



Smart  
connections.

Operating instructions  
PIKO Webserver 2.0

## **Legal notice**

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Thank you for choosing a product from KOSTAL Solar Electric GmbH!

We hope you enjoy consistently high energy yields with the PIKO inverter and your photovoltaic system.

If you have any technical questions, please call our service hotline:

- Germany and other countries<sup>1</sup>  
+49 (0)761 477 44 - 222
- Switzerland  
+41 32 5800 225
- France, Belgium, Luxembourg  
+33 16138 4117
- Greece  
+30 2310 477 555
- Italy  
+39 011 97 82 420
- Spain, Portugal<sup>2</sup>  
+34 961 824 927
- Turkey<sup>3</sup>  
+90 212 803 06 26

<sup>1</sup> Language: German, English

<sup>2</sup> Language: Spanish, English

<sup>3</sup> Language: English, Turkish


# 1. Proper use

The web server 2.0 forms the graphic interface (shown in the browser) between the inverter and the user.\*

He is a fixed part of the PIKO inverter and can be updated via a software update (UI). A detailed description of the update process, could be find in the operation manual of the inverter.

The web server\* allows the user to view important information, current values, events and versions (e.g. user interface, firmware or hardware) relating to the inverter. The statistics provide a summary of the yield and operating duration and also provide the log data, which supplies other information. The inverter can also be quickly and easily configured in the Settings.

## 2. About this manual

Read this manual carefully in its entirety. It contains step-by-step instructions. 

We recommend you print them out and follow them step-by-step to set up the PIKO Solar Portal.

Most of the user guidelines are self-explanatory. Every website has its own help texts. To view these texts, simply click on the linked word "More".

The most recent version of the operating manual for your product is available in the download area at [www.kostal-solar-electric.com](http://www.kostal-solar-electric.com).

### Target group

This manual is intended for PV system installers who set up PV plants and put them into operation. Technical expertise is required to use the PIKO web server correctly. For this reason, we recommend the PIKO web server is only installed by a properly qualified technician.

Information concerning your safety or that of the unit is highlighted especially.



#### TIP

Print both sides on one sheet of paper when printing out this operating manual.

This saves paper and the document remains easy to read.

## 2.1 Navigation through the document

In order to enable navigation through this document, it contains clickable areas.

One of these is the navigation bar in the header of each page. Here you can go to the overview pages of the individual chapters in one click.

The table of contents can also be used in this way. From the index at the beginning of each chapter you can go to the indicated sub-chapter in one click.

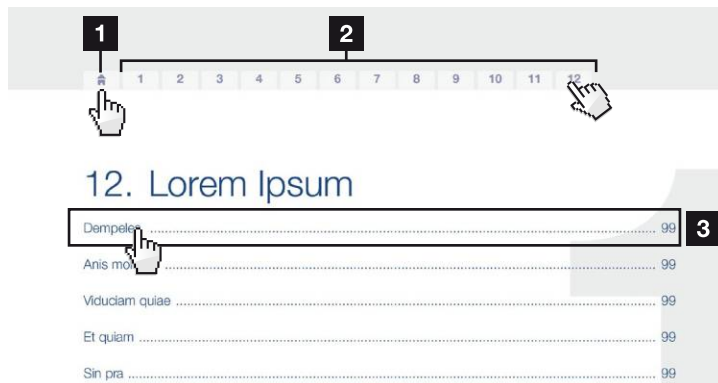


Fig. 1: Navigation through the document

- 1** Calling up the main table of contents
- 2** Navigation bar
- 3** Tables of contents

You can navigate to the referenced points in the document within the instruction text using the cross-references.

**Ch. 1**

**Fig. 1, It. 2**

Fig. 2: Examples of cross-references

## 2.2 Notes in this manual

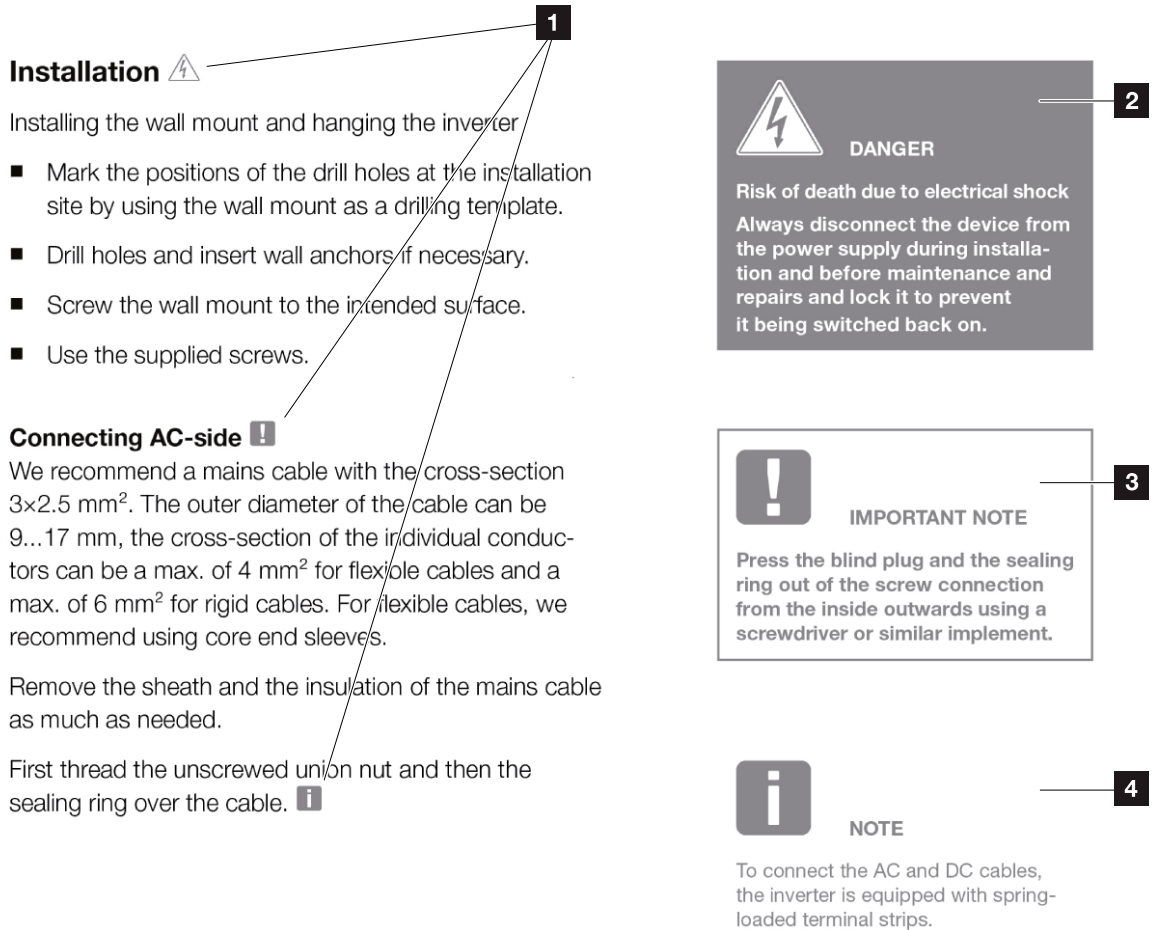


Fig. 3: Safety instructions in this manual

- 1** Reference icon within the instruction text
- 2** Warning
- 3** Information note
- 4** Other notes

Notes have been incorporated in the instruction texts. A differentiation is made in this manual between warnings and information notes. All notes are identified in the text line with an icon.

## 2.3 Warnings

The warnings refer to life-threatening dangers. Serious injuries possibly resulting in death may occur.

Each warning consists of the following elements:

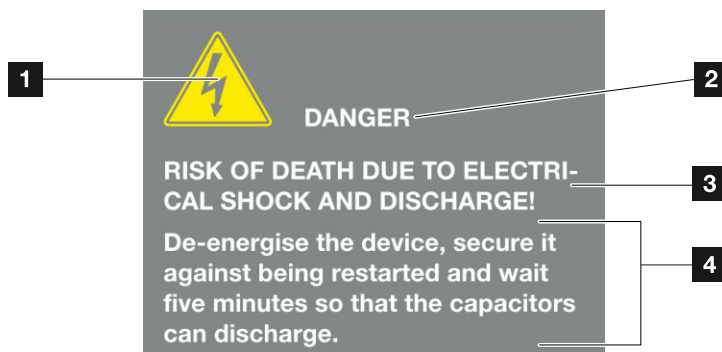


Fig. 4: Structure of the warnings

- 1** Warning symbol
- 2** Signal word
- 3** Type of danger
- 4** Corrective actions

## 2.4 Warning symbols



Danger



Danger due to electrical shock and discharge

### Signal words

Signal words are used to identify the severity of the danger.

#### **DANGER**

Indicates a direct hazard with a high level of risk, which can result in death or serious injury if it is not prevented.

#### **WARNING**

Indicates a hazard with a moderate level of risk, which can result in death or serious injury if it is not prevented.

#### **CAUTION**

Indicates a hazard with a low level of risk, which, if not avoided, may result in minor or slight injury or property damage.

## 2.5 Information notes

Information notes contain important instructions for the installation and smooth operation of the backup unit. These must be followed at all times. The information notes also point out that failure to observe notes can result in damage to property or financial damages.

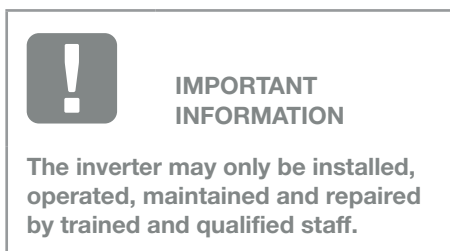


Fig. 5: Example of an information note

### Symbols within the information notes



Important information



Damage to property possible

### Other notes

They contain additional information or tips.



INFO

This is additional information.

Fig. 6: Example of an information note

### Symbols within the additional notes



Information or tip



Enlarged view

## 2.6 Symbols used

| Symbol         | Meaning   |
|----------------|---|
| 1., 2., 3. ... | Sequential steps in a handling instruction                            |
| ➔              | Effect of a handling instruction                                      |
| ✓              | Final result of a handling instruction                                |
| ↗              | Cross-reference to other places in the document or to other documents |
| ■              | List  |

Tab. 1: Symbols and icons used

## Abbreviations used

| Abbreviation | Explanation |
|--------------|-------------|
| Tab.         | Table       |
| Fig.         | Figure      |
| It.          | Item        |
| Ch.          | Chapter     |

### 3. The web server

The web server forms the graphic interface (shown in the browser) between the inverter and the user.\*

\*Deviations due to software versions (UI status) possible.



Fig. 7: Web server

- 1 Selection of language
- 2 Logged-in user
- 3 Inverter name
- 4 Menu
- 5 Values / input boxes
- 6 "Reset" button clears the input and resets it to the previous value.
- 7 "Accept" button saves and accepts all changes

The web server\* allows the user to view important information, current values, events and versions (e.g. user interface, firmware or hardware) relating to the inverter. The statistics provide a summary of the yield and operating duration and also provide the log data, which supplies other information. The inverter can also be quickly and easily configured in the Settings.

## 3.1 Connecting the inverter and computer

If the inverter and PC are already linked by means of a router, you can go straight to **Ch. 3.2**.

If there isn't yet a link, connect the computer to the router using e.g. an Ethernet cable.

More information can be found in the inverter's operating manual.

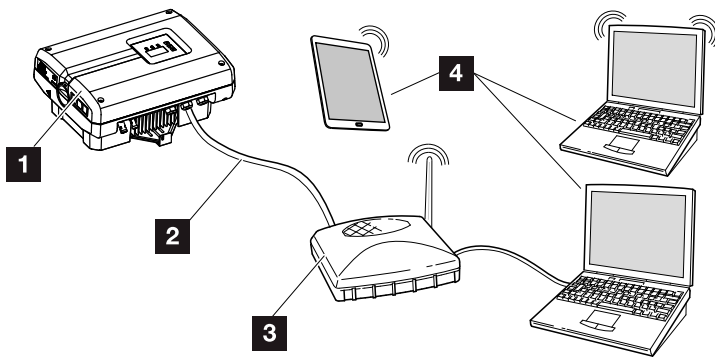




Fig. 8: Connecting inverter and computer


- 1 Inverter
- 2 Ethernet cable
- 3 Switch/hub/router with or without WLAN
- 4 Computer via LAN or WLAN (for configuration or data retrieval)

## 3.2 Using the web server

The web server is accessed on the inverter from a computer using a web browser (e.g. Internet Explorer). Both devices must be on the same network. 

### Settings in the computer<sup>1</sup>

- In the Internet protocol (TCP/IP) of the computer, the options “Automatically acquire IP address” and “Automatically acquire DNS server address” must be activated. 

You can go to the settings for the Internet protocol (TCP/IP) via the control panel: 

Control Panel >> Network and Sharing Center >> Change Adapter Settings.

Right-click on the LAN connection >> Properties >> Select “Internet protocol (TCP/IPv4)” > Properties.

- In the LAN settings of the computer, the option “Use proxy server for LAN” must be deactivated.

You can reach the “LAN settings” via the control panel: Control Panel >> Internet options >> Tab: “Connections” >> LAN settings.



#### TIP

Any device (e.g. a tablet PC) that has a browser (e.g. Internet Explorer 11 or Firefox 39) can be used to access the web server.

<sup>1</sup> With Windows 10



#### INFO

If the computer can already access the network in which the inverter is installed, these settings are not required.




#### INFO

The system control can be opened under Windows 10 with a right mouse click via the Windows icon.

## 3.3 Connecting the inverter and computer

### Connecting the inverter with a computer

1. De-energise the inverter. 
2. Open the inverter cover.

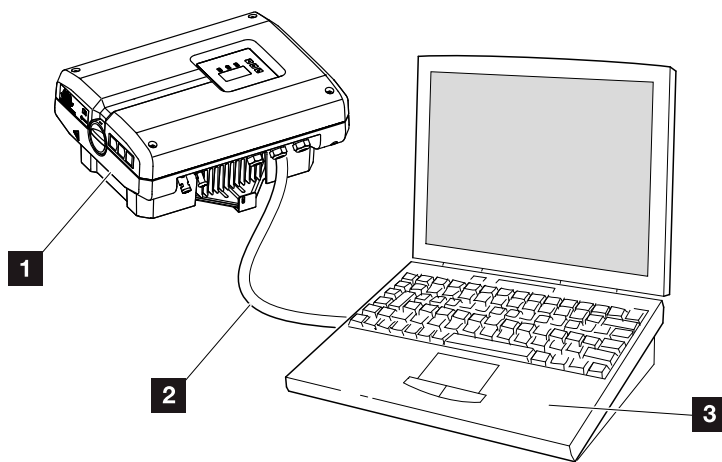



Fig. 9: Connecting inverter and computer with an Ethernet cable

- 1 Inverter
  - 2 Ethernet cable
  - 3 Computer (for configuration or data retrieval)
3. Connect the Ethernet cable to the RJ45 interface of the communication board. 
  4. Connect the Ethernet cable to the computer.
  5. Close the inverter cover.
  6. Activate fuses and DC switch.
- ✓ The inverter is connected to the computer.



#### TIP

You can find additional variants for connecting the inverter with a computer in the operating instructions of the inverter.



#### DANGER

##### RISK OF DEATH DUE TO ELECTRICAL SHOCK AND DISCHARGE!


De-energise the device, secure it against being restarted and wait five minutes so that the capacitors can discharge. A detailed description can be found in the operating instructions of the inverter.



#### IMPORTANT INFORMATION

If the computer and the inverter are connected directly with an Ethernet cable, the adjacent work sequence must be followed!

## 3.4 Calling up web server

1. Launch an Internet browser.
2. Enter the IP address of the inverter in the address line of the browser and confirm with "Enter". 

→ The web server is called up.

3. To log in, click on Login and select a user. The following log in data are preset as "Plant owner" as standard:


**User name: pvserver**

**Password: pvwr**

Enter the user name and password. 

→ The web server's menu opens.

### Undertaking settings in the web server

After logging in, the settings required can be undertaken on the inverter or values can be queried via the web server.  **Ch. 3.8**



#### TIP

The IP address can be queried in the inverter menu under "Settings / Communication / Network settings 2".

Additional entry options in the address line of the browser:

- S and the serial number of the inverter on the type plate (example: <http://S12345FD323456>)
- Name of the inverter: The inverter can be assigned a name. This may be no longer than 15 characters and may not contain special characters like + - \* /... (For example: [http://SWR\\_5](http://SWR_5)).



#### IMPORTANT INFORMATION

**The password should be changed once you have logged in for the first time under Settings.**

**The password may consist of no more than 15 characters and contain the following characters: a-z, A-Z, 0-9 and \_**

**You need a service code to log in as an installer. This can be requested from the service team.**

**If you have forgotten the password, you can reset it to the default values via the service menu > "Reset Weblogin".**

## 3.5 Disconnecting the inverter from the computer

1. De-energise the inverter. ⚠️ ⓘ
  2. Open the inverter cover.
  3. Unplug the Ethernet cable from the inverter and the PC.
  4. Close the inverter cover.
  5. Activate fuses and DC switch.
- ✓ The inverter is once again in operation.



### TIP

Leave the Ethernet cable connected to the inverter. This makes it possible to easily carry out further queries or setting configurations on the inverter.

If connecting through a router, for example, there is no need to remove the connection.



### DANGER

**RISK OF DEATH DUE TO ELECTRICAL SHOCK AND DISCHARGE!**

De-energise the device, secure it against being restarted and wait five minutes so that the capacitors can discharge. A detailed description can be found in the operating instructions of the inverter.

## 3.6 Menu structure in web browser

The menus\* of the web server are explained on the following pages.

\* Deviations due to software versions (UI status) possible.

### Home menu



Home ————— Displays inverter status and the current power values

### Current values menu



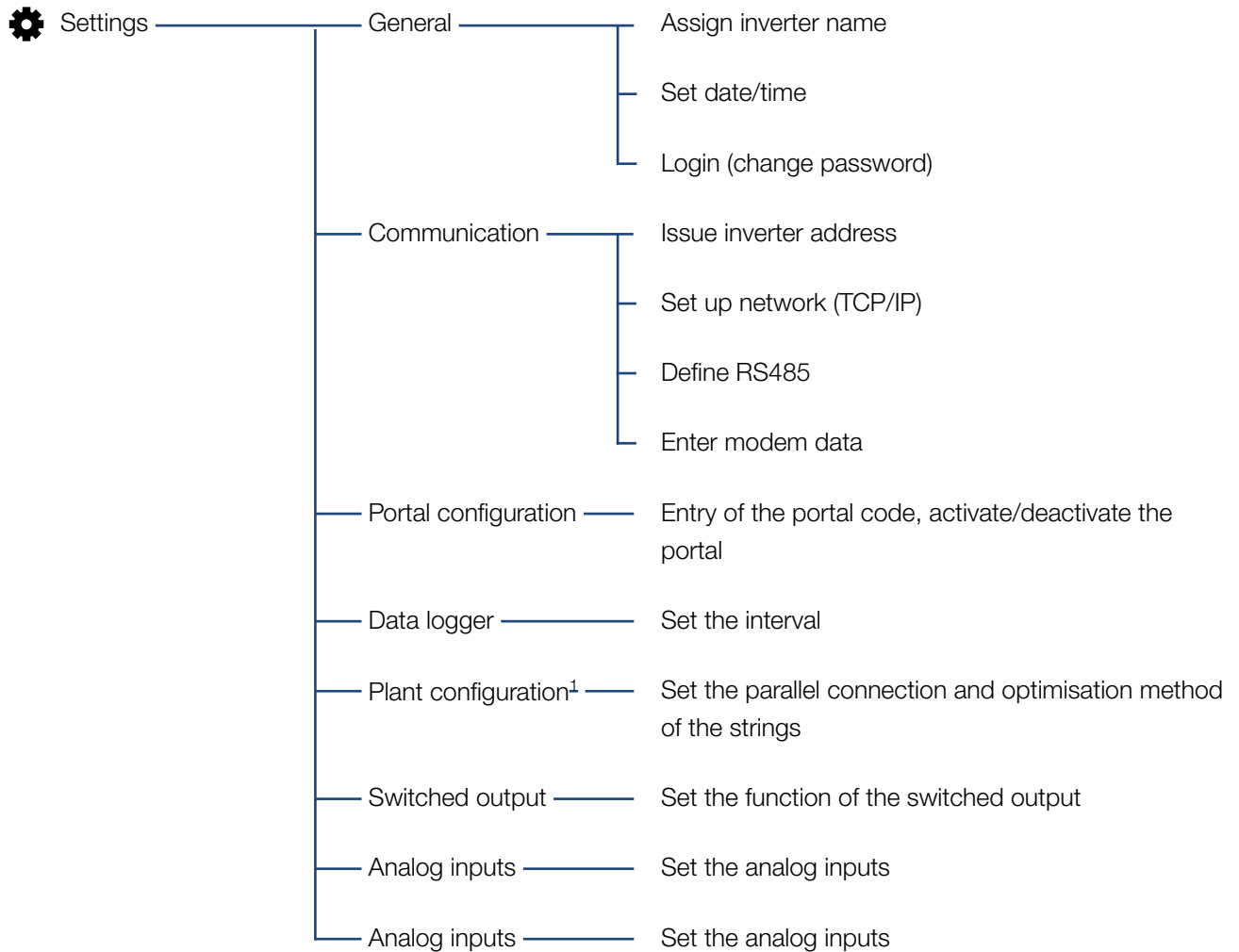
|                |                   |  |
|----------------|-------------------|--|
| Current values | — PV generator —  | Displays voltage, current, performance for each DC input                                 |
|                | — House —         | Display home consumption   |
|                | — Grid —          | Displays voltage, current, performance for each phase and total fed into the public grid |
|                | — Analog inputs — | Displays voltages at the analog inputs on the communication board                        |
|                | — S0 input —      | Displays the function of the S0 input and the associated values                          |

### Statistics menu

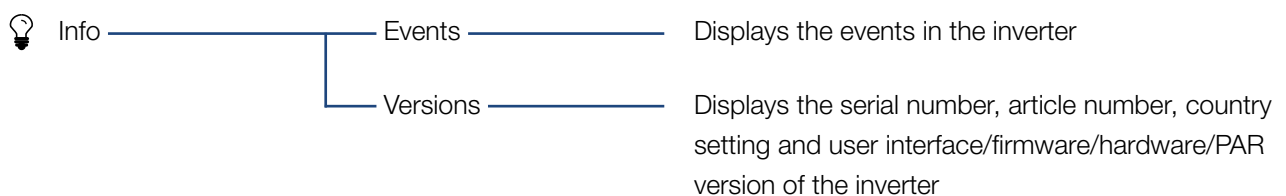


|            |              |  |
|------------|--------------|--|
| Statistics | — Day —      | Displays yield, home consumption, self-consumption, self-consumption rate and degree of self-sufficiency for the current day |
|            | — Total —    | Displays total yield, home consumption, self-consumption, self-consumption rate and degree of self-sufficiency               |
|            | — Log data — | Displays the history/log data stored in the inverter   |

## Settings menu



## Info menu



## Login/Logout menu



<sup>1</sup> These settings are partly only possible with a service code

## 3.7 Web server main menu

### ■ Home

Displays the key information and yield data for the inverter.

### ■ Current values

The various menu items allow the user to view the current values for the PV generators, the home consumption, the public grid connection, the analogue interfaces and the use of the S0/AL-Out contact on the communication board.

### ■ Statistics

Shows information about the inverter's yield and consumption data and the daily or total home consumption. "Log data" shows the inverter's history data or stores it on the computer.

### ■ Settings

These menu items allow you to configure the inverter (e.g. inverter name, network settings).

### ■ Info

On the Info page the user can view events pending in the inverter or the inverter's installed versions (e.g. user interface, firmware, hardware). This information can also be viewed without logging in to the web server.

### ■ Login/Logout

Allows the user to log into or out of the web server.

**Login:** Log in to the web server. You can log in as a plant owner or as an installer. As an installer you require a service code, which gives you additional setting options on the inverter.

**Logout:** Menu item to log out of the web server.




#### INFO

Some menu items appear only after entering a service code.

## 3.8 Web server submenus

### Web server page “Login/Logout”

Allows the user to log into or out of the web server.

- **Login:** Log in to the web server. You can log in as a plant owner or as an installer. As an installer you require a service code, which gives you additional setting options on the inverter. 
- **Logout:** Menu item to log out of the web server.



#### INFO

You need a service code to log in as an installer. This can be obtained from the service team.

### Web server page “Home”

- Displays information and yield data for the inverter.

| Parameter                       | Explanation   |
|---------------------------------|---|
| Power values - total DC Input   | Displays the generated energy of all PV generators.   |
| Power values - output power     | Shows how much power is fed into or drawn from the public grid.                                     |
| Power values - self-consumption | Shows the home consumption covered by self-produced energy (this is not shown for 1-phase devices). |
| Status - operating status       | Operational status of inverter. For more information, see operation instruction manual of inverter. |

## Web server page “Current values”

Menu items to display the current energy values of the AC and DC side.

### ■ PV generator

Displays the generated voltage, current and energy of the PV generators per DC input.

### ■ House

Shows the current home consumption and how this is distributed over the phases.

“Current home consump.” shows from which sources the home consumption is being covered (solar generator and public grid).

“Phase-sel. consumption” indicates how much energy is required on the individual phases.

| Parameter       | Explanation  |
|-----------------|--|
| Solar generator | Indicates the power consumption that is currently being covered from the PV modules.                             |
| Grid            | Indicates the power consumption that is currently being covered from the grid.                                   |
| Phase x         | Indicates the power consumption by phase (1, 2 or 3) that is currently being covered by the PV modules and grid. |

### ■ Grid

Shows the current performance data of the grid side (AC) and how the energy is distributed to the phase.

| Parameter      | Explanation   |
|----------------|---|
| Output power   | Shows how much power is fed into or drawn from the public grid.                               |
| Grid frequency | Shows the current grid frequency.   |
| Cos phi        | Indicates the current reactive power (cos phi).   |
| Limitation on  | Shows the current power curtailment setting.  |
| Phase x        | Indicates the power by phase (1, 2 or 3) that is covered by the battery, PV modules and grid. |

### ■ **Analog inputs**

Shows the voltage which is currently available on the analog input x. The meaning of the voltage data depends on the sensor used. In the case of an irradiation sensor, for example, it may be the intensity of solar irradiation. (For more information, refer to the manual for the sensor).

### ■ **S0 input**

The “Number of energy pulses” shows the number of energy pulses per time unit on the S0 interface. If an external energy meter is connected at the S0 input, for example, the energy counted by the meter can be queried.

## Web server page “Statistics”

Displays the yield, daily consumption, total consumption and log data.

### ■ Day

Shows the yield / consumption values for the current day.

| Parameter                  | Function  |
|----------------------------|---|
| Yield                      | Indicates the energy generated by the PV generators.  |
| Home consumption           | Indicates the energy consumed in the whole house.   |
| Self-consumption           | Indicates the rate of energy consumed in the house that is covered by PV energy.  |
| Self-consumption rate      | The self-consumption rate shows the ratio between self-consumption and the total energy generated by the PV generators.   |
| Degree of self-sufficiency | The degree of self-sufficiency indicates what percentage of the house's total power requirement is covered by self-generated PV energy. The higher the value, the less energy has had to be purchased from the energy supplier. |

## ■ Total

Shows all yield / consumption values that have accumulated in the inverter.

| Parameter                  | Function  |
|----------------------------|---|
| Yield                      | Indicates the energy generated by the PV generators.  |
| Home consumption           | Indicates the energy consumed in the whole house.   |
| Self-consumption           | Indicates the rate of energy consumed in the house that is covered by PV energy.  |
| Self-consumption rate      | The self-consumption rate shows the ratio between self-consumption and the total energy generated by the PV generators.   |
| Degree of self-sufficiency | The degree of self-sufficiency indicates what percentage of the house's total power requirement is covered by self-generated PV energy. The higher the value, the less energy has had to be purchased from the energy supplier. |
| Operation time             | Indicates the run time of the inverter.   |


## ■ Log data

The link calls up the measured values (log data). The log data of the inverter can be downloaded as a DAT file (logData.dat). The data in the file is in CSV format and can be viewed with any spreadsheet program (e.g. Excel). For more information, see operation instruction manual of inverter.

Option **“Open”**:

The data are displayed in a new or the same browser window.

Option **“Save”**:


The data (LogDaten.dat) are saved on your hard drive. After saving, this data can be displayed and further processed. 



### INFO

If the inverter is not connected to a solar portal, regular backup copies of the log data should be created.

## Web server page “Settings”

In Settings you can configure the inverter and the external components (e.g. sensor, ripple control receiver). 

### ■ General

Set the general parameters of the inverter.

| Menu item     | Function   |
|---------------|--|
| Inverter name | Enter the inverter name. The characters a–z, A–Z, 0–9 and “_” are allowed for the name change. Spaces or special characters are not possible. The browser connection to the web server can take place with the new name following the name change. Access with the serial number remains possible. |
| Date/time     | Enter the time and date. It is possible to adopt the PC time using the button “Set to PC time”.  |
| Login         | Change current password  |




#### INFO

The entries must be confirmed with a click on the “Accept” button. The settings are then saved.

## ■ Communication

Set the communication parameters of the inverter.

| Menu item        | Function   |
|------------------|--|
| Inverter address | Input RS485 address of inverter.<br>When two or more inverters are connected via RS485, each inverter must be given its own RS485 address.   |
| Network (TCP/IP) | Input network, gateway and DNS server configuration.<br>Configuration of the inverter network interface (Ethernet).<br><br>As the standard default setting, the option “Auto IP/DHCP” and “Router/Gateway” is activated. <br><br>For a detailed description of this, refer to the chapter “System monitoring” in the operating instructions manual of inverter. |



### INFO

As the standard default setting, the option “Auto IP / DHCP” is activated. This means that the inverter acquires its IP address from a DHCP server or automatically generates an IP address.

If the inverter is not allocated an automatic IP address through a DHCP server, the inverter can be configured using “Manual”.

The data necessary for configuration, such as IP, router and DNS addresses, can be found on your router / gateway.

If the inverter is connected to a “Router/Gateway”, the “Router/Gateway” option must be activated.

If data export using “Inverter with modem” is selected, communication is carried out through an inverter's modem. This can be installed in your own or another inverter.

“Network info” shows the addresses which the inverter is currently using. If the router / gateway also functions as a DNS server, the same IP address is displayed under DNS Server 1. If an alternative DNS server is issued through the “Manual” setting, the IP address for this is displayed under DNS Server 2.

#### Network configuration

☒ Auto-IP / DHCP

☐ Manual

IP address:  .  .  .

Subnet mask:  .  .  .

Router/Gateway:  .  .  .

DNS Server:  .  .  .


#### Data export

☒ Router/Gateway

☐ Inverter with modem

#### Network info

IP address: 168.192.2.32  
 Subnet mask: 255.255.255.0  
 Router/Gateway: 168.192.2.1  
 DNS server 1: 168.192.2.1  
 DNS server 2: 0.0.0.0  
 MAC address: 00:80:41:ae:fd:7e

| Menu item | Function   |
|-----------|--|
| RS485     | <p><b>Bus termination:</b> The bus termination must be activated on devices which are at the end of the RS485 bus.</p> <p><b>Bus bias voltage:</b> At least one device in an RS485 bus system should supply the bus voltage. Activation means that the inverter supplies the bus voltage.</p> <p><b>Protocol:</b> Selects the protocol used on the bus. </p> <p>KOSTAL: Used to reach additional PIKO inverters or an external data logger / power manager via the interface.</p> <p>Modbus: is used, to connect e.g. External data logger / power manager at the RS485</p> <p><b>Baud rate:</b> Selects the baud rate to be used for the bus system.</p> <p><b>Inverter address:</b> Displays the RS485 address of the inverter.</p> |
| Modem     | <p>Shows the modem status. When the GSM modem is connected correctly, the GSM signal strength is displayed. When the modem is connected incorrectly or not available, "No modem available" is displayed.</p> <p><b>GSM-PIN:</b> PIN of SIM card.</p>   |



#### INFO

A detailed description of the used protocol (e.g., TCP, RS485, KOSTAL, Modbus-RTU), can be requested via the service.

### ■ Portal configuration

Enter the solar portal configuration. If you want to use a solar portal, the log data and events can be sent to the solar portal

| Menu item              | Function  |
|------------------------|---|
| Portal code            | Input box for the portal code of a solar portal (e.g. PIKO Solar Portal - P3421).                                   |
| Active portal          | Display of the active portal.   |
| Last portal connection | Displays how many minutes ago the inverter last transferred data to the solar portal (when the function is active). |
| Data export            | Removal of the "check" deactivates sending to the solar portal.   |

### ■ Data logger

Choose from a saving interval of 5, 15 or 60 minutes.



#### INFO

When 5 minutes is selected, the data can be saved for approximately 130 days. When 15 minutes is selected, the data can be saved for approximately 400 days. When 60 minutes is selected, the data can be saved for approximately 1500 days. When the internal memory is full, the oldest data will be overwritten.

## ■ Plant configuration

Possible settings for activating parallel connection of generators or a variant of MPP tracking optimisation.



| Menu item                                       | Function   |
|---|--|
| Parallel connection<br>(only with service code) | Parallel connection can be activated or deactivated here depending on the connection of DC inputs DC1 and DC2 in the inverter. The string connection can only be adjusted for inverters with at least 2 DC inputs. A detailed description of parallel connection can be found in the operating instructions manual of inverter   |
| Plant management                                | <p><b>Shadow management:</b><br/>If PV strings are in partial shading, the PV string affected no longer achieves its optimum performance. If shadow management is activated, the inverter adapts the MPP tracker of the selected PV string such that it can operate at maximum possible performance. The function can be activated for each individual string.</p> <p><b>External module control:</b><br/>If PV modules with their own MPP tracker optimisation are connected to the inverter, the assistance of this external module control can hereby be activated.</p> |



### INFO

Not possible with PIKO 3.0



### INFO

If the DC inputs DC1 and DC2 are connected in parallel, they can no longer be optimised using shadow management.



### INFO

A list of approved optimizations and external module controls can be found on our homepage under the download area.


## ■ Switched output

Set the function of the S0 switched output on the communication board. The 2-pin terminal can be assigned various functions.

| Parameter                        | Function  |
|----------------------------------|---|
| S0 pulses                        | The switched output functions as a pulse output as described in EN 62053-31 with a constant rate of 2,000 pulses per kilowatt hour. This function is a factory setting. |
| Alarm output                     | The switched output functions as a potential-free NC contact. It is opened when an event occurs.  |
| Self-consumption control         | The switched output functions as a potential-free NO contact. It closes when the set conditions are fulfilled.  |
| Dynamic self-consumption control | A detailed description can be found in the operating instructions manual of inverter.   |

## ■ Analog inputs

Two settings are possible here.

| Menu item            | Function  |
|----------------------|---|
| Sensors              | If a sensor (e.g. PIKO Sensor) is connected.  |
| Active power control | For the connection of a ripple control receiver. <br>A detailed description can be found in the operating instructions manual of inverter. |



### IMPORTANT INFORMATION

The ripple control receiver may only be connected at the master inverter.

## Web server page “Info”

Displays all events and version numbers of the inverter.

### ■ Events

Call up events that have been stored in the inverter. Event messages can be faults or other events. Remedial measures can be found in the “Event codes” chapter in the operating instructions manual of the inverter.

### ■ Versions

Shows information about the versions installed on the inverter. This information can also be viewed without logging in to the web server.

| Function        | Meaning                              |
|-----------------|--------------------------------------|
| UI              | User interface version               |
| FW              | Firmware version                     |
| HW              | Hardware version                     |
| PAR             | Version of set of parameters         |
| Serial number   | Inverter serial number               |
| Articel number  | Articel number of the inverter       |
| Country setting | Shows the inverter's country setting |



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