Solar-Log™
by Solare Datensysteme GmbH

MAXIMIZED SUNPOWER

Product Portfolio

2012
Edition 3

Everything you need to monitor your Photovoltaic Plant!

EN

Solar-Log™
by Solare Datensysteme GmbH

MAXIMIZED SUNPOWER

Solar-Log™ is the manufacturer-independent plant monitoring system for photovoltaic systems, „Made in Germany“ from the market leader - Solare Datensysteme GmbH. The Solar-Log™ communicates directly with the inverter and continuously monitors its functions.

Dear Reader,

Can we influence our future in a positive way? We are convinced that it is possible!

Many countries, including Japan, China, India and the United States are already following Europe's lead in mitigating climate change by increasing the amount of renewable energies they employ. Renewable energies are playing an ever greater role in energy policies. They contribute greatly to the reduction of greenhouse gas emissions, air pollution and environmental risks by replacing fossil fuels and nuclear power as a source of energy. Solar power is paving our way to a future with clean energy.

We are also making our contribution with our sophisticated technology and years of experience. Innovative solutions in the field of Powermanagement (PM+), Solar-Log™ Smart Timing and Solar-Log™ WEB "Commercial Edition" – to just name a few – help us to maintain our competitive edge, nationally as well as internationally.

Our PM+ series has already garnered great acclaim: the OTTI 2012 Innovation Prize, the nomination for the German "Industriepreis 2012" and the nomination for the Intersolar Award 2012. We have expanded on the functionality of the PM+ for Intersolar. With the Solar-Log™ Smart Timing, we offer the possibility to use PV energy even more effectively. That means either using power locally or selling the power on an electricity power exchange (Germany). And changes to our internet-based portal Solar-Log™ WEB "Commercial Edition" will make monitoring even easier, with a new design and improved usability. We are focused on developing PV monitoring solutions that offer our customers worldwide added value.

Yours,

Jörg Karwath
Technology Director

Index

Introduction

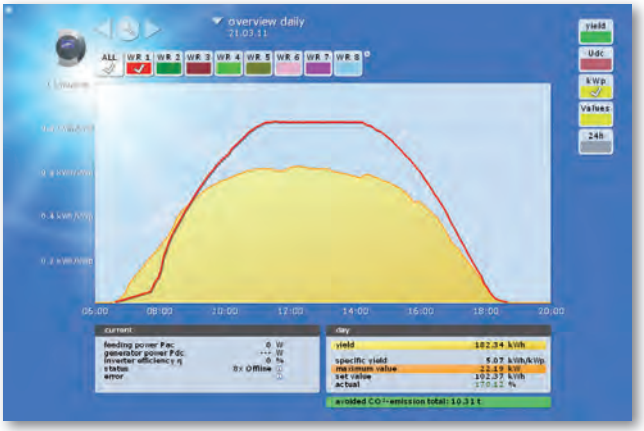
Solar-Log™ Monitoring makes sound financial sense – now and in the future

Solar-Log™ monitors more than 780,000 inverters worldwide, i.e. 5,49 Gigawatts and rising by the day!

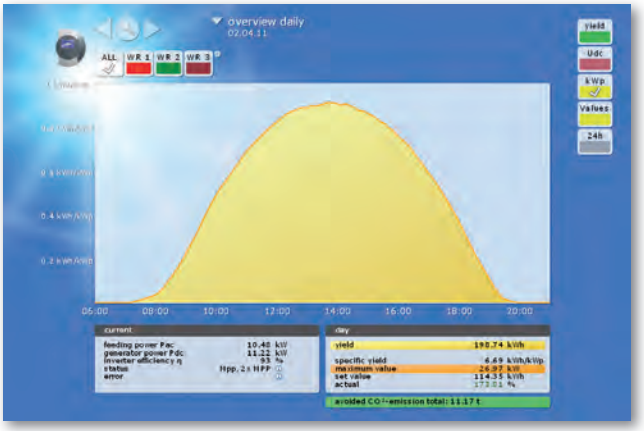
Why should you rely on Solar-Log™ Monitoring?

Minimize downtime – maximize yields

A solar power system only produces maximum yields if you are generating electricity continuously and without plant downtime. However, since these installations comprise a large number of components, technical defects are almost inevitable from time to time. With Solar-Log™ Monitoring, malfunctions are detected and reported instantaneously **before** they can give rise to large financial losses.



Inverter power restriction resulting from overheating or incorrect configuration

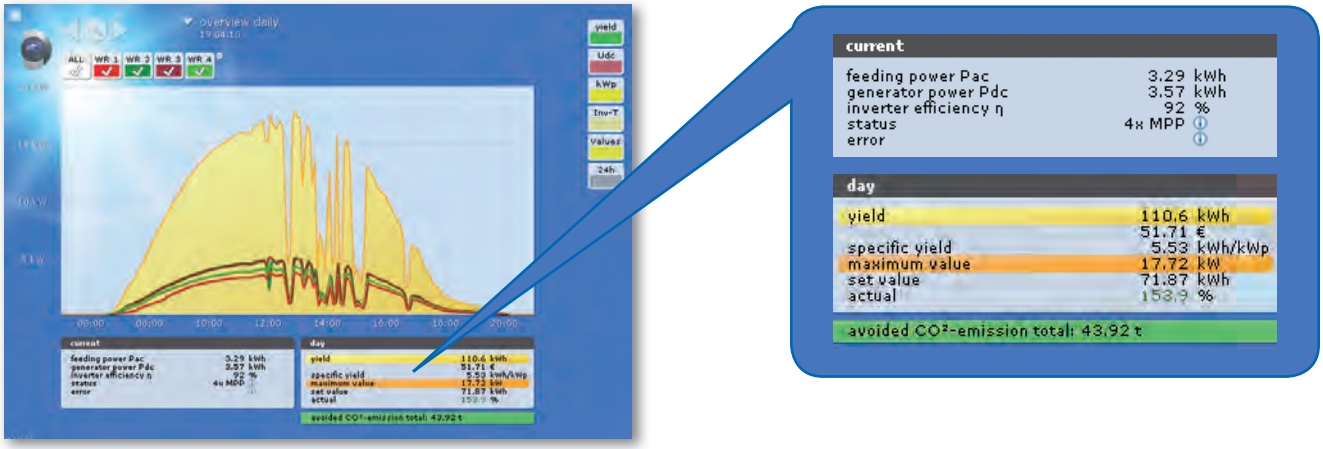


The perfect yield curve

Solar-Log™ Monitoring is more than just a monitoring system

- A cost analysis of your investment (drawn up on the basis of Solar-Log™ yield figures) supports you in many ways when seeking to establish effectiveness of your initial planning.
- With the help of plant yields and of nominal values based on the yield forecast, the break-even point, i.e. the point in time where the investment enters the profit zone, can be calculated.
- Based on evaluations and data, future values can be collected for new projects.

Professional monitoring – on site and over the internet



Daily overview with 4 inverters and shadowing

Advantages & benefits

For the plant operator

1. Depending on the model, the Solar-Log™ can be operated intuitively via the display or via a web browser over the network.
2. For the Solar-Log™ network connection, no additional software installation is required.
3. The yield and plant data are clearly presented and done so in a easily comprehendible format. On the Solar-Log1000, data can also be viewed on the logger‘s display panel.
4. The yield evaluations can be called up at any time via the internet or via mobile phone.
5. Solar-Log™ facilitates seamless PV plant monitoring on a daily basis, either by e-mail or text message, it transmits yield data and error messages. On the Solar-Log1000, the messages are also shown on the display panel.
6. The Solar-Log200/500/1000 will facilitate the use of your own power consumption.
7. Solar-Log200/500/1000 PM+ with Powermanagement function.

For the installer and the distributor

1. Solar-Log™ is compatible with most inverters available on the market and, depending on the data logger, between 1 and 100 inverters can be connected to it.
2. With Solar-Log™ “Easy Installation”, the logger's installation is now even easier. In most situations, the installer no longer requires PC or internet expertise.
3. If so desired, the Solar-Log™ registers itself automatically for WEB provisioning. Configuration thereafter is a convenient process that can be performed via WEB interface in your office.
4. Solar-Log200/500/1000 are optionally available with WiFi and Bluetooth. This makes wireless communication possible, with substantially reduced installation overhead.
5. Solar-Log200/1000 is available with GPRS mobile radio (i.e. wireless) technology. The big advantage of this is that the data connection is more stable and installation is less of an elaborate procedure.
6. Solar-Log™ WEB “Full Service” enables optimal customer support and professional plant monitoring regardless of which inverter is used. Error messages can be responded to immediately, saving time and costs.

Solar-Log™ Hardware

Solar-Log200, so small yet still so functional

Suitable for connection:

Display:

Optionally available with:

GPRS WiFi PM+

The Solar-Log200 is operated via a PC with a common web browser. The installation of software is not required. The graphic and tabular evaluations can be accessed at any time locally or via the Internet.

- **Perfectly suited for smaller plants with one inverter; and optional Powermanagement and cos φ control**
- **Recommended: max. plant size 15 kWp / Solar-Log200**
- **Possible to monitor consumption of self-produced power**
- **Same depth of data as larger units, including notification via SMS or e-mail**
- **Optional: wireless connection via GPRS, WiFi and / or Bluetooth**

Simple installation and connection

- **Solar-Log™ Easy Installation**
  The installation and initial operation of the data logger is quick and simple with "Easy Installation". The search for inverters and Internet log-on takes places immediately and automatically.
- **Cable cover**
  With its attractive design the cable cover for the Solar-Log™ offers the best possible mechanical protection for interfaces and cables.

Solar-Log™ WEB

The Solar-Log™ WEB online portal expands the monitoring function of the Solar-Log™ and offers comprehensive evaluation programs concerning the monitoring of PV plants.

- **Solar-Log™ WEB "Commercial Edition"**
  Solar-Log™ WEB "Commercial Edition" allows the plant operator to offer an expanded and professional plant monitoring service in the framework of a "Full Service" maintenance agreement.

Solar-Log™ added functions

- **Solar-Log^{200} PM+**
  The new EEG 2012 (Germany) places special demands on new and existing plants: PV plants must engage in feed-in management and network safety management in order to prevent an overload of the distribution network. The PM+ product line covers the entire spectrum of requirements with regard to active and reactive power.

- **Solar-Log^{200} consumption of self-produced energy**
  The Solar-Log^{200} makes it possible to measure the consumption of your own self-produced energy and to display this in graphic and tabular formats via the Solar-Log™ WEB. In order to consume the power that you have produced yourself, a digital meter reader is required. As a consumption meter, it is used to measure the power consumed and to display this in comparison to the power produced.

Data security

- The data volume from the Solar-Log™ can be recorded for up to 20 years. The micro SD card is used to protect against any loss of data in the event of a power failure.

Cordless connection to the internet or to SMA inverters

- **Solar-Log^{200} GPRS**
  Solar-Log^{200} GPRS is the alternative to an external GPRS modem, allowing the data logger to be connected to the data network simply and securely. A GPRS connection is especially suited to free-standing plants or buildings which do not have a usable internet connection available.

- **Solar-Log^{200} WiFi**
  Solar-Log™ WiFi allows you to use the WiFi radio data network that is often available in homes and offices. The antenna that is integrated within the device is able to receive nearby WiFi networks. If the signal is weak, WiFi repeaters may be necessary.

- **Solar-Log^{200} BT**
  This data logger is equipped with a Bluetooth module and allows wireless connection to all SMA BT inverters.

Representative presentation

- **Solarfox large display**
  In connection with the Solar-Log™, the large display can present the live data of a PV plant in a way that is visually appealing and in combination with individual advertising.

Solar-Log™ Hardware

Solar-Log500 is a convincing choice due to its high performance

Suitable for connection:

Display:

Optionally available with:

The Solar-Log500 is operated either via the 2-line text display or via a PC with a popular web browser. The installation of software is not required. The graphic and tabular evaluations can be accessed at any time locally or via the Internet.

- **Suitable for plants with up to ten inverters and optional Powermanagement and cos φ control**
- **Recommended: max. plant size 50 kWp / Solar-Log500**
- **Possible to monitor consumption of self-produced power**
- **Notification via SMS and email**
- **Optional: wireless connection via WiFi and Bluetooth**

Simple installation and connection

- **Solar-Log™ Easy Installation**
  The installation and initial operation of the data logger is quick and simple with "Easy Installation". The search for inverters and Internet log-on takes places immediately and automatically.
- **Cable cover**
  With its attractive design the cable cover for the Solar-Log™ offers the best possible mechanical protection for interfaces and cables.

Solar-Log™ WEB

The Solar-Log™ WEB online portal expands the monitoring function of the Solar-Log™ and offers comprehensive evaluation programs concerning the monitoring of PV plants.

- **Solar-Log™ WEB "Commercial Edition"**
  Solar-Log™ WEB "Commercial Edition" allows the plant operator to offer an expanded and professional plant monitoring service in the framework of a "Full Service" maintenance agreement.

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Number of inverters | Sensors | Meter S_0 | Solarfox / Large display | Ripple control receiver

Solar-Log™ added functions

- **Solar-Log500 PM+**
  The new EEG 2012 (Germany) places special demands on new and existing plants: PV plants must engage in feed-in management and network safety management in order to prevent an overload of the distribution network. The PM+ product line covers the entire spectrum of requirements with regard to active and reactive power.

- **Solar-Log500 consumption of self-produced energy**
  The Solar-Log500 makes it possible to measure the consumption of your own self-produced energy and to display this in graphic and tabular formats via the Solar-Log™ WEB. In order to consume the power that you have produced yourself, a digital meter reader is required. As a consumption meter, it is used to measure the power consumed and to display this in comparison to the power produced.

Data security

- The data volume from the Solar-Log™ can be recorded for up to 20 years. The micro SD card is used to protect against any loss of data in the event of a power failure.

Cordless connection to the internet or to SMA inverters

- **Solar-Log500 WiFi**
  Solar-Log™ WiFi allows you to use the WiFi radio data network that is often available in homes and offices. The antenna that is integrated within the device is able to receive nearby WiFi networks. If the signal is weak, WiFi repeaters may be necessary.

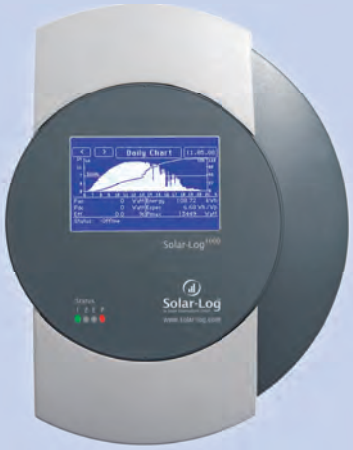
- **Solar-Log500 BT**
  This data logger is equipped with a Bluetooth module and allows wireless connection to all SMA BT inverters.

Representative presentation

- Solarfox large display
  In connection with the Solar-Log™, the large display can present the live data of a PV plant in a way that is visually appealing and in combination with individual advertising.

Solar-Log™ Hardware

Solar-Log1000, the professional monitoring system at its best



Suitable for connection:

Display:

Optionally available with:

The Solar-Log1000 is operated intuitively either via the sensitive touch screen or via a PC with a popular web browser. The installation of software is not required. The graphic and tabular evaluations can be accessed at any time locally or via the Internet.

- **Suitable for plants with up to 100 inverters and optional Powermanagement and cos φ control**
- **Suitable for string monitoring in combination with central inverter**
- **Recommended: max. plant size 1 MWp / Solar-Log1000**
- **Monitoring and control of the consumption of self-produced energy**
- **Optional: wireless connection via GPRS, WiFi and / or Bluetooth**

Simple installation and connection

- **Solar-Log™ Easy Installation**
  The installation and initial operation of the data logger is quick and simple with “Easy Installation”. The search for inverters and Internet log-on takes places immediately and automatically.
- **Cable cover**
  With its attractive design the cable cover for the Solar-Log™ offers the best possible mechanical protection for interfaces and cables.

Solar-Log™ WEB

The Solar-Log™ WEB online portal expands the monitoring function of the Solar-Log™ and offers comprehensive evaluation programs concerning the monitoring of PV plants.

- **Solar-Log™ WEB “Commercial Edition”**
  Solar-Log™ WEB “Commercial Edition” allows the plant operator to offer an expanded and professional plant monitoring service in the framework of a “Full Service” maintenance agreement.

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Number of inverters | Sensors | Meter S_0 | Solarfox / Large display | Ripple control receiver

Solar-Log™ added functions

- **Solar-Log1000 PM+**
  The new EEG 2012 (Germany) places special demands on new and existing plants: PV plants must engage in feed-in management and network safety management in order to prevent an overload of the distribution network. The PM+ product line covers the entire spectrum of requirements with regard to active and reactive power.

- **Solar-Log1000 PM+ & Solar-Log™ Utility Meter**
  The combination of the Solar-Log1000 PM+ and Solar-Log™ Utility Meter makes it possible to regulate the feed-in reactive power according to the voltage prevailing on the medium voltage level. The crucial point is that the PV plants are able to be controlled in accordance with the specifications of the particular network operator with respect to feed-in active power, and reactive power is made available. With the aid of the Utility Meter which is specially designed for the medium voltage directive, the variable provision of reactive power can be realized.

- **Solar-Log1000 Smart Meter**
  The Solar-Log1000 makes it possible to measure the consumption of your own self-produced energy, to control the consumption and to display this in graphic and tabular formats via the Solar-Log™ WEB. The Solar-Log1000 can switch on and off up to 4 external consumers. In order to consume the power that you have produced yourself, a digital meter reader is required. As a consumption meter, it is used to measure the power consumed and to display this in comparison to the power produced.

- **Solar-Log1000 & Solar-Log™ String Connection Box (SCB) or String Monitoring Box (SMB)**
  The Solar-Log1000, in connection with Solar-Log™ WEB and the SCB or SMB, monitors each individual string and ensures secure and accurate monitoring of PV plants.

Representative presentation

- **Solarfox large display and external displays**
  In connection with the Solar-Log™, the Solarfox large display can present the live data of a PV plant in a way that is visually appealing and in combination with individual advertising. External displays can be connected via the RS485 interface.

Cordless connection to the internet or to SMA inverters

- **Solar-Log1000 GPRS**
  Solar-Log1000 GPRS is the alternative to an external GPRS modem, allowing the data logger to be connected to the data network simply and securely. A GPRS connection is especially suited to free-standing plants or buildings which do not have a usable internet connection available.

- **Solar-Log1000 WiFi**
  Solar-Log™ WiFi allows you to use the WLAN radio data network that is often available in homes and offices. The antenna that is integrated within the device is able to receive nearby WLAN networks. If the signal is weak, WLAN repeaters may be necessary.

- **Solar-Log1000 BT**
  This data logger is equipped with a Bluetooth module and allows wireless connection to all SMA BT inverters.

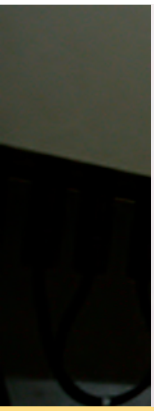
- **Modem Package & Mobile Radio Package (GPRS)**
  To allow the transfer of data to the Internet.

Data export, data security and alarm function

- **Solar-Log1000 Data Security**
  The data volume from the Solar-Log™ can be recorded for up to 20 years. The micro SD card is used to protect against any loss of data in the event of a power failure.

- **Solar-Log1000 Alarm Function**
  Anti-theft protection is possible via a contact loop and the external alarm is possible via a potential-free contact (relay).

- **Solar-Log1000 Data Export**
  Any new firmware or newly supported inverters can be manually imported via a USB stick. Furthermore, it is possible to manually extract or import data.



Product comparison

	Solar-Log^{200}	Solar-Log^{500}	Solar-Log^{1000}
Inverter communication / inverter = WR			
PM+ [2]	● NEW	● NEW	●
PM+ / WiFi [2]	● NEW	● NEW	●
PM+ / GPRS [2]	● NEW	–	●
Bluetooth (BT) [2]	●	●	●
WiFi (wireless LAN) [2]	●	●	●
Bluetooth (BT) / WiFi [2]	●	●	●
GPRS [2]	● NEW	–	●
Central inverter SCB and SMB [2]	–	–	●
max. number of inverters (depending on inverter manufacturer)	**1/1 manufacturer**	**up to 10/1 manufacturer**	**up to 100**
Communication interface	**1 x RS485 / RS422**	**1 x RS485 / RS422**	**1 x RS485, 1 x RS485 / RS422 / 1 x CAN**
recommended max. plant size	**15 kWp**	**50 kWp**	**1 MWp**
max. cable length	**max. 1000 m** [1]	**max. 1000 m** [1]	**max. 1000 m** [1]
Plant monitoring			
String monitoring (depending on type of inverter / on tracking level)	●	●	●
Inverter failure, status of fault and power monitoring	●	●	●
Connection of sensors (temp. / wind)	● [3]	● [3]	●
E-mail and SMS alarm	●	●	●
Local alarm (pot.-free contact)	–	–	●
Yield forecast and degradation calculation	●	●	●
EEG “own power consumption”: Digital current meters	●	●	●
EEG “own power consumption”: Control of ext. consumers	–	–	●
Visualisation			
Integrated web servers	●	●	●
Graphic visualisation – PC local and internet	●	●	●
Graphic visualisation – USB flash drive	–	–	●
LED – status display	●	●	●
Display on device	–	**2-line text display**	**full-graphic display**
Operation on device	–	**keypad entry**	**via touch screen**
Large display RS485 / S_0 impulse	–	●	●
Interfaces			
Ethernet network	●	●	●
USB flash drive	–	–	●
Modem, analogue / GPRS(GSM) / DSL	–	–	●
Potential-free contact (relay)	–	–	●
Alarm contact (anti-theft)	–	–	●
General data			
Network voltage / device voltage / current consumption	**115 V – 230 V / 12 V / 3 W**		
Ambient temperature	**-10 °C bis +50 °C**		
Housing / dimensions (W x D x H) in cm / Assembly / Protection level	**Plastic / 22,5 x 4 x 28,5 / Wall-mounted / IP 20 (only for interior use)**		
Connection to Solar-Log™ WEB	●	●	●
Multi-lingual (DE, EN, ES, FR, IT, NL, DK)	●	●	●
Memory, Micro-SD, 2 GB, Endless-loop data recording	●	●	●
Warranty cover age	**5 years**		

[1] Depending on the inverter used, and the cable length (details can also vary from one type of device to another).
[2] Other important information about Bluetooth and compatibility, Powermanagement, „own power“ consumption, SCB and SMB central inverters can be found on our website www.solar-log.com.
[3] Using with a RS422 inverter on the same bus is not possible.

In Detail

	Solar-Log200	Solar-Log500	Solar-Log1000
Accessories	Fully packaged cable kits for most supported inverters		
	Digital Meter	Digital Meter	Digital Meter
	PowerLine Package	PowerLine Package	PowerLine Package
	RS485 Wireless Package	RS485 Wireless Package	RS485 Wireless Package
	Sensors	Sensors	Sensors
	–	–	Mobile Wireless Package
	–	–	Modem Package
	Overvoltage protection	Overvoltage protection	Overvoltage protection
Accessories for SMA inverters	Special PiggyBack RS485 (except TL-20 series) (page 39)		
	Data Module SMA RS485 (page 39)		

Top Features	Solar-Log200	Solar-Log500	Solar-Log1000
Compatibility	Compatible with all the major inverter manufacturers, can be found on our website www.solar-log.com		
Software	Web-interface, no software installation is required.		
Easy Installation	Connection is usually possible without PC and installation expertise.		
	The inverter search and the internet registration is enabled immediately and is started automatically.	Query for additional information, then automatic inverter search and internet registration.	
Network recognition	Automatic search for the DHCP server and assignment of a valid IP address in the local network.		
Ability to be reached on the local network	WINS registration automatically takes place and the Solar-Log™ can be found in a web browser at: http://solar-log.		
	The IP address of the Solar-Log™ no longer needs to be known, unless there are several Solar-Logs on the network.		
Additional function	Monitoring and optimisation of own energy consumption	Monitoring and optimisation of own energy consumption	Monitoring and optimisation of own energy consumption
	–	–	Monitoring of central inverters
	Evaluation of Sensor Box data		
Support for the Solar-Log™ SCB and Solar-Log™ SMB	–	–	Monitoring of large systems with the support of Solar-Log1000 or Solar-Log1000 PM+ acc. to the German law § 6.1 EEG 2009 with reduction in active power above 100 kWp
	–	–	Solar-Log1000 PM+ standby power regulation above 100 kWp (legally stipulated in Germany since 1 July 2010)

Article number overview for all Solar-Logs

Type	Art.-No. Solar-Log200	Art.-No. Solar-Log500	Art.-No. Solar-Log1000
Standard	**255240**	**210501**	**211001**
BT	**255241**	**210502**	**211002**
WiFi	**255191**	**255189**	**255185**
BT / WiFi	**255192**	**255190**	**255186**
PM+	**255362** NEW	**255364** NEW	**211005**
PM+ / WiFi	**255363** NEW	**255365** NEW	**255366** NEW
GPRS	**255349** NEW	–	**255187**
PM+ / GPRS	**255402** NEW	–	**255188**

Solar-Log™ Highlights

Solar-Log™ PM+ the Powermanagement

OTTI SOLAR INNOVATION AWARD 27. PV-Symposium 2012

NEW

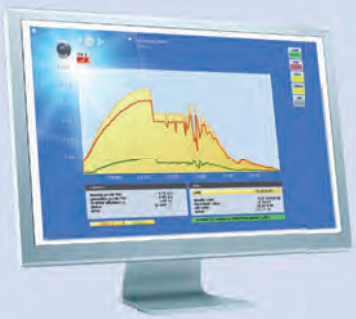
New EEG directive 2012 (Germany)

Since 2009, there is a legal requirement in Germany that the operators of PV plants must engage in feed-in management and network safety management and provide so-called network services. In the past, only large plants with an output >100 kWp were affected by the statutory rule; this has changed as of 01.01.2012. The crucial point of the requirements is that the PV plants are able to be controlled in accordance with the specifications of the particular network operator with respect to feed-in active power, and reactive power is made available.

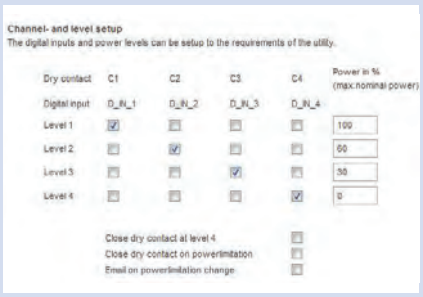
Implement feed-in management with the Solar-Log™

The new PM+ product line from Solar-Log™ product line covers the entire spectrum of requirements in the field of feed-in management. Regardless of whether a house installation requires construction or a large plant needs retro-fitting – Solar-Log™ offers a cost-effective solution.

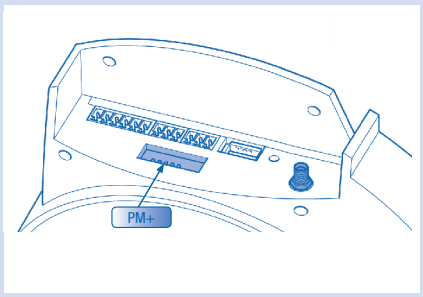
In the simplest case, this could take the form of a free firmware update (www.solar-log.com/en/service-support/downloads/firmware) or the complex control of the inverter using remote-controlled signals from the network operator and/or sensor.



Display showing a reduction on the Solar-Log™ WEB



Matrix for configuration of remote-controlled output reduction



New PM+ interface on the top side of the Solar-Log™ PM+ devices

PM+ interface

The new PM+ interface was specially developed for reading off the signals of a ripple control receiver. It converts the network operator's signals into potential-free contacts.

The PM+ interface can evaluate the potential-free states of up to two ripple control receivers.

Configuration via the web interface

The network operator makes independent decisions regarding how the remote control signals are transmitted and coded. The Solar-Log™ offers respective configuration options for performing both the connection and the configuration. The Powermanagement is configured via the data logger's web interface.

Type	Art.-No. Solar-Log200	Art.-No. Solar-Log500	Art.-No. Solar-Log1000
PM+	255362 NEW	255364 NEW	211005
PM+ / WiFi	255363 NEW	255365 NEW	255366 NEW
PM+ / GPRS	255402 NEW	–	255188

Solar-Log™ Easy Installation

Starting immediately, configuration of Solar-Log™ is quite simple

Solar-Log™ is quick and easy to install and commission with Easy Installation. This new firmware has been available since the end of April 2011. Thanks to the simplified and automatic procedures, the on-site installer does not require PC or installation expertise. When the Solar-Log™ is switched on for the first time the device goes immediately into Easy Installation mode which is the starting point for ensuring automatic provisioning.

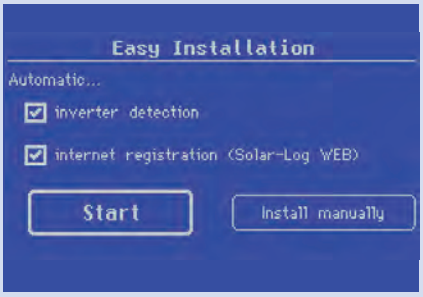
"Easy Installation" is mainly intended for smaller and medium-sized residential power plants of up to 5 inverters.

Automatic inverter search

The Solar-Log™ automatically starts the search for the most common inverter manufacturers and connected inverters (please see our website www.solar-log.com/service-support). When the search is completed, LED 1 stays on permanently.

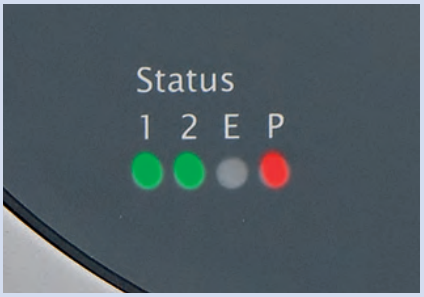
Solar-Log^{200}: The inverter search and the internet registration are enabled immediately.

Solar-Log$^{500/1000}$: The Easy Installation mode is booted manually after the language, country setting and where applicable, the date and time has been programmed.



Solar-Log^{1000} in "Easy installation" mode

WEB browser: http://solar-log



Solar-Log™ after a successful search for inverters and internet connection

High-speed internet connection

Solar-Log™ immediately searches for the DHCP server and can be allocated to a valid IP address on the local network. After that, connection to the Solar-Log™ WEB starts automatically and the data logger attempts to register itself. When the registration is completed, LED 2 stays on permanently. Easy Installation is compatible with Solar-Log™ WEB "Classic 2nd Edition" and with Solar-Log™ WEB "Commercial Edition".

Ease of access on the local network

Solar-Log™ registers itself with its own name on the local network and can be connected to the WEB browser via http://solar-log.xxx. The IP address of the Solar-Log™ no longer needs to be known, unless several Solar-Logs are linked to the same network

The optional manual configuration of the Solar-Log™ can still be performed via the WEB interface on the PC.

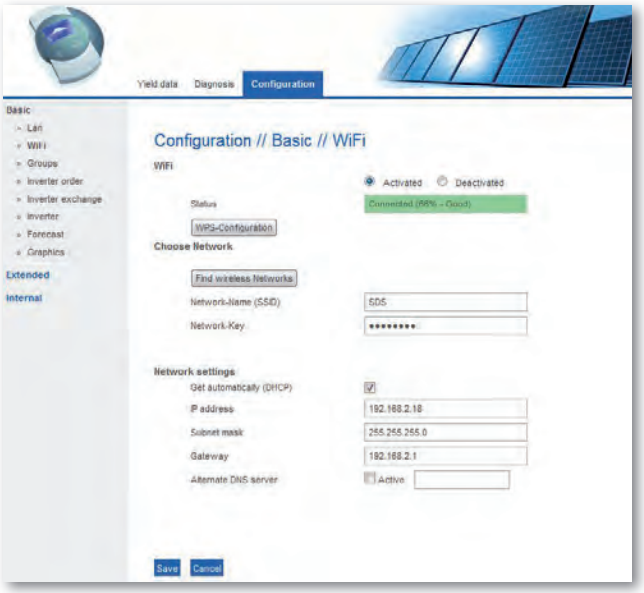
Solar-Log™ Highlights

Solar-Log™ WiFi (wireless LAN)

Starting immediately, Solar-Log™ with wireless internet connectivity

Solar-Log200/500/1000 units are optionally available with an integrated WiFi-module. The module with corresponding non-directional antenna is rigidly integrated in the housing. Signal strength is also displayed on the WEB interface and on the Solar-Log1000. If the signal is not powerful enough, it will need to be amplified using wireless repeaters.

Solar-Log™ WiFi is designed optimally to suit domestic systems with an existing WiFi Access Point.



The detailed information regarding the connection status is visible in the web interface.

Solar-Log™ WiFi offers many benefits

- During the Solar-Log™ installation, no wiring is required, i.e. there is no installation overhead.
- This faster method for installing the data logger saves valuable time and therefore reduces cost.
- Additional hardware such as the PowerLine Package is no longer required.

Technical data	
WiFi (WLAN Modes)	802.11b und 802.11g
Max. output transmission power	802.11 b: +20 dB / 802.11 g: +17 dB
Max. input level	-10 dB
Frequency	2,412 – 2.472 Channel 1 – 13 / 2.484 Channel 14 / 5.180 – 5.825 Channel 36 – 165
Encryption	WEP 128 und 64 Bit, WPA, WPA 2

Type	Art.-No.
Solar-Log200 WiFi	255191
Solar-Log200 BT / WiFi	255192
Solar-Log200 PM+ / WiFi	255363
Solar-Log500 WiFi	255189
Solar-Log500 BT / WiFi NEW	255190
Solar-Log500 PM+ / WiFi	255365
Solar-Log1000 WiFi	255185
Solar-Log1000 BT / WiFi NEW	255186
Solar-Log1000 PM+ / WiFi	255366

Solar-Log^{1000} GPRS & Solar-Log^{200} GPRS

Solar-Log$^{200/1000}$ with installed mobile radio (wireless) technology

The Solar-Log$^{200/1000}$ GPRS is the alternative to the external Solar-Log^{1000} GPRS modem. The new model is available with a magnetic foot antenna with a two meter cable. The SIM card holder is mounted to the inside of the device where it is protected against loss.

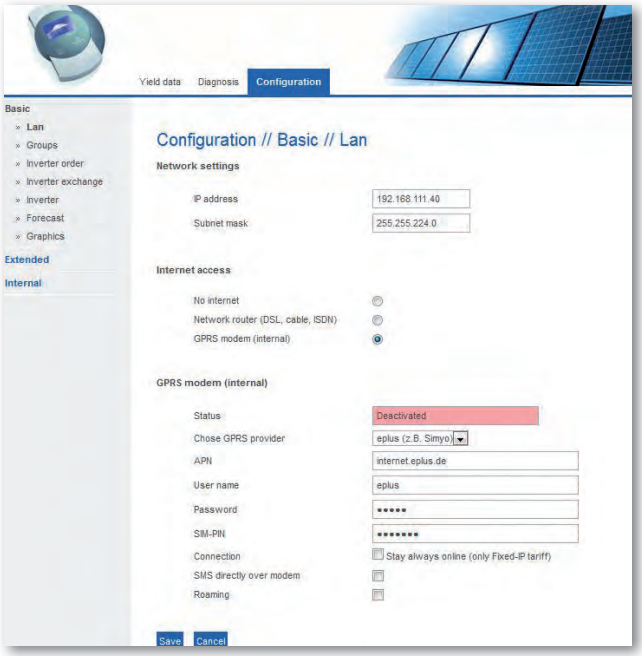
Solar-Log^{1000} PM+ is available with integrated GPRS modem

Please note that, inside the network, eather each one of the up to 9 Solar-Log^{1000} (Slave) units requires a SIM card, or a GPRS router must be integrated.

The advantages of Solar-Log$^{200/1000}$ GPRS

- The daily and automatic hardware reset function creates a more reliable data connection.
- The on-board modem reduces the installation overhead.
- The power consumption is reduced because no separate power adapter is required.

The internal GPRS modem cannot be retrofitted to the Solar-Log$^{200/1000}$, the external modem should continue to be used by Solar-Log^{1000}.



The detailed information regarding the connection status is visible

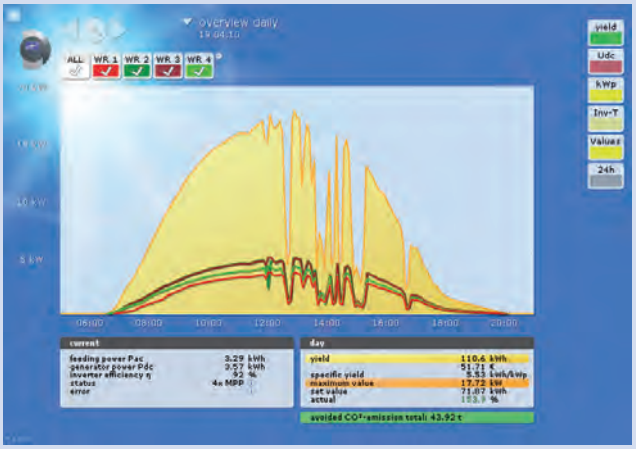
Technical data	
GSM bands	Quad-Band GSM / GPRS
GSM power rating	GSM 800 / 850 Power Class 4 ~ 33 dBm ± 2 dBm GSM 1800 / 1900 Power Class 1 ~ 30 dBm ± 2 dBm
Data transmission	Class 10, max. 85,6 kbps
Scope of delivery	2 m magnetic foot antenna
Connection	SMA antenna connection

Type	Art.-No.
Solar-Log^{200} GPRS	**255349**
Solar-Log^{200} PM+ GPRS	**255402**
Solar-Log^{1000} GPRS	**255187**
Solar-Log^{1000} PM+ GPRS	**255188**
Antenna extension for Solar-Log$^{200/1000}$ GPRS 5 m, internal / external area	**255326**
Antenna extension for Solar-Log$^{200/1000}$ GPRS 10 m, internal / external area	**255327**
Antenna extension for Solar-Log$^{200/1000}$ GPRS 15 m, internal / external area	**255328**
GPRS external antenna for Solar-Log$^{200/1000}$ GPRS, for increased radio range	**255329**

Solar-Log™ Plant Monitoring

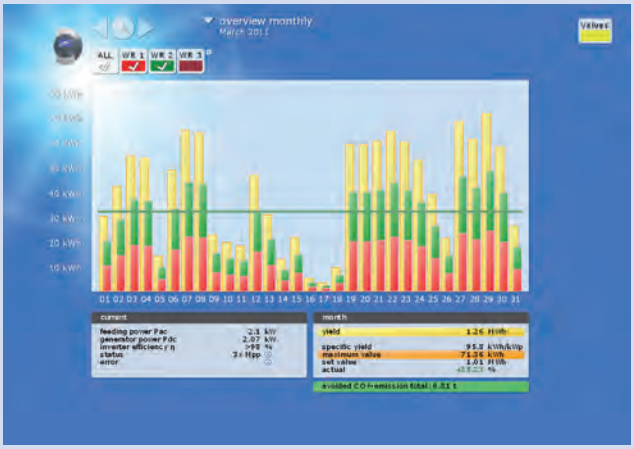
Versatile evaluation and display options

Solar-Log™ WEB can process and analyse plant data with the help of the Solar-Log™ data logger. This can be done either in graphic or numerical format in the form of daily, monthly and annual data reports. In addition to the yield line and input voltage, individual strings and inverters or environmental data associated with plant monitoring can be presented with the help of the Sensor Box as well as other reference values.



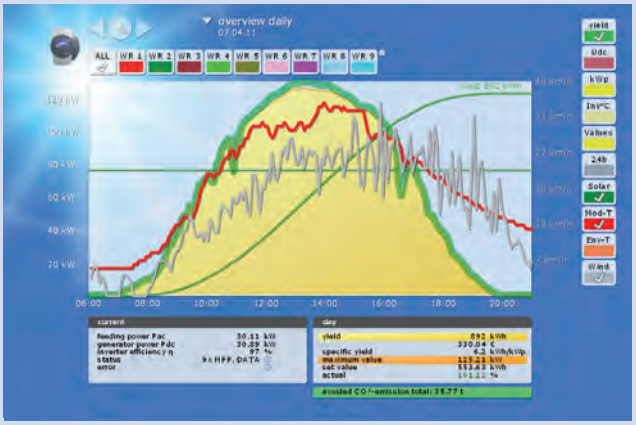
Daily overview with 4 inverters, shading

The daily view shows the graphic and numerical plant analysis as well as periods of shading between 12.00 and 15.00 (noon and 3 p.m.). Either all or just certain inverters can be selected. These are displayed in the screen view in different colours.



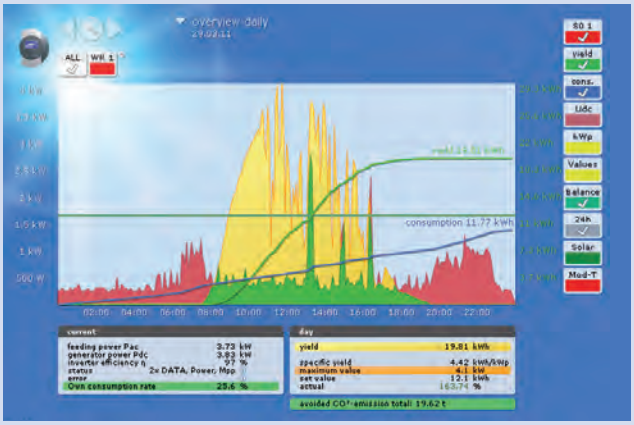
Monthly overview with 2 of 3 inverters

Within this monthly overview, individual days are shown in bar chart format. This view shows two of the three inverters.



Daily curve with irradiance sensor (green), wind sensor (grey), module temperature (red) and yield curve (yellow)

The Solar-Log™ offers the option of connecting a Sensor Box including irradiance sensor, module temperature sensor as well as a wind and ambient temperature sensor. This data, in conjunction with the Solar-Log™ evaluations, enable seamless analysis and rapid fault detection to take place (read more on page 40).



Daily overview with presentation of yield and consumption balance, 1 inverter current source (red), current production (yellow), own current (green)

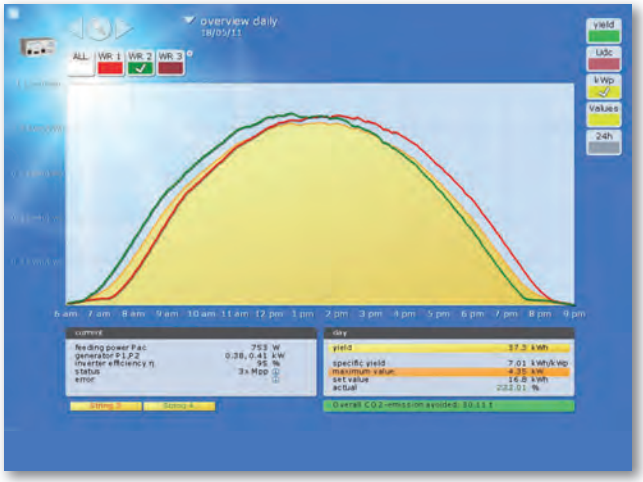
The Solar-Log^{1000} facilitates intelligent control and precisely timed recording of energy consumption. The data logger can "intelligently switch" up to 4 external consumers.
(read more on page 44)

Comprehensive failure monitoring and power balancing

Breakdowns, and in particular drops in power in solar power plants are often not noticed until weeks have passed, if at all. If such a breakdown coincides with high solar radiation, the loss in yield for the plant owner is subsequently higher. With Solar-Log™ Monitoring you have everything under control!

String comparison

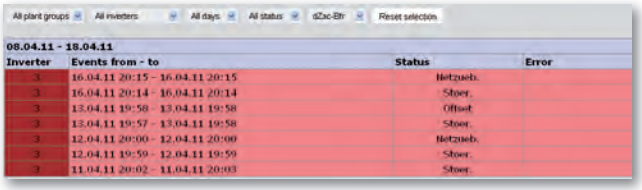
To enable the solar power plant to run efficiently and without downtime, the power ratings of individual inverters are compared against one another. Here, the Solar-Log™ examines the data in terms of kWh / kWp (specific power) of the inverters which means different sized inverters can still be compared against one another. On multi-string tracking inverters, the Solar-Log™ can detect variances right down to string level. The Solar-Log™ either transmits details of these variances by e-mail or by SMS.



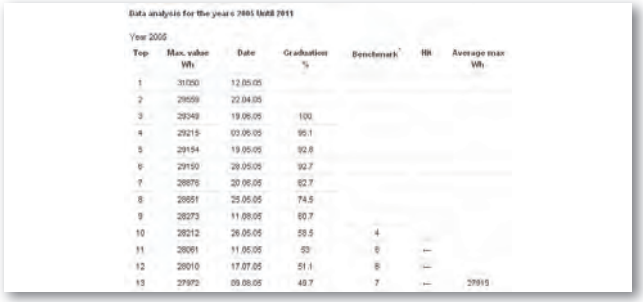
String comparison

Inverter status

The Solar-Log™ continuously records the status and fault codes of the inverters, i.e. you always have peace of mind that all connected inverters are working properly. Fault codes from each manufacturer are saved in the Solar-Log™ as well as on the internet. In the event of a malfunction they are transmitted by e-mail or SMS.



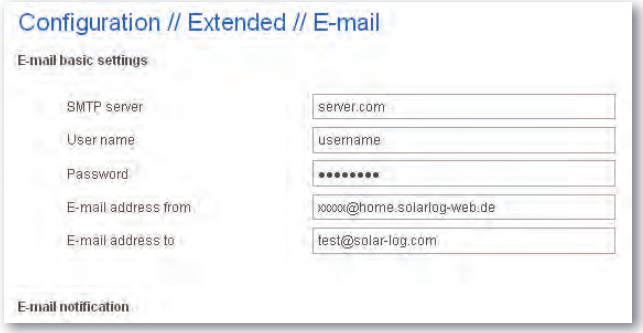
Inverter status



Degradation

Module degradation

Over the years, modules, inverters and cables age and their performance rating deteriorates. Solar-Log™ automatically performs calculations for individual years in respect of plant degradation and establishes the reduced yield levels of the solar power plant. Based on these guide values, problems can be identified and remedied at an early stage.



Message transmission

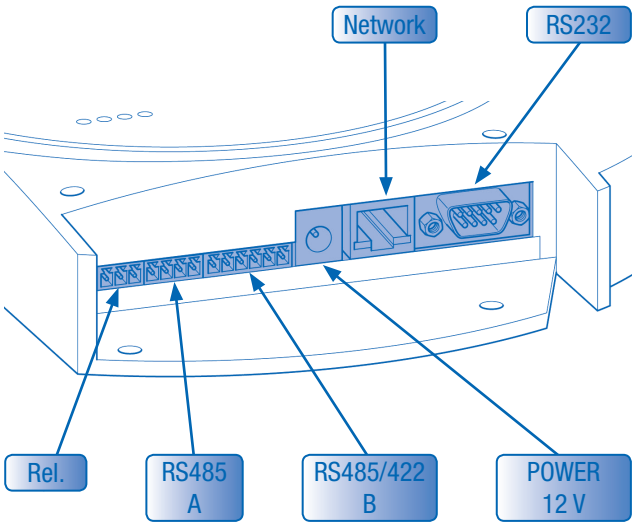
The Solar-Log™ either transmits yield and fault messages by e-mail or by SMS. The LEDs provide information about the operating status of the data logger. With the Solar-Log^{1000}, variant values are also displayed on the screen and anti-theft protection for modules and inverters can also be implemented by means of a contact loop. The alarm-raising function can be performed by e-mail, SMS or by means of a potential-free contact.

Connection options

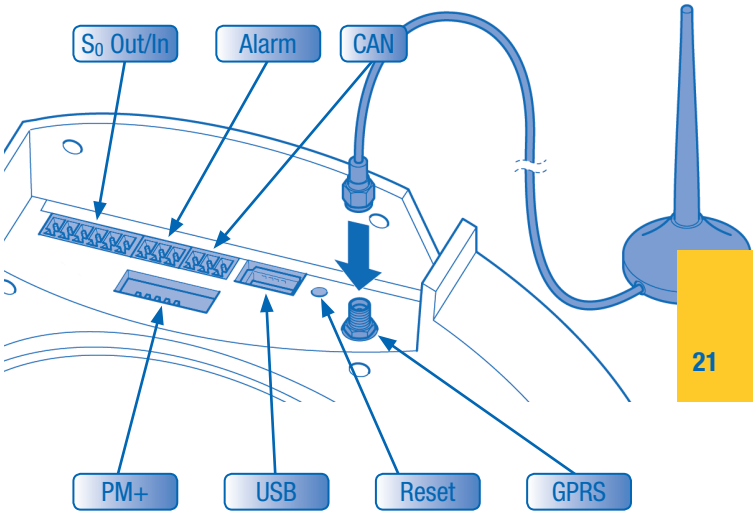
		Solar-Log^{200} interfaces	Solar-Log^{500} interfaces	Solar-Log^{1000} interfaces
Inverter interfaces	**RS485 / RS422 – interface usage**	**RS485 / RS422 –** multi-purpose interface	**RS485 / RS422 –** multi-purpose interface	**RS485 A –** interface **RS485 / RS422 B –** multi-purpose interface
	Number of inverters	Max. 1 inverter	Max. 10 inverters -various inverters from the same protocol	**Per interface** - Max 50 inverters - various inverters from the same protocol
	RS485 – interface usage	Inverter connection via RS485	Inverter connection via RS485	Inverter connection via RS485
		and – connection of a Sensor Box to record environmental data (irradiance and module sensor)	**and** – connection of a Sensor Box to record environmental data (irradiance, module and ambient temperature, wind sensor)	**and** – connection of a Sensor Box to record environmental data (irradiance, module and ambient temperature, wind sensor)
		and – for connection of an own-current consumption meter acc. to IEC 60870	**and** – for connection of an own-current consumption meter acc. to IEC 60870	**and** – for connection of an own-current consumption meter acc. to IEC 60870
		–	**and** – for connection of the display panels produced by Schneider Displaytechnik, Rico or HvG	**and** – for connection of the display panels produced by Schneider Displaytechnik, Rico or HvG
	RS422 – interface usage	RS 422 Fronius / Sunville connectible without additional interface converter	RS 422 Fronius / Sunville connectible without additional interface converter	RS 422 Fronius / Sunville connectible without additional interface converter
	CAN-Bus	–	–	For the connection of e.g. Voltwerk inverters
Additional function interfaces	**S_0 In / out**	S_0 Impulse input – for optional recording and calculation of self-produced power consumption	S_0 Impulse input – for optional recording and calculation of self-produced power consumption	S_0 Impulse input – for optional recording and calculation of self-produced power consumption
		–	S_0 Impulse output for connection of external display units, impulse factor can be set to any value	S_0 Impulse output for connection of external display units, impulse factor can be set to any value
	Relay(s)	–	–	For external switch control, e.g. alarm signal
	Alarm	–	–	Connection for anti-theft protection via contact loop for external alarms via potential-free contact
	USB connection	–	–	- For reading out data - To update device firmware without a PC or Internet access
	PM+ interface	**Only on Solar-Log^{1000} PM+ (Powermanagement)** - For connection of a ripple-control receiver for feedback control of the system - Complies with the requirements of mains power protection management	**Only on Solar-Log^{1000} PM+ (Powermanagement)** - For connection of a ripple-control receiver for feedback control of the system - Complies with the requirements of mains power protection management	**Only on Solar-Log^{1000} PM+ (Powermanagement)** - For connection of a ripple-control receiver for feedback control of the system - Complies with the requirements of mains power protection management
Network / internet connection	**Network**	Connection to the internet (Ethernet, Fixed address or DHCP)	Connection to the internet (Ethernet, Fixed address or DHCP)	Connection to the internet (Ethernet, Fixed address or DHCP)
	RS232	–	–	Modem connection for mobile radio (wireless) or dial-up modem
	GPRS	Antenna connection and SIM card slot for Solar-Log™ with integrated GPRS	–	Antenna connection and SIM card slot for Solar-Log™ with integrated GPRS

Interfaces – Connection (Sample View of Solar-Log^{1000})

Bottom view



Top view



Input

wireless RS485 Wireless-Package, Bluetooth
by cable RS485, RS422, CAN-Bus (Solar-Log^{1000})

Sensors RS485
Irradiation, temperature, wind force

meter as
Grid meter, consumption meter, unknown inverter meter

Ripple Control Receiver
Powermanagement+, power reduction, reactive power control

RS485 out / S_0 out
XL display, Solar-Log$^{500/1000}$ only
via internet
Solarfox

Solar-Log™ APP
iPhone
iPad

Solar-Log™ WEB
Visualization in WEB Portal

Customer
Access to the Solar-Log™

Output

Solar-Log™ WEB

Our online monitoring portfolio

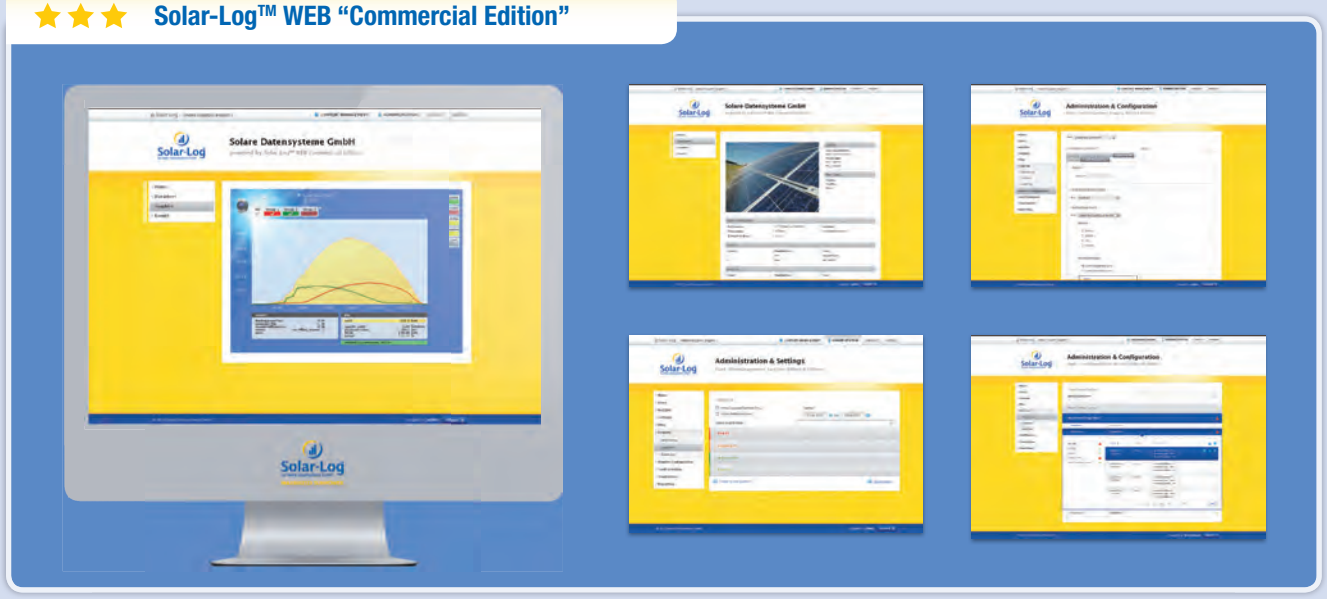
Solar-Log™ WEB – Evaluation and monitoring via the Internet

Solar-Log™ WEB expands monitoring of the Solar-Log™ into the Internet. With this Internet service the plant yields, error messages and configuration data for the Solar-Log™ are saved and displayed on our servers which are specially secured to prevent loss of data.

With our Solar-Log™ WEB, we offer you two options for monitoring and evaluation:

1.

★★★ **Solar-Log™ WEB "Commercial Edition"**



Solar-Log™ WEB "Commercial Edition"

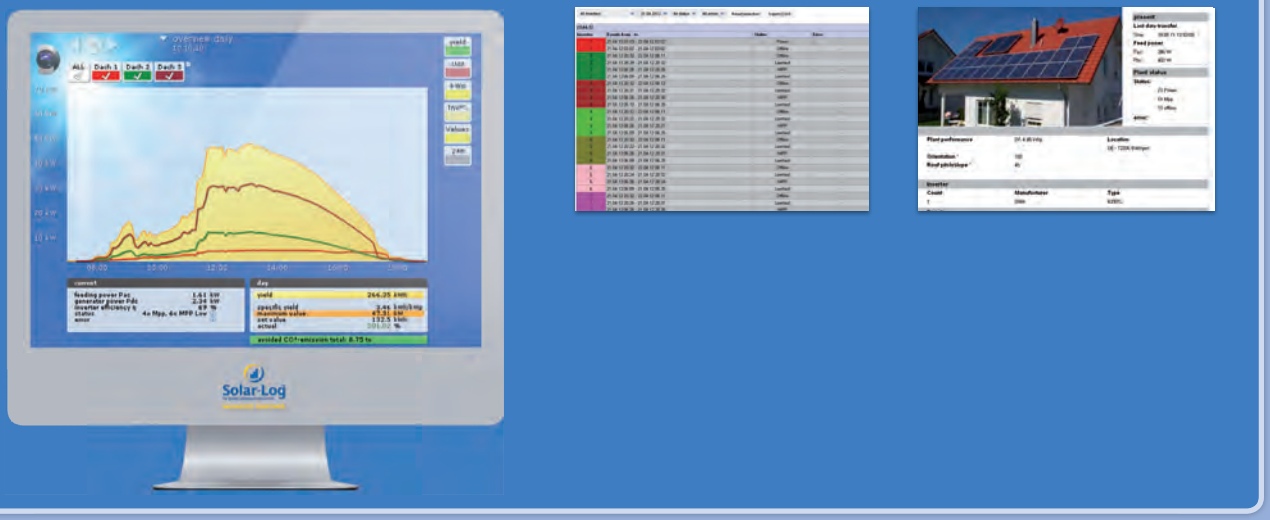
For the "Full Service" option from the portal operator - installation, monitoring, maintenance.

With Solar-Log™ WEB "Commercial Edition", the portal operator can issue the plant owner with a maintenance contract and can therefor offer his customers an extended and professional form of plant monitoring. This enhances the level of customer support provision. Solar-Log™ supports this "Full Service" maintenance concept through online access to the plant. The portal operator offers the complete package with monitoring, maintenance and servicing of the solar power plant. This enables the portal operator to respond rapidly to fault messages and to save valuable time, effort and costs. Changes to the Solar-Log™ configuration can be made conveniently from the office. The plant owner always has access to yield and plant data.

- **Professional maintenance**
  Provide “Full Service” plant maintenance for customers.
- **Easy Set Up**
  Quick and easy integration into Solar-Log™ WEB.
- **Efficient monitoring**
  Status of all monitored plants at a glance.
- **Quick reaction times**
  Recognize, analyse and remedy errors quickly.
- **Simple administration**
  Log and manage activities and errors in the plant log book.
- **Detailed reporting**
  Reliably provide customers with clear reports on a regular basis.

2.

★★ **Solar-Log™ WEB “Classic 2nd Edition”**



Solar-Log™ WEB “Classic 2nd Edition”

For technically adept plant owners who want to monitor their own plant.

“Classic 2nd Edition” offers the basic functions for plant monitoring. Private plant owners monitor their own plant and independently evaluate faults. The yields and evaluations are depicted in the form of graphics. “Classic 2nd Edition” is free of charge up to 30 kWp (depend on country), above which modest fees are applicable. Log-in via www.solar-log.com/classic2.

Solar-Log™ WEB “Commercial Edition” – the monitoring platform for installers and service providers

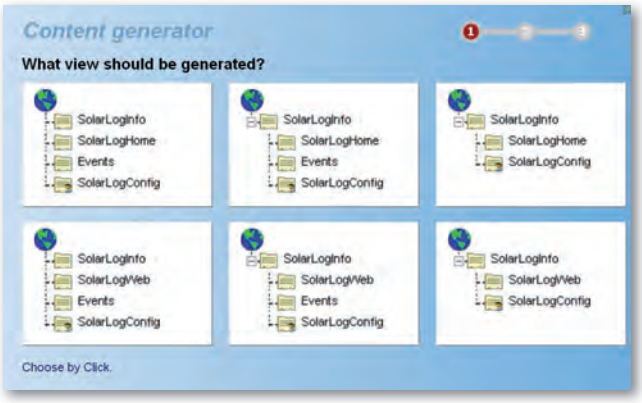
With the “Commercial Edition”, in addition to the “Classic 2nd Edition”, portal operator also receive a variety of functions for monitoring customer plants securely and comprehensively thus enabling them to offer professional service and maintenance contracts.

Professional Internet presence

Individual design of your own monitoring platform

The Solar-Log™ WEB “Commercial Edition” website can be individually designed without expert knowledge. A range of function modules are available which can be integrated as required at the touch of a button. The page structure can be expanded easily and simply just as you want.

The website’s appearance and layout can be customized to match the customer’s corporate design, e.g. logo and color scheme.



Configuration wizard to design the web pages

Customized page layout available in any color

An example template of a customized corporate design

Upon request, Solare Datensysteme offers the service to create individual templates and set up your own internet domain, ensuring an even more uniformed web presence for the portal operator.

The perfect overview for the installer and for the plant owner

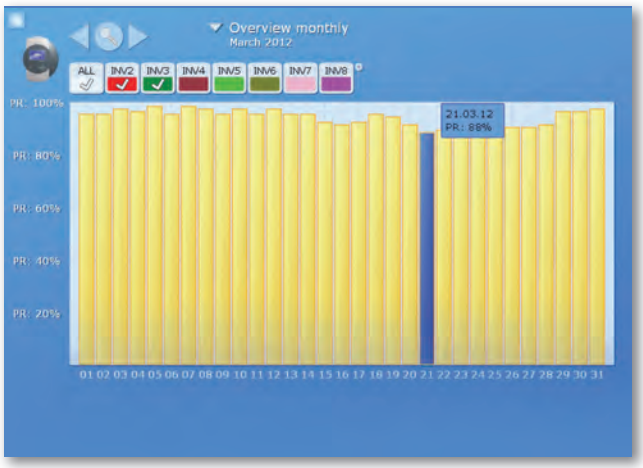
Appropriate display modules are available for all target groups.

The plants shown on a map clearly demonstrate the references of the portal operator.

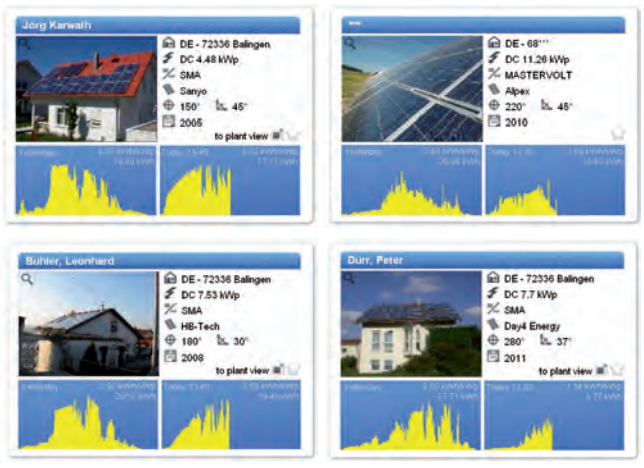
The overview option impressively displays the overall performance, the total yield or the amount of CO_2 emissions that have been avoided.

The data sheet provides an overview of the most important plant data such as location, performance and inverter details.

Data from up to ten plants at various locations can be graphically displayed and compared.



Using the Performance Ratio Graphic allows for a comparison of the potential yields, as measured by the irradiation sensors and actual yield.



The informative plant overview with a search option displays the most important plant data including the current and previous day's yield curve.

The portal operator defines which pages can be viewed by others and which is available only with personal log-in credentials.

Solar-Log™ WEB Commercial Edition

Efficient tools for the installer and service provider

Simple integration of PV plants and remote configuration

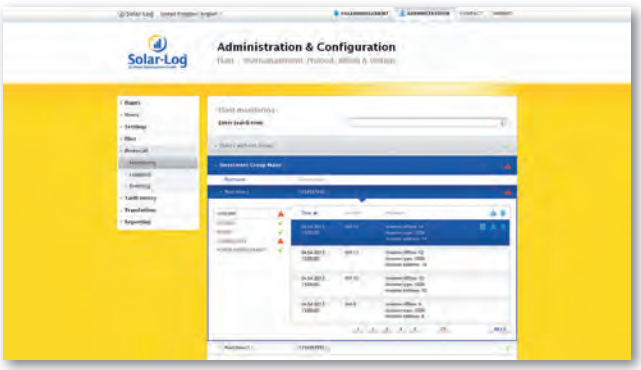
The set up wizard guides you through the first steps to integrate the plants into Solar-Log™ WEB. After which the Solar-Log™ settings can be conveniently access remotely via the internet, greatly reducing the installation time and effort required on site.

Remote configuration

Central and clearly laid out plant monitoring

Solar-Log™ WEB offers portal operators the option to centrally monitor all of the plants at the same time. Malfunctions such as inverter breakdowns or deviations in performance are shown according to their relevance. Errors in the transfer of data between Solar-Log™ and the portal are also recognized and a signal is sent out.

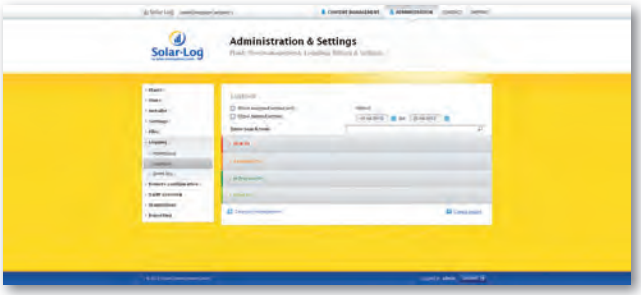
In this way the daily plant control for all customer plants is reduced to one procedure which can be carried out by teams without any overlap.



Errors or breakdowns can be recognized and analysed in a very short time.

Perfect organization with the plant logbook

In the “Commercial Edition”, the plant log book includes the option of an integrated ticket system to log and manage service calls. Service team members can be centrally assigned to service calls and appointments. A list of all of the relevant details, comments and the current service status can be entered and seen in the log book.



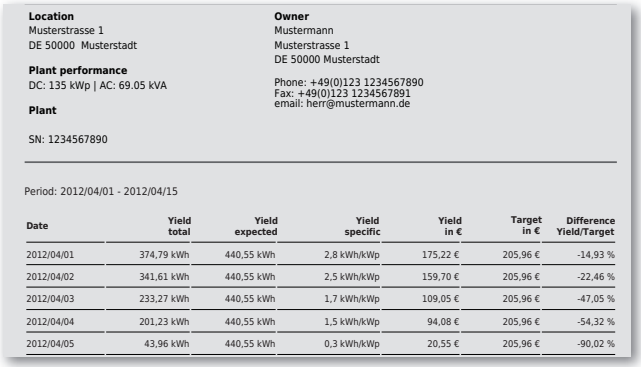
The overview of the log book entries are sorted according to status.

Always in the know with regular reports

A well-arranged yield report for every plant that is monitored by Solar-Log™ WEB is available in a PDF or CSV format. If desired, the reports can be automatically generated on a weekly, monthly or yearly basis and sent to as many e-mail addresses as you want. The ideal option for installers and their customers to be reliably informed on a regular basis.

Documents are available when you need them

Documents for specific plants such as string plans, contracts or specifications can be updated to the portal and are accessible at all times by authorized users.



Location
Musterstrasse 1
DE 50000 Musterstadt

Plant performance
DC: 135 kWp | AC: 69.05 kVA

Plant

SN: 1234567890

Owner
Mustermann
Musterstrasse 1
DE 50000 Musterstadt

Phone: +49(0)123 1234567890
Fax: +49(0)123 1234567891
email: herr@mustermann.de

Period: 2012/04/01 - 2012/04/15

Date	Yield total	Yield expected	Yield specific	Yield in €	Target in €	Difference Yield/Target
2012/04/01	374,79 kWh	440,55 kWh	2,8 kWh/kWp	175,22 €	205,96 €	-14,93 %
2012/04/02	341,61 kWh	440,55 kWh	2,5 kWh/kWp	159,70 €	205,96 €	-22,46 %
2012/04/03	233,27 kWh	440,55 kWh	1,7 kWh/kWp	109,05 €	205,96 €	-47,05 %
2012/04/04	201,23 kWh	440,55 kWh	1,5 kWh/kWp	94,08 €	205,96 €	-54,32 %
2012/04/05	43,96 kWh	440,55 kWh	0,3 kWh/kWp	20,55 €	205,96 €	-90,02 %

Daily yields with specific and monetary yields, as well as, balance variance.

In order to reap the best possible benefits from the manifold functions and options that Solar-Log™ WEB offers, a half-day training course with a detailed introduction is held. This can take place in Geislingen-Binsdorf, on location or via the Web.

Solar-Log™ WEB: „Commercial Edition“ and „Classic 2nd Edition“ in Comparison

	Plant monitored by:	Plant owner or by third party	Portal operator
	Product Name	**Classic 2nd Edition*** (< 30 kWp at no charge, > 30 kWp charged) depending on country	**Commercial / Full Service** (charged)
Basis functions	Event log (error / status messages of the inverters)	●	●
	Overview of the yields per kWp (specific yields)	●	●
	Performance comparison of the individual inverters and strings	●	●
	Data and fault messages via e-mail	●	●
	Compatible with Solarfox Public Display	●	●
	Compatible with Solar-Log™ APP for iPhone, iPod touch or iPad	●	●
	Standard transfer intervals: 30 min, 1 h, 2 h, 4 h, 8 h, daily	only standard	standard and every 10 or 15 min
Commercial functions	Registration	online	by portal operator
	Number of email addresses for performance / fault messages	1	4
	Simple configuration due to „Easy Installation“	●	●
	Data sheet with the essential information and plant image	●	●
	Detailed graphics and table view with export function	●	●
	Central fault message monitoring of all plants	–	●
	Remote configuration of the Solar-Log™ device	–	●
	User-defined automatic yield report (CSV, Pdf) via e-mail or FTP	–	●
	Customized page layout with RGB colour and Logo	–	●
	Individual page composition due to flexible Content Management System (CMS)	–	●
	Configuration wizard to design the web pages	–	●
	Platform for promotional activities and customer relationship	–	●
	Plant log book with ticket system and task assignment	–	●
	Plant project administration (location, owner, inverter, module and performance data)	–	●
	Display all current data (total yield, total output, CO_2 emission)	–	●
	Display all plant locations on a map	–	●
	Overview of selected plants	–	●
	File system for specific plant documents (string plans, contracts or specifications)	–	●
	Unser administration and individual access rights	–	●
	Graphical arrangement of up to 10 Solar-Logs	–	●
	Powermanagement regulation protocol	–	●
	Performance Ratio graphic	–	●
	String-Connection-Box graphic	–	●
	Data transfer from 1st Edition / 2nd Edition	–	●
	Compatible with SMA Sunny WebBox (limited functionality)	–	●
	On request, individual Corporate Identity template	–	charged
	On request, Domain name of your choice (de / eu / com)	–	charged

Changes & additions subject to change without notice.

Solar-Log^{1000} PM+

The Powermanagement (PM+) for photovoltaic plants in the medium voltage network

In accordance with statutory provisions arising out of the Medium-Voltage Directive of the German Federal Association of Energy and Water Management (BDEW) and the Renewable Energy Law (EEG), network operators must, when required, be able to remotely control the output of the generating plants that are feeding in to their networks.

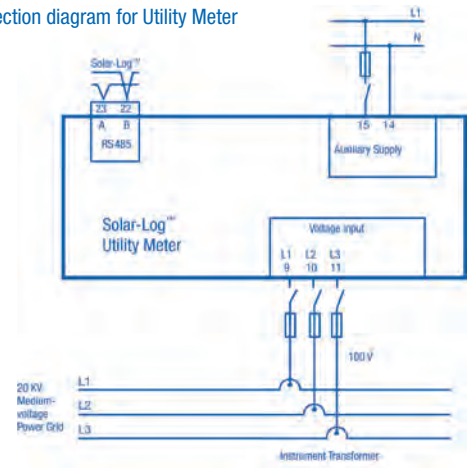
The Solar-Log^{1000} PM+ is equipped with a digital PM+ interface and can evaluate the potential-free outputs from two ripple control receivers that are able to be actuated by the network operator.
In the area of the provision of reactive power the voltage-dependent reactive power control via the function Q(U) represents a serious technical challenge. Being able to control the reactive power, allows a dynamic adjustment to current network conditions and thus assures a greater influence over the voltage stability in the network.

Solar-Log™ Utility Meter

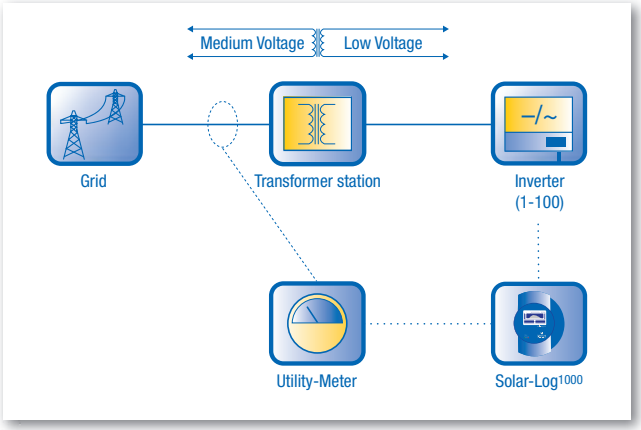
Function

The combination of the Solar-Log^{1000} PM+ and the Solar-Log™ Utility Meter makes it possible to regulate the feed-in reactive power according to the voltage prevailing on the medium voltage level. The Utility Meter which takes measurements via voltage converters in the medium voltage network, relays the measured values to the Solar-Log^{1000} PM+ via an RS485 Bus. Based on the voltage measured at the time the Solar-Log^{1000} PM+ uses stored characteristic curves to calculate the required reactive power. Based on this, the connected inverters are controlled accordingly.

Connection diagram for Utility Meter



Solar-Log™ Utility-Meter



Basic set-up of Q (U) regulation

Technical data	
Voltage measurement	17 V-520 V L-L, 4 inputs
Interface	RS485
Mounting	Top hat rails, 95-240 V_{AC} / 135-340 V_{DC} voltage supply

Type	Art.-No.
Solar-Log™ Utility Meter Measuring unit for cos phi control in conjunction with the network voltage	255385

Feed-in management for large plants

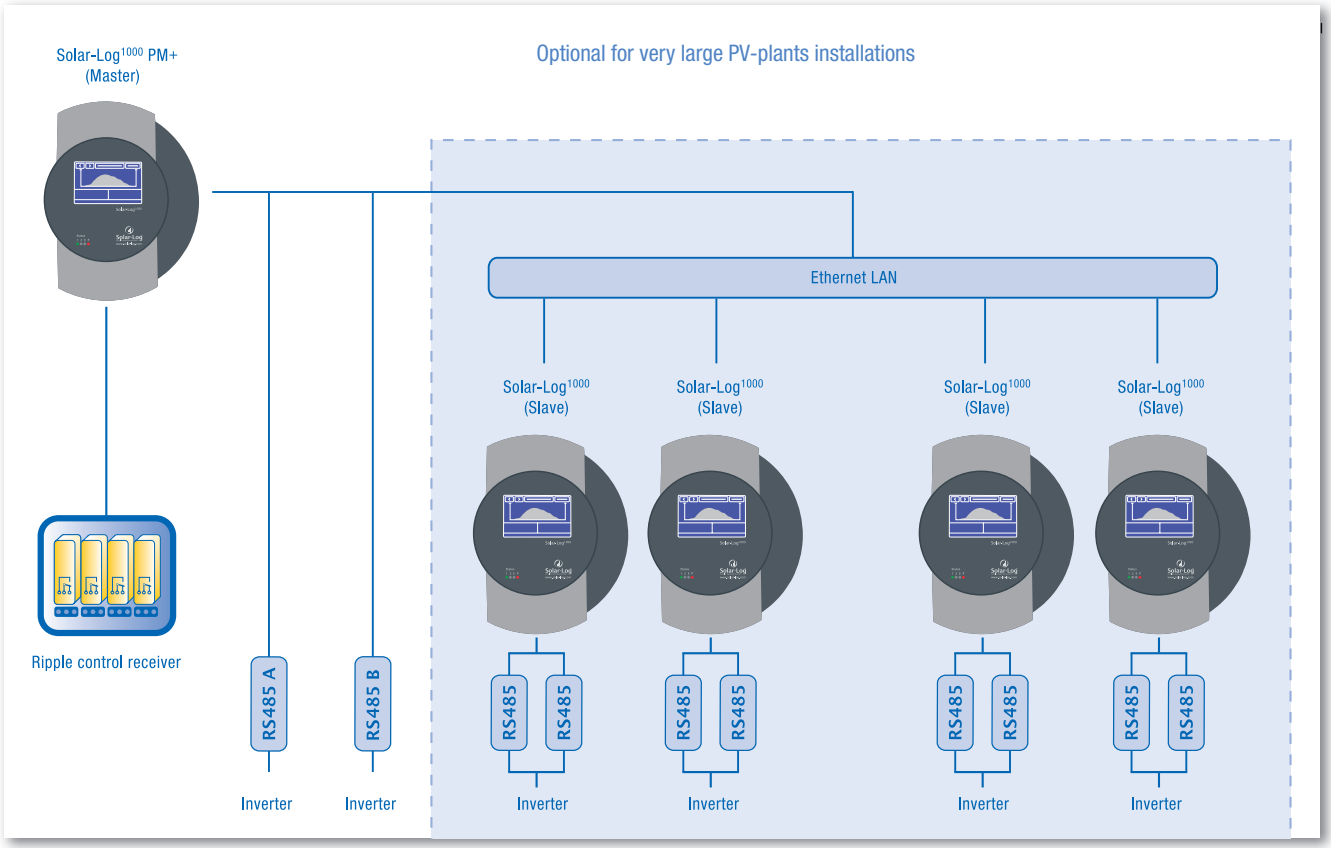
In order to provide feed management for large plants, there is the option to operate the Solar-Log^{1000} PM+ in a network with several Solar-Log^{1000} units.

Function:

- The ripple control receiver signals are received on the Solar-Log^{1000} PM+ (Master) and are distributed to the connected inverters via an RS485 bus.
- In addition, the switching commands of the Solar-Log^{1000} PM+ (Master) energy supplier are forwarded to other Solar-Log^{1000} units that then, in turn, switch the connected inverters on.
- For this procedure, the Solar-Log^{1000} PM+ (Master) is connected to up to 9 Solar-Log^{1000} (Slave) units via the network (RJ45 wiring).

Configuration:

- The IP addresses of the connected Solar-Log^{1000} units are entered and stored in the Solar-Log^{1000} PM+ (Master).
- After a reboot of the Solar-Log^{1000} (Slave), this then appears in “Configuration” under “Extension” as a new menu entry “Feed-in Management”.
- This menu item configures the “Feed-in Management” of the inverters connected to this Solar-Log™.



Example

Further information at:

www.solar-log.com/en/service-support/downloads/brochures-data-sheets.html/Solar-Log^{1000} PM+ Technical Description

Monitoring of large plants

With Solar-Log™ SCB and Solar-Log1000 large plants can be monitored

Large plants generate high levels of profitable sales revenues. For this reason good monitoring is all the more important.

The new Solar-Log™ String Connection Box monitors every individual string and was deliberately developed for successful data evaluation by the Solar-Log™. Strict adherence to a fundamental importance of quality was involved in the selection of materials. All components used comply with current DIN and VDE standards. The SCB “Made in Germany” adheres to the highest standards of quality.

Solar-Log™ SCB

SCB at a glance

Comprehensive monitoring

- Individual string monitoring for precise fault identification and localisation.
- Connectible Sensor Boxes for additional reference values.
- Optimum results obtained by integrating the Solar-Log™ with Solar-Log™ WEB.

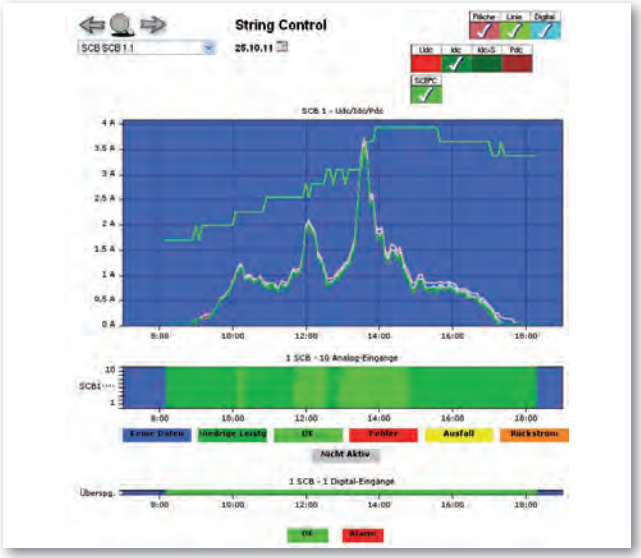


Image of Solar-Log™ WEB string control monitoring

Highest standards of operational safety

- Design rated to 900 V system voltage (with supply from modules via internal DC/DC mains power unit) on all components up to terminals and cables.
- 1100 V, 160 A load circuit breakers for reliable all-terminal DC disconnection at full load.
- Class I/II, “B/C” overvoltage protection as well as string protection on the positive and negative terminal for comprehensive protection of connected modules.
- High temperature stability in continuous operating mode (while adhering to “synchronicity”).

Ease of assembly

The powder-coated aluminium housing complies with protection standard IP65 and is able to withstand severe weathering without any difficulty. Clearly defined connections with contact protection inside the box assure high levels of reliability. All connections inside the String Connection Box are readily accessible and therefore simplify the task of installation. Voltage supply to the box is achieved by the DC voltage of the modules. For operational purposes, no external power supply cable needs to be routed. The SCB is completely preassembled at the time of delivery and is ready to be connected.

Type	Art.-No.
Solar-Log™ SCB 12 DC/DC	**255115**
Solar-Log™ SCB 16 DC/DC	**255123**

On request the box is available as a AC/DC version with emergency fire switch.

Type	Solar-Log™ SCB 12 DC / DC [1]	Solar-Log™ SCB 16 DC / DC [1]
DC input		
Number of inputs	12 x Plus / 12 x Minus	16 x Plus / 16 x Minus
Cable cross-section, flexible	1 – 16 mm^2	1 – 16 mm^2
Input voltage – DC	440 – 900 V [1]	440 – 900 V [1]
Cable current per string – DC	12 A	10 A
Number of fuse holders / fuse dimensions	12 + 12 / 10 x 38 mm	16 + 16 / 10 x 38 mm
Type of protection (not included in the delivery)	IEC 60269-6	IEC 60269-6
Overvoltage protection, type	Class I / II (B / C)	Class I / II (B / C)
Outputs		
Number of outputs	1 Plus / 1 Minus	1 Plus / 1 Minus
Cable cross-section, flexible	35 – 95 mm^2	35 – 95 mm^2
Max. output voltage	900 V [1]	900 V [1]
Cumulative current	160 A	160 A
Protection Earth	External M12 connection pin	External M12 connection pin
DC circuit breaker		
Rated operating voltage, Ue (DC)	1100 V_{DC}	1100 V_{DC}
Rated operating current in category DC22B, I_e	160 A_{DC}	160 A_{DC}
Mechanical service life	25,000 engagements / 120 per hour	25,000 engagements / 120 per hour
Reference standard	IEC 60947-3	IEC 60947-3
Data monitoring		
Energy consumption / DC supply voltage [1]	< 8 W / self-sustaining from 440 to 900 V	< 8 W / self-sustaining from 440 to 900 V
Ambient temperature	-20 °C to +65 °C	-20 °C to +65 °C
Measuring channels (current – DC)	12	16
Available data	String currents (12)	String currents (16)
	Total voltage	Total voltage
	Overvoltage protection triggered	Overvoltage protection triggered
	Sensor data (irradiance, wind, module temperature, ambient temperature)	Sensor data (irradiance, wind, module temperature, ambient temperature)
Configuration	Solar-Log™ Config Interface	Solar-Log™ Config Interface
Data bus		
Type	RS485	RS485
Bus spacing	2 m to 500 m	2 m to 500 m
Max. number of SCBs on the bus	60	60
Housing		
Dimensions (h x w x d) without screw onnections	600 mm x 600 mm x 170 mm	600 mm x 600 mm x 170 mm
Weight	approx. 20 kg	approx. 20 kg
Material	UV-resistant, powder-coated aluminium housing	UV-resistant, powder-coated aluminium housing
	UV-resistant cable apertures – screw connections M32 x 1.5 RAL9004	UV-resistant cable apertures – screw connections M32 x 1.5 RAL9004
Protection class, protection level	Protection class II, IP 65	Protection class II, IP 65
Planned options		
Solar-Log™ SCB 12 or 16 AC / DC [2] **(input voltage (DC) 0 – 1000 V)**	external AC voltage supply 1 x 230 V	external AC voltage supply 1 x 230 V
Fire brigade emergency stop	requires an external AC voltage supply 1 x 230 V	requires an external AC voltage supply 1 x 230 V
Warranty	**5 years**	

[1] Voltage supply direct via the PV generator

[2] Voltage supply via external AC 230 V connection

Solar-Log™ SMB and Solar-Log1000 – Monitoring large PV Plants

Many large plants are still not completely monitored. String monitoring offers the appropriate tools to detect a total or partial breakdown.

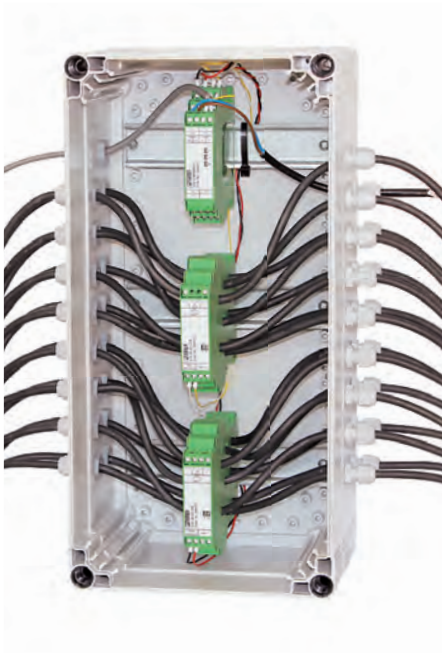
The Solar-Log™ SMB in combination with the Solar-Log™ provides the optimal solution when upgrading to string monitoring. The Solar-Log™ SMB is employed when the already present SCB only links the strings and does not monitor them.

The Solar-Log™ SMB is a two-part monitoring system that consists of:

Solar-Log™ SMB-C	Solar-Log™ SMB-M
Control Unit for the communication with the Solar-Log™ including measuring unit for 16 strings	Measuring unit for 16 strings

The Solar-Log™ SMB-M is always connected to a Solar-Log™ SMB-C. That is why every plant has to have at least one Solar-Log™ SMB-C. That means a maximum of 16 strings can be monitored from the Solar-Log™ SMB-C and the additional 16 strings from each attached Solar-Log™ SMB-M (maximum 3 SMB-M per SMB-C).

Up to 31 Solar-Log™ SMB-C can be connected to a Solar-Log™ RS485 interface.



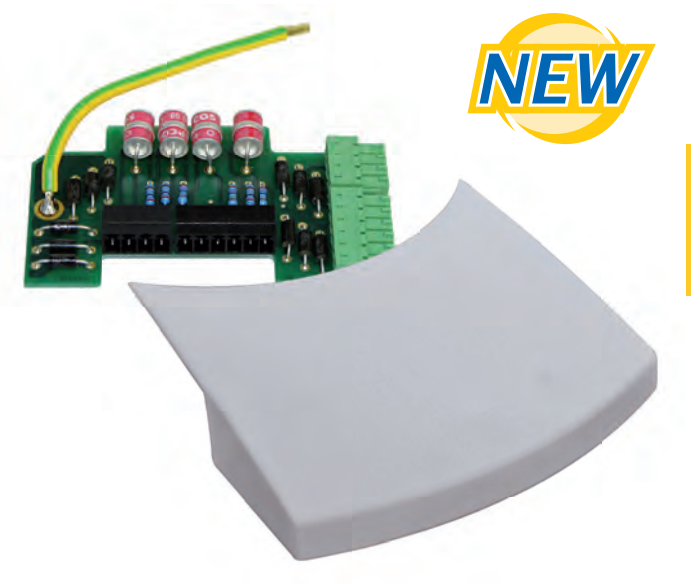
24 V power supply needed

Technical Data:	Solar-Log™ SMB-C	Solar-Log™ SMB-M
Measuring number of strings	2 x 8 strings	2 x 8 strings
Measuring range per string	0 – 20 A, < 1 % tolerance	0 – 20 A, < 1 % tolerance
Diameter for the cables	10 mm	10 mm
Temperature range	-20 °C – +70 °C	-20 °C – +70 °C
Protection Class	IP65	IP65
Dimensions	300 mm x 400 mm x 200 mm	300 mm x 400 mm x 200 mm
Power supply	23 V_{DC} – 30 V_{DC}	via Solar-Log™ SMB-C
Power consumption	Max. 800 mA	via Solar-Log™ SMB-C

Type	Art.-No.
Solar-Log™ SMB-C	**255427**
Solar-Log™ SMB-M	**255428**

Solar-Log™ overvoltage protection

The overvoltage protection device for the Solar-Log™ offers appliance protection against electrical voltage that is too high, which can lead to overvoltage damage. This damage can be caused by various factors. For example, if lightning strikes in the vicinity and creates a voltage spike, or when removing inverter communication cables from the logger while the inverter is operating.



Greater security, Solar-Log™ now with optional overvoltage protection

This appliance protection device has been specially developed for retrofitting the RS485/422 interface of the Solar-Log™. For Solar-Log1000, the RS485/422 and RS485 interfaces can be protected simultaneously with the overvoltage module.

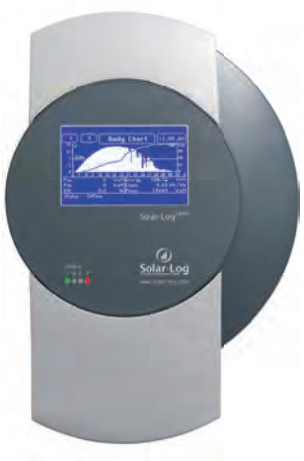
Easy to install

- Plug the overvoltage protection device into the relevant interface.
- Connect the inverter cable to the overvoltage protection device.
- Ground the overvoltage protection device – finished.

The Solar-Log™ overvoltage protection device offers security and comfort

- Failures due to overvoltage are minimized.
- The overvoltage protection device is easy to install.
- The visually attractive Solar-Log™ design is retained due to the longer cable cover that is used instead of the previous cover.

Please be aware that, in order for the overvoltage protection device to work properly, it must always be connected to Ground.



extended cable cover

Mounted Overvoltage protection

Technical Data	
Nominal operating voltage	5 V
Maximum operating voltage	6 V_{DC}; 4,25 V_{AC}
Maximum operating current	500 mA
DC resistance in operation	2,7 Ω
Line-ground capacitance	<= 5 nF
Protection level core - core, max.	8 V
Protection level line - ground, max.	90 V_{DC} (1 KV/µS)
Impulse protection level line - ground	<= 450 V
Nominal discharge current (1 KV/µS)	10 KA
Width x height x depth in mm	52 x 88 x 14

Type	Art.-No.
Extended cover and overvoltage protection for Solar-Log200/500	255382
Extended cover and overvoltage protection for Solar-Log1000	255381

Cable sets / interfaces

	Type	Interface / CAN	Art. No.
RS485 – interface / cable set			
	Cable set connection to BKL2 Universal / Alphasol / Powercom / Winaico	RS485	**255107**
	Cable set connection to BKL Universal / Solutronic xx / Q3 xx00	RS485	**220050**
	Cable set connection to BRJ2 Universal / Motech / Zentral Solar	RS485	**255157**
	Cable set connection to BRJ3 Universal / Samilpower / Enfinity	RS485	**255331**
	Cable set connection to BRJ4 Universal / Danfoss / AEG	RS485	**220042**
	Cable set connection to BRS1 Universal / Solutronic SP 1xx / Q3 1xx00	RS485	**255264**
	Cable set connection to Delta	RS485	**255125**
	Cable set connection to Diehl AKO	RS485	**220064**
	Cable set connection to Effekta	RS485	**255034**
	Cable set connection to HPC-250 HT-E	RS485	**255154**
	Cable set connection to HPC-050 / 100 HT-E	RS485	**255156**
	Cable set connection to Kaco	RS485	**220038**
	Cable set connection to Kostal / Convert	RS485	**220055**
	Cable set connection to Mastervolt	RS485	**220054**
	Cable set connection to Mitsubishi	RS485	**220049**
	Cable set connection to Power-One	RS485	**220043**
	Cable set connection to Refu	RS485	**220056**
	Cable set connection to Santerno-Solar-Log™ (from Solar-Log™ to 1st inverter incl. connector) – always required	RS485	**255109**
	Cable set connection to Santerno-Wechselrichter (from one inverter to another)	RS485	**255110**
	Cable set connection to Schüco	RS485	**220051**
	Cable set connection to SMA	RS485	**220037**
	Cable set connection to SolarMax	RS485	**220040**
	Cable set connection to Steca	RS485	**255066**
	Cable set connection to Sunways	RS485	**220039**
	Cable set connection to Sustainable Energy	RS485	**255155**
	Cable set connection to Vaillant	RS485	**220044**
	Cable set connection to Vectron	RS485	**255012**
	Cable set connection to Xantrex GT 30 E	RS485	**255348**
RS422 – Schnittstelle (3 m)			
	Cable set connection to BKL1 Universal / Salicru (EQX) / SE SunEzy	RS422	**255106**
	Cable set connection to BKL4 Universal / Eaton / Phoenixtec / Sunville / Riello / AEG-alt	RS422	**220057**
	Cable set connection to BRJ1 Universal / Europa Solar / Ever-Solar	RS422	**255108**
	Cable set connection to Fronius	RS422	**220041**
	Cable set connection to SamilPower	RS422	**255331**

	Type	Interface / CAN	Art. No.
RS422 – CAN			
	Cables set connection to Voltwerk / Conergy (from Solar-Log™ to 1st Inverter incl. connector) – always required	Canbus	**255001**
	Cables set connection to Voltwerk / Conergy (from one inverter to another)	Canbus	**255002**
Verlängerungskabel			
	Extension cable RS485, 4-pin, sheathed, length 8 m	RS485	**255145**
	Extension cable RS422, 6-pin, sheathed, length 8 m	RS422	**255146**
RS485 zur Selbstverkabelung			
	Sheathed 4-pin cable for RS485 wiring, **5 m** – indoor applications only	RS485	**220012**
	Sheathed 4-pin cable for RS485 wiring, **10 m** – indoor applications only	RS485	**220013**
	Sheathed 4-pin cable for RS485 wiring, **25 m** – indoor applications only	RS485	**220014**
	Sheathed 4-pin cable for RS485 wiring, **100 m** – indoor applications only	RS485	**220068**
Warranty	**2 years**		

Solar-Log™ RS485 Wireless Package

COMPATIBLE with Solar-Log200/500/1000/800e

The Solar-Log™ RS485 Wireless Package provides wireless connection of suitable inverters to the Solar-Log™ device. Thus the Solar-Log™ monitoring system is connected even where cable connections are difficult or impossible.

- Radio modules are always deployed in pairs.
- The use of other wireless packages in order to connect up several solar power systems is possible. Please note: only on request.
- The Solar-Log™ wireless package can also bridge larger distances when used in conjunction with the external and directional radio antenna, Also refer to external and directional radio antenna (page 37).
- The Solar-Log1000 contains a test function which is used to establish the radio range and the optimum assembly location for the modules / antenna.
- When placing an order, always quote the name of the inverter manufacturer because the RS485 Wireless Packages are fully pre-configured and are therefore, turnkey units.

Solar-Log™ RS485 Wireless Package (always in pairs)

Attention: Please check the inverter compatibility with the inverter database. www.solar-log.com

Technical data	
Range inside buildings	up to 80 m (up to three concrete walls)
Range over open field	up to 500 m, with directional radio antenna up to 800 m
Protection class, approval	IP 20, only suitable for internal use, CE standard
Power supply / performance	7 – 18 V, 1 Watt
Frequency	2.4 Ghz
Temperature range	0 ° – 70 °C
Dimensions per piece (w x h x d) / Weight	70 x 140 x 30 mm / 200 g
Antenna	Dipole antenna, 2.1 dBi amplification

Type	Art. No.
Solar-Log™ X24 RS485 Wireless Package (2 units) Please specify type of inverter for pre configured	**220058**

Outdoor and directional radio antenna for RS485 Wireless Package

The external and directional radio antenna provides improved wireless data transmission for the RS485 Wireless Package, while bridging greater distances. An unobstucted view is a prerequisite.

Advantages of external and directional radio antenna

- Extends the maximum distance by 300 m to a new maximum distance of 800 m (this specialized antenna replaces the antenna in the RS485 Wireless Package.
- Improvement in connection stability.
- This specialized antenna can be screwed into position, and can be extended.

Outdoor and directional radio antenna

Technical data	
Max. permitted wind speed	200 km/h
Temperature range	-40 °C to 80 °C
Humidity	100 % at 25 °C
Overvoltage protection	Earthing
Housing colour, material and protection class	Grey-white, ABS, UV-resistant, IP 65
Weight	300 g
Dimensions	120 x 120 x 43 mm
Electrical properties	
Frequency band	2300 MHz to 2500 MHz
Power gain	8.5 dBi
Front to back ratio	15 db
Load capacity	50 W (cw)
Impedance	50 Ohm
Connection	N connection (female)
Warranty	**2 years**

Type	Art. No.
Directional radio antenna for RS485 Wireless Package, for external use, incl. **3 m** cable and assembly material	**220059**
Accessories	
Antenna extension for (D-Link) directional radio antenna **9 m**, internal/external area	**220065**
Antenna extension for (D-Link) directional radio antenna **6 m**, internal/external area	**220066**
Antenna extension for (D-Link) directional radio antenna **3 m**, internal/external area	**220067**

Solar-Log™ BT (Bluetooth)

The Solar-Log™ BT is equipped with a Bluetooth module for wireless connection to all SMA Bluetooth inverters.

Advantages of Solar-Log™ with Bluetooth:

- No wiring required between the SMA inverters and the Solar-Log™.
- That means no preparation is required for the inverters, nor do the devices need to be opened up.
- Support for all SMA Bluetooth Piggy Backs.
- Mixed inverter operation possible via Bluetooth and RS485 interface.

The maximum open field range line is 50 m.

Please take note of these instructions:

- On the Solar-Log^{500} and Solar-Log^{1000}, a maximum of 7 SMA Bluetooth inverters can be identified.
- It is possible to connect other inverters by means of RS485 wiring. The required Bluetooth addressing on the inverter must be “1” (= factory default setting).
- If the Bluetooth module is used on the Solar-Log^{1000} BT and Solar-Log^{1000} BT / WiFi, the RS485-A interface is disabled automatically.
- On the Solar-Log^{500}, the RS485 interface can be used for a further maximum total of 10 SMA inverters.
- The maximum number of inverters depends on the distance.

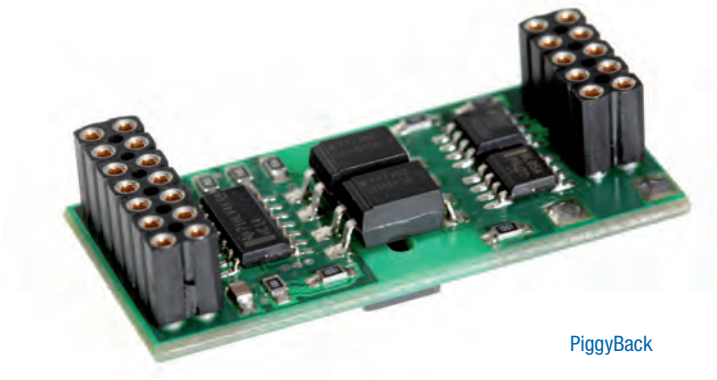
Type	Max. total number of inverters (across all interfaces)	Max. number of inverters with BT	Art. No.
Solar-Log^{200} BT	1	1	**255241**
Solar-Log^{200} BT / WiFi	1	1	**255192**
Solar-Log^{500} BT	10	7	**210502**
Solar-Log^{500} BT / WiFi	10	7	**255190**
Solar-Log^{1000} BT	100 (per interface, max. 50 inverters)	7	**211002**
Solar-Log^{1000} BT / WiFi	100 (per interface, max. 50 inverters)	7	**255186**

Special PiggyBack (RS485)

The Special PiggyBack (RS485) is an inexpensive alternative to the standard SMA PiggyBack (RS485) and facilitates communication between the SMA inverter and the Solar-Log™. It can only be used in conjunction with the Solar-Log™. The Special PiggyBack needs to have its voltage supplied by the Solar-Log™. Therefore, it must be made sure that the connecting cable has a sufficient wire diameter to allow a voltage of at least 8 V to reach the PiggyBack.

Please note:

- It is suitable for use with all SMA string inverters with the exception of SB3000TL-20 / 4000TL-20 / 5000TL-20 / Tripower.
- Must only be operated with Solar-Log™.
- 4-pin wiring is required for operation.
- Specialist personnel is required to install the PiggyBack interface card.
- The Special PiggyBack is supplied with power by the Solar-Log™ unit (max. 15 V).



PiggyBack

Note:
Solare Datensysteme GmbH declines any liability for damage arising from connection of the PiggyBack (Art. No. 220020) to SMA inverters.

Every Special PiggyBack (RS485) is subjected to a complete function test prior to delivery.
The system components are galvanically isolated from one another and offer insulation protection of 6.5 kV.

Compatibility	Art. No.
Compatible with SMA inverter	
Special PiggyBack (RS485) for SMA inverter – only for Solar-Log™ systems (Not compatible if a Data Module or a Quick Module is required)	**220020**
Data Module SMA (RS485) SB3000 / SB4000 / 5000TL-20 (Next Generation)	**220053**
Warranty	**2 years**
Fronius and identical inverter designs	
ComCard Retrofit Fronius and identical designs	**220022**
Warranty	**2 years**

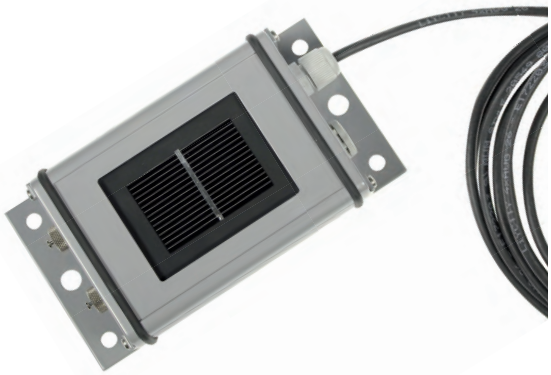
Pyranometer and Irradiance Sensors with Module Temperature Sensor

Sensors measure the deviations between the potential power production and the current power production and deliver key statistical values in regard to the quality of the whole plant. Solar-Log™ Monitoring continuously compares the yield data of a plant with the various sensors. If these values deviate from each other, an error message is generated. Depending on the requirements, there are various sensors available for the Solar-Log™.

Sensor Box

COMPATIBLE with Solar-Log200/500/1000/800e

The most important element in the Sensor Box is the irradiance sensor. This delivers a reference value for solar radiation and enables conclusions to be drawn about possible power generation problems. The irradiance sensor consists of a single solar cell and should be installed at the same angle as your panels. This helps it to serve as an ideal reference value. Drops in performance even at low levels of radiation can be identified and error messages generated. Due to the built-in internal module temperature sensor, it is easy to analyze reductions in performance.

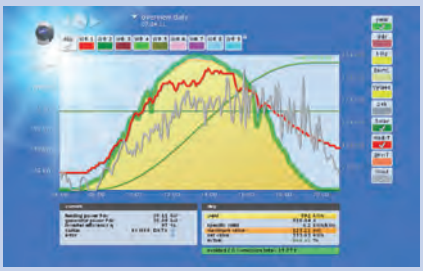


Benefits of communication between the Solar-Log™ and the Sensor Box:

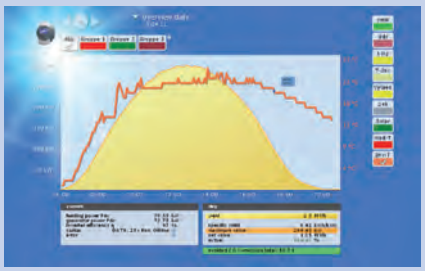
- Solar-Log™ generates an error message in response to any variance that occurs.
- Errors and malfunctions can be filtered out and analyzed rapidly and reliably.
- The sensor evaluation provides information about the cause of the fault.
- Up to 9 Sensor Boxes can be connected to the Solar-Log1000.

Do not use with a RS422 inverter on the same bus

The irradiance sensor is equipped with a high-quality monocrystalline cell, which is rugged and specifically designed for long-term use in outdoor locations. The sensors are installed parallel to the panels they are meant to monitor and are connected to the Solar-Log™ via an RS485 interface.



Daily curve with solarization sensor (green), wind sensor (grey), module temperature (red) and yield curve (yellow)



Daily curve with ambient temperature sensor

Daily summary, 1 inverter and wind sensor

Sensor Box Accessories

Ambient temperature sensor

The optional ambient temperature sensor (PT1000) delivers additional information. One problem that could arise and contribute to low yields is the combination of cold temperatures and sunshine causes a buildup of ice. The sensor can confirm the presence of such a problem.

Wind sensor

The wind sensor enables wind strengths to be tracked and in the event of breakdowns or reduced power output, to better identify storm damage as a possible cause.

Technical data	
Solar cell, laminated behind glass	Mono crystalline silicon (5 cm x 3.3 cm)
Dimensions (h x w x d), housing	14,5 cm x 8,5 cm x 4,0 cm, Powder-coated aluminium housing, protection class IP65
Temperature range	-20 °C to +70 °C
Power supply	via RS485 data cable from Solar-Log™ (10 – 28 V_{DC}), no further power supply required
Tolerance	Irradiance sensor: +/-5 %
Installation	On module assembly rails. Not necessary to open up the sensor.
Connecting cable	4 pin, 3 m, UV and weather resistant
Ambient temperature sensor	PT1000 Measuring range: -40 °C to +85 °C
Wind sensor	Cup anemometer Measuring range: 0-40 m/s, gusts 60 m/s
Warranty	**2 years**

Type	Art. No.
Sensor Box including irradiance sensor and module temperature sensor	**220060**
Wind sensor for connection to the Sensor Box, including a 5 m connection cable	**220061**
Ambient temperature sensor for connection to the Sensor Box, including a 3 m connection cable	**220062**

Sensor basic

The Sensor basic is specifically designed for residential systems and complies with all of the basic requirements for an irradiance sensor.

It delivers the irradiance values as well as the module temperature. Compared to the Sensor Box, the measurements from the Sensor basic are only 3 % less precise. The Sensor basic is based on a thin-film cell.

Attention: There is no option to connect a wind sensor or ambient temperature sensor. Using with a RS422 inverter on the same bus is not possible.

Technical data	
Solar cell	Amorphous thin layer silicon cell (3.5 cm x 3.5 cm)
Dimensions (h x w x d)	64 x 99 x 36 mm, Polycarbonate, UV-stabilised IP65
Temperature range	-25 °C bis +75 °C
Power supply	Via RS485 data cable from Solar-Log™ 10-28 V_{DC}, no further power supply required
Measuring range, radiation strength	0 bis 1400 W / m²
Tolerance	Irradiance sensor: +/-8 %
Installation	On module mounting rails. Not necessary to open up the sensor - all sensors are screwed in place.
Connection cable	4-pin, 3 m, UV and weather-resistant
Warranty	**1 year**

Type	Art. No.
Sensor basic including irradiance sensor and module temperature sensor	**255258**

Pyranometer with Weather Sensors

The Pyranometer delivers the most precise measurements for the overall irradiance and serves to measure the exact local prevailing overall irradiance at large plants. The Pyranometer is installed independent of module alignment. Because sunlight is usually measured on horizontal surfaces, the irradiance values are not directly comparable to plant yields. So for this reason, Pyranometer data is converted in the Solar-Log™ WEB portal to potential yields of the PV plant.

Benefits

- Calibrated high precision device to measure the irradiance at a plant.
- Calculation of the performance ratio in Solar-Log™ WEB Portal, i.e. recording the energy efficiency of a PV plant.
- Direct comparison of PV plants with a Pyranometer.
- Weather data such as temperature, wind speed, wind direction, humidity and air pressure provide information on the influence of weather conditions on the performance of a PV plant.

Manufacturer G. Lufft Mess- und Regeltechnik GmbH, Fellbach

Measurement	Measuring Range	Measuring Method
Pyranometer	1400 W/m²; spectral range (50 %): 300-2800 nm	Kipp & Zonen CMP3
Ambient temperature	-50 °C – +60 °C	NTC
Humidity	0 – 100 %	Capacitive
Air pressure	300 – 1200 hPA	MEMS capacitive
Wind direction	0 – 359,9 °	Ultrasound
Wind speed	0 – 60 m/s	Ultrasound

Technical data	
Power supply	24 V_{DC} +/- 10 %
Power consumption	20 VA at 24 V
Connection type	RS485
Protection class	IP65
Dimensions	Diameter: 150 mm, Height 332 mm, Weight: 1,5 kg

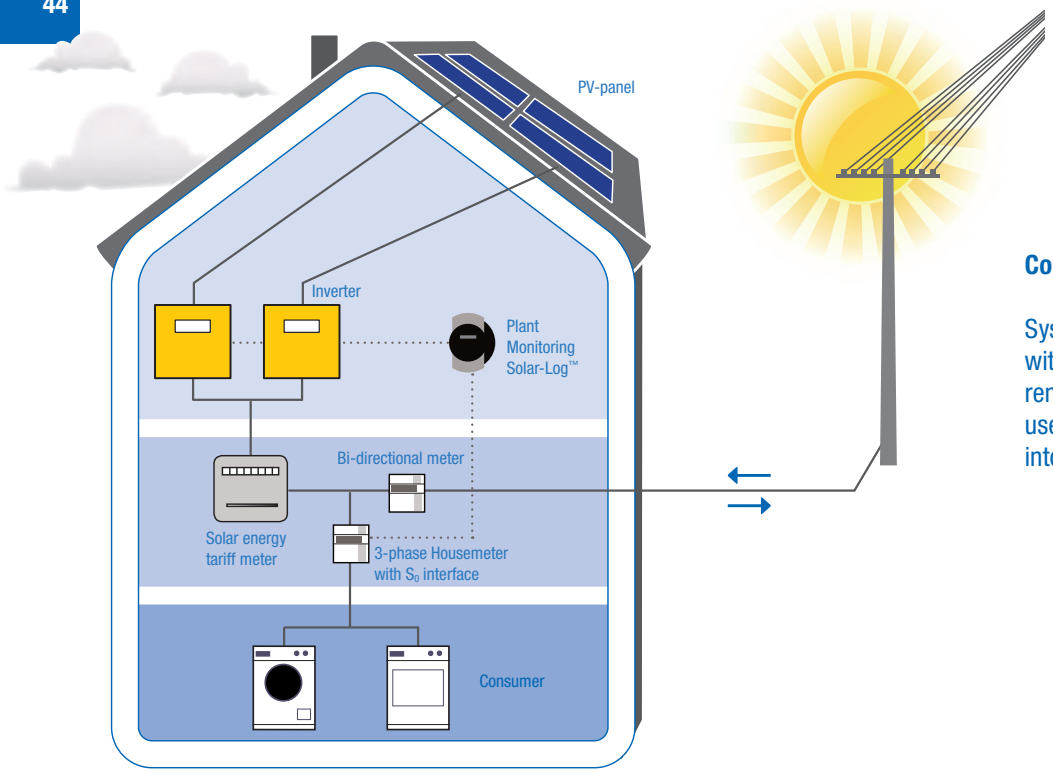
Type	Art. No.
Pyranometer with weather sensors	**available on request**

Smart Timing – Using PV Energy efficiently

Solar-Log™ Smart Timing effectively utilizes PV energy more with supply management. The energy generated can be used yourself or alternatively marketed directly to an energy exchange. Solar-Log™ Smart Timing offers the functionality and the necessary accessories to carry out both options for more effective energy management.

Consumption of Self-Produced Power

With the help of a digital electricity meter, the Solar-Log™ records the plant owner's power needs and monitors the PV power production. At a predetermined production threshold, Solar-Log™ can automatically turn on electrical devices such as a heat pump.

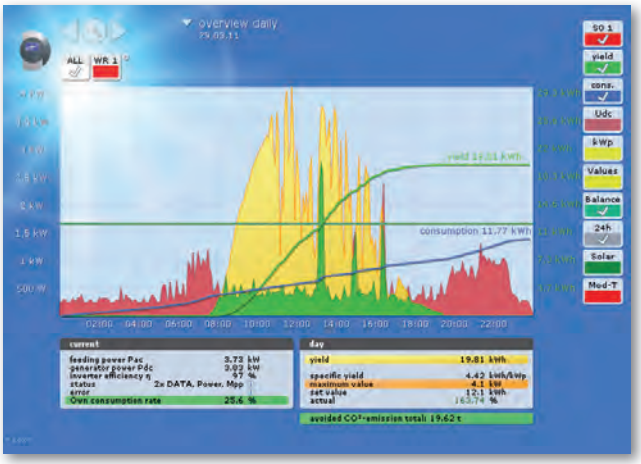


Consumption of Self-Produced Power

System of optimizing self-consumption with the Solar-Log1000. Based on the current needs, the generated power is either used for consumption in the home or fed into the distribution grid.

Details of the funding support scheme:

The Solar-Log™ is able to optimize use of self-produced and consumed power. The great advantage lies in the combination of the power NOT sourced externally and the resultant reduction in power costs. This is coupled with additional remuneration for self-produced power. The surplus power can also be directed into the mains supply for remuneration (depending on FIT and other regulations in your country). Solar-Log1000 even offers the capability of using self-produced power at precisely the times at which sufficient electricity is being generated – by engaging up to four consumers (e.g. laundry machine) and switching them off when necessary.



Daily summary with presentation of yield and power consumption balance, drawing down power (red), power generation (yellow), self-produced power (green)

Self-produced power consumption in conjunction with Solar-Log^{1000}:

The Solar-Log^{1000} has the following functions

- Calculation and display of power balance with the help of a Smiley display.
- Optimisation of self-produced power by the switching on of external consumers.
- If the power balance is configured as a “consumption meter” type, the touch screen provides an additional “Power balance” dialogue option.

In this dialogue, the existing current values are displayed and the amount of surplus power is calculated. This allows the operator to determine the ideal time for switching on external consumers. Depending on that surplus, a “Smiley” emoticon indicates whether or not manual engagement of consumers is meaningful at a given point in time. The values for power production are updated roughly every 20 seconds, while those for power consumption are updated roughly every 60 seconds.

Optimizing the Consumption of Self-Produced Power

In Germany, for instance, managing the power supply has become increasingly important due to the general reductions in feed-in tariffs and rising electricity costs. To achieve a high proportion of self-consumption, optimal consumption management is essential.

The Solar-Log^{1000} offers the option to schedule self-consumption of power in times when there is sufficient power production, thereby optimizing it.

- The Solar-Log^{1000} can swich on up to 4 external consumers and shut them down when necessary.
- Devices are engaged via mains power sockets or via the internal relay.
- Various options can be configured in the program, e.g. a later engagement time.

Please note:
The relay can only be energised using low voltage!

Energy Exchange – Additional revenue due to Direct Distribution (depending on the country)

PV energy that is generated in Germany can be partially or entirely sold on an energy exchange. The direct sale of power has a noticeable financial benefit for (already existing) large plants (more than 100 kWp) in particular, but it is also financially rewarding for new plants which do not have any consumption of self-produced power.

Market Premium Model in Germany

Although the normal market price for power on the energy exchange is below that of the EEG feed-in tariffs, the plant operator is compensated the difference with a Market Premium. The amount of the compensation is determined by the average price of electricity for the corresponding month. In addition to the Market Premium, a Management Premium is guaranteed so that the total payments are above the EEG tariff payments.

New Interface for Data Transmission

The main principle of feed-in management remains the same for plant operators, i.e. the power which is generated is fed into the distribution grid. Solar-Log™ has an extra software interface that sends the current power yields to the electricity traders every 15 minutes. With this information, the electricity traders can sell the respective share of power on the energy exchange.

Digital Electricity Meter

By adding an electricity meter to a PV plant with different operating modes you gain various extra functions. In one mode it functions as a transmitter, relaying the measured amount of power to the Solar-LogTM for analysis. If you wish to consume the self-produced power from a PV plant the meter serves as a consumption meter, displaying a comparison of the amount of consumed power with the amount of power produced.

Connection to the Solar-Log$^{200/500/1000}$

The electricity meter can be connected to Solar-Log™ via an S_0 input or an RS485 interface, depending on the connectivity options of the meter.

Iskra WS0021

Iskra WS0031

Inepro

Digital Electricity Meter

The meter can be configured to operate with the Solar-Log™ in three different modes:

1) Measuring power consumption for the optimal utilization of self-produced power.
2) Measuring the total amount of power that has been fed into the grid from the plant.
3) Inverter mode-measuring the power production from inverters that are not directly supported by Solar-Log™.

The S_0 connection involves the use of a 6-pin S_0 In/Out connector on the Solar-Log$^{200/500/1000}$ with a maximum cable length of 10 meters. A calibrated meter also offers the option to connect via an RS485 connection, which allows the Solar-Log™ to process the exact meter reading. The RS485 connection also affords you the advantage of longer cable lengths, up to 500 meters.

Technical data	Iskra uncalibrated 1-phase, S_0	Iskra uncalibrated 3-phase, S_0	Inepro calibrated 1-phase, S_0 and RS485	Inepro calibrated 3-phase, S_0 and RS485
Direct connection	80 A	65 A	100 A	100 A
Rated current	10 A	10 A	10 A	10 A
Voltage Un	230 V -20 % – +15 %	3 x 230 V/400 V +20 % – +15 %	230 V/400 V	3 x 230 V/400 V
Measuring range	4 mA - 80 A	4 mA - 65 A	<1 mA – 100 A	<1 mA – 100 A
Self-produced power	< 8 W	< 0,85 W	< 2 W	< 2 W per Phase
Start-up current	4 mA	4 mA	<1 mA	<1 mA
Mains frequency	50 Hz/60 Hz	50 Hz/60 Hz	50 Hz/60 Hz	50 Hz/60 Hz
Dimensions (h x w x d)	100,5 x 36,5 x 65 mm	84,3 x 53,6 x 65,1 mm	130 x 76 x 65 mm	130 x 126 x 65 mm
Protection class	IP20	IP20	IP51	IP51
LCD display	7-digit, LCD	6+1 digit, 100 Wh resolution	7-digit LCD (5.2)	7-digit LCD (5.2)
S0 impulse	1000 p/KWh	500 p/Kwh	1600 p/KWh	400 p/KWh
Other	Class 1 EN 62053-21 and EN 62052-11 2 counters (1 total, 1 resetable)	Class 1 EN62053-21 and EN62052-11 No LCD Display	Class 1 EN50470-1 and EN50470-3 MID RS485 and S_0	Class 1 EN50470-3 MID RS485 and S_0
Warranty	**1 year**		**2 years**	

Type	Art.-No.
Iskra WS0021, uncalibrated 1-phase	**255346**
Iskra WS0031, uncalibrated 3-phase	**255347**
Inepro calibrated 1-phase, S_0 and RS485	**255420**
Inepro calibrated 3-phase, S_0 and RS485	**255421**

Mains power socket

The Solar-Log[1000] enables the consumption of self-produced power to be optimised. The switching of external consumers usually involves the use of what are known as “mains power sockets”. These are specialized sockets that have a mains power connection (Ethernet) and are then operated by a Solar-Log[1000]. To optimise the consumption of self-produced power in an automated way, a power consumption meter is required as well as a mains power socket.

COMPATIBLE with Solar-Log[1000]

It is possible to operate the switches On / Off manually using the Solar-Log™ and to define automatic switching.

Solar-Log[1000] supports up to 4 mains power sockets.

Technical data	Standard 1,8 KW	WLAN 1,8 KW
Maximum load	1600 - 2000 watts	1600 - 2000 watts
Maximum current	8 A	8 A
Control	TCP / IP	TCP / IP
Statuses	On / Off	On / Off
Connector	Euro connector	Euro connector
Dimensions (h x w x d) / Weight	40 x 68 x 128 mm, 200 g	60 x 68 x 128 mm, 200 g
Warranty	**2 years**	

Type	Art. No.
Mains power socket standard 1,8 KW	**255429**
Mains power socket WLAN 1,8 KW	**255430**

Alternative internet connection

Mobile Wireless Package (GPRS)

COMPATIBLE with Solar-Log1000/800e

If you do not have a Solar-Log1000 GPRS, this Mobile Wireless Package will export your data to a mobile communications network.

- Wireless data transmission takes place across the mobile wireless network (GPRS).
- A SIM card is needed for internet access, and this is not included in the scope of supply.
- A mains / network test function can be performed using the Solar-Log1000.
- The mobile wireless connection is performed via the RS232 interface.

Technical data	
GSM bands	Quad-band GSM / GPRS
GSM power rating	GSM 800 / 850 Power Class 4 ~ 33 dBm GSM 1800 / 1900 Power Class 1 ~ 30 dBm
Data transmission	GPRS Class 12: max 86 kbps (DL and UL)
Power supply	5 – 32 V_{DC}
Other	Low Power Mode (1 mA with GPRS connect)
Dimensions (h x w x d) / Weight	77 x 67 x 26 mm, 100 g
Temperature range	-40 °C to +80 °C
Scope of delivery	Mains power unit, RS232 cable, magnetic foot antenna
Warranty	**2 years**

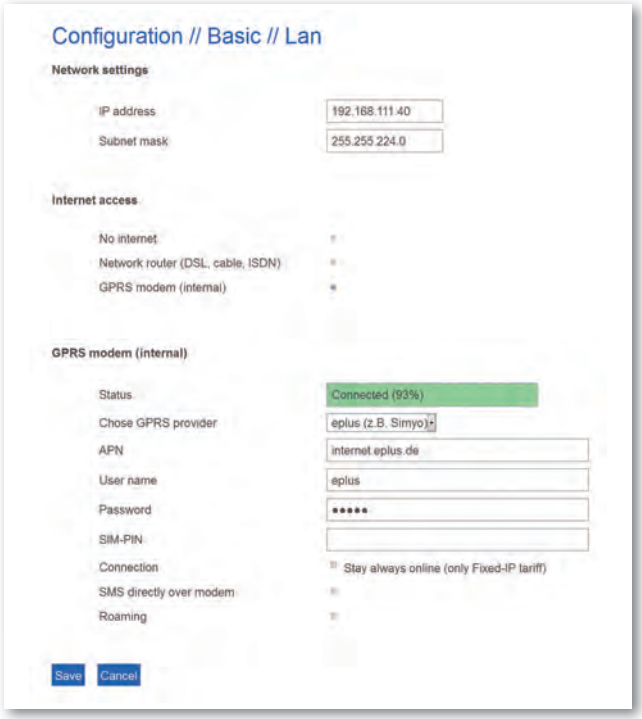
Type	Art.- No. internal modem	Art.-No. external modem
Terminal Mobile Wireless Package (GSM), Siemens CT63 complete kit	–	**220047**
Antenna extension GPRS modem **5 m**, internal / external area	**255326**	**255014**
Antenna extension GPRS modem **10 m**, internal / external area	**255327**	**255015**
Antenna extension GPRS modem **15 m**, internal / external area	**255328**	**255016**
Antenna adapter for Solar-Log™ GPRS	**255333**	**255333**
GPRS antenna for greater wireless coverage	**255329**	**255221**
Mounting Set for Mobile Wireless Package	–	**220048**

GPRS external antenna

to improve data connection

This antenna improves signal strength in response to poor GPRS reception and is suitable for wall mounting outdoors.

Technical data	
Frequency	GSM 900: 880 – 960 MHz / GSM 1800: 1710 – 1880 MHz
Impedance	50 Ohm
Polarization	Vertical
Gain / power	0 dB / max. 10 W
Dimensions (h x w x d) / Weight	370 x 155 x 36 mm (Ø 16 mm), 420 g
Temperature range / type of protection	-40 °C to +80 °C, IP 66
Cable length / connection	4950 + 100 mm, FME Female



The detailed information regarding the connection status is visible.

PowerLine Package and Cable Accessories

The PowerLine Package is a problem-free alternative to the network cable for exchanging data between the Solar-Log™ and the PC or the router. This involves data being modulated and transmitted via the domestic mains network.

Please note:

- For PowerLine data transmission, at least 2 connectors are required, but this can be extended at will.
- The PowerLine package does not need to be configured. Just plug it in, and data interchange can commence.
- The PowerLine connector includes a network and a USB connection.
- No phase coupler is required.
- Operation of the PowerLine package can be mixed with WLAN.

Technical data	
Transmission speed	85 Mbit/s
dLAN connection	EURO mains connector
Device connection	Connector type: RJ45 or USB (Universal Serial Bus) 1.1
Power intake	4.5 W (max.), 3 W in standby mode
Power supply	AC 100 – 240 V 50/60 Hz
Ambient conditions	10 – 90 % humidity (non-condensing)
Registrations	CE compliant in accordance with the technical requirements of all EU countries and for Switzerland: EN 55022/EN 50024/EN 60950
Dimensions (h x w x d) / Weight	85 x 53 x 30 mm/92 g
Warranty	**2 years**

Type	Art. No.
Develo DLan – PowerLine Package Duo (2 units)	**255431**

Cable Accessories for internet connection	
Type	**Art. No.**
5-Port Ethernet Switch	**220025**
Network cable, 1 m Cat5, RJ45	**220019**
Network cable, 2 m Cat5, RJ45	**220018**
Network cable, 5 m Cat5, RJ45	**220004**
Network cable, 10 m Cat5, RJ45	**220005**
Network cable, 15 m Cat5, RJ45	**220006**
Network cable, 20 m Cat5, RJ45	**220007**
Cross-over cable 5 m, sheathed, RJ45	**220008**
Cross-over cable 10 m, sheathed, RJ45	**220009**
Cross-over cable 15 m, sheathed, RJ45	**220010**
Cross-over cable 20 m, sheathed, RJ45	**220011**

Representative presentation

Solar-Log™ APP

Everything visible, at all times, from wherever you are

Up to 10 solar power systems of any kind can be monitored by Solar-Log™ and can be viewed using this APP. The Solar-Log™ APP displays the yield data of solar power systems in graphic format on the iPhone®, iPod touch® or iPad®. Daily up-to-date and historical data can be displayed in the form of daily, monthly, annual and overall views. The CO_2 saving from the system can also be displayed.

Solar-Log™ APP offers the following functions:

- Sample systems, including real data, are already preconfigured.
- Once data has been loaded, it can be displayed via the internet at any time.
- The current power (Pac), the yield and the specific yield can also be viewed on screen.
- The optionaly configurable slide show scrolls automatically through all the views.
- The plant image can be replaced with any other image.
- Separate background images for the data views and the CO_2 view can be stored on the system.
- The slide show mode makes it possible to view the system continuously, and to read out yield figures immediately.

Direct network connections are supported by the IP address (local installations) or by systems that can be reached via the Solar-Log™ WEB.

External presentation

Solarfox Public Displays

Clean energy, up-to-date and visible to all!

With Solarfox displays, you can present visually appealing live data from your solar power system to your customers, combined with your own distinctive advertising. The power rating of your facility is presented in the form of attractive diagrams. You can add distinctive graphics and logos any time to it. All contents can be altered at any time via on-line access using a web browser. All Solarfox displays are compatible with Solar-Log™ models, and data exchange takes place over the internet.

Solarfox® SF-200
32“ (81 cm) to 47“ (119 cm)

Designed for interior use and suitable for continuous operation. These devices deliver daylight-compatible, non-reflective presentation with a viewing angle of up to 178 °.

Included features:

- Solarfox-Display with control computer and remote control, tilting wall bracket
- Solarfox software with online administration via web browser
- Video function
- UMTS / WLAN support, via USB stick

Solarfox® SF-400
24“ (81 cm) to 52“ (132 cm)

The SF-400 series is equipped with a sturdy housing and works with air conditioning. When installed outdoors, it is thereby protected from humidity, moisture, heat as well as from vandalism and theft.

Included features:

- Solarfox display with control processor and remote control
- Wall mounting with inclination: 0 ° or 15 °
- Solarfox software with online management via webbrowser
- Video function / UMTS / WLAN support

Solarfox® SF-400 fulfills the IP-65 protection norm and can be used in a temperature range from -30 °C to 45 °C. It is especially suitable for public buildings with a great number of visitors from the public: city halls, schools, administration buildings, civic auditoriums, etc. and can make a good impression in both entry ways as well as in outside areas.

SOLARFOX® S8 for your living room
8“ (20 cm)

S8 mini display for continuous monitoring of your solar power system and of your power consumption (20 cm screen diagonal). Can also be used as an internet radio, MP3 player, radio alarm and digital picture frame. Only requires a power socket.

Included features:

- USB connection, card scanner for SD / SDHC, MMC, MC, xD and CF cards
- Integrated speakers and headphone output
- Internet access via WLAN or LAN with optional USB adapter

Solarfox® S8 can be used in any environment with WLAN. Solar-Log™ and a WLAN router or internet access is all that is required (alternatively, the Solarfox display can also be employed via LAN with the help of an adapter). This applies to Solar-Log$^{200/500/1000}$.

More Solarfox® products can be found at: www.solar-fox.de

For information and orders:

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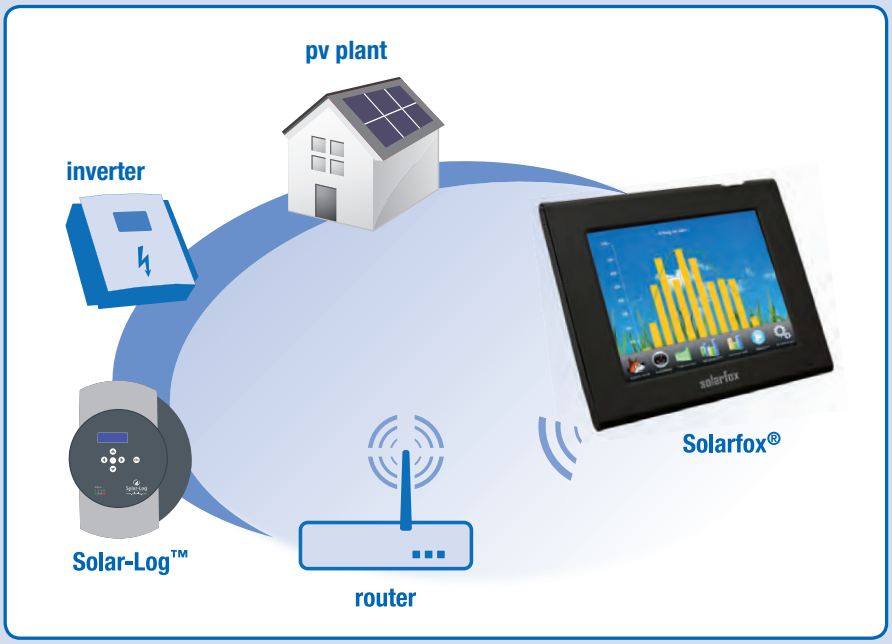


Solar-Log™ Installation Enclosure for outdoor use

The Solar-Log™ Installation Enclosure is made of polycarbonate and ABS plastic and facilitates a safe outdoor installation. The enclosure complies with the protection class IP65, providing the data logger reliable protection from dust and moisture to ensure safe operation under all weather conditions. With this latest model, the Installation Enclosure cover is no longer transparent to keep the contents in the Enclosure hidden from prying eyes. The box can be equipped with a data logger and additional accessories such as the RS485 Wireless Transceiver kit. In addition to the Solar-LogTM power outlet, a second outlet is included.

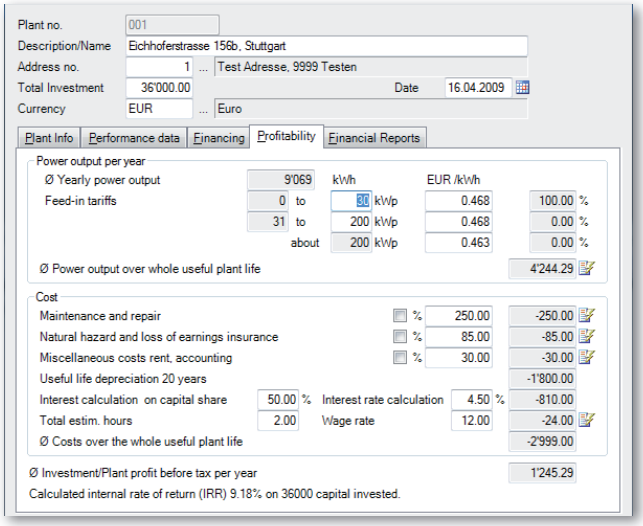
Changes & additions subject to change without notice, Solar-Log™ is not included in delivery

Technical data	
Installation Enclosure	The enclosure material is made of polycarbonate and ABS plastic.
	For quick and easy installation of the Solar-Log™, the holes on the mounting wall have been pre-drilled.
	To conceal the contents of the case cover is nontransparent.
	There is space in the case for additional accessories.
Mounting	4 PG connections are available for the mains power connection and other connections.
	To secure the data logger, disassemble the mounting plate from the Installation Enclosure, remove it from the enclosure and then attach the Solar-Log™ to it. Then screw the mounting plate back down.
	Hinges can be ordered to help open the cover easily.
Standard Color for the enclosure	Grey / RAL 7035
Surface	The installation enclosure is non-fading.
Protection Class	IP 65 when used with the proper cable screws and when the cable conduits are properly sealed.
Dimensions (w x h x d)	300 mm x 400 mm x 130 mm
Warranty	**2 years**

Type	Art. No.
Solar-Log™ Installation Enclosure IP 65 for outdoor use including 2 power connections, mounting plate	**255422**
Hinges (2 units) for the Installation Enclosure	**220072**

Solar-Log™ CASH Accounting Software

We are now able to watch over the financial aspects of solar energy systems as well as to monitor them. Benefit from our extensive expertise and our new and professional Solar-Log™ CASH software, specifically designed for investments in solar power equipment.



Top features:

- Easy to use
- Log depreciation and time period for each item.
- Check one-off costs, recurring in and outgoings, direct and indirect payroll costs.
- Advanced or discounted payments from the energy provider can be recorded.
- Program available in English and German, other languages possible.

Evaluation and calculation options:

- Yield calculations of the solar energy system.
- Profit and loss analysis of the investment.
- System depreciation including additional systems and interest calculations.
- Redemption schedule, loans including interest calculation on expected / actual comparisons, automatic calculations.
- Balance sheet and earnings statement.
- Combination of various systems in one financial report.

Data security:

- Stand-alone application, locally installed, based on Microsoft .NET platform
- Compatible with Windows XP, Vista & Windows 7

Pricing model

- **Annual fee € 50.-,** billing by credit card with instantaneous licensing
- **Updates free of charge, download from:** www.cash.solar-log.com

Solar-Log™
by Solare Datensysteme GmbH

Product index

Solar-Log™ is compatibel with:

IDS

many more to come

Solar-Log™ world wide

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very good
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