table below:
    - ▶ LEDs red / green (simultaneously) and yellow alternately

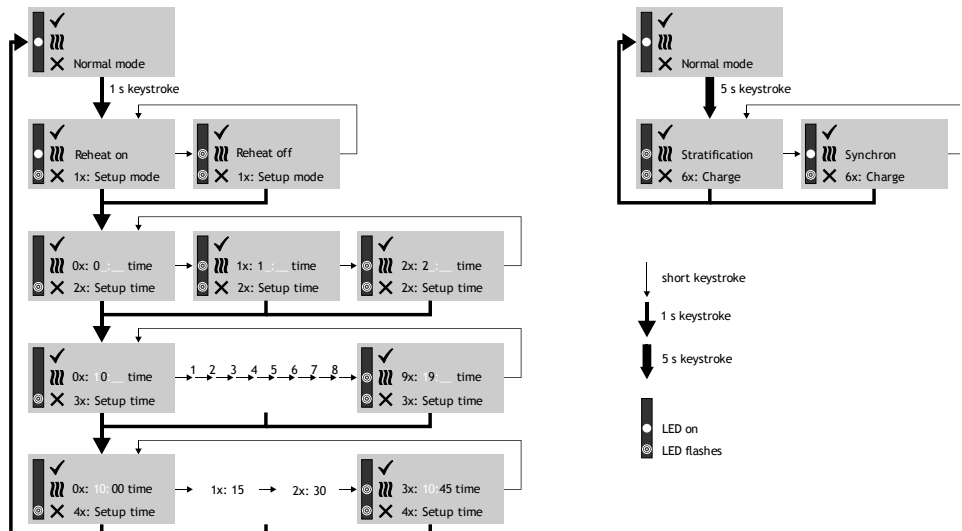
| Position control knob: | Corresponds to reheat temperature |
|------------------------|-----------------------------------|
| 55° C                  | off                               |
| 60° C                  | 40° C                             |
| 65° C                  | 45° C                             |
| 70° C                  | 50° C                             |
| 75° C                  | 55° C                             |
| 80° C                  | 60° C                             |
| 85° C                  | 65° C                             |

5. Value is saved automatically if the control knob is left unchanged for 5 seconds
  - ▶ all three LEDs flash rapidly for 2 seconds, setting is saved.
6. Set the temperature control knob to the desired temperature value

The setting can be undone. Repeat same procedure as above.

Reheating must be activated on PLA additionally, because PLA controls all connected AC ELWA.

## PLA Settings



The value for backup heating or stratification / synchronous charge is stored with 1 second keystroke permanently. Menus are automatically exited without saving if key is not pressed for 30 seconds.

### **Reheating:**

In the first menu item reheating can be enabled. This function is for automatic hot water ensuring. This allows you to switch off the heating system used normally to heat water. Reheating is useful in non-heating period.

If reheating is on, all connected AC ELWAs which have an adjusted reheating temperature will be activated from 16:00-23:00, regardless of whether or not excess power is available. The AC ELWAs then heat to each setpoint.

### **Time of day**

The time setting is relevant to the reheating. The accuracy of time is 15 minutes.

Note: time is not maintained during a power failure!

### **Stratification and synchronous charge:**

- The PLA can control the AC ELWAs with different priorities:  
In stratification mode, the AC ELWAs will be driven to their rated power in order (according to their number, smallest first).
- In synchronous mode all connected ELWAs are controlled with the same power.

### **AC ELWA fault display**

No display:      Check power supply.  
                         Check the circuit breaker  
                         check if parallel consumers are connected next to the AC ELWA in the same circuit.

Red LED:

- 1x flash ►      Over temperature protection (98 ° C) triggered. Device must be checked by Service.
- 2x flashes ►    Water temperature is above 90 ° C. Device switches off and switches on again once the water temperature has dropped.  
Note: The temperature in this case is very close to the operating limit of the over temperature protection (98 ° C). If the water was heated so high by an external heat source, set the limit temperature of the heat source to max. 90 ° C!
- 3x flashes ►    Overheating of the electronics. Device switches off and restarts automatically after cooling down.
- 4x flashes ►    Electronic fault. Device must be checked by Service.
- 6x flashes ►    Temperature sensor fault. Device must be checked by Service.

## PLA fault displays

No display: Check power supply. All 3 phases have failed.

Red LED:

1x flash ► One or more of the connected AC ELWAs have a fault.

## Maintenance

“Hard” water can cause calcification of the heater, especially when the target temperatures are set to above 60 ° C. We recommend an annual maintenance. In this case remove the device from the tank and free the heater from limestone. Do not scratch the surface of the heating element (corrosion).

If the mains cable of the unit is damaged, it has to be replaced by the manufacturer or its service agents or a similarly qualified person in order to avoid hazards.

## Troubleshooting

The device contains no parts which could be serviced by the user. In case of malfunction please contact your dealer.

## Disposal



Either keep packing material or dispose properly.

Dispose of the product at the end of its service life in accordance with the applicable regulations.

## EU Declaration of Conformity

Company my-PV GmbH, Teichstrasse 43, 4523 Neuzeug (Austria) hereby declares that the products

AC ELWA

PLA

AC ELWA-I, Universal Interface



Complies with the following directives and standards:

EN 60335-2-21 (just AC ELWA and AC ELWA-I)

EN 61000-6-2

EN 61000-6-3

EN 61000-3-2

EN 60730-2-9 (just AC ELWA and AC ELWA-I)

The above named company keeps records with confirm the compliance to the safety objectives and the essential safety requirements for inspection.

Neuzeug, 20.11.2015

Dr. Gerhard Rimpler  
CEO

## Technical specifications

### AC ELWA

|                             |   |
|-----------------------------|---|
| Voltage                     | 200 - 250 V   |
| Max. heatingpower           | 3000 W at 230 VAC                                       |
| Mains connection            | Single phase, grounded plug,<br>230 V, 50 – 60 Hz       |
| safeguarding                | 13 A or 16 A  |
| Connecting wire             | 2.8 m   |
| Standby-                    | <1 W  |
| Operating Pressure          | max. 10 bar (1 MPa)                                     |
| efficiency                  | >99 % at rated power                                    |
| Protection                  | IP21  |
| Operating temperature range | 10 ° C to 40 ° C  |
| Operating status display    | 3 LED's   |
| Interface                   | 1- wire- connection, max.<br>AWG 16/1,5 mm <sup>2</sup> |
| Dimension (BxHxT)           | 130 x 180 x 600 mm incl.<br>heating rod                 |
| Heater length               | 47 cm   |
| Immersion heater connection | 1 ½ Inch  |
| Weight                      | 2 kg incl. cable, without<br>package                    |

### PLA

|                             |                                       |
|-----------------------------|---------------------------------------|
| Voltage                     | 1x230 V or 3x230 V                    |
| Consumption                 | <1 W                                  |
| Cable cross section         | max. 16 mm <sup>2</sup>               |
| Max. current                | 63 A                                  |
| Dimension (BxHxT)           | 71 x 90 x 58 mm                       |
| Weight                      | 2000 g                                |
| Water protection            | IP20                                  |
| Operating temperature range | 10 ° C to 40 ° C                      |
| Operating status display    | 3 LED's                               |
| Data Logger                 | Daily data, memory depth ><br>5 years |
| Interface                   | Serial IR Interface                   |

### Control wire PLA - AC ELWA

|           |                           |
|-----------|---------------------------|
| Wire line | 0,5 - 1,5 mm <sup>2</sup> |
|-----------|---------------------------|

Subject to change.

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The logo for MYPV, consisting of the letters 'MYPV' in a bold, sans-serif font. The 'M' and 'P' are dark grey, while the 'Y' and 'V' are blue.