SOLAR ELECTRIC

KOSTAL

KOSTAL inverters

Interconnection and setup of several KOSTAL inverters

Installation guide

Installation guide

You can find this installation guide for interconnecting several KOSTAL inverters in our **Download area** for the KOSTAL Smart Energy Meter under Operating manuals.

WARNING

Failure to observe this guide may result in injury or damage to the device.

The installation guide does not replace the operating instructions or manuals for the inverter, battery and KOSTAL Smart Energy Meter required for proper assembly and installation.

IMPORTANT INFORMATION

Installation may only be carried out by a trained and qualified electrician!

Observe the safety instructions in the operating manual for the inverter, battery and KOSTAL Smart Energy Meter.

Whenever work is carried out on the devices or on the supply lines, the power supply in the house, inverter and battery must be completely de-energised. Refer to the corresponding operating manuals of the relevant devices (inverter/battery/KOSTAL Smart Energy Meter).

Device network of KOSTAL inverters

Up to 10 KOSTAL inverters can be used as a device network in the same house grid.

Note that

- there may be a maximum of one battery storage unit in the device network.

  This must be connected to a PLENTICORE plus or PLENTICORE BI.
- If an ENECTOR is connected to the KOSTAL Smart Energy Meter, a PIKO MP plus cannot be integrated into the system as a PV inverter.

The KOSTAL Smart Energy Meter is required for power monitoring or dynamic limitation of the feed-in capacity (e.g. to 70 %) at the grid connection point. This is installed at the grid connection point in the house grid as shown in the illustrations on the following pages.

IMPORTANT INFORMATION

Nature and source of hazard

If a battery storage unit is being used in the system, the feed-in capacity can be limited to up to 50%. Note this when configuring the settings in the Webserver menu of the KOSTAL Smart Energy Meter.

INFO

In this variant, the KOSTAL Smart Energy Meter runs as a master and transmits data to all KOSTAL inverters in the house grid.

In a device network comprising multiple inverters, the data is merged in the portal. Correct and complete visualisation can only be found in the KOSTAL Solar Portal and in the KOSTAL Solar App and not in the individual inverter. Please add all KOSTAL inverters and the KOSTAL Smart Energy Meter to the same PV system in the KOSTAL Solar Portal.

You have these options

The wiring can be structured as follows:

1. Device network comprising PV inverters and a hybrid or battery inverter.
2. Device network comprising PV inverters.

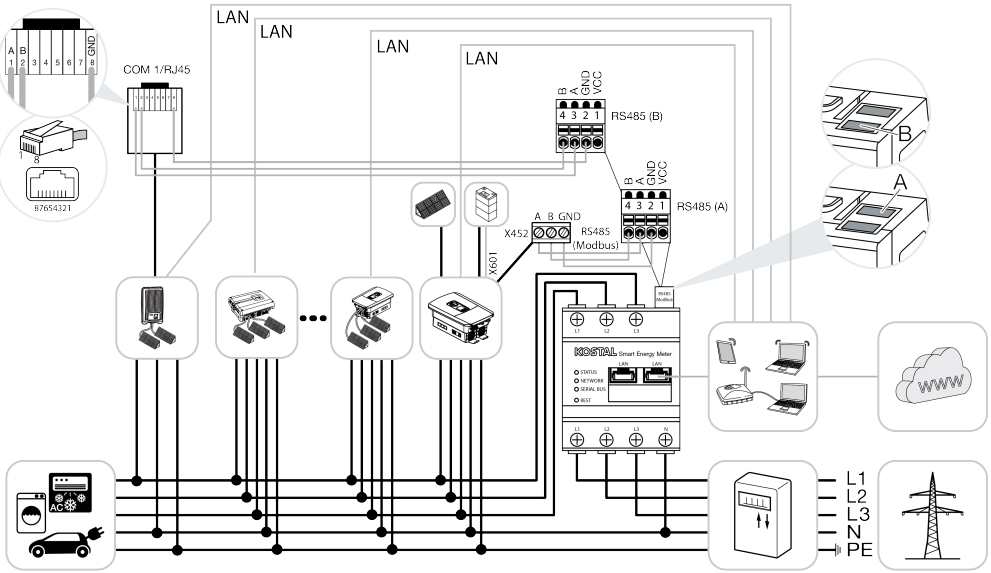
Type	Inverter
	As a device network comprising ■ PV inverters ■ and a hybrid or battery inverter.
	As a device network comprising ■ PIKO 4.2-20 (FW >= 05.00) / PIKO EPC

Device network comprising PV inverters and a hybrid or battery inverter.

The following KOSTAL inverters can be used in a device network comprising PV inverters and a hybrid or battery inverter:

Type	Inverter
	1 x PLENTICORE plus with battery or 1 x PLENTICORE BI with battery
	PIKO IQ / PLENTICORE plus without battery
	PIKO 4.2-20 (FW >= 05.00) / PIKO EPC
	PIKO MP plus as a PV inverter

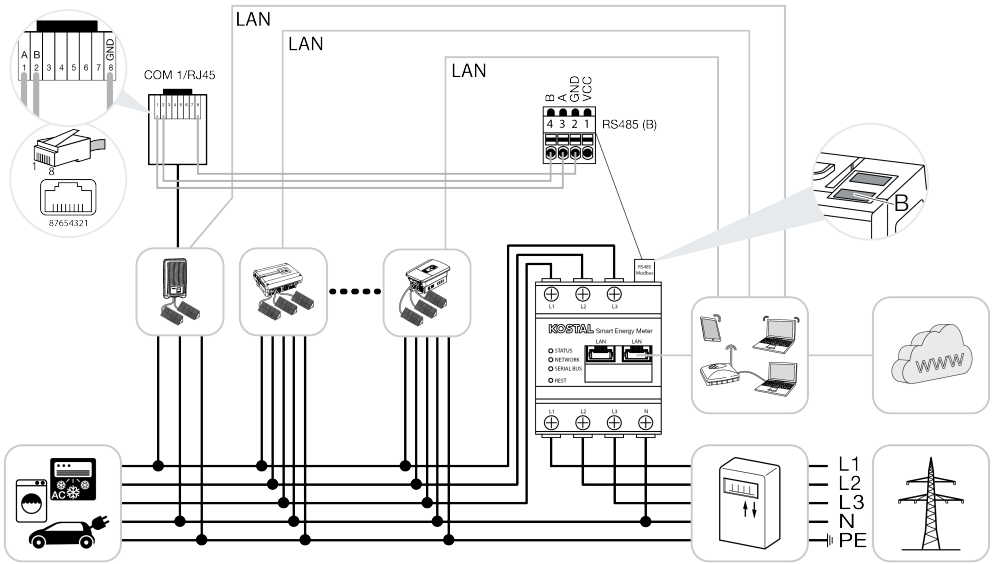
Please note that with this option, a maximum of one storage system can be integrated.



Device network comprising PV inverters

The following KOSTAL inverters can be used in a device network comprising only PV inverters:

Type	Inverter
	PIKO IQ / PLENTICORE plus without battery
	PIKO 4.2-20 (FW >= 05.00) / PIKO EPC
	PIKO MP plus



Installation procedure

The following steps must be undertaken to connect several KOSTAL inverters:

IMPORTANT INFORMATION

Installation may only be carried out by a trained and qualified electrician!

Observe the safety instructions in the operating manual for the inverter, battery and KOSTAL Smart Energy Meter.

Whenever work is carried out on the devices or on the supply lines, the power supply in the house, inverter and battery must be completely de-energised. Refer to the corresponding operating manuals of the relevant devices (inverter/battery/KOSTAL Smart Energy Meter).

1. Install all KOSTAL inverters in the house grid (see installation overview).
2. Install KOSTAL Smart Meter at the grid connection point (see installation overview).
3. Connect all devices to the KOSTAL Smart Meter and the Internet via LAN.
4. If a hybrid/battery inverter with connected battery is being used, also connect this to the KOSTAL Smart Energy Meter via the RS485 interface.
5. If a PIKO MP plus is being used, also connect this to the KOSTAL Smart Energy Meter via the RS485 interface.
6. Activate Modbus protocol in PIKO IQ, PLENTICORE plus and PLENTICORE BI.
7. If a hybrid/battery inverter with connected battery is being used, enable storage of excess AC energy from local generation.
8. Configure the settling time in the KOSTAL inverters for feed-in limitation/power limitation.
9. Activate data transfer to the KOSTAL Solar Portal in all KOSTAL inverters and KOSTAL Smart Energy Meters.
10. Set up all KOSTAL inverters in the KOSTAL Smart Energy Meter.
11. Set feed-in limitation/power limitation for the grid connection point in the KOSTAL Smart Energy Meter.
12. Activate the time server (automated time setting) in the KOSTAL Smart Energy Meter.
13. Assign all KOSTAL inverters and the KOSTAL Smart Energy Meter to a PV system in the KOSTAL Solar Portal.

Installing the communication link

All devices must be connected to the KOSTAL Smart Energy Meter and the Internet via LAN. In addition, a PLENTICORE plus or PLENTICORE BI that has a battery connected to them must be connected to the KOSTAL Smart Energy Meter via the RS485 interface.

INFO

For details, see the KOSTAL inverter operating manual and the KOSTAL Smart Energy Meter installation instructions.

LAN connection:

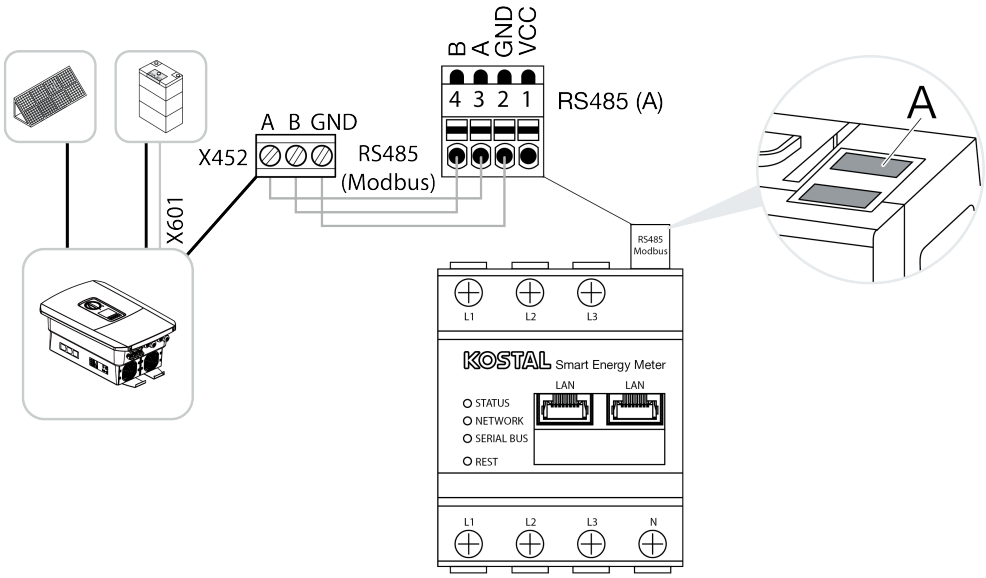
- PIKO IQ / PLENTICORE plus / PLENTICORE BI
- PIKO 4.2-20 (FW >= 05.00) / PIKO EPC
- PIKO MP plus (only needed for the data transfer to the KOSTAL Solar Portal)

RS485 connection:

Communication between the hybrid/battery inverter (PLENTICORE plus or PLENTICORE BI with connected battery) and the KOSTAL Smart Energy Meter must be established via an RS485 connection.

Inverter to RS485 interface (A) on the KOSTAL Smart Energy Meter:

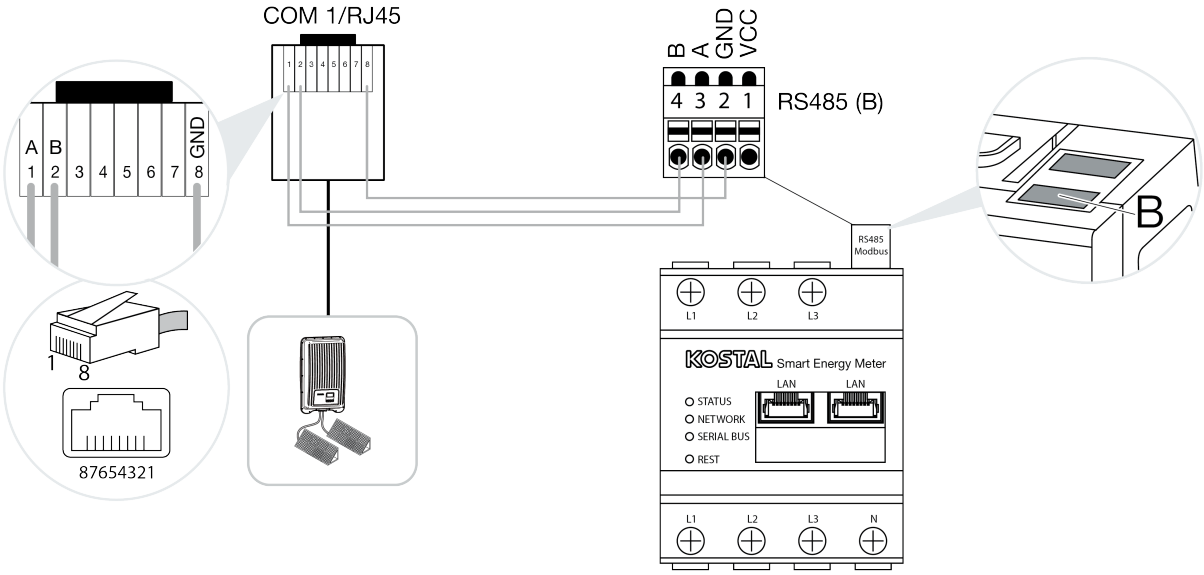
- PLENTICORE BI or PLENTICORE plus with battery



Communication between the PIKO MP plus and the KOSTAL Smart Energy Meter must be established via an RS485 connection.

Inverter to RS485 interface (B) on the KOSTAL Smart Energy Meter:

- PIKO MP plus

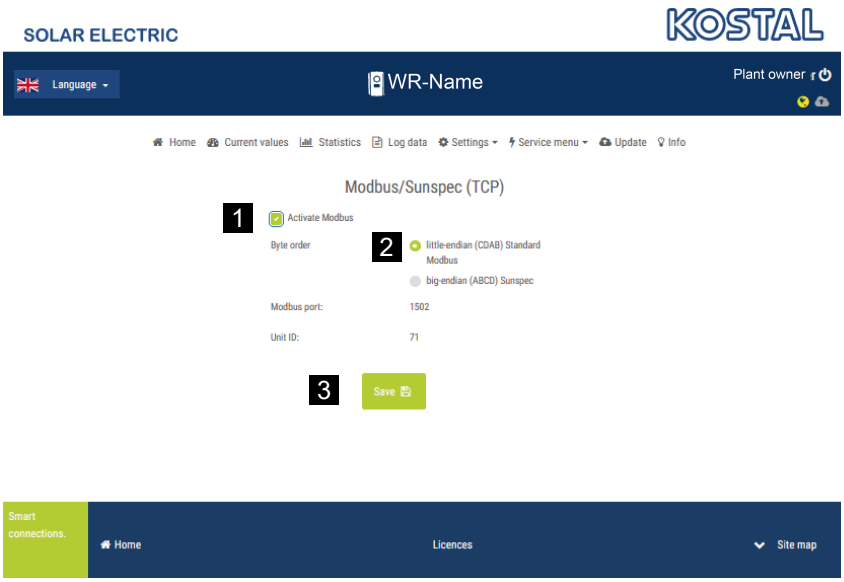


Activating Modbus protocol

Communication between the KOSTAL Smart Energy Meter and the KOSTAL inverters is undertaken via the Modbus protocol. For this purpose, the Modbus protocol must be activated in the inverter.

For the PIKO IQ, PLENTICORE plus or PLENTICORE BI:

To enable communication between the KOSTAL Smart Energy Meter and the inverter, the Modbus protocol must be activated.



Activate the Modbus (TCP) protocol by going to the following menu item in the Webserver (1):

Settings > Modbus / SunSpec (TCP) > Activate Modbus.

INFO

More information can be found in the inverter's operating manual. The byte order should be left as little-endian (CDAB) standard Modbus (2).

For the PIKO MP plus, PIKO 4.2-20 (FW >= 05.00) or PIKO EPC

No further settings are required for these inverters.

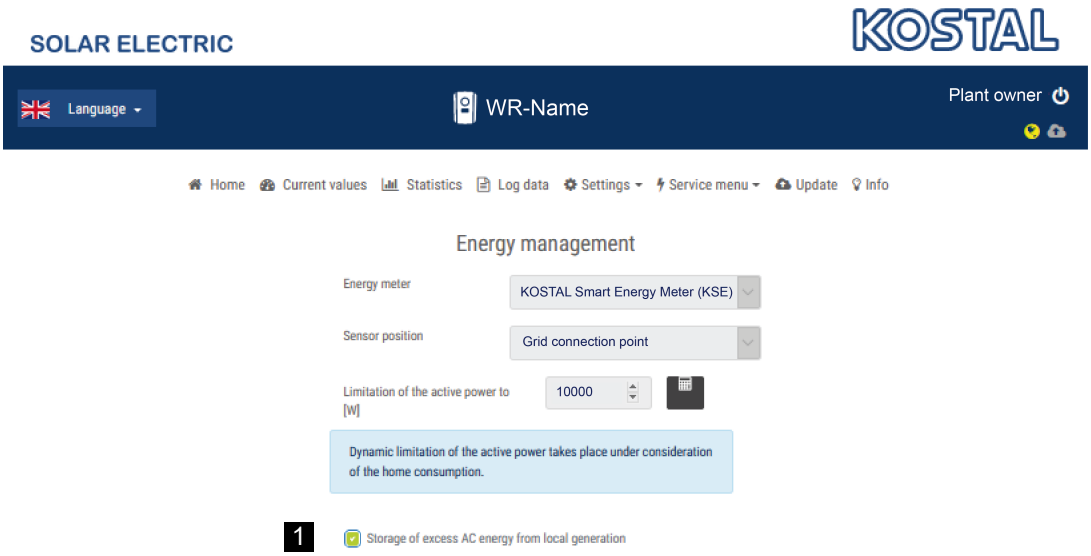
Activating storage of excess AC energy from local generation

Only for hybrid/battery inverter (PLENTICORE plus with battery/PLENTICORE BI)

When using a hybrid or battery inverter (PLENTICORE plus or PLENTICORE BI with connected battery), activate ***Storage of excess AC energy from local generation*** (1) by going to ***Service menu > Energy management***. This ensures that the energy of all PV inverters available in the house grid is used to charge the battery system.

INFO

More information can be found in the inverter's operating manual. The settings on the inverter can only be configured once you have registered as an installer using the personal service code.



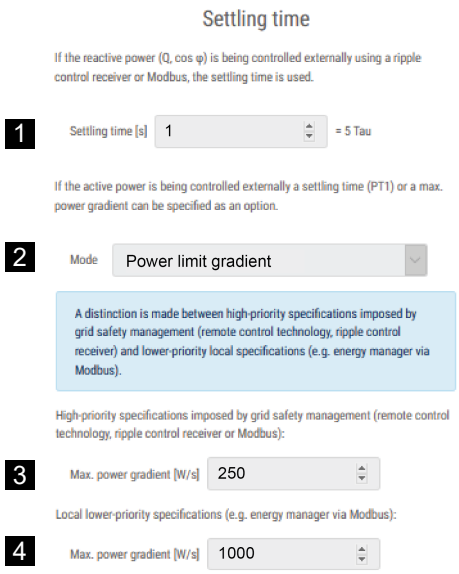
Configuring settling time

For the KOSTAL Smart Energy Meter to achieve a rapid type of control with a set feed-in limitation (power limitation) or zero feed-in, the settling time must be configured in all KOSTAL inverters.

To do this, proceed as follows:

1. For the PIKO IQ, PLENTICORE plus or PLENTICORE BI:
   Go to Service > Settling time via the Webserver.

   For the PIKO 4.2-20 (FW >= 05.00) and PIKO EPC:
   Using the PARAKO user software, call up the settling time by going to ***Change settings > Power limitation and reactive power feed-in > Settling time (external control)***. More information about the PARAKO parameterisation software for PIKO inverters can be found on our homepage in the download area for your product under Operating manual application.



2. Set the settling time (1) to 1s.
3. For external control of active power, select Power gradient under Mode (2).
4. In the specifications for max. power gradient, enter 250 W/s as the value for high priority (3) and 1000 W/s for low priority (4).
5. Save the settings.

✓ The settling time has been set.

Activating data transfer to the KOSTAL Solar Portal

Activate data transfer to the KOSTAL Solar Portal.

This requires the following steps:

For the PIKO IQ, PLENTICORE plus or PLENTICORE BI:

Calling up Webserver

1. Launch an Internet browser.
2. Enter the inverter's IP address in the browser's address bar and confirm with ***Return***. The IP address can be queried in the inverter menu.

➔ The Webserver is called up.

3. To log in, click on ***Login*** and log in as plant owner.

✓ The Webserver's menu opens.

Configuring settings in the Webserver

After logging in, the settings required can be configured on the inverter via the Webserver.

1. Go to the ***Settings > Solar Portal*** page.
2. Enable ***Use portal***.
3. Under ***Portal***, select the ***KOSTAL Solar Portal***.
4. Click on ***Save***.

✓ Data transfer to the KOSTAL Solar Portal is now enabled.

It may take up to 20 minutes to register on the portal.

For the PIKO 4.2-20 (FW >= 05.00) and PIKO EPC:

Calling up the inverter menu

1. Select the ***Settings*** menu on the inverter.
2. Confirm with the ***ENTER*** key.
3. Go to ***Settings > Communication***
4. Use the ***UP*** and ***DOWN*** keys to select the ***Portal configuration*** menu.
5. In the ***Code:*** field, enter the code ***P3421***.
6. Press and hold the ***ENTER*** key for approximately 3 seconds.
7. Select the ***Accept*** field.

✓ You have now entered the portal code. Data transfer to the ***KOSTAL Solar Portal*** is now enabled.

For the PIKO MP plus:

Data transfer is automatically activated on the PIKO MP plus.

Once the network connection has been established, the inverter automatically begins transferring data to the ***KOSTAL Solar Portal***.

If you do not want data to be transferred automatically, you can remove the network cable or deactivate data transfer under ***Settings > Network***.

For the KOSTAL Smart Energy Meter:

1. Launch an Internet browser.
2. Enter IP address.
3. Alternatively, ***http://ksem-seriennummer*** or ***http://ksem-g2-seriennummer*** can be used.
4. Log in with device password. You will find the password on the type plate or on the extra sticker from the package in the packaging.
5. Open the Solar Portal menu.
6. Enable and save transfer to the Solar Portal.

✓ Data transfer to the KOSTAL Solar Portal is now enabled.

Settings in the KOSTAL Smart Energy Meter

1. RS485 interface

By default, no changes have to be made to the RS485 interfaces.

These arrive preconfigured.

The following devices can be connected to the RS485 interfaces:

- RS485 interface (A): PLENTICORE plus / PLENTICORE BI
- RS485 interface (B): PIKO MP plus

If changes are to be made to the settings, perform the following steps:

1. Call up the KOSTAL Smart Energy Meter's online interface
2. Call up Modbus configuration under ***Modbus settings***.
3. Select ***PIKO IQ/PLENTICORE*** from drop-down list.
4. Press the ***Save*** button to adopt the settings.

✓ Settings for the RS485 interface (A) have been completed

INFO

When an inverter is selected, the predefined default values are adopted. These can be adjusted if necessary.

If a PIKO MP plus is to be added as a PV inverter, the slave interface B must be deactivated.

Parameter	Value
Interface	RS485 A
Mode	Slave
Presetting	PIKO IQ/PLENTICORE
Slave address	1
Baud rate	38400
Data bits	8
Parity	None
Stop bit	2

2. Adding KOSTAL inverters in the KOSTAL Smart Energy Meter

If you want to monitor the power at the grid connection point or use the dynamic limitation of feed-in capacity, all KOSTAL inverters present in the device network must be set up in the KOSTAL Smart Energy Meter.

INFO

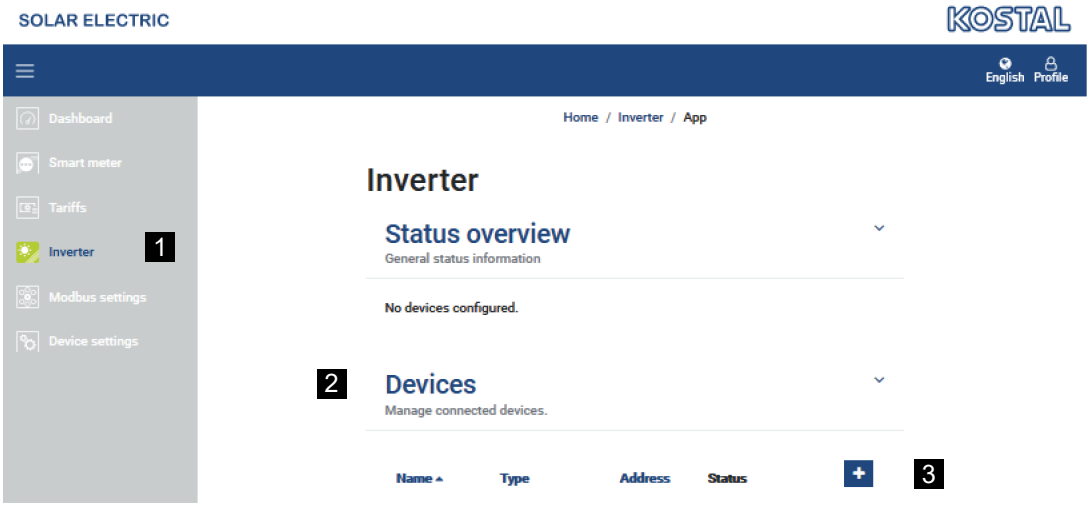
If power specification via ripple control receivers is required for the system in question, please do not add the inverters to the KOSTAL Smart Energy Meter under any circumstances!

Instead, configure the use of the ripple control signals in the KOSTAL inverters. You will find more detailed information in the relevant operating manuals.

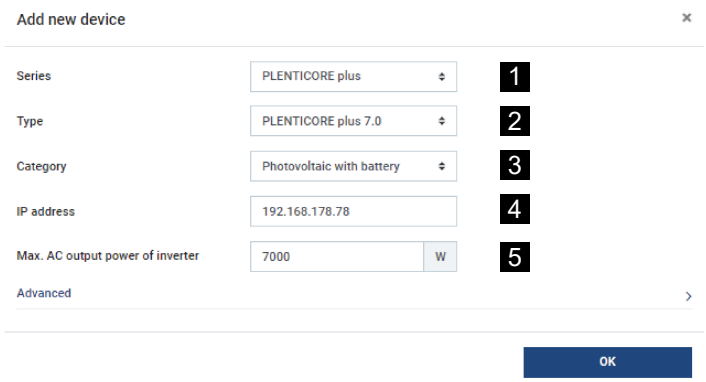
All KOSTAL inverters present in the device network must be set up in the KOSTAL Smart Energy Meter.

To do this, proceed as follows:

1. Call up the KOSTAL Smart Energy Meter's online interface
2. Go to ***Inverter > Devices*** (manage the inverters used).



3. Use the plus symbol to add an inverter.



4. Add more inverters using the same function.
5. Press the ***OK*** button to adopt the settings.

✓ The inverters have been set up in the KOSTAL Smart Energy Meter.

INFO

When an inverter is selected, the predefined default values are adopted. These can be adapted if necessary. Further information on the set up can be found in the operating manual for the KOSTAL Smart Energy Meter.

Parameter	Value
Series	Select inverter series
Category	Select here whether a battery is directly connected to the inverter (PLENTICORE).
IP address	Enter the inverter's IP address. The IP address can be read on the inverter's display.
Maximum output power	Enter the inverter's max. output power. This is required if a power limitation is to be set and calculated at the grid connection point.
Open advanced settings	
Unit ID	The unit ID does not have to be changed

3. Setting the feed-in capacity limitation for the grid connection point in the KOSTAL Smart Energy Meter.

A dynamic limitation of the feed-in capacity/feed-in limitation for the entire system measured by the KOSTAL Smart Energy Meter (e.g. to 70 % of the total output) can be set by going to ***Plant overview/ Settings > Settings (cogwheel) > Power limitation***. If this is necessary for your system, proceed as follows.

The power limitation monitors the feed-in of the entire system. If the value set for the feed-in limit is exceeded, the KOSTAL Smart Energy Meter calculates the amount by which each connected inverter needs to reduce its output to avoid exceeding the feed-in limit. The maximum output power value set for each individual inverter provides the basis for calculating the amount by which the inverter needs to reduce its power.

To do this, proceed as follows:

1. Call up the KOSTAL Smart Energy Meter's online interface
2. Go to Plant overview/Settings > Settings (cogwheel) > Power limitation Power limitation.

3. Activate power limitation (1).
4. Enter a value for the power limitation (2). The calculator function (3) can be used for the calculation. Here you can enter e.g. 70 % and the power limitation will be calculated automatically based on the values entered.
5. Important: If a battery storage unit is being used in the system, the feed-in capacity can be limited to up to 50%.
6. Press the Save button to adopt the settings.

✓ The power limitation has been set up in the KOSTAL Smart Energy Meter.

Activating time server in KSEM

For the data in the Solar Portal to display the correct time values, it is important that the correct time zone and time have been selected in the KOSTAL Smart Energy Meter. The NTP server (Network Time Protocol server) should be activated for this too.

To do this, proceed as follows:

1. Call up the KOSTAL Smart Energy Meter's online interface
2. Go to ***Device Settings > Device*** .
3. Select the time zone under ***Date and Time***.
4. If the KOSTAL Smart Energy Meter is permanently connected to the Internet via a network, activate ***NTP***. The time is then automatically obtained from the Internet via a server. Under the advanced settings, you can also set an alternative NTP server.
   If the KOSTAL Smart Energy Meter is not connected to the Internet, the time can also be set manually. The current system time and your current browser time are displayed on the interface for this purpose. Click on ***Set time*** to synchronise the two times. Your browser time is automatically converted into UTC and set as the KOSTAL Smart Energy Meter's system time.

5. Press the ***Save*** button to adopt the settings.

✓ The time settings have been configured

Setting up devices in the KOSTAL Solar Portal

All KOSTAL inverters and the KOSTAL Smart Energy Meter must be assigned to the same PV system in the KOSTAL Solar Portal.

- To do this, log on to the KOSTAL Solar Portal at **https://www.kostal-solar-portal.com**.
- Create a new system.
- Now add all KOSTAL inverters that are in the system and the KOSTAL Smart Energy Meter to this system.

Further information can be found in the operating manual for the KOSTAL Solar Portal. You can download them from the Download area of our website at **https://www.kostal-solar-electric.com** or visit our **YouTube channel** where you will find a large number of helpful videos.

Creating a system in the KOSTAL Solar Portal

1. Log into the KOSTAL Solar Portal.

INFO

Before you can register the inverter on the KOSTAL Solar Portal, the inverter has to log into the KOSTAL Solar Portal. This may take up to 20 minutes from first being set up in the inverter.

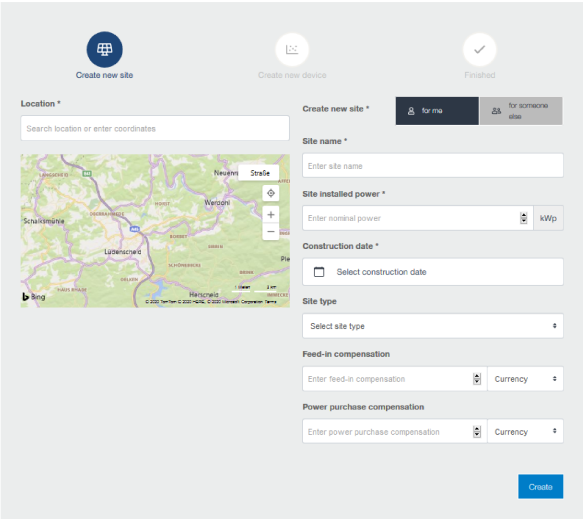
2. To set up an inverter, a system must first be created. To do this, under the heading ***System overview***, click on the button ***Create new system***.

➔ The ***Create new system*** page appears. Here you can set up a system.

INFO

You can also create a system here for someone else (e.g. as an installer for a customer). To do this click on the For someone else button. They will then be notified about the setup by e-mail.

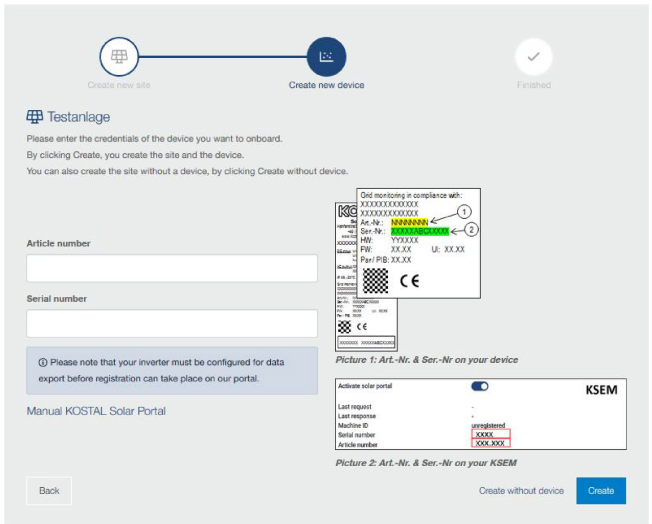
Create new site



3. Enter the system data and click on ***Create***.

➔ The ***Create new device*** page appears.

Create new device



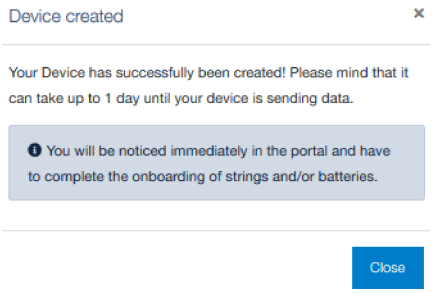
4. Enter the article number and serial number of the inverter here. These can be found on the inverter's type plate. Click on ***Create***.

INFO

If you do not yet have an inverter or if it has not yet logged into the portal, you can initially also create the system without devices and add devices at a later time by going to System > Configuration > Devices.

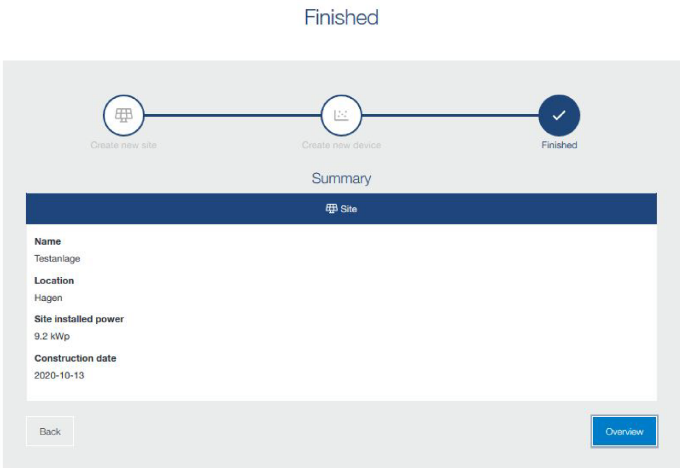
If you have a KOSTAL Smart Energy Meter, you can use the data from the KSEM > Solar Portal view to add the correct data.

➔ When the inverter is found, it is added to the system.



5. Close the window by clicking on the ***Close*** button.

➔ A summary appears.



6. A system with inverter has been created. Close the window by clicking on the ***Overview*** button.

➔ This opens the ***KOSTAL Solar Portal | System list*** page.

✓ The new system is now displayed in the system list.

www.kostal-solar-electric.com

06/2023 - EN - DOC02671194-0004 - Subject to technical changes. Errors excepted.
You can find current information at www.kostal-solar-electric.com.