SOLAR ELECTRIC

KOSTAL

KOSTAL Smart Energy Meter

Power measuring device - G2 series



Operating manual

Legal notice

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KOSTAL Solar Electric GmbH is aware of how language impacts on gender equality and always makes an effort to reflect this in documentation. Nevertheless, for the sake of readability we are unable to use non-gender-specific terms throughout and use the masculine form instead.

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Valid from KOSTAL Smart Energy Meter version:

SW 2.8.0

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1.1 Contact

Thank you for choosing a device from KOSTAL Solar Electric GmbH.

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

Warranty and service

Please have the following information to hand for speedy processing:

- Type designation
- Serial number (see type plate on the device)

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1.2 About this manual

Read this manual carefully in its entirety.

It contains important information about installation and operation. Pay particular attention to the information regarding safe usage. KOSTAL Solar Electric GmbH assumes no liability for damages arising from non-observance of this manual.

This manual is an integral part of the product. It applies exclusively to the device from KOSTAL Solar Electric GmbH. Keep this manual and give it to the new owner should you pass it onto a new operator.

The installer and the operator must have unrestricted access to these instructions at all times. The installer must be familiar with this manual and follow all instructions.

The most recent version of the operating manual for your product is available in the download area at **www.kostal-solar-electric.com**.

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1.3 Exclusion of liability

Any use that deviates from or goes beyond the proper use described is considered improper use. The manufacturer accepts no liability for any damage resulting from this. Modifications to the device are prohibited. The device may only be used if it is safe to operate and is in a technically perfect condition. Any instance of misuse will result in the termination of the warranty, guarantee and general liability of the manufacturer.

INFO

The device may only be installed, maintained and repaired by a trained and qualified electrician.

Only a qualified electrician may open the device. The device must be installed by a trained electrician (according to DIN VDE 1000-10 or BGV A3 accident prevention regulations or an internationally comparable standard) who is responsible for observing the applicable standards and regulations.

The electrician is responsible for ensuring that the applicable standards and regulations are observed and implemented. Work that could affect the electrical power system of the relevant energy supply company at the site may only be carried out by qualified electricians expressly authorised (licensed) by the energy supply company.

This includes changes to the factory-preset parameters.

Work that could affect the electrical power system of the relevant energy supply company at the site may only be carried out by qualified electricians expressly authorised (licensed) by the energy supply company. This includes changes to the factory-preset parameters. The installer must always observe the regulations of the energy supply company.

Factory settings may only be changed by qualified electrical installers or persons with at least comparable or higher technical qualifications, e.g. trades professionals, technicians or engineers. When doing so, all requirements are to be observed.

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1.4 Target group

Operator

As the operator, you are responsible for the device. You are responsible for the proper use and safe use of the device. This also includes instructing people using the device.

As an operator without specialist electrical training, you may only carry out activities that do not require an electrician.

Electrician

As an electrician, you have recognised electrical engineering training. On the basis of this expertise, you are authorised to carry out the electrical work required in this manual.

Requirements of an electrician:

- Knowledge of general and specific safety and accident prevention regulations.
- Knowledge of electrical regulations.
- Knowledge of national regulations.
- Ability to recognise risks and avoid possible hazards.

Qualification

Some activities in this manual require expertise in electrical engineering. If activities are carried out by someone without the necessary knowledge and qualifications, serious accidents and death may result.

- Only carry out activities for which you have been qualified and instructed.
- Observe the references to electricians in this manual.

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1.5 Notes in this manual

A distinction is made in this manual between warnings and information notes. All notes are identified in the text line with an icon.

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1.5.1 Warnings

DANGER

Indicates a direct hazard with a high level of risk, which, if not avoided, will result in death or serious injury.

WARNING

Indicates a hazard with a moderate level of risk, which, if not avoided, will result in death or serious injury.

CAUTION

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

INFO

Contains important instructions for installation and for trouble-free device operation in order to avoid damage to property and financial damages.

1.5.2 Meaning of symbols in warnings



Danger



Danger due to electrical shock and discharge

1.5.3 Meaning of symbols in information notes



The symbol indicates activities that may only be carried out by an electrician.



Information

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2. Safety

This documentation contains important information on the functional principles of your product as well as its safety and usage.

Read this documentation carefully and in full before you work with the product. Follow the instructions and safety specifications in this documentation during all activities.

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2.1 Proper use

The KOSTAL Smart Energy Meter is a measuring device, which determines electrical measuring values and is available to the inverter via LAN or RS485. It is not an electricity meter for measuring active consumption in the sense of the EU Directive 2004/22/EC (MID) and it may only be used for internal purposes.

The data about your system's energy generation collected by the KOSTAL Smart Energy Meter may deviate from the data of the main energy meter.

According to its classification as overvoltage category III, the KOSTAL Smart Energy Meter may only be connected in the sub-distribution / circuit distribution on the consumer side behind the energy supply company's energy meter and is only suitable for indoor use.

The KOSTAL Smart Energy Meter is approved for use in EU member states. Only use the KOSTAL Smart Energy Meter in accordance with the details provided in the enclosed documentation.

Any other form of use may result in damage to property or personal injury. For reasons of safety, the product (including the software) must not be modified and components must not be fitted if they are not expressly recommended or sold by KOSTAL Solar Electric GmbH for this product. Any form of product use other than that described in the intended use section is not considered to be intended.

Operators are prohibited from undertaking unauthorised changes, conversions and repairs as well as opening the product.

The enclosed documentation forms part of the product and must be read, noted and kept accessible at all times.

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2.2 Improper use

Any use of the product other than the use described in this documentation and in the applicable documentation is improper and is therefore not permitted.

Making any changes to the product that are not described in this documentation is not permitted. Prohibited changes to the product will result in loss of warranty.

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2.3 The operator's obligations

When using the product, the following obligations must be met:

Instruction

- Providing this documentation:
  - The operator must ensure that staff who carry out activities on and with the product have understood the content of the documentation for this product.
  - The operator must ensure that the documentation for this product is accessible to all users.
- Readability of the warning signs and labels on the product:
  - Warning signs and labels on the product must always remain legible after the product is installed.
  - The operator must replace any warning signs and labels that are no longer legible because they are old or damaged.

Occupational safety

- The operator must ensure that staff performing activities on and with the product are qualified to do so.
- The operator must ensure that the system is immediately shut down if there are discernible defects and must ensure that the defects are remedied.
- The operator must ensure that the product is only operated with the specified safety devices.

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2.4 Observed standards and guidelines

The EU Declaration of Conformity lists standards and guidelines, the requirements of which are met by the product.

You can find all of the information about the product on our website in the ***Download*** area:
www.kostal-solar-electric.com/download/

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3.1 Using the KOSTAL Smart Energy Meter

The KOSTAL Smart Energy Meter (KSEM) is a measuring device, which determines electrical measuring values at the grid connection point and is available via LAN or RS485. It can be used in combination with various KOSTAL solar inverters and the KOSTAL wallbox.

These include the following inverters:

- PLENTICORE G3
- PLENTICORE MP G3
- PLENTICORE BI G3
- PLENTICORE plus G1
- PLENTICORE plus G2
- PLENTICORE BI G2
- PIKO IQ
- PIKO MP plus
- PIKO 4.2-20
- PIKO CI
- PIKO EPC

The inverters can be used in conjunction with the KOSTAL Smart Energy Meter for the following applications:

- Reading the current household consumption and output power
- Limiting the output power of the inverters to as low as 0 W

INFO

If a battery storage system and other KOSTAL inverters are used in the system, the maximum possible curtailment is to 50 % of the generator output (kWp).

- When several PV inverters are connected in a cluster within the same domestic grid, only one KOSTAL Smart Energy Meter is required at the grid connection point.
- With the PIKO MP plus with battery, the KOSTAL Smart Energy Meter takes over the battery management system, which controls the charging and discharging of the battery.
- Transmission of consumption data to the KOSTAL Solar Portal.
- Controlling KOSTAL wallboxes

This includes the following wallbox:

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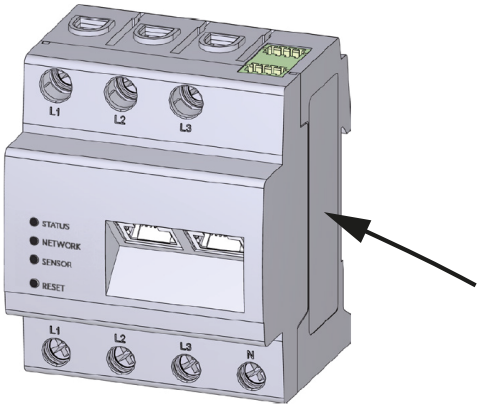
- ENECTOR AC 3.7/11
- ENECTOR AC 3.7/11 G2
- ENECTOR AC 7.4

The wallbox can be used in combination with the KOSTAL Smart Energy Meter and KOSTAL inverters for the following applications:

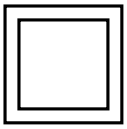
- Blackout protection (domestic connection monitoring)
  This involves monitoring the domestic connection whilst the electric vehicle is charging. If the maximum connection rating (e.g. 63 A) is exceeded, the charging power is reduced or charging is interrupted.
- ENECTOR with convenience functions (subject to a charge with G1 / automatically activated with G2)
  These include the ENECTOR's advanced charging modes (e.g. Lock Mode, Power Mode, Solar Pure Mode, Solar Plus Mode). Some modes only work in combination with a KOSTAL inverter.

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3.2 Labels on the energy meter

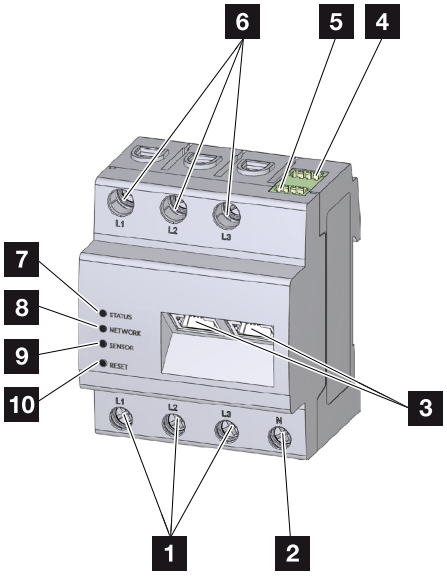


Signs and labels are attached to the housing of the energy meter. These signs and labels may not be altered or removed.

Symbol	Explanation
	Electrical installations require specialist skills
	Housing with protective insulation (protective class II).
	Device may not be disposed of with household waste. Observe the local application of disposal requirements
	CE marking The product satisfies the applicable EU requirements

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3.3 The KOSTAL Smart Energy Meter



1	Inputs for external wires L1, L2, L3
2	Neutral wire N
3	2 x LAN connection
4	RS485 connection (A) Pre-configured for PIKO IQ/PLENTICORE
5	RS485 connection (B) Pre-configured for PIKO MP plus
6	Outputs for external wires L1, L2, L3
7	Status LED
8	Network LED
9	Sensor LED for RS485 bus
10	Reset button

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3.4 LED statuses

The LEDs inform the user of the status of the KOSTAL Smart Energy Meter.

The following statuses are indicated:

Status LED

Colour	State	Description
Orange	On (<10 s)	Device starting
Green	Flashes slowly	
Green	On	Device ready
Green	Flashes quickly	Firmware update active
Yellow	Flashes 2 x	Confirmation for resetting the network settings using the Reset button for resetting the device password.
Red	On	Error
Red	Flashes	**Error messages / displays, Page 150**
Orange	On (>10 s)	

Network LED

Colour	State	Description
-	Off	No connection
Green	On	Network connection is being established
Green	Flashes	Network connection is active

Serial bus LED

Colour	State	Description
-	Off	No connection
Green	Flashes quickly	Connection active
Green	Flashes slowly	Scan process active
Red	On	Error - overload at 5 V output VCC
Orange	Flashes	Error – receiver not responding

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3.5 Functions

Recording home consumption

Using the KOSTAL Smart Energy Meter enables the inverter to monitor the flow of energy in the home 24 hours a day and to control it in an optimum manner.

The inverter primarily handles control. The PV energy generated is used firstly for self-consumption (such as lighting, the washing machine or TV). Only once self-consumption is covered can the energy generated above and beyond this be stored in a battery or fed into the public grid.

- Using energy meter (Modbus RTU) to record home consumption
- 24-hour measurement

Multiple-inverter connection

With a multiple-inverter connection, there are several KOSTAL solar inverters in the same house grid. By installing the KOSTAL Smart Energy Meter at the grid connection point, the flow of energy from all KOSTAL solar inverters present in the house grid can be measured and regulated by the KOSTAL Smart Energy Meter using control information, e.g. for power limitation in order to limit the feed-in to the public grid. The benefit of this setup is that only one energy meter is required for all KOSTAL solar inverters in the house grid.

- Simultaneous power curtailment of several KOSTAL solar inverters in the same house grid
- Saving costs by using just one energy meter

Battery management for PIKO MP plus with connected battery

The PIKO MP plus is not able to control a connected battery itself. In order to do this, the PIKO MP plus also needs the KOSTAL Smart Energy Meter and a battery activation code, both of which can be obtained from our KOSTAL Solar online shop. The KOSTAL Smart Energy Meter then handles battery management and transmits control information to the PIKO MP plus for this purpose.

Communication between KOSTAL inverters and KOSTAL Smart Energy Meters

The KOSTAL Smart Energy Meter offers various interfaces for communication, which can be used to connect to other KOSTAL inverters or sensors, or to connect to the internet.

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- LAN
  The KOSTAL Smart Energy Meter connects to the local home network via LAN, through which it then has access to other devices authorised by KOSTAL Solar Electric (e.g. inverters or the ENECTOR G2 wallbox), the internet and the Solar Portal.
- RS485/Modbus (RTU)
  Inverters or other devices authorised by KOSTAL Solar Electric are connected to the Modbus interface, via which information or control commands are transmitted.

Communication between the KOSTAL Wallbox and the KOSTAL Smart Energy Meter

With ENECTOR G1

The KOSTAL Smart Energy Meter communicates with the KOSTAL ENECTOR G1 Wallbox via an RS485 interface.

- RS485/Modbus (RTU)
  A KOSTAL Wallbox can be connected to the Modbus interface, through which information or control commands are transmitted.

With ENECTOR G2

The KOSTAL Smart Energy Meter communicates with the KOSTAL ENECTOR G2 wallbox via a LAN interface.

- LAN
  Via a LAN interface or via a shared router, the KOSTAL ENECTOR G2 wallbox can exchange information or control commands with the KOSTAL Smart Energy Meter G2.

Smart Grid (EEBus)

The ***Smart Grid*** function allows EEBus-compatible devices located on the local network to be connected or paired with the KOSTAL Smart Energy Meter. The KOSTAL Smart Energy Meter can receive data from EEBus-compatible smart meter gateways and control the connected loads.

The Webserver

The Webserver is the graphical interface for querying and configuring the KOSTAL Smart Energy Meter.

Supported web browsers

The KOSTAL Smart Energy Meter's web interface is optimised for the following web browsers. We recommend using one of the web browsers listed below to ensure that the web interface can be used smoothly.

- Microsoft Edge
- Mozilla Firefox

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- Apple Safari
- Google Chrome

Unsupported web browser

- Microsoft Internet Explorer

The web server offers the following functions:

- Logging in to the energy meter
- Checking the status
- Current generation/consumption figures
- Configuration of the KOSTAL Smart Energy Meter (e.g. software updates, enabling options, integrating PV systems for swarm networking, etc.)
- RS485/Modbus (RTU)
  Inverters, batteries, wallboxes or other devices approved by KOSTAL Solar Electric are connected to the Modbus interface, via which information or control commands are transmitted.
- LAN/Modbus (RTU)
  ENECTOR G2 wallboxes are connected via the LAN interface or via a shared router, through which information or control commands are transmitted.
- Enabling additional options
  This function (found under ***System settings > Activation code***) can be used to enable additional options. This may include, for example, enabling battery management in the KOSTAL Smart Energy Meter to connect a battery to the PIKO MP plus, or activating the wallbox control for the ENECTOR G1.
- Retrieving the error log file
- Backup for data and configuration

For more information, see **Operation, Page 69**.

The data logger

A data logger is integrated in the KOSTAL Smart Energy Meter. The data logger is a data storage system, which collects and stores the error information. Such information is required by the service team in the event of an error.

For more information, see **Exporting log data, Page 155**.

KOSTAL Solar Portal

The KOSTAL Solar Portal protects your investment in a PV system against yield losses, e.g. through active e-mail alerts of events.

You can log in to the KOSTAL Solar Portal for free at **www.kostal-solar-portal.com**.

Functions include:

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- Worldwide online access to the portal
- Graphic representation of the power and yield data
- Visualisation of data and thus being made aware of how to optimise self-consumption
- Notification of events by e-mail
- Data export
- Sensor evaluation
- Display and proof of a potential active power reduction by the grid operator
- Storage of log data for long-term and reliable monitoring of your PV system

You can find more information about this product on our website **www.kostal-solar-electric.com** by going to ***Products***.

3.5.1 Making product data accessible

As per ***Data Act - Regulation (EU) 2023/2854 - Article 3 - Obligation to make product data and related service data accessible to the user***, information about stored data must be made accessible to users.

For the KOSTAL Smart Energy Meter, the data is created and saved as follows.

The product generates the following data

The type, format and estimated scope of product data the networked product can generate;

- Log data via the KOSTAL Solar App:
  Generated data about the solar system is only generated if the Solar Portal item has been activated. The data can only be queried via the KOSTAL Solar Portal.
- Log data to the KOSTAL Solar Portal server:
  XML format, size 2 .. 50 kB, every 15 minutes
- Log data via Modbus TCP/RTU:
  Energy values relating to feed-in / consumption are recorded and stored continuously. These can be queried via Modbus RTU/TCP.

Information about generating data

Data is generated as follows.

- Data is continuously generated and visualised
- Data will be continuously provided by Modbus protocol with an update cycle of one second.

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Storing data on other devices

Information on whether the connected product is capable of storing data on a device or a remote server, including, where applicable, the intended duration of storage;

- When portal transmission is enabled, the data is transferred to external servers.
- Log data is averaged locally over five minutes and stored for 14 days

Data access

This section specifies how to access data or delete it if required, including the associated technological means as well as the applicable Terms and Conditions of Use and the applicable service quality.

- Log data can be queried via Modbus TCP/RTU.
- Specific log data for the solar system can also be downloaded on the KOSTAL Solar Portal if portal data transfer is enabled.
- Log data can be deleted by ***reset to factory settings***.

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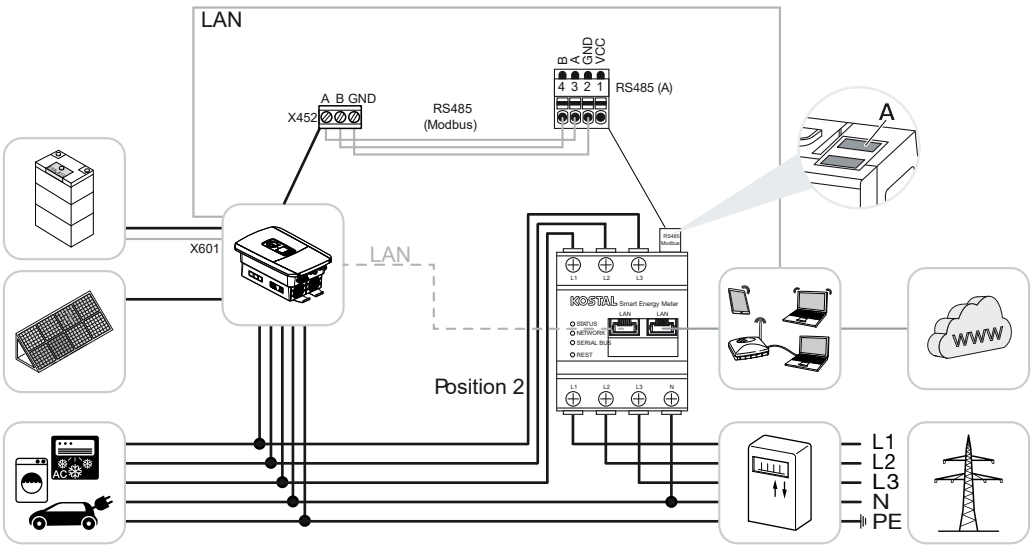
4.1 KSEM with PLENTICORE

The KOSTAL Smart Energy Meter (KSEM) can be used in conjunction with the PLENTICORE in the following configurations.

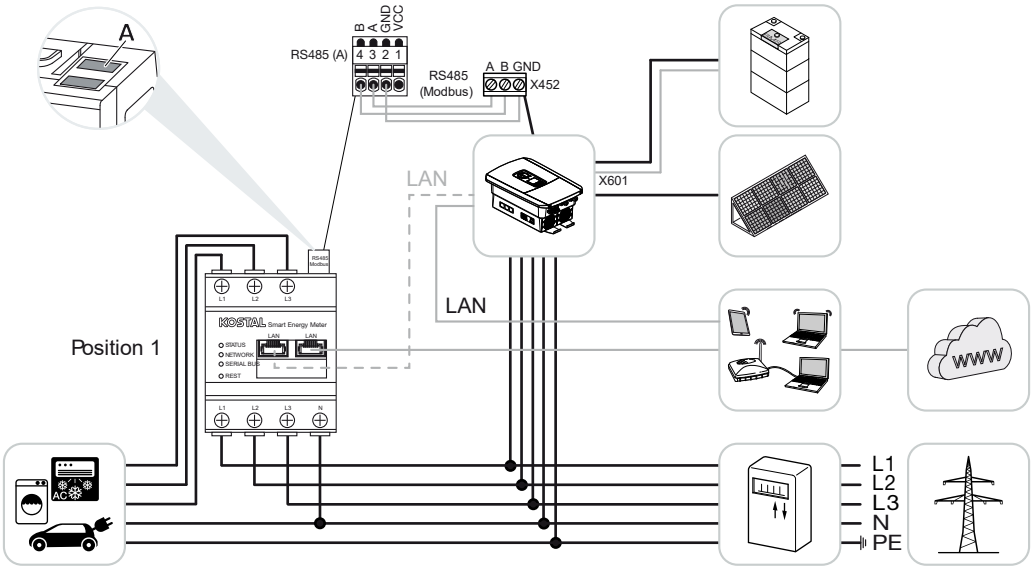
- 24-hour load/generation measurement (measuring current household consumption and output power)
- Storage of DC energy (from your own PV system)
- Storage capability for AC energy sources (e.g. from PV systems, wind turbines, combined heat and power units)
- Swarm networking (multiple KOSTAL solar inverters on the same domestic network; in this case, only one KOSTAL Smart Energy Meter is required).
- Dynamic active power control
- Provision of measurement data when battery functionality is used in combination with the PLENTICORE

4.1.1 PLENTICORE - load/generation measurement

Installation position – Mains connection point (standard/preferred)



Installation position – domestic consumption



Install the KOSTAL Smart Energy Meter in the domestic circuit as shown in the diagrams.

INFO

The installation position of the KOSTAL Smart Energy Meter is set in the inverter.

Establish and connect the RS485 communication link between the inverter and the KOSTAL Smart Energy Meter.

Establish a LAN connection from the KOSTAL Smart Energy Meter and the inverter to the internet. Optionally, the LAN connection from the inverter can also be connected directly to the KOSTAL Smart Energy Meter (switch function).

INFO

Please refer to the inverter operating instructions and the KOSTAL Smart Energy Meter installation instructions.

In this configuration, the KOSTAL Smart Energy Meter operates as a slave and sends data to the inverter.

It is not necessary to configure the inverter in the KOSTAL Smart Energy Meter, as it is pre-configured by default to use the Modbus RTU RS485 interface (A).

If you wish to make changes to the settings, carry out the following steps:

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

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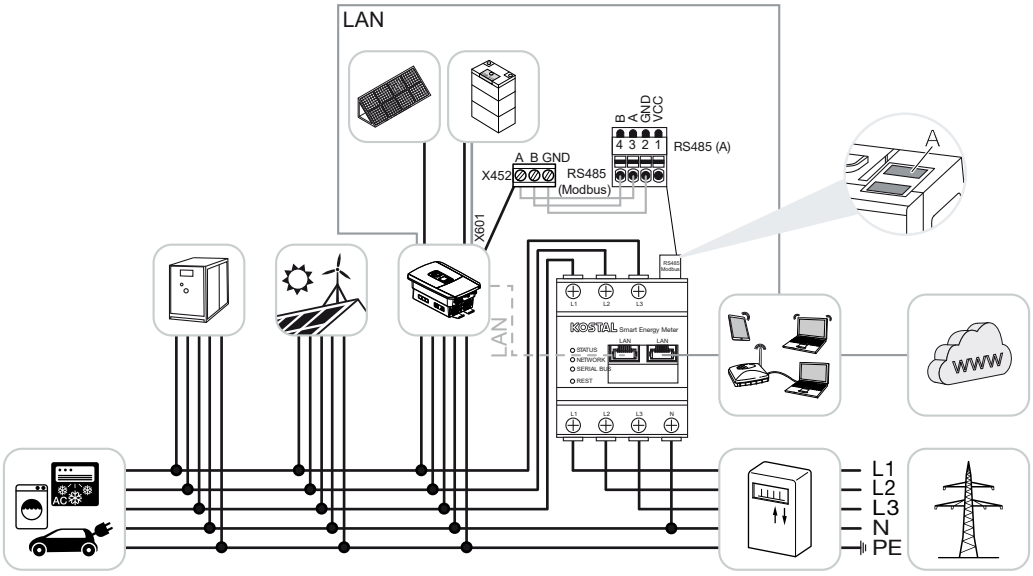
INFO

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

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

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4.1.2 PLENTICORE - additional scope for storage from AC energy sources



Install the KOSTAL Smart Energy Meter as shown at the grid connection point (position 2) within the domestic network.

INFO

The installation position of the KOSTAL Smart Energy Meter is set in the inverter.

Establish and connect the RS485 communication line between the inverter and the KOSTAL Smart Energy Meter.

Establish a LAN connection from the KOSTAL Smart Energy Meter and the inverter to the internet. Optionally, the LAN connection from the inverter can also be connected directly to the KOSTAL Smart Energy Meter (switch function).

INFO

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

In this configuration, the KOSTAL Smart Energy Meter operates as a slave and sends data to the inverter.

It is not necessary to configure the inverter in the KOSTAL Smart Energy Meter, as it is pre-configured by default to use the Modbus RTU RS485 interface (A).

In the inverter, under the menu item ***Battery > Battery settings > Other battery settings***, the option ***'Storage of surplus AC energy from local generation'*** must be enabled.

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INFO

For details, refer to the inverter's operating manual. Setting on inverter only possible after logging in as an installer.

If you wish to make changes to the settings, carry out the following steps:

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

INFO

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

4. In the inverter, under the menu item ***Battery > Battery Settings > Other Battery Settings***, activate the option ***'Storage of surplus AC energy from local generation***'.

INFO

See the inverter operating instructions for further details. Settings on the inverter can only be adjusted after logging in as an installer.

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

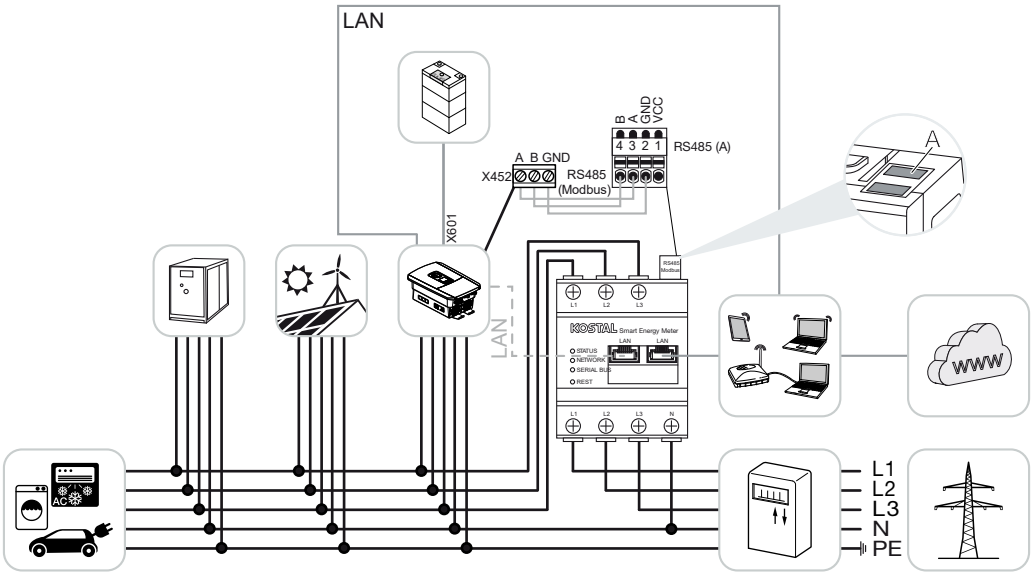
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4.2 KSEM with PLENTICORE BI

The KOSTAL Smart Energy Meter (KSEM) can be used in conjunction with the PLENTICORE BI in the following variants.

- Scope for storage from AC energy sources (e.g. from PV systems, wind turbines, combined heat and power units)
- Provision of measurement data

4.2.1 PLENTICORE BI - scope for storage from AC energy sources



Install KOSTAL Smart Energy Meter as shown at the grid connection point (position 2) in the house grid.

Set up RS485 communication cable between inverter and KOSTAL Smart Energy Meter and connect.

Establish LAN connection from KOSTAL Smart Energy Meter and inverter to the Internet. As an option, the LAN connection from the inverter can also be connected directly to the KOSTAL Smart Energy Meter (switch function).

INFO

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

In this variant, the KOSTAL Smart Energy Meter runs as a slave and transmits data to the inverter.

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The inverter does not have to be set up in the KOSTAL Smart Energy Meter because it is pre-configured to the Modbus RTU RS485 interface (A) as standard.

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

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

INFO

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

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

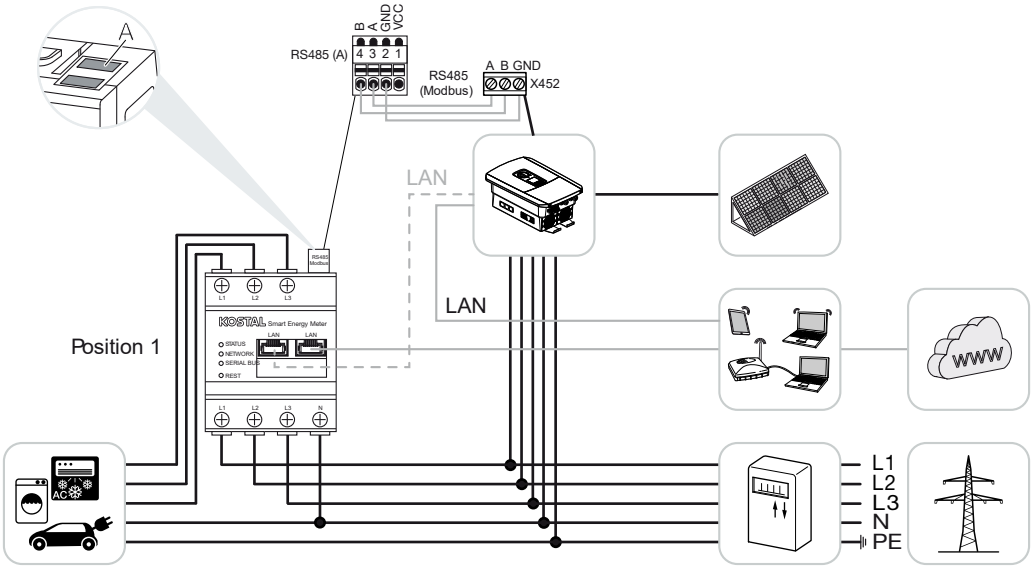
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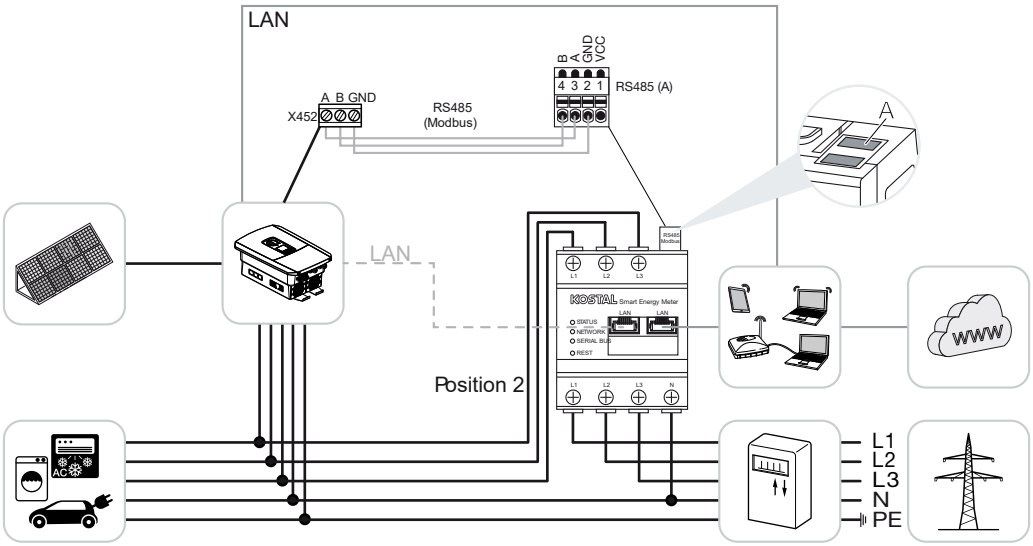
4.3 KSEM with PIKO IQ

The KOSTAL Smart Energy Meter (KSEM) can be used in conjunction with the PIKO IQ in the following variants.

- 24-hour load/generation measurement (measuring the current home consumption and output power)
- Multiple-inverter connection (several KOSTAL solar inverters in the same house grid, only one KOSTAL Smart Energy Meter is required for this) Multiple-inverter connection of KOSTAL inverters
- Dynamic active power control

4.3.1 PIKO IQ - load/generation measurement





Install KOSTAL Smart Energy Meter as shown for home consumption (position 1) or at the grid connection point (position 2 - standard) in the house grid.

INFO

The installation position of the KOSTAL Smart Energy Meter is set in the inverter.

Set up RS485 communication cable between inverter and KOSTAL Smart Energy Meter and connect.

Establish LAN connection from KOSTAL Smart Energy Meter and inverter to the Internet. As an option, the LAN connection from the inverter can also be connected directly to the KOSTAL Smart Energy Meter (switch function).

INFO

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

In this variant, the KOSTAL Smart Energy Meter runs as a slave and transmits data to the inverter.

The inverter does not have to be set up in the KOSTAL Smart Energy Meter because it is pre-configured to the Modbus RTU RS485 interface (A) as standard.

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

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

INFO

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

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

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4.4 KSEM with PIKO MP plus

The KOSTAL Smart Energy Meter (KSEM) can be used in conjunction with the PIKO MP plus in the following variants.

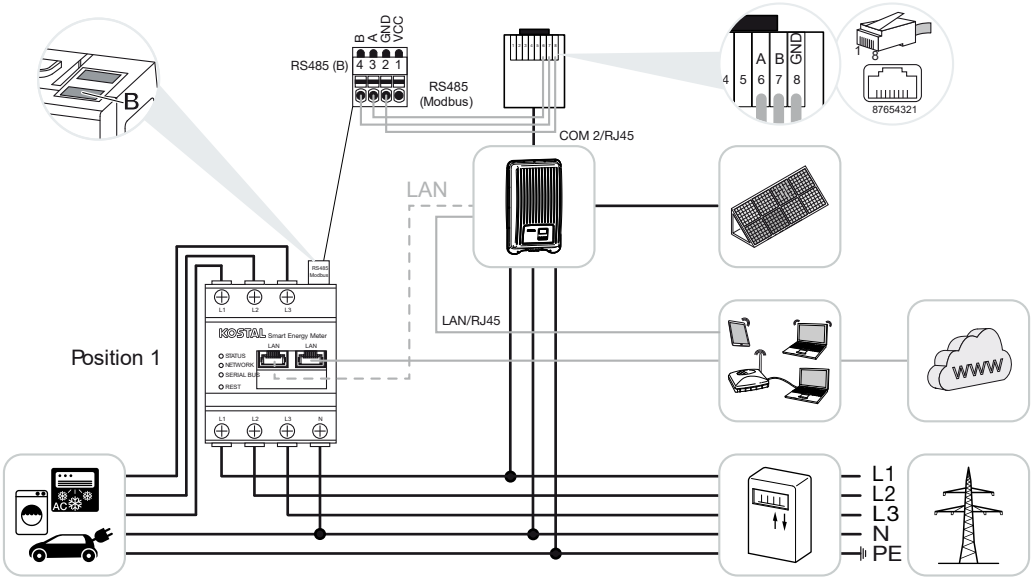
- 24-hour load/generation measurement (measuring the current home consumption and output power)
- Multiple-inverter connection (several KOSTAL solar inverters in the same house grid, only one KOSTAL Smart Energy Meter is required for this) Multiple-inverter connection of KOSTAL inverters
- Dynamic active power control
- Control (charge/discharge) a battery connected to the PIKO MP plus. **PIKO MP plus - battery control, Page 43**
- Provision of measurement data during battery functionality.

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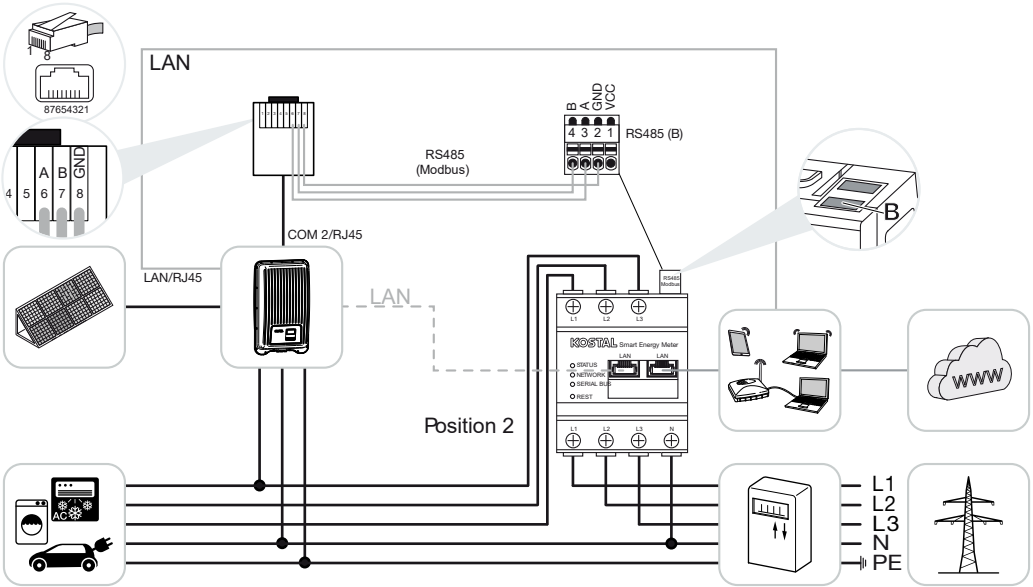
4.4.1 PIKO MP plus - load/generation measurement

Installation position – home consumption (position 1)

The installation position cannot be used for a PIKO MP plus with battery or in a multiple-inverter connection.



Installation position – grid connection point (position 2 – standard)



Install the KOSTAL Smart Energy Meter in the house grid as shown.

INFO

The installation position of the KOSTAL Smart Energy Meter is set in the inverter.

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Set up RS485 communication cable between inverter and KOSTAL Smart Energy Meter and connect.

Establish LAN connection from KOSTAL Smart Energy Meter and inverter to the Internet. As an option, the LAN connection from the inverter can also be connected directly to the KOSTAL Smart Energy Meter (switch function).

INFO

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

INFO

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

In this variant, the KOSTAL Smart Energy Meter runs as a slave and transmits data to the inverter.

The inverter does not have to be set up in the KOSTAL Smart Energy Meter because it is pre-configured to the Modbus RTU RS485 interface (B) as standard.

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

1. Call up online interface of KOSTAL Smart Energy Meter Calling up user interface
2. Call up Modbus configuration under Modbus settings.
3. Select the ***PIKO MP plus*** from drop-down list
   Press the ***Save***button to adopt the settings.

INFO

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

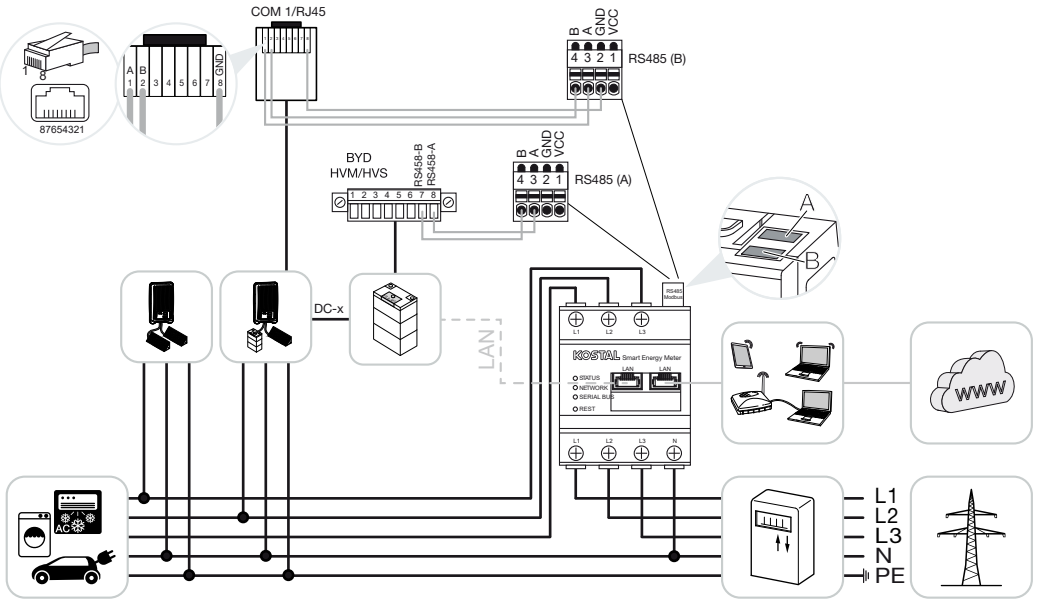
Parameter	Value
Interface	RS485 B
Mode	Slave
Presetting	PIKO MP plus
Slave address	247
Baud rate	19200
Data bits	8

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Parameter	Value
Parity	Even
Stop bit	1

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4.4.2 PIKO MP plus - battery control



Install the KOSTAL Smart Energy Meter at the grid connection point within the domestic network, as shown in the illustrations.

INFO

If battery management is enabled in the KOSTAL Smart Energy Meter, its installation position can no longer be set in the PIKO MP plus. It is essential that the KOSTAL Smart Energy Meter is installed at the grid connection point.

Establish and connect the RS485 communication cable between the inverter and the KOSTAL Smart Energy Meter RS485 (B).

Establish and connect the RS485 communication cable between the battery and the KOSTAL Smart Energy Meter RS485 (A).

Establish a LAN connection from the KOSTAL Smart Energy Meter, the battery and the inverter to the internet. Optionally, the LAN connection from the inverter or battery can also be connected directly to the KOSTAL Smart Energy Meter (switch function).

INFO

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

In this configuration, the KOSTAL Smart Energy Meter acts as the master and sends data to the inverter and battery.

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- Please note the following installation sequence during set-up:

INFO

In the PIKO MP plus, the battery must be assigned to a DC input. This is done in the PIKO MP plus under the menu item ***Settings*** > ***Service*** > ***Inputs*** > ***DCx*** > ***Battery***.

- Switching off the inverter by operating the DC switch
- Switch off the battery using the main switch
- Switch on the battery using the main switch
- Configure the inverter and the battery in the KOSTAL Smart Energy Meter
- Switching on the inverter by operating the DC switch

INFO

Type and source of the hazard

If the battery is switched off manually for any reason, the following switch-on sequence must be observed:

- Switch off the inverter
- Switch on the battery
- Switch on the inverter

The PIKO MP plus and the battery must be set up in the KOSTAL Smart Energy Meter.

To do this, carry out the following steps:

1. Call up online interface of KOSTAL Smart Energy Meter Calling up user interface
2. To use a battery with the PIKO MP plus, you must enable this function in the KOSTAL Smart Energy Meter. To do this, enable battery management under ***'Activation Code***'.

INFO

Enter an activation code, e.g. to connect a battery. This must first be purchased from the KOSTAL Solar Webshop.

3. Next, the devices can be set up. To do this, go to the menu item ***'System settings'*** > ***'Device manager'*** (manage the inverters in use).
4. Add an inverter using the ***'Add'*** button.

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INFO

When selecting an inverter, the predefined default values are applied. These can be adjusted if necessary.

Parameters	Value
Series	Select PIKO MP plus.
Type	Select the appropriate type/power class of the inverter. This automatically sets the maximum AC output power of the inverter.
Serial interface **NOTE! The pre-assigned interfaces must first be deactivated. To do this, click on the relevant interface in the pop-up message.**	Select the RS485 interface to which the PIKO MP plus is connected to the KOSTAL Smart Energy Meter.
Timeout	Accept the default value.
Maximum output power	This value must be set for every connected inverter. Selecting the type/inverter power class automatically sets the inverter's maximum output power. The maximum output power is the maximum power that the inverter to be configured is technically capable of delivering.
Battery management	Enable battery support.
Battery serial interface	Specifies the RS485 interface on the KOSTAL Smart Energy Meter to which the battery's communication cable is connected.
Battery type	Select the battery type, e.g. BYD HVM or BYD HVS.
Number of modules	Select the number of modules installed in the battery.
Max. SOC (State of Charge)	Set the maximum state of charge for the battery (default 100%).
Min. SOC (State of Charge)	Set the minimum state of charge for the battery. Please refer to the battery manufacturer's specifications (default 5%).

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Parameters	Value
Nominal battery charging/discharging power	This value is set automatically and does not need to be changed. It is calculated based on the battery type and the number of modules. However, it can be adjusted if the values do not match the battery specifications.
Open advanced settings	
RS485 address	Enter the inverter's RS485 address. This must be unique for each device and must not be duplicated.

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

✓ The PIKO MP plus and the battery have been set up in the KOSTAL Smart Energy Meter.

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4.4.3 Setting up a new battery with an existing PIKO MP plus

If just one battery is to be set up for an existing PIKO MP plus, this is done via the battery device type.

1. Use the plus symbol to add the battery.

Parameter	Value
Series	Battery
Linking with inverter	Select the PIKO MP plus to which the battery is connected.
Serial interface of battery	Select the RS485 interface at which the battery is connected to the KOSTAL Smart Energy Meter.
Battery type	Select the battery type, e.g. BYD HVM or BYD HVS.
Number of modules	Select the number of modules that are installed in the battery.
Max. SOC (charging status)	Set the battery's maximum charging status (default 100%).
Min. SOC (charging status)	Set the minimum charging status of the battery. Note the details provided by the battery manufacturer (default 5 %).
Nominal charge/discharge capacity of battery	This value is set automatically and does not need to be changed. It is calculated using the battery type and the number of modules. However, it can be adjusted if the values do not match the battery.

1. Press the ***OK*** button to adopt the settings.

✓ The battery has been set up in the KOSTAL Smart Energy Meter and linked to a PIKO MP plus. Finally, the battery still needs to be assigned to the correct DC input in the PIKO MP plus.

INFO

The battery must be assigned to a DC input in the PIKO MP plus. This is done in the PIKO MP plus by going to ***Settings > Service > Inputs > DCx > Battery***.

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4.5 KSEM with PIKO 4.2-20 / PIKO EPC

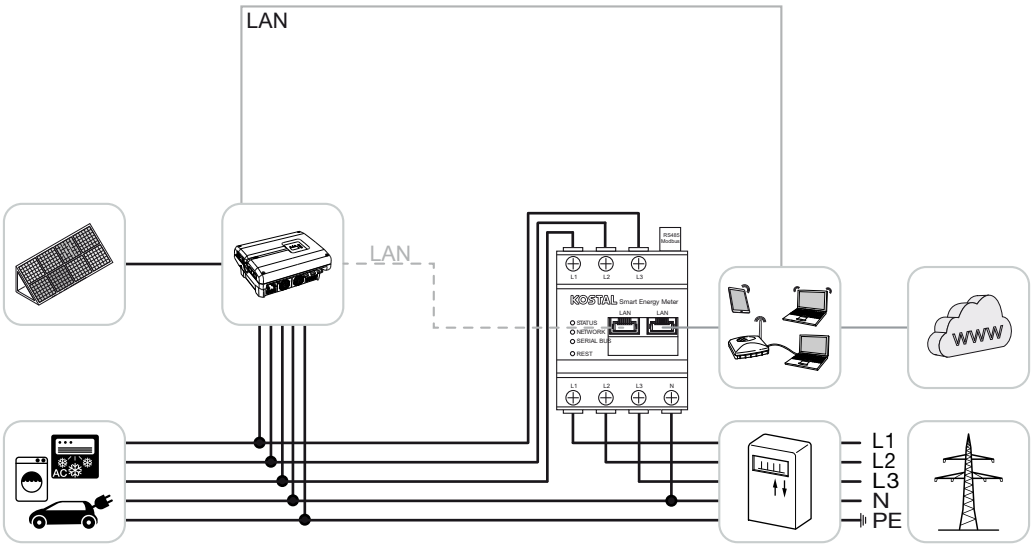
The KOSTAL Smart Energy Meter (KSEM) can be used in conjunction with the PIKO 4.2-20 or PIKO EPC in the following variants.

INFO

It is possible to use the KOSTAL Smart Energy Meter in conjunction with the PIKO 4.2-20 or PIKO EPC as of inverter FW5.0.

- 24-hour load/generation measurement (measuring the current home consumption and output power)
- Multiple-inverter connection (several KOSTAL solar inverters in the same house grid, only one KOSTAL Smart Energy Meter is required for this) Multiple-inverter connection of KOSTAL inverters
- Dynamic active power control
- Sending measurement data to the KOSTAL Solar Portal

4.5.1 PIKO 4.2-20 / PIKO EPC - load/generation measurement



Install the KOSTAL Smart Energy Meter at the grid connection point within the domestic network, as shown in the diagram.

Establish and connect a LAN communication link between the inverter and the KOSTAL Smart Energy Meter. Optionally, the LAN connection from the inverter can also be connected directly to the KOSTAL Smart Energy Meter (switch function).

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In this configuration, the KOSTAL Smart Energy Meter acts as the master and controls the inverter (e.g. for power limitation).

INFO

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

Set up the inverter in the KOSTAL Smart Energy Meter. To do this, carry out the following steps:

1. Call up online interface of KOSTAL Smart Energy Meter Calling up user interface
2. Go to the menu item ***'System settings > Device manager'*** and use the plus (+) button to add the PIKO 4.2-20 or PIKO EPC.

Parameters	Value
Series	Select PIKO FW >= 5.00
Type	Select inverter
Category	Photovoltaics
IP address	Enter the inverter's IP address.
Maximum output power	Enter the maximum output power of the inverter. This is required if a power limit needs to be set and calculated at the grid connection point.
Open advanced settings	
RS485 address	Enter the inverter's RS485 address. This must be unique for each device (default 255).

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

✓ The inverter has been set up.

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4.6 KSEM with PIKO CI

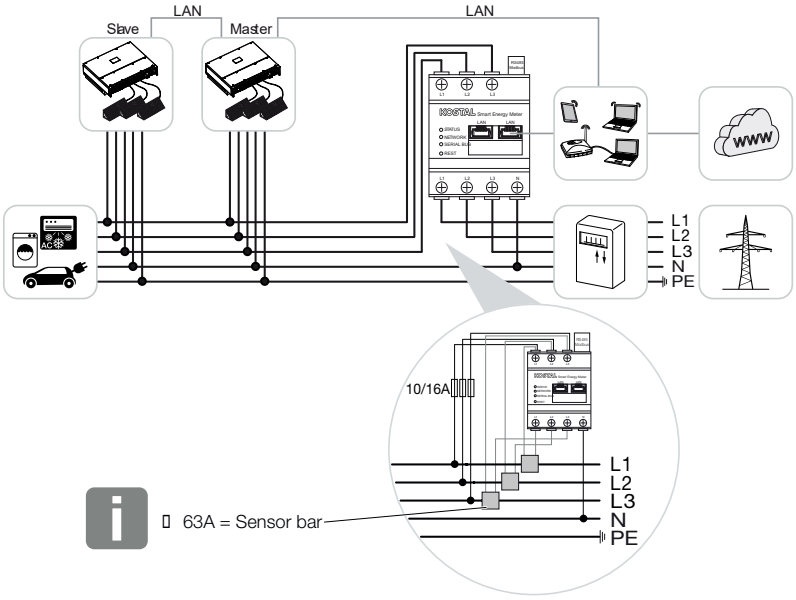
The KOSTAL Smart Energy Meter (KSEM) can be used in conjunction with the PIKO CI in the following variants.

- 24-hour load/generation measurement (measuring the current home consumption and output power)
- Multiple-inverter connection (several KOSTAL solar inverters in the same house grid, only one KOSTAL Smart Energy Meter is required for this) Multiple-inverter connection of KOSTAL inverters
- Dynamic active power control

The KOSTAL Smart Energy Meter can be connected to the PIKO CI in two different ways. The connection method must then be set via the KOSTAL PIKO CI app.

- **PIKO CI - load/generation measurement - connection via LAN, Page 50**
- **PIKO CI - load/generation measurement - connection via RS485, Page 53**

4.6.1 PIKO CI - load/generation measurement - connection via LAN



INFO

For currents above 63A, transformers must be used for measurement on the KOSTAL Smart Energy Meter. Further information on this can be found in the installation instructions for the KOSTAL Smart Energy Meter and at Menu - device settings.

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1. Install the KOSTAL Smart Energy Meter at the grid connection point in the house grid as shown.
2. Set up LAN connection between inverter and KOSTAL Smart Energy Meter and connect.

INFO

In the KOSTAL CI app for the PIKO CI inverter, the installation position and the use of the KOSTAL Smart Energy Meter in the inverter must be set.

For more information about settings in the inverter, refer to the inverter's operating manual.

3. Establish LAN connection from KOSTAL Smart Energy Meter and inverter to the Internet.

INFO

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

4. In this variant, the KOSTAL Smart Energy Meter runs as a slave and transmits data to the inverter.
5. In the KOSTAL Smart Energy Meter, you need to go to ***Modbus settings > Modbus TCP > Slave (Enable TCP Slave)*** and set to ***ON*** .

Set up the inverter in the KOSTAL Smart Energy Meter. To do this, proceed as follows:

1. Call up online interface of KOSTAL Smart Energy Meter Calling up user interface
2. Go to ***Inverter > Devices*** and add the PIKO CI using the plus symbol (+).

Parameter	Value
Series	Select PIKO CI
Type	Select inverter
Category	Photovoltaic
IP address	Enter the inverter’s IP address.
Maximum output power	Use the standard maximum output power value for the inverter.
Open advanced settings	
Unit ID	If using Unit ID, the default value 71 should be used.

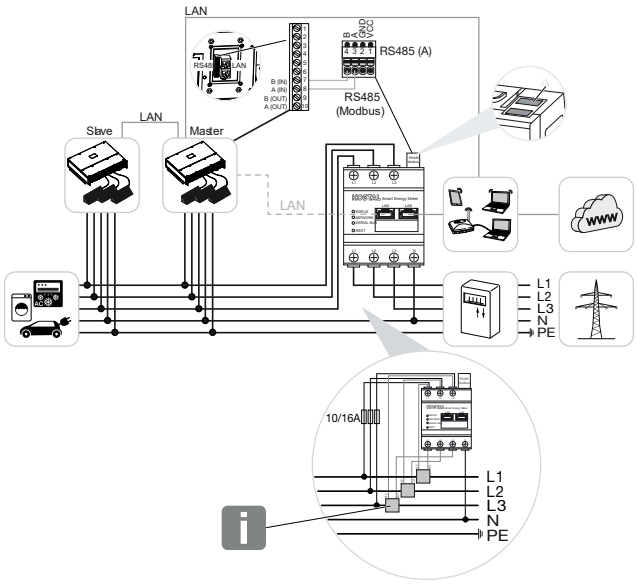
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1. Press the ***Save*** button to adopt the settings.

✓ The inverter has been set up.

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4.6.2 PIKO CI - load/generation measurement - connection via RS485



INFO

For currents above 63A, transformers must be used for measurement on the KOSTAL Smart Energy Meter. Further information on this can be found in the installation instructions for the KOSTAL Smart Energy Meter and at Menu - device settings.

Install the KOSTAL Smart Energy Meter at the grid connection point in the house grid as shown.

Set up RS485 communication cable between inverter and KOSTAL Smart Energy Meter and connect.

INFO

In the KOSTAL CI app for the PIKO CI inverter, which you will find in your app store, the terminating resistor for the last inverter must be activated via the software. The installation position and use of the KOSTAL Smart Energy Meter must also be set in the inverter.

For more information about settings in the inverter, refer to the inverter's operating manual.

Establish LAN connection from KOSTAL Smart Energy Meter and inverter to the Internet. As an option, the LAN connection from the inverter can also be connected directly to the KOSTAL Smart Energy Meter (switch function).

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INFO

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

In this variant, the KOSTAL Smart Energy Meter runs as a slave and transmits data to the inverter.

In the KOSTAL Smart Energy Meter, the PIKO CI still has to be selected for the RS485 interface (A). Do this by performing the following steps:

1. Call up online interface of KOSTAL Smart Energy Meter Calling up user interface
2. Call up Modbus configuration under Modbus settings.
3. Under Modbus RTU, select the ***PIKO CI*** from drop-down list for RS485 A interface Press the ***Save***button to adopt the settings.

Parameter	Value
Interface	RS485 A
Mode	Slave
Presetting	PIKO CI
Slave address	1
Baud rate	19200
Data bits	8
Parity	None
Stop bit	2

Setting up feed-in limitation

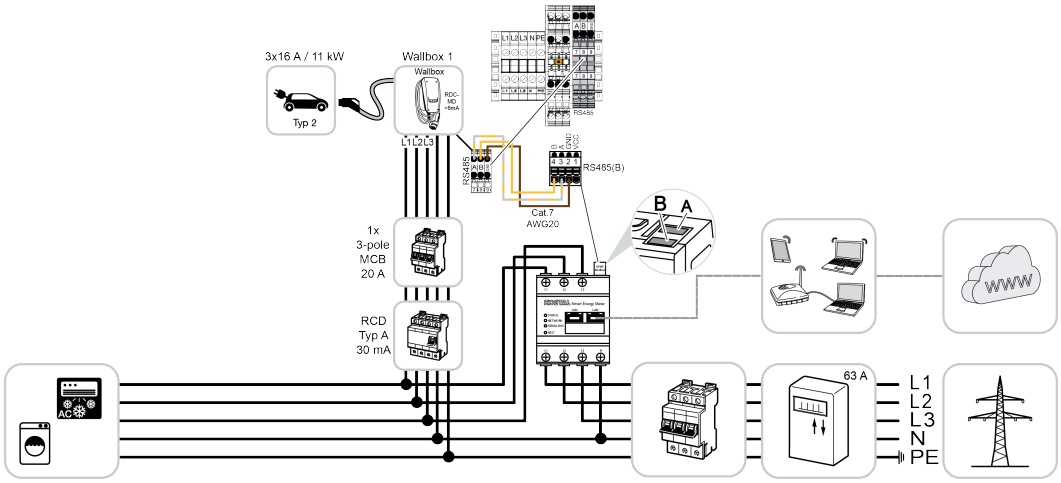
To set up a feed-in limitation (power limitation) at the grid connection point for the public grid, this function has to be set up in the PIKO CI. The KOSTAL Smart Energy Meter cannot control the PIKO CI.

If several PIKO CI are used, the feed-in limitation (power limitation) is configured in the master inverter.

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4.7 KSEM with ENECTOR AC 3.7/11 G1 wallbox

The KOSTAL Smart Energy Meter (KSEM) can be used in conjunction with the ENECTOR AC 3.7/11 wallbox in the following variants.



- Blackout protection (house connection monitoring)
  Here, the KOSTAL Smart Energy Meter monitors the amount drawn from the grid. If the grid demand exceeds the maximum current (e.g. 63 A per house connection phase) configured in the wallbox, the charging power of the wallbox is reduced to remain below the maximum house connection capacity.
- Use the convenience functions (Lock Mode, Solar Pure Mode, Solar Plus Mode). For more information, see Menu - wallbox.

INFO

In order for the wallbox to be set up in the KOSTAL Smart Energy Meter (KSEM), this function must first be activated via an activation code in the KSEM.

The activation code can be purchased from the KOSTAL Solar online shop.

To access the shop, go to: **shop.kostal-solar-electric.com**.

INFO

KOSTAL Smart Energy Meter with ENECTOR AC 7.4

If the KOSTAL Smart Energy Meter (KSEM) is to be used with the ENECTOR AC 7.4, the KSEM is only connected for single-phase use. Functions such as phase usage are not available.

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4.7.1 ENECTOR G1 with KOSTAL Smart Energy Meter for power cut protection (property connection monitoring)

If the ENECTOR is connected to a KOSTAL Smart Energy Meter and this is only to be used for blackout protection (house connection monitoring), the RS485 interface used must be configured in the KOSTAL Smart Energy Meter.

Only then can the ENECTOR read data from the KOSTAL Smart Energy Meter.

Do this by performing the following steps:

1. Call up the online interface of the KOSTAL Smart Energy Meter.
2. Call up the Modbus configuration under ***Modbus settings*** .
3. Activate the RS485 interface connected to the ENECTOR (e.g. ***RS485 B)*** .
   Select the ***User-defined*** value under ***Presettings*** and configure the following settings under ***Advanced.***

Parameter	Value
Interface	RS485 B
Presetting	User-defined
Mode	Slave
Slave address	2
Baud rate	57600
Data bits	8
Parity	None
Stop bit	2

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

✓ The interface to the ENECTOR has been set up in the KOSTAL Smart Energy Meter.

4.7.2 Setting up the ENECTOR G1 with convenience features in KSEM

Setting up the wallbox with convenience features in the KSEM G2 unlocks a wide range of additional options. With a PV system, features such as ***Solar Pure Mode*** or ***Solar Plus Mode*** become available. These can be selected via the KSEM interface or using the KOSTAL Solar App. An activation code is required to set up the wallbox in the KSEM.

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INFO

In order for the wallbox to be set up in the KOSTAL Smart Energy Meter (KSEM), this function must first be activated via an activation code in the KSEM.

The activation code can be purchased from the KOSTAL Solar online shop.

To access the shop, go to **shop.kostal-solar-electric.com.**

The following steps are necessary to set up the wallbox with comfort functions in the KSEM:

- Purchase activation code from the online KOSTAL shop.
- Activate the activation code in the KSEM.
- Set up the wallbox in the KSEM via the Device Manager.
- Activate data transfer to the KOSTAL Solar Portal in the KSEM.
- Assign the KSEM to a system as a device in the KOSTAL Solar Portal.

Purchasing activation code for wallbox

To activate functions, you will need PLENTICOINs that you have to purchase in advance.

1. The link **shop.kostal-solar-electric.com** will take you to the online KOSTAL Solar shop.
2. You can use ***Serial number check*** to check which functions you are able to activate for the KOSTAL Smart Energy Meter / ENECTOR. To do this, enter the serial number of the KOSTAL Smart Energy Meter and press ***Start***.
3. Then select the ***ENECTOR (KSEM) wallbox convenience function***.
4. Use PLENTICOINs to purchase the function. You will then receive the activation code to activate the wallbox in the KSEM.

Enter the activation code into the KOSTAL Smart Energy Meter

The activation code is entered via the KSEM user interface.

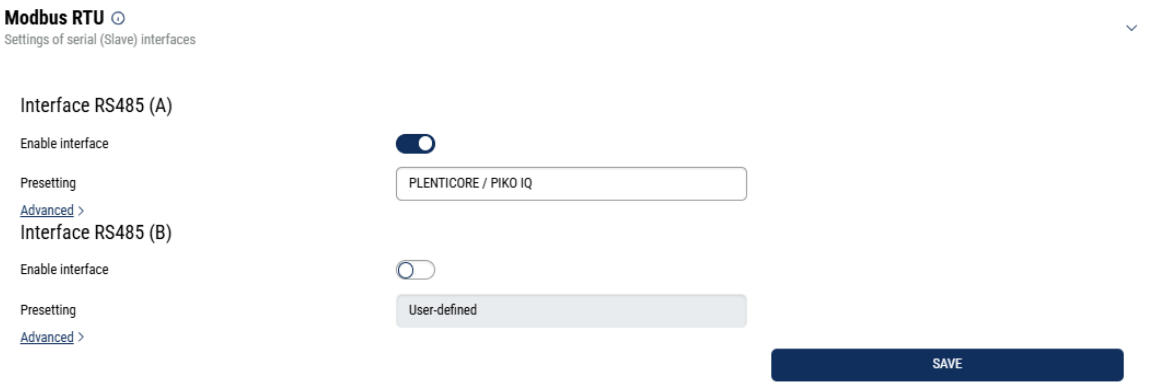
1. Log in to the KSEM user interface.
2. Select the menu item ***'System settings' > 'Activation code*** '.
3. Enter the 10-digit activation code for the ***KOSTAL ENECTOR G1 Wallbox*** and confirm.

✓ Activation is now complete.

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Enable the RS485 interface

Under the ***'Modbus'*** menu item, the RS485 interface to which the wallbox communication is connected must be deactivated. Only then can the wallbox be set up via the device manager.



1. Go to the ***'Modbus*** ' menu item.
2. Under ***'Modbus RTU'***, deactivate the RS485 interface (e.g. RS485 interface B) to which the wallbox communication is connected.
3. Click the ***'Save'*** button to apply the settings.

Setting up and configuring the Wallbox

Under the ***'Wallbox'*** menu item, you can view a selection of functions, the current status of the wallbox in terms of the connection, and the charging/discharging power.

The wallbox is set up via the ***Device Manager***.

INFO

The wallbox is supplied with the standard slave address 50. This is changed automatically during set-up in the KSEM. The wallbox is given slave address 100.
If a wallbox is deleted from the overview, slave address 50 is written back to the wallbox. The slave addresses issued are displayed in the overview.
If the KSEM is reset, the wallboxes are not automatically reset to the address 50. In such a scenario, the wallbox in the KSEM has to be set up afresh. Address 100 should then be entered in place of address 50 because this has already been changed in the wallbox.

INFO

If a vehicle is connected when setting up, the address is only automatically changed again later on.

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1. Open the KSEM G2 web server.
2. Select the ***'Device Manager*** ' menu item and then ***'Add*** '.
3. Under 'Add Manually', select 'Wallbox' and then choose the device type ***'KOSTAL ENECTOR AC'*** for a **KOSTAL ENECTOR G1 wallbox** via **RS485**, and confirm your selection by clicking ***'Next***'.
4. Assign a name to the wallbox.
5. Select the enabled RS485 interface (e.g. RS485 B) via which the wallbox is connected to the KSEM.
6. The slave address 50 must not be changed when setting up the wallbox.
7. Select the ***phase rotation for the wallbox***. This must match the physical connection of the wallbox.
8. Save your entry.
9. In the next window, select the number of phases on which the Wallbox is operated and confirm your selection.

✓ The wallbox is now set up.

You can then choose between the different charging modes.

Adding inverters in KOSTAL Smart Energy Meter

To ensure that all data is displayed correctly in the KOSTAL Solar Portal in combination with the wallbox, the KOSTAL inverter must be added under ***Inverter > Devices*** . Further information can be found in the KOSTAL Smart Energy Meter operating manual.

Activating data transfer to the KOSTAL Solar Portal in the KOSTAL Smart Energy Meter

Data transfer must be activated so that the wallbox data is also visible in the KOSTAL Solar Portal.

1. Go to ***Solar Portal***, press the ***Activate solar portal*** switch.

✓ Transfer is activated

INFO

Incorrect time information during data transfer to the KOSTAL Solar Portal

Check the time and time zone set in the KOSTAL Smart Energy Meter and correct them if necessary. If the time is set incorrectly, the data will be transferred from KSEM with incorrect time information and will not be displayed correctly in the KOSTAL Solar Portal.

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Assigning the KOSTAL Smart Energy Meter to a system in the KOSTAL Solar Portal

All KOSTAL inverters and the KOSTAL Smart Energy Meter must be assigned to a PV system in the ***KOSTAL Solar Portal***. If this was not been done when setting up your PV system, you must do it now.

1. To do this, log in to the **KOSTAL Solar Portal**.
2. Select a system or create a new one.
3. Now add the KOSTAL Smart Energy Meter to this system using the article and serial number. These can be found in the ***Solar Portal*** menu in the KOSTAL Smart Energy Meter:

✓ The KOSTAL Smart Energy Meter has been set up in the **KOSTAL Solar Portal**. This means that the data can now be accessed in the **KOSTAL Solar Portal** and in the KOSTAL Solar App.

INFO

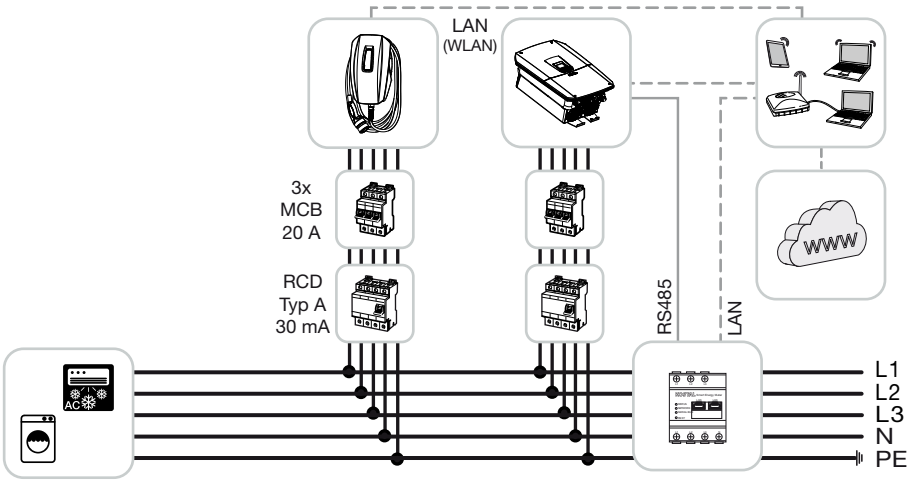
Wallbox charging data

The Solar Portal / Solar App only displays the wallbox charging data or the link between the wallbox and the KOSTAL Solar App once the wallbox has been set up and the initial charging process is complete.

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4.8 KSEM with ENECTOR AC 3.7/11 G2 wallbox

The KOSTAL Smart Energy Meter G2 (KSEM) can be used in conjunction with the ENECTOR G2 wallbox in the following configurations.



- Blackout protection (house connection monitoring)
  Here, the KOSTAL Smart Energy Meter monitors the amount drawn from the grid. If the grid demand exceeds the maximum current (e.g. 63 A per house connection phase) configured in the wallbox, the charging power of the wallbox is reduced to remain below the maximum house connection capacity.
- Use the convenience functions (Lock Mode, Solar Pure Mode, Solar Plus Mode). For more information, see Menu - wallbox.

4.8.1 Setting up the ENECTOR G2 in the KSEM

Setting up the wallbox in the KSEM G2 unlocks additional features. With a PV system, functions such as ***Solar Pure Mode*** or ***Solar Plus Mode*** become available. These can be selected via the KSEM G2 interface or using the KOSTAL Solar App.

No activation code is required to set up the ENECTOR G2 wallbox in the KSEM G2.

Setting up the wallbox in the Device Manager

The following steps are required to set up the wallbox with convenience functions in the KSEM:

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INFO

Controlling the wallbox via the KOSTAL Smart Energy Meter G2 is only possible if all devices are controlled via the energy meter. Mixed control between the KOSTAL Smart Energy Meter G2 and control via the PLENTICORE G3 with MDC is not possible and will result in errors.

Please also refer to the document **'Wiring and setup of multiple KOSTAL inverters**'.

1. Open the KSEM G2 web server.
2. Select the ***'Device Manager*** ' menu item and then ***'Add*** '.
3. Refresh the list using ***'Search for devices***'.
4. If the wallbox is displayed (KOSTAL Solar Electric GmbH charging unit), you can add it directly using the plus icon.
   If the wallbox is not displayed, it can be added manually to the system via ***'Add Manually' > 'Charging Unit' > 'Select Device Type' > 'KOSTAL ENECTOR AC G2*** '.
5. Give the wallbox a name.
6. Select the phase sequence. This must correspond to the actual connected phase sequence.
7. Select the number of connected phases.
8. Confirm your entries.
9. Close the window.

➔ The wallbox is added to the system. You can configure the wallbox further via ***'Edit*** '.

Assigning the KOSTAL Smart Energy Meter to a system in the KOSTAL Solar Portal

All KOSTAL inverters and the KOSTAL Smart Energy Meter must be assigned to a PV system in the ***KOSTAL Solar Portal***. If this was not been done when setting up your PV system, you must do it now.

1. To do this, log in to the **KOSTAL Solar Portal**.
2. Select a system or create a new one.
3. Now add the KOSTAL Smart Energy Meter to this system using the article and serial number. These can be found in the ***Solar Portal*** menu in the KOSTAL Smart Energy Meter:

✓ The KOSTAL Smart Energy Meter has been set up in the **KOSTAL Solar Portal**. This means that the data can now be accessed in the **KOSTAL Solar Portal** and in the KOSTAL Solar App.

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INFO

Wallbox charging data

The Solar Portal / Solar App only displays the wallbox charging data or the link between the wallbox and the KOSTAL Solar App once the wallbox has been set up and the initial charging process is complete.

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4.9 KSEM with PLENTICORE and ENECTOR wallbox

When used in conjunction with a PLENTICORE or PLENTICORE BI, the following settings can be used to ensure that the Wallbox is prioritised over the home battery during charging.

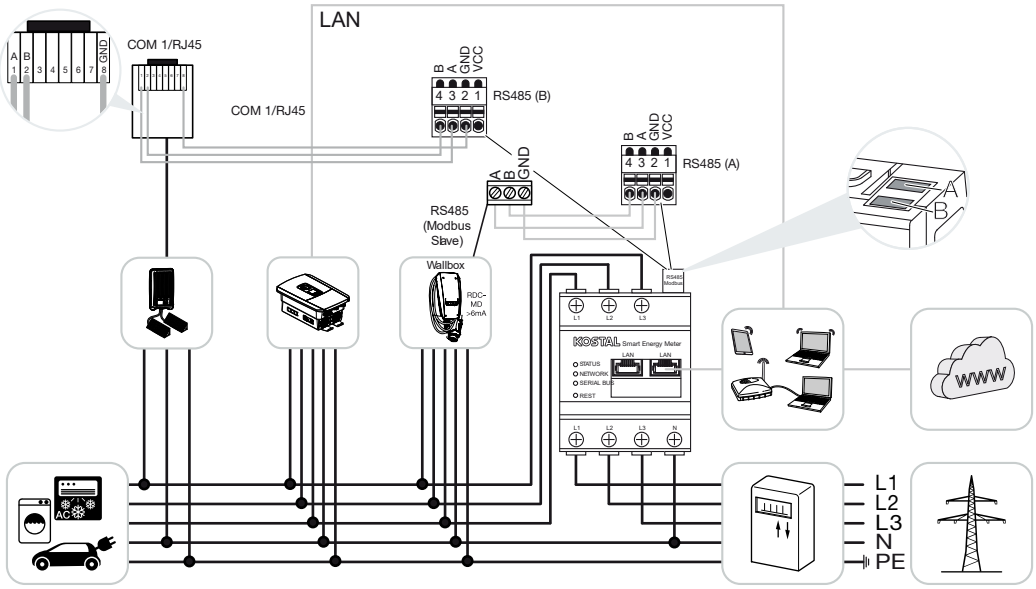
The following settings are required for this:

1. Add all inverters under ***System settings > Device manager*** in KSEM. For an inverter with a battery, ensure the correct category is selected (Photovoltaic with battery).
2. Add the ENECTOR wallbox in KSEM.
3. In the wallbox menu, you can set the priority to either the wallbox or the battery.

- If you are using a PLENTICORE with a battery and an ENECTOR, the power limit (no zero feed-in) can be configured in the inverter. Please note that if you wish to use Solar Pure Mode, the power reduction must not be less than the vehicle's minimum charging power.
- If you have more than one inverter in the system (e.g. a PLENTICORE with a battery and a PLENTICORE acting as a PV inverter), set up the power limit in KSEM under ***System Settings > System Overview/Settings > Settings*** (cog icon) and take note of the changes to the settling time.

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4.10 KSEM with PIKO MP plus and ENECTOR AC 3.7/11 wallbox



Only one KOSTAL Smart Energy Meter is required to monitor power and limit feed-in at the grid connection point. This is installed at the grid connection point in the house grid as shown in the illustrations.

INFO

In a device network comprising several KOSTAL 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.

To visualize the overall data, the KOSTAL Smart Energy Meter and all KOSTAL inverters must be added in the KOSTAL Solar Portal as devices of a PV system.

If the PIKO MP plus is operated together with the ENECTOR wallbox in a PV system, both communication interfaces are required by the KOSTAL Smart Energy Meter, meaning that no other devices (e.g. PLENTICORE with battery system) can be connected to the KOSTAL Smart Energy Meter.

Please note the following so that the devices are shown correctly in the KOSTAL Solar Portal and/or in the KOSTAL Solar App:

- Install the PIKO MP plus in the house grid (see circuit diagram at the beginning)
- Install KOSTAL Smart Energy Meter at the grid connection point (see circuit diagram at the beginning)
- Install the ENECTOR in the house grid (see circuit diagram at the beginning)

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- Connect the PIKO MP plus to the KOSTAL Smart Energy Meter via the RS485 interface.
- No energy meter may be selected for the PIKO MP plus.
- Connect all devices to the KOSTAL Smart Energy Meter and the Internet via LAN
- Activate Modbus protocol in PLENTICORE
- Set up PIKO MP plus in the KOSTAL Smart Energy Meter. It is important that the Modbus RS485 (slave) connection used has previously been enabled in the Modbus settings.
- Set up all KOSTAL inverters in the KOSTAL Smart Energy Meter
- In the KOSTAL Smart Energy Meter, the time zone (e.g. Europe/Berlin) must be selected in the device settings and the time must be set correctly.
- Sending to the Solar Portal must be activated in the KOSTAL Smart Energy Meter and in the inverters.
- Assign all KOSTAL inverters and the KOSTAL Smart Energy Meter to a PV system in the KOSTAL Solar Portal

All devices are then displayed in the Solar Portal.

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4.11 Swarm connection of KOSTAL inverters

Please refer to the installation guide on connecting multiple KOSTAL inverters (**swarm configuration**).

You can find this in our **download section** for the KOSTAL Smart Energy Meter under 'Operating Instructions'.

INFO

In a device network comprising several KOSTAL 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.

To visualize the overall data, the KOSTAL Smart Energy Meter and all KOSTAL inverters must be added in the KOSTAL Solar Portal as devices of a PV system.

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4.12 Configuring settings in the Webserver

After commissioning, further settings can be configured using the KOSTAL Smart Energy Meter's online interface.

To do this, use your PC or tablet to log in to the KOSTAL Smart Energy Meter. You will find a detailed description in **Operation, Page 69**.

INFO

To log in, you will need the password from the energy meter's type plate, which can also be found on a separate instruction leaflet in the packaging.

- The following settings should be configured by the installer after the initial commissioning:
- Configure prescribed settings relating to the grid feed-in/power limitation specified by the energy supply company (e.g. for dynamic limitation for PIKO 4.2-20, PIKO EPC and for multiple-inverter connection of solar inverters) if this has not already been done in the inverter.
- Log in to the KOSTAL Solar Portal. In this case, the measurement data is transmitted from the KOSTAL Smart Energy Meter to the portal.

INFO

The installer will need to log in to the KOSTAL Solar Portal for the PIKO MP plus with battery, for KOSTAL solar inverters in a multiple-inverter connection and for the ENECTOR wallbox.

- Set date/time zone
- Update device firmware **Updating device firmware, Page 156**
- Change password of KOSTAL Smart Energy Meter. This can be done by going to ***Profile > Change password*** **Change password, Page 157**

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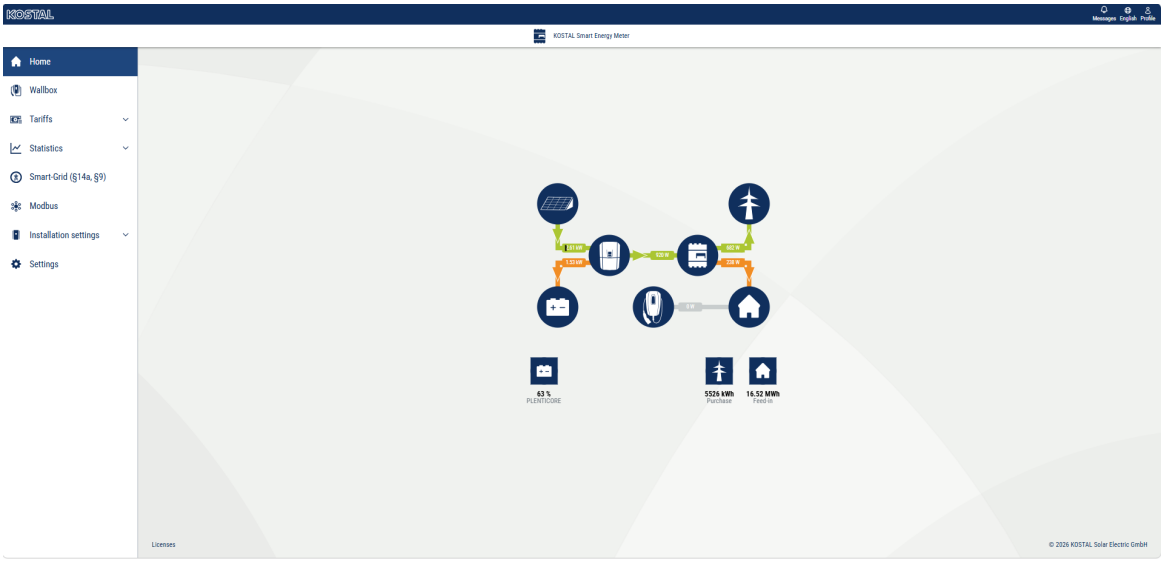
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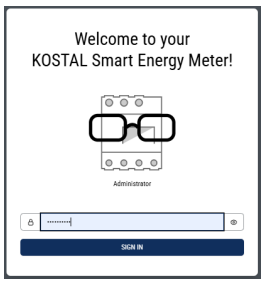
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5.1 The Webserver

The Webserver forms the graphic interface between the KOSTAL Smart Energy Meter and user.



Go to ***Login*** to log in to the KOSTAL Smart Energy Meter.



INFO

To log in, you will need the password from the energy meter's type plate, which can be found on a separate instruction leaflet in the packaging.

5.2 Preparing KOSTAL Smart Energy Meter

The KOSTAL Smart Energy Meter has to be connected to an existing local network in order for you to access it.

1. This requires the following steps:
2. Install the KOSTAL Smart Energy Meter in a distributor box on the top-hat rail according to the installation instructions provided and connect by cable.
3. Cover KOSTAL Smart Energy Meter with the cover or protection against accidental contact of the sub-distribution in the distributor box.
4. Connect network cable to KOSTAL Smart Energy Meter's grid connection (LAN port).
5. Connect the other end of the network cable to a router/switch.
6. Reconnect sub-distribution to power supply. Wait for the KOSTAL Smart Energy Meter's launch process to end.

✓ The KOSTAL Smart Energy Meter is connected to the network.

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5.3 Calling up user interface

Prerequisite:

- The computer or device you are using to access the system must be on the same network as the KOSTAL Smart Energy Meter (KSEM).
- A web browser must be installed on the device (e.g. Edge, Chrome, Firefox).

The user interface can be accessed via a standard browser on a PC, tablet or mobile phone. To do this, enter the hostname or IP address of the KOSTAL Smart Energy Meter in the browser's address bar. The factory-set hostname consists of the product name and the serial number.

INFO

This function depends on the router's settings and may not be available in larger managed networks.

Using HTTPS in the browser

To use the KOSTAL Smart Energy Meter with HTTPS in your browser, you must enter ***https://*** in the address bar instead of ***http://***.

INFO

As the web interface of the KOSTAL Smart Energy Meter is not a website registered on the internet, the browser will flag it as unsafe.

To access the web interface anyway, you must ignore the browser's warnings and add a one-off or permanent exception in the ***Advanced Settings***.

Accessing the web interface via the network environment in Windows 10

In Windows, click on ***'Network'*** in File Explorer or open ***'Devices and Printers'*** via the search function.

INFO

Furthermore, the target network must not be classified as **a 'Public network'** on the PC, as otherwise this function will be blocked by Windows.

An icon displaying the name of the KOSTAL Smart Energy Meter (e.g. KSEM-712345678) should be visible. Click on the KOSTAL Smart Energy Meter icon. The default browser will open to the KOSTAL Smart Energy Meter login page.

Accessing the web interface

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1. Enter the host name or IP address of the KOSTAL Smart Energy Meter in the browser's address bar.

   http://ksem-g2-<serial number> (example: **http://ksem-g2-712345678**)
   or
   http://ksem-<serial number>

   Alternatively, you can enter the IP address of the KOSTAL Smart Energy Meter (example: **http://192.168.1.20**).
2. Press the ENTER key.

➔ The login window will open.

3. Enter the password and press the ENTER key

INFO

To log in, you will need the password from the energy meter's type plate, which can be found on a separate instruction leaflet in the packaging.

✓ The KOSTAL Smart Energy Meter user interface opens.

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5.4 Configuring settings

If you wish to connect a PLENTICORE/PIKO IQ to the RS485 A interface or a PIKO MP plus to the RS485 B interface, no further settings are required, as these devices are already pre-configured for these interfaces as supplied.

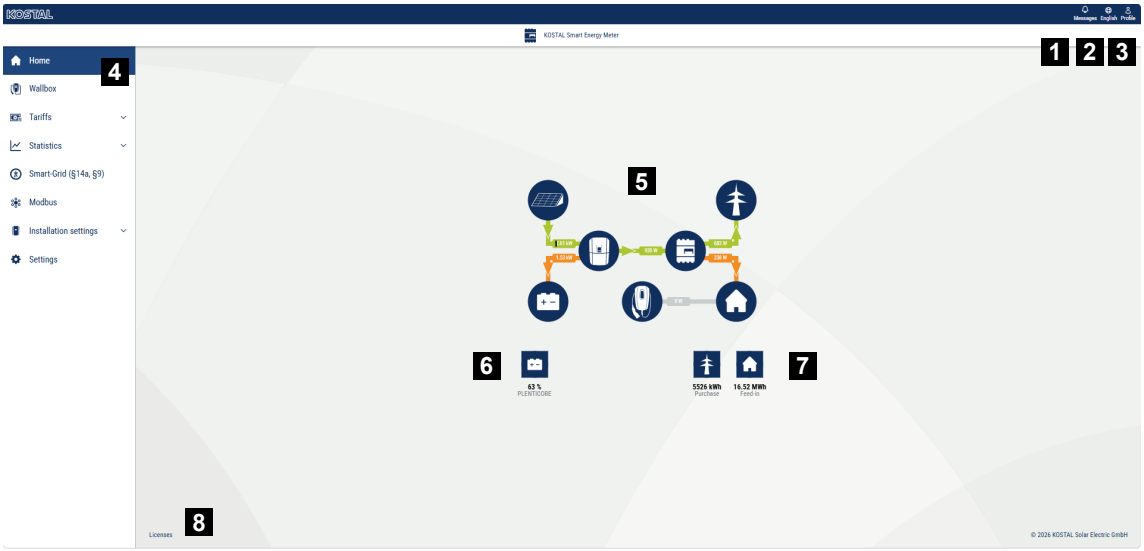
If you wish to change the settings for the interfaces on the KOSTAL Smart Energy Meter, you can select an inverter for the interface in the Modbus settings.

If you are using an ENECTOR AC 3.7/11 G1 wallbox, you can alternatively deactivate the slave interface and use it to control the wallbox instead. The correct values are set by default. If necessary, you can also adjust these values.

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5.5 Menu - Home

The dashboard provides the user with an overview of the most important current data from the KOSTAL Smart Energy Meter and the connected devices.



1 Notifications (e.g. latest update)
2 Language selection
3 Log in/Log out Web server, change password
4 Menus
5 Energy flow in the domestic grid
6 Current battery SoC
7 Current power consumption and generation data for the KOSTAL Smart Energy Meter since the device was commissioned
8 Licence information

INFO

For the energy values to be displayed accurately, the KOSTAL Smart Energy Meter has to be installed at the grid connection point because otherwise not all consumers in the house grid can be recorded.

INFO

To display the correct PV, battery or household consumption figures, the inverters must be added via the ***System Settings > Device Manager*** menu.

5.6 Menu – Wallbox



1 Overview of the available charging points and the status of all active charging processes.

2 Charging status. Stop or start charging.

3 The phase selection determines the number of phases to be used for charging the electric car.

4 The wallbox charging mode selection defines the conditions under which a charging process is generally permitted.

5 Key: Colours/Meaning

6 Charging mode selection and settings

7 Here you can set whether the home battery should generally be used to charge the vehicle or not. You can also specify the order/priority of the devices.

8 Power overview of all ongoing charging processes and the available power allocation across the entire system.

9 Current per phase of the mains connection

10 Display of phase imbalance during charging

11 Further settings for the wallbox

Under the ***Wallbox*** menu, you can control any wallboxes that have been set up.

The following wallboxes can be configured in the KSEM G2:

- ENECTOR G1 (KOSTAL ENECTOR AC) via an RS485 connection. This requires an activation code, which is entered via the menu option ***'System Settings > Activation Code '***. The wallbox can then be set up via the ***Device Manager*** in the KSEM G2.
- ENECTOR G2 (KOSTAL ENECTOR AC G2) via LAN connection. The wallbox can be set up via the ***Device Manager*** in KSEM G2.

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5.6.1 Add the ENECTOR G1 wallbox

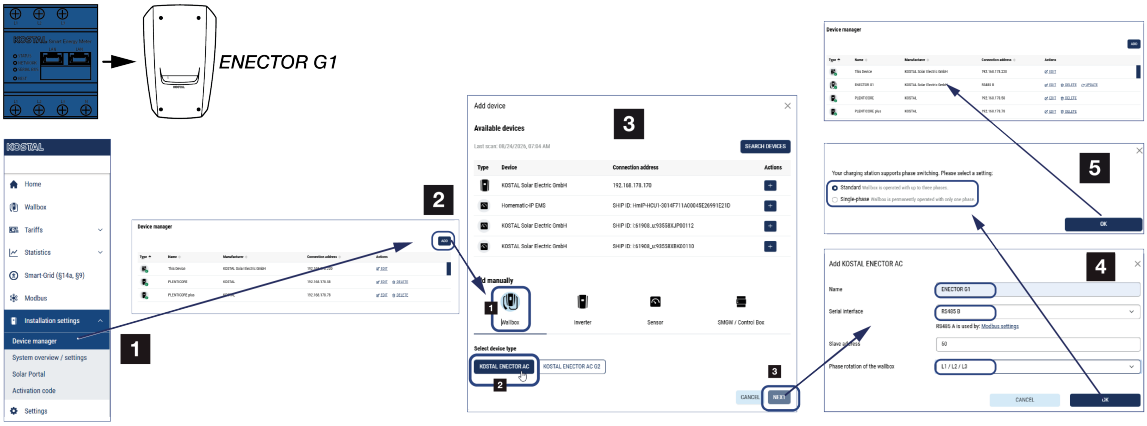
The ENECTOR G1 wallbox is connected to the KSEM G2 via the device manager and is then displayed under the 'Wallbox' menu. An additional activation code is required for setup in the KSEM G2; you can purchase this from the KOSTAL webshop or via a wholesaler.

The ENECTOR G1 is connected to the KSEM via an RS485 interface.

INFO

Note that the RS485 interface to which the wallbox is connected has to be released in the Modbus settings first.

To control the wallbox via the KOSTAL Smart Energy Meter G2 (KSEM G2), it must be added in the KSEM G2's Device Manager.



1. Open the KSEM G2 web server.
2. Select the menu item ***System Control > Device Manager*** and then ***Add***.
3. Under ***'Add manually'***, select ***'Wallbox'*** and then choose the device type ***'KOSTAL ENECTOR AC'*** for the ENECTOR G1. This device type will only appear once the activation code ***'KOSTAL Wallbox ENECTOR G1*** ' has been activated in the KSEM G2. Confirm your selection by clicking ***'Next'***.
4. On the next screen, complete or check the following fields
   - Name: Enter a name for the wallbox.
   - Serial interface: Select the interface via which the ENECTOR G1 is connected to the KSEM. By default, this should be RS485 B.
   - Slave address: 50 – This must not be changed. After installation, the wallbox is automatically assigned a new address (100) in the system.
   - Wallbox phase rotation: The selection of connected phases must match the phases actually connected to the device.

   Confirm your entries by clicking ***OK***.

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5. In the ‘Phase Switching’ window, select the number of phases to which the wallbox is connected.
   - Standard: The wallbox has been connected to 3 phases.
   - Single-phase: The wallbox has been connected to just one phase.
   Confirm your entries by clicking ***OK***.

➔ The wallbox is added to the system. You can configure the wallbox further via ***‘Edit*** ’.

Check / change phase sequence

INFO

Phase imbalance / phase sequence of the wallbox

If there are several wallboxes or high-power consumers on the domestic network, it may be necessary to adjust the phase sequence of the wallbox to avoid an unbalanced load, in accordance with applicable guidelines (in Germany, this is 4.6 kW).

By default, the phase sequence is set to L1/L2/L3 in the wallbox and does not need to be changed if there is only one wallbox on the domestic network.

If the phase sequence needs to be changed to avoid an unbalanced load, the phase sequence can be adjusted under the menu: ***System Settings > Device Manager > Settings > Wallbox > Edit > Phase Rotation of the Wallbox***. The selected phase sequence must correspond to the physical connection of the phases in the wallbox.

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5.6.2 Add the ENECTOR G2 wallbox

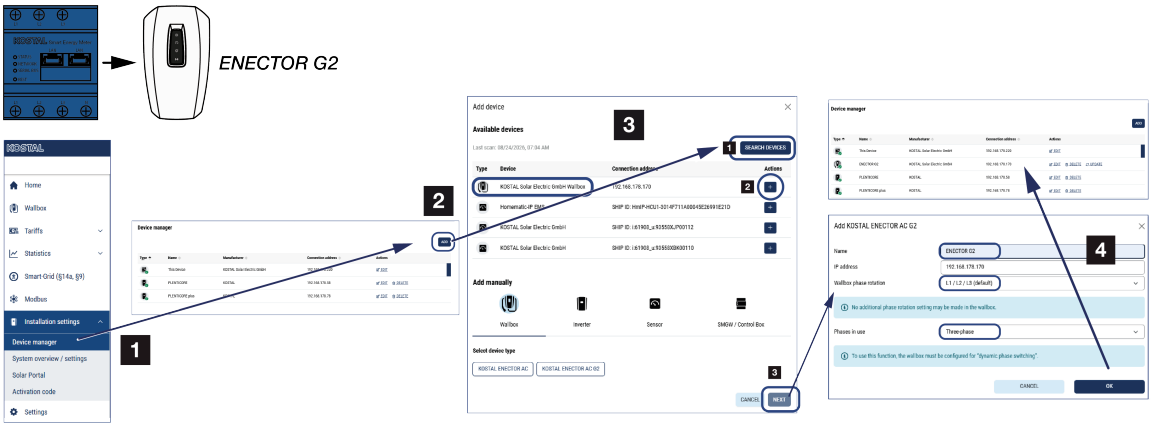
The ENECTOR G2 wallbox is connected to the KSEM G2 via the Device Manager and is then displayed under the Wallbox menu. No additional activation code is required for set-up.

INFO

Controlling the wallbox via the KOSTAL Smart Energy Meter G2 is only possible if all devices are controlled via the energy meter. Mixed control between the KOSTAL Smart Energy Meter G2 and control via the PLENTICORE G3 with MDC is not possible and will result in errors.

Please also refer to the document **'Wiring and Setup of Multiple KOSTAL Inverters**'.

To control the wallbox via the KOSTAL Smart Energy Meter G2 (KSEM G2), it must be added in the KSEM G2's device manager.



1. Open the KSEM G2 web server.
2. Select the menu item ***'System Control > Device Manager*** ' and then ***'Add*** '.
3. Refresh the list using ***'Search for devices'***.
4. If the wallbox (KOSTAL Solar Electric GmbH Wallbox) is displayed, you can add it by clicking the plus sign.
   If the wallbox is not displayed, it can be added manually to the system via ***Select device type > KOSTAL ENECTOR AC G2***.
5. On the next screen, complete or check the fields and then click OK.
   - Name: Name of the wallbox
   - IP address: IP address of the wallbox
   - Wallbox phase rotation: The selection of connected phases must match the phases actually connected to the device.
   Important: Phase rotation must only be configured in one place. Either in the ENECTOR G2 under Settings > General > Phase sequence or in the KSEM G2. If

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the setting has already been configured in the ENECTOR G2, the phase rotation in the KSEM G2 must remain at the default setting L1/L2/L3. By default, however, the wallbox is supplied with the phase sequence L1/L2/L3.
- Phases used: Select three-phase or single-phase.

6. Close the window

➔ The wallbox is added to the system. You can configure the wallbox further via ***'Edit*** '.

Check / change phase sequence

INFO

Phase imbalance / phase sequence of the wallbox

If there are several wallboxes or high-power consumers on the domestic network, it may be necessary to adjust the phase sequence of the wallbox to avoid an unbalanced load, in accordance with applicable guidelines (in Germany, this is 4.6 kW).

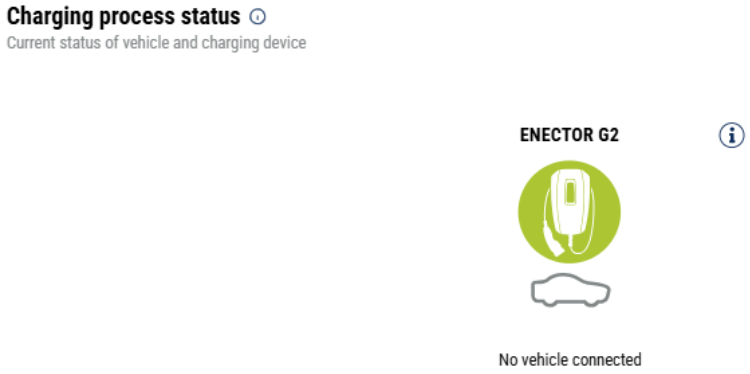
By default, the phase sequence is set to L1/L2/L3 in the wallbox and does not need to be changed if there is only one wallbox on the domestic network.

If the phase sequence needs to be changed to avoid an unbalanced load, the phase sequence can be adjusted under the menu: ***System Settings > Device Manager > Settings > Wallbox > Edit > Phase Rotation of the Wallbox***. The selected phase sequence must correspond to the physical connection of the phases in the wallbox.

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5.6.3 Charging Status

This section displays information about the current charging process. If an electric vehicle is connected and charging is in progress, you can pause or restart the process here. If the charging process is interrupted or paused by internal control mechanisms (e.g. cloud hysteresis), this is also displayed here.



5.6.4 Selecting phase usage

Select here the maximum number of phases you wish to use to charge your electric vehicle.

INFO

Damage to the electric vehicle is possible when switching phase usage

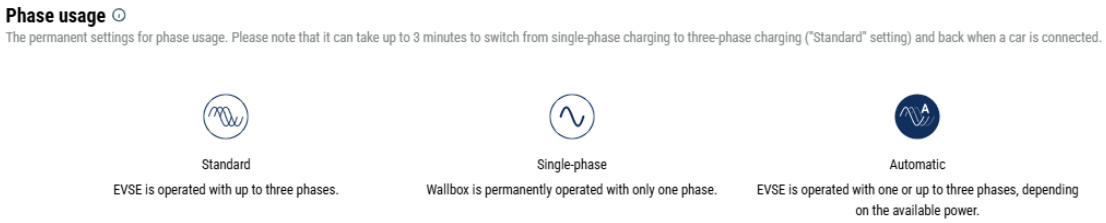
The Wallbox includes the option to switch phases whilst charging is in progress.

As some vehicles currently on the market are not compatible with a phase change whilst charging is in progress, automatic switching may, in isolated cases, cause significant damage to the vehicle.

Please check with your car manufacturer to confirm whether your vehicle supports this function. If not, please disconnect the vehicle from the Wallbox before a phase switch can be carried out.

When the phase is changed over while the charging plug is plugged into the vehicle, the charging process is always terminated before the phase is changed over. The charging process is interrupted for approximately 3 minutes.

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- **Standard (three-phase)**
  The three-phase electric vehicle can be charged with a power of between 4.1 - 11 kW. However, you can use this setting to charge all electric vehicles, no matter whether you want single-phase, two-phase or three-phase. The electric vehicle determines the maximum charging power.
- **Single-phase**
  The electric vehicle can be charged with a power of between 1.4 - 3.7 kW.
  For three-phase electric vehicles, here you can change the number of phases for charging from three-phase to single-phase charging, which reduces the charging power to 1.4-3.7 kW. This is a good idea if you want to use ***Solar Pure Mode***, for example, and do not have sufficient solar energy available (e.g. during spring or autumn). In this case, the vehicle can be charged with pure solar energy as of a surplus of 1.4 kW.
- **Automatic**
  With automatic phase switching, the wallbox automatically switches between single-phase (1.4–3.7 kW) and three-phase (4.1–11 kW) charging. This means the full charging range from 1.4 kW to 11 kW is available for charging the electric vehicle.

  In ***Solar Pure*** charging mode, this means that, for example, if the surplus PV output is between 1.4 and 4.2 kW, a single-phase charging process can be started. If the surplus PV power rises above 4.6 kW during the charging process, the system automatically switches to three-phase charging. When the system switches phases, the active charging process is always interrupted first and only then restarted with the new phase setting.

  Automatic phase switching procedure:
  When charging begins, the system checks whether the surplus PV power is sufficient for three-phase charging. If this is the case, the charging process starts in three-phase mode. If the surplus PV power is insufficient, charging starts in single-phase mode. Every 15 minutes, the system checks whether it is possible to switch to three-phase charging. If so, the switch is made. For this to happen, the available charging current must be 7 per cent above the minimum charging current required for three-phase charging. This is usually 4.5 kW. If three-phase charging is no longer possible – for example, because the PV output is insufficient due to cloud cover – the system will attempt to switch to single-phase charging after 5 minutes. If the required surplus power is still insufficient for this, charging is paused.

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5.6.5 Wallbox charging mode

The charging mode defines the conditions under which a charging process is generally permitted. There are various charging modes to choose from.



- ***Lock Mode*** (Lock Wallbox)
  The Wallbox is locked. It can only be unlocked by selecting a different mode on the KOSTAL Smart Energy Meter G2.
- ***Power Mode*** (standard charging)
  The electric vehicle is charged at the maximum selected power.
- ***Solar Pure Mode*** (solar charging)
  In this mode, the electric vehicle is charged solely using surplus PV energy.
- ***Solar Plus Mode*** (solar-optimised charging)
  Solar-optimised charging involves configuring a combination of surplus PV power and grid power.
- ***Time Mode*** (time-controlled charging)
  In this mode, you can specify at what time on which day of the week one of the available modes should be used.

Lock Mode (Wallbox locked)

The wallbox can be locked via the KSEM to prevent unauthorised access. It is not possible to charge an electric vehicle.

The Wallbox can be unlocked by selecting a different mode in the KSEM.

Power Mode (Simple Charging)

In ***Power Mode***, the electric vehicle is charged at the maximum charging power. This depends on how the wallbox is connected (single-phase or 3-phase), what maximum charging power has been set in the wallbox, the choice of phase usage and what charging power the electric vehicle allows.

The maximum charging power that the wallbox is designed to provide is set on the wallbox itself. Please refer to the wallbox's user manual for details.

For vehicles that can only be charged 1-phase, the maximum charging power is 3.7 kW.

For vehicles that can be charged 3-phase, the maximum charging power is 11 kW.

Prioritisation of loads and battery usage

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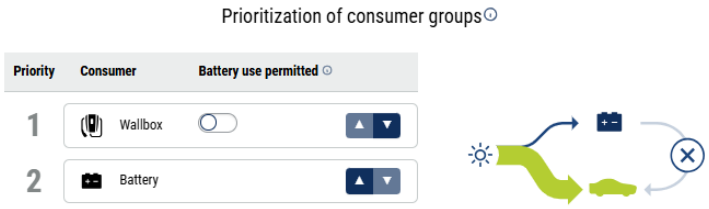
Prioritisation

The priority of loads can be set using the arrow keys. The load with the highest priority is given preference. This means that if the wallbox is in first place, the PV energy generated is made available to the wallbox and, if battery use is activated, the battery is also used for charging.

If the battery is in first place, the PV energy generated is first used to charge the battery until it is full, and only then is it supplied to the device in second place.

Battery usage

If a battery is present in the home network, it is not normally used to charge the electric vehicle. The additional use of the battery can be configured via the switch. Depending on the inverter with a battery in the home network, this function may not be available in all modes.



'Allow battery use' enabled: In this case, the home battery is also used to charge the electric vehicle. This means that the battery is used to charge the electric vehicle until it reaches the minimum SOC.

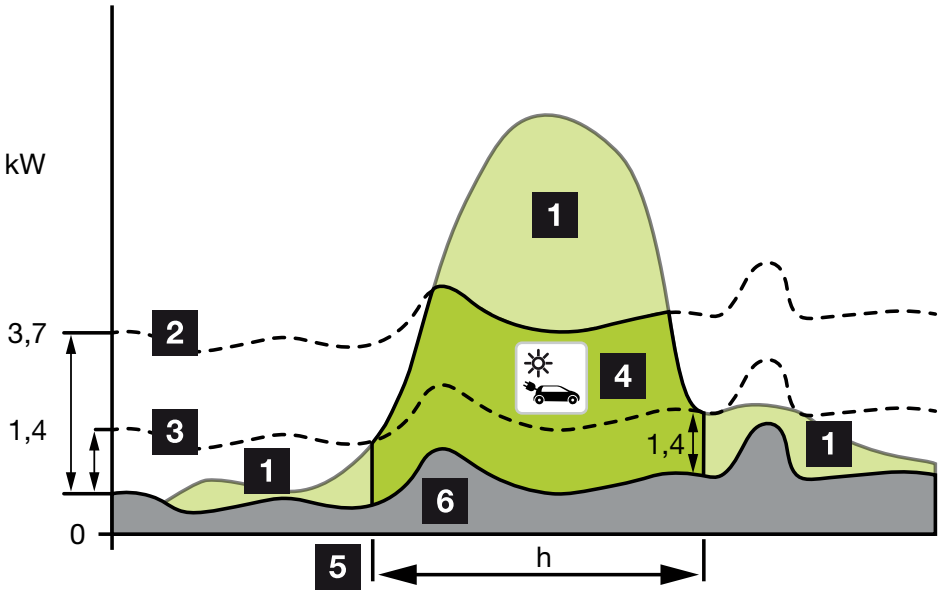
Battery usage disabled: In this case, charging the electric vehicle from the home battery is prevented. The electric vehicle is charged only from other sources, e.g. the public grid and surplus PV.

Solar Pure Mode (Solar Charging)

Solar charging is only possible in conjunction with a PV system and the KOSTAL Smart Energy Meter. The PV system supplies the power required to charge the electric vehicle. With this function, the electric vehicle is charged solely using surplus PV energy. If there is a battery in the domestic grid, this can also be used to charge the electric vehicle.

For electric vehicles that are charged 1-phase, the charging power is between 1.4 and 3.7 kW. This means that charging is only started when at least 1.4 kW of surplus PV energy is available and is interrupted or terminated when this falls below 1.4 kW.

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For electric vehicles that are charged 3-phase, the charging power is between 4.1 and 11 kW. This means that charging is only started when at least 4.1 kW of surplus PV energy is available and is interrupted or terminated when this falls below 4.1 kW.

1 PV surplus
2 Max. wallbox charging power 3.7 kW (with 1-phase vehicle)
Max. wallbox charging power 11 kW (with 3-phase vehicle)
3 Min. wallbox charging power 1.4 kW (with 1-phase vehicle)
Min. wallbox charging power 4.1 kW (with 3-phase vehicle)
4 Charging electric vehicle with PV surplus
5 Electric vehicle charging time
6 Home consumption of other devices - partly covered directly from PV.

INFO

Clouds/hysteresis for drawing power

If the necessary excess power is not available, charging is maintained for approx. 5 minutes at the minimum charging power to avoid unnecessary switching on and off. After the hysteresis time has elapsed, charging is interrupted and only resumed after a wait time of approx. 8 minutes.

Prioritisation of loads and battery usage

Prioritisation

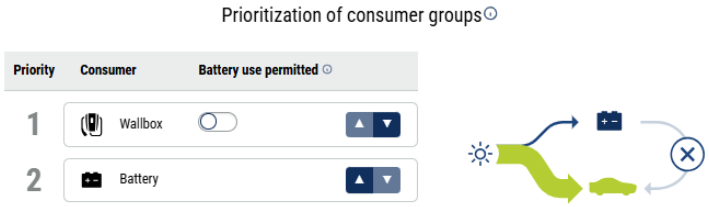
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The priority of loads can be set using the arrow keys. The load with the highest priority is given preference. This means that if the wallbox is in first place, the PV energy generated is made available to the wallbox and, if battery use is activated, the battery is also used for charging.

If the battery is in first place, the PV energy generated is first used to charge the battery until it is full, and only then is it supplied to the device in second place.

Battery usage

If a battery is present in the home network, it is not normally used to charge the electric vehicle. The additional use of the battery can be configured via the switch. Depending on the inverter with a battery in the home network, this function may not be available in all modes.



'Allow battery use' enabled: In this case, the home battery is also used to charge the electric vehicle. This means that the battery is used to charge the electric vehicle until it reaches the minimum SOC.

Battery usage disabled: In this case, charging the electric vehicle from the home battery is prevented. The electric vehicle is charged only from other sources, e.g. the public grid and surplus PV.

Solar Plus Mode (Solar-optimised charging)

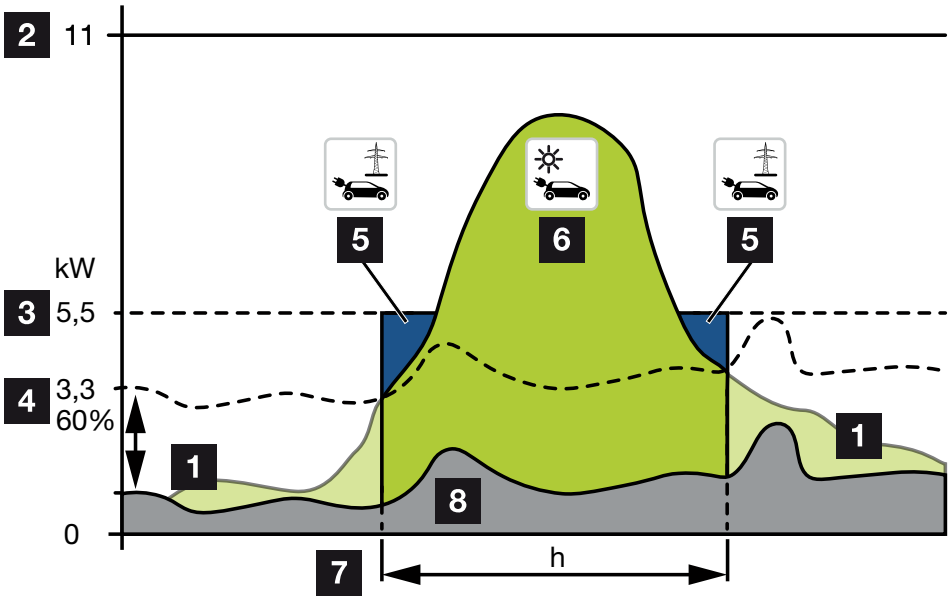
Solar-optimised charging is only possible in combination with a PV system and the KOSTAL Smart Energy Meter. The PV system supplies the energy needed to charge the electric vehicle.

If there is a PV surplus at the grid interconnection point, the amount drawn from the grid is replaced by the PV power or, if possible, increased to the PV surplus.

If desired, a minimum PV surplus power can also be defined here. This is the minimum level which must be present before charging is started at the power level defined by the customer. If the surplus power falls below the defined minimum value, charging is stopped again.

This function can be used to charge the electric vehicle in the evening, for example, when there is no longer enough PV energy available but the electric vehicle needs to be charged for the next morning.

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1 PV surplus

This surplus can also be used to charge a battery.

2 Max. wallbox charging power 11 kW (3-phase).

3 Fixed minimum starting charging power.

In this example, at 50% of the max. charging power of 11kW (for 3-phase connection with 3-phase vehicle = 5.5kW).

4 Set min. surplus power at the grid connection point before charging is started. In this example, 60 % of 5.5 kW = 3.3 kW.

The additional charging power of 2.2 kW (5) is drawn from the public grid.

5 Charging electric vehicle from the public grid. In this example 2.2 kW.

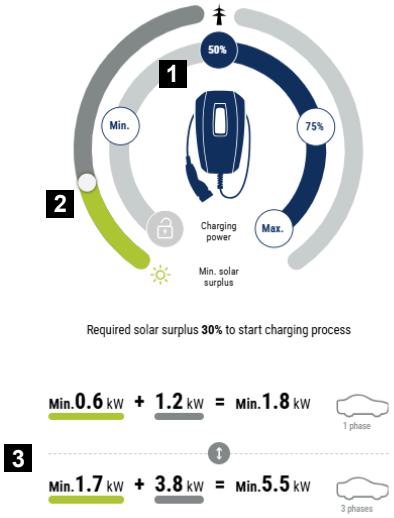
6 Charging electric vehicle from PV surplus.

7 Electric vehicle charging time.

8 Home consumption of other devices - partly covered directly from PV.

Set the initial charging power

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1 Setting the target initial charging power.

2 Slider for adjusting the ratio between solar energy used and electricity drawn from the grid.

3 Display of electric vehicle charging values.

Setting the charging power

Min.	This determines and sets the minimum charging power of the connected electric vehicle (1-phase 1.4 kW / 3-phase 4.1 kW).
50	The charging power is set to 50 per cent of the electric vehicle's maximum charging power (single-phase 1.85 kW / three-phase 5.5 kW).
75%	The charging power is set to 75 per cent of the electric vehicle's maximum charging power (single-phase 2.8 kW / three-phase 8.25 kW).
Max.	In this case, the maximum charging power of the connected electric vehicle is determined and set (single-phase 3.7 kW / three-phase 11 kW).

Setting the minimum solar surplus

In ***Solar Plus mode***, the slider can be used to set the ratio between solar energy used and energy drawn from the grid.

Example: If 30% solar energy / 70% grid draw is set, at least 30% solar energy must be available before the charging process starts. The remaining energy is drawn from the grid. If the proportion of solar energy increases, the grid draw is reduced.

Display of charging values for 1-phase and 3-phase electric vehicles

The illustration at the bottom shows the setting in kW for 1-phase or 3-phase vehicles. If more solar power is generated than the min. set, the amount drawn from the grid is reduced by the corresponding proportion.

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Prioritisation of loads and battery usage

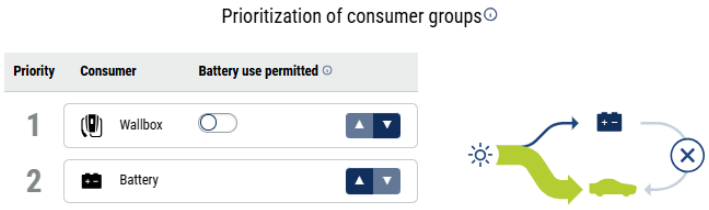
Prioritisation

The priority of loads can be set using the arrow keys. The load with the highest priority is given preference. This means that if the wallbox is in first place, the PV energy generated is made available to the wallbox and, if battery use is activated, the battery is also used for charging.

If the battery is in first place, the PV energy generated is first used to charge the battery until it is full, and only then is it supplied to the device in second place.

Battery usage

If a battery is present in the home network, it is not normally used to charge the electric vehicle. The additional use of the battery can be configured via the switch. Depending on the inverter with a battery in the home network, this function may not be available in all modes.



'Allow battery use' enabled: In this case, the home battery is also used to charge the electric vehicle. This means that the battery is used to charge the electric vehicle until it reaches the minimum SOC.

Battery usage disabled: In this case, charging the electric vehicle from the home battery is prevented. The electric vehicle is charged only from other sources, e.g. the public grid and surplus PV.

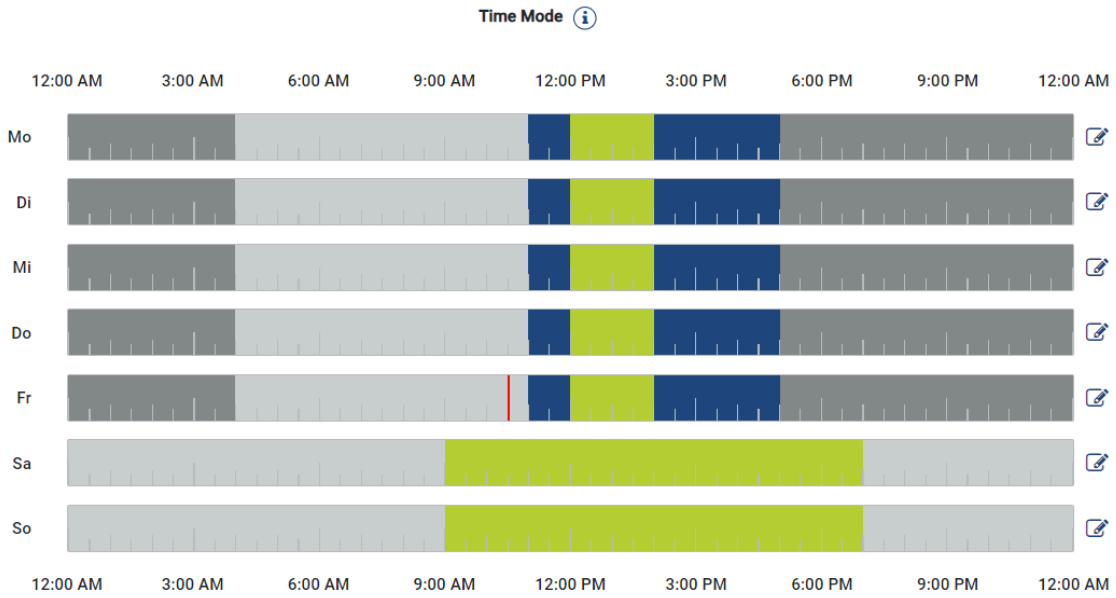
INFO

Clouds/hysteresis for drawing power

If the necessary excess power is not available, charging is maintained for approx. 5 minutes at the minimum charging power to avoid unnecessary switching on and off. After the hysteresis time has elapsed, charging is interrupted and only resumed after a wait time of approx. 8 minutes.

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Time Mode (Time-controlled charging)



In this mode, you can specify at what time on which day of the week one of the available modes should be used.

For example, the wallbox can be locked (***Lock Mode***) whilst you are generally away (e.g. 8 am to 12 noon) and switched to solar charging (***Solar Pure Mode***) during the scheduled times when you are at home.

If the car is to be charged at night at a lower power output (***Solar Plus Mode***) or at full charging power (***Power Mode***), this can also be scheduled.

INFO

Whilst ***Time Mode*** is active, the push-button is disabled to prevent scheduled lockout periods from being overridden.

Configuring Time Mode

1. Select the Time Mode.
2. To edit a day, click on the pencil icon to the right of the timeline. If you wish to edit several days at the same time, you can simply select them in the edit window.

➔ The ***'Time Mode Configuration – Charging Mode Assignment'*** window opens.

3. First, select a mode, e.g. ***Solar Pure Mode***.
4. Then select the times at which this mode should apply, e.g. 12 noon and 1 pm.

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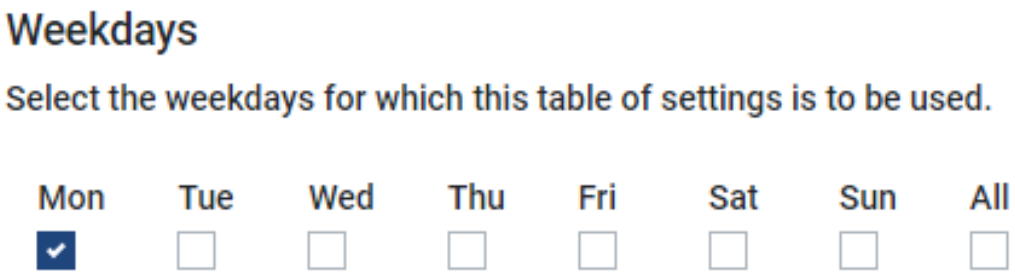
➔ The times are highlighted in the corresponding colour, matching the mode.

5. Repeat this process for the other times on this day until the day is fully scheduled.

INFO

If you use ***Solar Plus Mode*** here, the charging settings you have configured under ***Solar Plus Mode*** will be applied.

6. You can then apply this configuration to the selected day, to additional days, or to all days.



7. To apply the configuration, press ***Save***.

✓ Time Mode has been set up.

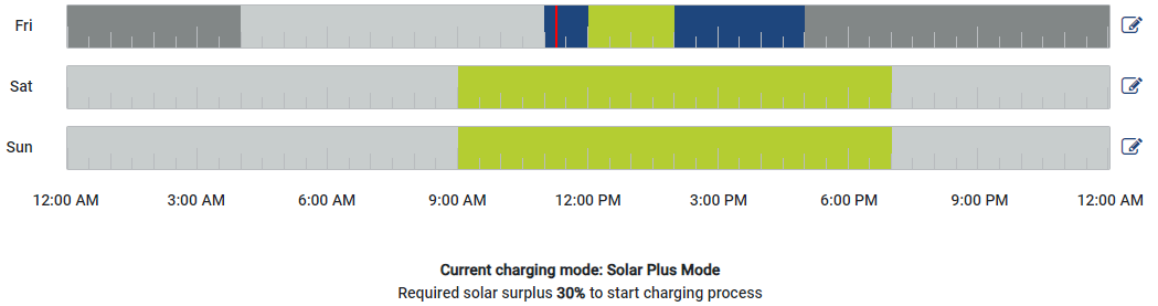
Time Mode is activated when the ***Time Mode*** icon has been selected. As soon as you select a different mode, ***Time Mode*** is deactivated.

If you hover the mouse pointer over the timeline, information about the selected mode will be displayed.

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The red line on the timeline marks the current time and indicates which mode is currently active. This is also displayed in text form below the timeline.



Prioritisation of loads and battery usage

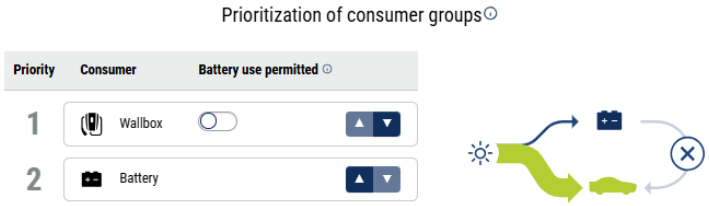
Prioritisation

The priority of loads can be set using the arrow keys. The load with the highest priority is given preference. This means that if the wallbox is in first place, the PV energy generated is made available to the wallbox and, if battery use is activated, the battery is also used for charging.

If the battery is in first place, the PV energy generated is first used to charge the battery until it is full, and only then is it supplied to the device in second place.

Battery usage

If a battery is present in the home network, it is not normally used to charge the electric vehicle. The additional use of the battery can be configured via the switch. Depending on the inverter with a battery in the home network, this function may not be available in all modes.



'Allow battery use' enabled: In this case, the home battery is also used to charge the electric vehicle. This means that the battery is used to charge the electric vehicle until it reaches the minimum SOC.

Battery usage disabled: In this case, charging the electric vehicle from the home battery is prevented. The electric vehicle is charged only from other sources, e.g. the public grid and surplus PV.

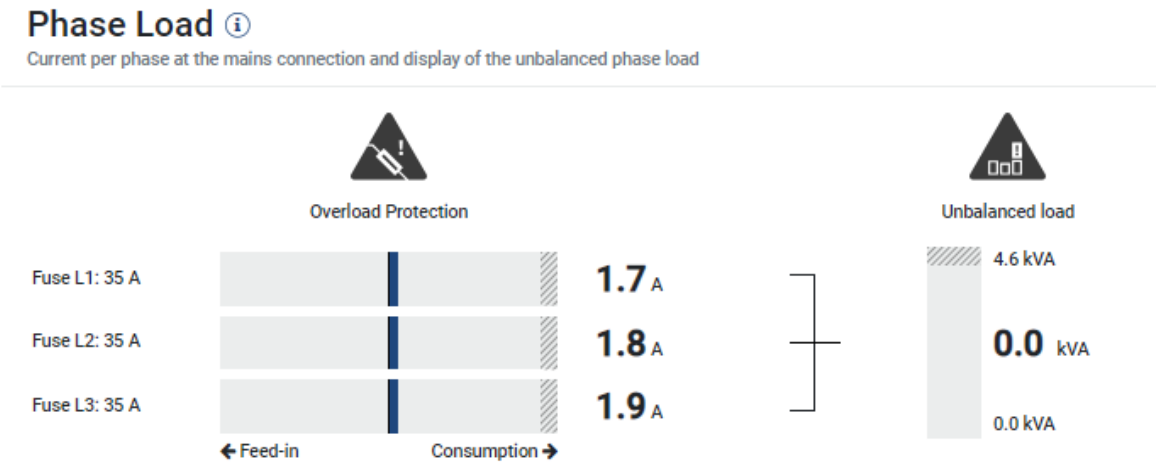
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5.6.6 Total charging power

This is the power of all charging processes taking place as well as the available power quota over the entire system. The maximum power is calculated from the rated current of the main fuse (or sum of the individual main fuses for a poly-phase grid connection). The value for the available power is calculated from the sum of the specified maximum charging currents.

5.6.7 Phase load

The current load per phases at the grid connection point and the unbalanced phase load during a charging process are shown under Phase load.



Overload protection

Overload protection shows the current consumption or feed-in per phase. If the value exceeds the limit range of the rated current shown (shaded area), the charging current is reduced in order to not overload the grid connection point and thus the house fuse (blackout protection).

The configured overload protection is shown in the settings. This is set via the DIP switch on the charging device. The lowest protection required to protect the house fuse must be set.

Unbalanced phase load

Unbalanced phase load provides an overview of the unbalanced load between the individual phases caused by the charging device. The unbalanced phase load must not exceed a particular value. In Germany, this value is currently 4600 VA or 4.6 kWh. You can set the value for the unbalanced phase load by going to ***Wallbox > Settings*** (cogwheel).

Set the maximum unbalanced phase load permitted for your country. The Energy Manager restricts the current consumption of connected and controllable consumers in order to observe the value set for the unbalanced phase load by the charging device.

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5.6.8 Wallbox charging control

To gain a better understanding of how the charging process works with and without a battery, and when prioritising the wallbox or the battery, please refer to the tables below for a brief explanation.

If ‘Do not use battery’ is selected, the battery will still be used under certain conditions to minimise the vehicle constantly switching on and off.

Furthermore, in Solar Pure Mode, the battery is used when the solar panels are shaded by clouds, again to prevent the charging process from being constantly interrupted.

Glossary

Term	Explanation
PV surplus	PV surplus is the sum of PV generation minus household consumption.
Minimum charging power	Depends on the minimum charging current and the number of phases used. The example calculation shows the minimum charging power based on the currently set minimum charging current for both single-phase and three-phase charging processes. The minimum charging current for three-phase vehicles is usually 6A per phase, i.e. 18A for all three phases, which amounts to just under 4.2 kW. The minimum charging current for single-phase vehicles is usually 6A per phase, i.e. just under 1.4 kW.

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Term	Explanation
Cloud cover hysteresis	This function serves to smooth out the control process in the event of changeable weather (e.g. cloud cover) and fluctuating PV output, and to avoid unnecessary interruptions to charging. When there is a drop in PV output, a hysteresis period is initiated. Wallbox charging processes continue at full power. Once the hysteresis period has elapsed, the charging power is reduced, an automatic phase switch is carried out, or the charging process is paused if the PV surplus is insufficient for the current charging power. The duration of the hysteresis is **5 minutes**. If the PV surplus required for the charging process is exceeded during the hysteresis period, the timer is stopped and the hysteresis is terminated. If the required power level is again fallen below, a new hysteresis cycle begins. If, during cloud cover hysteresis, the timer for automatic phase switching expires, the system switches to single-phase charging without waiting for the full 5 minutes to elapse.
Shut-off hysteresis	If, after the cloud cover hysteresis has elapsed, there is insufficient surplus PV power to continue the charging process at the minimum charging power, the charging process is switched off. The charging process will not be switched on again until at least the **8-minute** switch-off hysteresis has elapsed. This hysteresis can be terminated prematurely by manually switching the charging modes.
Initialisation (probing)	During the initialisation of the charging process, the minimum and maximum charging currents for the car and the wallbox are determined. These depend on the connected vehicle and the state of charge (SoC) of the vehicle battery, as well as on environmental conditions (for example, temperatures below 0°C or above 40°C). To determine the maximum power, this must be supplied briefly (e.g. 11 kW for three-phase charging), even if it is not available in the current charging mode (e.g. insufficient surplus PV). This may result in the home battery being briefly discharged for the probing process.

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Term	Explanation
Automatic phase switching	When this function is enabled, the number of phases with which the wallbox can charge is automatically switched depending on the set charging mode and the available surplus PV. The starting point is a three-phase charging process with sufficient PV surplus. If charging processes are restricted due to a lack of available PV power, this is first applied to the current to the car. If the current were to fall below the minimum charging current, the cloud-pass hysteresis is initiated and, once this period has elapsed, a phase switch to single-phase charging takes place. After the charging process has been switched off, the phase changeover to single-phase is initiated after **a 2-minute waiting period** . This is followed by a probe test, and if there is sufficient PV power, charging continues in single-phase mode. Every **15 minutes, the system checks** whether, based on the current PV surplus, a phase change from single-phase to three-phase or from three-phase to single-phase should take place. If, when the timer expires, a phase change from three-phase to single-phase is due to take place and a cloud cover hysteresis is active, the phase change takes place immediately. If a cloud-passing hysteresis period expires, a phase change from three-phase to single-phase is also carried out immediately, independently of the 15-minute timer for automatic phase switching. For a switchover from single-phase to three-phase, there must be at least a PV surplus of **minimum charging power plus 7 per cent** . As a rule, this amounts to 4.5 kW.

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Charge control in Solar Pure Mode

Surplus	Wallbox Prio Allow use of home battery	Wallbox Priority Do not allow use of home battery	Home battery priority
Surplus > Minimum charging power	■ The wallbox charges using surplus energy. ■ The home battery charges using additional surplus power, if available. ■ No grid draw.		■ The wallbox charges when the home battery is full or using additional surplus energy, if available. ■ The home battery charges using surplus energy. ■ No grid draw.
Surplus < minimum charging power	■ The wallbox charges at iMin. (1) (3) ■ The home battery discharges to cover household consumption and the charging process. ■ No power drawn from the grid.	■ The wallbox is not charging. ■ Home battery charges using surplus energy. ■ No power drawn from the grid.	
No surplus	■ Wallbox is charging at iMin. (1)(3) ■ The home battery is discharging to cover household consumption and the charging process. ■ No grid draw.	■ Wallbox is not charging. ■ Home battery discharges to cover household consumption not covered by PV. ■ No grid draw.	

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Surplus	Wallbox Prio Allow use of home battery	Wallbox Priority Do not allow use of home battery	Home battery priority
Probing and hysteresis	■ The home battery is discharged for probing and hysteresis. ■ No power is drawn from the grid.	■ The home battery is not discharged for probing and hysteresis. ■ Power may be drawn from the mains.	

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Charge control in Solar Plus mode

In Solar Plus mode, the minimum charging power can be set. The description in this mode always refers to the set minimum charging power.

Surplus	Wallbox Prio Allow use of home battery	Wallbox Priority Do not allow use of home battery	Home battery priority
Surplus > Minimum charging power	■ The wallbox charges using surplus energy. ■ The home battery charges using additional surplus energy, if available. ■ No grid draw.		■ The wallbox charges when the home battery is full or using additional surplus energy, if available. ■ The home battery charges using surplus energy. ■ No grid draw.
0 < surplus < minimum charging power Surplus > minimum charging power * slider	■ The Wallbox charges at iMin. ■ The home battery discharges and covers the home's consumption. ■ Grid power is drawn.		■ The wallbox charges at iMin when the home battery is full, or with any additional surplus, if available. ■ The home battery charges using surplus energy. ■ Grid draw may occur.
0 < surplus < minimum charging power Surplus < minimum charging power * slider	■ The Wallbox charges at iMin. (1) (3) ■ The home battery discharges to cover household consumption and the charging process. ■ Power may be drawn from the mains.	■ The wallbox is not charging. ■ Home battery charges using surplus energy. ■ No power is drawn from the grid.	

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Surplus	Wallbox Prio Allow use of home battery	Wallbox Priority Do not allow use of home battery	Home battery priority
No surplus	■ Wallbox is charging at iMin. (1)(3) ■ The home battery is discharging to cover household consumption and the charging process. ■ Power may be drawn from the grid.	■ The wallbox does not charge unless the slider is set to 0. ■ The home battery discharges to cover household consumption not covered by PV. ■ Power may be drawn from the grid.	
Probing and hysteresis	■ The home battery may discharge for probing and hysteresis. ■ Power may be drawn from the grid.	■ The home battery must not discharge for probing and hysteresis. ■ Power may be drawn from the mains.	

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Charge control in Power Mode (mains charging)

Surplus	Wallbox Priority Allow use of domestic battery	Wallbox Priority Do not allow use of home battery	Home battery priority
Surplus available	■ Wallbox charges at iMax. ■ Home battery charges using any additional surplus, if available. ■ The home battery discharges to supply the wallbox if the surplus is insufficient for iMax. ■ Power may be drawn from the grid if the home battery is empty.	■ The wallbox charges using iMax. ■ The home battery charges using any additional surplus energy, if available. ■ The home battery does not discharge to the wallbox. ■ Power may be drawn from the mains.	■ The wallbox charges using iMax. ■ Grid draw is reduced if the home battery is full or if additional surplus energy is available. ■ The home battery charges using surplus energy. (2) ■ Power may be drawn from the mains.
No surplus available	■ The Wallbox charges at iMax. ■ The home battery discharges to supply the wallbox. ■ The home battery discharges to cover household consumption not covered by PV. ■ Power may be drawn from the grid.	■ The wallbox is charging at iMax with 100% grid draw. ■ The home battery discharges to cover household consumption not covered by the solar panels. ■ Grid draw occurs.	

(1) It may happen that the wallbox charges continuously at a rate higher than iMin, as the home battery attempts to reduce grid draw to 0 and is recognised by the control system as surplus PV.

(2) The surplus PV is not used to charge the home battery, as the home battery cannot be charged whilst there is net draw.

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(3) When switching to **‘Wallbox Priority’** mode **,** if the PV surplus is insufficient, the shortfall is not initially covered by the battery. However, existing charging processes are balanced accordingly.

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5.6.9 Additional settings

You can access the additional settings via the cog icon (Settings).

Overload protection

The overload protection prevents the main fuse from tripping at the grid connection. This is configured in the wallbox via DIP switches and displayed here.

The settings can be changed here at a later date should the fuse size change. The wallbox DIP switches do not have to be adjusted as part of this process. The KOSTAL Smart Energy Meter uses the values set here to check for overload.

Parameter	Explanation
Type of mains connection	Select the type of mains connection. ■ With a 3-phase grid connection, the grid connection has three main fuses. ■ With a 1-phase grid connection, the grid connection has one main fuse.
Rated current Lx	Correctly set the rated current of the main fuse per phase here. If the value set for the fuse is greater than the actual value, protection against overloading the main fuse cannot be guaranteed. The rated current of each fuse can be read off the fuse/circuit breaker in the house connection box. Example: ■ Fuse for house connection box 63 A ■ Fuse for meter cabinet upstream of feed-in/supply meter e.g. 50 A ■ Fuse for meter cabinet downstream of feed-in/supply meter e.g. 35 A In this case, 35 A must be set because otherwise the smallest fuse would trip in the event of overload.

Phase balancing

The unbalanced phase load is calculated from the greatest difference in currents between the connected phases. The Energy Manager undertakes phase balancing in order to observe the set limit value. The current consumption of controllable consumers is restricted in order to achieve this. In Germany, the maximum permitted value is 4600 VA. Please find out the maximum that applies to your country and set the maximum unbalanced phase load permitted in your country.

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Advanced settings

Some electric vehicles may experience problems with low charging currents.

The ***2011 CP EV out of signaled duty range*** ID is output as an event in the KOSTAL Smart Energy Meter.

If this happens, a higher minimum charging current can be selected to remedy the problem.

The problem occurs if a low start charging power (e.g. 6 A) has been set in the wallbox but the electric vehicle needs more power (e.g. 8 A). This results in an error in the wallbox. Increasing the minimum charging current can remedy the problem. However, this also means that all electric vehicles will always start with the increased minimum charging current as long as this setting is activated.

Minimum charging current	Set the minimum charging current per phase from 6 to 16 A. Default value 6 A.

Recorded phase changes

Here you can download the log file (*phase_switching_log.txt*) for the logged phase switching.

The following aspects are recorded in the log file:

- the day and time at which the switchover took place,
- the electric vehicle connected,
- the charging device used,
- the phase usage selected (standard or single-phase).

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5.6.10 Updating the wallbox firmware

The ENECTOR G1 and ENECTOR G2 wallbox software can be updated manually via the menu option ***'System settings' > 'Device manager' > 'Update*** '.

The procedure differs between the ENECTOR G1 and ENECTOR G2.

Updating the ENECTOR G1 firmware

1. Open the Device Manager under ***System Settings > Device Manager.***
2. Select the ***'Update'*** option in the row for the Wallbox.
3. Select the update file via the ***'Select file'*** option. You can find the latest software in the product's download section on our website.
4. Select the ***'Update'*** option and confirm the installation by clicking ***'YES'*** in the next window.

➔ The software will be installed on the wallbox.

✓ Update completed.

Update ENECTOR G2 firmware

1. Open the Device Manager under ***System Settings > Device Manager.***
2. Select the ***'Update'*** option in the row for the wallbox.
3. Select the ***'Search and trigger update'*** option.
   Automatic updates are enabled by default on the ENECTOR G2. This button initiates the update process on the wallbox.

➔ If a new firmware update is found, it will be installed on the wallbox.

✓ Update completed.

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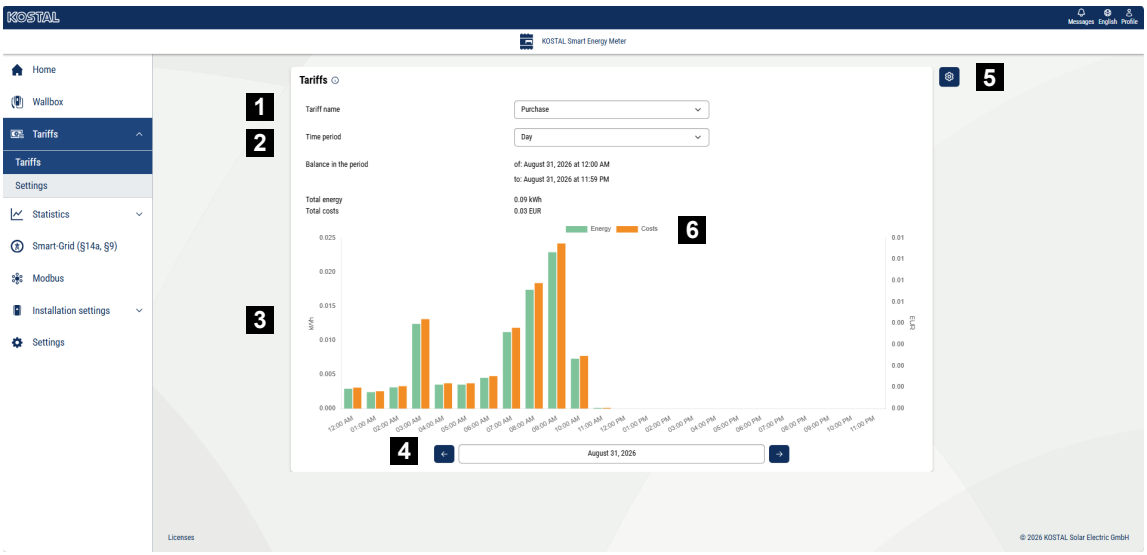
5.7 Menu – Tariffs

Menu for displaying consumption and tariff information relating to feed-in and consumption. The tariffs for feed-in and consumption (purchase) are set under ***'Settings*** '.

INFO

The chart under 'Tariffs' shows both the energy in kWh and the costs in the configured currency.

5.7.1 Tariffs



1 Switch view between feed-in and consumption (off-take)

2 Select time period (hour, day, week, month, year)

3 Chart

4 Select time period (view depends on the time period selected)

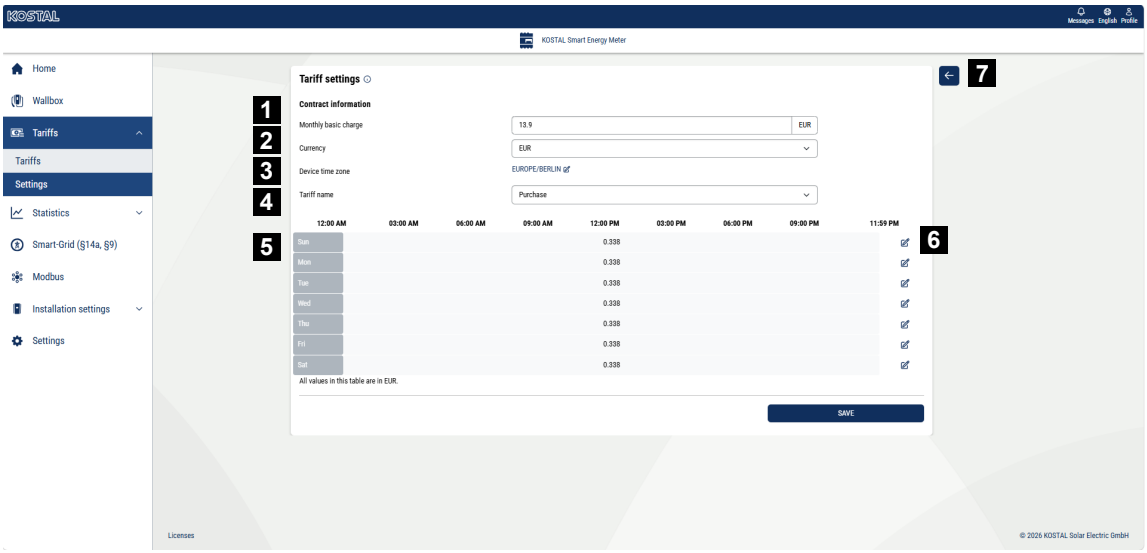
5 Access tariff settings

6 Show or hide energy/costs by selecting from the legend

Select the currency here and set the monthly standing charge for the tariff.

You can set the unit price for the tariff – whether for feed-in or consumption (purchase) – via the ***'Settings'*** menu option or by clicking the pencil icon next to the tariff view.

5.7.2 Settings



1 Select currency
2 Enter the monthly basic fee
3 Select time zone
4 Switch between feed-in and consumption tariffs
5 View the entered tariff
6 Edit tariff
7 Return to the overview

Select the currency here and set the monthly basic charge for the tariff.

Using the pencil icon next to the tariff view, you can set the unit price for the tariff for feed-in or consumption (purchase).

Manage energy prices



1 Select the days to which the tariff should apply
2 Selecting the time period for which the tariff should apply
3 Enter the working price (tariff)
4 Create a new energy price
5 Assign the working price to the selected days/hours
6 Save settings

First, enter an active price. You can create several for feed-in and consumption. Then select the days and hours for which the active price is to apply and assign it using the ***'Assign'*** button. The colours indicate which active price/tariff is valid for which period.

INFO

If a created energy price is not assigned to a time slot, it will be automatically deleted after saving.

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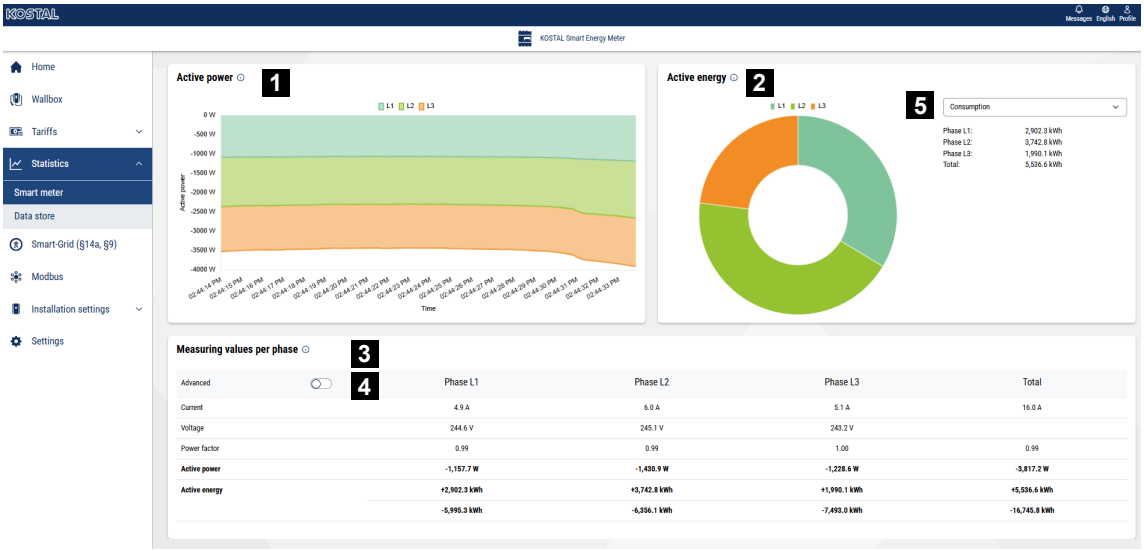
5.8 Menu – History Data

Here you will find the Smart Meter and Data Storage menu.

Under ‘Smart Meter’, you can see an overview of whether the entire system is currently drawing or feeding electricity into the grid, as well as power and energy readings.

The Data Storage function is used to select specific values, read them out and then export them.

5.8.1 Smart meters



1 Active power display (sum of phases)

2 Active energy display by consumption or supply per phase

3 Measured values per phase

4 Advanced mode: measured values including apparent and reactive power/energy

5 Selection: supply or feed-in

The graphs provide the user with an overview of whether the entire system is currently drawing or feeding electricity into the grid.

All power and energy values are shown separately as consumption (+) and feed-in (-).

Active power

The diagram shows the total power of the individual phases. Active power (P) is the power actually converted by a load and used. This is measured in watts.

Active energy

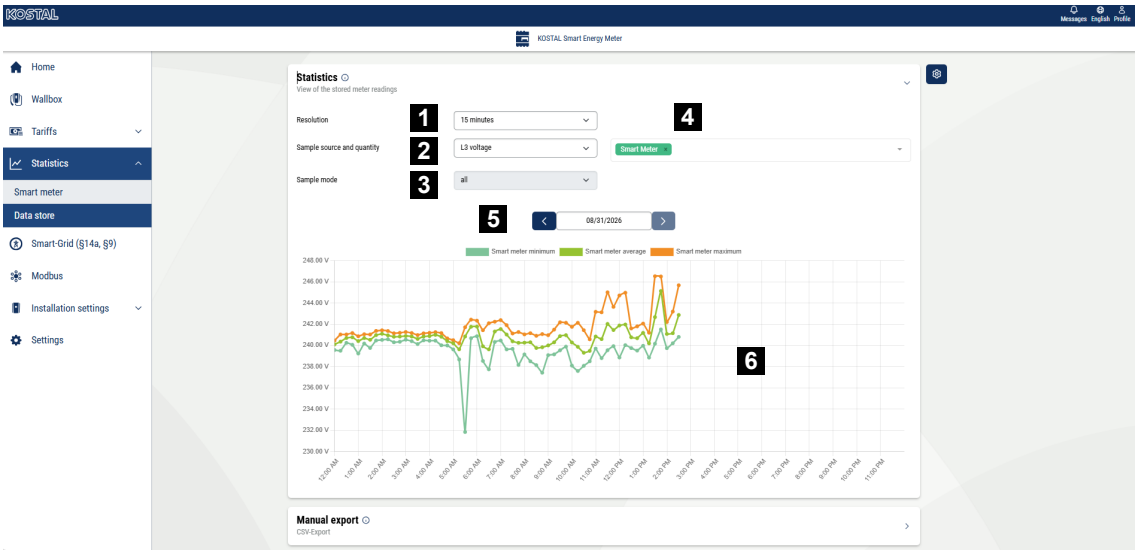
The diagram and the table show the power values for the entire system, broken down by phase, as a total for consumption or feed-in. Active energy is the power generated over a specific period. This is expressed in watt-hours.

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Measurements per phase

The table displays all measured values recorded by the system for each phase. In advanced mode, apparent and reactive power/energy are also displayed.

5.8.2 Data logger



1 Select resolution
2 Select measurement source
3 Measurement type
4 Select sensors
5 Date selection
6 Graph

The data logger enables the storage of all energy and power readings from all sensors, auxiliary devices and the main unit at intervals of 1 minute, 15 minutes, 1 hour or 1 day.

In addition, the minimum, maximum and average values for the power readings are calculated and stored for the respective intervals.

Resolution

Resolutions of 15 minutes, 1 hour and 1 day are available for the graph.

These can be displayed according to the storage duration:

- 15 minutes: 2 weeks
- 1 hour: 2 months
- 1 day: 10 years

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More detailed resolutions of 1 minute and 1 second are only available for CSV export. However, data can only be displayed if measurements are already available for the selected time period.

Data source

In addition to connected devices, such as sensors, smart meters are also available as data sources. By default, data for smart meters is displayed. Clicking the drop-down menu lists the available measurement sources. Clicking a measurement source adds the corresponding data to the graph. The measurement source also appears as an entry in the drop-down menu.

By clicking on the 'X' at the end of the entry, any measurement source currently shown in the graph can be removed. Up to 3 measurement sources can be selected. If 3 measurement sources are selected, no further sources can be chosen. A new measurement source can only be selected after at least one of the 3 measurement sources has been removed.

Measured variable and measurement type

Depending on the selection of measurement sources, the corresponding measured variables are displayed. The total number of measured variables is calculated; that is, if a measured variable is not available for a selected measurement source, no trend line is displayed in the graph for that source.

If only one measurement source is selected, all three measurement types are displayed:

- Minimum
- Average
- Maximum

If more than one measurement source is selected, the relevant measurement type can be specified.

For ***energy-type measured*** variables, no selection of measurement types is available, as only the total is displayed here.

Manual export

The manual export function allows the stored data from all available sources to be exported.

Resolutions

The following ***resolutions*** can be selected:

- ***1 second***: These **represent** the **live values** . The most recent file available is always provided. **Note: This** function is only available if the switch for recording 1-second data is enabled in Settings.
- ***1 minute***: Available for a maximum of **2 days**; a maximum of **12 hours** can be exported **at** a time

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- ***15 minutes***: Available for a maximum of **2 weeks**; a maximum of **1 week** can be exported **at** a time
- ***1 hour***: Available for a maximum of **2 months**; a maximum of **1 month** can be exported **at** a time
- ***1 day***: Available for a maximum of **10 years**; a maximum of **2 years** can be exported **at** a time

There are two drop-down menus for configuring the start and end dates of the export. Clicking on a drop-down menu opens a calendar. Days that are not available for the selected resolution are shown in pale colour. For the 1-minute, 15-minute and 1-hour resolutions, a specific time can also be selected. Once the relevant selection has been made, the **'Export'** button can be used **to** start **downloading** a ZIP archive. Depending on the configuration in the settings, this will contain either one CSV file per measurement source or a single large CSV file containing all measurement sources.

If there are a large number of connected sensors, there may be longer waiting times (up to several minutes) whilst the data is being exported. The export will abort if the waiting time exceeds 15 minutes.

Only one export process can be active at a time. Further requests will be rejected with an error message if an export process is already running. Manual exports are also not possible whilst an automatic export is in progress.

Settings

The settings can be accessed by clicking on the button with the cog icon.

General settings

Data logging can be enabled or disabled via ***'Record Measurements'*** . If data logging is disabled, data export via FTP and email will also be stopped.

The **'1-second data'** function **can** also be switched on or off here. This function places an additional load on the device's RAM, particularly when there are many data sources. Therefore, this function should **only** be **activated when necessary** .

Storage status

The memory usage is displayed here as a percentage. The storage duration describes how long measured values are stored according to their resolution:

- 1 minute: Available for a maximum of **2 days**
- 15 minutes: Available for a maximum of **2 weeks**
- 1 hour: Available for a maximum of **2 months**
- 1 day: Available for up to **10 years**

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Export settings

Here you can configure the export format and the automatic, scheduled export of data.

Legacy format

When the legacy format is used, the values from all data sources are exported into a single CSV file. If the compression option is also selected, this file is packed into a ZIP archive.

The legacy format setting applies to both manual export and automatic export via email and FTP. The compression option applies only to automatic export. When exporting manually, a ZIP archive is always generated.

Note: The legacy format has the restriction that only values from Smart Meters and Sensorbars sensors are exported.

Resolution and transmission interval

Here, you can select the interval and resolution of the exported data. Depending on the selected transmission interval, a specific resolution can be chosen:

- Transmission interval 15 mins – Resolution 1 second, 1 min
- Transmission interval: Hour – Resolution: 1 minute, 15 minutes
- Transmission interval: daily – resolution: 1 minute, 15 minutes, 1 hour
- Transmission interval: weekly – resolution: 15 minutes, 1 hour, 1 day
- Transmission interval: monthly – resolution: 1 hour, 1 day

In addition, a **start date** can be **selected** for when the automatic export is to begin.

FTP export settings

FTP export can be enabled as soon as an FTP server has been **configured** in the **device settings** . As an additional option, a **subdirectory path** can be specified.

Email export settings

Email export can be enabled as soon as the login details for an email server have been **configured** in the **device settings** . As an additional option, you can specify a **subject line for** the email.

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5.9 Menu – Smart Grid

The ***Smart Grid*** function allows EEBus-compatible devices located on the local network to be connected or paired with the KOSTAL Smart Energy Meter. The KOSTAL Smart Energy Meter can receive data from EEBus-compatible smart meter gateways and control the connected loads.

The following use cases can be implemented using the KOSTAL Smart Energy Meter.

Parameter	Explanation
Limitation of Power Consumption (LPC)	Limitation of power drawn from the grid This usage scenario can be used to allow external parties to control the power drawn from the grid (e.g. a power limitation for the ENECTOR or in order to charge a connected battery from the grid). Note: The battery can only be controlled by means of LPC with the inverter G3 SW version 3.6.0.
Limitation of Power Production (LPP)	Limitation of power generation This usage scenario can be used to allow external parties to control the feed-in (e.g. of a KOSTAL inverter).
Monitoring of Grid Connection Point (MGCP)	Provision of grid connection data.
Monitoring of Power Consumption (MPC)	Reading consumption data from externally connected EEBus devices.

5.9.1 MGCP Server

The KOSTAL Smart Energy Meter can operate as an EEBus server (MGCP server) and makes data points available for querying by externally connected clients.

The data points to be transmitted, known as Grid Connection Points, can be enabled and configured here. These can be retrieved by MPC clients. The following data points are available:

- ***Limitation factor for PV feed-in power***
- ***Instantaneous power for consumption / feed-in***
- ***Total energy produced***
- ***Total energy consumed***
- ***Instantaneous current value for consumption / feed-in per phase***
- ***Instantaneous voltage per phase***
- ***Instantaneous frequency***

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The ***limiting factor for the PV feed-in power*** is expressed as a percentage and corresponds to the 60% or 70% control setting; it should be set to the applicable value. If enabled, a value between 0 and 100% can be assigned to this data point.

In addition, the ***message update interval*** can be set between 1 and 100 seconds. The active data points are provided at this interval.

5.9.2 MPC Client

The MPC Client displays the performance metrics of connected MPC Servers – for example, from a PLENTICORE G3 inverter – in tabular form. The clients must first be paired with the KOSTAL Smart Energy Meter via ***EEBus connections***.

The following measurement values are displayed for each MPC Server:

- ***Active power per phase***
- ***Total active power***
- ***Energy consumed***
- ***Energy generated***
- ***Current per phase***
- ***Voltage per phase***
- ***Frequency***

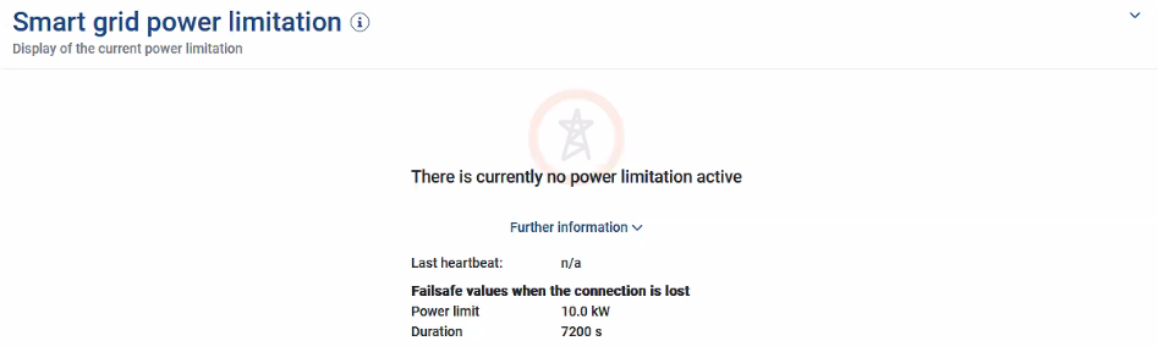
The measured values for active power, current and voltage can be displayed individually for each phase. The display interval can be configured within a range of 1 to 100 seconds.

5.9.3 Smart Grid Power Limitation

The ***'Smart Grid Power Limitation'*** section displays the current power limitation (if active) that was most recently set by the grid operator. In addition to the power limit, its validity period is also shown.

Under **'Smart Grid Power Limitation (Feed-in)** ', the current power limitation (if active) for electricity generation, as most recently set by the grid operator, is displayed. Alongside the power limit, its validity period is also shown.

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If a signal is transmitted via EEBUS from a smart meter gateway/control box to the KOSTAL Smart Energy Meter, the power of the controllable load (e.g. ENECTOR) is reduced to the value at the grid connection point for the specified time period.

If a power limit is in place due to connection problems with the KOSTAL Smart Energy Meter, this is indicated by the message ***'Power limit with fallback values is active*** '.

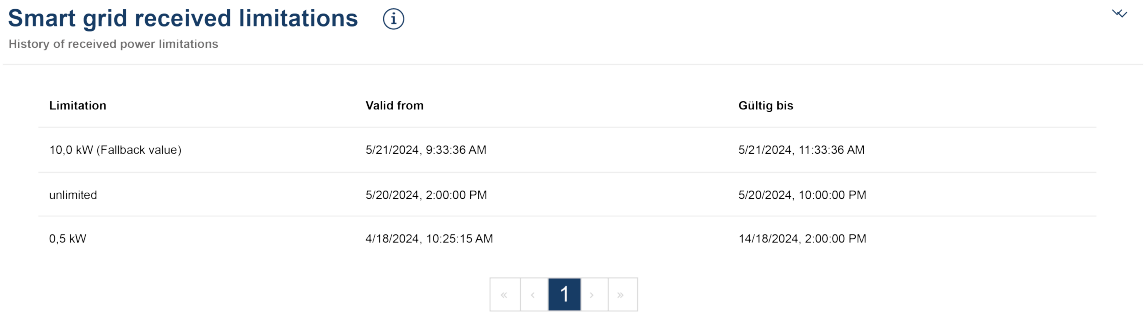
The following additional properties are displayed under ***'Further information*** ':

- ***Last heartbeat***: Time elapsed since the last heartbeat message was received from the KOSTAL Smart Energy Meter.
- ***Fail-back values in the event of a connection failure***: The power limitation to be applied and its duration in the event of connection problems with the KOSTAL Smart Energy Meter.

5.9.4 Smart Grid history

The ***'Smart Grid History'*** section displays the history of the power limitations received.

Under ***'Smart Grid History (Electricity Generation)*** ', the history of the power limitations received for electricity generation is displayed.



The display includes all changes to the power limitation:

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- Limit: ***unlimited***: If ‘Limit: unlimited’ is displayed, there was no power limitation for the specified period.
- Limit ***set***: If a value in kW is displayed under ‘Limit’, a power limitation set by the network operator was in place for the specified period.
- Limit ***set with fallback value***: If a value in kW is displayed under ‘Limit’ with the addition ***‘fallback value’***, a power limitation was in place for the specified period due to connection problems with the KOSTAL Smart Energy Meter.

A maximum of 10 entries are displayed. Depending on the total number of entries, buttons are displayed below the table that allow you to navigate through the history. You can use the arrow buttons to move one page forwards or backwards, or to jump to the start or end of the history.

A maximum of 10,000 entries can be stored. Once this limit is reached, the oldest entry is overwritten.

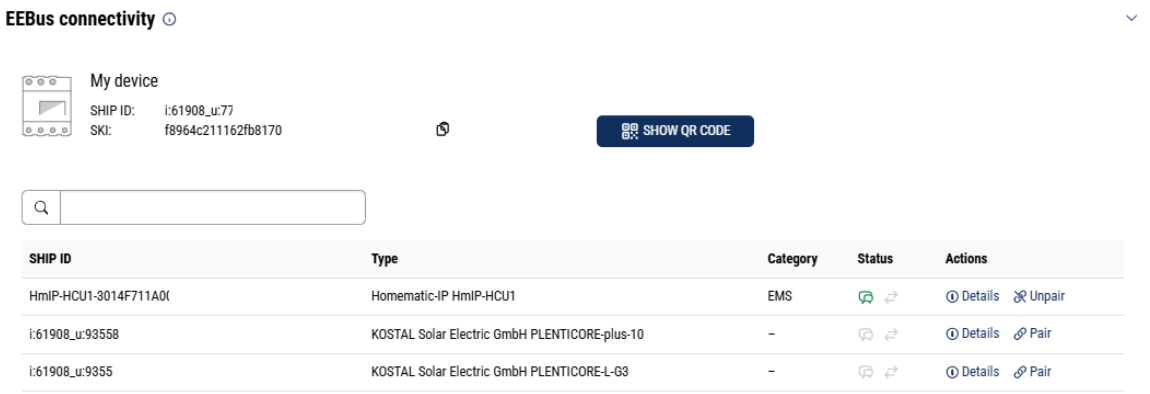
5.9.5 EEBus connections

In this section, you can establish, disconnect and manage EEBus connections to other devices.

INFO

Smart meter gateways may only be coupled with the KOSTAL Smart Energy Meter if they send data to the KOSTAL Smart Energy Meter. It is possible to couple other devices that are EEBus-compatible, but they are not controlled through the KOSTAL Smart Energy Meter. This can lead to error messages or malfunctions for the coupled devices.

EEBus devices on the same network are automatically detected and displayed under the ***‘EEBus Connections’*** section. Once an EEBus device has been found and you wish to establish a connection between the KOSTAL Smart Energy Meter and the EEBus device, you must manually confirm the connection – a process also known as ***pairing***.



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Under ***'My Device'***, the name of the KOSTAL Smart Energy Meter and the SKI device identifier are displayed.

The SKI (Subject Key Identifier) is the unique identifier for your own EEBus device. This can be queried by other EEBus devices during the pairing process to identify the EEBus device. In this case, the SKI can be copied to the clipboard using the copy icon.

The table lists all available EEBus devices on the local network.

The icons can be used to view further details about the EEBus device and to carry out pairing actions.

The following properties are displayed for each available EEBus device:

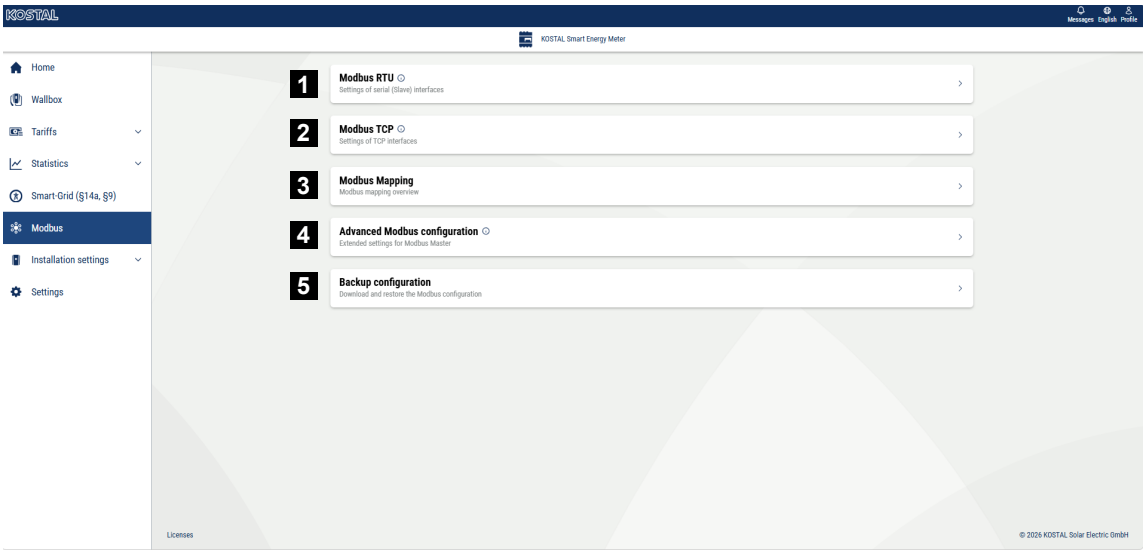
Parameter	Explanation	
SHIP ID	Host name of the EEBus device	
Type	Display Device name	
Category	Display Device type	
Status		***Not paired***: The EEBus device has been detected but is not paired.
		***Paired***: The EEBus device is paired.
		Not connected: There is currently no active connection.
		***Connected***: There is currently an active connection.
Action	View details and perform pairing actions.	

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Parameter	Explanation	
		**Details icon** Clicking on the icon for an EEBus device opens a dialogue box displaying further details: ■ Host name: Host name of the EEBus device ■ Description: Description or alternative name of the EEBus device ■ Manufacturer: Manufacturer of the EEBus device ■ Model: Model variant of the EEBus device ■ SKI: Device identifier (SKI = Subject Key Identifier) of the EEBus device
		**Pairing icon** To connect EEBus devices to one another, both devices must first be paired. Clicking ***'Pair'*** on the EEBus device to be connected opens a dialogue box. Information about the device to be connected is displayed here. Clicking the ***'Pair*** ' button confirms the connection. If a ***'Pair' action*** has already been carried out on the page for the EEBus device to be connected, a connection is established automatically.
		**'Unpair' icon** The ***'Unpair'*** action can be used to disconnect a connected and paired EEBus device. Clicking on ***'Unpair'*** opens a dialogue box. This displays information about the EEBus device to be disconnected. If there is an active connection to the EEBus device, this can be disconnected by clicking the ***'Disconnect'*** button. If, however, there is no active connection to the EEBus device, ***a*** new connection can be established by clicking the ***'Reconnect'*** button. Clicking the ***'Unpair'*** button removes the trust/pre-trust for the EEBus device. Any active connection to the EEBus device will then also be disconnected.

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5.10 Menu - Modbus



1 Configuring the Modbus RTU (RS485) interface. By default, the RS485 A interface is preconfigured for the PIKO IQ/PLENTICORE and the RS485 B interface for the PIKO MP plus.

2 Configuring the Modbus TCP interface

3 Overview of dynamic Modbus mapping

4 Advanced Modbus configuration

5 Downloading/restoring the Modbus configuration

Select the devices connected to the RS485 Modbus RTU interfaces, or enable Modbus TCP functionality if the devices communicate via Ethernet (LAN). In this case, Modbus TCP communication must also be enabled on the inverter. The TCP functionality only needs to be enabled if the KOSTAL Smart Energy Meter is to be queried via Modbus TCP by an external device (Modbus TCP slave).

INFO

If you wish to use an ENECTOR G1 wallbox with enabled convenience functions or a PIKO MP plus with a connected battery, the RS485 interface (e.g. RS485 B) must be enabled here.

INFO

A detailed description of the Modbus protocol and how it works can be found in the Modbus specification (e.g. see www.modbus.org). Modbus TCP forms part of the IEC 61158 standard.

5.10.1 Modbus RTU

KOSTAL solar inverters, but also other devices, can be connected to the Modbus RTU RS485 interface.

In ***Modbus RTU Slave*** mode, the KOSTAL Smart Energy Meter provides the measurement data via the RS485 interface. However, in ***Modbus RTU Master*** mode, measurement data is sent and written to other slave devices in order to control them. Master mode is only possible via user-defined settings.

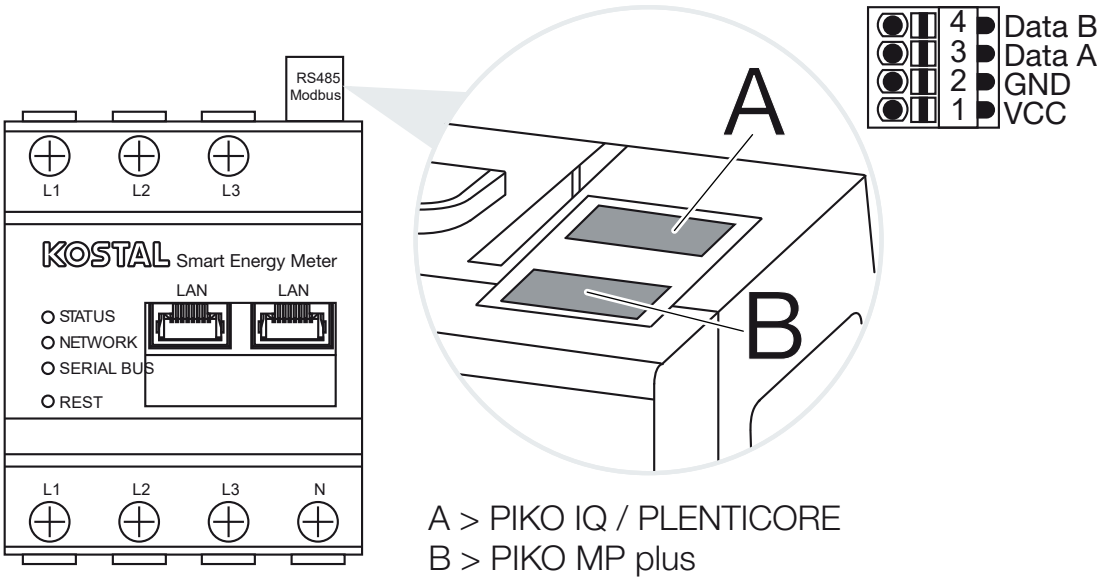
Both RS485 interfaces A and B can be configured individually.

INFO

You will find details of how to connect the communication cable from the inverter to the RS485 socket in the KOSTAL Smart Energy Meter's installation instructions.

Depending on the cable length and number of participants on the bus, we would recommend terminating the bus at both ends with a 120-ohm resistor. Termination reduces reflections in the connection. Under certain circumstances, this may be absolutely essential for application reliability.

When an inverter is selected for RS485 interface A or B, all fields are populated with predefined values. These can be adapted if necessary.



A > PIKO IQ / PLENTICORE
B > PIKO MP plus

Settings for Modbus RTU via RS485

Parameter	Explanation
Interface	**RS485 (A)** Pre-configured for PIKO IQ/PLENTICORE **RS485 (B)** Pre-configured for PIKO MP plus
Enable interface	**Activated** The Modbus - slave functionality on the respective RS485 interface is activated. Data can only be retrieved from the KOSTAL Smart Energy Meter via the interface once the interface has been activated and the settings have been saved. **Deactivated** The Modbus interface is deactivated. **NOTE! When using a PIKO MP plus with a connected battery or an ENECTOR wallbox and enabled convenience functions, you will need to deactivate the interface here. You are asked to do this when setting up the battery or the wallbox in the setup menu for the devices.**
Presetting	Selection of connected device. When a device is selected, all fields are populated with predefined values. These can be adapted if necessary.
Mode	**Slave (default)/master** The interface operates either as a Modbus master (data is sent and written to slave devices) or as a Modbus slave (only data which can be accessed from other devices is made available).
Slave address	Defines the address of the Energy Manager in the Modbus The value may be between 1 and 247.
Baud rate	Defines the baud rate of the connection
Data bits	Defines the number of data bits
Parity	Defines the parity of the connection
Stop bits	Defines the number of stop bits

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5.10.2 Modbus TCP

Other devices that evaluate the data of the KOSTAL Smart Energy Meter can be connected to the Modbus TCP (LAN) interface.

“Master” mode

In the operating mode ***Modbus TCP*** > ***Master***, the KOSTAL Smart Energy Meter writes to the registers of one or more connected devices acting as Modbus slaves. These devices may be SPS controllers or external energy management systems with standardised Modbus connections, for example, but they do not only have to be hardware specifically suited to this purpose. Web services, for example, can also receive data using this mode. However, the devices do have to be configured specifically to receive these register ranges.

It is possible to write to both the internal device power register and energy value register. You can also decide whether to transfer the sum value of all three phases only or the individual values. The relevant register ranges can be switched on and off in the tab ***Advanced Modbus configuration*** > ***Register configuration***.

The KSEM/RM PnP registers and the SunSpec registers are not transmitted via the Modbus TCP master. You will find information about the respective registers in the **KOSTAL Smart Energy Meter– Interface Description Modbus** documentation in the download area for the KOSTAL Smart Energy Meter.

In ***Master*** mode, the KOSTAL Smart Energy Meter sends and writes information to the registers of the configured slaves. These are added by entering the slave IP address.

Parameter	Explanation
Slave address	Defines the address of a TCP slave. This can be specified in the form of an IP address or URL.
Port	Defines the TCP port on which the slave expects Modbus communication.
x	Deletes the line
Add	Adds a line

Up to 10 TCP slaves can be configured.

“Slave” mode

In ***Slave*** mode, the KOSTAL Smart Energy Meter provides its measurement data (Modbus register) via LAN interface (TCP/IP). This setting is used to ensure that the KSEM can be read by third parties.

The Modbus ***Slave*** can be reached at port number 502 as standard. Port number 802 must be used for encrypted connections.

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Some writeable Modbus registers enable a wallbox that is controlled by the KOSTAL Smart Energy Meter to be controlled externally. Please be aware that the connection must be converted from Modbus TCP via port 502 to Modbus TCP with TLS encryption via port 802. This applies to all connections in this case.

Parameter	Explanation
Enable TCP Slave	**Enabled** The Modbus slave functionality on the Ethernet interface (LAN) is enabled. Data can only be retrieved from the KOSTAL Smart Energy Meter via the interface once the interface has been activated and the settings have been saved. The Modbus slave can be reached at ***port number 502*** as standard. **Deactivated** The Modbus interface is deactivated.
Enable encryption (TLS)	**Enabled** Enables encryption using TLS for Modbus slave connections. If encryption is enabled, the Modbus slave can only be reached via ***port number 802***. **Deactivated** Encryption is deactivated.

Certificates

Dealing with self-signed TLS certificates

A TLS certificate and the associated private key are required to set up an encrypted Modbus TCP connection. In the most simple cases, this type of key pair can be generated using the program **openssl**. This is a self-signed certificate. TLS versions below Version 1.2 are not supported.

INFO

Tapping sensitive data

Unknown TLS certificates should always be carefully checked to prevent unauthorised access to measurement data on the device by third parties.

For receivers that use known certificates or certificates that are already accepted, a secure TLS connection is automatically established.

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The device has a range of trustworthy certificates and certification authorities (CA). If a connection is being established with a receiver for the first time and this receiver has a self-signed certificate, the device detects the certificate and the user must actively accept it. All read and write access to the Modbus registers is refused until this is confirmed.

An overview of added and unknown certificates is provided in the ***Certificates*** drop-down table, which is located right below the Modbus TCP configuration. Certificates are described there as follows:

Status: Accepted

- The status displays a green tick. This certificate is trusted by the device. The certificate can be removed from the device by going to ***Delete***.
- Receivers that use this certificate are trusted and a secure TLS connection can be established to them.
- Clicking on ***Delete*** will delete the certificate from the list of trusted certificates. This certificate is no longer trusted and open connections using this certificate are terminated immediately.

Status: Not accepted

- The status displays a red cross. There is an ***Accept*** button behind it. This certificate is not trusted.
- In order to establish a secure TLS connection to receivers using this certificate, this certificate must first be actively trusted.
- Clicking on ***Accept*** adds the certificate to the trusted certificates and it is then considered to be accepted. A secure TLS connection can now be established from receivers that use this certificate.

5.10.3 Modbus Mapping

Modbus mapping displays an overview of all Modbus addresses assigned to applications and devices.

Static Modbus mapping

Display of the static register blocks for the applications in use.

Dynamic Modbus mapping

Dynamic register blocks are created automatically. Their exact start and end addresses are displayed in the table. New register blocks are always created at the lowest possible address. Register blocks for devices that cannot currently be accessed (e.g. due to a connection error) are retained in the configuration. These devices are marked with the status **'Offline'** in the overview table.

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The ***'Defragment'*** button can be used to defragment the register area. In the process, devices with the ***'Offline'*** status are removed from the table. The arrangement of the register blocks is changed so that register blocks of the same type are placed directly one after the other and there are no gaps of unused registers between two register blocks.

Defragmentation therefore alters the Modbus interface within the area of the dynamic register blocks that is addressed by external devices. This may result in the devices being assigned a different address range.

5.10.4 Advanced Modbus configuration

Here, further settings can be selected for the Modbus master functionality. These settings apply to all configured Modbus masters.

Transmit interval

Here, you can set an interval, at which the measurement data is to be transmitted from the KOSTAL Smart Energy Meter. The Energy Manager usually transmits its measurement data via the Modbus master as soon as it is available. If the interval is activated, the data is transmitted at a regular interval instead, regardless of when it is available. Only the current measuring values at the transmit time are ever communicated. Mean values are not produced for the interval.

Parameter	Explanation
Enable fixed transmit interval!	**Activated** KOSTAL Smart Energy Meter data is transmitted at a fixed transmit interval. Selection of interval from drop-down menu. **Deactivated** KOSTAL Smart Energy Meter data is transmitted after each measurement cycle (200ms or 500ms).
Set transmit interval	Select a transmit interval using the drop-down menu or enter a user-defined transmit interval in seconds at which you want the KOSTAL Smart Energy Meter to send its data.
Averaging over transmit interval	***Averaging over transmit interval*** switches on averaging calculations for the transmit interval. **Activated** Calculates and transmits a mean value for all measurement cycles within the set transmit interval. **Deactivated** Transfer current measuring values at the end of the transmit interval.

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Register configuration

Groups of registers can be selected here, which are to be written in master mode. The system load of the KOSTAL Smart Energy Meter can therefore be reduced if all of the registers are not required. This may be necessary if lots of devices are connected to the KOSTAL Smart Energy Meter.

The arrow on the right can be used to drop down a detailed list of registers, which are contained in the respective groups.

The following registers can be activated or deactivated:

INFO

You will find information about the respective registers in the **KOSTAL Smart Energy Meter- Interface Description Modbus** documentation in the download area for the KOSTAL Smart Energy Meter.

Parameter	Explanation
Current values total	The current values for the entire system (registers 0–27)
Current values phases	The current values itemised by phase (registers 40-145)
Energy values total	The energy values for the entire system (registers 512-551)
Energy values phases	The energy values itemised by phase (registers 592-791)

5.10.5 Backup configuration

This item can be used to import or export the entire configuration of the Modbus configuration.

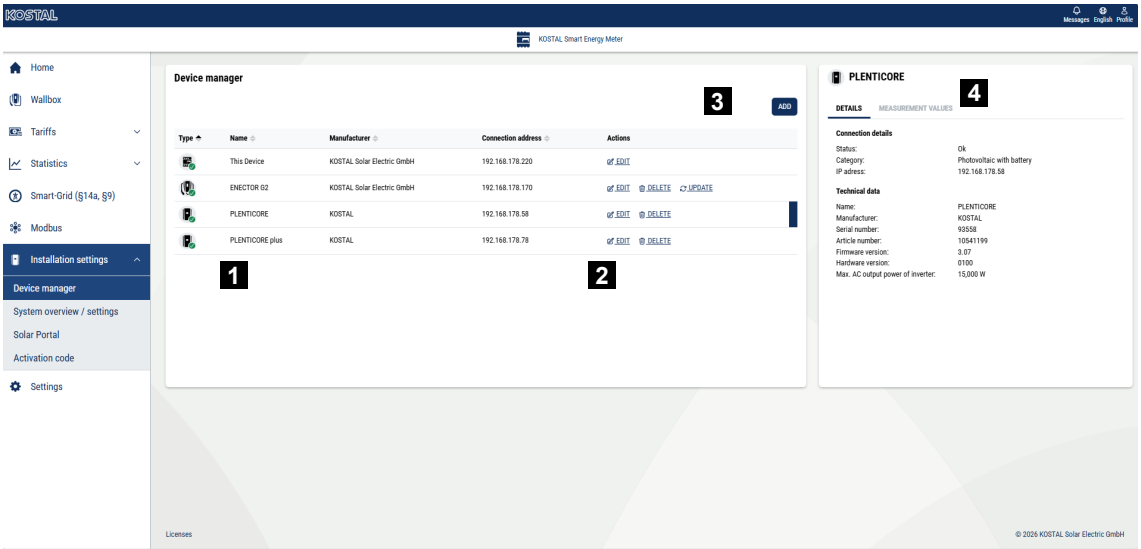
- Exporting the configuration allows the configuration currently saved to be downloaded as a file.
- Importing the configuration allows the configuration to be adopted from a previously exported file.

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5.11 Menu – System settings

- ***Device Manager***
  The***Device***Manager is used to connect new devices (e.g. inverters, wall boxes, sensors) to the KOSTAL Smart Energy Meter. Connected devices are then displayed under ‘Home’ and in the ‘System Overview’ menu. In addition, connected devices can be updated with new software here.
- ***System Overview / Settings***
  View the system configuration and all connected devices. Using the various statistics, the user can view the current values for household consumption, the KOSTAL Smart Energy Meter, the inverter, grid consumption and the wallbox.
- ***Solar Portal***
  In the Solar***Portal***menu, the connection to the Solar Portal can be enabled or disabled. Information on the connection status is also displayed.
- ***Activation Code***Additional options (e.g. ENECTIOR G1 wallbox) can be enabled in the KOSTAL Smart Energy Meter (KSEM) using an activation code.

5.11.1 Device Manager



1 Display of configured devices
2 Actions that can be performed on the devices
3 Add new devices
4 Viewing device details and measured values

The Device Manager is used to set up and configure devices that are to be connected to the KOSTAL Smart Energy Meter G2, or to carry out a software update.

You can also view device details and current readings for the selected device here.

The devices set up here are displayed in the ***system overview*** and on the ***Home*** page.

INFO

Communication problems and incorrect readings

Devices must only be connected to the KSEM via a single connection at any one time. For some devices, e.g. inverters with EEBus enabled, both interfaces are offered under ***'Add*** '. For inverters, the Modbus connection should be selected here. An additional connection of the same inverter via EEBus will result in errors.

Setting up / adding devices in KSEM

Devices can be connected to the KOSTAL Smart Energy Meter via the ***'Add'*** button.

1. Click the ***'Add'*** button.

➔ The ***'Add Device'*** window will appear.

2. To find devices on your home network that are accessible via Modbus-TCP, click the ***'Search for devices'*** button. All devices found on the home network will then be displayed in the ***'Available devices'*** list.
3. Use the plus symbol (**+**) to select the device you wish to add.

➔ The ***'Add Device'*** window opens.

4. Fill in the blank fields and then click Connect. For further information on how to fill in the fields, see the table below.
5. The device will be added to the system and shown as 'Connected' with a green tick. If a connection cannot be established, check the settings or the connection to the device.

✓ Device set up.

Adding devices manually

If the device cannot be found and does not appear in the ***'Available Devices'*** list, it can also be added manually. This may also be the case, for example, with an ENECTOR G1 wallbox connected via RS485.

1. Press the ***Add*** button.

➔ The ***'Add Device'*** window will appear.

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2. Under ***'Add manually'***, select the category and then the ***device type***. Then click ***'Next'***.

➔ The ***'Add Devices'*** window opens.

3. Fill in the empty fields and confirm your entries. Further information on how to complete the form can be found in the table below.
4. The device will be added to the system and displayed with a green tick next to 'Connection'. If no connection is established, check the settings or the connection to the device.

✓ Device set up

Add information about the inverter

Not all fields are displayed for every series of inverters. The display depends, for example, on the connection type (LAN or RS485) and whether a battery is connected.

Parameters	Explanation
Series	Select the inverter series, e.g. PLENTICORE G3 inverter
Type	Select the exact model of the device (e.g. PLENTICORE L G3 15 inverter).
Category	Select the type of operation for the device. Not all categories are always displayed. ■ Photovoltaic inverter ■ Battery inverter ■ Photovoltaic with battery inverter (hybrid inverter)
IP address	Enter the device's IP address. This field only appears if the device is connected via LAN.
Serial interface	Select the interface on the KSEM to which the device is connected. Only appears if the device is connected via RS485 (PIKO MP plus).
Timeout	This value, in seconds, specifies the time after which an error message is issued to the configured device in the event of a communication fault.

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Parameters	Explanation
Control inverter	Default: Enabled Enabled: The inverter is controlled via the KSEM. Disabled: The inverter is not controlled but is displayed in the overview. This may be necessary when using MDC in the PLENTICORE G3 inverter. When using MDC in the PLENTICORE G3, no device needs to be configured in the KSEM.
Max. AC output power of the inverter	This value must be set for every connected inverter. Selecting the type or power class of the inverter automatically sets the inverter's maximum output power. The maximum output power is the maximum power that the inverter being configured is technically capable of delivering. The value for the maximum output power depends solely on the inverter type and model. The actual power output of the connected solar modules is not relevant for this setting.
Advanced settings Unit ID	The inverter's Unit ID. This does not need to be changed.
Advanced settings RS485 Address	RS485 address. This does not usually need to be changed.

Information when adding wallboxes

Not all fields are displayed for every wallbox series. The display depends on the connection type: LAN (ENECTOR G2) or RS485 (ENECTOR G1).

Parameters	Explanation
Name	Assign a name to the device
IP address ENECTOR G2 only	Enter the device's IP address. Only appears if the device is connected via LAN.
Serial interface ENECTOR G1 only	Select the interface on the KSEM to which the device is connected.
Slave address ENECTOR G1 only	RS485 address of the wallbox. Must not be changed. The ENECTOR G1 is supplied with the default RS485 address 50. After installation, it is assigned a new address (100).
Phase rotation of the wallbox	Selection of the order of the connected phases. This must correspond to the physical connection configuration.

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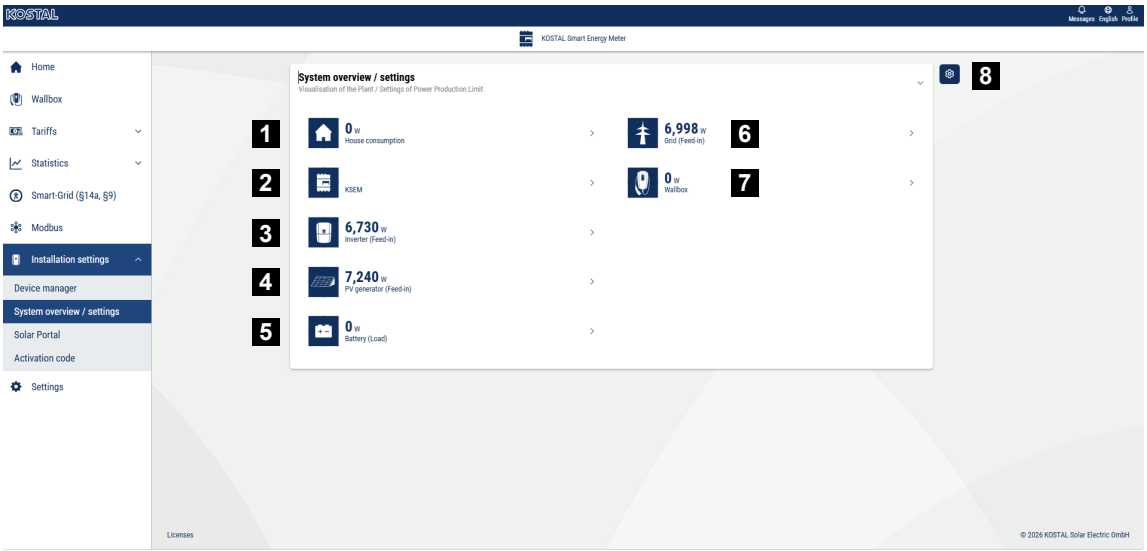
Parameters	Explanation
Phases used ENECTOR G2 only	Three-phase: The wallbox is connected in a three-phase configuration. Single-phase: The wallbox is connected as single-phase.
Phase connection ENECTOR G1 only This will be requested in the next window	Default: The wallbox is connected in three-phase mode. Single-phase: The wallbox is connected as single-phase.

Information when adding sensors

Not all fields are displayed for every series of sensors.

Parameter	Explanation
IP address	Enter the device's IP address.
Unit ID	Enter the device's UNIT ID.
Name	Assign a name to the device
Channel x	Assign a phase to the channel.
Class	Select here whether a consumer or a generator is connected to the sensor.
Type	Select a type from the list.

5.11.2 System Overview / Settings



1 Domestic consumption: Display showing which sources are supplying domestic consumption (solar generator [PV], battery or the public grid).

2 KSEM: Displays the optionally set curtailment at the grid feed-in point and the power setpoint when curtailment is applied by the KSEM. For this, the KSEM must be installed at the grid connection point. In addition, all inverters controlled via the KSEM must be configured with their power ratings under the 'Device Manager' menu item in the KSEM to ensure the calculation is correct.

3 Inverter: Display of output power and status.

4 PV generator: Displays the power output of the PV generators

5 Battery: Display of battery power (when a battery is connected), status and state of charge.

6 Grid: Display of voltage, current, power per phase and grid parameters. Feed-in: Energy is being fed into the public grid. Off-take: Energy is being drawn from the public grid to cover household consumption.

7 Wallbox: Status information for the wallbox, including performance figures.

8 Settings: Additional configuration options for power limitation and diagnostics.

INFO

Incorrect values

To ensure the display is correct, all inverters must be entered in the Inverter menu. Menu - inverter

The user can view the current figures for home consumption, the KOSTAL Smart Energy Meter, inverters, grid consumption and the wallbox via the various statistics. Detailed information can be viewed by expanding the relevant statistic.

House consumption

Display of the current home consumption and the sources from which home consumption is covered.

Parameter	Explanation
PV	The home consumption is covered by solar power.
Battery	The home consumption is covered by the battery.
Grid	The home consumption is covered by the public grid.

KOSTAL Smart Energy Meter (KSEM)

Parameter	Explanation
Curtailment at the grid feed-in point	In the KOSTAL Smart Energy Meter, an optional power limitation for the entire system can be activated and configured in the settings. The set value is displayed here.

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Inverter

Parameter	Explanation
Output power	Output power of the inverter
Status	The inverter's current operational status

PV generator

Parameter	Explanation
PV input power	PV power of the generators

Battery

Parameter	Explanation
Overall system condition	Battery charge level of the entire system
Battery charge limit	Battery charging limit Inactive: There is no limit. Charging limit: If a charging limit has been transmitted by the network operator for the consumer's consumption, this is displayed here.
Battery discharge limit	Battery discharge limit ***Inactive***: There is no limit. If the ***'Do not use home battery'*** function is enabled (selected under the 'Wallbox' menu item) and battery discharge is therefore limited, the current battery discharge limit in watts is displayed here. If a limit has been set by the network operator in accordance with Section 14a (LPC – Limit of Power Consumption: limit on electricity consumption from the grid), the charging limit is also displayed here.
Inverter name	Name of the inverter for which the values are displayed.
Charge/discharge power	Current power when discharging or charging
Status	The battery's current operational status
State of charge	State of charge of a house battery

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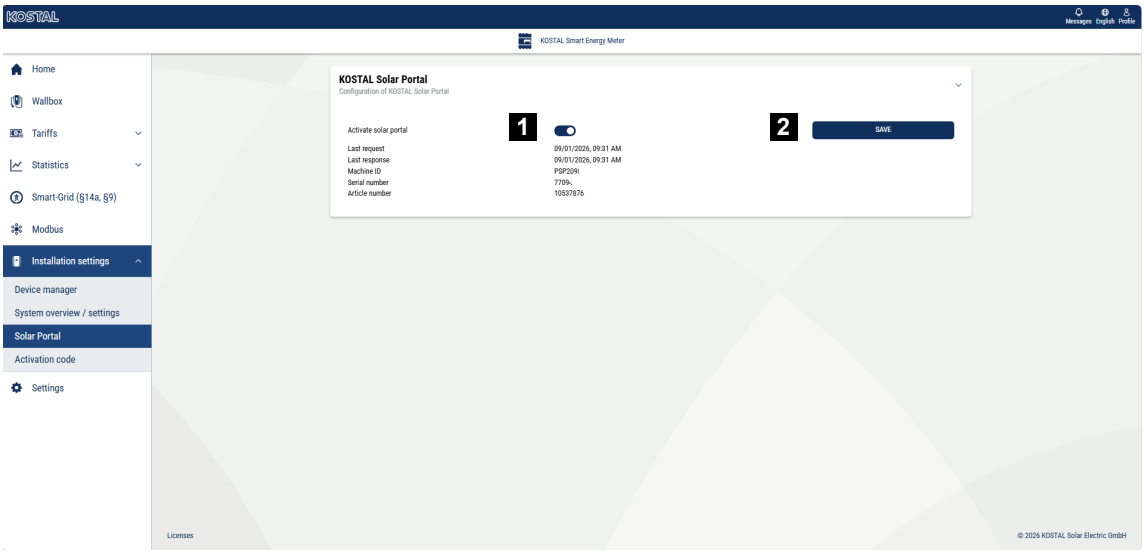
Grid (consumption)

Parameter	Explanation
Status	Operational status
Grid frequency	Shows the grid frequency
Cos phi	Indicates the current power factor (cos phi)
Phases	Shows the power values per phase

Wallbox

Parameter	Explanation
Serial number	Wallbox serial number
Status	Current operational status of the wallbox
Wallbox status code	Status code for the status
Charging power	Charging power with which the electric vehicle is charged.
Charged energy	Total charged energy that was charged into the electric vehicle during the current charging process.
Charging duration	Current charging duration.

5.11.3 Solar Portal



1 Enable data transfer to the Solar Portal.

2 Save changes.

In the ***Solar Portal*** menu, you can enable or disable the connection to the Solar Portal. Information on the status of the connection is also displayed.

INFO

To ensure that the data in the Solar Portal displays the correct time values, it is important that the correct time zone and time have been selected in the KOSTAL Smart Energy Meter under ***Settings > Device > Date and Time***.

The connection to the KOSTAL Solar Portal is only established or disconnected after clicking the ***Save*** button.

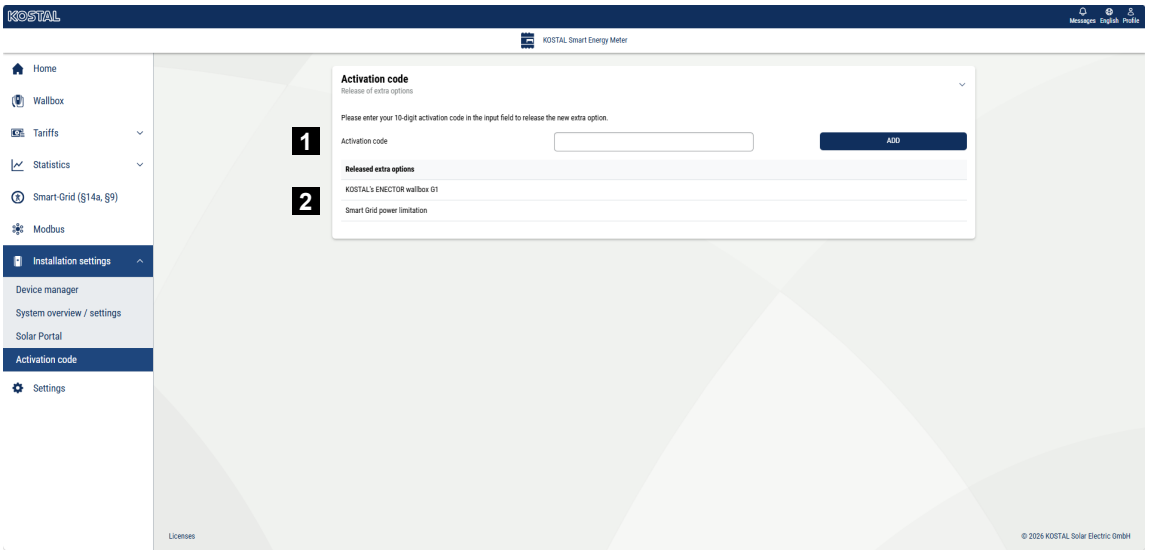
INFO

In the Solar Portal, the product code and serial number of the KOSTAL Smart Energy Meter must be entered to log in.

Parameters	Explanation
Activate Solar Portal	Enable or disable the connection/data transfer to the Solar Portal.
Last query	Time of the last enquiry to the Solar Portal. A '-' means that no enquiry has been made so far.
Last response	Time of the last response from the portal.
Device ID	An identifier assigned by the Solar Portal for the KOSTAL Smart Energy Meter.
Serial number	Serial number of the KOSTAL Smart Energy Meter
Product code	Item number of the KOSTAL Smart Energy Meter.

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5.11.4 Activation code



1 Enter activation code

2 Unlocked additional options

An activation code can be used to unlock additional options (e.g. the KOSTAL Wallbox ENECTOR G1 for comfort functions) in the KOSTAL Smart Energy Meter (KSEM).

An activation code can be purchased via the KOSTAL Solar webshop.

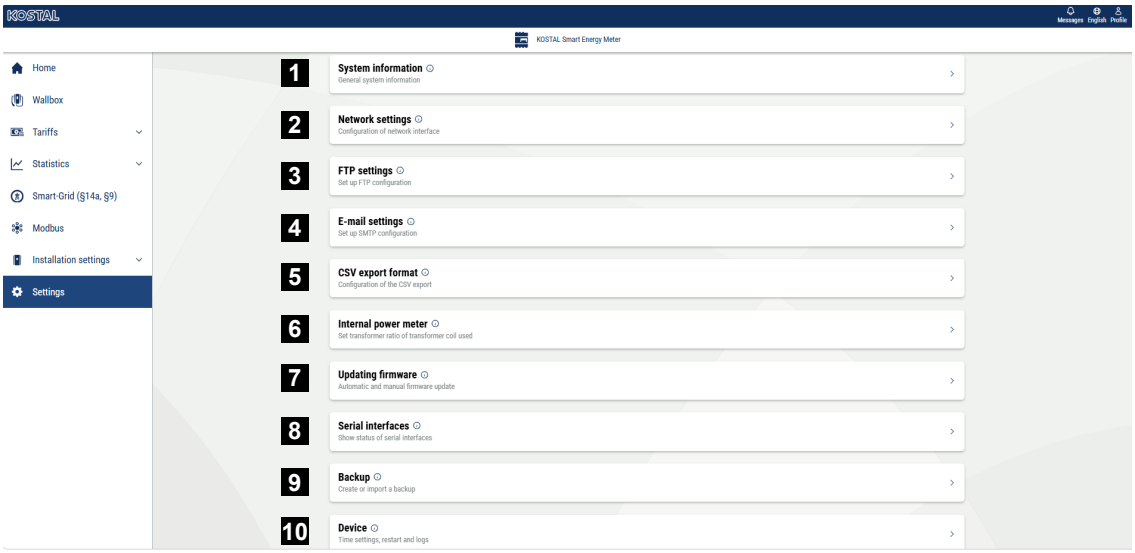
You can find the shop via the following link: **shop.kostal-solar-electric.com**.

1. Buy an activation code from the KOSTAL Webshop.
2. Enter the activation code under ‘Enter ***activation code*** ’ and confirm by clicking ***‘Add*** ’.

➔ The activated function is displayed.

✓ Function activated.

5.12 Menu - Settings



1 Displaying general system information
2 Configuring the network interface
3 Menus
4 Email configuration to receive notifications of events
5 If the device is connected to a current transformer, the transformer ratio can be specified here
6 Automatic exports are sent to an FTP/SFTP server via the saved configuration.
7 Under ‘Firmware Update’, a manual update can be installed and the mode for automatic updates can be set.
8 Displays the status of the serial interface
9 Creating or restoring a backup
10 Under ‘Device’, you can adjust the time settings, perform a restart or view system logs.

5.12.1 System information

General system information, as well as information about the current status of the system.

Parameter	Explanation
Product name	Display of the product name

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Parameter	Explanation
Device type	Displays the device's hardware version. HW0100: KSEM G1 HW0200: KSEM G2
Version	Version of the installed firmware
Serial number	Serial number of the device
CPU load	Current CPU load
RAM usage	Current RAM usage
Apps	Current app usage
Data	Current data usage
Hostname	Device name on the network. By default, this consists of the designation 'KSEM' followed by the serial number. The name can be changed in the network settings.
IP address	The IP address of the KOSTAL Smart Energy Meter, which has been assigned either manually or by a DHCP server. **NOTE! Clicking the (i) icon next to the IP address allows you to view further information about the network settings.** **NOTE! A window will open showing the current settings for the subnet mask, default gateway and DNS server.**
MAC address	MAC address of the KOSTAL Smart Energy Meter

5.12.2 Network settings

You can make changes to the IP settings here.

INFO

Please note that incorrect settings may result in the user interface becoming inaccessible.

Parameter	Explanation
Hostname	The hostname is the unique identifier for the device on the network. The name can be chosen freely and may consist of uppercase letters, lowercase letters, numbers and hyphens.

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Parameter	Explanation
DHCP	If DHCP is enabled, the device automatically obtains an IP address, e.g. from a router. In this case, no further settings are required. If you wish to set a static IP address, DHCP must be disabled and the ***Advanced Settings*** must be expanded. Here, you can configure a static IP address, subnet mask, default gateway and a DNS server. If UPnP is enabled, the device is automatically detected by computers on the same network and displayed in the network environment. This makes it easier for the user to find the device on the network if the IP address is unknown.
UPnP	Enable the UPnP service to view the device in the Network Neighbourhood on Windows. Note: For the UPnP service to work, your network must be configured as **a home network** or **work network** in Windows, and not as **a public network**.

5.12.3 FTP settings

Here you can configure the settings for connecting to a specific FTP server. It is advisable to test the FTP connection once it has been configured. To do this, use the 'Test' button to check the FTP connection to the configured FTP server.

Once enabled, the FTP export function can be used for certain applications, e.g. to export data from the data store under ***History Data > Data Store > Export Settings***. As an additional option, you can also specify a subdirectory path there.

Parameters	Explanation
Protocol	FTP or SFTP Secure SFTP is recommended.
Passive mode	For FTP only In active mode, the client listens on a port for incoming connections from the server (the client sends the FTP command PORT). As most clients are located behind a firewall or router, they can no longer accept incoming TCP connections. For this reason, passive mode is now almost exclusively used.
Server	Enter the name or IP address of the server here.
Port	Enter the port (e.g. 22) here.

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Parameters	Explanation
Username	Enter your login details for your FTP server here.
Password	

5.12.4 E-mail settings

If an event occurs, the KOSTAL Smart Energy Meter can inform you of it. To do this, you can set up configuration to your SMTP server (mail server) here, which will then inform you of various events via e-mail.

Set up SMTP configuration

INFO

You will receive the data needed for the setup from your provider.

Parameter	Explanation
E-mail address	Enter your e-mail address here
SMTP server	Enter the name of the SMTP server here (e.g. securesmtp.t-online.de).
Port	Enter the port here (e.g. 465).
Use encrypted connection (TLS)	If encryption (SSL/TSL) is required, enable it here.
The server requires authentication	If a login is required, activate it here.
User name	Enter your login parameters for your SNTP server (mail server) here.
Password	

After the SMTP configuration, the settings should be tested. Use the test button to send a test message to the configured e-mail address. If you have received a test message, the settings are correct. Otherwise, correct them.

5.12.5 CSV export format

This option is relevant if you wish to open and analyse CSV files exported at a later date using Microsoft Excel or Numbers.

Parameters	Explanation
Decimal separator	Select the separator for decimal places.
CSV separator	Select the separator for the Excel tables.

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Parameters	Explanation
Microsoft Excel®-compatible UTF-8 encoding	You can enable or disable UTF format here.

5.12.6 Internal power meter / transformer

The KOSTAL Smart Energy Meter can directly measure up to 63A per external wire. External transformers are used for higher currents. If your device is connected to a transformer, this can be set here.

INFO

You will find a description of the electrical connection for transformers with an indirect measurement in the KOSTAL Smart Energy Meter's installation manual.

If transformers are being used, the following requirements are recommended. A list of recommended transformers can be found in the download area for the product.

- 100 A primary
- 5 A secondary
- Accuracy class 1

To do this, enable ***Use current transformer*** and set the transformer ratio. Common transformer ratios are provided in the drop-down list.

If the ratio is not included in the list, click on ***Other*** and enter it manually. The primary current may be between 1 and 5000. The secondary current is fixed at 5 A.

5.12.7 Updating firmware

This option allows you to update the KOSTAL Smart Energy Meter’s firmware automatically or manually.

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Parameter	Explanation
Automatic updates	***Automatic updates*** The device regularly checks whether a firmware update is available and installs it automatically. The device will restart during this process and will be temporarily unavailable. ***Notify me of new updates*** The device regularly checks whether a firmware update is available. Updates are only installed once the user has confirmed them. ***Manual updates*** No automatic updates are carried out.
Last connection	Displays the date of the last connection to the server.
Update server contact	Connection status indicator.
Manual update	Use this menu option to install new device firmware for the KOSTAL Smart Energy Meter. To do this, select the update file and click 'Update'. You can find the latest version in the product's download section on our website.

5.12.8 Serial interface

Status information about the serial interfaces. This may either be assigned freely or by a particular application, the name of which is displayed here. The serial interface is configured in the relevant menus (e.g. Modbus settings or inverter)

5.12.9 Backup

Produce a password-protected backup to save the data and settings of the KOSTAL Smart Energy Meter.

Parameter	Explanation
Create	This function can be to save the system settings and data captured. A password for protecting the data backup must be assigned via the ***Password*** field. While the backup file is being produced, the system does not take any measurements and there is a temporary interruption in communication. Press the ***Create*** button to start the backup process. Once the backup process is complete, a backup file (*Backup.bak*) can be downloaded from the browser.

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Parameter	Explanation
Import a backup	A backup file can be selected using the ***Browse*** button. Clicking on ***Import*** opens the dialogue for importing the backup file. The password for the backup file can be entered here (if issued). Pressing the ***Import*** button starts the process. Please observe the information provided in the dialogue. All data and configurations are reset to those applicable at the time when the backup was created. Any data and configurations generated after this time are lost. Once the backup file has been successfully imported, the device restarts.

5.12.1 Device

0 Configure general settings on the KOSTAL Smart Energy Meter.

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Parameter	Explanation
Date and time	Set date and time of device. **NOTE! If you want to establish a connection to the Solar Portal, the time and time zone must be set/selected.** **Your time zone** Set the time zone so that calendar-based adjustments, e.g. changes between summer and winter time, can be taken into account by the system. **NTP** If the KOSTAL Smart Energy Meter is permanently connected to the Internet via a network, we would recommend activating the “NTP” option. The time is then obtained from the Internet automatically via a server. In the advanced settings, you can also set an alternative NTP server. **Set time** The KOSTAL Smart Energy Meter runs internally with the UTC time only. This is converted into your local time zone for display purposes. If the KOSTAL Smart Energy Meter is not connected to the Internet or if automatic time synchronisation is not to be used, 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.
Reset – device restart	Click on “Restart” to restart the device. This may take several minutes. The online interface then has to be reloaded.
Reset – reset device to state in which it was delivered	Clicking on “Reset” resets the device to state in which it was delivered. The default password then applies again. To log in again, you will need the password from the energy meter’s type plate, which can be found on a separate instruction leaflet in the packaging.
System logs	This menu item can be used to download system log data as a text file for certain time periods. **Exporting log data, Page 155**

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6. Faults / maintenance

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6.1 Functions of the reset button

Restarting KOSTAL Smart Energy Meter

Press and hold the RESET button for more than 6 seconds with a sharp object.

The device will then start.

Resetting the online interface password

Press the reset button as follows:

- once for a lengthy period (between 3 and 5 seconds) and then
- once briefly (half a second).

The gap between the two should be no more than one second. If the command was detected correctly, the status LED flashes orange twice. The online interface password is reset to what it was upon delivery (see type plate on device).

INFO

To log in, you will need the password from the energy meter's type plate, which can also be found on a separate instruction leaflet in the packaging.

Resetting the network settings

Press the reset button as follows:

- once briefly (half a second) and then
- once for a lengthy period (between 3 and 5 seconds).

The gap between the two should be no more than one second. If the command was detected correctly, the status LED flashes orange twice. One result of resetting the network settings is that the DHCP is activated.

Resetting KOSTAL Smart Energy Meter to state in which it was delivered

Call up the Webserver. The device is reset by going to ***Device settings*** > ***Device*** > ***Reset device to state in which it was delivered*** and clicking on ***Reset***.

INFO

After resetting, the default password applies again. To log in again, you will need the password from the energy meter's type plate, which can be found on a separate instruction leaflet in the packaging.

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6.2 Error messages / displays

Status LED is not lighting up

The KOSTAL Smart Energy Meter is not connected to the power supply.

- Ensure that at least the external wire L1 and neutral wire N are connected to the KOSTAL Smart Energy Meter.

Status LED is lit up or flashing red

There is an error.

- Restart KOSTAL Smart Energy Meter. Use a pointed object to press the Reset button for at least 6 s.
- Please contact your service technician or installer.

Network LED is not lit up or the KOSTAL Smart Energy Meter is not found in the network

The network cable is not correctly connected to the grid connection.

- Ensure that the network cable is correctly connected to the grid connection.

The KOSTAL Smart Energy Meter is not in the same local network.

- Connect KOSTAL Smart Energy Meter with the same router / switch.

Serial bus LED is lit up red or flashing orange

In the user interface check whether there are any error messages about communication with the receiver.

- If necessary, check cabling to receiver.

KOSTAL Smart Energy Meter is providing unrealistic measuring values

The KOSTAL Smart Energy Meter has been installed the wrong way round.

- Recheck how L1 to L3 are connected.
- The transformers are not configured. Go to Device settings > Transformer ratio, activate transformer and set the correct transformer ratio.

User interface cannot be called up using the KOSTAL Smart Energy Meter's IP address or name

- Contact the network administrator.

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6.3 KOSTAL Smart Energy Meter – Events

The events / messages listed here may appear on the KOSTAL Smart Energy Meter.

KOSTAL Smart Energy Meter events – device settings

Event code	Type of event	Description / possible cause / action
100	The backup could not be imported. Please repeat the process.	The backup import could not be carried out. Please first check that you have selected the locally stored backup file and entered the correct password. If the error can be ruled out based on the backup file and password, a new backup file of the original device must be created where possible. Ensure that the file extension and file type are not altered. The import process can now be carried out again.
101	The backup could not be created. Please repeat the process	The backup could not be created. Please repeat the process.
102	The backup could not be created. Please repeat the process.	An error occurred whilst exporting the backup. The backup could not be created. Please check the selected settings and try again after restarting the device. If the error persists, please create a system log and contact the manufacturer's support team.
103	The backup could not be restored. Please check the backup file you are using and repeat the process.	An error occurred whilst importing the backup file. Please check the file extension and file size of the backup file. If possible, create the backup file again and repeat the process. If the error persists, please generate a system log and contact the manufacturer's support team.
104	The backup could not be restored. Please check the backup file you are using and repeat the process.	The operation could not be carried out because the backup file is too large. Please check the file extension and file size of the backup file. If possible, create the backup file again and repeat the process. If the error persists, please generate a system log and contact the manufacturer's support team.
105	The backup could not be restored. Please check the backup file you are using and repeat the process.	The operation could not be carried out because the backup contains an incorrect software version. Please check and update the device with the outdated software, then create a new backup. Now repeat the restoration process.

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Event code	Type of event	Description / possible cause / action
106	The backup could not be restored. Please check the backup file and password used. Then repeat the process.	The password entered or the backup file provided is not valid. Please check the file used and the corresponding password. If you do not have this information, please create a new backup file with a password and repeat the process.
107	The firmware update could not be installed. Please check the update you are using and repeat the process.	The firmware upgrade could not be carried out. Please check that the firmware file used is the correct version. Alternatively, download the firmware again from the manufacturer's website and repeat the process.
108	The system is in safe mode. Please restore a valid backup or reset the device to its factory settings.	The system is in a secure state. If available, please restore a valid backup file. If this is not possible, please reset the device to its factory settings.
109	Time synchronisation could not be completed successfully. Please check the NTP server, the time zone and your internet connection in the device settings.	Synchronisation with the time server (NTP server) has failed. Please check your internet connection and server settings, then reload the page.
110	The firmware could not be installed; an internal error has occurred.	The fault ***'The firmware could not be installed; an internal error has occurred'*** cannot be resolved by the user **.** Please generate a system log and contact the manufacturer's support team.
111	The firmware is not compatible with this device.	The firmware being used is not compatible with this device type. Please generate a system log and contact the manufacturer's support team.
112	The firmware is not compatible with this product.	The firmware is not compatible with your product. Please check the product name under 'Device Settings' > 'System Information' and compare it with the firmware being used. If the product specifications differ, you will need firmware that is compatible with the device. If the error persists, please generate a system log and contact the manufacturer's support team.

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Event code	Type of event	Description / possible cause / action
113	The firmware signature is incorrect.	The firmware could not be successfully installed. Please download the firmware again from the download section and try the update again. If the error persists, please generate the system logs and contact the manufacturer's support team.
114	The signature could not be verified.	The certificate used in the firmware is not compatible with your device. Please check the product name and description of the firmware being used under Device Settings – System Information. If the product specifications differ, you will need firmware that is compatible with your device. If the error persists, please generate the system logs and contact the manufacturer's support team.
115	The requested firmware has since been withdrawn or replaced by a newer version. Please try again.	Between the last data retrieval from the update server and the current update attempt, the most recently retrieved update version has been withdrawn or replaced by a newer version. Please try again. If the error persists, please generate the system logs and contact the manufacturer's support team.

Events: KOSTAL Smart Energy Meter – File System Check

Event code	Type of event	Description / Possible cause / Action
150	The system has detected a fault in the file system.	The malfunction – ***an application error occurred during the file system check*** – cannot be resolved automatically. Please generate a system log and contact the manufacturer's support team.
151	The system has detected a problem with the file system.	The fault ***'Irreparable error detected in the file system*** ' cannot be rectified automatically. Please generate a system log and contact the manufacturer's support team.

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KOSTAL Smart Energy Meter events – Tariffs

Event code	Type of event	Description / possible cause / action
450	The database could not be updated. Please repeat the process	The fault ***with error code 450: 'Failed to write to the database'*** cannot be resolved by the user. Please contact the manufacturer's support team.

KOSTAL Smart Energy Meter events – Flash memory

Event code	Type of event	Description / possible cause / action
500	To prevent data loss, the device is in safe mode and no further data is being written.	The fault caused by ***the end of the flash memory's service life*** cannot be rectified by the user. Please contact the manufacturer's support team.

Events KOSTAL Smart Energy Meter – Smart Grid

Event code	Type of event	Description / possible cause / action
501	An invalid incoming connection attempt to the device has been detected.	Check the EEBus settings on the EEBus remote station. An attempt is being made to establish a connection via EEBus with the KOSTAL Smart Energy Meter. On the KOSTAL Smart Energy Meter, however, the connection has been disconnected.

Events KOSTAL Smart Energy Meter – EEBus

Event code	Type of event	Description / possible cause / action
550	The system was unable to initialise the EEBus component. Connections to other EEBus devices cannot be established.	The EEBus component could not be initialised successfully. Please check the network connections and restart the device if necessary.
551	An invalid incoming connection request to the device has been detected.	A connection attempt to the device was rejected because the connection parameters are invalid. Please check the connection parameters (e.g. PIN, certificate, SKI) and try again. If the error persists, please contact the manufacturer's support team.

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6.4 Exporting log data

For service purposes, the log files can be downloaded from the KOSTAL Smart Energy Meter. The log data is then used by the service team for error rectification.

Do this by performing the following steps:

1. Call up online interface of KOSTAL Smart Energy Meter Calling up user interface
2. Go to ***Device settings > Device > System logs***.
3. Select the time under ***Logs since***.
4. Press the ***Download*** button to start the download.
5. Save the data to your PC.

✓ The download is complete. Now you can make the data available to the service team.

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6.5 Updating device firmware

This menu item can be used to update the device firmware manually or automatically for the KOSTAL Smart Energy Meter.

Automatic update

If a firmware update is available, the update can be run in the KOSTAL Energy Meter using the following methods.

You can choose from two update methods. The selection must then be confirmed using the ***Save*** button.

- ***Automatic updates***
  The device regularly checks whether a firmware update is available and installs it automatically. The device restarts and is not available for a short period.
- ***Notify about updates***
  The device regularly checks whether a firmware update is available. Updates are only installed once confirmed by the user.
- ***Manual updates***
  No automatic updates are carried out.

Manual update

If you want to import an update manually, the following steps must be carried out:

1. Download the current firmware from our website by going to ***Download > Accessories > KOSTAL Smart Energy Meter***.
2. Use the ***Browse*** button to select the file on your PC.
3. Press ***Update*** to start the update.
4. Once a prompt has been accepted, the new firmware is uploaded and installed on the KOSTAL Smart Energy Meter.

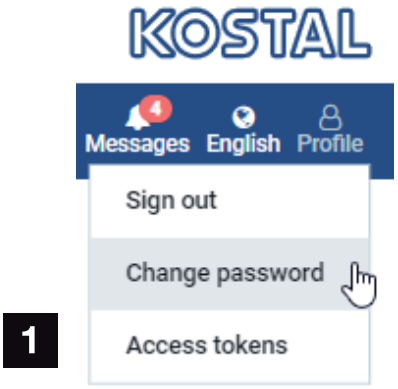
➔ Finally the KOSTAL Smart Energy Meter is restarted. This process may take several minutes. The website then has to be reloaded.

✓ The software is installed.

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6.6 Change password

The password can be changed by going to the following menu item.



1 Change password

1. Call up ***Change password*** under***Sign out***.
2. Start by entering the current password.
3. Enter the new password. This must contain at least 8 letters and a mixture of upper- and lower-case letters.
4. Enter the password again under ***Confirm***.
5. Confirm the input by selecting ***Submit***.

✓ You have changed your password.

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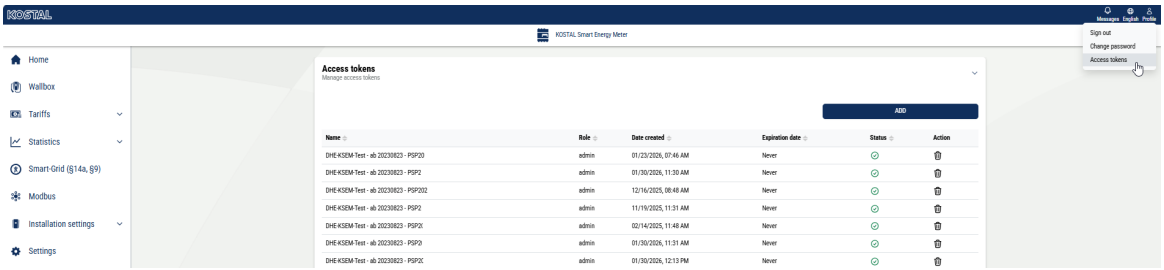
6.7 Access key

In order to grant an application access to the JSON (JavaScript Object Notation) interface or the web user interface of the KOSTAL Smart Energy Meter, the application must authenticate itself with the KOSTAL Smart Energy Meter.

Authorisation is carried out using an access key, which has been generated beforehand in the KOSTAL Smart Energy Meter.

Creating the access key

Access keys can be generated under the menu item ***Profiles > Access Keys***.

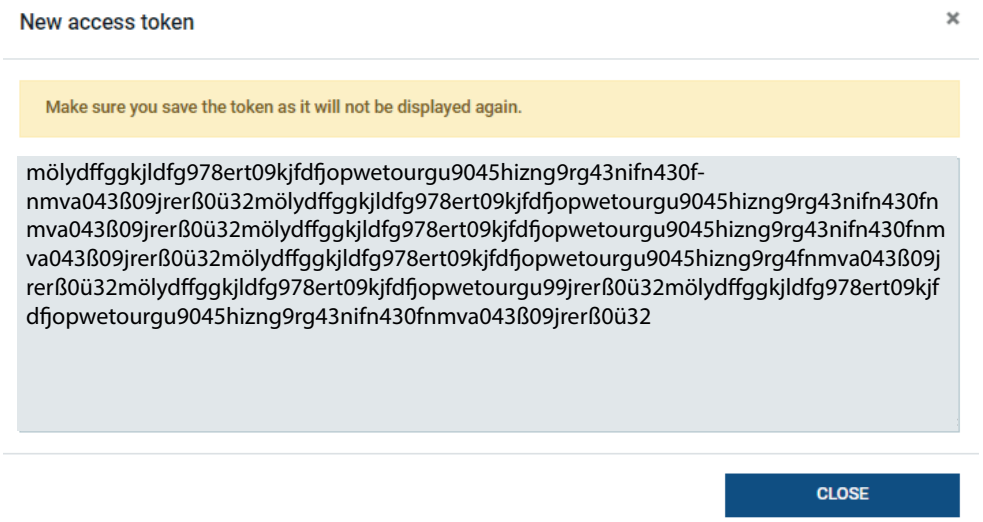


Clicking on ***ADD*** opens a window in which the name, role and expiry date of the access key can be specified.

Parameters	Explanation
Name	Name of the user, application or device that is to use the interface.
Role	■ ***api***: This allows measurement data to be retrieved via the JSON interface. ■ ***admin***: This allows you to log in to the web interface and configure settings. This access key has all the rights that a logged-in user has.
Expires on	the expiry date of the access key.

Once created, the access key is displayed only once. It cannot be obtained or displayed again and should therefore be copied and stored securely upon receipt.

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Authorisation of the access key

A newly issued access key must be authorised. Clicking on ***AUTHORISE*** authenticates the access key and authorises it for use with the JSON interface or the web user interface.

Deleting the access key

An access key can be deleted from the system by clicking on ***REVOKE***.

Using the API access key

Once an API access key has been authenticated and authorised by the user, it can be used by the application for JSON interface requests.

To do this, the access key is transmitted as part of the HTTP header:

```
GET /api/json/<resource> HTTP/1.1
Host: <energy manager>
Content-Type: application/json
Authorization: Bearer eyJhbGciOiJSUzI1NiIsInR5cCI6IkpXVCJ9[..]
```

Using the admin access key

Once an admin access key has been authenticated and authorised by the user, it can be used by the application to display the web user interface.

To do this, the access key is sent as part of the HTTP header or must be stored in the browser's local storage so that it can be read from there.

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Access key TTL

The lifetime of an access key can be limited during the authentication request. To do this, an expiry date is defined in addition to the name of the application. Furthermore, an issued access key can be revoked by a logged-in user via the web interface. All subsequent requests made using a revoked access key will be rejected.

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7. Appendix

7.1 EU declarations of conformity 162
7.2 Open Source licence 163

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7.1 EU declarations of conformity

KOSTAL Solar Electric GmbH hereby declares that the devices described in this document complies with the basic requirements and other relevant conditions of the directives listed below.

- Directive 2014/30/EU
  (on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (EMC))
- Directive 2014/35/EU
  (on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits Low Voltage Directive)
- Directive 2011/65/EU
  (RoHS) to limit the use of certain hazardous substances in electrical and electronic equipment

You will find a detailed EU Declaration of Conformity for the product in the download area at:

www.kostal-solar-electric.com

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7.2 Open Source licence

This product contains Open Source software, developed by third parties and licensed using vehicles including GPL and/or LGPL.

For more details on this, a list of the Open Source software used and the related licence texts, go to the Licences section on the device's website (Webserver).

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www.kostal-solar-electric.com

10/2026 - EN - DOC02908600-0009 - Subject to technical changes. Errors excepted.
You can find current information at www.kostal-solar-electric.com.