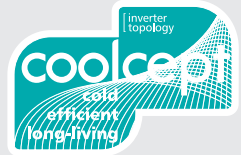




coolcept



coolcept-x



## Installation and operating instructions

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# 1 Preface

Thank you for choosing inverters from the *coolcept* product line of Steca Elektronik GmbH. By using solar energy, you are making a significant contribution to environmental protection; by reducing the amount of carbon dioxide (CO<sub>2</sub>) and other harmful gases that burden the earth's atmosphere.

Maximum efficiency with a long service life

The innovative inverter topology is based on a single-stage transformer-less circuit concept and is integrated into all devices in the *coolcept* series. This unique technology allows peak efficiencies of 98,0 % or 98,6 % to 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 *coolcept* inverters. This offers many advantages. The surface temperatures of the devices overall remains extremely low. In addition, there are clear benefits for the installation. The *coolcept-x* inverters have a sturdy metal casing that allows them to be also used outdoors.

The lightweight devices weigh only 9 or 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.

Visualization and accessories

The devices have a graphic display, with which the energy load values, actual capacities, and operating parameters of the photovoltaic system can be visualized. The innovative menu offers the possibility of individual selection of the different measured values.

See [www.stecasolar.com](http://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 information on the device (coolcept Indoor)




- ① Dangerous voltages can remain present on the components up to 10minutes after switching off the DC circuit breaker and the line circuit breaker.
- ② Read and follow the manual!
- ③ Serial number as a bar code and in plain text

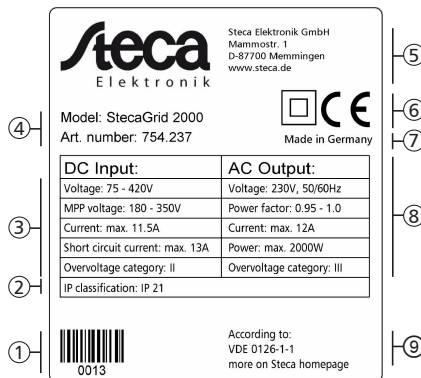
**Safety information on the device (coolcept Indoor)**

- ① Caution: Surface may be hot
- ② Dangerous voltages can remain present on the components up to 10minutes after switching off the DC circuit breaker and the line circuit breaker.
- ③ Read and follow the manual!
- ④ Serial number as a bar code and in plain text

## 2.2 Identification

Feature	Description
Types	<i>coolcept</i> (plastic housing): StecaGrid 1500, StecaGrid 2000, StecaGrid 2500, StecaGrid 3010, StecaGrid 3600, StecaGrid 4200  <i>coolcept-x</i> (stainless steel housing): StecaGrid 1500x, StecaGrid 2000x, StecaGrid 2500x, StecaGrid 3010x, StecaGrid 3600x, StecaGrid 4200x
Version status of the manual	Z09
Manufacturer's address	See  Chapter 11 „Contact“ on page 94
Certificates	See Appendix → Certificates and <a href="http://www.stecasolar.com">www.stecasolar.com</a> → coolcept – coolcept-x
Optional accessories	<ul style="list-style-type: none"> <li>■ External data loggers:           <ul style="list-style-type: none"> <li>– <i>WEB'log</i> from Meteocontrol</li> <li>– <i>Solar-Log</i> from Solare Datensysteme</li> </ul> </li> <li>■ Termination plug for RS485 bus           <ul style="list-style-type: none"> <li>– IP21: 752,856</li> <li>– IP65: 740,864</li> </ul> </li> </ul>

### Rating plate



- ① Bar code for internal use
- ② Protection class
- ③ Technical data of the DC input
- ④ Article number and product designation
- ⑤ Manufacturer's 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 Australia only: Cover the Protection class II symbol on the type plate, as described on ☞ „For Australia only: Cover the Protection class II symbol on the type plate.“ on page 37.*
- *For the serial number, see ☞ „Safety information on the device (coolcept Indoor)“ on page 5 and ☞ „Safety information on the device (coolcept Indoor)“ on page 6*
- *For the position of the type plate, see ☞ Chapter 3.1 „Housing“ on page 13.*

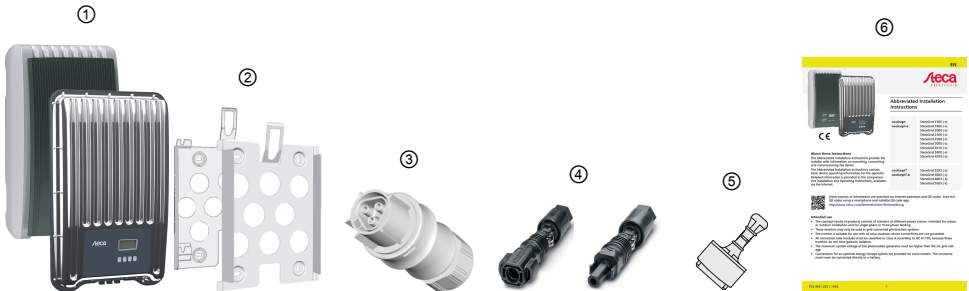
**EU Declaration of Conformity**

The products described in this document comply with the applicable European directives. Certificates for the products are provided at [www.stecasolar.com](http://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 generator must be used that have a maximum system voltage that is higher than the AC grid voltage.



### Notice

An overview of suitable PV generators is available at [www.stecasolar.com](http://www.stecasolar.com) ⇒ PV GRID CONNECTED ⇒ Service and support.

**Potential curves of the plus (+) and minus (-) DC connections with respect to PE**

$U_{PV}$  = Potential between the plus (+) and minus (-) DC-connections

StecaGrid 1500/2000 and 1500x/2000x

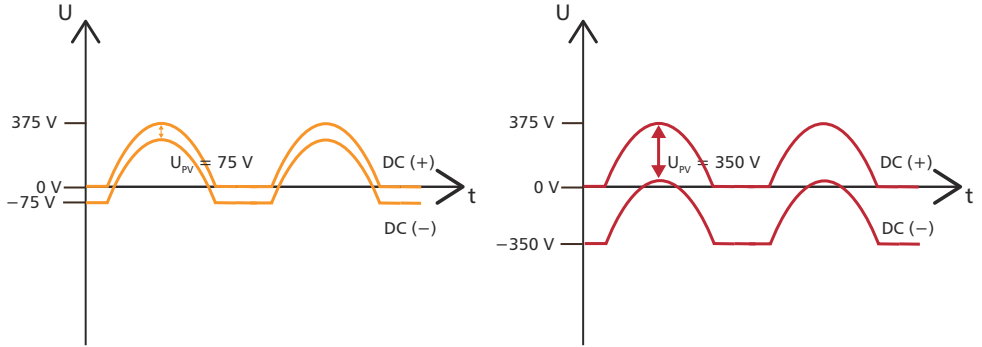


Fig. 1: Potential curves of  $U_{PV}$  at 75 V (left) and 350 V (right)

StecaGrid 2500/3010 and 2500x/3010x

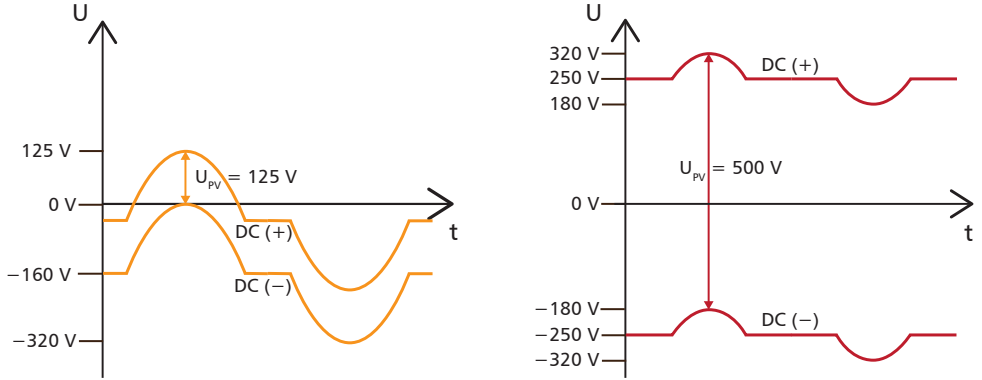


Fig. 2: Potential curves of  $U_{PV}$  at 125 V (left) and 500 V (right)

## StecaGrid 3600/4200 and 3600x/4200x

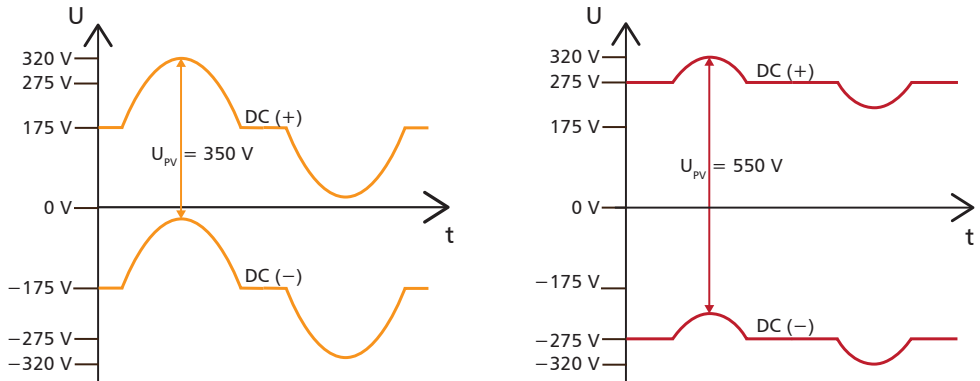


Fig. 3: Potential curves of  $U_{PV}$  at 350 V (left) and 550 V (right)

## 2.5 About this manual

### 2.5.1 Contents

This manual describes the inverters of the types coolcept and coolcept-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 generator, cables).

### 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
<b>DANGER!</b>	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.
<b>WARNING!</b>	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.
<b>NOTICE!</b>	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.

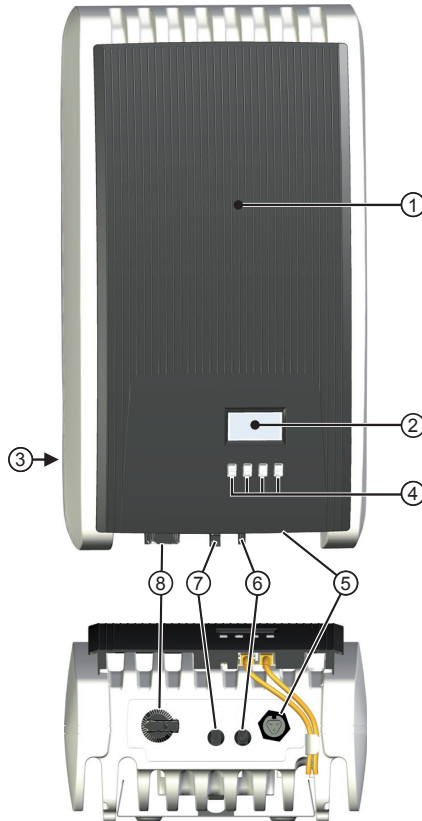
## Abbreviations

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

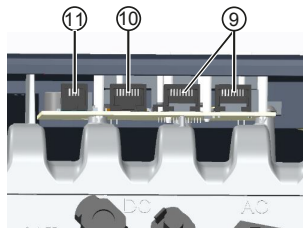
## 3 Structure and function

### 3.1 Housing

#### 3.1.1 coolcept



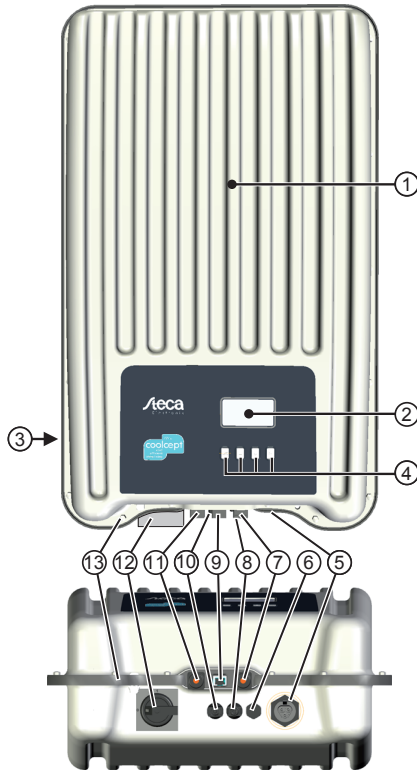
- ① Hood
- ② Display (monochrome, 128 x 64 pixels)
- ③ Rating plate, serial number, warnings
- ④ Operating buttons: ESC, Δ, ▽, SET (from left to right)
- ⑤ 1x AC connection
- ⑥ 1x DC connection Minus (-) for PV generator (Phoenix Contact SUNCLIX, touch protection)
- ⑦ 1x DC connection Plus (+) for PV generator (Phoenix Contact SUNCLIX, touch protection)
- ⑧ DC load-break switch (disconnects plus and minus input simultaneously)



- ⑨ 2 x RJ45 sockets (RS485 bus)
- ⑩ 1x RJ45 socket (Ethernet)
- ⑪ 1x RJ10 socket (Modbus RTU)

The housing components are described in detail below.

### 3.1.2 coolcept-x



- ① Hood
- ② Display (monochrome, 128 x 64 pixels)
- ③ Rating plate, serial number, warnings
- ④ Operating buttons: ESC, Δ, ▽, 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, touch protection)
- ⑨ 1x RJ45 socket (RS485 bus)
- ⑩ 1x DC connection Plus(+) for PV generator (Phoenix Contact SUNCLIX, touch protection)
- 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 „coolcept“ on page 13](#) and in [Chapter 3.1.2 „coolcept-x“ on page 14](#) 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	<ul style="list-style-type: none"> <li>■ Moves the marking bar or the display content upward</li> <li>■ In a numeric setting, moves the marking 1 position to the left</li> <li>■ Increases an adjustment value by 1 increment</li> </ul>	
▽	Press briefly	<ul style="list-style-type: none"> <li>■ Moves the marking bar or the display content downward</li> <li>■ In a numeric setting, moves the marking 1 position to the left</li> <li>■ Increases an adjustment value by 1 increment</li> </ul>	
SET	Press briefly	Goes to the next lower menu level	—
		<ul style="list-style-type: none"> <li>■ a selected numerical value starts flashing and can be changed</li> <li>■ adopts a change</li> <li>■ changes the state of a control element (check box/radio button)</li> </ul>	
	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 „coolcept“ on page 13](#) and [Chapter 3.1.2 „coolcept-x“ on page 14](#))

- 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

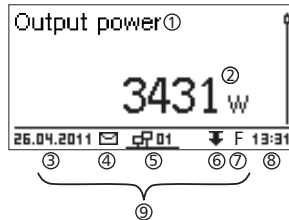
The display reacts slower at very low temperatures. In particular, this can apply for coolcept-x devices if they are used outdoors.

## 3.3.2 Information

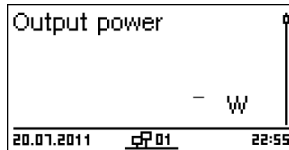
The information shown on the display is described below using illustrative examples.

### Status display

The status display shows the following values:



- ① Measurement name
- ② Measurement with units
- ③ Date is displayed alternately with IP address
- ④ Cover the *Non-confirmed event messages*; more information on this is provided in Section [„Event messages“ on page 73](#)
- 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 *CO<sub>2</sub> 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.

Daily yield ①	
20.07.2011	15,2 kWh ②
19.07.2011	21,0 kWh
18.07.2011	21,5 kWh

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

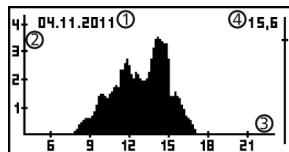
The yield periods contain the following numbers of individual entries:

- Day yield: last 31 days<sup>1)</sup>
- Monthly yield: last 13 months<sup>1)</sup>
- Annual yield: last 30 years<sup>1)</sup>

<sup>1)</sup> 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 <sup>1) 2) 3)</sup>
- ③ X axis: Time in hours/days/months/years
- ④ Total of all individual yields shown in the diagram, in kWh

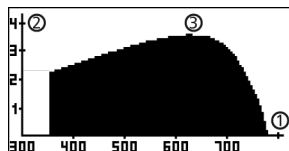
The graphical representation can show annual yields for the last 20 years.

- <sup>1)</sup> Yield in kWh
- <sup>2)</sup> With addition of „M“: : yield in MWh
- <sup>3)</sup> The scaling changes depending on the maximum value.

## Event messages

↳ *Chapter 7 „Fault rectification“ on page 72*


## PV generator characteristic curve



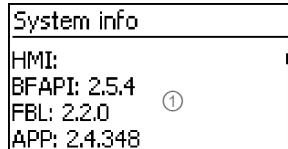
- ① X axis: input voltage in V
- ② Y axis: power in kW
- ③ Peak = MPP

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.

## Information



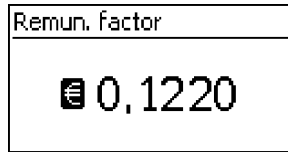
The menu item *Information* contains the following sub-menu items.

- *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*
  - *Version of the manual that belongs with the inverter*
- *Country setting*: country that is currently set and country-specific grid parameters; see also [Chapter 9.3 „Country table“ on page 92](#).
- *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

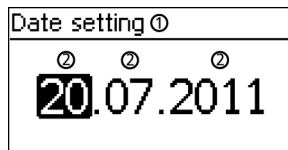
#### Numerical settings

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* ).



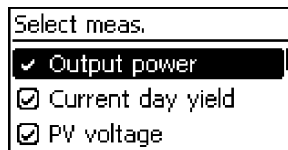
- ① Designation of the numerical setting  
 ② Value to be set; the selected value to be set is highlighted in black.

#### 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

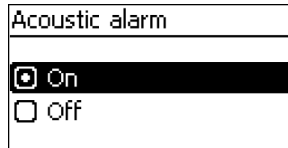


Selection of the measurements to be shown in the status display. The following measurements can be selected:

- Output power: Inverter output power<sup>1)</sup>
- 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<sup>1)</sup>
- 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<sup>2)</sup>
- Max. daily power: The maximum power supplied in the current day<sup>3)</sup>

- Abs. max. power: The maximum power ever fed into the grid<sup>3)</sup>
- Max. daily yield: The maximum daily yield achieved<sup>3)</sup>
- Operating hours: The operating hours during which the device has been connected to the grid (including night-time hours).
- Total yield: Yield since commissioning
- CO<sub>2</sub> savings: CO<sub>2</sub> 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

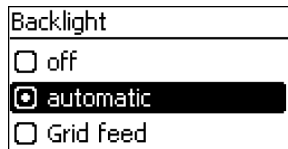


An acoustic alarm sounds (approx. 4.5 kHz) when an event message is displayed.

- 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
DHCP
IP address
Subnet mask

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 [Further information on page 56](#) (menu structure)

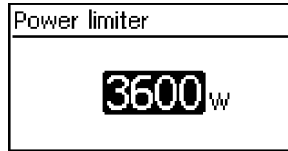
You can obtain the password from technical support; see [Chapter 11 „Contact“ on page 94](#).



### NOTICE!

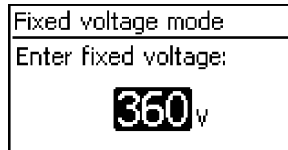
Risk of reduced yields. In the service menu, inverter and grid parameters can be changed. The service menu must only be operated by a specialist, who ensures that the change does not violate applicable regulations and standards!

## 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



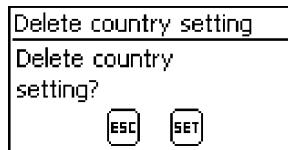
The device can regulate the input voltage to a manually adjustable value. This switches off the automatic setting of the MPP (MPP tracking). The input voltage can be adjusted over a range between the maximum and minimum input voltage and the minimum input voltage in 1V steps.

Exemplary application: Hydroelectric installation

### ! NOTICE!

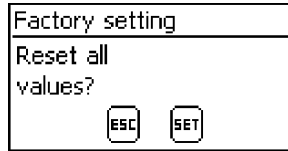
Before setting a fixed input voltage, make sure that the PV generator is suitable for this. Otherwise, this may result in yield losses or damage to the system.

## Delete country setting



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

## Factory setting

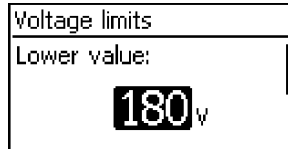


Resetting the device to the factory setting deletes the following data:

- 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)

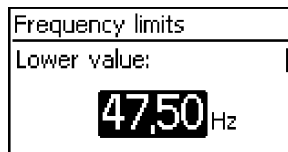


The following voltage limits can be changed:

- Upper disconnection value<sup>1)</sup>
- Lower disconnection value<sup>1)</sup> (Fig. left)

<sup>1)</sup> The disconnection value relates to the peak value of the voltage.

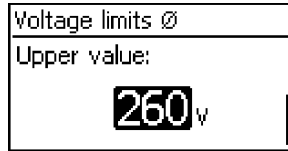
## Frequency limits



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 $\varnothing$ (average value)



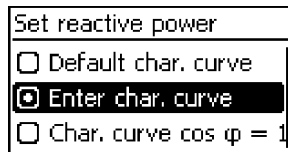
The following voltage limits can be changed:

- Upper disconnection value<sup>1)</sup> (Fig. left)
- Lower disconnection value<sup>1)</sup>

<sup>1)</sup> The disconnection value relates to the average value of the voltage.

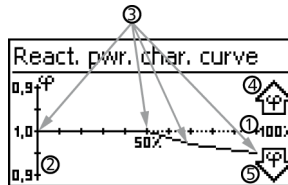
## Reactive power characteristic curve

Overview:



The reactive power characteristic curve must be set during 1st commissioning if this is prescribed for the previously selected country. The following applies:

- 3 characteristic curves are available for selection (Fig. left):
  - Default. char. curve (pre-defined)
  - Enter char. curve (manually adjustable)
  - Char. curve cos  $\varphi$  = 1 (pre-defined)



- After configuration, the characteristic curve is displayed as a graph (example in Fig. left).
  - ① x-axis, output power P in %
  - ② y-axis, phase shift cos  $\varphi$
  - ③ Nodes (in example: 4 nodes)
  - ④ Arrow symbol *Overexcitation*
  - ⑤ Arrow symbol *Underexcitation*

### Technical details

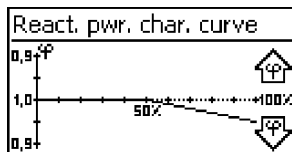
- Each characteristic curve is defined by 2 to 8 nodes.
- A node is defined by the output power P of the inverter (x-axis) and the associated phase shift (y-axis).



- The phase shift can be set over a range of 0.95 (overexcitation) through 1.00 (no phase shift) to 0.95 (underexcitation).
- The type of phase shift is shown in the graph using arrow symbols defined as follows (defined from the point of view of the inverter):

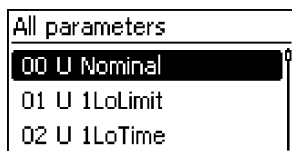
↑ Overexcitation, inductive

↓ Underexcitation, capacitive



- The 3 characteristic curves available for selection have the following properties:
  - Default char. curve: pre-defined according to the selected country (example in Fig. left).
  - Char. curve  $\phi = 1$ : pre-defined with  $\cos \phi =$  constantly 1.00. This characteristic curve must be selected if no reactive power control is to be performed on the device.
  - Enter char. curve: The number of nodes and their x/y values can be configured. Exceptions: The first node is always at x (P %) = 0 %, the last always at x (P %) = 100 %.

## 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](http://www.steca.com/portal) to register. See more ↪ *Chapter 5.4 „Internet portal“ on page 62*
- 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 21*
- 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 21.**



Fig. 4: 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 displayed 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.

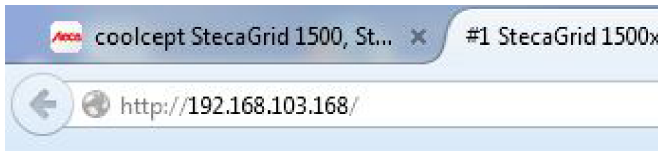


Fig. 5: Example for an IP address

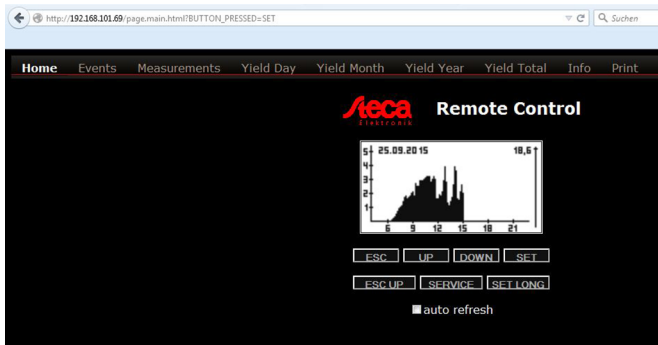


Fig. 6: Example 1 of an HTML page

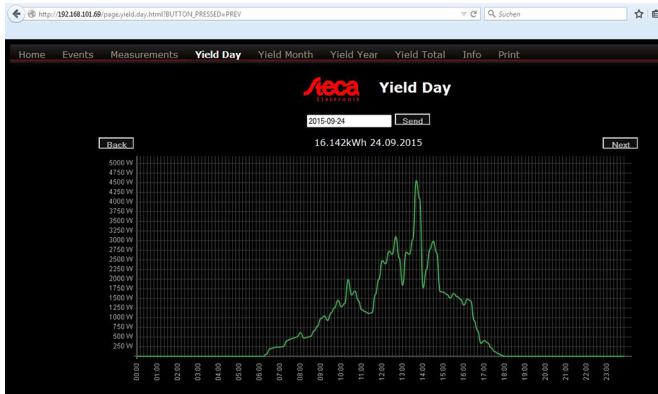


Fig. 7: Example 2 of an HTML page

### 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 [Chapter 3.6.5 „RS485 termination“](#) on page 31.
- 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 [Chapter 3.6.4 „Alternative RS485 data connection cable“](#) on page 30.
- 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, 3010, 3000, 3600, 4200 and StecaGrid 1500, 1800x, 2000x, 2300x, 2500x, 3010x, 3000x, 3600x, 4200x
- 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<sup>1)</sup> and 8<sup>1)</sup> of the RS485 bus<sup>2)</sup> 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<sup>1)</sup> and 8<sup>1)</sup> of the RS485 bus<sup>2)</sup> 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 9 „Technical data“ on page 80

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

<sup>1)</sup> Contact assignment of the RJ45 plug for the RS485 bus: See Fig. 8.

<sup>2)</sup> In this regard, see Ⓔ under ↪ Chapter 3.1 „Housing“ on page 13 and Ⓒ and Ⓓ under ↪ Chapter 3.1 „Housing“ on page 13.

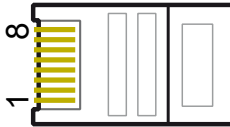


Fig. 8: Contact assignment (= line number) of the RJ45 plug

Optionally one (!) of the following masterdevices can be connected to the RS485 bus. 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](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 (Kiwigrind GmbH)

### Note

The settings must be made on the external data loggers as specified by the manufacturer, before connecting.

The wiring diagram of the RS485 bus is shown below.

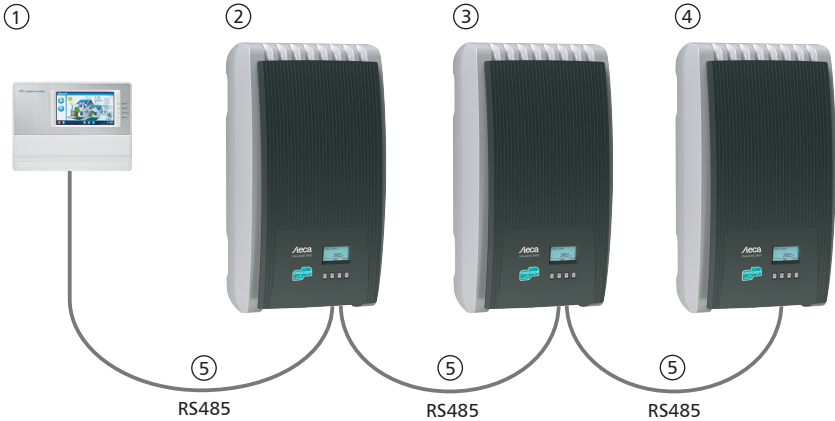


Fig. 9: Wiring diagram

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

### 3.6.4 Alternative RS485 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 <sup>1)</sup>	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!

<sup>1</sup> 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 7 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.

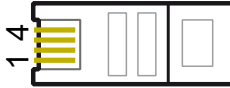


Fig. 10: Contact assignment (= line number) of the RJ10 plug

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 9 „Technical data“ on page 80](#)
  - 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.

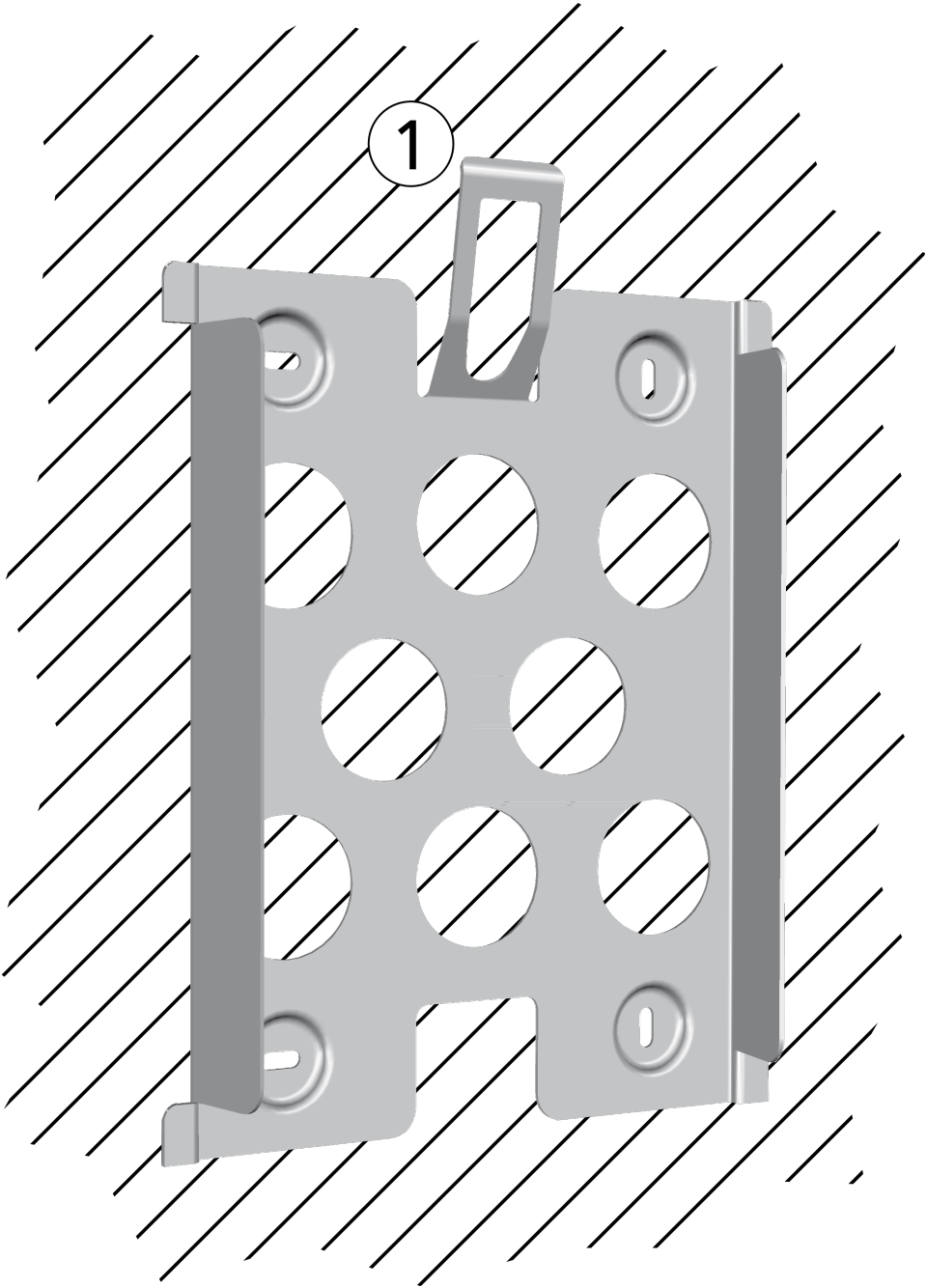
**Note**

- *Avoid exposing the inverter to direct sunlight.*
- *The display must be readable on the installed device.*

---

## 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-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.

**For Australia only: Cover the *Protection class II* symbol on the type plate.**



**Notice**

*When the inverter is used in Australia, the national regulations do not permit the Protection class II symbol to be displayed on the type plate.*

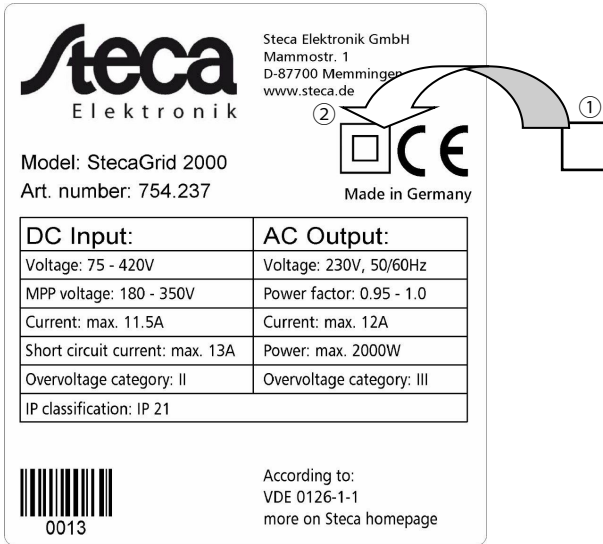


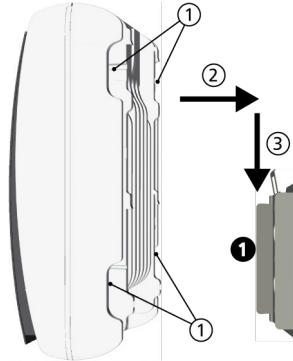
Fig. 11: Position of the sticker for covering the Protection Class II symbol

- ➔ Completely cover the *Protection class II* symbol using the small sticker provided, as shown in Fig. 11.

## 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 54.



1. ➔ Grasp inverter on the grip recesses ① (coolcept) or on the perimeter edge (coolcept-x), fit it onto the mounting plate ① so 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 [Chapter 9.2 „AC cables and line circuit breakers“](#) on page 91.

### 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 [Chapter 4.1 „Safety measures during installation“](#) on page 33.

## Grid voltage 220 V ... 240 V

➔ Wire the AC plug supplied as described in the Appendix under Mounting ⇒ AC plugs.

## Grid voltage 100 V ... 127 V



### DANGER!

Risk of death by electrocution! Never connect one of the phases L1, L2 or L3 to PE or N on the mains grid side.



### Notice

With a mains grid voltage of 100 V ... 127 V, the inverter can be connected between the L1, L2 and L3 external conductors as follows:

#### 2-phase mains grids

- N and L are connected between the L1 – L2 external conductors at the inverter side. See ② and ③ in Fig. 12.
- One of the two connected external conductors is connected to PE at the inverter side. This connection can be made within the AC plug or in an external junction box. Fig. 12 shows an example of an inverter-side connection between L1 and PE:  
Top: Connection ① in the AC plug ⑤  
Bottom: Connection ④ in an external junction box ⑥)

#### 3-phase mains grids

- N and L are connected between the L1 – L2 or L1 – L3 or L2 – L3 external conductors at the inverter side.
- One of the two connected external conductors is connected to PE at the inverter side. This connection can be made within the AC plug or in an external junction box. Fig. 12 shows an example of an inverter-side connection between L1 and PE:  
Top: Connection ① in the AC plug ⑤  
Bottom: Connection ④ in an external junction box ⑥)

The external conductor voltages are shown in Fig. 13.

1. ➔ Wire the AC plug supplied for the selected external conductors as described in the Appendix ④ Appendix „Assembly“ on page 96.
2. ➔ Connect one of the two connected phases to PE at the inverter side. Make this connection inside the AC plug or use an external junction box, as shown in Fig. 12.
3. ➔ Close the AC plug.



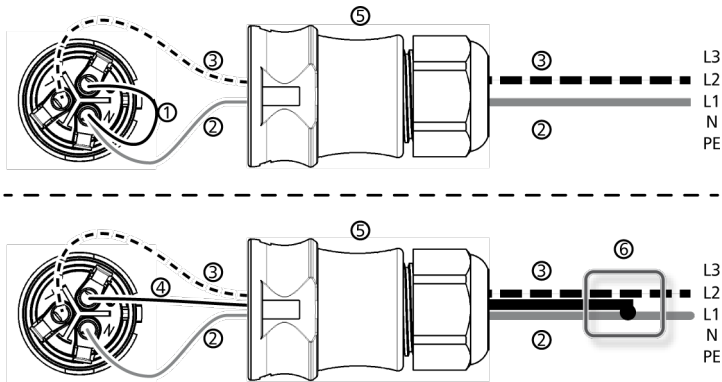


Fig. 12: Connection of N and PE in the AC plug (above) or junction box (below)

- ① Connection cable between N and PE with the connection point inside the AC plug
- ② External conductor L1
- ③ External conductor L2
- ④ Connection cable between N and PE with the connection point inside the junction box
- ⑤ Casing of the AC plug
- ⑥ Junction box

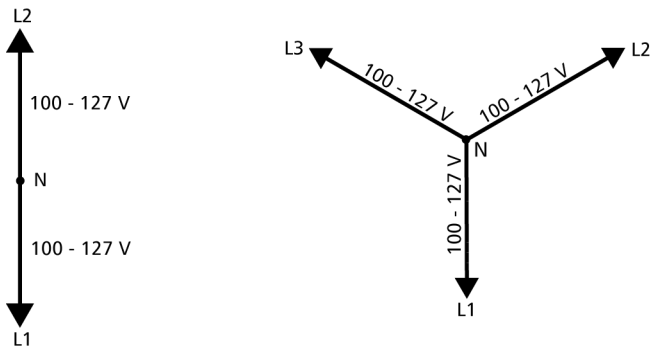


Fig. 13: External conductor voltages in 2- and 3-phase grids with 100 V ... 127 V

## 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 33.
- Use the provided SUNCLIX plugs so that the specified protection class is maintained.

## ! NOTICE!

Risk of damage to the inverter and the modules. Connect the opposing connectors for the DC connections to the DC cable, observing the correct polarity.

- ➔ Attach the connector plug counterparts to the DC cable according to the manufacturer's instructions; see Appendix.

## 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 30](#)).

## 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 33](#).

## ! NOTICE!

- Between the data connection cables (RS485/Ethernet) 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-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.
    - On the last inverter, switch on the termination (slide switch).
  2. ➔ Seal open RJ45 sockets 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](http://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

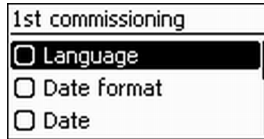
### Starting 1st commissioning

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  $\Delta \nabla$  to select a check list item.

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

The items are described in detail below.

#### Language



1. Press  $\Delta \nabla$  to select a display language.

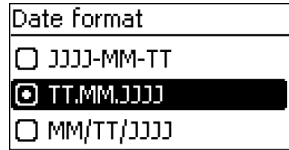
2. Press `SET`.

⇒ The language is adopted.

3. Press `ESC`.

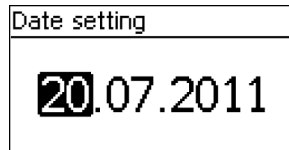
✓ The check list is shown.

## Date format



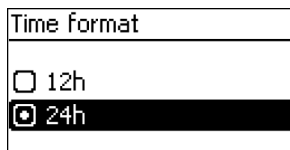
1. Press  $\triangle$ / $\nabla$  to select a date format.
2. Press SET.
  - $\Rightarrow$  The date format is adopted.
3. Press ESC.
  - $\checkmark$  The check list is shown.




## Date



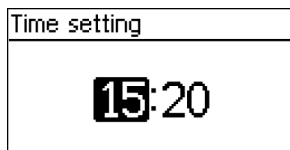
1. Press SET.
  - $\Rightarrow$  The day flashes.
2. Press  $\triangle$ / $\nabla$  to change the day.
3. Press SET.
  - $\Rightarrow$  The change is adopted.
4. Press  $\nabla$ .
  - $\Rightarrow$  The month is selected.
5. Repeat steps 1 to 3 for the month.
6. Press  $\nabla$ .
  - $\Rightarrow$  The year is selected.
7. Repeat steps 1 to 3 for the year.
8. Press ESC.
  - $\checkmark$  The check list is shown.







## Time format



1.  Press  $\triangle$ / $\nabla$  to select a time format.
2.  Press SET.
  - $\Rightarrow$  The time format is adopted.
3.  Press ESC.
  - $\checkmark$  The check list is shown.

## Time



1.  Press SET.
  - $\Rightarrow$  The hours display flashes.
2.  Press  $\triangle$ / $\nabla$  to change the hour.
3.  Press SET.
  - $\Rightarrow$  The change is adopted.
4.  Press  $\nabla$ .
  - $\Rightarrow$  The minutes are selected.
5.  Repeat steps 1 to 3 for the minutes.
6.  Press ESC.
  - $\checkmark$  The check list is shown.

## Country selection



### NOTICE!

The country can only be set once!

Country code sel.
<input type="checkbox"/> 03400 Espana
<input checked="" type="checkbox"/> 04400 United Kingdom
<input type="checkbox"/> 04600 Schweden

1. ➤ Press  $\triangle$ / $\nabla$  to select a country.
2. ➤ Press SET.

1st commissioning
Entry ok?
United Kingdom
<input type="button" value="ESC"/> <input type="button" value="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

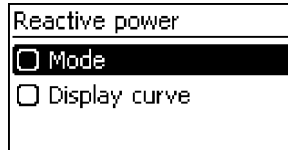
### ! NOTICE!

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:

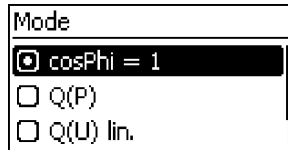
- Mode: Type of characteristic curve  
Select one of the following types:
  - $\cos \phi = 1$
  - Q(P)
  - Q(U) linear
  - Q(U) hysteresis
- Loading defaults<sup>1)</sup>: A default characteristic curve can be selected here.
- Node 1<sup>1)</sup>  
No. of nodes<sup>1)</sup> The nodes provide for free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

<sup>1)</sup>: Not indicated with mode  $\cos \phi = 1$ .

<sup>2)</sup>: Is only displayed when no. of nodes has been set to a value > 2.



1. Press SET to call up the item.



2. Press  $\Delta \nabla$  to select a type of reactive power characteristic curve.

3. Press SET.

⇒ The reactive power characteristic curve type is adopted.

4. Press ESC.

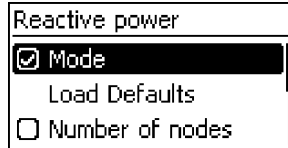
✓ The check list is shown.



## Loading defaults

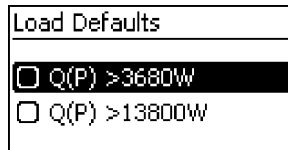
### ! NOTICE!

If  $\cos\Phi = 1$  was not selected, an additional menu item Load defaults is indicated.



1. Press  $\nabla$  to select "Load defaults".

2. Press SET.



3. Press  $\Delta\nabla$  to select a default characteristic line.

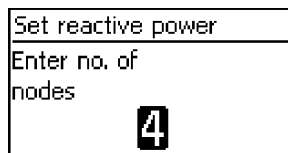
4. Press SET.

⇒ 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  $\Delta\nabla$  to change the number of nodes.

3. Press SET.

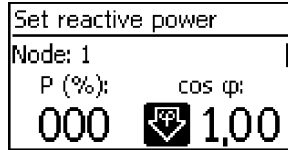
⇒ The value is adopted.

4. Press ESC.

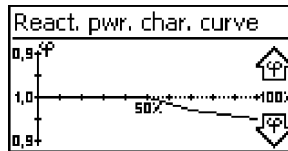
✓ The check list is shown.

Node *n***! NOTICE!**

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



1. ➤ Press  $\Delta \nabla$  to select a parameter for the node.
2. ➤ Press SET.
  - ⇒ The parameter value flashes.
3. ➤ Press  $\Delta \nabla$  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**

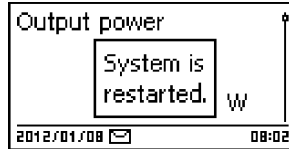
1. ➤ The previously set reactive power characteristic curve is displayed graphically (example in Fig. left).
2. ➤ Press ESC
  - ✓ The check list is shown.

## 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.

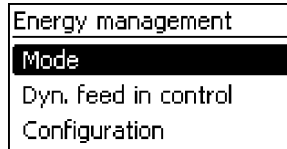
- ✓ If **SET** was pressed for a longer time then the inverter starts anew and synchronises itself with the grid (Fig. left).

## 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

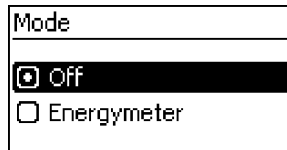
Furthermore, an energy meter can be used for feed-in management. It must be connected to the Modbus RTU interface and meet the preconditions specified in [Chapter 3.6.7 „Modbus RTU“ on page 31](#) and [Chapter 3.6.8 „Modbus RTU data connection cable“ on page 32](#).




### ! 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.

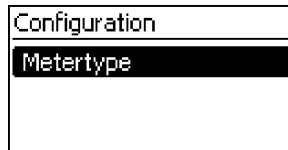
### Dynamic feed-in regulation



#### NOTICE!

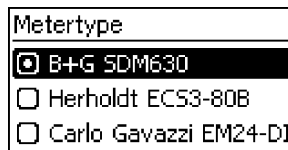
The power fed into the grid is adjusted in 10 W steps. It can be limited to a minimum of 0 W.





### Configuration of the energy meter



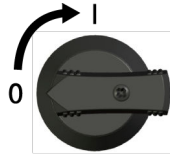
#### NOTICE!

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 **Δ▽** 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!

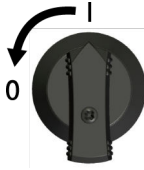
On the coolcept-x-devices the DC load-break switch can be safeguarded against being switched on unintentionally with a padlock (shackle thickness max. 7 mm).

## 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.

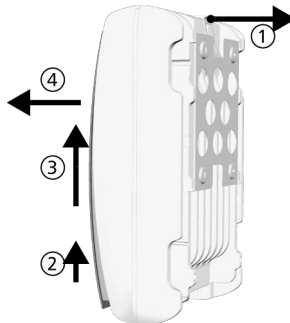
## Disconnecting the AC plug from the inverter

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.

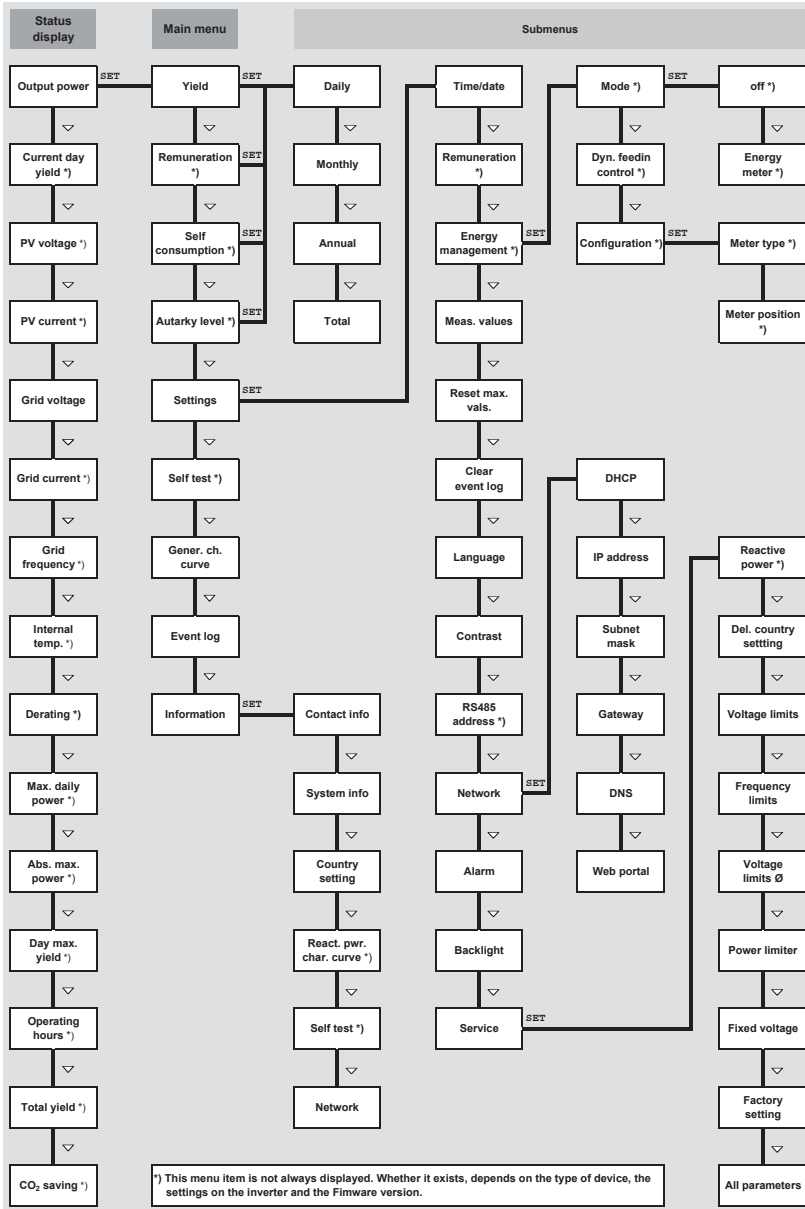
## Removing the inverter from the mounting surface



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).



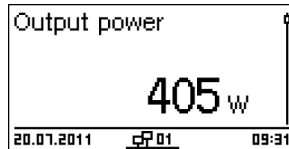
## 5.2 General operating functions

- Hidden content is shown using the  $\Delta$  and  $\nabla$  buttons.
- Repeated button presses: If  $\Delta/\nabla$  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.

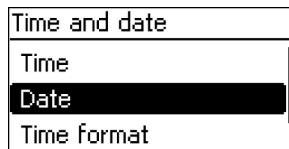
### Status display



1. If necessary, press **ESC** for 1 second to call up the status display (Fig. left).
2. Press  $\Delta/\nabla$  to display a different parameter.

### Menu navigation

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



3. Press  $\Delta/\nabla$  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 73

## 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.

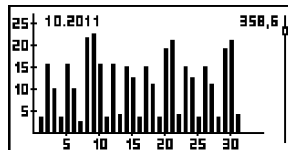
Monthly yield	
May 2011	360 kWh
<b>Apr 2011</b>	<b>350 kWh</b>
Mar 2011	372 kWh

3.  Press  $\Delta \nabla$  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  $\Delta \nabla$  to select an individual yield value.



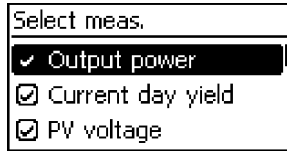
6.  Press SET.

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

7.  Press  $\Delta \nabla$  to page through the charts.

8.  Press SET to return to the list.

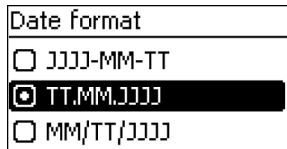
## Editing selection lists containing check boxes



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

1. Press  $\Delta$ / $\nabla$  to select a check box.
2. Press SET.
  - $\Rightarrow$  The state of the check box changes from *onto* *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.
  - $\checkmark$  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  $\Delta$ / $\nabla$  to select a radio button that is currently switched off.
2. Press SET.
  - $\Rightarrow$  The selected radio button is switched on and the previously switched on radio button is switched off.
3. Press ESC.
  - $\checkmark$  The changes are adopted and the next higher menu level is displayed.

## Changing numeric settings



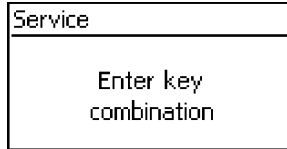
A numeric setting is displayed (example *Date* in Fig. left).

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

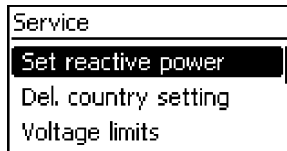
## Calling up the service menu and editing the values

### ! NOTICE!

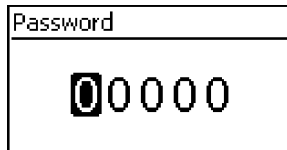
Risk of yield losses and contravention of regulations and standards. Inverter and grid parameters can be changed in the service menu. The service menu must therefore only be used by technical professionals who know the applicable regulations and standards.



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 21](#).
  - 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 21](#).

## 5.4 Internet portal



### Notes

The following illustrations show examples in English.

### 5.4.1 Registration

#### Calling up the Internet portal, entering the language and serial number

1. ➔ Enter the following address into the Internet browser (or click the address if you are reading this document as a PDF on a computer monitor): [www.steca.com/portal](http://www.steca.com/portal). Ensure that scripts and cookies for [www.steca.com/portal](http://www.steca.com/portal) are permitted in the browser.

⇒ Fig. 14 appears.

Fig. 14: Language selection and data entry form for the serial number

2. ➔ Select your language using the buttons ① (in Fig. 14).

⇒ The language is set immediately.

3. ➔ Enter the serial number of the device into the field ②.



### Notice

- The serial number always consists of a sequence with 6 numbers – 2 letters – 12 numbers, e. g. 123456AB123456789012.
- If you enter an invalid serial number, an error message is displayed and the login process is cancelled.
- Press the green button "+" (at the left next to the field ②), to enter the serial numbers of further inverters (a maximum of 5 inverters are possible).

4. ➔ After entering the last serial number, press the button ③.

✓ Fig. 15 appears.

## Entering the user data

### StecaGrid portal registration

Fig. 15: Data entry form for user data

### ! NOTICE!

The email address can only be entered once and cannot be subsequently changed! The email address is also the user name; see also ① in Fig. 21.

1. ➔ Enter your email address into the field ① (Fig. 15). Observe the note ④.
2. ➔ Enter any desired password into the field ② and repeat the entry of this password in the field ③ (safety check).
3. ➔ Confirm via the button ⑤ *or* use the ⑥ button to return to the previous page if necessary (entries in Fig. 15 are discarded).
  - ✓ After ⑤ has been pressed, Fig. 16 appears.

## Entering system data

### StecaGrid portal registration

▼ System

System name:  ① ✓

Installed power:  ② kWp ✓

System description\*:  ③  
 210 of 250 characters available.

\* Please enter a ④ description of the system here. For example, you can enter data about the number and type of solar modules, the inverters and the power of the system. This information will be shown under technical data in StecaGrid portal.

**Site data**

Map:  On  Off  Determine position ⑤ ⑥

Map: ⑦

Longitude:  ⑧ ✓

Latitude:  ⑧ ✓

Adresse (optional):  ⑨

⑩ [read the General Terms and Conditions and the Data Protection Regulations and accept them.](#)

⑪

Fig. 16: Data entry form for the system data

1. ➤ Enter any desired name<sup>A)</sup> for your solar system into the field ① in Fig. 16.
2. ➤ Enter the installed power<sup>A)</sup> of the system into the field ②.
3. ➤ Enter a description<sup>A)</sup> of the system into the field ③. Observe the note ④.
4. ➤ Use the Google Maps buttons ⑤ to ⑦ to navigate to the location of the system.
  - ⇒ The location data is displayed in the fields ⑧.
5. ➤ Enter an optional address of the system into the field ⑨.
6. ➤ Select the check box ⑩ and confirm via the button ⑪.

✓ Fig. 18 appears; an email with the same activation code as in Fig. 17 is sent to the email address ① in Fig. 17.



```

=====
[StecaGrid portal Registration]
E-mail verification
=====

Dear User,

This is an automatically generated e-mail to verify your e-mail address.

If you have not yet registered StecaGrid portal, you do not need to take further action and can simply ignore this e-mail.

To activate your account and continue the set-up procedure, please click on the following activation link:

.....
https://www.solar-monitoring.net/ssp/anmeldung/einrichtungSimple.php?source=2Z&lang=en&verKey=J...m&device=desktop
.....

Alternatively, you can enter the following activation key on the login page:

.....
JqwMBfcPgovBwPzkUHlzHHMhoiDWtYIBLvejBwoHAM
.....

Kind regards

Steca Elektronik GmbH
    
```

Fig. 17: Email with the activation code

A) Data may be subsequently changed.

### Completing registration

#### StecaGrid portal registration

Fig. 18: Data entry form for the activation code

1. In field ② in Fig. 18, enter the activation code you received in the email shown in Fig. 17.
2. Confirm via the button ③.

✓ After successful registration, Fig. 19 appears, and you are sent another email for confirmation (Fig. 20). This email contains a direct link to [Further information on page 68](#).

#### StecaGrid portal registration

Fig. 19: Confirmation message of successful registration

=====  
[StecaGrid portal Registration]  
=====

Dear User,

Congratulations on successfully registering your data logger.

Your system has been set up with the following data:

System name:  
My Solar System

Installed power:  
3.75 kWp

System description:  
StecaGrid 3600, 15 solar modules, 250 Wp

Data logger hardware number:  
748613YH005179760001

We hope you will enjoy using your dashboard.

The following link will take you to your system.:  
[http://public.solarmonitoring.net/dashboard/system/9\\_1f](http://public.solarmonitoring.net/dashboard/system/9_1f)

User data:  
-----  
E-mail/login: service@stecasolar.com  
Password: 123456  
-----

Kind regards  
Steca Elektronik GmbH

*Fig. 20: Email confirming successful registration*

## 5.4.2 Login – Displaying yield data – Changing settings

1. Enter the following address in your Internet browser: [www.solare-energiewende.de](http://www.solare-energiewende.de). Ensure that scripts and cookies for [www.solare-energiewende.de](http://www.solare-energiewende.de) are permitted in the browser.
  - ⇒ The home page of the Internet portal as shown in Fig. 21.
2. The functions as per the legend shown in Fig. 21.

Fig. 21: Home page of the Internet portal

- ① Entry field *User name* (= email address)
- ② Entry field *Password*
- ③ Button for logging in after ① and ② have been entered. After logging in, the functions as per the legend shown in Fig. 22.
- ④ Data entry field for the postal address of the system that is to be displayed (login not required).
- ⑤ Data entry field for the name of the system that is to be displayed.
- ⑥ Map for searching for systems.



Fig. 22: Yield display

- ① System data display
- ② Performance data display
- ③ Environmentally related data display
- ④ Buttons for changing the display
- ⑤ Yield charts display
- ⑥ Buttons for setting the period shown in ⑤
- ⑦ Button for changing the system data, as described in „Entering system data“ on page 64.
- ⑧ Button for selecting the language

## 6 Self test


The self test is mandatory for operation of inverters in Italy.

### Function

The prerequisites for performing the self test are as follows:

- The country *Italy* was selected during initial commissioning.
- The level of solar irradiation is high enough to ensure that the inverter can feed the grid.

During the self test, the inverter checks its switch-off behaviour with regard to too high / too low grid voltage and frequency (7 test phases, duration of approx. 40 minutes). The following applies:

- In each phase of the self test, the inverter changes its switch-off threshold, step-by-step upwards/downwards from the set lower/upper limit values.
- When the switch-off threshold reaches the actual grid voltage/frequency then the inverter stores this information.
- The data is shown on the display as follows:
  - The current values of the *first* test phase are displayed first; see the following illustration.
  - The values of the subsequent test phases are added below (initially hidden).
  - If the self test succeeded then the message `Self test passed` is added below. The message must be displayed and confirmed.
- If the self test conditions are not satisfied, one of the  *Messages of errors that prevent the self test from running, p. 71* is displayed.
- If a measurement lies outside the required tolerance during the self test then the self test is cancelled and the inverter displays the message `Self test failed`. The inverter remains disconnected from the grid (relay open, no feeding) until the self test is passed successfully.



### Note

To see the results of the self test saved in the inverter, press *Information* ⇒ *Self test*.

Self-test		
Uac max	①	276,01V
Uac act	②	226,17V
Uac off	③	227,70V
Toff	④	98,00ms

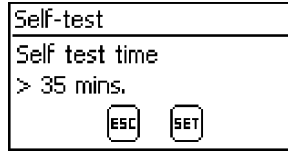
- ① Lower / upper limit value according to the country setting
- ② Measured actual grid voltage / frequency
- ③ Switch-off threshold (changed in steps)
- ④ Switch-off time <sup>1)</sup>

<sup>1)</sup> time between following events:

- Switch-off threshold reaches the actual grid voltage / frequency
- The inverter disconnects itself from the grid

## Operation

At the inverter you wish to test, *Italy* is selected as country setting.



1. Check the country setting via *Information* ▶ *System info* in the main menu as required.
2. Select *Self test* in the main menu.
  - ⇒ The dialog shown on the left is displayed.

Self-test	
Uac max	276,01V
Uac act	226,17V
Uac off	227,70V
Toff	98,00ms

3. Press and hold *SET* for 1 second.
  - ⇒ The self test starts.

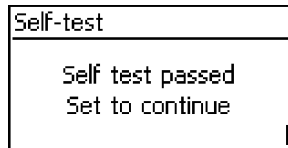
The values for the first test phase are displayed (Fig. left).

4. Press  $\nabla$  to display the values for the subsequent test phases (if available).
5. Only when *Self test failed* is displayed: Press *SET* to confirm the message.
  - ✓ The status display appears.

### NOTICE!

If *Self test failed* is displayed then repeat the self test as soon as possible so that the inverter can resume feeding.

When the self test has finished, proceed as follows:



1. Press  $\nabla$  several times until the message *Self test passed* is displayed (Fig. left).
2. Press *SET* to confirm the result of the self test.
  - ✓ The status display appears.

*Tab. 3: Messages of errors that prevent the self test from running*

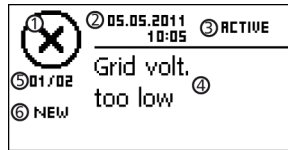
<b>Message</b>	<b>Description</b>	<b>Remedy</b>
An error was detected	An internal error prevented the self test from starting.	Contact your installer if this error occurs frequently.
Invalid grid conditions	The self test was cancelled due to invalid grid conditions, e.g. due to insufficient AC voltage.	Repeat the self test later.
MSD not ready	The self test was not started because the inverter was not ready for operation.	Repeat the self test a few minutes later when the inverter is ready for operation and is feeding.
Not enough sunlight	The self test was not started or was cancelled due to insufficient sunlight, especially in the evening / at night.	Repeat the self test during the day when the inverter is feeding the grid.

## 7 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 = 30
- ⑥ NEW is displayed until the event message has been manually confirmed via the ESC or  $\Delta \nabla$  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
Boost converter defective	The boost converter is defective, the inverter is not injecting into the grid or is injecting at reduced power. ▶ Notify your installer.	
Boost converter has wrong HW version	The inverter cannot identify an internal component, or it does not match the other components. The inverter cannot inject into the grid. ▶ Notify your installer.	
Boost converter malfunction	An internal component of the inverter is defective. It is possible that the inverter injects into the grid not at all, or with reduced capacity. ▶ Notify your installer.	
Boost converter not connected	The connection of the internal components is interrupted. The inverter is not injecting into the grid. ▶ Notify your installer.	
Boost converter not recognised	▶ Notify your installer.	
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.	

Event message	Description	Type
Device overheated	<p>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.</p> <ol style="list-style-type: none"> <li>1. Check whether the installation conditions are fulfilled.</li> <li>2. Contact your installer if this alarm occurs frequently.</li> </ol>	
Data transfer failed	<p>A setting failed, for example during initial commissioning, because it has not been properly adopted.</p> <ul style="list-style-type: none"> <li>▶ Repeat the setting.</li> <li>▶ Contact your installer if this error occurs frequently.</li> </ul>	
Fan faulty	<p>The internal fan of the inverter is defective. It is possible that the inverter injects into the grid with reduced capacity.</p> <ul style="list-style-type: none"> <li>▶ Notify your installer.</li> </ul>	
FE not connected	<p>The protective earth is not connected. For safety reasons the inverter is not allowed to inject into the grid.</p> <ul style="list-style-type: none"> <li>▶ Notify your installer.</li> </ul>	
Grid current DC offset too high	<p>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.</p> <ul style="list-style-type: none"> <li>▶ Notify your installer.</li> </ul>	
Grid frequency too high	<p>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.</p> <ul style="list-style-type: none"> <li>▶ Contact your installer if this error occurs frequently.</li> </ul>	
Grid frequency too high for reactivation	<p>After switch-off, the inverter cannot inject again because the grid voltage exceeds the legally prescribed switch-on value.</p> <ul style="list-style-type: none"> <li>▶ Contact your installer if this error occurs frequently.</li> </ul>	
Grid frequency too low	<p>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.</p> <ul style="list-style-type: none"> <li>▶ Contact your installer if this error occurs frequently.</li> </ul>	

Event message	Description	Type
Grid frequency too low reactivation	<p>After switch-off, the inverter cannot inject again because the grid voltage is below the legally prescribed switch-on value.</p> <p>► Contact your installer if this error occurs frequently.</p>	
Grid islanding detected	<p>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).</p> <p>► Contact your installer if this error occurs frequently.</p>	
Grid relay defective	<p>The inverter has detected that a grid relay is defective; for this reason, it is not injecting into the grid.</p> <p>► Notify your installer.</p>	
Grid voltage too high	<p>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.</p> <p>► Contact your installer if this error occurs frequently.</p>	
Grid voltage Ø too high	<p>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.</p> <p>► Contact your installer if this error occurs frequently.</p>	
Grid voltage too low	<p>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.</p> <p>► Contact your installer if this error occurs frequently.</p>	
Grid voltage Ø too low	<p>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.</p> <p>► Contact your installer if this error occurs frequently.</p>	
Grid voltage too high for reactivation	<p>After switching off, the inverter cannot resume feeding because the grid voltage exceeds the legally prescribed switch-on value.</p> <p>► Contact your installer if this error occurs frequently.</p>	

Event message	Description	Type
Grid voltage too low for reactivation	<p>After switch-off, the inverter cannot inject again because the grid voltage is below the legally prescribed switch-on value.</p> <p>► Contact your installer if this error occurs frequently.</p>	
Intern.error	<p>► Contact your installer if this alarm occurs frequently.</p>	
Intern. info	<p>► Contact your installer if this alarm occurs frequently.</p>	
Intern. warning	<p>► Contact your installer if this alarm occurs frequently.</p>	
Isolation error	<p>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.</p> <p>► Notify your installer.</p>	
L and N swapped	<p>Outer conductor and neutral conductor are connected swapped out. For safety reasons the inverter is not allowed to inject into the grid.</p> <p>► Notify your installer.</p>	
No branding	<p>The inverter has incorrect or faulty device data. For this reason, the inverter cannot inject into the grid.</p> <p>► Notify your installer.</p>	
No connection to the energy meter	<p>The communication connection between the inverter and the energy meter does not exist or is defective.</p> <p>► Please ask your installer to check the connection.</p>	
Overtemperature HSS	<p>The maximum permissible boost converter temperature has been exceeded. The inverter does not inject into the grid until the permissible temperature range is reached.</p> <ol style="list-style-type: none"> <li>1. Check whether the installation conditions are fulfilled.</li> <li>2. Contact your installer if this alarm occurs frequently.</li> </ol>	

Event message	Description	Type
Power reduction due to temperature	<p>The inverter reduces its output power because the maximum permissible temperature has been reached.</p> <ol style="list-style-type: none"> <li>1. Check whether the installation conditions are fulfilled.</li> <li>2. Contact your installer if this error occurs frequently.</li> </ol>	
PV current too high	<p>The input current at the inverter exceeds the permissible value. The inverter limits the current to the permissible value.</p> <p>► Contact your installer if this alarm occurs frequently.</p>	
PV voltage too high	<p>The input voltage applied on the inverter exceeds the permissible value.</p> <p>► Switch off the DC load-break switch of the inverter and notify your installer.</p>	
Reading CountryCode failed	<p>The inverter could not correctly read out the country setting from the memory.</p> <p>► Notify your installer.</p>	
Residual current too high	<p>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.</p> <p>► Notify your installer.</p>	
RS485 Gateway activated	<p>No communication with the inverter possible via the RS485 interface.</p> <p>► Disconnect the inverter from the grid and reset it (AC reset).</p> <p>► Have your installer carry out this operation.</p>	
Self test failed	<p>An error occurred during the self-test, the self-test has been aborted.</p> <p>► Notify your installer if</p> <ul style="list-style-type: none"> <li>■ the self-test has been aborted repeatedly at different times a day due to an error and</li> <li>■ grid voltage and frequency were definitely within the limit values of the country setting.</li> </ul>	

Event message	Description	Type
Software incompatible	<p>"After a firmware update, the different software statuses in the inverter do not match any more.</p> <ol style="list-style-type: none"><li>1. Repeat the firmware update using a valid update file.</li><li>2. Contact your installer if this error occurs frequently.</li></ol>	
Time/date lost	<p>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.</p> <ul style="list-style-type: none"><li>▶ Correct the time settings under <code>Settings</code></li><li>▶ <code>Time/date</code>.</li></ul>	

## 8 Maintenance and disposal

### 8.1 Maintenance


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

#### NOTICE!

Danger of destroying components on devices of type coolcept:

- Ensure that cleaning agents and cleaning materials do **not** get between the cooling fins on the front of the inverter (under the grey hood).
- The following cleaning materials, 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.

### 8.2 Disposal

Do not dispose of the device in the household waste. After the service life of the device has elapsed, send the device with the notification *For disposal* .

The device packaging consists of recyclable materials.

## 9 Technical data

### 9.1 Inverter

#### 9.1.1 StecaGrid 1500/1500x/2000/2000x

	StecaGrid 1500/x	StecaGrid 2000/x
<b>DC input side (PV generator connection)</b>		
Number of DC inputs	1	
Maximum start voltage	420 V	
Maximum input voltage	420 V	
Minimum input voltage for grid-feeding	75 V	
Start input voltage	90 V	
Rated input voltage	195 V	255 V
Minimum input voltage for rated output	135 V	180 V
Number of MPP trackers	1	
Operating input voltage range	75 ... 350 V	
Maximum input current	11.5 A	
Rated input current	8 A	
Maximum backfeed current into the PV generator	0 A	
Maximum input power at maximum active output power	1,540 W	2,050 W
Rated input power (cos phi = 1)	1,540 W	2,050 W
Recommended maximum PV power	1,800 Wp	2,500 Wp
Derating / power limiting	occurs automatically when: <ul style="list-style-type: none"> <li>■ input power &gt; max. recommended PV power</li> <li>■ Cooling is inadequate</li> <li>■ Input current too high</li> <li>■ Grid current too high</li> <li>■ Internal or external power reduction</li> <li>■ Grid frequency too high (in accordance with country setting)</li> <li>■ Limiting signal on external interface</li> <li>■ Output power limited (set on the inverter)</li> </ul>	
<b>AC output side (grid connection)</b>		
Output voltage	185 V ... 276 V (depending on the country settings)	



	StecaGrid 1500/x	StecaGrid 2000/x
Rated output voltage	230 V	
Maximum output current	12 A	
Rated output current	6.5 A	8.7 A
Maximum active power (cos phi = 1)	1,500 W	2,000 W
Maximum active power (cos phi = 0,95)	1,500 W	2,000 W
Maximum apparent power (cos φ = 0.95)	1,580 VA	2,100 VA
Rated output	1,500 W	2,000 W
Rated frequency	50 Hz and 60 Hz	
Grid type	L / N / PE (protective earth)	
Grid frequency	45 Hz ... 65 Hz (depending on the country settings)	
Power losses in nighttime operation	< 2 W	
Feeding phases	single-phase	
Distortion factor (cos phi = 1)	< 2 %	
Power factor cos phi	0.95 capacitive ... 0.95 inductive	
<b>Characterization of the operating behaviour</b>		
Maximum efficiency	98.0 %	
European efficiency	97.4 %	97.5%
CEC efficiency	97.6%	97.6%
MPP efficiency	> 99.7 % (static), > 99 % (dynamic)	
Efficiency values (at 5 %, 10 %, 20 %, 25 %, 30 %, 50 %, 75 %, 100 % of the rated output power) at rated voltage	90.7 %, 94.7 %, 96.6 %, 97.0 %, 97.3 %, 97.7 %, 97.7 %, 97.5 %	92.8 %, 95.8 %, 97.3 %, 97.5 %, 97.7 %, 97.8 %, 97.7 %, 97.4 %
Efficiency values (at 5 %, 10 %, 20 %, 25 %, 30 %, 50 %, 75 %, 100 % of the rated output power) at minimum MPP voltage	89.9 %, 94.2 %, 96.2 %, 96.6 %, 96.8 %, 97.1 %, 96.7 %, 96.1 %	91.4 %, 94.5 %, 96.2 %, 96.8 %, 97.0 %, 97.2 %, 97.1 %, 96.2 %
Efficiency values (at 5 %, 10 %, 20 %, 25 %, 30 %, 50 %, 75 %, 100 % of the rated output power) at maximum MPP voltage	90.7 %, 94.7 %, 96.7 %, 97.1 %, 97.4 %, 97.7 %, 97.8 %, 97.7 %	92.3 %, 95.7 %, 97.1 %, 97.4 %, 97.6 %, 97.8 %, 97.7 %, 97.5 %

	StecaGrid 1500/x	StecaGrid 2000/x
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	< 4 W	
Derating at full power	from 50 °C (T <sub>amb</sub> )	
Switch-on power	10 W	
Switch-off power	5 W	
<b>Safety</b>		
Protection class	II	
Isolation principle	No electrical isolation, transformer-less	
Grid monitoring	yes, integrated	
Insulation monitoring	yes, integrated	
Residual current monitoring	yes, integrated <sup>1)</sup>	
Overvoltage protection version	Varistors	
Reverse polarity protection	yes	
<b>Operating conditions</b>		
Area of application	coolcept: indoor rooms, with or without air conditioning coolcept-x: indoor rooms, with or without air conditioning, out of doors with or without protection	
Climate protection class as per IEC 60721-3-3	coolcept: 3K3 coolcept-x: 4K4H	
Ambient temperature range	-15 °C ... +60 °C	
Storage temperature	-30 °C ... +80 °C	
Relative humidity	coolcept: 0 % ... 95 %, non-condensing coolcept-x: 0 % ... 100 %, non-condensing	
Altitude of site	≤ 2000 m above sea level	
Pollution degree	PD3	
Noise emission (typical)	31 dBA	
Improper ambient gases	Ammonia, solvents	
<b>Fitting and construction</b>		

	StecaGrid 1500/x	StecaGrid 2000/x
Degree of protection	coolcept: IP21 (housing: IP51; display: IP21) coolcept-x: IP65	
Overvoltage category	III (AC), II (DC)	
<b>DC connection</b>		
Type	Phoenix Contact SUNCLIX (1 pair)	
Connection conductor cross-section	Conductor cross-section 2.5 ... 6 mm <sup>2</sup>	
Opposing connector	Opposing connector included in delivery	
<b>AC connection</b>		
Type	Wieland RST25i3 plug	
Connection cross section Connection conductor cross-section	Cable diameter 10 ... 14 mm <sup>2</sup> , conductor cross-section ≤ 4 mm <sup>2</sup>	
Opposing connector	Opposing connector included in delivery	
Dimensions (X x Y x Z)	coolcept: 340 x 608 x 222 mm coolcept-x: 399 x 657 x 227 mm	
Weight	coolcept: 8,3 kg; coolcept-x: 11 kg	
Display	Graphical display, 128 x 64 pixels	
Communication interfaces	RS485 (2 x RJ45 sockets: Anschluss an Meteocontrol WEB <sup>1</sup> log oder Solar-Log™, 1 x RJ10 Buchse: Connection to Modbus RTU counter), Ethernet interface (1 x RJ45)	
Feed-in management as per EEG 2012	EinsMan-ready, via RS485 interface	
Integrated DC circuit breaker	yes, compliant with VDE 0100-712	
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

<sup>1)</sup> Due to its design the inverter cannot cause any DC fault currents.

### 9.1.2 StecaGrid 2500/2500x/3010/3010x

	StecaGrid 2500/x	StecaGrid 3010/x
<b>DC input side (PV generator connection)</b>		
Number of DC inputs	1	

	StecaGrid 2500/x	StecaGrid 3010/x
Maximum start voltage	600 V	
Maximum input voltage	600 V	
Minimum input voltage for grid-feeding	125 V	
Start input voltage	150 V	
Rated input voltage	320 V	380 V
Minimum input voltage for rated output	225 V	270 V
Number of MPP trackers	1	
Operating input voltage range	125 ... 500 V	
Maximum input current	11.5 A	
Rated input current	8 A	
Maximum backfeed current into the PV generator	0 A	
Maximum input power at maximum active output power	2,560 W	3,070 W
Rated input power (cos phi = 1)	2,560 W	3,070 W
Recommended maximum PV power	3,100 Wp	3,800 Wp
Derating / power limiting	<p>occurs automatically when:</p> <ul style="list-style-type: none"> <li>■ input power &gt; max. recommended PV power</li> <li>■ Cooling is inadequate</li> <li>■ Input current too high</li> <li>■ Grid current too high</li> <li>■ Internal or external power reduction</li> <li>■ Grid frequency too high (in accordance with country setting)</li> <li>■ Limiting signal on external interface</li> <li>■ Output power limited (set on the inverter)</li> </ul>	
<b>AC output side (grid connection)</b>		
Output voltage	185 V ... 276 V (depending on the country settings)	
Rated output voltage	230 V	
Maximum output current	14 A	
Rated output current	11 A	13 A
Maximum active power (cos phi = 1)	2,500 W	3,000 W

	StecaGrid 2500/x	StecaGrid 3010/x
Maximum active power (cos phi = 0,95)	2,500 W	3,000 W
Maximum apparent power (cos φ = 0.95)	2,630 VA	3,160 VA
Rated output	2,500 W	3,000 W
Rated frequency	50 Hz and 60 Hz	
Grid type	L / N / PE (protective earth)	
Grid frequency	45 Hz ... 65 Hz (depending on the country settings)	
Power losses in nighttime operation	< 2 W	
Feeding phases	single-phase	
Distortion factor (cos phi = 1)	< 2 %	
Power factor cos phi	0.95 capacitive ... 0.95 inductive	
<b>Characterization of the operating behaviour</b>		
Maximum efficiency	98.0 %	
European efficiency	97.6 %	97.7 %
CEC efficiency	97.7 %	97.8 %
MPP efficiency	> 99.7 % (static), > 99 % (dynamic)	
Efficiency values (at 5 %, 10 %, 20 %, 25 %, 30 %, 50 %, 75 %, 100 % of the rated output power) at rated voltage	92.9 %, 95.5 %, 97.2 %, 97.3 %, 97.6 %, 97.7 %, 97.5 %, 97.1 %	94.6 %, 96.9 %, 97.9 %, 98.0 %, 98.1 %, 98.0 %, 97.6 %, 97.2 %
Efficiency values (at 5 %, 10 %, 20 %, 25 %, 30 %, 50 %, 75 %, 100 % of the rated output power) at minimum MPP voltage	92.1 %, 95.3 %, 96.6 %, 96.9 %, 97.0 %, 97.1 %, 96.7 %, 96.2 %	93.6 %, 95.8 %, 97.2 %, 97.3 %, 97.4 %, 97.2 %, 96.8 %, 96.1 %
Efficiency values (at 5 %, 10 %, 20 %, 25 %, 30 %, 50 %, 75 %, 100 % of the rated output power) at maximum MPP voltage	93.3 %, 96.1 %, 97.5 %, 97.6 %, 97.8 %, 98.0 %, 97.7 %, 97.5 %	94.4 %, 96.6 %, 97.7 %, 97.8 %, 97.9 %, 97.9 %, 97.5 %, 97.1 %
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	< 4 W	
Derating at full power	from 50 °C (T <sub>amb</sub> )	from 45 °C (T <sub>amb</sub> )

	StecaGrid 2500/x	StecaGrid 3010/x
Switch-on power	10 W	
Switch-off power	5 W	
<b>Safety</b>		
Protection class	II	
Isolation principle	No electrical isolation, transformer-less	
Grid monitoring	yes, integrated	
Insulation monitoring	yes, integrated	
Residual current monitoring	yes, integrated <sup>1)</sup>	
Oversvoltage protection version	Varistors	
Reverse polarity protection	yes	
<b>Operating conditions</b>		
Area of application	coolcept: indoor rooms, with or without air conditioning coolcept-x: indoor rooms, with or without air conditioning, out of doors with or without protection	
Climate protection class as per IEC 60721-3-3	coolcept: 3K3 coolcept-x: 4K4H	
Ambient temperature range	-15 °C ... +60 °C	
Storage temperature	-30 °C ... +80 °C	
Relative humidity	coolcept: 0 % ... 95 %, non-condensing coolcept-x: 0 % ... 100 %, non-condensing	
Altitude of site	≤ 2000 m above sea level	
Pollution degree	PD3	
Noise emission (typical)	31 dBA	
Improper ambient gases	Ammonia, solvents	
<b>Fitting and construction</b>		
Degree of protection	coolcept: IP21 (housing: IP51; display: IP21) coolcept-x: IP65	
Oversvoltage category	III (AC), II (DC)	
<b>DC connection</b>		
Type	Phoenix Contact SUNCLIX (1 pair)	

	StecaGrid 2500/x	StecaGrid 3010/x
Connection conductor cross-section	Conductor cross-section 2.5 ... 6 mm <sup>2</sup>	
Opposing connector	Opposing connector included in delivery	
<b>AC connection</b>		
Type	Wieland RST25i3 plug	
Connection cross section Connection conductor cross-section	Cable diameter 10 ... 14 mm <sup>2</sup> , conductor cross-section ≤ 4 mm <sup>2</sup>	
Opposing connector	Opposing connector included in delivery	
Dimensions (X x Y x Z)	coolcept: 340 x 608 x 222 mm coolcept-x: 399 x 657 x 227 mm	
Weight	coolcept: 9.6 kg coolcept-x: 12 kg	
Display	Graphical display, 128 x 64 pixels	
Communication interfaces	RS485 (2 x RJ45 sockets: Anschluss an Meteocontrol WEB'log oder Solar-Log™, 1 x RJ10 Buchse: Connection to Modbus RTU counter), Ethernet interface (1 x RJ45)	
Feed-in management as per EEG 2012	EinsMan-ready, via RS485 interface	
Integrated DC circuit breaker	yes, compliant with VDE 0100-712	
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

<sup>1)</sup> Due to its design the inverter cannot cause any DC fault currents.

### 9.1.3 StecaGrid 3600/3600x/4200/4200x

	StecaGrid 3600/x	StecaGrid 4200/x
<b>DC input side (PV generator connection)</b>		
Number of DC inputs	1	
Maximum start voltage	845 V	
Maximum input voltage	845 V	
Minimum input voltage for grid-feeding	350 V	

	StecaGrid 3600/x	StecaGrid 4200/x
Start input voltage	350 V	
Rated input voltage	455 V	540 V
Minimum input voltage for rated output	350 V	
Number of MPP trackers	1	
Operating input voltage range	350 V ... 700 V	
Maximum input current	12 A	
Rated input current	8 A	
Maximum backfeed current into the PV generator	0 A	
Maximum input power at maximum active output power	3770 W	4310 W
Rated input power (cos phi = 1)	3770 W	4310 W
Recommended maximum PV power	4500 Wp	5200 Wp
Derating / power limiting	<p>occurs automatically when:</p> <ul style="list-style-type: none"> <li>■ input power &gt; max. recommended PV power</li> <li>■ Cooling is inadequate</li> <li>■ Input current too high</li> <li>■ Grid current too high</li> <li>■ Internal or external power reduction</li> <li>■ Grid frequency too high (in accordance with country setting)</li> <li>■ Limiting signal on external interface</li> <li>■ Output power limited (set on the inverter)</li> </ul>	
<b>AC output side (grid connection)</b>		
Output voltage	185 V ... 276 V (depending on the country settings)	
Rated output voltage	230 V	
Maximum output current	16 A	18.5 A
Rated output current	16 A	18.3 A
Maximum active power (cos phi = 1)	3680 W (Belgium 3330 W)	4200 W (Belgium: 3330 W)
Maximum active power (cos phi = 0,95)	3500 W	3990 W
Maximum apparent power (cos phi = 0.95)	3680 VA	4200 VA



	StecaGrid 3600/x	StecaGrid 4200/x
Rated output	3680 W (Portugal: 3450 W)	4200 W (Portugal: 3680 W)
Rated frequency	50 Hz and 60 Hz	
Grid type	L / N / PE (protective earth)	
Grid frequency	45 Hz ... 65 Hz (depending on the country settings)	
Power losses in nighttime operation	< 2 W	
Feeding phases	single-phase	
Distortion factor (cos phi = 1)	< 2 %	
Power factor cos phi	0.95 capacitive ... 0.95 inductive	
<b>Characterization of the operating behaviour</b>		
Maximum efficiency	98.6 %	
European efficiency	98.3 %	98.2 %
CEC efficiency	98.3 %	98.2 %
MPP efficiency	> 99.7 % (static), > 99 % (dynamic)	
Efficiency values (at 5 %, 10 %, 20 %, 25 %, 30 %, 50 %, 75 %, 100 % of the rated output power) at rated voltage	95.8 %, 97.4 %, 98.2 %, 98.3 %, 98.4 %, 98.4 %, 98.1 %, 97.7 %	96.2 %, 97.6 %, 98.3 %, 98.3 %, 98.3 %, 98.2 %, 97.9 %, 97.4 %
Efficiency values (at 5 %, 10 %, 20 %, 25 %, 30 %, 50 %, 75 %, 100 % of the rated output power) at minimum MPP voltage	96.3 %, 97.7 %, 98.5 %, 98.6 %, 98.6 %, 98.5 %, 98.3 %, 97.9 %	96.7 %, 98.0 %, 98.5 %, 98.6 %, 98.6 %, 98.4 %, 98.1 %, 97.6 %
Efficiency values (at 5 %, 10 %, 20 %, 25 %, 30 %, 50 %, 75 %, 100 % of the rated output power) at maximum MPP voltage	95.2 %, 97.0 %, 97.8 %, 98.0 %, 98.1 %, 98.0 %, 97.8 %, 97.5 %	95.7 %, 97.0 %, 98.0 %, 98.1 %, 98.2 %, 97.9 %, 97.6 %, 97.2 %
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	< 4 W	
Derating at full power	from 50 °C (T <sub>amb</sub> )	from 45 °C (T <sub>amb</sub> )
Switch-on power	10 W	
Switch-off power	5 W	
<b>Safety</b>		

	StecaGrid 3600/x	StecaGrid 4200/x
Protection class	II	
Isolation principle	No electrical isolation, transformer-less	
Grid monitoring	yes, integrated	
Insulation monitoring	yes, integrated	
Residual current monitoring	yes, integrated <sup>1)</sup>	
Overvoltage protection version	Varistors	
Reverse polarity protection	yes	
<b>Operating conditions</b>		
Area of application	coolcept: indoor rooms, with or without air conditioning coolcept-x: indoor rooms, with or without air conditioning, out of doors with or without protection	
Climate protection class as per IEC 60721-3-3	coolcept: 3K3 coolcept-x: 4K4H	
Ambient temperature range	-15 °C ... +60 °C	
Storage temperature	-30 °C ... +80 °C	
Relative humidity	coolcept: 0 % ... 95 %, non-condensing coolcept-x: 0 % ... 100 %, non-condensing	
Altitude of site	≤ 2000 m above sea level	
Pollution degree	PD3	
Noise emission (typical)	31 dBA	
Improper ambient gases	Ammonia, solvents	
<b>Fitting and construction</b>		
Degree of protection	coolcept: IP21 (housing: IP51; display: IP21) coolcept-x: IP65	
Overvoltage category	III (AC), II (DC)	
<b>DC connection</b>		
Type	Phoenix Contact SUNCLIX (1 pair)	
Connection conductor cross-section	Conductor cross-section 2.5 ... 6 mm <sup>2</sup>	
Opposing connector	Opposing connector included in delivery	
<b>AC connection</b>		

	StecaGrid 3600/x	StecaGrid 4200/x
Type	Wieland RST25i3 plug	
Connection cross section Conductor cross-section	cable diameter 10 ... 14 mm <sup>2</sup> , conductor cross-section ≤ 4 mm <sup>2</sup>	
Opposing connector	Opposing connector included in delivery	
Dimensions (X x Y x Z)	coolcept: 340 x 608 x 222 mm coolcept-x: 399 x 657 x 227 mm	
Weight	coolcept: 9.1 kg; coolcept-x: 11.5 kg	
Display	Graphical display, 128 x 64 pixels	
Communication interfaces	RS485 (2 x RJ45 sockets: Anschluss an Meteocontrol WEB'log oder Solar-Log™, 1 x RJ10 Buchse: Connection to Modbus RTU counter), Ethernet interface (1 x RJ45)	
Feed-in management as per EEG 2012	EinsMan-ready, via RS485 interface	
Integrated DC circuit breaker	yes, compliant with VDE 0100-712	
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

<sup>1)</sup> Due to its design the inverter cannot cause any DC fault currents.

## 9.2 AC cables and line circuit breakers

Tab. 4: Conductor cross-sections of the AC cables and suitable line circuit breakers

Inverter	AC cable conductor cross-section	Power loss <sup>1)</sup>	Miniature circuit breaker
StecaGrid 1500/-x	1.5 mm <sup>2</sup>	10 W	B16
	2.5 mm <sup>2</sup>	6 W	B16
	4.0 mm <sup>2</sup>	4 W	B16
StecaGrid 2000/-x	1.5 mm <sup>2</sup>	18 W	B16
	2.5 mm <sup>2</sup>	11 W	B16
	4.0 mm <sup>2</sup>	6 W	B16
StecaGrid 2500/-x	2.5 mm <sup>2</sup>	16 W	B16
	4.0 mm <sup>2</sup>	11 W	B16
StecaGrid 3010/-x	2.5 mm <sup>2</sup>	25 W	B16 or B25

Inverter	AC cable conductor cross-section	Power loss <sup>1)</sup>	Miniature circuit breaker
	4.0 mm <sup>2</sup>	15 W	B16 or B25
StecaGrid 3600/-x	2.5 mm <sup>2</sup>	35 W	B25
	4.0 mm <sup>2</sup>	22 W	B25
StecaGrid 4200/-x	2.5 mm <sup>2</sup>	48 W	B25
	4.0 mm <sup>2</sup>	30 W	B25

<sup>1)</sup> Power loss of the AC cables at the rated power of the inverter and a cable length of 10 m

### 9.3 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.

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## 10 Liability, commercial guarantee, legal guarantee

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

## 11 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

Steca Elektronik GmbH

Mammostrasse 1

87700 Memmingen

Germany

Phone +49 (0) 700 783 224 743

+49 700 STECAGRID

Monday to Friday from 08:00 a.m. to 4:00 p.m.

Fax +49 (0) 8331 8558 132

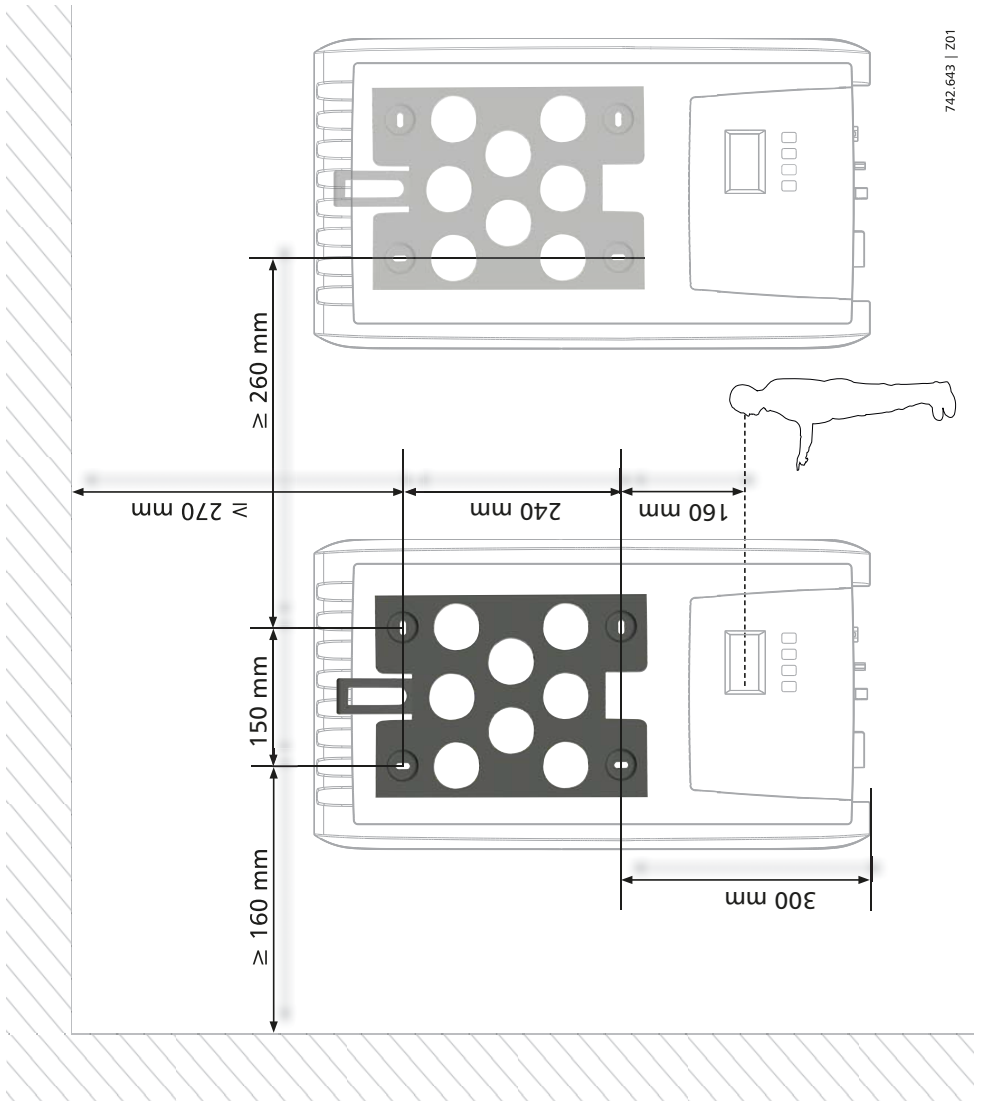
Email [service@stecasolar.com](mailto:service@stecasolar.com)

Internet [www.stecasolar.com](http://www.stecasolar.com)

# Appendix

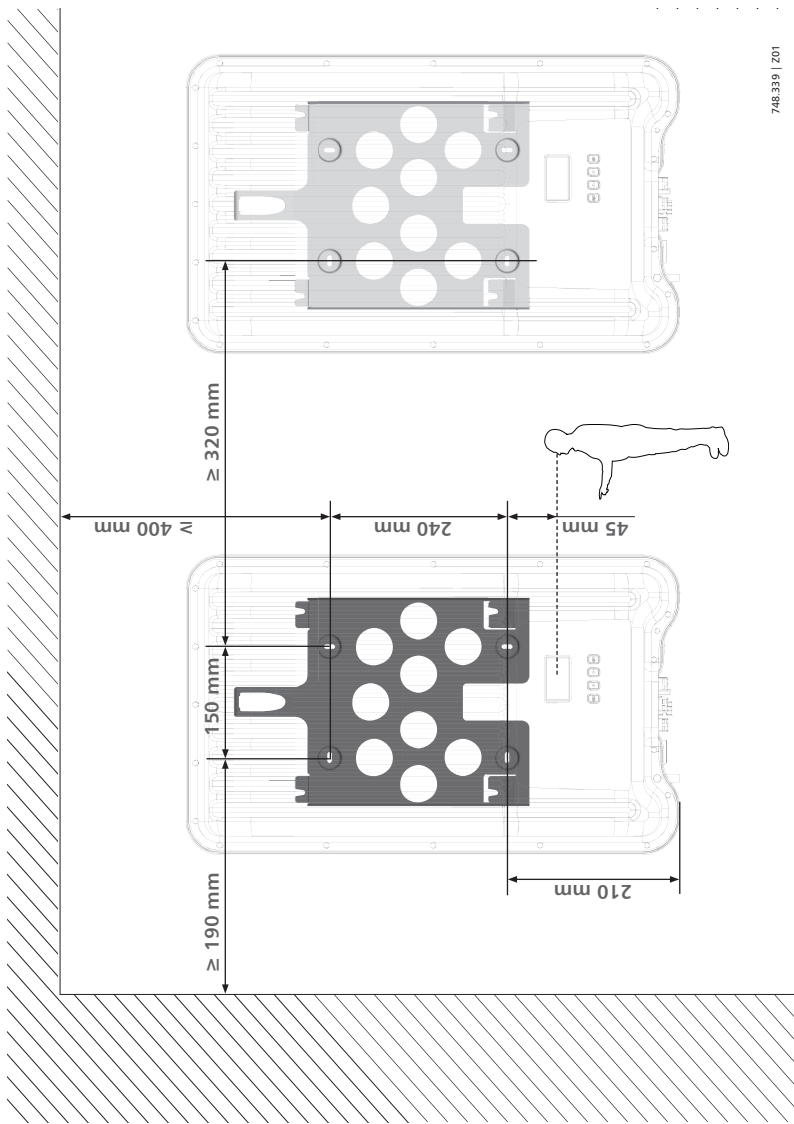
# A Assembly

## A.1 Bore dimension drawing for coolcept devices

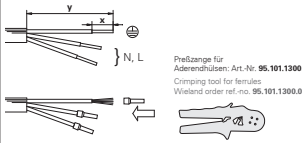
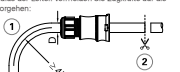
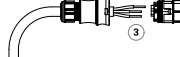
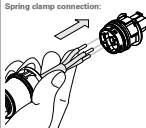
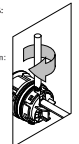




# A.2 Bore dimension drawing for coolcept-x devices

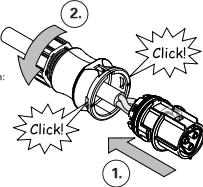


# A.3 AC plug

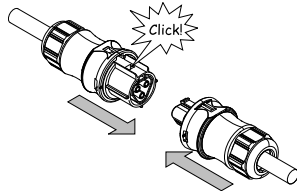
<b>gesis</b> RST 202/203 <b>DEU</b> <b>Gebrauchsanleitung für Steckverbinder 2...3-polig</b> <b>ENG</b> <b>Instructions for use for 2/3-pole Connector</b>	<b>gesis</b> <b>Hofline:</b> Tel.: +49 (951) 9224-998 Fax: +49 (951) 9226-996 Email: BTTSt@wieland-electric.com Internet: www.gesis.com	Wieland Electric GmbH Brennerstraße 10/14, 96052 Bamberg Tel. +49 (951) 9224-0 Fax +49 (951) 9224-198 Internet: www.wieland-electric.com Email: info@wieland-electric.com Stand P, updated: 10/2009 © 2009 Wieland Electric GmbH																															
<b>Wichtige Information - bitte aufmerksam lesen</b> Dieses Blatt beschreibt die Montage der zwei- und dreipoligen gesis RST-Steckverbinder. Bitte beachten Sie, daß elektrische Anschlüsse und Installationen ausschließlich von hierfür ausgebildeten Fachkräften vorgenommen werden dürfen. <b>Important information - please read carefully</b> This leaflet is intended for use by trained electricians only. It describes the mounting of the two and three pole gesis RST connectors. Please observe the warnings and notes.		<b>Abmantellängen und Absisolierlängen (mm)</b> <b>Dismantling and insulation strip lengths (mm)</b>																															
<b>Einsatzbereich und Zündschutzart</b> <b>Operating conditions and type of protection</b> <ul style="list-style-type: none"> <li>• IP 3 G Ex II, 0/0, IIB C</li> <li>• IP 3 D Ex II A22 T85 °C (H05VVF...T70 °C; H07RN-F...T60 °C)</li> </ul> Zertifikat Nr./Certificate No.: SEV 07 ATEX 0110 X		 <p>Preßzange für Aderschüßen: Art.-Nr. <b>95.101.1300.0</b>          Crimping tool for females: Wieland order ref.-no. <b>95.101.1300.0</b></p>																															
<b>Erweiterter Einsatzbereich für nachfolgende Geräte- und Erstanstschlüsse in Schraubtechnik</b> Extended range of application for following screw-type appliance and power connectors: <ul style="list-style-type: none"> <li>• RSTAGS/DIGS1 ZR, /.../SIDB1 ZR...</li> <li>• RSTAGS/DIGS1 ZR, /.../SIDB1 M...</li> </ul> Siehe auch „Besondere Bedingungen X“ See also „Special conditions X“		<b>Federkraft-Anschlüsse / Spring clamp connections</b> <table border="1"> <thead> <tr> <th>Leiter / conductor</th> <th>PE</th> <th>N, L</th> <th>PE</th> <th>N, L</th> </tr> </thead> <tbody> <tr> <td></td> <td>Einfach-Anschluß Single connector</td> <td></td> <td>Doppel-Anschluß Dual connector</td> <td></td> </tr> <tr> <td>Abmantellänge y (mm) / Dismantling length y (mm)</td> <td><b>40</b></td> <td><b>35</b></td> <td><b>55</b></td> <td><b>50</b></td> </tr> </tbody> </table>	Leiter / conductor	PE	N, L	PE	N, L		Einfach-Anschluß Single connector		Doppel-Anschluß Dual connector		Abmantellänge y (mm) / Dismantling length y (mm)	<b>40</b>	<b>35</b>	<b>55</b>	<b>50</b>																
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<b>Kabeltypen</b> <b>Cable types</b> <ul style="list-style-type: none"> <li>• H05VVF... 1,5mm<sup>2</sup> und 2,5mm<sup>2</sup></li> <li>• H07RN-F... 1,5mm<sup>2</sup> und 2,5mm<sup>2</sup></li> </ul>		<table border="1"> <thead> <tr> <th>Leiterquerschnitt (mm<sup>2</sup>) / Conductor cross section (mm<sup>2</sup>)</th> <th colspan="2">Absolierlänge x (mm) / Insulation strip length x (mm)</th> </tr> </thead> <tbody> <tr> <td>endsträngig / solid</td> <td>1,5</td> <td>2,5</td> </tr> <tr> <td>endsträngig / solid</td> <td><b>14,5+1</b></td> <td><b>14,5+1</b></td> </tr> <tr> <td>Ringsträngig (nur mit Aderschülse) / fine stranded (beneficial: ringsträngig)</td> <td><b>13+1</b></td> <td></td> </tr> <tr> <td>Aderschülse entspr. DIN 46228 E... Terminals acc. to DIN 46228 E...</td> <td><b>12</b></td> <td></td> </tr> <tr> <td>Aderschülse entspr. DIN 46228 E... Terminals acc. to DIN 46228 E...</td> <td><b>12</b></td> <td></td> </tr> <tr> <td>Ultraschallverdichtet / ultrasonically compressed</td> <td><b>14,5+1</b></td> <td><b>14,5+1</b></td> </tr> </tbody> </table>	Leiterquerschnitt (mm <sup>2</sup> ) / Conductor cross section (mm <sup>2</sup> )	Absolierlänge x (mm) / Insulation strip length x (mm)		endsträngig / solid	1,5	2,5	endsträngig / solid	<b>14,5+1</b>	<b>14,5+1</b>	Ringsträngig (nur mit Aderschülse) / fine stranded (beneficial: ringsträngig)	<b>13+1</b>		Aderschülse entspr. DIN 46228 E... Terminals acc. to DIN 46228 E...	<b>12</b>		Aderschülse entspr. DIN 46228 E... Terminals acc. to DIN 46228 E...	<b>12</b>		Ultraschallverdichtet / ultrasonically compressed	<b>14,5+1</b>	<b>14,5+1</b>										
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Anzahl der Kabel pro Klemmstelle: 1 bzw. 2 Number of cables per terminal point: 1 or 2 respectively		<b>Leitmontage</b> <b>Wire connection</b> <b>Federkraft-Anschluß:</b> Spring clamp connection:  <b>Schraubanschluß:</b> Antriebs PZ 1, Anzugsmoment typ. 0,8...1 Nm <b>Screw connection:</b> Drive PZ 1, Tightening torque typ. 0,8...1 Nm 																															
Doc. #BA000427 B		1/3																															

**Verschließen**  
Closing

**Verschraubung:**  
Anzugsmoment  
typ. 4+1 Nm  
**Screw connection:**  
Tightening torque  
typ. 4+1 Nm



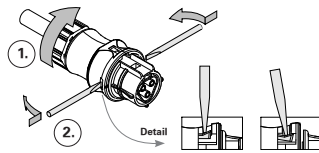
**Stecken und verriegeln**  
Plugging and locking



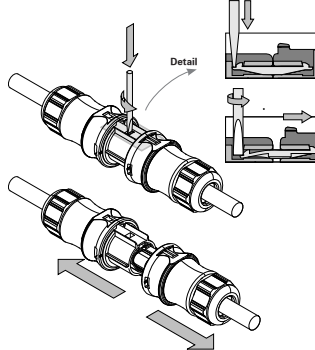
**ACHTUNG / CAUTION**

- 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!
- Um die Einhaltung der IP-Schutzart gewährleisten zu können, müssen an allen nicht belegten Steck- oder Buchsestellen Schutzkappen (Zubehör) montiert werden!  
To maintain IP 65 type of enclosure, protective caps (accessory) must be mounted on all unoccupied connectors!

**Öffnen des Steckverbinders**  
Opening the connector



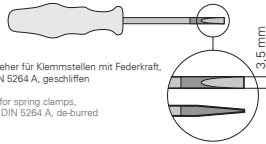
**Entriegeln und Trennen**  
Unlocking and separating



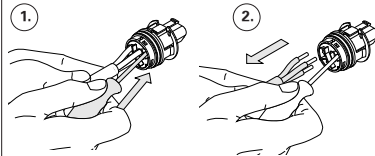
**ACHTUNG / CAUTION**

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!

**Leiterdemontage**  
Unlocking

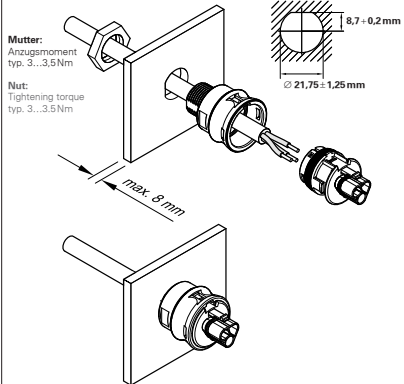


Schraubendreher für Klemmstellen mit Federkraft, Schneide DIN 5264 A, geschliffen  
Screwdriver for spring clamps, edge acc. to DIN 5264 A, de-burred



**Gehäuseeinbau mit M20-Durchführung**

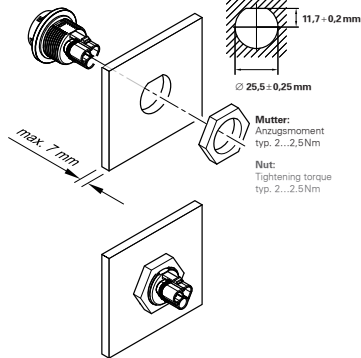
**Housing installation with M20 feedthrough**



**Mutter:**  
Anzugsmoment  
typ. 3...3.5 Nm

**Nut:**  
Tightening torque  
typ. 3...3.5 Nm

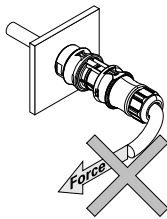
### Gehäuseeinbau mit M25-Durchführung Housing installation with M25 feedthrough



#### 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.)



#### HINWEISE / NOTES

- DE** Die Installationssteckverbinder RST 202...-I3... sind nach RL 94/9/EG (ATEX 95) An-hang I Geräte der Gerätegruppe II Kategorie 3D die nach RL 99/92/EG (ATEX 137) in der Zone 2 sowie den Gasgruppen IIA, IIB und IIC, die durch brennbare Stoffe im Bereich der Temperaturklassen T1 bis T6 explosionsgefährdet sind, eingesetzt werden dürfen.  
Bei der Verwendung/Installation sind die Anforderungen nach EN 60079-14 einzuhalten.  
**EN** The installation plug connectors RST 202...-I3... are, according to RL 94/9/EG (ATEX 95) Appendix I, appliances of Appliance Group II, Category 3G, which, according to RL 99/92/EG (ATEX 137), may be used in Zone 2, as well as in the gas groups IIA, IIB, and IIC, which are subject to the risk of explosion due to combustible materials in the range of temperature classes T1 to T6.  
During use/installation, the requirements according to EN 60079-14 are to be respected.
- DE** Die Installationssteckverbinder RST 202...-I3... sind nach RL 94/9/EG (ATEX 95) An-hang I auch Geräte der Gerätegruppe II Kategorie 3D die nach RL 99/92/EG (ATEX 137) in der Zone 22 von brennbaren Stäuben eingesetzt werden dürfen.  
Bei der Verwendung/Installation sind die Anforderungen nach EN 61241-14 einzuhalten.  
**EN** The installation plug connectors RST 202...-I3... are, according to RL 94/9/EG (ATEX 95) Appendix I, appliances of Appliance Group II, Category 3D, which, according to RL 99/92/EG (ATEX 137), may be used in Zone 22 of combustible dusts.  
During use/installation, the requirements according to EN 61241-14 are to be respected.
- DE** Der zulässige Umgebungstemperaturbereich beträgt -20°C bis +40°C.  
**EN** The permissible ambient temperature range is -20 °C to + 40 °C.

#### BESONDERE BEDINGUNGEN X / SPECIAL CONDITIONS X

- DE** Die Installationssteckverbinder RST 202...-I3... dürfen nur dort eingebaut werden, wo diese vor Einwirkung mechanischer Gefahr geschützt sind.  
**EN** The installation plug connectors RST 202...-I3... may only be installed at locations at which they are protected from the effects of mechanical dangers.
- DE** Nicht benötigte Stecker- und Buchsensteile müssen mit dem jeweils zugehörigen Verschlußstück verschlossen werden.  
**EN** Unnecessary plug and socket parts must be closed off with the pertinent circuit element which relates to them.
- DE** Die am Installationssteckverbinder RST 202...-I3... angeschlossenen Kabel und Leitungen sind vor Einwirkung mechanischen Gefahr zu schützen. Zusätzlich muss der Installateur/Betreiber eine entsprechende Zugentlastung der angeschlossenen Kabel und Leitungen gewährleisten.  
**EN** The cables and leads connected to installation plug connectors RST 202...-I3... are to be protected from the effect of mechanical danger. In addition to this, the installer/operator must guarantee an appropriate strain relief for the connected cables and leads.
- DE** Bei Verwendung eines Leiterquerschnittes  $\geq 2,5\text{mm}^2$  und bei einer Umgebungstemperatur bis max. 70 °C dürfen die Installationssteckverbinder RST203 als Geräte- und Erdschlüsse in Schraubtechnik mit einem maximalen Belastungsstrom von 9,4 A eingesetzt werden.  
**EN** The screw-type appliance and power connectors RST203 may be operated with 9.4 A if conductor cross section is equal or greater than 2.5mm<sup>2</sup> and ambient temperature does not exceed 70°C.
- DE** Wartungs- und Reinigungsarbeiten dürfen nur durchgeführt werden, wenn keine explosive Atmosphäre vorhanden ist.  
Elektrostatische Aufladung der Installationsverbinder RST202...-I3... z.B. durch Staubabwischen, muss vermieden werden.  
**EN** Maintenance and cleaning may only be performed in a non-explosive atmosphere.  
Electrostatic charging of installation connectors RST202...-I3... e.g. by dusting, must be avoided.



**日本語**

太陽電池モジュール用 SUNCLIX 本機用高圧電圧 IO コネクタ。2.5-6 mm<sup>2</sup>ソーラーケーブル PV1-F 型または PV1-F 型 (ZKLA) ソーラーケーブル (ZKLA) AWG 10-14

- 1 安全注意事項
  - 警告: SUNCLIX プラグインコネクタは、訓練を受けた電気技師等によって設置する必要があります。SUNCLIX プラグインコネクタを、SUNCLIX プラグインコネクタ用のケーブルプラグタイプまたは、異なるタイプのケーブルプラグタイプまたは、異なるタイプのケーブルプラグタイプまたは、異なるタイプのケーブルプラグタイプに接続してはいけません。
  - 注意: SUNCLIX プラグインコネクタは、異なるタイプのケーブルプラグタイプまたは、異なるタイプのケーブルプラグタイプに接続してはいけません。
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- 2 コネクタの接続
  - 1 初期インストール時にケーブルを 15 mm 以下に切断し、ケーブルの絶縁層を剥いてはいけません。ケーブルを剥いたケーブルの断端を直接に露出したままにしないでください。剥いたケーブルの断端は、SUNCLIX プラグインコネクタの内部に押し込まれるべきではありません。剥いたケーブルの断端は、SUNCLIX プラグインコネクタの内部に押し込まれるべきではありません。剥いたケーブルの断端は、SUNCLIX プラグインコネクタの内部に押し込まれるべきではありません。
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**中文**

用于太阳能光伏系统的 SUNCLIX 光伏连接器。适用于 2.5-6 mm<sup>2</sup> 的 PV1-F 型太阳能电池板电缆 (ZKLA) 引入太阳能电池板 (ZKLA) AWG 10-14

- 1 安全注意事项
  - 警告: SUNCLIX 连接器只允许由受过训练的电气技术人员安装。
  - 警告: SUNCLIX 连接器只允许由受过训练的电气技术人员安装。
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- 2 连接连接器
  - 1 初始安装时，将电缆切断至 15 mm 以下，剥去电缆绝缘层。请勿剥去任何绝缘层。剥去绝缘层的电缆端头不得直接暴露在连接器内部。剥去绝缘层的电缆端头不得直接暴露在连接器内部。剥去绝缘层的电缆端头不得直接暴露在连接器内部。
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**русский**

фотоэлектрической соединитель SUNCLIX для применения в фотоэлектрических установках. Подходит для кабелей PV1-F типа PV1-F при сечение проводов от 2,5 до 6 мм<sup>2</sup> (ZKLA) AWG 10-14

- 1 Указания по технике безопасности
  - Предупреждение: Соединитель SUNCLIX разрешено устанавливать только обученным электрикам.
  - Предупреждение: Соединитель SUNCLIX разрешено устанавливать только обученным электрикам.
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- 2 Подключение кабелей
  - 1 При первоначальной установке кабель необходимо обрезать до длины 15 мм. Не снимайте изоляцию с кабеля. Не снимайте изоляцию с кабеля. Не снимайте изоляцию с кабеля.
  - 2 Подключение кабелей
    - 1 При первоначальной установке кабель необходимо обрезать до длины 15 мм. Не снимайте изоляцию с кабеля. Не снимайте изоляцию с кабеля. Не снимайте изоляцию с кабеля.

**Türkçe**

Fotovoltaik sistemler için kullanılan tip SUNCLIX fotovoltaik konektörler, PV1-F tip PV1-F için kesit alanları 2,5 mm<sup>2</sup> - 6 mm<sup>2</sup> (ZKLA) AWG 10-14 için uygundur.

- 1 Güvenlik uyarıları
  - Uyarı: SUNCLIX birleştiricileri yalnızca eğitim almış elektrikçiler tarafından kullanılmalıdır.
  - Uyarı: SUNCLIX birleştiricileri yalnızca eğitim almış elektrikçiler tarafından kullanılmalıdır.
  - Uyarı: SUNCLIX birleştiricileri yalnızca eğitim almış elektrikçiler tarafından kullanılmalıdır.

- 2 Konektörün bağlanması
  - 1 İlk kurulum sırasında kabloları 15 mm'ye kadar kesilmeli ve kabloların yalıtım katmanları soyulmamalıdır.
  - 2 Konektörün bağlanması
    - 1 İlk kurulum sırasında kabloları 15 mm'ye kadar kesilmeli ve kabloların yalıtım katmanları soyulmamalıdır.

**Português**

Conectores de encaixe fotovoltaicos SUNCLIX para aplicação em sistemas fotovoltaicos. Adequados para cabos PV1-F com secção de fio de 2,5 a 6 mm<sup>2</sup> (ZKLA) AWG 10-14

- 1 Avisos de segurança
  - Atenção: Os conectores SUNCLIX devem ser instalados apenas por pessoal técnico devidamente treinado.
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- 2 Conectar o cabo (Figura 1)
- 2 Conectar o cabo (Figura 1)
- 2 Conectar o cabo (Figura 1)

**Español**

Conector enchufable fotovoltaico SUNCLIX para su empleo en instalaciones fotovoltaicas. Adecuado para cables PV1-F con sección de cable certificado por UL (ZKLA) AWG 10-14

- 1 Indicaciones de seguridad
  - Importante: Los conectores SUNCLIX solo deben ser instalados por personal técnico capacitado.
  - Importante: Los conectores SUNCLIX solo deben ser instalados por personal técnico capacitado.
  - Importante: Los conectores SUNCLIX solo deben ser instalados por personal técnico capacitado.

- 2 Conectar el cable (Figura 1)
- 2 Conectar el cable (Figura 1)
- 2 Conectar el cable (Figura 1)

UL SUBJECT 6703  
 40°C ~ 70°C  
 3.0 mm<sup>2</sup> PV1-F 4.0 mm<sup>2</sup> - 4.0 A AWG 12 - 30 A AWG 10 - 15 A AWG 12 - 30 A AWG 10 - 30 A  
 5 ~ 8 mm  
 MNR 014082Z - 05 10540565

EN 5021  
 -40°C ~ +85°C  
 3.0 mm<sup>2</sup> PV1-F 4.0 mm<sup>2</sup> - 4.0 A AWG 12 - 30 A AWG 10 - 15 A AWG 12 - 30 A AWG 10 - 30 A  
 5 ~ 8 mm  
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日本電産 根據日本技術標準  
 环境温度: -40°C ~ +85°C  
 导线截面积 (最大): 3.0 mm<sup>2</sup> PV1-F 4.0 mm<sup>2</sup> - 4.0 A AWG 12 - 30 A AWG 10 - 15 A AWG 12 - 30 A AWG 10 - 30 A  
 导线直径: 5 ~ 8 mm  
 产品编号: MNR 014082Z - 05 10540565

русский 根據日本技術標準  
 环境温度: -40°C ~ +85°C  
 导线截面积 (最大): 3.0 mm<sup>2</sup> PV1-F 4.0 mm<sup>2</sup> - 4.0 A AWG 12 - 30 A AWG 10 - 15 A AWG 12 - 30 A AWG 10 - 30 A  
 导线直径: 5 ~ 8 mm  
 产品编号: MNR 014082Z - 05 10540565

Türkçe 根據日本技術標準  
 环境温度: -40°C ~ +85°C  
 导线截面积 (最大): 3.0 mm<sup>2</sup> PV1-F 4.0 mm<sup>2</sup> - 4.0 A AWG 12 - 30 A AWG 10 - 15 A AWG 12 - 30 A AWG 10 - 30 A  
 导线直径: 5 ~ 8 mm  
 产品编号: MNR 014082Z - 05 10540565

Português 根據日本技術標準  
 环境温度: -40°C ~ +85°C  
 导线截面积 (最大): 3.0 mm<sup>2</sup> PV1-F 4.0 mm<sup>2</sup> - 4.0 A AWG 12 - 30 A AWG 10 - 15 A AWG 12 - 30 A AWG 10 - 30 A  
 导线直径: 5 ~ 8 mm  
 产品编号: MNR 014082Z - 05 10540565

Español 根據日本技術標準  
 环境温度: -40°C ~ +85°C  
 导线截面积 (最大): 3.0 mm<sup>2</sup> PV1-F 4.0 mm<sup>2</sup> - 4.0 A AWG 12 - 30 A AWG 10 - 15 A AWG 12 - 30 A AWG 10 - 30 A  
 导线直径: 5 ~ 8 mm  
 产品编号: MNR 014082Z - 05 10540565





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