SOLAR ELECTRIC

KOSTAL

PIKO CI

Solar inverter 30/50/60 kW

Operating manual

Legal notice

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Exclusion of liability

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General note on gender equality

The 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 version:

CB (Control Board) version - Internal code: PIKO CI 30:– m_G9511-302000-14-012601
CB (Control Board) version - Internal code: PIKO CI 50/60:- m_G9511-600900-13-012401
CSB (Communication Service Board) version: G711-0002200-13-012403
KOSTAL PIKO CI (App): V6.15.3

Contents

1. About this documentation

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.

Contents

1.1 Validity of the documentation

This documentation applies to inverters:

- PIKO CI 30
- PIKO CI 50
- PIKO CI 60

1.2 Content, function and intended audience of the documentation

Content and function of the document

This documentation is an operating manual and is part of the product it describes.

This documentation provides you with important information on the following topics:

- Structure and function of the product
- Handling the product safely
- Explanations, specifications and instructions for handling the product, from transportation to disposal
- Technical data

Target groups

This documentation is aimed at the following categories of people:

- System planners
- Plant owners
- Qualified staff in transport, storage, mounting, installation, operation, maintenance and disposal

1.3 Applicable documents and further information

To fully understand the content of this documentation and to perform the described work steps safely and in full, you require the following additional documents and information sources.

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

Applicable documentation

- Documentation for other components in the system
- The Quick Start Guide provided as part of the product's scope of delivery
- List of countries whose specifications the product meets
- Certificates and manufacturer declarations to forward to the energy supplier
- List of energy meters that are approved for use with the product
- List of inverter parameter values specific to each country
- List of events (error messages) that may occur in the inverter

Further information

- List of compatible partners: An overview of products from external partners that can be combined with products from to create optional upgrades.

Regulations

- Plant owner's operating regulations at the place of use
- Accident prevention regulations
- Regulations on work equipment safety
- Regulations on disposal and environmental protection
- Other applicable regulations at the place of use

1.4 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.

1.4.1 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.

1.4.2 Meaning of symbols in warnings

Danger

Danger due to electrical shock and discharge

1.4.3 Meaning of symbols in information notes

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

Information

2. Safety

This chapter provides you with important information on handling your product safely.

Contents

2.1 Proper use

Intended purpose

- This product is an inverter and is used to convert direct current from photovoltaic systems into alternating current.
- The alternating current generated may be used as follows:
  - Self-consumption
  - Feed-in to the public grid

Field of use

- The product is intended for professional and private use.
- The product is only intended for installation in a grid-connected photovoltaic system.

Place of use

- The product is not intended for use in explosive or aggressive environmental conditions. Observe the specifications for the installation location.
- The product is intended for use indoors and outdoors.
- The product is only intended for stationary use.

Specifications for additional components, replacement parts and accessories

Additional components, replacement parts and accessories may only be used if they have been approved by for this product type.

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

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.

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.

2.4 Qualification of the staff

The activities described in this documentation must only be performed by people who are qualified for the task. Depending on the activity, they require specific specialist knowledge in the following areas and knowledge of the relevant specialist terms:

- Electrics

The following additional, specific qualifications are required:

- Knowledge of all safety requirements for handling inverters
- Knowledge of the applicable regulations for handling the product. See **Applicable documents and further information, Page 9**.

2.5 Sources of danger

The product has been developed and tested in accordance with international safety requirements. Despite this, residual risks still exist and could cause personal injury and damage to property.

2.5.1 Danger of injury

Serious danger of injury or death from electric shock

When exposed to light, the PV modules generate a high DC voltage that is applied to the DC cables. Touching damaged live DC cables leads to life-threatening injuries or even death.

- Do not touch exposed live parts or cables.
- Before working on the product: De-energise product and secure it against being switched back on.
- For all work on the product: Wear suitable protective equipment and use suitable tools.

Danger of burns from hot housing parts

Housing parts can reach temperatures of over 60 °C during operation. Touching hot housing parts can cause burns.

- Switch off the product and allow it to cool.

2.5.2 Material damage

Risk of fire due to damaged supply cables

When exposed to light, the PV modules generate a high DC voltage that is applied to the inverter's supply cables. Damaged inverter supply cables or damaged plugs can cause a fire.

- Carry out regular visual checks on the supply cables and plugs.
- If you detect defects: Notify qualified staff and have the parts replaced.

2.6 Safety devices

Safety devices required during installation

The following safety devices must be installed:

- Line circuit breaker
- Residual current device

2.7 Personal protective equipment

For certain activities, staff are obligated to wear protective equipment. The required protective equipment is specified in the relevant chapters.

An overview of the required protective equipment

- Rubber gloves
- Protective glasses

2.8 Emergency procedure

2.8.1 Fire procedure

1. Leave the danger zone immediately.
2. Notify the fire service.
3. Tell the emergency services that a PV system is in operation and state the location of modules, inverters and separators.
4. Have any other measures carried out by qualified staff only.

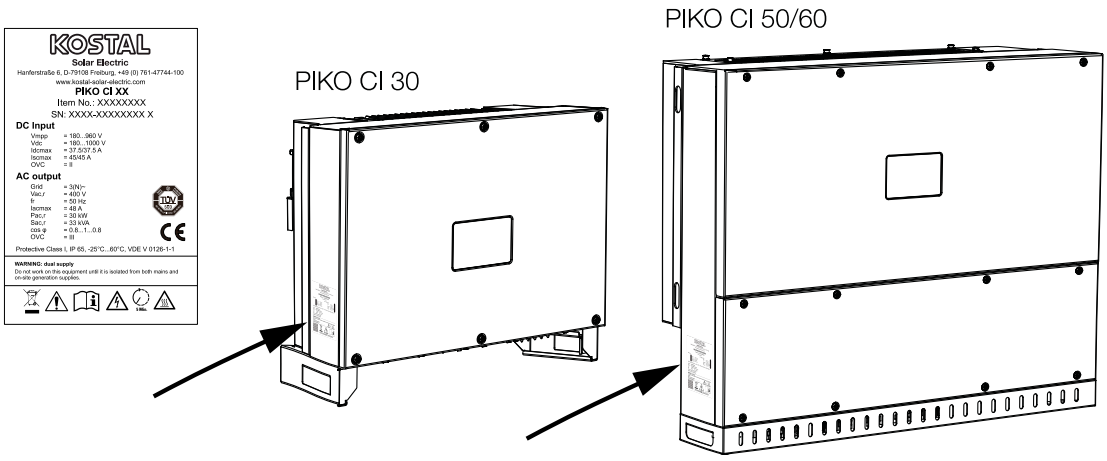
2.9 Observed standards and guidelines

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/

3. Device and system description

3.1 Type plate and label on the device



The type plate and other labels are attached to the device housing. These signs and labels must not be altered or removed.

You will find the following information on the type plate:

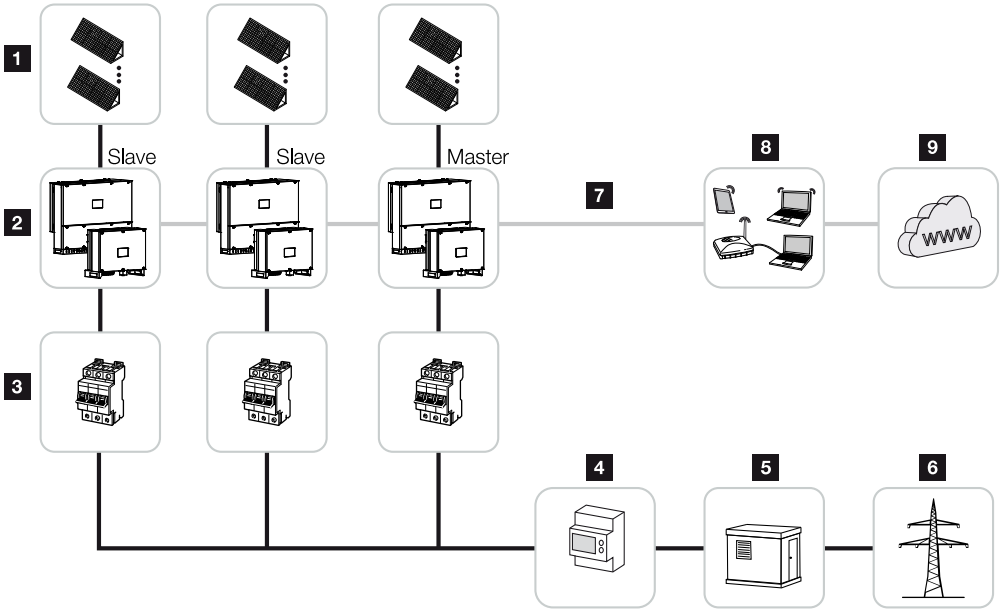
- Manufacturer
- Model
- Serial number and article number
- Characteristics specific to the device
- QR code with the following information: Serial number and article number
- Barcode with serial number. The barcode can be used to configure inverters with the KOSTAL PIKO CI app.

Symbol	Explanation
	Danger notice
	Danger due to electrical shock and discharge
	Observe and read operating manual

Symbol	Explanation
	Danger due to electrical shock and discharge. Wait five minutes (discharge time of the capacitors) after shutdown
	Device must not be disposed of with household waste. Observe the local application of disposal requirements.
	CE marking The product satisfies the applicable EU requirements.
	Additional earth connection

3.2 System overview

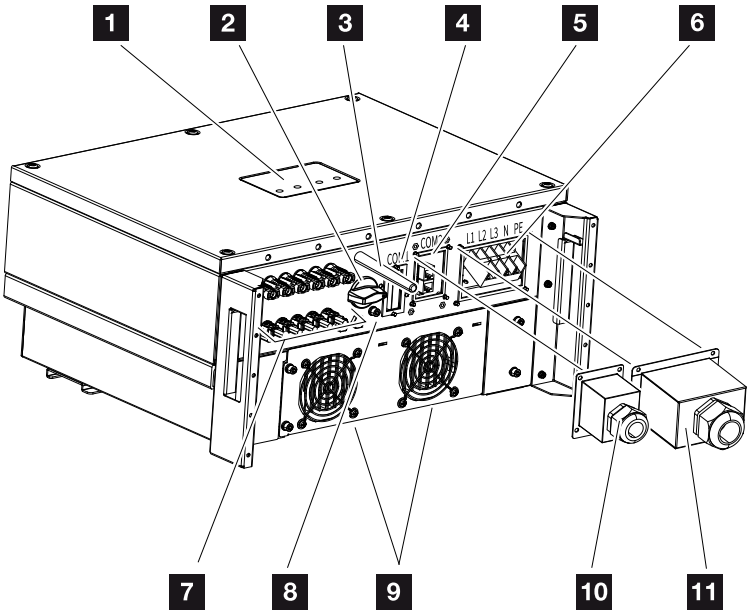
The inverter generates a three-phase AC and has been optimised for use in medium and large-scale PV systems thanks to its high output power. This makes it suitable for solar power plants, electricity farms and similar applications. The inverter can be operated in TT, TN-C, TN-S and TN-C-S grids.



1 PV strings
2 30 / 50 or 60 inverter
3 AC line circuit breaker
4 Energy meter
5 Distributor
6 Public grid
7 Communication connection (optional)
8 Router, PC connection
9 Internet

3.3 PIKO CI 30 inverter

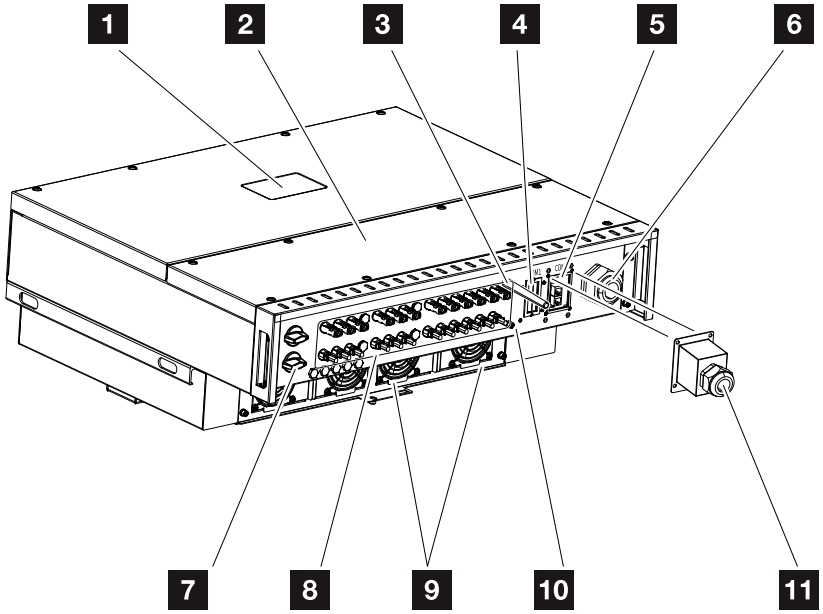
Exterior view



1 Status LED
2 DC switch
3 WiFi antenna
4 COM1 connection panel (communication module)
5 COM2 connection panel (RS485, LAN, digital inputs)
6 Connection for mains cable
7 Connections for PV modules
8 Additional PE connection (outside)
9 Fan
10 Cover for COM2 connection panel
11 Cover for grid connection

3.4 PIKO CI 50/60 inverter

Exterior view

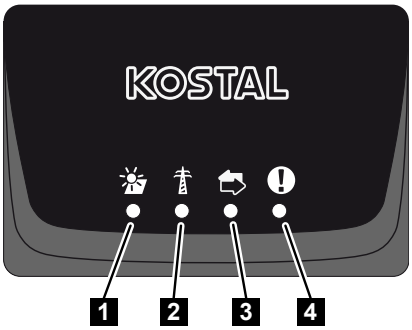


1 Status LED
2 Cover for terminal compartment
3 WiFi antenna
4 COM1 connection panel (communication module)
5 COM2 connection panel (RS485, LAN, digital inputs)
6 Cable opening for mains cable
7 DC switch
8 Connections for PV modules
9 Fan
10 Additional PE connection (outside)
11 Cover for COM2 connection panel

3.5 Status LED

The status LED provides information about the operational status of the inverter.

For more information: **Event codes, Page 141**.



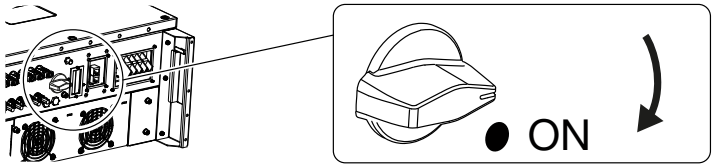
1 Status of PV modules
2 Status of grid
3 Status of communication
4 Warning message

3.6 DC circuit switch on inverter

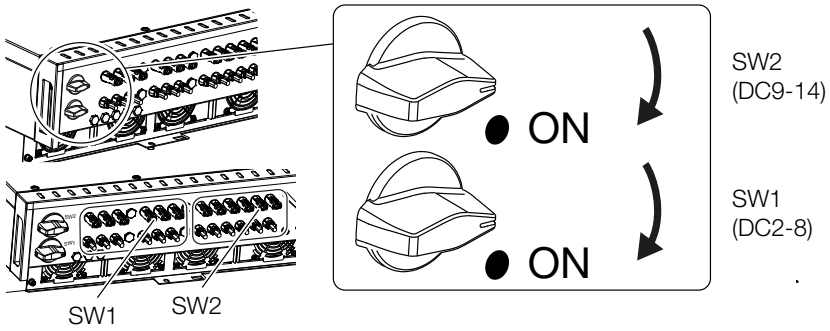
The inverter can be switched on and off via the DC circuit switch.

Switch on the inverter

PIKO CI 30

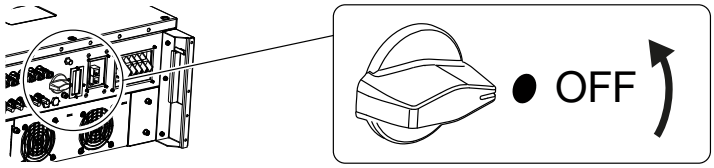


PIKO CI 50/60

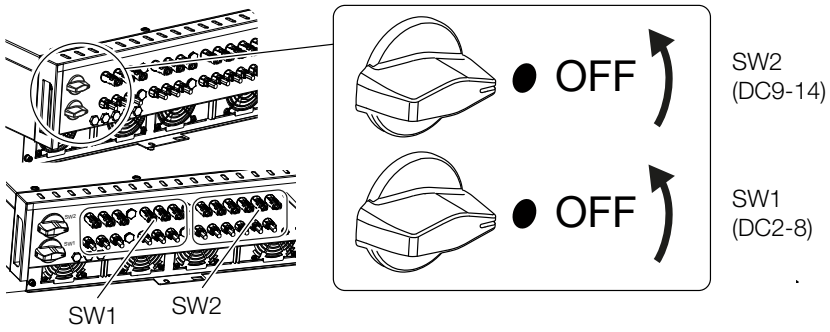


Switch off the inverter

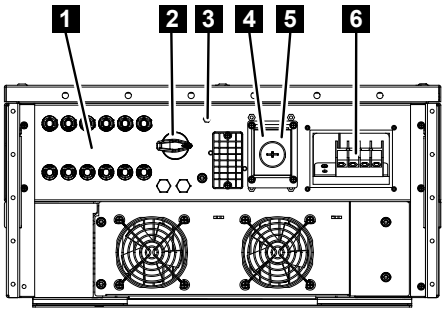
PIKO CI 30



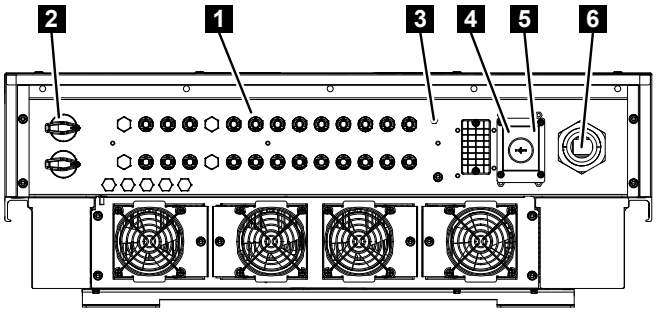
PIKO CI 50/60



3.7 The connection area



PIKO CI 30



PIKO CI 50 / 60

1 DC connections for PV generators (6 for PIKO CI 30, 10 for PIKO CI 50, 12 for PIKO CI 60)
2 DC circuit switch
3 WLAN antenna
4 LAN connection
5 Communication connection
6 AC terminal

3.8 Functional overview

The inverter converts energy from the connected PV modules into alternating current and feeds this into the public grid.

3.8.1 Three-phase alternating current

The inverter generates a three-phase AC and has been optimised for use in medium and large-scale PV systems thanks to its high output power. This makes it suitable for solar power plants, electricity farms and similar applications. The inverter can be operated in TT, TN-C, TN-S and TN-C-S grids.

3.8.2 Recording power generation

By connecting an external energy meter, the inverter can monitor the energy flow and optimally control the output power according to grid requirements.

3.8.3 Communication

The inverter has various interfaces for communication purposes. These establish a connection to other inverters, sensors, energy meters or a link to the Internet. All data is transmitted encrypted.

- RS485/Modbus (RTU)

  Data loggers or energy meters are connected to the Modbus interface to record the energy flow.
- LAN or WiFi can be used to connect the inverter to the local network via which it can then access the Internet and solar portal.

3.8.4 Central grid and system protection

Central grid and system protection is required in some countries. This monitors the voltage and frequency in the grid and in the event of a fault, shuts down the photovoltaic systems by means of a circuit breaker.

The inverter allows an external monitoring unit to be connected for grid and system protection. An additional circuit breaker is not required as internal switches within the inverter ensure compliance with the grid operator's technical specifications.

3.8.5 Ripple control receiver

For systems in which the grid operator controls the feed-in capacity using ripple control receivers, the inverter has the required digital inputs.

3.8.6 Park controller

The inverter can be controlled centrally using a PGS park controller. In this setup, the park controller is the master and can control all inverters. The associated settings are configured using the **KOSTAL PIKO CI App** (version 6.15.1 or more recent) or the **KOSTAL PIKO CI Conf Tool** (version 1.1.7 or more recent).

3.8.7 Event codes

Events or faults during operation are stored in the inverter's event memory and transmitted to the or can be viewed in the KOSTAL PIKO CI Conf App or the .

For more information: **Event codes, Page 141**.

3.8.8 Service concept

For service purposes the event codes can be read out using the KOSTAL PIKO CI Conf App, the or the . Your installer or service partner can then decide what action to take before on-site deployment. In this way, multiple on-site deployment can be avoided.

3.8.9 Wireless commissioning

Commissioning is undertaken wirelessly using tablets or smartphones. The KOSTAL PIKO CI Conf App is available for this purpose. You can download it free of charge from the App Store.

3.8.10 KOSTAL Solar Terminal

The is the central gateway for you as a user. You can find the on our website or at this link: **https://terminal.kostal-solar-electric.com**.

KOSTAL Solar Terminal

The is a central hub for various applications. To use them, you have to register once. You will then be given a user account for all the applications offered in the KOSTAL Solar Terminal. You can find more information on our website **https://www.kostal-solar-electric.com**.

If you have already registered for the KOSTAL Solar Terminal, you can sign in using your user details.

You have the following applications available to you, depending on your user role:

- KOSTAL Solar Portal
- Online KOSTAL Solar shop
- KOSTAL Solar Plan
- Smart Warranty activation
- Solar repower check

3.8.11 KOSTAL PIKO CI Conf App

The **KOSTAL PIKO CI Conf App**, which is available free of charge, provides a graphical user interface. The app is used to commission and configure the inverter and to display its status:

- Log in on inverter
- Log in as system operator or installer
- Status request
- Current feed-in values at grid connection
- Display log data / events
- Inverter version display
- Inverter configuration (e.g. LAN connection, setting up the energy meter, etc.)

3.8.12 KOSTAL PIKO CI Conf Tool

The KOSTAL PIKO CI Conf Tool is a configuration tool used to configure the PIKO CI inverter using a direct LAN connection.

This means that you no longer need to stand in front of the inverter with a smartphone in order to configure the inverter.

The configuration tool can be used to address and configure all PIKO CI inverters in the local LAN network.

The user interface offers the same settings as the KOSTAL PIKO CI Conf App provides on smartphones.

KOSTAL
PIKO CI Conf Tool

The tool provides the following functions:

- Log in to the inverter as a ***system operator*** or an ***installer***
- Power flow diagram view
- Present values view
  Using various statistics, the user can display the current values for daily, monthly, annual and total yield. Detailed information can be displayed by expanding the statistics.
- Information about the inverter's yield data for daily, monthly, annual or total time periods.
- Download overall inverter log data or covering a limited time period.
- Configure the inverter
- Update inverter firmware
- Query inverter versions

3.8.13 KOSTAL Solar Portal

The KOSTAL Solar Portal is a free online platform for monitoring the PV system.

The Solar Portal enables the operation of the inverter to be monitored via the Internet. For this purpose, the inverter sends the PV system's yield data and event messages to the solar portal via the Internet.

The information is then stored in the solar portal. You can view and call up this information via the Internet.

This means that the KOSTAL Solar Portal protects your investment in a PV system from yield losses, e.g. by actively warning you by e-mail when an event occurs.

Register for the KOSTAL Solar Portal free of charge using the at **https://terminal.kostal-solar-electric.com**.

The Solar Portal has the following functions:

- Worldwide portal access via the Internet
- 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
- Providing system data for the

Prerequisites for using the Solar Portal:

- The inverter must have a connection to the Internet.
- Data transfer to KOSTAL Solar Portal must be activated in the inverter.
- The inverter must not be assigned to any other PV system in the KOSTAL Solar Portal.
- The inverter must be assigned to your PV system in the KOSTAL Solar Portal.

You can find more information about this on our website **www.kostal-solar-electric.com**.

KOSTAL Solar Electric

3.8.14 The KOSTAL Solar Plan layout software

Our free tool makes the inverter layout easier for you.

Register for free of charge using the at **https://terminal.kostal-solar-electric.com**.

Just enter the system details and individual customer details and receive a recommendation for a suitable KOSTAL solar inverter for the planned solar system. All KOSTAL solar inverters are considered for this. In addition, the customer's electricity consumption is considered and the potential self-consumption and self-sufficiency quotas are displayed using standard load profiles.

The covers the following areas of the inverter layout:

- ***Rapid layout***
  Manual inverter layout taking account of the inverter specifications.
- ***Standard layout***
  Automatic inverter layout with possible consideration of power consumption.

As well as providing an improved inverter layout, the also supports in preparing quotations. Customer, project and installer details can be added to the technical data entered by the user and included with the quotation as a PDF overview.

You can find additional information on our website **www.kostal-solar-electric.com** in the ***Installer portal*** area.

KOSTAL Solar Terminal

3.9 The inverter's internal protective functions

The following protective functions are implemented in the inverter.

- Insulation monitoring
- Residual current monitoring

WARNING

Issues with the inverter's protective function

Some protective functions, such as insulation monitoring and residual current monitoring, may be affected by high capacities of the PV generator to earth.

These protective functions have been proven for a total capacity of the PV generator and battery to earth of 10µF. If the PV generator has a higher capacity to earth, there are no assurances that these protective measures will work properly.

WARNING

Electric shock or risk of fire originating from connected device!

If the protective functions output an error, there is a potential risk of fire or electric shock originating from the connected devices. The error must therefore be rectified immediately and this may only be done by qualified maintenance staff.

The protective functions are not affected by external blocking diodes.

Please check the setup specifications and standards valid locally to establish whether additional protective measures are required on site.

Insulation monitoring

Before connecting to the grid, the inverter checks the insulation of the entire PV generator and battery to earth.

If this resistance falls below the limit of 100 kΩ, this is displayed as an insulation fault.

- ***The inverter reports an "insulation resistance" event.***

For as long as the error persists and the insulation resistance is too low, the inverter does not connect to the grid.

This protective function cannot be configured or deactivated.

Residual current monitoring

The inverter monitors the leakage current of the PV generator, including the battery, as soon as it is connected to the grid.

The internal residual current monitoring is AC/DC sensitive and corresponds to a type B RCD.

Residual current monitoring fulfils the following protective functions.

Fire prevention

If the residual current exceeds a value of 300mA, the inverter shuts down within 300ms.

- ***The inverter reports an "insulation monitoring" or "residual current too high" event.***

Before switching on again, the inverter checks the insulation to earth. If the insulation monitoring also detects an error or the insulation monitoring event occurs on a frequent basis, this may indicate that the insulation is damaged. The damage must be repaired immediately by qualified maintenance staff.

This protective function cannot be configured or deactivated.

Protection from electric shock

An electric shock usually leads to an erratic increase in residual current. The inverter detects erratic residual currents and, depending on the size of the increase, shuts down within the following times:

Sudden change in residual or earth fault current [mA]	Maximum response time [s]
30	0.3
60	0.15
90	0.04

- ***The inverter reports an "insulation monitoring" or "residual current too high" event.***

Before switching on again, the inverter checks the insulation to earth. If the insulation monitoring also detects an error or a **residual current too high** event occurs on a frequent basis, this may indicate that the insulation is damaged. The damage must be repaired immediately by qualified maintenance staff.

This protective function cannot be adjusted or deactivated.

3.10 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 saved data must be made accessible to users.

For PIKO CI, the data is created and saved as follows.

The product generates the following data

a) Type, format and estimated scope of product data the networked product can generate;

- Log data via the inverter's KOSTAL PIKO CI App:
  - Event notifications/CSV format/max. 4 kB/regularly
  - Generation data per hour for one day/CSV format/max. 5 kB/regularly
  - Generation data per day for one month/CSV format/max. 3 kB/regularly
  - Generation data per month for 25 years/CSV format/max. 2 kB/regularly
  - Configuration data/CSV format/max. 11 kB
- Access to log data using KOSTAL Solar Portal:
  XML format, 2.5 kB in size, every 10 minutes

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.

Saving data on other devices

c) Specification whether the networked product is able to save data on a device or a remote server, including the intended archiving duration where applicable;

- Log data is averaged locally over a period of five minutes and saved for 1.5 years
- If portal transfer is activated, data is transferred to an external server (see also 2(a)).

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.

- The log data can be downloaded from the inverter using the integrated Webserver (see also 2(a)).
- The log data can be deleted using the ***Reset User Settings*** function.
- It is also possible to download log data using the KOSTAL Solar Portal, providing portal data transfer has been activated.

4. Transport and scope of delivery

4.1 Transport and storage

The function of the inverter has been tested and it has been carefully packaged prior to delivery. Upon receipt, check the delivery for completeness and any transport damage.

POSSIBLE DAMAGE

Damage to the device

Potential risk of damage when setting the inverter down. Whenever possible, place the inverter on its back after unpacking.

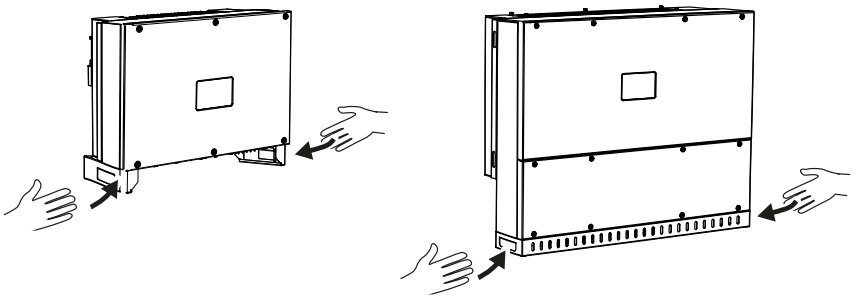
- Store all components of the inverter in the original packaging in a dry and dust-free place if the inverter is to be stored for a longer period of time before installation.
- Replace the packing material if it has been damaged.
- Do not stack more than four inverters on top of each other.
- To transport the inverter, use the recessed grips on the left and right of the bottom.

CAUTION

Danger of injury!

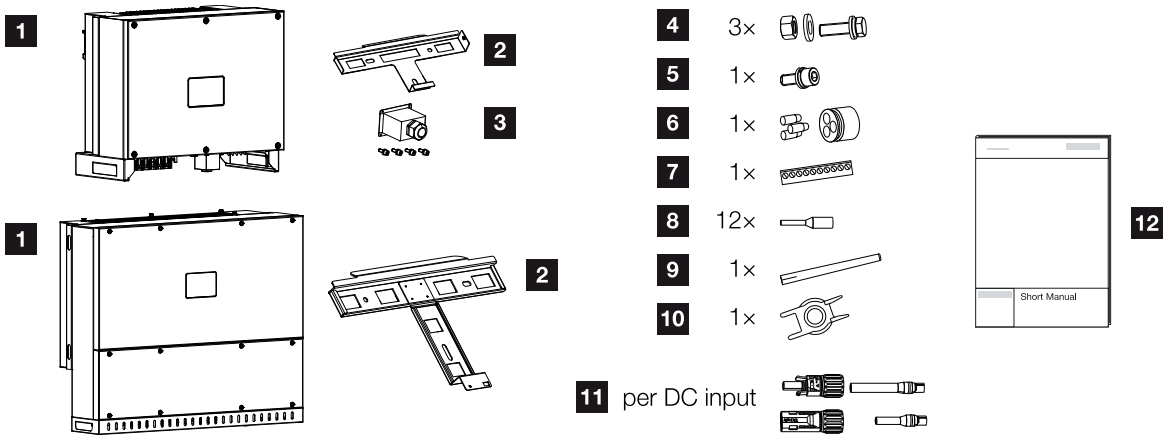
The inverter is very heavy.

- Do not lift or transport the inverter alone. Involve at least one or two other persons to avoid injury.



- Do not tip the inverter onto its side. Avoid tilted positions.
- Only place the inverter down on its back.
- Do not place the inverter down on its side or on the top.

4.2 Scope of delivery



1 Inverter
2 Wall mount
3 Cover for AC connection
4 Mounting kit: 3× M12 screws with nut and washer
5 M6 lock screw (1×)
6 Plug seals for routing communication cables with 3 plugs
7 Plug connector for communication interface
8 12× core end sleeves for communication cables
9 WiFi antenna
10 Removal tool for DC plug connectors
11 DC plug connector (each DC input: 1× plug, socket)
12 Short manual

5. Installation

5.1 Selecting the installation site

Observe these instructions when selecting the installation site so that you select the correct one.

Install the inverter indoors.

Install the inverter in a protected outdoor area.

Protect the inverter from direct precipitation.

Protect the inverter from coarse soiling, e.g. leaves.

Protect the inverter against dust, contamination and ammonia gases. Rooms and areas containing livestock are not permitted as installation sites.

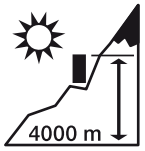
Do not install the inverter in potentially explosive areas.

-25 ... +60 °C

The ambient temperature must be between -25 °C and +60 °C.

0...100 %

The air humidity may be between 0% and 100% (condensing).

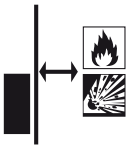


Inverter may only be installed up to an altitude of 4000 m.

Outdoors in salty areas, do not install device any closer than 500 m from the coast. The device may be corroded in such areas. Areas close to the coast with a sea breeze or regions exposed to onshore winds are considered to be areas affected by salt. The region may vary depending on weather conditions (e.g. typhoons and monsoon rains) or topography (e.g. near dams and mountains).

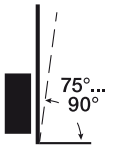
A sufficient safety distance from flammable materials and potentially explosive areas in the vicinity must be ensured.

Mount inverter on a stable installation surface that can safely bear the weight. Plasterboard walls and wood planking are not permitted.

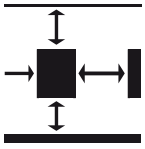


Do not install the inverter on a flammable installation surface.

WARNING! Risk of burns from hot parts on the inverter! Some of the inverter components can reach temperatures of over 80 °C during operation. Select the installation site in accordance with the information provided in these instructions. Always keep the ventilation openings clear.

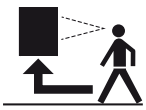


Install the inverter vertically. Tilted position up to 15° is permitted.



Maintain minimum distances and the necessary clearance.

The inverter makes noise during operation. Install inverter in such a way that people are not disturbed by operation noises.



The inverter must be easily accessible and the status LED must be easy to read.

Install the inverter out of reach of children or other unauthorised persons.

Lay cables with UV protection or use UV-resistant cables.

5.2 Wifi installation site

The inverter can be connected to the Internet by WLAN. Make sure that there is also a good connection to the Wifi router at the installation site. Changing the installation location at a later date involves a lot of effort. The range is approx. 20-30 m. Walls reduce the range considerably.

The following points should be noted:

- Check in advance, e.g. with your mobile device, whether there is sufficient Wifi reception at the installation site.
- Measure the field strength. This should be as high as possible.
- If necessary, use repeaters to improve Wifi reception at the installation site.

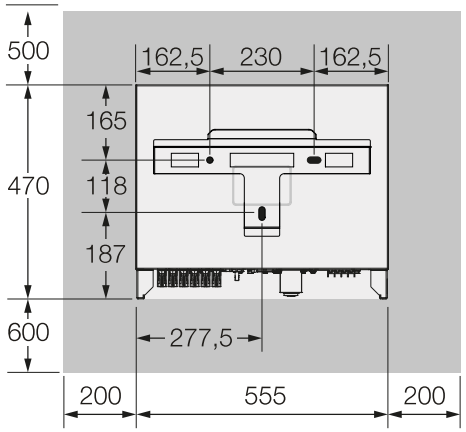
5.3 Installation dimensions

1. Be absolutely sure to maintain the clearance around the inverter so that it remains cool.
2. For installation, use retaining bolts that are suitable for the base, the weight of the inverter and the ambient conditions.
3. Use fastening screws that are suitable for the base in question to install the inverter wall mount.

INFO

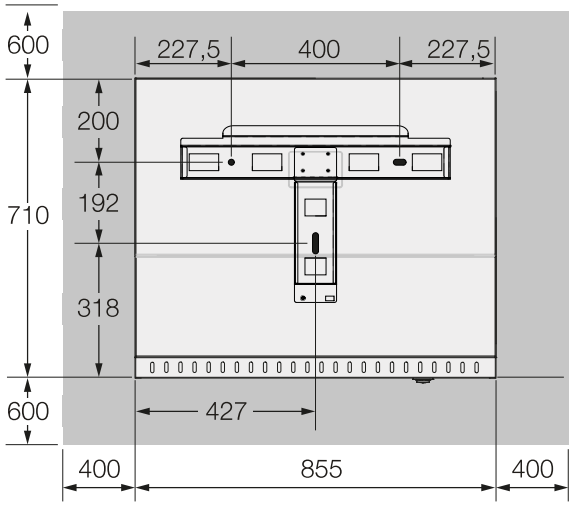
Requirement of retaining bolts: Ø 12 mm, 8.8, A2-70

PIKO CI 30

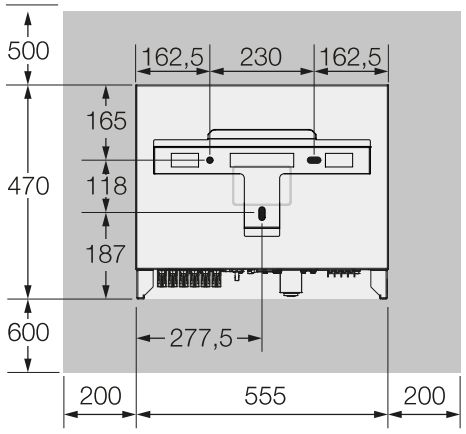


(mm)

PIKO CI 50/60

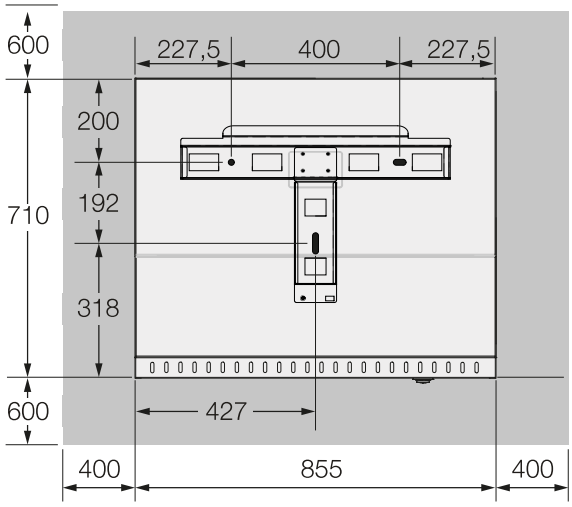


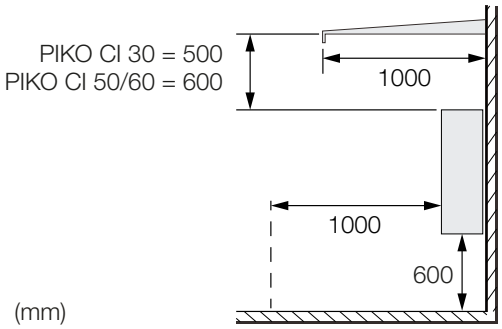
PIKO CI 30



(mm)

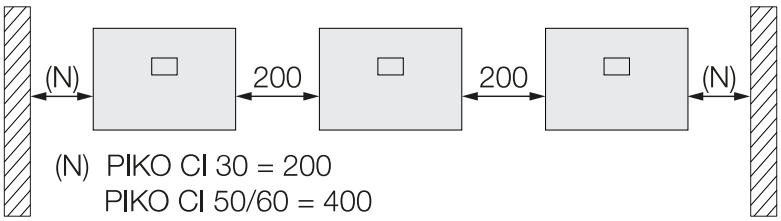
PIKO CI 50/60





4. Observe the specified distances if several inverters are installed side by side. The values given are minimum distances. Increase the distances if the thermal conditions in the installation environment require it, e.g. in case of unfavourable ventilation or strong sunlight.

30/50/60



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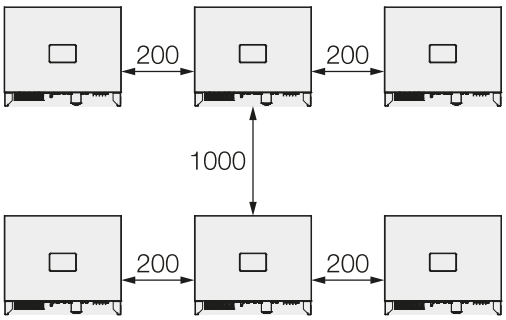
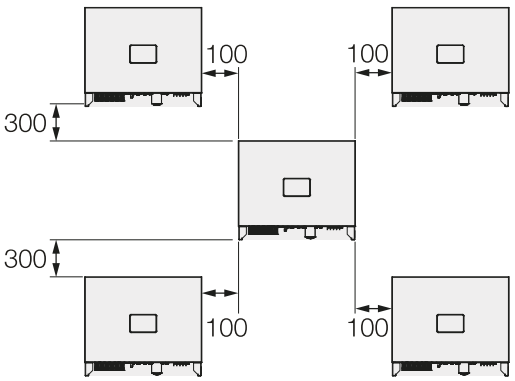
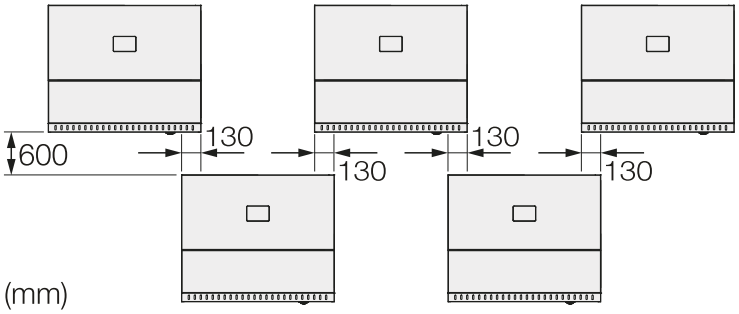




50/60



5.4 Installing the inverter

CAUTION

Danger of injury!

The inverter is very heavy.

- Do not lift or transport the inverter alone. Involve at least one or two other persons to avoid injury.

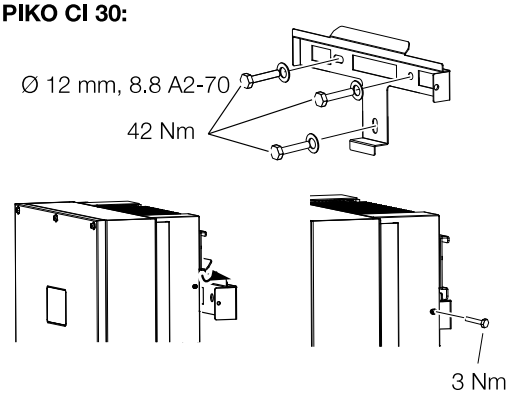
POSSIBLE DAMAGE

Damage to the inverter

If the wrong fastening material is used, the inverter may fall down.

- Install the inverter using suitable fastening material, which is suitable for the substrate.

PIKO CI 30:



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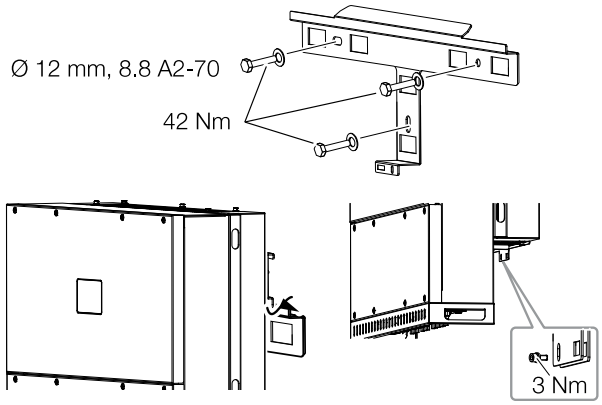
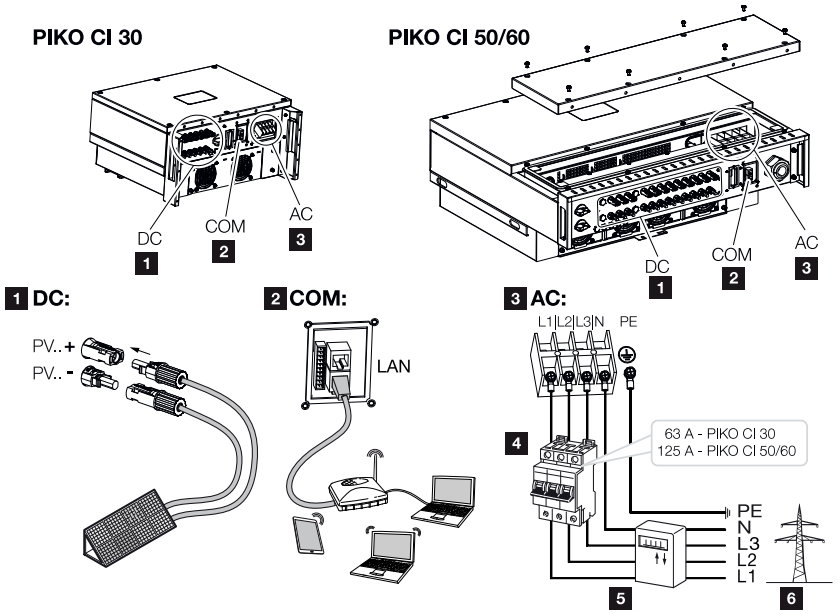


1. Install the inverter on a solid wall or on a stand. Observe the prescribed distances and other specifications.
2. Install the bracket on the base.
3. Lift the inverter onto the bracket.
4. Make sure that the inverter is correctly seated and cannot slip off the bracket.
5. Install the lock screw.

✓ The inverter is installed.

6. Electrical connection

6.1 Overview



Inverter connections

1 Connections for PV modules
2 Communication connections
3 AC connection
4 Line circuit breaker
5 Energy meter (e.g.)
6 Public grid

6.2 Cable specification

Grid connection AC

Select the conductor cross-section according to the rated output current and the type of routing.

INFO

For outdoor installation, use UV-resistant cable. Alternatively, lay the cable protected from solar radiation.

The 4-wire AC connection (3L/PE without N) is only possible in symmetrical networks.

Take into account necessary reduction factors for ambient temperature and accumulation (when laying several cables without spacing).

Example: Ambient temperature 40 °C: Reduction factor 0.87 (according to DIN VDE 0100-520 / HD 60364-5-52).

Cable type	Cable length
Copper conductor 4-wire (3L/PE without N) or 5-wire (3L/N/PE)	max. 200 m

	Wire cross-section	Cable diameter
30	10 - 25 mm^2	24 - 32 mm
50 / 60	30 - 50 mm^2	25 - 40 mm

Additional PE connection

	Wire cross-section
30	≥ 16 mm^2
50 / 60	≥ 35 mm^2

DC PV connections

Cable type	Wire cross-section	Cable diameter
Solar cable e.g. PV1-F	4 - 6 mm^2	6 - 8 mm

6.3 Connecting mains cable

DANGER

Risk of death due to electrical shock and discharge!

De-energise device and secure against being switched on again.

CAUTION

Risk of fire due to overcurrent and heating of the mains cable

If mains cables are too small, they can heat up and cause a fire.

- Use a suitable cross-section.
- Install line circuit breaker to secure against overcurrent.

IMPORTANT INFORMATION

Make sure that the phases of the AC terminal and in the mains supply match.

This product may generate a direct current in the outer protective earthing conductor. If protective residual current devices (RCD) or residual current monitoring devices (RCM) are used, only type B ≥ 300 mA RCDs or RCMs are permitted on the AC side.

If type A RCD compatibility is activated in the device, a type A RCD can also be used.

INFO

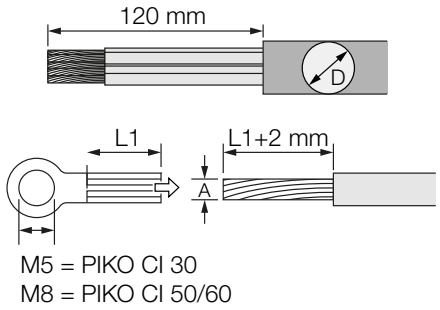
Whenever working on the inverter, only ever use insulated tools to prevent short-circuits.

INFO

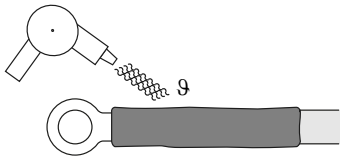
Make sure that the phases of the AC terminal and in the mains supply match.

The 4-wire AC connection (3L/PE without N) is only possible in symmetrical networks.

1. Disconnect the power supply from the mains.
2. Secure AC connection against being switched on again.
3. Switch the DC switch on the inverter to ***OFF***.
4. Correctly lay the mains cable from the power distributor to the inverter.
5. Install the necessary safety devices – line circuit breakers, residual current circuit breakers – in the mains cable.



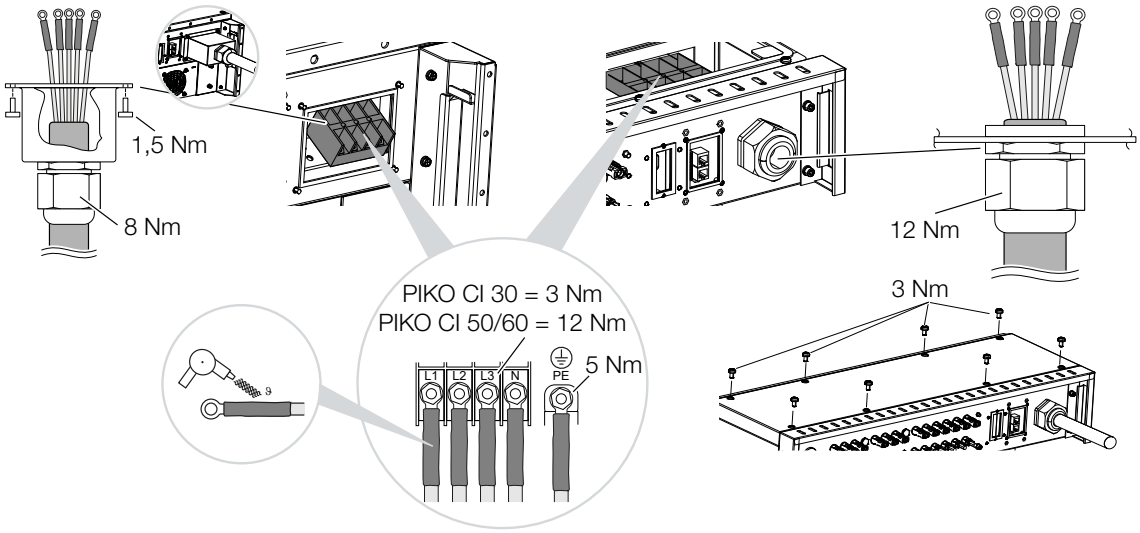
	A	D
PIKO CI 30	10 - 25 mm²	22 - 32 mm
PIKO CI 50/60	30 - 50 mm²	35 - 40 mm



6. Strip 120 mm of insulation off the mains cable.
7. Fit suitable heat-shrinkable sleeves onto the wires. Strip insulation off ends of conductors and crimp the cable ring lug onto the ends of conductors.
8. 30:
   Remove connection cover screws.
   Lead mains cable through connection cover.

   50/60:
   Remove screws on the bottom cover and take off the cover.
   Lead the mains cable through the feed-through into the terminal compartment of the inverter.

   Connect the mains cable to the AC terminal according to the labelling.

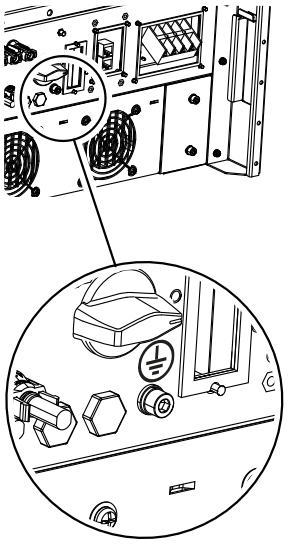


9. 30:
   Attach connection cover to AC connection and screw it tight.
   Tightening torque: 1.5 Nm.

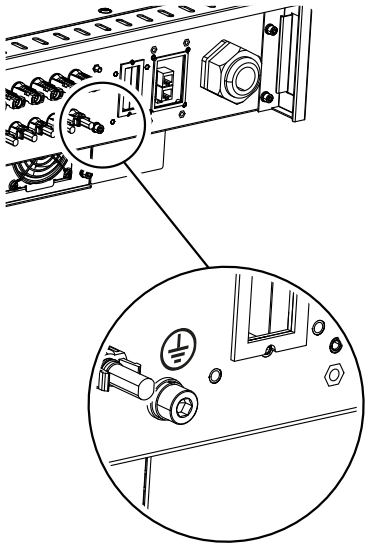
50/60:
Close the inverter and screw the cover tight.
Tightening torque: 3 Nm.

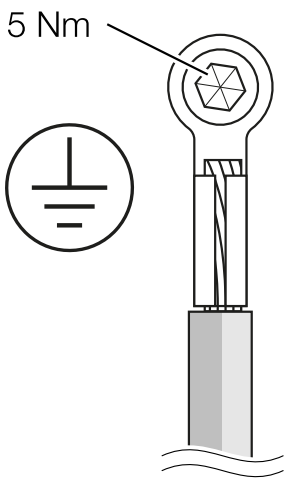
10. Seal the mains cable with sealing ring and union nut. Tighten the union nut.
11. In countries in which a second PE connection is required, connect this at the marked place on the housing (outside).

PIKO CI 30:



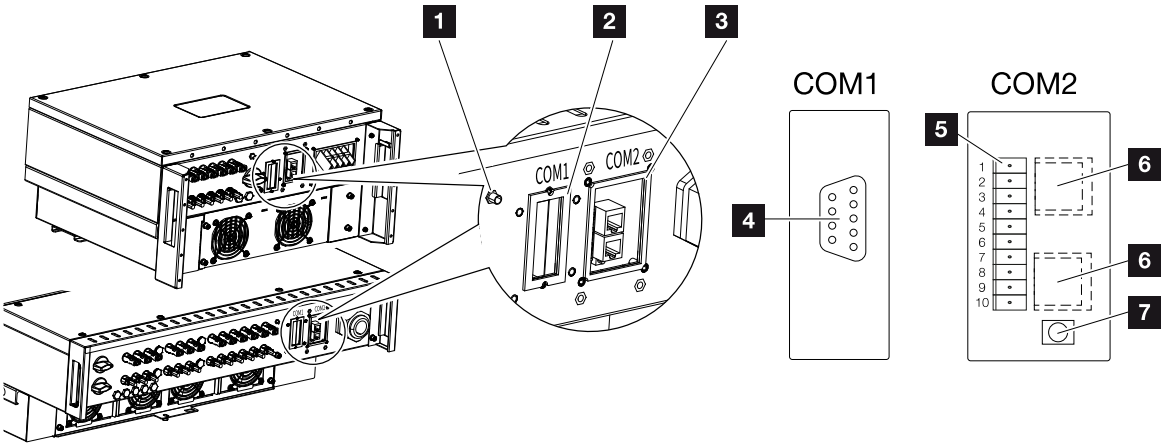
PIKO CI 50/60:





✓ Mains cable connected

6.4 Overview of communication connections

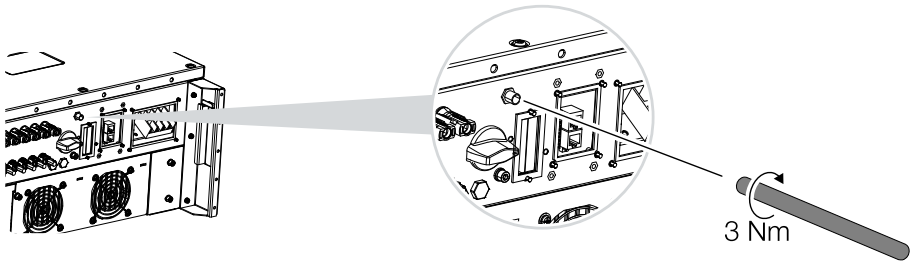


1 WiFi antenna
2 COM1 connection panel
3 COM2 connection panel
4 Socket for communication module
5 Connector strip for communication interface with RS485 interface, digital inputs for ripple control receiver and grid and system protection connection
6 LAN connection
7 Reset button for commissioning address (WLAN)

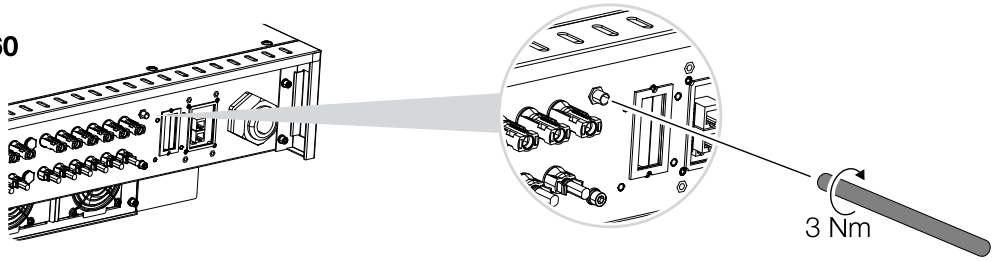
Item	Designation	Pin	Explanation
5	Communication interface	1	GND (ground) for Remote and DI1…4
		2	Remote: Central system protection
		3	DI4: Input 4
		4	DI3: Input 3
		5	DI2: Input 2
		6	DI1: Input 1
		7	RS485/Modbus interface B (input, data –)
		8	RS485/Modbus interface A (input, data +)
		9	RS485/Modbus interface B (output, data –)
		10	RS485/Modbus interface A (output, data +)
6	RJ45 terminal	–	LAN connection 1
		–	LAN connection 2

6.5 Mounting WiFi antenna

PIKO CI 30



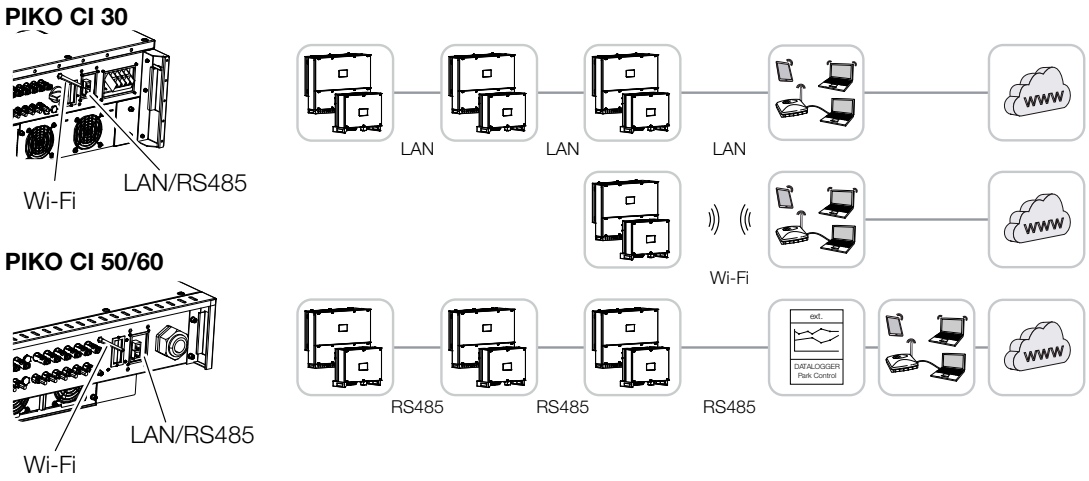
PIKO CI 50/60



1. Remove protective cap from connection thread on inverter.
2. Screw the supplied WiFi antenna onto the stud bolt.
   Tightening torque: 3 Nm

✓ WiFi antenna mounted.

6.6 Types of communication



The inverter has interfaces for LAN, RS485 Modbus and WiFi. There are therefore various possibilities for networking one or more inverters with each other and controlling them.

You can also combine different types of connections with each other. In a solar power plant, for example, it may be useful to network several inverters in the field in a wired manner (LAN/Ethernet or RS485), and to produce the connection to the local communication hub wirelessly via a radio link.

6.6.1 LAN / Ethernet

INFO

Connecting the Ethernet cable to a router integrates the inverter into your own network and the inverter can then be contacted by all computers incorporated in the same network.

When networking via Ethernet, the inverter can be connected to the local network or the Internet. Use the RJ45 connection in the COM2 connection panel for this purpose. Computers, routers, switches and/or hubs or other devices can be connected to the network. **Communication via LAN, Page 66**

6.6.2 RS485 Modbus

Modbus is an industry standard for networking industrial measurement and control systems. A data logger or energy meter, for example, can be connected via this connection to control the connected inverters. **Communication via RS485, Page 67**

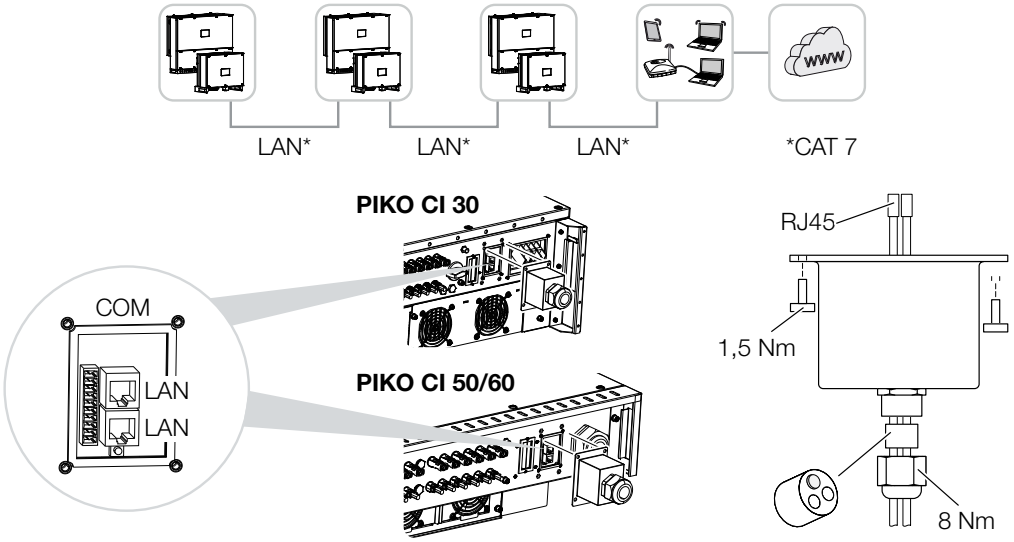
6.6.3 WLAN / WiFi

INFO

At a later date, there are also plans for a connection from inverter to inverter.

Via WiFi, one or more inverters can be integrated into the local WLAN network, e.g. via a router or hub. **Communication via WiFi, Page 69**

6.7 Communication via LAN



Connecting inverter to LAN/Ethernet cable

INFO

Use an Ethernet cable of category 7 (Cat 7, FTP) with a maximum length of 100 m as a network cable (Ethernet 10BaseT, 10/100 MBit/s).

1. Lead the Ethernet cable through the COM2 cover and seal it with sealing ring and union nut.
2. Tighten union nut to the prescribed torque.
   Tightening torque: 8 Nm (M25).
3. Connect Ethernet cable to one of the LAN sockets in the COM2 connection panel.
   The second LAN socket is used to continue the network connection to further inverters.
4. Connect LAN/Ethernet cable to the computer or router.

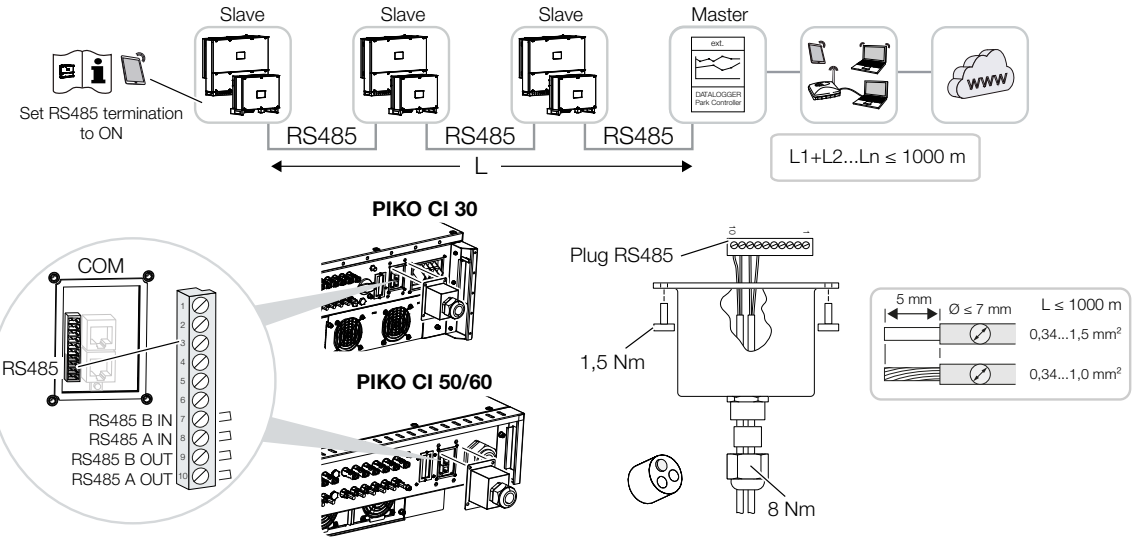
INFO

After commissioning, the settings for the Ethernet connection can still be configured in the KOSTAL PIKO CI Conf App.

This includes, for example, the setting for IP mode, in which acquisition of an automatic IP address can be set.

✓ LAN cable connected

6.8 Communication via RS485



Connecting the RS485 connection

INFO

Requirements of communication cable:

Wire cross-section from 0.34 to 1.5 mm² (rigid) or 0.34 to 1.0 mm² (flexible)

Bus length max. 1000

Length of stripped insulation approx. 5 mm

1. Lead the RS485 cable through the COM2 cover and seal it with sealing ring and union nut.
2. Tighten union nut to the prescribed torque.
   Tightening torque: 8 Nm (M25).
3. Fit RS485 cable to the supplied plug (RS485 x in) and plug it into the interface in the COM2 connection panel. RS485 out is used to continue the network connection to further inverters.
4. Connect RS485 cable to external device (e.g. data logger).

✓ RS485 cable connected.

After commissioning

INFO

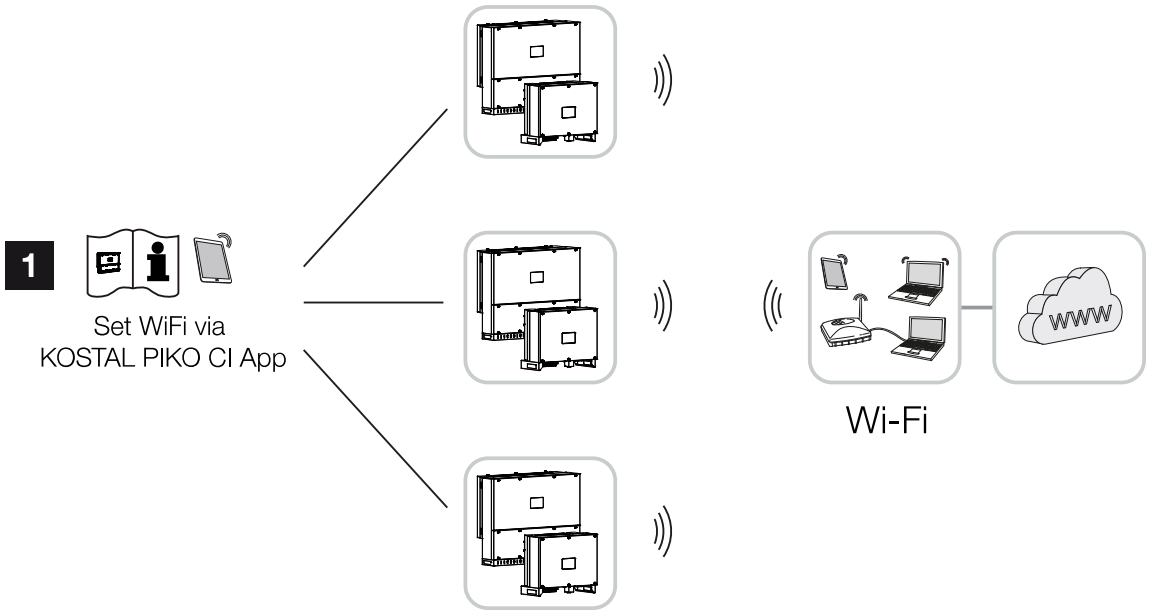
After commissioning, the settings for the RS485 connection still have to be configured in the KOSTAL PIKO CI Conf App.

This includes, for example, setting the transmission speed.

1. The RS485 termination of the last inverter must be set to ***ON*** in the KOSTAL PIKO CI Conf App. This can be done under ***Settings > Communication settings > RS485 Settings > Terminal resistor***.
2. A different Modbus address must be assigned to each inverter using the KOSTAL PIKO CI Conf App.
   For this purpose, go to ***Settings > Communication settings > RS485 settings > Modbus address***.
3. As an option, it is also possible to configure a park controller using the KOSTAL PIKO CI Conf App.
   For this purpose, go to ***Settings > Inverter settings > Power adaptation/control > Park controller***.

✓ Settings configured

6.9 Communication via WiFi



1 WiFi settings

Connecting inverters via WiFi

INFO

If you have forgotten the WLAN password, you can reset it to the default value ***12345678*** using the reset button under the cover for COM2.

1. The WiFi settings must be configured for each inverter in the KOSTAL PIKO CI Conf App.
2. To do this, go to the following menu item and configure the settings:
   Settings > Communication settings > WLAN settings > Select WLAN connection

✓ Inverter connected via WiFi.

6.10 Connecting the KOSTAL Smart Energy Meter

Connecting a allows generation values and consumption values to be recorded or the output power of the inverter into the public grid to be controlled. In addition, the can send data to the . To do this, the must be set up in addition to the in the same system in the .

The energy meter is installed in the meter cabinet or in the main distribution board. Please also refer to the operating documentation of the .

INFO

Only energy meters that have been approved for this inverter may be used.

You will find an up-to-date list of the approved energy meters on our website in the download area for the product.

The following energy meters are currently approved:

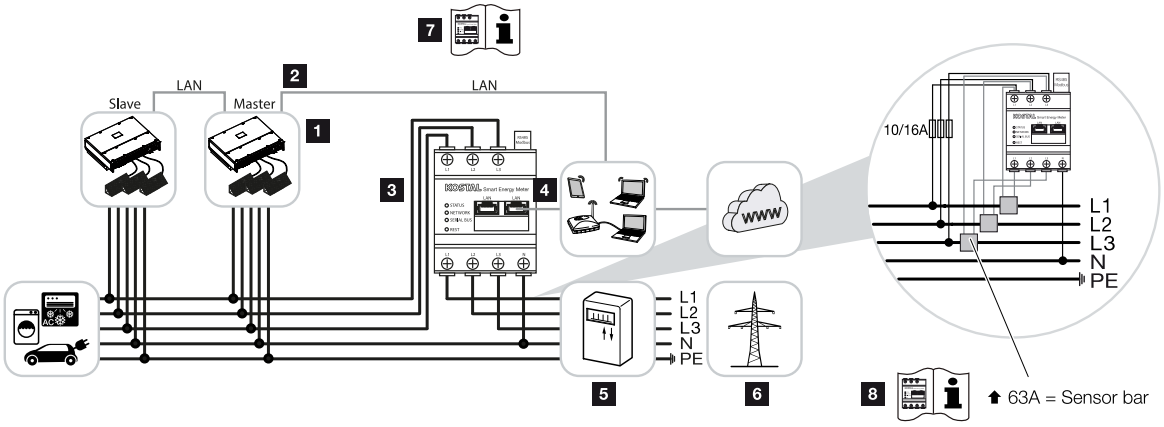
-

The can be connected to in two different ways. The connection method must then be set in the KOSTAL PIKO CI Conf App.

- **Communication connection for KOSTAL Smart Energy Meter via LAN, Page 71**
- **Communication connection for KOSTAL Smart Energy Meter via RS485, Page 74**

6.10.1 Communication connection for KOSTAL Smart Energy Meter via LAN

Wiring diagram for energy meter LAN - grid connection



1 Inverter
2 LAN interface for inverter
3
4 LAN interface for
5 Feed meter
6 Public grid
7 Read the operating manual of the .
8 Use a current transformer for currents above 63 A. Read the operating manual of the .

Connecting the

DANGER

Risk of death due to electrical shock and discharge!

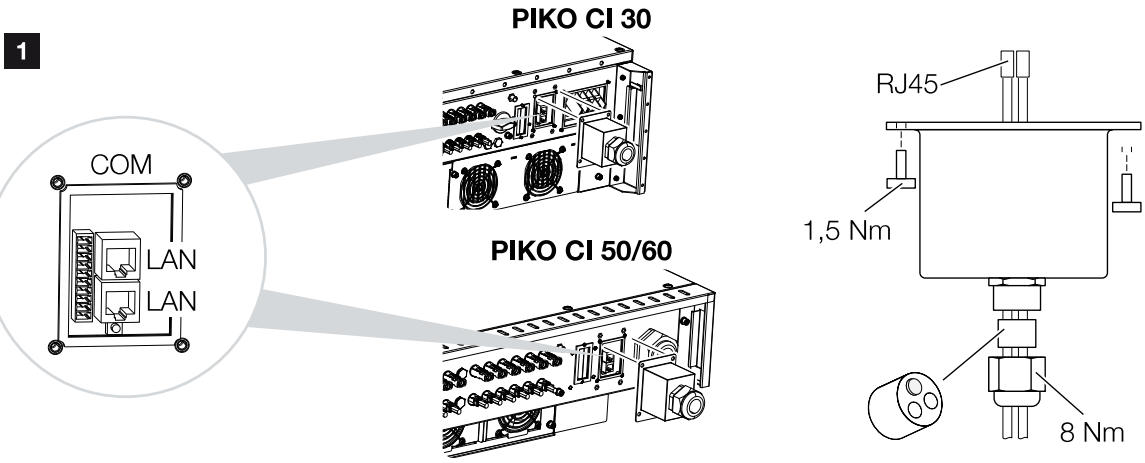
De-energise all devices and secure them against being switched on again.

INFO

Use an Ethernet cable of category 7 (Cat 7, FTP) with a maximum length of 100 m as a network cable (Ethernet 10BaseT, 10/100 MBit/s).

1. De-energise the mains cable.
2. Install the as shown in the illustrations at the grid connection point in the house grid.

3. Feed the Ethernet cable on the inverter through the COM2 cover and seal it with sealing ring and union nut. Tighten union nut to the prescribed torque.
   Tightening torque: 8 Nm (M25).



4. Connect Ethernet cable to one of the LAN sockets in the COM2 connection panel. The second LAN socket is used to continue the network connection to further inverters.
5. Mount COM2 cover cap.
   Torque: 1.5 Nm
6. Connect the other end of the Ethernet cable to the router.
7. Establish a LAN connection from the to the router.

✓ Inverter connected to KSEM.

After commissioning

After commissioning, the following settings still have to be configured in the KOSTAL PIKO CI Conf App.

INFO

If power limitation is carried out in combination with the , power limitation via a ripple control receiver (RCR) is not possible and must be deactivated.

Configuring settings using the KOSTAL Smart Energy Meter user interface

1. In the , set ***Modbus settings > Modbus TCP > Slave (Enable TCP Slave)*** to ***ON***.
2. To make the home consumption visible in the , in the set ***Inverter > Solar portal > Activate solar portal*** to ***ON***.

In this variant, the works as a slave and sends data to the inverter.

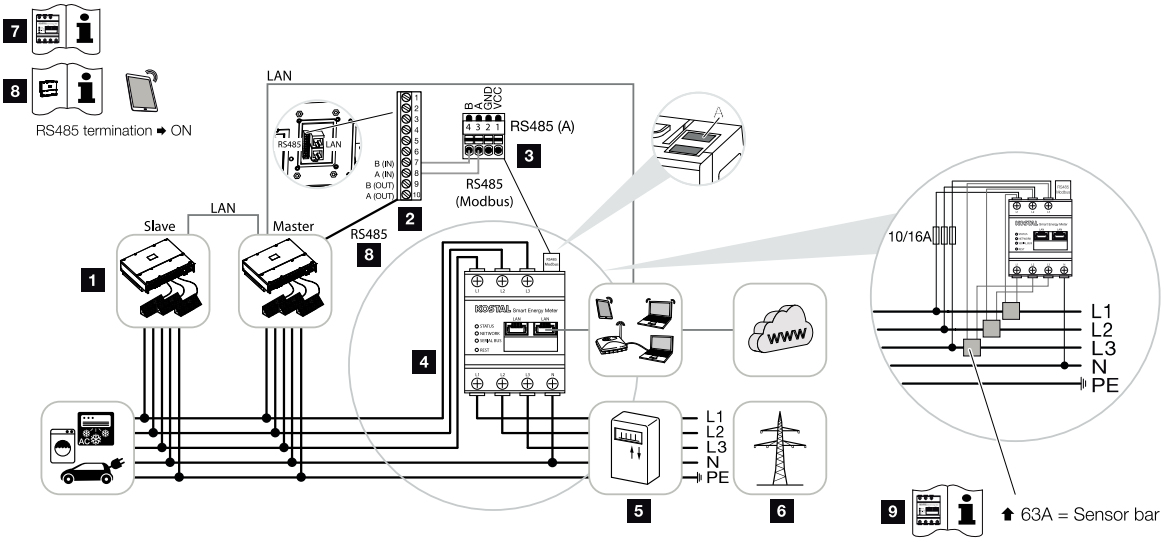
Configuring settings using the KOSTAL PIKO CI App

1. Use of the (KSEM) must be configured in the KOSTAL PIKO CI Conf App on the ***master*** inverter.
   For this purpose, go to ***Settings > Inverter settings > Power adaptation/control > KSEM management > Activate/deactivate KSEM > Activate***.
2. The connection between KSEM and inverter is set by going to ***Settings > Inverter settings > Power adaptation/control > KSEM management > Connection between KSEM and master inverter > LAN***.
3. The installation position is set by going to ***Settings > Inverter settings > Power adaptation/control > KSEM management > Sensor position > Grid connection point***.
4. The KSEM modbus address is set by going to ***Settings > Inverter settings > Power adaptation/control > KSEM management > Energy meter modbus address > 1*** (standard value in KSEM).
5. A power limitation of the grid feed-in (e.g. to 70%) must be entered in watts on the ***Master*** inverter.
   The active power limitation is entered by going to ***Settings > Inverter settings > Power adaptation/control > KSEM management > Limitation of the active power to (W)***.
6. The KSEM IP address is entered at ***Settings > Inverter settings > Power adaptation/control > KSEM management > Energy meter IP address > KSEM IP address***.
7. All other inverters connected to the master inverter are configured as ***slaves***. Do not configure any further settings in slave inverters.

✓ Inverters configured.

6.10.2 Communication connection for KOSTAL Smart Energy Meter via RS485

Wiring diagram for energy meter RS485 – grid connection



1 Inverter
2 RS485 interface for inverter
3 RS485 interface for
4
5 Feed meter
6 Public grid
7 Read the operating manual of the .
8 Set RS485 termination in the KOSTAL PIKO CI Conf App to ***ON***
9 Use a current transformer for currents above 63 A. Read the operating manual of the .

Connecting the

DANGER

Risk of death due to electrical shock and discharge!

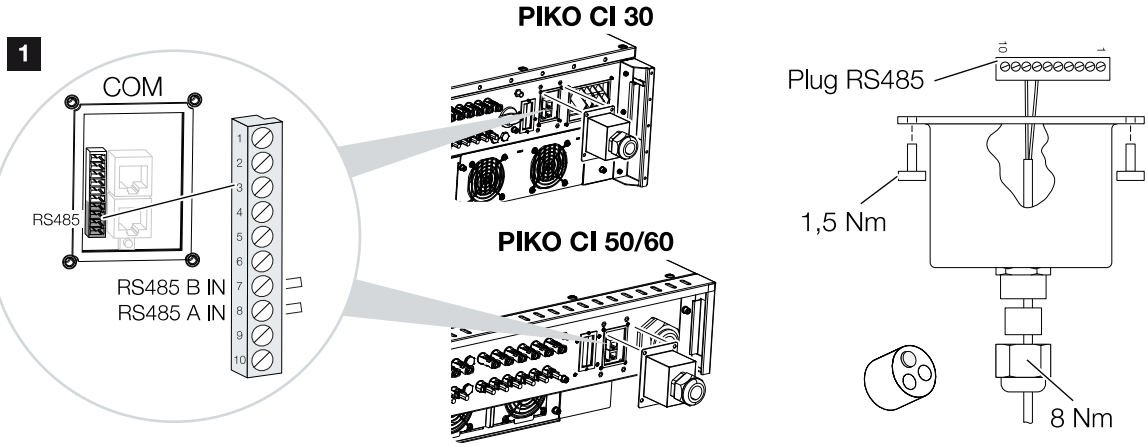
De-energise all devices and secure them against being switched on again.

INFO

Requirements of communication cable:

- Wire cross-section from 0.34 to 1.5 mm² (rigid) or 0.34 to 1.0 mm² (flexible)
- Bus length max. 1000 m
- Length of stripped insulation approx. 5 mm

1. De-energise the mains cable.
2. Install the as shown in the illustrations at the grid connection point in the house grid.
3. Correctly route the communication cable from the inverter to the control cabinet and connect to the following the manufacturer's wiring diagram.
4. Feed the communication cable through the cover of the inverter for COM2 connection panel. Seal connection with sealing ring and union nut.



5. Connect the communication cable to the plug connector for the communication interface. Note the pin assignment.
   Tightening torque: 0.2 Nm.
6. Connect the plug connector on the inverter to communication interface in COM2 connection panel.
7. Establish a LAN connection from the and the inverter to the Internet.

✓ Inverter connected to KSEM.

After commissioning

After commissioning, the following settings still have to be configured in the KOSTAL PIKO CI Conf App.

This includes elements, such as the RS485 connection setting.

INFO

If power limitation is carried out in combination with the , power limitation via a ripple control receiver (RCR) is not possible and must be deactivated.

Configuring settings using the KOSTAL Smart Energy Meter user interface

1. In the , go to ***Modbus settings*** and select the PIKO CI to the RS485 A interface. Please refer to the operating manual of the .

In this variant, the works as a slave and sends data to the inverter.

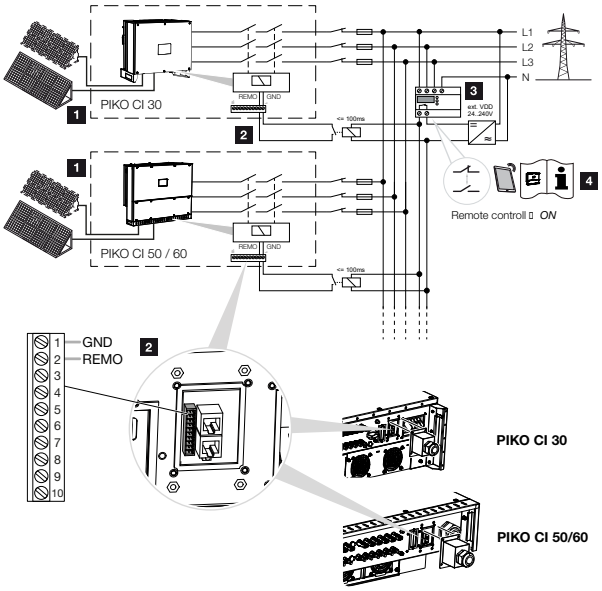
Configuring settings using the KOSTAL PIKO CI App

1. On the ***master*** inverter to which the RS485 communication cable is connected, set RS485 termination in the KOSTAL PIKO CI Conf App to ***ON***.
   This can be done under ***Settings > Communication settings > RS485 settings > Terminal resistor***.
2. Use of the (KSEM) must be configured in the KOSTAL PIKO CI Conf App on the ***master*** inverter.
   For this purpose, go to ***Settings > Inverter settings > Power adaptation/control > KSEM management > Activate/deactivate KSEM > Activate***.
3. The connection between KSEM and inverter is set by going to ***Settings > Inverter settings > Power adaptation/control > KSEM management > Connection between KSEM and master inverter > RS485***.
4. The installation position is set by going to ***Settings > Inverter settings > Power adaptation/control > KSEM management > Sensor position > Grid connection point***.
5. The KSEM modbus address is set by going to ***Settings > Inverter settings > Power adaptation/control > KSEM management > Energy meter modbus address > 1*** (standard value in KSEM).
6. A power limitation of the grid feed-in (e.g. to 70%) must be entered in watts on the ***Master*** inverter.
   The active power limitation is entered by going to ***Settings > Inverter settings > Power adaptation/control > KSEM management > Limitation of the active power to (W)***.
7. All other inverters connected to the master inverter by LAN are configured as ***slave***.
   Do not configure any further settings in slave inverters.

✓ Inverters configured.

6.11 Connecting central grid and system protection

Central grid and system protection with circuit breaker



1 Inverter

2 Connection

3 Grid and system protection

Switch closed: Feed-in

Switch open: Feed-in prevented

4 Activate the grid and system protection using the KOSTAL PIKO CI Conf App.

Central grid and system protection is required in some countries. This monitors the voltage and frequency in the grid and in the event of a fault, shuts down the photovoltaic systems by means of a circuit breaker.

If your energy supplier requires central grid and system protection for your system, install an external monitoring device, which switches off the inverter via a normally open or normally closed contact. An additional circuit breaker is not necessary because of the internal switches in the inverter.

Connection

DANGER

Risk of death due to electrical shock and discharge!

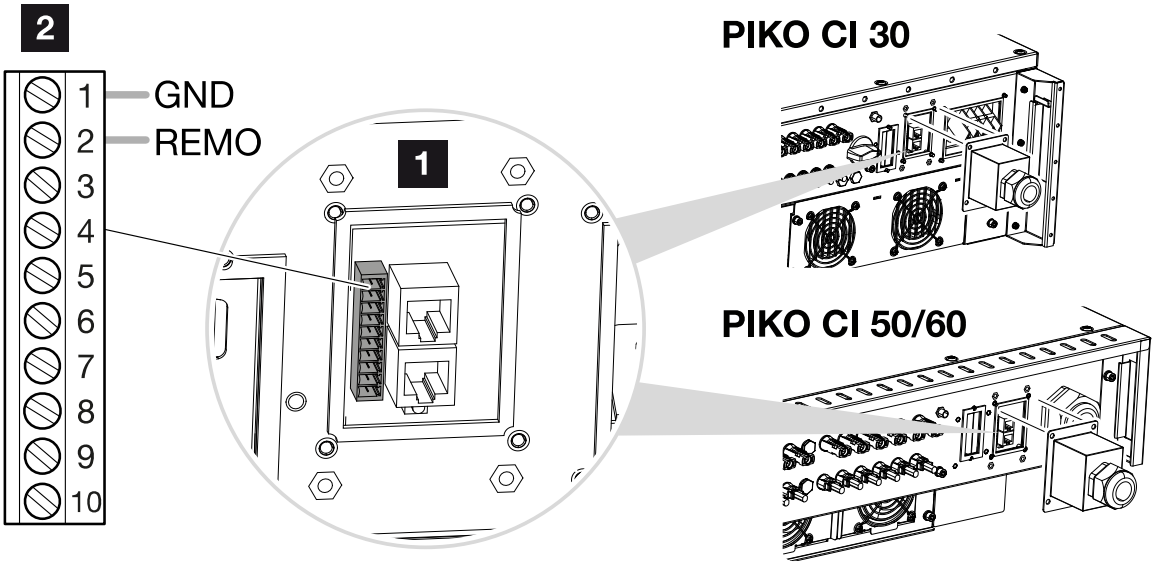
De-energise all devices and secure them against being switched on again.

INFO

Requirements of communication cable:

- Wire cross-section from 0.34 to 1.5 mm^2 (rigid) or 0.34 to 1.0 mm^2 (flexible)
- Length max. 30
- Length of stripped insulation approx. 5 mm

1. De-energise the mains cable.
2. Mount the monitoring device in the control cabinet or power distributor.
3. Correctly route the communication cable from the inverter to the control cabinet and connect following wiring diagram provided by manufacturer.
4. Pass the communication cable through the cover for the COM2 connection panel. Seal connection with sealing ring and union nut.
5. Connect the communication cable to the plug connector for the communication interface. Please note the pin assignment.
   Tightening torque: 0.2 Nm.
6. Connect plug connector on inverter to communication interface in COM2 connection panel.



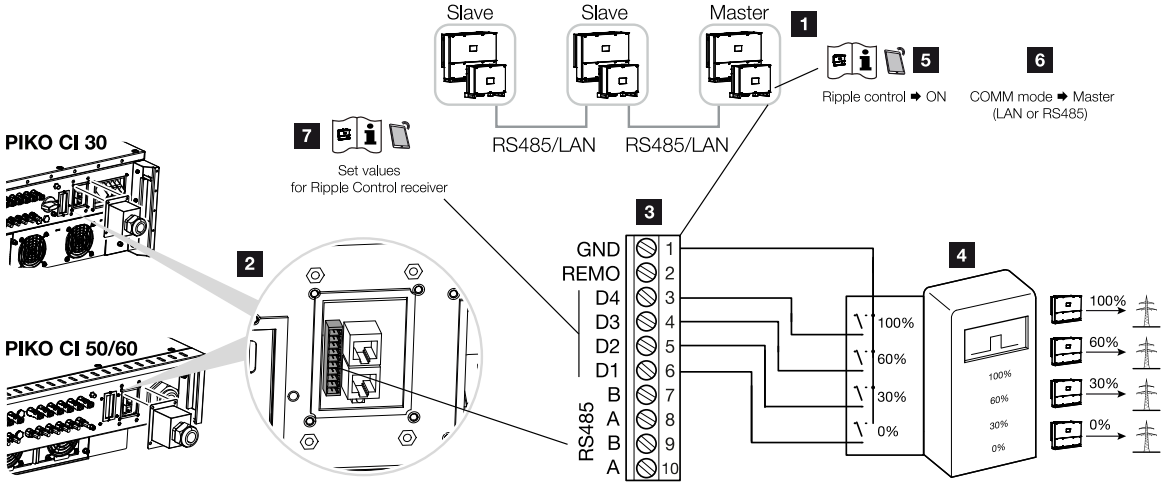
1 COM2 connection panel
2 Communication interface
3 Plug connector

After commissioning

1. After commissioning, the function must be activated in each inverter using the KOSTAL PIKO CI Conf App.
   This can be activated under ***Settings > Basic settings > External shutdown > ON***.

✓ Inverter set up for grid and system protection function.

6.12 Connecting ripple control receiver



1	Inverter to which the ripple control receiver is connected
2	COM2 connection panel
3	Plug for communication interface
4	Ripple control receiver
5	Activate ripple control receiver in the KOSTAL PIKO CI Conf App
6	Activate communication mode (LAN or RS485) in the KOSTAL PIKO CI Conf App
7	Activate switching values for ripple control receivers in the KOSTAL PIKO CI Conf App

Several energy supply companies offer the owners of PV systems the possibility of regulating their system with variable active power control and thus increasing the feed-in into the public grid to up to 100%.

INFO

In some applications, the digital may be regarded as a cost-effective alternative to the ripple control receiver. Here the feed-in may well be limited by the energy supply company, but the inverter controls the flow of energy (self-consumption in house grid and feed-in to the public grid) in such a way that the self-produced energy is not lost or loss is kept to an absolute minimum.

Ask your energy supply company or installer what application rule applies to you or whether there is an alternative (e.g. smart meter) better suited to you.

If a ripple control receiver is already connected to another KOSTAL inverter in your home network, you can use the control signals of this ripple control receiver.

Connection

DANGER

Risk of death due to electrical shock and discharge!

De-energise all devices and secure them against being switched on again.

INFO

Requirements of communication cable:

- Wire cross-section from 0.34 to 1.5 mm^2 (rigid) or 0.34 to 1.0 mm^2 (flexible)
- Length max. 30
- Length of stripped insulation approx. 5 mm

1. De-energise the mains cable.
2. Fit ripple control receiver in control cabinet or power distributor.
3. Correctly route the communication cable from the inverter to the control cabinet and connect following wiring diagram provided by manufacturer.
4. Pass the communication cable through the cover for the COM2 connection panel. Seal connection with sealing ring and union nut.
5. Connect the communication cable to the plug connector for the communication interface. Please note the pin assignment.
   Tightening torque: 0.2 Nm.
6. Connect plug connector on inverter to communication interface in COM2 connection panel.

✓ The ripple control receiver is connected.

After commissioning

1. Open the KOSTAL PIKO CI Conf App and connect to the inverter to which the ripple control receiver is connected.
2. Activate the ripple control receiver in the KOSTAL PIKO CI Conf App by going to ***Settings > Inverter settings > Power adaptation/control > Ripple control receiver (RCR) > Activate ripple control receiver > ON***.

3. Configure the connection type between master and slave inverter (LAN or RS485) on the master inverter by going to ***Settings > Inverter settings > Power adaptation/ control > Ripple control receiver (RCR) > Connection between master inverter and slave > LAN*** or ***RS485***
4. Set switching values for the ripple control receiver by going to ***Settings > Inverter settings > Power adaptation/control > Ripple control receiver (RCR) > RCR active power / RCR reactive power / RCR power factor***.

✓ The ripple control receiver has been configured.

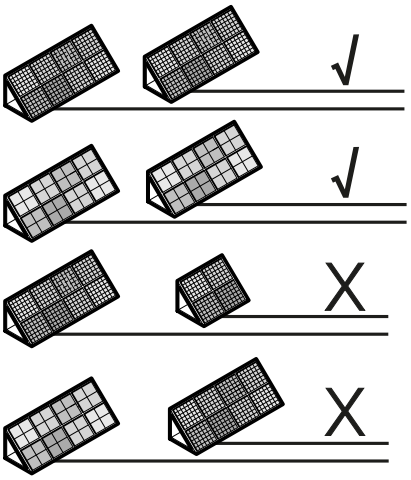
6.13 Closing the inverter

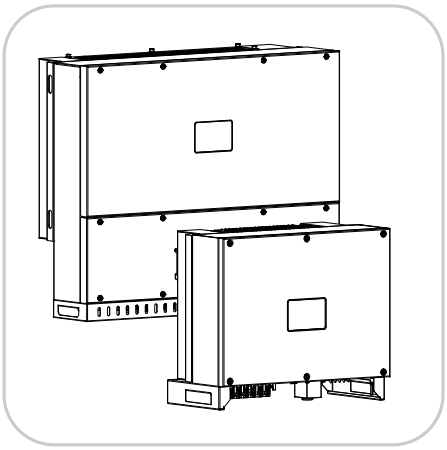
1. Tighten all cable glands and check that they are properly sealed.
2. Check the fit of connected wires and braids.
3. Remove any foreign objects (tools, wire cuttings, etc.) from the inverter.
4. Mount the cover and screw it tight.
5. Mount the cover on the 50 / 60 and screw it tight (1.5 Nm).

6.14 Connecting PV modules

Possible PV modules

per MPP-Tracker





Connectable solar modules

When selecting the PV modules to be connected to series inverters, note the following:

- Only connect PV modules according to IEC 61730 Class A.
- Do not ground the PV cables.
- Use suitable cables with the largest possible cross-section for connecting the PV modules!

INFO

Use flexible and tin-plated cables with double insulation according to EN50618.

We recommend a cross-section of 6mm^2. Please observe the specifications of the plug manufacturer and the technical data for the inverter.

- Per MPP tracker:
  - Only connect PV modules of the same type to an MPP tracker, i.e.:
  - same manufacturer,
  - same type,
  - same performance,
  - same size.

Different module types, sizes and connected loads and also a different number of PV modules can be connected to different MPP trackers.

Make sure that the maximum input current (I_{DCmax}) per MPPT and the maximum DC current per DC plug ($I_{Stringmax}$) are not exceeded in the process.

Technical data, Page 153

See also

Technical data [▶ 153]

6.14.1 Solar module connections

DANGER

Risk of death due to electrical shock and discharge!

The PV generators/cables may be live as soon as they are exposed to light.

WARNING

Serious burns due to arcs on the DC side!

During operation, dangerous arcs can occur when pulling or plugging the DC connections.

Before connecting the DC connectors, de-energise the DC side. DC switches must be in the OFF position.

WARNING

Risk of fire due to improper installation!

Incorrectly fitted plugs and sockets may heat up and cause a fire.

During installation, be sure to follow the manufacturer's requirements and manual. Properly mount plugs and sockets.

POSSIBLE DAMAGE

Risk of damage to the inverter due to PV modules connected with the wrong polarity

PV modules connected with the wrong polarity may cause thermal damage to the inverter.

- Measure the DC cables of the PV modules and connect to inverter with the correct polarity.
- Comply with the maximum input current per string for the inverter as stated in the technical data.
- The maximum input current must not be exceeded, even when using Y or T plugs.

Please note the following points before connecting the PV modules:

- Our planning tool should be used to optimally configure the solar modules and achieve the highest possible yields.
- Check the planning and the wiring of the modules for plausibility.
- Measure and record the DC idling voltage and polarity of the PV modules. The idling voltage of the PV modules must be in the voltage range between $U_{DCstart}$ and U_{DCmax}.

	$U_{DCStart}$	U_{DCmax}
30	≥ 250 V	≤ 1000 V
50/60	≥ 250 V	≤ 1100 V

- Make sure that the maximum short-circuit current of the PV modules is less than the permitted value.
- Make sure that the PV modules are not short-circuited.
- Make sure that the inverter is closed when the PV modules are connected.
- Make sure that when connecting several inverters there is no cross-connection of the PV modules.

Failure to observe these requirements will render any warranty, guarantee or other liability offered by the manufacturer null and void.

6.14.2 Preparing PV connector

The inverter uses DC plug connectors of the Helios H4 type from Amphenol.

During installation, use the DC plug connectors supplied with the inverter. Using incompatible positive and negative metal contacts and DC plug connectors may have serious consequences. Any resultant damage to the device is not covered by warranty.

- During installation, it is essential that the current specifications of the manufacturer are observed.
  Information about the Amphenol installation specification is available from:
  www.amphenol.com
- Only use installation tools from the manufacturer.
- When mounting the sockets and plugs, ensure that the solar modules have the correct polarity. PV modules connected with the wrong polarity may cause thermal damage to the inverter.

6.14.3 Installing PV plug connectors

DANGER

Risk of death due to electrical shock and discharge!

Disconnect the DC cables by interrupting the connections to the PV modules.

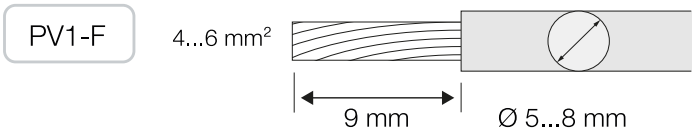
If it is not possible to disconnect the DC cables, observe the rules for working under voltage.

Use personal protective equipment, hard hat, visor or goggles, protective suit, insulating gloves.

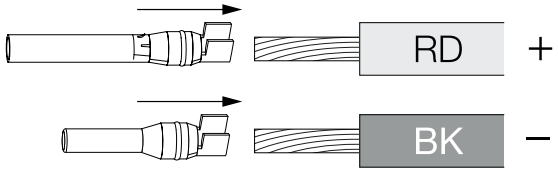
Use an insulating protective mat as an underlay.

Only use insulated tools.

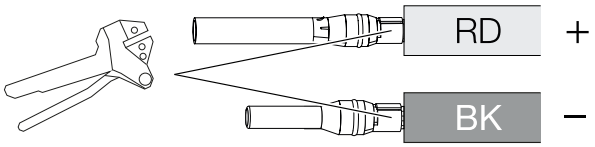
1. Strip approx. 9 mm of insulation off the solar cable.



2. Insert stripped wire end into crimped neck of contact.



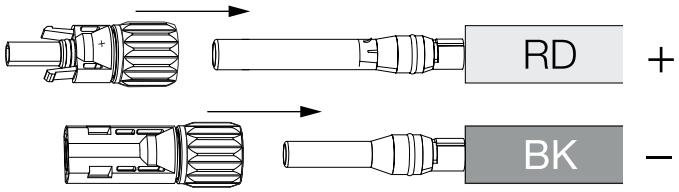
3. Crimp the contact with a suitable crimping tool.



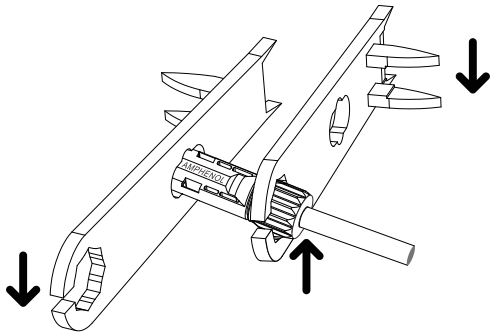
4. Insert contact into plug connector until the contact clicks into place tangibly and audibly.

INFO

Once snapped into the housing, the contact cannot be removed from the plug connector.



5. Tighten nut on plug connector (3 Nm).



✓ PV connector installed

6.14.4 Selecting PV inputs

If the inverter's DC inputs are not fully occupied, distribute the input assignment in accordance with the following tables: Make sure that the maximum input current (I_{DCmax}) per MPPT and the maximum DC current per DC input ($I_{Stringmax}$) are not exceeded in the process:

INFO

Only connect PV modules of the same type to an MPP tracker, i.e.:

- same manufacturer,
- same type,
- same performance,
- same size.

The following tables apply from article number:

- 30: 10534223
- 50: 10534084
- 60: 10534085

Maximum input current

	U_{DCmax}	I_{DCmax} per MPP tracker	$I_{Stringmax}$
30	≤ 1000 V	≤ DC 1-3: 40.5 A ≤ DC 4-6: 40.5 A	≤ 14 A
50/60	≤ 1100 V	≤ DC 2-4: 39 A ≤ DC 6-8: 39 A ≤ DC 10-11: 26 A ≤ DC 13-14: 26 A	≤ 18 A
50/60	≤ 1100 V	≤ DC 2-4: 39 A ≤ DC 6-8: 39 A ≤ DC 9-11: 39 A ≤ DC 12-14: 39 A	≤ 18 A

DC connection assignment for 30 with article number 10534223

	Connected PV strings	MPP trackers	
		1	2
		Used DC input	
30	1	1…6	
	2	1	4
	3	1, 2	4
	4	1, 2	4, 5
	5	1, 2, 3 (1)	4, 5
	6	1, 2, 3 (1)	4, 5, 6 (1)

(1) With 3 DC strings connected, $I_{Stringmax}$ ≤ 13.5 A per DC input.

DC connection assignment for 50 with article number 10534084 and 60 with article number 10534085

	Connected PV strings	MPP trackers			
		1	2	3	4
		Used DC input			
50/60	1	2…10/12			
	2	2	6		

	Connected PV strings	MPP trackers			
		1	2	3	4
		Used DC input			
	3	2	6	10	
	4	2	6	10	13
	5	2, 3	6	10	13
	6	2, 3	6, 7	10	13
	7	2, 3	6, 7	10, 11 (2)	13
	8	2, 3	6, 7	10, 11 (2)	13, 14 (2)
	9	2, 3, 4 (1)	6, 7	10, 11 (2)	13, 14 (2)
	10	2, 3, 4 (1)	6, 7, 8 (1)	10, 11 (2)	13, 14 (2)
60	11	2, 3, 4 (1)	6, 7, 8 (1)	9, 10, 11 (1)	12, 13 (2)
	12	2, 3, 4 (1)	6, 7, 8 (1)	9, 10, 11 (1)	12, 13, 14 (1)

(1) With 3 DC strings connected, $I_{Stringmax} \leq 13$ A per DC input.

(2) If 2 DC strings are connected to the 50, then $I_{Stringmax}$ must be ≤ 13 A per DC input.

The following tables apply to article numbers:

- 30: 10523267
- 50: 10523268
- 60: 10523269

Maximum input current

	U_{DCmax}	I_{DCmax} per MPP tracker	$I_{Stringmax}$
30	≤ 1000 V	≤ DC 1-3: 37.5 A ≤ DC 4-6: 37.5 A	≤ 14 A
50/60	≤ 1100 V	≤ DC 2-4: 33 A ≤ DC 6-8: 33 A ≤ DC 10-11: 22 A ≤ DC 13-14: 22 A	≤ 14 A

	U_{DCmax}	I_{DCmax} per MPP tracker	$I_{Stringmax}$
50/60	≤ 1100 V	≤ DC 2-4: 33 A ≤ DC 6-8: 33 A ≤ DC 9-11: 33 A ≤ DC 12-14: 33 A	≤ 14 A

DC connection assignment for 30 with article number 10523267

	Connected PV strings	MPP trackers	
		1	2
		Used DC input	
30	1	1…6	
	2	1	4
	3	1, 2	4
	4	1, 2	4, 5
	5	1, 2, 3 (1)	4, 5
	6	1, 2, 3 (1)	4, 5, 6 (1)

(1) With 3 DC strings connected, $I_{Stringmax}$ ≤ 12.5 A per DC input.

DC connection assignment for 50 with article number 10523268 and 60 with article number 10523269

	Connected PV strings	MPP trackers			
		1	2	3	4
		Used DC input			
50/60	1	2…10/12			
	2	2	6		
	3	2	6	10	
	4	2	6	10	13
	5	2, 3	6	10	13
	6	2, 3	6, 7	10	13
	7	2, 3	6, 7	10, 11 (2)	13
	8	2, 3	6, 7	10, 11 (2)	13, 14 (2)
	9	2, 3, 4 (1)	6, 7	10, 11 (2)	13, 14 (2)

	Connected PV strings	MPP trackers			
		1	2	3	4
		Used DC input			
	10	2, 3, 4 (1)	6, 7, 8 (1)	10, 11 (2)	13, 14 (2)
60	11	2, 3, 4 (1)	6, 7, 8 (1)	9, 10, 11 (1)	12, 13 (2)
	12	2, 3, 4 (1)	6, 7, 8 (1)	9, 10, 11 (1)	12, 13, 14 (1)

(1) With 3 DC strings connected, $I_{Stringmax} \leq 11$ A per DC input.

(2) If 2 DC strings are connected to the 50, then $I_{Stringmax}$ must be ≤ 11 A per DC input.

6.14.5 Connecting PV modules to the inverter

The DC cables of the solar modules must not be connected to the inverter under load.

DANGER

Risk of death due to electrical shock and discharge!

Switch off the inverter on both the AC and DC sides.

INFO

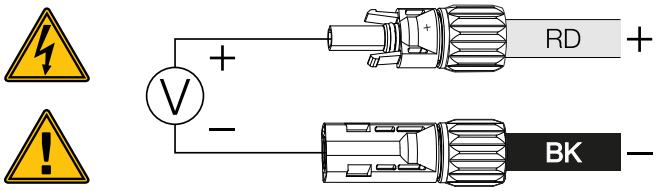
Observe national regulations! In France, in particular, the inverter and the supply lines must be labelled, for example.

The installer is responsible for obtaining and affixing the prescribed markings.

INFO

Keep the protective caps of the PV connections for future use.

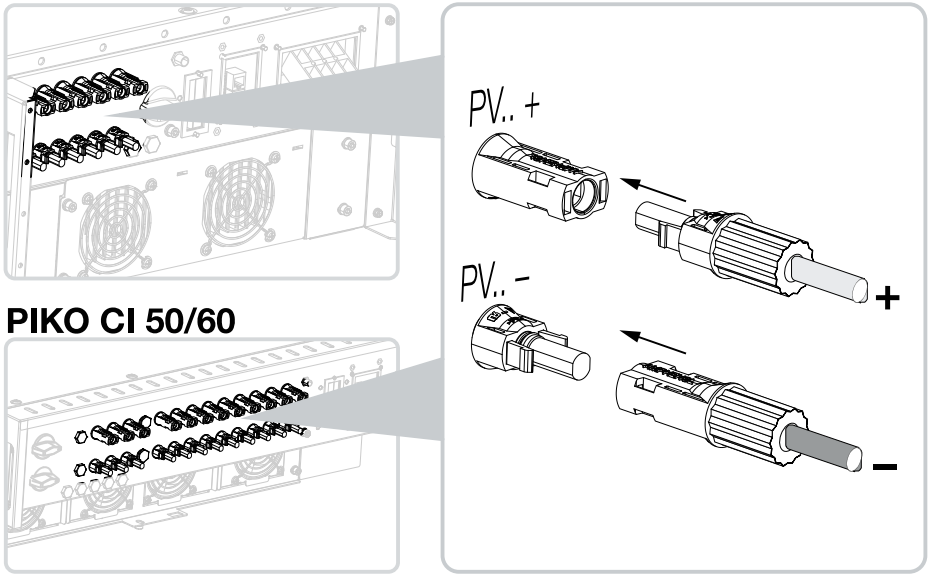
1. Unlock the AC connection of the inverter by switching off the line circuit breaker.
2. Turn the DC switch on the inverter to “OFF”.
3. Measure the DC cables of the PV modules before connecting them to the inverter with the correct polarity. PV modules connected with the wrong polarity may cause thermal damage to the inverter.
   Exceeding the maximum input current per string may result in damage to the inverter. Therefore, the maximum input current per string for the inverter as stated in the technical data must not be exceeded.



	$U_{DCstart}$	U_{DCmax}
PIKO CI 30	≥ 250 V	≤ 1000 V
PIKO CI 50/60	≥ 250 V	≤ 1100 V

4. Remove protective caps from input terminals.
5. Fit plug connectors of the individual PV strings into the DC inputs PV+ and PV- in pairs until they engage tangibly and audibly.

PIKO CI 30



PIKO CI 50/60

✓ The PV modules are connected.

7. Initial commissioning

Wirelessly commission and configure the necessary operating parameters using the KOSTAL PIKO CI Conf App and a tablet or your smartphone.

Contents

7.1 Installing KOSTAL PIKO CI app

1. Download the KOSTAL PIKO CI Conf App from the Apple App Store or Google Play Store onto your tablet or smartphone.

7.2 Connecting inverter to app

1. Turn on the WiFi/WLAN function on your tablet or smartphone.
2. Call up the WiFi/WLAN settings.
3. Switch on the inverter.
4. Make a note of the type and serial number of the inverter you want to start up. This information can be found on the type plate.
5. On your tablet or smartphone, find and select the WLAN network of your inverter. The inverter's SSID is composed of the type and serial number of the inverter. Example: PIKO_CI_50_12345678

INFO

If there are a lot of metal parts in the installation environment of the inverter – e.g. support frames, connecting cables, enclosures – the range of the radio connection may be impaired. Change position if you experience connection problems.

6. Enter as password: ***12345678*** and confirm your entry.

INFO

The default password is: ***12345678***. This should be changed after the initial commissioning.

If you have forgotten the WLAN password, you can reset it to the default value using the reset button under the cover for COM2.

7. Answer yes when asked if you want to remain permanently connected to the network.

INFO

The question does not always appear and depends on the smartphone/tablet's operating system.

8. Launch the app.

➔ The app displays the discovered inverters.

9. Select the inverter you want to start up.

✓ When the app displays the message ***Connect***, the inverter is connected.

7.3 Procedure for initial commissioning

INFO

The installation process may vary depending upon the software version of the inverter.

Information about the menus: KOSTAL PIKO CI app - menu structure

INFO

The default password for the installer/administrator is ***superadmin***.

With this user, a variety of settings can be configured vis-à-vis the system operator, such as network settings, power limitations or grid guidelines.

This password should be changed after the initial commissioning. If you forget your password, it can be reset via the service.

INFO

Observe national regulations! In France, in particular, the inverter and the supply lines must be labelled, for example.

The installer is responsible for obtaining and affixing the prescribed markings.

1. In the app, select the ***Settings*** page.

➔ On the ***Settings*** page, the app shows you various menus where you can configure settings.

2. In order to have access to all relevant settings, go to the ***User Management*** menu item and then select ***Change user***.
3. Select ***Login*** as ***installer***.
4. Enter the password ***superadmin*** and select ***Login***.
5. Configure the settings for inverter operation and on the ***Settings*** page, select ***Inverter settings***.

✓ The inverter is in operation and can now be used. Initial commissioning is completed.

After commissioning

The following settings still need to be configured after initial commissioning:

- Inverter settings made by the installer
- Prescribed settings for grid feed-in by the energy supply company
- Change the password or update the inverter software.

7.4 Handover to the operator

Following successful installation and commissioning, all documents are to be handed over to the operator.

Instruct the operator in how to use the PV system and the inverter.

The operator must be made aware of the following points:

- Position and function of the DC switch
- Position and function of the AC line circuit breaker
- Procedure for disconnecting the device
- Safety when handling the device
- Appropriate procedure when checking and servicing the device
- Meaning of the LEDs and the display messages
- Contact person in the event of a fault
- The provision of system and inspection documentation in accordance with DIN EN 62446 (VDE 0126-23) (optional).

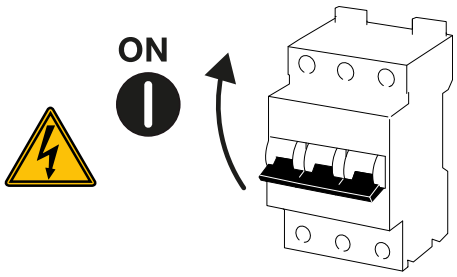
As the **installer and commissioning engineer**, have the operator confirm the proper handover with their signature.

As the **operator**, have the installer and commissioning engineer confirm that the installation of the inverter and the PV system is safe and complies with standards with their signature.

8. Operation and operating the device

8.1 Switching on the inverter

1. Activate supply voltage via the line circuit breaker.



2. Move the DC switch on the inverter to ***ON***.

INFO

As soon as one of the two DC switches on the 50/60 is set to ***ON***, the inverter starts up.

The DC switch SW1 switches the DC inputs DC2-8. **Block diagrams, Page 156**

The DC switch SW2 switches the DC inputs DC10-16. **Block diagrams, Page 156**

➔ The inverter starts up.

➔ The LEDs light up briefly during start-up.

➔ After startup, the LEDs indicate the operational status of the inverter.

INFO

When the inverter is commissioned for the first time, it goes into the ***Off*** (***Shutdown***) status.

When this happens, first carry out initial commissioning.

✓ The inverter is in operation.

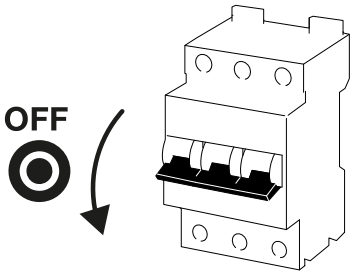
8.2 Switching off the inverter

INFO

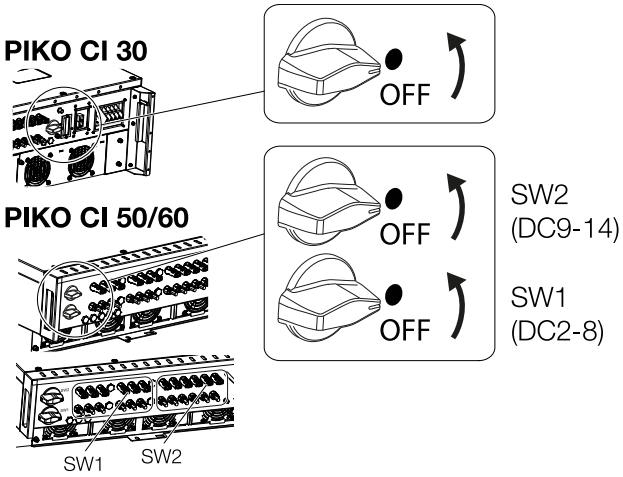
For maintenance work on the inverter, disconnect the device completely. **De-energising the inverter, Page 102**

To switch off the inverter, carry out the following steps:

1. Switch off line circuit breaker.



2. Switch the DC switch on the inverter to ***OFF***.



✓ The inverter is switched off.

The inverter remains energised and monitoring is still performed.

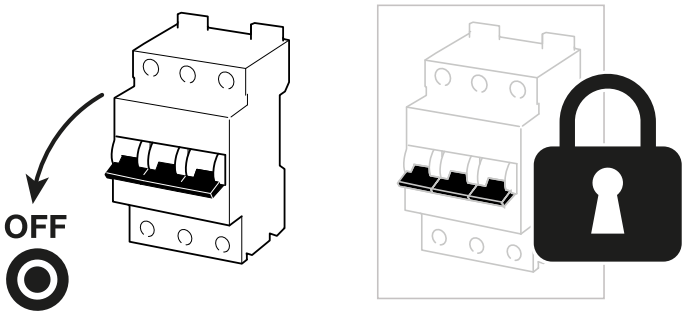
8.3 De-energising the inverter

For maintenance work on the inverter, especially on the connections, the inverter must be disconnected from the power supply.

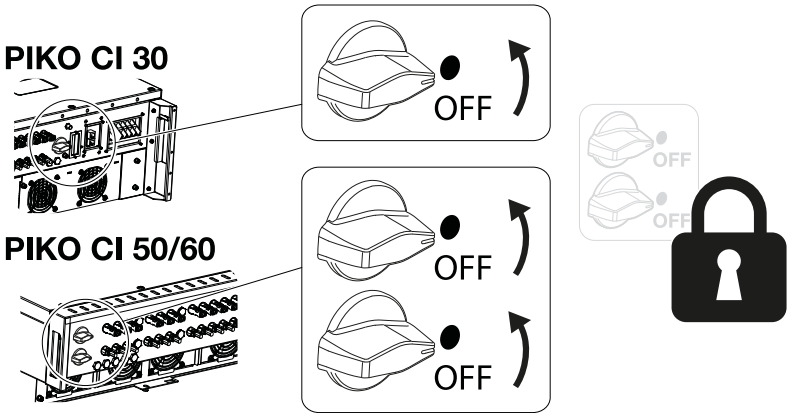
- For work on the AC side, e.g. on the energy meter, the earthing system or the communication connections, it is sufficient to disconnect the AC connection.
- For work on the PV modules or the DC feed lines, disconnect the DC connections.
- When working in the terminal compartment of the inverter, the inverter must be completely voltage-free on the AC and DC sides.

8.3.1 Disconnecting inverter on the AC side

1. Switch off AC line circuit breaker and secure it against being switched on again.



2. Switch DC switch on inverter to ***OFF*** and secure it against being switched on again.



✓ The inverter is voltage-free on the AC side.

8.3.2 Disconnecting DC cables

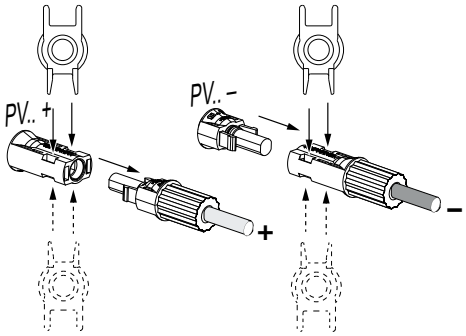
The inverter must first be de-energised on the AC side. Then all DC connections on the inverter can be disconnected. You will need the disassembly tool supplied with the device.

DANGER

Risk of death due to electrical shock and discharge!

When working in the terminal compartment, on the DC supply lines or on the PV modules, the DC cables must still be disconnected.

1. De-energise all devices and secure them against being switched on again.
2. Disconnect the DC cables by interrupting the connections to the PV modules.
   If it is not possible to disconnect the DC cables, observe the rules for working under voltage:
   - Use personal protective equipment, hard hat, visor or goggles, protective suit, insulating gloves.
   - Use an insulating protective mat as an underlay.
3. Insert the disassembly tool into the plug's side release openings so that the plug is unlocked and separated from the socket by approx. 1.5 mm.



4. Remove plug from the socket.
5. Ensure that the disconnected DC cables are protected against both weather (rain) and unauthorized access.
6. Check that all connections on the inverter are voltage-free.
7. Wait at least 10 minutes before carrying out any further work on the inverter so that the capacitors contained in it can discharge.

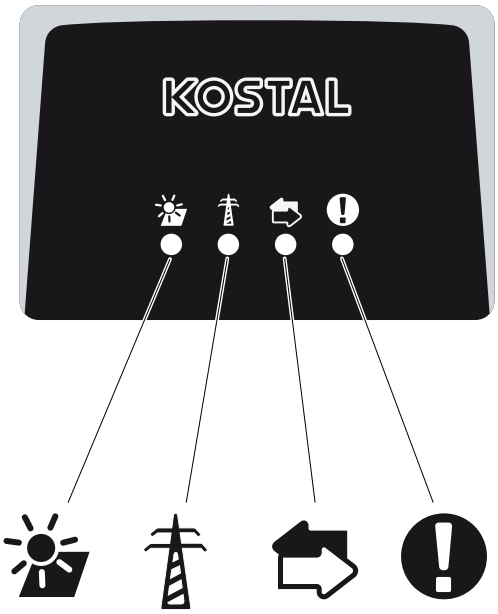
✓ The inverter is isolated on the DC side and voltage-free.

8.4 Operational statuses of inverter

After switching on, the inverter is always in one of the following operational statuses:

Operational status	Description
Standby	The connected PV modules are not supplying enough energy to feed it into the power grid. As soon as the required conditions are met, the inverter switches to the ***Feed in*** status.
Feed in	The inverter is generating electrical energy and feeding it into the connected power grid.
Off (Shutdown)	The inverter is switched off due to a switch-off command or an error that has occurred. As soon as the inverter receives a power-up command or the error is corrected, the inverter switches to the ***Standby*** status.

8.5 Status LEDs



The LEDs on the front indicate the current operational status.

Further status information can be viewed using the KOSTAL PIKO CI Conf App or in the .

Measures to rectify events can be found in the chapter **Event codes, Page 141**.

Meaning		State	Description
	PV inputs	Lights up	The input voltage is within the operating range
		Flashes	Overvoltage/undervoltage
	Feed-in	Off	The inverter does not feed in
		Lights up	The inverter feeds energy into the grid. Every 30 seconds the inverter reports its current power: flashes once: < 20 % Flashes twice: < 40 % Flashes 3x: < 60 % Flashes 4x: < 80 % Flashes 5x: < 100 %
		Continuous flashing	The state of the power grid does not allow any feed-in.

Meaning		State	Description
	Communication	Off	No connection active or no communication
		Flashes	The inverter is communicating with another device.
	Fault	Off	No fault
		Lights up or flashes	A fault has occurred

See also

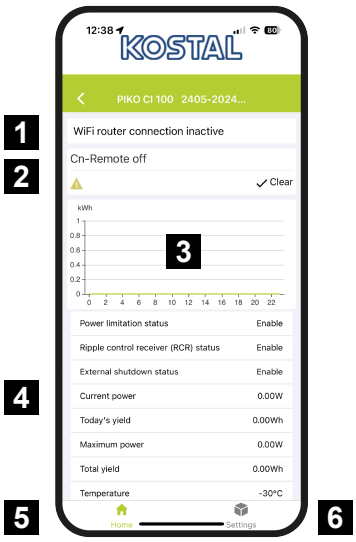
Event codes [▶ 141]

8.6 Status display via app

The smartphone app KOSTAL PIKO CI Conf App displays the current operational status, the power output and the current measuring values from inverter operation.

INFO

The user interface in the KOSTAL PIKO CI Conf App depends on the installed firmware (FW) and version of the app used and may differ from the description here.



1 Connection status to the router
2 Event messages
3 Energy generated
4 Current measuring values
5 Selection of the Home page
6 Selection of the Settings page

More information about the KOSTAL PIKO CI Conf App: **KOSTAL PIKO CI App, Page 109**.

9. KOSTAL PIKO CI App

9.1 KOSTAL PIKO CI App

The free KOSTAL PIKO CI Conf App provides a graphical user interface.

The app is used to commission and configure the inverter and to display its status:

- Log in on inverter
- Update inverter firmware
- Log in as user or administrator
- Status request
- Current feed-in values at grid connection
- Display of the log data
- Inverter version display
- Inverter configuration
  (e.g. LAN connection, setting up the energy meter, etc.)

9.2 Installation of the KOSTAL PIKO CI app

Download the KOSTAL PIKO CI Conf App from the Apple App Store or Google Play Store onto your tablet or smartphone and install it.

9.3 Connecting inverters with KOSTAL PIKO CI app

The KOSTAL PIKO CI Conf App is opened or launched using a smartphone or tablet. To do this, the smartphone or tablet must be within range of the inverter's WiFi wireless network.

Connecting a smartphone with an inverter by WLAN

1. Turn on the WiFi/WLAN function on your tablet or smartphone.
2. Call up the WiFi/WLAN settings.
3. Switch on the inverter.
4. Make a note of the type and serial number of the inverter you want to start up. This information can be found on the type plate.
5. On your tablet or smartphone, find and select the WLAN network of your inverter. The inverter's SSID is composed of the type and serial number of the inverter. Example: PIKO_CI_50_12345678

INFO

If there are a lot of metal parts in the installation environment of the inverter – e.g. support frames, connecting cables, enclosures – the range of the radio connection may be impaired. Change position if you experience connection problems.

6. Enter as password: ***12345678*** and confirm your entry.

INFO

The default password is: ***12345678***. This should be changed after the initial commissioning.

If you have forgotten the WLAN password, you can reset it to the default value using the reset button under the cover for COM2.

7. Answer the ***Check*** question with ***Stay***.

INFO

The question does not always appear and depends on the smartphone/tablet's operating system.

Launching KOSTAL PIKO CI App

1. Launch the app.
2. Select ***WLAN*** as the connection type.

➔ The app displays the inverter connected to the WLAN network of the tablet or smartphone.

3. Select the inverter to establish the connection.

✓ When the app displays the message ***Connect***, the inverter is connected.

9.4 Logging in as an installer

Once the KOSTAL PIKO CI Conf App is connected to an inverter, you can see all the values. However, some settings can only be changed by an installer/administrator. This requires a change of user.

To do this, proceed as follows:

1. In the app, select the ***Settings*** page.

➔ On the ***Settings*** page, the app shows you various menus where you can configure settings.

2. In order to have access to all relevant settings, go to ***User management*** and then touch the ***Change user*** button.
3. Select ***Installer***.
4. Enter the password and select ***Login*** .

INFO

The default password for the installer/administrator is ***superadmin***.

With this user, a variety of settings can be configured vis-à-vis the system operator, such as network settings, power limitations or grid guidelines.

This password should be changed after the initial commissioning. If you forget your password, it can be reset via the service.

✓ You are now logged in as an installer.

Configuring settings

Now configure the settings of the inverter as required.

9.5 KOSTAL PIKO CI app - menu description

The following menus are available to the user in the KOSTAL PIKO CI Conf App.

Parameter	Explanation
DOWNLOADING UPDATE FILES	Download the update files from the server. These are stored on the smartphone/tablet in the ***KOSTAL PIKO CI*** folder. To do this, the smartphone/tablet must not be connected to the inverter's WLAN. Otherwise, there is no Internet connection.
WLAN	Connect the smartphone/tablet to the inverter's WLAN.
Bluetooth	Connect the smartphone/tablet to the inverter's Bluetooth.

9.5.1 Home page

On the home page, the user is shown a status overview for the inverter. This includes:

- Inverter status
- WLAN connection status between router and inverter
- Event messages
- Performance diagram
- Current measuring values

Parameter	Explanation
Power limitation status	Status / current power limitation
Status of ripple control receiver (RCR)	Status / current setting of the ripple control receiver (RCD)
External shutdown status	Status of the central grid and system protection
Power reduction status	Status / current power reduction
Current power	Measuring value of the electrical power currently being generated in kilowatts (kW)
Today's yield	Measuring value of the energy generated on the current date in kilowatt hours (kWh)
Maximum power	Measuring value of the highest generated power up to the current date (kW)
Total yield	Measuring value of the energy generated up to the current date
Temperature	Current ambient temperature of the inverter
MPPTx	Measuring value of the MPPT groups' current input voltage/input current. One MPPT features several strings.
Stringx	Measuring value of the strings' current input voltage/input current
Output voltage Lx-Ly	Voltage of phases L1-L3
Output current Lx	Current of phases L1-L3
Power factor	Power factor (cosϕ) of the currently delivered electrical power
Grid frequency	Output frequency of the alternating current currently being generated
Active power	Measuring value of the active power currently being generated

Parameter	Explanation
Reactive power	Measuring value of the reactive power currently being generated

9.5.2 Settings

This menu item can be used to retrieve inverter data and configure the inverter. These include:

- Event messages
  (Displays inverter messages/events)
- Generation
  (Displays generation data for day/month/year)
- Basic settings
  (Displays device information, switching the inverter on/off or resetting to factory settings, exporting log data)
- User management
  (Changing users for login, changing password)
- Communication setting
  (e.g. Ethernet (LAN)/WLAN/WiFi/RS485 settings)
- Inverter setting
  (e.g. time/date, grid guideline, etc.)

9.5.3 Event messages

Parameter	Explanation
Event messages information	Display of events in the inverter. Further information about the events and possible error rectification: **Event codes, Page 141**.

9.5.4 Generation

Parameter	Explanation
Day/month/year energy	Indication of energy generated in diagram form for day/month/year.

9.5.5 Basic settings

Basic information

Parameter	Explanation
Type	Inverter model.
Serial number	Inverter serial number.
Firmware version	Inverter safety firmware version. Contains the safety, open and shutdown functions required for appliance safety and grid service functions.
Internal code	Controller board (CB) firmware version.
Modbus version	Modbus version used in the inverter.
Communication board version	Communication board firmware version
Update CSB firmware	Update the firmware for the communication board (CSB). The firmware must be downloaded beforehand via the ***Download Updates Files*** button on the start screen.
Update CB firmware	Update the firmware for the controller board (CB). The firmware must be downloaded beforehand via the ***Download Updates Files*** button on the start screen.

Operation

Parameter	Explanation
Switch on the inverter	Switch on the inverter.
Switch off the inverter	Switch off the inverter.
Reset to factory settings	Reset the inverter parameters to factory settings.
Activate external shutdown	Activate central grid and system protection monitoring in the inverter. Further information **KOSTAL PIKO CI App, Page 109**.

Data management

Parameter	Explanation
Export event messages	Export log data (event messages/generation data/configuration data of the inverter) **Retrieving log data, Page 131**. These are stored in the root directory on the smartphone.
Export generation data	
Export configuration	
Configuration import	Import configuration data of inverter.

About

Parameter	Explanation
App version	**KOSTAL PIKO CI Conf App** version.

9.5.6 User management

Parameter	Explanation
Change user	Change of user (***installer*** or ***system operator***).
Change installer password for login	Change***installer*** password. By default, the password is ***superadmin***.

9.5.7 Communication settings

WLAN settings

Parameter	Explanation
WLAN IP	WLAN IP address of the inverter WiFi module.
Select WLAN connection	Selection of WLAN router with password (connection of inverter to WLAN router).
Change local WLAN password	Change the inverter's WLAN password. By default this is ***12345678***

LAN settings

Parameter	Explanation
IP mode	The ***DHCP*** option is activated by default. This means that the inverter obtains its IP address from a DHCP server. Select ***static IP*** to assign the IP address yourself in ***IP address***. It goes without saying that this address must be available in your system.
IP address	Enter IP address of inverter. If the inverter is not allocated an IP address automatically through a DHCP server, the inverter can be configured manually. The data necessary for configuration, such as IP, subnet mask, router and DNS addresses, can be found on your router/gateway.
Subnet mask	Enter the subnet mask e.g. 255.255.255.0
Router/gateway	Enter the IP address of the router/gateway

Parameter	Explanation
Auto DNS	The ***Auto DNS*** option is activated by default. This means that inverters can also be addressed using a name instead of an IP address. For this purpose, the IP addresses of the DNS servers must be entered.
DNS server 1	Enter the IP address of the DNS server (Domain Name System)
DNS server 2	Enter the IP address of the backup DNS server (Domain Name System)
Last time of communication	Shows when communication with the inverter last took place.
Launch network diagnostics	Starts network diagnostics. The result is subsequently shown.
Communication status	Shows the status of communication with the grid.

RS485 settings

Parameter	Explanation
Baud rate	RS485 transmission rate
Data bit	RS485 data bit
Stop bit	RS485 stop bit
Parity bit	RS485 parity bit
Terminating resistor	Activate terminating resistor for the RS485 bus. This must be activated on the last inverter connected to the RS485 bus.
Modbus address	Modbus address

9.5.8 Inverter settings

Parameters within the inverter can be configured using the following menu items.

Time setting

Synchronises the inverter time.

Parameter	Explanation
Synchronize inverter time	Synchronize the time of the inverter with the time of the smartphone.

Grid settings

The following menu items can be used to set the parameters in the inverter which are specified by the grid operator. Parameters may only be changed on the inverter by qualified electricians who are familiar with the system and at the request of the grid operator. Inappropriate settings can be hazardous and lead to injury or even death of the user or third parties. Material damage to the device and other equipment can also occur.

Parameter	Explanation
Frequency monitoring of level 1 activated	Activate/deactivate frequency monitoring level 1
PV string monitoring	If the function is activated, one value per PV string is displayed on the home page. In addition, an event is output if the polarity of the PV string is reversed.
Grid guideline	Select grid guideline (e.g. VDE-AR-N 4105)
Start up time (s)	Start-up waiting time after switching on the inverter
Start up time following grid error (s)	Start-up time following inverter grid error
Power gradient (%/min)	Power gradient after switching on the inverter
Power gradient following grid error (%/min)	Power gradient after grid error of the inverter
Overfrequency limit value x (Hz)	Set overfrequency limit threshold value
Underfrequency limit value x (Hz)	Set underfrequency protection threshold value
Overvoltage limit value x (V)	Set overvoltage protection limit value
Undervoltage limit value x (V)	Set undervoltage protection limit value

Parameter	Explanation
Overfrequency switch-off time x time (s)	Set overfrequency switch-off time
Underfrequency switch-off time x time (s)	Set underfrequency shut-off time
Overvoltage switch-off time x time (s)	Set overvoltage switch-off time
Undervoltage switch-off time x time (s)	Set undervoltage switch-off time
Max. grid start voltage (V)	If the supply voltage is higher than the upper limit of the reconnection voltage after the inverter has been shut down for protection due to a fault, the inverter may not be reconnected to the grid.
Min. grid start voltage (V)	After the inverter is shut down for protection due to a fault, if the supply voltage is lower than the lower limit of the reconnection voltage, the inverter may not be reconnected to the grid.
Max. grid start frequency (Hz)	After the inverter is shut down for protection due to a fault, if the grid frequency is higher than the upper limit of the reconnection frequency, the inverter may not be reconnected to the grid.
Min. grid start frequency (Hz)	After the inverter is shut down for protection due to a fault, if the grid frequency is lower than the lower limit of the reconnection frequency, the inverter may not be reconnected to the grid.
Moving average	Set 10 minutes of average overvoltage value

Power adaptation/control

There are different options to control and configure the power for the PIKO CI. Select the option that is right for you and has been specified by the energy supply company.

There is also the option of using a combination of different controllers, e.g. park controller, KSEM and ripple control receiver. In this case, the priority should be set in the park controller.

Active power control

If the energy supply company only permits a certain active power input to the public power grid, the values can be specified here. If the specified limit values are exceeded, the inverter's PV generation is reduced.

Parameter	Explanation
P(U) regulation	Parameter of the P(U) curve, which reduces the active power if the output voltage exceeds a certain value
P(F) regulation	Parameter of the P(f) curve, which decreases the active power during overfrequency or increases the active power during underfrequency
P(f) function: Increased output at underfrequency (LFSM-U)	Activate P(f) function takes effect in the event of under-frequency when the active power generation needs to be increased quickly.
Power gradient (%/s)	Set the power gradient. The power gradient indicates how quickly the power is to be increased or decreased.
Maximum feed-in capacity (W)	Set the inverter's maximum active power
Maximum active power (%)	Setting for maximum output power of the inverter

Reactive power control

Parameter	Explanation
Settling time of reactive power	Specifies the reactive power settling time (3 Tao, PT-1 behaviour)
Reactive power mode	Specifies the reactive power control mode. ■ Pure active power ■ Cosphi ■ Constant reactive power ■ Cosphi(P) ■ Q(U) ■ Q(P) Once the mode has been selected, the energy supply company has additional settings for you to configure re-lating to reactive power control.

KSEM management

Configure the power limitation using the here.

Parameter	Explanation
Activate/deactivate KSEM	***Activate***: No energy meter connected to the inverter. ***Deactivate***: A is connected to the inverter.

Parameter	Explanation
Connection between KSEM and master inverter	***LAN:*** The KOSTAL Smart Energy Meter is connected to the inverter by LAN connection. ***RS485:*** The KOSTAL Smart Energy Meter is connected to the inverter by RS485 connection.
Sensor position	Installation position of energy meter (grid connection point or consumer). This should be established at the grid connection point by default.
Modbus address of energy meter	Energy meter Modbus address
Limitation of the active power to (W)	Enter the power limitation here.
IP address of energy meter	Energy meter IP address
L1-3 grid power	Displays the grid power at the individual phases
Total energy	Shows the energy supply from the public grid
Total feed-in energy	Shows the feed-in into the public grid
L1-3 consumer power	Shows the consumer power at the individual phases
Total consumption	Shows the total consumption
L1-3 inverter output	Shows the inverter output at on the individual phases
Total inverter output	Shows the total energy generated by the inverter

Ripple control receiver (RCR)

Parameter	Explanation
Activate ripple control receiver	Activate/deactivate ripple control receiver function.
Connection between inverters with active ripple control receiver	***LAN***: The inverters are connected to each other by LAN connection. ***RS485***: The inverters are connected to each other by RS485 connection.
RCR active power (%)	Set active power value for ripple control receiver
RCR reactive power	Set ***reactive power value*** or ***power factor cos phi*** for ripple control receiver

Park controller

If several PIKO CIs are installed within your system, you can monitor and control them using a park controller. The PGS park controller priority is important here. This can be high or low. If the priority is high, inverters are controlled using the park controller, if it is low, other controllers take higher priority.

Parameter	Explanation
Park controller configuration	Activating/deactivating PGS park controller ***Activate with high priority***: The PGS park controller is responsible for controlling inverters. For this purpose, the power limitation can be configured in the PGS park controller. Control by ripple control receiver, a KOSTAL Smart Energy Meter or the LFSM-U function are deactivated. ***Activate with low priority***: This means that, in the event of a combination of connected controllers (e.g. RCR, KOSTAL Smart Energy Meter, PGS park controller), a control value is determined for power limitation. Usually the lowest value.
Connection between park controller and inverter	LAN: The master inverter is connected to the PGS park controller by LAN connection. RS485: The master inverter is connected to the PGS park controller by RS485 connection.
Communication timeout (s)	Configure the time in seconds from which the ***Behaviour with missing controller*** is activated in the inverter and PGS controller being disconnected. 60 seconds is the default value
Behaviour with missing controller	Select the behaviour in the event of disconnected communication. ***Last valid value***: The last saved power limitation value will continue to be used. ***Limitation [%]***: Configure the active power limitation in the event of a missing controller here.

Other settings

Parameter	Explanation
Isolated network detection	Activate/deactivate isolated network detection. Ensures that the inverter does not switch on or off in the event of supply voltage errors.
Residual current monitoring	Activate/deactivate residual current monitoring. When the function is enabled, the inverter detects the array fault current.
Compatibility of type A RCD	**NOTE! This menu item depends on the inverter power and is not displayed for all inverters.** If this function has been activated, type A RCDs can be used as residual current protection equipment. In such cases, the inverter shuts down when the residual current becomes incompatible with a type A RCD. If the function is deactivated, a type B RCD must be used as residual current protection equipment if an RCD is stipulated.
Shadow management	If PV strings are in partial shading, the PV string affected no longer achieves its optimum performance. If shadow management is activated, the inverter adapts the MPP tracker in such a way that it can operate at maximum possible performance.
Shadow management interval time (s)	Set the interval of the MPP tracker sampling rate
Insulation resistance (kOhm)	If the value established for insulation resistance is less than the preset value, the inverter is not connected to the grid
Leakage current limit (mA)	Limit value for leakage current detection. If the value established is higher than the preset value, the inverter will shut down.
Limit for unbalanced voltage (%)	Setting the threshold value for DC voltage asymmetry
Dynamic grid support (FRT)	Dynamic grid support (FRT = Fault Ride Through)
Positive sequence K factor	Settings for uninterrupted cycling through grid faults FRT (Fault Ride Through)
Negative sequence K factor	

Monitoring of supply voltage	
Undervoltage ride through (V) UVRT	
Overvoltage ride through (V) OVRT	
Grid support mode	
Limited grid support (%)	
Irregular voltage change (%)	

Overvoltage protection monitoring	Activate/deactivate monitoring of the internal overvoltage protection modules (SPD - Surge Protective Device).
AFCI function	Activate arc detection.
Reset arc errors	Reset arc errors. This should only be done if the cause has been established.
Arc error sensitivity adjustment value	Adjust the sensitivity (default value: 40).
Arc detection adjustment value	Adjust the value for arc detection or use the default value (default value: 16)
Current arc intensity adjustment value	Adjust the value for current arc intensity or use the default value (default value: 800)
Average arc intensity adjustment value	Adjust the value for average arc intensity or use the default value (default value: 200)

10. System monitoring

10.1 The log data

The inverter is equipped with a data logger, which regularly records data from the system. The log data can be used for the following purposes:

- Check operating characteristics of the system
- Determine and analyse errors
- Download and graphically depict yield data

10.2 Retrieving log data

There are several options for retrieving and permanently storing the log data:

- **Option 1:** Download and display log data using the KOSTAL PIKO CI Conf App
- **Option 2:** Transfer log data to a solar portal and display it

10.2.1 Option 1: Download and display log data via the KOSTAL PIKO CI app

A range of inverter data can be exported.

- Event messages
- Generation data
- Inverter configuration data

1. In the KOSTAL PIKO CI Conf App, go to ***Settings > Basic settings > Export event messages***. KOSTAL PIKO CI app - menu structure
2. Confirm the download.

✓ The log data can be saved to a computer and displayed and further processed with any common spreadsheet program (e.g. Excel).

10.2.2 Option 2: Transfer log data to the KOSTAL Solar Portal and display it

With a solar portal it is possible to monitor the PV system and performance data via the Internet.

The has the following functions, which, however, may differ depending upon the portal:

- Graphic depiction of performance data
- Worldwide online access to the portal
- Email notification of errors
- Data export (e.g. Excel file)
- Long-term storage of log data

Data transfer to the :

INFO

A correctly set-up network connection/Internet connection is a prerequisite for data transfer.

It may take as long as 20 minutes following activation until the data export is visible on the .

The can be accessed using the following link: **www.kostal-solar-portal.com**.

- The inverter has an Internet connection.
- The inverter is registered on the .
- The activation of data transfer is activated in the inverter by default.

10.3 The KOSTAL Solar Portal

The solar portal of is a free Internet platform for monitoring the PV system.

The inverter sends the PV system's yield data and event messages to the via the Internet.

The information is stored in the . You can view and call up this information via the Internet.

KOSTAL Solar Portal

Conditions for use

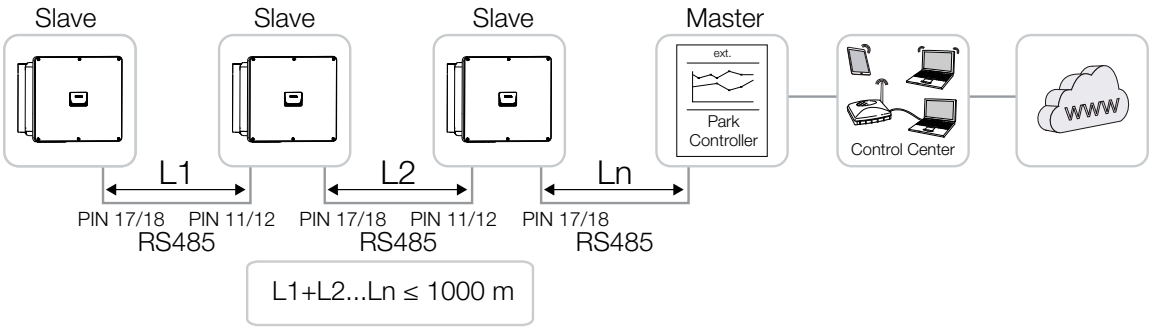
- The inverter must have a connection to the Internet.
- The inverter must not yet be registered on the .
- The inverter must not yet be assigned to a plant.

To use the , follow these three steps:

- Data transfer to must be activated in the inverter. With the , this activation is activated by default.
- You must register on the website of to use the . Registration is free.
- If the is connected to a , the must also be set up in the to display the self-consumption values.

10.4 Park control

If inverters are centrally controlled using a PGS park controller, the park controller can be activated and configured using the KOSTAL PIKO CI App or KOSTAL PIKO CI Conf Tool.



The following settings must be configured:

Settings in the KOSTAL PIKO CI App are configured on the inverter to which the PGS park controller is connected. Settings can only be configured by installers.

1. In the KOSTAL Solar App, connect to the inverter to which the park controller is connected.
2. Change the user and log in as installer.
   Settings > User management > Change user > Log in as installer
3. Activate the PGS park controller by going to ***Settings > Inverter settings > Power adaptation/control > Park controller > Park controller configuration.***
   - Activate with high priority means that the PGS controller takes control.
   - ***Activate with low priority*** means that a control value is determined in the event of a combination of connected controllers (e.g. RCR, KSEM, PGS). Usually the lowest value.
4. Select ***Connection between park controller and inverter > LAN*** or ***RS485.***
5. Configure the ***Communication timeout*** or adopt the default value of 60 seconds.
6. Should the connection to the PGS park controller be lost, you can select the ***Behaviour with missing controller***. In this case, you can choose either the ***Last valid value*** or a ***Limitation [%]***.
   If you select ***Limitation [%]***, you will have to configure additional settings for active power and reactive power mode.

✓ PGS park controller configured in inverter.

Other settings, which are required in the external PGS park controller / park controller, are described in the manuals for the respective PGS park controller / park controller.

11. Maintenance

11.1 During operation

Once correctly installed, the inverter runs virtually maintenance-free.

For proper operation in a larger solar system, the normal measures of regular system monitoring are fully sufficient.

In particular, tracking the energy obtained via data loggers, the or energy meters will quickly indicate irregularities. Events during operation are also logged.

For plant safety, we would recommend the maintenance work stated in the following sections.

11.2 Maintenance and cleaning

The following maintenance tasks are to be carried out for the inverter:

DANGER

Risk of death due to electrical shock and discharge!

Life-threatening voltages are present in the inverter.

- Only a qualified electrician may open and perform work on the device.
- Disconnect all poles of the device before starting work.
- Wait at least 10 minutes after disconnecting the device until the internal capacitors have discharged.

Maintenance list

Activity	Interval
Check operational status ■ Normal operating noise ■ Function of all communication connections ■ Damage or housing deformation	Once a month
Electrical connections ■ Check that cable connections and plugs have good contact and are secure ■ Check cable connections for damage or ageing ■ Check grounding	Once every six months
Clean the inverter ■ Remove soiling ■ Check ventilation ducts, clean if necessary ■ Remove and clean the fan if necessary	Once a year

Use maintenance lists in which the work undertaken is logged.

If no maintenance work is carried out, this will result in an exclusion of warranty (see 'Exclusion of warranty' in our service and warranty conditions).

11.3 Housing cleaning

Only clean the housing with a damp cloth.

Do not use any harsh cleaning agents.

Do not use devices that produce a spray or water jet.

In particular, check the condition of the ventilation ducts and the function of the fans.

11.4 Fan

Inverters generate heat during operation, which is dissipated via built-in heat sinks and fans. For this purpose, the ventilation ducts and fans must be kept free of contamination.

If problems occur, check whether the ambient temperature of the inverter exceeds the upper limit. If so, improve ventilation to lower the temperature. If the fan emits abnormal noise, replace the corresponding fans in good time. Please contact your support team for assistance with this.

Vacuuming ventilation ducts

To ensure many years of trouble-free operation, regularly vacuum the ventilation ducts.

POSSIBLE DAMAGE

Risk of damage when blowing out with compressed air.

When blowing out the ventilation ducts with compressed air, fine dust particles may find their way into the bearings of the installed fans and damage them.

- Do not use compressed air, vacuum the inverter's ventilation ducts instead.

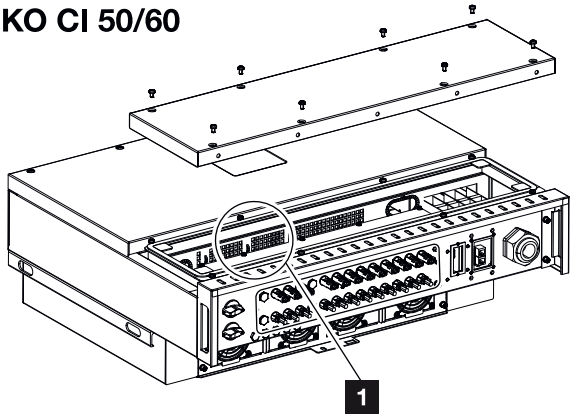
- Remove detritus consisting of leaves, dust, insects, etc., especially in the vicinity of the ventilation ducts.
- For example, use an industrial vacuum cleaner and vacuum the ventilation ducts and immediate surroundings.

11.5 Replacing PV fuses

The PV fuses in the 50/60 can be replaced. If an event prompting this is displayed, the inverter must be disconnected from the grid on the DC and AC sides.

50/60 inverter: PV fuses

PIKO CI 50/60



1 PV fuses

1. De-energise inverter on AC and DC sides (**De-energising the inverter, Page 102**).

DANGER

Risk of death due to electrical shock and discharge!

Life-threatening voltages are present in the inverter.

- Only a qualified electrician may open and perform work on the device.
- Disconnect all poles of the device before starting work.
- Wait at least 10 minutes after disconnecting the device until the internal capacitors have discharged.

2. Wait at least 10 minutes after the inverter has been switched off.
3. Open the lower section of the inverter.
4. Use a multimeter to identify and replace defective fuses.
5. Install cover and screw it tight (3 Nm).
6. Switch on the inverter again.

✓ The PV fuses have been replaced.

11.6 Event codes

There is no need to take action when an event occurs occasionally or only briefly and the device resumes operation. When an event lasts for long periods or recurs frequently, the cause must be determined and rectified.

DANGER

Risk of death due to electrical shock and discharge!

Life-threatening voltages are present in the inverter.

- Only a qualified electrician may open and perform work on the device.

In case of a permanent event, the inverter interrupts the feed-in and switches off automatically.

- Check whether the DC switch or the external DC voltage separator has been switched off.
- Check whether the event is due to a mains power failure, or whether the fuse between the feed meter and the inverter has tripped.

In case of fuse failure, notify your installer. In the event of a power failure, wait until the grid operator has rectified the fault.

If the event lasts only a short time (grid fault, overheating, overload, etc.), then the inverter will automatically resume operation as soon as the event has been resolved.

If the event persists, notify your installer or the manufacturer's customer support team.

INFO

Contact details can be found in the section **Warranty and service, Page 165**.

Provide the following information:

- Device type and serial number. You will find this information on the type plate on the exterior of the housing.
- Error description
  (LED display and message in the KOSTAL PIKO CI Conf App).

Operational statuses and error causes are reported as a combination of LED display and event code. The event code is shown in the KOSTAL PIKO CI Conf App, in the KOSTAL PIKO CI Conf Tool or in the . Determine the type of event using the table below (**Event messages, Page 142**).

If an event occurs repeatedly or permanently, or for events that are not listed in the table, please contact Service.

11.6.1 Event messages

Key for LEDs/display

	LED lights up		Status of PV modules
	LED flashing		Status of grid
	Original status		Status of communication
	LED off		Warning message/alarm

Event codes

Portal event code	Device event code	Meaning	LED
-	-	Status normal	
-	-	Commissioning/start-up	
-	-	WLAN / WiFi / RS485 communication	
-	-	PV normal	
30001	A0	Grid overvoltage	
30002	A1	Grid undervoltage	
30003	A2	Grid missing	
30004	A3	Grid overfrequency	
30005	A4	Grid underfrequency	
30006	B0	PV overvoltage	
30007	B1	PV insulation fault	
30008	B2	Leakage current error	

Portal event code	Device event code	Meaning	LED			
						
30010	C0	Control power low				
30011	B3	PV string error				
30012	B4	PV undervoltage				
30013	B5	Overvoltage protection module faulty				
30014	A6	Grid error				
30017	C2	Grid DC current share too high				
30018	C3	Inverter relay fault				
30020	C5	Inverter overtemperature				
30021	C6	Residual current monitoring fault				
30022	B7	Reverse polarity strings				
30023	C7	System error				
30024	C8	Fan blocked				
30025	C9	DC link unbalance				
30026	CA	Overvoltage of intermediate circuit				
30027	CB	Internal communication error				
30028	CC	Software incompatible				
30029	CD	EEPROM error				
30030	CE	Persistent warning				
30031	CF	Inverter error				

Portal event code	Device event code	Meaning	LED
30032	CG	DC booster error	
30038	CH	Master connection lost	
30039	CJ	Meter connection lost	

If the inverter enters shutdown mode due to an event shown above, the Warning/Alarm LED will light up. The Troubleshooting table (**Troubleshooting, Page 144**) describes actions to be taken for the most common events.

11.6.2 Troubleshooting

Event code	Causes	Recommended measures
Grid overvoltage Grid undervoltage Grid missing Grid overfrequency Grid underfrequency Grid error	The grid voltage exceeds its permissible range or the grid is not available.	If the alarm occurs occasionally, there may be a fault in the power supply system. No additional measures are required. If the alarm occurs repeatedly, contact your local power company. If the fault is not caused by the grid, check the grid settings of the inverter using the KOSTAL PIKO CI Conf App. If the alarm persists for a long time, check whether the AC line circuit breaker / AC terminals are disconnected or the grid power supply has failed.
PV overvoltage	The input voltage of the PV modules exceeds the permissible range of the inverter.	Check the number of PV modules and adjust them if necessary.

Event code	Causes	Recommended measures
PV undervoltage	The input voltage of PV modules is below the preset protection value of the inverter.	When the intensity of the sunlight is low, the voltage of the PV modules drops. No action is required. If the intensity of sunlight is high, check for short circuits, open circuits, etc. in the PV strings.
PV insulation fault	There is a short circuit between PV strings and protective earth. PV strings are installed in a persistently humid environment.	If the alarm occurs accidentally, the external circuits (PV strings) will supply irregular values. The inverter automatically returns to normal operation after the fault has been corrected. If the alarm occurs repeatedly or lasts for a long time, check whether the insulation resistance of the PV strings to earth is too low.
Leakage current error	The insulation resistance to earth on the input side decreases during inverter operation, resulting in too high a residual current.	Check the insulation resistance to earth for the PV strings. If a short circuit has occurred, correct the error. If the insulation resistance to earth in a rainy environment is lower than the default value, adjust the insulation resistance in the KOSTAL PIKO CI Conf App.
Weak PV irradiation	PV strings have been covered for a long time. PV strings deteriorate.	Check whether the PV string is covered. If the PV string is clean and not covered, check if the PV modules are ageing or if the performance has deteriorated.

Event code	Causes	Recommended measures
PV string error	The cables of the PV strings were connected the wrong way round during inverter installation.	Check that the PV string cables are correctly connected. If they are connected the wrong way round, connect the cables correctly. **NOTE! If the cables for the PV strings are connected the wrong way round and the DC switch is set to ON, intervention on the switches or PV connections is not permitted. If interventions are made, the device may be damaged. Wait for a period when there is less solar irradiation, e.g. in the evening, and for the PV string current to fall below 0.5 A. Set the three DC switches to OFF and correct the PV connections.**
BUS undervoltage BUS overvoltage Reverse polarity strings DC booster error	An unusual internal imbalance in relation to the energy control was caused by the PV strings, which triggered a major change in working conditions in the grid.	If the alarm occurs occasionally, the inverter can automatically return to normal operation after the fault has been corrected. If the alarm occurs repeatedly, contact your support team for technical assistance.
EEPROM error	EEPROM component damaged	Please contact your support team. Replace the monitoring card.
Zero power generation and yellow alarm light, which lights up in the remote monitoring system	Communication failure	If a data logger is being used, modern or otherwise, please restart the data logger. If the error still occurs, contact your support team.
Remote monitoring system indicates zero power generation	Communication failure	If a data logger is being used, modern or otherwise, please restart the data logger. If the error still occurs, contact your support team.

Event code	Causes	Recommended measures
Remote monitoring system shows no output voltage	DC switch to ***OFF***	Check if the DC switch is damaged, and if not, turn it to ***ON***. If the error still occurs, contact your support team.
Grid error	Fault in the power supply system	Wait until power is restored.
	DC switch to ***OFF***	Turn the DC switch to ***ON***. If the DC switch trips frequently, contact your support.
Master connection lost	Connection between slave and master inverter is interrupted.	Check whether the communication line to the master inverter has been interrupted. If the error still occurs, contact your support team. Check the communication settings in the KOSTAL PIKO CI Conf App.
Meter connection lost	Communication connection to energy meter (KSEM) interrupted	Check whether the communication line between the master inverter and energy meter (KSEM) has been interrupted. If the error still occurs, contact your support team. Check the communication settings in the KOSTAL PIKO CI Conf App.

12. Updating software

If the manufacturer has updated software for the inverter, this can be loaded into the inverter. The software is updated to the latest version. If an update is available, you will find this on the manufacturer's website, in the download area.

The following files must be updated, depending on the inverter:

- MCB (Master Control Board Firmware)
- SCB (Slave Control Board Firmware)
- CSB (Communication Service Board Firmware)
- AFCI (arc detection)
- WiFi/Bluetooth (communication module)

PIKO CI	MCB	SCB	CSB	AFCI	WiFi/Bluetooth
PIKO CI 30	m_9511-302000-xx-xxxxxx.bin	--	G711-0002200-xx-xxxxxx.bin	--	--
PIKO CI 50	m_9511-600900-xx-xxxxxx.bin	--	G711-0002200-xx-xxxxxx.bin	--	--
PIKO CI 60	m_9511-600900-xx-xxxxxx.bin	--	G711-0002200-xx-xxxxxx.bin	--	--

The PIKO CI update can be installed using one of the following methods:

- **Updating software using PIKO CI Tool, Page 149**
- **Updating software using PIKO CI App, Page 150**

12.1 Updating software using PIKO CI Tool

Use the ***KOSTAL PIKO CI Conf Tool*** to conveniently install the software on a PIKO CI inverter or several inverters.

For this purpose, the inverter must be connected to the LAN network. The ***KOSTAL PIKO CI Conf Tool*** and the tool's documentation is available in the product's Download area.

Link to **KOSTAL PIKO CI Conf Tool** instructions.

1. Download update files to your PC from the KOSTAL Solar homepage by going to the product's Download area and Update.
2. Double-click on ***PIKO CI Conf*** to launch the application.
3. Search for the inverter you want to update.
4. Log in as installer.
5. Go to Update.
6. Select Single or Multiple mode.
7. Select the update files and start the update.
8. Follow the instructions.

✓ Update completed

12.2 Updating software using PIKO CI App

If you want to update just one or two inverters, you can use the ***PIKO CI Conf App*** for this purpose. The following section describes how to proceed.

INFO

The default password for the installer/administrator is ***superadmin***.

With this user, a variety of settings can be configured vis-à-vis the system operator, such as network settings, power limitations or grid guidelines.

This password should be changed after the initial commissioning. If you forget your password, it can be reset via the service.

Updating software using KOSTAL PIKO CI Conf App

Use a smartphone or tablet with the installed KOSTAL PIKO CI Conf App. Proceed as follows:

1. Launch the KOSTAL PIKO CI Conf App on the smartphone/tablet that you are using for commissioning.
2. Download the update files from the server by clicking on the ***DOWNLOAD UPDATE FILES*** button.
3. Connect to the inverter's WLAN.
4. Make a note of the type and serial number of the inverter on which the update is going to be installed. This information can be found on the type plate.
5. Activate the WiFi/WLAN function on your smartphone/tablet by opening the WiFi/WLAN settings.
6. On your tablet or smartphone, find and select the WLAN network of your inverter. The inverter's SSID is composed of the type and serial number of the inverter. Example: PIKO_CI_50_12345678
7. Enter the inverter's password and confirm your entry.

INFO

The default password is: ***12345678***. This should be changed after the initial commissioning.

If you have forgotten the WLAN password, you can reset it to the default value using the reset button under the cover for COM2.

8. Answer yes when asked if you want to remain permanently connected to the network.

INFO

The question does not always appear and depends on the smartphone/tablet's operating system.

9. Switch back to the KOSTAL PIKO CI Conf App and connect the smartphone/tablet and inverter by tapping on ***START*** and selecting the inverter.
10. The user must be changed to import the update. Go to ***Settings > User management > Change User***.
11. Enter the password and select ***Login*** .
12. Go to ***Settings > Basic settings > Update CSB firmware***.

➜ The inverter automatically finds the update file (G711-xxxxxxx.bin) and starts the installation.

13. After the installation, wait approx. 2 minutes before installing the control board update.
14. Go to ***Settings > Basic settings > Update CB firmware***.

➜ The inverter automatically finds the update file (m_G9511-xxxxxxx.bin) and starts the installation.

15. Check the version of the software in the app under ***Settings > Basic settings***.

✓ The update has been installed.

13. Technical information

13.1 Technical data

Subject to technical changes. Errors excepted.
You can find current information at **www.kostal-solar-electric.com**.

Input side (DC)

PIKO CI		30	50	60
Max. PV power (cos ϕ = 1)	kWp	45	75	90
Nominal DC power	kW	30	50	60
Rated input voltage (Udc,r)	V	620		
Start input voltage (Udc,start)	V	250		
Min. system voltage (Udc,min)	V			
Max. system voltage (Udc,max)	V	1000	1100	
MPP range at rated output (Umpp,min)	V	480	540	
MPP range at rated output (Umpp,max)	V	800		
Operating voltage range (Udc,workmin)	V	180	200	
Operating voltage range (Udc,workmax)	V			
Max. working voltage (Udc,workmax)	V	960		
Max. input current (Idc,max) per MPPT - from article number: PIKO CI 30: 10534223, PIKO CI 50: 10534084, PIKO CI 60: 10534085	A	DC1-3: 40.5 | DC4-6: 40.5	DC1-3: 39 DC4-6: 39 | DC7-8: 26 | DC9-10: 26	DC1-3: 39 DC4-6: 39 | DC7-9: 39 | DC9-12: 39
Max. DC current per DC input (IStringmax) - from article number: PIKO CI 30: 10534223, PIKO CI 50: 10534084, PIKO CI 60: 10534085	A	14	18	
Max. input current (Idc,max) per MPPT - from article number: PIKO CI 30: 10523267, PIKO CI 50: 10523268, PIKO CI 60: 10523269	A	DC1-3: 37.5 | DC4-6: 37.5	DC2-4: 33 | DC6-8: 33 | DC10-11: 22 | DC13-14: 22	DC2-4: 33 | DC6-8: 33 | DC9-11: 33 | DC12-14: 33
Max. DC current per DC input (IStringmax) - from article number: PIKO CI 30: 10523267, PIKO CI 50: 10523268, PIKO CI 60: 10523269	A	14		
Max. DC short-circuit current (Isc_pv)				
Internal DC string fuses	A	20 (10 x 38 mm, gPV)		
Number of DC inputs		6	10	12
Number of independent MPP trackers		2	4	

Output side (AC)

PIKO CI		30	50	60
Rated power, cos ϕ = 1 (Pac,r)	kW	30	50	60
Output apparent power (SAC,max)	kVA	33	55	66
Nominal apparent power (Sac,nom)	kVA	30	50	60
Min. output voltage (Uac,min)	V	277		

PIKO CI		30	50	60
Max. output voltage (Uac,max)	V	520		
Rated current (I,nom)	A	43.3	72.2	86.6
Max. output current (Iac,max)	A	48	83	92
Short-circuit current (peak/RMS)	A	-/48	-/83	-/92
Grid connection		3N~, 230/400 V, 50 Hz		
Rated frequency (fr)	Hz	50		
Grid frequency (fmin - fmax)	Hz	47/53		
Setting range for the power factor (cos ϕAC,r)		0.8…1…0.8		
Power factor at rated power (cos ϕAC,r)		1		
THD	%	<3		

Device properties

PIKO CI		30	50	60
Standby	W	<1		

Efficiency

PIKO CI		30	50	60
Max. efficiency	%	98.2	98.3	
European efficiency	%	97.9	98.1	
MPP adjustment efficiency	%	99.9		

System data

PIKO CI		30	50	60
Topology: Without galvanic isolation – transformerless		Yes		
Protection class in accordance with IEC 60529		IP 65		
Protective class according to EN 62109-1		I		
Overvoltage category according to IEC 60664-1 on input side (PV generator)		II		
Overvoltage category according to IEC 60664-1 on output side (grid connection)		III		
DC/AC overvoltage protection		Type 2		
Pollution degree		4		
Environmental category (outdoor installation)		Yes		
Environmental category (indoor installation)		Yes		
UV resistance		Yes		
AC cable diameter (min-max)	mm	22…32	35…50	
AC cable cross-section (min-max)	mm^2	10…25	35…50	
PV cable cross-section (min-max)	mm^2	4…6		

PIKO CI		30	50	60
Max. fuse protection on output side (AC) IEC 60898-1	A	B63 / C63	B125 / C125	
Internal operator protection in accordance with EN 62109-2		RCMU/RCCB type B		
Independent disconnection device according to VDE V 0126-1-1		Yes		
Height/width/depth	mm	470/555/270	710/855/285	
Weight	kg	41	83	
Cooling principle – regulated fans		Yes		
Max. air throughput	m^3/h	185	411	
Noise emission (typical)	dB(A)	50	<63	
Ambient temperature	°C	-25…60		
Max. operating altitude above sea level	m	4000		
Relative humidity	%	0…100		
Connection technology, DC side		Amphenol plug H4		
Connection technology, AC side		M5	M8	

Interfaces

PIKO CI		30	50	60
Ethernet LAN TCP/IP (RJ45)		2		
Wi-Fi (2.4 GHz [IEEE 802.11 b/g/n])		Yes		
RS485		1		
Digital inputs		4		

Directives / Certification

	Directives / Certification
PIKO CI 30	EN62109-1, EN62109-2, VDE-AR-N 4105:2018, VDE-AR-N 4110:2018, PO12.2, RD 244:2019, UNE 217001, EN 50549-1 -2, CEI0-16 2019, CEI0-21 2019 >11.08kW, UK G99/1-4 LV, IRR-DCC MV 2015, IEC61727/62116
PIKO CI 50	EN62109-1, EN62109-2, VDE-AR-N 4105:2018, VDE-AR-N 4110:2018, PO12.2, RD 244:2019, UNE 217001, EN 50549-1 -2, CEI0-16 2019, CEI0-21 2019 >11.08kW, UK G99/1-4 LV, IRR-DCC MV 2015, IEC61727/62116
PIKO CI 60	EN62109-1, EN62109-2, VDE-AR-N 4105:2018, VDE-AR-N 4110:2018, PO12.2, RD 244:2019, UNE 217001, EN 50549-1 -2, CEI0-16 2019, CEI0-21 2019 >11.08kW, UK G99/1-4 LV, IRR-DCC MV 2015, IEC61727/62116

Overvoltage category II (DC input): The device is suitable for connection to PV strings. Long feed cables out of doors or a lightning protection system in the vicinity of the PV system may make lightning protection or surge protection equipment necessary.

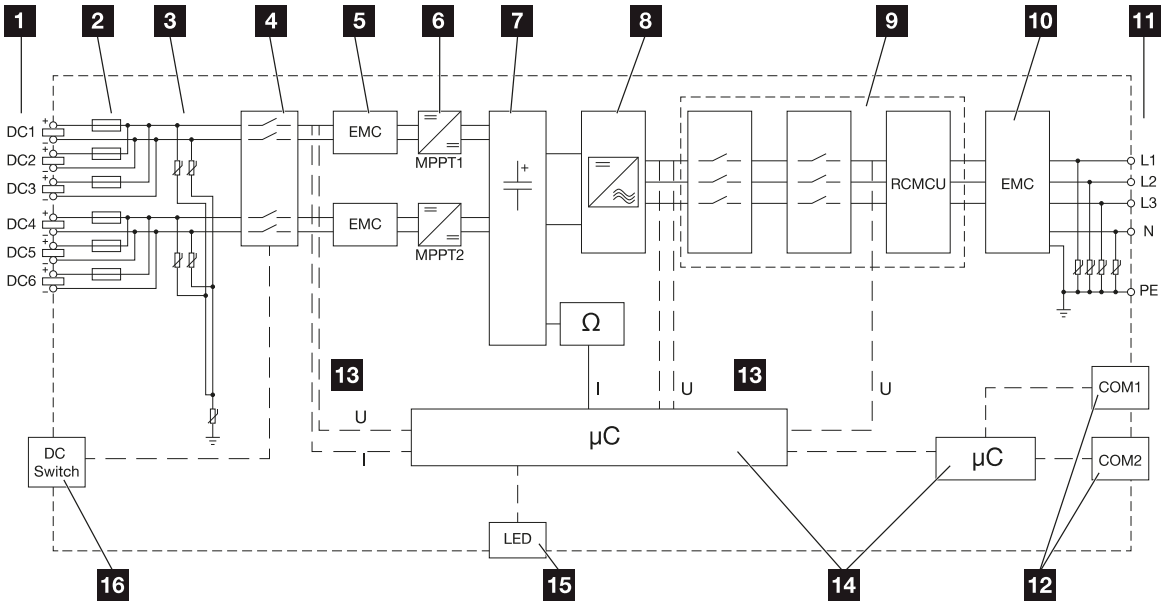
Overvoltage category III (AC output): The device is suitable for permanent connection in the grid distribution behind the meter and the line protection fuse. If the connection cable travels outdoors over long distances, overvoltage protection devices may be necessary.

Degree of contamination 4: Contamination results in continuous conductivity, e.g. due to conductive dust, rain or snow; indoors or outdoors.

Measured under rated output at an ambient temperature of 23 °C. In the case of an unfavourable string connection or higher ambient temperature, the noise emission may be higher.

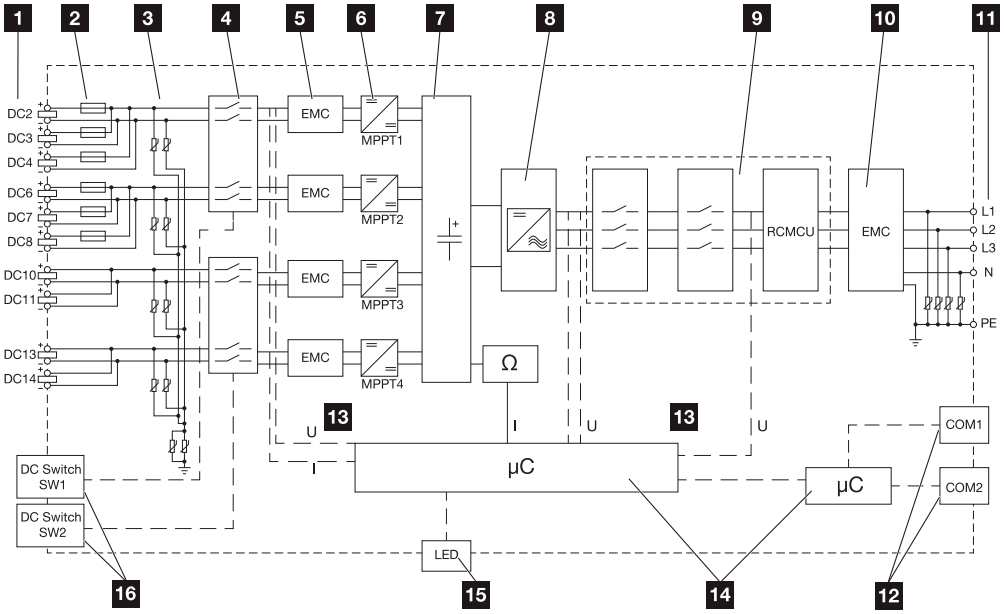
13.2 Block diagrams

Block diagram for 30



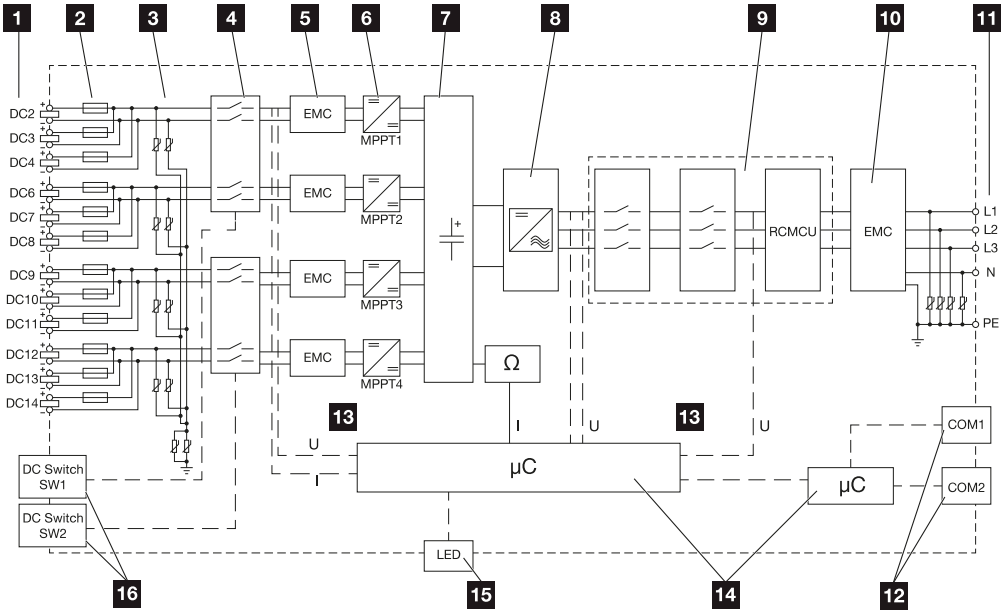
1 DC inputs for PV modules
2 DC fuses
3 Integrated overvoltage protection (DC side)
4 Electronic DC disconnection device
5 EMC filter (DC side)
6 DC regulator
7 Intermediate circuit
8 Inverter bridge circuit
9 Grid monitoring and shutdown
10 EMC filter (AC side)
11 AC connection
12 COM1 and COM2 connection panels for communication interfaces
13 Voltage and current measurement
14 Control system and communication
15 Status LED
16 DC switch

Block diagram for 50



1 DC inputs for PV modules
2 DC fuses
3 Integrated overvoltage protection (DC side)
4 Electronic DC disconnection device
5 EMC filter (DC side)
6 DC regulator
7 Intermediate circuit
8 Inverter bridge circuit
9 Grid monitoring and shutdown
10 EMC filter (AC side)
11 AC connection
12 COM1 and COM2 connection panels for communication interfaces
13 Voltage and current measurement
14 Control system and communication
15 Status LED
16 DC switch

Block diagram for 60



1 DC inputs for PV modules
2 DC fuses
3 Integrated overvoltage protection (DC side)
4 Electronic DC disconnection device
5 EMC filter (DC side)
6 DC regulator
7 Intermediate circuit
8 Inverter bridge circuit
9 Grid monitoring and shutdown
10 EMC filter (AC side)
11 AC connection
12 COM1 and COM2 connection panels for communication interfaces
13 Voltage and current measurement
14 Control system and communication
15 Status LED
16 DC switch

14. Accessories

14.1 KOSTAL Solar App

The free KOSTAL Solar App offers you professional monitoring of your photovoltaic system. You can use the KOSTAL Solar App to access all the functions on your smartphone or tablet at any time.

To set up and use the app, you will need access to the and the KOSTAL Solar Portal and to have an inverter set up there. To log in to the app, use the same login details as for the .

You can use the KOSTAL Solar App to monitor your photovoltaic system and view relevant system data both at home and when you are out and about. It allows you to access the consumption and generation data over various time periods, such as day, week, month and year, and to view your photovoltaic system's historical data. This means that with the KOSTAL Solar App you are always up to date.

Download the free KOSTAL Solar App today and benefit from new and advanced functionalities.

Additional information about this product is available on our website **www.kostal-solar-electric.com** under ***Products > Tools and applications > KOSTAL Solar App***.

Download on the App Store

KOSTAL Solar App

GET IT ON Google Play

14.2 PIKO CI app

In order to operate and configure the PIKO CI inverter, you will need the KOSTAL PIKO CI Conf App.

Download the KOSTAL PIKO CI Conf App from the Apple App Store or Google Play Store onto your tablet or smartphone and install it.

14.3 PIKO CI Conf Tool

The KOSTAL PIKO CI Conf Tool is a configuration tool to configure the PIKO CI inverter via a direct LAN connection.

This means that you no longer need to stand in front of the inverter with a smartphone in order to configure the inverter.

All PIKO CI inverters within the local LAN network can be addressed and configured using the configuration tool.

The user interface offers the same settings as the KOSTAL PIKO CI Conf App on smartphones.

The PC used for installation must be running on an up-to-date Windows operating system.

Download the app from the download area.

For this purpose, go to **Download** > Applications – Tools > **KOSTAL PIKO CI Conf Tool**.

14.4 KOSTAL Solar Portal

The KOSTAL Solar Portal is a free online platform for monitoring the PV system.

The Solar Portal enables the operation of the inverter to be monitored via the Internet. For this purpose, the inverter sends the PV system's yield data and event messages to the solar portal via the Internet.

The information is then stored in the solar portal. You can view and call up this information via the Internet.

This means that the KOSTAL Solar Portal protects your investment in a PV system from yield losses, e.g. by actively warning you by e-mail when an event occurs.

Register for the KOSTAL Solar Portal free of charge using the at **https://terminal.kostal-solar-electric.com**.

KOSTAL Solar Terminal

The Solar Portal has the following functions:

- Worldwide portal access via the Internet
- 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
- Providing system data for the

Prerequisites for using the Solar Portal:

- The inverter must have a connection to the Internet.
- Data transfer to KOSTAL Solar Portal must be activated in the inverter.
- The inverter must not be assigned to any other PV system in the KOSTAL Solar Portal.
- The inverter must be assigned to your PV system in the KOSTAL Solar Portal.

You can find more information about this on our website **www.kostal-solar-electric.com**.

KOSTAL Solar Electric

15. Warranty and service

Information about the service and warranty conditions can be found in the download area for the product at **www.kostal-solar-electric.com**.

For service information and in the event of parts being needed, we require your device type and the serial number. You will find this information on the type plate on the exterior of the housing.

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

- Germany and other countries (language: German, English):
  +49 (0)761 477 44-222
- Switzerland:
  +41 32 5800 225
- France, Belgium, Luxembourg:
  +33 16138 4117
- Greece:
  +30 2310 477 555
- Italy:
  +39 011 97 82 420
- Poland:
  +48 22 153 14 98
- Spain, Portugal (language: Spanish, English):
  +34 961 824 927

Spare parts

If spare parts or accessories are required for troubleshooting, use only original spare parts and accessories manufactured and/or approved by the manufacturer.

16. Appendix

16.1 EU Declaration of Conformity

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

- Directive 2011/65/EU
  (RoHS) to limit the use of certain hazardous substances in electrical and electronic equipment
- Directive 2014/53/EU
  (RED Radio Equipment and Telecommunications Terminal Equipment) Provision of radio equipment

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

www.kostal-solar-electric.com

16.2 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 and a list of the Open Source software used and the associated licence texts, go to the Licences section on the website (Webserver) under ***Licences***.

16.3 Decommissioning and disposal

To dismantle the inverter, proceed as follows:

1. De-energise inverter on AC and DC sides (**De-energising the inverter, Page 102**).

DANGER

Risk of death due to electrical shock and discharge!

De-energise device and secure against being switched on again. **De-energising the inverter, Page 102**

2. 50/60: Open the lower cover of the inverter.
3. Loosen terminals and cable glands.
4. Remove all DC cables, AC cables and communication cables.
5. 50/60: Close the inverter cover.
6. Loosen locking screw on inverter's bracket.
7. Lift inverter off the wall.

Proper disposal

Electronic equipment labelled with a dustbin with a line through it may not be disposed of with household waste. This equipment can be handed in to waste collection points free of charge.

Find out about the local requirements for the separate collection of electrical and electronic equipment in your country.

www.kostal-solar-electric.com

04/2025 - EN - DOC02534917-0010 - Subject to technical changes. Errors excepted.
You can find current information at www.kostal-solar-electric.com. Manufacturer: KOSTAL Industrie Elektrik GmbH & Co. KG, Hagen, Germany