ATKPWH.01 - Photovoltaic Water Heating

Version 3.0

User Manual

1 Basic Information

The most efficient way to use photovoltaics for homes and cottages with the fastest return on investment is photovoltaic water heating. Simply install photovoltaic panels on the roof, connect the ANTIK PV Water Heater, and connect your current hot water tank to it. Hot water will be heated by the sun; if there isn't enough sunlight on a given day, the device will switch to heating via the 230V grid. No electrical modifications, inspections, or permits from the electricity distributor are required, and you can still save significant costs on electricity.

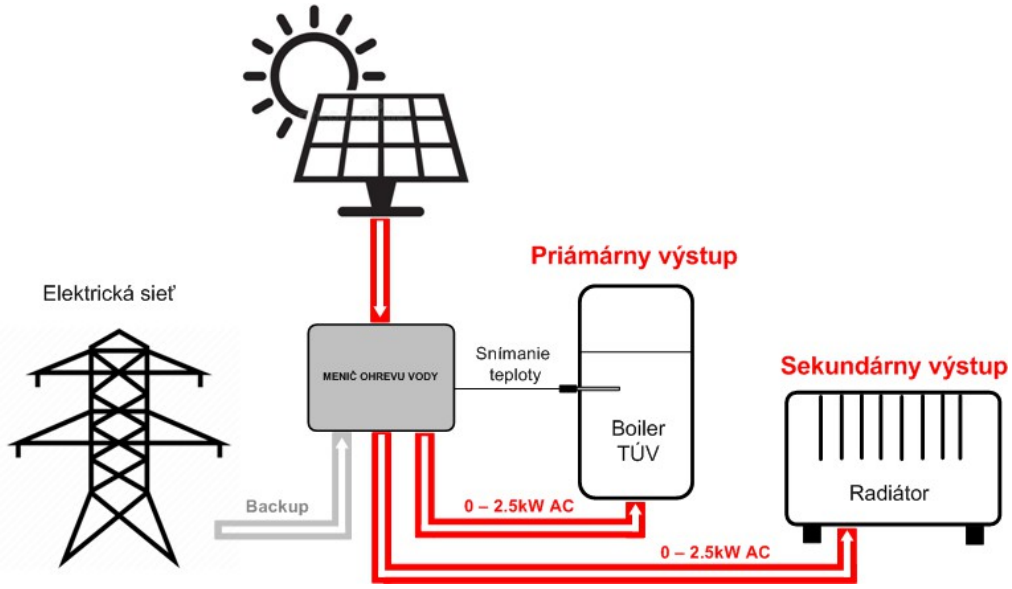
The device includes an MPPT inverter that converts the input DC voltage to an output AC voltage at 50 Hz, which is necessary for three reasons:

- Protection of the heating element's thermostat against contact burnout caused by an electric arc when disconnecting a load through which DC current flows
- Prevention of water electrolysis in the event of imperfect insulation of the heating element
- At the same time, the MPPT algorithm maximizes the current output

of the panels In addition to these basic advantages, the device has the

following additional features:

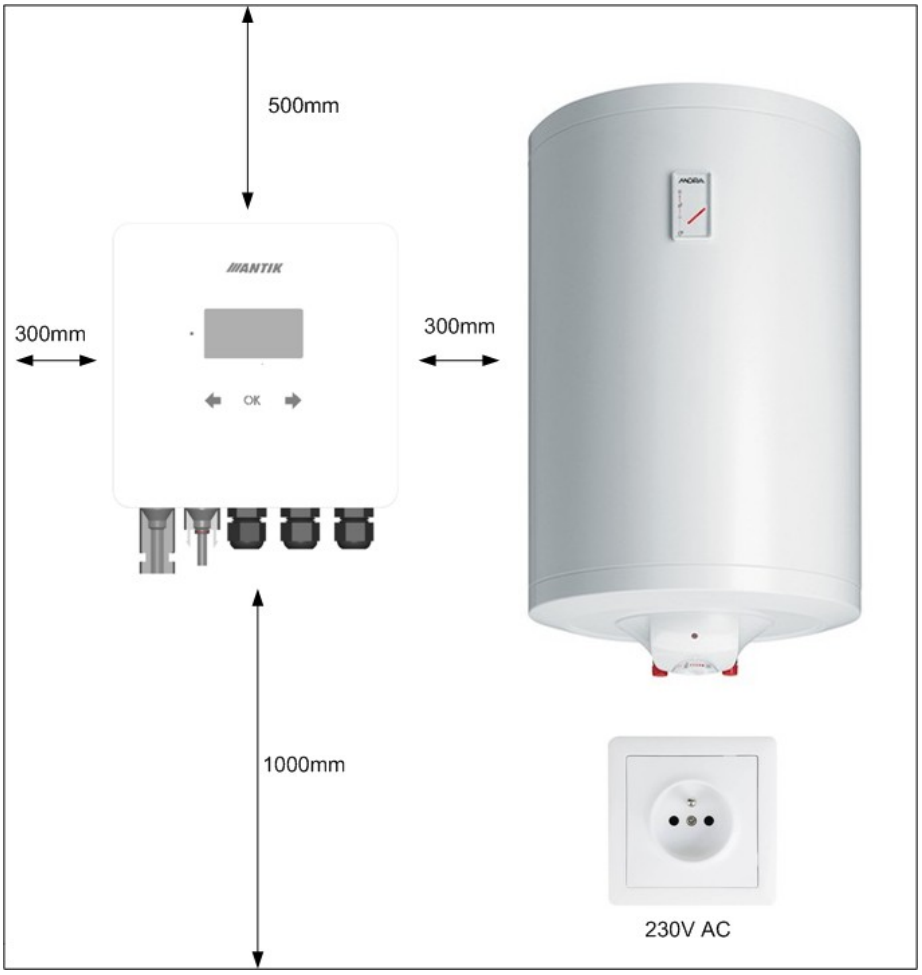
- Remote monitoring via WiFi and the Antik Smart Home app
- Remote monitoring of water temperature in the boiler
- Option for backup heating from the 230V mains
- Option to redirect the flow to the second outlet if the water in the primary outlet tank has reached the desired temperature
- Intuitive user interface



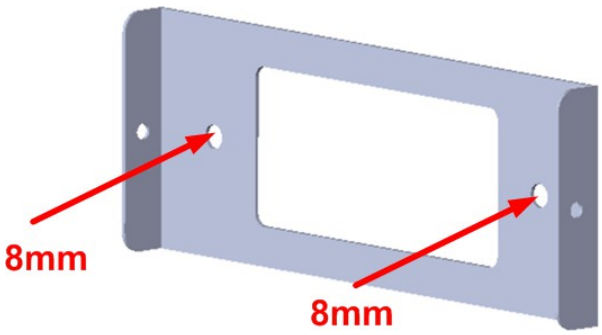
For better lightning protection, we recommend installing fuses and surge protection on the wires leading from the solar panels to the device.

2 Installation

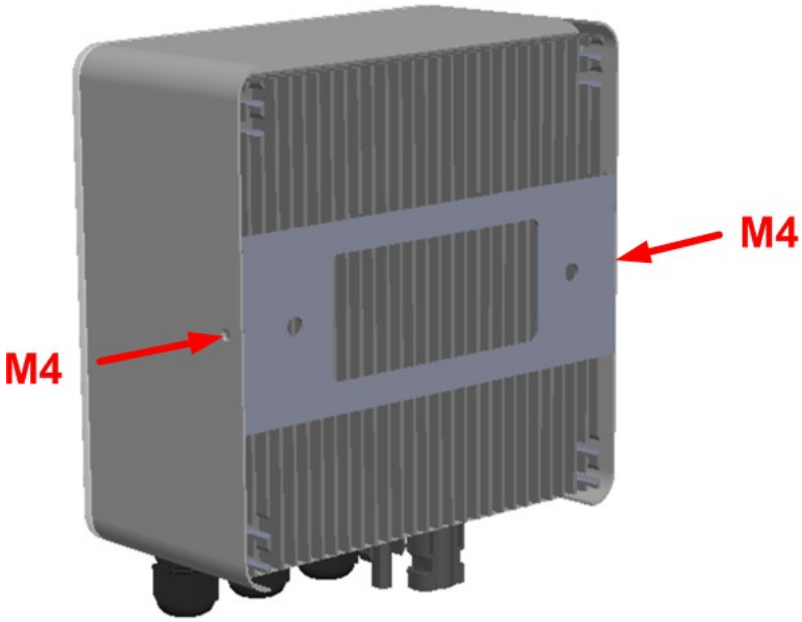
For installation, choose a location near an electric water heater and a 230V outlet. The photovoltaic inverter heats up slightly during operation, so maintain minimum distances from surrounding objects and the ceiling to ensure the best possible air circulation.



Remove the wall bracket from the back of the device and place it on the selected location. Mark the position of the holes with a pencil. Then drill two holes for 8mm wall plugs.



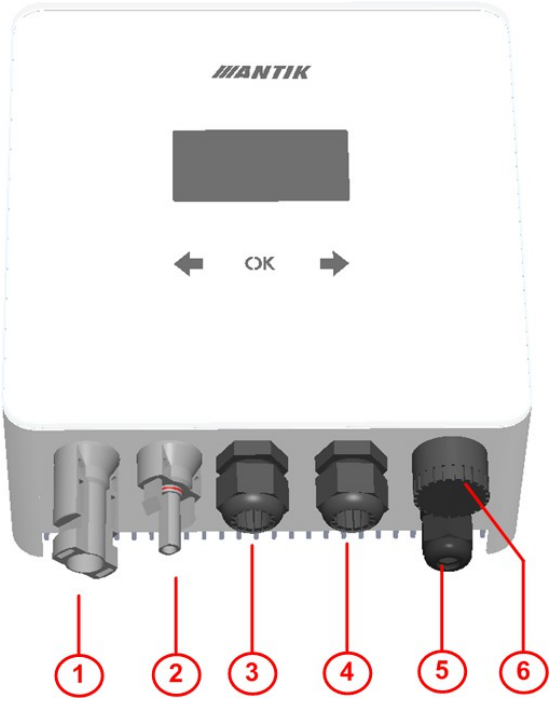
Insert the wall plugs into the drilled holes, then place the bracket against the wall and secure it with 6x60mm screws. Next, attach the unit to the bracket using two M4 side screws.



3 Connectors and Controls

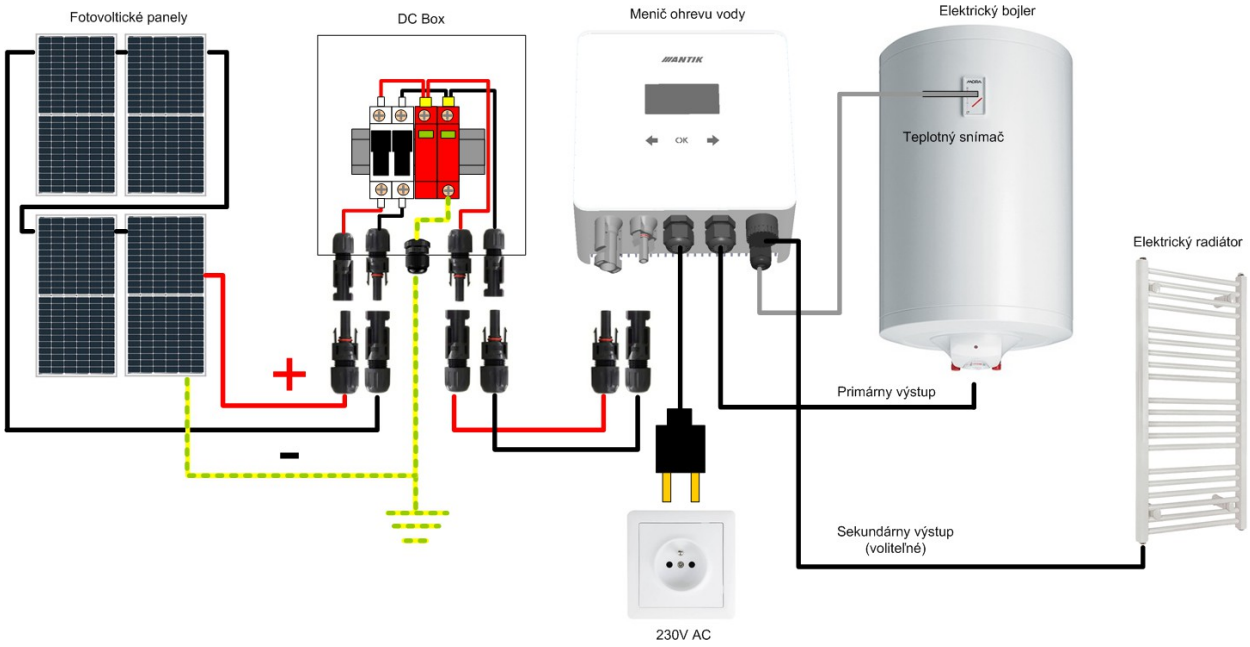
3.1 Connector description

1. Input + from PV panels
2. Input – from PV panels
3. 230VAC input from the mains
4. Power output to primary heating element
5. Input for water temperature sensor in the boiler
6. Power output to the secondary heating element



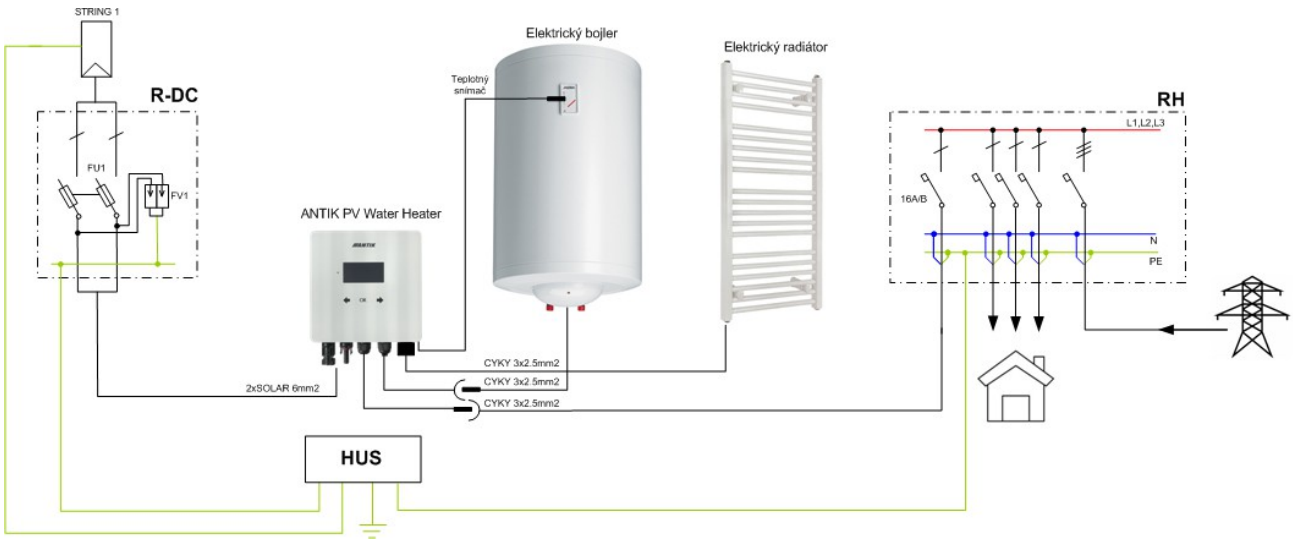
3.2 Connection

The device uses your existing electric water heater, which is currently connected directly to the 230V mains. Simplified connection of the water heater to the photovoltaic inverter:



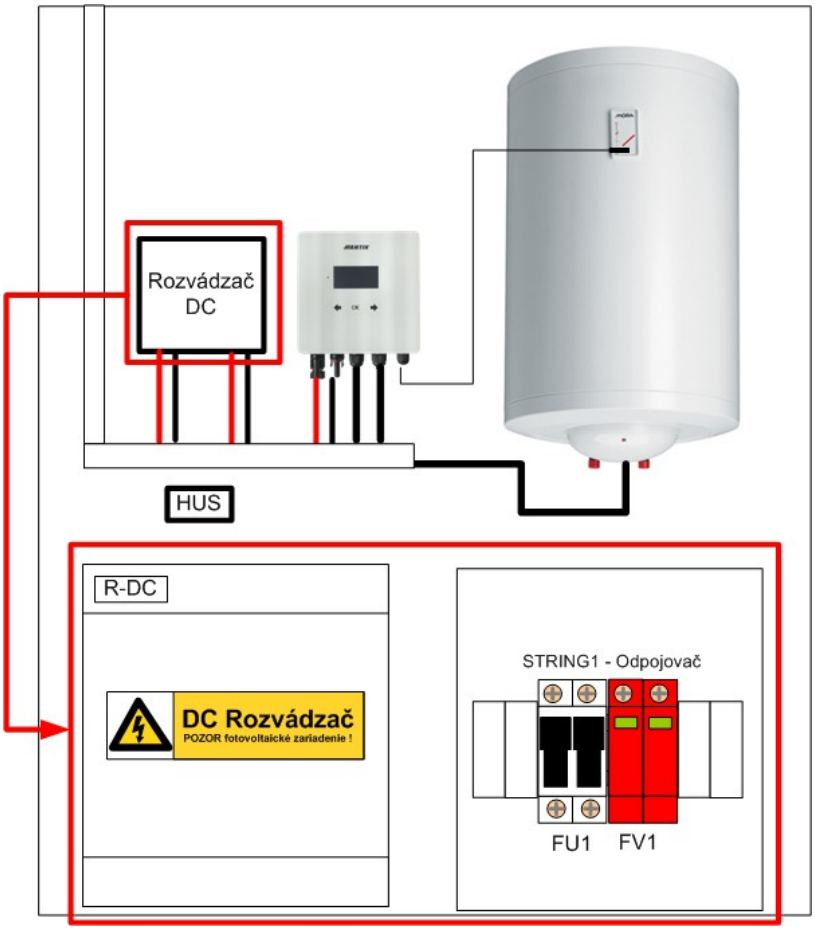
We recommend that system wiring and installation be entrusted to an electrician with the appropriate qualifications to work with electrical equipment.

3.3 Single-line diagram



3.4 Recommended component layout

We recommend installing the device indoors, in a well-ventilated room, and as close as possible to the DHW boiler. Extending the output cables is not recommended.



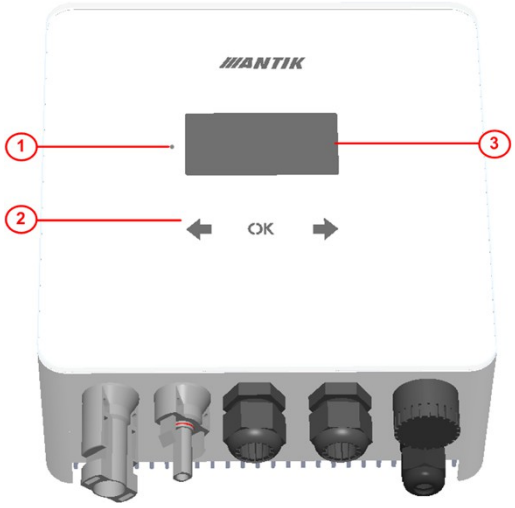
3.5 Photovoltaic panels

When selecting the number of panels, in addition to their power output, it is important to aim for an output voltage of 230 VDC at full load. The following numbers of panels are recommended to achieve maximum power output:

Panel type	Maximum system output
5x550W	2750W
6x450W	2700W
7x400W	2800W

4 Controls and Menu

4.1 Description of controls

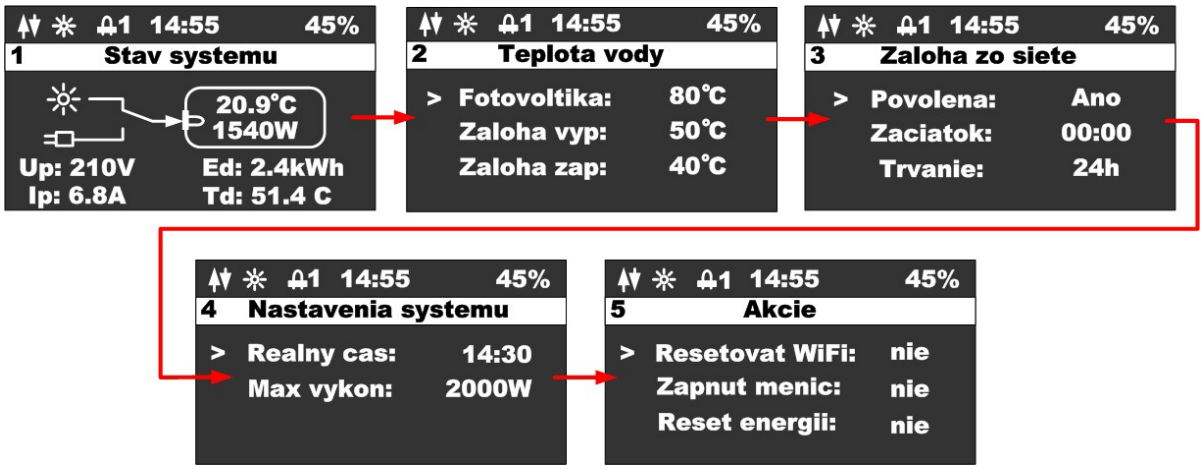


1. Operating status LED indicator
2. Touch buttons
3. Graphic OLED display

4.2 Menu

The device menu contains 5 screens. After 30 seconds, the display turns off automatically and the menu returns to the main screen—1. System Status.

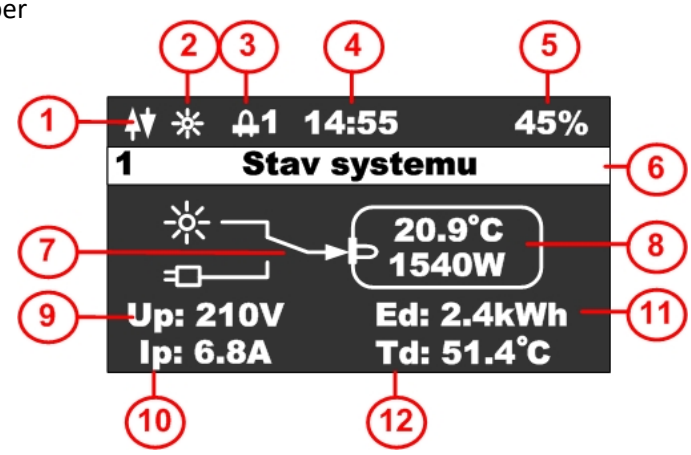
You can navigate between screens using the right and left arrow keys .



4.3 Screen - System Status

Pressing any key displays the device's main screen. To conserve power on the OLED display, the screen turns off 60 seconds after the last key press.

1. WiFi Module Status
2. Icon indicating the presence of panels
3. Icon indicating heating is on and output number
4. Current time
5. Internal PWM control percentages
6. Name of the displayed screen
7. Power flow switch status
8. Water temperature and current power
9. Panel voltage
10. Panel current
11. Daily energy production
12. Inverter temperature



4.4 Screen - Water temperature

This screen is used to set the desired water temperatures in the boiler:

1. Status bar
2. Water temperature in photovoltaic mode
3. Water temperature at which the backup is turi
4. Water temperature at which the backup is turi

Pressing the **OK** key places the cursor on the current line; use the ← → keys to change the value on that line.

Pressing the **OK** key until the cursor disappears exits edit mode, and you can switch to another screen.

4.5 Screen - Backup from the Network

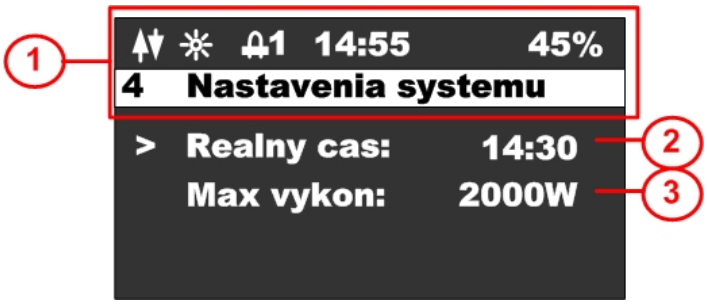
1. Status bar with screen name
2. Global backup permission
3. Backup start time
4. Backup duration in hours: 0 to 24

Pressing the **OK** key places the cursor on the current line; use the ← → keys to change the value on that line. For time, the ← key increments the hour, and the → key increments the minute.

Pressing the **OK** key until the cursor disappears exits edit mode, and you can switch to another screen.

4.6 Screen - System Settings

1. Status bar with screen name
2. Real Time (can be set if the device is not connected to Wi-Fi)
3. Inverter power limit



Pressing the **OK** key places the cursor on the current line; use the ← → keys to change the value on that line. For time settings, the ← key increments the hour, and the → key increments the minute.

Pressing the **OK** key until the cursor disappears exits edit mode, and you can switch to another screen.

4.7 Screen - Actions

Pressing the key displays the Actions screen. This screen is used to perform basic inverter actions.

Pressing the key returns the menu to the configuration screen.

Pressing the **OK** key displays the cursor

On the current line, use the keys to change the value on that line, and press **OK** again to perform the selected action. Pressing the keys repeatedly will remove the cursor. You can then return to the main menu.

1. Status bar with screen name
2. WiFi reset, EZ (easy mode - Android) and AP (access point mode - Apple) options.
3. Turn on the inverter, options YES, NO
4. Power reset, options YES, NO

Resetting Wi-Fi: If the device is not paired and neither of the two pairing options—EZ Mode (letter P) or AP Mode (letter A)—is lit in the status bar, you must reset the Wi-Fi. When resetting, select one of the options. For iOS devices running OS 16 and higher, you must select AP mode, as Apple has discontinued support for EZ mode. For Android devices, you can leave EZ mode selected. If the device is in pairing mode, the corresponding pairing mode will be displayed in the status bar.

5 Active cooling and protection against overheating and short circuits

The device contains a fan whose speed is controlled based on the device's internal temperature. If the internal temperature exceeds 60 degrees Celsius, the inverter begins to reduce output power, thereby preventing further overheating.

Fan control:

- Temperature below 40 degrees Celsius – fan is off
- Temperature between 40 and 60 degrees Celsius – fan speed control 0 to 100%
- Temperature above 60 degrees Celsius – fan at full speed and inverter power reduction

The device also includes the following protections:

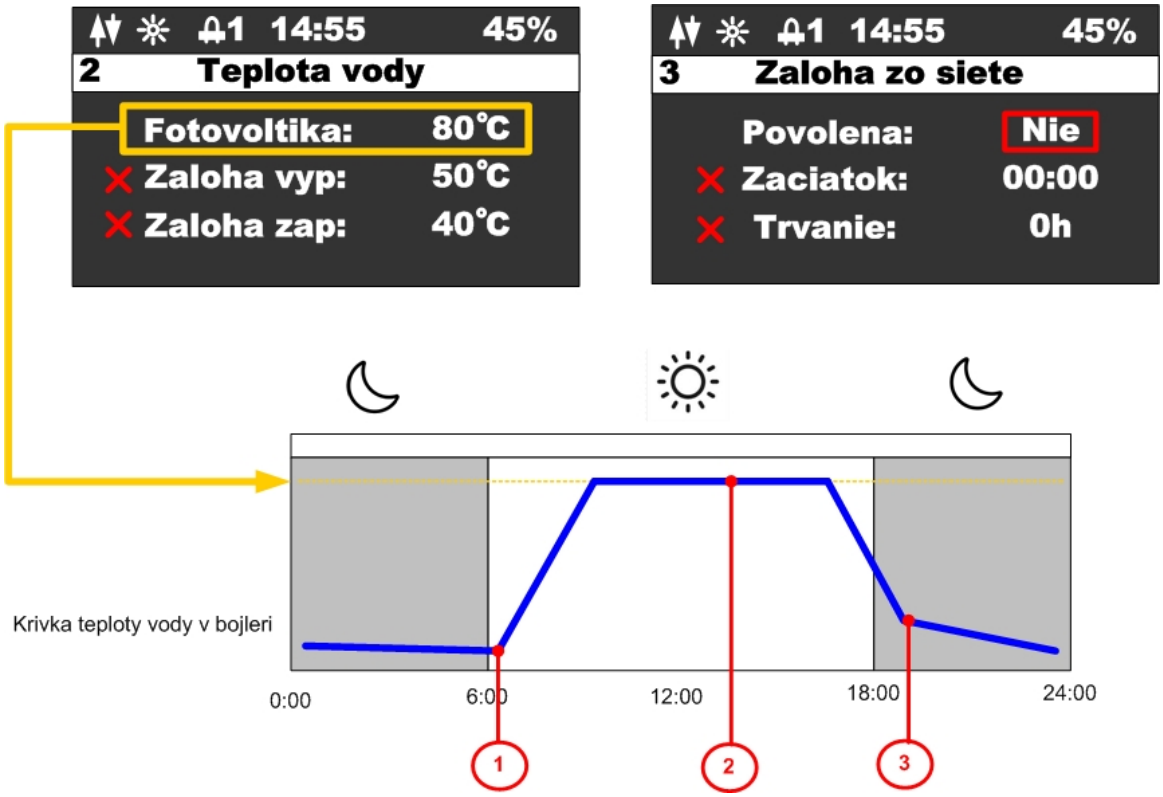
- Short-circuit protection on the inverter output – immediate shutdown, 3 restart attempts, and subsequent permanent disconnection
- DC and AC input protection with 16A fuses

6 Water temperature monitoring

The device ensures monitoring of the correct water temperature in the boiler according to your settings. It is possible to use pure solar mode or a mode with backup from the 230V grid if the water in the boiler is not sufficiently heated.

6.1 Solar mode

In solar mode, the "Allow grid backup" parameter is set to NO, so all temperatures and times related to grid backup are ignored. Water will be heated only during the day and up to the temperature specified by the "Photovoltaics" parameter (or until the boiler thermostat cuts off the heating).



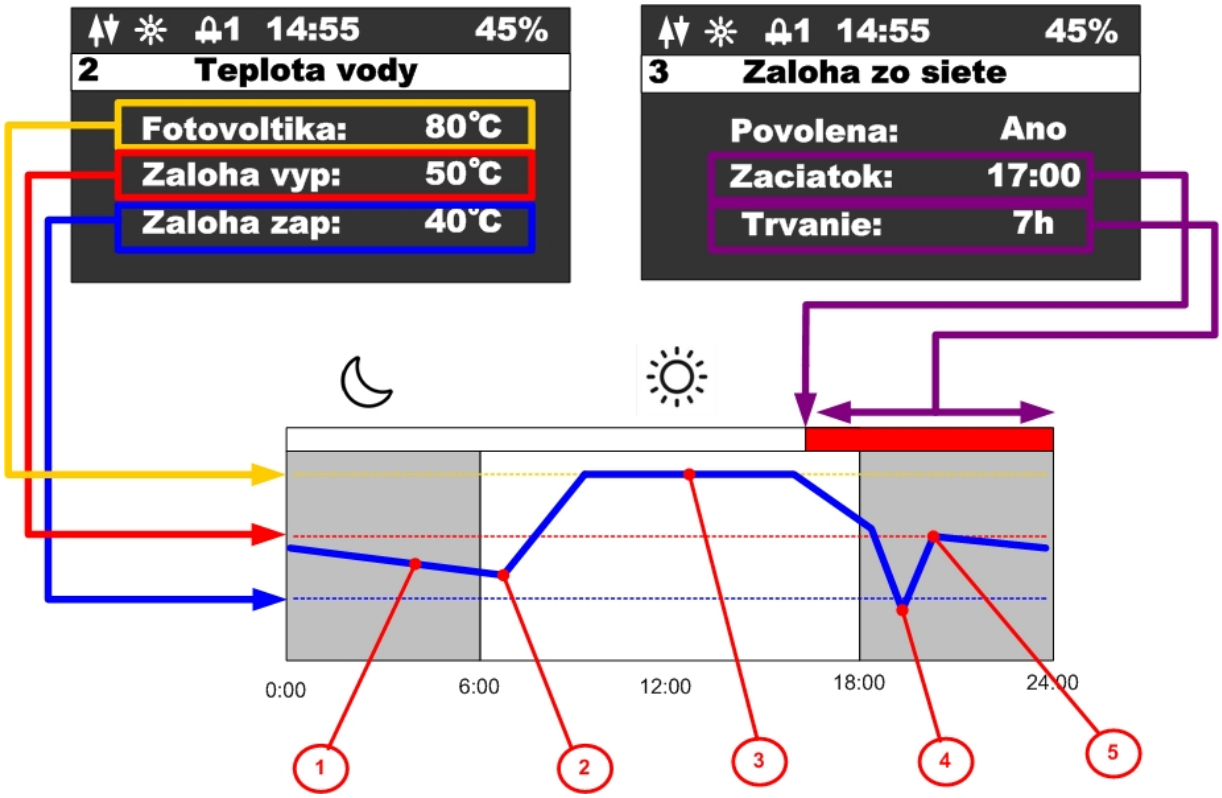
Description of individual points in the temperature curve:

1. After sunrise, the temperature in the boiler begins to rise
2. If the water temperature reaches the desired value, heating is interrupted and the device switches to the secondary output, which is indicated by the display of the corresponding icon in the status bar 
3. If the water temperature drops to any low level during the night, it will not be heated until the following day

6.2 Backup Mode

In backup mode, the "Enable backup from the grid" parameter is set to YES, and in this case, the device begins to be controlled by the backup temperatures, the start time, and the duration of the backup.

There are two backup temperatures. The upper temperature (Backup Off) sets the temperature at which heating is turned off during backup. The lower temperature (Backup On) sets the temperature below which, if the water temperature drops, the backup is activated. At the same time, the start time and duration specify the interval during which the backup will be active. Outside this interval, the backup will not turn on even if the temperature drops below the lower temperature. The backup activates no sooner than 5 minutes after the device is connected to the power supply.



Description of individual points in the temperature curve:

1. At night, the water temperature drops but has not reached the lower temperature
2. During the day, the temperature begins to rise due to heating from the photovoltaic system
3. When the temperature set for the photovoltaic system is reached, heating is interrupted and the device switches to the secondary output, which is indicated by an icon in the status bar 

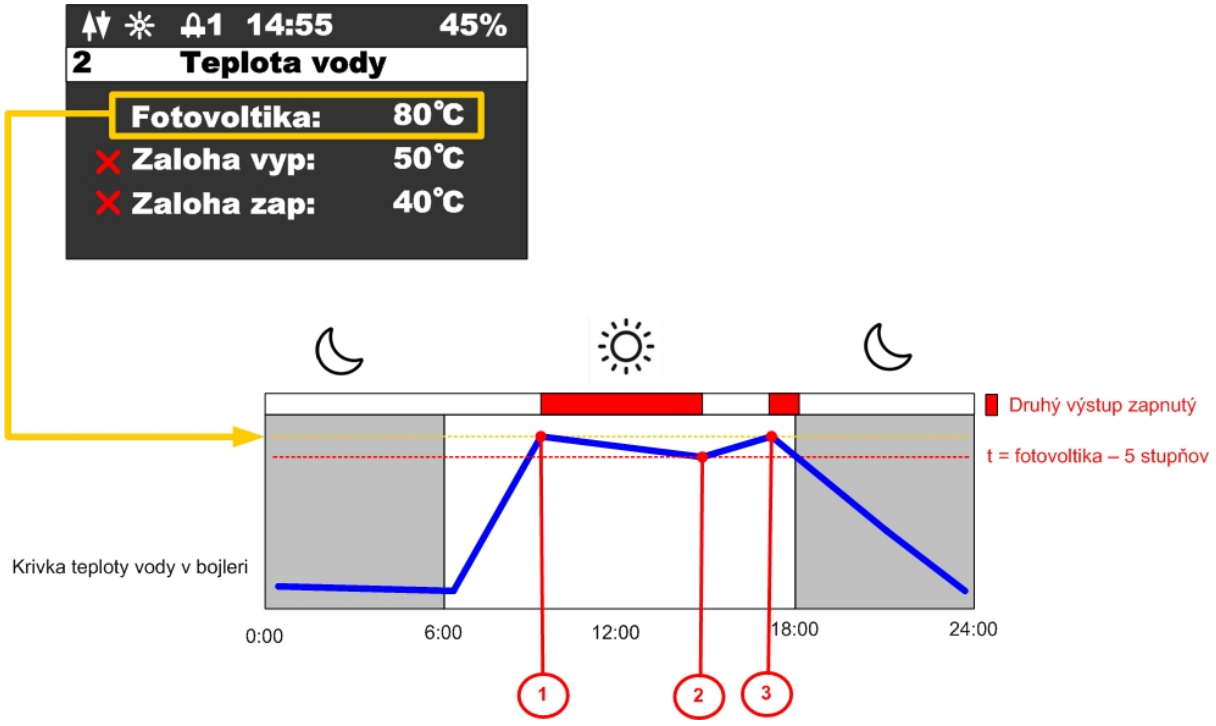
4. After a large draw of hot water, the temperature drops significantly, and since it fell below the lower limit and this occurred during the active backup interval, the backup is activated and the water begins to heat from 230V
5. The water temperature has reached the upper limit for the backup, and heating from the 230V mains is turned off

6.3 Secondary output

The device includes the option to connect a secondary output via a three-pin connector, which is protected by a waterproof cover. To connect the output, you must purchase a cable connector, which is an optional accessory.

Secondary output operation logic:

The device switches heating to the secondary output if the water temperature at the external sensor reaches the set temperature for photovoltaic heating or if the circuit has been opened by the thermostat (the device detects zero current). The second output remains on until the temperature at the external sensor drops 5 degrees below the set temperature for photovoltaics. If a zero current is detected at the time of switching to the second output (the output is not connected), the device switches back to the first output and will not switch to the second output again that day. The grid backup function is not supported on the second output.



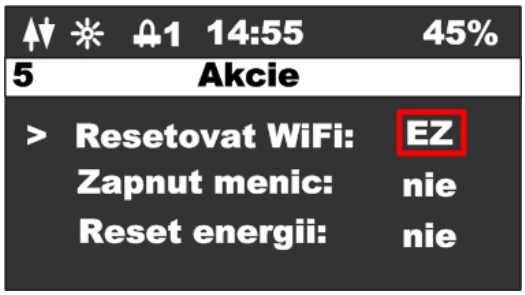
Description of individual points:

1. The water temperature has reached the set temperature for the photovoltaic system – the second output is activated
2. The water temperature has dropped 5 degrees below the set temperature – it switches back to the first output
3. The water temperature has reached the set temperature for photovoltaics again – the second output is activated

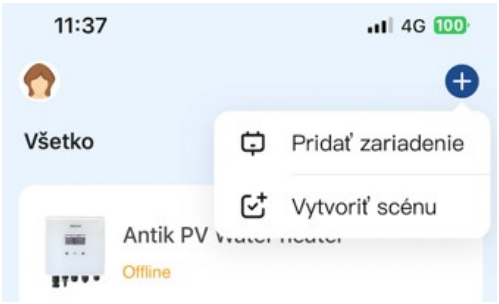
7 Pairing

7.1 EZ mode

Reset the Wi-Fi module from the device menu and make sure the letter “P” is displayed in the status bar:



Open the “ANTIK Smart Home” app . In the top right corner, select “Add New Device”:



In the device list, select “Antik Solar Water Heater” and follow the instructions in the mobile app.

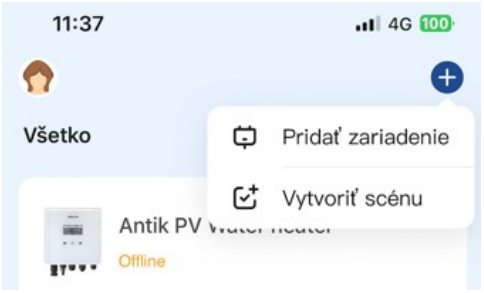
A successfully paired device is indicated by the two-way communication icon with the server.

If an icon with an antenna and a cross appears, there is a problem with the Wi-Fi signal. Check that the Wi-Fi router is turned on and in the correct position.

7.2 AP Mode

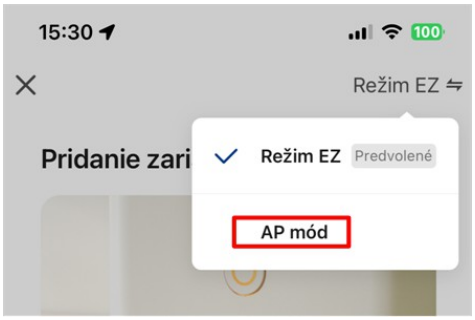
Reset the Wi-Fi module from the device menu and make sure the letter “A” is displayed in the status bar:

Open the “ANTIK Smart Home” app . In the top right corner, select “Add New Device”:



In the device list, select “Others (Wi-Fi)”

On the next screen, change the pairing mode to "AP mode." The app will then prompt you to connect to the Wi-Fi network created by the adapter. Once you connect to its network, everything else will happen automatically.



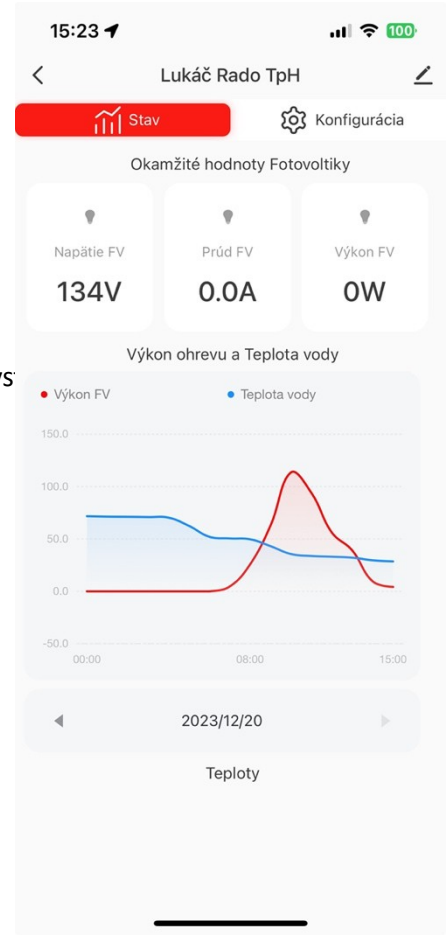
A successfully paired device is indicated by an icon showing two-way communication with the server.

If an icon with an antenna and a cross appears, there is a problem with the Wi-Fi signal. Check that the Wi-Fi router is turned on and in the correct location.

8 Mobile App

Using the ANTIK Smart Home mobile app, you can: Monitor parameters:

- Real-time values of panel voltage, current, and power
- Water temperature in the boiler / storage tank
- Device temperature
- Daily energy generated
- Total energy generated
- Power and water temperature graph with annual history
- Current operating mode (grid, solar, off)



Set parameters:

- Limit maximum output
- Set the desired water temperature from the photovoltaic sys
- Set water temperatures for backup
- Set the time to switch to backup heating
- Set the backup duration
- Turn the inverter on / off

Automation:

- Create automatic actions based on the values of individual parameters and control other devices in the home (outlets, light bulbs, etc.)

Service:

- Share the device with another user
- Remote firmware update

9 Technical Specifications

Technical specifications	
AC input	230 VAC, max. 16 A
DC input	0-400 VDC, max. 16 A
AC outputs	0 – 250 VAC 50 Hz Square wave (modified sine wave) suitable only for resistive loads!
MPPT converter	Maximum power 3000W
User interface	2.5” OLED display, touch buttons
Communication interfaces	WiFi – Connection to ANTIK Smart Home
Dimensions and weight	160x160x80mm, 2kg
Installation	Wall mounting using the included bracket
Operating temperature	-20 to +60°C
Rating	IP30