











»POWER FROM THE SUN FOR EVERYDAY USE.«

In one hour, the amount of energy radiated to the earth by the sun exceeds the annual energy requirement of the world population. Making use of this inexhaustible energy source for our everyday electricity requirement is the great challenge of the present and the future. Steca was quick to recognise the opportunities of a boom in the making: The company has become synonymous all over the world with vision, innovation, and initiative in the name of solar power. Steca is a recognised specialist in the development of high-performance systems which turn light into electricity before feeding it into the public grid.



SYSTEM OVERVIEW Residential systems Commercial systems **PRODUCTS** coolcept / coolcept-x / coolcept3 / coolcept3-x StecaGrid 8000+ 3ph / 10000+ 3ph / 20000 3ph / 23000 3ph **ENERGY MANAGEMENT AND** SYSTEM MONITORING Energy manager System monitoring Software SERVICE AND OTHER PRODUCT AREAS

www.steca.com

4 THE COMPANY

»WE ARE THINKING OF TOMORROW.«



Environmental protection in series





»Simple business processes, fair partnerships and transparent communication contribute to our joint success.«



Services and production have an ecological systems, off-grid PV systems and solar ther. The company considers the whole valuefuture at the Memmingen electronics speciaworldwide contribution to reducing power potential from the energy storage system. consumption and allowing alternative energy sources to be used efficiently by providing high-performance products.

electronic services for residential, automodevelops products for the environmentally made in Germany". friendly use of solar energy under the brand name of Steca. Steca Elektronik is one of the ments of the solar market: PV grid feeding producing products for an ecological future.

mal systems. Steca also produces battery list company Steca. The company makes a charging systems that extract the maximum

Steca sets a good example in its own production methods: the company uses only with the EU Environmental Management manufacturing processes that conform to and Audit Scheme. Steca has established a wide base in order strict ecological criteria. Steca is actively into achieve these goals. The company offers volved in research projects for efficient energy use and climate protection. The German tive, agricultural, environmental, traffic and federal government therefore listed Steca building technology and also for the indus- as an authority for energy generation in the trial and medical sectors. The company also environmental technology atlas "Green Tech

Steca's environmental policy is based on sustainability and environmental compatifew manufacturers that cover all three seg- bility, with a view to providing services and

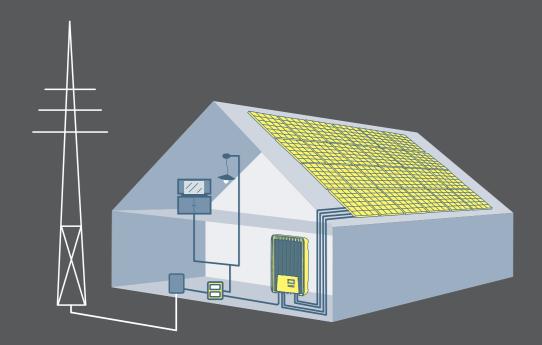
added chain from this perspective and also involves its suppliers and customers. Steca is certified in accordance with ISO 14001:2004 and organised in accordance





»MAXIMUM CAPACITY FOR MAXIMUM YIELD.«

Steca can provide you with the best inverter for your system whether this be a small solar energy system for a single-family house or an elaborate combined solution for an industrial complex. We focus on the most important aspects: user friendliness and maximum performance with the lowest possible cost expenditure.





Residential systems

Commercial systems



8 RESIDENTIAL SYSTEMS RESIDENTIAL SYSTEMS 9



RESIDENTIAL SYSTEMS

Single-family houses and apartment buildings

Solar power provides independence

Independence from the pricing arrangements of the large energy producers. Independent of the energy policies of countries that export conventional energy sources.

Photovoltaics are decentralised

Solar power is generated right where it is needed. This means: no energy losses and no costs for transmission and distribution.

Simply generate electricity yourself!

In addition to standard single-family houses, garages, carports and the roofs of apartment buildings are also suitable for electricity generation. The electricity is distributed locally throughout the settlement via the low voltage grid. Here, there is a need for solutions adapted to the individual situation. Optimal yield with easy care and handling are criteria which count for the operators.

Own consumption is also a topic that is very much in vogue. For operators of PV systems, use of PV current generated by their own system is in some cases less expensive than procurement from the power grid.

(A)

Key:

- A Solar modules
- B Grid inverter Grid-feed electricity meter
- House connection point
- G Electrical load



Overview of devices – single-phase inverters:

coolcept, coolcept-120 and coolcept-x inverters feed energy into singlephase power grids. The tried-and-tested coolcept topology makes singlephase grid feeding even more efficient. In addition they offer numerous system monitoring options.



coolcept coolcept-120

Grid inverter **Grid inverter** 1,800 W - up to several 10,000 W 1,800 W - up to several 10,000 W (from page 14) (from page 14)



StecaGrid Portal Web portal (Page 42)



Solar-Log[™] and Meteocontrol WEB'log Accessories (from page 40)

1-PHASE



StecaGrid User Visualisation software (Page 44)



3-PHASE

StecaGrid SEM **Energy manager** (Page 38)

Overview of devices – three-phase inverters:

coolcept³ and coolcept³-x inverters are specially designed for three-phase power grids. With three-phase inverters, energy is fed into the grid on at least two phases at all times. This significantly reduces the need for temporary storage of energy in the device, which has a positive effect on the

service life. The coolcept³ topology is based on previous coolcept inverters and works just as efficiently. coolcept³ indoor devices are also preconfigured for connection of an energy storage system.



coolcept3-x

Grid inverter

(from page 14)

coolcept³ Grid inverter 1,800 W - up to several 10,000 W 1,800 W - up to several 10,000 W (from page 14)



(Page 42)



Solar-Log[™] and Meteocontrol WEB'log Accessories (from page 40)



StecaGrid User Visualisation software (Page 44)



StecaGrid SEM **Energy manager** (Page 38)

10 COMMERCIAL SYSTEMS COMMERCIAL SYSTEMS 11



COMMERCIAL SYSTEMS

Industry, agriculture and ground-mounted installations

Solar energy systems are not only ecologically worthwhile and financially profitable – thanks to the feed-in tariffs which are legally guaranteed in numerous countries, they are one of the most secure capital investments worldwide: thus, an ever-increasing number of systems are being realised by commercial investors and investment funds.

Using current for own consumption

Own consumption of PV current is becoming increasingly important for commercial systems. In this segment too, PV current can sometimes be generated for less cost than when it is procured from the grid. Catering for one's own needs first rather than feeding all your power into the grid is therefore increasingly common.

Your yield always in view

Systems in this segment are installed on commercial buildings, agricultural buildings, or on the ground.

In such cases, however, the system operator is often not the owner of the roof or surface. This in turn calls for professional remote system monitoring. In the event of a fault, an automatic alarm must immediately notify the system operator and possibly the installer as well.



- A Solar modules B Grid inverter
- Grid-feed electricity meter
- D House connection point E Public electricity network

Overview of devices:







StecaGrid 20000 3ph StecaGrid 23000 3ph **Grid inverter** 20,000 W - up to several MW (from page 30)



StecaGrid Vision Display unit (Page 45)



StecaGrid User Visualisation software (Page 44)



Solar-Log and Meteocontrol WEB'log Accessories (from page 40)



StecaGrid SEM Energy manager (Page 38)









»HIGHEST PERFORMANCE ALONG WITH MAXIMUM FLEXIBILITY AND EASE OF USE.«

Together with their range of accessories, StecaGrid inverters represent an innovative family of inverter solutions for grid-connected solar power systems.





coolcept / coolcept-x / coolcept³ / coolcept³-x



StecaGrid 8000+ 3ph / 10000+ 3ph / 20000 3ph / 23000 3ph

14 COOLCEPT / COOLCEPT-X / COOLCEPT³ / COOLCEPT³-X COOLCEPT / COOLCEPT-X / COOLCEPT³ / COOLCEPT³-X 15



COOLCEPT

A world first: cool, long-living, efficient

The coolcept product family can be divided into single-phase coolcept inverters and three-phase coolcept³ inverters. Both types of inverter are based on the tried-and-tested coolcept topology.

What is coolcept?

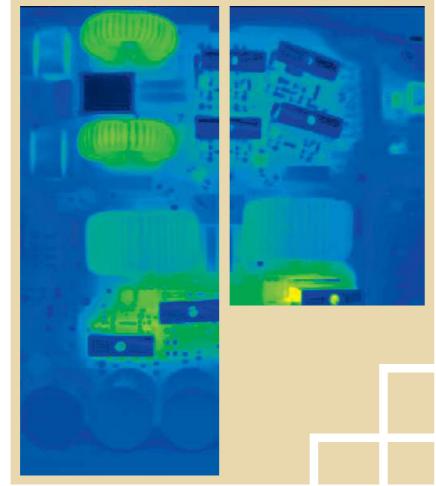
coolcept is Steca's new inverter topology that provides the highest peak efficiency. It is basically characterised by circuit simplicity combined with highest efficiency. The patented coolcept topology is a global innovation that is only available from Steca.

The advantages of coolcept:

coolcept is cool. High peak efficiency means the lowest possible heat dissipation. This makes cooling elements unnecessary.

coolcept is efficient. Stable peak efficiency over the entire power range ensures maximum yields.

coolcept is long-living. Low heat dissi-pation and cool components guarantee a long service life.



PRODUCT OVERVIEW

A direct comparison of all coolcept inverters

Understanding the name

Based on the same innovative coolcept topology, all single-phase and three-phase coolcept inverters are extraordinarily cool, efficient and durable. In addition, all devices are extremely lightweight and quiet. Nevertheless there are differences for planners and users. The name of the product family and inverter type provides an initial insight here.

The following information can be gleaned from the name alone: type of feeding (singlephase or three-phase), protection class (IP 21 or IP 65) and power class (1.8 - 5.5 kW). The names are decrypted precisely in the illustration on the right

The StecaGrid 2020 constitutes a special case as it is specially developed for 120 V grids. This property can also be discerned from the coolcept-120 product family name.



The first two figures in the type designation indicate the relevant performance class. In this case: 3.2 kW.

Whether the devices are single-phase or threephase can be discerned in the family name from the superscript 3 and in the type name by the ending "03". With single-phase devices, there is no such suffix.

The additional x in the product family and type name indicates that these coolcept devices are also designed for outdoor use. They conform to protection class IP 65. All types without this x are ideal for use indoors (IP 21).



The most important aspects of differentiation are summarised here at a glance. Product family name



_____ WORLD RECORD -----

Independant tests confirm highest level of efficiency

Photon Profi spoke of a "revolutionary" new development. "Thanks to its innovative topology the StecaGrid 3600 can rightly call itself the champion of all classes. Until now, no inverter in series production has provided better results on the Photon test bench." was the summary on the new number one.

The AIT (Austrian Institute of Technology) in Vienna has confirmed that the StecaGrid 3600 achieves the highest efficiency. This has been verified by a comprehensive test report from the renowned institute.

Highest efficiency at all input voltages

The peak efficiency is only very slightly dependent on the module input voltage. This allows a free choice of the number and type of modules, without risking a loss of yields.

A completely new cooling concept

This is only possible through the top efficiency of the coolcept inverters! The requirements – low-cost and high-efficiency – are fully satisfied!

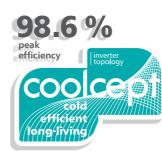
Inverters with "coolcept":

This high-end technology is integrated in Steca's series devices with a rated output of between 1.8 kW and 5.5 kW, which achieve a peak effectiveness of 98.6%.

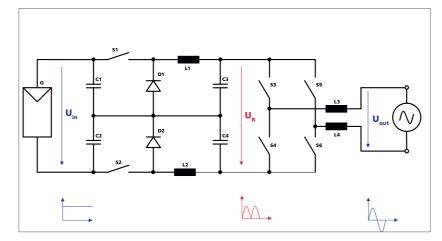


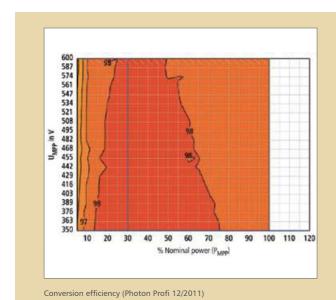


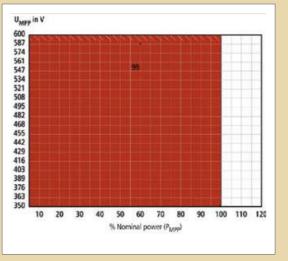
StecaGrid 1800x StecaGrid 2300x StecaGrid 3010x StecaGrid 3600x StecaGrid 4200x











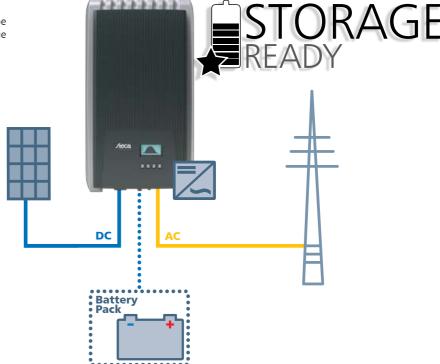
MPP efficiency: Highest MPP efficiency over the entire input range (Photon Profi 12/2011)

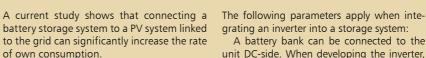
READY FOR THE FUTURE

Ready to be connected to an energy storage system

Equipped for the future:

coolcept3 devices are ready to be connected to an energy storage system.





Particularly around midday, more energy is usually generated than is required for consumption. Consequently, the excess energy is fed into the grid. With a connected storage system, this excess energy can initially be accumulated and then used in the evening or at night instead.

Due to their two additional Phoenix Contact SUNCLIX plug contacts, coolcept³ indoor devices (StecaGrid 3203/4003/4803 and StecaGrid 5503) are ideally preconfigured for use in a storage system. A simple upgrade of inverter firmware is sufficient to connect the storage system retrospectively, saving you money otherwise outlaid for replacing existing inverters.

A battery bank can be connected to the unit DC-side. When developing the inverter, we focussed on essential properties: a lowcost product for the customer for efficient use of current generated by their own system. Systems that can be used with coolcept³ devices are significantly less expensive to procure and more efficient to operate compared to competitor, AC-connected solutions. We focus on improving efficiency with its associated cost savings rather than add-ons like a back-up function for power cuts.

A storage system sized for the supply of a single-family house can be connected to inverters with Storage-Ready. For larger energy requirements, several storage systems can also be combined without this causing any problems for the inverter. Consumption and



feeding power can be measured on an ongoing basis by an intelligent energy manager. A decision can be made based on the latest data as to whether it is a good idea to charge or discharge the battery.

The inverter's preconfigured storage system connection conforms to the requirements of the German Market Incentive Programme. This means upgrade of the storage system is liable to funding in Germany so that up to 30 % of investment costs can be subsidised



TOP-GRADE PERFORMANCE FROM BAVARIA

coolcept inverters convince across the board

The lightweights on the market

The coolcept devices weigh just 9 kg. Even the outdoor variants with a stainless steel casing weigh in at a mere 12 kg. This extremely low weight makes both transportation and installation a great deal easier.

Easy to install

With their low weight, the coolcept devices can easily and safely be mounted onto the wall by just one person. The supplied wall bracket and practical recessed grips for right and left handed installers make mounting of the device simple and convenient. The device does not need to be opened for installation. All connections and the DC circuit breaker are externally accessible.

Made in Bavaria

The inverters in the coolcept series are original "Made in Bavaria", with top quality, safety, reliability and environmental sensitivity at the forefront during development and production. The StecaGrid 3600, the oldest member of the coolcept family, is the proud bearer of the Bavarian Energy Prize as the best grid inverter in the world in its class.

Pleasantly quiet – even at full load

Loud operating noises were yesterday. Since the emergence of the coolcept generation, inverters can be attached close to living areas without any problems - even on sun-drenched days, coolcept units will operate quietly.



coolcept, coolcept-120, coolcept-x, coolcept³ and coolcept³-x: the market lightweights



Smart networking

Monitor the output of your PV system for free* with the StecaGrid Portal. With the intuitive user interface, you can access your yield data anywhere and at any time – even from your smartphone or tablet PC.



All coolcept inverters can be used in many different countries, which simplifies the warehouse logistics process.

* For the first two years

CONSTANTLY IN THE LIMELIGHT

Winner of multiple awards

The StecaGrid 3600 has already been in the limelight many times. The specialist journal Photon Profi describes it as the master of all classes, while the AIT (the Austrian Institute of Technology in Vienna) has confirmed its exceptionally high efficiency, and it has also won the Bavarian Energy Prize, awarded by the Bavarian Ministry of Economics to the best inverter in the world.

Simply unbeatable

It is not just among specialists in journals and institutions that the inverters in the coolcept series enjoy a high degree of positive feedback. The devices are also regularly recommended on www.photovoltaikforum.com. Opinions concur across the board: a high degree of efficiency, reliability, low weight, noiseless operation, free guarantee extension to seven years, low power loss – the list can be endlessly expanded, or to put it in two words: simply unbeatable!

The specialists are clear:



The number one worldwide

The StecaGrid 3000 and the test winner, the StecaGrid 3600, have been awarded a "very good" rating for maximum efficiency by the specialist journal Photon Profi.



The AIT (Austrian Institute of Technology in Vienna) confirms:

the StecaGrid 3600 achieves maximum efficiency



The best inverter in the world:

the StecaGrid 3600 received the Bavarian Energy Prize in 2012

Our customers are delighted*:

»Better to mount 10 STECAGRID than one... – you can do it all by yourself, without a body-building course. These things are unbelievably light!«

»Here, Steca has developed a **completely new product**, which also provides protection against overheating due to the simplicity of the components (Mosfets).«

»So small, but with a Euro ETA efficiency of over 98%. This alone puts them **in a league of their own above** the other products which are always so highly recommended ...«

»I would always choose these devices in preference to the excessively priced inverters from ... – particularly since STECA offers a **7-year guarantee** which is also available via the Internet. «

*Extracts from www.photovoltaikforum.com

The press confirms:

»It met the **great expectations**. Thanks to its new, innovative topology the StecaGrid 3000 can rightly call itself the new **champion of all classes**.«

»It works with previously unheard of **efficiency** and can be produced in largely **automated** and **cost-effective** processes with a minimum number of parts.«

»... the Steca **tops the test ranking** and disproves the dogma that **small inverters** are less **efficient** and have higher **production costs** than large ones.«

»The new StecaGrid marks a new beginning for the **profitability** of small systems.«





REPOWERING OF INVERTERS

Modernisation pays - test facility delivers a yield increase of 9.23%

The efficiency of photovoltaic inverters has risen significantly in recent years. Due to the increase in yield achieved by the inverters due to their higher efficiency, it can pay to replace old inverters with new ones.

As a pioneer in this field, Steca collaborated with the University of Applied Sciences in Munich to research the efficiency of a repowering facility based on string inverters with an output range of around 3 kW.

The aim of the study was to gain insights into the actual yield increase, and into the practicability of repowering.

For this purpose, half of the old inverters on a facility with 12 strings, each with 2,890 Wp, were replaced with new ones. The European efficiency increase from η eu=92% with the old inverters to $\eta eu = 98.1\%$ with the new coolcept inverters.

The yield increase was then calculated by comparing the yields from the strings which

were retrofitted and the strings which were not retrofitted. The natural fluctuations in yield of the individual strings was offset using correction factors for evaluation pur-

Thus, within the measurement period, a yield increase of 9.23% resulted compared to the AC output of the old inverters.



Repowering test facility in Anzing, Germany

Specifications of the test facility:

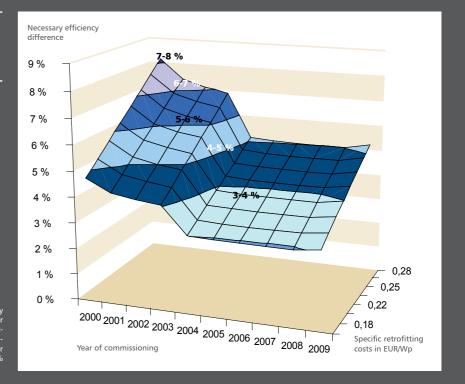
First commissioned: 2007 PV system size: 34.8 kWp Inverters used to date: Sun Profi SP 3400-600 New inverters: StecaGrid 3600 Efficiency difference η_{ei} : 6.1% Actual yield increase: EUR 129.63 per annum

REPOWERING IS EFFICIENT

The advantages of repowering

- · Increased yields through higher efficiency of the inverters
- Renewed period of guarantee
- Greater convenience and reliability with the latest generation of inverters
- Simple remote monitoring and visualisation of the system data

The coolcept inverters make repowering even more economically attractive



COOLCEPT INVERTER

The best choice for repowering







StecaGrid 1800x StecaGrid 3010x StecaGrid 3600x StecaGrid 4200x

Which systems are best suited to inverter repowering?

The replacement of inverters in existing systems is particularly worth while when the system was commissioned before 2009, when the guarantee period of the inverters has expired, or when the efficiency difference is sufficiently high.

Why should you install the new Steca coolcept inverters?

Steca's coolcept inverters offer the maximum possible yield increase, since with their top-ranking efficiency worldwide they consistently achieve the maximum efficiency difference. The good value for money of the inverters keeps retrofitting costs down. In this way, Steca makes repowering even more worth while!

Our sample references on our website show that repowering makes sense for a wide range of different systems: www.stecasolar.com/reference.



22 COOLCEPT / COOLCEPT-X / COOLCEPT³ / COOLCEPT³-X

coolcept

StecaGrid 1800, StecaGrid 2300, StecaGrid 3010, StecaGrid 3000, StecaGrid 3600, StecaGrid 4200

Highest efficiency with longer service life

The high efficiency results in a peak efficiency of 98.6 % and a European efficiency of up to 98.3 %, which results in less lost power that must be dissipated into the environment. This improves your yields.

In addition to this, a new and unique cooling concept inside the inverter ensures an even distribution of the dissipated heat and a long service life for the device.

Product design and visualisation

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

The guided, pre-programmed menu allows easy final commissioning of the device.

Installation

The lightweights weigh only 9 kg / 9.5 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. The device does not need to be opened for installation. All connections and the DC circuit breaker are externally accessible.







Product features

- Highest efficiencySimple installation
- Integrated data logger
 Firmware update possible
- Low housing temperature at full load
 Functionally perfect, environmentally-friendly plastic housing
- · Lowest possible own consumption · Integrated DC circuit breaker
- Protective insulation according to protection class II
- Droop Mode for integration in hybrid systems (further information: Catalogue Steca PV Off Grid / Single-phase and three-phase AC hybrid systems)
- Fixed voltage mode for other energy sources Service menu for parameter adjustment
- 7-year warranty after registration
- Optimised shadow management using global MPP tracking

- **Displays** Multifunction graphical LCD display with backlighting
- · Animated representation of yield

Operation

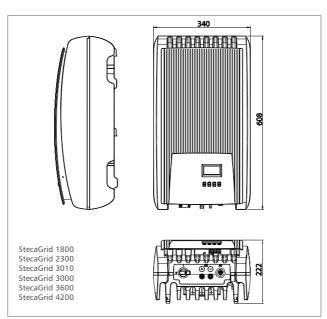
- Simple menu-driven operationMultilingual menu navigation

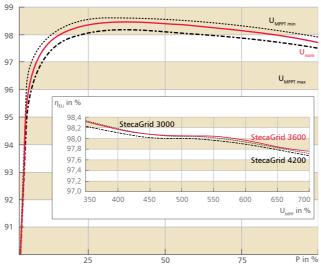
- Can be connected to a large-format display
 120 V variant: StecaGrid 2020
- (for technical data see www.stecasolar.com)





StecaGrid 1800 StecaGrid 2300 StecaGrid 3010 StecaGrid 3000 StecaGrid 3600





Efficiency values for the StecaGrid 3600 and comparison of the MPPT voltage of the StecaGrid 3000/3600/4200

System monitoring and accessories



StecaGrid User

(Page 44)

Visualisation software



Web portal

(Page 42)

StecaGrid Portal



StecaGrid SEM **Energy manager** (Page 38)



Solar-Log[™] and Meteocontrol WEB'log Accessories (from page 40)

	StecaGrid 1800	StecaGrid 2300	StecaGrid 3010	StecaGrid 3000	StecaGrid 3600	StecaGrid 420
DC input side (PV-generator)						
Maximum input voltage	600 V			845 V		
Minimum input voltage for feeding	125 V			350 V		
MPP voltage for rated output	160 V 500 V	205 V 500 V	270 V 500 V	350 V 700 V 360 V 700		
Maximum input current		11.5 A			12 A	
Maximum input power at maximum active output power	1,840 W	2,350 W	3,070 W	3,060 W	3,690 W	4,310 W
Maximum recommended PV power	2,200 Wp	2,900 Wp	3,800 Wp	3,800 Wp	4,500 Wp	5,200 Wp
AC output side (Grid connection)						
Grid voltage		18	5 V 276 V (depend	ling on regional settin	ıgs)	
Rated grid voltage			23	0 V		
Maximum output current	12 A	14	1 A	16	5 A	18.5 A
Maximum active power (cos phi = 1)	1,800 W	2,300 W	3,000 W	3,000 W	3,600 W 1)	4,200 W 1)
Maximum active power (cos phi = 0.95)	1,800 W	2,300 W	3,000 W	3,000 W	3,530 W	3,990 W
Maximum apparent power (cos phi = 0.95)	1,900 VA	2,420 VA	3,160 VA	3,130 VA	3,680 VA	4,200 VA
Rated power	1,800 W	2,300 W	3,000 W	3,000 W	3,600 W ²⁾	4,200 W ³⁾
Rated frequency			50 Hz aı	nd 60 Hz		
Frequency		45	Hz 65 Hz (depend	ling on regional settin	igs)	
Night-time power loss		< 1.2 W			< 0.7 W	
Feeding phases	single-phase					
Distortion factor (cos phi = 1)	< 2 %					
Power factor cos phi	0.95 capacitive 0.95 inductive					
Characterisation of the operating perform	nance		•			
Maximum efficiency		98 %			98.6 %	
European efficiency	97.4 %	97.6 %	97.7 %	98.3 %	98.3 %	98.2 %
Californian efficiency	97.5 %	97.7 %	97.8 %	98.4 %	98.3 %	98.2 %
MPP efficiency	> 99.7 % (static), > 99 % (dynamic)			ı		
Own consumption			< 4	1 W		
Power derating at full power	ab 50 °C (T _{amb}) ab 45 °C (T _{amb})			ab 50 °	°C (T _{amb})	ab 45 °C (T _{amb}
Safety						
Isolation principle			no galvanic isolatio	on, transformerless		
Grid monitoring	yes, integrated					
Residual current monitoring	yes, integrated 4)					
Operating conditions				-		
Area of application		ir	ndoor rooms with or v	vithout air conditionir	ng	
Ambient temperature			-15 °C	. +60 °C	-	
Storage temperature			-30 °C	. +80 °C		
Relative humidity			0 % 95 %, n	on-condensating		
Noise emission (typical)	23 dBA				31 dBA	
Fitting and construction						
Degree of protection			IP 21 (casing: IP	51; display: IP 21)		
Overvoltage category	III (AC), II (DC)					
DC Input side connection			Phoenix Contact	SUNCLIX (1 pair)		
AC output side connection	Wieland RST25i3 plug, mating connector included					
Dimensions (X x Y x Z)	340 x 608 x 222 mm					
Weight		9.5 kg			9 kg	
Communication interface	RS485; 2 x RJ45 sockets; connectable to Meteocontrol WEB'log or Solar-Log™; Ethernet interface					
Integrated DC circuit breaker				ith VDE 0100-712		
Cooling principle	temperature-controlled fan, variable speed					
Test certificate (Current status: homepage)		CE mark, VD	E AR N 4105, G83/2,			

Belgium: 3,330 W ²⁾ Portugal: 3,450 W ³⁾ Portugal: 3,680 W ⁴⁾ The design of the inverter prevents it from causing DC leakage current.



coolcept-x

StecaGrid 1800x, StecaGrid 2300x, StecaGrid 3010x, StecaGrid 3600x, StecaGrid 4200x

Highest efficiency with longer service life

The high efficiency results in a peak efficiency of 98.6 % and a European efficiency of up to 98.3 %, which results in less lost power that must be dissipated into the environment. This improves your yields.

In addition to this, a new and unique cooling concept inside the inverter ensures an even distribution of the dissipated heat and a long service life for the device.

Product design and visualisation

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

The guided, pre-programmed menu allows easy final commissioning of the device.

Installation

The lightweights with only 11.5 kg / 12 kg can be easily and safely mounted on a wall. The supplied wall bracket make mounting of the device simple and convenient. The device does not need to be opened for installation. All connections and the DC circuit breaker are externally accessible.

The devices meet all the standards for the IP 65 protection class. Its robust stainless steel housing provides reliable protection against dust and water, including jet water. This enables problem-free installation of the inverters outdoors.





StecaGrid 1800x StecaGrid 2300x StecaGrid 3010x StecaGrid 4200x

Product features

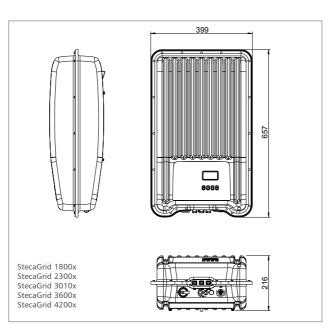
- Highest efficiencySimple installation
- · Integrated data logger
- Firmware update possible
 Low housing temperature at full load
 Solid stainless steel casing
- Suitable for outdoor installation
- Lowest possible own consumptionIntegrated DC circuit breaker
- Protective insulation according to protection class II
- Very long service life
 Droop Mode for integration in hybrid systems
 (further information: Catalogue Steca PV Off Grid /
- Single-phase and three-phase AC hybrid systems)
- Fixed voltage mode for other energy sources
 Service menu for parameter adjustment
- 7-year warranty after registration
- Optimised shadow management using global MPP tracking

- **Displays** Multifunction graphical LCD display with backlighting
- · Animated representation of yield

- Simple menu-driven operationMultilingual menu navigation

Options

· Can be connected to a large-format display



System monitoring and accessories







StecaGrid Portal Web portal (Page 42)



StecaGrid SEM **Energy manager** (Page 38)



Solar-Log[™] and Meteocontrol WEB'log Accessories (from page 40)

	StecaGrid 1800x	StecaGrid 2300x	StecaGrid 3010x	StecaGrid 3600x	StecaGrid 4200x	
DC input side (PV-generator)	'					
Maximum input voltage	600 V 845 V					
Minimum input voltage for feeding	125 V			35	350 V	
MPP voltage for rated output	160 V 500 V 205 V 500 V 270 V 500 V			350 V 700 V	360 V 700 V	
Maximum input current		11.5 A	ı	12	12 A	
Maximum input power at maximum active output power	1,840 W	2,350 W	3,070 W	3,690 W	4,310 W	
Maximum recommended PV power	2,200 Wp	2,900 Wp	3,800 Wp	4,500 Wp	5,200 Wp	
AC output side (Grid connection)		, ,				
Grid voltage		185 V 27	'6 V (depending on regio	nal settings)		
Rated grid voltage			230 V	-		
Maximum output current	12 A	14	ł A	16 A	18,5 A	
Maximum active power (cos phi = 1)	1,800 W	2,300 W	3,000 W	3,600 W 1)	4,200 W 1)	
Maximum active power (cos phi = 0.95)	1,800 W	2,300 W	3,000 W	3,530 W	3,990 W	
Maximum apparent power (cos phi = 0.95)	1,900 VA	2,420 VA	3,160 VA	3,680 VA	4,200 VA	
Rated power	1,800 W	2,300 W	3,000 W	3,600 W ²⁾	4,200 W ³⁾	
Rated frequency	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		50 Hz and 60 Hz	-7	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
Frequency		45 Hz 65		nal settings)		
Night-time power loss		45 Hz 65 Hz (depending on regional settings) < 1.2 W < 0.7 W			7 W	
Feeding phases	single-phase			., **		
Distortion factor (cos phi = 1)	< 2 %					
Power factor cos phi	0.95 capacitive 0.95 inductive					
Characterisation of the operating performan	· · · · · · · · · · · · · · · · · · ·					
Maximum efficiency	98 % 98.6 %			6 %		
European efficiency	97.4 %	97.6 %	97.7 %	98.3 %	98.2 %	
Californian efficiency	97.5 %	97.7 %	97.8 %	98.3 %	98.2 %	
MPP efficiency	> 99.7 % (static), > 99 % (dynamic)					
Own consumption			< 4 W	iarriicy		
Power derating at full power				from 45 °C (T _{amb})		
Safety						
Isolation principle	no galvanic isolation, transformerless					
Grid monitoring	-					
Residual current monitoring	yes, integrated yes, integrated ⁵⁾					
Operating conditions			yes, integrated			
Area of application	indo	oor rooms with or withou	t air conditioning, outdoo	ors with or without prote	ction	
Ambient temperature	inde	or rooms with or withou	-15 °C +60 °C	or without prote	Cuon	
Storage temperature			-30 °C +80 °C			
Relative humidity		0 %	100 %, non condensa	ating		
Noise emission (typical)	23 dBA	25 dBA	29 dBA	29 dBA	31 dBA	
Fitting and construction	25 05/1	25 00/1	25 05/1	25 00/1	31 05/1	
Degree of protection			IP 65			
Overvoltage category						
DC Input side connection	III (AC), II (DC)					
AC output side connection	Phoenix Contact SUNCLIX (1 pair) Wieland RST25i3 plug, mating connector included					
Dimensions (X x Y x Z)		VVICIAIIU NOI	399 x 657 x 227 mm	ctor included		
Weight		12 kg	333 X 037 X 227 HIIII	11	5 kg	
Communication interface	DC/IQE- 2 v	RJ45 sockets; connectab	le to Meteocontrol WEDI			
Integrated DC circuit breaker	113403, 2 3				et interface	
Cooling principle	yes, compliant with VDE 0100-712 temperature-controlled fan, variable speed, internal (dustproof)					
Test certificate (Current status: homepage)			1105, G83, UTE C 15-712			
icst certificate (current status, fromepage)		,	, ,	. ,		

¹⁾ Belgium: 3,330 W ²⁾ Portugal: 3,450 W ³⁾ Portugal: 3,680 W ⁴⁾ Specifications refer to rated input current



⁵⁾ The design of the inverter prevents it from causing DC leakage current

coolcept³

StecaGrid 3203, StecaGrid 4003, StecaGrid 4803, StecaGrid 5503

Inverter topology

The coolcept inverter topology was first implemented in the singlephase StecaGrid. It achieved optimum efficiency ratings thanks to the innovative switching concept. The three-phase coolcept³ inverters also benefit from the advantages of this switching concept. The three-phase topology is fully reactive current capable and therefore set up to meet demands that may be made in future as well.

Always symmetrical

The advantage of three-phase feeding is that the produced solar capacity is always symmetrically distributed on all three power conductors to the public power grid. This is the case across the whole output range offered by these inverters. The symmetrical feed-in is very much in the interests of the power supply companies, and is also compatible with domestic three-phase consumption.

Highest efficiency with longer service life

The high efficiency results in a peak efficiency of 98.6 %, which means that less power is lost that must be dissipated into the environment. This improves your yields.

As at least two phases of a three-phase feed-in design feed energy into the grid, it is not necessary to provide for intermediate energy storage in the device, as must be done in the case of single-phase feed-in. For this reason, the coolcept³ inverters dispense completely with the electrolytic capacitors that are required for intermediate storage. These capacitors may influence the service life of electronic devices as they may dry out. Therefore by using coolcept³ inverters, plant operators may expect to benefit from their long service lives.

In addition to this, a new and unique cooling concept inside the inverter ensures an even distribution of the dissipated heat and a long service life for the device.

Product features

- · Highest efficiency · Three-phase, symmetrical grid feeding
- Simple installation
- Integrated data logger
 Firmware update possible
- Low housing temperature at full load
- Functionally perfect, environmentally-friendly plastic housing
- Lowest possible own consumption Integrated DC circuit breaker
- Protective insulation according to protection class II
- · Very long service life · Droop Mode for integration in hybrid systems (further information: Catalogue Steca PV Off Grid / Single-phase and threephase AC hybrid systems)

 Fixed voltage mode for other energy sources

 Service menu for parameter adjustment

- 7-year warranty after registration
- Storage-ready: ready to be connected to an energy storage
- Optimised shadow management using global MPP tracking

- Multifunction graphical LCD display with backlighting
- Animated representation of yield

Operation

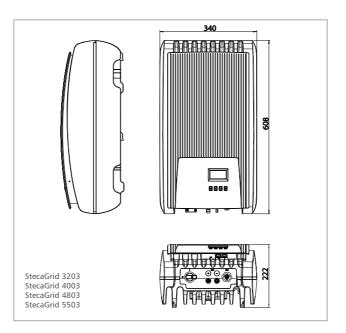
- Simple menu-driven operation
- · Multilingual menu navigation



Product design and visualisation

The StecaGrid has a graphical LCD display for visualising the energy yield values, current performance and operating parameters of the system. Its innovative menu allows individual selection of the various measurements. The guided, pre-programmed menu allows easy final commissioning of the device.

The lightweights with only 10 kg can be easily and safely mounted on a wall. The supplied wall bracket make mounting of the device simple and convenient. The device does not need to be opened for installation. All connections and the DC circuit breaker are externally accessible. For making DC connections, Sunclix mating connectors are included in the scope of supply.



System monitoring and accessories







StecaGrid Portal Web portal (Page 42)



StecaGrid SEM **Energy manager** (Page 38)



Solar-Log[™] and Meteocontrol WEB'log Accessories (from page 40)

	StecaGrid 3203	StecaGrid 4003	StecaGrid 4803	StecaGrid 5503	
DC input side (PV-generator)					
Maximum input voltage		1,0	00 V		
Minimum input voltage for feeding	250 V				
MPP voltage for rated output	300 V 800 V	375 V 800 V	450 V 800 V	510 V 800 V	
Maximum input current		1	1 A		
Maximum input power at maximum active output power	3,300 W	4,100 W	4,920 W	5,620 W	
Maximum recommended PV power	4,000 Wp	4,900 Wp	5,900 Wp	6,700 Wp	
DC side (storage system connection) 1)					
Voltage	680 1,000 V (max. grid peak to max. PV voltage)				
Max. current		10 A			
AC-Ausgangsseite (Netzanschluss)					
Grid voltage		320 V	480 V		
Rated grid voltage		40	00 V		
Maximum output current	7	A	10) A	
Maximum active power (cos phi = 1)	3,200 W	4,000 W	4,800 W	5,500 W	
Maximum active power (cos phi = 0.95)	3,040 W	3,800 W	4,560 W	5,225 W	
Maximum active power (cos phi = 0.9)	2,880 W	3,600 W	4,320 W	4,950 W	
Maximum apparent power (cos phi = 0.95)	3,200 VA	4,000 VA	4,800 VA	5,500 VA	
Maximum apparent power (cos phi = 0.9)	3,200 VA	4,000 VA	4,800 VA	5,500 VA	
Rated power	3,200 W	4,000 W	4,800 W	5,500 W	
Rated frequency	50 Hz and 60 Hz				
Frequency		45 Hz 65 Hz (depend	ding on regional settings)		
Night-time power loss		<	3 W		
Feeding phases	three-phase				
Distortion factor (cos phi = 1)	< 1 %				
Power factor cos phi	0,8 capacitive 0,8 inductive				
Characterisation of the operating performan	ce				
Maximum efficiency	98.	6 %	98.	7 %	
European efficiency	97.9 %	98.1 %	98.2 %	98.3 %	
Californian efficiency	98.3 %	98.4 %	98.5 %	98.5 %	
MPP efficiency		> 99.8 % (static)	, > 99 % (dynamic)		
Own consumption	< 8 W				
Power derating at full power	from 50 °C (T _{amb})				
Safety	with				
Isolation principle	no galvanic isolation, transformerless				
Grid monitoring		yes, in	tegrated		
Residual current monitoring		yes, int	egrated ²⁾		
Operating conditions					
Area of application		indoor rooms with or	without air conditioning		
Ambient temperature		-15 ℃ .	+60 °C		
Storage temperature		-30 °C .	+70 °C		
Relative humidity		0 % 95 %, n	on-condensating		
Noise emission (typical)		<29	9 dBA		
Fitting and construction					
Degree of protection		IP 21 (casing: IP	51; display: IP 21)		
Overvoltage category		III (AC), II (DC)		
DC Input side connection		Phoenix Contact	SUNCLIX (2 pairs)		
AC output side connection		Wieland RST25i5 plug, r	mating connector included		
Dimensions (X x Y x Z)		340 x 608	3 x 222 mm		
Weight		10) kg		
Communication interface	RS485; 2 x RJ45	sockets; connectable to Meteo	control WEB'log or Solar-Log™; I	Ethernet interface	
Integrated DC circuit breaker	yes, compliant with VDE 0100-712				
Cooling principle		temperature-controlled fan, va	riable speed, internal (dustproof)	
Test certificate (Current status: homepage)	C	E mark, VDE AR N 4105, ÖNO	RM E80001-4-712, more to com	ne	

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



²⁾ The design of the inverter prevents it from causing DC leakage current.

coolcept³-x

StecaGrid 3203x, StecaGrid 4003x, StecaGrid 4803x, StecaGrid 5503x

Inverter topology

The coolcept inverter topology was first implemented in the singlephase StecaGrid. It achieved optimum efficiency ratings thanks to the innovative switching concept. The three-phase coolcept³-x inverters also benefit from the advantages of this switching concept. The three-phase topology is fully reactive current capable and therefore set up to meet demands that may be made in future as well.

Always symmetrical

The advantage of three-phase feeding is that the produced solar capacity is always symmetrically distributed on all three power conductors to the public power grid. This is the case across the whole output range offered by these inverters. The symmetrical feed-in is very much in the interests of the power supply companies, and is also compatible with domestic three-phase consumption.

Highest efficiency with longer service life

The high efficiency results in a peak efficiency of 98.6 %, which means that less power is lost that must be dissipated into the environment. This improves your yields.

As at least two phases of a three-phase feed-in design feed energy into the grid, it is not necessary to provide for intermediate energy storage in the device, as must be done in the case of single-phase feed-in. For this reason, the coolcept³-x inverters dispense completely with the electrolytic capacitors that are required for intermediate storage. These capacitors may influence the service life of electronic devices as they may dry out. Therefore by using coolcept³-x inverters, plant operators may expect to benefit from their long service lives.

In addition to this, a new and unique cooling concept inside the inverter ensures an even distribution of the dissipated heat and a long service life for the device.

Product features

- · Highest efficiency · Three-phase, symmetrical grid feeding Simple installation
- Integrated data logger
 Firmware update possible
- Low housing temperature at full load
- Solid stainless steel casing
- Suitable for outdoor installation
- Lowest possible own consumption
- Integrated DC circuit breaker
- Protective insulation according to protection class II
 Very long service life
- Droop Mode for integration in hybrid systems (further informa-tion: Catalogue Steca PV Off Grid / Single-phase and threephase AC hybrid systems)

 Fixed voltage mode for other energy sources
- Service menu for parameter adjustment
- 7-year warranty after registration
 Optimised shadow management using global MPP tracking

- Displays

 Multifunction graphical LCD display with backlighting
- · Animated representation of yield

Operation

- Simple menu-driven operation Multilingual menu navigation

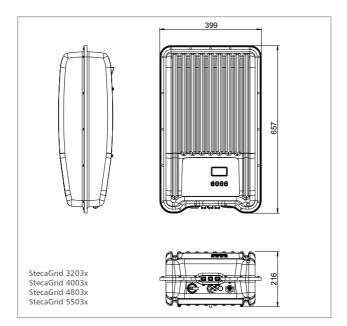


Product design and visualisation

The StecaGrid has a graphical LCD display for visualising the energy yield values, current performance and operating parameters of the system. Its innovative menu allows individual selection of the various measurements. The guided, pre-programmed menu allows easy final commissioning of the device.

The lightweights with only 12 kg can be easily and safely mounted on a wall. The supplied wall bracket make mounting of the device simple and convenient. The device does not need to be opened for installation. All connections and the DC circuit breaker are externally accessible. For making DC connections, Sunclix mating connectors are included in the scope of supply.

The devices meet all the standards for the IP65 protection class. Its robust stainless steel housing provides reliable protection against dust and water, including jet water. This enables problem-free installation of the inverters outdoors.



System monitoring and accessories







StecaGrid Portal Web portal (Page 42)



StecaGrid SEM **Energy manager** (Page 38)



Solar-Log[™] and Meteocontrol WEB'log Accessories (from page 40)

	StecaGrid 3203x	StecaGrid 4003x	StecaGrid 4803x	StecaGrid 5503x		
DC input side (PV-generator)						
Maximum input voltage	1,000 V					
Minimum input voltage for feeding	250 V					
MPP voltage for rated output	300 V 800 V	375 V 800 V	450 V 800 V	510 V 800 V		
Maximum input current		11	A			
Maximum input power at maximum active output power	3,300 W	4,100 W	4,920 W	5,620 W		
Maximum recommended PV power	4,000 Wp	4,900 Wp	5,900 Wp	6,700 Wp		
AC-Ausgangsseite (Netzanschluss)						
Grid voltage	320 V 480 V					
Rated grid voltage		400) V			
Maximum output current	7	A	10) A		
Maximum active power (cos phi = 1)	3,200 W	4,000 W	4,800 W	5,500 W		
Maximum active power (cos phi = 0.95)	3,040 W	3,800 W	4,560 W	5,225 W		
Maximum active power (cos phi = 0.9)	2,880 W	3,600 W	4,320 W	4,950 W		
Maximum apparent power (cos phi = 0.95)	3,200 VA	4,000 VA	4,800 VA	5,500 VA		
Maximum apparent power (cos phi = 0.9)	3,200 VA	4,000 VA	4,800 VA	5,500 VA		
Rated power	3,200 W	4,000 W	4,800 W	5,500 W		
Rated frequency	J,200 VV		· · · · · · · · · · · · · · · · · · ·	3,300 99		
, ,	50 Hz and 60 Hz					
Frequency	45 Hz 65 Hz (depending on regional settings)					
Night-time power loss	< 3 W					
Feeding phases	three-phase					
Distortion factor (cos phi = 1)	< 1 %					
Power factor cos phi		0,8 capacitive .	0,8 inductive			
Characterisation of the operating performan						
Maximum efficiency	98.0			7 %		
European efficiency	97.9 %	98.1 %	98.2 %	98.3 %		
Californian efficiency	98.3 %	98.4 %	98.5 %	98.5 %		
MPP efficiency	> 99.8 % (static), > 99 % (dynamic)					
Own consumption	< 8 W					
Power derating at full power		from 50 °C (T _{amb})		from 45 °C (T _{amb})		
Safety						
Isolation principle	no galvanic isolation, transformerless					
Grid monitoring	yes, integrated					
Residual current monitoring		yes, inte	grated 1)			
Operating conditions						
Area of application	indoor roo	ms with or without air condition	ning, outdoors with or without	protection		
Ambient temperature		-15 °C	+60 °C			
Storage temperature		-30 ℃	+70 °C			
Relative humidity		0 %	100 %			
Noise emission (typical)			dBA			
Fitting and construction						
Degree of protection		IP (65			
Overvoltage category	IP 65 III (AC), II (DC)					
DC Input side connection	Phoenix Contact SUNCLIX (1 pair)					
AC output side connection		Wieland RST25i5 plug, m				
Dimensions (X x Y x Z)		399 x 657				
Weight		12				
Communication interface	DCAGE: 2 V DIAE	sockets; connectable to Meteoco		Ethornot interface		
	1,3403, 2 x 1,143 5			Euremet intendee		
Integrated DC circuit breaker		yes, compliant wit		\		
Cooling principle		temperature-controlled fan, vari				
Test certificate (Current status: homepage)	CE mark, VDE AR N 4105, ÖNORM E80001-4-712, more to come					

¹⁾ The design of the inverter prevents it from causing DC leakage current



30 STECAGRID 8000+ 3PH / 10000+ 3PH / 20000 3PH / 23000 3PH

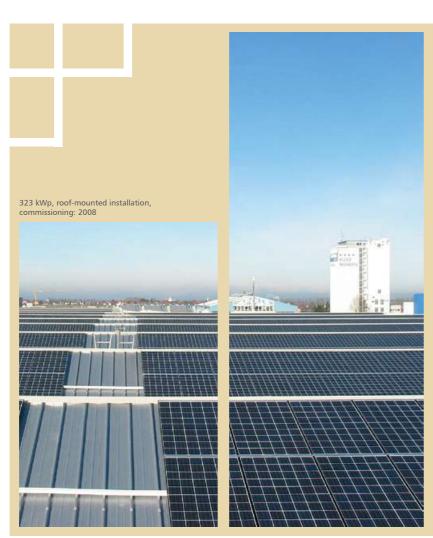




StecaGrid 20000 3ph StecaGrid 23000 3ph

Always symmetrical

For larger solar power systems, StecaGrid 8000+ 3ph, StecaGrid 10000+ 3ph, StecaGrid 20000 3ph and StecaGrid 23000 3ph are the ideal devices. They enable the creation of systems from 8 kWp to several MWp. These inverters are primarily used in systems on industrial roofs, agricultural buildings and in ground-mounted systems. Prerequisite: identical module orientation in each case, with no shadow problems.









Robust for outdoor use

The robust devices are optimally suited for outdoor installations. StecaGrid 8000+ 3ph and StecaGrid 10000+ 3ph inverters are currently providing good service in a large number of photovoltaic systems.

Low maintenance costs for large-scale industrial use

Requirements for a PV system and its individual components are particularly high when it comes to industrial usage. A choice may be made from the range of units available in advance based on hard facts such as protection class, price or efficiency.

There are other soft aspects too, however, that need to be taken into account for this decision – such as susceptibility to faults. Such information cannot be found on any datasheet, however, but needs to be gleaned from references and experience reports.

Steca's three-phase inverters for largescale systems have proven their worth time and time again, winning over customers due to their reliable operating performance and durability. Maintenance is reduced to a minimum meaning no additional time or cost expenditure is required.

Reliable partner for ground mounting systems

Inverters can also be mounted on the ground without any problems. For this reason they are the perfect complement to ground mounting systems due to their reliability and performance.

Display and operation

StecaGrid 8000+ 3ph, StecaGrid 10 000+ 3ph, StecaGrid 20000 3ph and StecaGrid 23000 3ph have a graphical LCD display for visualising the energy yield values, current performance and operating parameters of the system. Its innovative menu allows individual selection of the various measurements.



React, pwr. char. curve

1MWp, ground-mounted installation,



265 kWp, ground-mounted installation, commissioning: 2010



StecaGrid 8000+ 3ph and StecaGrid 10 000+ 3ph

Always symmetrical

The advantage of three-phase feeding is that the produced solar capacity is always symmetrically distributed on all three power conductors to the public power grid. This is the case across the whole output range offered by these inverters. When designing a system, the laborious avoidance of an asymmetry of more than 4.6 kW through the appropriate selection of separate inverters is thus dispensed with. Symmetrical feeding is greatly in the interests of energy supply companies. Lengthy discussions with such companies are therefore a thing of the past.

Long service live

While the voltage passes through zero on the grid-feeding phase, single-phase inverters must temporarily accommodate all energy supplied by the solar modules within the device. This is usually realised by electrolytic capacitors. These components influence the service life of an electronic device, due to the possibility of drying out.

With three-phase inverters, energy is fed into the grid on at least two phases at all times. Thus, the necessity of intermediate storage of energy in the device is greatly reduced, which is of benefit to the system operator with regard to a longer service life.

Flexible connection

Due to the wide input voltage range of 350 V to 845 V, and a maximum input current of 27 A / 32 A, all commonly available crystalline solar modules can be connected to the inverters in various configurations. Beyond this, the system is also approved for use with CdTe and CIS / CIGS thin-film modules (www.stecasolar.com/ matrix). Four plug/socket pairs are available for flexible, mechanical DC connection.

Product features

- High efficiencyWide input voltage range
- Three-phase, symmetrical grid feeding
 Integrated data logger
 Firmware update possible

- · Integrated DC circuit breaker
- Robust metal casing
 Suitable for outdoor installation
- · Wall-mounting with steel wall bracket for very easy installation

- · Multifunction graphical LCD display with backlighting
- · Animated representation of yield

Operation

- Simple menu-driven operation
- Multilingual menu navigation

- System monitoring with Solar-Log™ and WEB'log
- · Can be connected to the StecaGrid Vision display unit or a large-format display







StecaGrid 10000+ 3ph

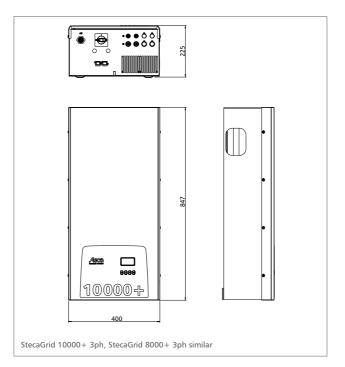
Easy handling

The StecaGrid 8000+ 3ph and StecaGrid 10000+ 3ph have a graphical LCD display for visualising the energy yield values, current performance and operating parameters of the system. Its innovative menu allows individual selection of the various measurements. The guided, pre-programmed menu allows easy final commissioning of the device.

Despite their high output, the inverters are wall-mounted devices. Thanks to the high degree of protection, these inverters can be installed indoors or outdoors. Due to the integrated DC circuit breaker, installation work is made easier, and the installation time is reduced. It is not necessary to open the inverter during installation.

Flexible system design

The combination of the StecaGrid 8000+ 3ph and the StecaGrid 10000+ 3ph allows optimum design for almost any power class. A diverse range of combinations are possible but they all share the same goal: the effective use of solar irradiation.



System monitoring and accessories



StecaGrid User Visualisation software (Page 44)



StecaGrid Vision Display unit (Page 45)



Solar-Log[™] and Meteocontrol WEB'log Accessories (from page 40)



StecaGrid SEM **Energy manager** (Page 38)

	8000+ 3ph	10 000+ 3ph			
DC input side (PV-generator)					
Maximum input voltage	845 V				
Minimum input voltage for feeding	35	0 V			
MPP voltage for rated output	350 V .	700 V			
Maximum input current	27 A	32 A			
Maximum input power at maxi- mum active output power	9,250 W	10,800 W			
Maximum recommended PV power	10,500 Wp	12,500 Wp			
AC output side (Grid connection)					
Grid voltage	320 V 480 V (depending on regional settings)				
Rated grid voltage	400 V				
Maximum output current	16 A				
Maximum active power (cos phi = 1)	8,800 W 1) 3)	10,300 W ²⁾³⁾⁵⁾			
Maximum active power (cos phi = 0.95)	8,800 W 1) 3)	9,800 W ³⁾			
Maximum active power (cos phi = 0.9)	8,800 W 1) 3)	9,300 W ³⁾			
Maximum apparent power (cos phi = 0.95)	9,260 VA ⁴⁾	10,300 VA ⁴⁾			
Maximum apparent power (cos phi = 0.9)	9,780 VA ⁴⁾	10,300 VA ⁴⁾			
Rated power	8,000 W ³⁾	9,900 W ³⁾			
Rated frequency	50 Hz, opt	ional 60 Hz			
Frequency	47.5 Hz 52 Hz (depending on regional settings)				
Night-time power loss	< 2	.5 W			
Feeding phases	three	-phase			
Distortion factor (cos phi = 1)	< 3 % (m	ax. power)			
Power factor cos phi	0.9 capacitive 0.9 inductive				

	8000+ 3ph	10 000+ 3ph
Characterisation of the operating	g performance	
Maximum efficiency	96.3 %	
European efficiency	95.2 %	95.4 %
MPP efficiency	>	99 %
Power derating at full power	from 5	0 °C (T _{amb})
Safety		
Isolation principle	no galvanic isolat	ion, transformerless
Grid monitoring	yes, in	tegrated
Residual current monitoring	yes, int	egrated ⁶⁾
Operating conditions		
Area of application	indoor rooms with or without air conditioni outdoors with protection	
Ambient temperature	-20 °C +60 °C	
Storage temperature	-30 °C +80 °C	
Relative humidity	0 % 95 %, non-condensating	
Noise emission (typical)	< 60 dBA	
Fitting and construction		
Degree of protection	IP 54	
Overvoltage category	III (AC), II (DC)	
DC Input side connection	Multicontact MC4 (4 pairs), rated current 22 A per input	
AC output side connection	Wieland RST25i5 plug, mating connector included	
Dimensions (X x Y x Z)	400 x 847	7 x 225 mm
Weight	42	2 kg
Communication interface	RS485; 2 x RJ45 sockets; connectable to StecaGrid Vision, Meteocontrol WEB'log of Solar-Log™	
Integrated DC circuit breaker	yes, compliant with DIN VDE 0100-712	
Cooling principle	temperature-control	led fan, variable speed
Test certificate	certificate of compliance as per DIN VDE 012 1-1, CE mark, VDE AR N 4105, G59, G83, AS4777, UTE C 15-712-1	

¹⁾ Germany and Denmark_unlimited: 8,000 W 2) Germany and Denmark unlimited: 9,900 W



³⁾ Denmark: 6.000 W

⁴⁾ Denmark: 6,670 VA at cos phi = 0.90; 6,320 VA at cos phi = 0.95

⁵⁾ Belgium and Australia: 10,000 W

⁶⁾ The design of the inverter prevents it from causing DC leakage current

34 STECAGRID 8000+ 3PH / 10000+ 3PH / 20000 3PH / 23000 3PH

StecaGrid 20000 3ph and StecaGrid 23 000 3ph

For universal use

The three-phase StecaGrid inverters are perfect suited for commercial rooftop systems right through to megawatt parks. Due to their output voltage of 460 V and their input voltage of 575 V to 900 V the StecaGrid 23000 3ph is the ideal player for medium voltage applications in large scale PV plants.

They comply with all requirements for IP 65 protection: their housing provides reliable protection from dust and water, including high pressure washing. These systems can therefore be installed out in the open without any problem.

Plug & play installation

The StecaGrid inverters are easy to handle and compact. Installation is safe and easy with simple plug connections and low weight. Installation costs are minimised because the devices also remain closed during installation.

Easy operation

Operation and monitoring are easy, further facilitated by the graphic display, the integrated RS485 interface and an Ethernet connection. The integrated data-logger collects and records all important ope-

High efficiency

Even at low irradiation, the three-phase inverters achieve an efficiency of up to 98.3 %. As a result of these high efficiency levels convection cooling is all that is needed to dissipate the heat. This ensures, in addition to noise-free cooling, the maintenance-free inner workings of the inverter.

Product features

- High efficiencyWide input voltage range
- Three-phase, symmetrial grid feeding
 Integrated data logger
 Firmware update possible

- · Integrated DC circuit breaker
- Robust metal casingSuitable for outdoor installation
- Wall-mounting with steel wall bracket for very easy

- Displays

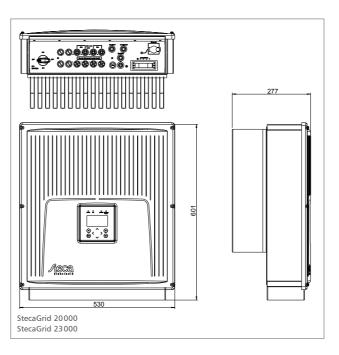
 Multifunction graphical LCD display with backlighting
- · Animated representation of yield

- Simple menu-driven operationMultilingual menu navigation

. System monitoring with Solar-Log™ and WEB'log



StecaGrid 20000 3ph StecaGrid 23000 3ph





	StecaGrid 20000 3ph	StecaGrid 23 000 3ph	
DC input side (PV-generator)			
Maximum input voltage	1,0	00 V	
Maximum input voltage for feeding	25	0 V	
MPP voltage for rated output	490 V 850 V 575 V		
Maximum input current	4	I A	
Maximum recommended PV power	24,000 Wp	27,600 Wp	
AC output side (Grid connection)			
Grid voltage	320 V 480 V	368 V 528 V	
Rated grid voltage	400 V	460 V	
Maximum output current	29	2 A	
Maximum active power (cos phi = 1)	20,000 W	23,000 W	
Maximum active power (cos phi = 0.95)	19,000 W	21,850 W	
Maximum active power (cos phi = 0.9)	18,000 W	20,700 W	
Maximum apparent power (cos phi = 0.95)	19,000 VA	21,850 VA	
Maximum apparent power (cos phi = 0.9)	18,000 VA	20,700 VA	
Rated power	20,000 W	23,000 W	
Rated frequency		nd 60 Hz	
Frequency		65 Hz	
Rated current	29 A	28.8 A	
Night-time power loss	< 0.5 W		
Feeding phases		phase	
Distortion factor (cos phi = 1)	< 1.8 % (max. power)		
Power factor cos phi	0.8 capacitive 0.8 inductive		
Characterisation of the operating performance	0.0 capacitive	0.0 inductive	
Maximum efficiency	98.2 %	98.3 %	
European efficiency	97.8 %	98.1 %	
· · · · · · · · · · · · · · · · · · ·			
MPP efficiency	99.9 %		
Safety			
Isolation principle	no galvanic isolation, transformerless		
Grid monitoring	yes, integrated		
Residual current monitoring	yes, integrated		
Operating conditions			
Area of application		ning, outdoors with or without protection	
Ambient temperature		+55 ℃	
Storage temperature		+70 °C	
Relative humidity	-	on-condensating)	
Noise emission (typical)	< 4!	5 dBA	
Fitting and construction			
Degree of protection		65	
Overvoltage category		, II (DC)	
DC Input side connection		MultiContact MC4 (6 pairs), rated current 22 A per input	
AC output side connection - type	Screw-typ	pe terminal	
Dimensions (X x Y x Z)	530 x 601 x 277 mm		
Weight	38.	4 kg	
Communication interface	RS485;	Ethernet	
Integrated DC circuit breaker	yes, compliant w	ith VDE 0100-712	
Cooling principle		onvection	
Test certificate	CE mark, Clearance certificate as per DIN VDE 0126-1-1, VDE AR N 4105, G59 (Others available on reques		

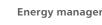




Continuous system monitoring is essential for obtaining the absolute maximum performance from your solar system at all times. Alongside a wide range of system monitoring options, Steca also offers the best possible solution for energy and feed-in management for your photovoltaic system.













Software

Smart Energy Manager for coolcept, coolcept-120, coolcept-x, coolcept3, coolcept3-x, StecaGrid 8000+ 3ph and 10000+ 3ph,

The feed-in management solution

The StecaGrid SEM offers different options of realising feed-in management with a photovoltaic system. A ripple control receiver from the relevant distribution grid operator can be connected. From firmware version 3.0, the feed output at the grid connection point can be limited to an adjustable value, or the ripple control signal can be switched to the relay output. The individual operating modes are selected and defined via the free StecaGrid User PC software. Up to ten inverters can be connected to the StecaGrid SEM via the RS 485 interface

SEM stands for Smart Energy Manager

Easiest installation

StecaGrid SEM can be installed on a top-hat rail in the switching cabinet right next to the ripple control receiver. Its width is 4 HP. Direct power supply at 230 V. A mains adapter plug or an external direct current power supply are not required.

Easily accessible service interface

All connected StecaGrid inverters can be accessed via a USB interface on the StecaGrid SEM. Connection to a PC via the supplied USB cable. The interface is on the front side of the casing – the cover does not need to be removed in the switching cabinet.

The StecaGrid SEM can be configurated via the StecaGrid User Software (from version 3.0). The software is available at www.stecasolar.com for free download.

Product features

- Wall-mounting with top-hat rail
- Compact and robust product design
- Quiet and emission-free Maintenance-free
- · Firmware update possible

Displays

· 4 LEDs show operating states

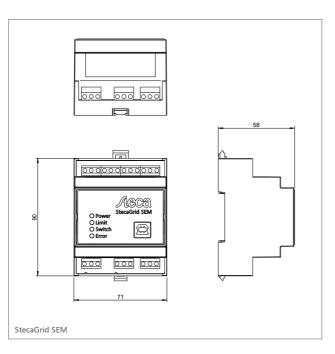
· Steca RS485 bus

- · Compliant with European Standards (CE)
- · Made in Germany

Can be connected to the StecaGrid Vision display unit or a

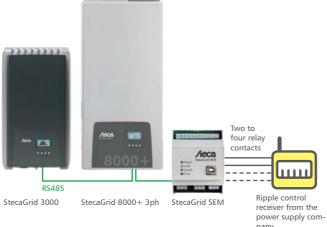


StecaGrid SEM



	StecaGrid SEM		
Characterisation of the operating performance			
Own consumption	< 3 W		
Operating conditions			
Area of application	indoor rooms, with or without air conditioning		
Interface to inverter	Steca RS485 bus with max. 1,000 m cable length and 10 bus participants at maximum		
Ambient temperature	0 °C +60 °C		
Storage temperature	-40 °C +85 °C		
Relative humidity	0 % 95 %		
Noise emission	silent		
Fitting and construction			
Degree of protection	IP 20		
Terminal (fine / single wire)	1.5 mm ² / 2.5 mm ²		
Dimensions (X x Y x Z)	72 x 91 x 58 mm		
Weight	300 g		
Power supply	230 V / 50 Hz or 60 Hz		
Communication interface	2 x RJ45; 4 x analogue for ripple control receiver, via screw-type terminals; USB, type B socket; S0 interface		
Relay output	potential-free contact, 250 V AC / 16 A		
Test certificate	CE mark		

Modes of operation

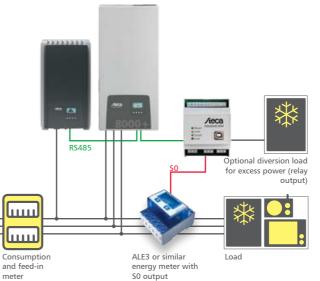


Forwarding of ripple control signal

In Germany, photovoltaic systems require feed-in management. To this end, ripple control receivers of the respective grid operators are installed. These ripple control receivers transmit a reduction signal from the grid operator whenever the system has to be throttled due to grid overloads.

StecaGrid SEM is the easiest way to connect your StecaGrid inverter to the ripple control receiver. StecaGrid SEM evaluates the relay outputs of the ripple control receiver and transmits the signals via the Steca solar bus (or Steca RS485 bus) to the connected inverters.

With the StecaGrid User software, the function of the individual relay outputs of the ripple control receiver can be freely configured. In this way, all ripple control receivers with two to four outputs can



Dynamic feed limitation

Data can be read from an energy meter via an SO interface. This allows for a distinction between the share of PV energy used at home and that fed into the grid. With this measurement data, StecaGrid SEM monitors the house connection and ensures that no more than a specified output is fed into the grid. If required, it accurately reduces the output of the connected inverters.

Benefit for system operators: energy consumed at home is not included in the limitation. The limit may be changed as required via the StecaGrid User software and the USB interface on the StecaGrid SEM. For example, the 70 % limitation or the standards set by the KfW funding programme for storage systems (60 %) are fulfilled. In general, feeding into the public grid can also be prevented by setting the specified value to 0 W.

The StecaGrid SEM can connect a load via a relay. The switch-on value for the load can be specified as required. The parameters for switching the relay, and therefore also the load, on and off can also be set as needed.

StecaGrid

9000 3ph

StecaGrid

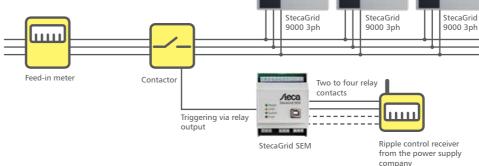
9000 3ph

Direct relay triggering

meter

Direct relay triggering is specifically suited for PV systems with the StecaGrid 9000 3ph inverters from 30 kWp to 100 kWp, which in Germany must be incorporated into feed-in management by the end of 2013.

The signals from the ripple control receiver to be fitted in the system are switched to the relay output of the StecaGrid SEM. If the specified value of the power supply company is below 100%, the PV system is disconnected from the grid. This fulfils the standards for feed-in management.





40 SYSTEM MONITORING SYSTEM MONITORING 41



Displayed and analysed: Solar-Log™ WEB keeps you up-to-date on the optimum work of your system at all times – even on the road, with the Solar-Log™ App.

SYSTEM MONITORING

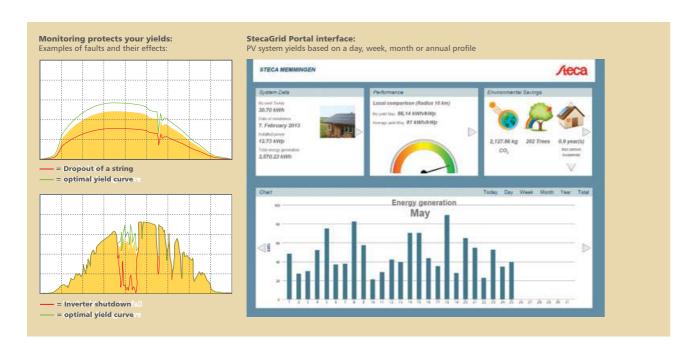
Locally and remotely

Continuous system monitoring is recom- Remote system monitoring is more convenimended, or even essential, for obtaining the absolute maximum performance from your solar energy system at all times. Steca offers and analysed via the HTML user interface. you a number of different system monitoring methods:

Local monitoring is sufficient when the the system data to an external database. operator regularly checks the data on the The operator can then log in to this database display unit. Above and beyond this, the and not only analyse his or her data but can data logger monitors the functions of the system components, displays faults and also compare the data with regional irradiance values. This thus provides the operator stores all relevant system data.

ent. The data logger can be connected to

The most professional method is to use online monitoring. The data logger sends with an objective impression of the effectiveness of his or her PV system.



	coolcept coolcept-120 coolcept-x	coolcept³ coolcept³-x	StecaGrid 8000+ 3ph StecaGrid 10000+ 3ph	StecaGrid 20000+ 3ph StecaGrid 23000+ 3ph
Local visualisa-	StecaGrid User Visualisation software	StecaGrid User Visualisation software	StecaGrid User Visualisation software	
tion			StecaGrid Vision Display unit	
Remote	Browser-based user interface	Browser-based user interface		
querying	StecaGrid Portal ¹⁾ Web-Portal	StecaGrid Portal Web-Portal		
			THE STATE OF THE S	
Remote monito-	Meteocontrol WEB'log Data logger and Meteocontrol WEB'log web portal	Meteocontrol WEB'log Data logger and Meteocontrol WEB'log web portal	Meteocontrol WEB'log Data logger and Meteocontrol WEB'log web portal	Meteocontrol WEB'log Data logger and Meteocontrol WEB'log web portal
ring				
	Solar-Log Data logger and Solar-Log™ Web HTML user interface	Solar-Log Data logger and Solar-Log™ Web HTML user interface	Solar-Log Data logger and Solar-Log™ Web HTML user interface	Solar-Log Data logger and Solar-Log™ Web HTML user interface

¹⁾ except for coolcept-120



42 SYSTEM MONITORING SYSTEM MONITORING 43



StecaGrid Portal

Free web portal for system monitoring

When the Ethernet interface of the coolcept inverter is connected to a router, the data from the data logger of the inverter is sent directly to the StecaGrid Portal. Setting up the portal is easy: on www.steca.com/portal, follow the link to the system data entry mask. In addition to system output, the modules used and the location of the system, the serial numbers of the installed inverters are queried. On the StecaGrid Portal, up to five coolcept- and coolcept³inverters can be combined to one system. The data of the individual devices are added up and displayed as a complete system.

Free use for two years

If the system operator agrees to having his system data published on www.solare-energiewende.de, the StecaGrid Portal can be used free of charge for two years. Afterwards for further optional use, which is not free of charge, he will receive an offer.

Clear presentation of yield data

The software interface is very clearly structured. In addition to the system data, yield data is displayed in daily, weekly, monthly and annual profiles. A scale evaluates current yield data of the system in comparison to values from other systems in the same region. This allows the user to determine at a glance whether the system's yield lies above or below the regional average. The display also shows the user's environmental contribution in terms of CO² saved due to yields.



Smart networking

Monitor the output of your PV system for free with the StecaGrid Portal. With the intuitive user interface, you can access your yield data anywhere and at any time - even from your smartphone or





Compare your PV system data to other systems from your region.

Direct comparison to other systems









StecaGrid User

Visualisation software for coolcept, coolcept-120, coolcept-x, coolcept3 and coolcept3-x, StecaGrid 8000+ 3ph, StecaGrid 10000+ 3ph and StecaGrid SEM

Universal and individual

The StecaGrid User software allows system operators to transfer entries from inverter data loggers to a computer and subsequently analyse the data. Inverters store diurnal variation curves, among other data. After 31 days, the oldest data are overwritten with new data. Using the StecaGrid User software, data can be read regularly and stored permanently on a computer.

The StecaGrid User software allows users to read the data of up to 100 inverters via a bus and have the data arranged and presented in a graph. The programme provides a clear overview of diurnal, monthly and annual variation curves both for the entire system and for each individual inverter. Yield data of several inverters can thus be compared. Various presentation options and colour schemes ensure that comparisons are clearly laid out.

The StecaGrid User also presents current measurements on the computer screen. The data that can be called up individually on the inverter's display are clearly presented on one StecaGrid User page.

Prepared for the future!

Choosing the ,information' menu item, users can read the hardware and software status of the connected inverters. The StecaGrid User software also carries out updates when new, improved software is available or new technical requirements necessitate a software adaptation

The yield data read from one inverter can be transferred to another inverter using the StecaGrid User software.

Other functions

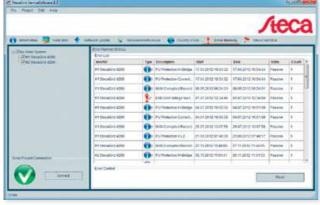
As of software version 3.x, StecaGrid User Software offers additional settings, for example to configure the energy manager StecaGrid

The software is available at www.stecasolar.com for free download. The computer connection requires a RS485 USB adapter cable.





Current measured values of the StecaGrid inverters connected to the RS485 bus



Display of internal error memory



Daily yield curve



Daily, monthly, annual and total yields are clearly displayed in StecaGrid User

StecaGrid Vision

Display unit for StecaGrid 8000+ 3ph and StecaGrid 10000+ 3ph

One photovoltaic system – one display

The philosophy behind the StecaGrid Vision display unit is to provide the system operator with a representation of the entire system's data. In the default display, the output and yields of all connected StecaGrid inverters are shown as combined totals. Thus, the operator does not need to go from one inverter to the next, reading out the values individually and adding them up themselves. Naturally, it is also possible to view and compare data from individual inverters.

Up to 20 inverters can be connected

One to 20 StecaGrid inverters can be connected to the optional StecaGrid Vision display unit. The wired connections between the inverters and to the display unit are realised via Steca's own com-

Easy to operate

The StecaGrid Vision impresses with its design. It is operated by means of four modern capacitive buttons. Graphic curves show the energy yields from the system as a whole, and from individual inverters, thus providing information at a glance, regarding the performance over the course of the day. In addition, StecaGrid Vision has a data logging function, which also enables querying of historical data. Error messages regarding the system as a whole, as well as individual inverters, are shown in plain text.

DisplayMultifunction graphic LCD display with backlighting, multiple operating parameters.

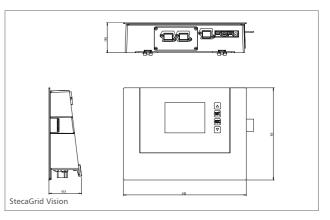
time, service information Animated representation of yield

. Multilingual menu navigation

Operation

for current output, energy yields, operating parameters, date,





	StecaGrid Vision		
Application conditions			
Area of application	indoor rooms, with or without air conditioning		
Interface to inverter	Steca bus with max. 1,000 m cable length		
Ambient temperature	-20 °C +45 °C		
Humidity	0 % 95 %		
Noise emissions in standard operating conditions	silent		
Equipment and design			
Protection class	IP 20		
Dimensions (X x Y x Z)	240 x 180 x 63.8 mm		
Weight	450 g		
Power supply	230 V mains adapter plug (included in delivery)		
Communication interface	USB		
Range	1,000 m		
Test certificate	CE mark		





PROFESSIONAL SYSTEM MONITORING

with StecaGrid Configurator 3.3 and 4.1

A technically matched system along with the suitable software secures the highest yields.

The simulation software versions provided by Steca aid system planners, dealers, installers and end customers in planning the right system.

Free software solutions

The comprehensive and detailed StecaGrid Configurator 3.3 is available for download at www.stecasolar.com.

The easy to use and intuitive StecaGrid Configurator 4.1 is started online as a browser application.



StecaGrid Configurator 4.1 Software for system planning online

The StecaGrid Configurator 4.1 is an innovative, user-friendly web application that makes the design and configuration of photovoltaic systems even easier than before. The application can be used without downloading and installing any extra software.

Intuitive and convenient

The intuitive menu structure allows quick entry of all data required for designing a system. The convenient user-interface allows selection from the range of StecaGrid inverters and corresponding PV modules and entry of the relevant system data. The StecaGrid Configurator 4.1 automatically calculates the optimum system design immediately.

For installers and system planners

If the interconnection concepts do not match each other, or the electrical values do not conform to the performance spectrum of a selected inverter, the program automatically indicates the problem.

The free StecaGrid Configurator 4.1 is optimally designed for the requirements of installers and system planners.



StecaGrid Configurator 3.3 Software for system monitoring

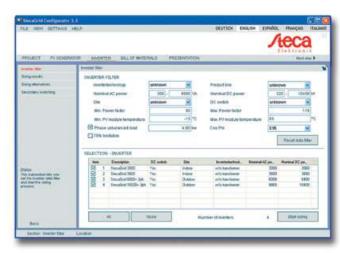
The update version of the StecaGrid Configurator makes it possible to plan a photovoltaic system in an even more professional manner. It offers a wealth of improvements compared to its forerunner, the 3.2 version.

Among the new features is the inclusion of the new 70 percent rule for design relationships where the output power is only 70 percent of the module power. To consider the reactive power, Cos Phi (1.00; 0.95 or 0.90) can be selected. The system planner can also specify the maximum and minimum module temperatures. The number of modules to be used in the selected system configuration can be modified subsequently. The effects on the system values and yields as well as exceeding of the input parameters are clearly shown.

This version is self-contained, offering a convenient user interface. There are four different options for determining the size of a photovoltaic system after selecting a module type. In addition, modules stored in a large database can be filtered according to specific criteria. If the required module is not stored in the database, you can add own modules to the programme. This is followed by the selection of the inverters according to a range of specifications, for example the installation site and rated AC or DC power. The calculated cost of generating electricity is taken as the standard selection criterion. To help with the specifications, the programme includes different values for the cost of systems planning as well as for modules, wiring, installation systems, etc. The installing company can provide their client data and company logo, which will appear on the printouts. A total of 100 locations throughout Europe offer irradiation data to help predict annual energy yield.

The predicted annual energy yield and the similarly editable values for the discount factor and operating time together allow the exact calculation in cents per kilowatt hour of the costs incurred by a system in producing electricity. On the basis of the electricity generation costs, it is possible to ascertain at a glance whether it would be more efficient to use the inverter with one more solar module, or one fewer. A list of required parts, the connection diagram and a summary of the project data all guarantee professional preparation for sales meetings with customers.

The programme's menu navigation can be set to German, English, French, Italian or Spanish.



The software is available free of charge at: www.stecasolar.com

For updates please refer to the Steca web site.



»STECA SOLAR ELECTRONICS PRODUCTS AND SOLUTIONS FOR AN ECOLOGICAL FUTURE.«

Steca has long stood for ideas and innovations as an electronic manufacturing services (EMS) provider and manufacturer of Steca brand product lines in solar electronics and battery charging systems. As a leading supplier of products for the solar electronics industry, Steca sets the international standard for the regulation and control of solar energy systems. In the three market segments PV grid connected, PV off grid and Solar thermal, the Steca brand is synonymous with innovation and vision. Development, production, sales and after sales service have set themselves the highest quality standards.



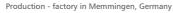
SERVICE AND OTHER PRODUCT AREAS



50 SERVICE SERVICE 51









Quality made in Germany



with added value, exclusively for Steca Service Partners -----

> Whether workshops, guarantee extensions or marketing tools: Whatever you need in our diverse range of Service Partner services, we support you with know-how and advertising material for your professional presence.

Seminars

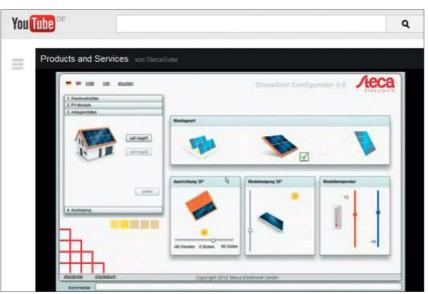
Steca is offering seminars on all productrelated topics as a workshop. Here, you will learn from the trainers how to use the products for your application, as well as their function, installation and operation. Your opinion counts in order to present better solutions.

Youtube Channel

The Stecasolar Youtube channel presents brief instructions on selected products, as well as company news. Videos with easy to understand information explain how to use the individual products.







With the purchase of any Steca product you benefit from our extensive range of services:



Hotline/Support

Our capable customer advisers and technical support department are at your service at all times to answer any product questions you may have. +49 (0) 700 STECAGRID (+49 (0) 700 783224743) (Monday to Friday from $8^{\circ\circ}$ to $16^{\circ\circ}$; 12 Euro-cents/minute from within the German public telephone ne or outside business hours: service@stecasolar.com. Naturally, we support our international partners in their national language: we have customer advisers who speak English, French, Spanish or Italian.



Guarantee and guarantee extension

We provide a 5-year guarantee on all grid inverters. Within the first 2 years, guarantees can be extended to 10 or 20 years in some cases. We offer our trading and service partners especially favourable commercial and legal guarantee conditions and cost-sharing flat-rates. Further information can be found at www.stecasolar.com.



Replacement service and repair

To keep the yield losses as low as possible in the case of a fault, we offer all our EU partners replacement devices. If a defective device cannot be repaired after expiry of the guarantee period, our Service Partners receive replacement devices under special conditions.



On-site customer service
If the Service Hotline and replacement service cannot correct your problems then our authorised Service Technicians will correct the problem on-site.



Workshops and seminars

As a Service Partner you are eligible to take part in our regular product training courses and receive information on new innovations.



We support our Service Partners with professional marketing tools for the Web, trade fairs and communication.



Steca Service-Partner-Logo

As an authorised Service Partner, we allow you to use our logo on your advertising material.





52 OTHER PRODUCT AREAS OTHER PRODUCT AREAS 53



Solar home systems



Inverter systems

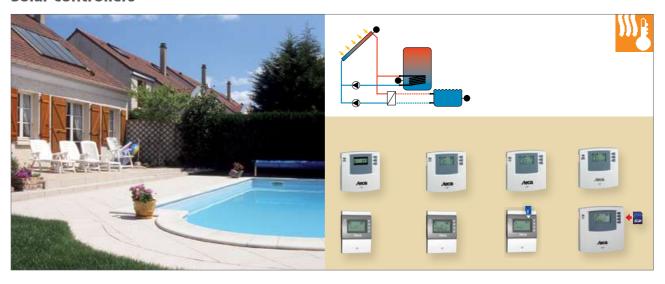


Hybrid systems





Solar controllers



Heating and domestic hot water controllers



System controllers





54 OTHER PRODUCT AREAS OTHER PRODUCT AREAS 55



BATTERY CHARGING SYSTEMS

ELEKTRONICS SERVICES

Battery chargers



Stationary systems



Parking bay power supply units



Quality



Development



Production











732.677 | 19.2014 © by Steca

Steca Elektronik GmbH Mammostraße 1 87700 Memmingen Germany Fon +49-(0)8331-8558-100 Fax +49-(0)8331-8558-132