PHOTOVOLTAIC PRODUCTS & SYSTEMS

Product Catalogue 2009 / 2010

Photovoltaic systems and system components: Solar Cells, Solar Modules, Solar Inverters and accessories from Sunways.

sunways
Photovoltaic Technology

Contents

At the solar park in Almendricos, a total of 70 Sunways Solar Inverters with HERIC® topology contribute to the technological and economic success of the installation. Reliability and high efficiencies pay dividends.

Leading PV provider. Sunways is an internationally successful PV company. Since 1993, our name is a byword for innovative technologies for generating electricity from the sun, namely photovoltaics. Our aspiration: the development of PV solutions that are ahead of their time in terms of innovative power and quality. Our vision: sustainable utilisation of solar energy worldwide.

The result: innovations that set standards and help protect the valuable resources of our earth. Our Solar Cells, Solar Modules and Solar Inverters offer unique technological perfection, power and quality.

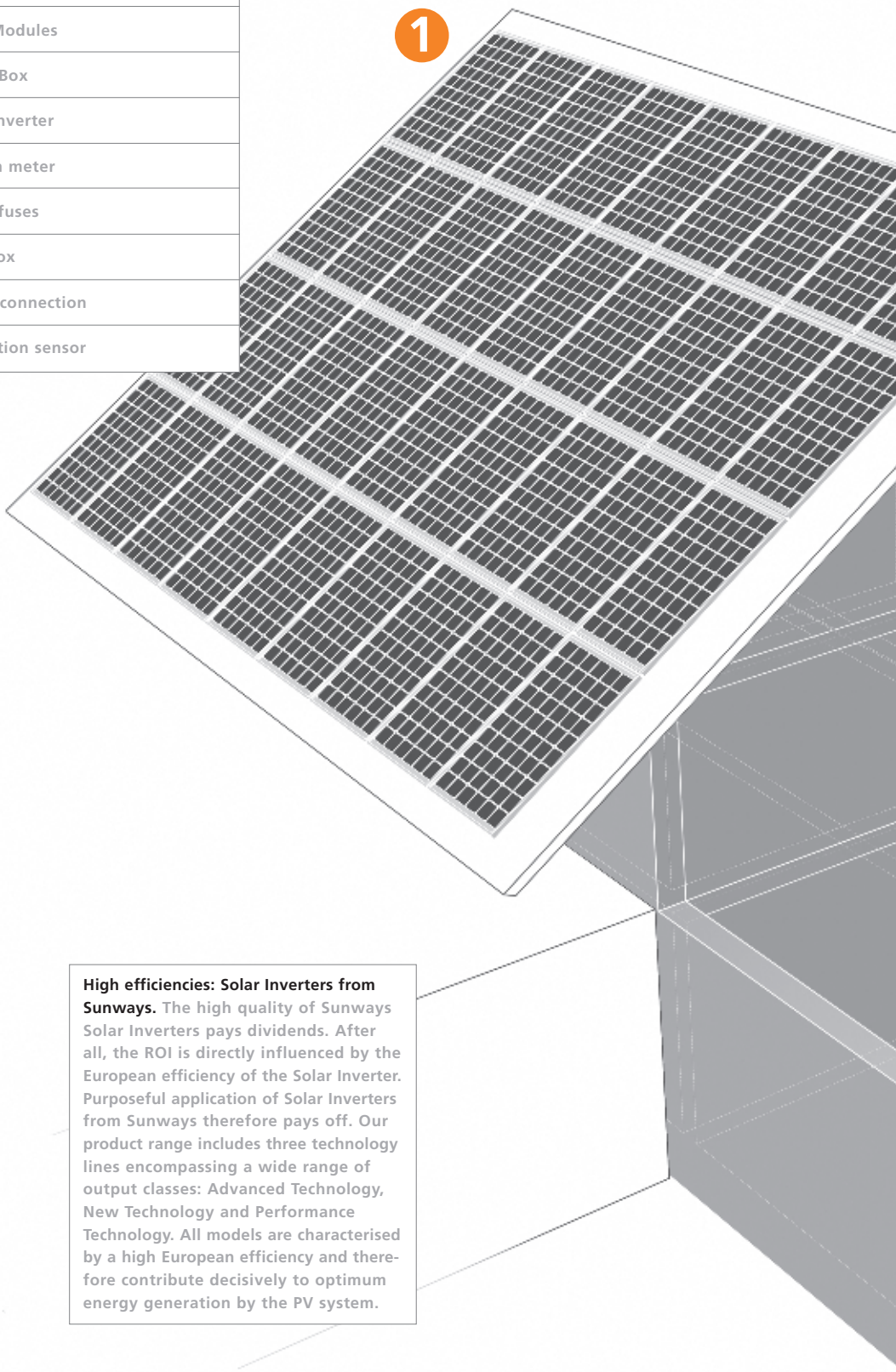
Corporate Responsibility Prime rated by oekom research

Not only have Sunways products received awards, but also the company itself; for example, the Premium label for Corporate Responsibility.

1.0
Sunways PV system design.

1.1 The main components of a PV system at a glance.

The PV components.
1 Solar Modules
2 String Box
3 Solar Inverter
4 Feed-in meter
5 Mains fuses
6 Fuse box
7 House connection
8 Irradiation sensor

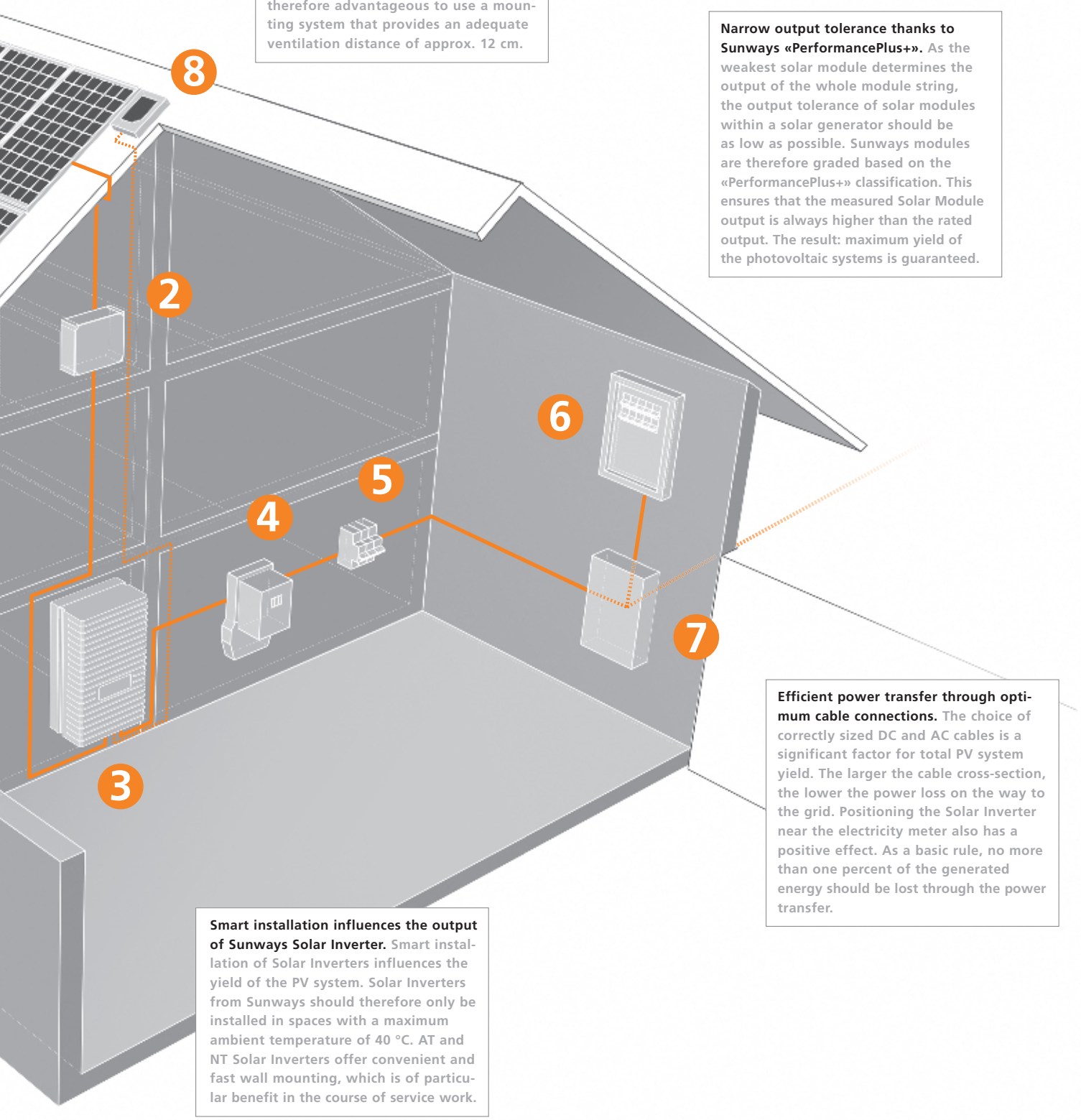


Photovoltaic systems from Sunways. Impressive power packs from a single source. The powerful combination of Sunways Solar Inverters with Sunways Solar Modules creates reliable photovoltaic systems that meet the highest demands in terms of yield and quality. Each photovoltaic system from Sunways is therefore subject to the basic principle that the theoretical output values of the individual components must be achieved in practice. Numerous independent evaluations and tests demonstrate that this is indeed the case.

High efficiencies: Solar Inverters from Sunways. The high quality of Sunways Solar Inverters pays dividends. After all, the ROI is directly influenced by the European efficiency of the Solar Inverter. Purposeful application of Solar Inverters from Sunways therefore pays off. Our product range includes three technology lines encompassing a wide range of output classes: Advanced Technology, New Technology and Performance Technology. All models are characterised by a high European efficiency and therefore contribute decisively to optimum energy generation by the PV system.

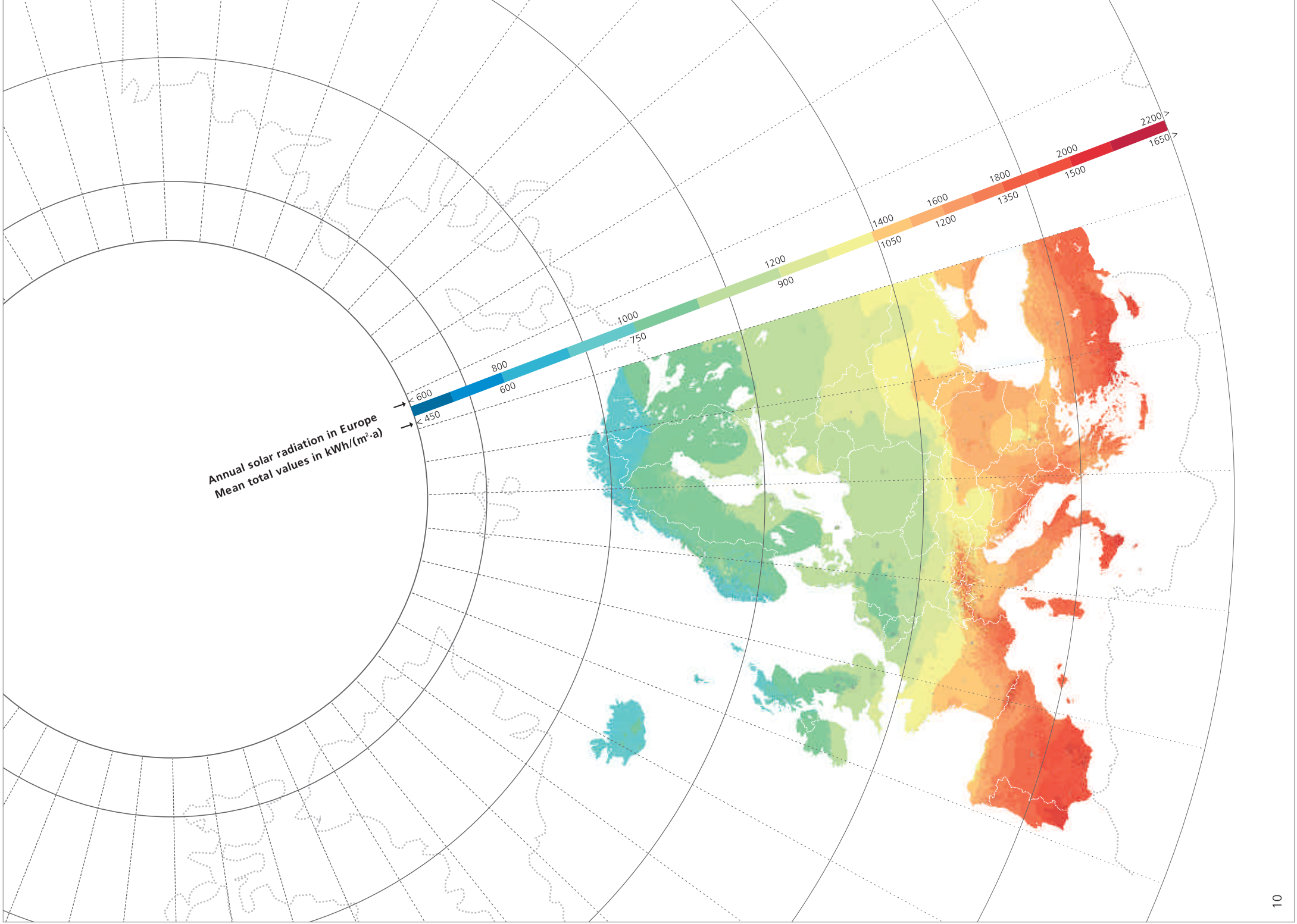
Ventilated mounting of Sunways Solar Modules: optimum cooling for higher output. Because a cooler solar module generates higher output than a warm module, the better your solar modules are ventilated, the higher the output at any given level of solar radiation. It is therefore advantageous to use a mounting system that provides an adequate ventilation distance of approx. 12 cm.

Narrow output tolerance thanks to Sunways «PerformancePlus+». As the weakest solar module determines the output of the whole module string, the output tolerance of solar modules within a solar generator should be as low as possible. Sunways modules are therefore graded based on the «PerformancePlus+» classification. This ensures that the measured Solar Module output is always higher than the rated output. The result: maximum yield of the photovoltaic systems is guaranteed.



Efficient power transfer through optimum cable connections. The choice of correctly sized DC and AC cables is a significant factor for total PV system yield. The larger the cable cross-section, the lower the power loss on the way to the grid. Positioning the Solar Inverter near the electricity meter also has a positive effect. As a basic rule, no more than one percent of the generated energy should be lost through the power transfer.

Smart installation influences the output of Sunways Solar Inverter. Smart installation of Solar Inverters influences the yield of the PV system. Solar Inverters from Sunways should therefore only be installed in spaces with a maximum ambient temperature of 40 °C. AT and NT Solar Inverters offer convenient and fast wall mounting, which is of particular benefit in the course of service work.


Annual solar radiation in Europe
Mean total values in kWh/(m²·a)
< 450
< 600
600
750
800
900
1000
1050
1200
1200
1350
1400
1500
1600
1650
1800
2000
2200 >

1.2 Your secret of success: system design influences the yield.

The quantity of energy falling onto the Earth's surface in the form of sunlight corresponds to around 10,000 times the global energy demand. Professional PV system design improves the efficiency of electricity generation from the sun, and consequently the yield.

Orientation of Solar Modules. The yield of a PV system varies with its orientation. In Europe south orientation and a roof inclination angle of 30° is ideal. Roofs with an orientation between southwest and southeast and an inclination between 10° and 50° are also very suitable for the installation of Sunways Solar Modules. The yield variation within this range is less than ten percent.

Tracker systems can achieve up to 25 percent higher yield compared with fixed installations. The optimum tilt angle for PV systems is between 30 and 35 percent.

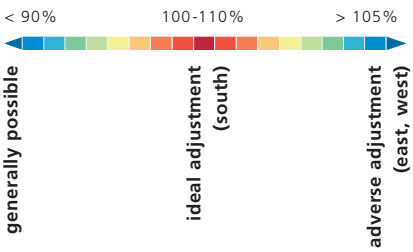
Shading of Solar Modules leads to loss of output and yield. PV system design therefore has to take into account the distance to shading objects and the sun's path throughout the year.

The power ratio between Solar Modules and Solar Inverters. The power ratio between Sunways Solar Modules and Solar Inverters should be selected so that the PV system is both cost-effective and technically practical.

For Sunways solar systems we recommend a design ratio of 90 to 105 percent under optimal conditions. This layout results from the «Performance Plus+» classification for the Sunways Solar Modules and the high efficiencies of the Sunways Solar Inverters.

Example of a power ratio:

$$\frac{\text{rated capacity}_{\text{Solar Module}}}{\text{rated capacity}_{\text{Solar Inverter}}}$$



Indication of source:
PVGIS© European Communities 2001 – 2008

Device	Optimum DC voltage (STC values)	European efficiency	Max. efficiency
NT 2600 to NT 6000	400 V	97,1%	97,5%
NT 8000 to NT 10000	400 V	96,4%	96,8%
AT 2700 to AT 5000	380 V	95,0%	95,5%
PT 30k	700 V	97,0%	97,5%

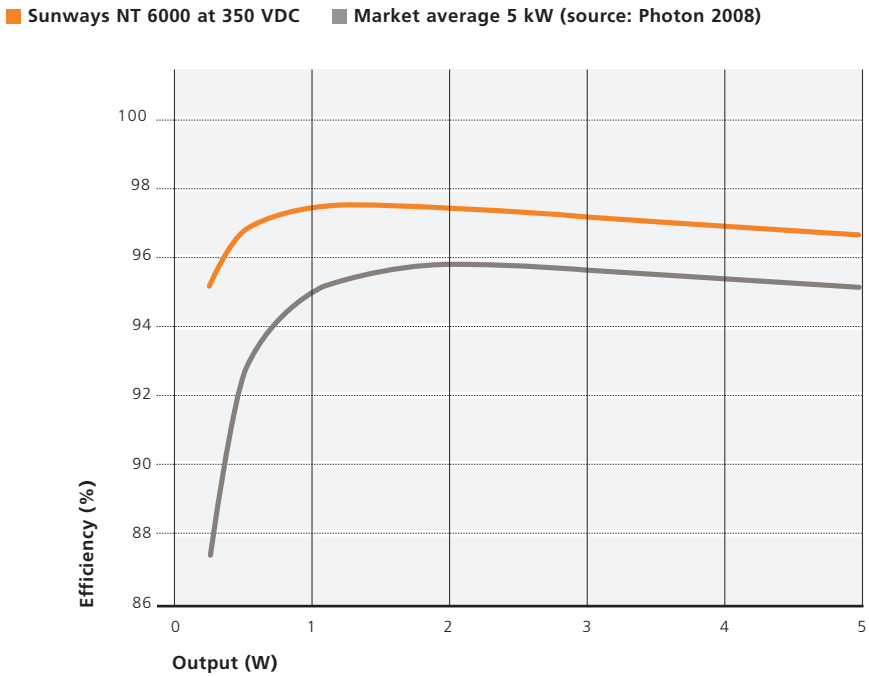
The system consisting of Solar Modules and Solar Inverter should aim to achieve the optimum operating voltage for the Solar Inverter in accordance with the table above.

Connection of Solar Modules. In order to ensure trouble-free operation of PV systems it is important to ensure that the electrical operating ranges of the Sunways Solar Modules and the Sunways Solar Inverters match when they are connected.

The Solar Inverter MPP voltage range. The solar generator voltage at the point of maximum power (MPP voltage) must always be within the MPP range of the Solar Inverter. Due to changes in the Solar Module temperatures (up to 75 °C) the MPP voltage of the solar generator will vary during the course of the year. The variation in MPP voltage is referred to as temperature coefficient of the MPP voltage ($U_{MPP,STC}$) and specified on the datasheet for the Sunways Solar Modules.

The maximum DC current of the Solar Inverter. In order to avoid undesired reductions in Solar Inverter performance, the MPP current of the solar generator should not exceed the maximum DC current of the Solar Inverter.

Efficiency comparison

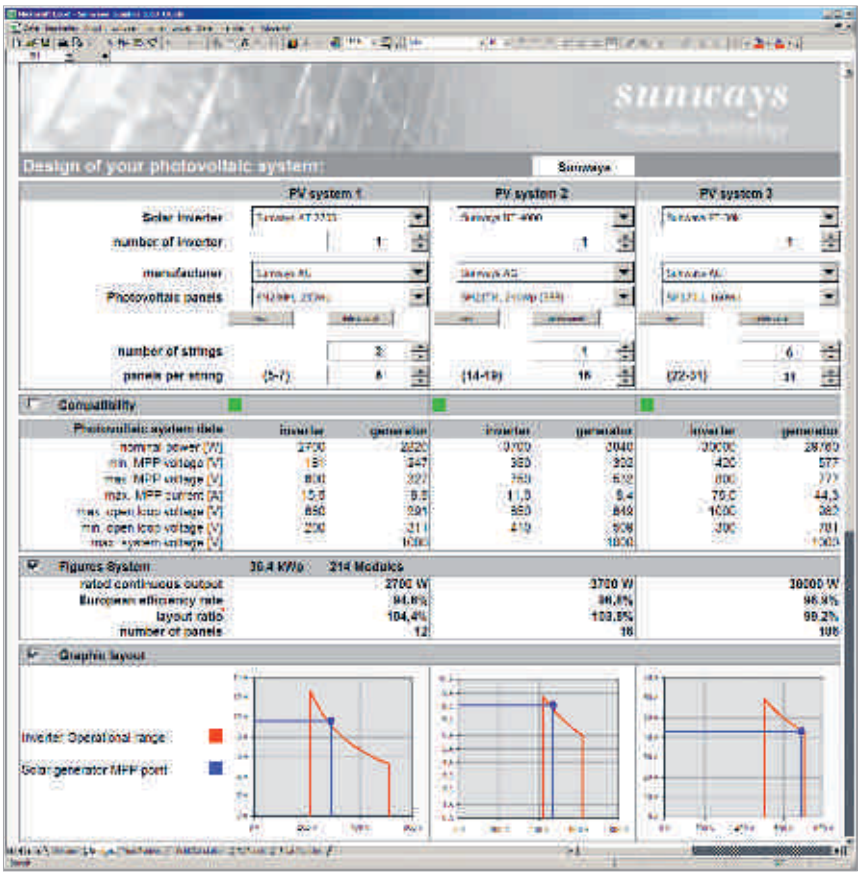


1.3 Site-specific system design

A suitable Solar Module can be selected once the orientation, roof inclination, roof area, installation options, shading, cable lengths and the location of the Solar Inverter have been determined. The technical data of the Solar Module determine the dimensioning of the PV systems.

PV system design with the Sunways Sundim software. For optimum implementation of all design aspects we recommend using the free Sunways Sundim design and configuration software. In just a few steps the software determines the ideal combination of Sunways Solar Modules and Sunways Solar Inverters. Sunways Sundim also calculates the likely yield of the PV systems and the expected annual yield. All the information can be printed if required.

The Sunways Sundim software can be downloaded free of charge from www.sunways.de.



Sunways Sundim software: the simplest and quickest way for designing PV systems professionally.

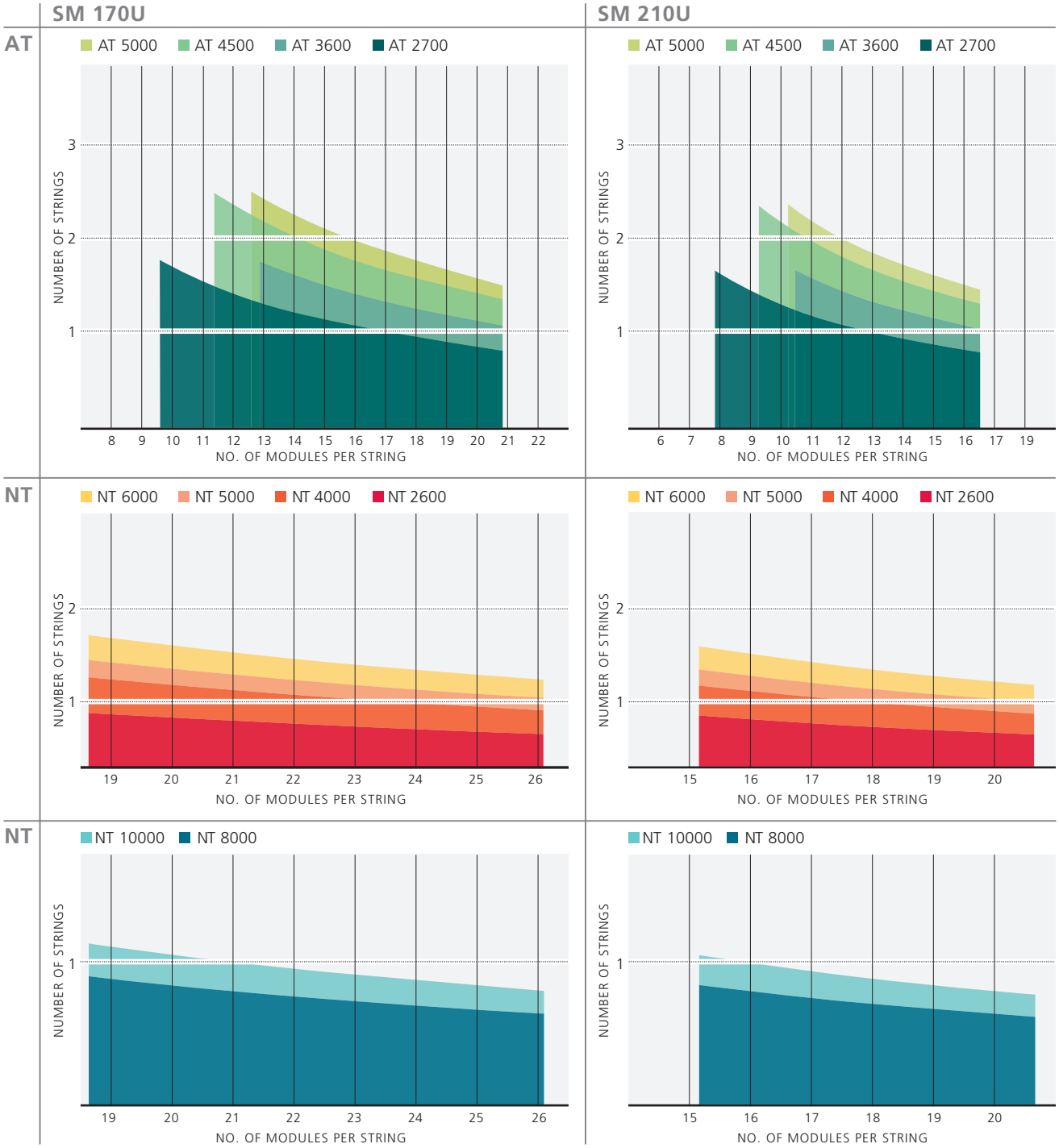
1.4 Maximum yield – our design diagrams enable you to find the optimum system configuration.

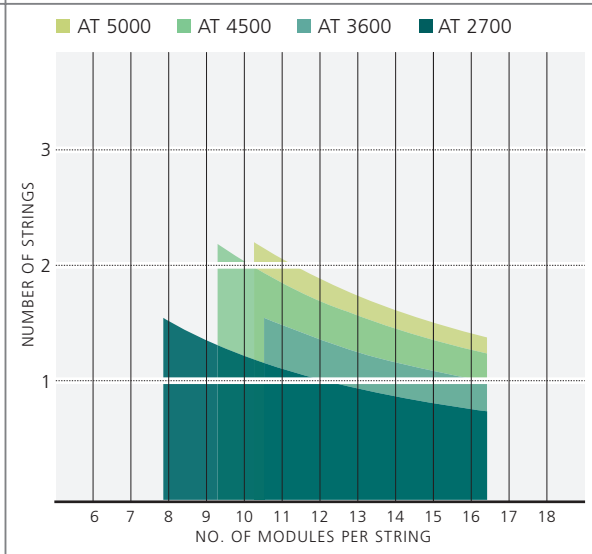
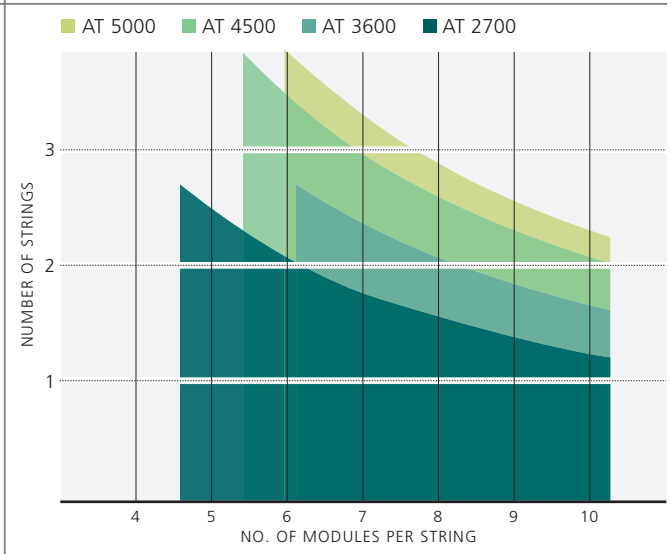
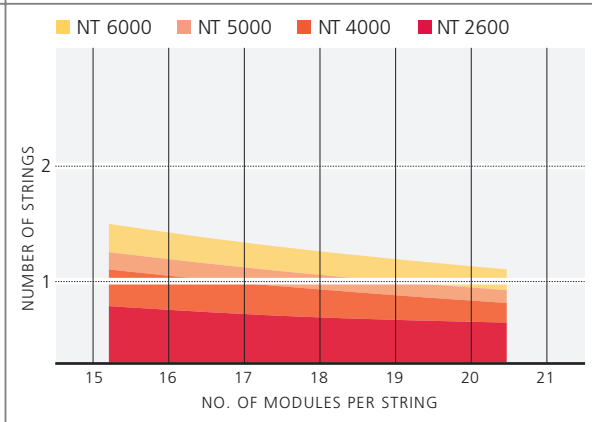
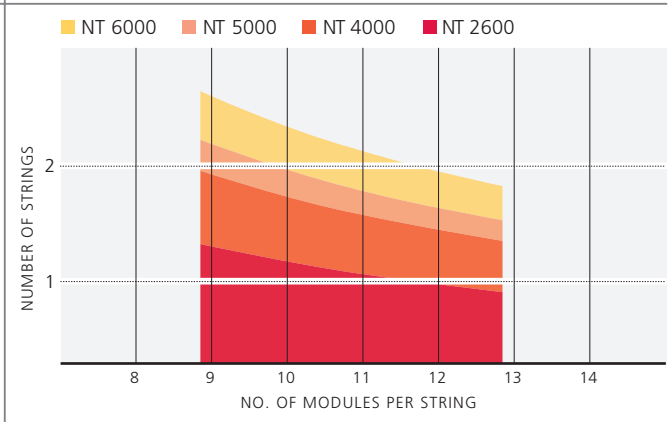
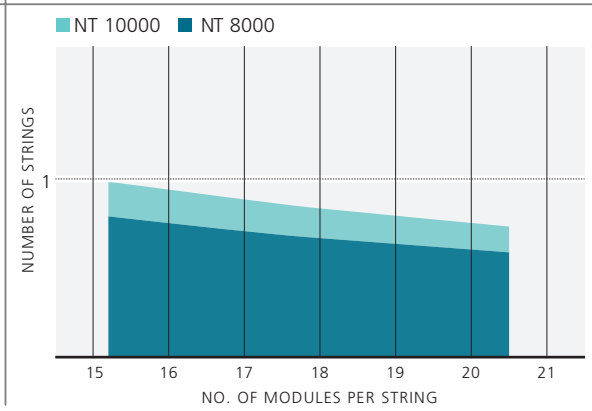
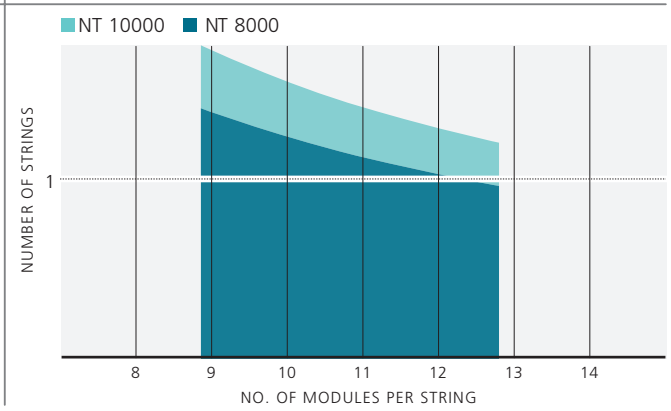
The procedure involves four steps.

1. Select the appropriate diagram for the module type.
2. Determine the number of Solar Modules.
3. Mark the point of intersection between the required number of strings and Solar Modules per string.
4. Check which Solar Inverter operating range fully encloses the point.

The diagrams enable quick system design and provide an overview of the best interconnection options for Sunways Solar Modules and Sunways Solar Inverters.

The diagrams are applicable for a module temperature range between -10 °C and 70 °C.



	SM 215M	SM 230M
AT		
NT		
NT		

2.0
Sunways photovoltaic systems and Sunways system components.

2.1 Seamless quality: from Solar Cells to photovoltaic systems.

Our motto: photovoltaic systems and system components that make sense. Once installed, Solar Cells, Solar Modules, Solar Inverters and PV systems from Sunways generate energy for decades, all in the interest of our customers, who benefit from the high yields and the reliability of our products.

Top quality as a matter of course. Sunways has longstanding experience in PV technology areas that are relevant for achieving high energy yield. We are still one of the few PV companies that develop all system components in-house, from Solar Cells to Solar Inverters.

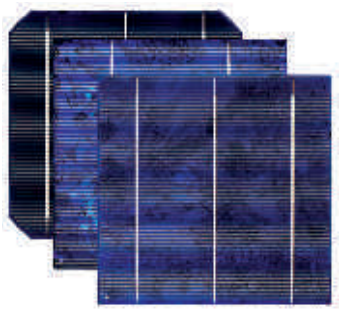
This has the advantage that we not only determine the quality standards and the properties of our products, but also align them with a view to maximising the yield of complete photovoltaic systems.

Our top-quality technological solutions provide the basis for this. As an independent company we ensure that our core processes are efficient. Ultimately, it is often the many minor details and the uncompromising quality that make Sunways Solar Cells, Solar Modules and Solar Inverters into top-class products.

Integrated solutions from a single source. The exceptionally high-yield photovoltaic systems from Sunways consist exclusively of Sunways Solar Modules with embedded Sunways Solar Cells and high-performance Sunways Solar Inverters.

Because each system is only ever as strong as its weakest element, the crucial factor for output consistency and reliability is optimal balance between the individual system components.

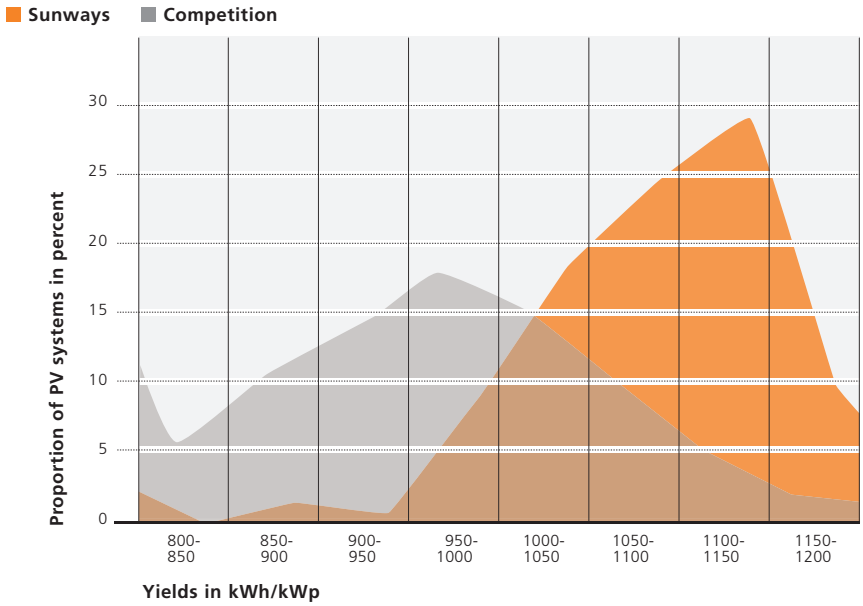
Sunways Solar Inverters are put through their paces in the company's in-house quality test laboratory. This process is based on strict quality control plans, which also encompass testing for the standards 0126 and EMC.



The printed «S» on every Sunways Solar Cell is a perceptible guarantee of quality.

Sunways Solar Modules owe their excellent module output and their reliability to comprehensive quality control with minimum manufacturing tolerances and our strict classification standard «PerformancePlus+».

Annual yields 2008



Up to ten percent higher yield. The evaluation of 1,646 PV systems during 2008 based on publicly accessible Internet databases* shows that the powerful combination of Sunways Solar Inverters with Sunways Solar Modules satisfies the very highest demands in relation to quality and yield.

Sunways photovoltaic systems achieved an average surplus yield of up to 97 kWh/kWp over the course of a year.

In other words: the yield from Sunways photovoltaic systems is up to ten percent higher.

*Sources:
www.pvlog.de, www.solarlog-home.de,
www.grotkasten.de

2.2 Solar Modules from Sunways. Our aim is maximum yield.

Sunways Solar Modules are durable quality products. Their excellent module output and reliability are a result of comprehensive quality control with minimum manufacturing tolerances.

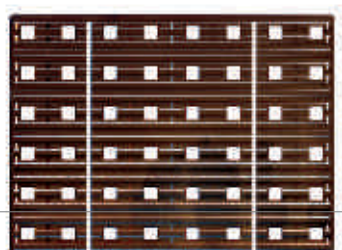
«Excellent» quality. The quality and performance of Sunways Solar Modules have already been tested and assessed: the Solar Module Sunways SM 170U was named test winner in the consumer protection magazine «Stiftung Warentest». This award was consequently confirmed in various independent tests in which our Solar Modules also exceeded the specified rated output under actual operating conditions. We therefore provide an above-average output guarantee: at least 90 percent of the rated output up to 12 years, at least 80 percent up to 25 years.

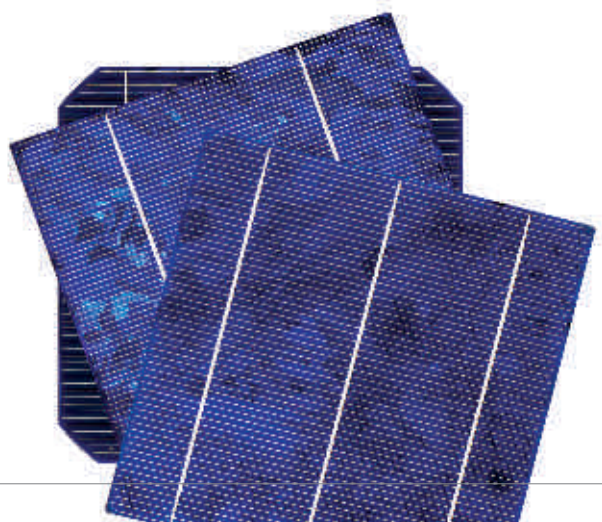
Production «Made in Germany». Solar Cells and Solar Modules from Sunways are manufactured in Germany. They therefore meet the highest quality requirements, because first-class quality is only achieved where manufacturing competency and quality awareness are in perfect accord. There are a total of five module types and 18 output classes to choose from that cover almost every area of application. All our models, from the Solar Module SM 170U up to the new Solar Laminates SM 215L, impress with excellent stability and durability.

Top stability and durability. Sunways Solar Modules are equipped with 4 mm solar safety glass, the specially structured surface of which ensures maximum light transmittance. The Solar Module frame consists of a high-strength 50 mm aluminium profile that gives every Solar Module a high degree of rigidity.

All Sunways Solar Modules are certified in accordance with the extended IEC 1730 II. They are therefore also suitable for demanding «heavy load» application areas with high snow loads of up to 5400 Pascal.

Multi- and monocrystalline Solar Cells from Sunways in different sizes and output classes for embedding in Sunways Solar Modules.





«Stiftung Warentest» named the
Solar Module SM 170U as test winner.

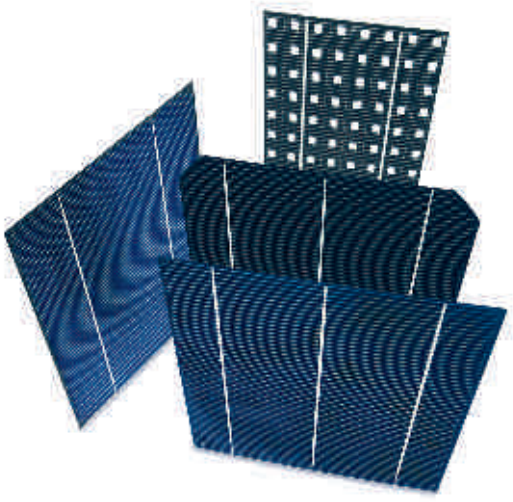
2.3 The basis for first-class quality: Sunways Solar Cells. Made in Germany.

The output of the Solar Modules is strongly dependent on the quality of the embedded Solar Cells. Sunways realised at an early stage that the constant uniform efficiency of all embedded Solar Cells is particularly crucial for the yield of the Sunways Solar Modules.

Perceptible and measurable precision. Superlative surface quality, first-class efficiencies, high-yield 3-busbar technology and maximum constant output: four properties that count towards the factors that make Sunways Solar Cells so successful and renowned all over the world.

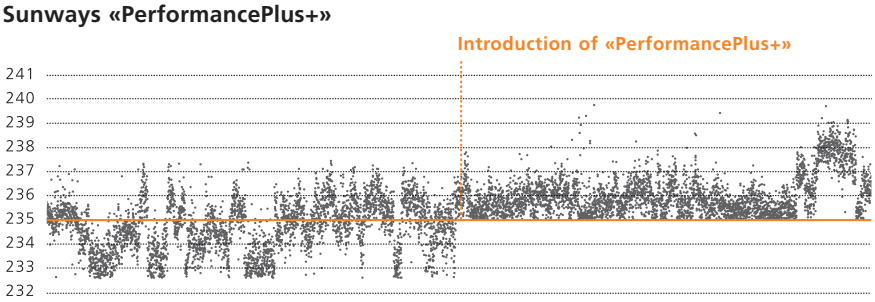
In addition, reliable product classifications through precise tolerance and quality controls guarantee the constant high efficiency of each individual Solar Cell from Sunways – and consequently the consistent high quality of Sunways Solar Modules.

Innovation and production. Our production lines in Constance (D) and Arnstadt (D) belong to the most modern solar cell production facilities in the world. This is where we manufacture multicrystalline and monocrystalline Solar Cells in a variety of sizes and output classes. A further reference is customised photovoltaic applications: transparent and coloured Sunways Solar Cells in various sizes and versions that also enable the implementation of unusual ideas in architecture or in the particularly demanding automotive area. Find out more at www.sunways.de.

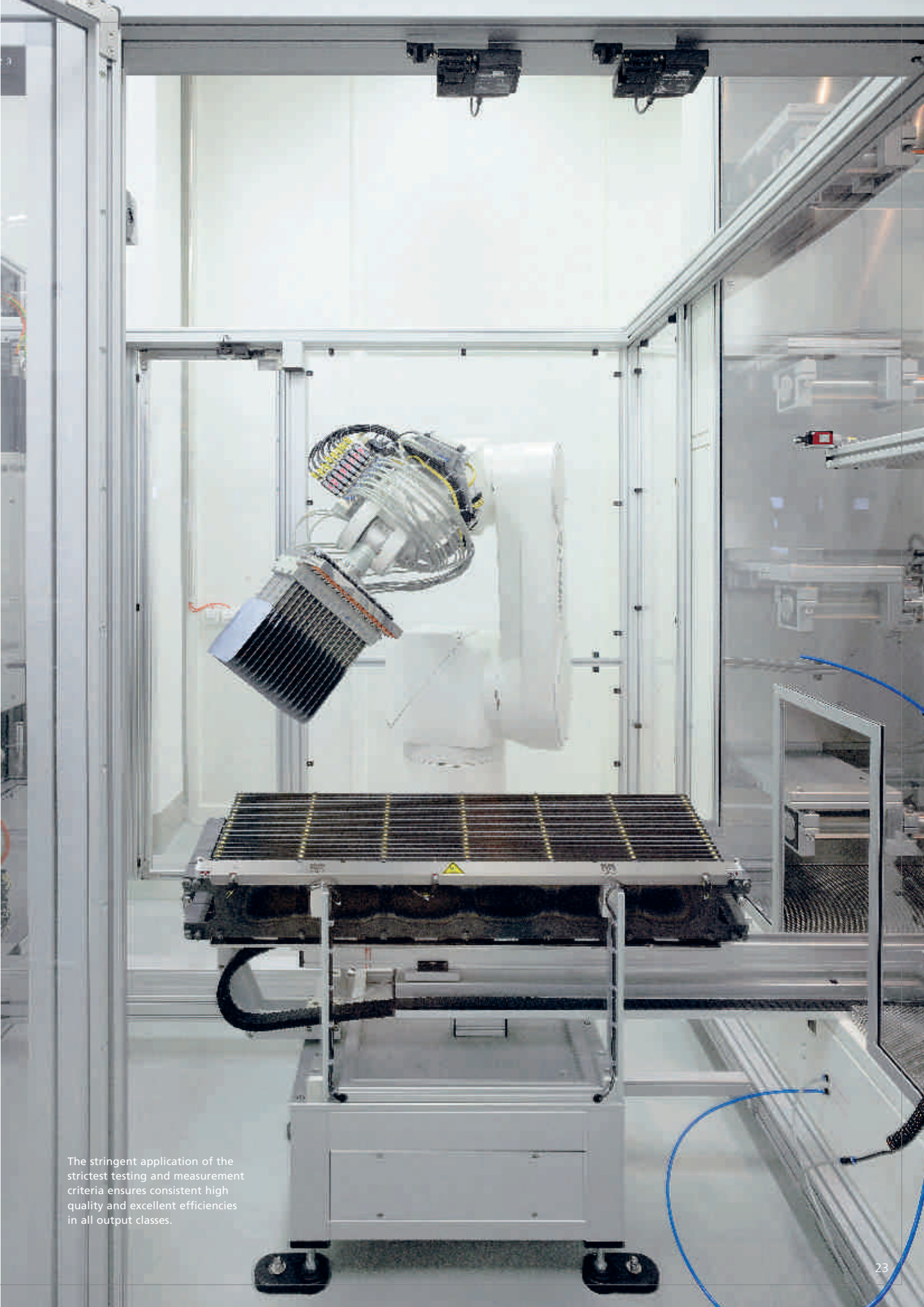


High-performance Sunways Solar Cells made in Germany: special application products come from Constance, while series production takes place in Arnstadt.

Sunways «PerformancePlus+»



Actual, individual Solar Module readings exceed the specified rated output.

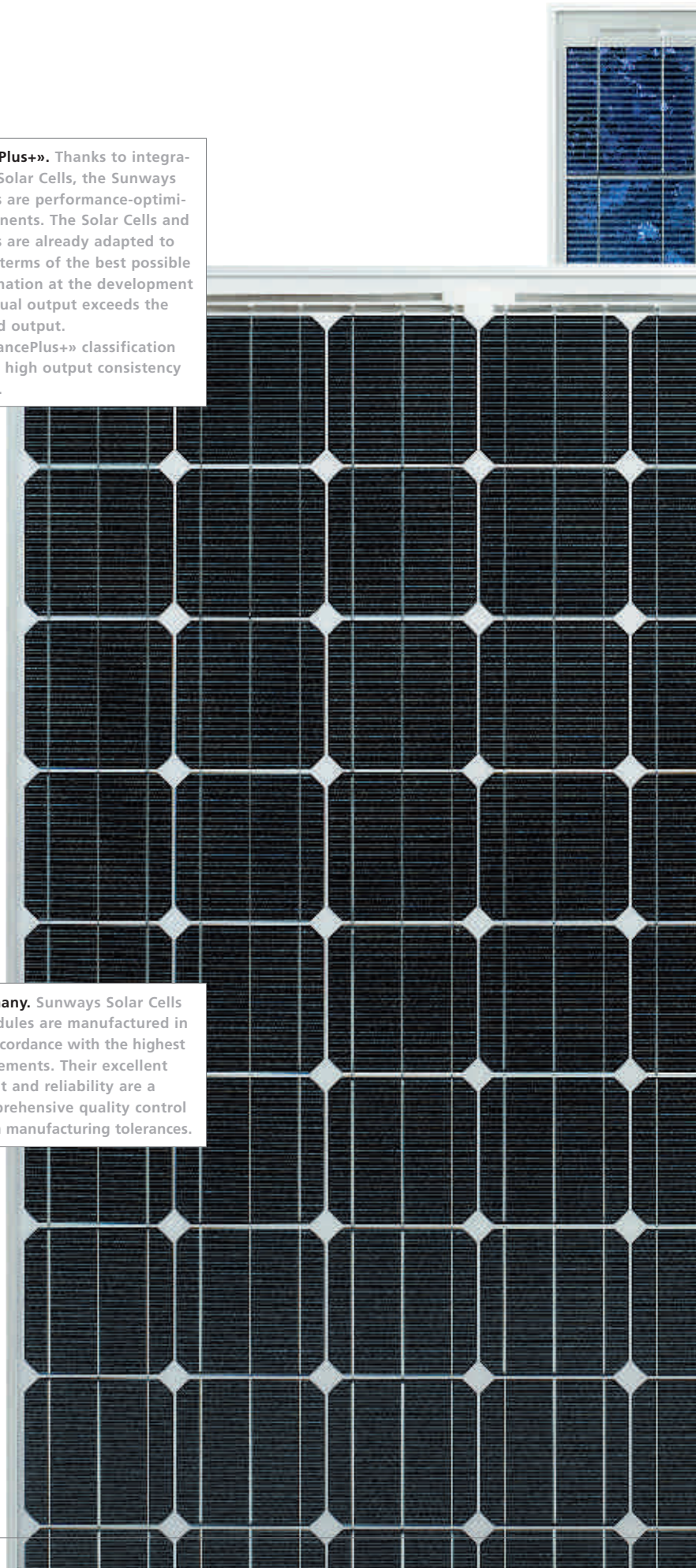


The stringent application of the strictest testing and measurement criteria ensures consistent high quality and excellent efficiencies in all output classes.

2.4 Solar Modules from Sunways: we accept no comp

«PerformancePlus+». Thanks to integrated Sunways Solar Cells, the Sunways Solar Modules are performance-optimised PV components. The Solar Cells and Solar Modules are already adapted to each other in terms of the best possible output combination at the development stage. The actual output exceeds the specified rated output.
The «PerformancePlus+» classification highlights the high output consistency and reliability.

Quick and easy installation. Due to their compact dimensions and their low weight, installation of Sunways Solar Modules is quick and easy. The Tyco Solarlok® connector system ensures simple and reliable connection of the Solar Modules.



Made in Germany. Sunways Solar Cells and Solar Modules are manufactured in Germany in accordance with the highest quality requirements. Their excellent module output and reliability are a result of comprehensive quality control with minimum manufacturing tolerances.

romises when it comes to output, service and quality.

High reliability and quality. Sunways Solar Modules have already received several awards for reliability and quality. The Solar Module SM 170U is the test winner with the best rating in the German consumer magazine «Stiftung Warentest».

«SolidPlus+» for stability and durability. Sunways Solar Modules are equipped with 4 mm safety solar glass, the specially structured surface of which ensures maximum light transmittance. The module frame consists of a high-strength 50 mm aluminium profile that gives the module a high degree of rigidity.
All Sunways Solar Modules are certified in accordance with the extended IEC 1730 II. They are therefore optimally suited for application areas with high snow loads of up to 5400 Pascal.

Guaranteed output. Sunways gives an above-average output guarantee on all Solar Modules. This is for a minimum of 90 percent of the rated output for a period of 12 years and for a minimum of 80 percent of the rated output for a period of up to 25 years. Naturally all Sunways Solar Modules also have a two-year manufacturer's guarantee.

2.5 Sunways Solar Modules:
Five models and 22 output classes at a glance:

Solar Module SM 17OU
Multicrystalline
6-inch
Output classes 175, 170, 165 and 160 W

Test winner in German consumer magazine «Stiftung Warentest». Impressive output, simple transport and easy installation on account of convenient dimensions and reduced weight.

Solar Module SM 210U
Multicrystalline
6-inch
Output classes 240, 235, 230, 225 and 220 W

Five output classes speak for themselves. Best suited for large-area use in stand-alone systems, industrial roofs and residential buildings.

Solar Module SM 215M
Monocrystalline
6-inch
Output classes 240, 235, 230 and 225 W

Solar Module with optimised area for efficient and resource-conscious installation of large-area photovoltaic systems.

Solar Module SM 230M
Monocrystalline
5-inch
Output classes 240, 235, 230, 225 and 220 W

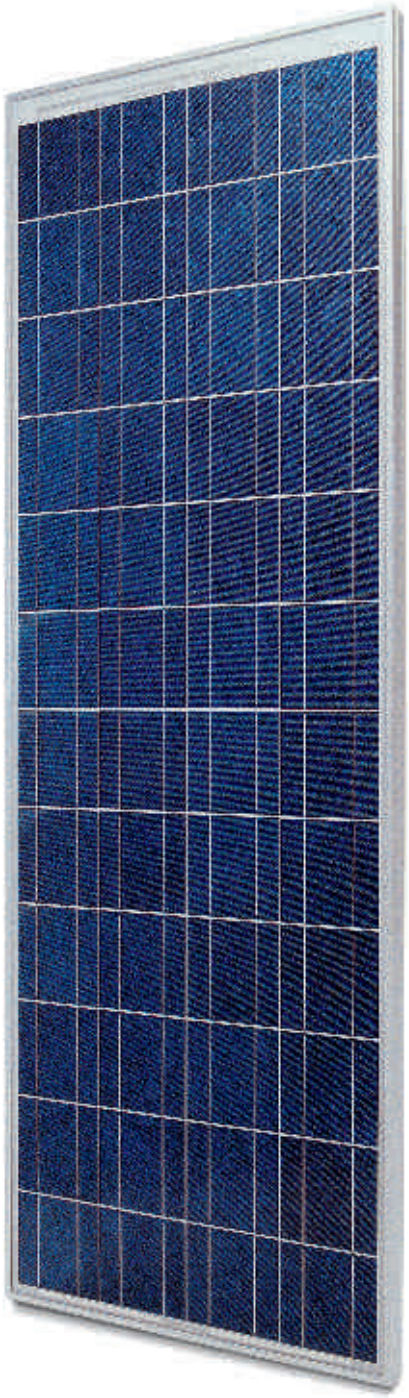
First-class yields, also for smaller PV systems or where no large roof areas are available.

Solar Module SM 215L – Laminate
Monocrystalline
6-inch
Output classes 235, 230, 225 and 220 W

The frameless Solar Module from Sunways for building integration (BIPV). Innovative application options and first-class yields.

Sunways Solar Modules SM 170 with 175, 170, 165 and 160 W output.

The Sunways Solar Module SM 170 impresses on account of its convenient 68 x 200 cm dimensions and low weight of 20 kg. These dimensions enable roof and frame-optimised installation, that is, the module dimensions match standard roof grid dimensions. The module is visually attractive on account of its elegant slim design.



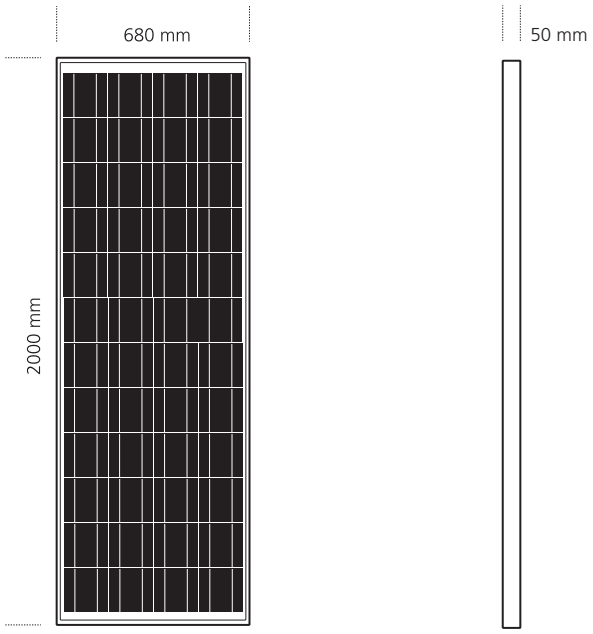
Product Highlights

- **Easy transport and simple installation due to low weight and convenient dimensions.**
- **Flexible and adjustable in use: optimally suited for difficult roof positions due to «slim» design.**
- **Test winner in German consumer magazine «Stiftung Warentest»: The Solar Module SM 170 impresses on account of its quality and output.**
- **Four output classes from 160 to 175 W. Integrated multicrystalline Sunways Solar Cells.**
- **Best quality with PerformancePlus+ and SolidPlus+.**

The Solar Cells and Solar Modules are already adapted to each other in terms of the best possible output combination at the development stage. Actual output of the Sunways Solar Modules exceeds the specified rated output.

All Sunways Solar Modules are certified in accordance with the extended IEC 1730 II. This results in an especially high level of stability and durability.

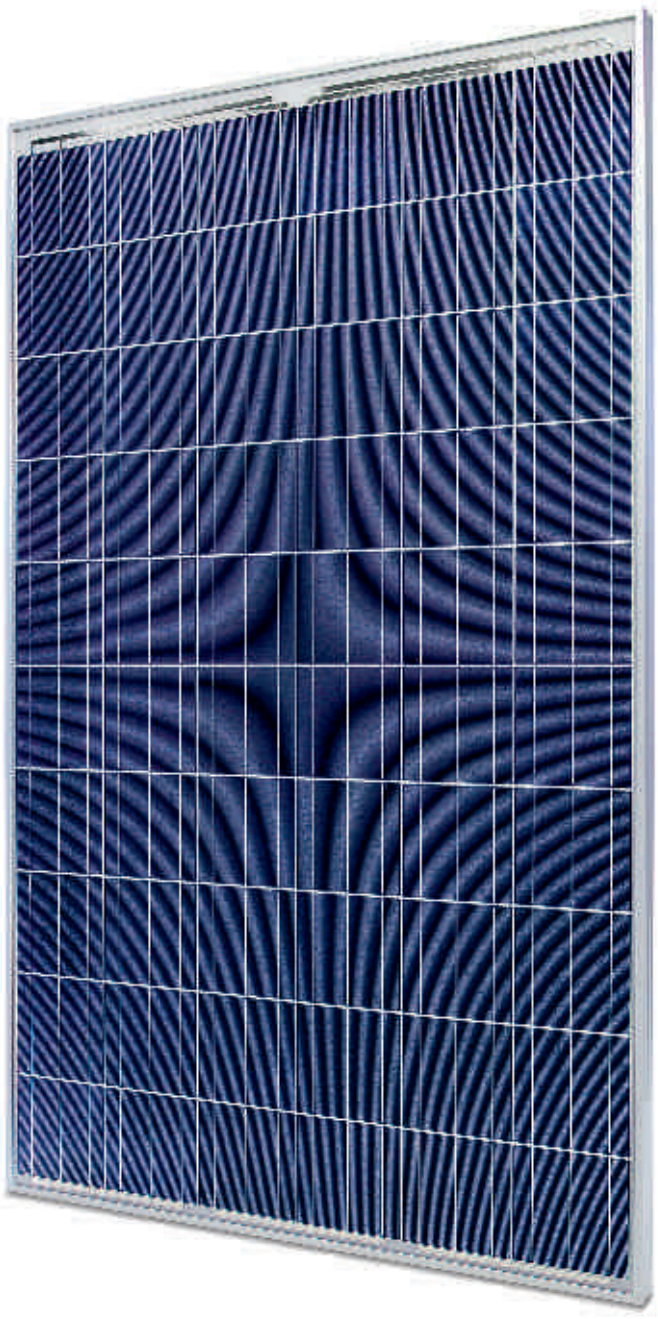
Models	**SM 170U**	**SM 170U**	**SM 170U**	**SM 170U**
Output classes	175	170	165	160
Category	**multicrystalline**			
Module size (length x width)	2000 x 680 mm			
Area	1,36 m²			
Thickness including frame	50 mm			
Weight	20 kg			
Electrical Data with STC				
Rated output P_{MPP}	175 W	170 W	165 W	160 W
MPP voltage	23,30 V	23,00 V	22,70 V	22,50 V
MPP current	7,57 A	7,40 A	7,29 A	7,12 A
Open-circuit voltage	29,60 V	29,40 V	29,30 V	29,10 V
Short-circuit current	8,07 A	7,95 A	7,80 A	7,62 A
Other electrical parameters				
System voltage	1000 V			
Temperature coefficient P_{MPP}	-0,43 % / °C			
Temperature coefficient I_{SC}	0,06 % / °C			
Temperature coefficient U_{OC}	-0,32 % / °C			
Limits				
Permissible module temperature	-40 to +85 °C			
Installation specifications	two cross rails under the module, each 500 mm from end of module			
Design				
Cells	48 Sunways Solar Cells, multicrystalline			
Cell dimensions	156 x 156 mm, completely square			
Front	Solar glass, 4 mm, highly transparent			
Encapsulation	EVA – Solar Cells – EVA			
Back	PLF - polyester laminated film			
Frame	Aluminium, bright anodised			
Connection	2 x 0.7 m solar cables with Tyco Solarlok® connectors			
Bypass diodes	2 pieces			
Qualifications and certificates	Protection class II, IEC 61215, CE			



STC Standard Test Conditions:
Air mass AM 1.5
Irradiation 1000 W/m²
Cell temperature 25 °C
Reverse current loadability:
Operation of the module using external current feed only permitted using string fuse with tripping current
< 3 x Isc(STC)

Sunways Solar Module SM 210U with 240, 235, 230, 225 and 220 W output.

New: with up to 240 W output! The Sunways Solar Module SM 210U is particularly suitable for large-area use in stand-alone systems, flat roofs and very large roofs. The 168 x 99 cm Solar Module dimensions enable efficient installation of large-area PV systems, while the Tyco Solarlok® plug-in system facilitates simple and fast installation and guarantees reliable module connection.



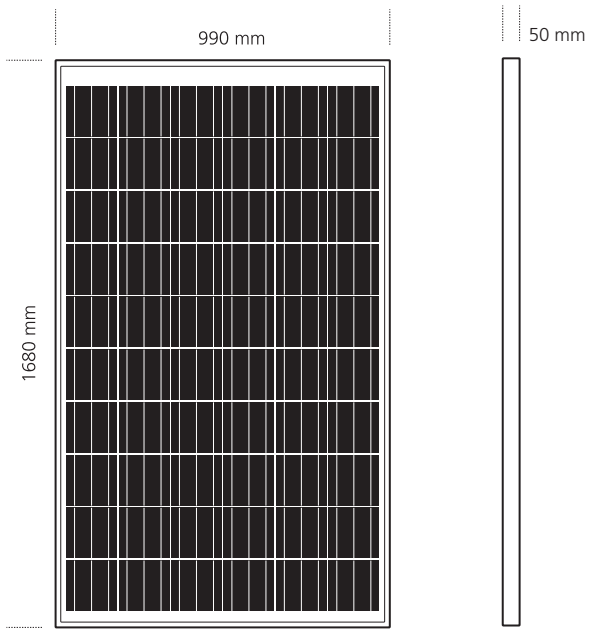
Product Highlights

- **Yield-optimised Solar Module for large-area applications – from house roofs to industrial roofs.**
- **Optically high-class surface texture with design quality.**
- **High-performance 3-busbar technology for first-class yields – Made in Germany.**
- **Five output classes from 220 to 240 W. Integrated multicrystalline Sunways Solar Cells.**
- **Best quality with PerformancePlus+ and SolidPlus+.**

Sunways Solar Cells and Solar Modules are manufactured in Germany and satisfy the highest quality requirements. Their reliability stems from comprehensive quality control.

Sunways Solar Modules SM 210 come with an above-average output guarantee: for a minimum of 90 percent of the rated output for a period of 12 years and for a minimum of 80 percent of the rated output for a period of 25 years.

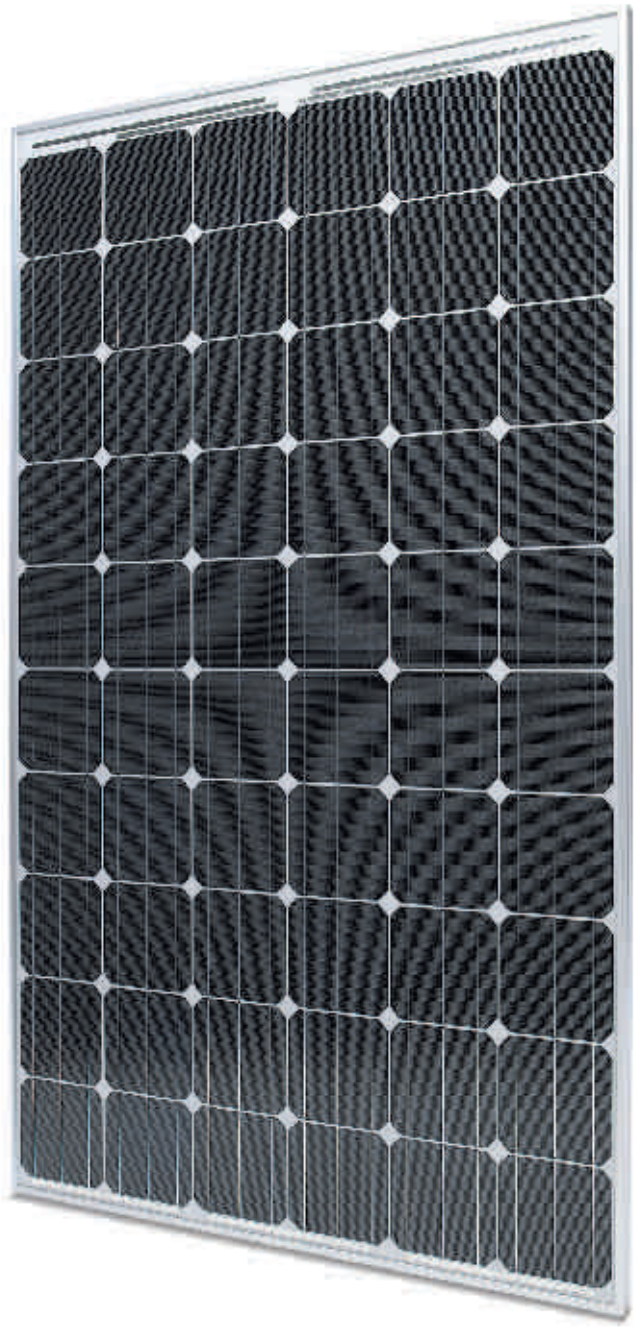
Models	**SM 210U**	**SM 210U**	**SM 210U**	**SM 210U**	**SM 210U**
Output classes	240	235	230	225	220
Category	**multicrystalline**				
Module size (length x width)	1680 x 990 mm				
Area	1,66 m²				
Thickness including frame	50 mm				
Weight	24 kg				
Electrical Data with STC					
Rated output P_{MPP}	240 W	235 W	230 W	225 W	220 W
MPP voltage	29,50 V	29,40 V	29,30 V	29,20 V	29,00 V
MPP current	8,14 A	8,00 A	7,86 A	7,71 A	7,59 A
Open-circuit voltage	37,10 V	37,00 V	36,80 V	36,70 V	36,60 V
Short-circuit current	8,56 A	8,48 A	8,38 A	8,29 A	8,18 A
Other electrical parameters					
System voltage	1000 V				
Temperature coefficient P_{MPP}	-0,43 % / °C				
Temperature coefficient I_{SC}	0,06 % / °C				
Temperature coefficient U_{OC}	-0,36 % / °C				
Limits					
Permissible module temperature	-40 to +85 °C				
Installation specifications					
Design					
Cells	60 Sunways Solar Cells, multicrystalline textured, 3 busbars				
Cell dimensions	156 x 156 mm, completely square				
Front	Solar glass, 4 mm, highly transparent				
Encapsulation	EVA – Solar Cells – EVA				
Back	PLF - polyester laminated film				
Frame	Aluminium, bright anodised				
Connection	2 x 1.2 m solar cables with Tyco Solarlok® connectors				
Bypass diodes	3 pieces				
Qualifications and certificates	Protection class II, IEC 61215, CE				



STC Standard Test Conditions:
Air mass AM 1.5
Irradiation 1000 W/m²
Cell temperature 25 °C
Reverse current loadability:
Operation of the module using external current feed only permitted using phase/line fuse with tripping current < 3 x Isc(STC)

Sunways Solar Modules SM 215M with 240, 235, 230 and 225 W output.

With its 60 embedded monocrystalline Solar Cells, the Sunways SM 215M Solar Module raises the benchmark as regards efficiency. It is particularly suitable for large-area PV systems. Thanks to the «PerformancePlus+» classification, the actual output of the SM 215M Solar Module – as with all the other Sunways Solar Modules – exceeds the rated output specified by Sunways.



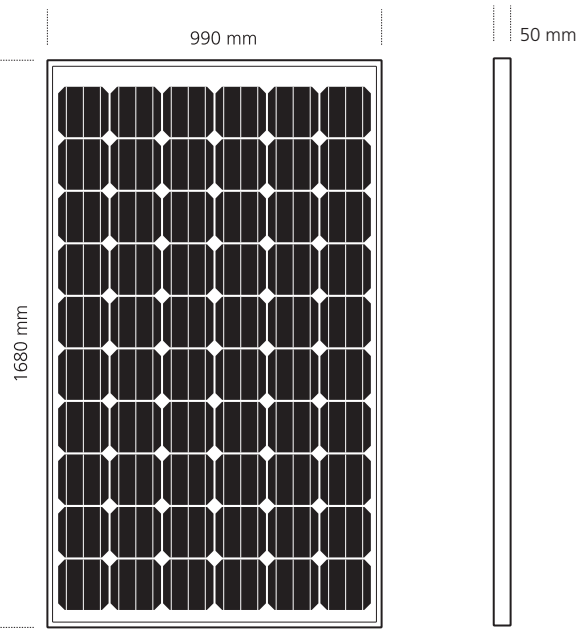
Product Highlights

- **Maximum output density for efficient and resource-conscious installation of large-area photovoltaic systems.**
- **Optimised peak output of 240 Wp for maximum yields.**
- **High performance monocrystalline Solar Cells with 3-busbar technology. Up to ten percent greater output in comparison with multicrystalline Solar Modules**
- **Four output classes from 225 to 240 W. Integrated Sunways Monocrystalline Solar Cells.**
- **Best quality with PerformancePlus+ and SolidPlus+.**

Owing to the graded output classes, Sunways Solar Modules enable customised planning of PV systems. The Sunways SM 215M Solar Module is certified in accordance with the extended IEC 1730 II.

Sunways Solar Modules are equipped with 4 mm solar safety glass. The Tyco Solarlok® plug-in system enables simple and fast installation and guarantees reliable connections.

Models	**SM 215M**	**SM 215M**	**SM 215M**	**SM 215M**
Output classes	240	235	230	225
Category	**monocrystalline**			
Module size (length x width)	1680 x 990 mm			
Area	1,66 m²			
Thickness including frame	50 mm			
Weight	24 kg			
Electrical Data with STC				
Rated output P_{MPP}	240 W	235 W	230 W	225 W
MPP voltage	29,60 V	29,30 V	29,00 V	28,80 V
MPP current	8,11 A	8,03 A	7,94 A	7,83 A
Open-circuit voltage	37,10 V	36,90 V	36,60 V	36,20 V
Short-circuit current	8,65 A	8,60 A	8,55 A	8,50 A
Other electrical parameters				
System voltage	1000 V			
Temperature coefficient P_{MPP}	-0,48 % / °C			
Temperature coefficient I_{SC}	0,01 % / °C			
Temperature coefficient U_{OC}	-0,37 % / °C			
Limits				
Permissible module temperature	-40 to +85 °C			
Installation specifications				
Design				
Cells	60 Sunways Solar Cells, monocrystalline, 3 busbars			
Cell dimensions	156 x 156 mm, pseudo-square			
Front	Solar glass, 4 mm, highly transparent			
Encapsulation	EVA – Solar Cells – EVA			
Back	PLF - polyester laminated film			
Frame	Aluminium, bright anodised			
Connection	2 x 1.2 m solar cables with Tyco Solarlok® connectors			
Bypass diodes	3 pieces			
Qualifications and certificates	Protection class II, IEC 61215, CE			



STC Standard Test Conditions:
Air mass AM 1.5
Irradiation 1000 W/m²
Cell temperature 25 °C
Reverse current loadability:
Operation of the module using external current feed only permitted using phase/line/string fuse with tripping current < 3 x Isc(STC)

Sunways Solar Modules SM 230M with 240, 235, 230, 225 and 220 W output.

The Sunways SM 230M Solar Module impresses with its 96 5-inch monocrystalline Sunways Solar Cells with first-class output values for particularly demanding locations – for example for houses with small roofs or partially-shaded PV systems. Their reliability stems from comprehensive quality control with minimum manufacturing tolerances.

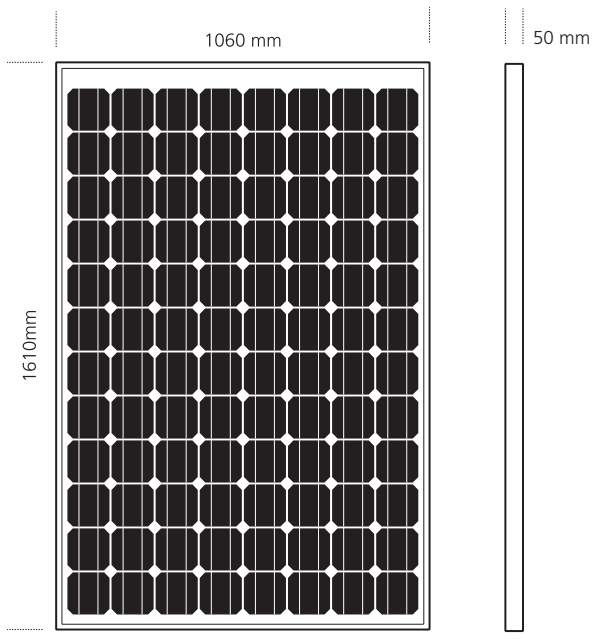
Product Highlights

- **Flexible connection of the SM 230M Solar Module using Sunways 5-inch Solar Cells.**
- **First-class yields with up to 240 Wp output per SM 230M Solar Module.**
- **Also recommended for use on smaller roof areas or for unavoidable partial shade.**
- **Four output classes from 220 to 240 W. Integrated Sunways Monocrystalline Solar Cells.**
- **Best quality with PerformancePlus+ and SolidPlus+.**

Sunways SM 230M Solar Modules are equipped with 125 x 125 mm design high-quality Sunways Solar Cells and therefore guarantee maximum output yield. The actual output of the Sunways 230M Solar Module exceeds the rated output specified by Sunways.

All Sunways Solar Modules are certified in accordance with the extended IEC 1730 II. This results in an especially high level of stability and durability. Sunways Solar Modules are equipped with 4 mm solar safety glass.

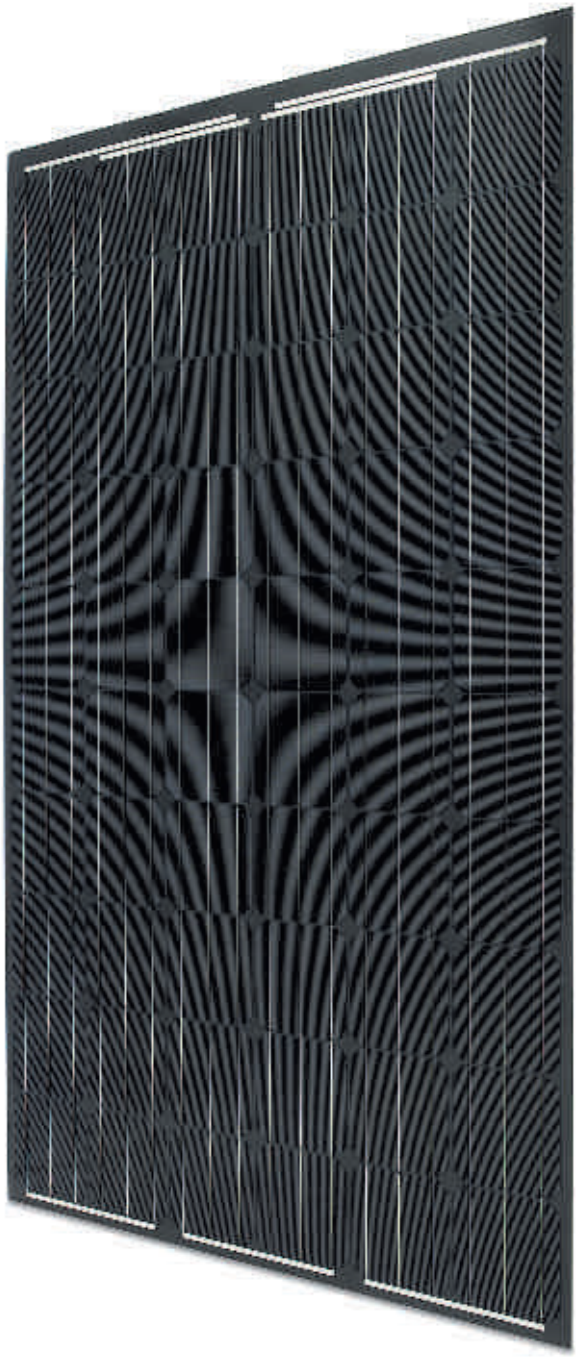
Models	**SM 230M**	**SM 230M**	**SM 230M**	**SM 230M**	**SM 230M**
Output classes	240	235	230	225	220
Category	**monocrystalline**				
Module size (length x width)	1610 x 1060 mm				
Area	1,71 m²				
Thickness including frame	50 mm				
Weight	24 kg				
Electrical Data with STC					
Rated output P_{MPP}	240 W	235 W	230 W	225 W	220 W
MPP voltage	48,90 V	48,80 V	48,70 V	48,60 V	48,50 V
MPP current	4,91 A	4,82 A	4,73 A	4,63 A	4,54 A
Open-circuit voltage	59,50 V	59,40 V	59,30 V	59,20 V	59,10 V
Short-circuit current	5,20 A	5,15 A	5,10 A	5,08 A	5,07 A
Other electrical parameters					
System voltage	1000 V				
Temperature coefficient P_{MPP}	-0,44 % / °C				
Temperature coefficient I_{SC}	0,06 % / °C				
Temperature coefficient U_{OC}	-0,36 % / °C				
Limits					
Permissible module temperature	-40 to +85 °C				
Installation specifications					
Design					
Cells	96 Sunways solar cells, monocrystalline				
Cell dimensions	125 x 125 mm, pseudo-square				
Front	Solar glass, 4 mm, highly transparent				
Encapsulation	EVA – Solar Cells – EVA				
Back	PLF - polyester laminated film				
Frame	Aluminium, bright anodised				
Connection	2 x 1.2 m solar cables with Tyco Solarlok® connectors				
Bypass diodes	4 pieces				
Qualifications and certificates	Protection class II, IEC 61215, CE				



STC Standard Test Conditions:
Air mass AM 1.5
Irradiation 1000 W/m²
Cell temperature 25 °C
Reverse current loadability:
Operation of the module using external current feed only permitted using phase/line fuse with tripping current < 3 x Isc(STC)

Sunways Solar Module SM 215 – Laminate with 235, 230, 225 and 220 W output.

The Sunways SM 215L Solar Laminate is an aesthetic design solution for architectural building integration. The entire expertise of the tried and tested Sunways Module technology is to be found in each of these Solar Modules. Combined with the approved installation system, construction design elements are produced which, besides electricity generation, also assume basic functions of the external envelope.



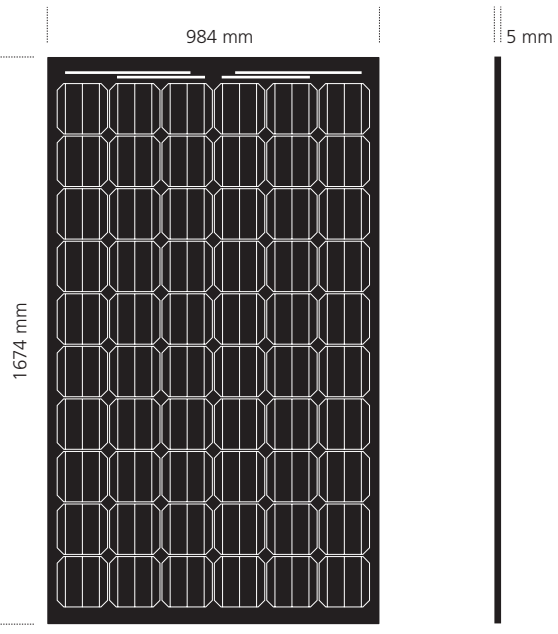
Product Highlights

- **Frameless module for building integration (BIPV) for architecturally demanding applications.**
- **With the expertise of the tried and tested Sunways Solar Module technology.**
- **Sunways Solar Module with outstanding efficiency, manufactured to the highest quality standards.**
- **Four output classes from 220 to 235 W. Integrated Sunways Monocrystalline Solar Cells.**
- **Best quality with PerformancePlus+.**

The actual output of the Sunways SM 215L Solar Module exceeds the specified rated output and therefore guarantees a maximum output yield.

Sunways Solar Modules have an above-average output guarantee: a minimum of 90 percent of the rated output for a period of 12 years and 80 percent of the rated output for a period of 25 years.

Models	**SM 215L**	**SM 215L**	**SM 215L**	**SM 215L**
Output classes	235	230	225	220
Category	**monocrystalline**			
Module size (length x width)	1674 x 984 mm			
Area	1,65 m²			
Thickness including frame	5 mm			
Weight	20 kg			
Electrical Data with STC				
Rated output P_{MPP}	235 W	230 W	225 W	220 W
MPP voltage	23,30 V	23,00 V	22,70 V	22,50 V
MPP current	7,57 A	7,40 A	7,29 A	7,12 A
Open-circuit voltage	29,60 V	29,40 V	29,30 V	29,10 V
Short-circuit current	8,07 A	7,95 A	7,80 A	7,62 A
Other electrical parameters				
System voltage	1000 V			
Temperature coefficient P_{MPP}	-0,48 % / °C			
Temperature coefficient I_{SC}	0,01 % / °C			
Temperature coefficient U_{OC}	-0,32 % / °C			
Limits				
Permissible module temperature	-40 to +85 °C			
Installation specifications	Installation and operating instructions: Assembly instructions for laminates			
Aufbau				
Cells	60 Sunways solar cells, monocrystalline, 3 busbars			
Cell dimensions	156 x 156 mm, pseudo-square			
Front	Solar glass, 4 mm, highly transparent			
Encapsulation	EVA – Solar Cells – EVA			
Back	PLF - polyester laminated film			
Frame	frameless			
Connection	2 x 1.2 m solar cables with Tyco Solarlok® connectors			
Bypass diodes	3 pieces			
Qualifications and certificates	IEC 61215 Ed. 2, IEC 61730, CE			



Measurement tolerance +/- 3% on all electrical specifications

Solar Module also available with white back film and in B quality.

Sunways supplied 220,000 Solar Cells for «BMW Welt» in Munich, designed by the architects COOP HIMMELB(L)AU.

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2.6 Solar Inverters from Sunways.

Consistent technologies for high output and reliable yield.

The right technology for any application. The Sunways Solar Inverters with Advanced Technology, New Technology or Performance Technology will impress with their technological superiority in every application range. What is crucial for success and yield is that the technological concepts are the result of continuous, professional development.

Maximum efficiency and yield. These two success factors distinguish the Sunways Solar Inverter: a reason why the Solar Inverters have occupied a top position in international competition for years.

All have the HERIC® topology developed and patented by Sunways in cooperation with the Fraunhofer Institute for Solar Energy Systems (ISE) which, thanks to the Sunways Solar Inverter, produce maximum efficiency even at partial loads. Then there is also the outstanding current management with fast and precise MPP control which ensures that, through dynamic output development, Sunways Solar Inverters will perform even in changeable weather conditions.

Thoroughly tested. In order for Sunways Solar Inverters to deliver in practice what they promise in theory, they are put through the strictest test procedures.

For example, infrared cameras are used to investigate thermal behaviour under differing operating conditions and endurance tests are carried out under full load with extreme ambient temperatures. The components we use are tested for reliability and durability using simulations and the most stringent test procedures.

Thanks to Sunways Power Control, Sunways Solar Inverters satisfy the latest guidelines for PV systems in accordance with the German Renewable Energy Law section 6.

The special internal qualities of Sunways Solar Inverters are also perceptible externally and are always exceptional.

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design award winner 2004

Focus Dialog Silber
Internationaler Designpreis Baden-Württemberg 2004

2.7 Solar Inverters from Sunways: technological se

Exclusive from Sunways: HERIC® topology. Sunways Solar Inverters are the best in terms of efficiency, yield and cost-effectiveness. The HERIC® topology means that Sunways Solar Inverters achieve maximum efficiency even with a partial load. HERIC® therefore contributes decisively to the superiority of Sunways Solar Inverters.

Guarantee. As an expression of exceptional quality and first-rate workmanship, Sunways provides a guarantee of five years on all Solar Inverters, far exceeding the legal warranty. In addition, the guarantee can be extended to ten years at low cost.

For Solar Inverters in the PT series the guarantee can be extended to 20 years – with an optional maintenance and service contract as an «all-round no-worries package».

Fast and easy installation. On account of the their compact dimensions and low dead weight, initial installation of Sunways Solar Inverters is as simple as it is fast. Through user-friendly operation, Sunways Solar Inverters are ready to operate in just a few minutes and ready for a configuration that is just as straightforward.

rvice providers with no ifs and buts.

Passive, three-phase voltage control. Using passive three-phase voltage control, Sunways Solar Inverters provide more reliability when switching off is necessary. In other words: Sunways Solar Inverters only switch off if there really is a network fault.

The Solar Inverter philosophy: «All-in-One». These equipment features and communication options are already integrated in all Sunways Solar Inverters in the AT and PT series, even in the standard equipment.

- Integrated DC load break switch
- Lighted graphic display with keypad
- Comprehensive internal data logger
- Inverter networking via CAN bus
- Ethernet interface for network integration
- Interface for direct «Sunways Modem» modem connection
- Active e-mail alert for system errors
- Potential-free alarm relay for connecting external alarm devices
- S0 pulse output for controlling large «Sunways Display»
- «Sunways Browser» for display and configuration via a web browser
- Link to the «Sunways Portal»
- Central display of system data with several networked devices via the main device

High level of reliability and durability. First-class quality begins at the product development stage. The systematic conversion of the highest quality standards during development, component selection and production, guarantees long-lasting reliable operation of Sunways Solar Inverters. In addition, Sunways Solar Inverters are subject to the most stringent test and simulation procedures.

2.8 Sunways Solar Inverter:

Three technologies and 12 output classes at a glance:

Solar Inverters with Advanced Technology
Models AT 5000, AT 4500, AT 3600 and AT 2700
Sunways HERIC® topology
Efficiency up to 95.5 percent

Constant output and a high degree of flexibility. Continuous high efficiency where temperatures and irradiation levels change. Ideally suited for use with thin-film solar modules.

Solar Inverters with New Technology
Models NT 6000, NT 5000, NT 4000 and NT 2600
Sunways HERIC® topology
Efficiency up to 97.5 percent

Highest peak efficiency of 97.5 percent. Ideal for PV systems designed for maximum output and top yield.

Solar Inverters with New Technology
Models NT 10000 and NT 8000
Sunways HERIC® topology
Efficiency up to 96.8 percent

With three independent DC inputs thanks to MPP multitracking. Active cooling for low operating temperatures inside the Solar Inverter. Optimally suited also for tracker PV systems.

Solar Inverters with Performance Technology
Models PT 33k and PT 30k
Sunways HERIC® topology
Efficiency up to 97.5 percent

The transformerless central inverter for medium-sized PV systems. Particularly suitable for high system voltages up to 1000 V. Maximum efficiency 97.7 percent

Sunways Solar Inverter with Advanced Technology: AT 5000, AT 4500, AT 3600 and AT 2700.

With four output classes from 2700 to 5000 W, Sunways AT Solar Inverters cover an extremely broad range of system sizes – and are also suitable for thin-film solar modules. Their particularly wide range of voltages allows plenty of scope for flexible system design. AT Solar Inverters impress with their steady output and constant efficiency.

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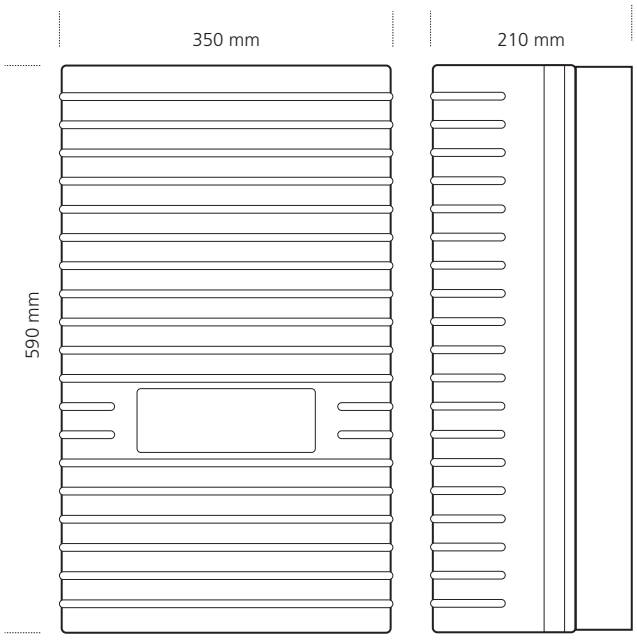
Product Highlights

- **Consistent high efficiency in diverse application areas.**
- **Flexible application potential because suitable for thin-film and silicon modules.**
- **Efficient HERIC® topology for superlative yields – even with a partial load of 25 percent.**
- **Advanced Technology with the output classes 2700 W, 3600 W, 4500 W or 5000 W.**

With their special two-stage HERIC®/FP circuit, AT Solar Inverters are distinguished by an incredibly broad application range.

Their input voltage range covers voltages from 181 to 680 V, enabling versatile system design. The AT series String Solar Inverters are intended for single-phase grid feed-in and operate with the reliable three-phase grid monitoring.

Models	AT 5000	AT 4500	AT 3600	AT 2700
Technical Data				
DC input				
Rated DC output	5200 W	4700 W	3750 W	2800 W
MPP voltage range	236 V to 600 V	214 V to 600 V	242 V to 600 V	181 V to 600 V
Maximum DC voltage	680 V			
Number of DC connections per MPP tracker	2 x Tyco Solarlok®			
Number of MPP trackers	1			
AC output				
Rated AC output	4600 W	4500 W	3600 W	2700 W
Maximum AC output	5000 W	4500 W	3600 W	2700 W
Nominal frequency	50 Hz			
Grid voltage	230 V			
Grid voltage monitoring	three-phase (acc. to DIN VDE 0126-1-1)			
Number of feed-in phases (230 V single-phase)	1			
Performance specifications				
Maximum efficiency	95,5%	95,5%	95,5%	95,5%
Max. European efficiency	95,0%	95,0%	94,9%	94,7%
Circuit design	HERIC® / FP, transformerless			
Other				
DC switch	internal, mechanical			
Data interfaces	Ethernet, CAN, RS485, potential-free signalling relay, S0, modem			
Sensor interfaces	irradiation, temperature			
Displays	LCD dot matrix, backlit, 128 x 64 pixels			
System monitoring	Active e-mail alert, integrated web server, Sunways Communicator, Sunways Portal			
IP protection level in accordance with IEC 60529	IP 54			
Ambient temperature	-25 °C to 40 °C (at full load)			
Dimensions (height x width x depth)	59 x 35 x 21 cm			
Weight	29 kg			
Standard warranty (optional)	5 years (10 years)			



Sunways Solar Inverters with New Technology: NT 6000, NT 5000, NT 4000 and NT 2600.

On account of their efficient HERIC® topology, Sunways NT Solar Inverters are optimally suited for PV systems geared towards maximum output and yield. With a wide and high input voltage range, these devices are suitable for voltages from 350 to 850 V. All models are equipped with the comprehensive «All-in-One» communication options.

Product Highlights

- **Peak efficiency 97.5 percent. Technologically and systematically geared towards maximum performance.**
- **Particularly high input voltages up to 850 V.**
- **Efficient HERIC® topology. First-rate efficiency even with partial load.**
- **New Technology with the output classes 2500 W, 3700 W, 4200 W or 5000 W.**

The systematic implementation of the highest quality standards, continual independent test procedures and a five-year manufacturer's warranty (10-year optional) guarantee the consistent high quality and reliability of Sunways Solar Inverters. This provides the customer with reliable power generation from solar energy and secure yields.

Sunways NT Solar Inverters are leaders in quality and manufacturing. They are subject to the most stringent test and simulation procedures.

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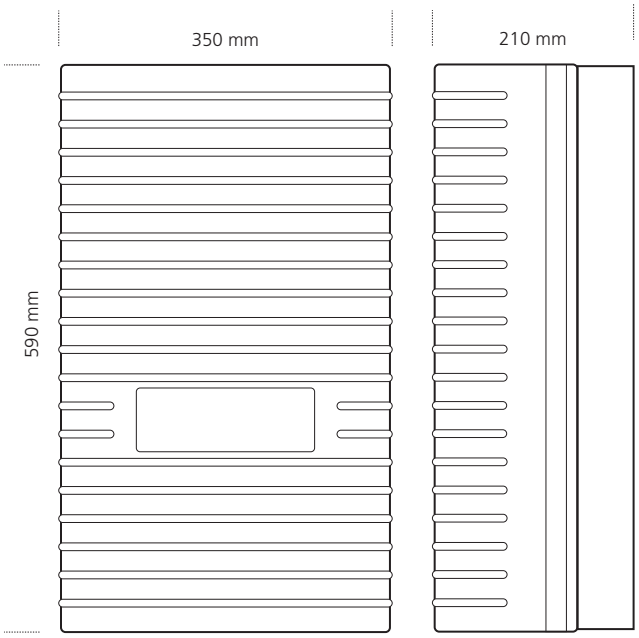
Models	NT 6000	NT 5000	NT 4000	NT 2600
Technical Data				
DC input				
Rated DC output	5200 W	4300 W	3800 W	2600 W
MPP voltage range	350 V to 750 V			
Maximum DC voltage	850 V			
Number of DC connections per MPP tracker	2 x Tyco Solarlok®			
Number of MPP trackers	1			
AC output				
Rated AC output	4600 W	4200 W	3700 W	2500 W
Maximum AC output	5000 W	4200 W	3700 W	2500 W
Nominal frequency	50 Hz			
Grid voltage	230 V			
Grid voltage monitoring	three-phase (acc. to DIN VDE 0126-1-1)			
Number of feed-in phases (230 V single-phase)	1			
Performance specifications				
Maximum efficiency	97,5%	97,5%	97,5%	97,4%
Max. European efficiency	97,0%	97,1%	97,1%	97,1%
Circuit design	HERIC® topology, transformerless			
Other				
DC switch	external (Type DCL 04 or DCL 05)			
Data interfaces	external RS232, RS485, potential-free alarm relay			
Sensor interfaces	irradiation , temperature			
Displays	LCD, 2 x 16 characters			
System monitoring	NT Monitor, Sunways Communicator, Sunways Portal			
IP protection level in accordance with IEC 60529	IP 54			
Ambient temperature	-25 °C to 40 °C (at full load)			
Dimensions (height x width x depth)	52 x 30 x 19 cm			
Weight	26 kg			
Standard warranty (optional)	5 years (10 years)			



Sunways Solar Inverters with New Technology: NT 10000 and NT 8000.

The NT 8000 and NT 10000 Solar Inverters are equipped with three HERIC® output levels, making them particularly suitable for PV system applications that are anticipated to use several MPP trackers. With their wide and high input voltage range, these devices are suitable for voltages from 350 to 850 V.

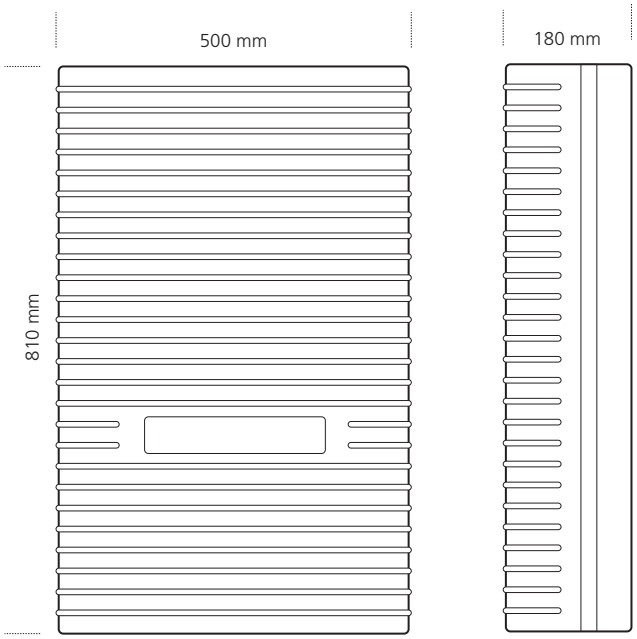
Product Highlights

- **The lightest Solar Inverter in its class anywhere. Efficient and quick wall installation.**
- **MPP multitracking with three DC inputs. High input voltage up to 850 V.**
- **Efficient HERIC® topology. First-rate efficiency even with partial load.**
- **New Technology with the output classes 8000 W or 10000 W.**

The Sunways NT 8000 and NT 10000 Solar Inverters were developed for three-phase grid feed-in and feature reliable three-phase grid monitoring. Both Solar Inverters are therefore highly suitable for tracker PV systems. The NT series models set the record for weight within their output class.

Both models are equipped with the comprehensive «All-in-One» communication options.

Models	NT 8000	NT 10000
Technical Data		
DC input		
Rated DC output	8800 W	11000 W
MPP voltage range	350 V to 750 V	
Maximum DC voltage	850 V	
Number of DC connections per MPP tracker	1 x Tyco Solarlok®	
Number of MPP trackers	3	
AC output		
Rated AC output	8000 W	10000 W
Maximum AC output	8000 W	10000 W
Nominal frequency	50 Hz	
Grid voltage	400 V	
Grid voltage monitoring	three-phase (acc. to DIN VDE 0126-1-1)	
Number of feed-in phases (230 V single-phase)	3	
Performance specifications		
Maximum efficiency	96,8%	96,8%
Max. European efficiency	96,3%	96,4%
Circuit design	HERIC® topology, transformerless	
Other		
DC switch	external (Type DCL 10)	
Data interfaces	external RS232, RS485, USB, potential-free alarm relay	
Sensor interfaces	irradiation , temperature	
Displays	LCD, 2 x 16 characters, 100 x 25 mm window size	
System monitoring	NT Monitor, Sunways Communicator, Sunways Portal	
IP protection level in accordance with IEC 60529	IP 54	
Ambient temperature	-25 °C to 40 °C (at full load)	
Dimensions (height x width x depth)	81 x 50 x 18 cm	
Weight	30 kg	
Standard warranty (optional)	5 years (10 years)	



Sunways Solar Inverters with Performance Technology: PT 33k and PT 30k

Sunways PT series Solar Inverters achieve a unique efficiency in their output class – over 97.5 percent. As transformerless central inverters they are designed for the operation of large highly cost-effective PV installations. Their three-phase grid feed-in occurs symmetrically and is therefore particularly stable.

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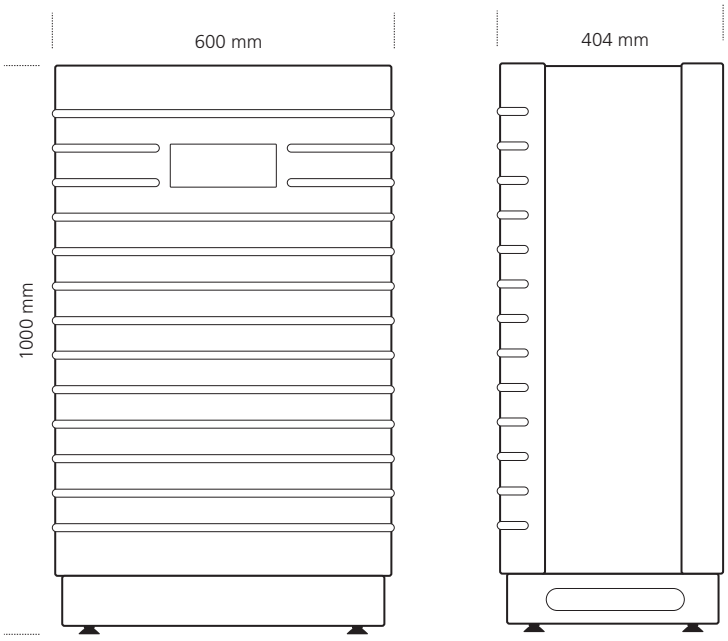
Product Highlights

- **Unique efficiency within this output class thanks to HERIC® topology: over 97.5 percent.**
- **1000 V input voltage. Enables cost-optimised systems.**
- **Light and compact device: Weight 155 kg.**
- **Comprehensive string monitoring using «String Box CAN 08» and the Sunways Portal.**
- **Performance Technology with an output of 30000 and 33000 W.**

With an input voltage range of up to 1000 V, the device makes full use of high system voltages in solar generators, thus enabling cost-efficient planning.

With its innovative design, the Solar Inverter PT is among the most compact, lightest and most attractive solar inverters in its class. The design is not only aesthetically functional but also enables better handling – from installation to operation.

Models	PT 30k	PT 33k
Technical Data		
DC input		
Rated DC power	31000 W	34500 W
MPP voltage range	420 V to 800 V	460 V to 800 V
Maximale voltage DC	1000 V	
Number of inputs per MPP tracker	1 x Wago rail-mounted blocks 35 mm²	
Number of MPP trackers	1	
AC output		
Rated AC output power	30000 W	33333 W
Maximum AC power	30000 W	33333 W
Maximaler AC current	50,0 A per phase	53,0 A per phase
Grid voltage	400 V	
Grid voltage monitoring	According to DIN VDE 0126-1-1	
Maximum efficiency	97,5%	
European efficiency	97,0%	
Switching concept	HERIC® topologie, three-phases, transformerless	
Other		
DC switch	integrated	
Data interfaces	Ethernet, CAN, voltageless alarm relay, S0, Modem	
Sensor interfaces	irradiation, temperature	
Display	LCD-Dotmatrix, LCD, backlit, 128 x 64 pixels	
System monitoring	active e-mail alerting, Sunways Browser, Sunways Portal	
IP rating according to IEC 60529	IP 42 / IP 54 (optional)	
Ambient temperature	-20°C to 40°C (all full load)	
Dimensions (height x width x depth)	100 x 60 x 40 cm	
Weight	155 kg	
Installation type	standing installation	
Standard warranty (option)	5 years (with maintenance contract: up to 20 years)	



Everything under control. The efficiency of a professional Photovoltaic system belongs to the used components. Sunways Solar Inverters with it's integrated communication interface is leading to a steady operating Photovoltaic system with best efficiency.

DC Load Break Switches. Maximum safety for your PV systems.

Sunways DC Load Break Switches for the NT series Solar Inverters comply with DIN VDE 0100-712 and are obligatory for all planned PV systems from 1 June 2006. They are distinguished by their robust housing and can be quickly and easily installed. With their safe switching technology based on load switching capacity, Sunways DC Load Break Switches contribute to the safety of PV systems.

Function of DCL 04
2-pin switch and connection box for parallel connection of up to 3 strings

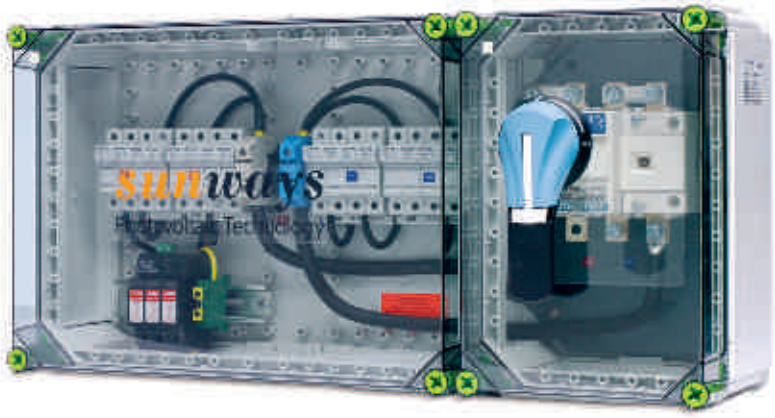
Function of DCL 05
2-pin switch and connection box for parallel connection of up to 3 strings

Function of DCL 10
6-pin switch and connection box for 3 separate strings

Model	DCL 04	DCL 05	DCL 10
Technical Data			
Operating temperature	-25 to +40 °C		
Max. switching current per input (DC)	16 A	25 A	3 x 10 A
Max. switching voltage (DC)	900 V	900 V	900 V
Max. current through input terminals per terminal	10 A	10 A	16 A
Max. string number/output	1	1	1
Protection class	II	II	II
Housing			
Weight	1,5 kg	1,5 kg	2,0 kg
Dimensions (W x H x D)	180 x 200 x 140 mm	180 x 200 x 140 mm	205 x 255 x 205 mm
Max. cable cross-section			
on input terminal	2,5 - 16 mm^2	2,5 - 16 mm^2	2,5 - 16 mm^2
on output terminal	6 mm^2	6 mm^2	6 mm^2
Cable glands	8 x M16	8 x M16	12 x M16
Max. cable diameter	10 mm	10 mm	10 mm
Protection type	IP 54	IP 54	IP 54

Simple installation. Safe operation. String Box for the PT Solar Inverter.

The Sunways String Box is the ideal solution for string collection near the Solar Modules – for reducing output losses on the DC side. Thanks to integrated string monitoring, the Sunways CAN String Box secures the energy yields from PV systems over the long term.



Sunways String Box 08 with integrated load break switch.

Sunways String Box 12 with integrated load break switch.

Product Highlights

- **The String Box is distinguished by a weather resistant housing with protection class IP65, which joins up to 12 PV strings.**

String Box CAN:

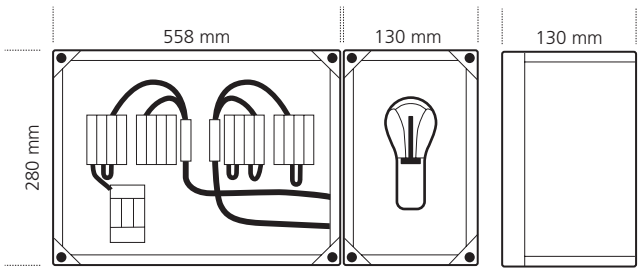
- **Recording of string currents per input, system voltage, PCB temperature and triggering of the surge protector.**
- **Reliable transmission of readings to the Sunways Solar Inverter.**

The String Box is available in the following versions:

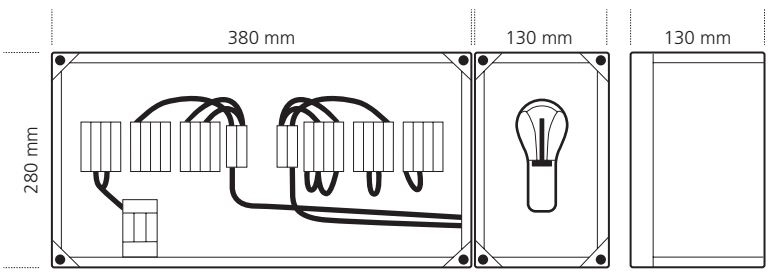
- String Box 08 Basic
- String Box 08 with surge protection
- String Box 08 with surge protection and DC load break switch
- String Box 12 Basic
- String Box 12 with surge protection
- String Box 12 with surge protection and DC load break switch
- String Box CAN 08 with integrated string monitoring

Model	String-Box 08	String-Box 12	String-Box CAN 08
Technical Data String-Box			
Input			
Number of inputs	8 x Plus, 8 x Minus	12 x Plus, 12 x Minus	8 x Plus, 8 x Minus
Max. DC voltage / terminal	1000 V		
Max. DC current / terminal	8,5 A		20 A
DIN fitting	M16		
Screw terminals	max. 10 mm^2		max. 6 mm^2
Safety socket	10 x 38 mm		
Mounting saftey socket	Minus side: cable sleeve, Plus side: please order fuse optional!		
Output			
No. of outputs	1 x Plus, 1 x Minus		
Max. DC voltage	1000 V		
Max. DC current	75 A		
Screw terminal fine-strand	max. 35 mm^2		16 to 70 mm^2
Screw terminal multi-strand	max. 50 mm^2		16 to 95 mm^2
Terminal type	Screw terminal for cable end sleeve		
String control			
Power supply	24 V		
Power consumption	max. 1,5 W		
Measuring channels	8 x strang current, 1 x strang voltage, 2 x potential-free digital inputs for connection of signal contacts		
Data bus	CAN-Bus (Protokoll CANopen DS-437)		
Data bus cable type	Outdoor application: Li2YCYv Indoor application: Patchcable CAT 5e		
Maximum number of bus	50 PT 30k, 50 String-Boxes (per CAN-Bus)		
DC load break switch (optional)			
Max. open-circuit voltage (VDC)	1000 V		
Max. DC current (ADC)	80 A		
Isolator unit	Socomec Sirco 125 A 4-pin, external actuation		
Output terminals	Cable socket M8 at switch		
Cable entry	Cable entry DIN fittings		
Overload protection (optional)			
Category	Class II / "C"		
Type	Phoenix VAL MS1000 DC		
Housing			
Design	Protection class II / IP65, Polycarbonat		
Dimensions (without DC load break sw.)	380 x 280 x 130 mm	558 x 280 x 130 mm	750 x 500 x 320 mm
Dimensions (with DC load break sw.)	660 x 320 x 179 mm	860 x 320 x 179 mm	
Ambient temperature	until 40 °C		-25 °C to 45 °C
Other	Pressure compensation element to prevent condensation		

String Box 08



String Box 12



The Sunways Display.
All the information at a glance.

In close proximity to the PV system, the Sunways Display draws attention to the environmentally friendly power generation using solar energy in an informative and open way. The sturdy display is suitable for indoor and outdoor use.

Product Highlights

- **Informative energy display for indoors and outdoors.**
- **Individual design options on request.**
- **Display of current output, total energy yield and CO_2 saving**

Increasing numbers of people are interested in energy production from solar power and innovative PV technology. However, PV systems are not always recognisable or easy to see at first glance.

The Sunways Display imparts this information in an instructive manner, thus contributing to a positive image.

Display 500 (DE, IT, ES)

Technical Data

Displays

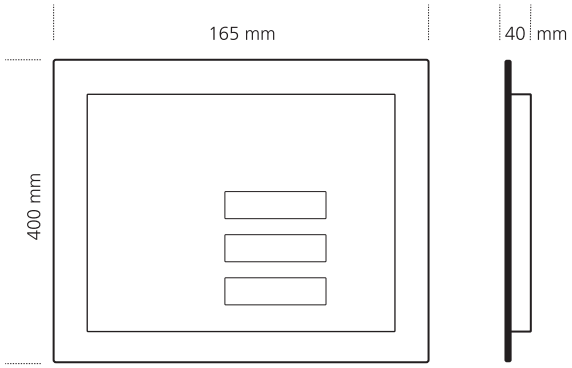
Number of measured values displayed	3	
Display elements	7-segment LCD displays, 25 mm number height, colour: black on silver	
Values displayed	Output:	6 digits up to 9999.99 kW
	Yield:	6 digits up to 999,999 kW
	CO_2 reduction:	6 digits up to 999,999 kg
CO_2 reduction factor	0,70 kg/kWh	

Housing

Dimensions (H x W x T)	500 x 400 x 35 mm
Housing material	Front: Single-pane safety glass, 5 mm Frame: Aluminium with PU casting compound
Operating temperature	-15 to +40 °C

Other Data

Input, interface	(for voltageless switching contact, minimal pulse length: 2 ms) e.g. electricity meter with pulse output S0 or Sunways Communicator interface DO1
Power supply	external plug-in power supply Input: 230 V AC Output: 7,5 V DC, 0,3 A
Power consumption	0,5 W
Guarantee	2 years
Standard	CE



Analogue, ISDN and GSM. The Sunways Modem guarantees fast data transfer

The Sunways Modem can be used with all Sunways Solar Inverters. In combination with the AT and PT Solar Inverters, the Modem features a special «wake up» function which enables round-the-clock access to the PV system. Depending on the model, the modem can be operated using the analog ISDN or GSM network.

The Sunways GSM Modem with antenna.

Product Highlights

- **Reliable remote monitoring of all Sunways Solar Inverters.**
- **Housing design adapted to Sunways Solar Inverters.**
- **Read-out of operating data during night operation using «wake up» function available with the AT and PT Solar Inverters.**

The Sunways Modem is connected to the Solar Inverter using a standard network cable which can span a distance of up to 100 m.

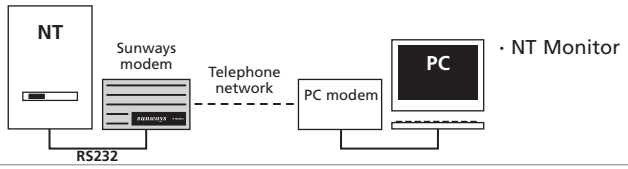
Connection to Sunways NT Solar Inverters can be made using an optional interface converter. The control function for operation is displayed with an LED.

Modem type / Article No.
- Analogue
  (Germany, with TAE plug)
- Analogue
  (international, with RJ11 plug)
- ISDN
- GSM

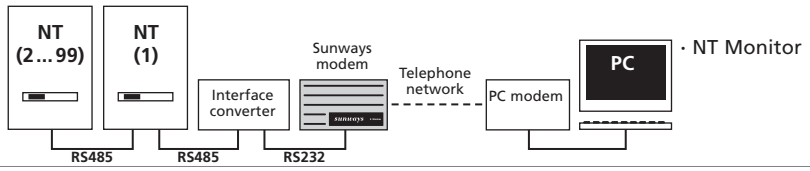
Technical Data

Connection to the telephone network	Analog modem:	RJ11 socket, V.92, up to 56 kbps
	ISDN Modem:	RJ45 socket, Euro ISDN, up to 65 kbps
	GSM modem:	via antenna, CSD up to 14.4 kbps, GPRS up to 85.6 kbps
Connection of Solar Inverter	NT series:	RS232 via Sub D9 socket
	AT series:	LVDS via RJ45 socket
Power supply	Power supply unit, 5 V DC (interior: plus, exterior: minus)	
Signal power supply	LED green = operation	
Power consumption	Analog, ISDN approx. 1 W GSM typical 2 W, max. 8 W	
Installation	Teardrop holes or attachment to standard rails with adapter	
Dimensions (W x H x D)	162 x 96 x 35 mm (for GSM: Height incl. antenna: 190 mm)	
Weight	approx. 250 g	
Protection type	IP 20	
Temperature range	0 to 60 °C	
Certificates, standards	CE, IEC 60950	

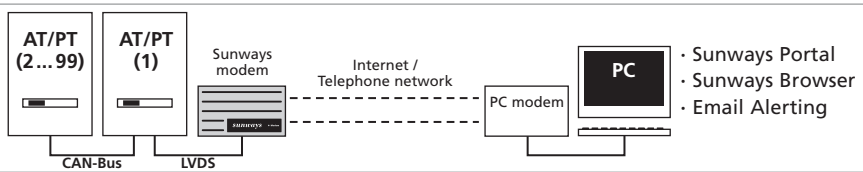
Solar Inverter NT Series (Individual unit)

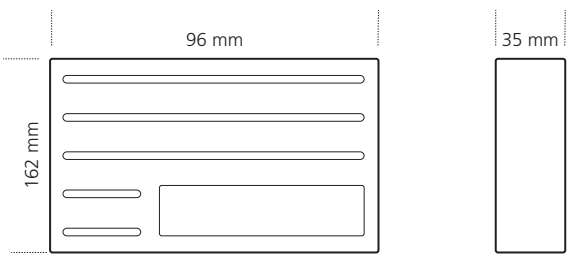


Solar Inverter NT Series (several inverters)



Solar Inverter AT / PT Series (several inverters)





Precise and reliable information: irradiation and temperature sensors.

The use of locally installed irradiation and temperature sensors enables precise system-specific yield monitoring of the PV systems. Evaluation can be carried out, for example, using the Sunways Portal based on a target/actual comparison. The irradiation and temperature sensors are installed in close proximity to the Solar Modules.

Product Highlights

- **Measurement of irradiation and temperature in close proximity to the Solar Modules.**
- **Reliable PV system yield monitoring.**
- **Robust and weatherproof design for outdoor use all-year-round.**

The irradiation and temperature sensors feature integrated temperature compensation across the whole operational range from -20 °C to 70 °C. The housing is made of powder-coated aluminium with protection class IP 65.

Additional quality features of the irradiation and temperature sensors are top precision and minimal measurement tolerances. Recommended application areas are medium to large PV systems.

Technical Data

General

Solar Cells	Monocrystalline silicon (50 mm x 33 mm)
Current shunt	0,12 Ω (TK = 20 ppm / K) for 10 V output
Operating temperature	-20 °C to +70 °C
Electrical connection	3 m connecting cable

Housing

Material / Protection type	powder-coated aluminium / IP 65
Dimensions / Weight	145 mm x 86 mm x 39 mm / approx. 340 g

Delivery scope

Si sensor
shielded cable, 0.14 mm², UV and heat-resistant, 3 m length
Wire end sleeve

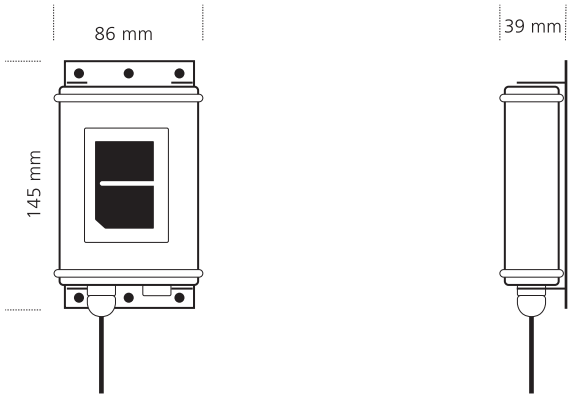
Radiation intensity accuracy

Error in temperature compensation	± 5 % (in comparison to pyranometer over an operating range of -20 °C to 70 °C (vertical light incidence))
Linearity of electronic circuit:	± 0,3 % of ave. for 50 to 1300 W/m²

Temperature accuracy

Deviation at 25 °C	± 1,5 °C
Nonlinearity	± 0,5 °C
Deviation at minimum and maximum temperature	± 2,0 °C

Model overview	Si-01TC-T-K	Si-12TC	Si-12TC-T
	Irradiation and temperature sensors for connection to Sunways Solar Inverter	Irradiation sensor for connection to Sunways Communicator	Irradiation and temperature sensors for connection to Sunways Communicator
Power supply	5 VDC ± 10 %	12 to 24 V	12 to 24 V
Radiation intensity output signal	0 to 1 V	0 to 10 V	0 to 10 V
Radiation intensity measurement range	0 to 1000 W/m²	0 to 1200 W/m²	0 to 1200 W/m²
Cell temperature output signal	1,235 V+T [°C] * 10 mV / °C	1,235 V+T [°C] * 10 mV / °C	1,84 V + T [°C] * 92 mV / °C
Cell temperature measurement range	-20 °C to 70 °C	-20 °C to 70 °C	-20 °C to 80 °C

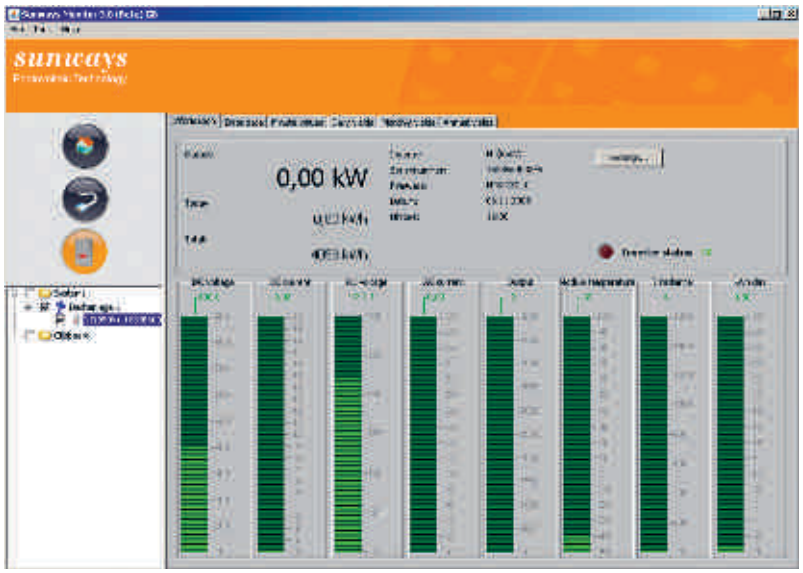


Photovoltaics from Sunways in the Heitersheim nursery, Germany. It makes an important contribution to sustainable energy use and will be a model for future generations.

3.0
Monitoring and management of photovoltaic systems.

3.1 Sunways Monitor:
free analysis software for your PC.

Sunways Monitor can retrieve all operating data from the internal data memory of the Sunways Solar Inverters and save them on a computer. All data are therefore available for individual yield analysis. The software can be used for different PV systems and different Solar Inverter types. It can be connected to the PV system directly via a cable or via a modem.



Sunways Monitor is particularly suitable for smaller PV systems with a single owner and operator for advanced system monitoring via a computer.

Product Highlights

- **Advanced software for data analysis on the computer free of charge.**
- **Intuitive user interface for convenient operation.**
- **Comprehensive analysis and comparison options for operating data.**

Sunways Monitor enables display of system yields at annual, monthly, daily or minutely intervals. The internal operating data displayed include the solar generator current and voltage, the grid current and voltage and all status messages.

If an irradiance and temperature sensor is installed these data are also displayed.

Sunways Monitor can be downloaded free of charge from www.sunways.de/sunwaysmonitor.

3.2 Sunways Portal: system monitoring for professional applications.

The Sunways Portal supports site-independent monitoring of PV systems via the Internet. Numerous functions support detailed analysis of operating characteristics and transfer of important status information directly via text message, e-mail or fax. Two access options for private and commercial system operators enable customised utilisation of the Sunways Portal.

The Sunways Portal is particularly suitable for larger PV systems and can used by one or several operators. The Sunways Portal offers unlimited access to the following data:

- Display of all inverter operating data
- System monitoring and notification through the portal in the event of deviations
- Comparison between target yields and actual yields
- Automatic dispatch of system reports
- Access to professional weather data
- Solar park management via login

Product Highlights

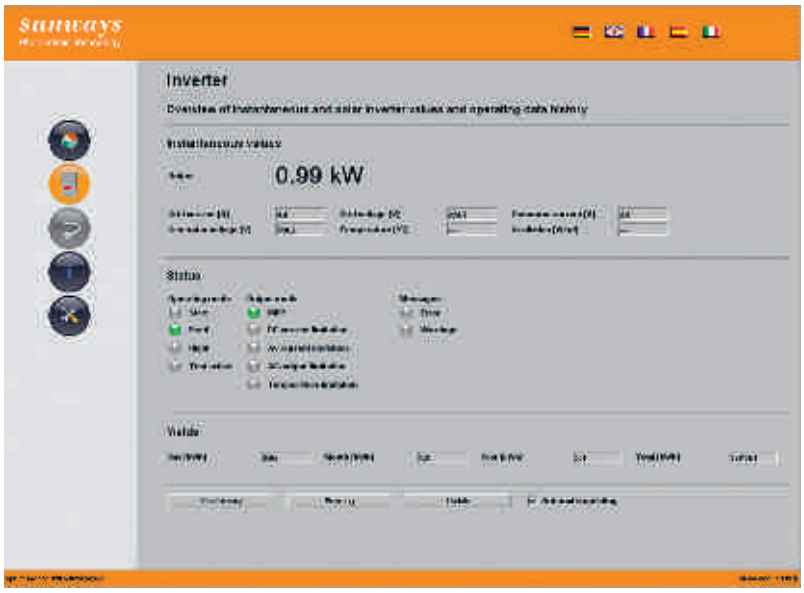
- **Automated monitoring of PV systems via the Internet.**
- **Unlimited access to and queries of status information with optional alarm function.**
- **Comprehensive analysis and comparison options for operating data.**

Basic access to the Sunways Portal for private system operators is available free of charge. In addition to information about the basic operating data the system also offers live access to PV installations.

The optional professional access includes numerous functions for professional or commercial system operation. Professional access is available for a monthly basic charge plus an annual system fee based on installed kWp of PV capacity. Please contact us for further information.

3.3 Sunways Browser: system monitoring integrated in the Solar Inverter. Simple and convenient.

The Sunways Browser is pre-installed in the AT and PT Solar Inverters from Sunways. The Sunways Browser offers access to the current operating data of PV systems and comprehensive configurations options. The Sunways Browser can be accessed locally, via a modem connection or via the Internet as required.



Everything under control. The Sunways Browser supports queries of operating, yield and error data of PV systems and remote configuration of Solar Inverters.

Product Highlights

- **System monitoring of Sunways Solar Inverters without software installation.**
- **Convenient Solar Inverter configuration and operating data analysis.**
- **Intuitive operation in several languages.**

The Sunways Browser enables system monitoring of one or several Solar Inverters. The Sunways Browser is integrated in the Solar Inverter and can be accessed via direct connection, modem or the Internet.

In the event of a malfunction of the PV systems an automatic remote alarm is triggered, sent to the system operator via e-mail and displayed in the Sunways Browser.

The profitability of PV installations hinges on trouble-free operation. Important prerequisites are professionally installed Solar Modules and Solar Inverters and proper service.

4.0

Sunways services.

You can rest assured.

4.1 Contact Sunways.
from advice to customer care.

You can rely on us. PV components and systems from Sunways are the equipment of choice for Professional users when it comes to generating electricity from the sun. Due to their quality, functionality and high efficiencies they have an excellent international reputation. We offer quick solutions for your daily challenges.

Benefit from our experiences in the development, design and management of photovoltaic systems from a single source.

4.2 Sunways services.

More options. More safety.

24-hour service
Should you have any problems with Sunways PV components, we will deal with them professionally and quickly.

A tight network of certified service partners and Sunways service staff ensure quick, simple and unbureaucratic local assistance. This avoids long outage times and enables continuous high yield security.

Contact us free of charge throughout Europe:

FREECALL Technical hotline:
00800–SUNWAYSAG
(00800–786 929 724)

Technical hotline
Our technical hotline is staffed by specialists who are ready to offer advice and support.

- **Support for installation and design**
- **Competent advice for technical solutions**
- **Professional advisory services and direct local support**
- **System configuration and calculations for a wide range of situations**
- **Advice regarding software and calculation programs**
- **Installation, commissioning and troubleshooting over the phone**

We offer support and guarantee straightforward and fast assistance:

FREECALL Technical hotline:
00800–SUNWAYSAG
(00800–786 929 724)

Service and maintenance contracts
We are committed to the name Sunways and our customers. Sunways therefore offers a 5-year warranty for Sunways Solar Inverters as standard warranty. Attractively priced warranty extensions for up to 20 years are optionally available.

- **Fewer failures through maintenance and timely device service**
- **Less administration – simply call us**
- **No hassle with repair bills**
- **Cost certainty over the whole service life**

For system operators requiring maximum reliability, we offer a specific «all-in, worry-free package» for the Sunways Solar Inverter PT range including all warranty and service options. This package is available for a term of up to 20 years. We offer further attractive benefits for operators of large PV installations with several Solar Inverters.

4.3 Become a Sunways partner. Head out into a world of new opportunities.

Practice-oriented seminars and training sessions for professionals. Our motto: focus on the key issues. In our seminars we quickly acquaint you with the potential applications and central functions of photovoltaics based on practical issues and realistic applications. Qualified technical, distribution and product management specialists convey comprehensive knowledge relating to the function, application, installation and communication of Sunways Solar Inverters directly using the device.

Staged specialisation, proven methodology and targeted content. Based on the requirements of our customers, the Sunways seminar programme is divided into two stages:

- **Stage 1:**
  Compact seminars – qualification as Sunways Installation Partner
- **Stage 2:**
  Competence seminars – qualification as certified Sunways Service Partner

Please contact us for a detailed description of the organisation of our seminars and specific training options. It is important for us that you opt for the most effective seminar programme for your purposes. We also offer customised seminars and training sessions on site.

«Super seminar – practice-oriented tips, optimum knowledge transfer! The seminar offers theoretical and practical answers for all main issues. The presenters know their trade, and the methodology and tutorials were varied and interesting.»

Quote from a Sunways Solar Inverter seminar participant.

Contact:
Pedro Otero
Phone +49 (0)7531 996 77-419
E-Mail pedro.otero@sunways.de

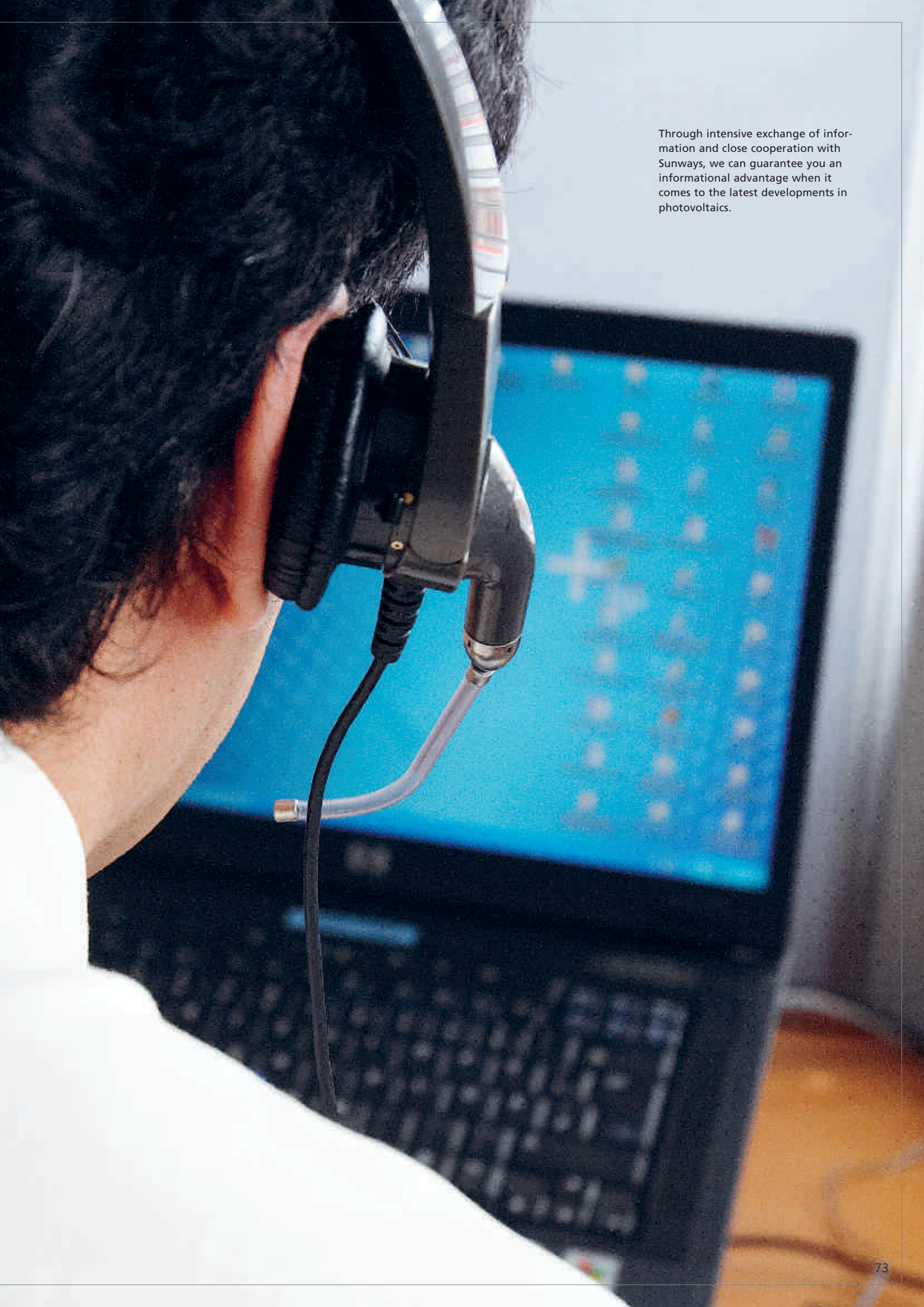
«Sunways on Tour». As part of the «Sunways on Tour» event series, we offer you an opportunity to gain an overview of Sunways photovoltaic systems at a location near you.

In a stimulating and relaxed atmosphere, our specialists introduce the latest trends in the photovoltaic market and the current product highlights from Sunways. Benefit from the opportunity to engage in technical discussion and information exchange with other participants. Perhaps we'll soon be in your area. A current list of events can be found at www.sunways.de.

Growing together through sales support and partnership. As a Sunways distribution partner, installation partner or certified service partner you benefit from our professional sales support. Your personal contact is always readily available. Whether you wish to advertise in the regional press, require design advice, prepare for a sales talk or exhibit at a regional trade show: we look forward to our mutual success.

Installation Partner
sunways
Photovoltaic Technology

Certified Service Partner
sunways
Photovoltaic Technology



Through intensive exchange of information and close cooperation with Sunways, we can guarantee you an informational advantage when it comes to the latest developments in photovoltaics.

Product overview

Solar Modules

SM 170U	Sunways Solar-Modul SM 170U	Power range: 160 W – 175 W Maximum system voltage: 1000 V(DC) LxWxH 2000 x 680 x 50 mm 48 Multi SC 156/0 IEC 61215 – Safety class II
SM 210U	Sunways Solar-Modul SM 210U	Power range: 220 W – 240 W Maximum system voltage: 1000 V(DC) LxWxH 1680 x 990 x 50 mm 60 Multi text. SC 3BB 156/0 IEC 61215 – Safety class II
SM 215M	Sunways Solar-Modul SM 215M	Power range: 225 W – 240 W Maximum system voltage: 1000 V(DC) LxWxH 1680 x 990 x 50 mm 60 SC-Mono 3BB 156/0 IEC 61215 – Safety class II
SM 230M	Sunways Solar-Modul SM 230M	Power range: 220 W – 240 W Maximum system voltage: 1000 V(DC) LxWxH 1610 x 1070 x 50 mm 96 Mono SC 125/0 IEC 61215 – Safety class II
SM 215L	Sunways Solar-Laminate SM 215L	Power range: 220 W – 235 W Maximum system voltage: 1000 V(DC) LxWxH 1674 x 984 x 5 mm 60 SC-Mono 3BB 156/0 IEC 61215 – Safety class II

Solar Inverter (DE)		
SI225NT1B	Sunways Solar Inverter NT 2600 (DE)	Inverter for grid feed in max. output power: 2500 W pre-configured for Germany
SI237NT1B	Sunways Solar Inverter NT 4000 (DE)	Inverter for grid feed in max. output power: 3700 W pre-configured for Germany
SI242NT1B	Sunways Solar Inverter NT 5000 (DE)	Inverter for grid feed in max. output power: 4200 W pre-configured for Germany
SI250NT1B	Sunways Solar Inverter NT 6000 (DE)	Inverter for grid feed in max. output power: 5000 W pre-configured for Germany
SI280NT1A	Sunways Solar Inverter NT 8000 (DE)	Inverter for grid feed in nominal output power: 8000 W pre-configured for Germany
SI310NT1A	Sunways Solar Inverter NT 10000 (DE)	Inverter for grid feed in max. output power: 10000 W pre-configured for Germany
SI227AT1A	Sunways Solar Inverter AT 2700 (DE)	Inverter for grid feed in nominal output power: 2700 W pre-configured for Germany
SI236AT1A	Sunways Solar Inverter AT 3600 (DE)	Inverter for grid feed in nominal output power: 3600 W pre-configured for Germany
SI245AT1A	Sunways Solar Inverter AT 4500 (DE)	Inverter for grid feed in nominal output power: 4500 W pre-configured for Germany
SI250AT1A	Sunways Solar Inverter AT 5000 (DE)	Inverter for grid feed in nominal output power: 5000 W pre-configured for Germany
SI330P11A	Sunways Solar Inverter PT 30k (DE)	Central Inverter for grid feed in max. output power: 30 kW IP42 protection class pre-configured for Germany
SI330P21A	Sunways Solar Inverter PT 30k (DE)	Central Inverter for grid feed in max. output power: 30 kW IP42 protection class, with DC overv. protec. pre-configured for Germany
SI330P31A	Sunways Solar Inverter PT 30k (DE)	Central Inverter for grid feed in max. output power: 30 kW IP54 protection class pre-configured for Germany
SI330P41A	Sunways Solar Inverter PT 30k (DE)	Central Inverter for grid feed in max. output power: 30 kW IP54 protection class, with DC overv. prot. pre-configured for Germany

Solar Inverter (ES)		
SI222NT2B	Sunways Solar Inverter NT 2600 (ES)	Inverter for grid feed in max. output power: 2200 W pre-configured for Spain
SI225NT2B	Sunways Solar Inverter NT 2600 (ES)	Inverter for grid feed in max. output power: 2500 W pre-configured for Spain
SI233NT2B	Sunways Solar Inverter NT 4000 (ES)	Inverter for grid feed in max. output power: 3300 W pre-configured for Spain
SI237NT2B	Sunways Solar Inverter NT 4000 (ES)	Inverter for grid feed in max. output power: 3700 W pre-configured for Spain
SI242NT2B	Sunways Solar Inverter NT 5000 (ES)	Inverter for grid feed in max. output power: 4200 W pre-configured for Spain
SI250NT2B	Sunways Solar Inverter NT 6000 (ES)	Inverter for grid feed in max. output power: 5000 W pre-configured for Spain
SI280NT2A	Sunways Solar Inverter NT 8000 (ES)	Inverter for grid feed in nominal output power: 8000 W pre-configured for Spain
SI310NT2A	Sunways Solar Inverter NT 10000 (ES)	Inverter for grid feed in max. output power: 10000 W pre-configured for Spain
SI227AT2A	Sunways Solar Inverter AT 2700 (ES)	Inverter for grid feed in nominal output power: 2700 W pre-configured for Spain
SI236AT2A	Sunways Solar Inverter AT 3600 (ES)	Inverter for grid feed in nominal output power: 3600 W pre-configured for Spain
SI245AT2A	Sunways Solar Inverter AT 4500 (ES)	Inverter for grid feed in nominal output power: 4500 W pre-configured for Spain
SI250AT2A	Sunways Solar Inverter AT 5000 (ES)	Inverter for grid feed in nominal output power: 5000 W pre-configured for Spain
SI330P12A	Sunways Solar Inverter PT 30k (ES)	Central Inverter for grid feed in max. output power: 30 kW IP42 protection class pre-configured for Spain
SI330P22A	Sunways Solar Inverter PT 30k (ES)	Central Inverter for grid feed in max. output power: 30 kW IP42 protection class, DC overv. protec. pre-configured for Spain
SI330P32A	Sunways Solar Inverter PT 30k (ES)	Central Inverter for grid feed in max. output power: 30 kW IP54 protection class pre-configured for Spain
SI330P42A	Sunways Solar Inverter PT 30k (ES)	Central Inverter for grid feed in max. output power: 30 kW IP54 protection class, DC overv. protec. pre-configured for Spain

Solar Inverter (IT)		
SI233NT3B	Sunways Solar Inverter NT 4000 (IT)	Inverter for grid feed in max. output power: 3300 W pre-configured for Italy
SI237NT3B	Sunways Solar Inverter NT 4000 (IT)	Inverter for grid feed in max. output power: 3700 W pre-configured for Italy
SI242NT3B	Sunways Solar Inverter NT 5000 (IT)	Inverter for grid feed in max. output power: 4200 W pre-configured for Italy
SI250NT3B	Sunways Solar Inverter NT 6000 (IT)	Inverter for grid feed in max. output power: 5000 W pre-configured for Italy
SI310NT3A	Sunways Solar Inverter NT 10000 (IT)	Inverter for grid feed in max. output power: 10000 W pre-configured for Italy
SI227AT3A	Sunways Solar Inverter AT 2700 (IT)	Inverter for grid feed in nominal output power: 2700 W pre-configured for Italy
SI230AT3A	Sunways Solar Inverter AT 3000 (IT)	Inverter for grid feed in nominal output power: 3000 W pre-configured for Italy
SI236AT3A	Sunways Solar Inverter AT 3600 (IT)	Inverter for grid feed in nominal output power: 3600 W pre-configured for Italy
SI245AT3A	Sunways Solar Inverter AT 4500 (IT)	Inverter for grid feed in nominal output power: 4500 W pre-configured for Italy
SI250AT3A	Sunways Solar Inverter AT 5000 (IT)	Inverter for grid feed in nominal output power: 5000 W pre-configured for Italy
SI330P13A	Sunways Solar Inverter PT 30k (IT)	Central Inverter for grid feed in max. output power: 30 kW IP42 protection class pre-configured for Germany
SI330P23A	Sunways Solar Inverter PT 30k (IT)	Central Inverter for grid feed in max. output power: 30 kW IP42 protection class, with DC overv. prot. pre-configured for Italy
SI330P33A	Sunways Solar Inverter PT 30k (IT)	Central Inverter for grid feed in max. output power: 30 kW IP54 protection class pre-configured for Italy
SI330P43A	Sunways Solar Inverter PT 30k (IT)	Central Inverter for grid feed in max. output power: 30 kW IP54 protection class, with CD overv. protec. pre-configured for Italy

Solar Inverter (FR)		
SI225NT4B	Sunways Solar Inverter NT 2600 (FR)	Inverter for grid feed in max. output power: 2500 W pre-configured for France
SI237NT4B	Sunways Solar Inverter NT 4000 (FR)	Inverter for grid feed in max. output power: 3700 W pre-configured for France
SI242NT4B	Sunways Solar Inverter NT 5000 (FR)	Inverter for grid feed in max. output power: 4200 W pre-configured for France
SI250NT4B	Sunways Solar Inverter NT 6000 (FR)	Inverter for grid feed in max. output power: 5000 W pre-configured for France
SI280NT4A	Sunways Solar Inverter NT 8000 (FR)	Inverter for grid feed in nominal output power: 8000 W pre-configured for France
SI310NT4A	Sunways Solar Inverter NT 10000 (FR)	Inverter for grid feed in max. output power: 10000 W pre-configured for France
SI227AT4A	Sunways Solar Inverter AT 2700 (FR)	Inverter for grid feed in nominal output power: 2700 W pre-configured for France
SI230AT4A	Solar Inverter Sunways AT 3000 (FR)	Inverter for grid feed in nominal output power: 3000 W pre-configured for France
SI236AT4A	Sunways Solar Inverter AT 3600 (FR)	Inverter for grid feed in nominal output power: 3600 W pre-configured for France
SI245AT4A	Sunways Solar Inverter AT 4500 (FR)	Inverter for grid feed in nominal output power: 4500 W pre-configured for France
SI250AT4A	Sunways Solar Inverter AT 5000 (FR)	Inverter for grid feed in nominal output power: 5000 W pre-configured for France
SI330P14A	Sunways Solar Inverter PT 30k (FR)	Central Inverter for grid feed in max. output power: 30 kW IP42 protection class pre-configured for France
SI330P24A	Sunways Solar Inverter PT 30k (FR)	Central Inverter for grid feed in max. output power: 30 kW IP42 protection class, with DC overv. prot. pre-configured for France
SI330P34A	Sunways Solar Inverter PT 30k (FR)	Central Inverter for grid feed in max. output power: 30 kW IP54 protection class pre-configured for France
SI330P44A	Sunways Solar Inverter PT 30k (FR)	Central Inverter for grid feed in max. output power: 30 kW IP54 protection class, with CD overv. protec. pre-configured for France

Warrenty Extension (DE)		
001151	Warranty Extension from 5 to 10 years	for Solar Inverter NT 6000, NT 5000, NT 4000 and NT 2600 (750 V) in Germany
002354	Warranty Extension from 5 to 10 years	for Solar Inverter NT 2600 and NT 4000 (850 V) in Germany
002355	Warranty Extension from 5 to 10 years	for Solar Inverter NT 5000 and NT 6000 (850 V) in Germany
001152	Warranty Extension from 5 to 10 years	for Solar Inverter NT 8000 / NT 10000 in Germany
002363	Warranty Extension from 5 to 10 years	for Solar Inverter AT 2700 and AT 3600 in Germany
002364	Warranty Extension from 5 to 10 years	for Solar Inverter AT 4500 and AT 5000 in Germany
002368	Warranty Extension from 8 to 10 years	for Solar Inverter AT 4500 and AT 5000 in Germany
002367	Warranty Extension from 8 to 10 years	for Solar Inverter AT 2700 and AT 3600 in Germany
002373	Warranty Extension for 5 years	for Solar Inverter PT 30k in Germany max. 20 years from commissioning Annual Maintenance to be run by customer
002380	Annual Fee Service and Mainenance Contract	for Solar Inverter PT 30k in Germany
Warrenty Extension (ES)		
002356	Warranty Extension from 5 to 10 years	for Solar Inverter NT 2600 and NT 4000 (850 V) in Spain
002357	Warranty Extension from 5 to 10 years	for Solar Inverter NT 5000 and NT 6000 (850 V) in Spain
002361	Warranty Extension from 5 to 10 years	for Solar Inverter NT 8000 / NT 10000 in Spain
002395	Warranty Extension from 5 to 10 years	for Solar Inverter AT 2700 and AT 3600 in Spain
002396	Warranty Extension from 5 to 10 years	for Solar Inverter AT 4500 and AT 5000 in Spain
Warrenty Extension (IT)		
002358	Warranty Extension from 5 to 10 years	for Solar Inverter NT 4000 (850 V) in Italy
002359	Warranty Extension from 5 to 10 years	for Solar Inverter NT 5000 and NT 6000 (850 V) in Italy
002362	Warranty Extension from 5 to 10 years	for Solar Inverter NT 10000 in Italy
002397	Warranty Extension from 5 to 10 years	for Solar Inverter AT 2700, AT 3000 and AT 3600 in France
002398	Warranty Extension from 5 to 10 years	for Solar Inverter AT 4500 and AT 5000 in Italy
Warrenty Extension (FR)		
002391	Warranty Extension from 5 to 10 years	for Solar Inverter NT 5000 and NT 6000 (850 V) in France
002392	Warranty Extension from 5 to 10 years	for Solar Inverter AT 2700 and AT 3600 in France
002390	Warranty Extension from 5 to 10 years	for Solar Inverter NT 2600 and NT 4000 (850 V) in France
002394	Warranty Extension from 5 to 10 years	for Solar Inverter NT 8000 / NT 10000 in France
002393	Warranty Extension from 5 to 10 years	for Solar Inverter AT 4500 and AT 5000 in France
Communicator		
002248	Sunways Communicator 10, analogue	Plant Monitoring for up to 99 x NT 2600 – NT 6000 or 33 x NT 10000 with integrated Analogue-Modem incl. Sunways Portal Pro access for 2 years
002249	Sunways Communicator 10, ISDN	Plant Monitoring for up to 99 x NT 2600 – NT 6000 or 33 x NT 10000 with integrated ISDN Modem incl. Sunways Portal Pro access for 2 years
002250	Sunways Communicator 10, GSM	Plant Monitoring for up to 99 x NT 2600 – NT 6000 or 33 x NT 10000 with integrated GSM Modem and bar antenna incl. Sunways Portal Pro access for 2 years
002453	Sunways Communicator 10, DSL	Plant Monitoring for up to 99 x NT 2600 – NT 6000 or 33 x NT 10000 for connection to a DSL router incl. Sunways Portal Pro access for 2 years
002451	Sunways Communicator 05, analogue	Plant Monitoring for up to 5 x NT 2600 – NT 6000 or 2 x NT 10000 with integrated analogue modem incl. Sunways Portal Basic access for 2 years
002452	Sunways Communicator 05, DSL	Plant Monitoring for up to 5 x NT 2600 – NT 6000 or 2 x NT 10000 for connection to a DSL router incl. Sunways Portal Basic access for 2 years

DC Circuit Breaker		
003016	DC Circuit Breaker DCL 04	2 pole circuit breaker and connection box for parallel switching of up to 3 strings (in accordance with DIN VDE 0100-712) max. 16 A
003017	DC Circuit Breaker DCL 05	2 pole circuit breaker and connection box for parallel switching of up to 3 strings (in accordance with VDE 0100-712) max. 25 A
003015	DC Circuit Breaker DCL 10	6 pole circuit breaker and connection box for 3 separate strings (in accordance with DIN VDE 0100-712) max. 3 x 10 A
String Box		
SE100E10A	String Box 08 (Basic)	String box for up to 8 strings Input: max. 8 x 8,5 A, Output: max. 75 A casing IP65, in minus input equipped with hollow shafts
SE101E10A	String Box 08 (overvoltage prot.)	String box for up to 8 strings Input: max. 8 x 7,5 A, Output: max. 75 A casing IP65, in minus input equipped with hollow shafts incl. overvoltage protection
SE102E10A	String Box 08 (overv.prot.+DC circuit breaker)	String box for up to 8 strings Input: max. 8 x 8,5 A, Output: max. 75 A casing IP65, in minus input equipped with hollow shafts incl. overvoltage protection and DC circuit breaker
SE103E10A	String Box 12 (Basic)	String box for up to 12 strings Input: max. 12 x 8,5 A, Output: max. 75 A casing IP65, in minus input equipped with hollow shafts
SE104E10A	String Box 12 (overvoltage protection)	String box for up to 12 strings Input: max. 12 x 8,5 A, Output: max. 75 A casing IP65, in minus input equipped with hollow shafts incl. overvoltage protection
SE105E10A	String Box 12 (overv.prot.+DC circuit breaker)	String box for up to 12 strings Input: max. 12 x 8,5 A, Output: max. 75 A casing IP65, in minus input equipped with hollow shafts incl. overvoltage protection and DC circuit breaker
SE112E10A	String Box 08 (overvoltage prot.)	String box for up to 8 strings with string control Input: max. 8 x 7,5 A, Output: max. 75 A casing IP65, in minus input equipped with hollow shafts incl. overvoltage protection
SE106E10A	Fuses for String Box (8 A)	for DC string protection for modules with 5" cells max. 1000 V, max. 8 A, set with 10 pieces
SE107E10A	Fuses for String Box (12 A)	for DC string protection for modules with 6" cells max. 1000 V, max. 12 A, set with 10 pieces
SE108E10A	Fuses for String Box (16 A)	for DC string protection max. 1000 V, max. 16 A, set with 10 pieces
SE109E10A	hollow shafts for String Box	to be use instead of fuses set with 10 pieces
Power-Control Series		
SE102E11A	Power-Control Box CAN	Power-Control Box CAN (for AT series) External unit for feed-in management according to Erneuerbare-Energien-Gesetz § 6 for PV systems with Solar Inverters of the AT series (CAN networking and one box per PV plant necessary)
SE103E11A	Power-Control Modul	Power-Control Module (for PT series) integrated unit for Solar Inverter PT 30k for feed-in management according to Erneuerbare-Energien-Gesetz § 6 (CAN networking and one box per PV plant necessary)

Display		
002454	Sunways Display DE 500	frameless display with ESG front 500 x 400 mm, german text: present power, energy yield, CO2 savings (6 digits) for photovoltaic systems up to 50 kWp
002465	Sunways Display ES 500	frameless display with ESG front 500 x 400 mm, spanish text: present power, energy yield, CO2 savings (6 digits) for photovoltaic systems up to 50 kWp
002466	Sunways Display IT 500	frameless display with ESG front 500 x 400 mm, italian text: present power, energy yield, CO2 savings (6 digits) for photovoltaic systems up to 50 kWp
Sensors		
001148	Irradiation sensor with integrated temperature sensor (0-1 V)	for connection to a Solar Inverter incl. Connector, powder-coated aluminium housing, IP65 (Mencke & Tegtmeyer SI-01TC-T)
003003	Irradiation sensor (0-10 V)	for connection to a Sunways Communicator (Mencke & Tegtmeyer Si-12TC)
003004	Irradiation sensor with integrated temperature sensor (0-10 V)	for connection to a Sunways Communicator (Mencke & Tegtmeyer Si-12TC-T)
Sunways Modem		
002401	Sunways Modem, analog (DE)	Analogue remote modem for PV plant monitoring with Sunways NT or AT Solar Inverters. Incl. power plug and necessary cabling (telephone: TAE)
002404	Sunways Modem, analog (INT)	Analogue remote modem for PV plant monitoring with Sunways NT or AT Solar Inverters. Incl. power plug and necessary cabling (telephone: RJ11)
002402	Sunways Modem, ISDN	ISDN remote modem for PV plant monitoring with Sunways NT or AT Solar Inverters. Incl. power plug and necessary cabling
002403	Sunways Modem, GSM	analogue remote modem for PV plant monitoring with Sunways NT or AT Solar Inverters. Incl. power plug, bar antenna and necessary cabling
001141	Analog Modem	for connection to a PC (RS232) or Solar Inverter for remote control incl. wall power supply and connection cable (Sunways cable type 2 / D)
Sunways Cables		
002991	Sunways cable type 1	for connection PC (RS232) - Solar Inverter (850 V) Null-Modem-Cable (twisted) Female to Female, Length: 3 m
001139	Sunways cable type 2 / cable type D	for connection PC (RS232) - Interface Converter / PC (RS232) – Modem / Modem – Solar Inverter (850 V) Modem Cable (1:1) Female to Male, Length: 3 m
002992	Sunways cable type 3	for connection Interface Converter – Modem Null-Modem-Cable (twisted) Male to Male, Length: 3 m
002461	Sunways cable type 4	for connection PC (USB) – Solar Inverter (NT 2600 – NT 6000) incl. Driver CD-ROM Length: 3 m
002993	Sunways cable type 5	for connection PC (USB) – Solar Inverter (NT 10000) USB device cable A Plug to B Plug, Length: 3 m
002994	Adapter cable USB to RS232	for adding a RS232 interface on a PC (via USB)

Interface Converter		
001140	Interface Converter RS232 to RS485	for connection of several Solar Inverters to a PC (RS232) housing for top head rail mounting, incl. applicable wall power supply
002995	Interface Converter USB to RS485	for connection of several Solar Inverters to a PC (USB) housing for top head rail mounting
002462	RS485 to Ethernet Converter	for connection of several Solar Inverters to an Ethernet Network housing for top head rail mounting, incl. applicable wall power supply
003005	RS485 Repeater	for signal boost in a RS485 network with more than 30 Solar Inverter at a single Sunways Communicator incl. applicable wall power supply
Tyco Equipment		
SE102E50A	SolarLok contact pin set	SolarLok contact pin set 50 pieces 4 mm² contact jackets
SE103E50A	SolarLok contact pin set	SolarLok contact pin set 50 pieces 4 mm² contact jackets
SE104E50A	SolarLok contact pin set	SolarLok contact pin set 50 pieces 6 mm² contact jackets
SE105E50A	SolarLok contact pin set	SolarLok contact pin set 50 pieces 6 mm² contact jackets
SE106E50A	SolarLok connector set inverter	SolarLok connector set inverter consists of 100 pieces bush boxes PLUS coded and 4 mm² contact pins
SE107E50A	SolarLok connector set inverter	SolarLok connector set inverter consists of 100 pieces connector boxes MINUS coded and 4 mm² contact jacket
SE108E50A	SolarLok connector set inverter	SolarLok connector set inverter consists of 100 pieces bush boxes PLUS coded and 6 mm² contact pins
SE109E50A	SolarLok connector set inverter	SolarLok connector set inverter consists of 100 pieces connector boxes MINUS coded and 6 mm² contact jacket
SE110E50A	SolarLok connector set module	SolarLok connector set module consists of 100 pieces bush boxes PLUS coded and 4 mm² contact pins
SE111E50A	SolarLok connector set module	SolarLok connector set module consists of 100 pieces connector boxes MINUS coded and 4 mm² contact jacket
SE112E50A	SolarLok connector set module	SolarLok connector set module consists of 100 pieces bush boxes PLUS coded and 6 mm² contact pins
SE113E50A	SolarLok connector set module	SolarLok connector set module consists of 100 pieces connector boxes MINUS coded and 6 mm² contact jacket
SE114E50A	SolarLok T-divider	SolarLok T-devider set with 20 pieces, PLUS coded
SE115E50A	SolarLok T-divider	SolarLok T-devider set with 20 pieces, MINUS coded
Solar Inverter Equipment		
002996	Tyco manual crimping tool	including die plate and Locator for cable assembly for Tyco Solarlok connectors (4,0 + 6,0 mm²)
002470	Filter Pads NT 10000	Set with 10 pieces
001235	Sunways auxiliary fan	for Solar Inverters NT 2600, NT 4000, NT 5000 and NT 6000
003014	Wall mounting frame (NT 2600...NT 6000)	Replacement wall mounting frame for Solar Inverter installation
002481	Wall mounting frame (NT 10000)	Replacement wall mounting frame for Solar Inverter installation

Imprint

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The products and features listed and described in this catalogue and some of the listed services are not available in all countries. Information regarding the scope of delivery, appearance, technical data, dimensions and weights are correct at the time of printing. We reserve the right to make changes.

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