



Monitor Simply and Securely



MONITORING, INFORMING, PRESENTING

Securing yield easily for small, large and very large solar power systems

Sunday afternoon at the garden fence. The sun is shining. Your neighbor nods in the direction of your solar power system: "And, what's it earning now?" One glance at your Sunny Beam is enough. The results leave your neighbor whistling in appreciation. A good feeling: your solar power system is doing what it should. Namely feeding solar power into the public grid and securing you valuable yields. Good that you (practically) do not have to take care of anything. Thanks to the intelligent monitoring solutions from SMA.

Everything under control

Even for small solar power systems, comprehensive monitoring is important for the yield. The decision for a solar power system means you are choosing not only an environmentally friendly technology, but also a long-term source of revenue. This means it is essential that the system is running smoothly at all times. If output reductions in your system go unnoticed for a long period, for example due to shadowing of the solar modules or disturbances in the public grid, serious losses in yield can result. Continuous monitoring therefore not only means seeing your self-produced solar power, but being able to react quickly should anything go wrong.

Dependable and simple – anywhere in the world

Modern monitoring is much more than just control. It keeps you clearly informed anywhere in the world, thanks to the Internet, about the faultless operation of the system – for example via e-mail. Furthermore, it presents the system data simply, understandably and professionally: this allows you as system operator to always have an eye on system yield. Or for larger systems, it allows you to effectively publicize your ecological commitment. Monitoring comes in numerous forms: wireless or cable, compact or complex, brief or detailed. Here, it makes no difference whether you wish to monitor the yield of a home rooftop system, or of an open-field solar power station of several megawatts.

In this brochure you will find everything you need to know about system monitoring from SMA and which solution is best suited for your individual solar power system. And if you have any additional questions, your local installation specialist will be happy to assist you.



SIMPLY SECURE: FROM KILOWATT TO MEGAWATT

Efficient solar inverters and comfortable monitoring solutions from SMA

The world-wide use of photovoltaics is becoming more and more profitable. As the global leader in solar power inverters, SMA plays a large part: by developing new technologies, a tremendous speed of innovation and a product spectrum unique in its depth. Our team of more than 300 engineers develops ultra-modern solar inverters – the heart of every photovoltaic system – and user-friendly products for monitoring.

The right monitoring solution for every solar system

SMA designs, produces and sells not only highly efficient solar inverters, but also simple to use monitoring systems. Whether a home rooftop system, a larger solar power system on a commercial building or large solar power plants, SMA has the right monitoring solution for every need, because your monitoring needs are as individual as your solar system. Set up in a flash, you can see your private and environmentally friendly solar energy production at all times.

Top quality from a single source

SMA does not offer individual devices, but rather a perfectly coordinated system. In doing so, we draw upon years of experience in the development and production of monitoring solutions. Both the solar inverters and system monitoring from SMA are designed for a lifespan of at least 20 years. To meet these strict requirements, we manufacture all devices in industrial quality and equip them with high-quality components. We also subject our products to extensive quality tests – from a drop test to the simulation of extreme external weather conditions. And when you have urgent questions, our experts will help you on our dedicated service line for monitoring products.

SMA. For the good feeling that your solar power system is always delivering the yield that it should. With certainty.







PRIVATE HOME ROOFTOP SYSTEM



COMMERCIAL SOLAR POWER SYSTEM



SOLAR POWER PLANT

THREEFOLD SIMPLE AND RELIABLE

For every solar power system the correct monitoring solution

The possible combinations for SMA system monitoring are as different and multifaceted as solar power systems themselves. To make it simple for you, we introduce our monitoring solutions in three usage scenarios. Here you can see at a glance how your environmentally friendly "profit machine" can be protected from yield losses.

Comfortable monitoring for home rooftop systems

Do you own a solar power system, for example on your home? Then relax. With our user-friendly and compact products you always, and easily, have an eye on your yields.

Modular system monitoring for commercial solar power systems

As the operator of larger solar power systems, you can individually assemble the right monitoring solution from various components. In combination with solar inverters from SMA, you profit from a perfectly coordinated system.

Reliable monitoring for solar power plants

The larger the solar power system, the faster small reductions in power negatively affect yield – if they remain undiscovered. With our solutions especially developed for solar parks, you monitor and control systems even in the megawatt range, comprehensively and reliably.



FULL-TIME MINDER

Comfortable monitoring for home rooftop systems

Our innovative monitoring solutions keep an eye on your solar power system around the clock. Because if you invest in a solar power system, you want to know how fast your investment is paying off. Thus, giving you that good feeling that everything is working. SMA monitoring is simple to set up and especially user-friendly. Whether wireless with the Sunny Beam or on the PC with Sunny Explorer: you have your system always in view and more time for the other important things in life.



SUNNY EXPLORER

The PC software solution

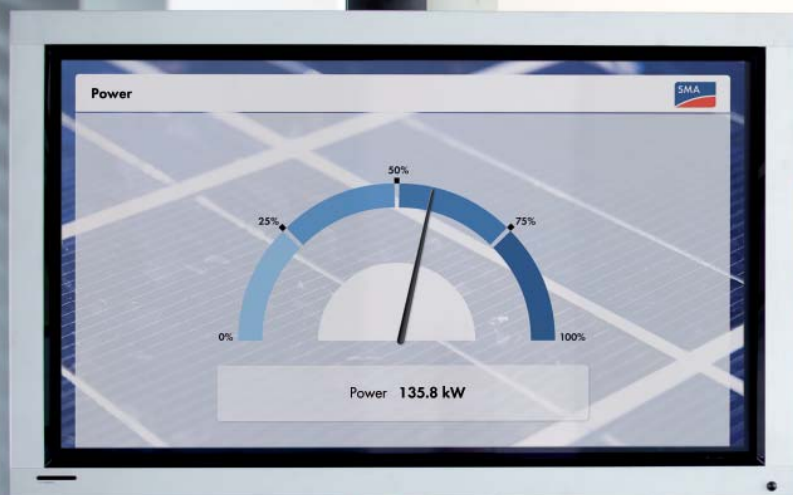
Secure, user-friendly, fast: Sunny Explorer is the basic solution for the quick and comfortable overview of your system. All you need is a PC with a *Bluetooth* interface – and you immediately receive the yield overview at a glance, wirelessly. You can download Sunny Explorer free of charge at www.SMA.de.



SUNNY BEAM

The all-in-one service package for the home

Simple, fascinating, wireless: The Sunny Beam is the compact solution for small solar power systems. It monitors your system automatically around the clock, it is very easy to operate and informs you at a glance about your yields and events. And the fact that it has received prizes for its design makes it even more attractive.



TEAMPLAYER

Modular system monitoring for commercial solar power systems

An efficient team, a promising strategy and a clearly defined goal: this is how the safeguarding of your solar yields should be designed. After all, even small reductions in power can negatively affect yield. For larger PV systems, monitoring not only depends upon the quality, but also the perfect interaction of the various components. And since every system is different, every monitoring solution must be individually planned. At

SMA, you choose from among the appropriate building blocks the components that meet your needs. No wonder monitoring from SMA has so many fans.



SUNNY WEBBOX

Remote monitoring and remote maintenance of large solar power systems

Comfortable, secure, professional: the Sunny WebBox allows the monitoring of the entire system from anywhere in the world. In combination with Sunny Portal, it is the most professional monitoring solution – regardless of where you are at the moment.



SUNNY PORTAL

Professional management and monitoring of solar systems

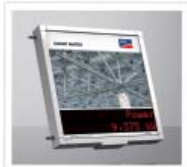
Informative, user friendly, individual: manage solar systems of every size simply and centrally with the comprehensive internet portal. You always have access from anywhere to the data which is most important to you. And the high-performance reporting informs you regularly via email – and thus safeguards your yields.



SUNNY SENSORBOX

The weather station for your solar power system

Secure, informative, compact: The Sunny SensorBox allows the complete analysis of your solar generator. In combination with Sunny Portal and Sunny WebBox, it provides a continuous target-actual comparison of plant performance. Hence you can quickly recognize and avoid possible power losses.



SUNNY MATRIX

Representative large-scale display

Robust, tailored, representative: the info board presents the data from your solar power system indoors and outdoors. It can also be individualized with your logo or a picture of your system, for example. Thus you can advertise your system and also demonstrate your commitment publicly.



FLASHVIEW

Professional plant presentation free of charge

Informative, attractive, simple: the free downloadable software presents the most important system data live and in easily understandable graphics. All you need is a Sunny WebBox and a PC with monitor.



PARK GUARD

Reliable monitoring for solar power stations

Modern solar parks often stretch over areas the size of multiple football fields. The larger the system, the more important comprehensive monitoring is. Even small disturbances in the grid or shadowing on your solar modules can have a negative effect on your yields – if they remain unnoticed. With monitoring from SMA, even large solar power plants can be optimally monitored, controlled and integrated into power plant control sta-

tions. And thanks to the Power Reducer Box you are also fulfilling the legal requirement for grid security management.

For future-proof grids and a faster payback of your system.



SUNNY WEBBOX

Remote monitoring and remote maintenance of large solar power plants

Comfortable, secure, professional: as a professional data logger, the Sunny WebBox forms the basis of monitoring for solar power stations. It collects data from the central inverters and records it over long periods of time. When desired, it automatically feeds the data to the Sunny Portal or a freely configurable Internet server, allowing a system diagnosis from anywhere in the world.



SMA OPC SERVER

Standardized data interface for large-scale systems

Professional, flexible, simple: with the SMA OPC Server¹⁾, you integrate large solar power systems from SMA into OPC compatible control systems. Whether solar, wind power or biogas: thanks to the software, information from different components of a power station can be exchanged comfortably and collected in a custom-built control system.



POWER REDUCER BOX

The solution for feed-in and grid safety management

Flexible, fast, safe: with the Power Reducer Box your system complies with the requirements of the EEG²⁾ and the BDEW guideline³⁾ "Generating Systems in the Medium Voltage Grid", which will be applicable to all solar power systems with more than 100 kW as of 1.1.2009. Remote-controlled active power derating and reactive power setpoints ensure your solar power plant is fit for the future.

1) OLE for Process Control

2) Renewable Energies Act (EEG)

3) Federal Association for Energy and Water (BDEW)

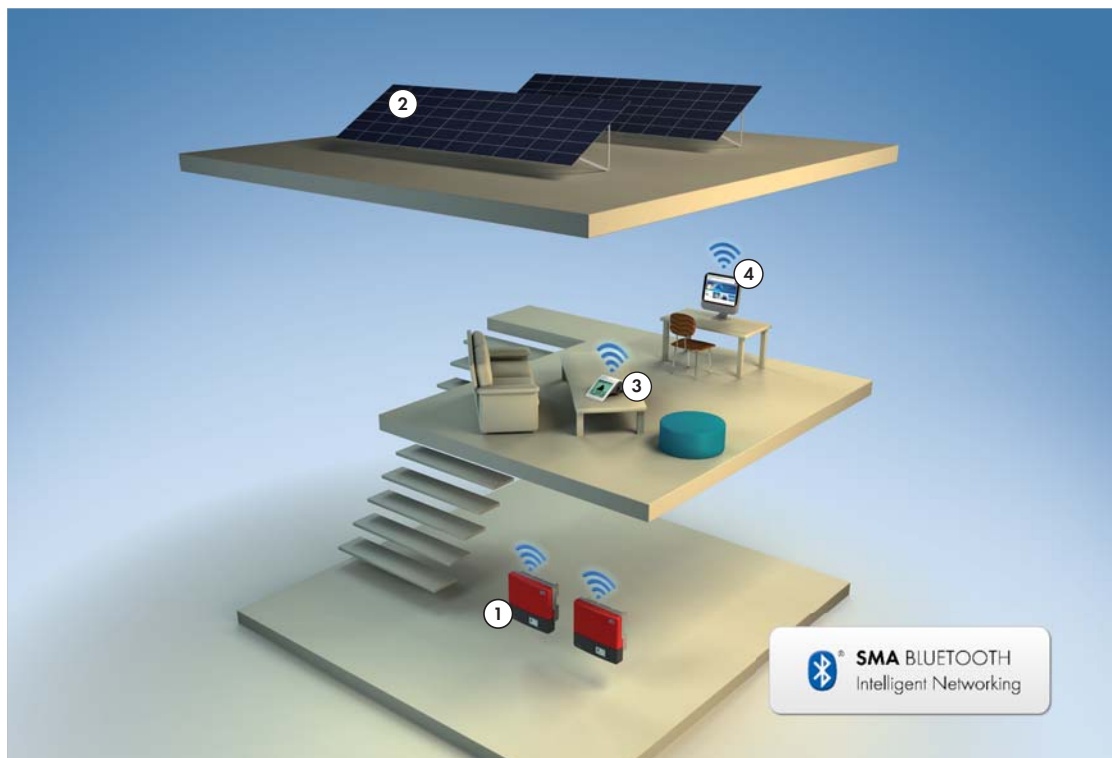
Typical system design – wireless transmission

Electricity Generation

- ① SUNNY BOY
- ② Solar generator

System Monitoring

- ③ SUNNY BEAM
- ④ SUNNY EXPLORER



WIRELESS OR CABLE?

Secure connection with and without wire

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

A comparison of the two systems

	<i>Bluetooth (radio connection)</i>	RS485 wiring
Typical application	Especially for small and mid-sized solar power systems	For medium and large solar power systems
Advantages	Reduced costs and effort	High speed and reliability
Number of participants (System monitoring and inverters)	Up to 50 per <i>Bluetooth</i> network	Up to 50 per RS485 bus
Range	Up to 100 m in open air between individual devices	1200 meters per RS485 bus
Data retrieval devices (for example, Sunny Beam or Sunny WebBox)	Up to four per network	One per RS485 bus

Typical system design – Cable Transmission

Electricity Generation

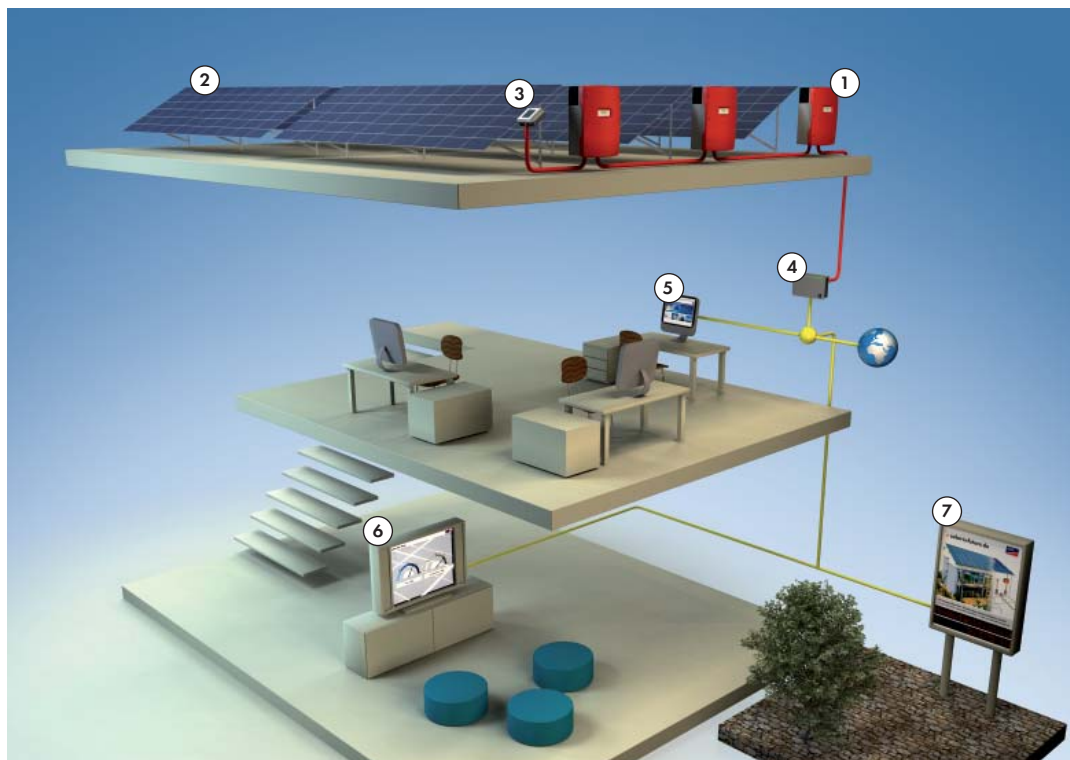
- ① SUNNY MINI CENTRAL
- ② Solar generator

System Monitoring

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

— RS485

— Local network / Internet



Wireless Success – intelligently connected with SMA Bluetooth®

With SMA *Bluetooth*, wireless networks can be created simply and quickly – without the additional effort of having to lay cables in walls, re-plaster or paint. This returns to perfectly suited to your private home rooftop system.

Bluetooth, the international radio communication standard, makes your monitoring flexible and extendable. You save time and installation costs. Thanks to *Bluetooth* all new inverters are recognized in a flash and automatically integrated into the system. Up to 50 devices can be integrated into a communication system due to the intelligent networking concept. *Bluetooth* Class 1 is the used standard. This results in a communication over larger distances. The SMA *Bluetooth* Repeater is available for systems with many walls or ceilings.

Bluetooth also stands up in terms of reliability. Thanks to constant frequency changes and the transmission of data packets in small units, the radio connection is extremely stable. And the broadcast power is always adapted to the particular requirement. By the way: the password protection built in to all devices secures your data against unauthorized access.

Robust and secure – powerful across long distances with proven RS485 wiring

The RS485 fieldbus is a veteran in the area of cable-connected communication technology. It has been used by SMA for many years and has proven itself in a nearly infinite number of systems. All devices are connected one after the other with a communication cable – just like pearls in a necklace (a so-called data bus). The Sunny WebBox is one of the nodes on this bus and collects all the data and reliably reports on the status of the solar power system.

The advantage of RS485 wiring: functional lengths of up to 1,200 meters and reliable data transmission even in interference-prone areas. Because with larger solar power systems in particular, you require maximum security and reliability.

Would you like more information on our devices? You will find all technical data sheets for downloading at www.SMA.de.

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