

# AC•THOR®

Photovoltaic-Power-Manager for hot water and space heating

## Operation Manual



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## 1. Assembly

Before placing into operation it is essential to read the assembly instructions provided with the device.

## 2. Commissioning; putting back into service

This takes just a few moves and is performed the first time the AC•THOR is operated or when it has been reset to factory settings.

1. Select language  
Use the cursor keys on the left and right to view further possibilities.
2. Select operating mode  
See chapter headed "Operating modes".
3. Select control of the signal source for the AC•THOR
  - a. Power meter automatic: Connection to my-PV power meter in the network is set up automatically.  
 NOTE: setting up the connection may take up to a minute.
  - b. Power meter manual: Connection to my-PV power meter in the network is set up by entering the IP address manually.
  - c. Power meter direct: Connection to my-PV power meter is set up without network directly by using a crossover network cable.
  - d. List of possible compatibility partners:  
For certain compatible partners the choice between „Auto“ (automatic IP-search of the device) or „Manual“ (manual entry of the IP address of the source) is possible. „Manual“ is for instance necessary when there are several compatible sources in the network and a special one of them should be chosen as the control system.
  - e. Further protocols: **http, Modbus TCP, Adjustable Modbus TCP**  
Adjustable Modbus TCP has to be configured in the Web-Interface. (see chapter „Special setting possibilities in the web interface“)
4. Temperature sensor assignment  
A number is assigned to the sensor in the order in which it is selected. The selection can be deselected by tapping on the key once more.  
To assign a sensor to the respective entry in the list, the serial numbers can be identified on a label attached to the sensor wire.



TIP: As the measuring value of the sensor is already shown in the selection list, an assignment can alternatively also be made by simply altering the temperature on the sensor.

5. Save the settings

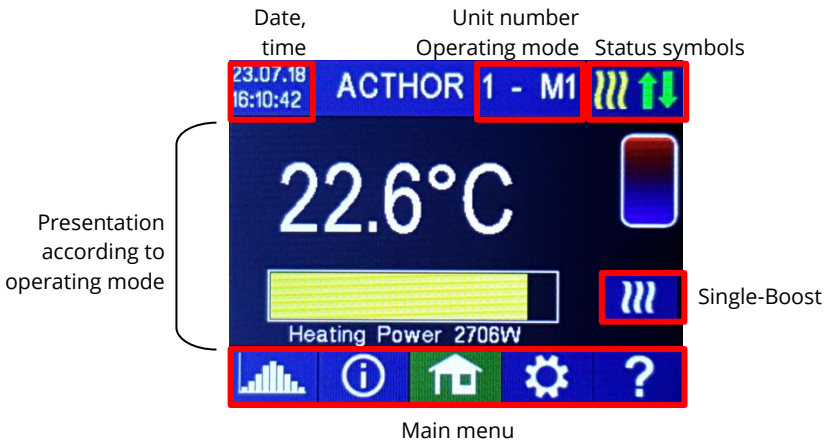
### 3. Controls and displays

#### Homescreen



The "Home" button always returns you to the home screen. The upper bar shows the current date, time, the unit number and the operating mode (mode M1 – Mx). On the right, symbols show the unit's current status.

The contents of the home screen vary according to the operating mode and shows how much power the AC•THOR is currently feeding into the load. Depending on how many, if any, temperature sensors are defined, the measured values are also shown.



The button "Single boost" only appears in hot water operating modes if the function for ensuring a minimum temperature is activated. Actuating the button starts a once-only boost backup mode. This can also be deactivated while it is in operation. If the boost backup is actuated automatically based on the day of the week, time of day or temperature, it cannot be deactivated by using the button.

#### Status symbol



Lights up = set temperature reached, Flashes = stand-by, waits for excess



Lights up = heats with PV excess. Flashes = boost backup mode



Lights up = no control signal



Lights up = physical connection to the RJ45 network connection is intact



Lights up = no intact physical connection to the RJ45 network connection

## Data logger



Recorded production data, meter values and temperatures can be read off at any time. The respective values can be selected using the "Open" button. These can be presented in the three views of the current year, month or day using the "Calendar" button.



TIP: Type directly in the diagram on the individual bars to present the data in their next level of definition and on the button of the data logger again to return to the previous level.

The following data can be displayed:

Total power: Shows the total power figures for all the connected loads. The yellow bars indicate the PV excess power used, the green bars the proportion of grid energy when the optional temperature boost backup is active.

Meter: indicates the value of the total power drawn from the grid (red) including household loads and grid feed-in (green) at the metering point.

Power 1: shows the power data for load 1.

Power 2: shows the power data for load 2.

Temperature 1-4: shows the data of the temperature probe.

## Status information on the display



The data of all variables relevant to the operation are shown in a list.

Output: shows the current output of the AC•THOR power unit.

Meter: shows the current data for the meter at the measuring point. A positive value shows drawing from the grid, a negative value, feeding into the grid.

PV Power: data not currently available.

Load: shows the nominal power of the load (at 230 V) which is currently being supplied by the AC•THOR output unit. This value can be determined from an output of 500 W.

Temperature 1: Current data probe 1

Temperature 2: Current data probe 2

Temperature 3: Current data probe 3

Temperature 4: Current data probe 4

IP: shows the current IP address of the AC•THOR.

Ctrl IP: shows the current IP address of the signal source. Shown in addition in the line below is the designation of the signal source and the current measured value. A positive value shows drawing from the grid, a negative value, feeding into the grid.

Status: Shows the unit's current status. See chapter "Status codes".

Grid voltage: shows the current input voltage at the AC•THOR.

Grid power: shows the current input power at the am AC•THOR.

Output voltage: shows the current output voltage of the AC•THOR.

Frequency: shows the current grid frequency. This information is of particular interest in operating mode M8.

Temperature output unit: shows the current temperature of the AC•THOR power electronics.

Fan: shows the current speed setting of the internal fan.

Serial number: shows the unit serial number.

MAC address: shows the MAC address of the unit.

Version: shows the current firmware version of the unit.

Version output unit: shows the current firmware version of the AC•THOR output unit.

Unit number: shows the unit number set. This is also visible on the home screen.

Operating mode: shows the operating mode set (M1 – Mx). This is also visible on the home screen.

Latest firmware: shows the latest firmware version, or "current" is displayed.

Update status: Ok, loading (number of files), or waiting for installation

Output unit update status: Ok, loading, or waiting for installation

Relay status: shows the current status of the switch output (0 or 1).

## Settings



See chapter "General settings" for general unit settings, also chapter "Operating modes" for settings specific to the respective operating mode.

## Help



After activation, brief information on the current view appears on the display. In the web interface the button leads to the online Operation Manual which corresponds to the firmware version installed.

## 4. Operating modes

⚠ You will find wiring diagrams for the respective operating modes and for wiring three-phase heating elements in the assembly instructions supplied with the AC•THOR, as well as in the latest version at any time on [www.my-pv.com](http://www.my-pv.com).

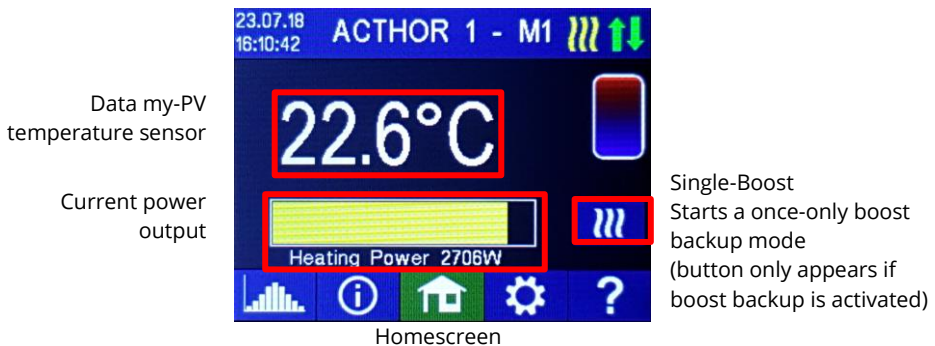
### M1: Hot water 3 kW

#### Explanation

In this operating mode, an electric heating element is supplied linearly with excess PV energy. It can be fitted with a bimetal thermostat to switch off when the temperature for which it is set is reached. Otherwise the my-PV temperature sensor is to be used.

Optionally, the AC•THOR can also take over guaranteeing the hot water temperature. For this, the my-PV temperature sensor is to be used.

⚠ The my-PV temperature sensor is in all cases to be installed in the storage tank above the heating element to provide a reliable reading!



👍 TIP: With the hot water boost backup, limit the use of grid power by avoiding the switch-off at maximum temperature. To do this, set the value higher than the cut out temperature on the immersion heating element thermostat and site the temperature sensor between the immersion heating element and the top edge of the storage tank. In this way, in boost backup mode only the volume above the sensor will be heated to the minimum temperature, while when there is excess PV, the entire contents above the immersion heating element will be heated.

## Specific settings for operating mode M1

### Hot water 1 temperatures

Adjustable is the maximum permitted temperature to be reached at the my-PV temperature sensor (factory setting = 60 °C). This has nothing to do with a bimetal thermostat which may be installed!



If the cut out temperature of an immersion heating element with a bimetal thermostat is set too low, the AC•THOR may possibly be unable to reach the desired temperature!

If the optional automatic temperature boost backup is shown "On" in the window on the right (factory setting "Off") or the relay output has been selected, a minimum temperature can then be set (factory setting 50 °C).

#### Automatic temperature boost backup "On":

the AC•THOR can ensure a minimum temperature at the my-PV temperature sensor through the immersion heating element connected. This is supplied with power at 3 kW.

#### Relay output:

Alternatively, the minimum temperature can be maintained by enabling an external heat source. Enablement is by means of a potential-free contact. This is available in all operating modes in which the relay output is not assigned to other functions. For details of wiring the potential-free contacts, please refer to the assembly instructions in the chapter "Connections".



TIP: If as an external heat source a second immersion heating element (maximum 3 kW) is used, it can be suitably connected up for 6 kW operation. This differs from the 6 kW operating mode in that here the second immersion heating element is only used for temperature boost backup and not as an extension to the normal control range!

### **Hot water 1 min switching times**

This setting can be selected when the temperature boost backup is "On" under "Hot water 1 temperatures", or when the relay output has been selected.

There are two time windows available to maintain the minimum temperature on the my-PV temperature sensor. Start and finish can each be defined at full hours. Factory settings suggest switching times of 5 to 11 pm and 5 to 7 am.



TIP: Restrict the times when the minimum temperature has to be maintained to mornings and evenings, to increase your own PV consumption through the day!

### **Hot water 1 min weekdays**

This setting can be selected when the temperature boost backup is "On" under "Hot water 1 temperatures", or when the relay output has been selected.

You can select the weekdays on which the minimum temperature has to be maintained. In the factory settings, all weekdays are activated.

### **Legionella program**

For ensuring drinking water hygiene, a period can be specified by the end of which a set minimum temperature must again be reached after the last time it was reached. The number of days in this period can be set between 1 and 14. A time at which the legionella program is to start can also be specified. Factory settings are number of days 7, starting time 8 pm, temperature is 60 °C, the legionella program is "Off".

The immersion heating element is supplied with power at 3 kW.



## M2: Hot water stratified charging

### Explanation

In a water tank in this operating mode, two immersion heating elements are supplied successively and linearly with excess PV power. The upper element has priority. The aim is to reach the desired temperature at the tapping point as quickly as possible before further excess power heats up the remaining contents of the tank. As soon as the upper immersion heating element reaches the target temperature the lower heater will be supplied. The AC•THOR checks independently whether the upper heater is again available later.



TIP: It is also possible to control two immersion heating elements in separate tanks. The "upper" heater would then for instance be located in a drinking water tank, the "lower" heater in a buffer tank alongside it.

Both heaters can be fitted with a bimetal thermostat to cut out when the set temperature is reached. Otherwise the my-PV temperature sensor is to be used.

Optionally, the AC•THOR can also take over the boost backup of the hot water temperature at the upper immersion heating element . For this, the my-PV temperature sensor is to be used.



The my-PV temperature sensor must in any event be installed in the hot water tank above the upper heater to provide a reliable reading!

The screenshot shows the AC•THOR Homescreen with the following elements:

- Top left: Date and time: 23.07.18, 16:17:06
- Top center: Device name: ACTHOR 1 - M2
- Top right: Status icons: three wavy lines and a green/red arrow.
- Center: Large temperature display: 22.3°C (highlighted with a red box).
- Bottom center: Heating Power: 2708W (highlighted with a red box).
- Bottom right: A vertical bar with a red arrow pointing right (highlighted with a red box).
- Bottom right: A wavy line icon (highlighted with a red box).
- Bottom: Navigation bar with icons for signal strength, info, home, settings, and help.

Labels on the left side of the screenshot:

- Data my-PV temperature sensor
- Current power output

Text on the right side of the screenshot:

- An arrow shows which heater is currently being supplied. (upper or lower)
- Single-Boost Starts a once-only boost backup mode (button only appears if boost backup is activated)

Centered below the screenshot: Homescreen

## Specific settings for operating mode M2

### Hot water 1 temperatures

Adjustable is the maximum permitted temperature to be reached at the my-PV temperature sensor (factory setting = 60 °C). This has nothing to do with a bimetal thermostat which may be installed!



If the cut out temperature of an immersion heating element with a bimetal thermostat is set too low, the AC•THOR may possibly be unable to reach the desired temperature!

If the optional automatic temperature boost backup is shown "On" in the window on the right (factory setting "Off"), a minimum temperature can then be set (factory setting 50 °C).

#### Automatic temperature boost backup "On":

The AC•THOR can ensure a minimum temperature at the my-PV temperature sensor with the upper heater. This is supplied with power at 3 kW.

#### **Hot water 1 min switching times**

This setting can be selected when the temperature boost backup is "On" under Hot water 1 temperatures".

There are two time windows available to maintain the minimum temperature on the my-PV temperature sensor. Start and finish can each be defined at full hours. Factory settings suggest switching times of 5 to 11 pm and 5 to 7 am.



TIP: Restrict the times when the minimum temperature has to be maintained to mornings and evenings, to increase your own PV consumption through the day!

#### **Hot water 1 min weekdays**

This setting can be selected when the temperature boost backup is "On" under Hot water 1 temperatures".

You can select the weekdays on which the minimum temperature has to be maintained. In the factory settings, all weekdays are activated.

#### **Legionella program**

For ensuring drinking water hygiene, a period can be specified by the end of which a set minimum temperature must again be reached after the last time it was reached. The number of days in this period can be set between 1 and 14. A time at which the legionella program is to start can also be specified. Factory settings are number of days 7, starting time 8 pm, temperature is 60 °C, the legionella program is "Off".

The upper immersion heating element is here supplied with power at 3 kW.

### **M3: Hot water 6 kW**

#### **Explanation**

In this operating mode, two heating elements each of 3 kW are supplied with excess PV power in a water storage tank. One of them be regulated continuously variable, the other cuts in as soon as more than 3 kW excess PV is available. When this occurs, the first heater starts again from 0 with the power regulation. Thus taken together, a control range from 0 to 6 kW is available.

Both heaters can be fitted with a bimetal thermostat to cut out when the set temperature is reached. Otherwise the my-PV temperature sensor is to be used.

Optionally, the AC•THOR can also take over boost backup of the hot water temperature with both immersion heating elements. For this, the my-PV temperature sensor is to be used.



The my-PV temperature sensor must in any event be installed in the hot water tank above the upper heater to provide a reliable reading!

Data my-PV  
temperature sensor  
Current power  
output



Single-Boost  
Starts a once-only boost  
backup mode  
(button only appears if  
boost backup is activated)

Homescreen

Note: in this operating mode as well, the maximum output of the units can only be set to 3 kW, as this specification affects the AC•THOR output unit.

## Specific settings for operating mode M3

### Hot water 1 temperatures

Adjustable is the maximum permitted temperature to be reached at the my-PV temperature sensor (factory setting = 60 °C). This has nothing to do with a bimetal thermostat which may be installed!



If the cut out temperature of an immersion heating element with a bimetal thermostat is set too low, the AC•THOR may possibly be unable to reach the desired temperature!

If the optional automatic temperature boost backup is shown "On" in the window on the right (factory setting "Off"), a minimum temperature can then be set (factory setting 50 °C).

#### Automatic temperature boost backup "On":

With both immersion heating elements, the AC•THOR can assure a minimum temperature at the my-PV temperature sensor. These are supplied with 6 kW power.

### Hot water 1 min switching times

This setting can be selected when the temperature boost backup is "On" under Hot water 1 temperatures".

There are two time windows available to maintain the minimum temperature on the my-PV temperature sensor. Start and finish can each be defined at full hours. Factory settings suggest switching times of 5 to 11 pm and 5 to 7 am.



TIP: Restrict the times when the minimum temperature has to be maintained to mornings and evenings, to increase your own PV consumption through the day!

### Hot water 1 min weekdays

This setting can be selected when the temperature boost backup is "On" under Hot water 1 temperatures".

You can select the weekdays on which the minimum temperature has to be maintained. In the factory settings, all weekdays are activated.

### **Legionella program**

For ensuring drinking water hygiene, a period can be specified by the end of which a set minimum temperature must again be reached after the last time it was reached. The number of days in this period can be set between 1 and 14. A time at which the legionella program is to start can also be specified. Factory settings are number of days 7, starting time 8 pm, temperature is 60 °C, the legionella program is "Off".

The immersion heating elements are supplied with a total power of 6 kW.

## **M4: Hot water + Domestic hot water heat pump**

### **Explanation**

In this operating mode the electric immersion heating element of a DHW heating pump is linearly supplied with excess PV power. On exceeding a given excess power threshold, operation of the heating pump will be enabled. This threshold can be set. Similarly a minimum time for which this threshold must be exceeded. At the same time as the heat-pump is working, the additional excess power can be passed by the AC•THOR to the immersion heating element. This is activated in the factory settings.

The my-PV temperature sensor is to be used!



The my-PV temperature sensor is in all cases to be installed in the storage tank above the heating element to provide a reliable reading!

After the defined excess power threshold has been exceeded for a specified time ( $t_{P>}$ ), the heat-pump starts for the minimum operating time ( $t_{run}$ ). This may also result in power being drawn from the grid!

When the minimum operating time has expired, the heat-pump remains enabled, provided there is still excess PV power available and the target temperature at the my-PV temperature sensor is not yet reached. If this now causes a fall in the excess PV power, the heat-pump will only be disabled after 60 seconds.

Once the heat-pump is disabled, it will not be reactivated for a period which can be set ( $t_{wait}$ ).

Optionally, the AC•THOR can also take over guaranteeing the hot water temperature. This is carried out by enabling the heat-pump, when the immersion heating element will continue to be linearly supplied with excess.



The target temperature of the heat-pump control is not to be set lower than the AC•THOR minimum temperature, as this could then no longer be guaranteed!

Data my-PV temperature sensor

Current power output

Time period and time counter value of the HP control

Single-Boost Starts a once-only boost backup mode (Button appears only when the relay output is activated)

Homescreen

## Specific settings for operating mode M4

### Hot water 1 temperatures

Adjustable is the maximum permitted temperature to be reached at the my-PV temperature sensor (factory setting = 60 °C). This has nothing to do with a bimetal thermostat which may be installed!



If the cut out temperature of an immersion heating element with a bimetal thermostat is set too low, the AC•THOR may possibly be unable to reach the desired temperature!

If the optional automatic temperature boost backup with relay output has been selected, a minimum temperature can then be set (factory setting 50 °C).

#### Relay output:

The AC•THOR can also maintain the minimum temperature at the my-PV temperature sensor by enabling the heat-pump.

### Hot water 1 min switching times

This setting can be selected when the relay output is selected under "Hot water 1 temperatures".

There are two time windows available to maintain the minimum temperature on the my-PV temperature sensor. Start and finish can each be defined at full hours. Factory settings suggest switching times of 5 to 11 pm and 5 to 7 am.



TIP: Restrict the times when the minimum temperature has to be maintained to mornings and evenings, to increase your own PV consumption through the day!

### Hot water 1 min weekdays

This setting can be selected when the relay output is selected under "Hot water 1 temperatures".

You can select the weekdays on which the minimum temperature has to be maintained. In the factory settings, all weekdays are activated.

## Legionella program

For ensuring drinking water hygiene, a period can be specified by the end of which a set minimum temperature must again be reached after the last time it was reached. The number of days in this period can be set between 1 and 14. A time at which the legionella program is to start can also be specified. Factory settings are number of days 7, starting time 8 pm, temperature is 60 °C, the legionella program is "Off".

This enables the heat-pump and the immersion heating element remains in "excess" operation.

## Selecting switching thresholds

As switching threshold for a heat-pump, any output between 0 and 9,999 W can be set. Factory setting is 500 W. An alteration to this output threshold only becomes effective after the end of the current control cycle or after the AC•THOR is restarted.

Optionally, simultaneous control of the AC•THOR load output can be deactivated on the right of the screen.

## Switching delay

A period in minutes is laid down (t P>), during which the switching threshold above must at least be exceeded before the heat-pump is enabled. The factory setting suggests 15 minutes. After this, a minimum operating period (t run) and a minimum pause duration (t wait) can be set for the heat-pump. Factory settings suggest 30 minutes for both these values

# M5: Hot water + Space heating

## Explanation

This operating mode is intended for buildings with hot water and space heating by electricity. This requires two electric heat sources one after the other to be linearly supplied with excess PV power. The immersion heating element for the hot water supply takes priority. As soon as the hot water target temperature at the respective my-PV temperature sensor is reached, next an electric space heating is supplied until here too the target value at the my-PV temperature sensor is reached.

Optionally, the AC•THOR can also take over guaranteeing the hot water temperature.



In this operating mode, two my-PV temperature probes are required!



The first my-PV temperature sensor is in any case to be sited over the heater in the hot water tank to provide a reliable reading!



For controlling the space heating, the second my-PV temperature sensor is to be installed in a suitable place to provide a reliable reading!

With electric underfloor heating for instance in a probe-tube in the floor.

If measuring the air in the room, avoid direct sunlight.



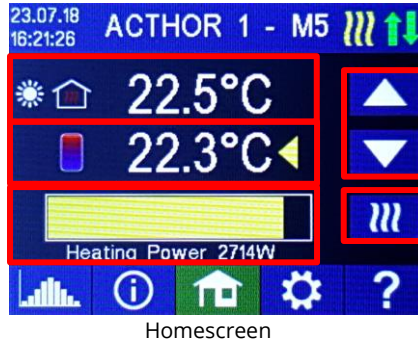
**TIP:** When specifying room temperatures, to avoid using power from the public grid the minimum values for day and night should be set correspondingly low. See explanation "SH 1 temperatures".

Data my-PV  
temperature sensors

Room temperature  
(sun = daytime  
operation)

Water temperature

Current power feed  
(yellow arrow shows  
which load is  
currently being  
supplied)



Set minimum  
room temperature

Single-Boost  
Starts a once-only hot  
water boost backup  
(button only appears if  
boost backup is activated)

On the display a sun or moon symbol shows which time period is currently controlling the room temperature. Different minimum temperatures can be specified for day and night. The minimum room temperatures can be adjusted directly on the home screen using the arrows. Activating the storage tank button (appears when values are changed) alter the value for the current period according to whether day or night is active. This will not alter the maximum permitted temperature value.

## Specific settings for operating mode M5

### Hot water 1 temperatures

The maximum temperature permitted to be reached at my-PV temperature sensor 1 can be adjusted (factory setting 60 °C). This has nothing to do with a bimetal thermostat which may be installed!



If the cut out temperature of an immersion heating element with a bimetal thermostat is set too low, the AC•THOR may possibly be unable to reach the desired temperature!

If the optional automatic temperature boost backup is shown "On" in the window on the right (factory setting "Off"), a minimum temperature can then be set (factory setting 50 °C).

Automatic temperature boost backup "On":

the AC•THOR can ensure a minimum temperature at the my-PV temperature sensor through the immersion heating element connected. This is supplied with power at 3 kW.

### Hot water 1 min switching times

This setting can be selected when the temperature boost backup is "On" under Hot water 1 temperatures".

There are two time windows available to maintain the minimum temperature on the my-PV temperature sensor. Start and finish can each be defined at full hours. Factory settings suggest switching times of 5 to 11 pm and 5 to 7 am.



TIP: Restrict the times when the minimum temperature has to be maintained to mornings and evenings, to increase your own PV consumption through the day!

### Hot water 1 min weekdays

This setting can be selected when the temperature boost backup is "On" under Hot water 1 temperatures".

You can select the weekdays on which the minimum temperature has to be maintained. In the factory settings, all weekdays are activated.

### Legionella program

For ensuring drinking water hygiene, a period can be specified by the end of which a set minimum temperature must again be reached after the last time it was reached. The number of days in this period can be set between 1 and 14. A time at which the legionella program is to start can also be specified. Factory settings are number of days 7, starting time 8 pm, temperature is 60 °C, the legionella program is "Off".

The immersion heating element is supplied with power at 3 kW.

### SH 1 temperatures

The maximum room temperature permitted to be reached at my-PV temperature sensor 2 can be adjusted (factory setting 22 °C), as are the minimum temperatures which should be maintained in the day and night periods (factory setting 20 °C in each case).

### SH 1 Switching times

Start and finish of the night period can both be adjusted with hours and minutes. The factory setting suggests the period between 10 pm and 5 am. This setting can be selected as desired for all days of the week with corresponding selection of the button alongside the time (MON-SUN, MON-FRI, SAT-SUN).

## M6: Space heating (one circuit)

### Explanation

In this operating mode an electric space heating is supplied linearly with excess PV power.

The my-PV temperature sensor is to be used!



To control the space heating, the my-PV temperature sensor is to be installed in a suitable location to provide a reliable reading!

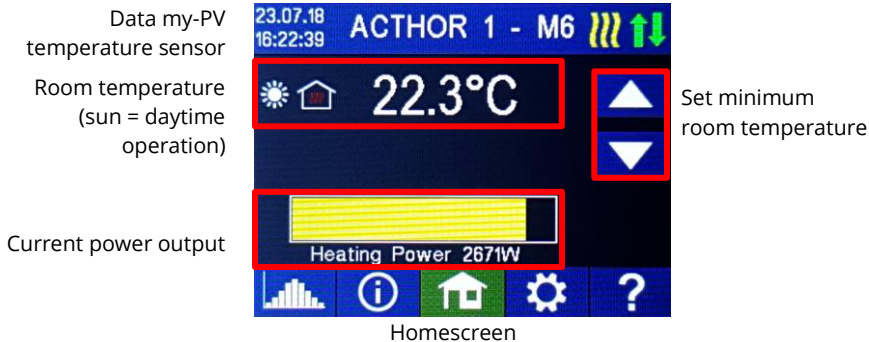
With electric underfloor heating for instance in a probe-tube in the floor.

If measuring the air in the room, avoid direct sunlight.



TIP: When specifying room temperatures, to avoid using power from the public grid the minimum values for day and night should be set correspondingly low. See explanation "SH 1 temperatures".





On the display a sun or moon symbol shows in which time period the room temperature control is currently operating. Different minimum temperatures can be specified for day and night. The minimum room temperatures can be adjusted directly on the home screen using the arrows. Activating the storage tank button (appears when values are changed) alter the value for the current period according to whether day or night is active. This will not alter the maximum permitted temperature value.

## Specific settings for operating mode M6

### SH 1 temperatures

The maximum room temperature permitted to be reached at my-PV temperature sensor 1 can be adjusted (factory setting 22 °C), as are the minimum temperatures which should be maintained in the day and night periods (factory setting 20 °C in each case).

### SH 1 Switching times

Start and finish of the night period can both be adjusted with hours and minutes. The factory setting suggests the period between 10 pm and 5 am. This setting can be selected as desired for all days of the week with corresponding selection of the button alongside the time (MON-SUN, MON-FRI, SAT-SUN).

## M7: Hot water + PWM

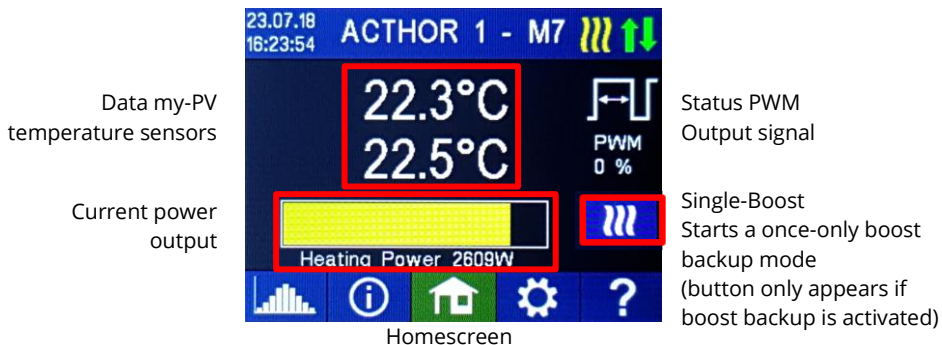
### Explanation

In this operating mode, an electric heating element is supplied linearly with excess PV energy. In addition, the AC•THOR can send out a temperature-dependent PWM signal. This can for instance control the speed of a pump.

This function was tested by my-PV with the pump type **Wilo Yonos Para PWM1**. For other pumps, the function cannot be certified.

 In this operating mode, two my-PV temperature probes are required!


Optionally, the AC•THOR can also take over guaranteeing the hot water temperature. For this, a third my-PV temperature sensor is to be used.



## Specific settings for operating mode M7

### Hot water 1 temperatures

Adjustable is the maximum permitted temperature to be reached at the my-PV temperature sensor (factory setting = 60 °C). This has nothing to do with a bimetal thermostat which may be installed!

 If the cut out temperature of an immersion heating element with a bimetal thermostat is set too low, the AC•THOR may possibly be unable to reach the desired temperature!

If the optional automatic temperature boost backup is shown "On" in the window on the right (factory setting "Off") or the relay output has been selected, a minimum temperature can then be set (factory setting 50 °C).

#### Automatic temperature boost backup "On":

the AC•THOR can ensure a minimum temperature at the my-PV temperature sensor through the immersion heating element connected. This is supplied with power at 3 kW.

#### Relay output:

Alternatively, the minimum temperature can be maintained by enabling an external heat source. Enablement is by means of a potential-free contact. This is available in all operating modes in which the relay output is not assigned to other functions. For details of wiring the potential-free contacts, please refer to the assembly instructions in the chapter "Connections".



TIP: If as an external heat source a second immersion heating element (maximum 3 kW) is used, it can be suitably connected up for 6 kW operation. This differs from the 6 kW operating mode in that here the second immersion heating element is only used for temperature boost backup and not as an extension to the normal control range!

### Hot water 1 min switching times

This setting can be selected when the temperature boost backup is "On" under "Hot water 1 temperatures", or when the relay output has been selected.

There are two time windows available to maintain the minimum temperature on the my-PV temperature sensor. Start and finish can each be defined at full hours. Factory settings suggest switching times of 5 to 11 pm and 5 to 7 am.



TIP: Restrict the times when the minimum temperature has to be maintained to mornings and evenings, to increase your own PV consumption through the day!

### Hot water 1 min weekdays

This setting can be selected when the temperature boost backup is "On" under "Hot water 1 temperatures", or when the relay output has been selected.

You can select the weekdays on which the minimum temperature has to be maintained. In the factory settings, all weekdays are activated.

### Legionella program

For ensuring drinking water hygiene, a period can be specified by the end of which a set minimum temperature must again be reached after the last time it was reached. The number of days in this period can be set between 1 and 14. A time at which the legionella program is to start can also be specified. Factory settings are number of days 7, starting time 8 pm, temperature is 60 °C, the legionella program is "Off".

The immersion heating element is supplied with power at 3 kW.

## M8: Frequency mode

### Explanation

In this operating mode, a dump-load in an AC island network is linearly supplied with excess PV power. The output of the AC•THOR is specified to the unit by a battery inverter through alteration of the grid frequency via power-grid connection. Wiring for intercommunication is not required!

If an immersion heating element is used as a dump load, the AC•THOR can optionally also take over boost backup of the hot water temperature. For this, the my-PV temperature sensor is to be used.



In this application, the my-PV temperature sensor in the storage tank must in any event be installed above the immersion heating element to provide a reliable reading!



In boost backup mode, the battery must be expected to discharge!

Data my-PV temperature sensor

Current grid frequency

Current power output

Single-Boost Starts a once-only boost backup mode (button only appears if boost backup is activated)

Homescreen



TIP: Using several AC•THORs, each one may specify a different frequency range. In this way it is also possible to set priorities for several dump loads.

## Specific settings for operating mode M8

### Frequency

The frequency range in which the adjustable power can be linearly fed can be altered. As the lower limit (no power), a range between 49 and 51 Hz is available. Factory setting is 50 Hz. As upper limit (maximum power), a range between 50 and 52 Hz is available. Factory setting is 51 Hz.

The frequency range must be at least 1.0 Hz!

### Maximum power

The input of maximum power of the heating load is extremely important for this operating mode. This is why this setting possibility appears here in second place again, in addition to its normal position in the settings. See "General Settings" for details.

### Hot water 1 temperatures

Adjustable is the maximum permitted temperature to be reached at the my-PV temperature sensor (factory setting = 60 °C). This has nothing to do with a bimetal thermostat which may be installed!



If the cut out temperature of an immersion heating element with a bimetal thermostat is set too low, the AC•THOR may possibly be unable to reach the desired temperature!

If the optional automatic temperature boost backup is shown "On" in the window on the right (factory setting "Off") or the relay output has been selected, a minimum temperature can then be set (factory setting 50 °C).

#### Automatic temperature boost backup "On":

the AC•THOR can ensure a minimum temperature at the my-PV temperature sensor through the immersion heating element connected. This is supplied with power at 3 kW.

#### Relay output:

Alternatively, the minimum temperature can be maintained by enabling an external heat source. Enablement is by means of a potential-free contact. This is available in all operating modes in which the relay output is not assigned to other functions. For details of wiring the potential-free contacts, please refer to the assembly instructions in the chapter "Connections".



TIP: If as an external heat source a second immersion heating element (maximum 3 kW) is used, it can be suitably connected up for 6 kW operation. This differs from the 6 kW operating mode in that here the second immersion heating element is only used for temperature boost backup and not as an extension to the normal control range!

### Hot water 1 min switching times

This setting can be selected when the temperature boost backup is "On" under "Hot water 1 temperatures", or when the relay output has been selected.

There are two time windows available to maintain the minimum temperature on the my-PV temperature sensor. Start and finish can each be defined at full hours. Factory settings suggest switching times of 5 to 11 pm and 5 to 7 am.



TIP: Restrict the times when the minimum temperature has to be maintained to mornings and evenings, to increase your own PV consumption through the day!

### Hot water 1 min weekdays

This setting can be selected when the temperature boost backup is "On" under "Hot water 1 temperatures", or when the relay output has been selected.

You can select the weekdays on which the minimum temperature has to be maintained. In the factory settings, all weekdays are activated.

### Legionella program

For ensuring drinking water hygiene, a period can be specified by the end of which a set minimum temperature must again be reached after the last time it was reached. The number of days in this period can be set between 1 and 14. A time at which the legionella program is to start can also be specified. Factory settings are number of days 7, starting time 8 pm, temperature is 60 °C, the legionella program is "Off".

The immersion heating element is supplied with power at 3 kW.

## 5. General settings

For settings specific to the different operating modes, please see the chapter "Operating modes". Under the settings these are accessed on the first sheet "Setup 1/X" and some of them on sheet two, "Setup 2/X".

Time zone: The time zone can be set for the time. In addition, summer time is activated for Europe.

Date: The date can be entered in the format dd.mm.yy.

Time: The time can be entered in the format hh:mm:ss.

NTP server: (NTP = Network Time Protocol) As long as the router provides an Internet, the AC•THOR draws its time information automatically from the Internet. However, the respective time zone is not specified. NTP-Timeserver-address can be changed if necessary. The factory setting is 131.130.251.107.



With a direct connection from the AC•THOR to the my-PV power meter, there is no Internet connection. Hence the time cannot be taken!

IP DHCP/static: As standard, DHCP is activated, i.e., the unit will get an IP address from the router to which it is connected. This only works when the router is configured as a DHCP server. If no DHCP server is active in the grid or if a static assignment is required, a fixed IP address is needed.



The settings have to fit with the router, otherwise the device become invisible in the network!

IP address: can only be set when "Static IP" has been selected and there is no direct connection to the my-PV power meter.

Subnet mask: can only be set when "Static IP" has been selected and there is no direct connection to the my-PV power meter.

Gateway address: can only be set when "Static IP" has been selected and there is no direct connection to the my-PV power meter.

DNS server: can only be set when "Static IP" has been selected and there is no direct connection to the my-PV power meter.

Display duration: the number of seconds elapsing until the display is turned off can be set. A value between "10" and "250" seconds can be entered.

Display brightness: brightness of the display can be adjusted in ten steps.

Logo brightness: brightness of the illuminated AC•THOR logo on the unit can be adjusted in ten steps. "0" indicates that the logo will not be turned off

Control: In this section the choice of the signal source for the AC•THOR is made. See chapter "Commissioning".

Ctrl IP: The IP address of the signal source can be selected manually. For example, this is necessary when there are several compatible sources in the network and a special one of them should be chosen as the control system.

Control target value: here the set value of the power at the metering point is specified. A negative value means feed-in. The factory pre-set of the set-point is -50 W. This parameter can be freely chosen in a range between -999 and +999 W.

Sensors: Here the temperature sensor is selected for the operating mode. See chapter "Commissioning".

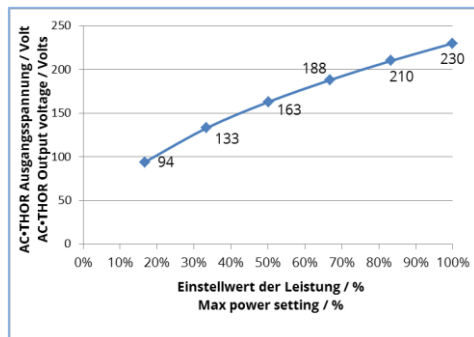
Operating mode: Detailed description will be found in the chapter "Operating modes".

Language: Apart from German, the following languages can be selected: English, Italian, French, Dutch and Spanish.


Unit number: Ex-factory, every AC•THOR carries the number 1.


The possibility of setting higher numbers is to allow for future functions.

Maximum power: This setting limits the output voltage of the AC•THOR. This results in a reduction factor of the nominal power of the load, i. the actual maximum output power depends on the rated power of the load. The maximum output voltage as a function of the parameter results from the following characteristic curve:



The value can be set on the display between 17 – 100 percent.

 Adjustment is generally only required if the rated load power is bigger than the power available for the AC•THOR.  
(protection, inverter power in frequency mode)

 Even in operating mode M3 (DHW 6kW), the maximum unit output can be set to a maximum of 3,000 W since this specification affects the regulated output. DO NOT limit the power in this operating mode, otherwise there will be a jump in the power control.

Access level: according to user level (1 – 3), different setting possibilities are enabled on the AC•THOR. In level 3 all settings are enabled. As factory setting, this level is active. It is possible to restrict the setting options enabled.

Level 2 offers slightly restricted setting possibilities for experienced users. Some examples of settings which cannot be altered are those for communication, operating mode, basic settings, sensor assignment and control settings.

In level 1 the setting possibilities are limited to temperature specifications and switching times for space heating (only relevant in operating modes M5 and M6), as well as the brightness and duration of the display settings and brightness of the AC•THOR logo.

A password is required to be able to return to a higher level. The password for level 2 is "1970", that for level 3, "1965".

Hysteresis: switch hysteresis can be set for hot water and room heating. This does not cause too high a target temperature! After reaching the target temperature, the value is allowed to fall by the set amount before the heating process is restarted.

Hot water maximum temperature (factory setting 3.0 °C)

Hot water minimum temperature (factory setting 3.0 °C)

Space heating maximum temperature (factory setting 0.5 °C)

Space heating minimum temperature (factory setting 0.5 °C)


Fault record: See chapter "Fault messages"

Factory settings:

*Factory settings:* tapping on the menu point resets the AC•THOR to its factory settings. This will cause all altered settings in the unit to be deleted!

**CAUTION! No security confirmation is requested!**

*Check for new firmware:*

 Internet access is required!

Start check for new updates manually. When a new version is available, it will be stored on the SD card. This procedure takes several minutes. The AC•THOR will operate normally during this period.

*Start firmware update:* if a newer software version is present on the SD card, the update can be started manually. After the update, the unit will be restarted automatically.

*Start power firmware update:* if a newer output unit software version is present on the SD card, the update can be started manually. After the update, the unit will be restarted automatically.

## 6. Web-Interface

In principle, in the web-browser, the web interface offers the same presentation and settings possibilities as the AC•THOR display. Consider that the appearance and the scope of options can change with updated software versions.



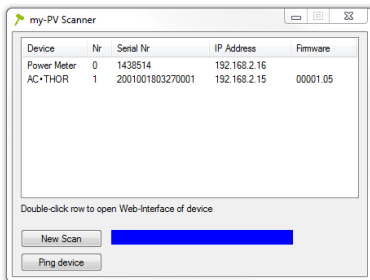
You can only access the web interface if the AC•THOR is in a network. If it has a direct connection to the power meter, this access is not possible!



If you cannot access the AC•THOR in the network, check the network settings on the display!

Expiry of the network connection:

1. After the connection using a patch lead the AC•THOR is assigned a dynamic IP address by the router. It can then be searched for in the network using the program "my-PV Scanner.exe" (included in the "Software package AC-THOR.zip" on [www.my-pv.com](http://www.my-pv.com)).



2. If there are several AC•THOR units in the network, the unit to be configured can be identified by the serial number (on the rating plate on the back of the unit).
3. The web interface opens by double clicking on the respective search result.

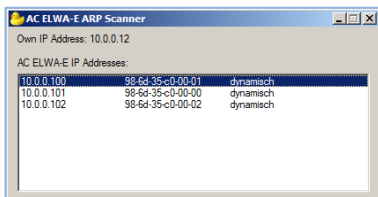


Scanning is performed via UDP port 16124. Firewalls (or specific router settings) may prevent the AC•THOR from being found.



TIP: You will also find the IP address of the AC•THOR on the display or in the DHCP list in the router!

Alternatively, the second scan program "Scan AC ELWA-E ARP.exe" can be used, which sends an ARP query to the router and displays the connected my-PV devices. Since the router takes some time to update the ARP table it may be that the ARP scan takes some time to show AC ELWA-E results.



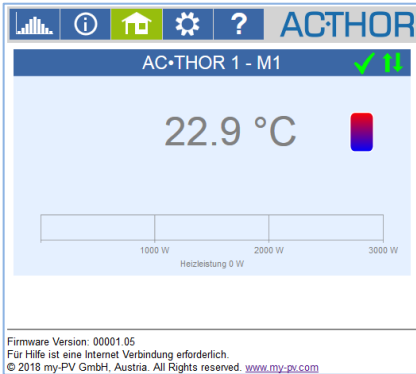
my-PV does not recommend to connect the AC•THOR to the Internet via port forwarding access!



## Home (homepage)



The AC•THOR start page in the web browser gives the same information as the home screen on the display. Navigation using the symbols bar is carried out in the same way. Further information in the chapter "Control and display elements".



## Data logger



The AC•THOR data logger in the web browser gives the same information as the data logger on the display. The selection of values and time period is possible using the menu bar above the diagram. Further information in the chapter "Control and display elements".



TIP: Move the mouse over the bar and the exact values will be shown!



Yellow bars indicate the proportion of energy that comes from the photovoltaic system, green bars indicate the proportion of optional boost-backup.



In the case of third-party control, for example through Modbus TCP, the bars always appear green because a distinction is not possible!

## Status information



The status information in the web browser contains more details than that on the AC•THOR display. The following additional values are given. An explanation of the other values is given in the chapter "Status information in the display".

Power share PV:

this value shows the share of the total power from photovoltaics.

Power share grid:

this value shows the share of the total power from the electricity grid.

Power 1 share PV:

this value shows the share of the power for load 1 from photovoltaics.

Note: In operating mode M3 (hot water 6 kW) a figure is also only shown for power 1.

Power 1 share grid:

this value shows the share of the power from load 1 from the grid.

Power 2 share PV:

this value shows the share of the power for load 2 from photovoltaics.

Power 2 share grid:

this value shows the share of the power from load 2 from the grid.

Hot water boost backup status: active for codes >0.

Next legionella cycle:

days remaining before next legionella cycle is run.

## Settings



The setting possibilities in the web browser are slightly more extensive than those in the AC•THOR display. See next section "Special possibilities for settings in the web interface".

An explanation of the other general unit settings is included in the chapter "General settings".

An explanation of the other specific unit settings for the different operating modes is included in the chapter "Operating modes".

## Access level

Level:  Password:

## Mode

Mode:

## Hotwater

Temperature: max °C  Min °C

Boost-Mode:  Off  On  Relay

Timeframe: start hour  stop hour  and start hour  stop hour

Weekday  Mon  Tue  Wed  Thu  Fri  Sat  Sun

## Legionella-Mode

Prevention of legionella:  Off  On

Activation-Interval:  Days

Start-Hour:

Target-Temperature:  °C

## Spaceheating 1

Temperature:	max °C	min Day °C	min Night °C		
	<input type="text" value="22"/>	<input type="text" value="20"/>	<input type="text" value="20"/>		
Weekly program: Night during	Hr	Min	until	Hr	Min
Monday:	<input type="text" value="22"/>	<input type="text" value="0"/>	-	<input type="text" value="5"/>	<input type="text" value="0"/>
Tuesday:	<input type="text" value="22"/>	<input type="text" value="0"/>	-	<input type="text" value="5"/>	<input type="text" value="0"/>
Wednesday:	<input type="text" value="22"/>	<input type="text" value="0"/>	-	<input type="text" value="5"/>	<input type="text" value="0"/>
Thursday:	<input type="text" value="22"/>	<input type="text" value="0"/>	-	<input type="text" value="5"/>	<input type="text" value="0"/>
Friday:	<input type="text" value="22"/>	<input type="text" value="0"/>	-	<input type="text" value="5"/>	<input type="text" value="0"/>
Saturday:	<input type="text" value="22"/>	<input type="text" value="0"/>	-	<input type="text" value="5"/>	<input type="text" value="0"/>
Sunday:	<input type="text" value="22"/>	<input type="text" value="0"/>	-	<input type="text" value="5"/>	<input type="text" value="0"/>

## Hysteresis

Hotwater max	Hotwater min	Spaceheating max	Spaceheating min
<input type="text" value="3"/> °C	<input type="text" value="3"/> °C	<input type="text" value="0.5"/> °C	<input type="text" value="0.5"/> °C

## Relay-Function

Power threshold  W  Off  On

Time threshold exceeded  Minutes

Min. time on  Minutes

Min. time off  Minutes

## Frequency-Modus

Frequency start	Frequency end
<input type="text" value="50"/> Hz	<input type="text" value="51"/> Hz

## Time settings

Current time:	Wed, 13 Jun 2018 08:15:59
Timezone:	+01:00 CET
Daylight saving mode:	<input type="radio"/> Off <input checked="" type="radio"/> On
NTP server IP address:	131, 130, 251, 107
	<a href="#">Save</a>

## Control type

Signal source:	Power Meter Auto
<b>Actor Number &gt;1: only "Slave" selectable</b>	
	<a href="#">Save</a>

## Control settings

IP address of the signal source:	0.0.0.0
Control status:	No Control
Power timeout:	10 Seconds
Control target:	-50 W
<b>Negative value means feed-in. Only change this value if you are familiar with the control strategy - red Help for more details.</b>	
Block Start-Hour:	0
Block Stop-Hour:	0
	<a href="#">Save</a>

## Multi units

Mode	<input checked="" type="radio"/> Off <input type="radio"/> Synchron <input type="radio"/> Stratify
	<a href="#">Save</a>

## IP settings

MAC Address:	98-6D-35-C0-00-FF
Current IP Address:	192.168.2.21
Current Subnet Mask:	255.255.255.0
Current Gateway:	192.168.2.1
<b>Use static IP only if you are familiar with network administration.</b>	
	<input checked="" type="radio"/> DHCP <input type="radio"/> Static IP
IP Address:	192.168.2.21
Subnet Mask:	255.255.255.0
Gateway:	192.168.2.1
DNS Server:	192.168.2.1
	<a href="#">Save</a>

## Basic settings

Device-Number (for Multi Mode):	1
Max Power:	3000 W
	<a href="#">Save</a>

## Debug-Mode

<b>Enable debug mode only after consulting my-PV.</b>	<input type="radio"/> Enabled <input checked="" type="radio"/> Disabled
	<a href="#">Save</a>

## System

Ethernet:	00100.02	Status:	Nicht geprüft	<a href="#">Install update</a>
Power stage:	100	Status:	Ok	<a href="#">Install PS update</a>
	<a href="#">Check for updates</a>			
Serial No.:	2001001803010000			
Export & Import settings:	<a href="#">Export</a>	<a href="#">Import</a>		
	<a href="#">Reboot device</a>			
	<a href="#">Factory reset</a>			

## Special setting possibilities in the web interface

The following unit settings are only possible in the web interface and cannot be carried out on the AC•THOR display.

### Power Timeout

In the event that the control signal is only transmitted at intervals, or if there are transmission problems, the run-out time of the AC•THOR can be altered with this value. The factory setting is 10 seconds.

### Control settings

Signal source: Power Meter Auto

IP address of the signal source: 0 . 0 . 0 . 253

Control status: No Control

**Power timeout: 10 Seconds**

Control target:  
Negative value means feed-in. Only change this value if you are familiar with the control strategy - red Help for more details. -50 W

**Block Start-Hour: 0 Block Stop-Hour: 0**

Save

### Block time

This function makes it possible to lay down a period during which the AC•THOR is not to be in operation. Unlike the two time frames for hot water securing the transition to the following day is possible (Start Hour is higher than Stop Hour).



TIP: For example the function can be used to give an existing battery time for charging and to start the heat generation subordinate.



Changes of the time settings are effective within one minute.


### Control type: Adjustable Modbus TCP (Sunspec etc)


With the "**Adjustable Modbus TCP**" control mode, the AC•THOR receives the power-value in the feed-in point from an inverter or Modbus counter. The required register parameters can be set in 5 input fields.


Signal source	Meter Register			Scale Register		Comments
KACO TL1 + TL3	40084	Int16	+ feed in	40085	Sunspec	Sunspec must be enabled on inverter
Kostal PIKO IQ Plenticore plus	252	Float	- feed in	-	-	Suitable electricity meters please refer to the Kostal descriptions
SolarEdge	40206	Int16	+ feed in	40210	Sunspec	Sunspec must be enabled on SolarEdge
MEC electronics	40098	Float	- feed in	-	-	Approved for meter type MECmeter



With the settings "Adjustable Modbus TCP (Sunspec etc)", the IP address of the signal source must not change during operation (eg by a DHCP router), otherwise the AC•THOR loses the control signal.

 When controlled by an inverter, a feed-in meter is required in the system. The query of the inverter otherwise provides no data.

 We ask for your understanding that we cannot do any binding support for third-party products. For questions about third-party products, please contact the technical support of the respective company.

 Operation with battery may require additional control parameters. In this case, please contact the technical support of my-PV.

## Multi units

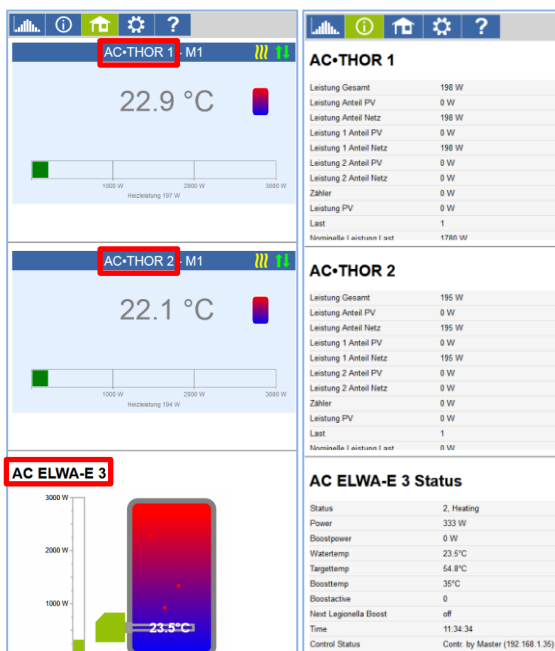
Initiating from firmware version 100.04, several AC•THOR can be used in a network. Operation is based on the master / slave principle.



TIP: Also the product AC ELWA-E from my-PV can be used as a slave since Ethernet firmware 102.04!

See Operation Manual of AC ELWA-E at [www.my-pv.com](http://www.my-pv.com).

To display all devices, the displays of **Home** and **Status** are expanded in the master's web-interface. Each unit is additionally identified by a number.



 When using several units the following things have to be considered:

- Only one master can be assigned to a signal source and vice versa.
- Up to 10 slaves can be controlled in one network.

- A maximum of 5 slaves are possible per master.
- All slaves in the network must have different device numbers, even if these are assigned to different masters.
- **All devices must be assigned by permanent IP addresses.** This can be done in two ways:
  - In the web interface of the respective device (see IP Settings)
  - On the display of AC•THOR
  - By the router (recommended)

### Settings on Slaves

For the slaves only the device numbers has to be specified (see Basic Settings). All other settings are only required on the master.

As soon as an assignment has been made, further control settings are no longer possible or required. The IP address field is disabled and **Slave** appears in the Control type field.

**Control type**

Signal source: Author Number >1: only "Slave" selectable Slave

---

**Control settings**

IP address of the signal source: 0 0 0 0

Control status: No Control

Power timeout: 10 Seconds

Control target: -50 W  
Negative value means feed-in. Only change this value if you are familiar with the control strategy - red Help for more details.

Block Start-Hour: 0 Block Stop-Hour: 0

### Settings on Master

Only for devices with number 1 (= master) the following display appears in the setup:

**Multi units**

Mode  Off  Synchron  Stratify

To make the settings for several devices on the master, first choose between **Synchron** and **Stratify**. In the case of synchronous charging, the power is evenly distributed to the master and its slaves. In the case of stratified charge, the devices are controlled one after the other according to their numbers, in each case until the set target temperature is reached.

After the selection, please click **Save** (left) to display the button **Scan for Slaves** (right).

**Multi Units / Mehrere Geräte**


Mode / Modus  Off / Aus  Synchron  Stratify / Schicht

Slaves / Sekundärregler:	Unit No.: / Gerät Nr.:	IP Address: / IP Adresse:	Enable / Aktiv
	2	not available / nicht verfügbar	<input type="checkbox"/>
	3	not available / nicht verfügbar	<input type="checkbox"/>
	4	not available / nicht verfügbar	<input type="checkbox"/>
	5	not available / nicht verfügbar	<input type="checkbox"/>
	6	not available / nicht verfügbar	<input type="checkbox"/>
	7	not available / nicht verfügbar	<input type="checkbox"/>
	8	not available / nicht verfügbar	<input type="checkbox"/>
	9	not available / nicht verfügbar	<input type="checkbox"/>
	10	not available / nicht verfügbar	<input type="checkbox"/>
	11	not available / nicht verfügbar	<input type="checkbox"/>

With the search the slaves in the network are displayed. Assign the found slaves to the master by activating them. The IP address now leads directly to the Web interface of the respective slave as a hyperlink.

Multi Units / Mehrere Geräte			
Mode / Modus		<input type="radio"/> Off / Aus	<input checked="" type="radio"/> Synchron
Slaves / Sekundärregler:		<input type="radio"/> Stratify / Schicht	
Unit No. : / Gerät Nr.:	IP Address: / IP Adresse:	Enable / Aktiv	
2	10.0.0.101	<input checked="" type="checkbox"/>	
3	10.0.0.102	<input type="checkbox"/>	
4	not available / nicht verfügbar	<input type="checkbox"/>	
5	not available / nicht verfügbar	<input type="checkbox"/>	
6	not available / nicht verfügbar	<input type="checkbox"/>	
7	not available / nicht verfügbar	<input type="checkbox"/>	
8	not available / nicht verfügbar	<input type="checkbox"/>	
9	not available / nicht verfügbar	<input type="checkbox"/>	
10	not available / nicht verfügbar	<input type="checkbox"/>	
11	not available / nicht verfügbar	<input type="checkbox"/>	

Save / Speichern      Scan for Slaves / Suche nach Sekundärregler

 Scanning is performed via UDP port 16124. Firewalls (or specific router settings) may prevent that other units can be found.

### Debug-Mode

In order to simplify the analysis in the case of possible connection problems, a debug mode can be activated in coordination with our technical support.

## Help



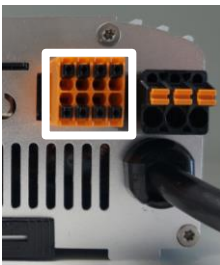
In the web interface the button leads to the online Operation Manual which corresponds to the firmware version installed.

## 7. Multi units

See chapter „Special setting possibilities in the web interface“.

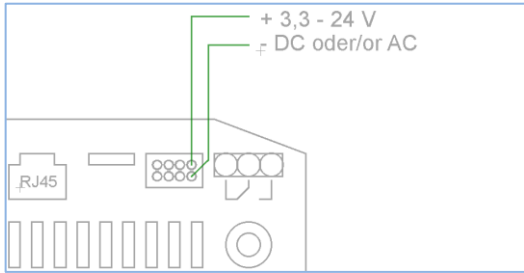
## 8. Potential-free input for external boost control


The AC • THOR can be operated via an external signal with maximum power. The corresponding signal input is located at the 8-pin connector to which the temperature sensor is also connected.



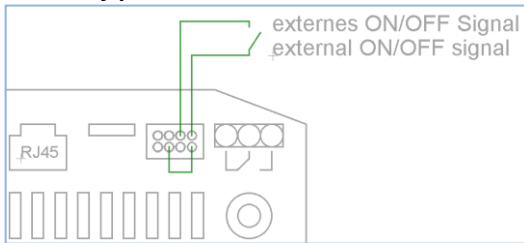


### Control by 3.3 - 24 V AC or DC voltage



 For DC voltage, the polarity must be observed!

### Control by potential-free contact



## 9. Description of the protocols for http and Modbus TCP

These are described in a separate document which can be provided on request.


## 10. Firmware update


### Update of server

See chapter "General settings".

### Update with SD card

This possibility is provided for installations without Internet access. Consultation with our technical support is necessary.

 Never remove the SD card while the unit is operational!

 Never exchange an SD card between one unit and another! It contains data specific to the serial number of the unit.

## 11. Device Key

The device key is shown on a sticker in the Assembly instructions supplied. Keep it safe. It serves for access to the future online platform [www.my-pv.live](http://www.my-pv.live).

## 12. Status codes

0..... Off

1-8... Unit start-up

9... Operation

>=200 Fault conditions power stage

### 13. Fault temperature sensors

0°	Broken probe
85°	Data disruption temperature sensor

### 14. Fault messages on the Display

Fault messages are only displayed on the home screen of the display. They are not shown in the web interface.

Fault 101	No phase detected on the middle relay contact
Fault 102	Temperature sensor 1 required for hot water boost backup
Fault 103	Temperature sensor 1 required for 6 kW operating mode
Fault 104	Temperature sensor 1 required for space heating
Fault 105	Temperature sensor 1 required for hot water
Fault 106	Power restriction <3 kW
Fault 107	Temperature sensor 2 required for space heating
Fault 108	Temperature sensor 2 required for PWM
Fault 109	Temperature sensor 1 required for legionella protection
Fault 110	Firmware update unsuccessful communication fault with output unit   Restart the unit
Fault 111	Firmware update unsuccessful Problem with p-file. Switch off the unit. Insert SD card with p-file. See Operating instructions <a href="http://www.my-pv.com">www.my-pv.com</a> Restart the unit
Fault 112	Temp sensor 3 required for hot water boost backup
Fault 113	Output unit communication timeout. Restart the unit.
Fault 114	Output unit stuck in bootloader. Restart the unit.

### 15. Fault signals by the AC•THOR Logo

1x blinking ►	SD Card error
2x blinking ►	Firmware defective
3x blinking ►	Display error

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Subject to change without notice.

