



SUNNY FAMILY 2011/2012

» **Welcome to the SMA Product Guide. This catalog contains the complete worldwide product offering from SMA. When selecting an inverter, be sure it is suitable for use in your particular region.**

Each PV system is unique: SMA has the right solution for every application. Use this table to find products that are UL-listed specifically for countries requiring this certification.

SUNNY BOY

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Look for this symbol throughout the Guide.



It identifies products that are suitable for use where UL-listed products are required.



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Solar inverters from SMA:

Innovative technology and unmatched quality

The first solar inverter was one of ours. Today, SMA solar inverters are the product of almost 30 years of experience. With 7.9 gigawatts of installed PV power, we play a leading role in the success of photovoltaics. An important reason for this is that we invest substantially in research and development. At our company headquarters in Niestetal, Germany, over 500 developers are working on making our devices even more user-friendly and further cost-effective.

Investment security and fast amortization

Durability and economic viability are important criteria in selecting an inverter. With a service life of over 20 years and greater than 98 percent efficiency, SMA products set the standard for the industry. The key to our success—the combination of the latest technologies and modern production processes. The enhanced OptiTrac Global Peak operation control, the asymmetrical Optiflex multistring topology and the Optiprotect security concept ensure the best possible performance, regardless of the weather.

Flexible plant design

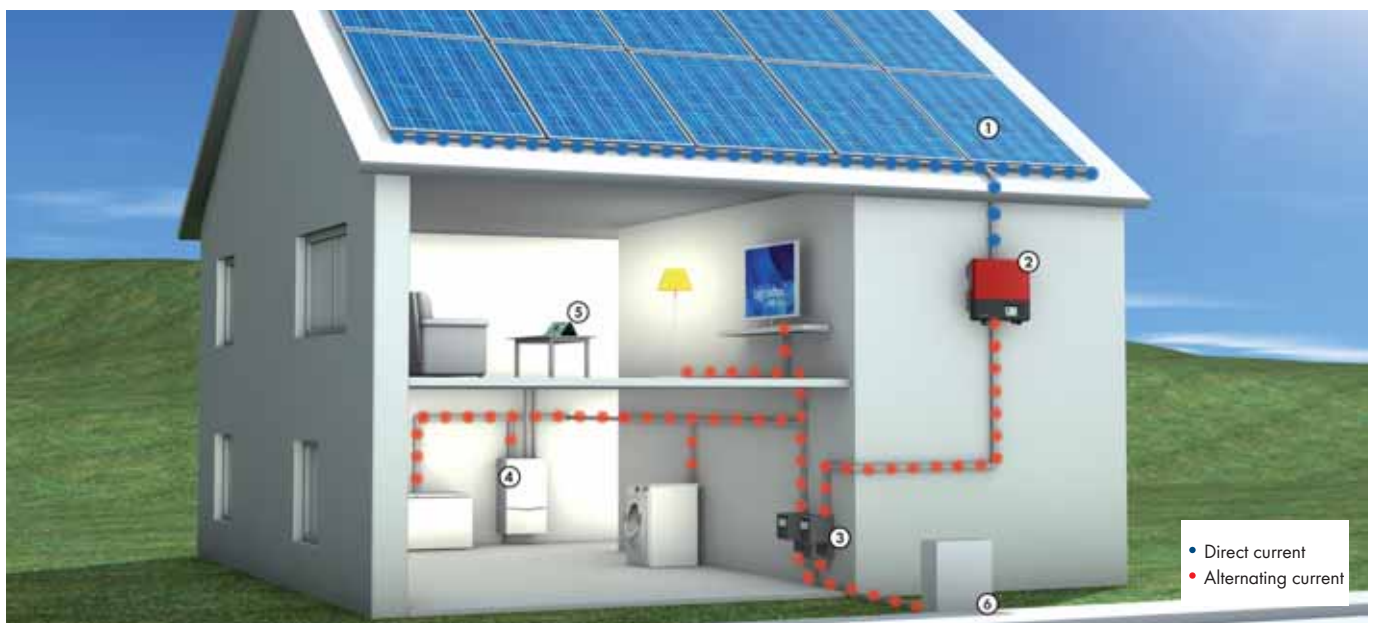
PV plants are just as individual as the buildings and surfaces on which they are installed. A broad range of products allows for the selection of the right inverter for any PV module and ensures the best energy harvest possible. SMA offers an inverter for any requirement, making the perfect plant design possible. Our inverters can be installed indoors as well as outdoors.

Safe installation

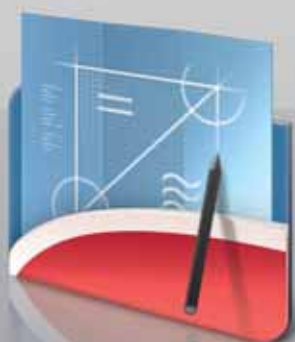
With the SMA Grid Guard and Electronic Solar Switch (ESS), SMA provides the most reliable safety systems on the market. For countries that require UL certification, the design of these safety technologies differs slightly (see page 208). The standardized SUNCLIX® DC plug system, the newly developed communication unit Quick Module or the SMA Plug-in Grounding kit make installation even easier and faster.

Simple control

All SMA inverters can be combined with a wide range of PV plant monitoring components such as the Sunny Beam with *Bluetooth®* for compact monitoring, the Sunny WebBox for online diagnosis and maintenance, and the Sunny Portal—the world's largest online portal for PV plant monitoring and administration.



Components: 1. PV module, 2. SUNNY BOY PV inverter, 3. Feed-in meter, 4. Loads, 5. SUNNY BEAM, 6. Grid connection



Simple

- Optimal design for grid-connected PV plants
- Provides tips aimed at system optimization
- Free download

Comprehensive

- Includes comprehensive database of all available PV modules
- Use of high-resolution meteorological data
- Supports locations worldwide
- Automatic dimensioning of the cable lengths and cross sections
- Energy analysis over a period of one operating year

SUNNY DESIGN

System design made easy

With Sunny Design, designing PV systems is easier than ever. Simply enter all the required information and within a few minutes you will receive the optimal configuration. The free software provides solar professionals and system planners with a user-friendly interface and a practical input wizard helps with any questions. The software provides data for an economic evaluation of the system along with a technical check of the included components. The end customer gains a customized PV system and the solar professional saves valuable time.

Sunny Design contains important SMA inverter data as well as specifications on all currently available PV modules. It is easy to use and guides the planner through the entire design process. This saves time and allows different configuration options to be simulated without the need for complicated calculations. Sunny Design automatically calculates the design values and comes up with a comprehensive result for all design variants.

First, critical operating conditions are identified. This ensures that the planner is notified of any deviations from the standard design. Although this notification does not necessarily mean that the design is not permissible, it serves to indicate that a thorough check is required to see whether this operating state is optimal for the current configuration (e.g. array voltage too low).

Sunny Design enables the system designer to fully concentrate on what plant designing is all about. The software helps to estimate the yield and investment cost implications of the most important performance parameters, creating a tailor-made system for the customer.

Additionally, a realistic operation evaluation is performed over a calendar year utilizing an integrated meteorological database. Although a precise yield forecast cannot be expected from Sunny Design (further simulation programs with complex variable analysis is necessary for this), Sunny Design can determine the yield differences between various designs, including a technical performance verification. Not only can the best system design be found, it can also be evaluated for cost-effectiveness.

Lastly, a technical assessment of the system design is clearly illustrated in an individually customized results report. As a printed document or an electronic PDF file, this summary is the ideal supplement to any offer.

Free download at
www.SMA.de/SunnyDesign

System Requirements

Supported operating systems

Windows XP SP3*
Windows Vista SP2*
Windows 7*
*with .Net Framework 4.0

Hardware (minimum requirements)

Intel Pentium 1 GHz
1 GB RAM
100 MB (free hard drive space)
1024 x 768 pixels / 256 colors



Use of real, high-resolution meteorological data



Database of current PV modules



Database of all SMA inverters



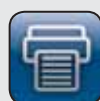
Provides tips aimed at plant optimization



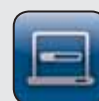
Worldwide support



Generation of design proposals



Results report with individual layout for integration into plant quotes



Automatic online updates



Simple

- GPS-based locator
- Determines roof tilt and orientation
- Irradiation values provided by on-line meteorological database

Fast

- Online feed-in tariffs and average system costs
- Determination of yield and expected profits/savings
- Integrated financing calculator

Convenient

- Local solar power professional search*
- Installer telephone or email provided at the press of a button
- Free download in Apple App Store

SMA SOLARCHECKER

iPhone® app for estimating PV system yield

“Is it worth having a photovoltaic system on my roof?” This is a question many homeowners are asking themselves. Installation specialists who own an iPhone 3GS can answer this question in just a few seconds—thanks to the Solarchecker from SMA. This iPhone application quickly and conveniently estimates the yield of a PV system, simplifying on-site estimates.

Traditionally, solar system engineers needed a long time before they could provide potential customers with an initial yield estimate. Now, technicians can instantly calculate this estimate using an iPhone and the SMA Solarchecker. This mobile device features integrated sensors that allow it to automatically determine the location, orientation and tilt of a roof. The SMA Solarchecker application uses this data, along with custom information such as system size and financing costs, to estimate the power yield and profits of a potential PV system. Although the estimate does not replace the final, detailed planning of the system, it saves valuable time and quickly convinces customers of the benefits of these cost-effective and environmentally friendly projects.

The iPhone as a solar power planner

The SMA Solarchecker finds the operator's current location using the iPhone's GPS tracker. Using these values, the application determines the site's potential solar irradiation, which is derived from a GPS-based weather database. Using the phone's magnetic compass, the application then measures to what degree the roof deviates from the ideal south-facing orientation. The device also determines the possible angle of the solar array using the tilt sensor. The SMA Solarchecker then uses these values

to determine the specific yield of a PV system, i.e. the number of kilowatt hours produced per kW of power.

Calculating energy yield with the Solarchecker

To determine the energy yield, the planned power of the PV array must be calculated first. The SMA Solarchecker offers two ways to complete this step. The user can enter power directly in kWp or input the number of square meters of the planned PV system. In the latter case, the application automatically converts the roof area into power. Of course, the application takes into account the previously specified PV module type.

The SMA Solarchecker calculates the annual energy yield of the PV system by multiplying the specific yield of the roof area with the planned peak power. Long-term estimates, e.g. over 20 years, are also possible. For degradation, the SMA Solarchecker uses a value of 0.2 percent per year. A more precise calculation can be made by adjusting this value.

Important Information

Because the returns and profits are dependent on the estimate of the specific yearly yield, they both carry some uncertainty. SMA is not liable for lower actual yields, which can be caused by other factors such as shading, dirt or otherwise compromised modules. For more precise yield calculations, SMA recommends consulting a qualified technician or system planner.

Profit estimate at the press of a button

For locations with a feed-in tariff, simply type in the current feed-in tariff per kilowatt hour and the expected financing costs and the application will estimate the possible profits that can be generated by the planned PV system.

Free download at
www.apple.com/itunes



Use of approved irradiation data



Automatic determination of position, inclination and orientation



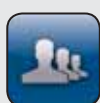
Manual input of roof area, module type and maintenance costs



Integrated financing calculator



Yield and profit estimate at the press of a button



Integrated solar power professional search*



Data transfer via automatically generated e-mail



Languages: German, English, Italian, Spanish, French

* All members of the Sunny PRO Club are included in SMA's solar power professional search.





INVERTERS WITHOUT TRANSFORMERS



Efficient

- Maximum efficiency of 98.1%
- OptiTrac™ Global Peak for best tracking efficiency
- Bluetooth® communication

Safe

- Electronic string fuse and failure detection
- Optional DC overvoltage protector (Type II)
- String current monitoring

Flexible

- DC input voltage up to 1000 V
- Integrated grid management functions
- Custom plant design with Optiflex

Simple

- Three-phase feed-in
- Cable connection without tools
- SUNCLIX® DC plug system
- Easily accessible connection area

SUNNY TRIPOWER

8000TL / 10000TL / 12000TL / 15000TL / 17000TL

The three-phase inverter for easy system design

The Sunny Tripower is packed full of innovation. Thanks to the new SMA Optiflex technology, which features two MPP inputs and a very broad input voltage range, the three-phase Sunny Tripower is suited to almost any module configuration. This flexibility simplifies plant design and is perfect for systems up to the megawatt range. The Sunny Tripower also assists grid managers. It meets all the requirements for reactive power supply, utility interaction management and grid support. The Optiprotect safety concept, with its self-learning string failure detection, electronic string fuse and available DC overvoltage protector (Type II), ensures maximum uptime.

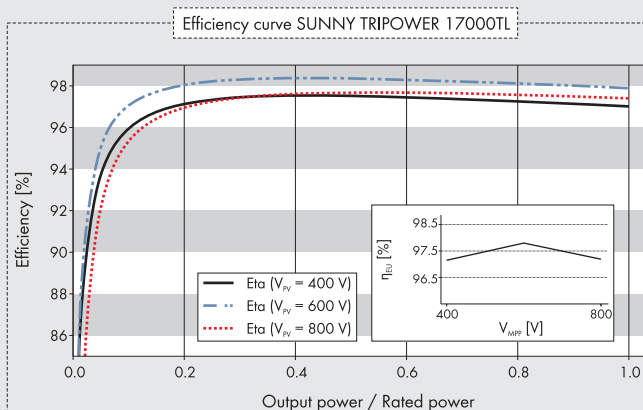


Bad Hersfeld, Germany

SUNNY TRIPOWER

8000TL / 10000TL / 12000TL / 15000TL / 17000TL

Technical Data	Sunny Tripower 8000TL	Sunny Tripower 10000TL
Input (DC)		
Max. DC power (@ cos φ=1)	8200 W	10200 W
Max. input voltage	1000 V	1000 V
MPP voltage range / rated input voltage	320 V – 800 V / 600 V	320 V – 800 V / 600 V
Min. input voltage / initial input voltage	150 V / 188 V	150 V / 188 V
Max. input current input A / input B	22 A / 11 A	22 A / 11 A
Max. input current per string input A** / input B**	33 A / 12.5 A	33 A / 12.5 A
Number of independent MPP inputs / strings per MPP input	2 / A:4; B:1	2 / A:4; B:1
Output (AC)		
Rated power (@ 230 V, 50 Hz)	8000 W	10000 W
Max. apparent AC power	8000 VA	10000 VA
Nominal AC voltage	3 / N / PE; 220 / 380 V 3 / N / PE; 230 / 400 V 3 / N / PE; 240 / 415 V	3 / N / PE; 220 / 380 V 3 / N / PE; 230 / 400 V 3 / N / PE; 240 / 415 V
Nominal AC voltage range	160 V – 280 V	160 V – 280 V
AC power frequency / range	50 Hz, 60Hz / -6 Hz ... +5 Hz	50 Hz, 60Hz / -6 Hz ... +5 Hz
Rated grid frequency / rated grid voltage	50 Hz / 230 V	50 Hz / 230 V
Max. output current	16 A	16 A
Power factor at rated power	1	1
Adjustable displacement factor	0.8 leading... 0.8 lagging	0.8 leading... 0.8 lagging
Phase conductors / connection phases	3 / 3	3 / 3
Efficiency		
Max. efficiency / European efficiency	98.1 % / 97.5 %	98.1 % / 97.7 %
Protection		
Input-side disconnection device	●	●
Ground-fault monitoring / grid monitoring	● / ●	● / ●
DC surge arrester Type II, can be integrated	○	○
DC reverse-polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / –	● / ● / –
All-pole sensitive residual current monitoring unit	●	●
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	I / III
General Data		
Dimensions (W / H / D)	665 / 690 / 265 mm (26.2 / 27.2 / 10.4 in)	665 / 690 / 265 mm (26.2 / 27.2 / 10.4 in)
Weight	64 kg / 141.1 lb	64 kg / 141.1 lb
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	-25 °C ... +60 °C / -13 °F ... +140 °F
Noise emission (typical)	51 dB(A)	51 dB(A)
Self-consumption at night	1 W	1 W
Topology / cooling concept	Transformerless / OptiCool	Transformerless / OptiCool
Degree of protection / degree of protection of connection area (according to IEC 60529)	IP65 / IP54	IP65 / IP54
Climatic category (according to IEC 60721-3-4)	4K4H	4K4H
Maximum permissible value for relative humidity (non-condensing)	100 %	100 %
Features		
DC terminal	SUNCLIX	SUNCLIX
AC terminal	Spring-type terminal	Spring-type terminal
Display	Graphic	Graphic
Interface: RS485 / Bluetooth	○ / ●	○ / ●
Warranty: 5 / 10 / 15 / 20 / 25 years	● / ○ / ○ / ○ / ○	● / ○ / ○ / ○ / ○
Multi-function relay	●	●
Certificates and approvals (more available on request)	CE, VDE0126-1-1, G83/1-1, RD 1663/2000, RD 661/2007, G59/2, PPC, AS4777, EN 50438*, C10/11, PPDS, IEC 61727, ENEL-Guida, UTE C15-712-1	
Type designation	STP 8000TL-10	STP 10000TL-10



Accessories



RS485 interface
DM-485CB-10



DC surge arrester
(Type II), input A
DCSPD KIT1-10



DC surge arrester
(Type II), inputs A and B
DCSPD KIT2-10

* Does not apply to all national deviations of EN 50438

** To be observed in case of a short circuit in the electronic string fuse

● Standard features ○ Optional features — Not available

Data at nominal conditions

Sunny Tripower 12000TL	Sunny Tripower 15000TL	Sunny Tripower 17000TL	
12250 W	15340 W	17410 W	
1000 V	1000 V	1000 V	
380 V – 800 V / 600 V	360 V – 800 V / 600 V	400 V – 800 V / 600 V	
150 V / 188 V	150 V / 188 V	150 V / 188 V	
22 A / 11 A	33 A / 11 A	33 A / 11 A	
33 A / 12.5 A	33 A / 12.5 A	33 A / 12.5 A	
2 / A:4; B:1	2 / A:5; B:1	2 / A:5; B:1	
12000 W	15000 W	17000 W	
12000 VA	15000 VA	17000 VA	
3 / N / PE; 220 / 380 V	3 / N / PE; 220 / 380 V	3 / N / PE; 220 / 380 V	
3 / N / PE; 230 / 400 V	3 / N / PE; 230 / 400 V	3 / N / PE; 230 / 400 V	
3 / N / PE; 240 / 415 V	3 / N / PE; 240 / 415 V	3 / N / PE; 240 / 415 V	
160 V – 280 V	160 V – 280 V	160 V – 280 V	
50 Hz, 60Hz / -6 Hz ... +5 Hz	50 Hz, 60Hz / -6 Hz ... +5 Hz	50 Hz, 60Hz / -6 Hz ... +5 Hz	
50 Hz / 230 V	50 Hz / 230 V	50 Hz / 230 V	
19.2 A	24 A	24.6 A	
1	1	1	
0.8 leading... 0.8 lagging	0.8 leading... 0.8 lagging	0.8 leading... 0.8 lagging	
3 / 3	3 / 3	3 / 3	
98.1 % / 97.7 %	98.2 % / 97.8 %	98.2 % / 97.8 %	
●	●	●	
● / ●	● / ●	● / ●	
○	○	○	
● / ● / —	● / ● / —	● / ● / —	
●	●	●	
I / III	I / III	I / III	
665 / 690 / 265 mm (26.2 / 27.2 / 10.4 in)	665 / 690 / 265 mm (26.2 / 27.2 / 10.4 in)	665 / 690 / 265 mm (26.2 / 27.2 / 10.4 in)	
64 kg / 141.1 lb	64 kg / 141.1 lb	64 kg / 141.1 lb	
-25 °C ... +60 °C / -13 °F ... +140 °F	-25 °C ... +60 °C / -13 °F ... +140 °F	-25 °C ... +60 °C / -13 °F ... +140 °F	
51 dB(A)	51 dB(A)	51 dB(A)	
1 W	1 W	1 W	
Transformerless / OptiCool	Transformerless / OptiCool	Transformerless / OptiCool	
IP65 / IP54	IP65 / IP54	IP65 / IP54	
4K4H	4K4H	4K4H	
100 %	100 %	100 %	
SUNCLIX	SUNCLIX	SUNCLIX	
Spring-type terminal	Spring-type terminal	Spring-type terminal	
Graphic	Graphic	Graphic	
○ / ●	○ / ●	○ / ●	
● / ○ / ○ / ○ / ○	● / ○ / ○ / ○ / ○	● / ○ / ○ / ○ / ○	
●	●	●	
CE, VDE0126-1-1, G83/1-1, RD 1663/2000, RD 661/2007, G59/2, PPC, AS4777, EN 50438*, C10/11, PPDS, IEC 61727, ENEL-Guida, UTE C15-712-1			
STP 12000TL-10	STP 15000TL-10	STP 17000TL-10	



Economical

- Class-leading 99% maximum efficiency
- OptiTrac MPP tracking for highest yields possible

Reliable

- OptiCool active temperature management

Simple

- Three-phase feed-in
- SUNCLIX DC plug-in system
- Bluetooth® communication

Flexible and Future-Proof

- DC input voltage up to 1,000V
- Integrated grid management functions
- Reactive power control

SUNNY TRIPOWER 20000TL HIGH EFFICIENCY

Greater return on investment through halved losses

The new Sunny Tripower TL High Efficiency offers 99 percent, best-in-class efficiency, which results in a short payback period. This efficiency breakthrough reduces conversion losses by half and further improves the unit's specific price—making it the ideal inverter for medium and large decentralized PV plants. This model optimizes efficiency while retaining all necessary integration requirements such as reactive power control, network support and grid management.

Accessories

RS485 interface
DM-485CB-10DC overvoltage protector
(type II), input A
DCSPD KIT1-10DC overvoltage protector
(type II), inputs A and B
DCSPD KIT2-10

● Standard features ○ Optional features – Not available
Provisional data, as of August 2011
Data at nominal conditions

Technical Data	Sunny Tripower 20000TL High Efficiency
Input (DC)	
Max. DC power (@ $\cos \varphi = 1$)	20500 W
Max. input voltage	1000 V
MPP voltage range @ 230 V grid voltage	580 V – 800 V
Max. input current	36 A
Max. input current per string	36 A
Number of independent MPP inputs / strings per MPP input	1 / 6
Output (AC)	
Rated power (@ 230 V, 50 Hz)	20000 W
Max. apparent AC power	20000 VA
Nominal AC voltage	3 / N / PE, 230 V / 400 V
Nominal AC voltage range	160 V – 280 V
AC power frequency / range	50 Hz, 60 Hz / -6 Hz, +5 Hz
Rated power frequency / rated grid voltage	50 Hz / 230 V, 400 V
Max. output current	29 A
Power factor at rated power	1
Displacement power factor, configurable	0.8 leading ... 0.8 lagging
Feed-in phases / connection phases	3 / 3
Efficiency	
Max. efficiency / European weighted efficiency	99 % / 98,6 %
Protective devices	
DC-side disconnection device	○
Ground fault monitoring / grid monitoring	● / ●
DC surge arrester (type II), can be integrated	–
DC reverse polarity protection / AC short-circuit protection / galvanically isolated	● / ● / –
All-pole sensitive residual-current monitoring unit	●
Protection class (as per IEC 62103) / overvoltage category (as per IEC 60664-1)	I / III
General Data	
Dimensions (W / H / D) in mm	665 / 690 / 265
Weight	52 kg / 114.6 lb
Operating temperature range	-25 °C ... +60 °C / -13 °F ... 140 °F
Noise emission (typical)	51 dB(A)
Self-consumption (at night)	1 W
Topology / cooling concept	Transformerless / OptiCool
Electronics degree of protection / connection area (per IEC 60529)	IP65 / IP54
Climatic category (per IEC 60721-3-4)	4K4H
Maximum permissible value for relative humidity, non-condensing	100%
Features	
DC terminal	SUNCLIX
AC terminal	Spring terminal
Display	Chart
Interfaces: RS485 / Bluetooth®	○ / ●
Warranty: 5 / 10 / 15 / 20 / 25 years	● / ○ / ○ / ○ / ○
Multi-function relay	○
Certificates and licenses (more available on request)	CE, VDE 0126-1-1, BDEW, VDE-AR-N 4105
Type designation	STP 20000TLHE-10



Flexible

- Integrated grid management with reactive power control

High Yields

- Maximum efficiency of 97.7%
- Transformerless, H5 topology
- OptiCool active temperature management

Reliable

- Pluggable SMA Power Balancer for three-phase power
- Integrated ESS DC switch disconnect
- Monitored string fuses

Simple

- SUNCLUX DC plug-in system speeds installation

SUNNY MINI CENTRAL 9000TL / 10000TL / 11000TL with Reactive Power Control

Optimum grid integration with reactive power supply

Sunny Mini Central inverters with reactive power control are the ideal solution when utility companies require reactive power supply. They can be used for PV plant designs which specify the displacement factor $\cos \varphi$ and the corresponding percentage of reactive power. Large PV power plants can now make optimum use of distribution capacities, which significantly contributes to the continued penetration of renewable energy on the grid.

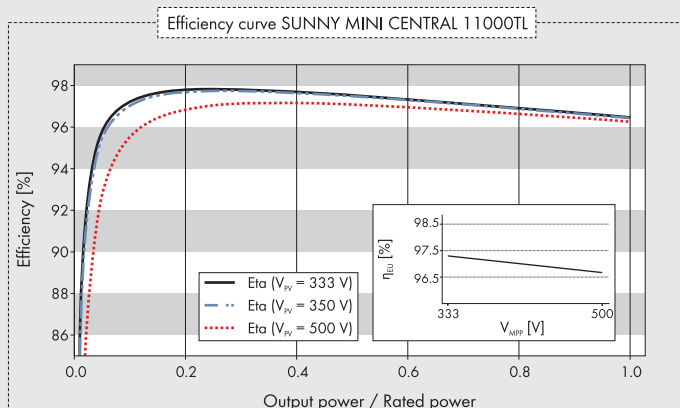


Thiva, Greece

SUNNY MINI CENTRAL 9000TL/10000TL/11000TL

with Reactive Power Control

Technical Data	Sunny Mini Central 9000TL	Sunny Mini Central 10000TL
Input (DC)		
Max. DC power (@ cos $\varphi=1$)	9300 W	10350 W
Max. input voltage	700 V	700 V
MPP voltage range / rated input voltage	333 V - 500 V / 350 V	333 V - 500 V / 350 V
Min. input voltage / initial input voltage	333 V / 400 V	333 V / 400 V
Max. input current	28 A	31 A
Max. input current per string	28 A	31 A
Number of independent MPP inputs / strings per MPP input	1 / 5	1 / 5
Output (AC)		
Rated output power (@230 V, 50 Hz)	9000 W	10000 W
Max. apparent AC power	9000 VA	10000 VA
Nominal AC voltage / range	220 V, 230 V, 240 V / 180 V - 265 V	220 V, 230 V, 240 V / 180 V - 265 V
AC power frequency / range	50 Hz, 60 Hz / -6 Hz ... +5 Hz	50 Hz, 60 Hz / -6 Hz ... +5 Hz
Rated power frequency / rated power voltage	50 Hz / 230 V	50 Hz / 230 V
Max. output current	40 A	44 A
Power factor at rated output power	1	1
Adjustable displacement factor	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging
Feed-in phases / connection phases	1 / 1	1 / 1
Power balancing	●	●
Efficiency		
Max. efficiency / European efficiency	97.7 % / 97.3 %	97.7 % / 97.2 %
Protection		
Reverse current protection / input-side disconnection device	Optional (fuses) / ●	Optional (fuses) / ●
Ground fault monitoring / grid monitoring	● / ●	● / ●
DC reverse-polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / -	● / ● / -
All-pole sensitive residual current monitoring unit	●	●
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	I / III
General Data		
Dimensions (W / H / D)	468 / 613 / 242 mm (18.4 / 24.1 / 9.5 in)	468 / 613 / 242 mm (18.4 / 24.1 / 9.5 in)
Weight	35 kg / 77.16 lb	35 kg / 77.16 lb
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	-25 °C ... +60 °C / -13 °F ... +140 °F
Noise emission (typical)	42 dB(A)	45 dB(A)
Self-consumption (night)	0.25 W	0.25 W
Topology	Transformerless	Transformerless
Cooling concept	OptiCool	OptiCool
Degree of protection (according to IEC 60529)	IP65	IP65
Degree of protection of connection area (according to IEC 60529)	IP65	IP65
Climatic category (according to IEC 60721-3-4)	4K4H	4K4H
Maximum permissible value for relative humidity (non-condensing)	100 %	100 %
Features		
DC terminal	SUNCLIX	SUNCLIX
AC terminal	Screw terminal	Screw terminal
Display	Text line	Text line
Interface: RS485 / Bluetooth	○ / ○	○ / ○
Warranty: 5 / 10 / 15 / 20 / 25 years	● / ○ / ○ / ○ / ○	● / ○ / ○ / ○ / ○
Certificates and approvals (more available on request)	CE, VDE0126-1-1, RD 1663/2000, RD 661/2007, EN 50438*, C10/11, PPDS, EC 61727, UTE C15-712-1	
Type designation	SMC 9000TLRP-10	SMC 10000TLRP-10



Accessories



RS485 interface
485PB-SMC-NR



Bluetooth Piggy-Back
BTPBINV-NR



SMA Power Balancer
Connection cable
PBL-YCABLE-10

* Does not apply to all national annexes to EN 50438

● Standard features ○ Optional features — Not available
Data at nominal conditions

Technical Data	Sunny Mini Central 11000TL	
Input (DC)		
Max. DC power (@ $\cos \varphi = 1$)	11400 W	
Max. input voltage	700 V	
MPP voltage range / rated input voltage	333 V - 500 V / 350 V	
Min. input voltage / initial input voltage	333 V / 400 V	
Max. input current	34 A	
Max. input current per string	34 A	
Number of independent MPP inputs / strings per MPP input	1 / 5	
Output (AC)		
Rated output power (@230 V, 50 Hz)	11000 W	
Max. apparent AC power	11000 VA	
Nominal AC voltage / range	220 V, 230 V, 240 V / 180 V - 265 V	
AC power frequency / range	50 Hz, 60 Hz / -6 Hz ... +5 Hz	
Rated power frequency / rated power voltage	50 Hz / 230 V	
Max. output current	48 A	
Power factor at rated output power	1	
Adjustable displacement factor	0.8 leading ... 0.8 lagging	
Feed-in phases / connection phases	1 / 1	
Power balancing	●	
Efficiency		
Max. efficiency / European efficiency	97.7 % / 97.2 %	
Protection		
Reverse current protection / input-side disconnection device	Optional (fuses) / ●	
Ground fault monitoring / grid monitoring	● / ●	
DC reverse-polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / —	
All-pole sensitive residual current monitoring unit	●	
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	
General Data		
Dimensions (W / H / D)	468 / 613 / 242 mm (18.4 / 24.1 / 9.5 in)	
Weight	35 kg / 77.16 lb	
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	
Noise emission (typical)	46 dB(A)	
Self-consumption (night)	0.25 W	
Topology	Transformerless	
Cooling concept	OptiCool	
Degree of protection (according to IEC 60529)	IP65	
Degree of protection of connection area (according to IEC 60529)	IP65	
Climatic category (according to IEC 60721-3-4)	4K4H	
Maximum permissible value for relative humidity (non-condensing)	100 %	
Features		
DC terminal	SUNCLIX	
AC terminal	Screw terminal	
Display	Text line	
Interface: RS485 / Bluetooth	○ / ○	
Warranty: 5 / 10 / 15 / 20 / 25 years	● / ○ / ○ / ○ / ○	
Certificates and approvals (more available on request)	CE, VDE0126-1-1, RD 1663/2000, RD 661/2007, EN 50438*, C10/11, PPDS, IEC 61727, UTE C15-712-1	
Type designation	SMC 11000TLRP-10	



Efficient

- Maximum efficiency of 98%
- OptiTrac operation management for best tracking efficiency
- Transformerless, with H5 topology

Reliable

- OptiCool™ active temperature management

Safe

- SMA Power Balancer for three-phase power supply line
- Integrated ESS DC switch-disconnect
- Monitored string fuses

Simple

- SUNCLIX® DC plug system

SUNNY MINI CENTRAL 9000TL / 10000TL / 11000TL

Precise system design for maximum yields

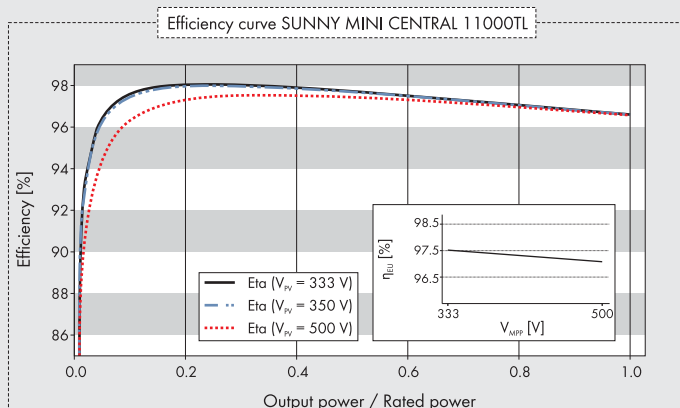
The Sunny Mini Central simplifies the planning of medium and large PV plants, from 27 kWp up to the megawatt range. Three power classes ranging from 9 to 11 kW and the combination of high efficiency and low specific price ensures high performance and short amortization. The decentralized system design also helps keep maintenance costs low. SMA's Sunny Mini Central features state-of-the-art technology that reliably pays off with every sunbeam.



Bolzano, Italy

SUNNY MINI CENTRAL 9000TL / 10000TL / 11000TL

Technical Data	Sunny Mini Central 9000TL	Sunny Mini Central 10000TL
Input (DC)		
Max. DC power (@ cos φ =1)	9300 W	10350 W
Max. input voltage	700 V	700 V
MPP voltage range / rated input voltage	333 V - 500 V / 350 V	333 V - 500 V / 350 V
Min. input voltage / initial input voltage	333 V / 400 V	333 V / 400 V
Max. input current	28 A	31 A
Max. input current per string	28 A	31 A
Number of independent MPP inputs / strings per MPP input	1 / 5	1 / 5
Output (AC)		
Rated output power (@230 V, 50 Hz)	9000 W	10000 W
Max. apparent AC power	9000 VA	10000 VA
Nominal AC voltage / range	220 V, 230 V, 240 V / 180 V - 265 V	220 V, 230 V, 240 V / 180 V - 265 V
AC power frequency / range	50 Hz, 60 Hz / -6 Hz ... +5 Hz	50 Hz, 60 Hz / -6 Hz ... +5 Hz
Rated power frequency / rated power voltage	50 Hz / 230 V	50 Hz / 230 V
Max. output current	40 A	44 A
Power factor at rated output power	1	1
Adjustable displacement factor	—	—
Feed-in phases / connection phases	1 / 1	1 / 1
Power balancing	●	●
Efficiency		
Max. efficiency / European efficiency	98 % / 97.6 %	98 % / 97.5 %
Protection		
Reverse current protection / input-side disconnection device	Optional (fuses) / ●	Optional (fuses) / ●
Ground fault monitoring / grid monitoring	● / ●	● / ●
DC reverse-polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / —	● / ● / —
All-pole sensitive residual current monitoring unit	●	●
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	I / III
General Data		
Dimensions (W / H / D)	468 / 613 / 242 mm (18.4 / 24.1 / 9.5 in)	468 / 613 / 242 mm (18.4 / 24.1 / 9.5 in)
Weight	35 kg / 77.16 lb	35 kg / 77.16 lb
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	-25 °C ... +60 °C / -13 °F ... +140 °F
Noise emission (typical)	42 dB(A)	45 dB(A)
Self-consumption (night)	0.25 W	0.25 W
Topology	Transformerless	Transformerless
Cooling concept	OptiCool	OptiCool
Degree of protection (according to IEC 60529)	IP65	IP65
Degree of protection of connection area (according to IEC 60529)	IP65	IP65
Climatic category (according to IEC 60721-3-4)	4K4H	4K4H
Maximum permissible value for relative humidity (non-condensing)	100 %	100 %
Features		
DC terminal	SUNCLIX	SUNCLIX
AC terminal	Terminal	Screw terminal
Display	Text line	Text line
Interface: RS485 / Bluetooth	○ / ○	○ / ○
Warranty: 5 / 10 / 15 / 20 / 25 years	● / ○ / ○ / ○ / ○	● / ○ / ○ / ○ / ○
Certificates and approvals (more available on request)	CE, VDE0126-1-1, DK 5940 ED2.2**, RD 1663/2000, PPC, AS4777, EN 50438*, C10/11, PPDS, IEC 61727, UTE C15-712-1	
Type designation	SMC 9000TL-10	SMC 10000TL-10



Accessories



RS485 interface
485PB-SMC-NR



Bluetooth Piggy-Back
BTPBINV-NR



SMA Power Balancer
Connection cable
PBL-YCABLE-10

* Does not apply to all national deviations of EN 50438

** Only applies to IT option

● Standard features ○ Optional features – Not available
Data at nominal conditions

Technical Data	Sunny Mini Central 11000TL	
Input (DC)		
Max. DC power (@ $\cos \varphi = 1$)	11400 W	
Max. input voltage	700 V	
MPP voltage range / rated input voltage	333 V – 500 V / 350 V	
Min. input voltage / initial input voltage	333 V / 400 V	
Max. input current	34 A	
Max. input current per string	34 A	
Number of independent MPP inputs / strings per MPP input	1 / 5	
Output (AC)		
Rated output power (@230 V, 50 Hz)	11000 W	
Max. apparent AC power	11000 VA	
Nominal AC voltage / range	220 V, 230 V, 240 V / 180 V – 265 V	
AC power frequency / range	50 Hz, 60 Hz / -6 Hz ... +5 Hz	
Rated power frequency / rated power voltage	50 Hz / 230 V	
Max. output current	48 A	
Power factor at rated output power	1	
Adjustable displacement factor	–	
Feed-in phases / connection phases	1 / 1	
Power balancing	●	
Efficiency		
Max. efficiency / European efficiency	98 % / 97.5 %	
Protection		
Reverse current protection / input-side disconnection device	Optional (fuses) / ●	
Ground fault monitoring / grid monitoring	● / ●	
DC reverse-polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / –	
All-pole sensitive residual current monitoring unit	–	
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	
General Data		
Dimensions (W / H / D)	468 / 613 / 242 mm (18.4 / 24.1 / 9.5 in)	
Weight	35 kg / 77.16 lb	
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	
Noise emission (typical)	46 dB(A)	
Self-consumption (night)	0.25 W	
Topology	Transformerless	
Cooling concept	OptiCool	
Degree of protection (according to IEC 60529)	IP65	
Degree of protection of connection area (according to IEC 60529)	IP65	
Climatic category (according to IEC 60721-3-4)	4K4H	
Maximum permissible value for relative humidity (non-condensing)	100 %	
Features		
DC terminal	SUNCLIX	
AC terminal	Screw terminal	
Display	○	
Interface: RS485 / Bluetooth	○ / ○	
Warranty: 5 / 10 / 15 / 20 / 25 years	● / ○ / ○ / ○ / ○	
Certificates and approvals (more available on request)	CE, VDE0126-1-1, DK 5940 ED2.2**, RD 1663/2000, PPC, AS4777, EN 50438*, C10/11, PPDS, IEC 61727, UTE C15-712-1	
Type designation	SMC 11000TL-10	



Efficient

- Maximum efficiency of 98%
- OptiTrac operation management for best tracking efficiency
- Transformerless, with H5 topology

Reliable

- OptiCool™ active temperature management

Safe

- SMA Power Balancer for three-phase power supply line
- Integrated ESS DC switch-disconnect
- Monitored string fuses

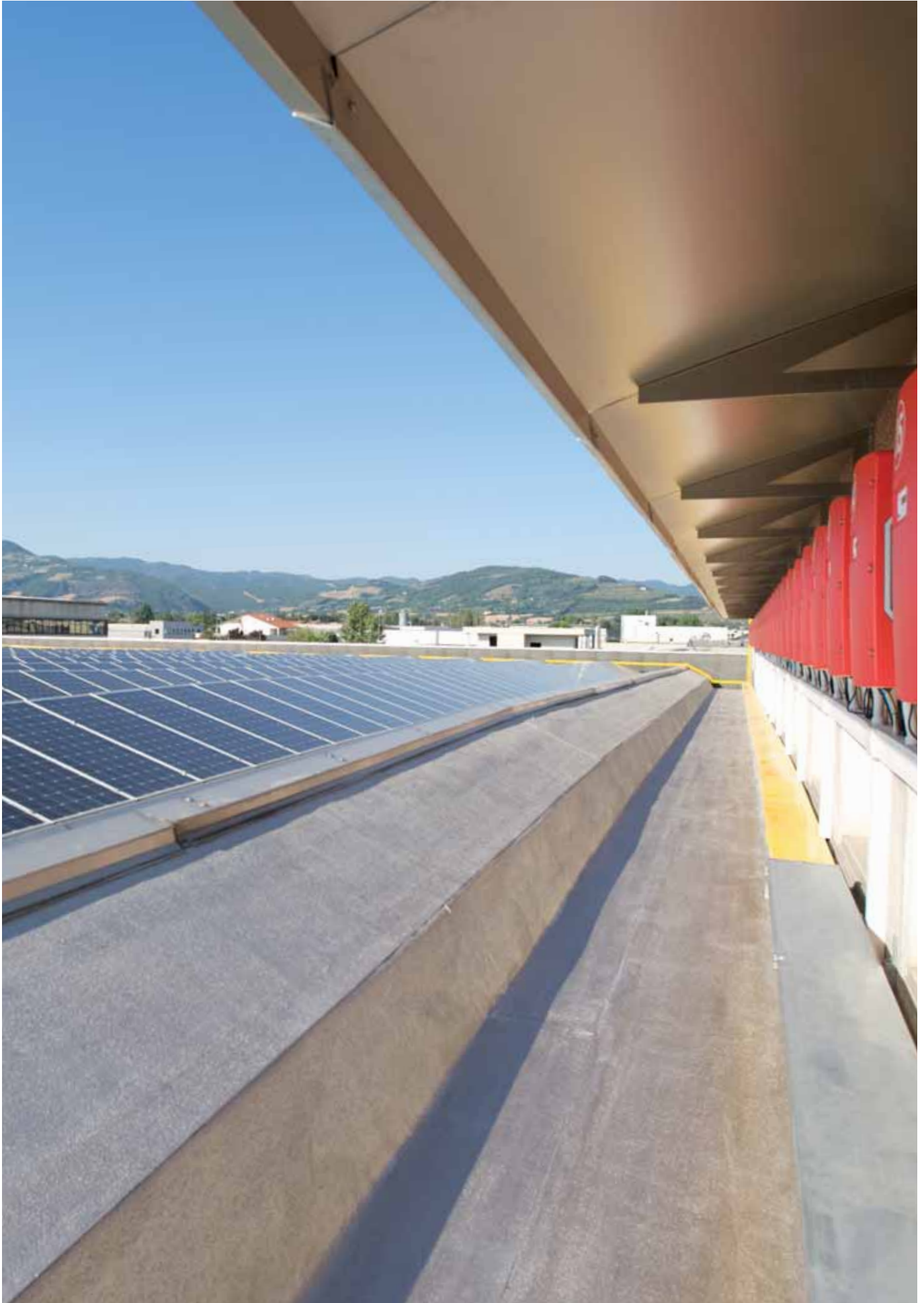
Simple

- SUNCLIX® DC plug system

SUNNY MINI CENTRAL 6000TL / 7000TL / 8000TL

High yield performance for a variety of combinations

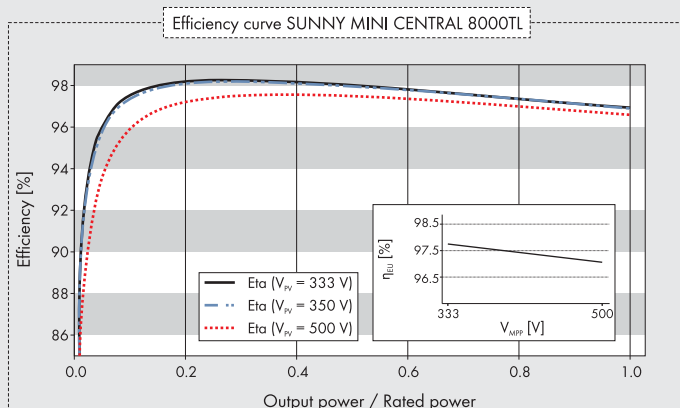
The transformerless SMA Sunny Mini Central 6000TL, 7000TL and 8000TL solar inverters provide their owners with industry leading yields. This family of inverters features maximum efficiency and excellent MPP tracking and is perfect for PV systems from 18 kW up to the megawatt range. The finely graduated performance classes are ideal for precise system configuration. The flexibility it provides during layout and a favorable price-performance ratio makes the Sunny Mini Central the ideal inverter for mid-sized to large solar power projects.



Tiber Targhe, Città di Castello, Italy

SUNNY MINI CENTRAL 6000TL / 7000TL / 8000TL

Technical Data	Sunny Mini Central 6000TL	Sunny Mini Central 7000TL
Input (DC)		
Max. DC power (@ cos $\varphi=1$)	6200 W	7200 W
Max. input voltage	700 V	700 V
MPP voltage range / rated input voltage	333 V - 500 V / 350 V	333 V - 500 V / 350 V
Min. input voltage / initial input voltage	330 V / 400 V	330 V / 400 V
Max. input current	19 A	22 A
Max. input current per string	19 A	22 A
Number of independent MPP inputs / strings per MPP input	1 / 4	1 / 4
Output (AC)		
Rated output power (@230 V, 50 Hz)	6000 W	7000 W
Max. apparent AC power	6000 VA	7000 VA
Nominal AC voltage / range	220 V, 230 V, 240 V / 180 V - 265 V	220 V, 230 V, 240 V / 180 V - 265 V
AC power frequency / range	50 Hz, 60 Hz / -6 Hz ... +5 Hz	50 Hz, 60 Hz / -6 Hz ... +5 Hz
Rated power frequency / rated power voltage	50 Hz / 230 V	50 Hz / 230 V
Max. output current	27 A	31 A
Power factor at rated output power	1	1
Adjustable displacement factor	—	—
Feed-in phases / connection phases	1 / 1	1 / 1
Power balancing	●	●
Efficiency		
Max. efficiency / European efficiency	98 % / 97.7 %	98 % / 97.7 %
Protection		
Reverse current protection / input-side disconnection device	— / ●	— / ●
Ground fault monitoring / grid monitoring	● / ●	● / ●
DC reverse-polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / —	● / ● / —
All-pole sensitive residual current monitoring unit	●	●
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	I / III
General Data		
Dimensions (W / H / D)	468 / 613 / 242 mm (18.4 / 24.1 / 9.5 in)	468 / 613 / 242 mm (18.4 / 24.1 / 9.5 in)
Weight	31 kg / 68.34 lb	32 kg / 70.55 lb
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	-25 °C ... +60 °C / -13 °F ... +140 °F
Noise emission (typical)	31 dB(A)	33 dB(A)
Self-consumption (night)	0.25 W	0.25 W
Topology	Transformerless	Transformerless
Cooling concept	OptiCool	OptiCool
Degree of protection (according to IEC 60529)	IP65	IP65
Degree of protection of connection area (according to IEC 60529)	IP65	IP65
Climatic category (according to IEC 60721-3-4)	4K4H	4K4H
Maximum permissible value for relative humidity (non-condensing)	100 %	100 %
Features		
DC terminal	SUNCLIX	SUNCLIX
AC terminal	Screw terminal	Screw terminal
Display	Text line	Text line
Interface: RS485 / Bluetooth	○ / ○	○ / ○
Warranty: 5 / 10 / 15 / 20 / 25 years	● / ○ / ○ / ○ / ○	● / ○ / ○ / ○ / ○
Certificates and approvals (more available on request)	CE, VDE0126-1-1, DK 5940 ED2.2*, RD 1663/2000, RD 661/2007, PPC, AS4777, EN 50438*, C10/11, PPDS, IEC 61727, UTE C15-712-1	
Type designation	SMC 6000TL	SMC 7000TL



Accessories



RS485 interface
485PB-SMC-NR



Bluetooth Piggy-Back
BTPBINV-NR



SMA Power Balancer Set
Plug-in system
PBL-SBUS-10-NR

* Does not apply to all national deviations of EN 50438

** Only applies to IT option

● Standard features ○ Optional features – Not available
Data at nominal conditions

Technical Data	Sunny Mini Central 8000TL	
Input (DC)		
Max. DC power (@ $\cos \varphi=1$)	8250 W	
Max. input voltage	700 V	
MPP voltage range / rated input voltage	333 V – 500 V / 350 V	
Min. input voltage / initial input voltage	330 V / 400 V	
Max. input current	25 A	
Max. input current per string	25 A	
Number of independent MPP inputs / strings per MPP input	1 / 4	
Output (AC)		
Rated output power (@230 V, 50 Hz)	8000 W	
Max. apparent AC power	8000 VA	
Nominal AC voltage / range	220 V, 230 V, 240 V / 180 V – 265 V	
AC power frequency / range	50 Hz, 60 Hz / -6 Hz ... +5 Hz	
Rated power frequency / rated power voltage	50 Hz / 230 V	
Max. output current	35 A	
Power factor at rated output power	1	
Adjustable displacement factor	–	
Feed-in phases / connection phases	1 / 1	
Power balancing	●	
Efficiency		
Max. efficiency / European efficiency	98 % / 97.7 %	
Protection		
Reverse current protection / input-side disconnection device	– / ●	
Ground fault monitoring / grid monitoring	● / ●	
DC reverse-polarity protection / AC short-circuit current capability / galvanically isolated	Short-circuit diode / ● / –	
All-pole sensitive residual current monitoring unit	–	
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	
General Data		
Dimensions (W / H / D)	468 / 613 / 242 mm (18.4 / 24.1 / 9.5 in)	
Weight	33 kg / 72.75 lb	
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	
Noise emission (typical)	40 dB(A)	
Self-consumption (night)	0.25 W	
Topology	Transformerless	
Cooling concept	OptiCool	
Degree of protection (according to IEC 60529)	IP65	
Degree of protection of connection area (according to IEC 60529)	IP65	
Climatic category (according to IEC 60721-3-4)	4K4H	
Maximum permissible value for relative humidity (non-condensing)	100 %	
Features		
DC terminal	SUNCLIX	
AC terminal	Screw terminal	
Display	Text line	
Interface: RS485 / Bluetooth	○ / ○	
Warranty: 5 / 10 / 15 / 20 / 25 years	● / ○ / ○ / ○ / ○	
Certificates and approvals (more available on request)	CE, VDE0126-1-1, DK 5940 ED2.2**, RD 1663/2000, RD 661/2007, PPC, AS4777, EN 50438*, C10/11, PPDS, IEC 61727, UTE C15-712-1	
Type designation	SMC 8000TL	



Efficient

- Maximum efficiency of 97%
- Cost savings from reduced parallel strings
- Shade management with OptiTrac Global Peak MPPT

Flexible

- Maximum DC input voltage of 750 V
- Integrated grid management
- Multi-string technology

Simple

- Convection cooled
- Simplified wall mounting
- SUNCLIX DC plug-in system
- Quick connection without tools

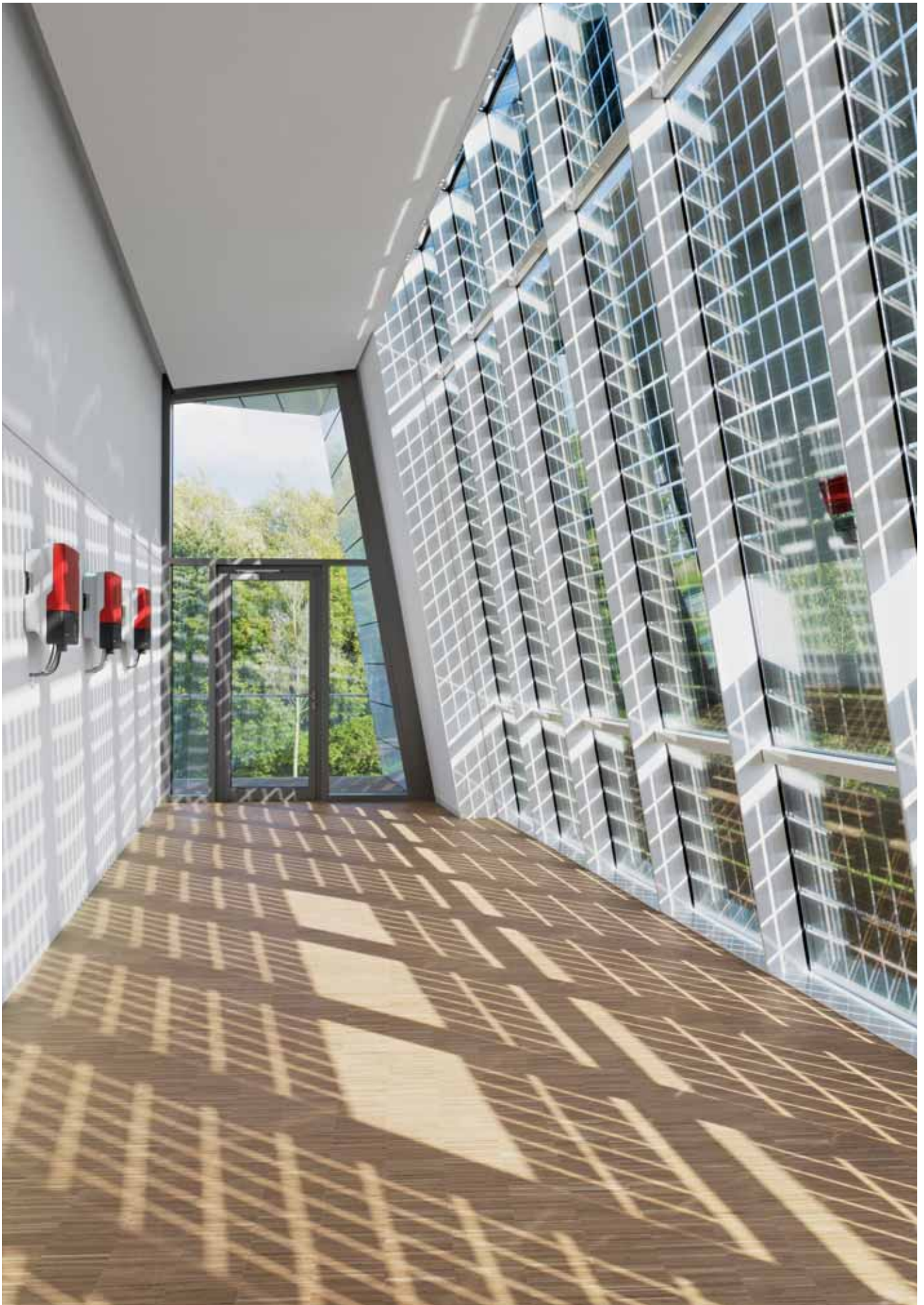
Informative

- Simple country configuration
- Integrated Bluetooth technology
- Multi-function relay included

SUNNY BOY 3000TL / 4000TL / 5000TL with Reactive Power Control

Exceptionally versatile with integrated grid management functions

The new transformerless Sunny Boy 3000TL, 4000TL and 5000TL are the ideal solution for difficult PV arrays. As multi-string devices, they offer the perfect solution for mitigating partial shading and allow for maximum design and installation flexibility. The high DC voltage input of 750 V results in cost savings, since fewer parallel strings are needed. A new, simplified wall mounting system speeds installation, while integrated grid management functions, which support grid stability, also make the device suitable for a variety of applications.



Niestetal, Germany

SUNNY BOY 3000TL / 4000TL / 5000TL

with Reactive Power Control

Technical Data	Sunny Boy 3000TL	Sunny Boy 4000TL
Input (DC)		
Max. DC power (@ cos $\varphi=1$)	3200 W	4200 W
Max. input voltage	750 V	750 V
MPP voltage range / rated input voltage	175 V – 500 V / 400 V	175 V – 500 V / 400 V
Min. input voltage / initial input voltage	125 V / 150 V	125 V / 150 V
Max. input current input A / input B	15 A / 15 A	15 A / 15 A
Max. input current per string input A / input B	15 A / 15 A	15 A / 15 A
Number of independent MPP inputs / strings per MPP input	2 / A:2; B:2	2 / A:2; B:2
Output (AC)		
Rated output power (@ 230 V, 50 Hz)	3000 W	4000 W
Max. apparent AC power	3000 VA	4000 VA
Nominal AC voltage / range	220 V, 230 V, 240 V / 180 V – 280 V	220 V, 230 V, 240 V / 180 V – 280 V
AC power frequency / range	50 Hz, 60 Hz / -5 Hz ... +5 Hz	50 Hz, 60 Hz / -5 Hz ... +5 Hz
Rated power frequency / rated power voltage	50 Hz / 230 V	50 Hz / 230 V
Max. output current	16 A	22 A
Power factor at rated power	1	1
Adjustable displacement factor	0.8 leading ... 0.8 lagging	0.8 leading ... 0.8 lagging
Feed-in phases / connection phases	1 / 1	1 / 1
Efficiency		
Max. efficiency / European efficiency	97 % / 96.3 %	97 % / 96.4 %
Protection		
Input-side disconnection device	●	●
Ground-fault monitoring / grid monitoring	● / ●	● / ●
DC surge arrester Type II, can be integrated	–	–
DC reverse-polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / –	● / ● / –
All-pole sensitive residual current monitoring unit	●	●
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	I / III
General Data		
Dimensions (W / H / D)	490 / 519 / 185 mm (19.3 / 20.4 / 7.3 in)	490 / 519 / 185 mm (19.3 / 20.5 / 7.3 in)
Weight	26 kg / 57.3 lb	26 kg / 57.3 lb
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	-25 °C ... +60 °C / -13 °F ... +140 °F
Noise emission (typical)	25 dB(A)	25 dB(A)
Self-consumption (night)	1 W	1 W
Topology	Transformerless	Transformerless
Cooling concept	Convection	Convection
Degree of protection (according to IEC 60529)	IP65	IP65
Degree of protection of connection area (according to IEC 60529)	IP54	IP54
Climatic category (according to IEC 60721-3-4)	4K4H	4K4H
Maximum permissible value for relative humidity (non-condensing)	100 %	100 %
Features		
DC terminal	SUNCLIX	SUNCLIX
AC terminal	Spring-type terminal	Spring-type terminal
Display	Graphic	Graphic
Interface: RS485 / Bluetooth	○ / ●	○ / ●
Warranty: 5 / 10 / 15 / 20 / 25 years	● / ○ / ○ / ○ / ○	● / ○ / ○ / ○ / ○
Multi-function relay	●	●
Certificates and approvals (more available on request)	CE, VDE0126-1-1, Enel Guida, UTE C15-712-1, C10/11, G83/1-1, G59/2, RD 1663/2000, RD 661/2007, PPC, AS4777, EN 50438*, PPDS, VDE-AR-N 4105	
Type designation	SB 3000TL-21	SB 4000TL-21

Accessories



RS485 interface
DM-485CB-10

* Does not apply to all national deviations of EN 50438

*** 4600 VA with VDE-AR-N-4105

● Standard features ○ Optional features – Not available

Provisional data, as of March 2011

Data at nominal conditions

Technical Data	Sunny Boy 5000TL	
Input (DC)		
Max. DC power (@ $\cos \varphi=1$)	5300 W	
Max. input voltage	750 V	
MPP voltage range / rated input voltage	175 V – 500 V / 400 V	
Min. input voltage / initial input voltage	125 V / 150 V	
Max. input current input A / input B	15 A / 15 A	
Max. input current per string input A / input B	15 A / 15 A	
Number of independent MPP inputs / strings per MPP input	2 / A:2; B:2	
Output (AC)		
Rated output power (@ 230 V, 50 Hz)	4600 W	
Max. apparent AC power	5000 VA***	
Nominal AC voltage / range	220 V, 230 V, 240 V / 180 V – 280 V	
AC power frequency / range	50 Hz, 60 Hz / -5 Hz ... +5 Hz	
Rated power frequency / rated power voltage	50 Hz / 230 V	
Max. output current	22 A	
Power factor at rated power	1	
Adjustable displacement factor	0.8 leading ... 0.8 lagging	
Feed-in phases / connection phases	1 / 1	
Efficiency		
Max. efficiency / European efficiency	97 % / 96.5 %	
Protection		
Input-side disconnection device	●	
Ground-fault monitoring / grid monitoring	● / ●	
DC surge arrester Type II, can be integrated	–	
DC reverse-polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / –	
All-pole sensitive residual current monitoring unit	●	
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	
General Data		
Dimensions (W / H / D)	490 / 519 / 185 mm (19.3 / 20.5 / 7.3 in)	
Weight	26 kg / 57.3 lb	
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	
Noise emission (typical)	25 dB(A)	
Self-consumption (night)	1 W	
Topology	Transformerless	
Cooling concept	Convection	
Degree of protection (according to IEC 60529)	IP65	
Degree of protection of connection area (according to IEC 60529)	IP54	
Climatic category (according to IEC 60721-3-4)	4K4H	
Maximum permissible value for relative humidity (non-condensing)	100 %	
Features		
DC terminal	SUNCLIX	
AC terminal	Spring-type terminal	
Display	Graphic	
Interface: RS485 / Bluetooth	○ / ●	
Warranty: 5 / 10 / 15 / 20 / 25 years	● / ○ / ○ / ○ / ○	
Multi-function relay	●	
Certificates and approvals (more available on request)	CE, VDE0126-1-1, Enel Guida, UTE C15-712-1, C10/11, G83/1-1, G59/2, RD 1663 / 2000, RD 661/2007, VDE-AR-N 4105, PPC, AS4777, EN 50438*, PPDS	
Type designation	SB 5000TL-21	



High Yields

- Maximum efficiency of 97%
- Multi-String technology*
- Transformerless, with H5 topology
- Shade management with OptiTrac Global Peak

Safe

- Integrated ESS DC switch-disconnect

Simple

- Easily accessible connection area
- Cable connection without tools
- SUNCLIX® DC plug system

Informative

- Bluetooth® data transmission
- Multilingual graphic display
- Multi-function relay included

SUNNY BOY 3000TL / 4000TL / 5000TL

Unmatched performance

The SMA Sunny Boy has once again set a new standard in inverter technology. A modern graphic data display, viewable even after sunset, simplified installation and wireless communication via *Bluetooth* make the Sunny Boy 3000TL, 4000TL and 5000TL extremely user-friendly while still achieving optimal performance. A maximum efficiency of 97 percent and effective shade management due to SMA's new OptiTrac Global Peak MPP tracking ensures the inverters produce unprecedented yields. As transformerless, multi-string devices, the Sunny Boy 4000TL and 5000TL also provide a high degree of system design flexibility, making them the first choice for demanding projects.

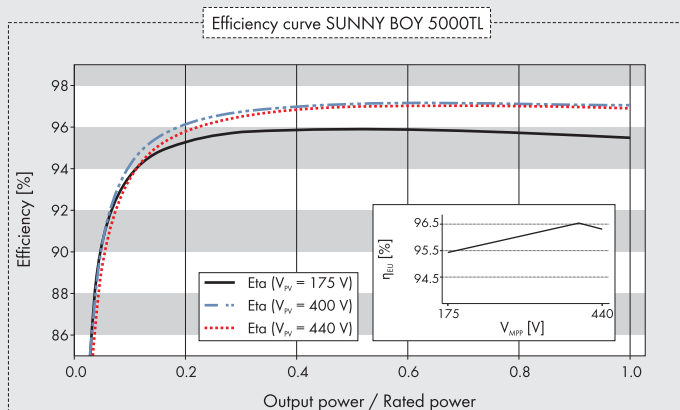
* except for Sunny Boy 3000TL



Eschborn, Germany

SUNNY BOY 3000TL / 4000TL / 5000TL

Technical Data	Sunny Boy 3000TL	Sunny Boy 4000TL
Input (DC)		
Max. DC power (@ cos φ=1)	3200 W	4200 W
Max. input voltage	550 V	550 V
MPP voltage range / rated input voltage	188 V - 440 V / 400 V	175 V - 440 V / 400 V
Min. input voltage / initial input voltage	125 V / 150 V	125 V / 150 V
Max. input current input A / input B	17 A / –	15 A / 15 A
Max. input current per string input A / input B	17 A / –	15 A / 15 A
Number of independent MPP inputs / strings per MPP input	1 / 2	2 / A:2; B:2
Output (AC)		
Rated output power (@ 230 V, 50 Hz)	3000 W	4000 W
Max. apparent AC power	3000 VA	4000 VA
Nominal AC voltage / range	220 V, 230 V, 240 V / 180 V - 280 V	220 V, 230 V, 240 V / 180 V - 280 V
AC power frequency / range	50 Hz, 60 Hz / -5 Hz ... +5 Hz	50 Hz, 60 Hz / -5 Hz ... +5 Hz
Rated power frequency / rated power voltage	50 Hz / 230 V	50 Hz / 230 V
Max. output current	16 A	22 A
Power factor at rated power	1	1
Adjustable displacement factor	–	–
Feed-in phases / connection phases	1 / 1	1 / 1
Efficiency		
Max. efficiency / European efficiency	97 % / 96.3 %	97 % / 96.4 %
Protection		
Input-side disconnection device	●	●
Ground-fault monitoring / grid monitoring	● / ●	● / ●
DC surge arrester Type II, can be integrated	–	–
DC reverse-polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / –	● / ● / –
All-pole sensitive residual current monitoring unit	●	●
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	I / III
General Data		
Dimensions (W / H / D)	470 / 445 / 180 mm (18.5 / 17.5 / 7.1 in)	470 / 445 / 180 mm (18.5 / 17.5 / 7.1 in)
Weight	22 kg / 48.5 lb	25 kg / 55.12 lb
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	-25 °C ... +60 °C / -13 °F ... +140 °F
Noise emission (typical)	25 dB(A)	29 dB(A)
Self-consumption (night)	0.5 W	0.5 W
Topology	Transformerless	Transformerless
Cooling concept	Convection	OptiCool
Degree of protection (according to IEC 60529)	IP65	IP65
Degree of protection of connection area (according to IEC 60529)	IP54	IP54
Climatic category (according to IEC 60721-3-4)	4K4H	4K4H
Maximum permissible value for relative humidity (non-condensing)	100 %	100 %
Features		
DC terminal	SUNCLIX	SUNCLIX
AC terminal	Spring-type terminal	Spring-type terminal
Display	Graphic	Graphic
Interface: RS485 / Bluetooth	○ / ●	○ / ●
Warranty: 5 / 10 / 15 / 20 / 25 years	● / ○ / ○ / ○ / ○	● / ○ / ○ / ○ / ○
Multi-function relay	●	●
Certificates and approvals (more available on request)	CE, VDE0126-1-1, DK 5940 ED2.2, G83/1-1, G59/2 RD 1663/2000, RD 661/2007, PPC, AS4777, EN 50438*, PPDS, KEMCO**, C10/11, UTE C15-712-1	
Type designation	SB 3000TL-20	SB 4000TL-20



Accessories



RS485 interface
DM-485CB-10

* Does not apply to all national deviations of EN 50438

** Only for SB 3000TL-20

● Standard features ○ Optional features – Not available
Data at nominal conditions

Technical Data	Sunny Boy 5000TL	
Input (DC)		
Max. DC power (@ $\cos \varphi=1$)	5300 W	
Max. input voltage	550 V	
MPP voltage range / rated input voltage	175 V – 440 V / 400 V	
Min. input voltage / initial input voltage	125 V / 150 V	
Max. input current input A / input B	15 A / 15 A	
Max. input current per string input A / input B	15 A / 15 A	
Number of independent MPP inputs / strings per MPP input	2 / A:2; B:2	
Output (AC)		
Rated output power (@ 230 V, 50 Hz)	4600 W	
Max. apparent AC power	5000 VA	
Nominal AC voltage / range	220 V, 230 V, 240 V / 180 V – 280 V	
AC power frequency / range	50 Hz, 60 Hz / -5 Hz ... +5 Hz	
Rated power frequency / rated power voltage	50 Hz / 230 V	
Max. output current	22 A	
Power factor at rated power	1	
Adjustable displacement factor	–	
Feed-in phases / connection phases	1 / 1	
Efficiency		
Max. efficiency / European efficiency	97 % / 96.5 %	
Protection		
Input-side disconnection device	●	
Ground-fault monitoring / grid monitoring	● / ●	
DC surge arrester Type II, can be integrated	–	
DC reverse-polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / –	
All-pole sensitive residual current monitoring unit	●	
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	
General Data		
Dimensions (W / H / D)	470 / 445 / 180 mm (18.5 / 17.5 / 7.1 in)	
Weight	25 kg / 55.12 lb	
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	
Noise emission (typical)	29 dB(A)	
Self-consumption (night)	0.5 W	
Topology	Transformerless	
Cooling concept	OptiCool	
Degree of protection (according to IEC 60529)	IP65	
Degree of protection of connection area (according to IEC 60529)	IP54	
Climatic category (according to IEC 60721-3-4)	4K4H	
Maximum permissible value for relative humidity (non-condensing)	100 %	
Features		
DC terminal	SUNCLIX	
AC terminal	Spring-type terminal	
Display	Graphic	
Interface: RS485 / Bluetooth	○ / ●	
Warranty: 5 / 10 / 15 / 20 / 25 years	● / ○ / ○ / ○ / ○	
Multi-function relay	●	
Certificates and approvals (more available on request)	CE, VDE0126-1-1, DK 5940 ED2.2, G83/1-1 G59/2, C10/11, UTE C15-712-1, RD 1663/2000, RD 661/2007, PPC, AS4777, EN 50438*, PPDS	
Type designation	SB 5000TL-20	



Efficient

- 96% maximum efficiency
- Transformerless

Safe

- Integrated ESS DC switch-disconnect

Reliable

- Time proven technology
- Maintenance free, thanks to convection cooling

Simple

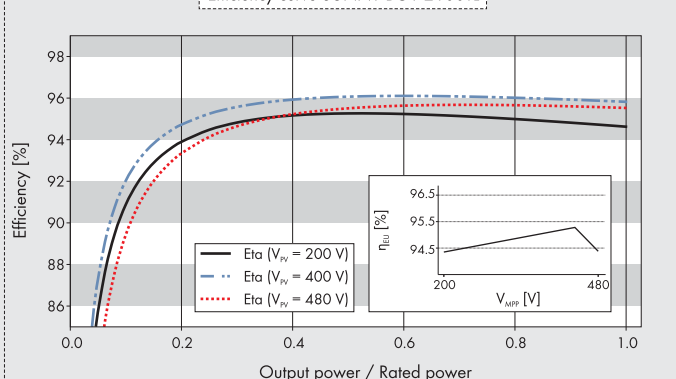
- SUNCLIX® DC plug system

SUNNY BOY 1600TL / 2100TL

Small inverters with big results

Combining broad input voltage and current ranges, the transformerless Sunny Boy 2100TL HC can be connected to nearly all standard crystalline PV modules. The proven and reliable Sunny Boy 1600TL is the starter model among the transformerless inverters; nevertheless, its efficiency is top-notch. Its low weight and robust enclosure allow simple installation, both indoors and outdoors. The Sunny Boy 1600TL is the ideal inverter for small PV plants.

Efficiency curve SUNNY BOY 2100TL



Accessories

RS485 interface
485PB-NRBluetooth Piggy-Back
BTPBINV-NR

* Does not apply to all national annexes to EN 50438

● Standard features ○ Optional features — Not available

For SUNNY BOY 1600TL:

Provisional data, as of March 2011

Data at nominal conditions

Technical Data	Sunny Boy 1600TL	Sunny Boy 2100TL
Input (DC)		
Max. DC power (@ $\cos \varphi = 1$)	1700 W	2200 W
Max. input voltage	600 V	600 V
MPP voltage range / rated input voltage	155 V - 480 V / 400 V	200 V - 480 V / 400 V
Min. input voltage / initial input voltage	125 V / 150 V	125 V / 150 V
Max. input current	11 A	11 A
Max. input current per string	11 A	11 A
Number of independent MPP inputs / strings per MPP input	1 / 1	1 / 2
Output (AC)		
Rated output power (@ 230 V, 50 Hz)	1600 W	1950 W
Max. apparent AC power	1600 VA	2100 VA
Nominal AC voltage / range	220 V, 230 V, 240 V / 180 V - 260 V	220 V, 230 V, 240 V / 180 V - 260 V
AC power frequency / range	50 Hz / -4.5 Hz ... +2.5 Hz	50 Hz / -4.5 Hz ... +2.5 Hz
Rated power frequency / rated power voltage	50 Hz / 230 V	50 Hz / 230 V
Max. output current	11 A	11 A
Power factor at rated power	1	1
Adjustable displacement factor	—	—
Feed-in phases / connection phases	1 / 1	1 / 1
Efficiency		
Max. efficiency / European efficiency	96 % / 95 %	96 % / 95.2 %
Protection		
Input-side disconnection device	○	○
Ground-fault monitoring / grid monitoring	● / ●	● / ●
DC surge arrester Type II, can be integrated	—	—
DC reverse-polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / —	● / ● / —
All-pole sensitive residual current monitoring unit	●	●
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	I / III
General Data		
Dimensions (W / H / D)	440 / 339 / 214 mm (17.3 / 13.4 / 8.4 in)	440 / 339 / 214 mm (17.3 / 13.4 / 8.4 in)
Weight	16 kg / 35.3 lb	16 kg / 35.3 lb
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	-25 °C ... +60 °C / -13 °F ... +140 °F
Noise emission (typical)	33 dB(A)	33 dB(A)
Self-consumption (night)	0.1 W	0.1 W
Topology	Transformerless	Transformerless
Cooling concept	Convection	Convection
Degree of protection (according to IEC 60529)	IP65	IP65
Degree of protection of connection area (according to IEC 60529)	IP65	IP65
Climatic category (according to IEC 60721-3-4)	4K4H	4K4H
Maximum permissible value for relative humidity (non-condensing)	100 %	100 %
Features		
DC terminal	SUNCLIX	SUNCLIX
AC terminal	Connector	Connector
Display	Text line	Text line
Interface: RS485 / Bluetooth	○ / ○	○ / ○
Warranty: 5 / 10 / 15 / 20 / 25 years	● / ○ / ○ / ○ / ○	● / ○ / ○ / ○ / ○
Multi-function relay	—	—
Certificates and approvals (more available on request)	CE, VDE0126-1-1, AS4777, EN 50438*, PPDS, UTE C15-712-1, C10/11	
Type designation	SB 1600TL-10	SB 2100TL



Efficient

- Maximum efficiency of 98.3%
- Transformerless, with H5 topology

High Yields

- Superior yield with OptiTrac MPP tracking
- OptiCool™ active temperature management

Safe

- SMA Power Balancer for three-phase grid connection
- Integrated DC load disconnect and combiner box
- UL 1741/IEEE-1547 compliant

SUNNY BOY 8000TL-US / 9000TL-US / 10000TL-US

Transformerless design, maximum yields

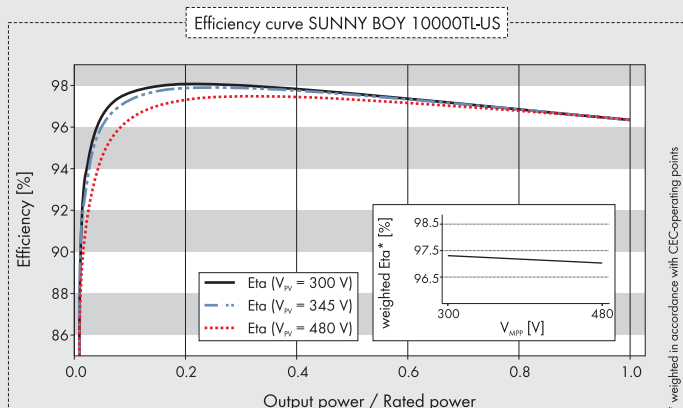
The Sunny Boy TL-US series is UL-listed for North America and features SMA's innovative H5 topology, resulting in superior efficiencies of up to 98 percent and unmatched solar yields. The transformerless design reduces weight, increases the speed of payback and provides optimum value for any decentralized, commercial PV system. The Sunny Boy TL-US series for North America is the ideal choice for mid-size and large plants from 24 kWp up to the megawatt range.



Napa Valley, USA

SUNNY BOY 8000TL-US / 9000TL-US / 10000TL-US

Technical Data	Sunny Boy 8000TL-US	Sunny Boy 9000TL-US
Input (DC)		
Recommended max. PV power (@ module STC)	10000 W	11250 W
Max. DC power (@ cos φ=1)	8300 W	9300 W
Max. input voltage	600 V	600 V
MPP voltage range / rated input voltage	300 V – 480 V / 345 V	300 V – 480 V / 345 V
Min. input voltage / initial input voltage	300 V / 360 V	300 V / 360 V
Max. input current	28 A	31 A
Max. input current per string	28 A	31 A
Number of independent MPP inputs / strings per MPP input @ Combiner Box	1 / 6	1 / 6
Output (AC)		
Rated output power / max. apparent AC power	8000 W / 8000 VA	9000 W / 9000 VA
Nominal AC voltage / nominal AC voltage range	208 V / 183 V – 229 V	208 V / 183 V – 229 V
Rated power frequency / rated power	60 Hz / 59.3 Hz ... 60.5 Hz	60 Hz / 59.3 Hz ... 60.58 Hz
AC power frequency / range	40 A	44 A
Max. output current	208 V / 60 Hz	208 V / 60 Hz
Power factor at rated output power	1	1
Feed-in phases / connection phases	1 / 2	1 / 2
Efficiency		
CEC efficiency / max. efficiency	98 % / 98.3 %	98 % / 98.3 %
Protection		
DC reverse-polarity protection	●	●
AC short-circuit current capability	●	●
Galvanically isolated	—	—
All-pole sensitive residual current monitoring unit	●	●
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	I / III
General Data		
Dimensions (W / H / D)	470 / 615 / 240 mm (18.4 / 24.1 / 9.5 in)	470 / 615 / 240 mm (18.4 / 24.1 / 9.5 in)
Dimensions of DC Disconnect (W / H / D)	187 / 297 / 190 mm (7.28 / 11.7 / 7.5 in)	187 / 297 / 190 mm (7.28 / 11.7 / 7.5 in)
Weight	35 kg / 78 lb	35 kg / 78 lb
Weight of DC Disconnect	3.5 kg / 8 lb	3.5 kg / 8 lb
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	-25 °C ... +60 °C / -13 °F ... +140 °F
Noise emission (typical)	36 dB(A)	37 dB(A)
Self-consumption at night	0.25 W	0.25 W
Topology	Transformerless H5	Transformerless H5
Cooling concept	OptiCool	OptiCool
Degree of protection	NEMA 3R	NEMA 3R
Degree of protection of connection area	NEMA 3R	NEMA 3R
Climatic category (according to IEC 60721-3-4)	—	—
Maximum permissible value for relative humidity (non-condensing)	100 %	100 %
Features		
DC terminal	Screw terminal	Screw terminal
AC terminal	Screw terminal	Screw terminal
Display	Text line	Text line
Interface: RS485 / Bluetooth	○ / ○	○ / ○
Warranty: 10 / 15 / 20 years	● / ○ / ○	● / ○ / ○
Multi-function relay	—	—
Certificates and approvals (more available on request)	UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1	
Type designation	SB 8000TLUS-10	SB 9000TLUS-10



Accessories



Sunny Boy Combiner Box
SBCBT6-10



Bluetooth Piggy-Back
BTPBINV-NR



RS485 interface of type
485USPB-SMC-NR

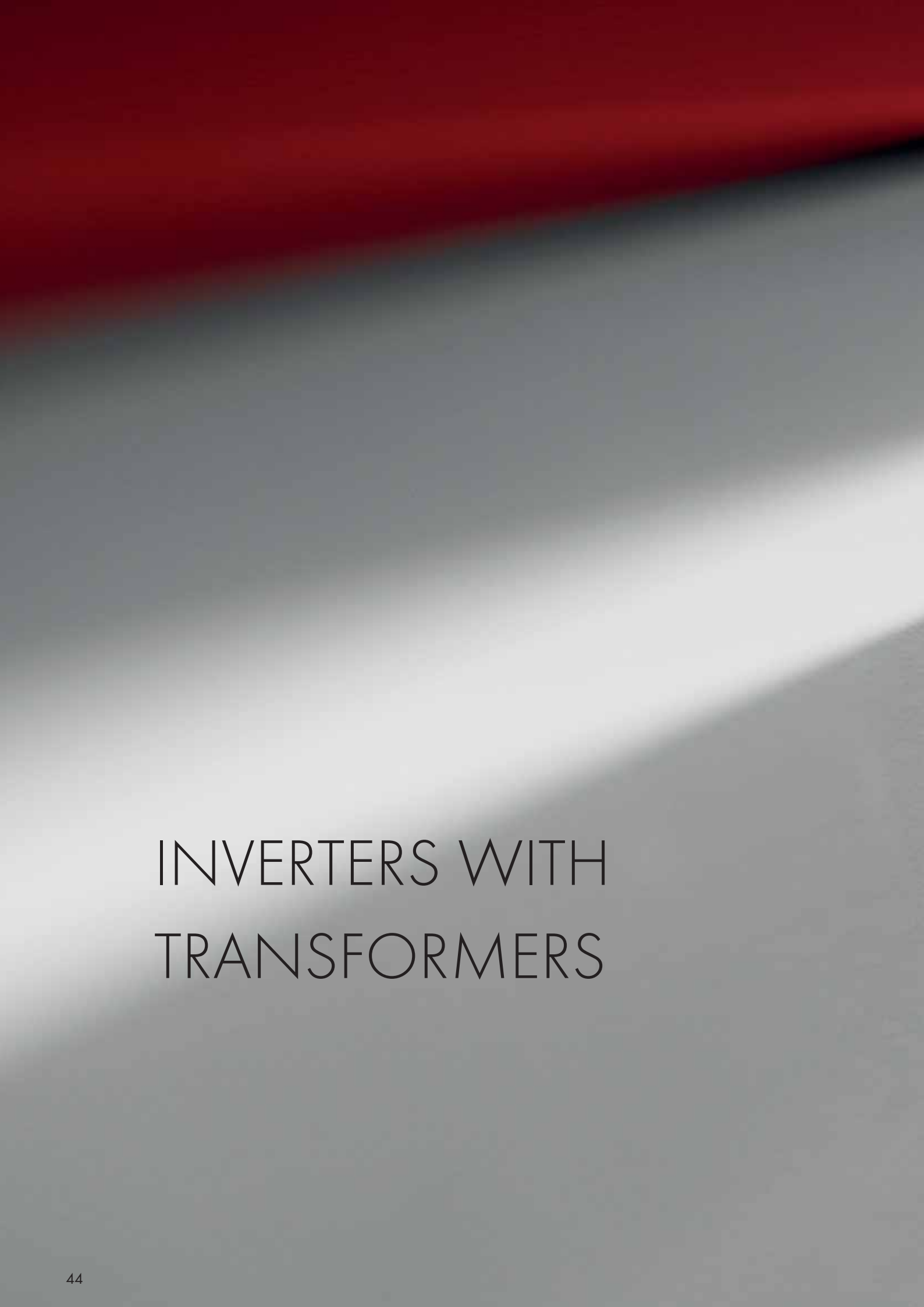


SMA Power Balancer Set
PBL-SBUS-10-NR

NOTE: US inverters ship with gray lids.

● Standard features ○ Optional features — Not available
Data at nominal conditions

Technical Data	Sunny Boy 10000TL-US	
Input (DC)		
Recommended max. PV power (@ module STC)	12500 W	
Max. DC power (@ $\cos \phi = 1$)	10350 W	
Max. input voltage	600 V	
MPP voltage range / rated input voltage	300 V – 480 V / 345 V	
Min. input voltage / initial input voltage	300 V / 360 V	
Max. input current	35 A	
Max. input current per string	35 A	
Number of independent MPP inputs / strings per MPP input @ Combiner Box	1 / 6	
Output (AC)		
Rated output power / max. apparent AC power	10000 W / 10000 VA	
Nominal AC voltage / nominal AC voltage range	208 V / 183 V – 229 V	
Rated power frequency / rated power	60 Hz / 59.3 Hz ... 60.5 Hz	
AC power frequency / range	48 A	
Max. output current	208 V / 60 Hz	
Power factor at rated output power	1	
Feed-in phases / connection phases	1 / 2	
Efficiency		
CEC efficiency / max. efficiency	97.5 % / 98.3 %	
Protection		
DC reverse-polarity protection	●	
AC short-circuit current capability	●	
Galvanically isolated	—	
All-pole sensitive residual current monitoring unit	●	
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	
General Data		
Dimensions (W / H / D)	470 / 615 / 240 mm (18.4 / 24.1 / 9.5 in)	
Dimensions of DC Disconnect (W / H / D)	187 / 297 / 190 mm (7.28 / 11.7 / 7.5 in)	
Weight	35 kg / 78 lb	
Weight of DC Disconnect	3.5 kg / 8 lb	
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	
Noise emission (typical)	37 dB(A)	
Self-consumption at night	0.25 W	
Topology	Transformerless H5	
Cooling concept	OptiCool	
Degree of protection	NEMA 3R	
Degree of protection of connection area	NEMA 3R	
Climatic category (according to IEC 60721-3-4)	—	
Maximum permissible value for relative humidity (non-condensing)	100 %	
Features		
DC terminal	Screw terminal	
AC terminal	Screw terminal	
Display	Text line	
Interface: RS485 / Bluetooth	○ / ○	
Warranty: 10 / 15 / 20 years	● / ○ / ○	
Multi-function relay	—	
Certificates and approvals (more available on request)	UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1	
Type designation	SB 10000TLUS-10	



INVERTERS WITH TRANSFORMERS





Efficient

- OptiCool™ active temperature management
- OptiTrac operation management for best tracking efficiency

Safe

- Galvanic isolation
- Integrated ESS DC switch-disconnect
- SMA Power Balancer for three-phase grid connection

Flexible

- Integrated reactive power capability and grid management functions
- Input voltage range of up to 800 V
- Suitable for array grounding*

Simple

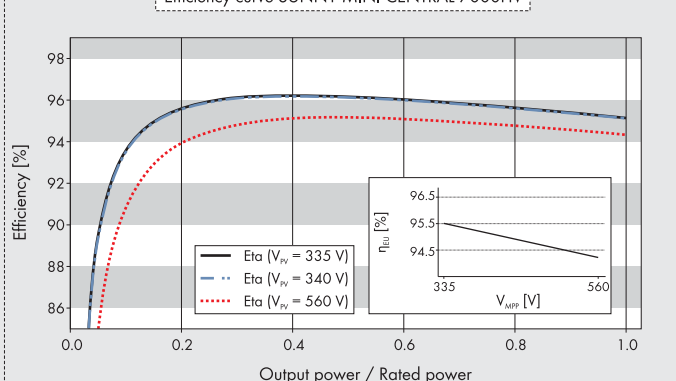
- SUNCLIX® DC plug system

SUNNY MINI CENTRAL 7000HV

The thin-film champion

Thanks to a greater input voltage range in the Sunny Mini Central 7000HV, more modules can be connected in series than with common inverters. This reduces cabling costs on the DC side and simplifies installation. Due to its galvanic isolation, the Sunny Mini Central 7000HV can be used both with crystalline cells and thin-film modules. Its performance range allows for the installation of large PV arrays using smaller string inverters, resulting in more detailed system monitoring. Its new reactive power and grid management functions mean it is also suitable for international use.

Efficiency curve SUNNY MINI CENTRAL 7000HV



Accessories

RS485 interface
485PB-SMC-NRBluetooth Piggy-Back
BTPBINV-NRSMA Power Balancer Set
Plug-in system
PBL-SMC-10-NRGrounding set "Positive"
ESHV-P-NRGrounding set "negative"
ESHV-N-NR

● Standard features

○ Optional features

— Not available

Data at nominal conditions

* Does not apply to all national annexes to EN 50438

Technical Data	Sunny Mini Central 7000HV	
Input (DC)		
Max. DC power (@ $\cos \varphi=1$)	7500 W	
Max. input voltage	800 V	
MPP voltage range / rated input voltage	335 V – 560 V / 340 V	
Min. input voltage / initial input voltage	290 V / 400 V	
Max. input current	23 A	
Max. input current per string	23 A	
Number of independent MPP inputs / strings per MPP input	1 / 4	
Output (AC)		
Rated output power (@230 V, 50 Hz)	6650 W	
Max. apparent AC power	7000 VA	
AC nominal voltage / range	220 V, 230 V, 240 V / 160 V – 265 V	
AC power frequency / range	50 Hz, 60 Hz / -6 Hz ... +5 Hz	
Rated power frequency / rated power voltage	50 Hz / 230 V	
Max. output current	31 A	
Power factor at rated output power	1	
Adjustable displacement factor	0.8 leading ... 0.8 lagging	
Feed-in phases / connection phases	1 / 1	
Power balancing	●	
Efficiency		
Max. efficiency / European efficiency	96.2 % / 95.5 %	
Protection devices		
Reverse current protection / input-side disconnection device	– / ●	
Ground fault monitoring / grid monitoring	● / ●	
DC reverse-polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / ●	
All-pole sensitive residual current monitoring unit	–	
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	
General data		
Dimensions (W / H / D)	468 / 613 / 242 mm (18.4 / 24.1 / 9.5 in)	
Weight	65 kg / 143.3 lb	
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	
Noise emission (typical)	41 dB(A)	
Internal consumption (night)	0.25 W	
Topology	LF transformer	
Cooling concept	OptiCool	
Degree of protection (according to IEC 60529)	IP65	
Degree of protection of connection area (according to IEC 60529)	IP65	
Climatic category (according to IEC 60721-3-4)	4K4H	
Maximum permissible value for relative humidity (non-condensing)	100 %	
Features		
DC terminal	SUNCLIX	
AC terminal	Screw terminal	
Display	Text line	
Interface: RS485 / Bluetooth	○ / ○	
Warranty: 5 / 10 / 15 / 20 / 25 years	● / ○ / ○ / ○ / ○	
Certificates and approvals (more available on request)	CE, VDE0126-1-1, DK 5940 ED2.2, G83/1-1, RD 1663/2000, RD 661/2007, PPC, AS4777, EN 50438*, PPDS, UTE C15-712-1, IEC 61727, C10 / 11	
Type designation	SMC 7000HV-11	



Powerful

- OptiCool™ active temperature management
- OptiTrac operation management for best tracking efficiency

Safe

- Galvanic isolation
- Integrated ESS DC switch-disconnect
- SMA Power Balancer for three-phase grid connection

Flexible

- Suitable for array grounding*

Simple

- SUNCLIX® DC plug system

SUNNY MINI CENTRAL 4600A / 5000A / 6000A

Proven technology for a multitude of applications

The Sunny Mini Central 4600A, 5000A and 6000A are designed for when galvanic isolation is required. This means they can be used around the world for many different types of projects, including those that use crystalline cells or thin-film modules. Thanks to their graduated performance classes, these inverters offer the highest degree of system design flexibility. The Sunny Mini Centrals 5000A and 6000A are ideal for three-phase configurations, while the Sunny Mini Central 4600A is designed for single-phase systems.

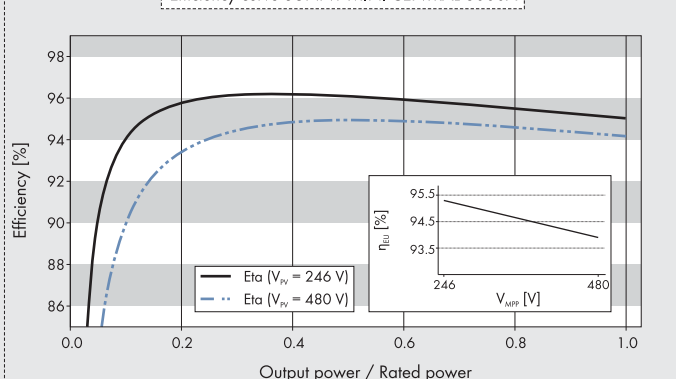


Trévoux, France

SUNNY MINI CENTRAL 4600A / 5000A / 6000A

Technical Data	Sunny Mini Central 4600A	Sunny Mini Central 5000A
Input (DC)		
Max. DC power (@ cos $\varphi=1$)	5250 W	5750 W
Max. input voltage	600 V	600 V
MPP voltage range / rated input voltage	246 V - 480 V / 246 V	246 V - 480 V / 246 V
Min. input voltage / initial input voltage	211 V / 300 V	211 V / 300 V
Max. input current	26 A	26 A
Max. input current per string	26 A	26 A
Number of independent MPP inputs / strings per MPP input	1 / 4	1 / 4
Output (AC)		
Rated output power (@230 V, 50 Hz)	4600 W	5000 W
Max. apparent AC power	5000 VA	5500 VA
AC nominal voltage / range	220 V, 230 V, 240 V / 160 V - 265 V	220 V, 230 V, 240 V / 160 V - 265 V
AC power frequency / range	50 Hz, 60 Hz / 6 Hz ... 5 Hz	50 Hz, 60 Hz / -6 Hz ... +5 Hz
Rated power frequency / rated power voltage	50 Hz / 230 V	50 Hz / 230 V
Max. output current	26 A	26 A
Power factor at rated output power	1	1
Adjustable displacement factor	—	—
Feed-in phases / connection phases	1 / 1	1 / 1
Power balancing	●	●
Efficiency		
Max. efficiency / European efficiency	96.1 % / 95.3 %	96.1 % / 95.3 %
Protection devices		
Reverse current protection / input-side disconnection device	— / ●	— / ●
Ground fault monitoring / grid monitoring	● / ●	● / ●
DC reverse-polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / ●	● / ● / ●
All-pole sensitive residual current monitoring unit	—	—
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	I / III
General data		
Dimensions (W / H / D)	468 / 613 / 242 mm (18.4 / 24.1 / 9.5 in)	468 / 613 / 242 mm (18.4 / 24.1 / 9.5 in)
Weight	62 kg / 136.69 lb	62 kg / 136.69 lb
Operating temperature range	-25 °C ... +60 °C / 13 °F ... 140 °F	-25 °C ... +60 °C / 13 °F ... 140 °F
Noise emission (typical)	42 dB(A)	42 dB(A)
Internal consumption (night)	0.25 W	0.25 W
Topology	LF transformer	LF transformer
Cooling concept	OptiCool	OptiCool
Degree of protection (according to IEC 60529)	IP65	IP65
Degree of protection of connection area (according to IEC 60529)	IP65	IP65
Climatic category (according to IEC 60721-3-4)	4K4H	4K4H
Maximum permissible value for relative humidity (non-condensing)	100 %	100 %
Features		
DC terminal	SUNCLIX	SUNCLIX
AC terminal	Screw terminal	Screw terminal
Display	Text line	Text line
Interface: RS485 / Bluetooth	○ / ○	○ / ○
Warranty: 5 / 10 / 15 / 20 / 25 years	● / ○ / ○ / ○ / ○	● / ○ / ○ / ○ / ○
Certificates and approvals (more available on request)	CE, VDE0126-1-1, DK 5940 ED2.2**, G83/1-1, RD 1663 / 2000, RD 661/2007, PPC, AS4777, EN 50438*, PPDS, UTE C15-712-1, C10/11, IEC 61727	
Type designation	SMC 4600A	SMC 5000A

Efficiency curve SUNNY MINI CENTRAL 6000A



Accessories

RS485 interface
485PB-SMC-NRBluetooth Piggy-Back
BTPBINV-NRSMA Power Balancer Set
Plug-in system
PBL-SMC-10-NRGrounding set "Positive"
ESHV-P-NRGrounding set "negative"
ESHV-N-NR

- Standard features
 - Optional features
 - Not available
- Data at nominal conditions

* Does not apply to all national deviations of EN 50438

** Only applies to IT option

Technical Data	Sunny Mini Central 6000A	
Input (DC)		
Max. DC power (@ $\cos \varphi = 1$)	6300 W	
Max. input voltage	600 V	
MPP voltage range / rated input voltage	246 V - 480 V / 246 V	
Min. input voltage / initial input voltage	211 V / 300 V	
Max. input current	26 A	
Max. input current per string	26 A	
Number of independent MPP inputs / strings per MPP input	1 / 4	
Output (AC)		
Rated output power (@230 V, 50 Hz)	6000 W	
Max. apparent AC power	6000 VA	
AC nominal voltage / range	220 V, 230 V, 240 V / 160 V - 265 V	
AC power frequency / range	50 Hz, 60 Hz / -6 Hz ... +5 Hz	
Rated power frequency / rated power voltage	50 Hz / 230 V	
Max. output current	26 A	
Power factor at rated output power	1	
Adjustable displacement factor	—	
Feed-in phases / connection phases	1 / 1	
Power balancing	●	
Efficiency		
Max. efficiency / European efficiency	96.1 % / 95.3 %	
Protection devices		
Reverse current protection / input-side disconnection device	— / ●	
Ground fault monitoring / grid monitoring	● / ●	
DC reverse-polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / ●	
All-pole sensitive residual current monitoring unit	—	
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	
General data		
Dimensions (W / H / D)	468 / 613 / 242 mm (18.4 / 24.1 / 9.5 in)	
Weight	63 kg / 138.89 lb	
Operating temperature range	-25 °C ... +60 °C / 13 °F ... 140 °F	
Noise emission (typical)	42 dB(A)	
Internal consumption (night)	0.25 W	
Topology	LF transformer	
Cooling concept	OptiCool	
Degree of protection (according to IEC 60529)	IP65	
Degree of protection of connection area (according to IEC 60529)	IP65	
Climatic category (according to IEC 60721-3-4)	4K4H	
Maximum permissible value for relative humidity (non-condensing)	100 %	
Features		
DC terminal	SUNCLIX	
AC terminal	Screw terminal	
Display	Text line	
Interface: RS485 / Bluetooth	○ / ○	
Warranty: 5 / 10 / 15 / 20 / 25 years	● / ○ / ○ / ○ / ○	
Certificates and approvals (more available on request)	CE, VDE0126-1-1, DK 5940 ED2.2**, G83/1-1, RD 1663/2000, RD 661/2007, PPC, AS4777, EN 50438*, UTE C15-712-1, C10/11, PPDS, IEC 61727	
Type designation	SMC 6000A	



Powerful

- Efficiency of up to 95.6%
- OptiCool™ active temperature management
- OptiTrac operation management for best tracking efficiency

Safe

- Galvanic isolation
- Integrated ESS DC switch-disconnect

Flexible

- For indoor and outdoor installation
- Suitable for array grounding*

Simple

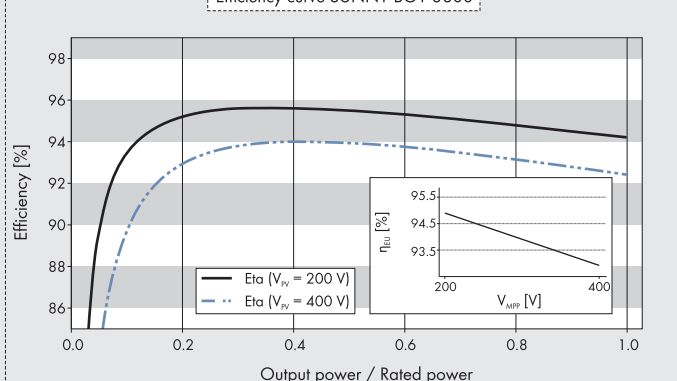
- SUNCLIX® DC plug system

SUNNY BOY 3300 / 3800

The generalist

It is robust, easy-to-handle and, thanks to its galvanic isolation, can be used in all kinds of AC grids. The Sunny Boy 3300/3800 can be used with all module types—crystalline or thin-film. Its die-cast aluminum enclosure, with the OptiCool active temperature management system, guarantees the highest yields possible and a long service life, even under extreme conditions.

Efficiency curve SUNNY BOY 3800



Accessories

RS485 interface
485PB-NRBluetooth Piggy-Back
BTPBINV-NRGrounding set "Positive"
ESHV-P-NRGrounding set "negative"
ESHV-N-NR

* Does not apply to all national deviations of EN 50438

** Only applies to IT option

● Standard features ○ Optional features – Not available
Data at nominal conditions

Technical Data	Sunny Boy 3300	Sunny Boy 3800
Input (DC)		
Max. DC power (@ $\cos \varphi = 1$)	3820 W	4040 W
Max. input voltage	500 V	500 V
MPP voltage range / rated input voltage	200 V – 400 V / 200 V	200 V – 400 V / 200 V
Min. input voltage / initial input voltage	200 V / 250 V	200 V / 250 V
Max. input current	20 A	20 A
Max. input current per string	16 A	16 A
Number of independent MPP inputs / strings per MPP input	1 / 3	1 / 3
Output (AC)		
Rated output power (@ 230 V, 50 Hz)	3300 W	3800 W
Max. apparent AC power	3600 VA	3800 VA
Nominal AC voltage / range	220 V, 230 V, 240 V / 180 V – 265 V	220 V, 230 V, 240 V / 180 V – 265 V
AC power frequency / range	50 Hz, 60 Hz / -4.5 Hz ... +4.5 Hz	50 Hz, 60 Hz / -4.5 Hz ... +4.5 Hz
Rated power frequency / rated power voltage	50 Hz / 230 V	50 Hz / 230 V
Max. output current	18 A	18 A
Power factor at rated power	1	1
Adjustable displacement factor	–	–
Feed-in phases / connection phases	1 / 1	1 / 1
Efficiency		
Max. efficiency / European efficiency	95.2 % / 94.4 %	95.6 % / 94.7 %
Protection devices		
Input-side disconnection device	●	●
Ground-fault monitoring / grid monitoring	● / ●	● / ●
DC surge arrester Type II, can be integrated	–	–
DC reverse-polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / ●	● / ● / ●
All-pole sensitive residual current monitoring unit	–	–
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	I / III
General data		
Dimensions (W / H / D)	450 / 352 / 236 mm (17.7 / 13.9 / 9.3 in)	450 / 352 / 236 mm (17.7 / 13.9 / 9.3 in)
Weight	38 kg / 83.6 lb	38 kg / 83.6 lb
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	-25 °C ... +60 °C / -13 °F ... +140 °F
Noise emission (typical)	40 dB(A)	42 dB(A)
Internal consumption (night)	0.1 W	0.1 W
Topology	LF transformer	LF transformer
Cooling concept	OptiCool	OptiCool
Degree of protection (according to IEC 60529)	IP65	IP65
Degree of protection of connection area (according to IEC 60529)	IP65	IP65
Climatic category (according to IEC 60721-3-4)	4K4H	4K4H
Maximum permissible value for relative humidity (non-condensing)	100 %	100 %
Features		
DC terminal	SUNCLIX	SUNCLIX
AC terminal	Connector	Connector
Display	Text line	Text line
Interface: RS485 / Bluetooth	○ / ○	○ / ○
Warranty: 5 / 10 / 15 / 20 / 25 years	● / ○ / ○ / ○ / ○	● / ○ / ○ / ○ / ○
Multi-function relay	–	–
Certificates and approvals (more available on request)	CE, VDE0126-1-1, DK 5940 ED2.2**, G83/1-1, CER/06/190, RD 1663/2000, RD 661/2007, PPC, AS4777, EN 50438*, PPDS, UTE C15-712-1, C10/11	
Type designation	SB 3300	SB 3800



High Yields

- Maximum efficiency 96.3%
- The best tracking efficiency with OptiTrac MPP tracking
- Shade management with OptiTrac Global Peak

Safe

- Galvanic isolation
- Integrated ESS DC switch-disconnect
- Theft protection

Simple

- Quick Module speeds and simplifies configuration
- SUNCLIX® DC plug system
- Suitable for array grounding*

Informative

- Large graphic display
- Bluetooth® data transmission

SUNNY BOY 2000HF / 2500HF / 3000HF

A high yield performer

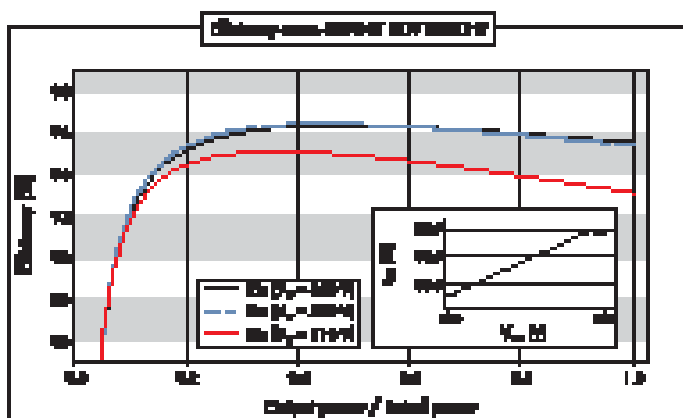
The Sunny Boy HF series is the new generation of galvanically isolated inverters from SMA. Packed full of innovative technology, it provides the highest yields from transformer-based inverters in this performance class. Installation is now easier than ever thanks to the DC connector system SUNCLIX®, optional plug-in array grounding, and an easily accessible configuration area—all in a reduced weight unit. The wide input voltage range of 175 to 700 V gives you extraordinary system design flexibility, and the modern graphic display and wireless Bluetooth communication system make the inverters very user-friendly.



Vieste, Italy

SUNNY BOY 2000HF / 2500HF / 3000HF

Technical Data	Sunny Boy 2000HF	Sunny Boy 2500HF
Input (DC)		
Max. DC power (@ cos $\varphi=1$)	2100 W	2600 W
Max. input voltage	700 V	700 V
MPP voltage range / rated input voltage	175 V - 560 V / 530 V	175 V - 560 V / 530 V
Min. input voltage / initial input voltage	175 V / 220 V	175 V / 220 V
Max. input current	12 A	15 A
Max. input current per string	12 A	15 A
Number of independent MPP inputs / strings per MPP input	1 / 2	1 / 2
Output (AC)		
Rated output power (@ 230 V, 50 Hz)	2000 W	2500 W
Max. apparent AC power	2000 VA	2500 VA
Nominal AC voltage / range	220 V, 230 V, 240 V / 180 V - 280 V	220 V, 230 V, 240 V / 180 V - 280 V
AC power frequency / range	50 Hz, 60 Hz / -4.5 Hz ... +4.5 Hz	50 Hz, 60 Hz / -4.5 Hz ... +4.5 Hz
Rated power frequency / rated power voltage	50 Hz / 230 V	50 Hz / 230 V
Max. output current	11.4 A	14.2 A
Power factor at rated power	1	1
Adjustable displacement factor	—	—
Feed-in phases / connection phases	1 / 1	1 / 1
Efficiency		
Max. efficiency / European efficiency	96.3 % / 95 %	96.3 % / 95.3 %
Protection devices		
Input-side disconnection device	●	●
Ground-fault monitoring / grid monitoring	● / ●	● / ●
DC surge arrester Type II, can be integrated	—	—
DC reverse-polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / ●	● / ● / ●
All-pole sensitive residual current monitoring unit	—	—
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	I / III
General data		
Dimensions (W / H / D)	348 / 580 / 145 mm (13.7 / 22.8 / 5.7 in)	348 / 580 / 145 mm (13.7 / 22.8 / 5.7 in)
Weight	17 kg / 37.4 lb	17 kg / 37.4 lb
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	-25 °C ... +60 °C / -13 °F ... +140 °F
Noise emission (typical)	38 dB(A)	38 dB(A)
Internal consumption (night)	1 W	1 W
Topology	HF transformer	HF transformer
Cooling concept	OptiCool	OptiCool
Degree of protection (according to IEC 60529)	IP65	IP65
Degree of protection of connection area (according to IEC 60529)	IP54	IP54
Climatic category (according to IEC 60721-3-4)	4K4H	4K4H
Maximum permissible value for relative humidity (non-condensing)	100 %	100 %
Features		
DC terminal	SUNCLIX	SUNCLIX
AC terminal	Connector	Connector
Display	Graphic	Graphic
Interface: RS485 / Bluetooth	○ / ●	○ / ●
Warranty: 5 / 10 / 15 / 20 / 25 years	● / ○ / ○ / ○ / ○	● / ○ / ○ / ○ / ○
Multi-function relay	○	○
Certificates and approvals (more available on request)	CE, VDE0126-1-1, G83/1-1, RD 1663/2000, RD 661/2007, PPC, AS4777, EN 50438*, PPDS, IEC 61727, ENEL-Guida, UTE C15-712-1, C10/11	
Type designation	SB 2000HF-30	SB 2500HF-30



Accessories



SMA Plug-in Grounding
PLUG-IN-GRD-10-NR*



Quick Module RS485 +
multi-function relay
485QM-10-NR

* Does not apply to all national deviations of EN 50438

** Only applies to V option

● Standard features ○ Optional features – Not available
Data at nominal conditions

Technical Data	Sunny Boy 3000HF	
Input (DC)		
Max. DC power (@ cos φ=1)	3150 W	
Max. input voltage	700 V	
MPP voltage range / rated input voltage	210 V – 560 V / 530 V	
Min. input voltage / initial input voltage	175 V / 220 V	
Max. input current	15 A	
Max. input current per string	15 A	
Number of independent MPP inputs / strings per MPP input	1 / 2	
Output (AC)		
Rated output power (@ 230 V, 50 Hz)	3000 W	
Max. apparent AC power	3000 VA	
Nominal AC voltage / range	220 V, 230 V, 240 V / 180 V – 280 V	
AC power frequency / range	50 Hz, 60 Hz / -4.5 Hz ... +4.5 Hz	
Rated power frequency / rated power voltage	50 Hz / 230 V	
Max. output current	15 A	
Power factor at rated power	1	
Adjustable displacement factor	–	
Feed-in phases / connection phases	1 / 1	
Efficiency		
Max. efficiency / European efficiency	96.3 % / 95.4 %	
Protection devices		
Input-side disconnection device	●	
Ground-fault monitoring / grid monitoring	● / ●	
DC surge arrester Type II, can be integrated	–	
DC reverse-polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / ●	
All-pole sensitive residual current monitoring unit	–	
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	
General data		
Dimensions (W / H / D)	348 / 580 / 145 mm (13.7 / 22.8 / 5.7 in)	
Weight	17 kg / 37.4 lb	
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	
Noise emission (typical)	38 dB(A)	
Internal consumption (night)	1 W	
Topology	HF transformer	
Cooling concept	OptiCool	
Degree of protection (according to IEC 60529)	IP65	
Degree of protection of connection area (according to IEC 60529)	IP54	
Climatic category (according to IEC 60721-3-4)	4K4H	
Maximum permissible value for relative humidity (non-condensing)	100 %	
Features		
DC terminal	SUNCLIX	
AC terminal	Connector	
Display	Graphic	
Interface: RS485 / Bluetooth	○ / ●	
Warranty: 5 / 10 / 15 / 20 / 25 years	● / ○ / ○ / ○ / ○	
Multi-function relay	○	
Certificates and approvals (more available on request)	CE, VDE0126-1-1, G83/1-1, RD 1663/2000, RD 661/2007, PPC, AS4777, EN 50438*, PPDS, IEC 61727, ENEL-Guida, UTE C15-712-1, KEMCO**, C10/11	
Type designation	SB 3000HF-30	



Safe

- Integrated ESS DC switch-disconnect
- Galvanic isolation

All Purpose

- For indoor and outdoor installation
- Suitable for array grounding*

Reliable

- Field-proven technology
- Maintenance free, thanks to convection cooling

Simple

- SUNCLIX® DC plug system

SUNNY BOY 1200 / 1700 / 2500 / 3000

Proven technology for secure investments

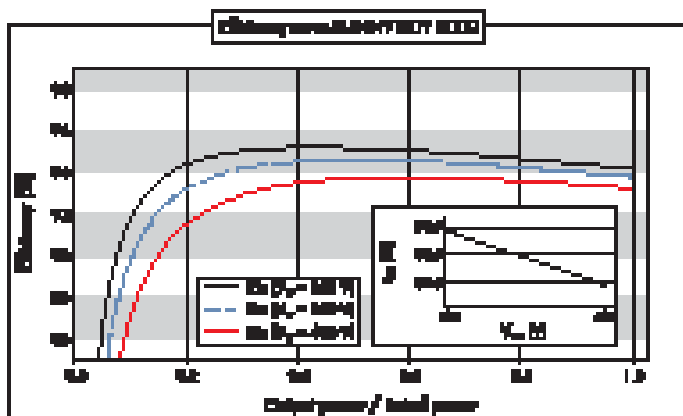
The Sunny Boy 1200, 1700, 2500 and 3000 feature galvanic isolation, allowing them to be used in the most diverse AC grids. The devices are also suitable for simple array grounding. Their integrated ESS DC switch disconnect makes installation easier while also reducing assembly costs. Equipped with OptiTrac MPP tracking, the Sunny Boy will always find the ideal operating point, even under dynamic weather conditions, reliably converting solar energy into solar yield.



Lyon, France

SUNNY BOY 1200 / 1700 / 2500 / 3000

Technical Data	Sunny Boy 1200	Sunny Boy 1700
Input (DC)		
Max. DC power (@ cos φ=1)	1320 W	1850 W
Max. input voltage	400 V	400 V
MPP voltage range / rated input voltage	100 V - 320 V / 120 V	147 V - 320 V / 180 V
Min. input voltage / initial input voltage	100 V / 120 V	139 V / 180 V
Max. input current	12.6 A	12.6 A
Max. input current per string	12.6 A	12.6 A
Number of independent MPP inputs / strings per MPP input	1 / 2	1 / 2
Output (AC)		
Rated output power (@ 230 V, 50 Hz)	1200 W	1550 W
Max. apparent AC power	1200 VA	1700 VA
Nominal AC voltage / range	220 V, 230 V, 240 V / 180 V - 265 V	220 V, 230 V, 240 V / 180 V - 265 V
AC power frequency / range	50 Hz, 60 Hz / -4.5 Hz ... +4.5 Hz	50 Hz, 60 Hz / -4.5 Hz ... +4.5 Hz
Rated power frequency / rated power voltage	50 Hz / 230 V	50 Hz / 230 V
Max. output current	6.1 A	8.6 A
Power factor at rated power	1	1
Adjustable displacement factor	—	—
Feed-in phases / connection phases	1 / 1	1 / 1
Efficiency		
Max. efficiency / European efficiency	92.1 % / 90.9 %	93.5 % / 91.8 %
Protection devices		
Input-side disconnection device	●	●
Ground-fault monitoring / grid monitoring	● / ●	● / ●
DC surge arrester Type II, can be integrated	—	—
DC reverse-polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / ●	● / ● / ●
All-pole sensitive residual current monitoring unit	—	—
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	I / III
General data		
Dimensions (W / H / D)	440 / 339 / 214 mm (17.3 / 13.3 / 8.4 in)	440 / 339 / 214 mm (17.3 / 13.3 / 8.4 in)
Weight	23 kg / 50.6 lb	25 kg / 55 lb
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	-25 °C ... +60 °C / -13 °F ... +140 °F
Noise emission (typical)	41 dB(A)	46 dB(A)
Internal consumption (night)	0.1 W	0.1 W
Topology	LF transformer	LF transformer
Cooling concept	convection	convection
Degree of protection (according to IEC 60529)	IP65	IP65
Degree of protection of connection area (according to IEC 60529)	IP65	IP65
Climatic category (according to IEC 60721-3-4)	4K4H	4K4H
Maximum permissible value for relative humidity (non-condensing)	100 %	100 %
Features		
DC terminal	SUNCLIX	SUNCLIX
AC terminal	Connector	Connector
Display	Text line	Text line
Interface: RS485 / Bluetooth	○ / ○	○ / ○
Warranty: 5 / 10 / 15 / 20 / 25 years	● / ○ / ○ / ○ / ○	● / ○ / ○ / ○ / ○
Multi-function relay	—	—
Certificates and approvals (more available on request)	CE, VDE0126-1-1, DK 5940 ED2.2, G83/1-1, RD 1663/2000, RD 661/2007, PPC, AS4777, EN 50438*, PPDS, IEC 61727, UTE C15-712-1, C10/11	
Type designation	SB 1200	SB 1700



Accessories



RS485 interface
485PB-NR



Bluetooth Piggy-Back
BTPBINV-NR



Grounding set "Positive"
ESHV-P-NR



Grounding set "negative"
ESHV-N-NR

* Does not apply to all national deviations of EN 50438

** Only applies to IT option

● Standard features ○ Optional features – Not available
Data at nominal conditions

Technical Data	Sunny Boy 2500	Sunny Boy 3000
Input (DC)		
Max. DC power (@ cos φ=1)	2700 W	3200 W
Max. input voltage	600 V	600 V
MPP voltage range / rated input voltage	224 V - 480 V / 300 V	268 V - 480 V / 350 V
Min. input voltage / initial input voltage	224 V / 300 V	268 V / 330 V
Max. input current	12 A	12 A
Max. input current per string	12 A	12 A
Number of independent MPP inputs / strings per MPP input	1 / 3	1 / 3
Output (AC)		
Rated output power (@ 230 V, 50 Hz)	2300 W	2750 W
Max. apparent AC power	2500 VA	3000 VA
Nominal AC voltage / range	220 V, 230 V, 240 V / 180 V - 265 V	220 V, 230 V, 240 V / 180 V - 265 V
AC power frequency / range	50 Hz, 60 Hz / -4.5 Hz ... +4.5 Hz	50 Hz, 60 Hz / -4.5 Hz ... +4.5 Hz
Rated power frequency / rated power voltage	50 Hz / 230 V	50 Hz / 230 V
Max. output current	12.5 A	15 A
Power factor at rated power	1	1
Adjustable displacement factor	—	—
Feed-in phases / connection phases	1 / 1	1 / 1
Efficiency		
Max. efficiency / European efficiency	94.1 % / 93.2 %	95 % / 93.6 %
Protection devices		
Input-side disconnection device	●	●
Ground-fault monitoring / grid monitoring	● / ●	● / ●
DC surge arrester Type II, can be integrated	—	—
DC reverse-polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / ●	● / ● / ●
All-pole sensitive residual current monitoring unit	—	—
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	I / III
General data		
Dimensions (W / H / D)	440 / 339 / 214 mm (17.3 / 13.3 / 8.4 in)	440 / 339 / 214 mm (17.3 / 13.3 / 8.4 in)
Weight	28 kg / 61.7 lb	32 kg / 70.4 lb
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	-25 °C ... +60 °C / -13 °F ... +140 °F
Noise emission (typical)	33 dB(A)	30 dB(A)
Internal consumption (night)	0.25 W	0.25 W
Topology	LF transformer	LF transformer
Cooling concept	convection	convection
Degree of protection (according to IEC 60529)	IP65	IP65
Degree of protection of connection area (according to IEC 60529)	IP65	IP65
Climatic category (according to IEC 60721-3-4)	4K4H	4K4H
Maximum permissible value for relative humidity (non-condensing)	100 %	100 %
Features		
DC terminal	SUNCLIX	SUNCLIX
AC terminal	Connector	Connector
Display	Text line	Text line
Interface: RS485 / Bluetooth	○ / ○	○ / ○
Warranty: 5 / 10 / 15 / 20 / 25 years	● / ○ / ○ / ○ / ○	● / ○ / ○ / ○ / ○
Multi-function relay	—	—
Certificates and approvals (more available on request)	CE, VDE0126-1-1, G83/1-1, CER/06/190, RD 1663/2000, RD 661/2007, PPC, AS4777, EN 50438*, PPDS, DK 5940 ED2.2**, C10/11	
Type designation	SB 2500	SB 3000



UL Certified

- For countries that require UL certification (UL 1741/IEEE 1547)

Efficient

- 97% peak efficiency
- OptiCool™ active temperature management system

Safe

- Galvanic isolation

Simple

- Patented automatic grid voltage detection*
- Integrated DC disconnect switch

SUNNY BOY 5000-US / 6000-US / 7000-US / 8000-US

Versatile performer with UL certification

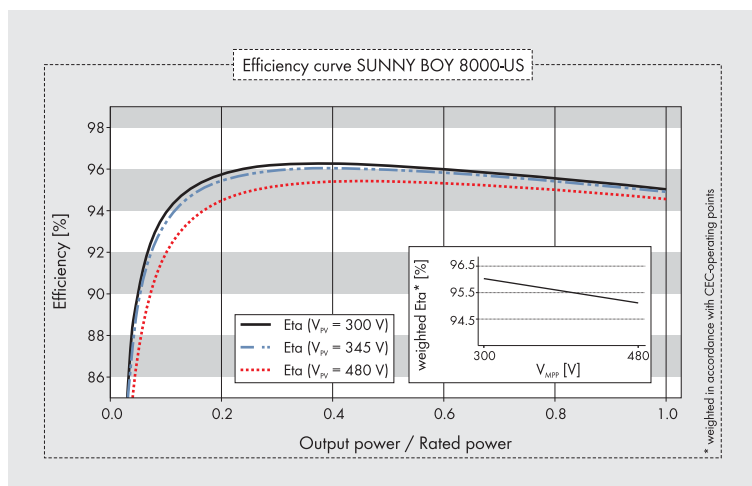
The Sunny Boy 5000-US, 6000-US, 7000-US and 8000-US inverters are UL certified and feature excellent efficiency. Graduated power classes provide flexibility in system design. Automatic grid voltage detection* and an integrated DC disconnect switch simplify installation, ensuring safety as well as saving time. These models feature galvanic isolation and can be used with all types of modules—crystalline as well as thin-film.

* US patent US7352549B1

Technical Data	Sunny Boy 5000-US 208 V	Sunny Boy 5000-US 240 V	Sunny Boy 5000-US 277 V
Input (DC)			
Recommended max. PV power (@ module STC)	6250 W		
Max. DC power (@ cos ϕ =1)	5300 W		
Max. input voltage	600 V		
MPP voltage range / rated input voltage	250 V – 480 V / 310 V		
Min. input voltage / initial input voltage	250 V / 300 V		
Max. input current	21 A		
Max. string fuse at DC switch-disconnector	20 A		
Number of independent MPP inputs	1		
Strings per MPP input (@ DC disconnect)	4		
Output (AC)			
Rated output power / max. apparent AC power	5000 W / 5000 VA		
nominal AC voltage / nominal AC voltage range	208 V / 183 V – 229 V	240 V / 211 V – 264 V	277 V / 244 V – 305 V
Rated power frequency / rated power voltage	60 Hz / 208 V	60 Hz / 240 V	60 Hz / 277 V
AC power frequency / range	60 Hz / 59.3 Hz ... 60.5 Hz		
Max. output current	24 A	21 A	18 A
Power factor at rated output power	1		
Feed-in phases / connection phases	1 / 2	1 / 2	1 / 1
Efficiency			
CEC efficiency / max. efficiency	95.5 % / 96.7 %	95.5 % / 96.8 %	95.5 % / 96.8 %
Protection devices			
DC reverse-polarity protection	●		
AC short-circuit current capability	●		
Galvanically isolated	●		
All-pole sensitive residual current monitoring unit	—		
Protection class (according to IEC 62103)	I		
Overvoltage category (according to IEC 60664-1)	III		
General data			
Dimensions (W / H / D)	470 / 615 / 240 mm (18.4 / 24.1 / 9.5 in)		
Dimensions of DC Disconnect (W / H / D)	187 / 297 / 190 mm (7.3 / 11.7 / 7.5 in)		
Weight	64 kg / 143 lb		
Weight of DC Disconnect	3.5 kg / 8 lb		
Operating temperature range**	-25 °C ... +45 °C / -13 °F ... +113 °F		
Noise emission (typical)	44 dB(A)		
Internal consumption (night)	0.1 W		
Topology	LF transformer		
Cooling concept	OptiCool		
Degree of protection	NEMA 3R		
Degree of protection of connection area	NEMA 3R		
Climatic category (according to IEC 60721-3-4)	—		
Maximum permissible value for relative humidity (non-condensing)	100 %		
Features			
DC terminal	Screw terminal		
AC terminal	Screw terminal		
Display	Text line		
Interface: RS485 / Bluetooth	○ / ○		
Warranty: 10 / 15 / 20 years	● / ○ / ○		
Certificates and approvals (more available on request)	UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1		
Type designation	SB 5000US		

SUNNY BOY 5000-US / 6000-US / 7000-US / 8000-US

Technical Data	Sunny Boy 6000-US 208 V	Sunny Boy 6000-US 240 V	Sunny Boy 6000-US 277 V
Input (DC)			
Recommended max. PV power (@ module STC)	7500 W		
Max. DC power (@ cos ϕ =1)	6350 W		
Max. input voltage	600 V		
MPP voltage range / rated input voltage	250 V – 480 V / 310 V		
Min. input voltage / initial input voltage	250 V / 300 V		
Max. input current	25 A		
Max. string fuse at DC switch-disconnector	20 A		
Number of independent MPP inputs	1		
Strings per MPP input (@ DC disconnector)	4		
Output (AC)			
Rated output power / max. apparent AC power	6000 W / 6000 VA		
nominal AC voltage / nominal AC voltage range	208 V / 183 V – 229 V	240 V / 211 V – 264 V	277 V / 244 V – 305 V
Rated power frequency / rated power voltage	60 Hz / 208 V	60 Hz / 240 V	60 Hz / 277V
AC power frequency / range	60 Hz / 59.3 Hz ... 60.5 Hz		
Max. output current	29 A	25 A	22 A
Power factor at rated output power	1		
Feed-in phases / connection phases	1 / 2	1 / 2	1 / 1
Efficiency			
CEC efficiency / max. efficiency	95.5 % / 96.9 %	95.5 % / 96.8 %	96 % / 97 %
Protection devices			
DC reverse-polarity protection	●		
AC short-circuit current capability	●		
Galvanically isolated	●		
All-pole sensitive residual current monitoring unit	—		
Protection class (according to IEC 62103)	I		
Overvoltage category (according to IEC 60664-1)	III		
General data			
Dimensions (W / H / D)	470 / 615 / 240 mm (18.4 / 24.1 / 9.5 in)		
Dimensions of DC Disconnect (W / H / D)	187 / 297 / 190 mm (7.3 / 11.7 / 7.5 in)		
Weight	64 kg / 143 lb		
Weight of DC Disconnect	3.5 kg / 8 lb		
Operating temperature range*	-25 °C ... +45 °C / -13 °F ... +113 °F		
Noise emission (typical)	45 dB(A)		
Internal consumption (night)	0.1 W		
Topology	LF transformer		
Cooling concept	OptiCool		
Degree of protection	NEMA 3R		
Degree of protection of connection area	NEMA 3R		
Climatic category (according to IEC 60721-3-4)	—		
Maximum permissible value for relative humidity (non-condensing)	100 %		
Features			
DC terminal	Screw terminal		
AC terminal	Screw terminal		
Display	Text line		
Interface: RS485 / Bluetooth	○ / ○		
Warranty: 10 / 15 / 20 years	● / ○ / ○		
Certificates and approvals (more available on request)	UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1		
Type designation	SB 6000US		



Accessories



RS485 interface of type
485USPB-SMC-NR



Bluetooth Piggy-Back
BTPBINV-NR



SMA Power Balancer Set
PBL-SBUS-10-NR

NOTE: US inverters ship with gray lids.

* also available with operating temperature range of
-40 °C ... +45 °C / -40 °F ... +113 °F

● Standard features ○ Optional features — Not available
Data at nominal conditions

Sunny Boy 7000-US 208 V	Sunny Boy 7000-US 240 V	Sunny Boy 7000-US 277 V	Sunny Boy 8000-US 240 V	Sunny Boy 8000-US 277 V
	8750 W		10000 W	
	7400 W		8600 W	
	600 V		600 V	
	250 V - 480 V / 310 V		300 V - 480 V / 345 V	
	250 V / 300 V		300 V / 365 V	
	30 A		30 A	
	20 A		20 A	
	1		1	
	4		4	
	7000 W / 7000 VA		7680 W / 8000 VA	
208 V / 183 V - 229 V	240 V / 211 V - 264 V	277 V / 244 V - 305 V	240 V / 211 V - 264 V	277 V / 244 V - 305 V
60 Hz / 208 V	60 Hz / 240 V	60 Hz / 277V	60 Hz / 240 V	60 Hz / 277V
	60 Hz / 59.3 Hz ... 60.5 Hz		60 Hz / 59.3 Hz ... 60.5 Hz	
34 A	29 A	25 A	32 A	32 A
	1		1	
1 / 2	1 / 2	1 / 1	1 / 2	1 / 1
95.5 % / 97.1 %	96 % / 96.9 %	96 % / 97.1 %	96 % / 96.3 %	96 % / 96.5 %
	●		●	
	●		●	
	●		●	
	—		—	
	I		I	
	III		III	
470 / 615 / 240 mm (18.4 / 24.1 / 9.5 in)	470 / 615 / 240 mm (18.4 / 24.1 / 9.5 in)		470 / 615 / 240 mm (18.4 / 24.1 / 9.5 in)	
187 / 297 / 190 mm (7.3 / 11.7 / 7.5 in)	187 / 297 / 190 mm (7.3 / 11.7 / 7.5 in)		187 / 297 / 190 mm (7.3 / 11.7 / 7.5 in)	
64 kg / 143 lb	64 kg / 143 lb		66 kg / 145 lb	
3.5 kg / 8 lb	3.5 kg / 8 lb		3.5 kg / 8 lb	
-25 °C ... +45 °C / -13 °F ... +113 °F	-25 °C ... +45 °C / -13 °F ... +113 °F		-25 °C ... +45 °C / -13 °F ... +113 °F	
46 dB(A)	46 dB(A)		49 dB(A)	
0.1 W	0.1 W		0.1 W	
LF transformer	LF transformer		LF transformer	
OptiCool	OptiCool		OptiCool	
NEMA 3R	NEMA 3R		NEMA 3R	
NEMA 3R	NEMA 3R		NEMA 3R	
—	—		—	
100 %	100 %		100 %	
Screw terminal	Screw terminal		Screw terminal	
Screw terminal	Screw terminal		Screw terminal	
Text line	Text line		Text line	
○ / ○	○ / ○		○ / ○	
● / ○ / ○	● / ○ / ○		● / ○ / ○	
UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1	UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1		UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1	
SB 7000US			SB 8000US	



UL Certified

- For countries that require UL certification (UL 1741/IEEE 1547)

Efficient

- 96.8% peak efficiency
- OptiCool™ active temperature management system

Safe

- Galvanic isolation

Simple

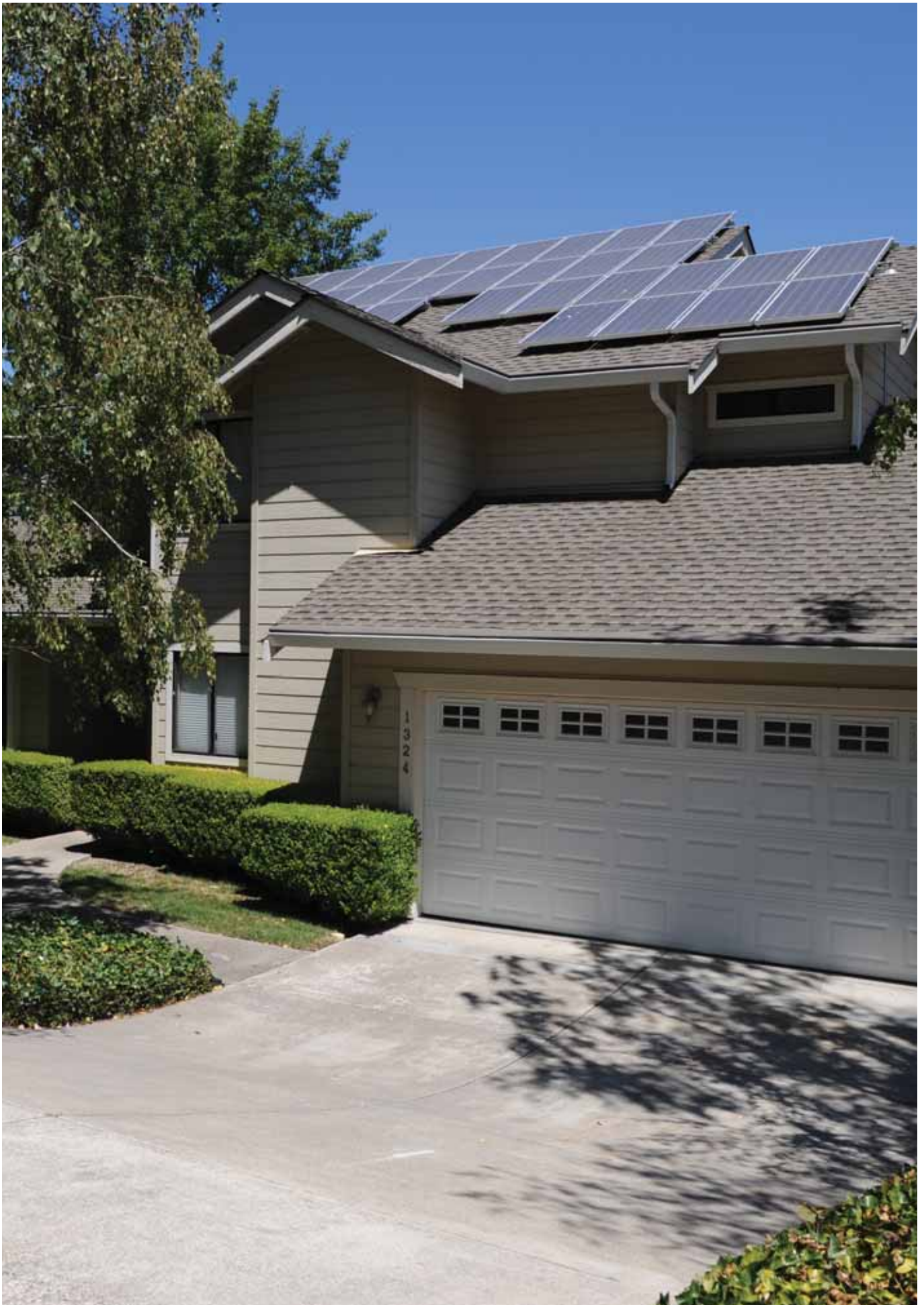
- Patented automatic grid voltage detection*
- Integrated DC disconnect switch

SUNNY BOY 3000-US / 3800-US / 4000-US

UL certified, reliable system managers

The Sunny Boy 3000-US, 3800-US and 4000-US inverters are specially designed for countries that require UL certification. Automatic grid voltage detection* and an integrated DC disconnect switch simplifies installation, ensuring safety as well as saving time. These models feature galvanic isolation and can be used with all types of modules—crystalline as well as thin-film. The die-cast aluminum enclosure, with the OptiCool active temperature management system, guarantees the highest yields possible and a long service life, even under extreme conditions. The Sunny Boy 3800-US is designed for projects with a current limit of 16A.

* US patent US7352549B1

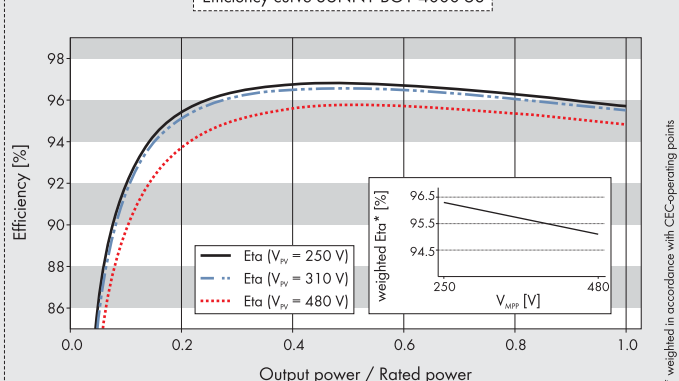


Walnut Creek, USA

SUNNY BOY 3000-US / 3800-US / 4000-US

Technical Data	Sunny Boy 3000-US 208 V	Sunny Boy 3000-US 240 V	
Input (DC)			
Recommended max. PV power (@ module STC)	3750 W		
Max. DC power (@ cos ϕ =1)	3200 W		
Max. input voltage	500 V		
MPP voltage range / rated input voltage	200 V – 400 V / 250 V		
Min. input voltage / initial input voltage	175 V / 228 V		
Max. input current	17 A		
Max. string fuse at DC switch-disconnector	20 A		
Number of independent MPP inputs	1		
Strings per MPP input (@ DC disconnect)	4		
Output (AC)			
Rated output power / max. apparent AC power	3000 W / 3000 VA		
nominal AC voltage / nominal AC voltage range	208 V / 183 V – 229 V	240 V / 211 V – 264 V	
Rated power frequency / rated power voltage	60 Hz / 208 V	60 Hz / 240 V	
AC power frequency / range	60 Hz / 59.3 Hz ... 60.5 Hz		
Max. output current	15 A	13 A	
Power factor at rated output power	1		
Feed-in phases / connection phases	1 / 2	1 / 2	
Efficiency			
CEC efficiency / max. efficiency	95 % / 96 %	95.5 % / 96.5 %	
Protection devices			
DC reverse-polarity protection	●		
AC short-circuit current capability	●		
Galvanically isolated	●		
All-pole sensitive residual current monitoring unit	–		
Protection class (according to IEC 62103)	I		
Overvoltage category (according to IEC 60664-1)	III		
General data			
Dimensions (W / H / D)	450 / 350 / 235 mm (17.8 / 13.8 / 9.3 in)		
Dimensions of DC Disconnect (W / H / D)	187 / 297 / 190 mm (7.3 / 11.7 / 7.5 in)		
Weight	38 kg / 84 lb		
Weight of DC Disconnect	3.5 kg / 8 lb		
Operating temperature range	-25 °C ... +45 °C / -13 °F ... +113 °F		
Noise emission (typical)	40 dB(A)		
Internal consumption (night)	0.1 W		
Topology	LF transformer		
Cooling concept	OptiCool		
Degree of protection	NEMA 3R		
Degree of protection of connection area	NEMA 3R		
Climatic category (according to IEC 60721-3-4)	–		
Maximum permissible value for relative humidity (non-condensing)	100 %		
Features			
DC terminal	Screw terminal		
AC terminal	Screw terminal		
Display	Text line		
Interface: RS485 / Bluetooth	○ / ○		
Warranty: 10 / 15 / 20 years	● / ○ / ○		
Certificates and approvals (more available on request)	UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1		
Type designation	SB 3000US		

Efficiency curve SUNNY BOY 4000-US



Accessories

RS485 interface
485USPB-NRBluetooth Piggy-Back
BTPBINV-NR

NOTE: US inverters ship with gray lids.

● Standard features ○ Optional features – Not available
Data at nominal conditions

Technical Data	Sunny Boy 3800-US 240 V	Sunny Boy 4000-US 208 V	Sunny Boy 4000-US 240 V
Input (DC)			
Recommended max. PV power (@ module STC)	4750 W	4375 W	
Max. DC power (@ $\cos \varphi = 1$)	4200 W	4200 W	
Max. input voltage	600 V	600 V	
MPP voltage range / rated input voltage	250 V – 480 V / 310 V	250 V – 480 V / 310 V	
Min. input voltage / initial input voltage	250 V / 285 V	250 V / 285 V	
Max. input current	18 A	18 A	
Max. string fuse at DC switch-disconnector	20 A	20 A	
Number of independent MPP inputs	1	1	
Strings per MPP input (@ DC disconnector)	4	4	
Output (AC)			
Rated output power / max. apparent AC power	3800 W / 3800 VA	4000 W / 4000 VA	
nominal AC voltage / nominal AC voltage range	240 V / 211 V – 264 V	208 V / 183 V – 229 V	240 V / 211 V – 264 V
Rated power frequency / rated power voltage	60 Hz / 240 V	60 Hz / 208 V	60 Hz / 240 V
AC power frequency / range	60 Hz / 59.3 Hz ... 60.5 Hz	60 Hz / 59.3 Hz ... 60.5 Hz	
Max. output current	16 A	17 A	17 A
Power factor at rated output power	1	1	
Feed-in phases / connection phases	1 / 2	1 / 2	1 / 2
Efficiency			
CEC efficiency / max. efficiency	96 % / 96.8 %	95.5 % / 96.5 %	96 % / 96.8 %
Protection devices			
DC reverse-polarity protection		●	
AC short-circuit current capability		●	
Galvanically isolated		●	
All-pole sensitive residual current monitoring unit		–	
Protection class (according to IEC 62103)		I	
Overvoltage category (according to IEC 60664-1)		III	
General data			
Dimensions (W / H / D)		450 / 350 / 235 mm (17.8 / 13.8 / 9.3 in)	
Dimensions of DC Disconnect (W / H / D)		187 / 297 / 190 mm (7.3 / 11.7 / 7.5 in)	
Weight		38 kg / 84 lb	
Weight of DC Disconnect		3.5 kg / 8 lb	
Operating temperature range		-25 °C ... +45 °C / -13 °F ... +113 °F	
Noise emission (typical)		37 dB(A)	
Internal consumption (night)		0.1 W	
Topology		LF transformer	
Cooling concept		OptiCool	
Degree of protection		NEMA 3R	
Degree of protection of connection area		NEMA 3R	
Climatic category (according to IEC 60721-3-4)		–	
Maximum permissible value for relative humidity (non-condensing)		100 %	
Features			
DC terminal		Screw terminal	
AC terminal		Screw terminal	
Display		Text line	
Interface: RS485 / Bluetooth		○ / ○	
Warranty: 10 / 15 / 20 years		● / ○ / ○	
Certificates and approvals (more available on request)		UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1	
Type designation	SB 3800-US-10	SB 4000US	



High Yields

- Maximum efficiency 96%
- The best tracking efficiency with OptiTrac MPP tracking
- OptiCool™ active temperature management

Safe

- Galvanic isolation
- Integrated DC switch-disconnect

User-friendly

- Slim enclosure mounts in between wall studs
- Plug-in grounding with GFDI
- Reduced weight
- Quick and easy configuration thanks to Quick Module

Informative

- Modern graphic display
- Bluetooth® technology

SUNNY BOY 2000HF-US / 2500HF-US / 3000HF-US

Easy installation, simple communication and maximum performance

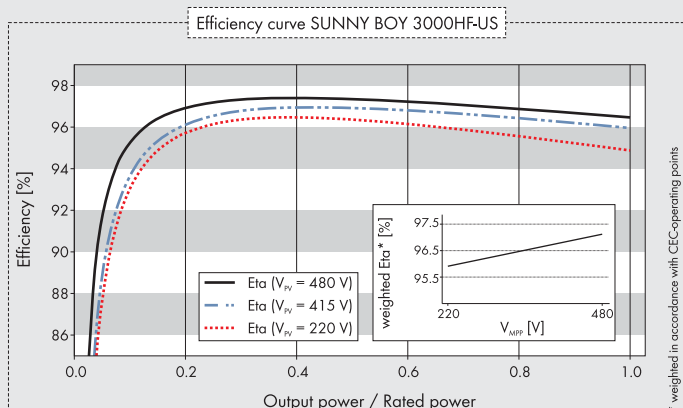
The new Sunny Boy high frequency inverters are designed for projects requiring UL certification and represent the next step in innovative SMA technology. Featuring world-class efficiency, a slim-line enclosure and reduced weight, the Sunny Boy HF series of inverters can be mounted in between wall studs, making it perfect for new construction or space-constrained retrofits. Installation is made simple by automatic grid detection*, field configuration for positive ground modules and a wide input voltage range of 175 to 600 V, which provides exceptional system design flexibility. The modern graphic display and wireless Bluetooth communication system provides a wealth of data in a user-friendly format.

* US patent US7352549B1

Technical Data	Sunny Boy 2000HF-US 208 V	Sunny Boy 2000HF-US 240 V
Input (DC)		
Recommended max. PV power (@ module STC)	2500 W	
Max. DC power (@ $\cos \varphi=1$)	2100 W	
Max. input voltage	600 V	
MPP voltage range / rated input voltage	175 V – 480 V / 400 V	
Min. input voltage / initial input voltage	175 V / 220 V	
Max. input current	15 A	
Max. input current per string	15 A	
Number of independent MPP inputs / strings per MPP input	1 / 2 (opt. 3)	
Output (AC)		
Rated power / Max. apparent AC power	2000 W / 2000 VA	
Nominal AC voltage / Nominal AC voltage range	208 V / 183 V – 229 V	240 V / 211 V – 264 V
AC power frequency / range	60 Hz / 59.3 Hz ... 60.5 Hz	
Rated grid frequency / rated grid voltage	60 Hz / 208 V	60 Hz / 240 V
Max. output current	10 A	8.5 A
Power factor at rated power	1	
Phase conductors / connection phases	1 / 2	1 / 2
Efficiency		
CEC efficiency* / max. efficiency	96.5 % / 97.1 %	96.5 % / 97.1 %
Protection devices		
DC reverse-polarity protection	●	
AC short-circuit current capability	●	
Galvanically isolated	●	
All-pole sensitive residual current monitoring unit	–	
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	
General data		
Dimensions (W / H / D)	348 / 727 / 183 mm (14 / 29 / 7 inch)	
Weight	23 kg / 51 lb	
Operating temperature range	-25 °C ... +45 °C / -13 °F ... +113 °F	
Noise emission (typical)	–	
Internal consumption (night)	< 1 W	
Topology	HF transformer	
Cooling concept	OptiCool	
Degree of protection	NEMA 3R	
Degree of protection of connection area	NEMA 3R	
Climatic category (according to IEC 60721-3-4)	–	
Maximum permissible value for relative humidity (non-condensing)	100 %	
Features		
DC terminal	Spring-type terminal	
AC terminal	Spring-type terminal	
Display	Graphic	
Interface: RS485 / Bluetooth	○ / ●	
Warranty: 10 / 15 / 20 years	● / ○ / ○	
Certificates and approvals (more available on request)	UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1	
Type designation	SB 2000HFUS-30	

SUNNY BOY 2000HF-US / 2500HF-US / 3000HF-US

Technical Data	Sunny Boy 2500HF-US 208 V	Sunny Boy 2500HF-US 240 V
Input (DC)		
Recommended max. PV power (@ module STC)	3125 W	
Max. DC power (@ $\cos \varphi=1$)	2600 W	
Max. input voltage	600 V	
MPP voltage range / rated input voltage	220 V - 480 V / 415 V	
Min. input voltage / initial input voltage	175 V / 220 V	
Max. input current	15 A	
Max. input current per string	15 A	
Number of independent MPP inputs / strings per MPP input	1 / 2 (opt. 3)	
Output (AC)		
Rated power / Max. apparent AC power	2500 W / 2500 VA	
Nominal AC voltage / Nominal AC voltage range	208 V / 183 V - 229 V	240 V / 211 V - 264 V
AC power frequency / range	60 Hz / 59.3 Hz ... 60.5 Hz	
Rated grid frequency / rated grid voltage	60 Hz / 208 V	60 Hz / 240 V
Max. output current	12 A	10.4 A
Power factor at rated power	1	
Phase conductors / connection phases	1 / 2	1 / 2
Efficiency		
CEC efficiency* / max. efficiency	96.5 % / 97.1 %	96.5 % / 97.1 %
Protection devices		
DC reverse-polarity protection	●	
AC short-circuit current capability	●	
Galvanically isolated	●	
All-pole sensitive residual current monitoring unit	—	
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	
General data		
Dimensions (W / H / D)	348 / 727 / 183 mm (14 / 29 / 7 inch)	
Weight	23 kg / 51 lb	
Operating temperature range	-25 °C ... +45 °C / -13 °F ... +113 °F	
Noise emission (typical)	—	
Internal consumption (night)	< 1 W	
Topology	HF transformer	
Cooling concept	OptiCool	
Degree of protection	NEMA 3R	
Degree of protection of connection area	NEMA 3R	
Climatic category (according to IEC 60721-3-4)	—	
Maximum permissible value for relative humidity (non-condensing)	100 %	
Features		
DC terminal	Spring-type terminal	
AC terminal	Spring-type terminal	
Display	Graphic	
Interface: RS485 / Bluetooth	○ / ●	
Warranty: 10 / 15 / 20 years	● / ○ / ○	
Certificates and approvals (more available on request)	UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1	
Type designation	SB 2500HFUS-30	



Accessories



Flush-Mount Kit for integration in wood-framed walls
Mount KIT-10-NR



Quick Module RS485 + multi-function relay
485QMUS-10-NR



String fuses Upgrade kit
SB-SFK-US-10-NR

* Provisional data

● Standard features ○ Optional features – Not available
Data at nominal conditions

Technical Data

Input (DC)

Recommended max. PV power (@ module STC)
Max. DC power (@ $\cos \varphi = 1$)
Max. input voltage
MPP voltage range / rated input voltage
Min. input voltage / initial input voltage
Max. input current
Max. input current per string
Number of independent MPP inputs / strings per MPP input

Output (AC)

Rated power / Max. apparent AC power
Nominal AC voltage / Nominal AC voltage range
AC power frequency / range
Rated grid frequency / rated grid voltage
Max. output current
Power factor at rated power
Phase conductors / connection phases

Efficiency

CEC efficiency* / max. efficiency

Protection devices

DC reverse-polarity protection
AC short-circuit current capability
Galvanically isolated
All-pole sensitive residual current monitoring unit
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)

General data

Dimensions (W / H / D)
Weight
Operating temperature range
Noise emission (typical)
Internal consumption (night)
Topology
Cooling concept
Degree of protection
Degree of protection of connection area
Climatic category (according to IEC 60721-3-4)
Maximum permissible value for relative humidity (non-condensing)

Features

DC terminal
AC terminal
Display
Interface: RS485 / Bluetooth
Warranty: 10 / 15 / 20 years
Certificates and approvals (more available on request)

Type designation

Sunny Boy 3000HF-US 208 V

Sunny Boy 3000HF-US 240 V

3750 W

3150 W

600 V

220 V – 480 V / 415 V

220 V / 220 V

15 A

15 A

1 / 2 (opt. 3)

3000 W / 3000 VA

208 V / 183 V – 229 V

240 V / 211 V – 264 V

60 Hz / 59.3 Hz ... 60.5 Hz

60 Hz / 208 V

60 Hz / 240 V

14.8 A

12.5 A

1

1 / 2

1 / 2

96.5 % / 97.1 %

96.5 % / 97.1 %

●

●

●

–

I / III

348 / 727 / 183 mm (14 / 29 / 7 inch)

23 kg / 51 lb

-25 °C ... +45 °C / -13 °F ... +113 °F

–

< 1 W

HF transformer

OptiCool

NEMA 3R

NEMA 3R

–

100 %

Spring-type terminal

Spring-type terminal

Graphic

○ / ●

● / ○ / ○

UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B),
CAN/CSA C22.2 107.1-1

SB 3000HFUS-30



UL Certified

- For countries that require UL certification (UL 1741/IEEE 1547)

Safe

- Galvanic isolation due to integrated transformer

Simple

- Simple installation thanks to three-point mounting assembly

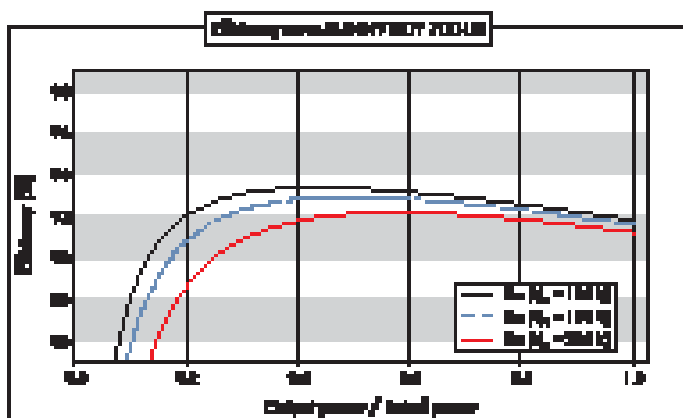
Flexible

- Three different input voltage ranges
- Modular addition for all applications

SUNNY BOY 700-US

The versatile choice for any system configuration

The SMA Sunny Boy 700-US was SMA's first mass-produced string inverter and it continues to enjoy immense popularity in today's solar market. Its compact size and economical price make it ideal for starter or demonstration systems. It is also perfectly suited for adding a bit more power to an existing solar system. Its modular design makes expansion to almost any size easy. Three different configurable input voltage ranges make the Sunny Boy 700-US a versatile choice, whatever your system configuration.



Accessories

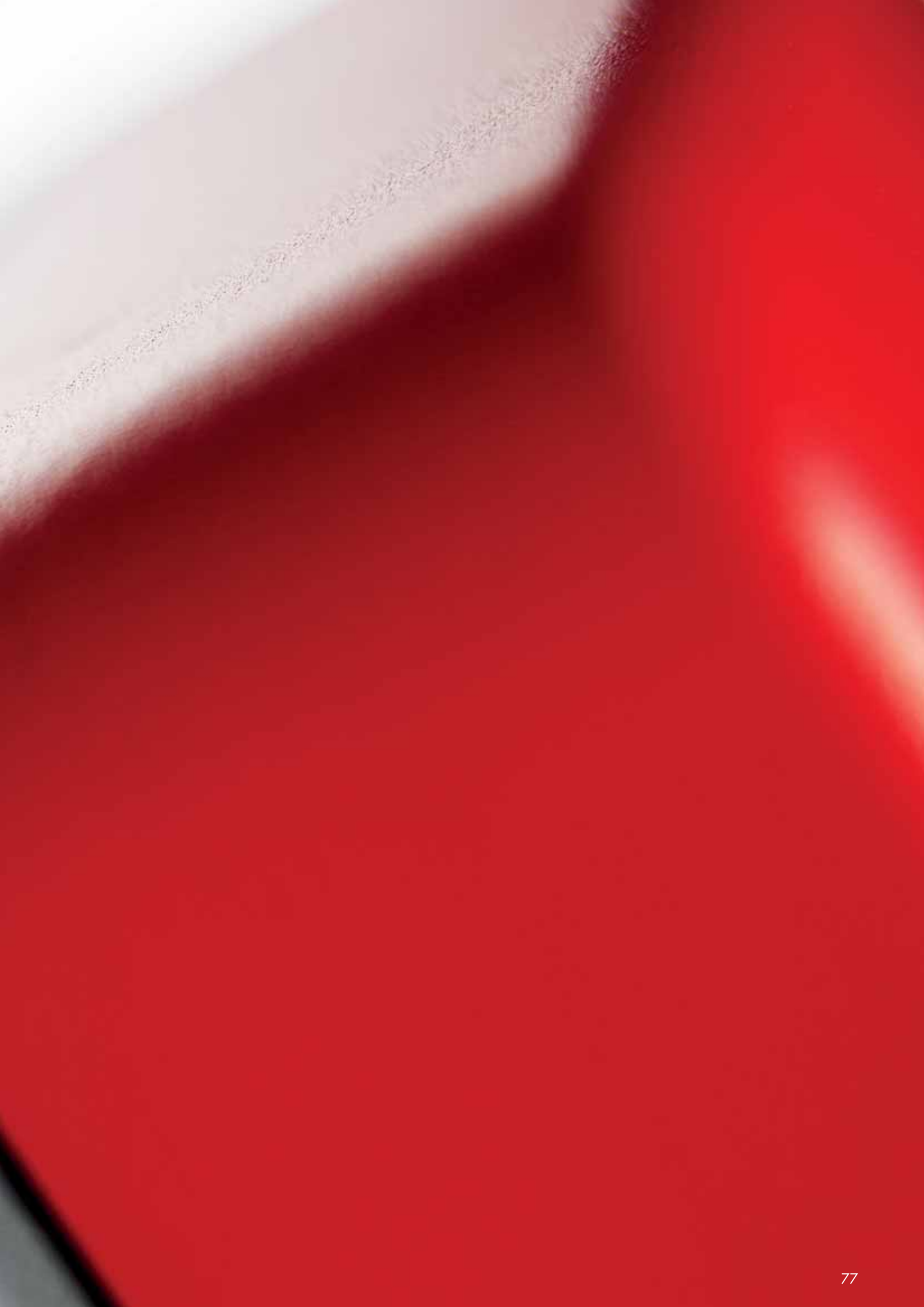


RS485 interface
485USPB-NR

● Standard features ○ Optional features – Not available
Data at nominal conditions

Technical Data	Sunny Boy 700-US 150 V	Sunny Boy 700-US 200 V	Sunny Boy 700-US 250 V
Input (DC)			
Recommended max. PV power (@ module STC)	575 W	750 W	875 W
Max. DC power (@ $\cos \varphi = 1$)	510 W	670 W	780 W
Max. input voltage	150 V	200 V	250 V
MPP voltage range/rated input voltage	77 V – 120 V / 95 V	100 V – 160 V / 125 V	125 V – 200 V / 150 V
Min. input voltage/initial input voltage	75 V / 95 V	100 V / 125 V	125 V / 150 V
Max. input current	7 A	7 A	7 A
Max. input current per string	7 A	7 A	7 A
Number of independent MPP inputs	1	1	1
Strings per MPP input	2	2	2
Output (AC)			
Rated output power/max. apparent AC power	460 W / 460 VA		
nominal AC voltage/nominal AC voltage range	120 V / 106 V – 132 V	120 V / 106 V – 132 V	120 V / 106 V – 132 V
AC power frequency/range	60 Hz / 59.3 Hz ... 60.5 Hz		
Max. output current	4.4 A	5.7 A	6.6 A
Power factor at rated output power	1		
Feed-in phases/connection phases	1 / 2	1 / 2	1 / 2
Efficiency			
CEC efficiency/max. efficiency	91.5 % / 92.4 %	91.5 % / 93.3 %	91.5 % / 93.6 %
Protection devices			
DC reverse-polarity protection	●		
AC short-circuit current capability	●		
Galvanically isolated	●		
All-pole sensitive residual current monitoring unit	–		
Protection class (according to IEC 62103)	I		
Overvoltage category (according to IEC 60664-1)	III		
General data			
Dimensions (W/H/D)	322 / 290 / 180 mm (12.7 / 12.6 / 7.1 inch)		
Weight	23 kg / 51 lb		
Operating temperature range	-25 °C ... +45 °C / -13 °F ... +113 °F		
Noise emission (typical)	no information		
Internal consumption (night)	0.1 W		
Topology	NF transformer		
Cooling concept	Convection		
Degree of protection	NEMA 3X		
Degree of protection of connection area	NEMA 3X		
Climatic category (according to IEC 60721-3-4)	–		
Maximum permissible value for relative humidity (non-condensing)	100 %		
Features			
DC terminal	Screw terminal		
AC terminal	Screw terminal		
Display	Text line		
Interface: RS485/ Bluetooth	○ / –		
Warranty: 10/15/20 years	● / ○ / ○		
Certificates and approvals (more available on request)	UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B), CAN / CSA C22.2 107.1-1		
Type designation	SB 700U		

SUNNY TOWER





Efficient

- Efficiency of up to 98%
- Low specific price
- Greater yield with multiple MPP trackers

Safe

- Integrated ESS DC load disconnection switch

Flexible

- Modular design
- Sunny Mini Central and Sunny Boy inverters can be combined
- Suitable for outdoors

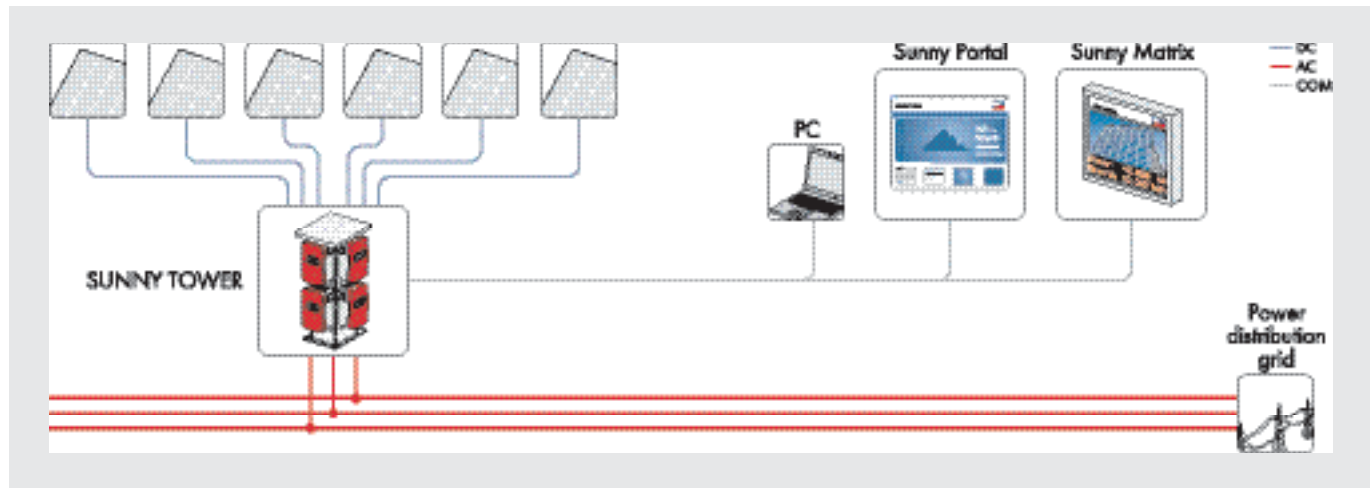
Convenient

- Delivered as a turn-key solution
- Easy installation
- Integrated data acquisition with optional Sunny WebBox

SUNNY TOWER

Easy installation and maximum yield

The Sunny Tower is easy to install and profitable. Its exceptional efficiency of up to 98 percent and easy installation ensure maximum power yield. The intelligent OptiCool™ temperature management system makes the Sunny Tower suitable for use at high ambient temperatures. In addition, the modular structure allows for combining Sunny Mini Central and Sunny Boy inverters, ensuring maximum flexibility in system design and expansion.



Technical Data	Sunny Tower for 6 Sunny Mini Central 8000TL	Sunny Tower for 6 Sunny Mini Central 11000TL
Input (DC)		
Max. DC power (@ cos φ=1)	49.5 W	68.4 W
PV voltage range	333 V – 500 V	333 V – 500 V
Max. input voltage	700 V	700 V
Max. input current	6 x 25 A	6 x 34 A
DC voltage ripple	< 10 %	<10 %
Max. number of strings (parallel)	6 x 4	6 x 5
DC reverse polarity protection	Short-circuit diode	Short-circuit diode
Output (AC)		
Continuous AC power (at 40 °C)	48 kW	66 kW
Nominal AC power	48 kW	66 kW
Max. output current	3 x 70 A	3 x 96 A
THF of grid current	< 4 %	< 4 %
Nominal AC voltage	220 V – 240 V	220 V – 240 V
AC grid frequency	50 Hz, 60 Hz	50 Hz, 60 Hz
Power factor at rated power	1	1
Grid connection	Stud terminal, max. 5 x 95 mm²	Stud terminal, max. 5 x 95 mm²
Efficiency		
Max. efficiency	98 %	98 %
European efficiency	97.7 %	97.5 %
Protection		
Thermally-controlled varistors	●	●
Ground-fault monitoring	●	●
Disconnection input side	●	●
Grid monitoring	●	●
AC short-circuit current capability	●	●
Miniature circuit-breaker	6 x B50	6 x B63
General Data		
Inverter protection class / Sunny Tower (according to IEC 60529)	IP65 / IP44	IP65 / IP44
Cooling concept	OptiCool	OptiCool
Operating temperature range	-25 °C ... +60 °C	-25 °C ... +60 °C
Topology	Transformerless	Transformerless
Phase conductors	3	3
Dimensions (W / H / D)	1100 / 1810 / 990 mm	1100 / 1810 / 990 mm
Weight	320 kg	320 kg
Features		
Warranty: 5 / 10 years	● / ○	● / ○
Plant monitoring (pre-wired)	○ / ○ / ○	○ / ○ / ○
RS485 / Sunny WebBox / SMA Power Balancer		
● Standard ○ Optional – Not available		
Type designation	ST6	ST6



- Pre-configured in any combination between 30–48 kW



UL Certified

- UL certified (UL 1741/IEEE-1547)
- CSA compliant (C22.2 No.107.1-0)

Reliable

- 10-year standard warranty
- Sealed electronics enclosure and rugged stainless steel outdoor-rated structure
- Opticool™ temperature management system

Simple

- Prewired at factory for three-phase utility interconnection
- Integrated load-break rated lockable AC/DC disconnect switch

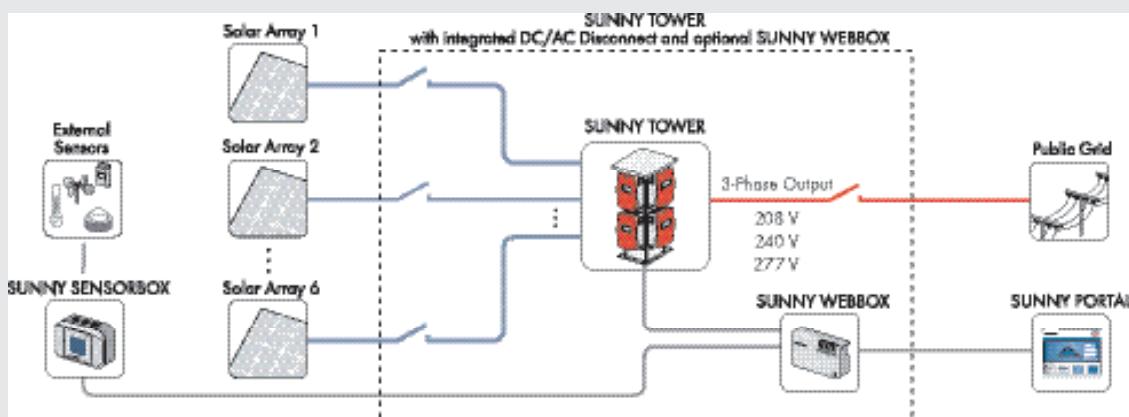
Flexible

- Internet-ready with Sunny WebBox
- Integrated fused series string combiner
- Ideal for commercial applications

SUNNY TOWER-US

The flexible solution for commercial PV systems

Designed with the installer in mind, SMA has combined ease of installation, a low cost per watt and high efficiency in the Sunny Tower-US. The UL and CSA compliant inverter system can be pre-configured in any combination between 30–48 kW. Its modular design eliminates the need for cost-prohibitive heavy machinery, as is required for large central inverters. It allows installers to apply their existing experience and tools in the residential market to attract commercial-grade projects, all while benefiting from the Sunny Boy's world-class efficiency and SMA's industry-best reliability.



Technical data	Sunny Boy 5000-US			Sunny Boy 6000-US			Sunny Boy 7000-US			Sunny Boy 8000-US	
	208 V AC	240 V AC	277 V AC	208 V AC	240 V AC	277 V AC	208 V AC	240 V AC	277 V AC	240 V AC	277 V AC
Input (DC)											
Max. recommended PV power (@ module STC)	6250 W			7500 W			8750 W			10000 W	
Max. DC power (@ cos φ = 1)	5300 W			6350 W			7400 W			8600 W	
Max. DC voltage	600 V			600 V			600 V			600 V	
DC nominal voltage	310 V			310 V			310 V			345 V	
MPP voltage range	250 V – 480 V			250 V – 480 V			250 V – 480 V			300 V – 480 V	
Min. DC voltage / start voltage	250 V / 300 V			250 V / 300 V			250 V / 300 V			300 V / 365 V	
Max. input current / per string (at DC disconnect)	21 A / 20 A			25 A / 20 A			30 A / 20 A			30 A / 20 A	
	36 A @ combined terminal			36 A @ combined terminal			36 A @ combined terminal			36 A @ combined terminal	
Number of MPP trackers / fused strings per MPP tracker	1 / 4 (DC disconnect)										
Output (AC)											
AC nominal power	5000 W			6000 W			7000 W			7680 W	8000 W
Max. AC apparent power	5000 VA			6000 VA			7000 VA			8000 VA	
Nominal AC voltage / adjustable	208 V / ●	240 V / ●	277 V / ●	208 V / ●	240 V / ●	277 V / ●	208 V / ●	240 V / ●	277 V / ●	240 V / ●	277 V / ●
AC voltage range	183 – 229 V	211 – 264 V	244 – 305 V	183 – 229 V	211 – 264 V	244 – 305 V	183 – 229 V	211 – 264 V	244 – 305 V	211 – 264 V	244 – 305 V
AC grid frequency; range	60 Hz; 59.3 – 60.5 Hz			60 Hz; 59.3 – 60.5 Hz			60 Hz; 59.3 – 60.5 Hz			60 Hz; 59.3 – 60.5 Hz	
Max. output current	24 A	21 A	18 A	29 A	25 A	22 A	34 A	29 A	25 A	29 A	32 A
Power factor (cos φ)	1			1			1			1	
Phase conductors / connection phases	1 / 2	1 / 2	1 / 1	1 / 2	1 / 2	1 / 1	1 / 2	1 / 2	1 / 1	1 / 2	1 / 1
Harmonics	< 4%			< 4%			< 4%			< 4%	
Efficiency											
Max. efficiency	96.7%	96.8%	96.8%	96.9%	96.8%	97.0%	97.1%	96.9%	97.0%	96.3%	96.5%
CEC efficiency	95.5%	95.5%	95.5%	95.5%	95.5%	96.0%	95.5%	96.0%	96.0%	96.0%	96.0%
Protection devices											
DC reverse-polarity protection	●			●			●			●	
AC short circuit protection	●			●			●			●	
Galvanically isolated / all-pole sensitive monitoring unit	●/–			●/–			●/–			●/–	
Protection class / overvoltage category	I / III			I / III			I / III			I / III	
General data											
Dimensions (W / H / D) in mm (in)	470 / 615 / 240 (18.5 / 24 / 9)										
Operating temperature range (full power)**	–25 °C ... +45 °C (–13 °F ... +113 °F)										
Noise emission (typical)	44 dB(A)			45 dB(A)			46 dB(A)			49 dB(A)	
Internal consumption at night	0.1 W			0.1 W			0.1 W			0.1 W	
Topology	LF transformer			LF transformer			LF transformer			LF transformer	
Cooling concept	OptiCool			OptiCool			OptiCool			OptiCool	
Electronics protection rating / connection area	NEMA 3R / NEMA 3R			NEMA 3R / NEMA 3R			NEMA 3R / NEMA 3R			NEMA 3R / NEMA 3R	
Features											
Display: text line / graphic	●/–			●/–			●/–			●/–	
Interfaces: RS485 / Bluetooth®	○/○			○/○			○/○			○/○	
Warranty: 10 / 15 / 20 years	●/○/○			●/○/○			●/○/○			●/○/○	
Certificates and permits (more available on request)	UL1741, UL1998, IEEE 1547, FCC Part 15 (Class A & B), CSA C22.2 No. 107.1-2001										
**Extended operating temperature range to -40 °C available. Specify when ordering.											
NOTE: US inverters ship with gray lids. Data at nominal conditions											
● Standard ○ Optional – Not available											

The background features a large, abstract geometric shape in a vibrant orange color, which is partially cut off by the top and right edges of the frame. This shape has a thick, dark grey border that follows its contours. The rest of the background is a light grey color with a subtle, fine-grained texture.

BACKUP SYSTEMS



- System M / L
for all current grid types
- System M
with optional phase coupling

Simple

- Can be integrated into existing and new PV systems
- Pre-configured sets for various performance classes

Flexible

- Single and three-phase systems are possible
- Modularly extendable
- Capacities from 5 kW to 100 kW available

Efficient

- Small battery through integration into the PV plant
- Power supply and battery charging over the grid
- Continuously high PV efficiency

Reliable

- Automatic switching to backup in only approx. 20 milliseconds
- Automatic disconnection per DIN VDE 0126-1-1 and AS 4777

SUNNY BACKUP Set M / L / XL

Solar power—even in the event of grid failure

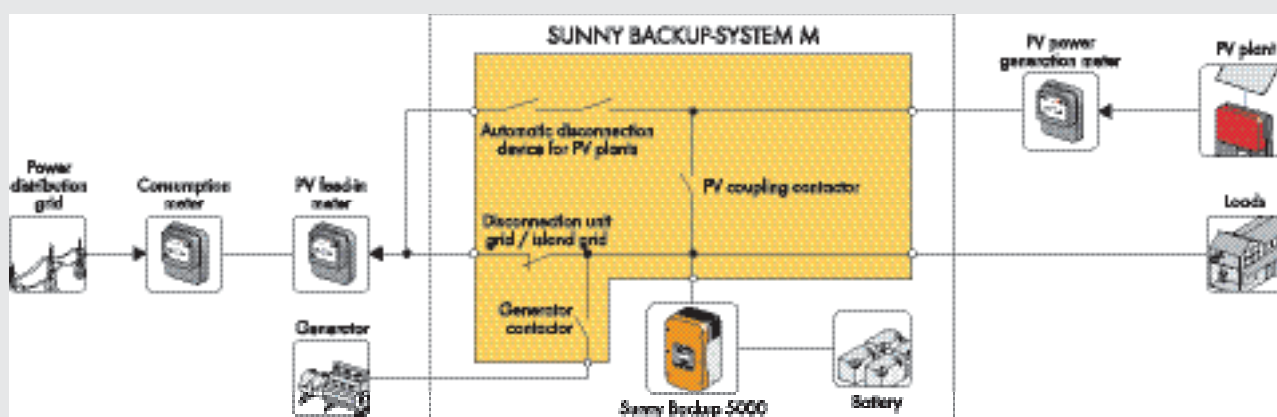
Compared with conventional emergency power systems, the Sunny Backup System scores well. It features the best performance, greatest user benefits and lowest investment and operating costs. As an add-on to a PV system the Sunny Backup automatically switches to stand-alone power supply within approximately 20 milliseconds of a grid failure. Both new and existing PV plants can be equipped with a Sunny Backup System with no effect on PV efficiency. The best part is that due to the integration of the PV plant, a small low-cost battery can be used, as it is usually only needed to bridge the night hours.



Wörrstadt, Germany

SUNNY BACKUP-SYSTEM M / L / XL

Technical Data	Sunny Backup System M	Sunny Backup System L
Output: loads		
Nominal power / current during grid operation	7.4 kW / 32 A at 35°C	35 kW / 3 x 50 A at 35°C
Max. power / current in grid operation for 30 min	8.9 kW / 38 A at 35°C	41 kW / 3 x 60 A at 35°C
Maximum fuse link	40 A	63 A
Backup power (duration / 30 min / 1 min)	5 kW / 6.5 kW / 8.4 kW	15 kW / 19.5 kW / 25.2 kW
Number of phases (grid operation / backup operation)	3 / 3 x 1~	3 / 3
Voltage (range)	230 V (187 V - 253 V)	230 V (187 V - 253 V)
Frequency (range)	50 Hz (45 Hz ... 55 Hz)	50 Hz (45 Hz ... 55 Hz)
Permissible grid structure	TN / TT	TN / TT
Typical interruption time during grid failure	20 ms	20 ms
Input PV plant		
Nominal AC-PV power / current	5.7 kW / 25 A at 35°C	28 kW / 3 x 40 A at 35°C
Maximum size of fuse link	32 A	50 A
Compatible PV inverter	all SB and SMC-A	all SB, SMC and Tripower
Input battery		
Nominal voltage	48 V	48 V
Battery type	VRLA / FLA / NiCd	VRLA / FLA / NiCd
Efficiency / self-consumption		
Max. efficiency in backup operation	94 %	95 %
Self-consumption day / night (silent mode)	48 W / 32 W	103 W / 69 W
Protection devices		
DC reverse polarity protection / deep discharge protection	● / ●	● / ●
AC short circuit / AC overload	● / ●	● / ●
Grid monitoring (SMA Grid Guard) / galvanic separation	● / ●	● / ●
Protection class (according to IEC 62103)	I	I
Overvoltage category (according to IEC 60664)	III	III
General data		
SBU dimensions (W / H / D)	467 / 612 / 235 mm	467 / 612 / 235 mm
AS-Box dimensions (W / H / D)	550 / 950 / 225 mm	800 / 950 / 225 mm
SBU / AS-Box weight	63 kg / 50 kg	63 kg / 70 kg
Operating temperature range	-25°C ... +50°C	-25°C ... +50°C
Climatic class (according to IEC 60721-2-1)	4K4H	4K4H
SBU / AS-Box degree of protection (IP) (according to IEC 60529)	IP30 / IP54	IP30 / IP54
Features / function		
Integrated bypass in case of fault / test operation	● / ●	● / ●
State of charge calculation	●	●
Communication line	5 m	5 m
Array input (nominal power)	Optional (32 A at 35°C)	Optional (40 A at 35°C)
SBU / AS-Box warranty (5 / 10 / 15 / 20 / 25 years)	● / ○ / ○ / ○ / ○	● / ○ / ○ / ○ / ○
240 V voltage range (192.5 - 260.0 V)	○	○
Certificate and approvals (further approvals on request)	CE, VDE 0126-1-1	CE, VDE 0126-1-1
Accessories		
Battery cables	○	○
Battery fuse "BATFUSE"	○	○
Interfaces (RS485 PB) / Multicaster PB	○ / ○	○ / ○
● Standard equipment ○ Optional — not available		
Type designation	SBU5000 and AS-Box-M-20	3 x SBU5000 and AS-Box-L-20



Technical Data	Sunny Backup System XL (only for TN)	
Output: loads		
Nominal power / current during grid operation	110 kW / 3 x 160 A at 25 °C	
Max. power / current in grid operation for 30 min	— / —	
Maximum fuse link	160 A	
Backup power (duration / 30 min / 1 min)	60 kW / 78 kW / 100 kW	
Number of phases (grid operation / backup operation)	3 / 3	
Voltage (range)	230 V (187 V - 253 V)	
Frequency (range)	50 Hz (45 Hz ... 55 Hz)	
Permissible grid structure	TN	
Typical interruption time during grid failure	20 ms	
Input PV plant		
Nominal AC-PV power / current	110 kW / 3 x 160 A at 25 °C	
Maximum size of fuse link	160	
Compatible PV inverter	all SB, SMC and Tripower	
Input battery		
Nominal voltage	48 V	
Battery type	VRLA / FLA / NiCd	
Efficiency / self-consumption		
Max. efficiency in backup operation	95 %	
Self-consumption day / night (silent mode)	360 W / 230 W	
Protection devices		
DC reverse polarity protection / deep discharge protection	● / ●	
AC short circuit / AC overload	● / ●	
Grid monitoring (SMA Grid Guard) / galvanic separation	● / ●	
Protection class (according to IEC 62103)	I	
Overvoltage category (according to IEC 60664)	III	
General data		
SBU dimensions (W / H / D)	467 / 612 / 235 mm	
AS-Box dimensions (W / H / D)	1000 / 1600 / 300 mm	
SBU / AS-Box weight	63 kg / 180 kg	
Operating temperature range	-25 °C ... +50 °C	
Climatic class (according to IEC 60721-2-1)	4K4H	
SBU / AS-Box degree of protection (IP) (according to IEC 60529)	IP30 / IP65	
Features / function		
Integrated bypass in case of fault / test operation	● / ●	
State of charge calculation	●	
Communication line	5 m	
Array input (nominal power)	Optional (160 A at 25 °C)	
SBU / AS-Box warranty (5 / 10 / 15 / 20 / 25 years)	● / ○ / ○ / ○ / ○	
240 V voltage range (192.5 - 260.0 V)	○	
Certificate and approvals (further approvals on request)	CE, VDE 0126-1-1	
Accessories		
Battery cables	○	
Battery fuse "BATFUSE"	○	
Interfaces (RS485 PB) / Multicaster PB	● / ○	
● Standard equipment ○ Optional — not available		
Type designation	12 X SBU 5000 and AS-Box-XL	



Simple

- Can be integrated into existing and new PV systems
- Pre-configured set

Efficient

- Energy supply and battery charging over the grid
- Consistent high PV efficiency

Convenient

- Compact and affordable switching unit
- Smaller battery size due to utilization of the PV energy

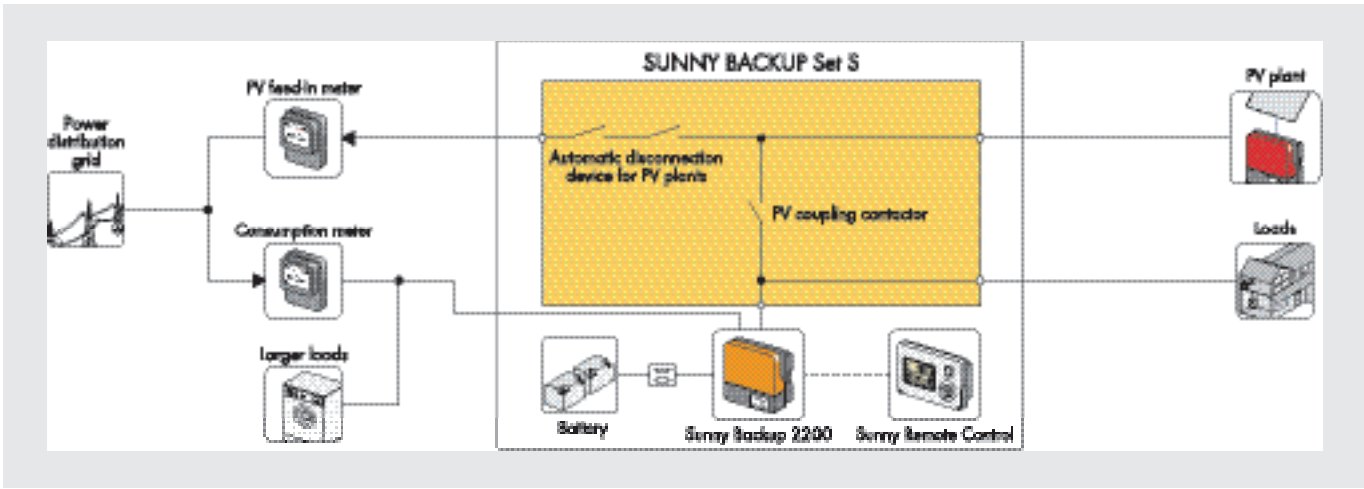
Reliable

- Automatic switching to backup supply in approx. 50 milliseconds
- Automatic disconnection per DIN VDE 0126-1-1 and AS 4777

SUNNY BACKUP Set S

Reliable back-up electricity supply for family homes

The innovative Sunny Backup Set S brings backup power to residential homes. In the event of a grid failure, the Sunny Backup Set S automatically switches to off-grid mode within 50 milliseconds. Whether in summer or winter, owners of small to mid-sized PV systems and SMA inverters can supply their most important electrical loads themselves in case of a blackout. This affordable, complete solution is suitable for both new solar electric systems as well as existing PV systems, which can be easily retrofitted.



Technical Data	Sunny Backup Set S	
Output: loads		
Nominal power / current during grid operation	5.7 kW / 25 W	
Backup power (duration / 30 min / 1 min)	2.2 kW / 2.9 kW / 3.8 kW	
Number of phases (grid operation / backup operation)	1 / 1	
Voltage (range)	230 V (172.5 V – 264.5 V)	
Frequency (range)	50 Hz (45 Hz ... 65 Hz)	
Acceptable grid types	TN	
Typical duration of interruption in case of a grid failure	50 ms	
Input PV plant		
Nominal AC-PV power / current	4.6 kW / 20	
Compatible PV inverters	All Sunny Boy inverters*	
Input battery		
Nominal voltage / number of blocks	24 V / 2 x 12 V	
Battery type, energy / capacity per block	AGM, 3.4 kWh / 142 Ah	
Efficiency / self-consumption		
Maximum efficiency of backup operation	93.6 %	
Self-consumption day / night (silent mode)	40 W / 6 W	
Service life (according to Eurobat)	Service life (according to Eurobat)	
Protection devices		
DC reverse polarity protection / deep discharge protection	– / ●	
AC short circuit / AC overload	● / ●	
Grid monitoring (SMA Grid Guard) / galvanic isolation	● / ●	
General data		
SBU dimensions (W / H / D)	470 / 445 / 180 mm	
AS-Box dimensions (W / H / D)	200 / 300 / 120 mm	
Battery dimensions per block (W / H / D)	498 / 230 / 177 mm	
SBU weight / AS-Box / battery block	19 kg / 4.5 kg / 54.5 kg	
Operating temperature range	-25°C ... +60°C	
Degree of protection of SBU / AS-Box (according to IEC 60529)	IP54 / IP65	
Features / function		
Integrated bypass in case of fault / test operation	● / ●	
State of charge calculation / communication line	● / 5 m	
Array input (nominal power)	–	
SBU 2200 / AS-Box warranty (5 / 10 / 15 / 20 / 25 years)	● / ○ / ○ / ○ / ○	
Battery warranty (2 years)	●	
AS-Box warranty (5 years)	● / ○ / ○ / ○ / ○	
Certificate and approvals (further approvals on request)	CE, VDE 0126-1-1	
Accessories		
Battery cables	4 m	
Battery fuse “BATFUSE”	●	
Interfaces (RS485 PB)	○	
Additional battery parallel / other battery	○ / ○	
External control unit “SRC-1”	●	
* SB 2500, SB 2800, SB 3000 model May 2005 or later		
● Standard features ○ Optional – not available		
Type designation	SBU-Set-S.1	



CENTRAL INVERTERS





Central inverters from SMA:

Leading technology for solar power stations

In recent years, the success of photovoltaics has led to the steady growth of plant sizes. With the Sunny Central product line, SMA offers central inverters intended specifically for high performance installations. Thanks to special properties such as class leading efficiency, string monitoring, direct medium-voltage feed-in, grid management and the option of outdoor installation, this line is optimally suited for use in solar power stations with homogenous structures.

An investment that pays off

From 100 kW Sunny Centrals up to series-produced megawatt stations, SMA Sunny Central inverters are exceptionally cost effective. Whether you are considering the Sunny Central HE series or the new the CP inverters for outdoor use, SMA central inverters, with efficiencies over 98 percent, are the most efficient in their segment. Furthermore, the HE and CP series offer comprehensive grid management functions.

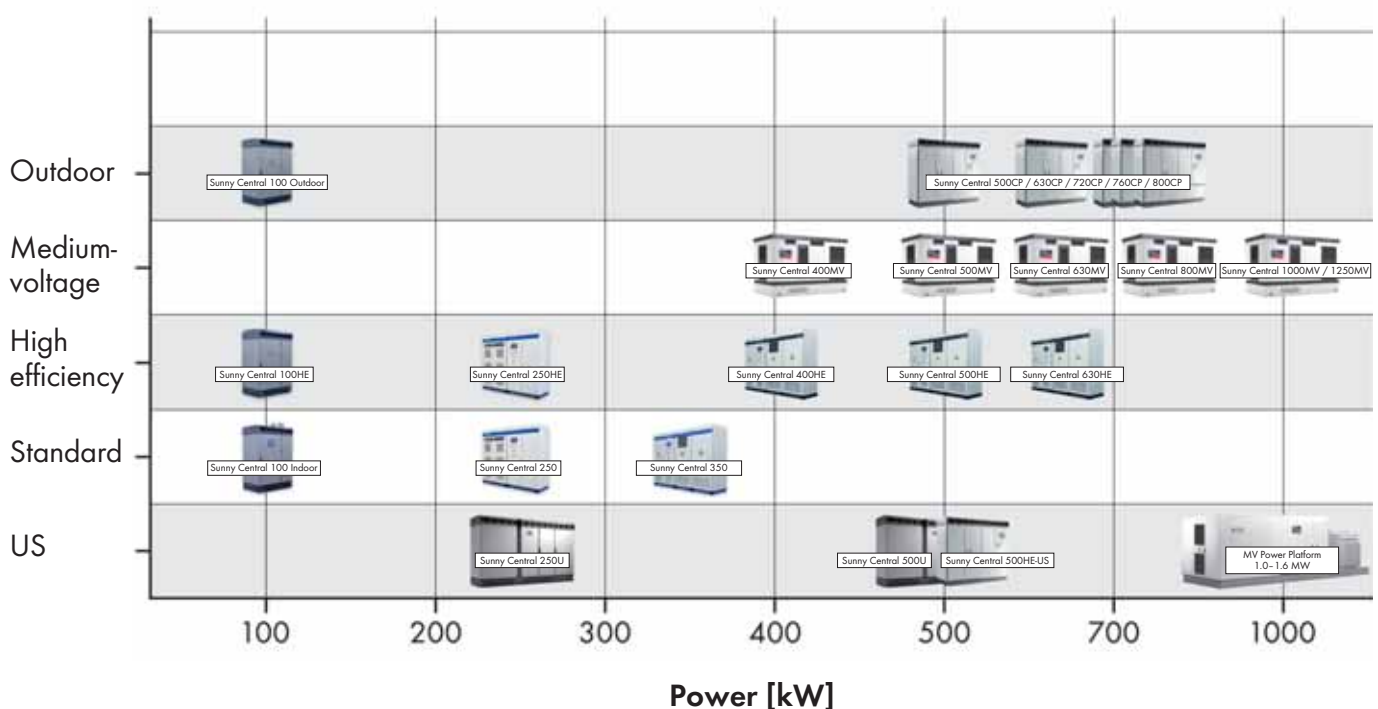
Central inverters with their own weatherproof enclosures also allow for outdoor use, which greatly simplifies transport and installation.

Guarantee of reliability and durability

SMA central inverters have been developed for a minimum lifespan of 20 years because maximum investment security is only ensured when inverters operate reliably over a long period of time. SMA plant monitoring assures additional safety. Thanks to numerous communications interfaces, operators can monitor their plant from any PC around the world via the Internet, allowing yield variations to be recognized and resolved quickly.

» Comprehensive Worldwide Service

SMA not only has many years of experience in the implementation of large solar power plants, but it also offers the appropriate service to match every application. This ensures the highest system availability and most secure investment possible.





Economic

- Outdoor enclosure allows for direct field deployment
- Simplified shipping without concrete substation

Efficient

- Full nominal power at ambient temperatures up to 50 °C (122 °F)
- 10% additional power for constant operation at ambient temperatures up to 25 °C (77 °F)

Flexible

- Powerful grid management functions (including LVRT)
- DC voltage range configurable

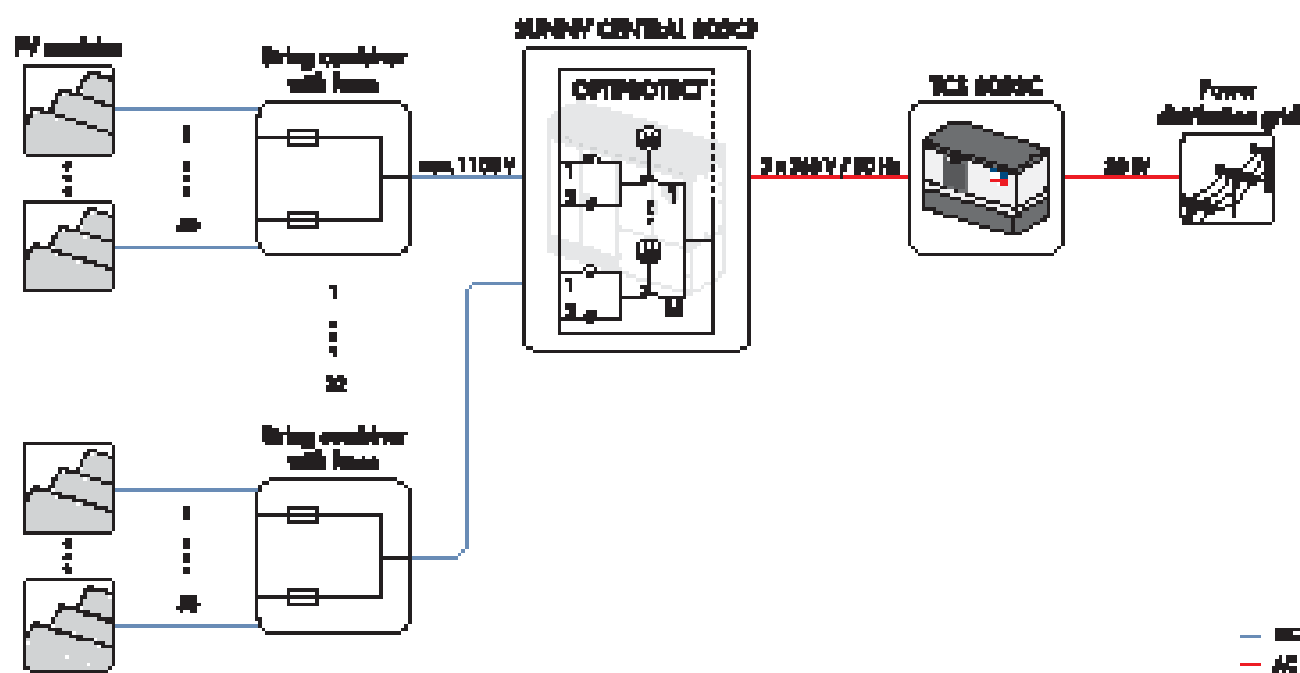
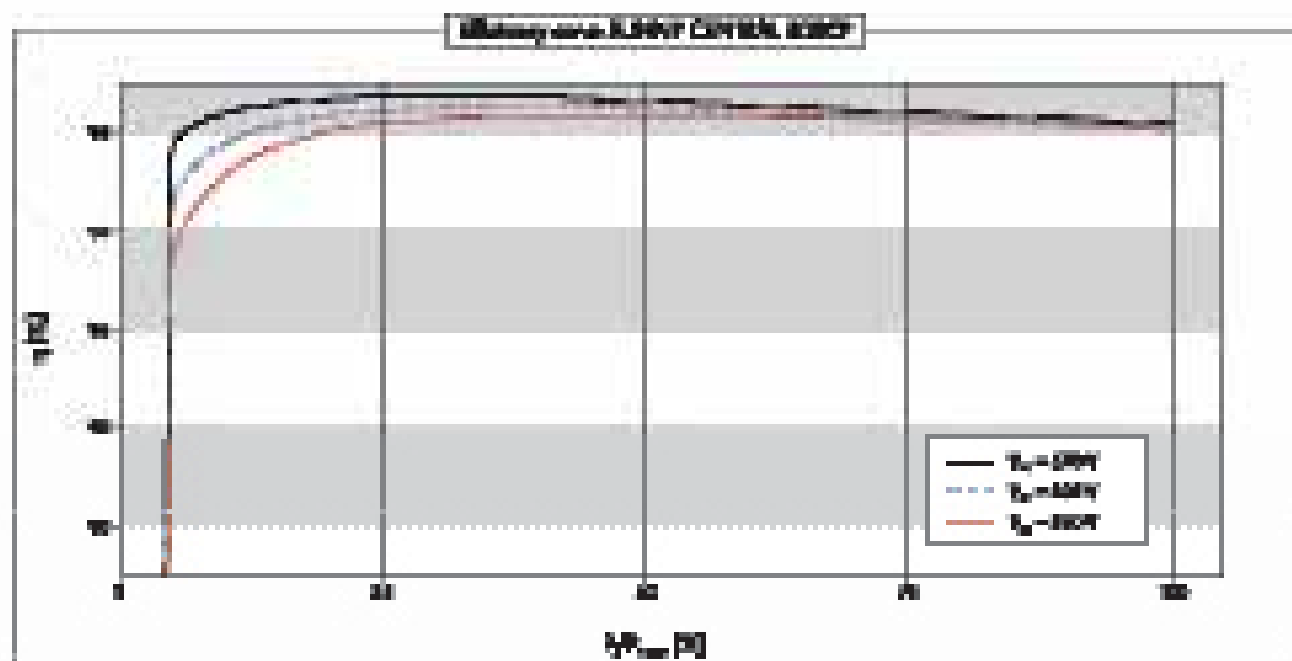
Reliable

- Easy and safe installation due to a separate connection area
- Optional extended input voltage range up to 1100 V

SUNNY CENTRAL 500CP / 630CP / 720CP / 760CP / 800CP

High performance comes standard

The award-winning design of the Sunny Central CP series saves you real money. The compact and weatherproof enclosure is easy to load and transport and can be installed almost anywhere, eliminating the need for heavy, protective concrete substations. The OptiCool™ cooling concept allows it to operate at full nominal power with ambient temperatures up to 50 °C (122 °F). With powerful grid management functions, operators are perfectly prepared for today's utility requirements, as well as those still to come. Intelligent power management is the inverter's most important feature. In continuous operation, the Sunny Central 800CP can feed 880 kVA to the grid at ambient temperatures of up to 25 °C (77 °F). That's 10 percent more than the rated nominal power.



SUNNY CENTRAL

500CP / 630CP / 720CP / 760CP / 800CP

Technical Data	Sunny Central 500CP	Sunny Central 630CP
Input (DC)		
Max. DC power (@ cos φ=1)	560 kW	713 kW
Max. input voltage ¹⁾	1000 V / 1100 V optional	1000 V / 1100 V optional
MPP voltage range (@ 25 °C / @ 50° C at 50 Hz)	449 V – 820 V / 430 V – 820 V ²⁾	529 V – 820 V / 500 V – 820 V ²⁾
MPP voltage range (@ 25° C / @ 50° C at 60 Hz)	449 V – 820 V / 436 V – 820 V ²⁾	529 V – 820 V / 505 V – 820 V ²⁾
Rated input voltage	480 V	550 V
Max. input current	1250 A	1350 A
Minimum input voltage / V _{MPP,min} at I _{MPP} < I _{DC,max}	429 V / 430 V	498 V / 500 V
Number of independent MPP inputs	1	1
Number of DC inputs	9 / 32 (Optiprotect)	9 / 32 (Optiprotect)
Output (AC)		
Rated power (@ 25 °C) / nominal AC power (@ 50 °C)	550 kVA / 500 kVA	700 kVA / 630 kVA
Nominal AC voltage / range	270 V / 243 V – 297 V	315 V / 284 V – 347 V
AC power frequency / range	50 Hz, 60 Hz / 47 Hz ... 63 Hz	50 Hz, 60 Hz / 47 Hz ... 63 Hz
Rated power frequency / rated power voltage	50 Hz / 270 V	50 Hz / 315 V
Max. output current	1176 A	1283 A
Max. THD	< 3 %	< 3 %
Power factor at rated power / adjustable shift factor	1 / 0.9 leading ... 0.9 lagging	
Feed-in phases / connection phases	3 / 3	3 / 3
Efficiency ⁷⁾		
Max. efficiency / European efficiency / CEC efficiency	98.6 % / 98.4 % / 98.5 %	98.7 % / 98.5 % / 98.5 %
Protection		
Input side disconnection device	Motor-driven switch-disconnector / circuit breaker (Optiprotect)	
Output side disconnection device	AC circuit breaker	
DC overvoltage protection / AC overvoltage protection	Surge arrester type II / surge arrester type II	
Grid monitoring	●	●
Ground fault monitoring / Remote ground fault monitoring	○ / ○	○ / ○
Insulation monitoring	○	○
Surge arrester for auxiliary supply	●	●
Protection class (as per IEC 62103) / overvoltage category (as per IEC 60664-1)	I / III	I / III
General Data		
Dimensions (W / H / D)	2562 / 2279 / 956 mm (101 / 90 / 38 inch)	
Weight	1800 kg	1800 kg
Operating temperature range	-20 °C ... +50 °C	-20 °C ... +50 °C
Noise emission ⁵⁾	60 db(A)	60 db(A)
Max. self-consumption (in operation) / self-consumption (at night)	1700 W ⁴⁾ / < 100 W	1700 W ⁴⁾ / < 100 W
External auxiliary supply voltage	230 / 400 V (3 / N / PE)	230 / 400 V (3 / N / PE)
Cooling concept	OptiCool	OptiCool
Degree of protection: electronics / connection area (as per IEC 60529)	IP54 / IP23	IP54 / IP23
Application	Unprotected outdoors	Unprotected outdoors
Maximum permissible value for relative humidity (non-condensing)	15 % ... 95 %	15 % ... 95 %
Maximum operating altitude above MSL	2000 m	2000 m
Fresh air consumption	3000 m³/h	3000 m³/h
Features		
DC terminal	Ring terminal lug / cage terminal (Optiprotect)	Ring terminal lug / cage terminal (Optiprotect)
AC terminal	Ring terminal lug	Ring terminal lug
Display	○	○
Communication protocols	Ethernet (optical fiber optional), modbus	Ethernet (optical fiber optional), modbus
Sunny String-Monitor	RS485 / is not required (Optiprotect)	RS485 / is not required (Optiprotect)
Color of enclosure, door, base, roof	RAL 9016 / 9016 / 7005 / 7004	
Certificates and approvals (more upon request)	EN 61000-6-2, EN 61000-6-4, EEG conformity, Arrêté du 4/23/08, R.D. 1663 / 2000, R.D. 661 / 2007, BDEW-MSRL / FGW / TR8 ⁶⁾	
● Standard features ○ Optional features – Not available		
Type designation	SC 500CP-10	SC 630CP-10

- 1) Startup at DC voltage < 1000 V
- 2) At 1.05 V_{AC, nom} and cos φ = 1
- 3) Further AC voltages, DC voltages and power classes can be configured (for more detailed information, see technical information "Innovations_CP" at www.SMA.de)
- 4) Self-consumption during nominal operation
- 5) Sound pressure level at a distance of 10 m
- 6) With complete dynamic grid support
- 7) Efficiency measured without internal power supply

Sunny Central 720CP	Sunny Central 760CP	Sunny Central 800CP	
808 kW	898 kW	898 kW	
1000 V / 1100 V optional	1000 V / 1100 V optional	1000 V / 1100 V optional	
577 V - 820 V / 525 V - 820 V ^{2) 3)}	609 V - 820 V / 554 V - 820 V ^{2) 3)}	641 V - 820 V / 583 V - 820 V ^{2) 3)}	
577 V - 820 V / 525 V - 820 V ^{2) 3)}	609 V - 820 V / 554 V - 820 V ^{2) 3)}	641 V - 820 V / 583 V - 820 V ^{2) 3)}	
565 V	595 V	620 V	
1400 A	1400 A	1400 A	
515 V / 515 V	545 V / 545 V	568 V / 570 V	
1	1	1	
9 / 32 (Optiprotect)	9 / 32 (Optiprotect)	9 / 32 (Optiprotect)	
792 kVA / 720 kVA	836 kVA / 760 kVA	880 kVA / 800 kVA	
324 V / 292 V - 356 V	342 V / 308 V - 376 V	360 V / 324 V - 396 V	
50 Hz, 60 Hz / 47 Hz ... 63 Hz	50 Hz, 60 Hz / 47 Hz ... 63 Hz	50 Hz, 60 Hz / 47 Hz ... 63 Hz	
50 Hz / 324 V	50 Hz / 342 V	50 Hz / 360 V	
1411 A	1411 A	1411 A	
< 3 %	< 3 %	< 3 %	
	1 / 0.9 leading ... 0.9 lagging		
3 / 3	3 / 3	3 / 3	
98.6 % / 98.4 % / 98.5 %	98.6 % / 98.4 % / 98.5 %	98.6 % / 98.4 % / 98.5 %	
Motor-driven switch-disconnector / circuit breaker (Optiprotect)			
AC circuit breaker			
Surge arrester type II / surge arrester type II			
●	●	●	
○ / ○	○ / ○	○ / ○	
○	○	○	
●	●	●	
I / III	I / III	I / III	
2562 / 2279 / 956 mm (101 / 90 / 38 inch)			
1800 kg	1800 kg	1800 kg	
-20 °C ... +50 °C	-20 °C ... +50 °C	-20 °C ... +50 °C	
60 db(A)	60 db(A)	61 db(A)	
1700 W ⁴⁾ / < 100 W	1700 W ⁴⁾ / < 100 W	1700 W ⁴⁾ / < 100 W	
230 / 400 V (3 / N / PE)	230 / 400 V (3 / N / PE)	230 / 400 V (3 / N / PE)	
OptiCool	OptiCool	OptiCool	
IP54 / IP23	IP54 / IP23	IP54 / IP23	
Unprotected outdoors	Unprotected outdoors	Unprotected outdoors	
15 % ... 95 %	15 % ... 95 %	15 % ... 95 %	
2000 m	2000 m	2000 m	
3000 m ³ /h	3000 m ³ /h	3000 m ³ /h	
Ring terminal lug / cage terminal (Optiprotect)	Ring terminal lug / cage terminal (Optiprotect)	Ring terminal lug / cage terminal (Optiprotect)	
Ring terminal lug	Ring terminal lug	Ring terminal lug	
○	○	○	
Ethernet (optical fiber optional), modbus RS485 / is not required (Optiprotect)	Ethernet (optical fiber optional), modbus RS485 / is not required (Optiprotect)	Ethernet (optical fiber optional), modbus RS485 / is not required (Optiprotect)	
RAL 9016 / 9016 / 7005 / 7004			
EN 61000-6-2, EN 61000-6-4, EMC conformity, CE conformity, Arrêté du 4/23/08, R.D. 1663 / 2000, R.D. 661 / 2007, BDEW-MSRL / FGW / TR8 ⁶⁾			
SC 720CP-10	SC 760CP-10	SC 800CP-10	



Economical

- Low weight results in simplified transport
- Significant savings in access road construction

Simple

- Complete turnkey solution in concrete enclosure
- Ideally suited for CP series central inverters

Innovative

- Optional steel enclosure for varying requirements
- Amorphous transformer for minimum open circuit losses

Modular

- Medium-voltage switchgear for fast construction of PV plants
- Internal power supply transformer to supply the inverters

TRANSFORMER COMPACT STATION 1000SC / 1250SC / 1600SC

The compact solution for the medium-voltage grid

The new Transformer Compact Station is the ideal link between SMA central inverters and the medium-voltage grid. As a complete turnkey solution housed in a concrete design, it provides all necessary options including medium-voltage switchgear and amorphous transformers with greatly reduced open circuit losses. In a steel design, it is significantly smaller and lighter, saving time and reducing costs. The Transformer Compact Station 1600SC includes an adjustable voltage tap that can be controlled easily with a rotary switch. This makes the device the perfect partner for CP series central inverters.

OPTIONS

Amorphous transformer

A transformer with amorphous core reduces open circuit losses by approximately 70 percent compared to a transformer with an iron core (loss class C).

Example: Open circuit losses of a 1,600 kVA transformer with iron core: 1,700 W. Open circuit losses with an amorphous core: 510 W. Energy savings in 20 years: approximately 200,000 kWh.

Medium-voltage switchgear

Using medium-voltage switchgears, several transformer stations can be connected in a string or a ring. This allows the modular construction of large PV farms.

Low-voltage switchgear

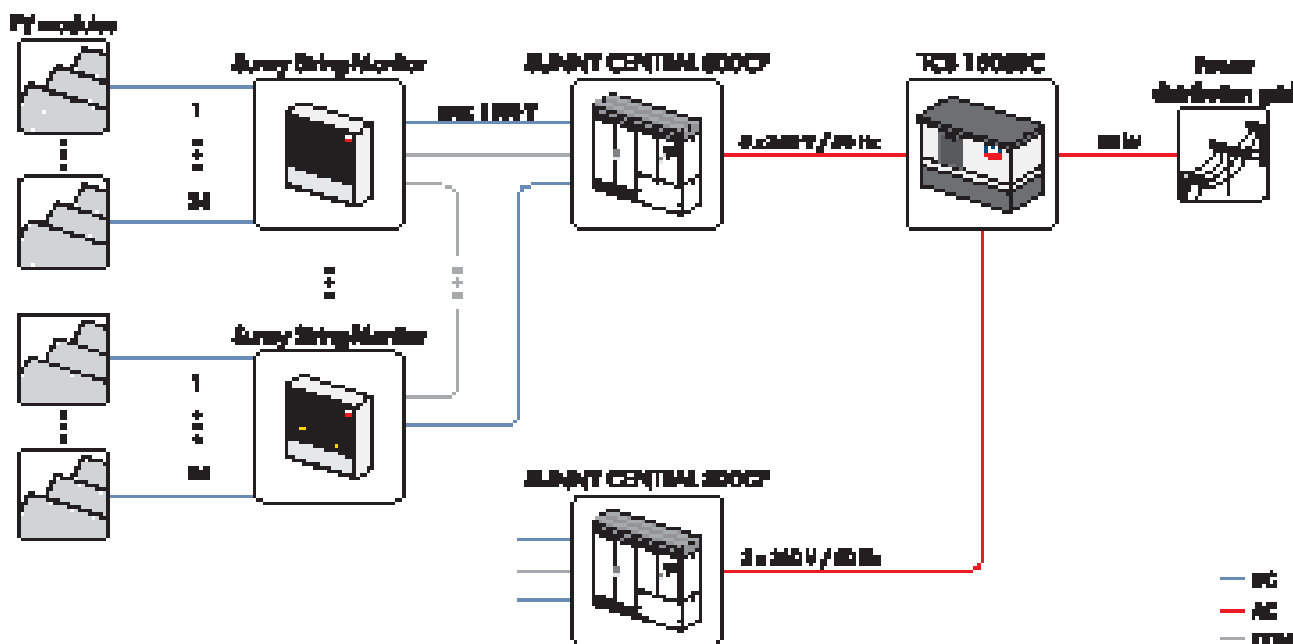
On demand, the standard LV/HRC fuse-switch-disconnectors can be replaced by circuit breakers.

Internal power supply transformer

An internal power supply transformer allows the supply of the transformer station and the connected inverters directly from the medium-voltage grid.

Steel enclosure

With the compact and light steel enclosure, the weight of the transformer station is reduced by 50 to 75 percent – meaning easier and less expensive transport.



TRANSFORMER COMPACT STATION

1000SC / 1250SC / 1600SC

Technical Data	Transformer Compact Station 1000SC	Transformer Compact Station 1250SC
Medium-voltage side		
Rated power (@ 25 °C)	1 100 kVA	1 375 kVA
Nominal AC power (@ 45 °C)	1 000 kVA	1 250 kVA
Rated power voltage	20 kV ¹⁾	20 kV ¹⁾
Nominal AC voltage range	18 kV ... 22 kV	18 kV ... 22 kV
Rated power frequency	50 Hz	50 Hz
Output current	28.9 A	36.4 A
Low-voltage side		
Nominal input voltage	270 V	315 V
2.5 % ²⁾	—	—
5.0 % ²⁾	—	—
7.5 % ²⁾	—	—
10.0 % ²⁾	—	—
12.5 % ²⁾	—	—
Nominal input current	2 x 1070 A	2 x 1155 A
Dimensions and weight		
Dimensions (W / H / D) ³⁾	2380 / 2520 / 2980 mm (93.7 / 99.2 / 117.3 inch)	2380 / 2520 / 2980 mm (93.7/99.2/117.3 inch)
Weight	~12.8 t	~13.6 t
Dimensions (W / H / D) in steel enclosure ³⁾	2300 / 2640 / 3000 mm (90.6/103.9/118.1 inch)	2300 / 2640 / 3000 mm (90.6 / 103.9 / 118.1 inch)
Weight	~5.5 t	~6.3 t
Dimensions (W / H / D) with medium-voltage switchgear ³⁾	2380 / 2520 / 2980 mm (93.7 / 99.2 / 117.3 inch)	2380 / 2520 / 2980 mm (93.7 / 99.2 / 117.3 inch)
Weight	~13.2 t	~14 t
Dimensions (W / H / D) with steel medium-voltage switchgear ³⁾	2300 / 2640 / 3000 mm (90.6 / 103.9 / 118.1 inch)	2300 / 2640 / 3000 mm (90.6 / 103.9 / 118.1 inch)
Weight	~5.9 t	~6.6 t
Features		
Low-voltage switchgear	2 x LV/HRC switch-disconnector	2 x LV/HRC switch-disconnector
Oil-immersed and sealed medium-voltage transformer	Iron core	Iron core
Degree of protection and ambient conditions		
Degree of protection (as per IEC 60529)	IP23	IP23
Application	Unprotected outdoors	Unprotected outdoors
Operating temperature range	-20 °C ... +45 °C	-20 °C ... +45 °C
Permissible maximum value for relative humidity (non-condensing)	15 % ... 95 %	15 % ... 95 %
Maximum operating altitude above MSL	1000 m	1000 m
Options		
Internal power supply transformer	6 kVA ⁴⁾	6 kVA ⁴⁾
Medium-voltage switchgear	RE-T / C-C-T	RE-T/C-C-T
Low-voltage switchgear	2 x circuit breaker	2 x circuit breaker
Prefabricated cable set	5 m / 10 m / 15 m	5 m / 10 m / 15 m
Steel compact station	○	○
Medium-voltage transformer with amorphous core	○	○
Certificates and approvals (more upon request)	IEC 62271-202	IEC 62271-202
● Standard features ○ Optional features — Not available		
Type designation	TCS-1000-SC	TCS-1250-SC

- 1) Further voltages available upon request
 - 2) Adjustable with an on-load-tap-changer on the transformer
 - 3) Data may differ depending on the version and options
 - 4) Additional power classes available on request
- Please note:** The design of the stations is country-specific and may deviate from the station shown in the image.

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- Ideally suited for CP series central inverters

Innovative

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- Amorphous transformer for minimum open circuit losses

Modular

- Medium-voltage switchgear for fast construction of PV plants
- Internal power supply transformer to supply the inverters

TRANSFORMER COMPACT STATION 500SC / 630SC / 800SC

The compact solution for the medium-voltage grid

The new Transformer Compact Station is the ideal link between SMA central inverters and the medium-voltage grid. As a complete turnkey solution housed in a concrete design, it provides all necessary options including medium-voltage switchgear and amorphous transformers with greatly reduced open circuit losses. In a steel design, it is significantly smaller and lighter, saving time and reducing costs. The Transformer Compact Station 800SC includes an adjustable voltage tap that can be controlled easily with a rotary switch. This makes the device the perfect partner for CP series central inverters.

OPTIONS

Amorphous transformer

A transformer with amorphous core reduces open circuit losses by approximately 70 percent compared to a transformer with an iron core (loss class C).

Example: Open circuit losses of a 1,600 kVA transformer with iron core: 1,700 W. Open circuit losses with an amorphous core: 510 W. Energy savings in 20 years: approximately 200,000 kWh.

Medium-voltage switchgear

Using medium-voltage switchgears, several transformer stations can be connected in a string or a ring. This allows the modular construction of large PV farms.

Low-voltage switchgear

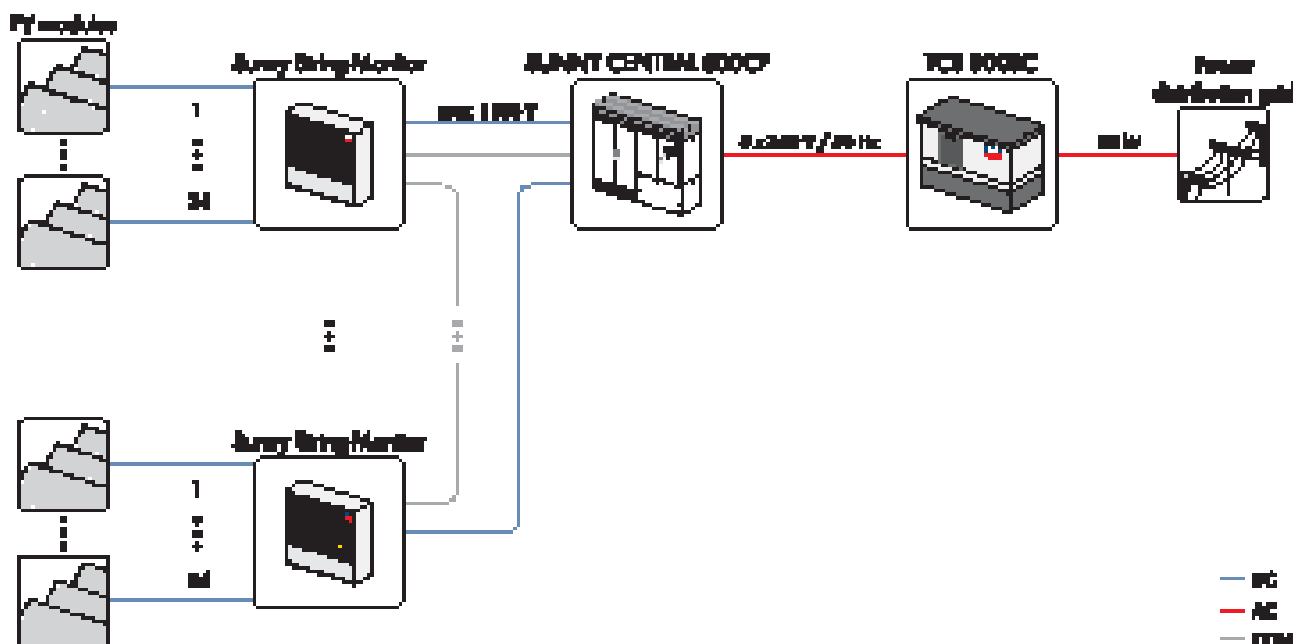
Upon request, the standard LV/HRC fuse-switch-disconnectors can be replaced by circuit breakers.

Internal power supply transformer

An internal power supply transformer allows the supply of the transformer station and the connected inverters directly from the medium-voltage grid.

Steel enclosure

With the compact and light steel enclosure, the weight of the transformer station is reduced by 50 to 75 percent – meaning easier and less expensive transport.



TRANSFORMER COMPACT STATION

500SC / 630SC / 800SC

	Transformer Compact Station 500SC	Transformer Compact Station 630SC
Technical Data		
Medium-voltage side		
Rated power (@ 25 °C)	550 kVA	700 kVA
Nominal AC power (@ 45 °C)	500 kVA	630 kVA
Rated power voltage	20 kV ¹⁾	20 kV ¹⁾
Nominal AC voltage range	18 kV ... 22 kV	18 kV ... 22 kV
Rated power frequency	50 Hz	50 Hz
Nominal output current	14.5 A	18.2 A
Low-voltage side		
Nominal input voltage	270 V	315 V
2.5 % ²⁾	—	—
5.0 % ²⁾	—	—
7.5 % ²⁾	—	—
10.0 % ²⁾	—	—
12.5 % ²⁾	—	—
Nominal input current	1070 A	1155 A
Dimensions and weight		
Dimensions (W/H/D) ³⁾	1900 / 2380 / 2320 mm (74.8 / 93.7 / 91.3 inch)	1900 / 2380 / 2320 mm (74.8 / 93.7 / 91.3 inch)
Weight	~9.4 t	~9.4 t
Dimensions (W/H/D) in steel enclosure ³⁾	2300 / 2340 / 3000 mm (90.6 / 92.1 / 118.1 inch)	2300 / 2340 / 3000 mm (90.6 / 92.1 / 118.1 inch)
Weight	~3.5 t	~3.5 t
Dimensions (W/H/D) with medium-voltage switchgear ³⁾	1900 / 2380 / 2820 mm (74.8 / 93.7 / 111 inch)	1900 / 2380 / 2820 mm (74.8 / 93.7 / 111 inch)
Weight	~10.9 t	~10.9 t
Dimensions (W/H/D) with steel medium-voltage switchgear ³⁾	2300 / 2340 / 3000 mm (90.6 / 92.1 / 118.1 inch)	2300 / 2340 / 3000 mm (90.6 / 92.1 / 118.1 inch)
Weight	~3.9 t	~3.9 t
Features		
Low-voltage switchgear	1 x LV/HRC switch-disconnector	1 x LV/HRC switch-disconnector
Oil-immersed and sealed medium-voltage transformer	Iron core	Iron core
Degree of protection and ambient conditions		
Degree of protection (as per IEC 60529)	IP23	IP23
Application	Unprotected outdoors	Unprotected outdoors
Operating temperature range	-20 °C ... +45 °C	-20 °C ... +45 °C
Permissible maximum value for relative humidity (non-condensing)	15 % ... 95 %	15 % ... 95 %
Maximum operating altitude above MSL	1000 m	1000 m
Options		
Internal power supply transformer	3 kVA ⁴⁾	3 kVA ⁴⁾
Medium-voltage switchgear	RE-T / C-C-T	RE-T / C-C-T
Low-voltage switchgear	1 x circuit breaker	1 x circuit breaker
Prefabricated cable set	5 m / 10 m / 15 m	5 m / 10 m / 15 m
Steel compact station	O	O
Medium-voltage transformer with amorphous core	O	O
Certificates and approvals (more upon request)	IEC 62271-202	IEC 62271-202
● Standard features ○ Optional features — Not available		
Type designation	TCS-500-SC	TCS-630-SC

- 1) Further voltages available upon request
 - 2) Adjustable with an on-load-tap-changer on the transformer
 - 3) Data may differ depending on the version and options
 - 4) Additional power classes available on request
- Please note:** The design of the stations is country-specific and may deviate from the station shown in the image.

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Efficient

- Greater efficiency without low-voltage transformers due to direct connection to the medium-voltage grid

Turnkey Delivery

- Complete with medium-voltage transformer and concrete substation for outdoor installation

Optional

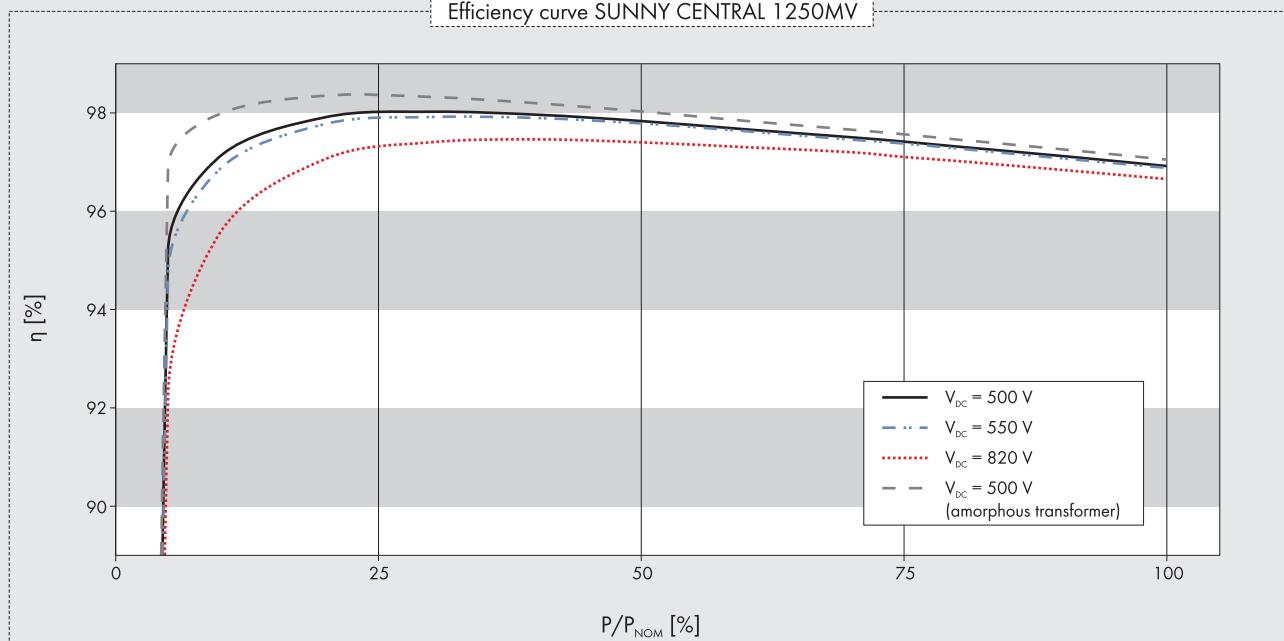
- Medium-voltage switchgear systems for a flexible structure in designing large solar plants
- AC transfer station with measurement
- Medium-voltage transformers for other grid voltages (deviating from 20 kV)

SUNNY CENTRAL for direct medium-voltage feed-in 800MV / 1000MV / 1250MV

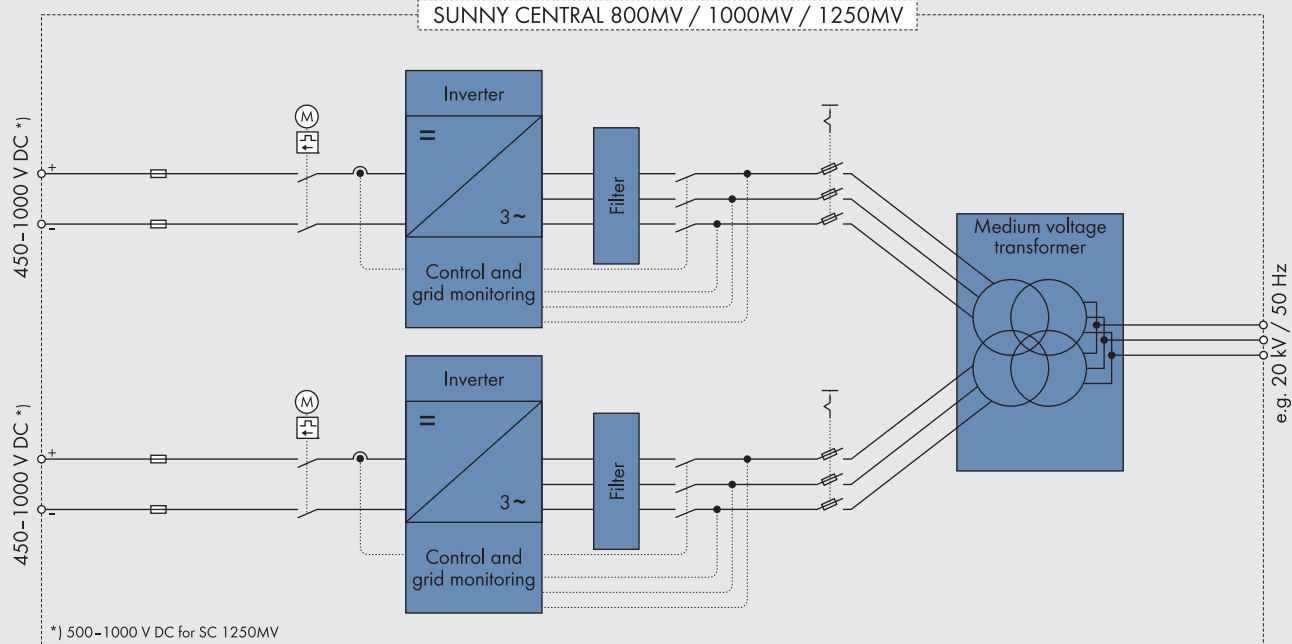
High-performance medium-voltage station

For even more power, two Sunny Central HE inverters can be combined in a medium-voltage station (MV), which feeds directly into a shared medium-voltage transformer. For example, two Sunny Central 630HE inverters can be combined into a powerful Sunny Central 1250MV station. By removing the need for low-voltage transformers, efficiency is increased and, at the same time, inverter costs are lowered. The Sunny Central MV also offers flexibility for the future. It is the first central inverter to fulfill the requirements of the Medium-Voltage Directive, making it an investment that will continue to pay off in the coming years.

Efficiency curve SUNNY CENTRAL 1250MV



SUNNY CENTRAL 800MV / 1000MV / 1250MV



SUNNY CENTRAL for direct medium-voltage feed-in

800MV / 1000MV / 1250MV

Technical Data	Sunny Central 800MV	Sunny Central 1000MV
Input (DC)		
Max. DC power (@ cos φ=1)	909 kW	1133 kW
Max. input voltage	1000 V	1000 V
MPP voltage range (@ 25 °C / @ 45 °C at 50 Hz) ¹⁾	450 V – 820 V / 450 V – 820 V	450 V – 820 V / 450 V – 820 V
MPP voltage range (@ 25 °C at 60 Hz) ¹⁾	450 V – 820 V	450 V – 820 V
Rated input voltage	500 V	500 V
Max. input current	1986 A	2484 A
Minimum input voltage	450 V	450 V
Number of independent MPP inputs	2	2
Number of DC inputs	(16+16) + 4 DCHV	(16+16) + 4 DCHV
Output (AC)		
Rated power (@ 25 °C) / nominal AC power (@ 45 °C)	880 kVA / 800 kVA	1100 kVA / 1000 kVA
Nominal AC voltage / range	20000 V / 18000 V – 22000 V	20000 V / 18000 V – 22000 V
AC power frequency / range	50 Hz, 60 Hz / 47 Hz ... 63 Hz	50 Hz, 60 Hz / 47 Hz ... 63 Hz
Rated power frequency / rated power frequency	50 Hz / 20000 V	50 Hz / 20000 V
Max. output current	25.4 A	31.8 A
Max. THD	< 3 %	< 3 %
Power factor at rated power / adjustable shift factor	1 / 0.9 leading ... 0.9 lagging	
Feed-in phases / connection phases	3 / 3	3 / 3
Efficiency ²⁾		
Max. efficiency / European efficiency	97.7 % / 97.3 %	97.9 % / 97.5 %
Protection		
Input side disconnection device	Motor-driven switch-disconnector on DC side	
Output side disconnection device	AC fuse-switch-disconnector	
DC overvoltage protection / AC overvoltage protection	Surge arrester type II / surge arrester type I	
Grid monitoring	●	●
Ground fault monitoring / Remote ground fault monitoring	● / ○	● / ○
Insulation monitoring	●	●
Galvanic isolation	●	●
Surge arrester for auxiliary supply	●	●
Protection class (as per IEC 62103)	I	I
General Data		
Dimensions (W / H / D)	5400 / 3620 / 3000 mm (212.6 / 142.5 / 118.1 inch)	
Weight	35000 kg / 77162 lb	35000 kg / 77162 lb
Operating temperature range	-20 °C ... +45 °C / -4 °F ... +113 °F	-20 °C ... +45 °C / -4 °F ... +113 °F
Max. self-consumption (in operation) / self-consumption (at night)	3000 W ³⁾ / < 180 W + 1100 W ⁵⁾	3000 W ³⁾ / < 180 W + 1100 W ⁵⁾
External auxiliary supply voltage / External back-up fuse for auxiliary supply	3 x 230 V, 50 / 60 Hz / B 20 A, 3-pole	
Cooling concept	Forced cooling	Forced cooling
Degree of protection: electronics / connection area (as per IEC 60529)	IP20 / IP54	IP20 / IP54
Application	Unprotected outdoors	Unprotected outdoors
Maximum permissible value for relative humidity (non-condensing)	15 % ... 95 %	15 % ... 95 %
Maximum operating altitude above MSL	1000 m	1000 m
Fresh air consumption	12400 m ³ /h	12400 m ³ /h
Features		
DC terminal	Ring terminal lug / cage terminal	Ring terminal lug / cage terminal
AC terminal	Ring terminal lug	Ring terminal lug
Display	LC text display	LC text display
Communication interfaces / Sunny String-Monitor	Ethernet, modbus / RS485	Ethernet, modbus / RS485
Analog inputs / overvoltage protection for analog inputs	4 x Ain ⁴⁾ / ○	4 x Ain ⁴⁾ / ○
Internal power supply transformer	○	○
Medium-voltage transformer with amorphous core	○	○
Medium-voltage switchgear	○	○
Color of enclosure / door / base / roof	RAL 7035 / 7024 / 7024 / 7024	RAL 7035 / 7024 / 7024 / 7024
Certificates and approvals (more upon request)	EN 61000-6-2, EN 61000-6-4, EMC conformity, CE conformity, BDEW-MSRL / FGW / TR8 ⁶⁾ , Arrêté du 4/23/08, R.D. 1663 / 2000, R.D. 661 / 2007	
● Standard features ○ Optional features – Not available		
Type designation	SC 800MV-11	SC 1000MV-11

HE: High Efficiency, inverter without galvanic isolation for connection to a medium-voltage transformer (taking into account the SMA specification for the transformer)

- 1) At $1.05 V_{AC, nom}$ and $\cos \varphi = 1$
- 2) Efficiency measured without an internal power supply at $V_{DC} = 500 V$
- 3) Maximum power in one phase for each inverter < 1400 W (asymmetrical consumption)
- 4) Each with 1x irradiation sensor and 1x pyranometer
- 5) Disconnected according to the transformer's open circuit losses and inverter consumption
- 6) With limited dynamic grid support

Please note: In certain countries the stations may differ from the concept shown in the images.

Technical Data	Sunny Central 1250MV	
Input (DC)		
Max. DC power (@ $\cos \varphi = 1$)	1448 kW	
Max. input voltage	1000 V	
MPP voltage range (@ 25 °C / @ 45 °C at 50 Hz) ¹⁾	500 V – 820 V / 500 V – 820 V	
MPP voltage range (@ 25 °C at 60 Hz) ¹⁾	510 V – 820 V	
Rated input voltage	550 V	
Max. input current	2844 A	
Minimum input voltage	500 V	
Number of independent MPP inputs	2	
Number of DC inputs	(16+16) + 4 DCHV	
Output (AC)		
Rated power (@ 25 °C) / nominal AC power (@ 45 °C)	1400 kVA / 1250 kVA	
Nominal AC voltage / range	20000 V / 18000 V – 22000 V	
AC power frequency / range	50 Hz, 60 Hz / 47 Hz ... 63 Hz	
Rated power frequency / rated power frequency	50 Hz / 20000 V	
Max. output current	40.4 A	
Max. THD	< 3 %	
Power factor at rated power / adjustable shift factor	1 / 0.9 leading ... 0.9 lagging	
Feed-in phases / connection phases	3 / 3	
Efficiency ²⁾		
Max. efficiency / European efficiency	97.8 % / 97.4 %	
Protection		
Input side disconnection device	Motor-driven switch disconnecter on DC side	
Output side disconnection device	AC fuse-switch-disconnector	
DC overvoltage protection / AC overvoltage protection	Surge arrester type II / surge arrester type I	
Grid monitoring	●	
Ground fault monitoring / Remote ground fault monitoring	● / ○	
Insulation monitoring	●	
Galvanic isolation	●	
Surge arrester for auxiliary supply	●	
Protection class (as per IEC 62103)	I	
General Data		
Dimensions (W / H / D)	5400 / 3620 / 3000 mm (212.6 / 142.5 / 118.1 inch)	
Weight	35000 kg / 77162 lb	
Operating temperature range	-20 °C ... +45 °C / -4 °F ... +113 °F	
Max. self-consumption (in operation) / self-consumption (at night)	3000 W ³⁾ / < 180 W + 1350 W ⁵⁾	
External auxiliary supply voltage / External back-up fuse for auxiliary supply	3 x 230 V, 50 / 60 Hz / B 20 A, 3-pole	
Cooling concept	Forced cooling	
Degree of protection: electronics / connection area (as per IEC 60529)	IP20 / IP54	
Application	Unprotected outdoors	
Maximum permissible value for relative humidity (non-condensing)	15 % ... 95 %	
Maximum operating altitude above MSL	1000 m	
Fresh air consumption	12400 m ³ /h	
Features		
DC terminal	Ring terminal lug / cage terminal	
AC terminal	Ring terminal lug	
Display	LC text display	
Communication interfaces / Sunny String-Monitor	Ethernet, modbus / RS485	
Analog inputs / overvoltage protection for analog inputs	4 x Ain ⁴⁾ / ○	
Internal power supply transformer	○	
Medium-voltage transformer with amorphous core	○	
Medium-voltage switchgear	○	
Color of enclosure / door / base / roof	RAL 7035 / 7024 / 7024 / 7024	
Certificates and approvals (more upon request)	EN 61000-6-2, EN 61000-6-4, EMC conformity, CE conformity, BDEW-MSRL / FGW / TR8 ⁶⁾ , Arrêté du 4/23/08, R.D. 1663 / 2000, R.D. 661 / 2007	
● Standard features ○ Optional features – Not available		
Type designation	SC 1250MV-11	



Efficient

- Greater efficiency without low voltage transformers due to direct connection to the medium-voltage grid

Turnkey Delivery

- Complete with medium-voltage transformer and concrete substation for outdoor installation

Optional

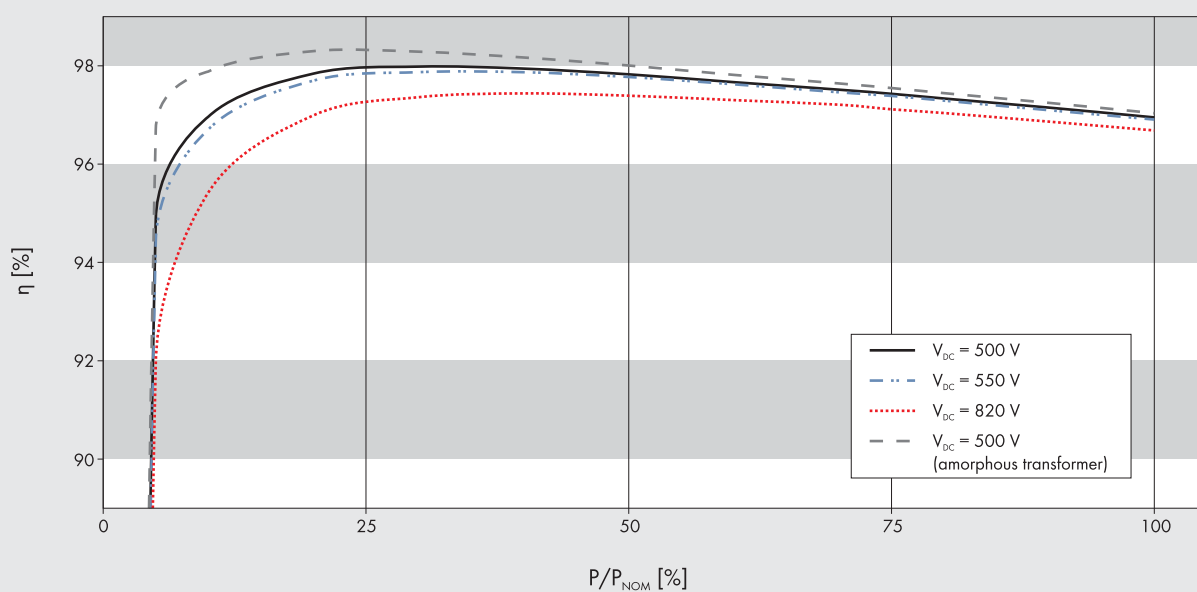
- Medium-voltage switchgear systems for a flexible structure in designing large solar plants
- AC transfer station with measurement
- Medium-voltage transformers for other grid voltages (deviating from 20 kV)

SUNNY CENTRAL for direct medium-voltage feed-in 400MV / 500MV / 630MV

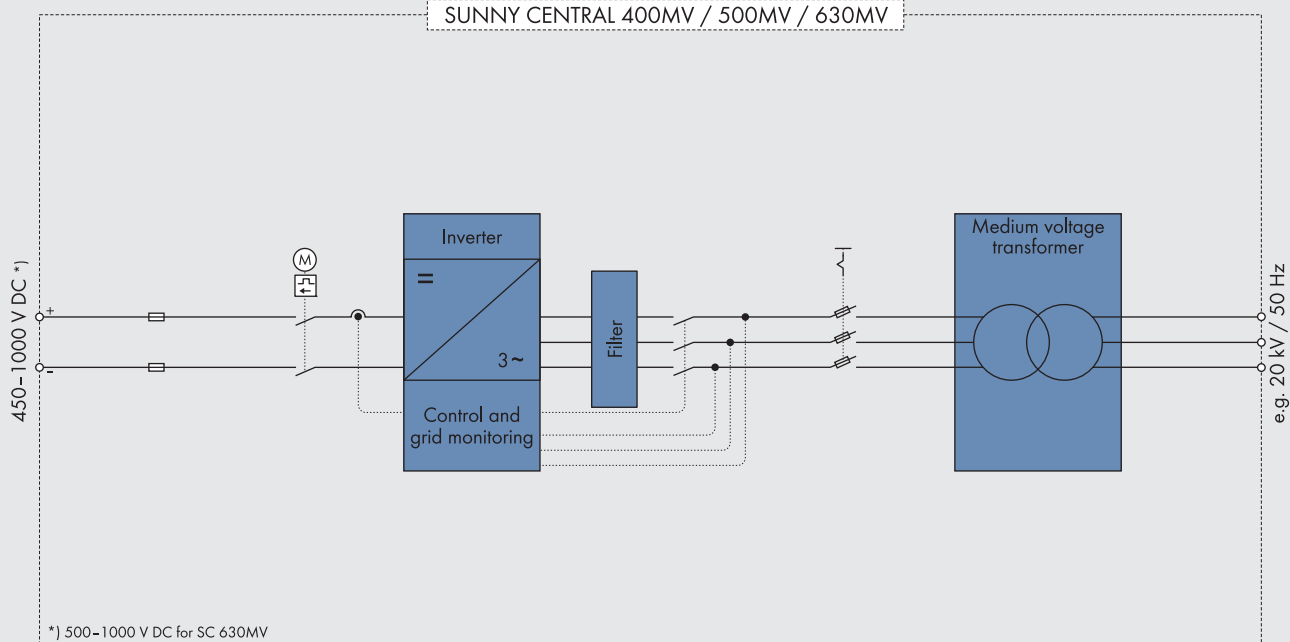
The compact station for safe grid management

Equipped with a new SMA HE central inverter and a medium-voltage transformer, the Sunny Central MV feeds directly into the medium-voltage grid. By removing the need for low-voltage transformers, efficiency is increased and, at the same time, inverter costs are lowered. The Sunny Central MV is delivered as a "turnkey" concrete substation for outside installation. The Sunny Central MV also actively participates in grid management, fulfilling all requirements of the Medium-Voltage Directive.

Efficiency curve SUNNY CENTRAL 630MV



SUNNY CENTRAL 400MV / 500MV / 630MV



SUNNY CENTRAL for direct medium-voltage feed-in

400MV / 500MV / 630MV

Technical Data	Sunny Central 400MV	Sunny Central 500MV
Input (DC)		
Max. DC power (@ cos φ=1)	455 kW	567 kW
Max. input voltage	1000 V	1000 V
MPP voltage range (@ 25 °C / @ 45 °C at 50 Hz) ¹⁾	450 V - 820 V / 450 V - 820 V	450 V - 820 V ¹⁾
MPP voltage range (@ 25 °C at 60 Hz) ¹⁾	450 V - 820 V	450 V - 820 V ¹⁾
Rated input voltage	500 V	500 V
Max. input current	993 A	1242 A
Minimum input voltage	450 V	450 V
Number of independent MPP inputs	1	1
Number of DC inputs	(8+8) + 2 DCHV	(8+8) + 2 DCHV
Output (AC)		
Rated power (@ 25 °C) / nominal AC power (@ 45 °C)	440 kVA / 400 kVA	550 kVA / 500 kVA
Nominal AC voltage / range	20000 V / 18000 V - 22000 V	20000 V / 18000 V - 22000 V
AC power frequency / range	50 Hz, 60 Hz / 47 Hz ... 63 Hz	50 Hz, 60 Hz / 47 Hz ... 63 Hz
Rated power frequency / rated power frequency	50 Hz / 20000 V	50 Hz / 20000 V
Max. output current	12.7 A	15.9 A
Max. THD	< 3 %	< 3 %
Power factor at rated power / adjustable shift factor	1 / 0.9 leading ... 0.9 lagging	
Feed-in phases / connection phases	3 / 3	3 / 3
Efficiency ²⁾		
Max. efficiency / European efficiency	97.5 % / 97.1 %	97.7 % / 97.3 %
Protection		
Input side disconnection device	Motor-driven DC switch-disconnector	
Output side disconnection device	AC fuse-switch-disconnector	
DC overvoltage protection / AC overvoltage protection	Surge arrester type II / surge arrester type I	
Grid monitoring	●	●
Ground fault monitoring / Remote ground fault monitoring	● / ○	● / ○
Insulation monitoring	●	●
Galvanic isolation	●	●
Surge arrester for auxiliary supply	●	●
Protection class (as per IEC 62103)	I	I
General Data		
Dimensions (W / H / D)	5300 / 3600 / 2500 mm (208.7 / 141.7 / 98.4 inch)	
Weight	30000 kg / 66139 lb	30000 kg / 66139 lb
Operating temperature range	-20 °C ... +45 °C / -4 °F ... +113 °F	-20 °C ... +45 °C / -4 °F ... +113 °F
Max. self-consumption (in operation) / self-consumption (at night)	1500 W ³⁾ / < 100 W + 720 W ⁵⁾	1500 W ³⁾ / < 100 W + 720 W ⁵⁾
External auxiliary supply voltage / External back-up fuse for auxiliary supply	3 x 230 V, 50 / 60 Hz / B 20 A, 3-pole	
Cooling concept	Forced cooling	Forced cooling
Degree of protection: electronics / connection area (as per IEC 60529)	IP20 / IP54	IP20 / IP54
Application	Unprotected outdoors	Unprotected outdoors
Maximum permissible value for relative humidity (non-condensing)	15 % ... 95 %	15 % ... 95 %
Maximum operating altitude above MSL	1000 m	1000 m
Fresh air consumption	6200 m ³ /h	6200 m ³ /h
Features		
DC terminal	Ring terminal lug / cage terminal	Ring terminal lug / cage terminal
AC terminal	Ring terminal lug	Ring terminal lug
Display	LC text display	LC text display
Communication interfaces / Sunny String-Monitor	Ethernet, modbus / RS485	Ethernet, modbus / RS485
Analog inputs / overvoltage protection for analog inputs	2 x Ain ⁴⁾ / ○	2 x Ain ⁴⁾ / ○
Internal power supply transformer	○	○
Medium-voltage transformer with amorphous core	○	○
Medium-voltage switchgear	○	○
Color of enclosure / door / base / roof	RAL 7035 / 7024 / 7024 / 7024	RAL 7035 / 7024 / 7024 / 7024
Certificates and approvals (more upon request)	EN 61000-6-2, EN 61000-6-4, EMC conformity, CE conformity, BDEW-MSRL / FGW / TR8 ⁶⁾ , Arrêté du 4/23/08, R.D. 1663 / 2000, R.D. 661 / 2007	
● Standard features ○ Optional features – Not available		
Type designation	SC 400MV-11	SC 500MV-11

HE: High Efficiency, inverter without galvanic isolation for connection to a medium-voltage transformer (taking into account the SMA specification for the transformer)

- 1) At $1.05 V_{AC, nom}$ and $\cos \varphi = 1$
- 2) Efficiency measured without an internal power supply at $V_{DC} = 500 V$
- 3) Maximum power in a phase for each inverter < 1400 W (asymmetrical consumption)
- 4) Each with 1x irradiation sensor and 1x pyranometer
- 5) Disconnected according to the transformer's open circuit losses and inverter consumption
- 6) Applies to BDEW-MSRL/FGW/TR8: with limited dynamic grid support

Please note: In certain countries the substations may differ from the concept shown in the images.

Technical Data	Sunny Central 630MV	
Input (DC)		
Max. DC power (@ $\cos \varphi = 1$)	723 kW	
Max. input voltage	1000 V	
MPP voltage range (@ 25 °C / @ 45 °C at 50 Hz) ¹⁾	500 V – 820 V / 500 V – 820 V	
MPP voltage range (@ 25 °C at 60 Hz) ¹⁾	510 V – 820 V	
Rated input voltage	550 V	
Max. input current	1422 A	
Minimum input voltage	500 V	
Number of independent MPP inputs	1	
Number of DC inputs	(8+8) + 2 DCHV	
Output (AC)		
Rated power (@ 25 °C) / nominal AC power (@ 45 °C)	700 kVA / 630 kVA	
Nominal AC voltage / range	20000 V / 18000 V – 22000 V	
AC power frequency / range	50 Hz, 60 Hz / 47 Hz ... 63 Hz	
Rated power frequency / rated power frequency	50 Hz / 20000 V	
Max. output current	20.2 A	
Max. THD	< 3 %	
Power factor at rated power / adjustable shift factor	1 / 0.9 leading ... 0.9 lagging	
Feed-in phases / connection phases	3 / 3	
Efficiency ²⁾		
Max. efficiency / European efficiency	97.8 % / 97.4 %	
Protection		
Input side disconnection device	Motor-driven switch-disconnector on DC side	
Output side disconnection device	AC fuse-switch-disconnector	
DC overvoltage protection / AC overvoltage protection	Surge arrester type II / surge arrester type I	
Grid monitoring	●	
Ground fault monitoring / Remote ground fault monitoring	● / ○	
Insulation monitoring	●	
Galvanic isolation	●	
Surge arrester for auxiliary supply	●	
Protection class (as per IEC 62103)	I	
General Data		
Dimensions (W / H / D)	5300 / 3600 / 2500 mm (208.7 / 141.7 / 98.4 inch)	
Weight	30000 kg / 66139 lb	
Operating temperature range	-20 °C ... +45 °C / -4 °F ... +113 °F	
Max. self-consumption (in operation) / self-consumption (at night)	1500 W ³⁾ / < 100 W + 860 W ⁵⁾	
External auxiliary supply voltage / External back-up fuse for auxiliary supply	3 x 230 V, 50 / 60 Hz / B 20 A, 3-pole	
Cooling concept	Forced cooling	
Degree of protection: electronics / connection area (as per IEC 60529)	IP20 / IP54	
Application	Unprotected outdoors	
Maximum permissible value for relative humidity (non-condensing)	15 % ... 95 %	
Maximum operating altitude above MSL	1000 m	
Fresh air consumption	6200 m ³ /h	
Features		
DC terminal	Ring terminal lug / cage terminal	
AC terminal	Ring terminal lug	
Display	LC text display	
Communication interfaces / Sunny String-Monitor	Ethernet, modbus / RS485	
Analog inputs / overvoltage protection for analog inputs	2 x Ain ⁴⁾ / ○	
Internal power supply transformer	○	
Medium-voltage transformer with amorphous core	○	
Medium-voltage switchgear	○	
Color of enclosure / door / base / roof	RAL 7035 / 7024 / 7024 / 7024	
Certificates and approvals (more upon request)	EN 61000-6-2, EN 61000-6-4, EMC conformity, CE conformity, BDEW-MSRL / FGW / TR8 ⁶⁾ , Arrêté du 4/23/08, R.D. 1663 / 2000, R.D. 661 / 2007	
● Standard features ○ Optional features – Not available		
Type designation	SC630MV-11	



Turnkey

- Modular power solution allows for rapid field deployment
- Conversion, distribution and control functions included
- Customizable service options

Innovative

- Based on award-winning SMA Sunny Central technology
- Leading grid management functions available

Secure

- Renowned SMA manufacturing standards ensure long term operation
- Diverse service options address project-specific needs

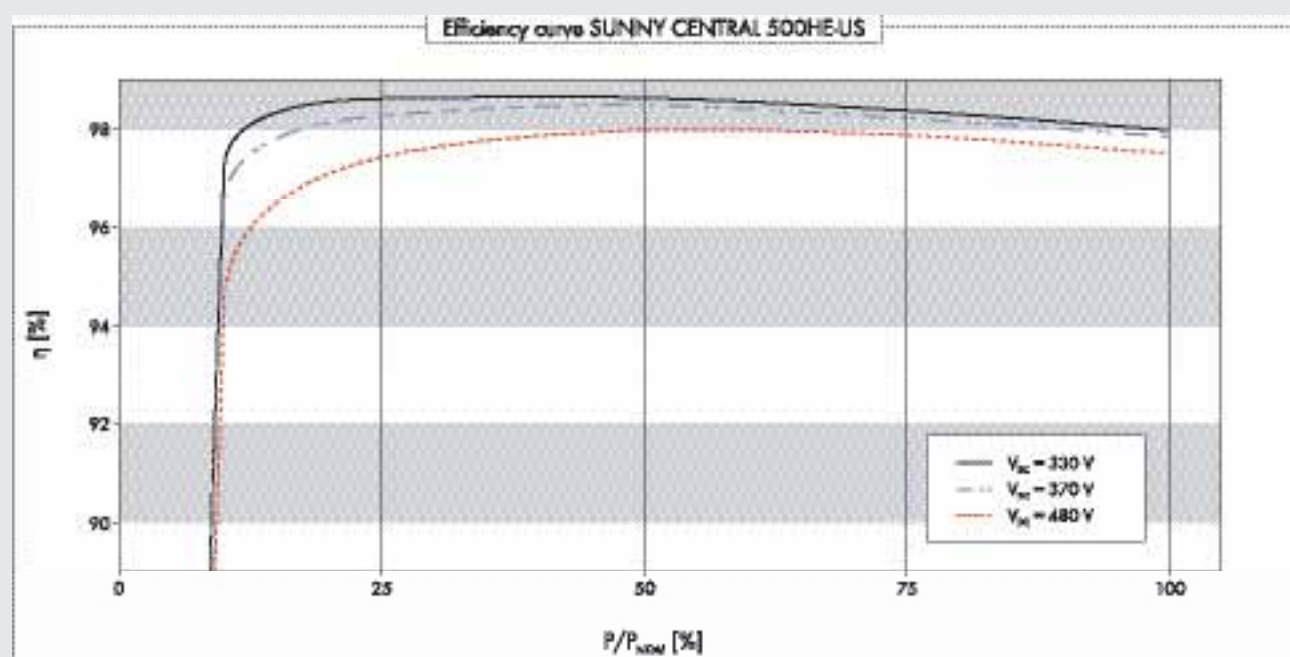
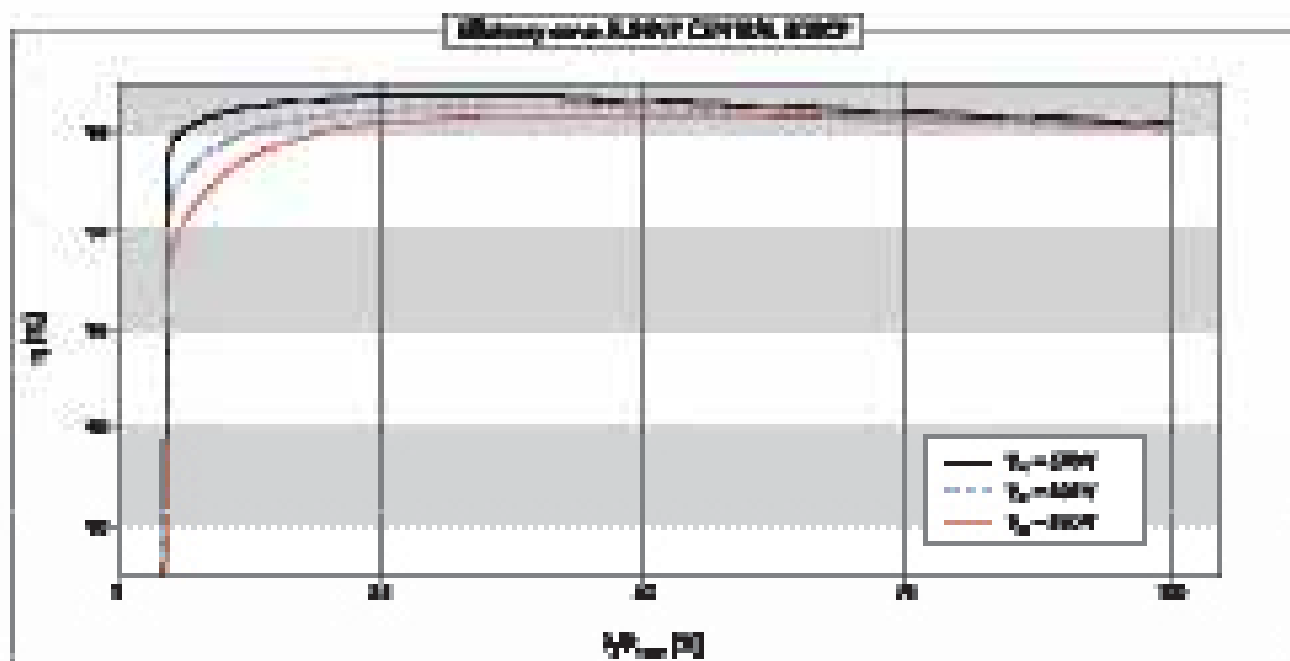
Flexible

- Available as an open platform, with a canopy shade or as a full steel enclosure
- Can be installed on a concrete slab, piers or vault

MV POWER PLATFORM 1.0 / 1.25 / 1.4 / 1.5 / 1.6 MW

Modular utility-scale power solution

The SMA MV Power Platform—available as an open, shaded or enclosed structure—provides the most cost-effective way to modularly install large-scale PV power converters. These 1.0–1.6 megawatt medium-voltage turnkey power solutions include two Sunny Central inverters; a medium-voltage transformer; optional DC or AC/DC disconnect cabinets; and a control and supply panel for power distribution to local loads and (optionally) field tracker motors. They also feature easy integration with installer SCADA equipment; a modular, steel base with all component interconnection cabling; and a convenient plug-and-play installation scheme. Designed for Seismic Zone D applications, all configurations can be deployed for temperatures down to -40 °C. Each configuration can also be installed on a concrete slab, vault or piers for maximum flexibility.



MV POWER PLATFORM 1.0 / 1.25 / 1.4 / 1.5 / 1.6 MW

Technical data	SAMPLE CONFIGURATIONS			
	MVPP 1.0 MW		MVPP 1.5 MW	MVPP 1.6 MW
	600 V DC	1000 V DC	1000 V DC	1000 V DC
Input (DC)				
Max. DC power	1013 kW	1120 kW	1796 kW	1796 kW
MPP voltage range (@77°F/122°F at 60Hz)	330 V ... 600 V / 330 V ... 600 V ^{a)}	449 V ... 820 V / 436 V ... 820 V ^{a)}	609 V ... 820 V / 554 V ... 820 V ^{a)}	641 V ... 820 V / 583 V ... 820 V ^{a)}
Rated input voltage	380 V	480 V	595 V	620 V
Max. DC voltage	600 V	1000V / 1100 V ^{b)}	1000V / 1100 V ^{b)}	1000V / 1100 V ^{b)}
Max. DC input current	3200 A	2500 A	2800 A	2800 A
Number of independent MPP inputs	2	2	2	2
Number of fused DC inputs	18	18 / 64 (Optiprotect)	18 / 64 (Optiprotect)	18 / 64 (Optiprotect)
Output (AC)				
Nominal AC power	1000 kVA @113 °F	1000 kVA @122 °F	1500 kVA @122 °F	1600 kVA @122 °F
Maximum AC power	1000 kVA @113 °F	1100 kVA @77 °F	1650 kVA @77 °F	1760 kVA @77 °F
Nominal AC voltage options	12.47 kV; 13.8 kV; 20.6 kV; 24.9 kV; 27.6 kV; 34.5 kV	12.47 kV; 13.8 kV; 20.6 kV; 24.9 kV; 27.6 kV; 34.5 kV	12.47 kV; 13.8 kV; 20.6 kV; 24.9 kV; 27.6 kV; 34.5 kV	12.47 kV; 13.8 kV; 20.6 kV; 24.9 kV; 27.6 kV; 34.5 kV
Total Harmonic Distortion of grid current	< 3 % @ nominal power	< 3 % @ nominal power	< 3 % @ nominal power	< 3 % @ nominal power
Grid frequency	60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz
Power factor (adjustable)	0.90 _{lead} - 0.90 _{lag}	0.90 _{lead} - 0.90 _{lag}	0.90 _{lead} - 0.90 _{lag}	0.90 _{lead} - 0.90 _{lag}
Transformer vector group	Dy1y1	Dy1y1	Dy1y1	Dy1y1
Transformer no load taps	±2.5 % & ±5.0 %	±2.5 % & ±5.0 %	±2.5 % & ±5.0 %	-5.0 %; -2.5 %; +3.5 %; +7.0 %; +10.5 %; +14.0 % ^{c)}
Transformer cooling type	KNAN	KNAN	KNAN	KNAN
Power consumption				
Internal consumption in operation (inverter + MV-transformer)	< 3400 VA + < 12 kVA	< 3000 VA + < 12 kVA	< 3000 VA + < 19.2 kVA	< 3000 VA + < 19.2 kVA
Standby consumption (inverter + MV-transformer)	< 220 VA + < 1500 VA	< 200 VA + < 1500VA	< 200 VA + < 2200 VA	< 200 VA + < 2200 VA
Supply via	○ / ○ / ●	○ / ○ / ●	○ / ○ / ●	○ / ○ / ●
internal PV power / external power supply / green power				
External auxiliary supply voltage	208 V; 480 V; 600 V	208 V; 480 V; 600 V	208 V; 480 V; 600 V	208 V; 480 V; 600 V
Efficiency				
Max. efficiency / European efficiency / CEC efficiency inverter	98.60% / 97.90% / 98.00%	98.60% / 98.40% / 98.50%	98.60% / 98.40% / 98.50%	98.60% / 98.40% / 98.50%
Max. efficiency / European efficiency / CEC efficiency inverter	TBD / TBD / TBD	TBD / TBD / TBD	TBD / TBD / TBD	TBD / TBD / TBD
Protection rating and ambient conditions				
Protection rating	NEMA 3R	NEMA 3R	NEMA 3R	NEMA 3R
Operation temperature range @ nominal power	-13 °F ... +113 °F	-4°F ... +122°F	-4°F ... +122°F	-4°F ... +122°F
Storage temperature standard / low temperature option	-13°F ... +140°F / -40°F ... +140°F	-4°F ... +140°F / -40°F ... +140°F	-4°F ... +140°F / -40°F ... +140°F	-4°F ... +140°F / -40°F ... +140°F
Relative humidity	15 % ... 95 %	15 % ... 95 %	15 % ... 95 %	15 % ... 95 %
Snow load (psf)	>40	>40	>40	>40
Wind load (mph)	>110	>110	>110	>110
Fresh air consumption (CFM)	3531.6	3531.6	3531.6	3531.6
Max. altitude above sea level (m)	2000	2000	2000	2000
Design lifetime (years)	>20	>20	>20	>20
Compliance and certificates				
Seismic rating according UBC sec. 1632 and IBC sec. 1613 ^{d)}	Site class D, S _s =2.0g, S ₁ =1.0g	Site class D, S _s =2.0g, S ₁ =1.0g	Site class D, S _s =2.0g, S ₁ =1.0g	Site class D, S _s =2.0g, S ₁ =1.0g
NEC 2011 / OSHA 1910	● / ●	● / ●	● / ●	● / ●
PE certificate on mechanical, electrical, seismic for California / other state	● / ○	● / ○	● / ○	● / ○

- a) @ 1.05 U_{ACnom} and $\cos \varphi = 1$
- b) Standard: 1000 V DC, optional 1100 V DC with a start-up < 1000 V DC
- c) Reduction from 1600 kVA to 1400 kVA in 40 kVA steps possible to balance module degradation
- d) Pier height 3 ft max., mounting via wedge anchors included in delivery
- e) Suitable to -13 °F ... +140 °F, has to include buffer module

	SAMPLE CONFIGURATIONS			
Technical data	MVPP 1.0 MW		MVPP 1.5 MW	MVPP 1.6 MW
	600 V DC	1000 V DC	1000 V DC	1000 V DC
Features				
Disconnect Unit	○	○	○	○
AC circuit breakers located in inverter / Disconnect Unit	● / ○	● / ○	● / ○	● / ○
Project specific power supply for tracker motors etc.	○	○	○	○
Auxiliary power fusible disconnect switch / overvoltage protection	● / ○	● / ○	● / ○	● / ○
Customer SCADA system compartment ^{e)}	34" x 30" x 12", Supply: 120V/60Hz/max 250W	34" x 30" x 12", Supply: 120V/60Hz/max 250W	34" x 30" x 12", Supply: 120V/60Hz/max 250W	34" x 30" x 12", Supply: 120V/60Hz/max 250W
On platform	2x 120V/ max. 250W each	2x 120V/ max. 250W each	2x 120V/ max. 250W each	2x 120V/ max. 250W each
Transformer alarm contacts: Thermo / Pressure / Fluid level	● / ○ / ○	● / ○ / ○	● / ○ / ○	● / ○ / ○
Transformer oil containment	○	○	○	○
Delivery FCA/on site	● / ○	● / ○	● / ○	● / ○
Platform design				
Open including Disconnect Units				
Width / Height / Depth	29' / 8'9" / 12'	29' / 8'9" / 12'	29' / 8'9" / 12'	29' / 8'9" / 12'
Weight (lb)	<39,000	<39,000	<39,000	<39,000
Open excluding Disconnect Units				
Width / Height / Depth	24' / 8'9" / 12'	24' / 8'9" / 12'	24' / 8'9" / 12'	24' / 8'9" / 12'
Weight (lb)	<34,000	<34,000	<34,000	<34,000
Canopy including Disconnect Units				
Width / Height / Depth (roof)	31' / 10'6" / 14'	31' / 10'6" / 14'	31' / 10'6" / 14'	31' / 10'6" / 14'
Weight (lb)	<42,000	<42,000	<42,000	<42,000
Canopy excluding Disconnect Units				
Width / Height / Depth (roof)	26' / 10'6" / 14'	26' / 10'6" / 14'	26' / 10'6" / 14'	26' / 10'6" / 14'
Weight (lb)	<37,000	<37,000	<37,000	<37,000
Enclosure including Disconnect Units				
Width / Height / Depth	32' / 10'6" / 12'	32' / 10'6" / 12'	32' / 10'6" / 12'	32' / 10'6" / 12'
Weight (lb)	<48,000	<48,000	<48,000	<48,000
Enclosure excluding Disconnect Units				
Width / Height / Depth	27' / 10'6" / 12'	27' / 10'6" / 12'	27' / 10'6" / 12'	27' / 10'6" / 12'
Weight (lb)	<43,000	<43,000	<43,000	<43,000
● Standard features ○ Optional features – Not available				
Type designation	MV-1000HE-US	MV-1000CP-10	MV-1500CP-10	MV-1600CP-10



High Yields

- Excellent specific price
- Full nominal power up to 50 °C (122 °F)
- 10% additional power in continuous operation at ambient temperatures up to 25 °C (77 °F)
- Efficiency exceeds 98%

Flexible

- Integrated DC main distribution for direct connection of string-monitors
- Input voltage up to 1000 V supports flexible system design
- Connection of up to two external DC main distributors for diverse system configuration

Reliable

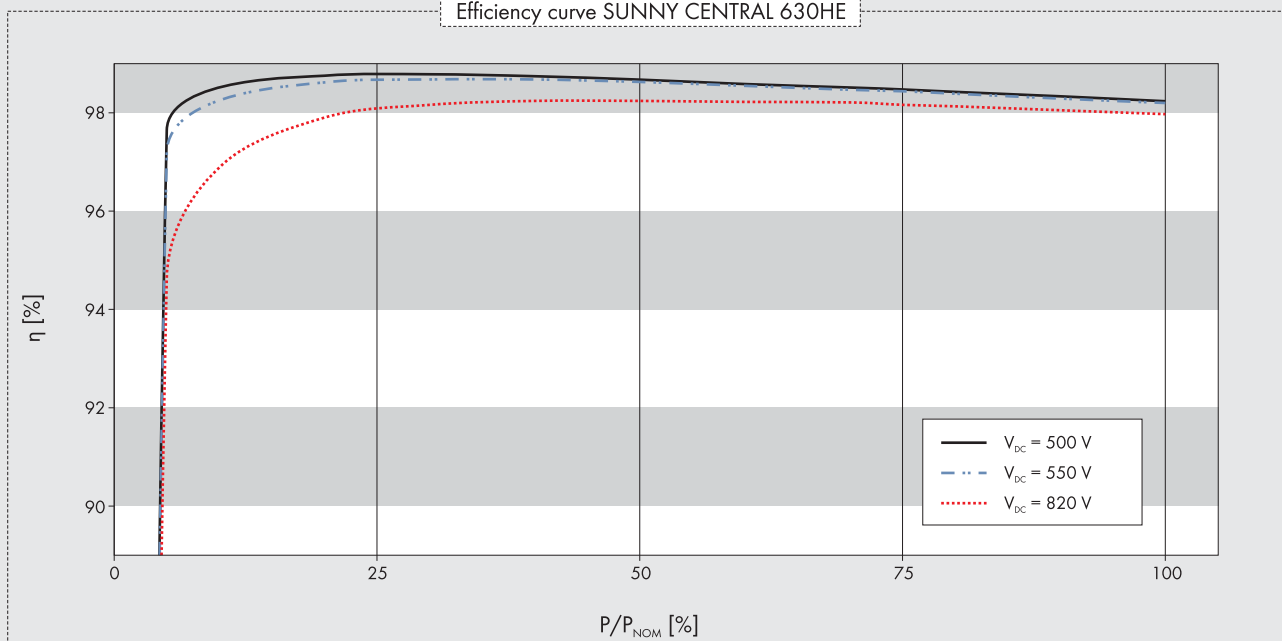
- Comprehensive grid management functions
- Flawless string monitoring

SUNNY CENTRAL 400HE / 500HE / 630HE

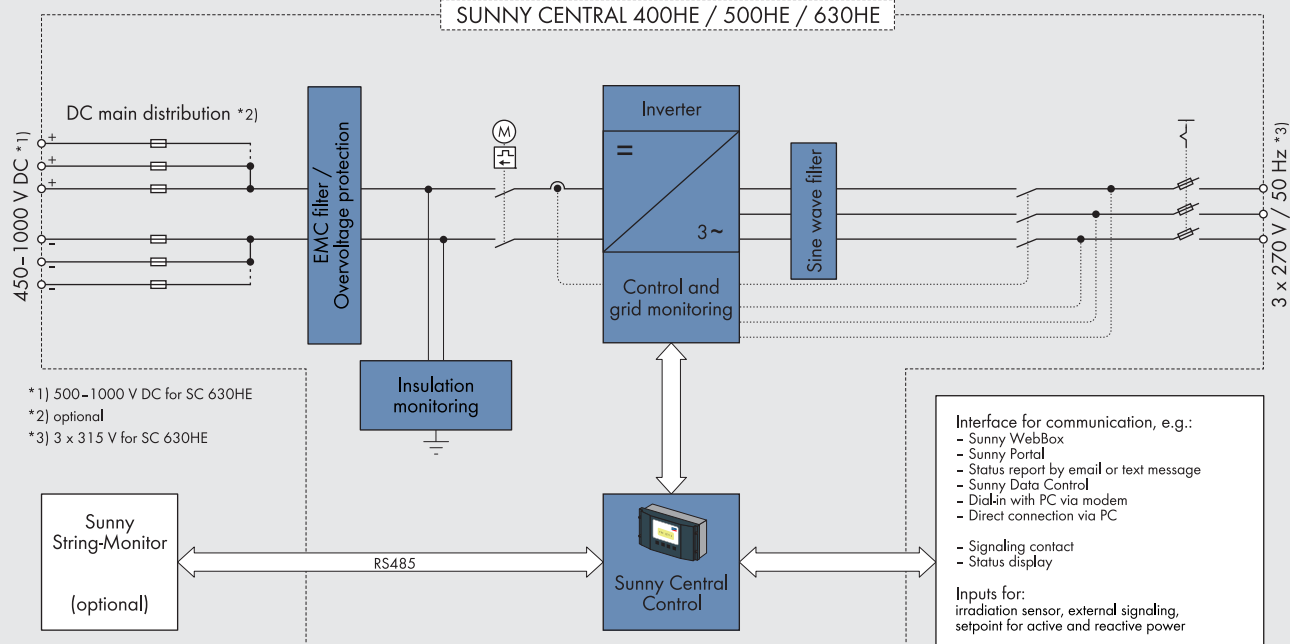
Proven high performance

Combining high system design flexibility with minimal costs and even more power, the distinguished High Efficiency series has once again been improved. Featuring a direct connection to a medium-voltage transformer, the series is already equipped with the intelligent power management of next generation SMA central inverters. This means that the maximum power achieved in continuous operation has been increased by 10 percent, compared to the nominal power at ambient temperatures under 25 °C (77 °F). The inverters also feature comprehensive grid management functions—including immediate reconnection after a grid voltage drop.

Efficiency curve SUNNY CENTRAL 630HE



SUNNY CENTRAL 400HE / 500HE / 630HE



SUNNY CENTRAL 400HE / 500HE / 630HE

Technical Data	Sunny Central 400HE	Sunny Central 500HE
Input (DC)		
Max. DC power (@ cos φ=1)	448 kW	560 kW
Max. input voltage	1000 V	1000 V
MPP voltage range (@ 25 °C / @ 50 °C at 50 Hz) ¹⁾	450 V – 820 V / 450 V – 820 V	450 V – 820 V / 450 V – 820 V
MPP voltage range (@ 25 °C at 60 Hz) ¹⁾	450 V – 820 V	450 V – 820 V
Rated input voltage	500 V	500 V
Minimum input voltage	450 V	450 V
Max. input current	993 A	1242 A
Number of independent MPP inputs	1	1
Number of DC inputs	(8+8) + 2 DCHV	(8+8) + 2 DCHV
Output (AC)		
Rated power (@ 25 °C) / nominal AC power (@ 50 °C)	440 kVA / 400 kVA	550 kVA / 500 kVA
Nominal AC voltage / range	270 V / 243 V – 297 V	270 V / 243 V – 297 V
AC power frequency / range	50 Hz, 60 Hz / 47 Hz ... 63 Hz	50 Hz, 60 Hz / 47 Hz ... 63 Hz
Rated power frequency / rated power voltage	50 Hz / 270 V	50 Hz / 270 V
Max. output current	941 A	1176 A
Max. THD	< 3 %	< 3 %
Power factor at rated power / adjustable shift factor	1 / 0.9 leading ... 0.9 lagging	
Feed-in phases, connection phases	3 / 3	3 / 3
Efficiency ²⁾		
Max. efficiency / European efficiency	98.6 % / 98.4 %	98.6 % / 98.4 %
Protection		
Input side disconnection device	Motor-driven DC switch-disconnector	
Output side disconnection device	AC fuse-switch-disconnector	
DC overvoltage protection, AC overvoltage protection	Surge arrester type II / surge arrester type I	
Grid monitoring	●	●
Ground fault monitoring / Remote ground fault monitoring	● / ○	● / ○
Insulation monitoring	●	●
Protection (as per IEC 62103)	I	I
General Data		
Dimensions (W / H / D)	2800 / 2120 / 850 mm (110.3 / 83.5 / 33.5 inch)	
Weight	1900 kg / 4189 lb	1900 kg / 4189 lb
Operating temperature range	-20 °C ... +50 °C / -4 °F ... +122 °F	-20 °C ... +50 °C / -4 °F ... +122 °F
Noise emission ³⁾	56.27 dB(A)	56.95 dB(A)
Max. self-consumption (in operation) / self-consumption (at night)	1500 W ⁴⁾ / < 100 W	1500 W ⁴⁾ / < 100 W
External auxiliary supply voltage	3 x 230 V, 50 / 60 Hz	3 x 230 V, 50 / 60 Hz
Cooling concept	Forced cooling	Forced cooling
Degree of protection: electronics / connection area (as per IEC 60529)	IP20 / IP20	
Application	Not air-conditioned indoors	Not air-conditioned indoors
Maximum permissible value for relative humidity (non-condensing)	15 % ... 95 %	15 % ... 95 %
Maximum operating altitude above MSL	1000 m	1000 m
Fresh air consumption	6200 m ³ /h	6200 m ³ /h
Features		
DC terminal	Ring terminal lug / cage terminal	Ring terminal lug / cage terminal
AC terminal	Ring terminal lug	Ring terminal lug
Display	LC text display	LC text display
Communication protocols / Sunny String-Monitor	Ethernet, modbus / RS485	Ethernet, modbus / RS485
Analog inputs / overvoltage protection for analog inputs	2 x Ain ⁵⁾ / ○	2 x Ain ⁵⁾ / ○
Internal power supply transformer	○	○
PV plant monitoring	Optional (via Sunny Portal)	Optional (via Sunny Portal)
Certificates and approvals (more upon request)	EN 61000-6-2, EN 61000-6-4, EMC conformity, CE conformity, BDEW-MSRL / FGW / TR8 ⁶⁾ , Arrêté du 4/23/08, R.D. 1663 / 2000, R.D. 661 / 2007, Golden Sun CGC / GF 001:2009	
● Standard features ○ Optional features – Not available		
Type designation	SC 400HE-11	SC 500HE-11

HE: High Efficiency, inverter without galvanic isolation for connection to a medium-voltage transformer (taking into account the SMA specification for the transformer)

- 1) At 1.05 $V_{AC, nom}$ and $\cos \varphi = 1$
- 2) Efficiency measured without internal power supply at $V_{DC} = 500$ V
- 3) Sound pressure level at a distance of 10 m
- 4) Maximum power in a phase < 1400 W (asymmetrical consumption)
- 5) 1x irradiation sensor and 1x pyranometer
- 6) Applies to BDEW-MSRL/FGW/TR6: with limited dynamic grid support

Additional features: heating, emergency stop switch

Technical Data	Sunny Central 630HE	
Input (DC)		
Max. DC power (@ $\cos \varphi = 1$)	713 kW	
Max. input voltage	1000 V	
MPP voltage range (@ 25 °C / @ 50 °C at 50 Hz) ¹⁾	500 V – 820 V / 500 V – 820 V	
MPP voltage range (@ 25 °C at 60 Hz) ¹⁾	510 V – 820 V	
Rated input voltage	550 V	
Minimum input voltage	500 V	
Max. input current	1422 A	
Number of independent MPP inputs	1	
Number of DC inputs	(8+8) + 2 DCHV	
Output (AC)		
Rated power (@ 25 °C) / nominal AC power (@ 50 °C)	700 kVA / 630 kVA	
Nominal AC voltage / range	315 V / 284 V – 346 V	
AC power frequency / range	50 Hz, 60 Hz / 47 Hz ... 63 Hz	
Rated power frequency / rated power voltage	50 Hz / 315 V	
Max. output current	1283 A	
Max. THD	< 3 %	
Power factor at rated power / adjustable shift factor	1 / 0.9 leading ... 0.9 lagging	
Feed-in phases, connection phases	3 / 3	
Efficiency ²⁾		
Max. efficiency / European efficiency	98.6 % / 98.4 %	
Protection		
Input side disconnection device	Motor-driven DC switch-disconnector	
Output side disconnection device	AC fuse-switch-disconnector	
DC overvoltage protection, AC overvoltage protection	Surge arrester type II / surge arrester type I	
Grid monitoring	●	
Ground fault monitoring / Remote ground fault monitoring	● / ○	
Insulation monitoring	●	
Protection (as per IEC 62103)	I	
General Data		
Dimensions (W / H / D)	2800 / 2120 / 850 mm (110.3 / 83.5 / 33.5 inch)	
Weight	1900 kg / 4189 lb	
Operating temperature range	-20 °C ... +50 °C / -4 °F ... +122 °F	
Noise emission ³⁾	64.2 db(A)	
Max. self-consumption (in operation) / self-consumption (at night)	1500 W ⁴⁾ / < 100 W	
External auxiliary supply voltage	3 x 230 V, 50 / 60 Hz	
Cooling concept	Forced cooling	
Degree of protection: electronics / connection area (as per IEC 60529)	IP20 / IP20	
Application	Not air-conditioned indoors	
Maximum permissible value for relative humidity (non-condensing)	15 % ... 95 %	
Maximum operating altitude above MSL	1000 m	
Fresh air consumption	6200 m³/h	
Features		
DC terminal	Ring terminal lug / cage terminal	
AC terminal	Ring terminal lug	
Display	LC text display	
Communication protocols / Sunny String-Monitor	Ethernet, modbus / RS485	
Analog inputs / overvoltage protection for analog inputs	2 x Ain ⁵⁾ / ○	
Internal power supply transformer	○	
PV plant monitoring	Optional (via Sunny Portal)	
Certificates and approvals (more upon request)	EN 61000-6-2, EN 61000-6-4, EMC conformity, CE conformity, BDEW-MSRL / FGW / TR8 ⁶⁾ , Arrêté du 4/23/08, R.D. 1663 / 2000, R.D. 661 / 2007, Golden Sun CGC / GF 001:2009	
● Standard features ○ Optional features – Not available		
Type designation	SC 630HE-11	



Reliable

- Motorized DC disconnect
- DC and AC overvoltage protection

Informative

- Easy remote querying
- Status messages can be sent via e-mail or SMS

Optional

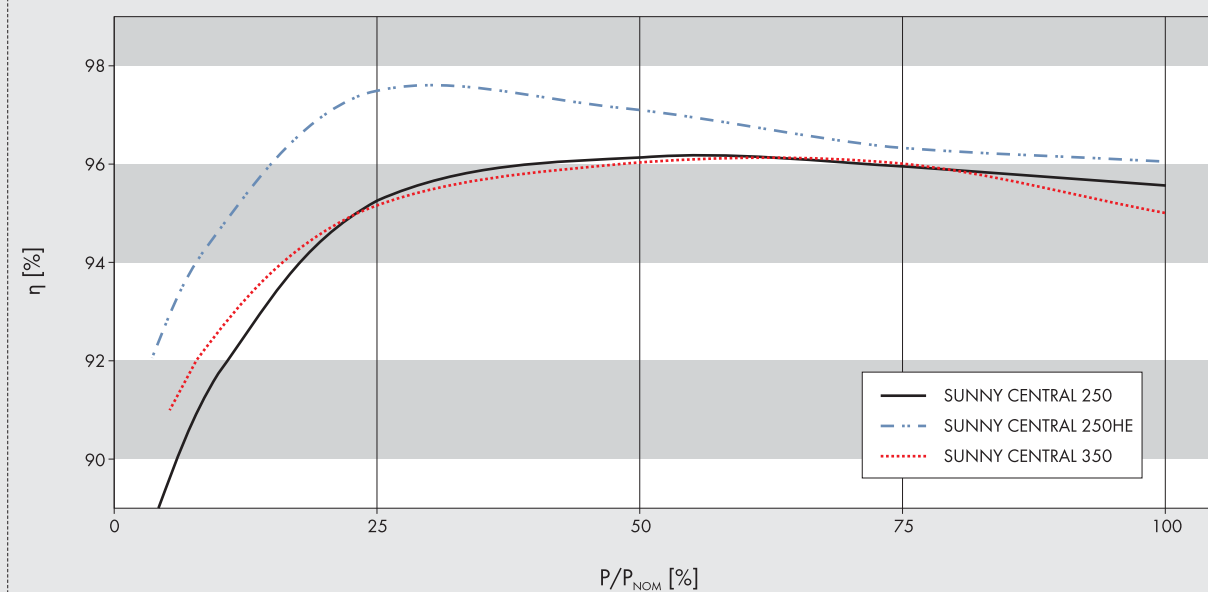
- String current monitoring
- Extended DC input voltage range up to 1000 V

SUNNY CENTRAL 250 / 250HE / 350

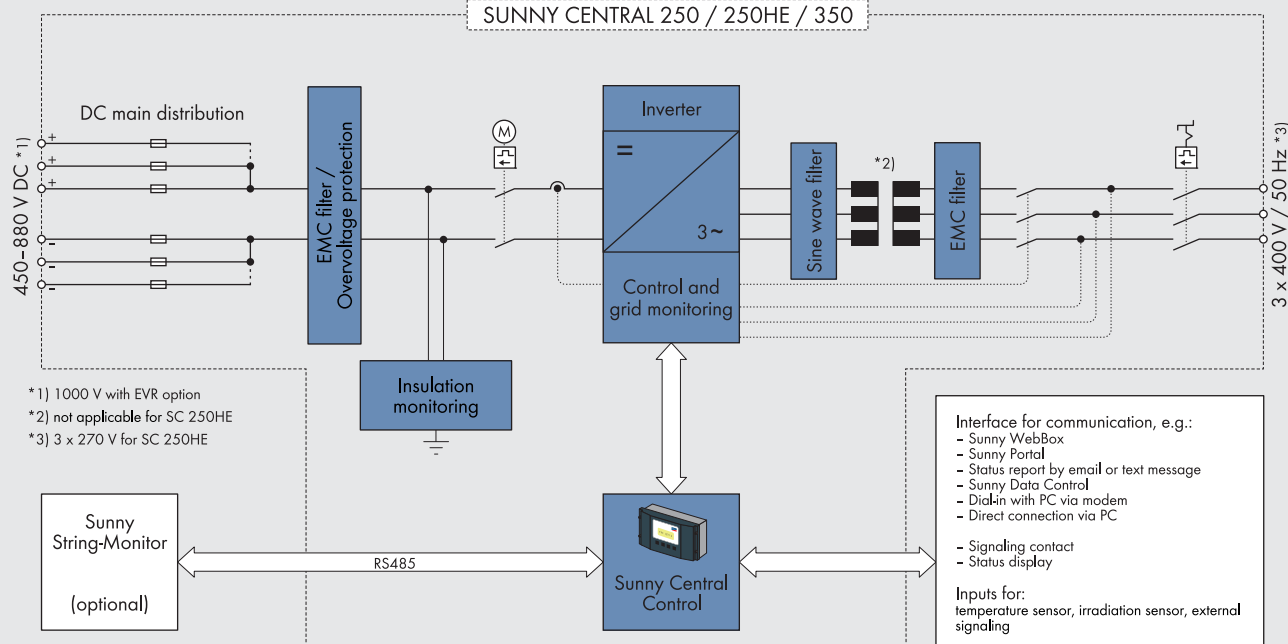
Direct connection to the low-voltage grid

The first choice for use in medium- and large-scale PV power plants, the proven Sunny Central 250 and 350 allow system operators to achieve excellent solar yields, especially in ground-mounted systems or roof systems with homogeneous structures. The central inverters have 5, 8 or 12 fused inputs for the DC distributor box and several devices can be connected together on the AC side, making megawatt systems possible. Whereas the Sunny Central 250 and 350 feed directly into the low-voltage grid, the Sunny Central 250HE can be connected directly to a medium-voltage transformer.

Efficiency curve SUNNY CENTRAL 250 / 250HE / 350



SUNNY CENTRAL 250 / 250HE / 350



SUNNY CENTRAL 250 / 250HE / 350

Technical Data	Sunny Central 250	Sunny Central 250HE
Input (DC)		
Max. DC power (@ cos φ=1)	262 kW	261 kW
Max. input voltage	880 V / 1000 V optional	880 V / 1000 V optional
MPP voltage range (@ 25 °C)	450 V – 820 V ¹⁾	450 V – 820 V ¹⁾
Rated input voltage	500 V	500 V
Minimum input voltage	450 V	450 V
Max. input current	591 A	591 A
Number of independent MPP inputs	1	1
Number of DC inputs	8	8
Output (AC)		
Rated power (@ 25 °C)	250 kVA	250 kVA
Nominal AC voltage	360 V – 440 V	243 V – 297 V
AC power frequency	50 Hz, 60 Hz	50 Hz, 60 Hz
Rated power frequency / rated power voltage	50 Hz / 400 V	50 Hz / 270 V
Max. output current	361 A	535 A
Max. THD	< 3 %	< 3 %
Power factor at rated power	1	1
Feed-in phases, connection phases	3 / 3	3 / 3
Efficiency ²⁾		
Max. efficiency / European efficiency	96.1 % / 95.2 %	97.5 % / 96.7 %
Protection		
Input side disconnection device	Motor-driven DC circuit breaker	
Output side disconnection device	AC circuit breaker	
DC overvoltage protection / AC overvoltage protection	Surge arrester type II / surge arrester type I	
Grid monitoring	●	●
Ground fault monitoring / Remote ground fault monitoring	○ / –	○ / –
Insulation monitoring	○	○
Galvanic isolation	●	–
Surge arrester for auxiliary supply	●	●
General Data		
Dimensions (W / H / D)	2120 / 2400 ³⁾ / 850 mm (83.5 / 94.5 / 33.5 inch)	
Weight	2070 kg / 4563 lb	1170 kg / 2580 lb
Operating temperature range	-20 °C ... +40 °C / -4 °F ... +104 °F	-20 °C ... +40 °C / -4 °F ... +104 °F
Max. self-consumption (in operation) / self-consumption (at night)	1500 W / < 80 W	1500 W / < 80 W
External auxiliary supply voltage	230 / 400 V (3 / N / PE)	230 / 400 V (3 / N / PE)
Cooling concept	Forced cooling	
Degree of protection: electronics / connection area (as per IEC 60529)	IP20 / IP20	IP20 / IP20
Application	Not air-conditioned indoors	Not air-conditioned indoors
Maximum permissible value for relative humidity (non-condensing)	15 % ... 95 %	15 % ... 95 %
Maximum operating altitude above MSL	1000 m	1000 m
Fresh air consumption	4200 m ³ /h	3500 m ³ /h
Features		
DC terminal / AC terminal	Ring terminal lug / ring terminal lug	Ring terminal lug / ring terminal lug
Display	LC text display	LC text display
Communication protocols / Sunny String-Monitor	Ethernet / RS485	Ethernet / RS485
Analog inputs / overvoltage protection for analog inputs	2 x Ain ⁴⁾ / ○	2 x Ain ⁴⁾ / ○
Certificates and approvals (more upon request) ⁵⁾	EN 61000-6-2, EN 61000-6-4, CE conformity, EEG conformity, R.D. 1663 / 2000	
● Standard features ○ Optional features – Not available		
Type designation	SC 250	SC 250HE

- 1) At 1.05 V_{AC, nom} and cos φ= 1
- 2) Efficiency measured without an internal power supply
- 3) The switch cabinet is raised by 210 mm for the EVR option
- 4) Terminal for an analog sensor provided by the customer in two-wire and four-wire version
- 5) EEG conformity: grid management and static voltage support

Technical Data	Sunny Central 350	
Input (DC)		
Max. DC power (@ cos φ=1)	369 kW	
Max. input voltage	880 V / 1000 V optional	
MPP voltage range (@ 25 °C)	450 V – 820 V ¹⁾	
Rated input voltage	500 V	
Minimum input voltage	450 V	
Max. input current	800 A	
Number of independent MPP inputs	1	
Number of DC inputs	12	
Output (AC)		
Rated power (@ 25 °C)	350 kVA	
Nominal AC voltage	360 V – 440 V	
AC power line frequency	50 Hz, 60 Hz	
Rated power frequency / rated power voltage	50 Hz / 400 V	
Max. output current	505 A	
Max. THD	< 3 %	
Power factor at rated power / adjustable shift factor	1	
Feed-in phases, connection phases	3 / 3	
Efficiency ²⁾		
Max. efficiency / European efficiency	96 % / 95.2 %	
Protection		
Input side disconnection device	Motor-driven DC switch-disconnector	
Output side disconnection device	AC circuit breaker	
DC overvoltage protection / AC overvoltage protection	Surge arrester type II / surge arrester type I	
Grid monitoring	●	
Ground fault monitoring / Remote ground fault monitoring	○ / –	
Insulation monitoring	○	
Galvanic isolation	●	
Surge arrester for auxiliary supply	●	
General Data		
Dimensions (W / H / D)	2120 / 2800 ³⁾ / 850 mm (83.5 / 110.3 / 33.5 inch)	
Weight	2800 kg / 6173 lb	
Operating temperature range	-20 °C ... +40 °C / -4 °F ... +104 °F	
Max. self-consumption (in operation) / self-consumption (at night)	2500 W / < 70 W	
External auxiliary supply voltage	230 / 400 V (3 / N / PE)	
External back-up fuse for auxiliary supply	B 16 A, 3-pole	
Cooling concept	Forced cooling	
Degree of protection: electronics / connection area (as per IEC 60529)	IP20 / IP20	
Application	Not air-conditioned indoors	
Maximum permissible value for relative humidity (non-condensing)	15 % ... 95 %	
Maximum operating altitude above MSL	1000 m	
Fresh air consumption	6500 m ³ /h	
Features		
DC terminal / AC terminal	Ring terminal lug / ring terminal lug	
Display	LC text display	
Communication protocols / Sunny String-Monitor	Ethernet / RS485	
Analog inputs / overvoltage protection for analog inputs	2 x Ain ⁴⁾ / ○	
Certificates and approvals (more upon request) ⁵⁾	EN 61000-6-2, EN 61000-6-4, CE conformity, EEG conformity, R.D. 1663 / 2000	
● Standard features ○ Optional features – Not available		
Type designation	SC 350	



Flexible

- For indoor and outdoor installation
- Extended temperature range from -20°C to $+50^{\circ}\text{C}$ (-4°F to $+122^{\circ}\text{F}$)
- Compact dimensions, easier installation

Efficiency

- 97.6% leading edge efficiency

Reliable

- System monitoring via integrated data logger
- Easy remote querying using remote access

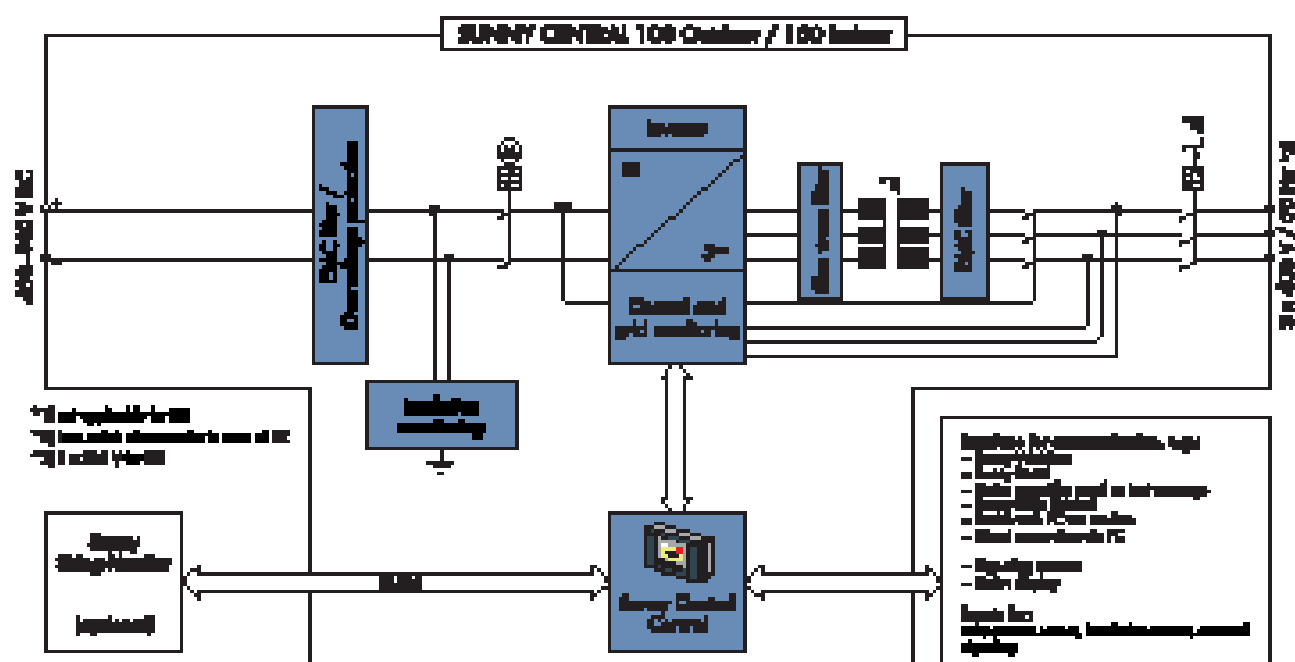
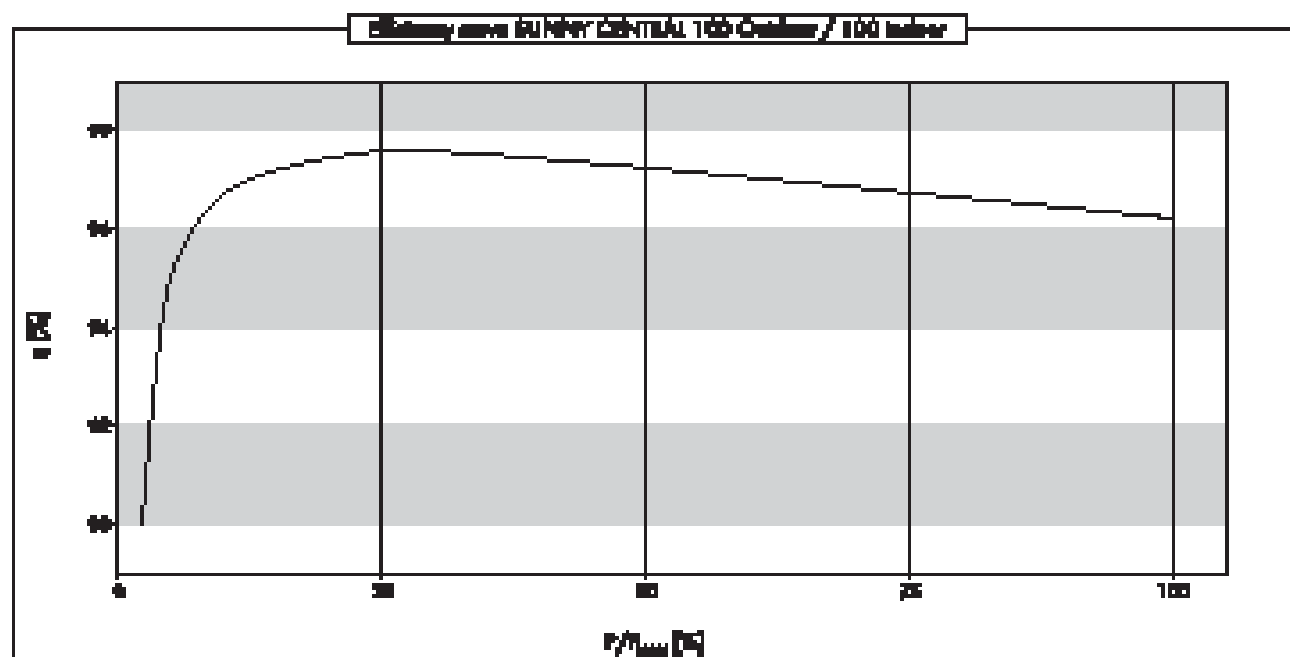
Optional

- String monitoring
- DC input voltage range up to 1000 V
- Operation with a grounded PV generator

SUNNY CENTRAL 100 Outdoor / 100 Indoor

Robust power at an attractive price

Powerful and efficient, the Sunny Central 100 Outdoor is perfectly suited for implementing large-scale solar power systems in open spaces. With a weatherproof enclosure and extended temperature range, it is the first choice for reliable outdoor operation, even in harsh climates. Plant operators benefit twice. The compact design greatly reduces installation work and thanks to innovative transformer technology, the inverter's class-leading efficiency has again been improved. The indoor version is equipped with a special ventilation concept for use inside buildings.



SUNNY CENTRAL 100 OUTDOOR / 100 INDOOR



Castel Viscardo, Italy

- 1) At $1.05 V_{AC, nom}$ and $\cos \varphi = 1$
- 2) Efficiency measured without an internal power supply
- 3) Compliance with nominal values up to an ambient temperature of $+40\text{ }^{\circ}\text{C}$, at an ambient temperature of $+50\text{ }^{\circ}\text{C}$ compliance with nominal values for 2 hours.
- 4) Terminal for an analog sensor provided by the customer in two-wire and four-wire version

Technical Data	Sunny Central 100 Outdoor / Indoor	Sunny Central 100 Outdoor / Indoor HE
Input (DC)		
Max. DC power (@ cos φ=1)	105 kW	105 kW
Max. input voltage	1000 V	1000 V
MPP voltage range (@ 25 °C)	450 V – 820 V ¹⁾	450 V – 820 V ¹⁾
Rated input voltage	500 V	500 V
Maximum input current	235 A	235 A
Number of independent MPP inputs	1	1
Number of DC inputs	3	3
Output (AC)		
Rated power (@ 25 °C)	100 kVA	100 kVA
Nominal AC voltage / range	400 V / 360 V – 440 V	300 V / 270 V – 330 V
AC power frequency	50 Hz, 60 Hz	50 Hz, 60 Hz
Rated power frequency / rated power voltage	50 Hz / 400 V	50 Hz / 300 V
Max. output current	145 A	193 A
Max. THD	< 3 %	< 3 %
Power factor at rated power	1	1
Feed-in phases / connection phases	3 / 3	3 / 3
Efficiency ²⁾		
Max. efficiency / European efficiency	97.6 % / 97 %	97.6 % / 97 %
Protection		
Input side disconnection device	Motor-driven DC circuit breaker	Motor-driven DC switch-disconnector
Output side disconnection device	○	○
Grid monitoring	●	●
Ground fault monitoring	○	○
Insulation monitoring	○	○
Galvanic isolation	●	–
Surge arrester for auxiliary supply	●	●
General Data		
Dimensions (W / H / D)	1835 / 1280 / 830 mm (72.3 / 50.4 / 32.7 inch)	1835 / 1280 / 830 mm (72.3 / 50.4 / 32.7 inch)
Weight	925 kg	505 kg
Operating temperature range	-20 °C ... +50 °C ³⁾	-20 °C ... +50 °C ³⁾
Max. self-consumption (in operation) / self-consumption (at night)	1000 W / < 50 W	1000 W / < 50 W
External auxiliary supply voltage	230 V, 50 / 60 Hz	230 V, 50 / 60 Hz
Cooling concept	Forced cooling	Forced cooling
Degree of protection: electronics / connection area (as per IEC 60529)	Outdoor IP54, IP44 / IP54, IP44 Indoor IP20/IP20	IP54, IP44 / IP54, IP44
Application	Unprotected outdoors	Unprotected outdoors
Maximum permissible value for relative humidity (non-condensing)	15 % ... 95 %	15 % ... 95 %
Maximum operating altitude above MSL	1000 m	1000 m
Fresh air consumption	2300 m³/h	2300 m³/h
Features		
DC terminal / AC terminal	Ring terminal lug / ring terminal lug	Ring terminal lug / ring terminal lug
Display	LC text display	LC text display
Communication protocols / Sunny String-Monitor	Ethernet / RS485	Ethernet / RS485
Analog inputs / overvoltage protection for analog inputs	Optional 1 x PT 100, 2 x Ain ⁴⁾ / ○	Optional 1 x PT 100, 2 x Ain ⁴⁾ / ○
Certificates and approvals (more upon request)	EN 61000-6-2, EN 61000-6-4, CE conformity, R.D. 1663 / 2000	EN 61000-6-2, EN 61000-6-4, CE conformity, R.D. 1663 / 2000
● Standard features ○ Optional features – Not available		
Type designation	SC 100 Outdoor	SC 100 Indoor / OutdoorHE



High Yields

- 98% CEC efficiency
- Suitable for ambient temperatures of up to 60 °C (140 °F)
- OptiCool™ intelligent temperature management

Low System Costs

- Outdoor-rated enclosure
- Couples to medium-voltage external transformer
- Available as integrated solution

Strong Peripherals

- Optional DC & AC disconnects
- Optional combiner boxes with string monitoring
- Sunny WebBox, Modbus® & OPC compatible

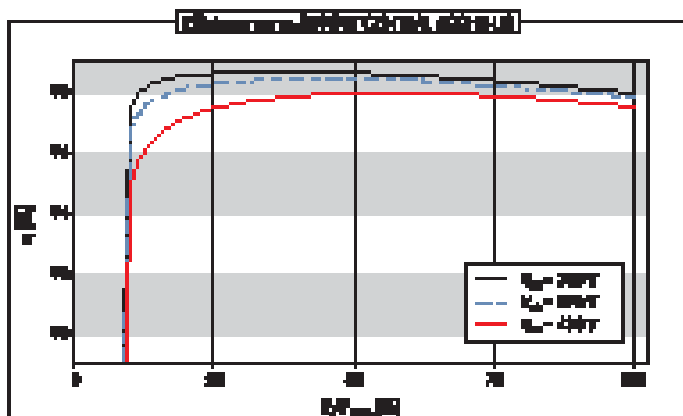
UL Certified

- UL 1741 / IEEE-1547 compliant

SUNNY CENTRAL 500HE-US

The ideal solution for large-scale North American solar power plants

The Sunny Central 500HE-US couples to an external medium-voltage transformer to accommodate long distance power feeds to distribution substations and delivers the highest efficiency available for large PV inverters. An updated user interface features a large LCD that provides a graphical view of the daily plant production as well as the status of the inverter and the utility grid. Flexible plant monitoring is available through various communications solutions such as Ethernet, Modbus, RS485 and OPC. Designed for easy installation, operation and performance monitoring, the UL-certified Sunny Central 500HE-US is the ideal choice for large-scale PV projects.



- 1) Specifications apply to irradiation values at STC
- 2) AC voltage range for full active power: 196 V – 210 V
- 3) Measured without internal power supply at $V_{DC} = 330$ V
- 4) Max. temperature at nominal conditions +45 °C/+113 °F
- 5) Sound pressure level at a distance of 10 m
- 6) No reduction in power up until 1000 m, afterwards 5 % per 1000 m

Technical Data	Sunny Central 500HE-US	
Input (DC)		
Max. DC power (@ $\cos \varphi=1$)	513 kW ¹⁾	
Max. input voltage	600 V	
MPP voltage range	330 V – 600 V	
Rated input voltage	380 V	
Minimum input voltage	330 V	
Max. input current	1600 A	
Number of independent MPP inputs	1	
Number of DC inputs	6 – 9	
Output (AC)		
Rated power (@ 25 °C) / nominal AC power (@ 50 °C)	500 kVA / 351 kVA	
Nominal AC voltage / range	200 V / 180 V – 220 V ²⁾	
AC power frequency / range	60 Hz / 59.3 Hz ... 60.5 Hz	
Rated power frequency / rated power voltage	60 Hz / 200 V	
Max. output current	1470 A	
Max. THD	3 %	
Power factor at rated power / adjustable shift factor	> 0.99 / 0.9 leading ... 0.9 lagging	
Feed-in phases, connection phases	3 / 3	
Efficiency ³⁾		
Max. efficiency / European efficiency / CEC	98.6 % / 97.9 % / 98.0 %	
Protection		
Input side disconnection device	Motor-driven contactor	
Output side disconnection device	AC circuit breaker	
DC overvoltage protection, AC overvoltage protection	○ / ○	
Grid monitoring	●	
Ground fault monitoring	●	
General Data		
Dimensions (W / H / D)	2562 / 2277 / 956 mm (101 / 90 / 38 inch)	
Weight	1800 kg	
Operating temperature range	-25 °C ... +50 °C / -13 °F ... +122 °F ⁴⁾	
Noise emission	59.3 dB(A) ⁵⁾	
Max. self-consumption (in operation) / self-consumption (at night)	1700 W / < 110 W	
Cooling concept	OptiCool	
Degree of protection	NEMA 3R	
Application	Unprotected outdoors	
Maximum permissible value for relative humidity (non-condensing)	15 % ... 95 %	
Maximum operating altitude above MSL	4000 m ⁶⁾	
Fresh air consumption	3000 m ³ /h	
Features		
Display	LC graphic display	
Communication interfaces	Ethernet, modbus, TCP, analog	
Internal power supply transformer	●	
PV plant monitoring	Optional (via Sunny Portal)	
Color of enclosure / door / base / roof	RAL 9016 / 9016 / 7005 / 7004	
Certificates and approvals (more upon request)	EMC conformity according to FCC, Part 15, Class A, UL 1741, UL 1998, IEEE 1547	
● Standard features ○ Optional features – Not available		
Type designation	SC 500HE-US	



Efficiency

- 97% CEC weighted efficiency
- Direct connection to the 480 V grid
- Suitable for ambient temperatures of up to 60 °C (140 °F)

Reliable

- Integrated isolation transformer
- Suitable for indoor or outdoor use
- Integrated data logger
- Simple remote query and maintenance

Strong Peripherals

- AC/DC disconnect unit
- Optional combiner boxes
- Sunny Central String-Monitor-US

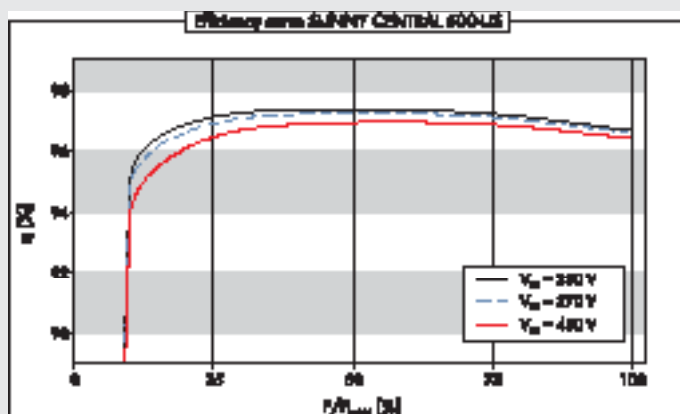
UL Certified

- UL 1741 / IEEE-1547 compliant

SUNNY CENTRAL 250-US / 500-US

Perfect for commercial systems in North America

The Sunny Central 250-US and 500-US solar inverters are ideally suited for commercial projects in North America. The integrated transformer makes direct connection with the low-voltage grid possible and, thanks to the outdoor-rated enclosure and OptiCool™ temperature management system, the units can be installed practically anywhere. The CEC efficiency of 97 percent is remarkable for transformer based inverters. Monitoring and remote maintenance is performed via the integrated data logger, which is accessible through RS485, Ethernet or OPC interfaces.



- 1) Specifications apply to irradiation values below STC
- 2) AC voltage range for full active power: 480 V – 514 V
- 3) Measured without internal power supply at $V_{DC} = 330$ V
- 4) Max. temperature at nominal conditions +45 °C/+113 °F
- 5) Sound pressure level at a distance of 10 m
- 6) No reduction in power up until 1000 m, afterwards 5% per 1000 m

Technical Data	Sunny Central 250-US	Sunny Central 500-US
Input (DC)		
Max. DC power (@ $\cos \varphi=1$)	260 kW ¹⁾	516 kW ¹⁾
Max. input voltage	600 V	600 V
MPP voltage range	330 V – 600 V	330 V – 600 V
Rated input voltage	380 V	380 V
Minimum input voltage	330 V	330 V
Max. input current	800 A	1600 A
Number of independent MPP inputs	1	1
Number of DC inputs	4; 6	6 – 9
Output (AC)		
Rated power (@ 25 °C) / nominal AC power (@ 50 °C)	250 kVA / 173.5 kVA	500 kVA / 351 kVA
Nominal AC voltage / range	277 V / 480 V / 422 V – 528 V ²⁾	277 V / 480 V / 422 V – 528 V ²⁾
AC power frequency / range	60 Hz / 59.3 Hz ... 60.5 Hz	60 Hz / 59.3 Hz ... 60.5 Hz
Rated power frequency / rated power voltage	60 Hz / 480 V	60 Hz / 480 V
Max. output current	300 A	600 A
Max. THD	3 %	3 %
Power factor at rated power / adjustable shift factor	> 0.99	> 0.99
Feed-in phases / connection phases	3 / 3	3 / 3
Efficiency ³⁾		
Max. efficiency / European efficiency / CEC	97.5 % / 96.6 % / 97.0 %	97.4 % / 96.9 % / 97.0 %
Protection		
Input side disconnection device	Motor-driven contactor	Motor-driven contactor
Output side disconnection device	Motor-driven contactor	Motor-driven contactor
DC overvoltage protection / AC overvoltage protection	– / –	○ / ○
Grid monitoring	●	●
Ground fault monitoring	●	●
Galvanic isolation	●	●
General Data		
Dimensions (W / H / D)	2786 / 2027 / 830 mm (110 / 80 / 33 inch)	3536 / 2027 / 930 mm (140 / 80 / 37 inch)
Weight	1900 kg	3250 kg
Operating temperature range	-25 °C ... +50 °C / -13 °F ... +122 °F ⁴⁾	-25 °C ... +50 °C / -13 °F ... +122 °F ⁴⁾
Noise emission	51.6 dB(A) ⁵⁾	53.9 dB(A) ⁵⁾
Max. self-consumption (in operation) / self-consumption (at night)	800 W / < 70 W	1500 W / < 80 W
Cooling concept	OptiCool	OptiCool
Degree of protection	NEMA 3R	NEMA 3R
Application	Unprotected outdoors	Unprotected outdoors
Maximum permissible value for relative humidity (non-condensing)	15 % ... 95 %	15 % ... 95 %
Maximum operating altitude above MSL	4000 m ⁶⁾	4000 m ⁶⁾
Fresh air consumption	4000 m ³ /h	6000 m ³ /h
Features		
Display	LC text display	LC text display
Communication interfaces	Ethernet, modbus, TCP, analog	Ethernet, modbus, TCP, analog
Internal power supply transformer	●	●
PV plant monitoring	Optional (via Sunny Portal)	Optional (via Sunny Portal)
Color of enclosure / door / base / roof	RAL 7032 / 7032 / 7045 / 7045	RAL 7032 / 7032 / 7045 / 7045
Certificates and approvals (more upon request)	EMC conformity per FCC, Part 15, Class A, UL 1741, UL 1998, IEEE 1547	
● Standard features ○ Optional features – Not available		
Type designation	SC 250U	SC 500U



Compliant

- Full compliance to safety standards of NEC 2011

Flexible

- Adaptable to all US inverters
- Extendable up to six switch-disconnectors
- Available with or without AC switch

Compact

- All load break switches in one enclosure
- Available as integrated part of a complete MV block

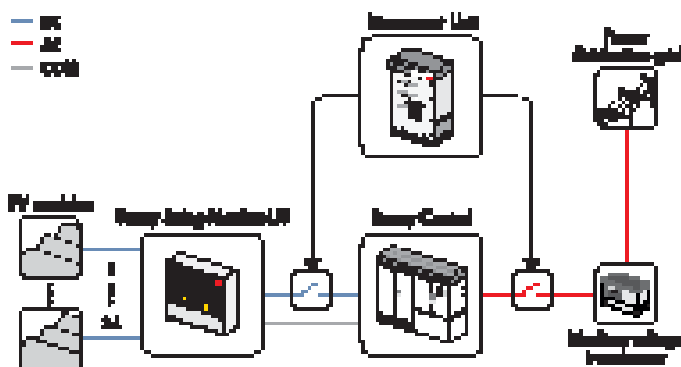
Reliable

- Easy access and fast handling
- Reliable separation even under full load

DISCONNECT UNIT

Full NEC conformity in a single enclosure

The new Disconnect Unit combines all safety measures into a single, compact enclosure. It is suited perfectly for North American Sunny Central inverters in 600 V to 1000 V systems. All load break switches are located on a single switchboard, working under full load conditions and ampacity reserves required by the NEC 2011. The switching handles are installed directly on the front to identify the switching status easily. This guarantees a secure and fast separation of all energy from the inverter in case of emergency or maintenance.

135



Precise

- Accurate monitoring of all PV strings

Flexible

- Sunny String-Monitor is available with various connection types for the string connections
- For grounded or non-grounded PV arrays upon request
- String monitoring with 8, 16 or 24 measurement channels
- Optional remote-controlled DC switch

SUNNY STRING-MONITOR

Insurance for solar yields

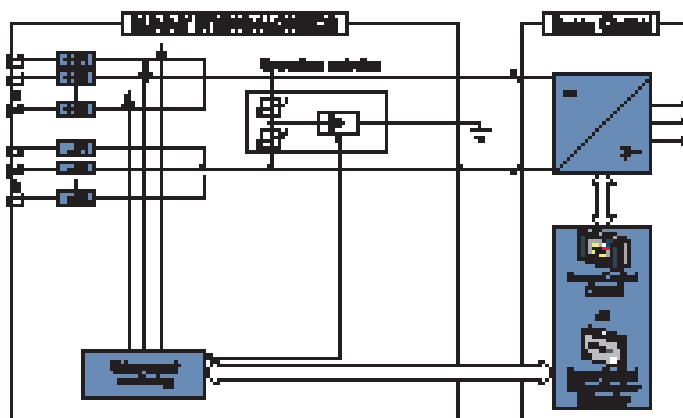
With the Sunny String-Monitor, SMA offers detailed PV array monitoring. By measuring and comparing the individual string currents, power deviations in the solar array are detected and analyzed by the inverter. According to preference, the Sunny Central String-Monitor can be delivered either in an enclosure for wall mounting or as a standalone box. In addition to string current measurement, the Sunny String-Monitor features string fuse protection as well as an overvoltage protection device.



Montalto di Castro, Italy

SUNNY STRING-MONITOR

[illegible]



1) When the 25 A fuse is used, the permissible DC input voltage is reduced to 950 V

[illegible]



Economical

- Optimal failure detection for high yields
- Reduced system costs through use of up to nine devices per Sunny Central

Precise

- Failure detection through string current monitoring
- DC distributor box in NEMA 3R with integrated current measurement

Flexible

- Three different versions for the best possible system design
- Optionally suitable for installation near the coast

User-friendly

- Convenient installation preparation due to detachable side and base plates
- Simple configuration of the string current monitoring

SUNNY CENTRAL STRING-MONITOR-US

Insurance for solar yields in North America

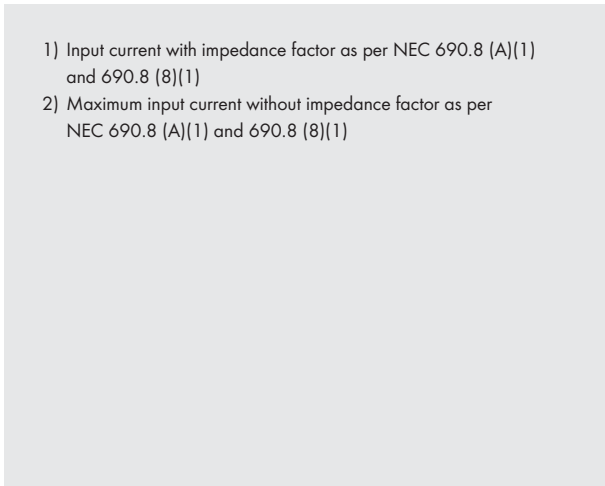
Sunny Central String-Monitor-US provides detailed PV array monitoring for the North American market. By measuring and comparing individual string currents, power deviations in the solar array are accurately detected and are analyzed in the Sunny Central inverter. The Sunny Central String-Monitor-US is delivered in a NEMA 3R enclosure for wall or pole mounting, according to preference. For the string current measurement, there are three variants of string fuse protection, all of which comply with the NEC standard, making the Sunny Central String-Monitor-US ideally suited for use in North America.



Napa Valley CA, USA

SUNNY CENTRAL STRING-MONITOR-US

[illegible]



- 1) Input current with impedance factor as per NEC 690.8 (A)(1) and 690.8 (8)(1)
- 2) Maximum input current without impedance factor as per NEC 690.8 (A)(1) and 690.8 (8)(1)

[illegible]



A close-up photograph of a white, curved object, possibly a piece of equipment or a vehicle part. A thin green stripe is visible on the left side. A dark, recessed area is visible in the center, creating a strong contrast with the white surface.

MONITORING SYSTEMS



Easy to Use

- Free PC software for wireless monitoring of the PV plant via *Bluetooth®*
- Quick overview of yields and system status

User-friendly

- Intuitive operation
- Graphic display of key PV system data

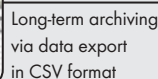
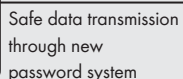
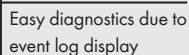
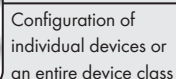
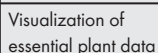
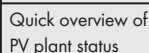
Reliable

- Long-term archiving via data export in CSV format
- Rapid diagnosis via access to measured values and event memory

SUNNY EXPLORER

The free PC software solution

Switch on your laptop or PC, activate the *Bluetooth* interface, and start Sunny Explorer. That's all that's needed to give operators and installers an overview of their PV system. The free software is the optimum addition to the new generation of SMA inverters with integrated *Bluetooth*. Key plant data can be visualized on a computer quickly and wirelessly. Energy values and events can be archived by exporting data in CSV format, and then processed and visualized in Excel. Sunny Explorer also provides support during inverter configuration. Because no complicated cabling is needed, system maintenance is convenient and fast.



Technical Data	Sunny Explorer
Languages	
Available languages	German, English, Italian, Spanish, French, Dutch, Portuguese, Greek, Korean, Czech
System requirements	
Supported operating systems	Windows XP SP2, Windows Vista (32-bit and 64-bit), Windows 7 (32-bit und 64-bit)
Supported Bluetooth stacks	Microsoft, Toshiba, BlueSoleil, Broadcom
Hardware (minimum requirements)	
Processor	PIII 800 MHz (XP), P4 1 GHz (Vista, Windows 7)
Main memory	512 MB (XP), 1 GB (Vista, Windows 7)
Free hard drive space	265 MB (240 MB .NET / 25 MB application)
Resolution	1024 x 768 pixels
Communication	
Inverter communication	Bluetooth
Max. number of devices	1 master: 50 / 2 masters: 25
Plant information	
Plant overview	Ideally suited for an overview of the entire PV plant by presentation of the most important data
Plant settings	Simple parameter setting for an entire device class
Current plant values	Summary of current device data. The display of minimum and maximum values, sums and averages (depicted for every device class) provides the operator with detailed information about the current status of their PV plant.
Device information	
Device overview	Most important device information at a glance
Device settings	Individual parameter adjustment for each device
Current device values	Detailed information on the current values of the selected device
Events	Rapid event analysis with use of the device analysis functions and direct viewing of recorded events
Data export	
Daily files	Overview of the PV plant performance data stored every 5 minutes, with daily storage of a file containing the values for all inverters
Monthly files	Long-term overview of the PV plant's daily yields, with monthly storage of a file containing the values for all inverters
Events	Rapid overview of all events written to a file for a selected time frame
Type designation	Sunny Explorer



User-friendly

- Wireless table device with large, easy-to-read display
- USB interface for data transfer to PC

Innovative

- Automatic monitoring of up to 12 inverters via Bluetooth®
- Power supply via integrated solar cell

Easy to Use

- Intuitive operation via rotary push button
- Easy-to-understand display of all key plant data

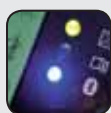
Reliable

- Audio alarm in the event of faults
- Data archiving for at least 90 days in daily files and up to 12 monthly files in CSV format

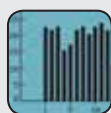
SUNNY BEAM with Bluetooth® Wireless Technology

The all-in-one service package for the home

Informative, compact, and easy to operate, the Sunny Beam with Bluetooth doesn't just look good; it's an innovative monitoring solution. Key data is visible on its large graphic display, including a daily profile, current output, as well as daily and total energy yield. The performance of up to 12 inverters, the monthly overview, the energy yield in Euros or US dollars, and the CO₂ savings can all be accessed with one hand. Data for a minimum of 90 days is stored in the device and can be directly transferred to a computer via a USB cable. The Sunny Beam can also be set up to emit an audio signal to notify operators of potential system errors.



Wireless communication with inverters via Bluetooth



Large, easy-to-read LC display



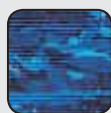
Acoustic alarm system



USB interface for data transmission to a PC and charging the batteries



Simple and intuitive operation via the rotary push button

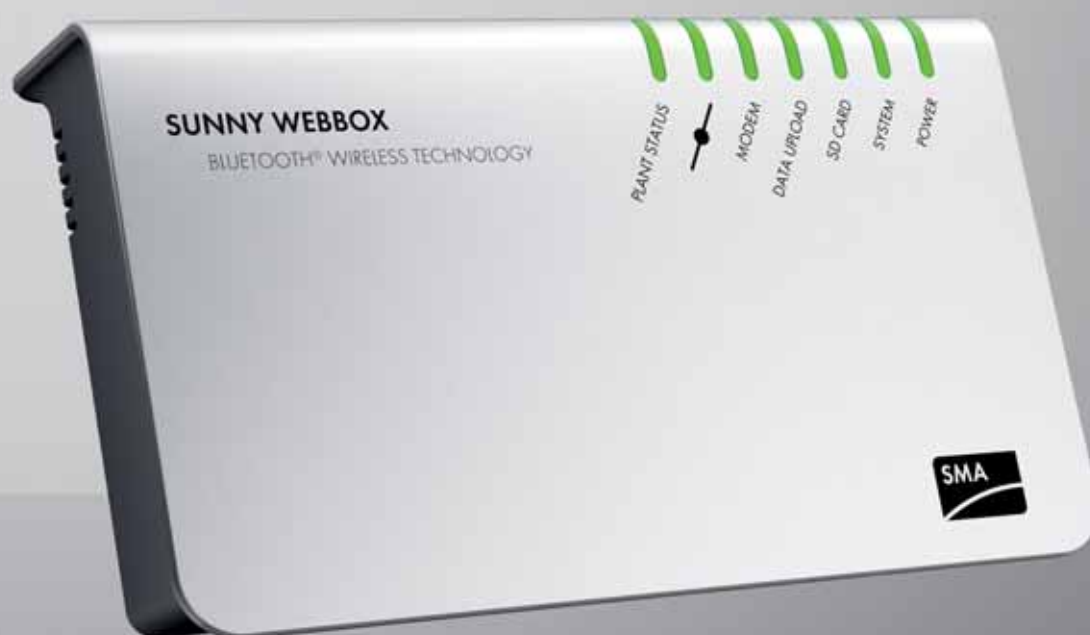


Power supply via PV cell and battery



Compact and lightweight
Dimensions:
127 x 75 x 195 mm
Weight: approx. 350 g

Technical Data	Sunny Beam with Bluetooth®	
Communication		
Inverter communication	Bluetooth	
PC communication	USB 2.0	
Max. communication range		
Bluetooth in free-field conditions	up to 100 m	
Max. number of SMA devices		
Sunny WebBox	Max. 12	
Power Supply		
Power supply	Integrated PV cell, USB cable	
Number of batteries	2	
Battery type	ENEKEEP (Mignon AA), NiMH (1.2 Vdc)	
Environmental conditions in operation		
Ambient temperature	0 °C ... 40 °C	
Degree of protection (according to EN IEC 60529)	IP20	
General data		
Dimensions (W / H / D)	127 / 75 / 195 mm	
Weight kg	0.35 kg	
Mounting location	Indoors	
Installation options	Tabletop device	
Status display	LCD	
Software language	German, English, Italian, Spanish, French, Dutch, Portuguese, Greek, Czech	
Language of the manual	German, English, Italian, Spanish, French, Dutch, Portuguese, Greek, Czech	
Features		
Display	LCD	
Operation	rotary push button	
Warranty	5 years	
Certificates and approvals	www.SMA-Solar.com	
Information displayed		
General information	Date, time	
Plant data	Current output, daily yield, total yield, specific annual yield, CO ₂ savings, remuneration	
USB cable	●	
USB plug-in power supply	○	
Replacement batteries	○	
SMA Bluetooth Repeater	For extending the maximum Bluetooth-communication range	
● Standard features ○ Optional features — Not available		
Type designation	Sunny Beam Bluetooth	



Reliable

- Remote monitoring, diagnosis and configuration of the solar power system from anywhere in the world
- Data logger for all key plant data

Responsive

- Rapid detection of operation failures
- Error notification via e-mail or text message

User-friendly

- Easy remote access via a web browser
- Includes free standard access to the Sunny Portal for the entire service life of the system

Informative

- Flexible display, evaluation, yield and event reports via the Sunny Portal

SUNNY WEBBOX

Remote monitoring and maintenance of large solar power plants

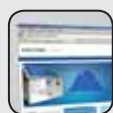
The Sunny WebBox is the ideal monitoring solution for large solar plants. It receives and stores current measurement values and transmits data via *Bluetooth®* or RS485, keeping you informed of system performance 24 hours per day. In the event of a problem, the Sunny WebBox allows you can react quickly. Parameters can be changed remotely and a variety of measured values can be depicted, analyzed and downloaded via a Web browser from anywhere in the world with an Internet connection. All data from the connected devices is stored and, if desired, automatically transmitted to the Sunny Portal. With the optional GSM modem, measurement data can even be transmitted to the Sunny Portal from remote locations.



Communication with the inverters via RS485 or *Bluetooth*



Presentation of plant data with Sunny Matrix or Flashview



Free, automatic visualization of the measured values in Sunny Portal



SD card slot for optional memory expansion and data transmission to a PC



Integrated web server
Enables online remote data access from any web-enabled PC in the world



Integrated FTP server for data transmission and storage on a PC



Quick set-up thanks to Sunny WebBox Assistant and the quick reference guide



Flexible data transfer to a selectable FTP server parallel to Sunny Portal

Technical Data	Sunny WebBox	Sunny WebBox with <i>Bluetooth</i>
Communication		
Inverter communication	RS485, 10 / 100 Mbit Ethernet (only for Sunny Central)	<i>Bluetooth</i>
PC communication	10 / 100 Mbit Ethernet	10 / 100 Mbit Ethernet
Modem	Analog (optional), GSM (optional)	—
Data interface	Modbus TCP, RPC	RPC
Connections		
Ethernet	10 / 100 Mbit, RJ45	10 / 100 Mbit, RJ45
Inverter	1 x SMACOM	—
Max. number of SMA devices		
RS485, Ethernet	50 / 50	— / —
<i>Bluetooth</i>	—	50
Max. communication range		
RS485	1 200 m	—
Ethernet	100 m	—
<i>Bluetooth</i> in free-field conditions	—	Up to 100 m (can be extended with an SMA <i>Bluetooth</i> Repeater)
Power Supply		
Power supply	External plug-in power supply	External plug-in power supply
Input voltage	100 V – 240 V AC; 50 / 60 Hz	100 V – 240 V AC; 50 / 60 Hz
Power consumption	typ. 4 W / max. 12 W	typ. 4 W / max. 12 W
Environmental conditions in operation		
Ambient temperature	-20 °C ... +65 °C	-20 °C ... +65 °C
Maximum permissible value for relative humidity (non-condensing)	5 % ... 95 %	5 % ... 95 %
Memory		
Internal	8 MB in a ring buffer configuration	12.5 MB in a ring buffer configuration
External	SD card 1 GB / 2 GB (optional)	SD card 1 GB / 2 GB (optional)
General data		
Dimensions (W / H / D)	255 / 130 / 57 mm	255 / 130 / 57 mm
Weight kg	0.75 kg	0.75 kg
Mounting location	Indoors	indoors
Installation options	Top-hat rail mounting, wall mounting, tabletop device	
Status display	LEDs	
Software language, language of the manual	German, English, Italian, Spanish, French, Dutch, Portuguese, Greek, Korean, Czech	
Features		
Operation	Integrated web server (Internet browser)	
Warranty	5 years	
Certificates and approvals	www.SMA-Solar.com	
Accessories		
SMA <i>Bluetooth</i> Repeater for extending the max. communication range	—	○
Sunny SensorBox	Connection via RS485 Power Injector	Connection via SMA Power Injector with <i>Bluetooth</i>
Sunny Matrix	○	○
SD card 1 GB / 2 GB (optional)	○	○
Outdoor GSM antenna, GSM data card	○ / ○	— / —
RS485 communication cable	○	—
Plug-in power supply with adapters	●	●
● Standard features ○ Optional features — Not available		
Type designation	Sunny WebBox	Sunny WebBox with <i>Bluetooth</i>



User-friendly

- Central administration of all customer and system data
- Easy to understand reporting

Mobile

- World-wide access through a web-enabled computer or mobile phone

Personalization

- Personalized configuration of pages and diagrams
- Individual yield and event reports sent via e-mail

Informative

- Fully automatic yield comparison of system devices
- Professional integration into personal website

SUNNY PORTAL

Professional management, monitoring and presentation of PV systems

Whether for a small home system or a large solar park, centralized administration and system monitoring saves time and money. Through the Sunny Portal, plant operators, installers and service technicians have access to key data at any time, from any location. Pre-configured standard pages can be easily customized with individual information. The Sunny Portal features almost infinite options for analyzing data and visualizing yields, whether you need a data table or a highly personalized diagram. In larger systems, the yields of all inverters in the plant are compared automatically, allowing for the detection of even the smallest deviations. The powerful reporting functions also provide regular updates via e-mail to help insure yields.



Management of several PV plants from one central location



Monitoring without having to be on-site



Quick overview of measured and yield values of the solar plant



Easy diagnostics through display of measured values and event log



High-performance reporting to help safeguard yields



Personalized access to screen options and functions



Flexible page design for individual presentation of the solar plant



Standard pages for the most common display options

Technical Data	Sunny Portal
Languages	
Available languages	German, English, Italian, Spanish, French, Dutch, Portuguese, Greek, Korean, Czech, Chinese
System requirements	
Supported operating systems	All / optimized access for mobile devices
Plant information	
Plant description	Overview of the key properties of the PV plant
Annual comparison	Quick yield overview of the entire operating period
Energy balance	Overview of purchased and fed in power and self-consumption, if applicable (power meter integration via Meter Connection Box or Sunny Home Manager required)
Plant log book	Access to messages regarding plant events
Device overview	Properties and parameters of the devices in the PV plant
Software	
Recommended browsers	Firefox, Internet Explorer Version 7 or later, Safari
Other	JavaScript and cookies enabled
Supported data logger	Sunny WebBox, Sunny Home Manager
Access	
Website	www.sunnyportal.com
Smartphone	www.sunnyportal.mobi, Sunny Portal App for iPhone and Android
Plant management	
Sunny Portal Account	One password for all your plants in Sunny Portal
Page design	
Standard pages	Automatic standard pages for the most common plant monitoring and presentation needs
Personalized pages	A variety of templates for page construction
Page modules	Tables, diagrams, custom images, free text, plant overview (CO ₂ , remuneration, energy)
Visualization of yield and measured values	
Diagram types	Selection of six diagram types for optimum presentation of yield and measured values, bar graphs, area charts, and line charts (with, without, or only tags), as well as XY diagrams
Tables	Individual configuration of charts for all yield and measured values
Time periods	From 5 minutes to 1 year, various time intervals selectable (depending on provided data)
Monitoring	
Inverter comparison	Fully automatic and ongoing inverter yield comparison and e-mail alarms
Communication monitoring	Ongoing monitoring and, when necessary, alarms for the connection between Sunny Portal and Sunny WebBox, the Sunny Home Manager and the Power Reducer Box
Status reports	
Information reports	Daily or monthly reports on energy yield, maximum output, remuneration, CO ₂ reduction, a self-defined page can also be sent from Sunny Portal via e-mail
Event reports	Hourly or daily reports on information, warnings, faults and errors, with personalized content and recipients
Report format	Text, PDF, HTML
Individual access	
Publication of specific pages	Access via the public area on Sunny Portal by all Internet users, ideal for personalized presentations on personal Web sites
User roles	Assign roles of "guest", "standard user", "installer" and "plant administrator" to easily determine who has which viewing and configuration rights
Type designation	Sunny Portal



Reliable

- Rapid error detection

Informative

- Precise measurement of irradiation intensity, module temperature, ambient temperature and wind speed

Easy to Install

- Simple integration into existing PV plants via RS485

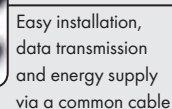
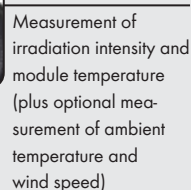
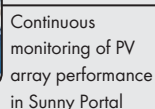
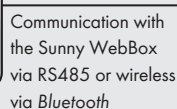
Convenient

- Data analysis on any PC or in the Sunny Portal

SUNNY SENSORBOX

The weather station for PV systems

The Sunny SensorBox is installed directly onto solar modules and measures irradiation and temperature. In combination with Sunny WebBox and Sunny Portal, it provides continuous meteorological and power production data. This makes it possible to detect shade, dirt, and gradually declining array performance, providing security against lost yield. An optional sensor to measure of ambient temperature or wind speed provides even more data.



Technical Data		Sunny SensorBox	
Communication			
Data logger		RS485 to Sunny WebBox, <i>Bluetooth</i> to Sunny WebBox with <i>Bluetooth</i>	
Terminals			
Sunny WebBox and Power Injector		Spring-type terminals	
Max. Communication Range			
RS485		1200 m	
<i>Bluetooth</i> in free-field conditions		up to 100 m (can be extended with an SMA <i>Bluetooth</i> Repeater)	
Power Supply			
Power supply		RS485 Power Injector or SMA Power Injector with <i>Bluetooth</i>	
Input voltage		100 V – 240 V AC; 50 / 60 Hz	
Power consumption		< 1 W	
Environmental Conditions in Operation			
Ambient temperature		-25 °C ... +70 °C	
Degree of protection according to EN IEC 60529		IP65	
General Data			
Dimensions (W / H / D)		120 / 50 / 90 mm	
Weight		0.5 kg	
Mounting location		Outdoor	
Installation options		Mounting plate, roof bracket	
Language versions (manual)		German, English, Italian, Spanish, French, Dutch, Portuguese, Greek, Korean, Czech	
General Data			
Operation		Via the Sunny WebBox interface	
Warranty		5 years	
Certificates and approvals		www.SMA-Solar.com	
Accessories			
SMA <i>Bluetooth</i> Repeater		○	
Mounting plate		○	
Roof bracket		○	
Wind sensor		○	
Wall-mounting bracket for wind sensor		○	
PT100 ambient temperature sensor		○	
PT100 module temperature sensor		●	
RS485 Power Injector or SMA Power Injector with <i>Bluetooth</i>		●	
● Standard features ○ Optional features – Not available			
Type designation		Sunny SensorBox	



Informative

- Recording of grid consumption, feed-in and self-consumption
- Clear presentation for analysis in Sunny Portal

Simple

- Convenient installation with SMA communication products
- Simple integration into existing PV system monitoring

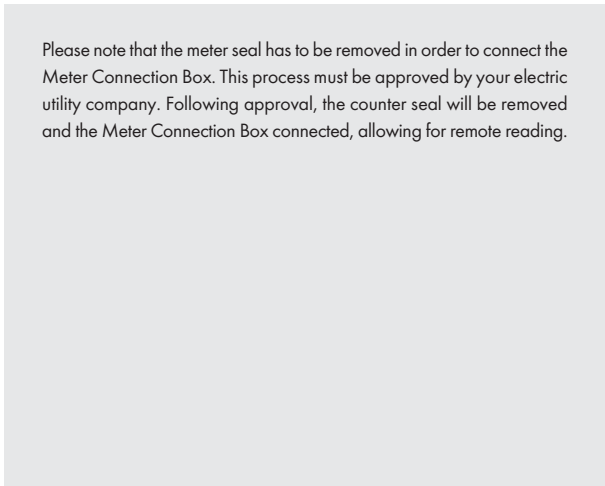
Flexible

- Compatible with standard energy meters with an S0 impulse output

METER CONNECTION BOX

Energy consumption analysis made easy

The Meter Connection Box is the ideal tool for optimizing energy consumption. It makes it easy to integrate energy meters into your PV monitoring system. The Meter Connection Box is connected directly to the S0 output of an energy meter, where it reads the meter changes. In combination with the Sunny WebBox and Sunny Portal, this allows you to quickly and conveniently view and analyze your personal energy balance. Depending on the configuration of the connected energy meters, this device allows you to visually compare your purchased and generated energy as well as the PV power you have consumed.

[illegible]



Durable

- Large, weather-proof display for effective plant presentation

Flexible

- Multiple sizes for any application
- Customizable front panel label
- Flexible display
- Customizable text and content

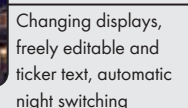
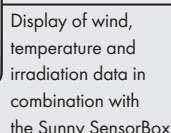
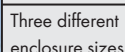
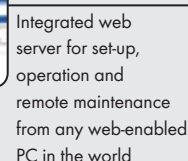
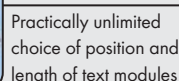
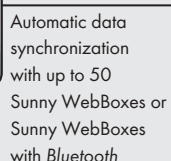
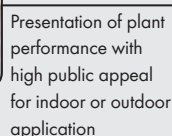
User-friendly

- Easy set-up and operation via a web browser
- Automatic brightness control

SUNNY MATRIX

Attractive large-scale display

The Sunny Matrix is a sturdy large-format display that visualizes yield, performance and CO₂ reduction of PV systems in large, luminous figures. It derives the display data from the Sunny WebBox via an Ethernet interface, either through the local network or from any location in the world connected to the Internet. If the solar power system is fitted with a Sunny SensorBox, the local recorded weather data will also be available for display. The Sunny Matrix is available in various formats and has no restriction on the layout of text. Variable numbers of lines and characters make the Sunny Matrix an eye-catching, versatile display for viewing solar power production quickly and publicly.



Technical Data	Sunny Matrix
Communication	
Data logger communication	Ethernet
Terminals	
Ethernet	10 / 100 Mbit
Max. Number of Devices	
Ethernet	50
Max. Communication Range	
Ethernet	—
Power supply	
Input voltage	100 V – 240 V AC; 50 / 60 Hz
Power consumption	normally 20 W + 5 W per 4-character display module
Max. current input	1.3 A
Environmental Conditions in Operation	
Ambient temperature	-25 °C ... +60 °C
Degree of protection	IP54
General Data	
Dimensions (W / H / D)	800 x 400 x 120 mm, 800 x 800 x 120 mm, 800 x 1000 x 120 mm
Weight	15 kg, 20 kg, 25 kg
Mounting location	Outdoor
Installation options	Wall mounting
Character height	51 mm
Length of lines	4, 8, 12 or 16 characters
Number of lines	max. 2 lines on 400 mm model, max. 4 lines on 800 / 1000 mm model
Line layout	Positioning to customer specification
Front panel design	According to customer specification
Software language	German, English, Italian, Spanish, French, Dutch, Portuguese
Language versions (manual)	German, English, Italian, Spanish, French, Dutch, Portuguese
Features	
Operation	Integrated web server (Internet browser)
Warranty	5 years
Certificates and approvals	www.SMA-Solar.com
Information Displayed	
General information	Date, time, personal text, personal web text
Plant data	Current output, daily yield, total yield, CO ₂ savings
SensorBox data	Ambient temperature, module temperature, internal solar irradiation, wind speed
Sunny Island data	Battery state of charge
Accessories	
Optional software	Sunny Matrix Admin Tool
Available languages	German, English, Italian, Spanish, French, Dutch, Portuguese
Type designation	Sunny Matrix



Eye-catching

- Attractive presentation on standard displays

Informative

- Display of output, yield, environmental and local data
- Continuous display of the most important system data

Easy to Use

- Customizable images and logos
- Easy set-up and operation

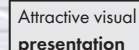
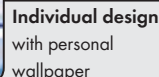
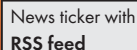
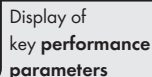
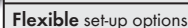
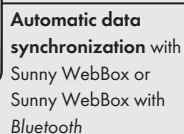
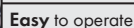
Economical

- Free download

FLASHVIEW

Professional plant presentation at no cost

Yields, current output, environmental and ambient data: Flashview presents all of this for solar power systems on any monitor connected to a PC. Various display views switch automatically or can be manually selected by the viewer. Flashview queries the system data from the Sunny WebBox through an existing network connection or any location in the world via the Internet. It is also customizable: integrate system images, as well as link to external RSS feeds.

[illegible]



Reliable

- Logging of all events and status changes

Compliant

- Complies with the German EEG* amendment on feed-in management
- Satisfies the German Medium-Voltage Directive (BDEW)** for grid safety management

Flexible

- Active power limitation and reactive power setpoint
- Reliably controls up to 2500 inverters

Easy to Use

- Straightforward integration into existing systems
- Easy installation
- Free support from the SMA Service Line
- Integrated web server

POWER REDUCER BOX

Feed-in management for large-scale PV plants

With the Power Reducer Box, SMA delivers a solution for large PV plants that must take part in feed-in management. It allows the grid operator to remotely control system performance. It achieves this by translating the setpoint values transmitted via radio ripple control receiver into control commands for the Sunny WebBox, which forwards them to the inverters. During this process, each change of status is logged twice, once in the Power Reducer Box and once in the Sunny WebBox. If desired, the Power Reducer Box can also automatically transmit data to the Sunny Portal, informing the operator immediately of the utility operator's requirements.

* German Renewable Energy Sources Act

** Directive established by the German Federal Association for Energy and Water



Professional

- Visualization, control and monitoring of large-scale plants
- Integration of SMA equipment into existing control-room technology such as GLT and SCADA systems

Innovative

- One data interface for up to 2500 SMA devices
- Data interface in accordance with the OPC-DA/OPC-XML-DA communication standard

Simple

- One data interface for 50 Sunny WebBox devices, even at different locations
- Compatible with WinCC, InTouch, WEBfactory, etc.

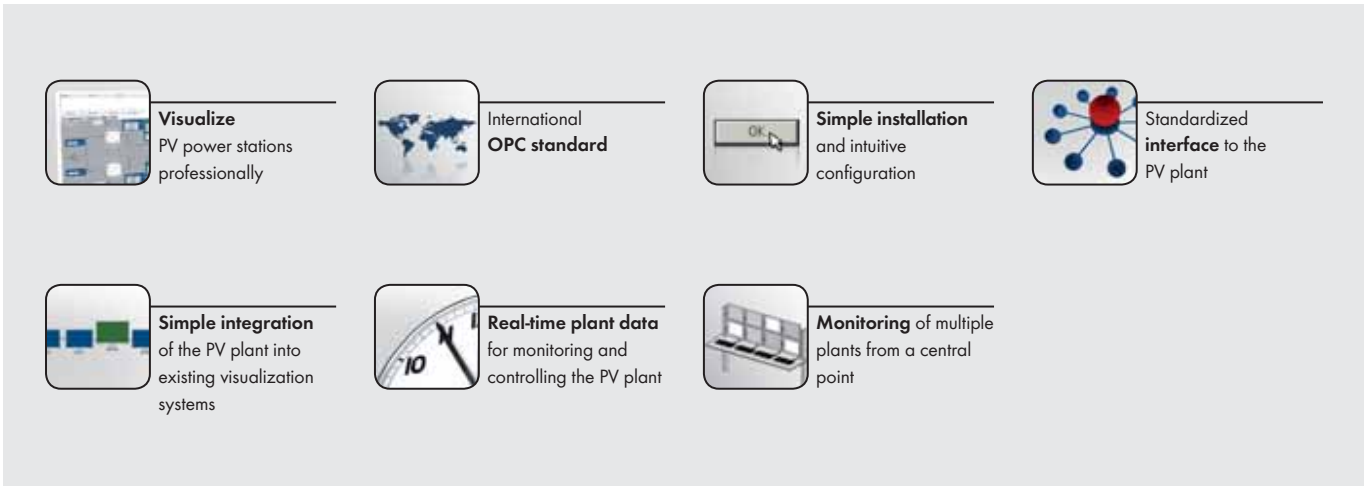
Flexible

- Simple and fast installation, high reliability
- Compatible with WinCC, InTouch, LabView, etc.

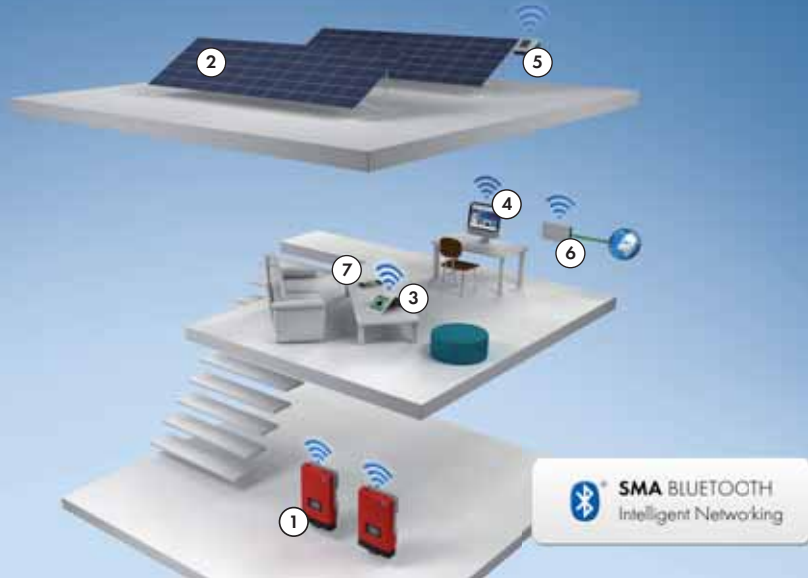
SMA OPC SERVER

The standardized data interface for large-scale systems

Large-scale plants and PV power utility stations require customized monitoring solutions and need to link systems and components supplied by different manufacturers into one joint control system. OPC, the international communication standard in the field of automation technology, enables simple and reliable data exchange between products and applications supplied by different vendors. With the SMA OPC Server, SMA equipment can be very easily integrated into OPC-compatible systems.



Technical Data	SMA OPC Server	
Languages		
Available languages	German, English, French	
System Requirements		
Required SMA devices	Sunny WebBox	
Supported operating systems	Windows XP Pro (SP2), Windows Server 2003 (recommended)	
Hardware (Minimum requirements)		
Processor	2 GHz	
Main memory	2 GB	
Free hard drive space	10 MB	
Communication		
Sunny WebBox communication	Ethernet	
OPC communication	OPC-DA, OPC.XML-DA	
Max. Number of Devices		
Ethernet	50 Sunny WebBox devices	
Software		
Requirements	Microsoft .NET Framework 2.0, OPC core components	
Supports the Following Systems		
OPC client	Wonderware InTouch, Siemens WinCC, National Instruments LabVIEW, WEBfactory	
Scope of delivery		
Contents	CD-ROM, documentation	
Functionality		
Data update	Up to 10 seconds	
Unidirectional data exchange	Inverter measured values	
Bidirectional data exchange	Inverter parameters	
Other		
Legal notice	Operation with valid license contract only	
Type designation	SMA OPC server	



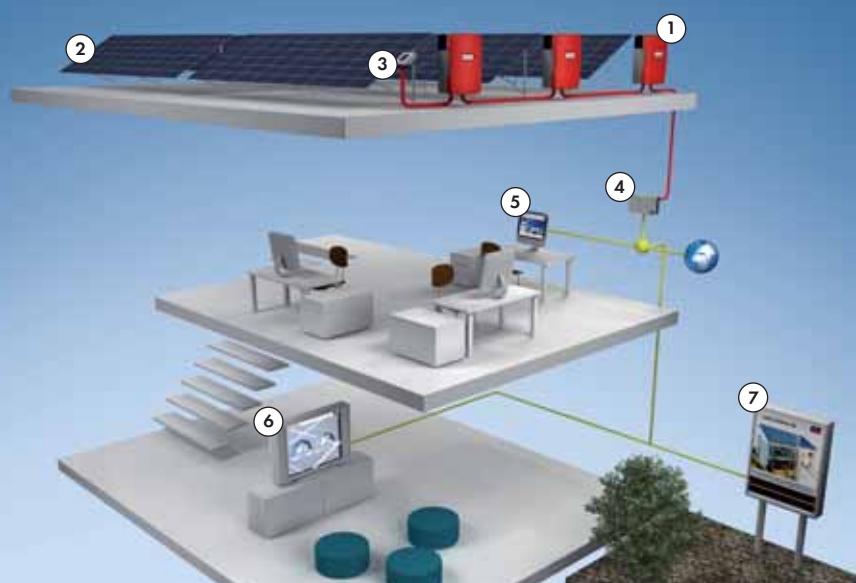
Typical plant design – wireless transmission

Electricity generation

- ① SUNNY BOY
- ② PV ARRAY

PV plant monitoring

- ③ SUNNY BEAM WITH BT
- ④ SUNNY EXPLORER
- SUNNY PORTAL
- ⑤ SUNNY SENSORBOX WITH BT*
- ⑥ SUNNY WEBBOX WITH BT
- ⑦ MOBILE ACCESS



Typical plant design – cable transmission

Electricity generation

- ① SUNNY MINI CENTRAL
- ② PV ARRAY

PV plant monitoring

- ③ SUNNY SENSORBOX
- ④ SUNNY WEBBOX
- ⑤ SUNNY PORTAL
- ⑥ FLASHVIEW
- ⑦ SUNNY MATRIX

— RS485

— Local network/Internet

Bluetooth®

- Automatic networking of up to 50 devices
- Range of up to 100 m (328 ft) unobstructed
- Compatible with standard Bluetooth devices

RS485

- Greatest reliability via symmetrical signal transmission
- Various accessories available (radio links, fiber optic converters)

Wired or Wireless

Secure connection with and without cable

To monitor solar power systems, data has to be transmitted. This can be power values or energy yields. For the communication between the solar inverter and monitoring devices, SMA provides two basic choices: wireless and wired variants. Both have advantages and are used with different sized systems. Let SMA help you decide which method of communication best suits your PV plant.

*In connection with SMA Power Injector with Bluetooth

	Bluetooth (radio connection)	RS485 wiring
Typical application	Especially for small and medium-sized PV plants	For medium-sized and large PV plants
Advantages	Reduced costs and effort	High speed and reliability
Number of nodes (PV plant monitoring and inverters)	Up to 50 per <i>Bluetooth</i> -network	Up to 50 per RS485 bus
Range	Up to 100 m in unobstructed between individual devices	1200 m per RS485 bus
Number of data retrieval devices (for example, Sunny Beam or Sunny WebBox)	Up to four per network (depending on number of nodes)	1 per RS485 bus
Feed-in and grid management option	none	SMA Power Reducer Box*

Wireless Success—intelligently networked with SMA *Bluetooth*

With SMA *Bluetooth*, wireless networks can be created simply and quickly—without the additional effort of having to lay cables in walls, re-plastering or painting, making it perfectly suited to your residential rooftop system. *Bluetooth*, the international wireless standard, makes monitoring flexible and extendable. Installers and plant operators save time and installation costs. Thanks to *Bluetooth*, all new inverters are recognized quickly and automatically integrated into the system. With the SMA intelligent networking concept, up to 50 devices can be integrated in a network. *Bluetooth* Class 1 is the standard used and it enables communication over longer distances. If that's not enough because walls or ceilings are in the way, you can also use the SMA *Bluetooth* Repeater to strengthen the signal and extend the range.

Bluetooth is also reliable. Thanks to the transmission of data packets in small units and constant frequency changes, the radio connection is extremely stable. The broadcast power is also adapted to meet the connection's specific requirements. Built-in password protection secures your data against unauthorized access.

Robust and Secure—powerful across long distances with proven RS485 wiring

The RS485 fieldbus is a veteran in the area of cable-connected communication technology. It has been used by SMA for many years and has proven itself in a nearly endless number of systems. All devices are connected to each other in a chain (i.e. a data bus). At the end of this chain, the Sunny WebBox collects all the data and reliably informs you of the status of the PV system. The advantage of RS485 wiring is that functional lengths of up to 1200 m (3937 ft) and reliable data transmission can be achieved even in interference-prone areas. It is also appropriate for larger solar power systems, where operators require maximum security and reliability.

* Information on regulations for feed-in and grid management in your country can be obtained from your distribution grid operator.

OFF-GRID INVERTERS





Off-Grid inverters by SMA:

System manager for all types of energy generators

The Sunny Island battery inverter provides secure power supply for stand-alone systems. It forms a standard AC voltage grid into which all users and generators can be easily integrated. With this AC coupling and the Sunny Island as a system manager, SMA delivers an innovative solution for supplying electricity to remote locations and for creating an emergency supply for areas with unstable grids.

Functional principle

The Sunny Island is a battery inverter and is in charge of setting up a stable standalone grid. In doing this, it holds the voltage and frequency of the AC grid constant within specified limits. Both users and generators are connected directly to this grid. If there is an energy surplus, the Sunny Island charges the batteries. If there is a shortage, it supplies the grid with energy from the batteries. Thanks to its highly developed battery management system, it can recognize the charge levels at any given

moment and, through its function as system manager, is capable of making further decisions as well. If batteries are discharged or if there is a great demand for electricity, the Sunny Island can start a generator or it can disconnect loads as needed. If the batteries are fully charged and there is little demand, it can reduce the solar plant's electricity production. It also determines the optimal strategy for charging the batteries, and in so doing, increases their lifespan.

Flexible grid layout

In addition to solar and wind power plants, diesel generators and other electricity generators as well (as all 230 V loads) can be connected to the AC standalone grid. This does away with costly DC cabling. For smaller systems, SMA offers the Sunny Island Charger, an MPP charge regulator for a DC connection of the PV system to the batteries. This makes SMA the only company in the world to offer coordinated solutions for both AC and DC connections.

A unique and special advantage of the SMA solutions is that stand-alone grids can be set up quickly and can be cost-effectively adapted to increasing electricity demands.

Expandable up to 300 kW

Stand-alone grids using the Sunny Island 2012, 2224 or 5048 can be expanded without difficulty through the parallel connection of several devices—single-phase as well as three-phase. For systems with more than 15 kW, three Sunny Island 5048s and a battery are combined in a cluster. To reach the total power desired, several of these clusters can be connected in parallel. The advantage to this is even if a battery fails, only one portion of the system is affected, which ensures a secure stand-alone grid supply.



Components: 1. PV array, 2. SUNNY BOY, 3. SUNNY ISLAND, 4. Batteries, 5. Diesel generator, 6. Wind turbine system



Efficient

- Max. efficiency > 96%
- CEC efficiency of 94.5%
- Charge level calculation

Simple

- Easy commissioning with the "Quick Configuration Guide"
- Complete off-grid management
- Excellent for grid-tied battery back up

Flexible

- For Sunny Island systems from 4.5 to 72 kW
- Single and three-phase operation, connectable in parallel and modularly expandable
- AC and DC coupling

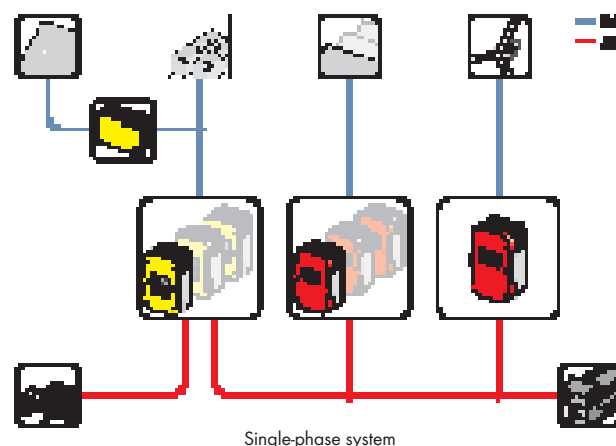
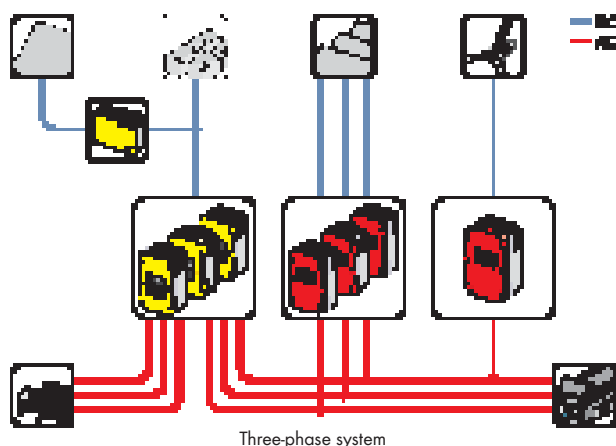
Durable

- Extreme overload capacity
- OptiCool™ active temperature management system
- 5-year standard warranty, extendable to 20 years

SUNNY ISLAND 4548-US / 6048-US

The efficient off-grid manager—now with 20 percent more power

The new SMA Sunny Island 4548-US and 6048-US inverters are based on the proven off-grid technology in the Sunny Island 5048-US but now feature 20 percent more power output. A maximum efficiency of 96 percent ensures peak production, which results in reduced diesel usage in rural communities. More flexible sizing allows for simplified system planning. And, with multicuster technology, up to 12 Sunny Islands can be integrated into off-grid power systems up to 110 kW in size.



Technical Data	Sunny Island 4548-US	Sunny Island 6048-US
AC output (loads)		
Nominal AC voltage / adjustable	120 V / 105 V – 132 V	120 V / 105 V – 132 V
Nominal AC frequency / adjustable	60 Hz / 55 Hz ... 65 Hz	60 Hz / 55 Hz ... 65 Hz
Continuous AC power (at 25 °C / at 40 °C) for 3 h	5000 W / 4000 W	6000 W / 5000 W
Continuous AC power (at 25 °C)	4500 W	5750 W
AC power at 25 °C for 30 min / 1 min / 3 s	5300 W / 8400 W / 11000 W	7000 W / 8400 W / 11000 W
Nominal AC current / max. AC current (peak)	37.5 A / 180 A for approx. 60 ms	48 A / 180 A for approx. 60 ms
THD output voltage / power factor at rated power	3 % / -1 ... +1	3 % / -1 ... +1
AC input (generator or grid)		
AC input voltage / range	120 V / 80 V – 150 V	120 V / 80 V – 150 V
AC input frequency / range	60 Hz / 54 Hz ... 66 Hz	60 Hz / 54 Hz ... 66 Hz
Max. input current / adjustable	56 A / 0 A ... 56 A	56 A / 0 A ... 56 A
Max. input power	6.7 kW	6.7 kW
Battery DC input		
Battery voltage / range	48 V / 41 V – 63 V	48 V / 41 V – 63 V
Max. battery charging current / continuous charging current at 25 °C	100 A / 85 A	130 A / 110 A
Battery type / battery capacity	Lead, NiCd / 100 Ah ... 10000 Ah	Lead, NiCd / 100 Ah ... 10000 Ah
Charge control	IUoU process	IUoU process
Efficiency / self-consumption		
Max. efficiency / CEC efficiency	96 % / 94.5 %	96 % / 94 %
Self-consumption with no load / standby	25 W / 4 W	25 W / 4 W
Protection		
DC reverse polarity protection / DC fuse	● / ●	● / ●
AC short circuit / AC overload	● / ●	● / ●
Overtemperature / battery deep discharge	● / ●	● / ●
General data		
Dimensions (W / H / D)	467 / 612 / 235 mm (18.4 / 24.1 / 9.3 inch)	467 / 612 / 235 mm (18.4 / 24.1 / 9.3 inch)
Weight	63 kg / 139 lb	63 kg / 139 lb
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +122 °F	-25 °C ... +60 °C / -13 °F ... +122 °F
Degree of protection (according to IEC 60529)	Interior assembly (NEMA 1)	Interior assembly (NEMA 1)
Features / function		
Operation & display / multifunctional relay	Internal / 2	Internal / 2
3-phase systems / parallel connection	● / ●	● / ●
Integrated bypass / multicluster operation	– / ●	– / ●
State of charge calculation / full charge / equalization charge	● / ● / ●	● / ● / ●
Integrated soft start / generator support	● / ●	● / ●
Battery temperature sensor / communication lines	● / ●	● / ●
Warranty (5 / 10 / 15 / 20 / 25 years)	● / ○ / ○ / ○ / –	● / ○ / ○ / ○ / –
Certificates and approvals	www.SMA-Solar.com	www.SMA-Solar.com
Accessories		
Battery cable / battery fuse	○ / ○	○ / ○
Interface (RS485 / multicluster PB)	○ / ○	○ / ○
Extended generator start "GenMan"	○	○
Load-shedding contactors / external battery current measurement	○ / ○	○ / ○
● Standard features ○ Optional – Not available		
Type designation	SI4548-US-10	SI6048-US-10



Flexible

- For systems from 3 to 300 kW
- 1- and 3-phase operation, connectable in parallel and modularly extendable
- AC and DC coupling

Simple

- Easy commissioning with the "Quick Configuration Guide"
- Complete off-grid management

Efficient

- High efficiency
- Intelligent battery management for maximum battery life
- Charge level calculation

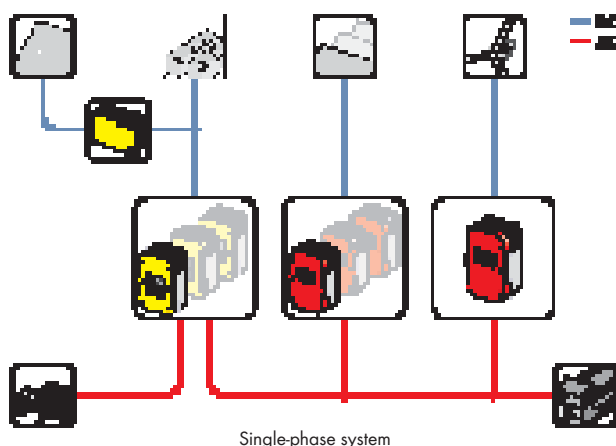
Robust

- Extreme overload capability
- OptiCool™ active temperature management system
- 5-year warranty

SUNNY ISLAND 5048 / 5048-US

The Island Manager

The Sunny Island 5048 makes commissioning within minutes possible. All required operational settings can be made quickly and easily in just a few steps. The Sunny Island 5048 is versatile, extendable and takes on all control processes. Its first-class battery management ensures maximum battery life. It also features impressive efficiency, a rugged die-cast aluminum enclosure and the OptiCool active cooling system. The Sunny Island is also available in a UL-compliant 5048-US version with an output rating of 120 V and 60 Hz for the North American market.



● Standard features ○ Optional – Not available



Simple

- For systems from 2 kW to 5 kW
- AC and DC coupling
- Simple installation

Efficient

- High efficiency
- Excellent price-performance ratio

Durable

- Extreme overload capacity
- 5-year warranty

SUNNY ISLAND 3324 / 4248

Making stand-alone grids easier than ever

Easy installation, safe operation and an outstanding price-performance ratio make the SMA Sunny Island 3324 and 4248 battery inverters especially suitable for small and mid-sized stand-alone grids. The inverters guarantee a reliable and high-quality power supply. Due to their outstanding overload capabilities and that they are designed to withstand high ambient temperatures, this line can be used under extreme weather conditions.



Flexible

- For systems from 1 to 9 kW
- 1- and 3-phase operation, connectable in parallel and modularly extendable
- AC and DC coupling

Simple

- Simple installation
- Complete off-grid management
- Easy and remote configuration and monitoring with Sunny Remote Control

Efficient

- High efficiency
- Charge level calculation
- Intelligent battery management for maximum battery life-span

Durable

- For indoor and outdoor installation
- Excellent overload characteristics
- Very wide temperature range
- 5-year warranty

SUNNY ISLAND 2012 / 2224

Compact and powerful for small stand-alone systems

The new Sunny Island 2012 and 2224 extends the off-grid SMA inverter series for the lower power range. The inverters not only feature all the proven product characteristics of the "big brother" Sunny Island 5048 but, thanks to their reduced weight and compact design, the new family members are even easier to handle and install. The high IP54 protection class and the Sunny Remote Control (SRC-1) give you full flexibility when choosing an installation location. Easy-to-use technology at its best, the new Sunny Island models are an unbeatable combination for off-grid systems of up to nine kilowatts.



Flexible

- For 12/24/48 V
- Up to four devices can be connected in parallel
- Modular and extendable

Simple

- Easy installation and commissioning
- Operation and configuration via Sunny Island (Single Point of Operation)

Efficient

- Active MPP tracking
- Efficiency > 98%

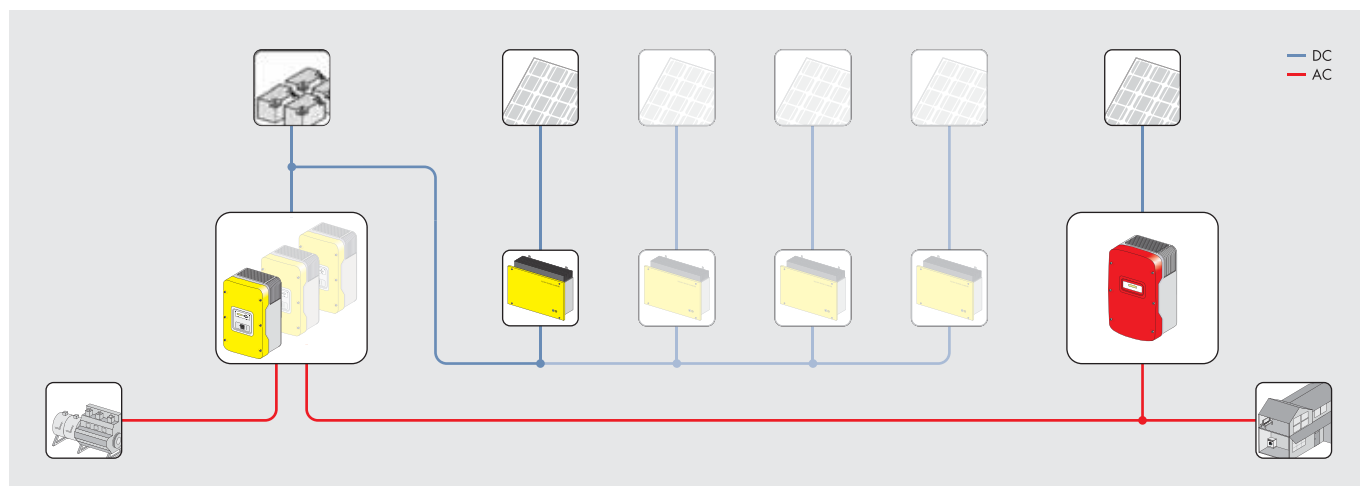
Durable

- Outdoor-compatible through IP65
- Fanless
- Nominal power up to 40 °C
- 5-year warranty

SUNNY ISLAND CHARGER 50

Maximum efficiency and versatile DC coupling

For the first time, a single manufacturer offers AC and DC coupling. The all-purpose SMA Sunny Island Charger 50 features a broad DC input voltage range, making system configuration possible for almost all PV modules. Thanks to the integrated MPP tracking system, the charger guarantees an energy yield that is 15 to 30 percent higher than that of conventional shunt and serial charge controllers. It includes unique features for charge controllers in this power range. A high protection rating, fanless operation and a broad temperature range make worldwide use possible, even in difficult ambient conditions. Easy installation and the completely automatic customization of the key controller settings by the Sunny Island make its startup simple.



Technical Data	Sunny Island Charger 12 V	Sunny Island Charger 24 V	Sunny Island Charger 48 V
Input (PV array)			
Max. PV power	630 W	1250 W	2400 W
Max. DC voltage	140 V DC	140 V DC	140 V DC
Optimum MPPT voltage range	25 V – 60 V	40 V – 80 V	70 V – 100 V
Number of MPP trackers	1	1	1
Max. PV current	40 A	40 A	40 A
Output (battery)			
Nominal DC power up to 40 °C	600 W	1200 W	2400 W
Nominal battery voltage	12 V	24 V	48 V
Nominal voltage range	8 V – 15.6 V	16 V – 31.5 V	36 V – 65 V
Battery type	Sealed and vented lead-acid batteries	Sealed and vented lead-acid batteries	Sealed and vented lead-acid batteries
Max. charging current	50 A	50 A	50 A
Continuous charging current	50 A	50 A	50 A
Charge control	IUoU	IUoU	IUoU
Efficiency			
Max. efficiency	98 %	98 %	98 %
Europ. efficiency	97.3 %	97.3 %	97.3 %
Protection			
DC reverse polarity	●	●	●
Short-circuit current capability	●	●	●
Overload protection	●	●	●
Overvoltage protection and low-voltage protection	●	●	●
Overtemperature protection and low-temperature protection	●	●	●
General data			
Dimensions (W / H / D)	421 / 310 / 143 mm	421 / 310 / 143 mm	421 / 310 / 143 mm
Weight	10 kg	10 kg	10 kg
Degree of protection (according to IEC 60529)	IP65	IP65	IP65
Operating temperature range	-25 °C ... +60 °C	-25 °C ... +60 °C	-25 °C ... +60 °C
Humidity	0 % ... 100 %	0 % ... 100 %	0 % ... 100 %
Self-consumption by day / night	<5 W / <3 W	<5 W / <3 W	<5 W / <3 W
Features / function			
Display	Multicolor LED	Multicolor LED	Multicolor LED
Parameter configuration	Plug & Play in combination with SI5048, SI2224, SI2012 (Sync Bus Piggy Back required) , DIL switch with stand-alone applications	Plug & Play in combination with SI5048, SI2224, SI2012 (Sync Bus Piggy Back required) , DIL switch with stand-alone applications	Plug & Play in combination with SI5048, SI2224, SI2012 (Sync Bus Piggy Back required) , DIL switch with stand-alone applications
Parallel operation	Up to 4 devices	Up to 4 devices	Up to 4 devices
Interface: Sync Bus Piggy-Back	○	○	○
External temperature sensor (type KTY)	○	○	○
Warranty (5 / 10 / 15 / 20 / 25 years)	● / ○ / ○ / ○ / ○	● / ○ / ○ / ○ / ○	● / ○ / ○ / ○ / ○
Certificates and approvals	CE	CE	CE
● Standard features ○ Optional – Not available			
Type designation	SIC50-MPT 12V	SIC50-MPT 24 V	SIC50-MPT 48 V



Flexible

- 3 different sizes from 30 to 300 kW
- Different generator, PV and load sizes

Simple

- Integrated AC distribution for Sunny Island, generator and PV
- Integrated load-shedding contactor

Reliable

- Active anti-islanding
- Reverse current monitoring
- Automatic bypass for the generator

Durable

- IP65 high protection class
- 5-year warranty

Multicuster Boxes for SUNNY ISLAND 5048

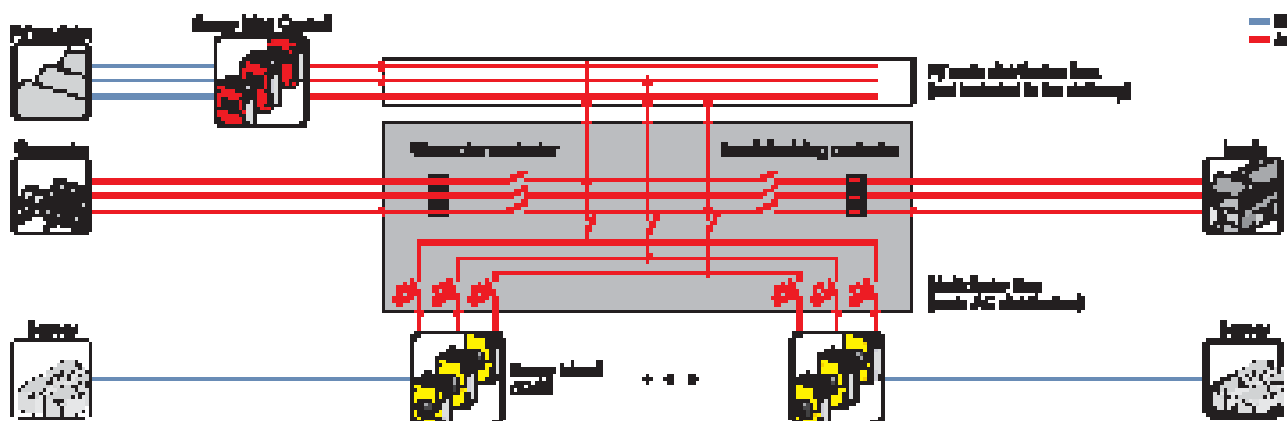
For easy set-up of stand-alone and hybrid systems

The Multicuster-Boxes for the Sunny Island 5048 make setting up large off-grid systems easy. They are the ideal solution for island and hybrid systems from 30 to 300 kW, allowing from 2 to 12 three-phase clusters, each consisting of three Sunny Island inverters, to be connected in parallel. The Multicuster Box was designed as an AC distribution center for connecting generators and to supply loads up to 300 kW. To simplify installation, all Multicuster Boxes are completely wired and fitted at the factory with a main connector for PV or wind generators. All communication cables required for the installation are included.



Multicuster Boxes for SUNNY ISLAND 5048

Technical Data	SUNNY ISLAND 5048 Multicuster Box 6	SUNNY ISLAND 5048 Multicuster Box 12
General		
Phase number	3-phase	3-phase
Nominal AC voltage	230 V (LN), 400 V (L1, L2)	230 V (LN), 400 V (L1, L2)
AC voltage range	172.5 V – 265 V 300 V – 433 V	172.5 V – 265 V 300 V – 433 V
Nominal AC frequency / range	50 Hz / 40 Hz ... 70 Hz	50 Hz / 40 Hz ... 70 Hz
Reliable grid configuration	TN	TN
Dimensions (W / H / D)	760 / 760 / 210 mm	1000 / 1400 / 300 mm
Assembly type	Suspended	Standing on base
Weight	60 kg	140 kg
Terminals for Sunny Island		
Maximum number of devices	6	12
Nominal AC power / nominal AC current at 25 °C	30 kW / 3 x 44 A	60 kW / 3 x 87 A
Nominal AC power / nominal AC current at 45 °C	24 kW / 3 x 35 A	48 kW / 3 x 70 A
AC power (25 °C, 30 minutes)	40 kW	80 kW
AC power (25 °C, 1 minute)	50 kW	100 kW
Fuses	Miniature circuit-breaker C 32A	Miniature circuit-breaker C 32A
Load connection		
Number	1 (3-phase)	1 (3-phase)
Nominal AC power (25 °C, unlimited)	55 kW	110 kW
Nominal AC current (25 °C)	3 x 80 A	3 x 160 A
Fuses	LV / HRC (size 00)	LV / HRC (size 00)
PV plant connection		
Number	1 (3-phase)	1 (3-phase)
Nominal AC power (25 °C, unlimited)	55 kW	110 kW
Nominal AC current (25 °C)	3 x 80 A	3 x 160 A
Fuses	–	–
Generator connection		
Number	1 (3-phase)	1 (3-phase)
Nominal AC power (25 °C, unlimited)	55 kW	110 kW
Nominal AC current (25 °C)	3 x 80 A	3 x 160 A
Fuses	LV / HRC (size 00)	LV / HRC (size 00)
Features		
Warranty (5 / 10 / 15 / 20 / 25 years)	● / ○ / ○ / ○ / ○	● / ○ / ○ / ○ / ○
Certificates	CE	CE
Ambient conditions		
Ambient temperature	-25 °C ... +50 °C	-25 °C ... +50 °C
Degree of protection (according to IEC 60529)	IP65	IP65
Humidity	0 % ... 100 %	0 % ... 100 %
Accessories		
Communication lines	●	●
Multicuster Piggy-Back	○	○
● Standard features ○ Optional – Not available		
Type designation	MC-Box-6.3	MC-Box-12.3



Technical Data		SUNNY ISLAND 5048 Multicuster Box 36	
General			
Phase number		3-phase	
Nominal AC voltage		230 V (LN), 400 V (L1, L2)	
AC voltage range		172.5 V – 250 V 300 V – 433 V	
Nominal AC frequency / range		50 Hz / 40 Hz ... 70 Hz	
Reliable grid configuration		TN	
Dimensions (W / H / D)		1200 / 2000 / 800 mm	
Assembly type		Standing on base	
Weight		400 kg	
Terminals for Sunny Island			
Maximum number of devices		36	
Nominal AC power / nominal AC current at 25 °C		180 kW / 3 x 260 A	
Nominal AC power / nominal AC current at 45 °C		144 kW / 3 x 209 A	
AC power (25 °C, 30 minutes)		234 kW / 3 x 340 A	
AC power (25 °C, 1 minute)		300 kW / 3 x 440 A	
Fuses		Miniature circuit-breaker C 32A	
Load connection			
Number		1 (3-phase)	
Nominal AC power (25 °C, unlimited)		300 kW	
Nominal AC current (25 °C)		3 x 435 A (AC1)	
Fuses		LV / HRC (size 3)	
PV plant connection			
Number		1 (3-phase)	
Nominal AC power (25 °C, unlimited)		300 kW	
Nominal AC current (25 °C)		3 x 435 A (AC1)	
Fuses		–	
Generator connection			
Number		1 (3-phase)	
Nominal AC power (25 °C, unlimited)		300 kW	
Nominal AC current (25 °C)		3 x 435 A (AC1)	
Fuses		LV / HRC (size 3)	
Features			
Warranty (5 / 10 / 15 / 20 / 25 years)		● / ○ / ○ / ○ / ○	
Certificates		CE	
Ambient conditions			
Ambient temperature		-25 °C ... +60 °C	
Degree of protection (according to IEC 60529)		IP54	
Humidity		0 % ... 100 %	
Accessories			
Communication lines		●	
Multicuster Piggy-Back		○	
● Standard features ○ Optional – Not available			
Type designation		MC-Box-36.3	



Image for illustrative purposes only



Flexible

- Integrated AC distribution for Sunny Island, generator and PV systems
- Accommodates various generator, PV and load sizes
- For systems up to 110 kW

Simple

- Load shedding, Sunny Island and generator contactors and circuit breakers
- Circuit breaker for PV system

Enhanced Safety

- Reverse current monitoring
- Simple emergency operation of the generator

Sturdy

- Robust NEMA 3 enclosure rating protects against weather and windblown dust

Multicuster Box for Sunny Island 4548-US, 5048-US, and 6048-US

Simple design of large off-grid systems

The Multicuster Box for the Sunny Island 4548-US, 5048-US, and 6048-US is the ideal solution for the easy installation of off-grid systems up to 110 kW. Two to four three-phase clusters, each with three Sunny Islands, can be connected in parallel. The Multicuster Box is pre-wired for operation and equipped with a main connection for PV or wind energy systems. The communication cables necessary for installation are also included.

Multicluster Box for Sunny Island 4548-US, 5048-US, and 6048-US

[illegible]



Flexible

- For use from 45 to 65 Hz
- Can be connected in parallel
- Suitable for 1- and 3-phase operation

Simple

- Ideal complement for energy sources without active power control
- Easy installation and commissioning

Safe

- Minimized AC interference emission thanks to power factor adjustment
- Integrated load frequency statistics

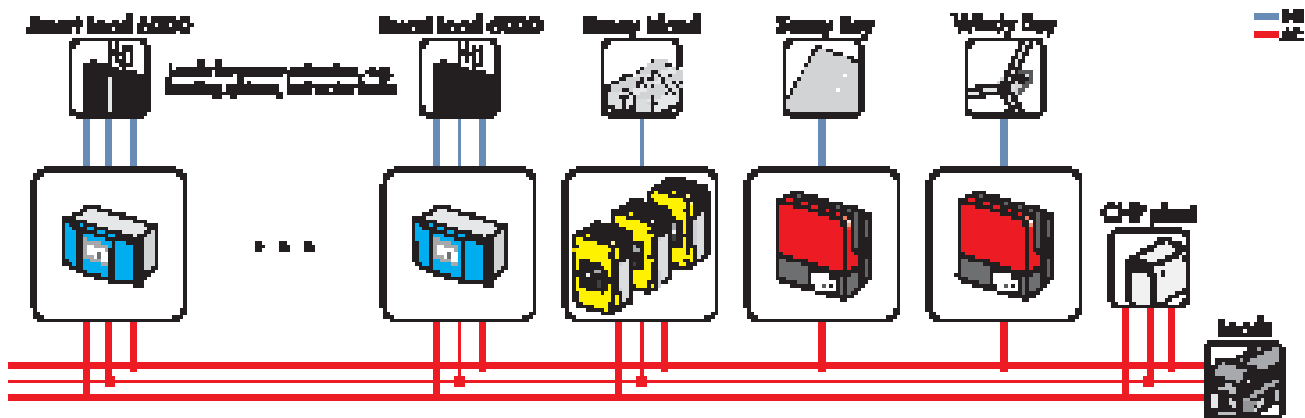
Robust

- IP65 high protection class
- 5-year warranty

Smart Load for SUNNY ISLAND

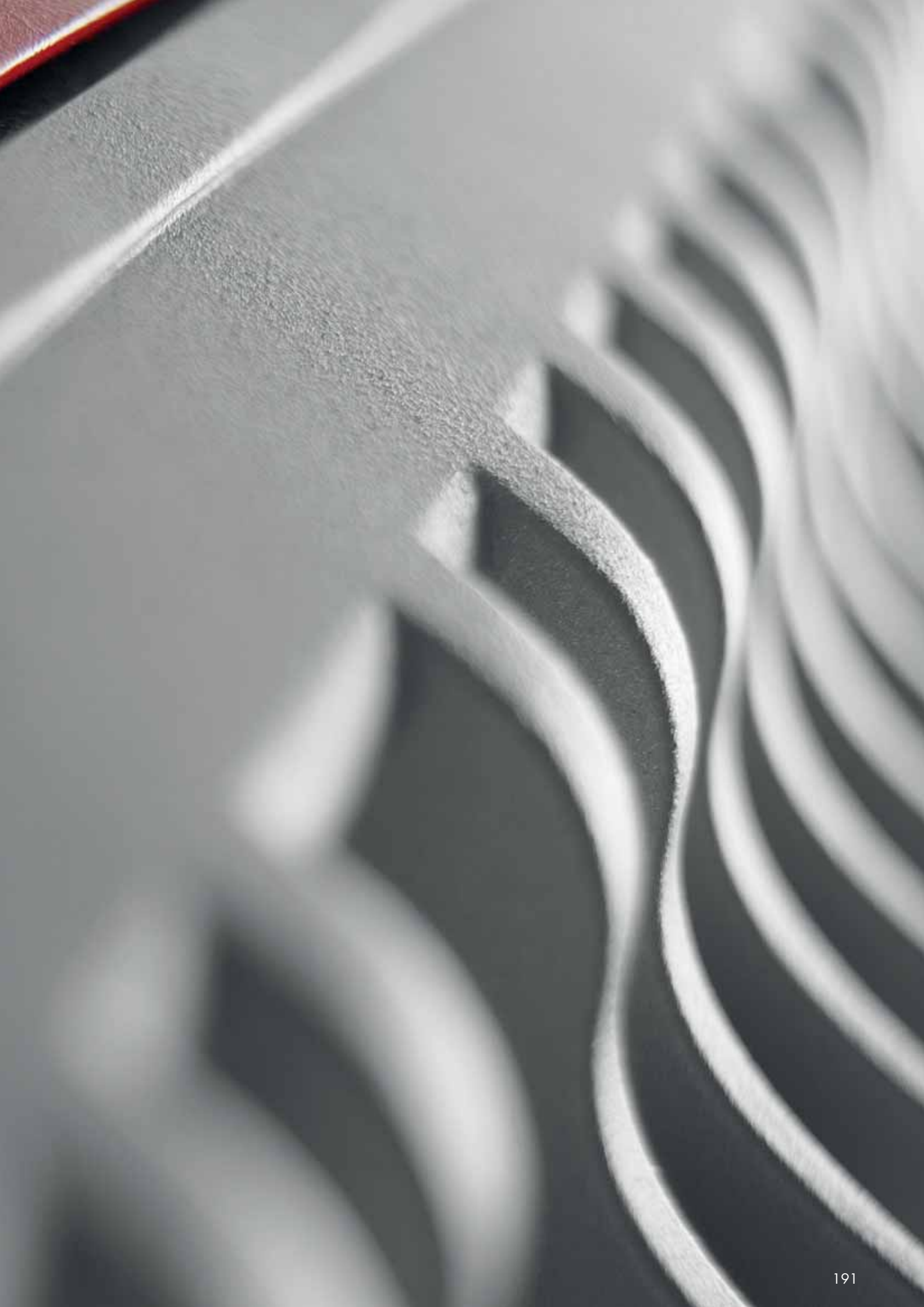
Intelligent dumpload for stand-alone grids

The Smart Load forms the perfect complement to unregulated energy generators in stand-alone grids, e.g. small, directly-connected wind generators with passive stall power control. If there is an electricity surplus, the Smart Load feeds it into special loads such as heating cartridges in a hot water tank. The control system is completely automatic, lightning fast and free of retroactive effects for other loads. This continuous and quick energy consumption allows for ideal protection of system components and guarantees increased reliability.

[illegible]



WIND POWER INVERTERS





Efficient

- Up to 96.1% efficiency
- Can be combined to form three-phase units with up to 18 kW output
- Integrated SMA Power Balancer
- OptiCool™ ensures continuous operation even at high temperatures

Easy to Use

- Programmable polynomial curve enables free selection of turbines
- Certified for the most countries (SMA Grid Guard)

Safe

- Galvanic isolation
- Compatible with Windy Boy Protection Box 600

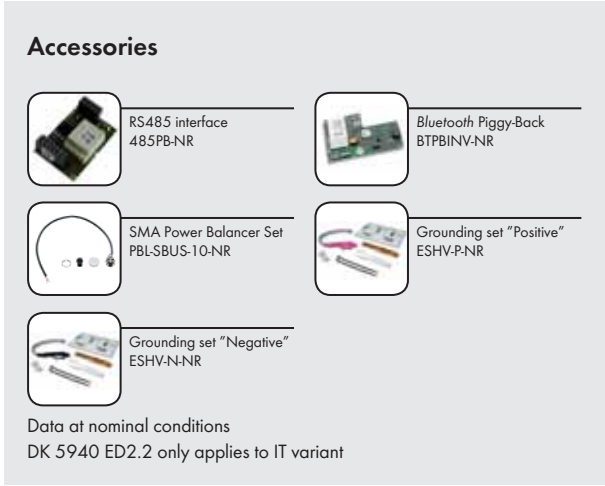
Reliable

- Worldwide SMA Service including Service Line
- Comprehensive SMA warranty program

WINDY BOY 5000A / 6000A

The performance class up to 18 kW

The Windy Boy 5000A, 6000A not only feature a maximum efficiency of 96.1 percent, but are also suited for the development of three-phase grid-feeding wind energy plants. The integrated SMA Power Balancer prevents undue load unbalance. The plant is also able to feed-in even if individual phases fail. The weather-proof enclosure and the wide temperature range allow for installation at almost any location. Thanks to the OptiCool temperature management system, these models work with maximum output at outdoor temperatures of up to 45 °C (113 °F). In case of an unlikely problem, the worldwide SMA Service and comprehensive warranty program provide maximum security.

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High Yields

- Maximum efficiency of 97%
- Transformerless, with H5 topology
- OptiCool™ ensures continuous operation even at high temperatures

Flexible

- Broad input voltage range
- Cable connection without tools
- Programmable polynomial curve enables free selection of turbines

Easy to Use

- Easily accessible connection area
- Low specific weight

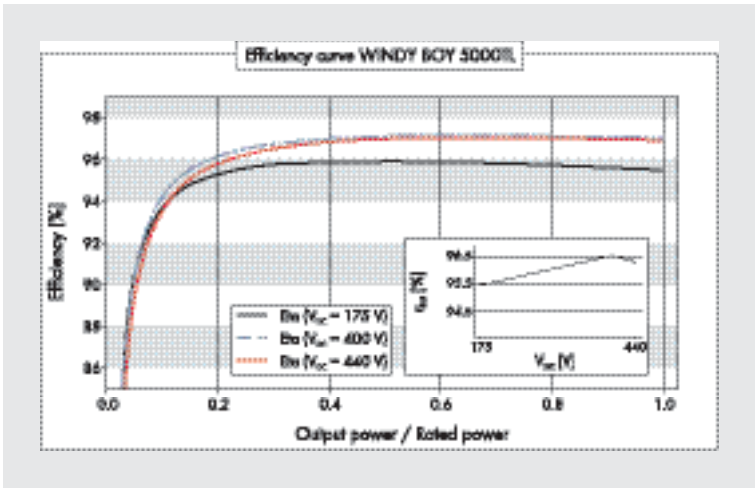
Informative

- Bluetooth® technology
- Multilingual graphic display

WINDY BOY 3600TL / 5000TL

Technology meets simplicity

With even better communication, usability and efficiency, the Windy Boy 3600TL and 5000TL models set a new standard for inverter technology. With modern graphic displays, a simplified assembly concept, and cable-free plant communication using the *Bluetooth* global standard, the new generation Windy Boys are ideally suited to almost every need. The transformer-free Windy Boy 3600TL and 5000TL feature a peak efficiency of 97 percent, resulting in optimal yields for small wind energy systems. The polynomial curve and broad input voltage range provide maximum plant design flexibility. The new generation Windy Boy is an inverter for all turbine types.



Accessories



Data at nominal conditions
DK 5940 ED2.2 only applies to IT variant

[illegible]



Efficient

- Up to 95.6% efficiency
- OptiCool™ ensures continuous operation even at high temperatures

Easy to Use

- Wide range of installation sites
- Programmable polynomial curve enables free selection of turbines
- Certified for most countries (SMA Grid Guard)

Reliable

- Galvanic isolation
- Compatible with the Windy Boy Protection Box 500

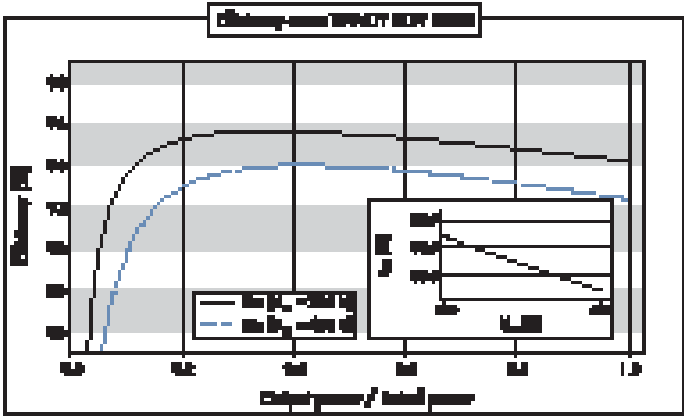
Reliable

- Worldwide SMA Service including Serviceline
- Comprehensive SMA warranty program

WINDY BOY 3300 / 3800

Highest yield in any climate

With a maximum efficiency of 95.6 percent, the Windy Boy 3300 and 3800 inverters are among the most cost-effective inverters for small wind energy systems. The weatherproof enclosure and broad temperature range permit installation at nearly any location, and thanks to the OptiCool cooling system, the inverters operate at outdoor temperatures of up to 45 °C (113 °F) with maximum output. The programmable polynomial curve enables optimal adaptation to the turbine curve, which increases yield. In case of an unlikely problem, the worldwide SMA Service and comprehensive warranty program provide maximum security.



Accessories

Bluetooth Piggy-Back
BTPBINV-NR

Grounding set "Negative"
ESHV-N-NR

Data at nominal conditions
DK 5940 ED2.2 only applies to IT variant

Technical Data	Windy Boy 3300	Windy Boy 3800
Input (DC)		
Max. DC power (@ cos φ=1)	3820 W	4040 W
Recommended array power at 2500 / 5000 full load hours per year	3100 W / 2800 W	3600 W / 3300 W
Max. input voltage / nominal DC voltage	500 V / 200 V	500 V / 200 V
Min. open-circuit voltage for activating "Turbine Mode"	200 V	200 V
Voltage range in "Turbine Mode"	200 V – 500 V	200 V – 500 V
Max. input current	20 A	20 A
Output (AC)		
Rated output power (@ 230 V, 50 Hz)	3300 W	3800 W
Max. apparent AC power	3600 VA	3800 VA
Nominal AC voltage / range	220 V, 230 V, 240 V / 180 V – 265 V	220 V, 230 V, 240 V / 180 V – 265 V
Power line frequency / range	50 Hz, 60 Hz / -4.5 Hz ... +4.5 Hz	50 Hz, 60 Hz / -4.5 Hz ... +4.5 Hz
Rated power frequency / rated power voltage	50 Hz / 230 V	50 Hz / 230 V
Max. output current	18 A	18 A
Power factor at rated output power	1	1
Feed-in phases / connection phases	1 / 1	1 / 1
Efficiency		
Max. efficiency / European efficiency	95.2 % / 94.4 %	95.6 % / 94.7 %
Protection		
Ground fault monitoring / grid monitoring	● / ●	● / ●
DC reverse polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / ●	● / ● / ●
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	I / III
General Data		
Dimensions (W / H / D)	450 / 352 / 236 mm (17.7 / 13.9 / 9.3 inch)	450 / 352 / 236 mm (17.7 / 13.9 / 9.3 inch)
Weight	38 kg / 83.8 lb	38 kg / 83.8 lb
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	-25 °C ... +60 °C / -13 °F ... +140 °F
Noise emission	40 db(A)	42 db(A)
Topology	LF transformer	NF transformer
Cooling concept	OptiCool	OptiCool
Protection class of electronics / connection area (according to IEC 60529)	IP65 / IP65	IP65 / IP65
Climatic category (according to IEC 60721-2-1)	4K4H	4K4H
Maximum permissible value for relative humidity (non-condensing)	100 %	100 %
Features		
DC terminal	SUNCLIX	SUNCLIX
AC terminal	Connector	Connector
Display	Text line	Text line
Interfaces: RS485 / Bluetooth	○ / ○	○ / ○
Warranty: 5 / 10 years	● / ○	● / ○
Certificates and approvals (additional on request)	CE, VDE0126-1-1, DK 5940 ED2.2, G83/1-1, CER/06/190, RD 1663, AS4777, EN 50438	CE, VDE0126-1-1, DK 5940 ED2.2, G83/1-1, CER/06/190, RD 1663, AS4777, EN 50438
● Standard features ○ Optional features — Not available		
Type designation	WB 3300	WB 3800



High Yields

- Maximum efficiency over 96%
- OptiCool™ ensures continuous operation even at high temperatures

Flexible

- Programmable polynomial curve enables free selection of turbines
- Broader input voltage range

Easy to Use

- Fast and simple connection

Informative

- Bluetooth® technology
- Multi-language graphic display

WINDY BOY 2000HF / 2500HF / 3000HF

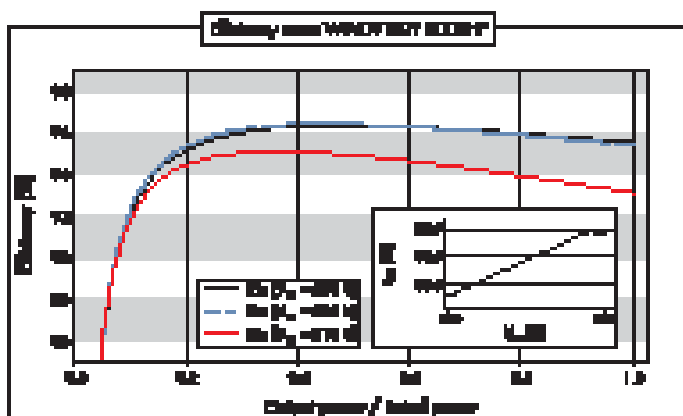
Narrow and compact for high yields

Packed full of the latest SMA technology, the Windy Boy HF series provides the highest yields for transformer-based inverters in this performance class. Installation is now easier than ever thanks to the new SUNCLIX® DC connector system and an easily accessible configuration area. Mounting has also seen simplified due to a reduction in weight. The programmable polynomial curve and the broad input voltage range also offer great freedom in wind turbine selection and enable grid-feeding even at low wind speeds. The modern graphic display and wireless *Bluetooth* communication system make the devices highly user-friendly.



WINDY BOY 2000HF / 2500HF / 3000HF

Technical Data	Windy Boy 2000HF	Windy Boy 2500HF
Input (DC)		
Max. DC power (@ cos φ=1)	2100 W	2600 W
Max. input voltage / nominal DC voltage	700 V / 530 V	700 V / 530 V
Min. open-circuit voltage for activating "Turbine Mode"	220 V	220 V
Voltage range in "Turbine Mode"	175 V – 700 V	175 V – 700 V
Max. input current	12 A	15 A
Output (AC)		
Rated output power (@ 230 V, 50 Hz)	2000 W	2500 W
Max. apparent AC power	2000 VA	2500 VA
Nominal AC voltage / range	220 V, 230 V / 180 V – 280 V	220 V, 230 V / 180 V – 280 V
Power line frequency / range	50 Hz, 60 Hz / -4.5 Hz ... +4.5 Hz	50 Hz, 60 Hz / -4.5 Hz ... +4.5 Hz
Rated power frequency / rated power voltage	50 Hz / 230 V	50 Hz / 230 V
Max. output current	11.4 A	13.9 A
Power factor at rated output power	1	1
Feed-in phases / connection phases	1 / 1	1 / 1
Efficiency		
Max. efficiency / European efficiency	96.4 % / 95 %	96.4 % / 95.3 %
Protection		
Ground fault monitoring / grid monitoring	● / ●	● / ●
DC reverse polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / ●	● / ● / ●
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	I / III
General Data		
Dimensions (W / H / D)	348 / 580 / 145 mm (22.8 / 13.7 / 5.7 inch)	348 / 580 / 145 mm (22.8 / 13.7 / 5.7 inch)
Weight	17 kg / 37.5 lb	17 kg / 37.5 lb
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	-25 °C ... +60 °C / -13 °F ... +140 °F
Noise emission	38 db(A)	38 db(A)
Topology	HF transformer	HF transformer
Cooling concept	OptiCool	OptiCool
Protection class of electronics / connection area (according to IEC 60529)	IP65 / IP54	IP65 / IP54
Climatic category (according to IEC 60721-2-1)	4K4H	4K4H
Maximum permissible value for relative humidity (non-condensing)	100 %	100 %
Features		
DC terminal	SUNCLIX	SUNCLIX
AC terminal	Connector	Connector
Display	Graphic	Graphic
Interfaces: RS485 / Bluetooth	○ / ●	○ / ●
Warranty: 5 / 10 years	● / ○	● / ○
Certificates and approvals (additional on request)	CE, VDE0126-1-1, DK 5940 ED2.2, G83/1-1, RD 1663, AS4777, EN 50438	CE, VDE0126-1-1, DK 5940 ED2.2, G83/1-1, RD 1663, AS4777, EN 50438
● Standard features ○ Optional features – Not available		
Type designation	WB 2000HF	WB 2500HF



Accessories



SMA Plug-in Grounding
PLUGIN-GRD-10-NR*



Quick Module RS4
multi-function relay
485QM-10-NR

Provisional data, last updated May 2011 – Data at nominal conditions
DK 5940 ED2.2 valid only for IT variants

Technical Data		Windy Boy 3000HF	
Input (DC)			
Max. DC power (@ cos φ=1)		3150 W	
Max. input voltage / nominal DC voltage		700 V / 530 V	
Min. open-circuit voltage for activating “Turbine Mode”		220 V	
Voltage range in “Turbine Mode”		175 V – 700 V	
Max. input current		15 A	
Output (AC)			
Rated output power (@ 230 V, 50 Hz)		3000 W	
Max. apparent AC power		3000 VA	
Nominal AC voltage / range		220 V, 230 V / 180 V – 280 V	
Power line frequency / range		50 Hz, 60 Hz / -4.5 Hz ... +4.5 Hz	
Rated power frequency / rated power voltage		50 Hz / 230 V	
Max. output current		15 A	
Power factor at rated output power		1	
Feed-in phases / connection phases		1 / 1	
Efficiency			
Max. efficiency / European efficiency		96.4 % / 95.4 %	
Protection			
Ground fault monitoring / grid monitoring		● / ●	
DC reverse polarity protection / AC short-circuit current capability / galvanically isolated		● / ● / ●	
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)		I / III	
General Data			
Dimensions (W / H / D)		348 / 580 / 145 mm (22.8 / 13.7 / 5.7 inch)	
Weight		17 kg / 37.5 lb	
Operating temperature range		-25 °C ... +60 °C / -13 °F ... +140 °F	
Noise emission		38 db(A)	
Topology		HF transformer	
Cooling concept		OptiCool	
Protection class of electronics / connection area (according to IEC 60529)		IP65 / IP54	
Climatic category (according to IEC 60721-2-1)		4K4H	
Maximum permissible value for relative humidity (non-condensing)		100 %	
Features			
DC terminal		SUNCLIX	
AC terminal		Connector	
Display		Graphic	
Interfaces: RS485 / Bluetooth		○ / ●	
Warranty: 5 / 10 years		● / ○	
Certificates and approvals (additional on request)		CE, VDE0126-1-1, DK 5940 ED2.2, G83/1-1, RD 1663, AS4777, EN 50438	
● Standard features ○ Optional features – Not available			
Type designation		WB 3000HF	



Efficient

- Efficiency up to 95%
- Improved yields via polynomial curves

Easy to Use

- Wide range of installation sites
- Certified for most countries (SMA Grid Guard)

Reliability

- Galvanic isolation
- Compatible with Windy Boy Protection Box 600

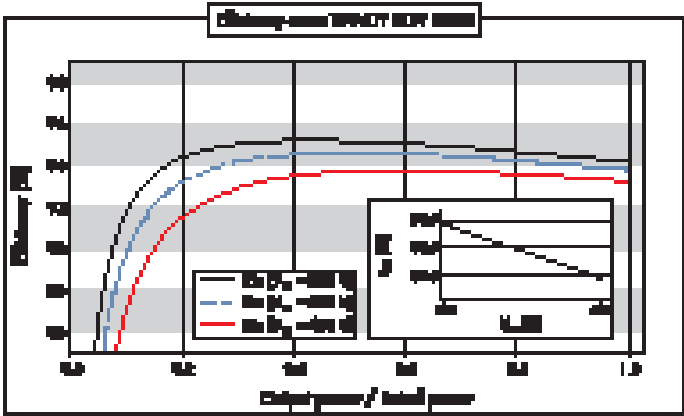
Reliable

- Worldwide SMA Service including Service Line
- Comprehensive SMA warranty program

WINDY BOY 2500 / 3000

Proven technology for use worldwide

The Windy Boy 2500 and 3000 inverters are ideally suited to small wind energy systems and feature a maximum efficiency of 95 percent. The programmable polynomial curve enables optimal adaptation to the turbine curve, which is also protected with a special smooth start device. This Windy Boy also features the SMA Grid Guard interface, which can be used anywhere in the world. It ensures maximum wind energy plant reliability and allows for the feed-in to almost any public grid. In case of an unlikely problem, the worldwide SMA Service and comprehensive warranty program provide maximum security.



Accessories

Bluetooth Piggy-Back
BTPBINV-NR

Grounding set "Negative"
ESHV-N-NR

Data at nominal conditions
DK 5940 ED2.2 only applies to IT variant

	Windy Boy 2500	Windy Boy 3000
Technical Data		
Input (DC)		
Max. DC power (@ cos φ=1)	2700 W	3200 W
Recommended array power at 2500 / 5000 full load hours per year	2100 W / 1900 W	2500 W / 2200 W
Max. input voltage / nominal DC voltage	600 V / 300 V	600 V / 350 V
Min. open-circuit voltage for activating "Turbine Mode"	250 V	290 V
Voltage range in "Turbine Mode"	224 V - 600 V	268 V - 600 V
Max. input current	12 A	12 A
Output (AC)		
Rated output power (@ 230 V, 50 Hz)	2300 W	2750 W
Max. apparent AC power	2500 VA	3000 VA
Nominal AC voltage / range	220 V, 230 V, 240 V / 180 V – 265 V	220 V, 230 V, 240 V / 180 V – 265 V
Power line frequency / range	50 Hz, 60 Hz / -4.5 Hz ... +4.5 Hz	50 Hz, 60 Hz / -4.5 Hz ... +4.5 Hz
Rated power frequency / rated power voltage	50 Hz / 230 V	50 Hz / 230 V
Max. output current	12.5 A	15.1 A
Power factor at rated output power	1	1
Feed-in phases / connection phases	1 / 1	1 / 1
Efficiency		
Max. efficiency / European efficiency	94.1 % / 93.2 %	95 % / 93.6 %
Protection		
Ground fault monitoring / grid monitoring	● / ●	● / ●
DC reverse polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / ●	● / ● / ●
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	I / III
General Data		
Dimensions (W / H / D)	440 / 339 / 214 mm (17.3 / 13.3 / 8.4 inch)	440 / 339 / 214 mm (17.3 / 13.3 / 8.4 inch)
Weight	28 kg / 61,7 lb	31 kg / 70.5 lb
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	-25 °C ... +60 °C / -13 °F ... +140 °F
Noise emission	33 db(A)	30 db(A)
Topology	LF transformer	LF transformer
Cooling concept	Convection	Convection
Protection class of electronics / connection area (according to IEC 60529)	IP65 / IP65	IP65 / IP65
Climatic category (according to IEC 60721-2-1)	4K4H	4K4H
Maximum permissible value for relative humidity (non-condensing)	100 %	100 %
Features		
DC terminal	SUNCLIX	SUNCLIX
AC terminal	Connector	Connector
Display	Text line	Text line
Interfaces: RS485 / Bluetooth	○ / ○	○ / ○
Warranty: 5 / 10 years	● / ○	● / ○
Certificates and approvals (additional on request)	CE, VDE0126-1-1, DK 5940 ED2.2, G83/1-1, CER/06/190, RD 1663, AS4777, EN 50438	CE, VDE0126-1-1, DK 5940 ED2.2, G83/1-1, CER/06/190, RD 1663, AS4777, EN 50438
● Standard features ○ Optional features — Not available		
Type designation	WB 2500	WB 3000



Efficient

- Specially designed for small wind energy systems
- Improved yields via polynomial curves

Easy to Use

- Free choice of installation site
- Certified for most countries (SMA Grid Guard)

Reliable

- Galvanic Isolation
- Compatible with Windy Boy Protection Box 400

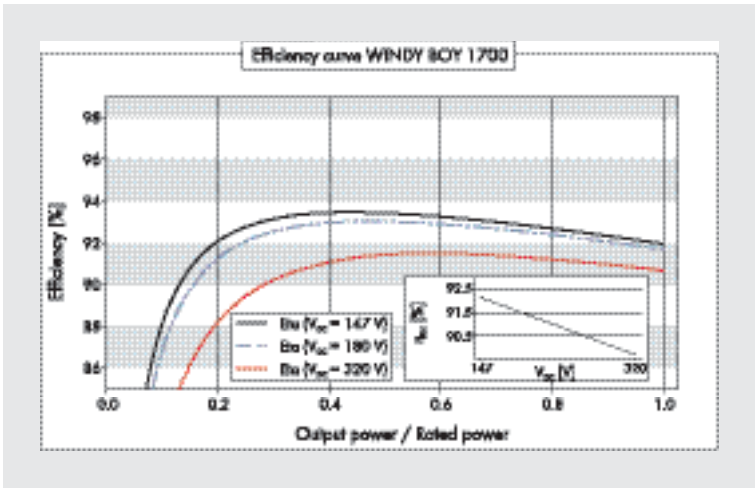
Flexible

- Broad input voltage-range for Windy Boy 1200

WINDY BOY 1200 / 1700

Powerful compact devices

The Windy Boy 1200 and 1700 are ideally suited for small wind energy systems. The programmable polynomial curve enables optimal adaptation to the turbine curve, which increases yield. The weatherproof enclosure and the wide temperature range allow for installation at almost any location. These models are optimally adjusted to fast and frequent load changes and, with the optimal Windy Boy Protection Box, provide the perfect interface for any turbine. Using the integrated display and various communication interfaces you can monitor all plant values at any time.



Accessories

	RS485 interface 485USPB-NR		Bluetooth Piggy-Back BTPBINV-NR
	Grounding set "Positive" ESHV-P-NR		Grounding set "Negative" ESHV-N-NR

Data at nominal conditions
DK 5940 ED2.2 only applies to IT variant

DK 5940 ED2.2 only applies to II variant



Economical

- Specially designed for small wind turbine systems
- Outstanding performance at low wind speeds

Easy to Use

- Programmable polynomial curve enables free selection of turbines
- Free choice of installation site

Reliable

- Galvanic isolation
- In accordance with almost all European power supply line guidelines

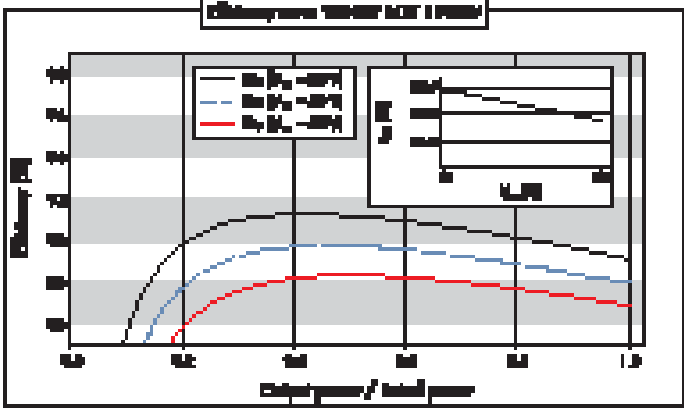
Secure

- Worldwide SMA Service including Serviceline
- Comprehensive SMA warranty program

WINDY BOY 1100LV

The solution for low generator voltage

The Windy Boy 1100LV is the perfect solution for the smallest wind energy systems with low generator voltage. Turbines with a nominal voltage of 24 or 48 V can be connected without an additional voltage converter. The programmable polynomial curve gives you full flexibility for choosing the turbine, while its weatherproof enclosure and wide operating temperature range allow for installation at nearly any location. As an inverter for wind energy systems, the Windy Boy is optimally adjusted to fast and frequent load changes. Its minimum internal consumption during periods of no wind also increases the yield, which you can monitor at any time using the display and various communication interfaces.



Accessories



Bluetooth Piggy-Back
BTPBINV-NR



Grounding set "Negative"
ESHV-N-NR

Data at nominal conditions
DK 5940 ED2.2 only applies to IT variant

Technical Data	Windy Boy 1100LV	
Input (DC)		
Max. DC power (@ cos φ=1)	1240 W	
Recommended generator power at 2500 / 5000 full load hours per year	1000 W / 900 W	
Max. input voltage / nominal DC voltage	60 V / 25 V	
Min. open-circuit voltage for activating "Turbine Mode"	25 V	
Voltage range in "Turbine Mode"	21 V - 60 V	
Max. input current	62 A	
Output (AC)		
Rated output power (@ 230 V, 50 Hz)	1000 W	
Max. apparent AC power	1100 VA	
Nominal AC voltage / range	220 V, 230 V, 240 V / 180 V - 260 V	
Power line frequency / range	50 Hz, 60 Hz / -4.5 Hz ... +4.5 Hz	
Rated power frequency / rated power voltage	50 Hz / 230 V	
Max. output current	5 A	
Power factor at rated output power	1	
Feed-in phases / connection phases	1 / 1	
Efficiency		
Max. efficiency / European efficiency	92 % / 90.4 %	
Protection		
Ground fault monitoring / grid monitoring	● / ●	
DC reverse polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / ●	
General Data		
Dimensions (W / H / D)	434 / 295 / 214 mm (17 / 11.6 / 9.3 inch)	
Weight	28 kg / 61.7 lb	
Operating temperature range	-25 °C ... +60 °C / -13 °F ... +140 °F	
Noise emission	33 db(A)	
Topology	LF transformer	
Cooling concept	Convection	
Protection class of electronics / connection area (according to IEC 60529)	IP65 / IP65	
Climatic category (according to IEC 60721-2-1)	4K4H	
Maximum permissible value for relative humidity (non-condensing)	100 %	
Features		
DC terminal	SUNCLIX	
AC terminal	Connector	
Display	Text line	
Interfaces: RS485 / Bluetooth	○ / ○	
Warranty: 5 / 10 years	● / ○	
Certificates and approvals (additional on request)	CE, VDE0126-1-1, DK 5940 ED2.2, G83/1-1, CER/06/190, RD 1663, AS4777, EN 50438	
● Standard features ○ Optional features – Not available		
Type designation	WB 1100LV	



UL Certified

- For locations requiring UL certification (UL 1741/IEEE-1547)

High Yields

- 97% peak efficiency
- CEC efficiency of up to 96%
- OptiCool™ active temperature management

Easy to Use

- Automatic grid voltage detection*
- Programmable polynomial curve enables free selection of turbines

Reliable

- Rugged cast aluminum outdoor rated enclosure
- Compatible with Windy Boy Protection Box 600
- 10-year limited standard warranty

WINDY BOY 5000-US / 6000-US / 7000-US / 8000-US

The customized solution for wind turbine systems

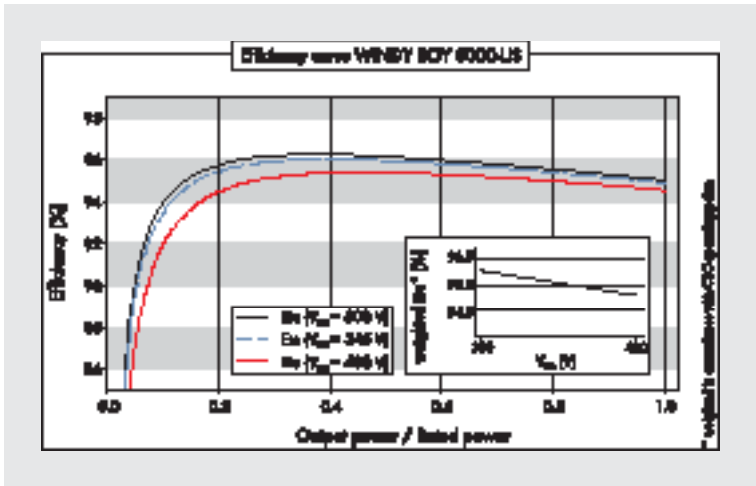
Windy Boy inverters combine the same proven technology present in all Sunny Boy inverters with special firmware that permits direct grid-tied operation with a broad range of wind turbines—without batteries. This greatly reduces the overall system cost because components such as the charge controller, batteries and associated switch gear can be eliminated. Increased total energy capture combined with a reduction of balance of system components greatly reduces the installation and operating costs of a grid-tied wind system. Contact your local wind turbine supplier for information on compatible wind turbine models and system design considerations.

* US patent US7352549B1

Technical Data	Windy Boy 5000-US 208 V	Windy Boy 5000-US 240 V	Windy Boy 5000-US 277 V
Input (DC)			
Max. DC power (@ cos $\varphi=1$)	5300 W	5300 W	5300 W
Max. input voltage / nominal DC voltage	600 V / 310 V	600 V / 310 V	600 V / 310 V
Min. open-circuit voltage for activating "Turbine Mode"	300 V	300 V	300 V
Voltage range in "Turbine Mode"	250 V – 600 V	250 V – 600 V	250 V – 600 V
Max. input current	21 A	21 A	21 A
Output (AC)			
Rated output power (@ 230 V, 50 Hz)	5000 W	5000 W	5000 W
Max. apparent AC power	5100 VA	5100 VA	5100 VA
Nominal AC voltage / range	208 V / 183 V – 229 V	240 V / 211 V – 264 V	277 V / 244 V – 305 V
Power line frequency / range	60 Hz / 59.3 Hz ... 60.5 Hz	60 Hz / 59.3 Hz ... 60.5 Hz	60 Hz / 59.3 Hz ... 60.5 Hz
Rated power frequency / rated power voltage	60 Hz / 208 V	60 Hz / 240 V	60 Hz / 277 V
Max. output current	27.9 A	24.1 A	20.9 A
Power factor at rated output power	1	1	1
Feed-in phases / connection phases	1 / 1	1 / 1	1 / 1
Efficiency			
Max. efficiency / CEC efficiency	96.7 % / 95.5 %	96.8 % / 95.5 %	96.8 % / 95.5 %
Protection			
DC reverse polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / ●	● / ● / ●	● / ● / ●
Protection class (according to IEC 62103)	I	I	I
Overvoltage category (according to IEC 60664-1)	III	III	III
General Data			
Dimensions (W / H / D)	468 / 613 / 242 mm (18,5 / 24 / 9 inch)	468 / 613 / 242 mm (18,5 / 24 / 9 inch)	468 / 613 / 242 mm (18,5 / 24 / 9 inch)
Weight	64 kg / 141 lb	64 kg / 141 lb	64 kg / 141 lb
Operating temperature range	-25 °C ... +45 °C / -13 °F ... +113 °F	-25 °C ... +45 °C / -13 °F ... +113 °F	-25 °C ... +45 °C / -13 °F ... +113 °F
Noise emission	44 db(A)	44 db(A)	44 db(A)
Topology	LF transformer	LF transformer	LF transformer
Cooling concept	OptiCool	OptiCool	OptiCool
Protection class of electronics / connection area (according to IEC 60529)	NEMA 3R / NEMA 3R	NEMA 3R / NEMA 3R	NEMA 3R / NEMA 3R
Features			
Display	Text line	Text line	Text line
Interfaces: RS485 / Bluetooth	○ / ○	○ / ○	○ / ○
Warranty: 10 years	●	●	●
Certificates and approvals (additional on request)	UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B)	UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B)	UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B)
● Standard features ○ Optional features – Not available			
Type designation	WB 5000US	WB 5000US	WB 5000US

WINDY BOY 5000-US / 6000-US / 7000-US / 8000-US

Technical Data	Windy Boy 6000-US 208 V	Windy Boy 6000-US 240 V	Windy Boy 6000-US 277 V
Input (DC)			
Max. DC power (@ cos φ=1)	6350 W	6350 W	6350 W
Max. input voltage / nominal DC voltage	600 V / 310 V	600 V / 310 V	600 V / 310 V
Min. open-circuit voltage for activating “Turbine Mode”	300 V	300 V	300 V
Voltage range in “Turbine Mode”	250 V – 600 V	250 V – 600 V	250 V – 600 V
Max. input current	25 A	25 A	25 A
Output (AC)			
Rated output power (@ 230 V, 50 Hz)	6000 W	6000 W	6000 W
Max. apparent AC power	6100 VA	6100 VA	6100 VA
Nominal AC voltage / range	208 V / 183 V – 229 V	240 V / 211 V – 264 V	277 V / 244 V – 305 V
Power line frequency / range	60 Hz / 59.3 Hz ... 60.5 Hz	60 Hz / 59.3 Hz ... 60.5 Hz	60 Hz / 59.3 Hz ... 60.5 Hz
Rated power frequency / rated power voltage	60 Hz / 208 V	60 Hz / 240 V	60 Hz / 277 V
Max. output current	33.3 A	28.9 A	25 A
Power factor at rated output power	1	1	1
Feed-in phases / connection phases	1 / 1	1 / 1	1 / 1
Efficiency			
Max. efficiency / CEC efficiency	97 % / 95.5 %	97 % / 95.5 %	97 % / 96 %
Protection			
DC reverse polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / ●	● / ● / ●	● / ● / ●
Protection class (according to IEC 62103)	I	I	I
Overvoltage category (according to IEC 60664-1)	III	III	III
General Data			
Dimensions (W / H / D)	468/613/242 mm (18.5/24/9 inch)	468/613/242 mm (18.5/24/9 inch)	468/613/242 mm (18.5/24/9 inch)
Weight	64 kg/141 lb	64 kg/141 lb	64 kg/141 lb
Operating temperature range	-25 °C ... +45 °C / -13 °F ... +113 °F	-25 °C ... +45 °C / -13 °F ... +113 °F	-25 °C ... +45 °C / -13 °F ... +113 °F
Noise emission	45 db(A)	45 db(A)	45 db(A)
Topology	LF transformer	LF transformer	LF transformer
Cooling concept	OptiCool	OptiCool	OptiCool
Protection class of electronics / connection area (according to IEC 60529)	NEMA 3R/NEMA 3R	NEMA 3R/NEMA 3R	NEMA 3R/NEMA 3R
Features			
Display	Text line	Text line	Text line
Interfaces: RS485 / Bluetooth	○ / ○	○ / ○	○ / ○
Warranty: 10 years	●	●	●
Certificates and approvals (additional on request)	UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B)	UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B)	UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B)
● Standard features ○ Optional features – Not available			
Type designation	WB 6000US	WB 6000US	WB 6000US



Accessories



RS485 interface
485USPB-NR

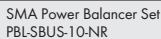


Bluetooth Piggy-Back
BTPBINV-NR



SMA Power Balancer Set
PBL-SBUS-10-NR

NOTE: US inverters ship with gray lids.
Data at nominal conditions

Bluetooth Piggy-Back
BTPBINV-NR

NOTE: US inverters ship with gray lids.
Data at nominal conditions



UL Certified

- For the North American small wind market (UL 1741/IEEE-1547)

Efficient

- Peak efficiency of 96.5%
- OptiCool™ active temperature management

Easy to Use

- Programmable polynomial curve enables free selection of turbines

Reliable

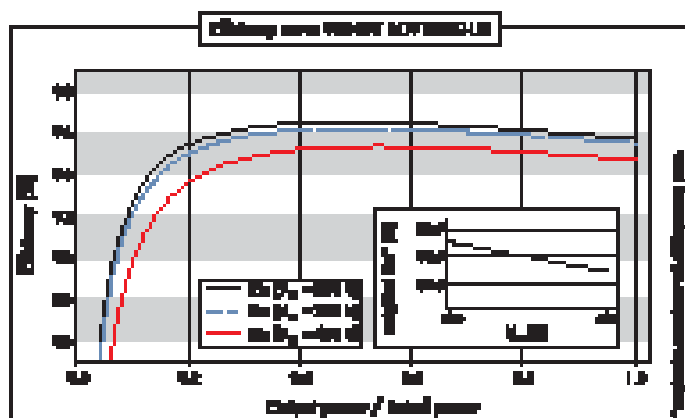
- Galvanic isolation due to integrated transformer

WINDY BOY 3000-US

A reliable option with UL certification

User-friendly, safe and reliable, the Windy Boy 3000-US is specially certified for locations requiring UL certification. The automatic grid voltage detection* allows for straightforward and secure installation. The aluminum die-cast enclosure and the OptiCool active cooling system ensure optimal yield as well as a long lifespan, even under adverse operating conditions.

* US patent US7352549B1.



Accessories



RS485 interface
485USPB-NR



Bluetooth Piggy-Back
BTPBINV-NR

NOTE: US inverters ship with gray lids.
Data at nominal conditions

Technical Data	Windy Boy 3000-US 208 V	Windy Boy 3000-US 240 V
Input (DC)		
Max. DC power (@ $\cos \varphi=1$)	3200 W	3200 W
Max. input voltage / nominal DC voltage	500 V / 250 V	500 V / 250 V
Min. open-circuit voltage for activating "Turbine Mode"	230 V	230 V
Voltage range in "Turbine Mode"	175 V – 500 V	200 V – 500 V
Max. input current	17 A	17 A
Output (AC)		
Rated output power (@ 230 V, 50 Hz)	3000 W	3000 W
Max. apparent AC power	3000 VA	3000 VA
Nominal AC voltage / range	208 V / 183 V – 229 V	240 V / 211 V – 264 V
Power line frequency / range	60 Hz / 59.3 Hz ... 60.5 Hz	60 Hz / 59.3 Hz ... 60.5 Hz
Rated power frequency / rated power voltage	60 Hz / 208 V	60 Hz / 240 V
Max. output current	15 A	15 A
Power factor at rated output power	1	1
Feed-in phases / connection phases	1 / 1	1 / 1
Efficiency		
Max. efficiency / CEC efficiency	96 % / 95 %	96.5 % / 95.5 %
Protection		
DC reverse polarity protection / AC short-circuit current capability / galvanically isolated	● / ● / ●	● / ● / ●
Protection class (according to IEC 62103) / overvoltage category (according to IEC 60664-1)	I / III	I / III
General Data		
Dimensions (W / H / D)	450 / 352 / 236 mm (17.7 / 13.9 / 9.3 inch)	450 / 352 / 236 mm (17.7 / 13.9 / 9.3 inch)
Weight	40 kg / 88 lb	40 kg / 88 lb
Operating temperature range	-25 °C ... +45 °C / -13 °F ... +113 °F	-25 °C ... +45 °C / -13 °F ... +113 °F
Noise emission	40 db(A)	40 db(A)
Topology	LF transformer	LF transformer
Cooling concept	OptiCool	OptiCool
Protection class of electronics / connection area (according to IEC 60529)	NEMA 3R / NEMA 3R	NEMA 3R / NEMA 3R
Features		
Display	Text line ○ / ○	Text line ○ / ○
Interfaces: RS485 / Bluetooth	●	●
Warranty: 10 years	●	●
Certificates and approvals (additional on request)	UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B)	UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B)
● Standard features ○ Optional features – Not available		
Type designation	WB 3000US	WB 3000US



Reliable

- Highly dynamic overvoltage protection
- Optimal start-up performance of the wind turbine

High yields

- High efficiency of the integrated inverter
- Feeding-in even at excessive generator voltage

Easy to Use

- Easy installation
- 3-phase generator connection
- Available in three voltage classes: 400 V, 500 V and 600 V

WINDY BOY PROTECTION BOX

Optimal protection for small wind power plants

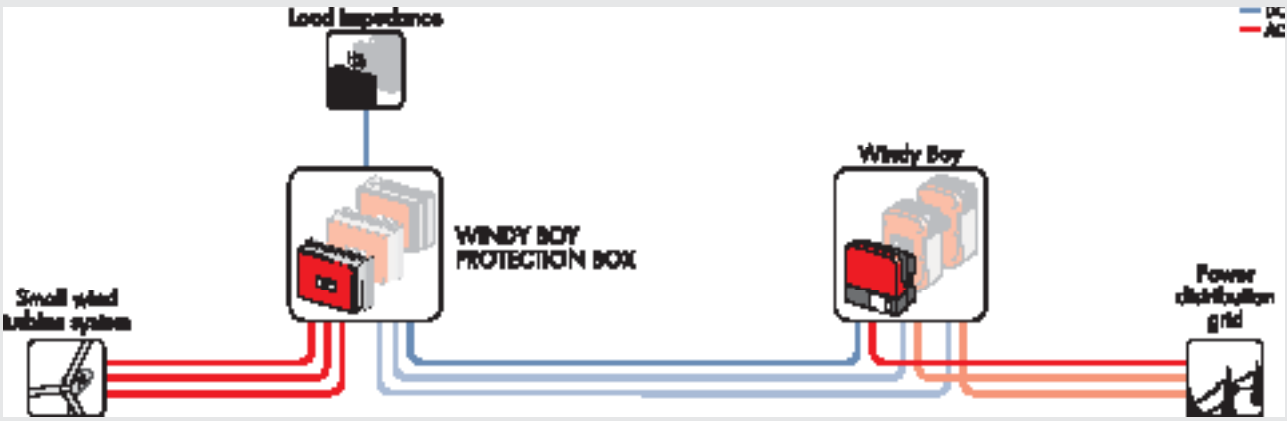
A rectifier and overvoltage protection in one, the Windy Boy Protection Box can do it all. It protects the inverter from excess generator voltage by feeding excess voltage to a load resistor, which slows down the turbine. In addition, the Windy Boy Protection Box features a three-phase rectifier. It is delivered as a turnkey unit and can be used with nearly all types of generators made by many manufacturers in various performance classes. The box is suited for use with wind systems as well as for other permanent magnet generators such as small water power plants and CHP systems.



Eigg Island (courtesy of Wind & Sun Ltd.)



WINDY BOY PROTECTION BOX



FUEL CELL INVERTERS





Efficient

- Highest efficiency
- Optimized for heating devices

Compact

- Low weight
- Broad range of functions in a single device

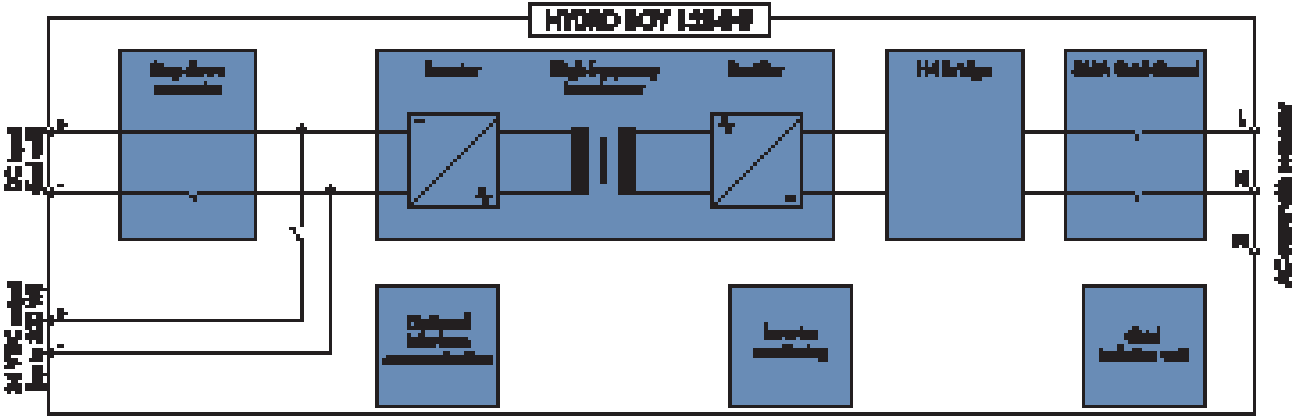
Reliable

- Galvanic isolation
- Complies with the requirements of EN 60335-1

HYDRO BOY 1524HF

High yield models in a lightweight enclosure

The 1524HF is the new generation Hydro Boy. State-of-the-art high frequency technology ensures optimal efficiency. By reducing the weight and volume of coils, this inverter is especially light and easy to handle. The 1524HF combines world class SMA technology and optimal efficiency in a light-weight construction.



Technical Data		Hydro Boy 1524HF	
Input (DC)			
Max. DC power (@ cos φ=1)		1500 W	
Max. input voltage		50 V	
Rated DC voltage		33 V	
Input voltage range		25 V – 50 V	
Max. input current		60 A	
Output (AC)			
Rated power (at 230 V, 50 Hz)		1200 W	
Max. apparent AC power		1200 VA	
Rated output current		5.2 A	
Nominal AC voltage		220 V, 230 V, 240 V	
Nominal AC voltage range		184 V – 264 V	
AC power frequency		50 Hz, 60 Hz	
AC power frequency range		-5 Hz ... +5 Hz	
Feed-in phases		1	
Connection phases		1	
Adjustable power factor		0.51 overexcited ... 0.51 underexcited	
Efficiency			
Max. efficiency		92.2 %	
Protection			
DC reverse polarity protection		●	
AC short-circuit monitoring		●	
Grid monitoring		●	
Overvoltage category (according to IEC 60664-1)		III	
General Data			
Dimensions (W / H / D)		444 / 130 / 458 mm (77.4 / 5.1 / 18.1 inch)	
Weight		16 kg / 35.27 lb	
Operating temperature range		0 °C ... 70 °C / 32 °F ... 158 °F	
Self-consumption: operation / standby		15 W / 4 W	
Topology		HF transformer	
Cooling concept		Convection	
Degree of protection (according to IEC 60529)		IP20	
Features			
DC terminal		Screw terminal	
AC terminal		Connector	
Interfaces: CAN / RS232 / RS485		● / – / –	
Warranty: 2 years		●	
Certificates and approvals (more on request)		VDE0126-1-1, G83 / 1-1, KGS A 410	
● Standard features ○ Optional features – Not available			
Type designation			
		HB 1524HF	



SERVICE



**Customer-oriented**

- Professional commissioning, maintenance and repair
- Telephone support through our Service Line

Optimum availability

- Fast and simple device replacement
- One-year full warranty on every replacement device

Assured returns

- Five-year warranty on Sunny Boy, Sunny Mini Central, Sunny Tripower and Sunny Island inverters

Flexible

- Warranty extensions to 10, 15, 20 years

SMA Service for decentralized inverter solutions

Comprehensive service for all customer requirements

Those who choose to build a PV system are counting on earnings over the long term. To achieve these benefits, the solar inverter must not only be durable and highly efficient, the service partner must also provide reliable, flexible and competent support. SMA provides industry leading technology and expert service from a single source. Whether the SMA Service Line, onsite service, or our replacement service is needed, our flexible services are individually tailored to the needs of solar professionals worldwide.

Expert advice over the telephone via the SMA Service Line

The experts on our Service Line support solar professionals during the installation and commissioning of PV plants, advise on technical issues, and provide tips on system monitoring. These specially trained expert teams are available at various telephone numbers for all inquiries regarding inverters, communication devices, and Sunny Island products.

SMA Service on-site

Solar professionals can rely on our support. We have a well developed international service network with numerous access points, currently in 13 countries. In the event of a service requirement, SMA can be onsite quickly. We are ready to support our customers around the world, from onsite diagnosis to device replacement.

Device replacement for highest security of return

Should a failure occur, we will keep down times as short as possible by replacing your device. After a call is received, the replacement inverter is generally shipped on the same day. To replace the defective inverter, the customer will receive a comparable device with state-of-the-art technology, including all updates and alterations. If a device is exchanged within the warranty period, the remaining warranty period is transferred to the replacement device. In any event, we provide a one-year full warranty on all replacement parts both within and outside the warranty period, and that's not all. Our service technicians can take care of the installation of the replacement device upon request.

More security with long-term warranties

SMA products meet the highest quality standards and come with a standard five year warranty. Additionally, we offer an extended warranty for an additional 5, 10, 15 or 20 years, with which operators can assure themselves of the right to free repair or a replacement device.

Interested?

Whether for commissioning, service work or tips on plant monitoring, operators and solar professionals are in good hands with SMA Service. Additional information on our services is available on the corresponding SMA website, where you may also download or order a free copy of our service data sheet.

SMA SERVICELINES



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Germany

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> Communication +49 561 9522-2499

> SMS call-back +49 176 888 222 44

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SMA Beijing Commercial Company Ltd.

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Surveillance et Communication

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SMA Middle East LLC

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Masdar City, Abu Dhabi (AE)

SMA SOLAR TECHNOLOGY AG WWW.SMA-SOLAR.COM



Customer-friendly

- Professional servicing onsite
- Telephone and remote support

Flexible

- Customizable service packages to meet individual needs and requirements

Cost Security

- Maintenance service contract for enhanced longevity
- Component guarantees ensure long-term part availability

Comprehensive

- Up to 25-year warranty terms available
- 98% or 99% inverter uptime options

SMA Service for centralized inverter solutions

Security thanks to modular design

With a PV plant's expected service life exceeding 20 years, careful consideration must be given to not just the technologies used but also the reliability and durability of a system's components. Likewise, a comprehensive plan must be in place for the maintenance and operation of the plant. SMA Service for PV power plants addresses these needs and ensures optimum inverter availability—providing integrators, investors and utilities with the greatest security possible. SMA also understands that every PV power plant is different and requirements vary. That's why we developed a modular service approach specifically designed for large power plants. This allows our customers to define individual service packages that best meet their needs. Approaching 100 service locations worldwide, SMA Service guarantees outstanding local customer support through a variety of customizable packages.

Maintenance

To optimize system performance, SMA performs controls, cleaning and parts replacement at regular intervals. This preventative maintenance is important for long term operation.

Spare parts warranty

Whether electronic or mechanical, we guarantee the availability of all components over the duration of the complete system life cycle. Our customers can be confident that even as technologies evolve, SMA's support will be constant. This guarantee also provides additional cost security for the operational life of the inverter solution.

Diagnostics and repair

Beginning with remote service, which often eliminates on-site assistance, to First Level, (diagnostics and small repairs), or Second Level Support, (comprehensive repairs), SMA offers the proper service plan for our customers' needs. Customers can optionally administer First Level Support themselves. With local staff to assist, SMA Service quickly provides the appropriate response to any situation.

Inverter availability

SMA inverters lead the industry. Our customers know our world-class manufacturing and high-quality components result in a superior solution. To fully protect investment security, SMA offers two inverter uptime guarantees: 98 or 99 percent. With these guarantees, we will reimburse the customer for the difference between the actual and agreed-upon inverter uptime. With warranty periods up to 25 years in length, SMA can also guarantee our solution's performance for the life of the PV plant.

Need more information?

Call SMA Power Plant Solutions at +1 888 476 2872 to hear more.

SMA SERVICELINES



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SMA SOLAR TECHNOLOGY AG WWW.SMA-SOLAR.COM

SUNNY PRO | Club

Making Strong Partners Stronger



NY PRO Club
Strong Partners Stronger



Sunlab
3255 Main Street
Phoenix, AZ

Brian Johnson

SPC-US-1236547



Member Benefits

- Technical Training
- Priority Technical Support
- Advanced News and Product Updates
- Exclusive Member Events
- Personalized Product Literature
- Custom Marketing Materials

The Sunny PRO Club

Empower your business by joining forces with SMA

As the world leader in solar inverter technology and manufacturing, SMA is dedicated to supporting and guiding the growth of the solar industry. To this end, we take special interest in helping installers grow their businesses.

A Professional Partnership

Whether you're a two-person start-up or a nationwide operation, success doesn't come easy. That's why you need strong partners. By joining SMA's Sunny PRO Club, you gain access to a host of valuable services designed to support your business. From customizable marketing tools to advanced technical training, let SMA give you the confidence you need to work to your full potential.

Technical Benefits

As a Sunny PRO Club member, you will have the technical resources you need to be successful in this competitive market. Position your company as an SMA Solar Power Professional and give your business the edge it needs to surpass the competition.

Stay informed on new technologies, products and installation best-practices through:

- Free & Discounted Solar Academy Training
- Exclusive Technical Webinars

- Priority Technical Support
- Advanced News & Product Updates
- Invites to Member Events

Marketing Services

Sunny PRO Club members gain instant access to a catalog of Marketing Services specially designed to support their businesses. By combining your expertise with the strength of the SMA brand and resources, you will be poised to take your business to the next level.

Take advantage of a broad selection of marketing materials including:

- Personalized Brochures
- Tradeshow Displays
- Advertising Templates
- Logo Design Services
- Personalized Product Literature
- Custom Mailers
- Vehicle Signage

Join Today!

It's easy to become a Sunny PRO Club member! Simply download your at www.SunnyPROClub.com. Once your application is processed, you'll receive a comprehensive welcome package outlining the details of our membership.

Membership Requirements:

- Annual membership fee: \$175.00
- Maintain a licensed electrician or NABCEP certified installer on staff
- Attend 1 Technical Training per year

We look forward to partnering with you!

Sunny PRO Club

Tel. +1 877 506 1747

SunnyPROClub@SMA-America.com

www.SunnyPROClub.com



SMA SOLAR | ACADEMY

Be a solar expert







Comprehensive

- Learn the latest in SMA inverter technology and photovoltaics
- Courses for new-comers and experienced users

Target-oriented

- Training courses tailored specifically for installers, sales staff and system designers

Hands-on

- Specially-trained instructors
- Close communication with developers and other trade professionals

User-friendly

- Register online and sign up for a seminar reminder
- Company tour and lunch included

SMA SOLAR ACADEMY

Practical knowledge for the solar professional

The SMA Solar Academy offers a comprehensive range of seminars on photovoltaics and provides information on SMA products, their use in PV systems, as well as the numerous data communication options available. The program also addresses current topics and recent developments in the solar industry. Classes are held at the SMA America headquarters in Rocklin, California, and at rotating sites all over North America.

Seminars

SMA Solar Academy in Rocklin, California, offers 12 seminars on photovoltaic systems and sales, most of which qualify for NABCEP (North American Board Certified Energy Practitioners) continuing education credit. The curriculum consists of a broad range of classes covering grid-tied and off-grid products, commercial systems, communication devices, sales and marketing, code compliance and installation best practices. Each course is designed to meet the demands of increasingly complex industry requirements and provide a level of technical detail sufficient for both beginners and experienced professionals.

Training courses

(Each seminar is one day in duration and can be booked individually.)

INTRODUCTION TO PHOTOVOLTAICS This course offers a basic understanding of electricity and electronics as it relates to photovoltaics. Topics include basic understanding of AC and DC circuits, AC and DC electrical components, photovoltaic cell, module and array parameters, utility transformers and electrical safety.

MINI SEMINAR This short seminar focuses on a technical overview of Sunny Boy inverters and their interaction with the utility grid. Topics include grid-tied photovoltaic components, inverter MPP tracking characteristics, single phase and three phase utility applications, SMA DC disconnect and inverter installation and troubleshooting. This seminar also provides an introduction to the Sunny Central series of inverters.

SALES & MARKETING TRAINING* The focus of this training centers on the effective marketing and sales of SMA products to grow your business. Topics include product features and benefits, current product line, product comparisons, the economics of selling solar and in depth product knowledge.

SUNNY BOY 1 This course offers a basic understanding of Sunny Boy inverters and their interaction with the utility grid. Topics include Sunny Boy product knowledge, U.S. utility transformer integration, SMA DC disconnect, components of grid-tied PV systems, residential grid-tied backup, inverter safeguards and UL1741. It also covers installation requirements based on the National Electrical Code and introduces safe installation practices for high DC and AC voltages. Hands on training provides reinforcement of training concepts.

SUNNY BOY 2 This is an advanced-level course on multiple Sunny Boy inverters and Sunny Tower installations in three phase. Topics include the design and sizing of the PV array using Sunny Design software, sizing of DC and AC over-current protection devices, as well as wiring to comply with UL and the National Electrical Code safety standards. Hands on training provides reinforcement of training concepts.

SUNNY CENTRAL 1 This course provides in-depth knowledge of the Sunny Central family of inverters with and without internal transformers. Applications include large-scale PV plants ranging from hundreds of kilowatts to utility scale megawatt installations. This training session provides an overview of the National Electrical Code requirements and safety in dealing with high voltages. It also provides a broad perspective of data logging, monitoring, command and control options for interaction with plant operators and utilities.

SUNNY CENTRAL 2 This course provides advanced-level training on central inverters for utility scale applications. The curriculum focuses on the design, installation and monitoring of PV plants in the megawatt range. It reviews features and functionalities of central inverters, with internal and external transformers, connected to low- and medium-voltage grids. The seminar also provides an overview of grid management features that allow utilities to remotely control PV plants.

SUNNY ISLAND 1 This course provides an in-depth understanding of the Sunny Island battery backup inverter, its response to a grid failure and its role in a grid-tied backup system. Topics include battery management, battery types, generator management, generator types, system management and additional system components, system design. Hands on training provides reinforcement of training concepts.

SUNNY ISLAND 2 This course provides a review of grid-tied backup systems using AC and DC coupled energy sources and a hands-on practice on battery, generator, grid, and system management configuration. It also covers design, installation, and troubleshooting guidelines for single phase and three phase off-grid systems with an overview of system diagnostic codes.

COMMUNICATION 1 This course provides an overview of inverter communication options including displays, user interfaces, data logging, monitoring and control of renewable energy plants. Topics include RS-232, RS-485, wired and wireless hardware and communication protocol standards. The course includes an introduction to data logging using WebBox, Sunny Beam and SMA software for single and multiple inverters.

REVENUE GRADE METERING* This course provides an introduction to power measurement, modbus command and control as well as demand monitoring options for large photovoltaic plants. It also provides an in-depth look at SMA's Power Measurement Kit, a solution for applications where ANSI C12 revenue-grade metering is required for production based incentive (PBI) markets.

WEBBOX This course provides an in-depth look at the installation and setup of the WebBox, an SMA data logging and monitoring system. This session focuses on wiring and configuring the WebBox to monitor single and multiple SMA inverters locally and over the Internet. Attendees will also learn how to register the WebBox to the Sunny Portal to post and customize renewable energy plant web pages.

*Does not qualify for NABCEP credit

» Interested?

Registering for seminars at the SMA Solar Academy is simple. Just visit www.SMA-America.com/SolarAcademy to view course schedules and locations. Register by phone at +1 916 625 0870 or send an e-mail to Training@SMA-America.com. We look forward to seeing you at one of our seminars soon.



KNOW-HOW





Centralized or decentralized?

SMA has the right inverter concept for any PV plant

From kilowatt to megawatt, SMA is the single source manufacturer for the right solar inverter of every size and for every site. Thereby, the customer can choose among various plant concepts. While a central inverter concept may clearly be the best solution for one PV plant, conditions in another system, even a system similar in size, may require a decentralized concept.

You must always consider installation and plant operating costs in particular when deciding whether to opt for a centralized or decentralized plant structure. Under certain conditions, decentralized plant design has been shown to offer a range of advantages over centralized design. A few of the important aspects typical of the power class above 100 kWp are noted in the following examples.

Decentralized plant design: precise and effective

If a PV plant is oversized or undersized, this can have just as much of an effect on the plant's energy yield as the inverter efficiency. Specific system performance can be set precisely using small inverter units. Together with a high degree of efficiency, several smaller devices can present a better alternative than one large centralized unit.

Advantageous in mixed plant structures

A centralized inverter such as the Sunny Central works most effectively with a homogenous solar generator. Decentralized concepts, such as those using Sunny Mini Central inverters, are a better choice when generator units differ and should thus be operated separately. This can be caused by using mismatched PV modules or modules with a higher manufacturing tolerance, sub-generators that are oriented differently, or tracking sub-generators.

Maintenance-friendly operation under all conditions

Maintenance work on decentralized systems is much less complicated and economical compared to centralized systems, as the individual inverters can be replaced if necessary. Installing smaller and lighter devices can be less expensive than a large heavy concrete substation if ground load capacity or site accessibility is limited.

However, monitoring of a plant with a centralized inverter is easy to set up and covered by the standard hardware. Even the required participation in grid management for large scale plants can be implemented particularly easily. And above a certain plant size, decentralized concepts are simply no longer practical.

Comprehensive analysis is important

These examples show that you really must account for all costs (TCO: Total Cost of Ownership) when choosing the most economical solution and evaluate them when planning the specifics of your solution. Different conditions may result in the fact that a system generates profit on one site or struggles with amortization on the other. It is therefore wise to take advantage of the technical advice and experience of the SMA team when determining the optimum plant structure and components for your project.





Design of PV plants

Three steps to success

The possibilities for plant design are vast. There are many different module types, various inverters, roof pitches, locations and many more. The right design of a solar plant is crucial for the anticipated yield. The most important design decisions can be summarized in the following three steps. They take the fundamental technical

context as well as guidelines and rules of thumb for the design of a standard PV plant in parallel grid operation into account. If deviations from the required standard conditions occur, the specified guidelines must be modified accordingly.

1. Incorporate the inverter's electrical thresholds

First of all, the voltage of the generator must match the inverter. The limits are defined by the MPP voltage at the highest cell temperature (standard: 70 °C) and the open circuit voltage at the lowest cell temperature (standard: -10 °C). The maximum plant voltage of the PV modules can also limit the open circuit voltage of the generator.

2. Choose between optimizing the economy or optimizing the yield

The performance ratio (relationship between the maximum input power of the inverter compared with the peak power of the PV generator) provides information concerning oversizing or undersizing of the inverter. To utilize the full power of the PV generator at all times, the inverter must be slightly oversized (power ratio 110%) However, the economically optimal system is slightly undersized. Therefore, the following decision must be made during the designing process: do you want to "squeeze" every last drop of energy from the solar generator at all times (optimize the energy

yield) or select a slightly lower inverter performance, accepting minimal yield losses at higher irradiation levels (optimize economy)? Of course, the answer to this question depends largely on the economic conditions at the plant location.

3. Use the maximum efficiency of the inverter

Every inverter has an input voltage at which its conversion efficiency is maximized. Whether this voltage lies in the upper or lower area of the operational range is, depends on the internal design and is listed in the respective data sheet. If possible, the MPP voltage of the PV modules at NOCT (Normal Operation Cell Temperature) should be close to this voltage.

Though professional design of a PV plant includes many more steps, the three basic decision steps above largely determine the future yield. For this purpose, SMA offers the free software SUNNY DESIGN, which incorporates all the aspects of plant design.





Inverters as grid managers

Overview of the grid management functions of SMA inverters

It started in Germany in January 2009, following France in 2008: since then, large-scale PV plants have had to participate in grid management, and provide grid services to an increasing extent. Experts unanimously agree that such measures are essential. The installed PV power increases continuously, and individual projects are growing larger and larger. Increasing size and power also mean greater responsibility for the electricity grid, as only a stable grid permits unrestricted expansion of renewable energies. This was enough reason for SMA to commit fully to participation from the outset. SMA, technology leader in the field of solar inverters, is now also a pioneer in grid management.

Powerful grid management functions

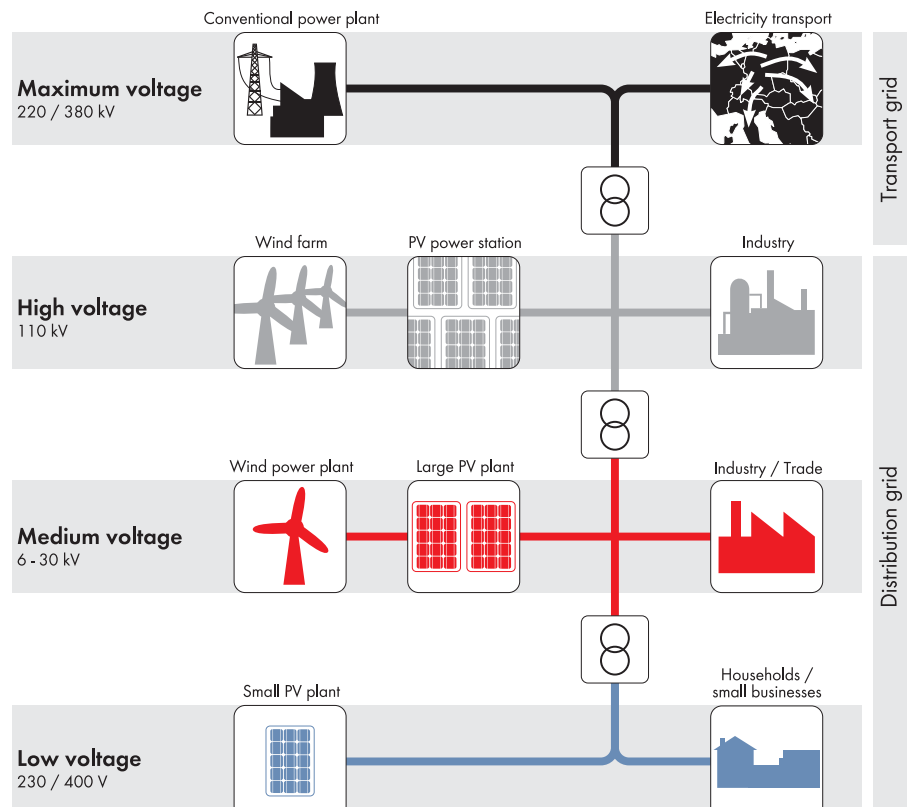
For example, the SMA Power Reducer Box was the first market ready solution for utility interaction management as defined in Art. 6 of the German Renewable Energies Act (EEG)—and is also compatible with virtually all SMA inverters. Inverters with an automatic power reduction feature in case of increased frequencies make a valuable contribution to stabilizing the grid frequency if more energy is generated than can be consumed. Reactive-power compatible inverters help keep the grid voltage constant, but can also be used to compensate for undesirable phase shifts. And the dynamic grid support features support the grid in the event of faults, and can also prevent, or at least restrict, the fault from spreading further.

1. Generation and grid stability management

Sixty seconds: inverters in Germany have just one minute to implement possible specifications of the utility operator. If a section of the grid is overloaded temporarily, the utility operator can and must limit the power from decentralized generating systems. The plants make a major contribution to the stability of the grid, which can hardly keep pace with the rapid expansion of power from renewable energies in some cases. The SMA Power Reducer Box translates the incoming setpoint specifications of the utility operator into control commands for the Sunny WebBox. This in turn forwards the commands to the connected inverters via fieldbus, and logs the external setpoint specification—which is important for legally compulsory compensation for possible resulting yield shortfalls.

2. Automatic active power frequency control

The frequency in alternating current grids is kept constant within strict limits—typically at exactly 50 Hz or 60 Hz. The frequency drops if more energy is consumed than the generators feed-in. The opposite occurs if there is an energy surplus—the grid frequency increases. SMA inverters can react to this with an automatic active power reduction: the higher the frequency is above the setpoint, the more they derate the active power output. This stabilizes the grid and prevents mass deactivation of systems due to excessive grid frequency.



The grid levels in the German AC power distribution grid



3. Static voltage support based on reactive power

In order to protect the connected loads, the voltage must be kept within defined limits—that applies to the distribution grid in particular. With their ability to provide controlled inductive or capacitive reactive power, PV inverters can help guarantee the voltage quality required in EN 50160.

Reason: the increasing feed-in at low and medium-voltage levels can result in voltage increases which caused problems for the previous grid operation method (flow of energy from central generator to decentralized loads). Using reactive power, PV inverters can now reduce undesirable voltage increases significantly. Reactive power-compatible inverters can also be used to compensate for existing phase

shift. As even reactive power reduces efficiency, this reduces the load on the grid infrastructure, whose capacity limits may already have been reached. Typical causes of phase shifts include transformers, large motors or even simply long cable sections.

There are several options for adjusting the percentage of reactive power: Plant operators can use set points specified by utility operator, or various reactive power values can be set via an agreed schedule or remotely programmed via the SMA Power Reducer Box. The third option is regulation of the percentage of reactive power via a characteristic curve depending on the grid voltage measured at the connection point or the active power output of the inverter.

4. Dynamic grid support

Until now, PV plants had to disconnect from the grid immediately, even during temporary drops in grid voltage. This meant that many plants were deactivated in the event of grid failure, unbalancing the grid even further. Inverters with dynamic grid support functions act within milliseconds in such events, preventing the grid failure spreading further. The so-called restricted dynamic grid support ensures that the inverter is ready to feed energy into the grid immediately after a drop in the grid voltage. Devices with full LVRT or FRT behavior (Low-Voltage or Fault Ride Through) can also feed reactive power into the grid during grid voltage drops. LVRT is already supported by the new Sunny Central CP series.

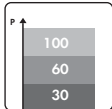
* Medium-Voltage Directive issued by the German Association of Energy and Water Industries (BDEW)

Equipped for the future with SMA know-how

Providers of decentralized grid services and an intelligent interface to the supply grid: that describes the solar inverter of the future. The utility operators have also recognized that inverters are particularly

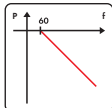
predestined for the pending grid management responsibilities—and demand these system services to an ever greater extent. SMA makes an important contribution to this with its products.

SMA inverter grid management functions



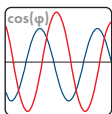
Remote-controlled power reduction in case of grid overload

In order to avoid short-term grid overload, the network operator presets a nominal active power value which the inverter will match within 60 seconds. The nominal value is transmitted to the inverters via a ripple control receiver in combination with the SMA Power Reducer Box. Typical limiting values are 100, 60, 30 or 0 percent of the nominal power.



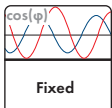
Frequency-dependent control of active power

As a power frequency of 60 Hz, the inverter automatically reduces the active power output according to a definable characteristic curve, contributing to stabilize the power frequency.



Static voltage support based on reactive power

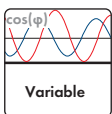
SMA inverters feed leading or lagging reactive power to the grid in order to stabilize the grid voltage. Three different modes are available:



Fixed

a) Fixed specification of the reactive power by the network operator

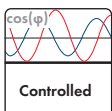
The network operator defines a fixed reactive power value or a fixed displacement factor between $\cos(\varphi)_{\text{lagging}} = 0.90$ and $\cos(\varphi)_{\text{leading}} = 0.90$



Variable

b) Dynamic specification of the reactive power by the network operator

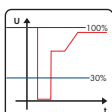
The network operator defines the dynamic displacement factor – as any value between $\cos(\varphi)_{\text{lagging}} = 0.90$ and $\cos(\varphi)_{\text{leading}} = 0.90$. The value is transmitted via a communication unit, the SMA Power Reducer Box performs the evaluation



Controlled

c) Control of the reactive power via a characteristic curve

The reactive power of the displacement factor is controlled by a pre-defined characteristic curve – depending on the active power fed into the grid or the grid voltage.



Dynamic grid support

The inverter remains connected to the grid during a voltage drop that lasts for up to 1.5 seconds and supports the grid by feeding in reactive power. The inverter will immediately resume normal feed-in operation once the voltage exceeds a defined minimum threshold.



The right PV inverter

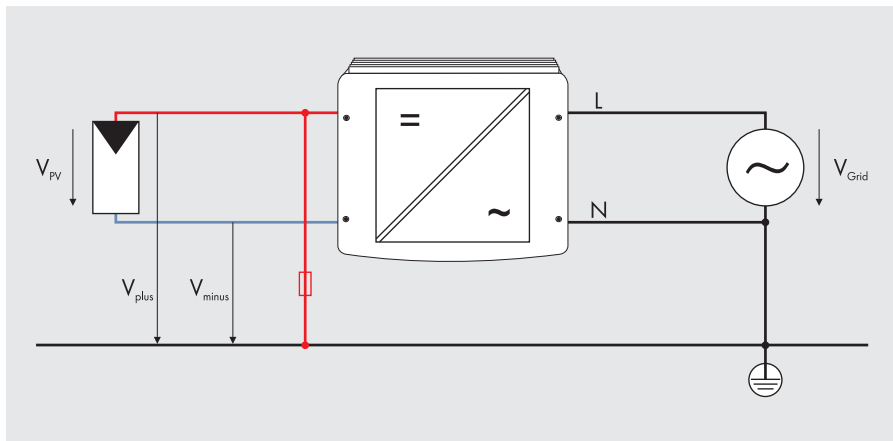
for every module technology

Besides conventional PV modules, new cell technologies and other advancements have been appearing on the market for quite some time. Of these, some can only be operated under certain conditions. For this reason, the manufacturer's application instructions must be observed when using PV modules.

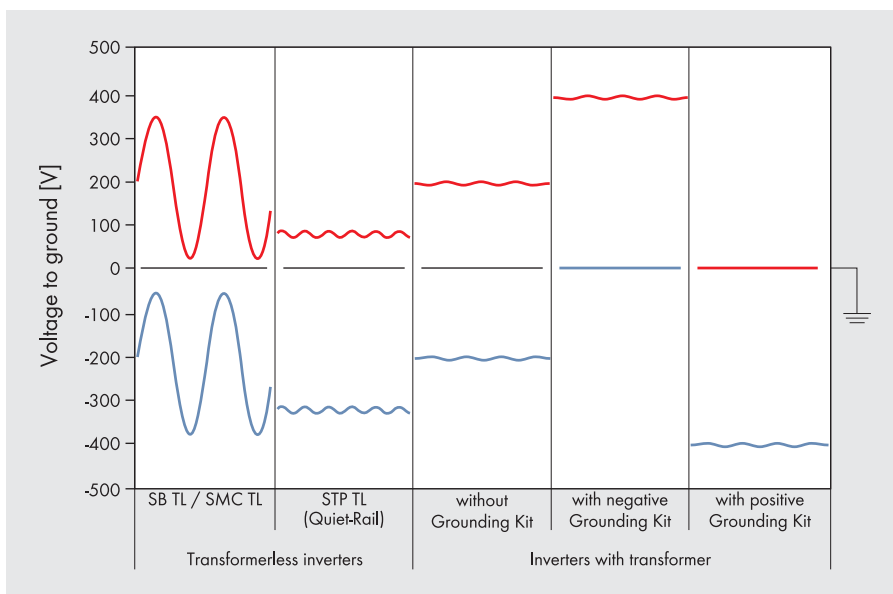
The versatile range of different topologies allows a flexible application of SMA's inverters—combined with the suitable grounding set—providing the ideal device for any module technology. Moreover, SMA is in close contact with the module manufacturers, which means that current installation recommendations can be effortlessly observed.

When selecting an inverter that meets the special PV module requirements, the generator potential in operation of various inverter topologies must be taken into account. The adjacent diagram shows a chronological map of potential courses of the generator connections during operation using several different inverters.

To help you select the right inverter for each module type, we have compiled the most important current recommendations for you. They are covered in the technical information package "Module Technology" and are explained in detail there.



Generation potential in different inverter topologies and grounding variations



Block circuit diagram: PV plant with positive array grounding

1. Recommendation of the manufacturer

Check whether the manufacturer of the PV modules issues recommendations on the grounding of the generator or the topology of the inverter to be used.

Example: A manufacturer recommends grounding the positive generator connection for a specific module type. The right choice: Sunny Boy with transformer and a positive grounding set.

Cell technologies/module design	Inverters without transformer		Inverters with transformer		
	SB xxxxxTL SMC xxxxxTL	STP xxxxxTL (Quiet-Rail)	Series device SB xxx, SMC xxxxx	With negative grounding set	With positive grounding set
Monocrystalline Si	●	●	●	○	○
Polycrystalline Si	●	●	●	○	○
CdTe	—	—	—	●	—
Amorphous Si (superstrate)	—	—	—	●	—
Amorphous Si (substrate)	●	●	●	○	○
CIS/CIGS	●	●	●	○	○
Monocrystalline Si (A-300)	—	—	—	—	●
Metal foil as substrate or in module design	—	●	●	●	●

Legend: ● Recommended, ○ Not necessary, — Not recommended

Recommended combinations of inverters and cell technologies

2. Selection based on module characteristics

If the manufacturer of the PV module does not define any specifications for the use of its products, we recommend choosing an inverter based on the characteristics of the PV module.

Example: Thin-film modules with CdTe or amorphous silicone cells often use a TCO-coated pane of glass as a substrate for cell construction. The right choice: Sunny Boy with transformer and a negative grounding set.

Example: In case of flexible thin-film cells, a stainless steel foil is often used as a substrate mount. Use an inverter topology in which the PV generator only features a small amount of AC voltage to the ground. The right choice: Sunny Boy with a transformer or a device with no transformer with Quiet Rail Technology (e.g. Sunny Tripower). It prevents reverse effects of the grid voltage on the generator potential via special wiring.

The table below shows favorable combinations for many different cell technologies.

For further information, see the download area of our homepage.



System costs in the spotlight

Cost reduction through a holistic view of PV plants

The feed-in tariff requirements for photovoltaics vary widely throughout the world and are subject to frequent changes. In general, however, the following applies: For photovoltaic power generation to be affordable at any given location, the generation costs must be sufficiently low. In most cases, continuous cost reduction is necessary in order to absorb the periodic reduction in feed-in tariffs. However, only considering the individual costs of the PV plant or inverter is not enough. What is needed is a holistic view of system costs.

The term “Total Costs of Ownership,” or TCO, refers to an accounting method that not only considers original costs, but all aspects of a PV plant that are necessary for operation for a period of 20 years or more. Such aspects include planning and installation costs, repair costs and maintenance to ensure system efficiency. SMA system technology helps significantly reduce the TCO in almost all areas – from planning and installation to maintenance and operation.

Flexible planning

A portfolio of products that include a wide variety of power classes leads to lower planning costs for PV plants. The right inverter solution can be found for any application, whether it's a 5 kW residential system in Germany, a 10 MW PV farm in France or a 60 kW stand-alone power supply system for a village in central China. The plant designer can access different inverter topologies (with or without transformer, single-phase/three-phase, etc.) using almost any type of module and deploy customized solutions for PV plant monitoring. Thanks to the Optiflex asymmetrical multi-string concept, the three-phase Sunny Tripower offers a unique level of flexibility when it comes to system configuration. Installers can also benefit from the fact that almost all devices can be used anywhere in the world, reducing logistics, warehouse storage and service costs.

Easy installation

Setting up a PV plant is all about installation time, and therefore cost. System technology that is both easy to use and man-

ageable can lead to a significant reduction in installation expenditures. For example, the standard DC plug-in system, SUNCLIX, allows a customer to install PV cables in less than five seconds, without using tools. The enclosure of the Sunny Tripower comes with a socket for Type II surge arresters so that they can be automatically integrated into the inverter monitoring system. All inverters in the low to medium power classes can be linked with each other and to suitable communication devices via SMA Bluetooth. In just a short time, a powerful PV plant monitoring system can be set up that allows access to all operating data and the device configuration. The time and cost-intensive installation of communication cables can now be eliminated.

Maximum reliability

PV plants are ideally designed to generate power for more than 20 years. With its unique test center, SMA ensures that errors are identified early in the development phase and that all components can function under extreme operating conditions. There is even a separate test center for large-scale PV plant technology.



Country-specific configuration in the blink of an eye: rotary switch on the Sunny Boy 5000TL



To the test: Inverters in the SMA test center

In this center, SMA engineers test central inverters with capacities reaching 800 kW under all climatic conditions and can simulate any conceivable array or system configuration. In addition, the “SMARt Flow” production concept developed by SMA guarantees a streamlined and thoroughly traceable production process that meets the highest quality standards. The result: Low maintenance costs and maximum reliability.

Highest efficiency

High efficiency is one of the hallmarks of SMA inverters. Throughout the entire service life of a PV plant, SMA inverters will generate significantly higher yields than lesser inverter models, which more than makes up for the higher purchase cost. The high efficiency is made possible by innovations like the patented H5 topology and intelligent add-on functions such as the OptiTrac Global Peak MPP tracking system, which was specifically developed to mitigate the effects of partial shading. The OptiCool enclosure concept and the new power management system integrated in SMA central inverters also contribute to these optimum values.

Intensive research and development

As a solar technology leader, SMA is consistently developing innovations to lower costs. Advances include the greater use of high-frequency technology and the further integration and reduction in the number of components. All coil items (coils, chokes, transformers) are designed to be more compact, lighter and more affordable while achieving higher frequencies. A reduction in the number of components makes purchasing more affordable, has a positive effect on manufacturing complexity and also lowers the risk of errors. Even a minor improvement in efficiency brings a variety of positive effects. In addition to greater yields for the plant operator, improved efficiency also leads to a reduction in heat load which in turn can lead to smaller heat sinks and a more compact enclosure. This can also have a positive effect on the enclosure price and transportation and logistics costs. The success of SMA’s ongoing research and development work is clear. Over the last 30 years every new generation of SMA devices has proven to be more powerful and more affordable than the previous generation. The goal of SMA is to cut system

costs in half by 2015, and more than 500 developers at the company are working diligently to achieve that goal.

System technology for large-scale PV plants

Launched in 2010, the Compact Power series of central inverters reduce system costs by up to 35 percent compared to their predecessors. Thanks to the weatherproof enclosure, the inverters no longer need a concrete substation, which means their total weight of around 30 tons (including transformer) is reduced by nearly 50 percent. In ambient temperatures up to 25 degrees Celsius, the devices can deliver 110 percent of rated power, increasing overall energy production. They also feature internal string failure detection, which can reliably detect a string failure out of 1,600 individual strings. Complex configuration is not required. In addition, the system is capable of minimizing yield loss whenever a fault occurs. Any string input affected can be remotely switched off individually so that the plant can continue feeding power into the grid at only a slightly reduced amount. The devices naturally comply with current grid management standards and include the necessary unit certificates.

System technology for off-grid power supply

AC-coupled hybrid systems are now more affordable than pure diesel-based power supply systems. They benefit from not only the low-cost AC power components, but also from the continuously declining costs for renewable power generation. Long-term savings are also achieved through the predominant use of renewable energy sources. Both the fuel costs and maintenance costs of a diesel generator are drastically reduced through the use of hybrid systems. Other cost advantages arise from the modular design of PV plants with SMA multicluster technology. Systems with 5 to 300 kW capacities can be planned with greater flexibility, expanded at any time, and easily maintained by local service technicians. Even the transport of relatively small components to remote installation sites is much more cost-effective. All things considered, PV-supported hybrid systems from SMA are not only more environmentally safe and convenient than conventional solutions, they can also boast a lower TCO.



Maximizing yields

with High-Tech by SMA

The technical details of SMA inverters benefit in particular from the expertise of our developers and their decades of experience. Many innovative SMA technologies either directly or indirectly increase the system yield immediately.

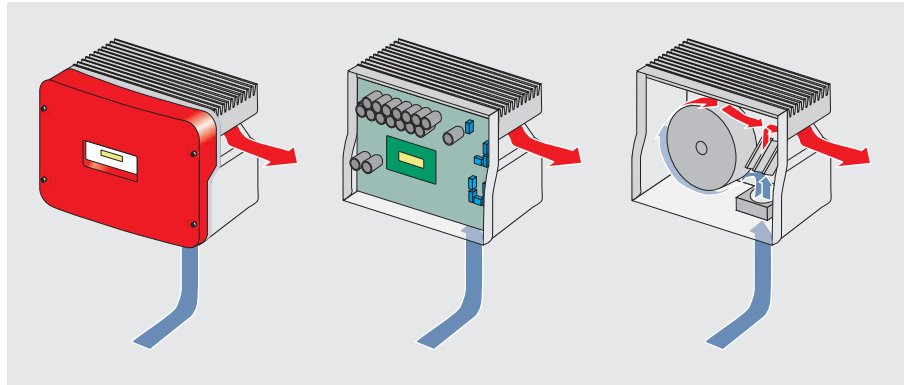
H5 Topology—patented inverter circuits for maximum efficiency

A modern inverter “consumes” between three and six percent of the energy collected by the solar modules for conversion of the direct current into alternating current, which corresponds to an efficiency of between 94 and 97 percent. SMA’s patented H5 topology, an advanced circuit for the inverter bridge, optimizes the current flow in the in-

verter and thereby reduces the loss during conversion. Basically the sinusoidal grid current is produced using the high frequency chopping and buffering of the DC current in the inverter bridge circuits. This leads to a costly oscillation of buffered energy. A special synchronization of the inverter bridges as well as the integration of a fifth semiconductor switch prevents this oscillation and reduces the conversion loss to less than two percent. This is how the inverters based on this technology reach new levels of performance with efficiency rates above 98 percent.

The trend is clear: PV plants and inverters are becoming ever more powerful while installation conditions remain the same. The effective heat dissipation from the enclosure is thus increasingly important. This is because increasing temperatures in the enclosure reduce the performance and lifespan of electronic components. With the patented two-chamber cooling system OptiCool, SMA inverters offer an ideal combination of passive and active cooling which is worthy of the name "intelligent temperature management." To maximize the cooling effect, the entire inverter enclosure is a part of the cooling system. It is divided into two separate chambers: the front is sealed tight

How OptiCool functions in the Sunny Boy 3800



and thus offers the electronics solid protection against penetration of water, dust and dirt. By contrast, all components with a functionally higher temperature, such as chokes and transformers, can be found at the back of the enclosure. A temperature-controlled

fan dissipates the heat from this area through a special flow tunnel to the outside. All in all, OptiCool produces a lower component temperature and assures maximum reliability and outstanding overload characteristics.

OptiTrac

Highly efficient MPP tracking

Every solar inverter has at least one: the MPP-Tracker ensures that the solar module always operates at its maximum power (MPP). Since the MPP depends on the temperature and the strength of the irradiation, it must be recalculated again and again. It is essential that this process take place as quickly and safely as possible. Irradiation conditions can change quickly and often—on sunny days, a passing patch of clouds can make this happen in just a few seconds. OptiTrac is SMA's solution for just this problem: sophisticated experiments at the SMA Solar Test Center have resulted in the refining of MPP tracking and the further increase of its efficiency. It does not matter if crystalline or thin-film modules are used. Extensive tests and field trials confirm that OptiTrac increases the energy yield of a PV plant by up to 1.5 percent per year on average—money for the plant operator.

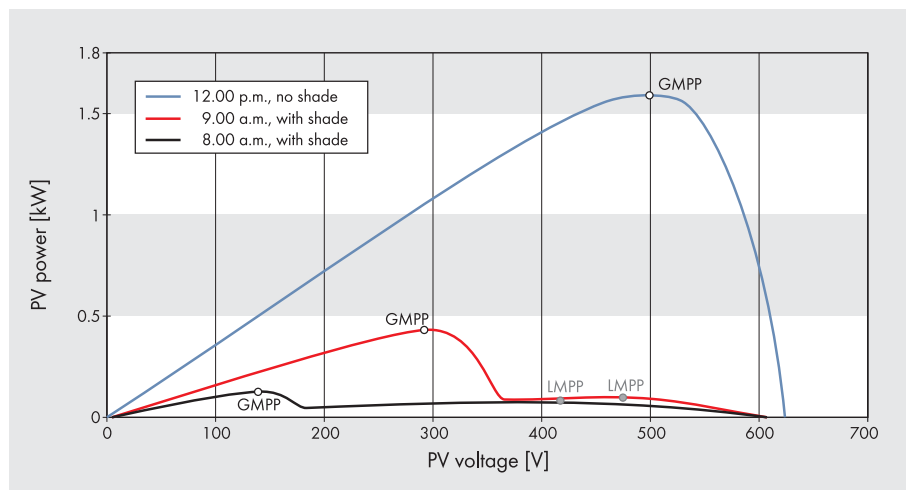
OptiTrac Global Peak

Good yield in spite of partial shading

In order to always find the optimum operating point even in partially shaded PV plant, an additional function, "Global Peak", was added to the proven MPP tracking system. It enables the inverter to almost fully use the energy supply of the solar modules under all conditions. Reason: If the individual modules in a string are shaded, the string's power curve can suddenly show several maximum points. In general, there is only one operating point with the actual maximum power: the global maximum power, which results in significantly higher power

compared with the other local maximums. This is where the new OptiTrac Global Peak gets interesting: as it reliably finds the global maximum power, the available energy of a partially shaded string can be used almost fully.

The SMA inverters Sunny Boy 3000TL, 4000TL and 5000TL will be equipped with OptiTrac Global Peak as standard from the second quarter of 2010. Older devices of these types can be upgraded via a software update. In the medium term, OptiTrac Global Peak will also be available for the Sunny Tripower.





A sure thing

SMA protection concepts for installation and maintenance

Safety first—this is especially important for the area of energy technology. A whole series of regulations and standards are there to protect operators, maintenance personnel, and the everyday user against accidents with electricity. SMA sets the benchmark by equipping all products with exemplary safety facilities.

SMA Grid Guard

Utility interface for use worldwide

Most PV plants feed the solar energy directly into the power distribution grid using an inverter. The regional utility operator is responsible for this grid: they ensure that the prescribed thresholds for voltage and frequency are complied with, that the electricity grid is used effectively and is easy to maintain in the event of a fault. Of course, this only works if those feeding into the grid comply with certain rules and can be selectively disconnected from the grid. The automatic grid disconnection device SMA

Grid Guard prevents unintentional feeding when the supply grid is turned off (islanding) as well as when the upper and lower limits of the standards are exceeded. In this way, it offers maximum protection for both maintenance personnel and consumer alike against excessive voltage and frequency.

Recognized safety standard

SMA was one of the first manufacturers to incorporate the requirements of the utility operators in the functions of their solar inverters. The maintenance-free automatic grid disconnection function has been a standard feature on the Sunny Boy inverters since 1995. The ongoing development of the “SMA Grid Guard” represents a recognized standard for safety: in this kind of active grid monitoring, the quality of the connected grid is constantly monitored—by monitoring voltage, frequency and impedance. Here, fail-safe operation must be guaranteed so that periodic functional test-

ing by the utility operator is not necessary. The first requirements for this safety concept were described in the German standard VDE 0126-1-1. They now include the vast experience we have attained over the course of more than a decade of safe feeding operations. Today utility operators in other countries refer to these requirements, and they modify them to suit the local grid conditions or extend the requirements with additional regulations. As the most modern type of automatic disconnection device, the SMA Grid Guard grid monitor can be used easily throughout the world.

Grid monitoring increases availability

The continuous monitoring of the grid parameters guarantees a very high availability of the inverters on the grid. The software can also adapt to difficult grid conditions via an automatic learning process: it can distinguish recurring events from faults and therefore safely avoid unnecessary grid disconnections.

Country versions

The features described here complies with the safety philosophy of the SMA inverters which is recognized in most countries around the world. Moreover, SMA also offers products which are tailored for the special requirements of specific countries. While these inverters contain all safety devices, they may not always be in the design described here. For example, UL-listed inverters are equipped with a special grid monitoring device, a mechanical DC circuit breaker and automatic ground fault detection interruption (GFDI) to comply with the currently valid UL regulations.

Electronic Solar Switch

The first internal DC load disconnection unit for solar inverters

Working on an electrical device generally requires the power supply to be disconnected. A DC load disconnection unit that acts as a circuit-breaker under load between solar generator and inverter is therefore a strict requirement in most countries. The goal of the developers at SMA was to design a disconnect which did not entail additional installation costs, was simple and safe to handle, and had no effect on the efficiency of the PV plant.

The patented Electric Solar Switch (ESS) is composed of a grip handle, which covers all socket outlets and plugs completely, which prevents disconnection under load. To disconnect the generator from the inverter, the complete grip handle must first be pulled off. At the same time, an electrical circuit is activated which prevents the occurrence of an electric arc, thus guaranteeing maximum protection even if the DC lines are disconnected incorrectly. There is no more current present at the DC plug connection



which are now revealed—only the voltage of the solar generator is still present.

The ESS works passively during normal grid feeding, incurring absolutely no losses, and thus has no influence on the efficiency of the inverter. The ESS is also the only DC disconnect which guarantees continued further use of the reliable PV plug connectors and the high standard of protection against accidental contact in generator cabling in accordance with protection class II. This electronic switch, developed and patented



by SMA, thus brings added safety to all work carried out on the PV plant, which exceeds the standard requirements.



SMA Multicluster technology

The path to your own power distribution grid

AC-based off-grid systems open up new possibilities for providing a stable and powerful energy supply-independent of the power distribution grid. This kind of stand-alone network not only provides the customary supply quality usually associated with power distribution grids but due to its modular design, it is also very simple to install and can be easily expanded. Through the integration of more renewable energy sources, which avoid fuel costs and

are steadily becoming more economically viable, such systems are already more cost-effective than conventional systems running on diesel generators. This section explains the basic technical principles of off-grid power supply systems and demonstrates their structure and function using the example of a large hybrid system with around 270 kW generating capacity.

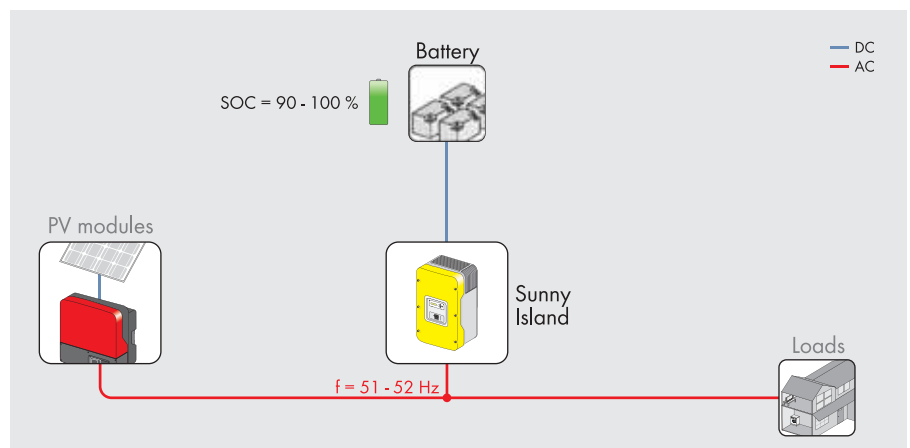
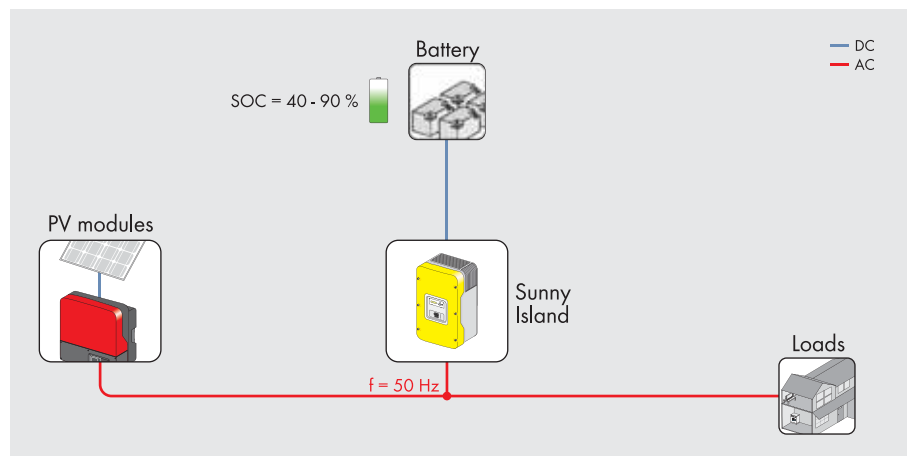
1. Why alternating current?

AC coupling is the basis for modular off-grid power supplies of up to 300 kW. In contrast to DC coupling, all energy sources and loads are connected through an AC power grid, which offers a number of advantages, specifically: commercially available and affordable AC power devices can be used on the load side. On the generator side, any number of renewable or conventional energy sources can be incorporated. Alternating current grids can be expanded without specialized technical knowledge and using standard components available everywhere. Compared to components for direct current grids, these components are considerably less expensive because they normally have to carry higher voltages but also much lower currents. There is also much more planning flexibility involved since even large distances between the generators, batteries and loads can be implemented. In addition, the connection of

generators and loads in alternating current grids is possible at almost any point in the network, providing optimum conditions for subsequent expansion.

2. Sunny Island – the grid and battery manager

The central component of the stand-alone grid is the Sunny Island battery inverter. In its role of grid manager, it is in charge of the stability of the alternating current grid and ensures that voltage and frequency remain within the permissible limiting values. The Sunny Island will take care of storing any excess energy in the battery, and in the reverse case, of supplying the grid with power from the battery. Thus, it is a bidirectional battery inverter, often referred to as a combined inverter/battery charger. Such devices are particularly cost-effective, since they execute both functions via the same power semiconductor devices.



At a state of charge under 90 %, power surpluses can be absorbed by the battery at any time. When the battery is fully charged and power surpluses are produced, the Sunny Island increases the AC frequency. The generators then continuously reduce their power output.



The Sunny Island is equipped not only with grid management, but also with a highly developed battery management function, including monitoring. It is continuously updated on the batteries' exact state of charge and as system manager makes ongoing decisions. At times when the batteries are empty and there is little generation capacity, it can activate a permanently available backup energy source (e.g., a diesel generator) or even switch off certain consumer loads. It also determines the optimum strategy for charging the batteries, and in doing so, increases their service life. Apart from all this, the compact device provides further special functions specifically geared to the requirements of stand-alone grids.

Automatic reactive power compensation

With a possible phase shift of -90 degrees to $+90$ degrees (shift factor $\cos(\phi)$ from 0 to 1 lagging/leading), the Sunny Island can, if necessary, provide its entire nominal power in the form of reactive power, making it capable of compensating for phase shifts in the stand-alone grid caused by lagging or leading loads (e.g., engines, transformers, cable lines).

PV management via remote control

When the batteries are full and electricity demand is low, the Sunny Island reduces the electricity produced by all renewable energy generators—whether PV plants, hydropower or wind turbine systems, with the single provision that all the inverters are SMA devices and their stand-alone grid mode is activated. If this is the case, the devices will no longer disconnect from the grid with rising frequency, but will continuously reduce their power output. As grid manager, the Sunny Island specifies the frequency in the stand-alone grid and can limit the power of all the generators and maintain the energy balance of the grid without any further communication.

Extreme overload capability

When certain loads are switched on, high start-up currents are frequently encountered, which can be well in excess of the normal operating current. In addition, some loads may require a lot of energy just for a short while, creating short peaks on the load profile. Off-grid system sizing it is extremely important to use battery inverters with a high overload capability; this will en-

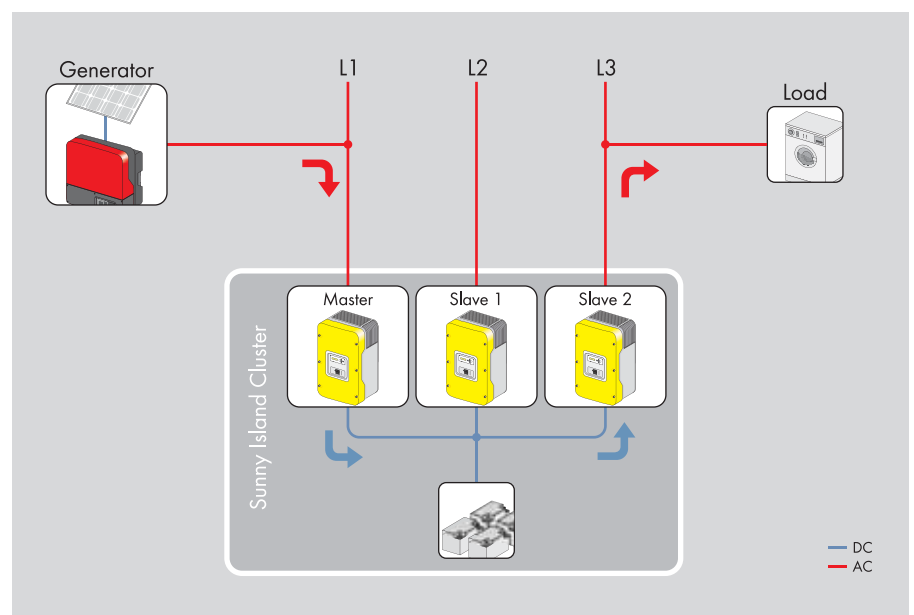
sure that such load peaks can be handled without incident. The Sunny Island 5048 can handle 6.5 kW for 30 minutes, 8.4 kW for one minute and as much as 12 kW for three seconds – i.e., approximately two and a half times its nominal power.

3. Three phases – no problem

For the transmission of large capacities in alternating current grids, a three-phase configuration has proven effective. This is true for both for large power distribution grids and for stand-alone grids. Due to the overlap of the phase-shifted individual capacities, three-phase loads have almost continuous power at their disposal, which is a significant advantage. The generators in diesel power units or wind turbine systems also supply three-phase power in most cases. It is possible to set up single-phase systems up to a battery inverter power of 20 kW (parallel switching of four Sunny Island 5048 to one phase). For larger capacities, however, three-phase stand-alone grids are usually preferred.

This is accomplished by always having three Sunny Island inverters connected to a three-phase cluster. A "master" device sets the frequency for both "slave" devices, which in turn operate exactly at 120 or 240 degrees phase-shifted from each other. Synchronization is achieved via a special communication connection between the devices. Another advantage of this connection is that the entire cluster can be configured using only the master inverter.

If the system is properly wired and configured, a three-phase stand-alone grid can function just as well as the single-phase version. An asymmetric grid load caused by a single-phase consumer can also be compensated for automatically by having the inverter draw more power from the battery based on the phase with the greater load. Even completely asymmetric operation is possible, for instance, when solar power is fed to phase 1 and there is consumption on phase 3. However, since in this case the energy must be put through two additional Sunny Island inverters, for efficiency reasons, it is better to keep the distribution of loads and generators as symmetrical as possible.



Asymmetric load on the three-phase grid is no problem



Multicluster Box 6 for max. 2 clusters

MC-Box 12 for 3...

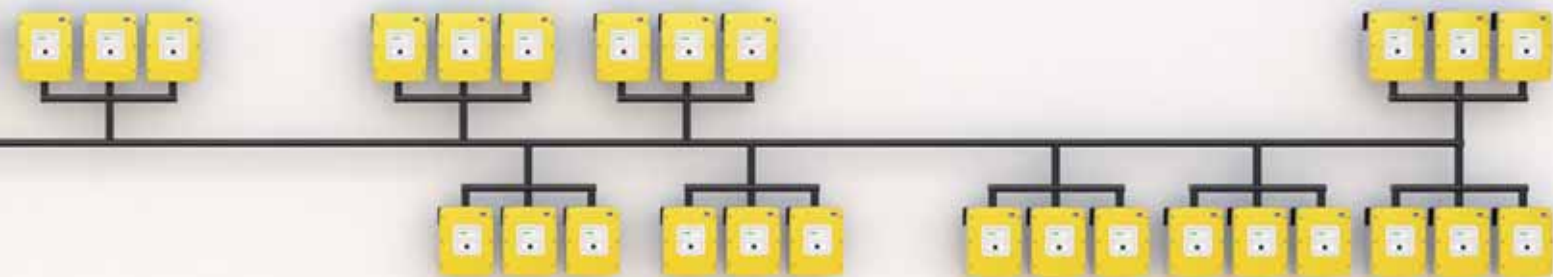
4. Multicluster technology – More cost effective for large systems

The special advantage of SMA's off-grid system technology lies in its modular design. PV plants of any power class are built using comparatively small and manageable components, which makes transport and installation easy, even at remote locations. By dividing inverter capacity into clusters (i.e., groups of three devices each), the plant designer remains extremely flexible with respect to system performance. It is almost infinitely scalable thanks to the parallel connection of multiple clusters; subsequent expansion of the off-grid system is also easy to implement.

Since the basic design is the same and the devices which are used are always the same, service personnel can configure, operate and maintain PV plants of any size after only a single training session.

Besides the Sunny Island battery inverter, the core element of the modular system is the Multicluster Box. It makes it easy to connect all the components into one battery-supported AC grid with a variety of power generators. The Multicluster Box is available in three power classes, comes fully wired and contains all of the necessary switching elements and monitoring devices. It allows the implementation of any off-grid system ranging from 5 to 300 kW in capacity.





...or 4 clusters

MC-Box 36 for 5, 6, 7, 8...

9, 10, 11 or 12 clusters

Power made to measure: The Multiclusterc Box

The core element of the Multiclusterc technology is the Multiclusterc Box, which is available in three power classes. As a pre-configured AC distribution board, it enables the easy connection of all AC components in the stand-alone grid, including battery, generator, renewable-energy generation plants (e.g., photovoltaic, wind turbine or hydro-electric power), loads and two to 12 clusters, each made up of three Sunny Island inverters. The different Multiclusterc Box versions differ only by the number of connected clusters and the appropriate sizing of all live components. The Multiclusterc Box has a clear layout. There are connections for each Sunny Island inverter and main connections for a generator, the renewable-energy generating system and the loads. For the last two, sub-distributions are usually required which, however, need to be individually planned.

Multi-level security: generator and load-shedding protection

Both for load and generator connections, a power contactor is integrated in the distribution. The generator contactor serves to connect grid-forming generators such as those used, for instance, in more powerful diesel generating plants or CHPs. In contrast to generators in grid-parallel operation, they cannot synchronize with an existing grid, and therefore the generator specifies the grid parameters in this case. The Sunny Island inverter cluster adjusts accordingly. As soon as voltage and frequency pre- and post- generator contactor are equalized, the connection is established.

If the Sunny Island cluster fails or is switched off, the generator contact closes automatically so that the generator is directly linked to the connected loads. In the case of a generator failure, on the other hand, the system rapidly disconnects and maintains supply with battery power and the available renewable energy sources. Thus, even when one component fails, secure operation is assured.

If a long-term generator failure occurs and the renewable energy sources are not sufficient to fully power all the loads, initially the energy stored in the battery will be used. Once a lower discharge threshold is reached, the contactor on the load side opens and unlocks the line in order to safely prevent the batteries from deep discharge and the cluster group from disconnection. Instead, the system remains active and uses all available sun, wind or hydro power to recharge the battery. The loads are automatically reconnected once the battery's state of charge is high enough.

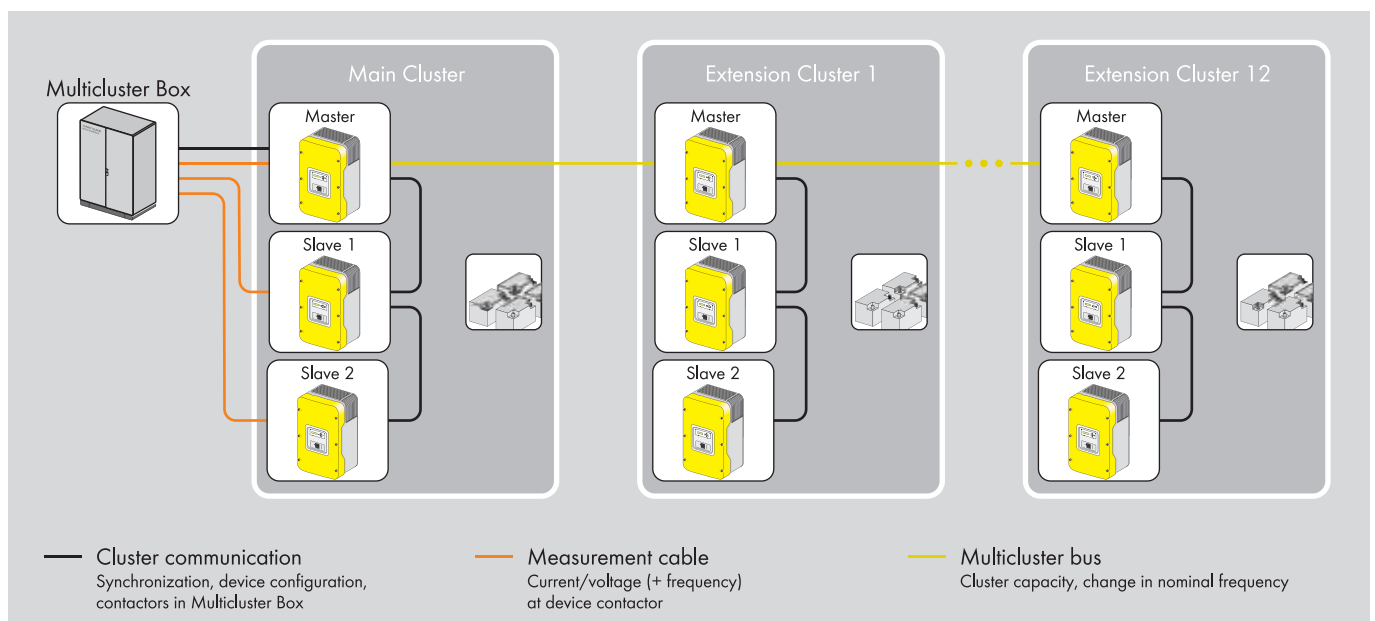
Even in cases of severe faults, the maximum possible power supply reliability and battery protection are guaranteed. On the other hand, load management, for instance, to avoid unnecessary load peaks, is executed by the multi-function relay of the Sunny Island inverters. In each device of the main cluster there are two relays available, to which it is possible to assign one of 17 functions via the device menu. Apart from starting the generator when the battery charge is low, it is also possible to connect individual loads via a separately installed contactor.

Flat hierarchy: inverters linked into cluster groups

In a stand-alone grid with up to 36 Sunny Island inverters, a clearly organized structure is essential to ensure effective control of the grid. As mentioned above, each of the maximum 12 clusters consists of three inverters – one master and two slaves. Each of these three-phase clusters is assigned a separate sub-battery that it controls and monitors. In addition, one of the clusters is defined as the main cluster. The corresponding main master device controls the entire system and also communicates with the Multicluster Box. The main cluster is supported by up to 11 extension clusters, each of which in turn consist of one extension master and two extension slaves. By doing so, we distinguish four hierarchy levels overall (number of devices in brackets): main master (1), main slave (2), extension master (1 – 11) and extension slave (2 – 22).

Measurement and control: Communication lines

Apart from the contactors, the Multicluster Box also contains two communication interfaces for connection to the main cluster. On the one hand, current, voltage and frequency at the generator connection to the three inverters of the main cluster are transmitted. This data is required, amongst other reasons, for the synchronization of the Sunny Island cluster to the generator. For tripping the contactors, the Multicluster Box is also connected to the internal communication bus of the main cluster. And, finally, all the master inverters in the system are connected to each other. By means of the multicluster bus, information on the current cluster power output, the battery charge state and the nominal frequency is exchanged.



The structure of the modular multicluster system with the required communication connections



Flexible in normal operation

The modular design of off-grid systems offers an amazing degree of flexibility that provides advantages not only in terms of planning, but also for system expansion and maintenance. The modular design makes it easy to incrementally expand and upgrade any small system. Additional clusters can be connected to the Multicluster Box at any time so that the capacity of renewable energy generation can be expanded in accordance with demand. The only limiting factors are the number of Sunny Island connections possible on each Multicluster Box and the ampacity of their switching devices (see the technical specifications of the Multicluster Box).

In fact, the availability of the total system is also enhanced by the modular structure based on compact standard devices. With the exception of the main cluster, maintenance or replacement of individual Sunny Island inverters can take place during system operation—the only difference being that the total output of the system is correspondingly lower during this time. The

same is true for the individual sub-batteries that are assigned to the various Sunny Island clusters. Finally, the intelligent battery management of the cluster group ensures that all the sub-batteries have regained the same state of charge within a very short time.

Easy maintenance by local service technicians

Regular service work on Sunny Island inverters is limited to cleaning the ventilation fans. The individual battery units must be serviced once a year due to the protective low voltage used on the DC side. This work can also be performed without any specialized knowledge and during normal operation. In case of a Sunny Island inverter failure, every service technician trained by SMA is able to carry out device replacement. In the even more unlikely case of an error in the Multicluster Box, remedial action involves little effort. Instead of replacing the cabinet as a whole, it is sufficient to have a service technician replace the affected component onsite.



5. The Island Solution – Modern electricity supply on Eigg Island

An example of a high-performance, off-grid power supply system can be found on Eigg Island. The island is part of the Scottish Hebrides, about 30 square kilometers in size and with a population of 90. The island has not yet been connected to the power distribution grid of the mainland, which is about 16 kilometers away. The costs are simply too high. Until 2008, the island was supplied with electricity by diesel generators. This form of power supply was always very expensive and also caused a great deal of noise pollution at night. In addition, all electricity had to be switched off when maintenance work was required.

Your own power distribution grid

Since 2008, the islanders have reaped the benefit of a modern three-phase electricity grid, 95 percent of which is supplied by renewable energy sources. This hybrid off-grid system integrates hydroelectric, wind and photovoltaic power using three renewable energy sources. Only at times of poor generating capacity is a backup diesel generator used. And, although electric power is now available 24 hours a day in grid quality, the costs for the islanders have fallen by more than 60 percent.

The central element of the stand-alone grid is the group of four Sunny Island clusters that is connected to various generators and loads via a Multiclust Box 12. Three water turbines with a total of 110 kW, four small wind turbines with 24 kW and a PV plant with 10 kW peak capacity (scheduled to increase to 32 kW in 2011) secure a supply of environmentally sound electricity. The Sunny Island inverters with 60 kW nominal power have access to about 144 kW of renewable power generation capacity. This power ratio is typical for off-grid systems since the maximum capacities of different generators are only rarely available at the same time. Two diesel generators with 64 kW nominal power each serve as backup in case the renewable energy source is deemed insufficient. During operation, however, only one of the generators is used at all times. The other generator is used during maintenance work or in case of faults. The battery bank has a storage capacity of 212 kWh. This alone can keep the island supplied for around 12 hours. In order to avoid transmission losses resulting from the distance of several kilometers between loads and generators, the local power distribution grid operates partially at a medium-voltage level of 11 kV. The power generation at a local level further relieves the distribution grid, as a certain amount of the energy produced is consumed directly in the vicinity.

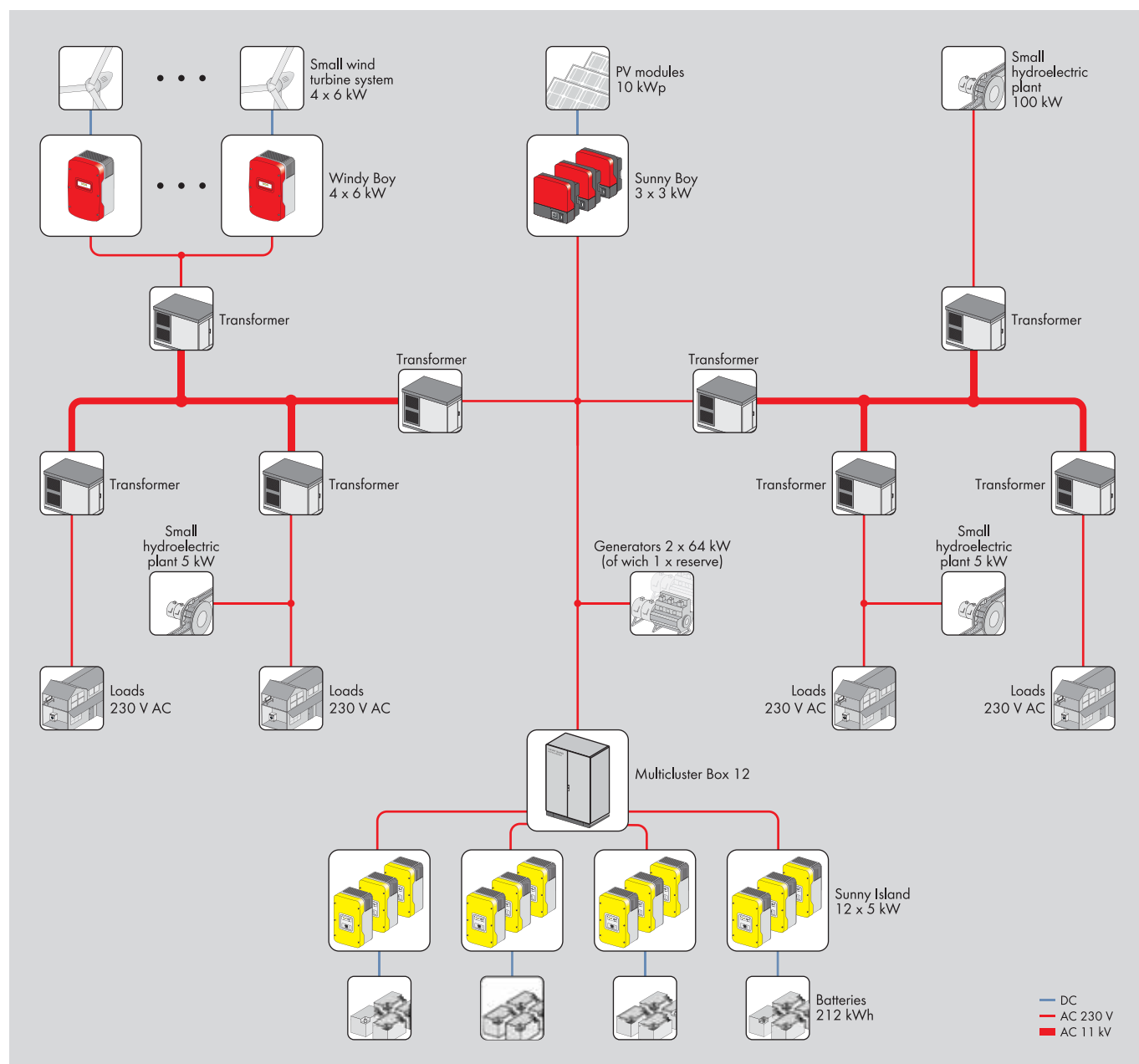
Operating principles

In normal operation, the main master of the Sunny Island inverters controls the entire grid and ensures that the energy balance is equalized at all times. When the generated power from renewable sources exceeds the current demand (15 – 60 kW), the surplus is stored in the battery. When the battery is fully charged, the main master starts to increase power frequency by a small amount. It activates remotely-controlled electric heating loads which heat warm water tanks in public buildings. The renewable energy generators also carry out a frequency-controlled reduction of their capacity. If the power generated from renewable energy sources is not sufficient, the 60 kW power of the Sunny Island inverters is available for support; this energy will be taken from the battery.

The main master will only start the diesel generator when the state of charge goes below 60 percent. In this case, the power frequency is preset by the diesel generator and the Sunny Island clusters are synchronized to their grid parameters. At the same time, they are continuously keeping the energy balance stable. When large loads are activated or deactivated, the load on the generator is not changed immediately. The inverters are able to compensate the load fluctuation by instantaneous changes of their charge or discharge current. An important contribution is made by the enormous

overload capacity of the devices. For three seconds they supply 144 kW of battery power to the grid. In its role as grid manager, the main cluster weighs the alternatives of operating the diesel generator with the highest possible efficiency, and charging the battery with the appropriate charging current (the charge state also plays a role in this equation). As a result, the generator runs less frequently on inefficient partial load and is burdened less with unnecessary, short start/stop cycles. Incidentally, since sudden load changes are absorbed by the Sunny Island inverters, those genera-

tors which only have a low power output in relation to the consumer loads can also be operated safely.



REFERENCES







PV plants

The appropriate inverter for every application

The future belongs to renewable energies. Fossil fuels such as oil and coal are finite resources, and damage the climate and the environment. Photovoltaic plants, on the other hand – with their low wear, good scalability and generation which matches consumption – are among the most effective measures for a reliable and sustainable supply of energy, not least because the solar energy in question can cover our global consumption more than a thousand times over.

On the following pages, we show several examples demonstrating that the integration of PV plants into the visual appearance of our cities and countryside is highly successful. These plants are not unsightly and often add to the aesthetic value of many buildings.

Photovoltaic plants are now used as the basis for off-grid systems in many corners of the world in order to set up energy supplies in remote off-grid regions, which would otherwise be unthinkable.



Top:
Service center Eschborn city
Germany, 104 kWp
 SB 3000TL, SB 4000TL, SB 5000TL

Bottom left:
Tiber Targhe
Italy, 277.5 kWp
 SMC 5000A, SMC 8000TL

Bottom right:
Pirig Solarenergie
Germany, 50 kWp
 SB 1100, SB 2500, SMC 4600A,
 SMC 5000A, SMC 9000TL, SBU XL



Top:
PV farm Almeria
Spain, 15 MWp
 SC 500MV, SC 1000MV

Bottom left:
Montalto di Castro
Italy, 85 MWp
 SC 630 HE

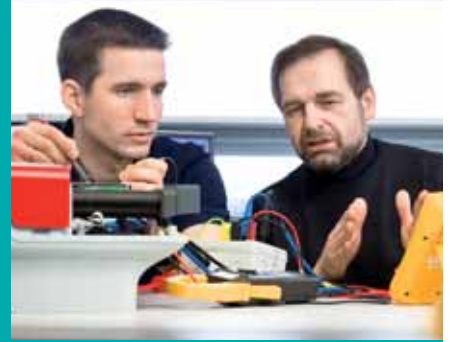
Bottom right:
Longest PV plant in the world
Germany, 2,649 kWp
 SC 250HE, SC 350HE, SC 500HE,
 SC 1000MW



Top left:
Alpine hut
Italy, 1.5 kWp
 SI 4500, SB 1700

Top right:
SMA Solar Academy
Germany, 151 kWp
 SI 5048, SB 3000TL, SB 5000TL,
 SMC 7000, STP 15000TL

Bottom:
Private residence
United States, 150 kWp
 15 SB Inverters



Glossary

Explanations on Solar Technology

Central Inverter

Central inverters are particularly well-suited for use in PV plants with a homogenous structure (modules of the same kind with identical orientation and tilt). They are used for plants starting at around 100kW and are usually designed for outdoor installation.

Dumpload

Dumpload is a load which can be spontaneously activated in the event of an energy surplus and can also be used to balance out strong load fluctuations. Consumers with storage capability (pumps, cooling units, boilers) are the most energy sensible. However, for the actual technical function, appropriately cooled resistors suffice.

ESS (Electronic Solar Switch)

The ESS is a DC disconnection unit integrated into the inverter to safely disconnect a solar array from the inverter. The ESS has a grip handle for easy operation. After pulling down the grip handle, the DC plugs can be accessed and disconnected with no risk of arcing. Disconnecting the plug results in immediate disconnection from the live array.

H5 Topology

The inverter bridge with H5 topology features a fifth semiconductor switch, which ensures optimal efficiency during conversion at an efficiency rate of 98 percent.

HF

HF stands for "High Frequency" and also designates the new Sunny Boy series with high frequency transformers. The compact, galvanically isolating inverters provide very high efficiency for devices with transformers.

Low-Voltage Ride Through (LVRT)

Network management function from the field of dynamic grid support. When there is a short disruption in grid voltage, the inverter does not switch off, as has been required until now, but supports the grid with reactive power. After the disturbance, it immediately resumes feeding. In Germany, LVRT is required as of January 2011 for plants at the medium-voltage level.

Maximum Power Point (MPP)

The operational point (current / voltage) of the PV array under which the highest possible power under the prevailing conditions is harvested. The actual MPP changes constantly depending on the level of irradiation and the temperature.

MPP Tracker

A device that adjusts the voltage and current of a PV array so that it operates at its "Maximum Power Point."

MSD

Part of "Mains monitoring with allocated Switching Devices". This is a mandatory safety device which prevents power from a solar energy system from being fed into an external power grid when the public supply grid is not functioning. This function is taken over by the Sunny Boy and Sunny Mini Central using SMA Grid Guard, making a regular test unnecessary due to their single fault characteristics.

Multistring Inverter

An inverter which, to a great extent, combines the advantages of several string inverters (separate MPP tracking of individual strings) and a central inverter (low specific costs).

OptiCool™

A patented enclosure concept by SMA, in which the interior of the enclosure is divided into two compartments. The sealed chamber protects the sensitive electronics from water, dust and debris. The second chamber contains transformers and chokes, as well as other components, and can be actively cooled when necessary.

Optiflex

An innovative and highly-flexible Sunny Tripower concept. The Sunny Tripower features an asymmetric multi-string input with two MPP trackers for custom-fit installation with a nearly unlimited numbers of modules and maximum system efficiency.

Optiprotect

The Sunny Tripower features a completely new and comprehensive safety concept. Its electronic string fuses, automatic string failure detection and overvoltage protection, that can be integrated into the enclosure, all work to monitor the PV system, ensure safe operation, and optimally secure energy yield.

OptiTrac Global Peak

Another advance in our time-tested OptiTrac MPP tracker for operation in partially-shaded PV plants. This specialized operation management system ensures that the modules are constantly operated at the point of maximum power even when there are multiple maximum power points, without causing measurable yield loss (loss < 0.2 percent).

Power Balancer

The Power Balancer is a standard Sunny Mini Central inverter function that prevents the formation of an unbalanced load during three-phase grid feeding. This is accomplished by connecting three inverters to a three-phase feeding unit via a control line.

Quick Module

A removable communication and configuration module for the new Sunny Boy HF series. The Quick Module contains a rotary switch for country-specific configuration and a *Bluetooth®* NetID, as well as an SD card slot. The optional Quick Module RS485 also features an RS485 interface and a multifunction relay.

SMA Grid Guard

According to predefined parameters, the SMA Grid Guard concept monitors factors such as the voltage and frequency of the connected AC grid. This serves to prevent the formation of islanding in the event of grid disconnection (see also "MSD"). Grid Guard enables simple and reliable operation of SMA inverters on nearly all worldwide electrical power grids.

SMA Plug-in Grounding

A grounding set for the new Sunny Boy HF series. Grounding is quick and simple—an easy plug-in without having to open the enclosure. The polarity is defined by the orientation in which the grounding is attached.

String Inverter

In string technology, the photovoltaic array is divided into separate module surfaces and each of these "strings" is assigned to a separate string inverter. This technology reduces system costs while at the same time substantially simplifying installation and increasing the energy yield and system availability.

SUNCLIX®

A DC plug system for many SMA inverters, developed in cooperation with Phoenix Contact. The field plugs can be connected to almost any cable without tools, and are included with the inverters free of charge.

» SMA Innovations



2011

Sunny Boy 3000HF-US

Redefining excellence

The UL-Certified Sunny Boy HF series features a slim enclosure, reduced weight, modern graphic display, a wide input voltage range, and industry-leading CEC efficiencies



2010

Sunny Central 800CP

High performance as standard

Compact, weatherproof enclosure and intelligent power management: the new Sunny Central series does not need a heavy concrete substation and thus decreases system costs



2010

Sunny Boy 3000HF

Simply efficient.

The new generation of galvanically isolating inverters: highest yields in its performance class and easiest installation thanks to the SMA Plug-in Grounding, SUNCLIX and Quick Module



2008

Sunny Boy 5000TL

Perfection Plus. Simple.

The new Sunny Boy generation.

Bluetooth technology, graphic display, suitable for worldwide use and easy to install: leading-edge technology meets user convenience



2007

Sunny Backup System

PV power even in case of grid failure

Awarded the 2007 innovation prize for the most innovative solar product



2006

ESS

Electronic Solar Switch

Our first device-integrated DC switch-disconnector for safely disconnecting the PV array from the inverter



2010

Sunny Tripower 17000TL

The three-phase inverter
for easy system planning

Packed full of pioneering technology:
with Optiprotect as multi-level security
concept and Optiflex for flexible plant
configuration



2009

Sunny Central 630HE

Grid management included

Optimum future prospects: more
power with lower specific system costs,
high flexibility for plant design and
compliance with the "Medium-Voltage
Directive"



2009

Sunny Island 1212

Compact design and high performance
with peak efficiency

Bidirectional HF inverter, galvanic
isolation, reduced weight, high
efficiency

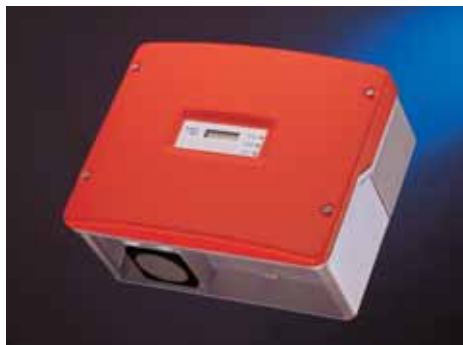


2006

Sunny Mini Central 8000TL

The world champion of amortization

H5 topology, record efficiency of 98 %,
low specific price: no other pays off
faster



2005

Sunny Boy 3300

The test winner

Powerful Sunny Boy with OptiCool,
galvanic isolation and maximum
efficiency, for the first time in a die-
cast aluminum enclosure



2005

Sunny Portal

Internet portal to present
plant data

Customized PV plant monitoring
and individual visualization at
www.SunnyPortal.com

» SMA Innovations



2004

Sunny WebBox

Data logger of the new generation

Innovative monitoring and communication with the PV plant via Internet (Sunny Portal)



2003

Sunny Beam

The simplest PV plant monitoring via radio

Attractive design for the living area, power supply via integrated PV cell



2002

Sunny Central

Central inverter for construction of larger PV power stations

With string monitoring, Sunny Central Team, and optimum service, Sunny Central is the large-scale solution



2001

Sunny Island

The system solution for off-grid supply

User-friendly connection of all components on the AC side, easy installation and extension of the plant



1995

Sunny Boy 700

The first string inverter

Cost reductions thanks to minimized DC wiring, easier installation and increased efficiency



1991

PV-WR

The first PV inverter designed for series production

User display, communication and visualization with a PC

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