Steca Elektronik

coolcept³ coolcept³-x

Installation and operating instructions

EN

750.661 | Z03 | 2016-09-12

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1 Preface

Thank you for choosing inverters from the *coolcept³* range of products manufactured by Steca Elektronik GmbH. By using solar energy you make a significant contribution to environmental protection by reducing the total amount of atmospheric pollution caused by carbon dioxide (CO_2) and other damaging gases.

Highest efficiency with longer service life

The innovative inverter topology is based on a single-stage transformerless circuit concept and is integrated into all devices in the coolcept³ series. This unique technology allows peak efficiencies of up to 98,6 % be achieved. Depending on the type, the European efficiency of the devices is also significantly greater than 98 % and sets new standards in photovoltaic grid-feed systems.

A new and unique cooling concept inside the inverter ensures an even distribution of heat and a long service life.

Designer casing and easy installation

For the first time, the very high efficiency allows the use of a designer casing made of plastic for the coolcept³ inverters. This offers many advantages. The overall surface temperature of the devices remains very low. This also offers great installation advantages. The coolcept³-x inverters have a sturdy metal casing that allows them to be also used outdoors.

The lightweight devices weigh only approx. 12 kg and can be easily and safely mounted on a wall. The supplied wall bracket and practical recessed grips for right and left handed installers make mounting of the device simple and convenient. All connections and the DC circuit breaker are externally accessible.

Visualisation tools and accessories

The devices have a graphical display for visualising the energy yield values, current performance and operating parameters of the photovoltaic system. Its innovative menu allows individual selection of the various measurements.

See *www.stecasolar.com* for further information on accessories. Your installer can, of course, also give you more information about the options and accessories that are available.

2 General information

2.1 General safety instructions

- This document is part of the product.
- Install and use the device only after reading and understanding this document.
- Always perform the measures described in this document in the sequence specified.
- Keep this document in a safe place for the entire service life of the device. Pass the document on to subsequent owners and operators of the device.
- The yield of the system can be reduced through improper operation
- If the housing is damaged, do not connect the device to the DC or AC lines
- If one of the following components is damaged, immediately take the device out of operation and disconnect it from the mains grid and PV generators.:
  - Device (not functioning, visible damage, smoke, penetration of liquid etc.)
  - Lines
  - PV generators

  Do not switch the system on again before
  - the device has been repaired by a dealer or the manufacturer,
  - Damaged cables or PV generators have been repaired by a technical specialist.
- Never cover the device
- Do not open the casing: Risk of death. Invalidation of the guarantee.
- Factory labels and markings must never be altered, removed or rendered unreadable.
- Comply with the instructions of the respective manufacturer when you connect an external component that is not described in this document (e.g. external data loggers). Components that are incorrectly connected can damage the device.

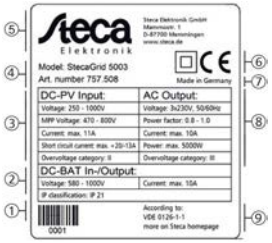
Safety instructions on the device

① Serial number as a bar code and in plain text
② Warning of hot surface, only coolcept³-x
③ Dangerous voltages can remain present on the components up to 10 minutes after switching off the DC circuit breaker and the line circuit breaker
④ Read and follow the manual!
⑤ Dispose of the device at a collection point for electronic equipment

2.2 Identification

Feature	Description
Types	*coolcept³* (plastic housing): StecaGrid 3203, StecaGrid 4003, StecaGrid 5003, StecaGrid 6003 *coolcept³-x* (stainless steel housing): StecaGrid 3203x, StecaGrid 4003x, StecaGrid 4803x, StecaGrid 5503x
Version status of the manual	Z03
Manufacturer's address	Contact, see *Chapter 10 „Contact“ on page 71*
Certificates	For Declaration of Conformity, see www.stecasolar.com ⇒ coolcept³ – coolcept³-x
Optional accessories	■ External data loggers: – *WEB'log* from Meteocontrol – *Solar-Log* from Solare Datensysteme ■ StecaGrid SEM: 747.231 ■ RS485 bus cable 1.5 m for coolcept³-x: 737.605 ■ RS485 bus cable 5 m for coolcept³-x: 737.603 ■ RS485 bus cable 20 m for coolcept³-x: 737.604 ■ RS485-USB adapter cable for coolcept³-x: 737.707 ■ PushPull RJ45 connecting plug for coolcept³-x: 737.607 ■ Termination plug for RS485 bus – IP21: 752.856 – IP65: 740.864

Rating plate



① Bar code for internal use
② Technical data of DC-Bat connection (for coolcept[3] devices only) and protection class
③ Technical data - DC-PV input
④ Article number and product designation
⑤ Manufacturer and address
⑥ Cover the *Protection class II* and CE mark
⑦ Country of manufacture
⑧ Technical data of the AC output
⑨ Standard for grid monitoring

Notice

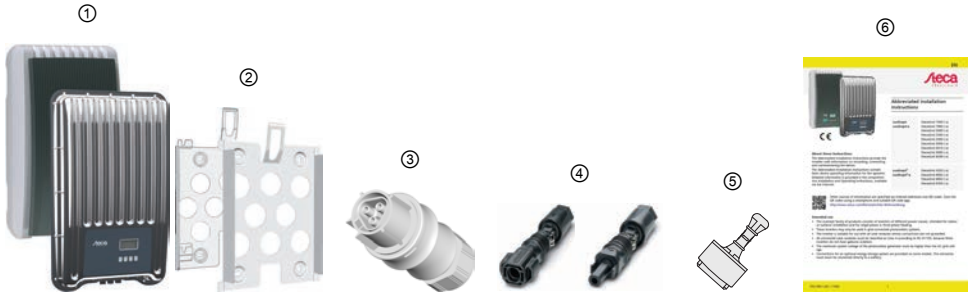
– *For the serial number, see ↳ „Safety instructions on the device“ on page 6.*
– *For the position of the type plate, see ↳ Chapter 3.1 „Housing“ on page 11 pos. 3.*

EU Declaration of Conformity

The products described in this document comply with the applicable European directives. Certificates for the products are provided at www.stecasolar.com ⇒ PV GRID CONNECTED ⇒ Grid inverters

2.3 Scope of delivery

- Inverter ①, type coolcept (plastic housing) or coolcept-x (stainless steel housing, IP65)
- Mounting plate ② for type coolcept or coolcept-x
- AC plug ③
- 1 pair SUNCLIX plug-in connectors ④
- 3 sealing caps (for RJ45 socket; only coolcept-x) ⑤
- Brief installation and operating instructions ⑥



2.4 Intended use

- The inverter must only be used in grid-coupled photovoltaic systems. The inverter is suitable for all PV generator with connections that do not need to be grounded.
- PV generator must be used that have an IEC 61730 class A rating because the inverter does not have electrical isolation.

- If the maximum AC operating voltage is higher than the maximum system voltage of the photovoltaic generator, then PV generators must be used that have a maximum system voltage that is higher than the AC grid voltage.
- The battery connection contacts are intended for an optional energy storage system. This consists of an additional control component and an external energy storage unit. The battery connection must not be directly connected to a battery **under any circumstances**.

Notice

An overview of suitable PV generators is available at www.stecasolar.com ⇒ PV GRID CONNECTED⇒ Service and support.

2.5 About this manual

2.5.1 Contents

This manual describes the inverters of the types coolcept^3 and coolcept^3-x. The points at which the types differ are marked in the text.

This manual contains all information that a specialist needs to set up and operate the inverters. Follow the instructions of the respective manufacturers when installing other components (e.g. PV generators, cables or external energy storage units).

2.5.2 Target group

Unless otherwise indicated, the target audiences of this manual are technical professionals and system operators. Technical professionals are, for example:

- Persons who have the knowledge of terminology and the skills necessary for setting up and operating photovoltaic systems.
- Persons who have the necessary training, knowledge and experience, and knowledge of the applicable regulations in order to evaluate and recognise the dangers inherent in the following work:
  - Installation of electrical equipment
  - Production and connection of data communication cables
  - Production and connection of mains grid power supply cables

2.5.3 Designations

Symbols

The following table contains the symbols used in this manual

Warning signs	Type of danger
	Warning – high-voltage.
	Warning – danger zone.

Symbols used on the device

Tab. 1: The following table contains the symbols used on the device.

Cover the	Description
	Danger from electricity.
	Read the manual before using the product.

Signal words

Keywords used in conjunction with the symbols described:

Signal word	Meaning
DANGER!	This combination of symbol and signal word indicates an immediate dangerous situation that will result in death or serious injury if it is not avoided.
WARNING!	This combination of symbol and signal word indicates a possible dangerous situation that can result in death or serious injury if it is not avoided.
NOTICE!	This combination of symbol and signal word indicates a possible dangerous situation that can result in material and environmental damage if it is not avoided.

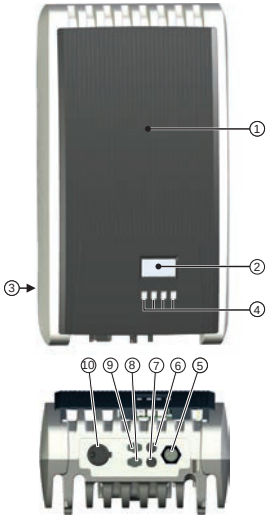
Abbreviations

Abbreviation	Description
Derating	Power reduction
DHCP	DHCP automatically integrates the device in an existing network (acronym: **D**ynamic **H**ost **C**onfiguration **P**rotocol)
MSD	Internal grid monitoring of the inverter (English: **M**ains monitoring with allocated **S**witching **D**evices).
MPP	Working point producing the most power (English: **m**aximum **p**ower **p**oint)
MPP tracker	Controls the power of the connected module strings to match the MPP
SELV, TBTS, MBTS	Schutzkleinspannung (EN: **S**afety **E**xtra **L**ow **V**oltage; FR: **T**rès **B**asse **T**ension de **S**écurité; ES: **M**uy **B**aja **T**ensión de **S**eguridad)
V_{PV}	The PV generator voltage present at the DC connection (photovoltaic voltage)

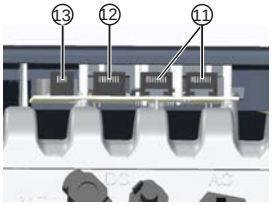
3 Structure and function

3.1 Housing

3.1.1 coolcept[3]



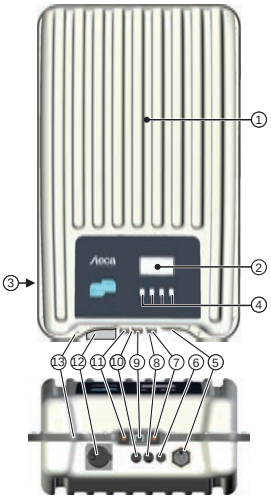
① Hood
② Display (monochrome, 128 x 64 pixels)
③ Rating plate, serial number, warnings
④ Operating buttons: ESC, △, ▽, SET (from left to right)
⑤ 1x AC connection
⑥ 1x DC connection Minus (−) for optional energy storage system (Phoenix Contact SUNCLIX, safe to touch)
⑦ 1x DC connection Minus (−) for solar modules (Phoenix Contact SUNCLIX, safe to touch)
⑧ 1x DC connection Plus (+) for solar modules (Phoenix Contact SUNCLIX, safe to touch)
⑨ 1x DC connection Plus (+) for optional energy storage system (Phoenix Contact SUNCLIX, safe to touch)
⑩ DC load-break switch (disconnects plus and minus input simultaneously)



⑪ 2 x RJ45 sockets (RS485 bus)
⑫ 1x RJ45 socket (Ethernet)
⑬ 1x RJ10 socket (Modbus RTU)

The housing components are described in detail below.

3.1.2 coolcept³-x



① Hood
② Display (monochrome, 128 x 64 pixels)
③ Rating plate, serial number, warnings
④ Operating buttons: ESC, △, ▽, SET (from left to right)
⑤ 1x AC connection
⑥ Pressure equalization membrane
⑦ 1x RJ45 socket (RS485 bus)
⑧ 1x DC connection Minus (−) for PV generator (Phoenix Contact SUNCLIX, safe-touch)
⑨ 1x RJ45 socket (RS485 bus)
⑩ 1x DC connection Plus (+) for PV generator (Phoenix Contact SUNCLIX, safe to touch)
⑪ 1x RJ45 socket (Ethernet)
⑫ DC load-break switch (disconnects plus and minus input simultaneously, can be safeguarded with a padlock)
⑬ Bore for optional attachment of a grounding element or mechanical fastening element (securing chain)

The housing components are described in detail below.

3.2 Operating buttons

The operating buttons ④ in *Chapter 3.1.1 „coolcept³“ on page 11* and in *Chapter 3.1.2 „coolcept³-x“ on page 12* have the following functions:

Button	Action	Function	
		General	**guided operation**
ESC	Press briefly	Goes to the next higher menu level	Navigates 1 step back
		Discards any changes	
	Press longer (≥ 1 second)	Goes to the status display	Jumps to the start of the guided configuration process
△	Press briefly	■ Moves the marking bar or the display content upward ■ In a numeric setting, moves the marking 1 position to the left ■ Increases an adjustment value by 1 increment	
▽	Press briefly	■ Moves the marking bar or the display content downward ■ In a numeric setting, moves the marking 1 position to the left ■ Increases an adjustment value by 1 increment	
SET	Press briefly	Goes to the next lower menu level	—
		■ a selected numerical value starts flashing and can be changed ■ adopts a change ■ changes the state of a control element (check box/radio button)	
	Press longer (≥ 1 second)	Answers a query dialog with *Yes*	Goes 1 step back

3.3 Display

3.3.1 General information

For the presentation on the display (② in *Chapter 3.1.1 „coolcept³“ on page 11* and *Chapter 3.1.2 „coolcept³-x“ on page 12*)

- Symbol ✳: While the inverter is processing large volumes of data, it cannot process any user inputs. The resulting waiting time is indicated by the animated sun symbol.
- Errors are indicated by a red flashing backlighting. An event message is also displayed at the same time.

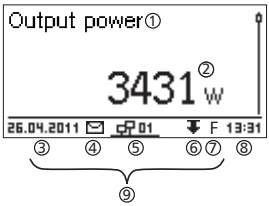
Notice

The display reacts slower at very low temperatures. In particular, this can apply for coolcept³-x devices if they are used outdoors.

3.3.2 Information

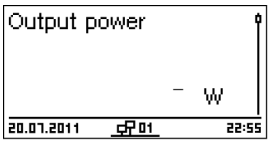
The information shown on the display is described below using illustrative examples.

Status display



The status display shows the following values:

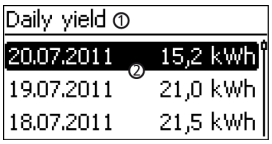
① Measurement name
② Measurement with units
③ Date is displayed alternatingly with IP address
④ Cover the *Non-confirmed event messages*; more information on this is provided in Section ↻ *„Event messages" on page 51*
⑤ Animated symbol *Connect* symbol with 2-digit inverter address; indicates data traffic on the RS485 bus.
⑥ Cover the *Power reduction* (Derating)
⑦ Cover the *Fixed voltage mode activated*
⑧ Time
⑨ IP address of the device when a network connection has been established, display alternates with ③ – ⑦



The following applies to the status display:

- The measurements shown in the status display are defined under `Settings` ▸ `Meas. values`. Some measurements are always displayed (default setting).
- Current values are not displayed at night (solar irradiation too low; example in Fig. left).
- The `CO2 saving` shown in the status display are calculated using the savings factor *508 g/kWh* .

Numeric yield (day, month, year)



Daily, monthly and annual yields can be displayed numerically in a list.

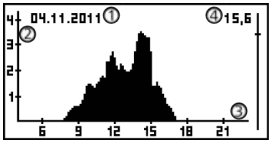
① Yield period (day/month/year)
② Individual yields with period and value (1 per row)

The yield periods contain the following numbers of individual entries:

- Day yield: last 31 days[1)]
- Monthly yield: last 13 months[1)]
- Annual yield: last 30 years[1)]

[1)] A yield value of 0 is shown when the inverter was not yet installed at that time.

Graphical yield (day, month, year)



Daily, monthly and annual yields can be displayed graphically in a chart.

① Period on an individual yield (here: day yield)
② Y axis [1) 2) 3)]
③ X axis: Time in hours/days/months/years
④ Total of all individual yields shown in the diagram, in kWh

The graphical representation can show annual yields for the last 20 years.

[1)] Yield in kWh

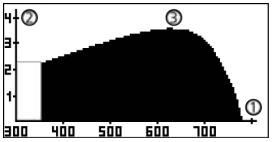
[2)] With addition of *„M"*: : yield in MWh

[3)] The scaling changes depending on the maximum value.

Event messages

↳ *Chapter 6 „Fault rectification“ on page 50*

PV generator characteristic curve

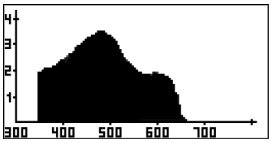


① X axis: input voltage in V
② Y axis: power in kW
③ Peak = MPP

If the *„Ch. Curve“* menu item is called, the inverter records the PV generator characteristic curve and then displays it (Fig. upper left).

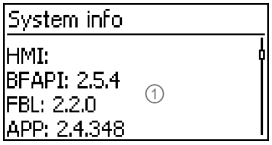
The following applies:

- The inverter traverses the input voltage range and records the power generated over this range. Duration: a few seconds; ✱ is displayed.
- The MPP is at the peak of the PV generator characteristic curve.
- This peak and the PV generator characteristic curve change with the level of solar irradiation.



- Multiple peaks are a sign of partial shadowing (Fig. left).
- If the top of the curve is flat, the inverter can possibly no longer feed power into the grid.

Information



The menu item `Information` contains the following sub-menu items.

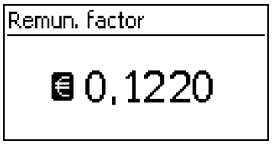
- `Contact info`
- `System info` (see Fig. left):
  - Product designation
  - Serial number of the inverter
  - Information concerning the software and hardware version of the inverter (see sample ① in Fig. left)
  - Inverter address
  - Power limit set at the inverter or predefined by the country selection.
- `Country setting`: country that is currently set and country-specific grid parameters; see also ↳ *Chapter 8.3 „Country table“ on page 69*.
- `Reactive power characteristic curve`: Diagram of the reactive power characteristic curve (only if prescribed for the set country)

- `Network`: Network parameters, partially configurable under `Settings` ▸ `Network`
  - `Host name`: Unique name in the network
  - `DHCP status`: DHCP on/off
  - `Link status`: Status of the network connection
  - `IP address`: IP address of the inverter
  - `Subnet mask`: Subnet mask of the inverter
  - `Gateway`: IP address of the network gateway
  - `DNS address`: IP address of the DNS server
  - `MAC address`: Hardware address of the inverter
- Results of the last self-test (only if in the country setting *Italy* is set)

3.3.3 Settings

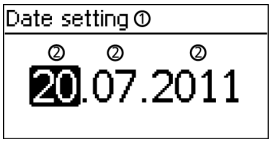
Numerical settings

When performing numerical settings of remuneration and dates, the following applies:



Remuneration

- Possible currencies: £ (Pounds), € (Euros), kr (Krones), *none*.
- The maximum value that can be set for remuneration is limited for technical reasons. The remuneration must be set using different units as required. Example: Dollars instead of Cents (set currency to *none*).



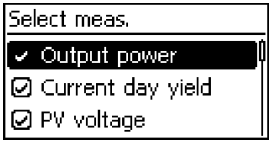
① Designation of the numerical setting
② Value to be set; the selected value to be set is highlighted in black.

Date

When setting the month/year, a check is performed to ensure that the selected day is valid. If not, then the day is automatically corrected.

Example: 31.02.2011 is corrected to 28.02.2011.

Selection of the measurements



Selection of the measurements to be shown in the status display. The following measurements can be selected:

- `Output power`: Inverter output power[1)]
- `Current day yield`: Day yield since 0:00
- `PV voltage`: The voltage supplied by the PV generators
- `PV current`: The current supplied by the PV generators
- `Grid voltage`: Voltage at the inverter connection[1)]
- `Grid current`: The current fed into the mains grid
- `Grid frequency`: The frequency of the public grid
- `Internal temperature`: Internal temperature of the inverter
- `Derating` Reason for derating[2)]
- `Max. daily power`: The maximum power supplied in the current day[3)]
- `Abs. max. power`: The maximum power ever fed into the grid[3)]

- `Max. daily yield`: The maximum daily yield achieved[3)]
- `Operating hours`: The operating hours during which the device has been connected to the grid (including night-time hours).
- `Total yield`: Yield since commissioning
- `CO2 savings`: CO_2 savings achieved since commissioning

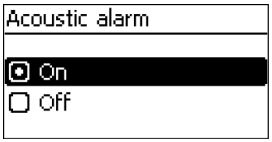
[1)] Measurement is always displayed (cannot be switched off)

[2)] Possible causes:

– Internal temperature too high
– User default *Power limiter*
– Frequency too high
– Controlled by grid operator (feed-in management)
– Delayed increase in power after starting

[3)] Can be reset to 0 via `Settings` ▸ `Reset max. vals.`

Acoustic alarm

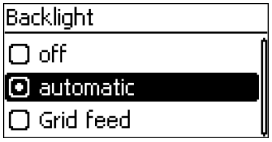


An acoustic alarm sounds (approx. 4.5 kHz) when an event message is displayed.

- 2 Sounds: Warning
- 3 Sounds: Error

The acoustic alarm is switched off with the factory default settings.

Backlight

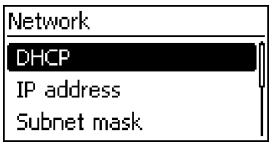


- `off`
- `automatic`: Switches on for 30 seconds when a button is pushed
- `Grid feed`: (factory setting)
  – *Not feeding*: Switches on for 30 seconds when a button is pushed; then switches off
  – *Feeding*: Switches on for 30 seconds when a button is pushed; then dims

TCP/IP network

Notice

– *A prerequisite for this is that you know the parameters required for setting up the TCP/IP network connection. Consult (further) technical professionals if required.*
– *DHCP is activated in the device ex-works. This allows automatic integration of the device in most networks.*



Network settings, required for network communication, e. g. with an Internet portal:

- `DHCP`: Switch DHCP on/off
- `IP address`: IP address of the inverter
- `Subnet mask`: Subnet mask of the inverter
- `Gateway`: IP address of the network gateway

- `DNS address`: IP address of the DNS server
- `web-portal`: Settings at the web portal
  - `Web portal setting`: Disabling of data transmission and selection of a web portal
  - `Re-transmission`: Data in the inverter is transmitted a second time
  - `Connection check`: Checks the internet connection and indicates the result

3.3.4 Service menu

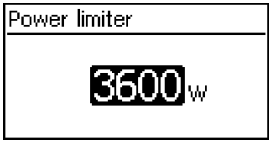
The service menu items are described below. Some items are password protected; see *Chapter 5.1 „Overview of operating functions“ on page 46* (menu structure).

You can obtain the password from technical support; see *Chapter 10 „Contact“ on page 71*.

NOTICE!

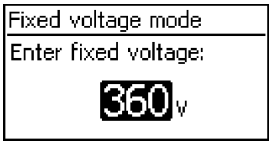
Risk of reduced yields. In the service menu, inverter and grid parameters can be changed. The service menu must only be operated by a specialist, who ensures that the change does not violate applicable regulations and standards!

Power limiter



The inverter output power can be manually limited to a minimum of 500 W. When the power is manually limited, the *Power reduction* symbol is shown in the status display and the *„Derating“*/*„Cause: User default“* measurement is displayed.

Fixed voltage



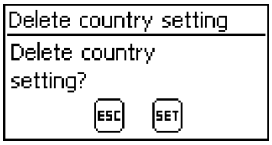
The device can regulate the input voltage to a manually adjustable value. This switches off the automatic setting of the MPP (MPP tracking). The input voltage can be adjusted over a range between the maximum and minimum input voltage and the minimum input voltage in 1V steps.

Exemplary application: Hydroelectric installation

NOTICE!

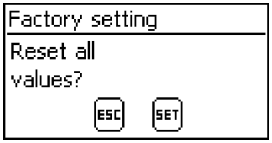
Before setting a fixed input voltage, make sure that the generator is suitable for this. Otherwise, this may result in yield losses or damage to the system.

Delete country setting



After the country setting has been deleted the device restarts anew and displays the guided 1st commissioning menu.

Factory setting

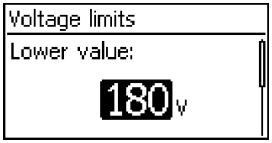


Resetting the device to the factory setting deletes the following data:

- Yield data
- Event messages
- Date and time
- Country setting
- Display language
- Network settings

After the factory setting has been deleted, the device restarts anew and displays the guided 1st commissioning menu.

Voltage limits (peak value)

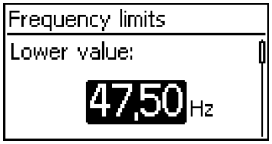


The following voltage limits can be changed:

- Upper disconnection value[1)]
- Lower disconnection value[1)] (Fig. left)

[1)] The disconnection value relates to the peak value of the voltage.

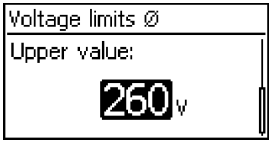
Frequency limits



The following frequency limits can be changed:

- Upper disconnection value
- Lower disconnection value (Fig. left)
- Derating switch-on threshold (because frequency is too high)
- Frequency threshold when switching on again

Voltage limits ø (average value)



The following voltage limits can be changed:

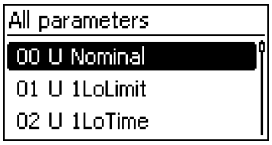
- Upper disconnection value[1)] (Fig. left)
- Lower disconnection value[1)]

[1)] The disconnection value relates to the average value of the voltage.

Reactive power

The possible reactive power settings are identical to the settings during the initial commissioning. See *„Reactive power" on page 39*.

All parameters



Service technicians can use this menu item for changing additional MSD parameters.

3.4 Cooling

The internal temperature control system prevents excessive operating temperatures. When the internal temperature is too high, the inverter adjusts the power consumption from the PV generators to reduce the heat dissipation and operating temperature.

The inverter is convection cooled via fins on the front and rear side. A maintenance-free fan circulates the heat within the closed housing evenly over the entire surface of the housing.

3.5 Grid monitoring

The inverter constantly monitors the mains grid parameters while feeding the grid. If the grid deviates from the legally prescribed specifications then the inverter automatically switches off. When the grid conforms to the legally prescribed specifications then the inverter automatically switches on again.

3.6 Data communication

The device has the following communication interfaces:

- 1x RJ45 socket (Ethernet for TCP/IP network) for communication, e. g. with a central data server
- 2x RJ45 sockets (RS485 bus) for communication with external devices, e. g. a data logger
- 1x RJ10 socket (Modbus RTU) for communication e. g. with an external energy counter

3.6.1 Data

The inverter can transmit a wide range of data to other devices. Some of this data is shown on the display and certain data is stored in the internal memory (EEPROM) as described below.

Displayed data

- Voltage and current of the PV generator
- Power and current fed into the grid
- Voltage and frequency of the power grid
- Energy yields on a daily, monthly and annual basis
- Error conditions, notes
- Version information

Logged data (EEPROM)

- Event messages with date
- Energy yields on a daily, monthly and annual basis

The storage resolution of the energy yield data is as follows:

Energy yield data	Storage resolution/period
10-minute values	31 days
Daily values	13 months
Monthly values	30 years
Annual values	30 years
Total yield	permanent

3.6.2 Network (TCP/IP)

The device can transfer yield data and event messages via the TCP/IP interface to the Internet portal *http://www.solare-energiewende.de* server. The yield data can be displayed graphically in the Internet portal as illustrated below. This service is free of charge for a period of 2 years from the time of registration. The following applies:

- Before the Internet portal can be used, the user must go to *www.steca.com/portal* to register.
- The local network settings must be set at the inverter in order to establish a connection to the Internet portal server. This can be performed automatically or manually:

  Automatically: If IP addresses are automatically assigned in your network (DHCP), then no settings need to be made at the inverter.

  Manually: If IP addresses are not automatically assigned in your network, then you must manually set the inverter network settings via `Settings` ▸ `Network`; see
  „TCP/IP network“ on page 17
- The address of the Internet portal server is permanently stored in the inverter and cannot be changed.
- Once the network connection is established, the inverter automatically starts non-encrypted transmission of data to the server.

Notice

The network cable must be disconnected in order to prevent transmission of the data, or data transmission must be disabled according to „TCP/IP network“ on page 17.

Fig. 1: Graphical representation of the yield data in the Internet portal

Furthermore, you can use the TCP/IP interface to display yield data and other information as HTML pages. You need a PC connection to indicate the data. The HTML pages can be displays by means of a browser, such as Mozilla Firefox. To enable the connection, enter the IP address of the inverter (see inverter status indication) in the browser.

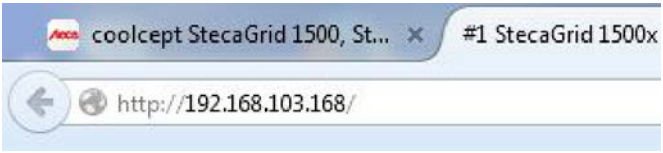


Fig. 2: Example for an IP address

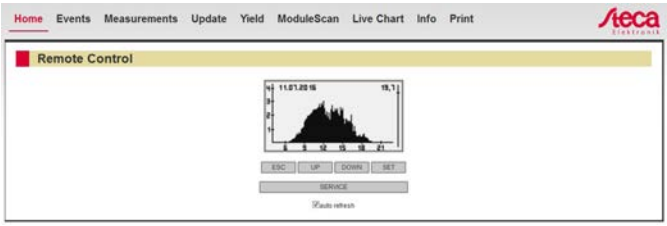


Fig. 3: Example 1 of an HTML page

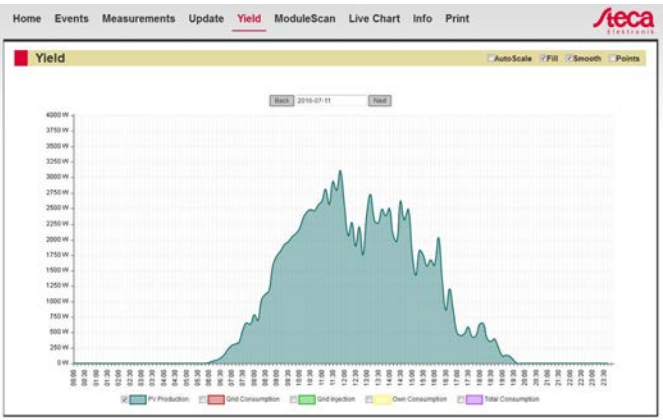


Fig. 4: Example 2 of an HTML page

To display the HTML pages, the chart.js licence-free software is used, www.chartjs.org. Copy-right (c) 2013-2015 Nick Downie."

The HTML pages are the simplest way to update the firmware of the inverter. The corresponding page is shown below.

Fig. 5: View of the firmware update

3.6.3 RS485 bus

The inverter communicates with other devices via an RS485 bus. The following applies: The following applies:

- The inverter has two RS485 interfaces (RJ45 sockets) on the lower side of the casing.
- The beginning and end of the RS485 bus must be terminated; see 3.6.5, p.25.
- Standard RJ45 cables can be used as bus cables (Cat-5 patch cables, not supplied). Use an alternative data connection cable for longer connections; see 3.6.4, p.24 .
- The inverters connected to the RS485 bus operate as *slaves.*

Notice

The following inverters have compatible data interfaces and can be connected to the RS485 bus as slaves:

- *StecaGrid 2020*
- *StecaGrid 1500, 1800, 2000, 2300, 2500, 3000, 3010, 3600, 4200 and StecaGrid 1500x, 1800x, 2000x, 2300x, 2500x, 3010x, 3600x, 4200x*
- *StecaGrid 3203, 4003, 4803, 5003, 5503, 6003 and StecaGrid 3203x, 4003x, 4803x, 5503x*
- *StecaGrid 8000 3ph, StecaGrid 10000 3ph*
- *StecaGrid 8000+ 3ph, StecaGrid 10000+ 3ph*

Comply with the instructions in the manuals of these devices relative to addressing, termination, and approved data cables.

Notice

If in the country setting Italy is set, then the RS485 bus must be connected as follows to enable control through an external device in accordance with CEI 0-21.

– *External fast switch-off (ital.: Teledistacco): If the lines 3[1)] and 8[1)] of the RS485 bus[2)] are connected, e. g. via an external relay, the following applies:*

  ***Relay closes**: The inverters on the bus disconnect themselves from the network.*

  ***Relay opens**: The inverters connected on the network connect themselves to the network (regular operation).*

– *Switch-over of the grid frequency disconnection thresholds (Ital.: Modalità definitiva di funzionamento del sistema di protezione di interfaccia (impiego del SPI sulla base di letture locali e di informazioni/comandi esterni)): If the lines 5[1)] and 8[1)] of the RS485 bus[2)] are connected, e. g. via an external relay, the following applies:*

  ***Relay closes**: The inverters connected on the bus set the switch-off thresholds in accordance with CEI 0-21 to 47.5 Hz and 51.5 Hz.*

  ***Relay opens**: The inverters connected on the bus set the switch-off thresholds in accordance with the country setting Italy ;*
  Chapter 8 „Technical data“ on page 57.

We recommend that you integrate the wiring of lines 3, 5, and 8 in the bus termination.

[1)] Contact assignment of the RJ45 plug for the RS485 bus: See Fig. 6.

[2)] In this regard, see ⑥ under Chapter 3.1.1 „coolcept³“ on page 11 and ⑦ and ⑨ under Chapter 3.1.2 „coolcept³-x“ on page 12.

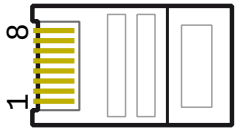


Fig. 6: Contact assignment (= line number) of the RJ45 plug

Optionally *one* (!) of the following *master*devices can be connected to the RS485 bus. The devices support the transfer protocol used by the inverter. The devices support the transfer protocol used by the inverter.

- Energy management unit StecaGrid SEM: Interface to a ripple control receiver for EEC-compliant feed-in management
- PC or notebook (with suitable software):
  - Read inverter information using the "*StecaGrid User*" read out software. This is available on our homepage see *http://www.steca.com/index.php?StecaGrid_User_de*
  - Connection to the inverter via optional adapter RS485⇔USB is possible; the adapter is available from Steca under Article Number 746.610 (IP21) or 737.707 (IP65).
  - Load firmware updates (for technical professionals only)
- External data loggers, recommended by Steca for professional system monitoring:
  - WEB'log (Meteocontrol)
  - Solar-Log (Solare Datensysteme)
  - Energy-Manager (Kiwigrid GmbH)

Notice

The correct settings must be made in external data loggers, according to the manufacturer's instructions, before connecting them to the bus.

The wiring diagram of the RS485 bus is shown below.

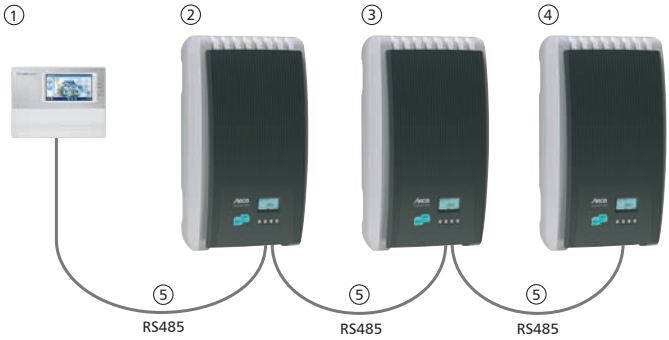


Fig. 7: Wiring diagram

① External data logger
② First inverter
③ Inverter
④ Last inverter, terminated
⑤ RJ45 standard cable (patch cable)

3.6.4 Alternative data connection cable

NOTICE!

Material damage caused by electrical voltage!
The alternative data connection cable may only be manufactured by professional personnel.

The alternative data connection cable is a Cat-5 cable for long data connections. The following applies to the alternative data connection cable:

- The total length of the RS485 bus must not exceed 1,000 m (Master/first inverter to last inverter).
- Use the pin assignment according to the table below if the alternative data connection cable is connected to the RJ45 socket of the first inverter or to the connector of an external data logger.

Tab. 2: Pin assignment of the alternative RS485 data cable

Device	Inverter	Solar-Log	WEB'log[1)]	Kiwigrid	Signal
Connection	RJ45	Terminal strip	RJ12	Terminal strip	↓
Contact	1	1	2	A	Data A
	2	4	4	B	Data B
	3	—	—	—	—
	4	—	—	—	—
	5	—	—	—	—
	6	—	—	—	—
	7	—	—	—	—
	8	3	6	GND	Ground

NOTICE!

[1] Danger of destroying the inverter's RS485 input. Pin 1 of the RJ12 socket of the Web'log data logger carries 24 V DC. Never connect the alternative data connection cable to pin 1!

3.6.5 RS485 termination

To prevent data transmission errors, the start and end of the RS485 bus should be terminated:

- The external data logger (at the start of the data connection) must be terminated according to the manufacturer's specifications.
- The last inverter (at the end of the data connection) is terminated by plugging the optionally available termination plug into the free RJ45 socket (for RS485 bus) (see table in *Chapter 2.2 „Identification" on page 6* under 'Optional accessories').

3.6.6 RS485 addressing

Every inverter must be assigned its own unique address for communication between the bus master and the slaves.

Every inverter is set with an address of 1 at the factory. This means that the addresses must be adjusted in systems having more than 1 inverter. The following applies:

- The address is changed at the inverter via the menu items *„Settings“* ▸ *„Address“*.
- Only addresses ranging from 1 – 99 may be set.
- The bus master devices usually support less than 99 addresses. Consult the respective operating instructions for these devices before setting the addresses of the inverters.
- We recommend starting with address 1 for the first inverter on the bus and then incrementing the address by 1 for each subsequent inverter on the bus, in the same order as they are physically installed. This makes it easier to identify the relevant inverters when their address is displayed in messages shown on the remote display.

3.6.7 Modbus RTU

The inverter communicates via Modbus RTU with energy meters. The following applies:

- Only energy meter pre-programmed in the inverter can be used.
- The energy meter must measure the supply from the grid in positive direction. Follow the manufacturer's instructions.

3.6.8 Modbus RTU data connection cable

NOTICE!

Material damage from electrical current! The alternative data connection cable may only be manufactured by technical professionals.

On the inverter side, a 4-pole telephone cable with RJ10 connector may be used as data connection cable.

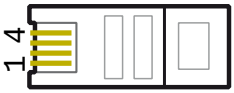


Fig. 8: Contact assignment (= line number) of the RJ10 plug

Device **Connection**	**Inverter** **RJ10**	**Signal**
Contact	1	Data A
	2	Data B
	3	Ground
	4	—

NOTICE!

Danger of destroying the Modbus RTU input of the inverter. Contact 4 of the RJ10 socket of the inverter carries voltage <20V. Do not use this contact.

4 Installation

4.1 Safety measures during installation

Observe the following safety notes when performing the work described in Section *Installation* .

DANGER!

Risk of death by electrocution!

- Only technical professionals may perform the work described in Section *Installation* .
- Do not connect cables to the inverter until explicitly asked to do so in the manual.
- Do not open the housing of the inverter.
- Connect only SELV circuits to the RJ45 sockets.
- Lay the cables such that the connection cannot come loose accidentally.
- When laying cables, ensure that no damage occurs to any of the constructional fire safety measures in the building.
- Make sure that no inflammable gases are present.
- Observe all applicable installation regulations and standards, national laws and connection values specified by the regional power supply company.

DANGER!

Danger from electrical current

ELECTRICAL SHOCK AND DISCHARGE!

The PV generators/lines may be energised as soon as the PV generators are exposed to light.

Always disconnect all DC and AC cables as follows before starting work on the inverter:

1. Turn the AC circuit breaker to off. Take measures to prevent the system from being unintentionally switched on again.
2. Set the DC circuit breaker on the inverter to position 0. Take measures to prevent the system from being unintentionally switched on again.
3. Disconnect the DC cable plug connectors according to the manufacturer's instructions.
4. Disconnecting the AC plug from the inverter ⇒ Release safety clip at the front of the AC plug by depressing it with a suitable object, then pull the plug out.

5. Check that all pins of the AC plug are free of voltage. Use a suitable voltmeter for this (do not use a simple neon phase checker).

NOTICE!

Risk of damage to the inverter or derating!

- The mounting location must satisfy the following conditions:
  - The mounting location and immediate environment are permanently fixed, vertical, flat, non-inflammable and not subject to constant vibration.
  - The permissible ambient conditions are conformed to; see Technical data *Chapter 8 „Technical data“ on page 57*.
  - The following free spaces must be present around the inverter:

    Above/below: at least 200 mm

    At the sides/in front: at least 60 mm
- Do not install the inverter in areas where animals are kept.
- Observe the connection ratings specified on the type plate.
- The DC cables must not be connected to an earth potential (DC inputs and AC output are not galvanically isolated).

NOTICE!

When transmitting data over a public network:

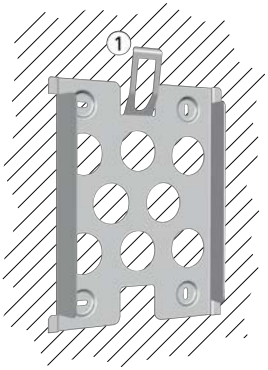
- Transmitting data over a public network may result in additional costs.
- Data transmitted over a public network is not protected from unauthorised access by third-parties.

Notice

- *Avoid exposing the inverter to direct sunlight.*
- *The display must be readable on the installed device.*
- *The inverter operates not completely noiselessly. Consider this when choosing an installation location.*

4.2 Mounting the inverter

Fastening the mounting plate



▶ Screw the mounting plate to the mounting surface using 4 screws:

- Use screws (and dowels etc.) appropriate for the weight of the inverter.
- The mounting plate must lie flat on the mounting surface and the metal strips at the sides must point forwards (Fig. left).
- Install the mounting plate vertically with the retaining plate ① at the top (example in Fig. left).

NOTICE!

With coolcept^3-x, you can secure the inverter with a padlock against theft or unauthorized removal. The padlock is inserted in a shackle which will lock into the retaining plate during mounting. Now, it is no longer possible to unlock the retaining plate.

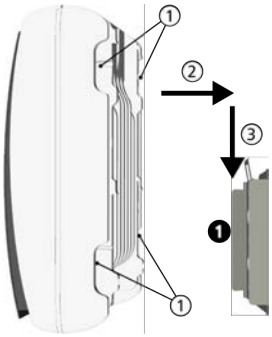
NOTICE!

For more information on determining the optimum position for the mounting plate, refer to the Brief Installation Instructions comprised in the delivery, and to the Appendix under Mounting.

Attaching the inverter on the mounting plate

NOTICE!

How to remove the inverter from the mounting plate is described under *Chapter 4.9 „Switch on DC“ on page 44*.



1. Grasp inverter on the grip recesses ① (coolcept^3) or by the perimeter edge (coolcept^3-x), fit it onto the mounting plate ❶so that it is centred ② and lightly press it on (see the example in the fig. on the left).
2. Lower the inverter ③ until the securing sheet metal element of the mounting plate audibly locks in place. In this process, the hooks on the rear of the inverter must be guided above the catches on the mounting plate.
3. The inverter must now be firmly seated on the mounting plate and it can no longer be lifted (upwards).

4.3 Prepare AC connection

4.3.1 Miniature circuit breaker

Information on the required line circuit breaker and the cables to be used between the inverter and the line circuit breaker is provided in *Further information on page 69*

4.3.2 Fault current circuit breaker

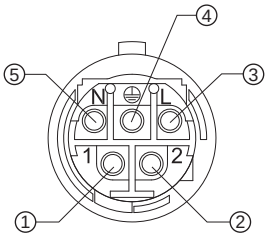
If the local installation regulations require the installation of an external residual current circuit breaker, then a Type A residual current circuit breaker as per IEC 62109-1, § 7.3.8. is sufficient.

4.3.3 Assemble AC plug

DANGER!

Risk of death by electrocution! Observe the hazard warnings under !

Wire the AC plug supplied as shown in the figure below.



① Phase 1
② Phase 2
③ Phase 3
④ Protective conductor PE has no function in the device; it does not have to be connected since the inverter meets the requirements of the protection class II.
⑤ Neutral conductor

4.4 Prepare DC connections

DANGER!

Risk of death by electrocution!

– Observe the hazard warnings under *Chapter 4.1 „Safety measures during installation “ on page 30*.
– Use the provided SUNCLIX plugs so that the specified protection class is maintained.

NOTICE!

The mating pieces that match the DC connections must be connected to the DC cables with correct polarity and in accordance with the manufacturer's guidelines.

Only an energy storage system approved by Steca may be connected to the battery connections.

If this instruction is not complied with, there is danger of damaging the inverter and the modules.

4.5 Preparing the data connection cable

If a data connection is required, use a standard RJ45 cable (patch cable, Cat5) or construct an alternative data connection cable (see *Further information on page 26*).

4.6 Connecting the inverter inverter and switching the AC on

DANGER!

Risk of death by electrocution! Observe the hazard warnings under *Chapter 4.1 „Safety measures during installation “ on page 30*.

NOTICE!

– Between the data connection cables (RS485/ Ethernet/Modbus RTU) and the DC/AC lines, maintain a distance of 200 mm, to avoid interference in the data transmission.
– The protection class IP65 for type coolcept^3-x is only ensured if the AC and DC plugs are plugged in and the RJ45 sockets are sealed with sealing caps.

1. If necessary, establish the data connection:
   - Connect the inverters and the master with data connection cables.
   - Plug a suitable termination plug into the last inverter.
2. Seal open RJ45 sockets of coolcept^3-x with sealing caps.
3. Forcefully press the plug connector mating piece (DC cable) into the DC connection on the inverter until it audibly locks in place.
4. Plug the AC connector onto the coupling on the inverter, until the plug audibly locks in place.
5. Switch on the AC miniature circuit breaker. The start page for 1st commissioning is shown on the display.
6. Perform 1st commissioning and switch on the DC supply, as described in

4.7 Initial commissioning of the inverter

4.7.1 Function

Conditions for starting initial commissioning

Initial commissioning starts automatically when at least the AC connector has been installed and switched on as described previously. If initial commissioning is not fully completed then it starts again anew the next time the device is switched on.

Guided initial commissioning

Initial commissioning is a guided procedure that sets the following information:

- Display language
- Date / Time
- Country
- Reactive power characteristic curve (if prescribed for the selected country)

Setting the country

The following applies when setting the country:

- The country set must always be the same as the country where the inverter is installed. This ensures that the inverter will load the specified net parameters of the respective country; for more information, refer to the Countries table on the Steca homepage, *www.steca.com/Wechselrichter-Wohnsiedlung*.
- **The country can only be set once!**
  Contact the Steca Technical Support if you have set the wrong country.
- If the Countries table does not list your country, select a country with stricter specifications.
- The country setting does not affect the language used on the display. The display language is set separately.

4.7.2 Operation

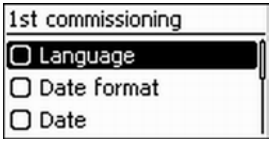
Starting 1st commissioning

The check list for 1st commissioning is displayed:

- The default display language is English.
- The `Language` entry is selected.
- The check boxes are not selected.

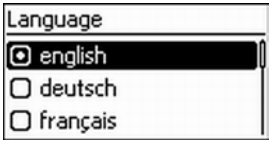
NOTICE!

– When a check list item is called up, the corresponding check box is automatically selected.
– Initial commissioning is completed by calling up the `Finish` item.
– `Finish` can only be performed when *all other* check boxes are selected.



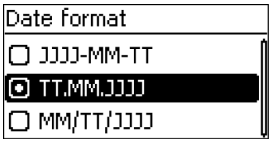
1. Press △▽ to select a check list item.
2. Press `SET` to call up the item.
   The items are described in detail below.

Language



1. Press △▽ to select a display language.
2. Press `SET`.
   ⇨ The language is adopted.
3. Press `ESC`.
   ✓ The check list is shown.

Date format

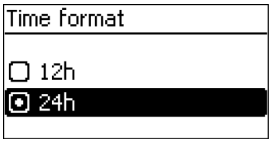


1. Press △▽ to select a date format.
2. Press SET.
   ⇨ The date format is adopted.
3. Press ESC.
   ✓ The check list is shown.

Date

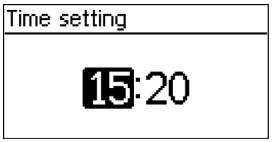
1. Press SET.
   ⇨ The day flashes.
2. Press △▽ to change the day.
3. Press SET.
   ⇨ The change is adopted.
4. Press ▽.
   ⇨ The month is selected.
5. Repeat steps 1 to 3 for the month.
6. Press ▽.
   ⇨ The year is selected.
7. Repeat steps 1 to 3 for the year.
8. Press ESC.
   ✓ The check list is shown.

Time format



1. Press △▽ to select a time format.
2. Press SET.
   ⇨ The time format is adopted.
3. Press ESC.
   ✓ The check list is shown.

Time



1. Press SET.
   ⇨ The hours display flashes.
2. Press △▽ to change the hour.
3. Press SET.
   ⇨ The change is adopted.
4. Press ▽.
   ⇨ The minutes are selected.
5. Repeat steps 1 to 3 for the minutes.
6. Press ESC.
   ✓ The check list is shown.

Country selection

NOTICE!
The country can only be set once!

1. Press △▽ to select a country.
2. Press SET.

3. Press ESC.
   ⇨ the dialog shown at the left is displayed.
4. Press ESC to select a different country by performing step 1 and step 2, or

   Press SET for a longer period of time (> 1 s) to confirm the currently selected country.
   ✓ The check list is shown.

Reactive power

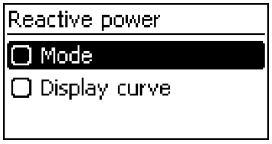
NOTICE!

The following items are only displayed when the use of a reactive power characteristic curve is prescribed for the country currently selected in the Country item:

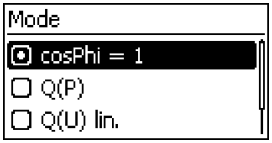
- `Mode`: Type of characteristic curve
  Select one of the following types:
  – cos phi = 1
  – Q(P)
  – Q(U) linear
  – Q(U) hysteresis
- `Loading defaults`[1]: A default characteristic curve can be selected here.
- `Node 1`[1]
  `No. of nodes`[1] The nodes provide for free programming of a characteristic curve.
- `Node 2`[1]
- `Node n`[1] [2]
- `Display char. curve`

[1]: Not indicated with mode cos phi = 1.

[2]: Is only displayed when `no. of nodes` has been set to a value > 2.



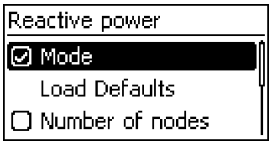
1. Press `SET` to call up the item.



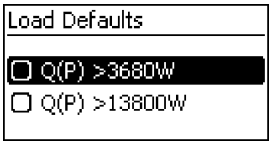
2. Press △▽ to select a type of reactive power characteristic curve.
3. Press `SET`.
   ⇨ The reactive power characteristic curve type is adopted.
4. Press `ESC`.
   ✓ The check list is shown.

Loading defaults

NOTICE!
If cosPhi = 1 was not selected, an additional menu item Load defaults is indicated.

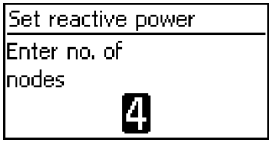


1. Press ▽ to select "Load defaults".
2. Press SET.



3. Press △▽ to select a default characteristic line.
4. Press SET.
   ⇨ The default characteristic line is adopted.
5. Press ESC.
   ✓ The check list is shown.

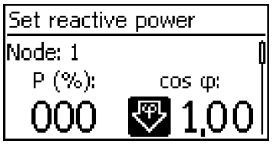
Number of nodes



1. Press SET.
   ⇨ The value flashes.
2. Press △▽ to change the number of nodes.
3. Press SET.
   ⇨ The value is adopted.
4. Press ESC.
   ✓ The check list is shown.

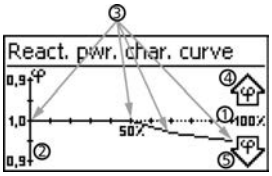
Node *n*

NOTICE!
`P %` cannot be changed at the first and last nodes (`000 %`, `100 %`).



1. Press △▽ to select a parameter for the node.
2. Press `SET`.
   ⇨ The parameter value flashes.
3. Press △▽ to change the value.
4. Press `SET`.
   ⇨ The change is adopted.
5. Repeat steps 1 to 4 for the other parameters.
6. Press `ESC`.
   ✓ The check list is shown.

Display char. curve

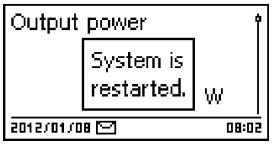


1. The previously set reactive power characteristic curve is displayed graphically (example in Fig. left).
   ① x-axis, output power P in %
   ② y-axis, phase shift cos φ
   ③ Nodes (in example: 4 nodes)
   ④ Arrow symbol *Overexcitation*
   ⑤ Arrow symbol *Underexcitation*
2. Press `ESC`
   ✓ The check list is shown.

Finish

✓ `Finish` has been selected in the check list and `SET` has been pressed. One of 2 possible dialogues is displayed.

1. Proceed as follows, depending on the respective dialogue:
   - Dialogue `Settings are incomplete`: Press `SET` and work through the open items in the check list.
   - Dialogue `Are all settings correct?`:
     Press `ESC` to correct settings or



2. Press and hold SET (> 1 s) to finish 1st commissioning.

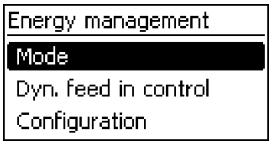
✓ If SET was pressed for a longer time then the inverter starts anew and synchronises itself with the grid (Fig. left).

4.8 Feed-in management

Depending on the country, photovoltaic systems must have the possibility of being reduced in the fed-in effective power by the network operator. The following products are recommended for implementing this legally prescribed specification:

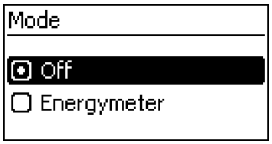
- StecaGrid SEM
- WEB'log from Meteocontrol
- Solar-Log from Solare Datensysteme
- Energy-Manager from Kiwigrid

Furthermore, an energy meter can be used for feed-in management. It must be connected to the Modbus RTU interface and meet the preconditions specified in *Chapter 3.6.7 „Modbus RTU" on page 28* and *Chapter 3.6.8 „Modbus RTU data connection cable" on page 28*.



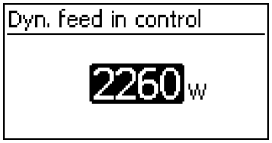
NOTICE!
The settings for feed-in management must be made in the sub-menu 'Energy management'.

Mode



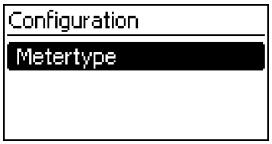
1. Press SET to call up the item.
2. Press ▽ to select "Energy meter".
3. Press SET.
4. Press ESC to go one level higher to Energy management.

Dynamic feed-in regulation

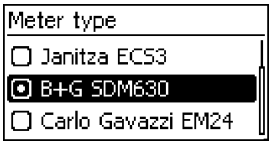


NOTICE!
The power fed into the grid is adjusted in 10 W steps. It can be limited to a minimum of 0 W.

Configuration of the energy meter



NOTICE!
The inverter can only work with energy meters that have been pre-programmed in the inverter. The pre-programmed energy meters are listed under Meter type.



1. Press SET to call up the item.
2. Press △▽ to select a meter type.
3. Press SET.
4. Press ESC to quit the sub-menu.

4.9 Switch on DC

Place DC load-break switch on the inverter on position I (Fig. left). After testing via the internal MSD (approx. 2 minutes), the power fed into the grid can be shown on the display (assuming that sunlight is present).

NOTICE!

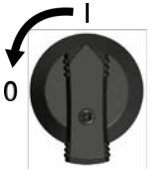
At the coolcept[3]-x devices, the DC load-break switch can be safeguarded with a padlock (shackle thickness max. 7 mm) against accidental activation.

4.10 Deinstalling the inverter

DANGER!

Risk of death by electrocution! Only technical professionals may perform the work described in this section. Follow the safety instructions at the beginning of the Section "Installation".

Switching off the AC and DC supplies



1. Set the DC circuit breaker on the inverter to position 0 (Fig. left).
2. Turn the AC circuit breaker to off.
3. Wait for at least 10 minutes before disconnecting the plug-in connectors of the DC cable.

Disconnecting the DC connections from the inverter

→ Disconnect the DC cable plug connectors according to the manufacturer's instructions; see appendix.

WARNING!
DC cables carry voltage when the PV generators are subjected to sunlight.

Disconnecting the AC plug from the inverter

1. → Disconnecting the AC plug from the inverter

   Release the safety clip at the front of the AC plug by depressing it with a suitable object, then pull the plug out.

2. → Check that all pins of the AC plug are free of voltage:

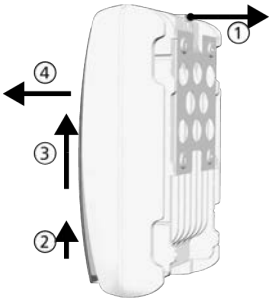
   Use a suitable voltmeter for this (do not use a simple neon phase checker).

Opening the AC plug (only if required)

→ Opening the AC plug:

First, unscrew the rear cable connection. Next, release the safety clips at the left and right of the plug housing by depressing them simultaneously with a suitable object. Now, pull the top part of the housing off the contact element.

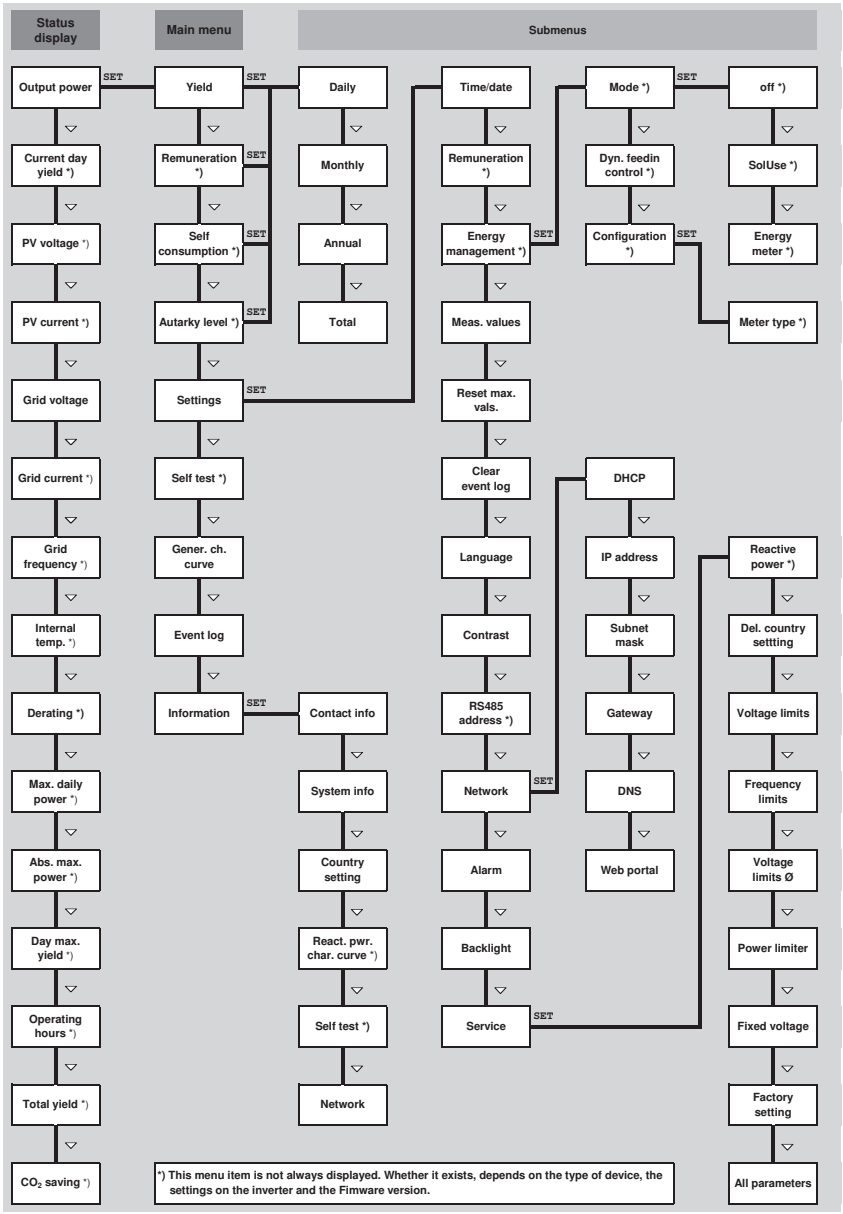
Removing the inverter from the mounting surface



1. → Use one hand to press the retaining plate on the mounting plate approx. 5 mm towards the mounting surface ① (Fig. left).
2. → Use the other hand to push the inverter upwards, far enough so that the retaining plate no longer latches ②. Release the retaining plate.
3. → Lift the inverter with both hands until the hooks on the rear side of the inverter are free ③.
4. → Remove the inverter from the mounting surface ④.

5 Operation

5.1 Overview of operating functions



Only the ▽ and SET operating buttons are illustrated (for the sake of clarity).

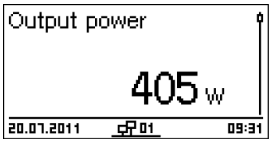
5.2 General operating functions

- Hidden content is shown using the △ and ▽ buttons.
- Repeated button presses: If △▽ need to be pressed repeatedly, you can alternatively hold these buttons pressed for a *long* time. The rate of repetition increases the longer the button is held.
- Pressing any button switches on the display backlighting

5.3 Important operating functions

The figures in this section show examples.

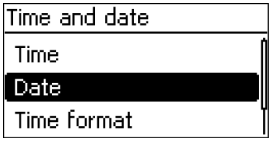
Status display



1. If necessary, press ESC for 1 second to call up the status display (Fig. left).
2. Press △▽ to display a different parameter.

Menu navigation

1. Press ESC for 1 second to call up the status display as required.
2. Press SET.
   ⇨ The main menu is displayed with the top item selected.



3. Press △▽ to select a menu item.
4. Press SET to call up the submenu (Fig. left).
5. Repeat steps 3 and 4 for further submenus as required.

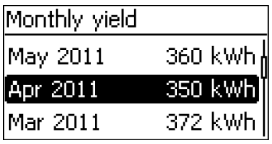
Event messages

See ↯ *„Event messages“ on page 51*.

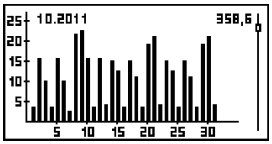
Displaying entries numerically (list) and graphically (diagram)

The status display is shown.

1. Press SET.
   ⇨ The main menu is displayed with Yield selected.
2. Press SET.
   ⇨ The list with yield time periods is shown.



3. Press △▽ to select a yield time period.
4. Press SET.
   ⇨ The individual yields for the yield time period are shown in a list (Fig. left).
5. Press △▽ to select an individual yield value.



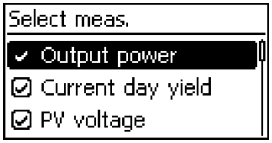
6. Press SET.

   ⇨ The selected individual yield is shown in a chart (Fig. left).

7. Press △▽ to page through the charts.

8. Press SET to return to the list.

Editing selection lists containing check boxes



A selection list with check boxes is displayed (Fig. left).

1. Press △▽ to select a check box.

2. Press SET.

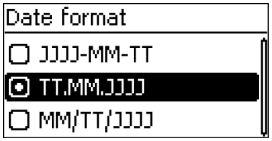
   ⇨ The state of the check box changes from *on*to *off*and vice-versa (preset check boxes cannot be changed).

3. Repeat steps 1 and 2 for further check boxes as required.

4. Press ESC.

   ✓ The changes are adopted and the next higher menu level is displayed.

Editing selection lists containing radio buttons



A selection list with radio buttons is displayed (Fig. left).

1. Press △▽ to select a radio button that is currently switched off.

2. Press SET.

   ⇨ The selected radio button is switched on and the previously switched on radio button is switched off.

3. Press ESC.

   ✓ The changes are adopted and the next higher menu level is displayed.

Changing numeric settings

A numeric setting is displayed (example *Date* in Fig. left).

1. Press SET.

   ⇨ The selected value flashes (*Day* in Fig. left).

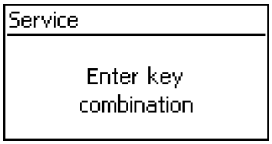
2. Press △▽ to change the value.

3. Press SET.
   ⇨ The change is adopted (value no longer flashes) *or* Press ESC to cancel the change (value no longer flashes).
4. Press ▽.
   ⇨ The next value is selected.
5. Repeat steps 1 to 4 for the remaining values.
6. Press ESC.
   ✓ The next higher menu level is displayed.

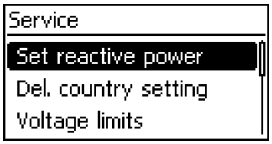
Calling up the service menu and editing the values

NOTICE!

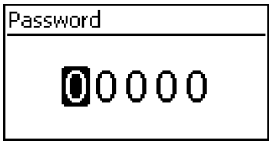
Risk of yield losses and contravention of regulations and standards. Inverter and grid parameters can be changed in the service menu. The service menu must therefore only be used by technical professionals who know the applicable regulations and standards.



1. Select the Service menu item.
2. Press SET.
   ⇨ The fig. shown at the left appears.



3. Press △▽ simultaneously for 3 seconds.
   ⇨ The service menu is displayed (Fig. left).
4. Press △▽ to select a menu item.



5. Press SET to edit the menu item. The following applies:
   - Enter the password if required (Fig. left); see *Chapter 3.3.4 „Service menu" on page 18*.
   - If necessary, press △▽ within a menu item to display and edit other settings (e.g. Voltage limits).
   - The menu items are described in *Chapter 3.3.4 „Service menu" on page 18*.

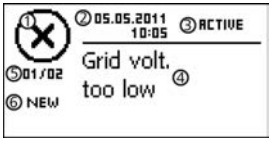
5.4 Internet portal

For a StecaGrid portal description and the registration page of your system, go to *www.steca.com/portal*.

6 Fault rectification

Faults are indicated by event messages as described below. The display flashes red. The *list of event messages* below contains information on troubleshooting and fault correction.

Structure



Event messages contain the following information:

① Symbol for the type of event message
② Date/time when the event occurred
③ `ACTIVE` = cause of the event message is still present *or* `Date/time` at which the cause of the event message was corrected.
④ Cause of the event message
⑤ Counter: *No. of the displayed event messages* / *Total number of event messages*; max number of all event messages = 60
⑥ `NEW` is displayed until the event message has been manually confirmed via the `ESC` or △▽ button.

Function

Event message types

- Type **Information** (symbol ⓘ)
  The inverter has detected an error that does not affect the feed-in process. The user does not need to intervene.
- Type **Warning** (symbol ⚠)
  The inverter has detected an error that may result in reduced yields. It is highly recommended that you correct the cause of the error.
- Type **Error** (symbol ⊗)
  The inverter has detected a serious error. The inverter will not feed into the grid while this error is present. Please contact your installer. More information is provided in the table below.

Display behaviour

New event messages are displayed immediately. The messages disappear after they have been confirmed or their causes have been corrected.

Note

When an event message is confirmed, the user thereby simply confirms that he/she has seen the message. This does not correct the error that caused the event message to be shown!

If messages exist whose cause has been corrected but have not been confirmed then ✉ is shown in the status display. If an already confirmed error recurs then it is displayed again.

Operation

Confirming event messages

✓	An event message with the comment `NEW` is displayed.
▶	Press `ESC`/△/▽. The event message is confirmed.

Displaying event messages

1. Select `Event log` in the main menu.
2. Press `SET`.
   ⇨ The event messages are displayed in chronological order (latest message first).
3. Press △▽ to page through the event messages.

Event messages

Event message	Description	Type
`CountryCode failed`	There is an inconsistency between the selected country setting and the country setting stored in memory. ▶ Notify your installer.	
`Country parameters invalid`	The inverter cannot inject into the grid because it has no valid parameters. ▶ Notify your installer.	
`Device overheated`	In spite of capacity reduction, the maximum permissible temperature is exceeded. The inverter does not inject into the grid until the permissible temperature range is reached. 1. Check whether the installation conditions are fulfilled. 2. Contact your installer if this alarm occurs frequently.	
`Data transfer failed`	A setting failed, for example during initial commissioning, because it has not been properly adopted. ▶ Repeat the setting. ▶ Contact your installer if this error occurs frequently.	
`Fan faulty`	The internal fan of the inverter is defective. It is possible that the inverter injects into the grid with reduced capacity. ▶ Notify your installer.	
`Grid current DC offset too high`	The DC current power share that is injected by the inverter into the grid, exceeds the permissible value. Pursuant to statutory regulations, the inverter switches off automatically as long as this fault is pending. ▶ Notify your installer.	
`Grid frequency too high`	The grid frequency applied on the inverter exceeds the permissible value. Pursuant to statutory regulations, the inverter switches off automatically as long as this fault is pending. ▶ Contact your installer if this error occurs frequently.	
`Grid frequency too high for reactivation`	After switch-off, the inverter cannot inject again because the grid voltage exceeds the legally prescribed switch-on value. ▶ Contact your installer if this error occurs frequently.	

Event message	Description	Type
Grid frequency too low	The grid frequency applied on the inverter is below the permissible value. Pursuant to statutory regulations, the inverter switches off automatically as long as this fault is pending. ▶ Contact your installer if this error occurs frequently.	
Grid frequency too low reactivation	After switch-off, the inverter cannot inject again because the grid voltage is below the legally prescribed switch-on value. ▶ Contact your installer if this error occurs frequently.	
Grid islanding detected	The grid is not carrying any voltage (self-run of the inverter). For safety reasons the inverter is not allowed to inject into the grid. It switches itself off as long as the error is present (display dark). ▶ Contact your installer if this error occurs frequently.	
Grid relay defective	The inverter has detected that a grid relay is defective; for this reason, it is not injecting into the grid. ▶ Notify your installer.	
Grid voltage too high	The grid voltage applied on the inverter exceeds the permissible value. Pursuant to statutory regulations, the inverter switches off automatically as long as this fault is pending. ▶ Contact your installer if this error occurs frequently.	
Grid voltage ∅ too high	The output voltage averaged over the legally prescribed time period exceeds the permissible tolerance range. The inverter switches off automatically as long as this fault is pending. ▶ Contact your installer if this error occurs frequently.	
Grid voltage too low	The grid voltage applied on the inverter is below the permissible value. Pursuant to statutory regulations, the inverter switches off automatically as long as this fault is pending. ▶ Contact your installer if this error occurs frequently.	
Grid voltage ∅ too low	The output voltage averaged over the legally prescribed time period is below the permissible tolerance range. The inverter switches off automatically as long as this fault is pending. ▶ Contact your installer if this error occurs frequently.	
Grid voltage too high for reactivation	After switching off, the inverter cannot resume feeding because the grid voltage exceeds the legally prescribed switch-on value. ▶ Contact your installer if this error occurs frequently.	
Grid voltage too low for reactivation	After switch-off, the inverter cannot inject again because the grid voltage is below the legally prescribed switch-on value. ▶ Contact your installer if this error occurs frequently.	
Intern.error	▶ Contact your installer if this alarm occurs frequently.	

Event message	Description	Type
Intern. info	▶ Contact your installer if this alarm occurs frequently.	
Intern. warning	▶ Contact your installer if this alarm occurs frequently.	
Isolation error	The insulating resistor between plus and minus input and ground underranges the permissible value. For safety reasons the inverter is not allowed to inject into the grid. ▶ Notify your installer.	
L and N swapped	Outer conductor and neutral conductor are connected swapped out. For safety reasons the inverter is not allowed to inject into the grid. ▶ Notify your installer.	
No branding	The inverter has incorrect or faulty device data. For this reason, the inverter cannot inject into the grid. ▶ Notify your installer.	
No connection to the energy meter	The communication connection between the inverter and the energy meter is missing or not correct. ▶Contact your installer to have the connection checked.	
Overtemperature HSS	The maximum permissible boost converter temperature has been exceeded. The inverter does not inject into the grid until the permissible temperature range is reached. 1. Check whether the installation conditions are fulfilled. 2. Contact your installer if this alarm occurs frequently.	
Power reduction due to temperature	The inverter reduces it output power because the maximum permissible temperature has been reached. 1. Check whether the installation conditions are fulfilled. 2. Contact your installer if this error occurs frequently.	
PV current too high	The input current at the inverter exceeds the permissible value. The inverter limits the current to the permissible value. ▶ Contact your installer if this alarm occurs frequently.	
PV voltage too high	The input voltage applied on the inverter exceeds the permissible value. ▶ Switch off the DC load-break switch of the inverter and notify your installer.	
Reading CountryCode failed	The inverter could not correctly read out the country setting from the memory. ▶ Notify your installer.	

Event message	Description	Type
Residual current too high	The fault current that flows from the plus or minus input via the PV generators exceeds the permissible value. Pursuant to statutory regulations, the inverter switches off automatically as long as this fault is pending. ▶ Notify your installer.	
RS485 Gateway activated	No communication with the inverter possible via the RS485 interface. ▶ Disconnect the inverter from the grid and reset it (AC reset). ▶ Have your installer carry out this operation.	
Software incompatible	"After a firmware update, the different software statuses in the inverter do not match any more. 1. Repeat the firmware update using a valid update file. 2. Contact your installer if this error occurs frequently.	
Time/date lost	The inverter lost the time because it remained unconnected from the grid for too long a time. Yield data cannot be stored, event messages only with incorrect date. ▶ Correct the time settings under Settings ▶Time/date.	

7 Maintenance and disposal

7.1 Maintenance

The inverter is virtually maintenance-free. Nevertheless, we recommend that you inspect it regularly to ensure that the fins on the front and rear of the device are free of dust. Clean the device when necessary as described below.

NOTICE!

Danger of destroying components on devices of type coolcept[3]:

- **Do not** allow cleaning agents and devices to penetrate between the fins at the front of the inverter (under the grey hood).
- The following cleaning agents, in particular, **must not be used**:
  - Cleaning agents that contain solvent
  - Disinfectants
  - Gritty or sharp-edged cleaning materials

Removing dust

→ Dust should be removed using compressed air (max. 2 bar).

Removing heavy soiling

DANGER!

Risk of death by electrocution! Use cleaning agents only with a slightly damp cloth.

1. → Remove heavy soiling with a slightly damp cloth (use clear water). If necessary, use a 2 % hard soap solution instead of water.
2. → After cleaning, remove any soap residue using a slightly damp cloth.

7.2 Disposal

The crossed-out wheelie bin symbol on the device indicates that this product must not be disposed of with the normal household waste. It must be taken to a collection point for waste electrical and electronic equipment. Information on the collection points can be obtained from the local waste disposal company, the next collection point for household waste or from the dealer where you bought your device.

Electrical devices can contain hazardous components which, if they are disposed of improperly, may do harm to environment and human health. Separate collection ensures proper treatment, recovery and reuse of the raw materials contained in the waste equipment according to the provisions of current legislation.

The device packaging consists of recyclable materials.

8 Technical data

8.1 Inverter

8.1.1 StecaGrid 3203/3203x/4003/4003x

	StecaGrid 3203/x	StecaGrid 4003/x
DC input side (PV generator connection)		
Number of DC inputs	1	
Maximum start voltage	1000 V	
Maximum input voltage	1000 V	
Minimum input voltage for feeding-in	250 V	
Start input voltage	250 V	
Rated input voltage	415 V	515 V
Minimum input voltage for rated output	300 V	375 V
Number of MPP trackers	1	
Operating input voltage range	250 ... 800 V	
Maximum input current	11 A	
Maximum short-circuit current	+20 A/– 13 A	
Rated input current	8 A	
Max. current refeed to PV generator	0 A	
Maximum input capacity at maximum output effective power	3,300 W	4,100 W
Nominal input power (cos φ = 1)	3,300 W	4,100 W
Derating / power limiting	occurs automatically when: ■ input power > max. recommended PV power ■ Cooling is inadequate ■ Input current too high ■ Output current too high ■ Grid frequency too high (in accordance with country setting) ■ Limiting signal on external interface ■ Output power limited (set on the inverter)	
DC side (storage connection)[1)]		
Voltage	580 V ... 1000 V	
Maximum current	10 A	

	StecaGrid 3203/x	StecaGrid 4003/x
AC output side (grid connection)		
Output voltage	320 V to 480 V (depending on the country settings)	
Rated output voltage	400 V	
Maximum output current	7 A	
Maximum inrush current (switch-on current)	16 A (for 10 ms)	
RMS short-circuit current	3.82 A_{RMS} (for 60 ms)	
Rated output current	4.6 A	5.8 A
Maximum effective power (cos φ = 1)	3,200 W	4,000 W
Maximum effective power (cos φ = 0.95)	3,040 W	3,800 W
Maximum effective power (cos φ = 0.90)	2,880 W	3,600 W
Maximum apparent power (cos φ = 0.95)	3,200 VA	4,000 VA
Maximum apparent power (cos φ = 0.90)	3,200 VA	4,000 VA
Rated output	3,200 W	4,000 W
Nominal frequency	50 Hz and 60 Hz	
Grid type	$L_1/L_2/L_3$/N/FE (protective earth)	
Grid frequency	45 Hz ... 65 Hz (depending on the country settings)	
Power losses in night-time operation	< 3 W	
Feeding phases	Three-phase	
Distortion factor (cos φ = 1)	< 1 %	
Power factor cos φ	0.8 capacitive ... 0.8 inductive	
Characterization of the operating behaviour		
Maximum efficiency	98.6 %	
European efficiency	97.9 %	98.1 %
California efficiency	98.3 %	98.4 %
MPP efficiency	> 99.7 % (static), > 99 % (dynamic)	

	StecaGrid 3203/x	StecaGrid 4003/x
Efficiency values (at 5 %, 10 %, 20 %, 25 %, 30 %, 50 %, 75 %, 100 % of the rated power) at rated voltage	82 %, 91.7 %, 95.6 %, 96.2 %, 96.8 %, 97.5 %, 97.7 %, 97.1 %	87.3 %, 93.7 %, 96.5 %, 97.1 %, 97.4 %, 97.9 %, 98 %, 97.7 %
Efficiency values (at 5 %, 10 %, 20 %, 25 %, 30 %, 50 %, 75 %, 100 % of the rated power) at minimum MPP voltage	81.6 %, 91.2 %, 95.1 %, 95.9 %, 96.3 %, 97 %, 97.1 %, 96.7 %	85.4 %, 92.8 %, 96.1 %, 96.7 %, 97 %, 97.5 %, 97.4 %, 97.1 %
Efficiency values (at 5 %, 10 %, 20 %, 25 %, 30 %, 50 %, 75 %, 100 % of the rated power) at maximum MPP voltage	86.4 %, 93.2 %, 96.2 %, 96.8 %, 97.3 %, 98 %, 98.2 %, 98.3 %	89.1 %, 94.5 %, 96.8 %, 97.3 %, 97.7 %, 98.2 %, 98.2 %, 98.1 %
Efficiency reduction in the case of a rise in ambient temperature (at temperatures > 40 °C)	0.005 %/°C	
Efficiency change in the case of deviation from the DC rated voltage	0.002 %/V	
Own consumption	< 8 W	
Power reduction at full power	from 50 °C (T_{amb})	
Switch-on power	10 W	
Switch-off power	8 W	
Safety		
Protection class	II	
Separation principle	No electrical isolation, transformer-less	
Grid monitoring	yes, integrated	
Insulation monitoring	yes, integrated	
Fault current monitoring	yes, integrated[2)]	
Version overvoltage protection	Varistors	
Reverse polarity protection	yes	
Implementation conditions		
Implementation area	coolcept^3: indoor rooms, with or without air conditioning coolcept^3-x: indoor rooms, with or without air conditioning, out of doors with or without protection	
Climate classification pursuant to IEC 60721-3-3	coolcept^3: 3K3 coolcept^3-x: 4K4H	
Ambient temperature	–15 °C ... +60 °C	

	StecaGrid 3203/x	StecaGrid 4003/x
Storage temperature	–30 °C ... +70 °C	
Relative humidity	coolcept^3: 0 % ... 95 %, non-condensing coolcept^3-x: 0 % ... 100 %	
Installation altitude	≤ 2000 m above sea level	
Degree of pollution	PD3	
Noise emission (typical)	29 dBA	
Impermissible ambient gases	Ammonia, solvents	
Equipment and design		
Protection class	coolcept^3: IP21 (housing: IP51; display: IP21) coolcept^3-x: IP65	
Overvoltage category	III (AC), II (DC)	
DC connection		
Type	coolcept^3: Phoenix Contact SUNCLIX (2 pairs: 1 x PV, 1 x battery) coolcept^3-x: Phoenix Contact SUNCLIX (1 pair)	
Connection cross section	Conductor cross-section 2.5 … 6 mm^2	
Opposing connector	Opposing connector (1 pair) included in delivery	
AC connection		
Type	Wieland RST25i5 plug	
Connection cross section	Cable diameter 10 ... 14 mm^2, conductor cross-section ≤ 4 mm^2	
Opposing connector	Opposing connector included in delivery	
Dimensions (X x Y x Z)	coolcept^3: 340 x 608 x 222 mm coolcept^3-x: 399 x 657 x 227 mm	
Weight	coolcept^3: 10 kg coolcept^3-x: 12 kg	
Display	Graphical display, 128 x 64 pixels	
Communication interfaces	RS485 (2 x RJ45 sockets: connection to Meteocontrol WEB'log or Solar-Log™), Ethernet interface (1 x RJ45), Modbus RTU (1 x RJ10 socket: connection to energy meter, only coolcept^3)	
Integrated DC circuit breaker	yes, compliant with VDE 0100-712	

	StecaGrid 3203/x	StecaGrid 4003/x
Cooling principle	Temperature-controlled fan, speed variable, internal (dust-protected)	
Test certificate	Certificates download see the product page on our homepage.	

Technical data at 25 °C / 77 °F

[1] Only Steca storage-ready devices may be connected to the storage system connection. Batteries **cannot** be connected directly.

[2] Due to its design the inverter cannot cause any DC fault currents.

8.1.2 StecaGrid 4803x/5503x

	StecaGrid 4803x	StecaGrid 5503x
DC input side (PV generator connection)		
Number of DC inputs	1	
Maximum start voltage	1000 V	
Maximum input voltage	1000 V	
Minimum input voltage for feeding-in	250 V	
Start input voltage	250 V	
Rated input voltage	615 V	700 V
Minimum input voltage for rated output	490 V	560 V
Number of MPP trackers	1	
Operating input voltage range	250 ... 800 V	
Maximum input current	11 A	
Maximum short-circuit current	+20 A/– 13 A	
Rated input current	8 A	
Max. current refeed to PV generator	0 A	
Maximum input capacity at maximum output effective power	4,920 W	5,620 W
Nominal input power (cos φ = 1)	4,920 W	5,620 W

	StecaGrid 4803x	StecaGrid 5503x
Derating / power limiting	occurs automatically when: ■ input power > max. recommended PV power ■ Cooling is inadequate ■ Input current too high ■ Output current too high ■ Grid frequency too high (in accordance with country setting) ■ Limiting signal on external interface ■ Output power limited (set on the inverter)	
DC side (storage connection)[1)]		
Voltage	580 V ... 1000 V	
Maximum current	10 A	
AC output side (grid connection)		
Output voltage	320 V to 480 V (depending on the country settings)	
Rated output voltage	400 V	
Maximum output current	10 A	
Maximum inrush current (switch-on current)	16 A (for 10 ms)	
RMS short-circuit current	3.82 A_{RMS} (for 60 ms)	
Rated output current	7 A	8 A
Maximum effective power ($\cos \varphi = 1$)	4,800 W	5,500 W
Maximum effective power ($\cos \varphi = 0.95$)	4,560 W	5,225 W
Maximum effective power ($\cos \varphi = 0.90$)	4,320 W	4,950 W
Maximum apparent power ($\cos \varphi = 0.95$)	4,800 VA	5,500 VA
Maximum apparent power ($\cos \varphi = 0.90$)	4,800 VA	5,500 VA
Rated output	4,800 W	5,500 W
Nominal frequency	50 Hz and 60 Hz	
Grid type	$L_1/L_2/L_3$/N/FE (protective earth)	
Grid frequency	45 Hz ... 65 Hz (depending on the country settings)	
Power losses in night-time operation	< 3 W	

	StecaGrid 4803x	StecaGrid 5503x
Feeding phases	Three-phase	
Distortion factor (cos φ = 1)	< 1 %	
Power factor cos φ	0.8 capacitive ... 0.8 inductive	
Characterization of the operating behaviour		
Maximum efficiency	98.7 %	
European efficiency	98.2 %	98.3 %
California efficiency	98.5 %	98.5 %
MPP efficiency	> 99.7 % (static), > 99 % (dynamic)	
Efficiency values (at 5 %, 10 %, 20 %, 25 %, 30 %, 50 %, 75 %, 100 % of the rated power) at rated voltage	92.8 %, 96.2 %, 97.9 %, 98.2 %, 98.4 %, 98.7 %, 98.6 %, 98.4 %	92.9 %, 95.8 %, 97.7 %, 98 %, 98.2 %, 98.5 %, 98.4 %, 98.2 %
Efficiency values (at 5 %, 10 %, 20 %, 25 %, 30 %, 50 %, 75 %, 100 % of the rated power) at minimum MPP voltage	87.8 %, 94.2 %, 96.8 %, 97.3 %, 97.6 %, 97.9 %, 97.8 %, 97.7 %	90.2 %, 95.1 %, 97.3 %, 97.6 %, 97.8 %, 98.2 %, 98.1 %, 97.7 %
Efficiency values (at 5 %, 10 %, 20 %, 25 %, 30 %, 50 %, 75 %, 100 % of the rated power) at maximum MPP voltage	89.6 %, 94.5 %, 97 %, 97.4 %, 97.7 %, 98.3 %, 98.4 %, 98.2 %	90.5 %, 95.1 %, 97.2 %, 97.6 %, 97.8 %, 98.2 %, 98.2 %, 98 %
Efficiency reduction in the case of a rise in ambient temperature (at temperatures > 40 °C)	0.005 %/°C	
Efficiency change in the case of deviation from the DC rated voltage	0.002 %/V	
Own consumption	< 8 W	
Power reduction at full power	from 50 °C (T_{amb})	
Switch-on power	10 W	
Switch-off power	8 W	
Safety		
Protection class	II	
Separation principle	No electrical isolation, transformer-less	
Grid monitoring	yes, integrated	
Insulation monitoring	yes, integrated	
Fault current monitoring	yes, integrated[2)]	

	StecaGrid 4803x	StecaGrid 5503x
Version overvoltage protection	Varistors	
Reverse polarity protection	yes	
Implementation conditions		
Implementation area	indoor rooms, with or without air conditioning, out of doors with or without protection	
Climate classification pursuant to IEC 60721-3-3	4K4H	
Ambient temperature	–15 °C ... +60 °C	
Storage temperature	–30 °C ... +70 °C	
Relative humidity	0 % ... 100 %	
Installation altitude	≤ 2000 m above sea level	
Degree of pollution	PD3	
Noise emission (typical)	29 dBA	
Impermissible ambient gases	Ammonia, solvents	
Equipment and design		
Protection class	IP 65	
Overvoltage category	III (AC), II (DC)	
DC connection		
Type	Phoenix Contact SUNCLIX (1 pair)	
Connection cross section	Conductor cross-section 2.5 … 6 mm^2	
Opposing connector	Opposing connector (1 pair) included in delivery	
AC connection		
Type	Wieland RST25i5 plug	
Connection cross section	Cable diameter 10 ... 14 mm^2, conductor cross-section ≤ 4 mm^2	
Opposing connector	Opposing connector included in delivery	
Dimensions (X x Y x Z)	399 x 657 x 227 mm	
Weight	12 kg	
Display	Graphical display, 128 x 64 pixels	
Communication interfaces	RS485 (2 x RJ45 sockets: connection to Meteocontrol WEB'log or Solar-Log™), Ethernet interface (1 x RJ45)	
Integrated DC circuit breaker	yes, compliant with VDE 0100-712	

	StecaGrid 4803x	StecaGrid 5503x
Cooling principle	Temperature-controlled fan, speed variable, internal (dust-protected)	
Test certificate	Certificates download see the product page on our homepage.	

Technical data at 25 °C / 77 °F

[1] Only Steca storage-ready devices may be connected to the storage system connection. Batteries **cannot** be connected directly.

[2] Due to its design the inverter cannot cause any DC fault currents.

8.1.3 StecaGrid 5003/6003

	StecaGrid 5003	StecaGrid 6003
DC input side (PV generator connection)		
Number of DC inputs	1	
Maximum start voltage	1000 V	
Maximum input voltage	1000 V	
Minimum input voltage for feeding-in	250 V	
Start input voltage	250 V	
Rated input voltage	640 V	770 V
Minimum input voltage for rated output	470 V	560 V
Number of MPP trackers	1	
Operating input voltage range	250 ... 800 V	
Maximum input current	11 A	
Maximum short-circuit current	+20 A/– 13 A	
Rated input current	8 A	
Max. current refeed to PV generator	0 A	
Maximum input capacity at maximum output effective power	5,110 W	6,130 W
Nominal input power (cos φ = 1)	5,110 W	6,130 W

	StecaGrid 5003	StecaGrid 6003
Derating / power limiting	occurs automatically when: ■ input power > max. recommended PV power ■ Cooling is inadequate ■ Input current too high ■ Output current too high ■ Grid frequency too high (in accordance with country setting) ■ Limiting signal on external interface ■ Output power limited (set on the inverter)	
DC side (storage connection)[1)]		
Voltage	580 V ... 1000 V	
Maximum current	10 A	
AC output side (grid connection)		
Output voltage	320 V to 480 V (depending on the country settings)	
Rated output voltage	400 V	
Maximum output current	10 A	
Maximum inrush current (switch-on current)	16 A (for 10 ms)	
RMS short-circuit current	3.82 A_{RMS} (for 60 ms)	
Rated output current	7.2 A	8.7 A
Maximum effective power (cos φ = 1)	5,000 W	6,000 W
Maximum effective power (cos φ = 0.95)	4,750 W	5,700 W
Maximum effective power (cos φ = 0.90)	4,500 W	5,400 W
Maximum apparent power (cos φ = 0.95)	5,000 VA	6,000 VA
Maximum apparent power (cos φ = 0.90)	5,000 VA	6,000 VA
Rated output	5,000 W	6,000 W
Nominal frequency	50 Hz and 60 Hz	
Grid type	$L_1/L_2/L_3$/N/FE (protective earth)	
Grid frequency	45 Hz ... 65 Hz (depending on the country settings)	
Power losses in night-time operation	< 3 W	

	StecaGrid 5003	StecaGrid 6003
Feeding phases	Three-phase	
Distortion factor (cos φ = 1)	< 1 %	
Power factor cos φ	0.8 capacitive ... 0.8 inductive	
Characterization of the operating behaviour		
Maximum efficiency	98.7 %	
European efficiency	98.2 %	98.3 %
California efficiency	98.5 %	98.5 %
MPP efficiency	> 99.7 % (static), > 99 % (dynamic)	
Efficiency values (at 5 %, 10 %, 20 %, 25 %, 30 %, 50 %, 75 %, 100 % of the rated power) at rated voltage	92.8 %, 96.3 %, 97.9 %, 98.1 %, 98.3 %, 98.7 %, 98.5 %, 98.4 %	90.5 %, 95.3%, 97.3 %, 97.7 %, 98.0 %, 98.2 %, 98.2 %, 97.9 %
Efficiency values (at 5 %, 10 %, 20 %, 25 %, 30 %, 50 %, 75 %, 100 % of the rated power) at minimum MPP voltage	87.9 %, 94.4 %, 96.9 %, 97.3 %, 97.6 %, 98.0 %, 97.8 %, 97.7 %	92.0 %, 96.2 %, 97.8 %, 98.1 %, 98.3 %, 98.4 %, 98.2 %, 97.8 %
Efficiency values (at 5 %, 10 %, 20 %, 25 %, 30 %, 50 %, 75 %, 100 % of the rated power) at maximum MPP voltage	89.8 %, 94.6 %, 97 %, 97.4 %, 97.7 %, 98.3 %, 98.3 %, 98.2 %	90.2 %, 95.1%, 97.2 %, 97.6 %, 97.9 %, 98.0 %, 98.1 %, 97.7 %
Efficiency reduction in the case of a rise in ambient temperature (at temperatures > 40 °C)	0.005 %/°C	
Efficiency change in the case of deviation from the DC rated voltage	0.002 %/V	
Own consumption	< 8 W	
Power reduction at full power	from 50 °C (T_{amb})	from 45 °C (T_{amb})
Switch-on power	10 W	
Switch-off power	8 W	
Safety		
Protection class	II	
Separation principle	No electrical isolation, transformer-less	
Grid monitoring	yes, integrated	
Insulation monitoring	yes, integrated	
Fault current monitoring	yes, integrated[2)]	

	StecaGrid 5003	StecaGrid 6003
Version overvoltage protection	Varistors	
Reverse polarity protection	yes	
Implementation conditions		
Implementation area	Indoor rooms, with or without air conditioning	
Climate classification pursuant to IEC 60721-3-3	3K3	
Ambient temperature	–15 °C ... +60 °C	
Storage temperature	–30 °C ... +70 °C	
Relative humidity	0 % ... 95 %, non-condensing	
Installation elevation	≤ 2000 m above sea level	
Degree of pollution	PD3	
Noise emission (typical)	29 dBA	
Impermissible ambient gases	Ammonia, solvents	
Equipment and design		
Protection class	IP 21 (housing: IP 51; display: IP 21)	
Overvoltage category	III (AC), II (DC)	
DC connection		
Type	Phoenix Contact SUNCLIX (2 pairs: 1 x PV, 1 x battery)	
Connection cross section	Conductor cross-section 2.5 … 6 mm^2	
Opposing connector	Opposing connector (1 pair) included in delivery	
AC connection		
Type	Wieland RST25i5 plug	
Connection cross section	Cable diameter 10 ... 14 mm^2, conductor cross-section ≤ 4 mm^2	
Opposing connector	Opposing connector included in delivery	
Dimensions (X x Y x Z)	340 x 608 x 222 mm	
Weight	10 kg	
Display	Graphical display, 128 x 64 pixels	
Communication interfaces	RS485 (2 x RJ45 sockets: connection to Meteocontrol WEB'log or Solar-Log™), Ethernet interface (1 x RJ45), Modbus RTU (1 x RJ10 socket: connection to energy meter)	
Integrated DC circuit breaker	yes, compliant with VDE 0100-712	

	StecaGrid 5003	StecaGrid 6003
Cooling principle	Temperature-controlled fan, speed variable, internal (dust-protected)	
Test certificate	Certificates download see the product page on our home-page.	

Technical data at 25 °C / 77 °F

[1] Only Steca storage-ready devices may be connected to the storage system connection. Batteries **cannot** be connected directly.

[2] Due to its design the inverter cannot cause any DC fault currents.

8.2 AC cables and line circuit breakers

Tab. 3: Conductor cross-sections of the AC cables and suitable line circuit breakers

Inverter	Cable cross section AC line	Power loss[1]	Miniature circuit breaker
StecaGrid 3203/3203x	2.5 mm²	4 W	B16
	4.0 mm²	3 W	B16
StecaGrid 4003/4003x	2.5 mm²	7 W	B16
	4.0 mm²	4 W	B16
StecaGrid 4803x	2.5 mm²	10 W	B16
	4.0 mm²	7 W	B16
StecaGrid 5503x	2.5 mm²	13 W	B16
	4.0 mm²	8 W	B16
StecaGrid 5003	2.5 mm²	11 W	B16
	4.0 mm²	7 W	B16
StecaGrid 6003	2.5 mm²	14 W	B16
	4.0 mm²	8 W	B16

[1] Power loss of the AC line at the inverter's nominal power and line length 10 m.

8.3 Country table

Due to legal requirements, the values in the table above may change at short notice. For a current overview, go to *http://www.steca.com/Wechselrichter-Wohnsiedlung*. You'll find the table for the respective product family under Downloads ⇒ Certificates.

9 Liability, commercial guarantee, legal guarantee

For the warranty terms for your device, go to *http://www.steca.com/pv-grid/warranties*.

10 Contact

In the case of complaints or faults, please contact the local dealer from whom you purchased the product. They will help you with any issues you may have.

Europe

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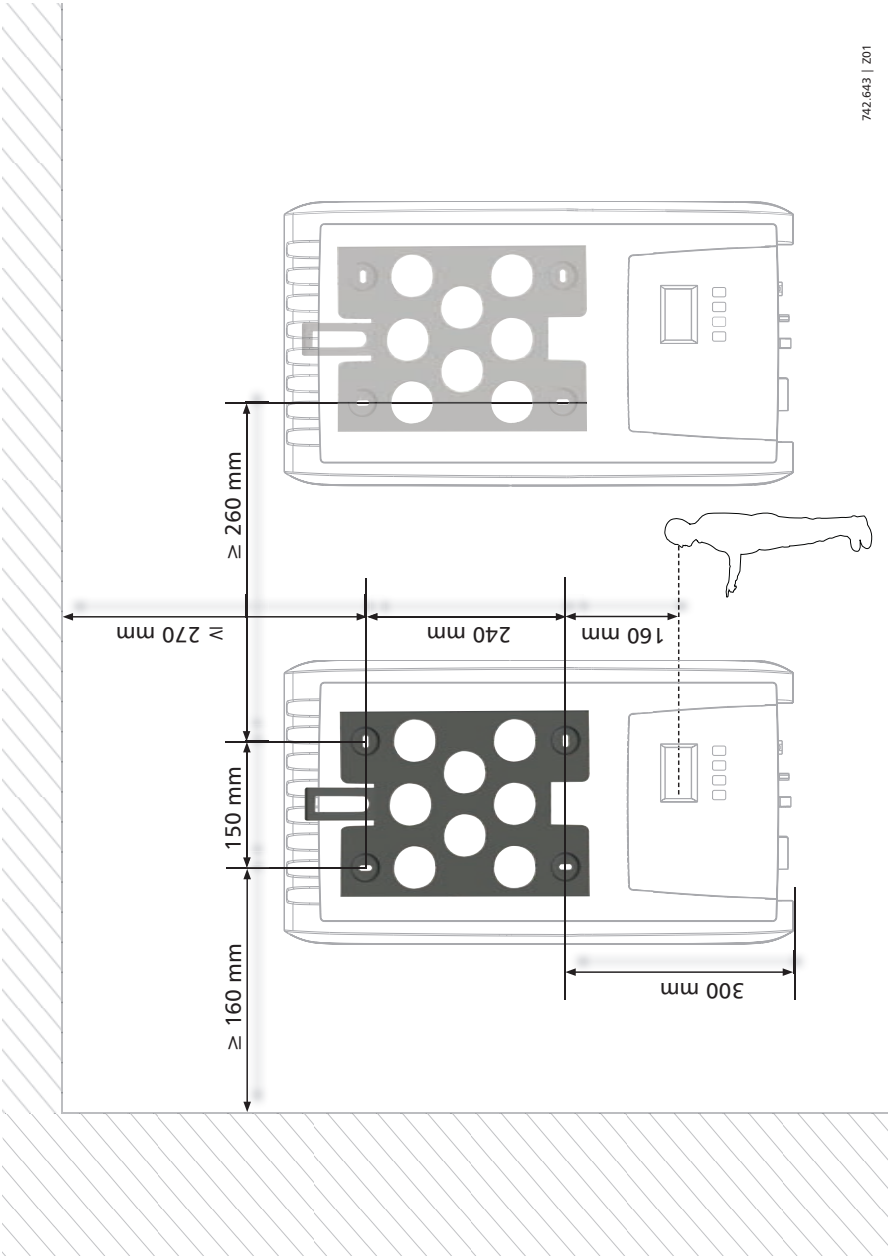
Internet	*www.stecasolar.com*

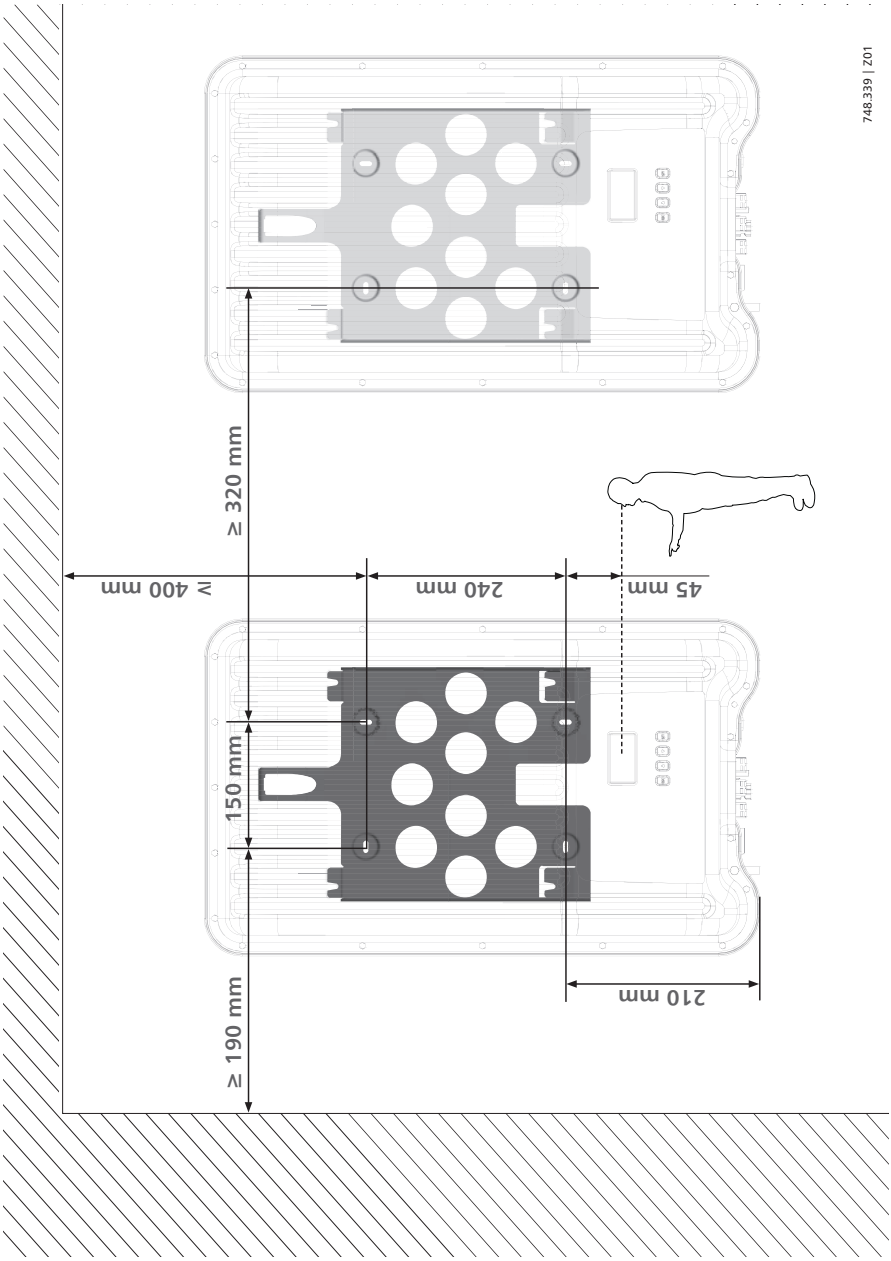
Appendix

A Assembly

A.1 Bore dimension drawing for coolcept³ devices



A.2 Bore dimension drawing for coolcept³-x devices



A.3 AC plug

gesis RST 20i4/20i5/25i5

DEU **Montageanleitung für Steckverbinder 4-/5-polig**

ENG **Mounting Instructions for 4-/5-pole Connector**

gesis
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wieland

Montageanleitung (Mai 2006)

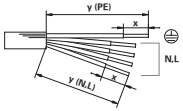
Wichtige Information - bitte aufmerksam lesen
Dieses Beiblatt beschreibt die Montage der vier- und fünfpoligen ***gesis*** RST-Steckverbinder. Bitte beachten Sie, daß elektrische Anschlüsse und Installationen ausschließlich von hierfür ausgebildeten Fachkräften vorgenommen werden dürfen.

Important information - please read carefully
This leaflet is intended for use by trained electricians only. It describes the mounting of the four and five pole gesis RST connectors. Please observe the warnings and notes.

Kabeltypen
Cable types

- UL AWM Style 21098

Abmantellängen und Abisolierlängen (mm)
Dismantling and Insulation strip lengths (mm)

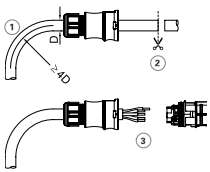


Zugentlastung / strain relief	Ø 6…10 / 10…14		Ø 13…18	
Leiter / conductor	PE	N,L	PE	N,L
Schraubanschluss / screw connection				
Abmantellänge **y (mm)** / Dismantling length **y** (mm)	**30**	**25**	**55**	**50**
Abmantellänge **y** (Doppelanschluß) / Dismantling length **y** (splitter connector)	**45**	**40**		
Abisolierlänge **x** (mm) / insulation strip length **x** (mm)	**8** (Leiterquerschnitt/conductor cross section 1,5…4 mm²)			
Crimpanschluss / crimp connection				
Abmantellänge **y** / Dismantling length **y**	**42**	**37**	**49**	**44**
Abisolierlänge **x** / insulation strip length **x**	**7,0+1** (Leiterquerschnitt/conductor cross section 0,75…4 mm²)			

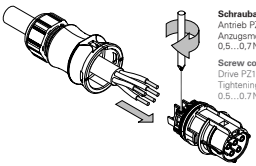
Biegeradien
Beachten Sie den minimalen Biegeradius der Leiter. Vermeiden Sie Zugkräfte auf die Kontaktstellen, indem Sie wie folgt vorgehen:

Bending radius
Note the minimum bending radius for conductors. Avoid pull forces on the contact points by proceeding as follows:

1. **Leitung wie benötigt biegen**
   Bend the wire as required
2. **Leitung ablängen**
   Cut the wire to length
3. **Abmanteln, abisolieren.**
   Strip the cable and wires.



Leitermontage
Wire connection

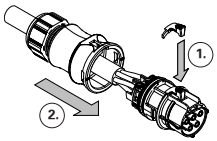


Schraubanschluß:
Antrieb PZ1,
Anzugsmoment typ.
0,5…0,7 Nm

Screw connection:
Drive PZ1,
Tightening torque
0.5…0.7 Nm

Einsetzen der Handentriegelung (optional)
Die Handentriegelung ermöglicht das Trennen der Steckverbindung ohne Werkzeug.

Inserting the manual disconnect (optional)
The manual disconnect enables disconnecting without a tool.



Sitz der Handentriegelung
Position of manual disconnect

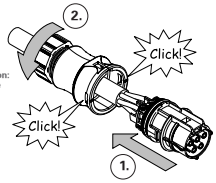
ACHTUNG / CAUTION
Bei Verwendung der Handentriegelung erlischt die Zulassung nach VDE 0606, da die Steckverbindung dann ohne Werkzeug zu öffnen ist.
Die Vorschrift VDE 0627 bleibt hiervon unberührt und wird im vollen Umfang eingehalten.

Connectors with manual disconnect are not approved according to VDE 0606 since the connection can be separated without tools.
Nevertheless, the direction VDE 0627 is obeyed to its full extent.

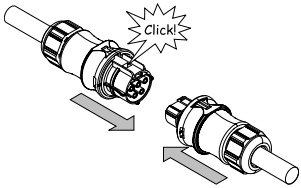
Verschließen
Closing

Verschraubung:
Anzugsmoment typ. 4+1 Nm

Screw connection:
Tightening torque typ. 4+1 Nm



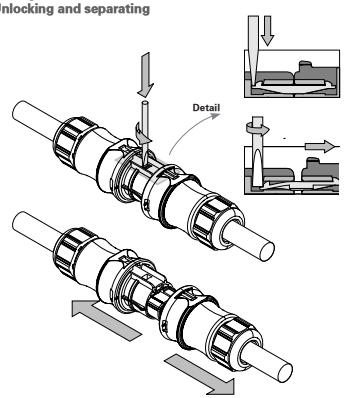
Stecken und verriegeln
Plugging and locking



ACHTUNG / CAUTION
Die Steckverbinder sind nicht zur Stromunterbrechung geeignet. Trennen oder stecken Sie die Verbindung niemals unter Last!

The connectors are not for current interrupting. Never connect or disconnect under load!

Entriegeln und Trennen
Unlocking and separating

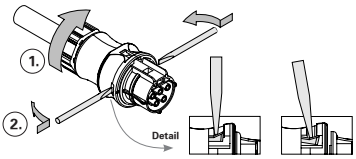


ACHTUNG / CAUTION

Die Steckverbinder sind nicht zur Stromunterbrechung geeignet. Trennen oder stecken Sie die Verbindung niemals unter Last!

The connectors are not for current interrupting. Never connect or disconnect under load!

Öffnen des Steckverbinders
Opening the connector

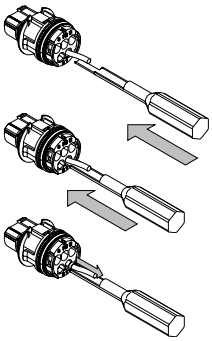


Leiterdemontage Crimpkontakte

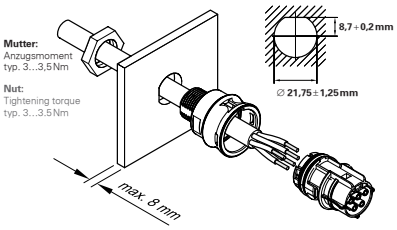
Benutzen Sie zum Lösen der Crimpkontakte das Entriegelungswerkzeug (Art.-Nr. 05.502.3500.0). Zur Veranschaulichung der Handhabung ist nur ein Leiter gezeigt.

Unlocking crimp connections

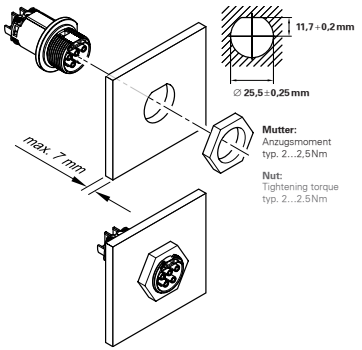
For unlocking, use the tool (Ref.-No. 05.502.3500.0) as pictured. For clarity, only one conductor is shown.



Gehäuseeinbau mit M20-Durchführung
Housing installation with M20 feedthrough



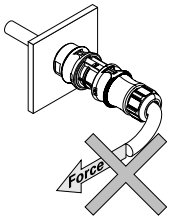
Gehäuseeinbau mit M25-Durchführung
Housing installation with M25 feedthrough



ACHTUNG / CAUTION

Damit die Schutzart IP68 eingehalten wird, stellen Sie durch geeignete Maßnahmen sicher, daß die Steckverbinder vor Biegekräften geschützt sind (z.B. keine Lasten an Kabel hängen; Kabelaufwicklungen nicht freihängend etc.).

To ensure protection category IP68, do not expose the connection to bending forces (e.g. do not attach loads to the cable, no free-dangling cable windings etc.)



Italiano

Connettore fotovoltaico SUNCLIX per l'utilizzo in impianti fotovoltaici per cavo solare da 2,5-6 mm² del tipo PV1-F o cavo solare certificato UL (ZKLA), AWG 10 – 14

1 Avvertenze di sicurezza

AVVERTENZA: I connettori SUNCLIX devono essere collegati solo da persone che operano sotto la supervisione di elettricisti specializzati.

AVVERTENZA: Collegare o scollegare i connettori SUNCLIX soltanto in assenza di carico.

IMPORTANTE: Utilizzare questi connettori soltanto insieme a un cavo solare da 2,5-6 mm² del tipo PV1-F o un cavo solare certificato UL (cavo di rame ZKLA, AWG 10 – 14). Solo con questo cavo si garantisce il collegamento elettrico sicuro. Altri tipi di cavo sono possibili su richiesta. Per la posa del cavo rispettare i raggi di curvatura prescritti dal produttore.

IMPORTANTE: Collegare questi connettori soltanto con altri connettori SUNCLIX. Per il collegamento rispettare assolutamente le indicazioni sulla tensione nominale e la corrente nominale. È permesso il più piccolo valore comune.

IMPORTANTE: Proteggere dalla polvere e dall'umidità i connettori.
- Non immergere in acqua i connettori.
- Non posare il connettore direttamente sul manto di copertura del tetto.
- Applicare un cappuccio di sicurezza (ad es. PV-C PROTECTION CAP, codice 1785430) ai connettori non collegati.

2 Collegamento del connettore

2.1 Collegamento del cavo (figura 1)
- Spelare il cavo di 15 mm con un utensile adatto. Eseguendo questa operazione, fare attenzione a non tagliare un singolo filo.

1 Inserire con cura il conduttore spelato con i cavetti intrecciati fino a battuta. Le estremità dei cavetti devono essere visibili nell'elemento di bloccaggio a molla.
2 Chiudere l'elemento di bloccaggio a molla. Verificare che scatti.
3 Infilare l'inserto nel capocorda.
4 Serrare la connessione a vite per cavo con una coppia di 2 Nm.

2.2 Unione dei connettori
- Congiungere assieme connettore maschio e connettore femmina. Il collegamento viene così inserito.
- Tirare il giunto per verificare che il collegamento sia corretto.

3 Separazione dei connettori (Fig. 2)

È necessario un cacciavite per viti a taglio con una punta larga 3 mm (ad es. SZF 1-0,6X3,5; 1204517).
1 Inserire il cacciavite come indicato in figura 2.
2 Lasciare inserito il cacciavite e scollegare il connettore femmina dal connettore maschio.

3.1 Scollegamento del cavo (Fig. 3)
1 Svitare la connessione a vite per cavo.
2 Inserire il cacciavite come indicato in figura 3.
3 Fare leva con forza sul collegamento e staccare il connettore femmina dall'inserto.
4 Aprire l'elemento di bloccaggio a molla con il cacciavite. Rimuovere il cavo.

Français

Connecteur photovoltaïque SUNCLIX destiné aux câbles pour systèmes à énergie solaire de 2,5-6 mm², type PV1-F ou homologués UL (ZKLA), AWG 10 – 14

1 Consignes de sécurité

AVERTISSEMENT : Seuls des personnes dûment formées en électrotechnique sont autorisées à installer les connecteurs mâles SUNCLIX.

AVERTISSEMENT : Les connecteurs SUNCLIX ne doivent jamais être déconnectés en charge.

IMPORTANT : Utiliser ces connecteurs exclusivement avec un câble pour système à énergie solaire de 2,5-6 mm², de type PV1-F ou un câble homologué UL (fil de cuivre ZKLA, AWG 10 – 14). Seul ce câble est en mesure de garantir la sécurité électrique du raccordement. Autres types de câble possibles sur demande. Lors de la pose du câble, respecter les rayons de courbure prescrits par le fabricant.

IMPORTANT : Raccorder ces connecteurs mâles uniquement avec d'autres connecteurs SUNCLIX. Lors du raccordement, respecter impérativement les valeurs données pour la tension nominale et pour l'intensité nominale. Le plus petit dénominateur commun est autorisé.

IMPORTANT : Protéger les connecteurs mâles de l'humidité et de la saleté.
- Ne jamais plonger les connecteurs mâles dans l'eau.
- Ne jamais poser directement le connecteur sur la peau du toit.
- Equiper les connecteurs mâles non enfichés d'un capuchon de protection (par ex. PV-C PROTECTION CAP, 1785430).

2 Raccordement du connecteur

2.1 Raccordement du câble (Figure 1)
- Dénuder le câble sur 15 mm avec un outil approprié. Veiller à ne sectionner aucun fil du câble.

1 Introduire avec prudence le fil dénudé aux brins torsadés jusqu'en butée. Les extrémités des cordons doivent apparaître dans le « tiroir » à ressort.
2 Refermer le « tiroir » à ressort. Vérifier qu'il est bien encliqueté.
3 Enfiler le raccord dans le manchon.
4 Serrer le presse-étoupe à 2 Nm.

2.2 Assemblage du connecteur mâle
- Assembler le connecteur et le connecteur femelle. Veiller à ce que la connexion s'encliquète.
- Exercer une traction des deux côtés du raccordement pour en vérifier la solidité.

3 Déconnexion du connecteur mâle (2)

Un tournevis à fente à lame large de 3 mm est requis (par ex. SZF 1-0,6X3,5 ; référence 1204517).
1 Introduire un tournevis com. indiqué à la Fig. 2.
2 Laisser le tournevis en place et séparer les connecteurs mâle et femelle l'un de l'autre.

3.1 Séparation du câble (Fig. 3)
1 Dévisser le raccord vissé du câble.
2 Introduire un tournevis com. indiqué à la Fig. 3.
3 Soulever la liaison puis séparer le manchon du raccord.
4 Ouvrir le « tiroir » à ressort avec le tournevis. Extraire le câble du connecteur.

English

SUNCLIX photovoltaic I/O connector for installation in photovoltaic systems for 2,5-6 mm² solar cables, type PV1-F or for solar cables with UL certification (ZKLA), AWG 10–14

1 Safety notes

WARNING: The SUNCLIX plug-in connectors may be connected only by trained electricians.

WARNING: Never plug in or disconnect the SUNCLIX plug-in connectors under load.

NOTE: Use these plug-in connectors only together with a 2.5-6 mm² PV1-F type solar cable or a UL-certified solar cable (ZKLA copper litz wires, 10-14 AWG). A safe electrical connection is only possible with this cable. Other cable types are available on request.

When laying out the cable, observe the bending radiuses that the manufacturer specifies.

NOTE: Connect this plug-in connector only with other SUNCLIX plug-in connector. When making the connections, be sure to observe the specifications on nominal voltage and nominal current. The smallest common value is permissible.

NOTE: Protect the plug-in connectors from humidity and dirt.
- Do not immerse the plug-in connector in water.
- Never lay out the plug directly on the roofing.
- Attach a protective cap (e.g. PV-C PROTECTION CAP, order number 1785430) to plug-in connectors that are not plugged in.

2 Connecting connectors

2.1 Connecting the cable (Fig. 1)
- Strip the cable with a suitable tool by 15 mm. Make sure that no individual wires are cut off.

1 Carefully insert the stripped wire with twisted litz wires all the way in. The litz wire ends have to be visible in the spring.
2 Close the spring. Make sure that the spring is snapped in.
3 Push the insert into the sleeve.
4 Tighten the cable gland to 2 Nm.

2.2 Assemble the connector
- Bring the plug and the socket together. The connection snaps close thereby.
- Pull on the coupling to check the proper connection.

3 Separating the connector (Fig. 2)

You need a slot screwdriver with a 3-mm wide blade (e.g. SZF 1-0,6X3,5; item no. 1204517).
1 Insert the screwdriver as shown in Fig. 2.
2 Leave screwdriver inserted and disconnect the plug and the socket from each other.

3.1 Loosen the cable (Fig. 3)
1 Screw open the cable gland.
2 Insert the screwdriver as shown in Fig. 3
3 Pry the connection open and pull the sleeve and the insert apart.
4 Open the spring with the screwdriver. Remove the cable.

Deutsch

SUNCLIX-Photovoltaik-Steckverbinder zum Einsatz in Photovoltaik-Anlagen für 2,5-6 mm²-Solarkabel vom Typ PV1-F oder für UL-zertifizierte Solarkabel (ZKLA), AWG 10–14

1 Sicherheitshinweise

WARNUNG: Die SUNCLIX-Steckverbinder dürfen ausschließlich durch elektrotechnisch unterwiesene Personen angeschlossen werden.

WARNUNG: Stecken oder trennen Sie die SUNCLIX-Steckverbinder niemals unter Last.

ACHTUNG: Verwenden Sie diese Steckverbinder nur zusammen mit einem 2,5-6 mm²-Solarkabel vom Typ PV1-F oder UL-zertifiziertem Solarkabel (ZKLA Kupferlitze, AWG 10 – 14). Nur mit diesem Kabel ist der sichere elektrische Anschluss gewährleistet. Weitere Kabeltypen sind auf Anfrage möglich. Beachten Sie beim Verlegen des Kabels die Biegeradien, die der Hersteller vorgibt.

ACHTUNG: Verbinden Sie diese Steckverbinder nur mit anderen SUNCLIX-Steckverbindern. Beachten Sie bei dem Verbinden unbedingt die Angaben zu Nennspannung und Nennstrom. Der kleinste gemeinsame Wert ist zulässig.

ACHTUNG: Schützen Sie die Steckverbinder vor Feuchtigkeit und Schmutz.
- Tauchen Sie die Steckverbinder nicht unter Wasser.
- Verlegen Sie den Stecker nicht direkt auf der Dachhaut.
- Versehen Sie die Steckverbinder, die nicht gesteckt sind, mit einer Schutzkappe (z. B. PV-C PROTECTION CAP, 1785430).

2 Steckverbinder anschließen

2.1 Kabel anschließen (Bild 1)
- Isolieren Sie das Kabel mit einem geeigneten Werkzeug um 15 mm ab. Achten Sie darauf, dabei keine Einzeldrähte abzuschneiden.

1 Führen Sie die abisolierte Ader mit verdrillten Litzen sorgfältig bis zum Anschlag ein. Die Litzenenden müssen in der Feder sichtbar sein.
2 Schließen Sie die Feder. Stellen Sie sicher, dass die Feder eingerastet ist.
3 Schieben Sie den Einsatz in die Hülse.
4 Ziehen Sie die Kabelverschraubung mit 2 Nm an.

2.2 Steckverbinder zusammen fügen
- Führen Sie Stecker und Buchse zusammen. Dabei rastet die Verbindung ein.
- Ziehen Sie an der Kupplung, um die korrekte Verbindung zu prüfen.

3 Steckverbinder trennen (Bild 2)

Sie benötigen einen Schlitz-Schraubendreher mit 3-mm-breiter Klinge (z. B. SZF 1-0,6X3,5, 1204517).
1 Führen Sie den Schraubendreher ein, wie in Bild 2 gezeigt.
2 Lassen Sie den Schraubendreher stecken und trennen Sie Buchse und Stecker voneinander.

3.1 Kabel lösen (Bild 3)
1 Drehen Sie die Kabelverschraubung auf.
2 Führen Sie den Schraubendreher ein, wie in Bild 3 gezeigt.
3 Hebeln Sie die Verbindung auf und ziehen Sie Hülse und Einsatz auseinander.
4 Öffnen Sie die Feder mit dem Schraubendreher. Entfernen Sie das Kabel.

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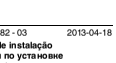
Phone +49-(0)5235-3-00

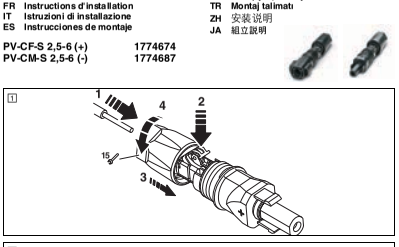
www.phoenixcontact.com

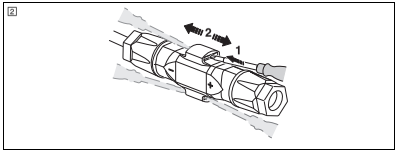
MNR 0140682 - 03 2013-04-18

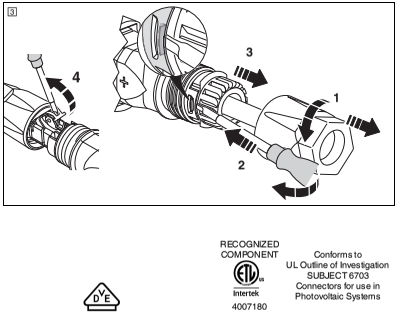
DE Einbauanweisung
EN Installation notes
FR Instructions d'installation
IT Istruzioni di installazione
ES Instrucciones de montaje
PT Instruções de instalação
RU Инструкция по установке
TR Montaj talimatı
ZH 安装说明
JA 組立説明

PV-CF-S 2,5-6 (+) 1774674
PV-CM-S 2,5-6 (-) 1774687









RECOGNIZED COMPONENT
Intertek
4007180

Conforms to UL Outline of Investigation SUBJECT 6703
Connectors for use in Photovoltaic Systems

D E

EN 50521

Italiano	Français	English	Deutsch
Dati tecnici a norma	Caractéristiques techniques selon la norme	Technical data according to the standard	Technische Daten nach Norm
Temperatura ambiente	Température ambiante	Ambient temperature	Umgebungstemperatur
Tensione nominale, max.	Tension nominale, max.	Nominal voltage, max.	Nennspannung, max.
Corrente nominale, max.	Intensité nominale, max.	Nominal current max.	Nennstrom, max.
Diametro cavo	Diamètre de câble	Cable diameter	Kabeldurchmesser

-40 °C...+85 °C	-40 °C ...+70 °C
1100 V DC	600 V DC
2,5 mm² - 27 A; 4 mm² - 40 A; 6 mm² - 40 A	AWG 14 - 15 A, AWG 12 - 20 A, AWG 10 - 30 A
5 ... 8 mm	5 ... 8 mm

UL SUBJECT 6703

Español

Conector enchufable fotovoltaico SUNCLIX para su empleo en instalaciones fotovoltaicas para cable solar de 2,5-6 mm² del tipo PV1-F o para cable solar certificado por UL (ZKLA), AWG 10-14

1 Indicaciones de seguridad

ADVERTENCIA: Los conectores enchufables SUNCLIX deben ser conectados únicamente por personas con formación electrotécnica.

ADVERTENCIA: Los conectores enchufables SUNCLIX nunca se deben enchufar o desenchufar bajo carga.

IMPORTANTE: Use estos conectores enchufables solamente en combinación con un cable solar de 2,5-6 mm² del tipo PV1-F o un cable solar certificado por UL (hilos de cobre trenzados ZKLA, AWG 10–14). Únicamente con este cable es posible garantizar la conexión eléctrica segura. Otros tipos de cable son posibles, bajo consulta. Al tender el cable, tenga en cuenta los radios de flexión especificados por el fabricante.

IMPORTANTE: Conecte estos conectores enchufables únicamente con otros conectores enchufables fotovoltaicos SUNCLIX. Para su conexión, es indispensable tener en cuenta las indicaciones referentes a la tensión y la corriente nominales. Se admite el valor mínimo común.

IMPORTANTE: Proteja los conectores enchufables de la humedad y la suciedad.
- No sumerja los conectores enchufables en agua.
- No coloque el conector directamente sobre la cubierta del tejado.
- Proteja los conectores enchufables que no están conectados con un capuchón (p. ej., PV-C PROTECTION CAP, 1785430).

2 Conectar conector enchufable

2.1 Conectar cable (figura 1)

- Pele el cable con una herramienta adecuada unos 15 mm. Al hacerlo, tenga cuidado de no cortar hilos sueltos.

1 Introduzca cuidadosamente los conductores pelados con hilos trenzados hasta el tope. Las puntas de los conductores deben ser visibles en el compartimento del resorte.
2 Cierre el compartimento del resorte. Asegúrese de que el resorte está bien encajado.
3 Introduzca el inserto en el manguito.
4 Apriete el prensaestopas con 2 Nm.

2.2 Acoplar los conectores enchufables

- Introduzca el conector macho en el conector hembra. Al hacerlo, la conexión encastra.
- Tire del acoplamiento para comprobar que la conexión es correcta.

3 Separar los conectores enchufables 2

Se necesita un destornillador plano con hoja de 3 mm de anchura (p. ej., SZF 1-0,6X3,5; 1204517).
1 Introduzca el destornillador como se muestra en la figura 2.
2 Deje insertado el destornillador y separe el conector hembra del conector macho.

3.1 Soltar el cable (figura 3)

1 Desenrosque el prensaestopas.
2 Introduzca el destornillador como se muestra en la figura 3.
3 Haga palanca hacia arriba para abrir la conexión y separe el manguito del inserto.
4 Abra el compartimento del resorte con el destornillador. Retire el cable.

Português

Conectores de encaixe fotovoltáicos SUNCLIX para aplicação em sistemas fotovoltáicos para cabos solares de 2,5-6 mm² do tipo PV1-F ou para cabos solares com certificação UL (ZKLA), AWG 10 – 14

1 Avisos de segurança

ATENÇÃO: Os conectores de encaixe SUNCLIX apenas podem ser conectados por pessoas treinadas em eletrotécnica.

ATENÇÃO: Nunca conectar ou separar os conectores de encaixe SUNCLIX sob carga.

IMPORTANTE: Utilizar os conectores de encaixe apenas em conjunto com um cabo solar de 2,5-6 mm² do tipo PV1-F ou um cabo solar com certificação UL (ZKLA com malha de cobre, AWG 10 – 14). Apenas com este cabo a conexão elétrica segura está garantida. Outros tipos de cabos podem ser obtidos sob consulta. Ao instalar o cabo,respeitar os raios de curva definidos pelo fabricante.

IMPORTANTE: Apenas conectar estes conectores de encaixe com outros conectores de encaixe fotovoltáicos SUNCLIX. Ao conectar, sempre observar os dados sobre tensão nominal e corrente nominal. É admissível o menor valor em comum.

IMPORTANTE: Proteger os conectores de encaixe de umidade e sujeira.
- Não submergir os conectores de encaixe na água.
- Não instalar os conectores diretamente na camada externa do telhado.
- Instalar uma tampa de proteção nos conectores de encaixe não conectados (p. ex., PV-C PROTECTION CAP, 1785430).

2 Conectar os conectores de encaixe

2.1 Conectar o cabo (Figura 1)

- Decapar o cabo com uma ferramenta adequada em 15 mm. Prestar atenção para não cortar fios individuais.

1 Inserir o fio decapado com os fios trançados cuidadosamente até o final. As pontas dos fios devem aparecer no compartimento de mola.
2 Fechar o compartimento de mola. Garantir que esteja travado.
3 Deslizar o inserto para dentro da luva.
4 Apertar o aparafusamento do cabo com 2 Nm.

2.2 Unir os conectores de encaixe

- Unir o conector macho e fêmea. A conexão deve engatar e travar.
- Puxar na união para verificar a conexão correta.

3 Separar os conectores de encaixe (Figura 2)

É necessário usar uma chave de fenda com ponta de 3 mm de largura (p. ex., SZF 1-0,6X3,5; Cód. 1204517).
1 Inserir a chave de fenda como mostrado na Figura 2.
2 Manter a chave de fenda inserida e separar conector macho e fêmea.

3.1 Soltar o cabo (Figura 3)

1 Desparafusar a conexão roscada do cabo.
2 Inserir a chave de fenda como mostrado na Figura 3.
3 Usar a chave de fenda como alavanca para abrir a união e puxar para separar inserto e luva.
4 Abrir o compartimento de mola com a chave de fenda. Remover o cabo.

Türkçe

Fotovoltaik sistemlerde kullanım için SUNCLIX-Photovoltaik konnektör, Tip PV1-F 2,5-6 mm²-solar kablo ceya UL sertifikalı solar kablo (ZKLA), AWG 10 – 14 için

1 Güvenlik uyarıları

UYARI: SUNCLIX konnektörler yalnızca elektroteknik alanda eğitimli kişiler tarafından bağlanabilir.

UYARI: SUNCLIX konnektörleri asla yük altındayken takmayın veya ayırmayın.

NOT: Bu konnektörleri sadece, Tip PV1-F bir 2,5-6 mm² solar kablo ile veya UL sertifikasına sahip bir solar kablo ile birlikte kullanın (ZKLA bakır kablo, AWG 10-14). Sadece bu kablo ile güvenli bir bağlantı sağlanmış olur. Sormanız üzerine başka kablo tipleri de teslim edilebilir. Kabloyu döşerken üretici tarafından belirtilen bükme yarıçaplarını dikkate alın.

NOT: Bu konnektörleri sadece başka SUNCLIX-fotovoltaik konnektörlerle bağlayın. Bağlarken mutlaka nominal gerilim ve nominal akım bilgilerini dikkate alın. En küçük ortak değere izin verilir.

NOT: Konnektörleri neme ve kirlere karşı koruyun.
- Konnektörleri asla suya daldırmayın.
- Konnektörü doğrudan tavan paneline döşemeyin.
- Takılı olmayan konnektörlere koruyucu bir kapak takın (örn. PV-C PROTECTION CAP, Ürün No. 1785430).

2 Konnektörün bağlanması

2.1 Kablonun bağlanması (Resim 1)

- Kablonun ucunu uygun bir aletle 15 mm sıyırın. Bu esnada münferit telleri kesmemeye dikkat edin.

1 Döndürülmüş örgülü, izolasyonu sıyrılmış damarı dikkatlice dayanağa kadar itin. Örgülü tel uçları yay cebinde görünmelidir.
2 Yay cebini kapatın. Yerine tam oturduğundan emin olun.
3 İlave elemanı kovana itin.
4 Kablo vidasını 2 Nm ile sıkın.

2.2 Konnektörü birleştirme

- Fişi ve soketi birleştirin. Bağlantı yerine oturur.
- Bağlantının doğru olduğunu kontrol etmek için kavramayı çekin.

3 Konnektörü ayırma (Resim 2)

3 mm-kalınlığında ucu olan yarık başlı bir tornavida gereklidir (örn. SZF 1-0,6X3,5; 1204517).
1 Tornavidayı Resim 2'de gösterildiği gibi takın.
2 Tornavidayı takılı olarak bırakın ve fişi soketten ayırın.

3.1 Kabloyu ayırma (Resim 3)

1 Kablonun vidasını açın.
2 Tornavidayı Resim 3'de gösterildiği gibi takın.
3 Bağlantıyı kaldırın ve kovanla ilave elemanı birbirinden ayırın.
4 Yay cebini tornavida ile açın. Kabloyu çıkarın.

Русский

Фотогальванический соединитель SUNCLIX для применения в фотогальванических установках для 2,5-6 мм²-солнечного кабеля типа PV1-F или сертифицированного UL солнечного кабеля (ZKLA), AWG 10 – 14

1 Указания по технике безопасности

ОСТОРОЖНО: Соединители SUNCLIX могут подключать только лица, проинструктированные в области электротехники.

ОСТОРОЖНО: Штекерные соединители SUNCLIX не допускается соединять или разъединять, если токоведущие части находятся под напряжением.

ПРЕДУПРЕЖДЕНИЕ: Штекерные соединители использовать только вместе с 2,5-6 мм² солнечным кабелем типа PV1-F или сертифицированным UL солнечным кабелем (ZKLA, медный провод, AWG 10-14). Только этот кабель обеспечивает надежное электрическое подключение. Другие типы кабелей поставляются по запросу. При прокладке кабеля соблюдать предписания изготовителя в отношении радиусов изгибов.

ПРЕДУПРЕЖДЕНИЕ: Эти штекерные соединители соединять только с другими соединителями для фотогальванической системы SUNCLIX. При соединении обязательно учитывать данные для номинального напряжения и номинального тока. Допустимо наименьшее общее значение.

ПРЕДУПРЕЖДЕНИЕ: Для штекерных соединителей обеспечить защиту от влаги и загрязнений.
- Не погружать штекерные соединители в воду.
- Не устанавливать штекерные соединители непосредственно на кровельном покрытии.
- На неподключенные штекерные соединители надевать защитные колпачки (например, PV-C PROTECTION CAP, арт. № 1785430).

2 Подключение штекерных соединителей

2.1 Подключение кабеля (рис. 1)

- Изолировать кабель соответствующим инструментом на 15 мм. При этом следить за тем, чтобы не отрезать единичные проводники.

1 Осторожно до упора вставить проводник со скрученными литцами, предварительно сняв изоляцию. Концы гибкого проводника должны быть видимы в пазу пружины.
2 Закрыть пружину. Убедиться, что пружина надежно зафиксирована защелкой.
3 Наконечник вставить в гильзу.
4 Резьбовой кабельный ввод затянуть с усилием 2 Нм.

2.2 Соединить штекерные соединители

- Соединить штекер с розеткой. При этом соединение фиксируется щелчком защелки.
- Потянуть за соединительный зажим, чтобы проверить правильность соединения.

3 Разъединить штекерные соединители (рис. 2)

Требуется отвертка с прямым шлицем шириной 3 мм (например, SZF 1-0,6X3,5; арт. № 1204517).
1 Ввести отвертку, как показано на рис. 2.
2 Отвертку оставить вставленной в отверстии, и извлечь штекер из розетки.

3.1 Отпустить кабель (рис. 3)

1 Открутить резьбовой кабельный разъем.
2 Ввести отвертку, как показано на рис. 3.
3 Приподнять соединение и отсоединить гильзу от наконечника.
4 Отверткой открыть паз пружины. Удалить кабель.

中文

用于太阳能光伏设备的 SUNCLIX 光伏连接器，适用于 2,5-6 mm² 的 PV1-F 型太阳能电缆或经 UL 认证的太阳能电缆 (ZKLA) AWG 10–14

1 安全注意事项

警告：SUNCLIX 连接器只允许由受过电气工程方面培训的人员进行连接。

警告：不允许在有负载的情况下插入或断开 SUNCLIX 连接器。

注意：该连接器请只允许与 2,5-6 mm² 的 PV1-F 型太阳能电缆或经 UL 认证的太阳能电缆 （ZKLA 铜绞线，AWG 10-14）一起使用。只有使用该电缆，才能确保安全的电气连接。可根据需要提供其它电缆类型。铺设电缆时请注意制造商规定的弯曲半径。

注意：请只将该连接器与其它 SUNCLIX 光伏连接器连接。连接时请务必注意额定电压和额定电流的说明。适用最小的公共值。

注意：保护好连接器以防潮和防尘。
- 绝不能将连接器浸入水中。
- 不允许将连接器直接铺设于屋顶之上。
- 在未插入的连接器上装上一个保护帽 （例如 PV-C PROTECTION CAP, 产品编号 1785430)。

2 连接连接器

2.1 连接电缆 （图 1)

- 用合适的工具剥去 15 mm 的电缆外皮。 请注意不要切断任何单条芯线。

1 小心地将已剥去外皮的电缆连同绞合的绞线引入到底。必须要能在弹簧扣中看到绞线的末端。
2 关上弹簧扣。请确保弹簧扣确实卡入。
3 将插入件推入套筒内。
4 以 2 Nm 拧紧导线连接螺钉。

2.2 接合连接器

- 将插头 和) 插槽 连接在一起。此时连接会卡接上。
- 拉动接合处以检查是否已正确连接上。

3 断开连接器 （图 2)

您需要一把刀口宽度为 3 mm 的一字形螺丝刀 （例如 SZF 1-0.6X3.5; 1204517)。
1 如图 2 所示导入螺丝刀。
2 插入螺丝刀并将插头与插槽相互断开。

3.1 松开电缆 （图 3)

1 拧开导线连接螺钉。
2 如图 3 所示导入螺丝刀。
3 撬起连接并将套筒和插入件拉开。
4 用螺丝刀打开弹簧扣。取出电缆。

日本語

太陽光発電システム施工用 SUNCLIX 太陽光発電 I/O コネクタ、2,5~6 mm² ソーラーケーブル PV1-F タイプまたは UL 認証 （ZKLA）ソーラーケーブル AWG 10~14 に対応

1 安全上の注意

警告 : SUNCLIX プラグインコネクタは、訓練を受けた電気技術者のみが接続して下さい。

警告 : 通電中に SUNCLIX プラグインコネクタを決して抜き挿ししないで下さい。

注意 : プラグインコネクタは 2,5 ~ 6 mm² ソーラーケーブル PV1-F タイプまたは UL 認証ソーラーケーブル （ZKLA 銅撚線、AWG 10 ~ 14）との組み合わせでのみ使用して下さい。安全な電気的接続はこれらのケーブルを使用する場合においてのみ可能となります。その他のケーブルタイプについてはお問い合わせください。安全な電気的接続はこれらのケーブルを使用する場合においてのみ可能となります。

ケーブル引き回しの際は、ケーブル製造者が指定する曲げ半径に注意して下さい。

注意 : このプラグインコネクタには他の SUNCLIX プラグインコネクタでのみ接続して下さい。接続を行う際は、定格電圧と定格電流の仕様を必ず確認して下さい。最小の共通の値が許可されます。

注意 : 湿気と汚染からプラグインコネクタを保護して下さい。
- プラグインコネクタを水没させないで下さい。
- 直接屋根の上にプラグインコネクタを決して置かないで下さい。
- プラグインコネクタが接続されていない時は、保護キャップ（例 : PV-C PROTECTION CAP、注文番号 1785430）を取り付けて下さい。

2 コネクタの接続

2.1 コネクタの接続 (図 1)

- 適切な工具を使用して剥き線長さを 15 mm にして下さい。その際、個々の芯線が切れていないことを確認して下さい。

1 被覆を剥いたケーブルの撚線を慎重に奥まで挿入して下さい （注 : 撚線の捩りは不要です）。撚線の先端はスプリング内に見えている必要があります。
2 スプリングを閉じて下さい。この際、スプリングのロック部が掛かっているか確認して下さい。
3 インサートをコネクタ本体 （スリーブ）に押し込んで下さい。
4 2 Nm のトルクでケーブルグランドを締め付けて下さい。

2.2 コネクタの嵌合

- コネクタ同士 （プラグとソケット）の嵌合面を合わせて下さい。この際、フックが掛かるまで押し込みます。
- コネクタ （嵌合部）を引っ張り、しっかりと接続されているか確認して下さい。

3 コネクタの取り外し (図 2)

ブレード先端幅 3 mm （例 : SZF 1-0.6X3.5、製品番号 1204517）のマイナスドライバーが必要です。
1 図 2 に示すようにマイナスドライバーを挿入します。
2 ドライバーを挿入した状態のまま、コネクタ （プラグとソケット）を引き抜いて下さい。

3.1 ケーブルの取り外し (図 3)

1 ケーブルグランドを回し緩めて外して下さい。
2 図 3 に示すようにマイナスドライバーを挿入して下さい。
3 嵌合部を解除してコネクタ本体 （スリーブ）から インサートを引き抜いて下さい。
4 マイナスドライバーでスプリングを開放して下さい。ケーブルを取り外して下さい。

RECOGNIZED COMPONENT
Intertek 4007180
Conforms to UL Outline of Investigation SUBJECT 6703 Connectors for use in Photovoltaic Systems

Español	Português	Türkçe	Русский	中文	日本語		
Datos técnicos según la norma	Dados técnicos de acordo com a norma	Standarda göre Teknik Özellikler	Технические спецификации согласно стандарту	技术数据符合标准要求	規格に準じた技術仕様	EN 50521	UL SUBJECT 6703
Temperatura ambiente	Temperatura ambiente	Ortam sıcaklığı	Температура окружающей среды	环境温度	周囲温度	-40 °C...+85 °C	-40 °C ...+70 °C
Tensión nominal, máx.	Tensão nominal, máx.	Nominal gerilim, maks.	Номинальное напряжение, макс.	额定电压 , 最大	定格電圧 （最大）	1100 V DC	600 V DC
Corriente nominal, máx.	Corrente nominal, máx.	Nominal akım, maks.	Номинальный ток, макс.	额定电流 , 最大	定格電流 （最大）	2,5 mm² - 27 A; 4 mm² - 40 A; 6 mm² - 40 A	AWG 14 - 15 A, AWG 12 - 20 A, AWG 10 - 30 A
Diámetro de cable	Diâmetro do cabo	Kablo çapı:	Диаметр кабеля	电缆直径	ケーブル外径	5 ... 8 mm	5 ... 8 mm

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