Solar-Log™
by Solare Datensysteme GmbH

MAXIMIZED SUNPOWER

Product Portfolio

Everything you need to monitor your Photovoltaic Plant!

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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.

Solar-Log™ International Term and Conditions apply. Changes and errors expected. Date of Issue: June 2011

Dear Reader,

During the past few weeks and months we have been working towards one goal: bringing you a solid product overview of Solare Datensysteme GmbH's wealth of innovations associated with the monitoring of solar power systems. Mind you, we don't just stop at innovation. The challenge we set to overcome is this: innovation must be beneficial, for you as a solar colleague and for the end customer.

One example of this challenge is ease of installation. With our new Easy Installation function for our Solar-Log™ line of products, inverter detection is done automatically. Furthermore, automatic connection and registration for the indispensable Solar-Log™ WEB internet-based monitoring system takes place. This enables you to save valuable time and trouble during each installation operation. All this without additional costs.

Whether it be the helpful and subsequently time-saving optional WiFi equipment for all Solar-Logs or the integrated GPRS module that is now available for the Solar-Log^{1000}, we are making communication easier and better. Both functions simplify connection to Solar-Log™ WEB, because they eliminate the elaborate process of routing cables. We have many other useful innovations that range from a Smart Metering function to optimization of internal power consumption. We also offer a power management function which regulates input power for large facilities greater than 100 kWp. This is all to help you further improve the monitoring and control of your photovoltaic power systems. We do all of this to increase our number of satisfied customers, and of course, contribute to a cleaner environment.

Yours,

Jörg Karwath
Technology Director

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Introduction

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

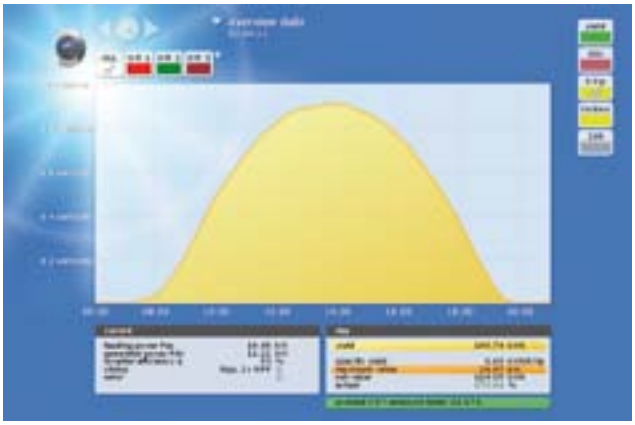
Solar-Log™ monitors more than 300,000 inverters worldwide, i.e. 2.1 Gigawatts and rising by the day!

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

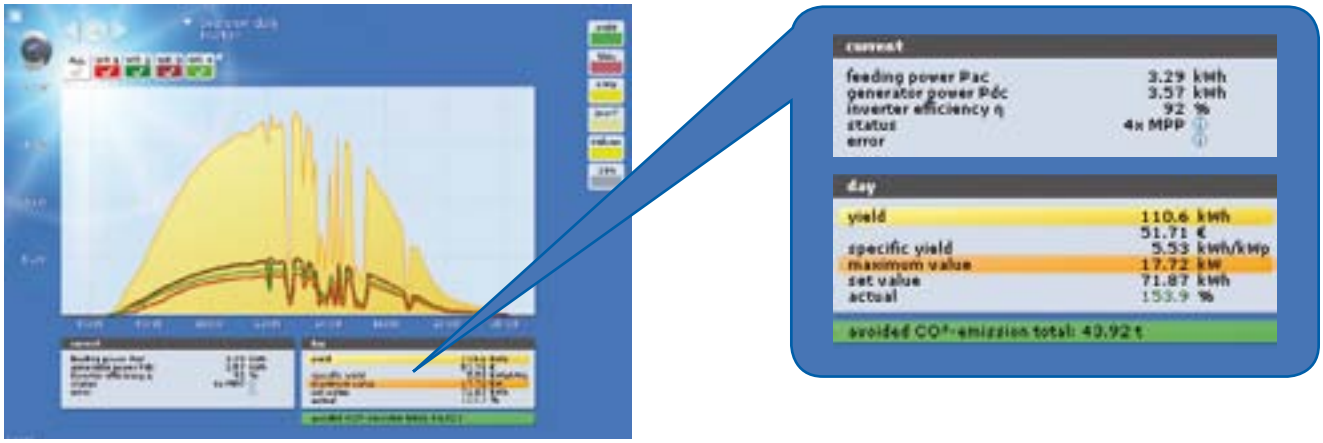


The perfect yield curve

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-Log^{1000}, 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 SMS, it transmits yield data and error messages. On the Solar-Log^{1000}, the messages are also shown on the display panel.
6. The Solar-Log$^{1000/500/200}$ will facilitate the use of your own power consumption. In Germany since 1 January 2009, in accordance with the Renewable Energies Law, your own power production receives dedicated government support.

For the installer and the dealer

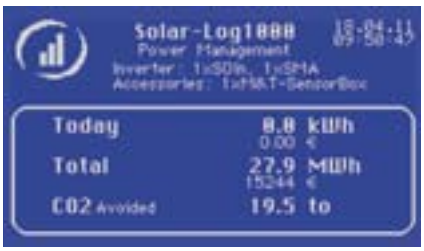
1. Solar-Log™ is compatible with most inverters available on the market and, depending on the data logger, between 1 and 100 inverters can be connected to it.
2. With Solar-Log™ “Easy Installation”, the logger's installation is now even easier. In most situations, the installer no longer requires PC 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-Log$^{200/500/1000}$ are optionally available with WiFi and Bluetooth. This makes wireless communication possible, with substantially reduced installation overhead.
5. Solar-Log^{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.

Hardware

Solar-Log™ Family		
Solar-Log200	**Solar-Log500**	**Solar-Log1000**
		
Supports 1 inverter	Supports up to 10 inverters	Supports up to 100 inverters
Operates via web browser on the network	Operates via 2-line text display	Operates via touch screen
	optionally via web browser on the network	
In each case with: 12 Volt adapter		
Connector for all sockets (1 x 6 terminals)	Connector for all sockets (2 x 6 terminals)	Connector for all sockets (2 x 6 terminals, 1 x 4 t., 2 x 3 t.)
		
Supports small residential systems with 1 inverter	For monitoring of smaller and medium sized PV plants, supports up to 10 inverters	For professional monitoring of larger PV investments, supports up to 100 inverters

Type	Art.-No. Solar-Log200	Art.-No. Solar-Log500	Art.-No. Solar-Log1000
Standard	255240	210501	211001
BT	255241	210502	211002
WiFi	255191 NEW	255189 NEW	255185 NEW
BT / WiFi	255192 NEW	255190 NEW	255186 NEW
PM+			211005
GPRS			255187 NEW
PM+ / GPRS			255188 NEW

Screen examples from Solar-Log1000 display



Solar-Log™ in Detail

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	Solar-Log200	Solar-Log500	Solar-Log1000
Accessories	Fully packaged cable kits for all supported inverters		
	3-phase Housemeter	3-phase Housemeter	3-phase Housemeter
	PowerLine Package	PowerLine Package	PowerLine Package
	RS485 Wireless Package	RS485 Wireless Package	RS485 Wireless Package
	Sensor Box	Sensor Box	Sensor Box
	–	–	Mobilfunk Paket
	–	–	Modem Paket
Accessories for SMA inverters	Special PiggyBack RS485 (except TL-20 series) (page 31)		
	Data Module SMA RS485 (page 31)		

Top Features	Solar-Log200	Solar-Log500	Solar-Log1000
Compatibility	Compatible with all the major inverter manufacturers.		
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			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 (legally stipulated in Germany since 1 July 2010)

Highlights

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. When the search is complete, LED-1 stays on permanently.

On the **Solar-Log**^{200}, the inverter search and the internet registration are enabled immediately. On the **Solar-Log**$^{500/1000}$ 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 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 complete LED-2 stays on permanently. Easy Installation is compatible with Solar-Log™ WEB Classic II and with Solar-Log™ WEB Commercial.

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™ 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/enclosure. 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.

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

Model / Type No. S.8

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.

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

Solar-Log1000 GPRS

**Solar-Log1000 with installed
mobile radio (wireless) technology**

The Solar-Log1000 GPRS is the alternative to the external GPRS modem. The new model is available with a magnetic foot antenna with a 2-meter cable. The SIM card holder is mounted to the inside of the device, where it is protected against loss.

**Solar-Log1000 PM+ is available
with integrated GPRS modem**

Please note that, inside the network, eather each one of the up to 9 Solar-Log1000 (Slave) units requires a SIM card, or a GPRS router must be integrated.

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

Model / Type No. S.8

The advantages of Solar-Log1000 GPRS

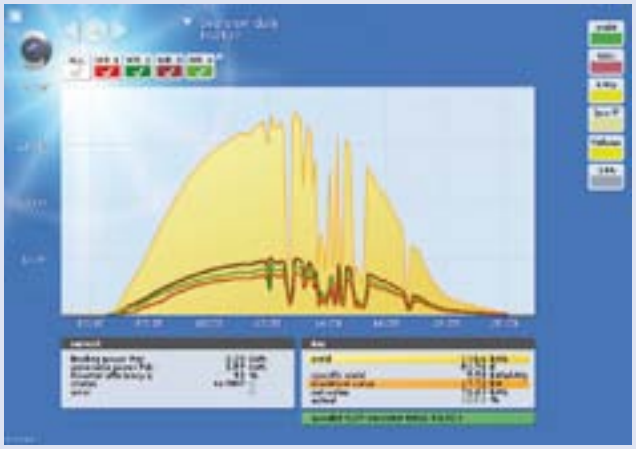
- The daily and automatic hardware reset function creates a more reliable data connection.
- The on-board modem reduces the installation overhead.
- The power consumption is reduced because no separate power adapter is required.

The internal GPRS modem cannot be retrofitted to the Solar-Log1000, so the external modem should continue to be used here.

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 34)

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 34)

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!

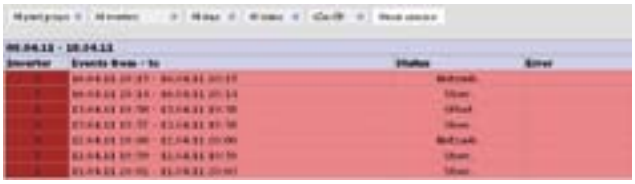
String comparison

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.

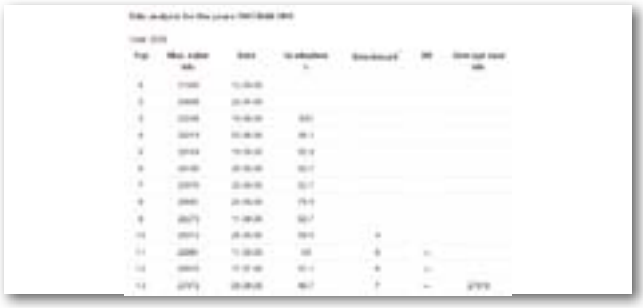
String comparison

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.

Plant data and data security

Solar-Log™ offers comprehensive data security and enables the plant owner to incorporate new functions at any time, simply by downloading software updates.

Data export

The yield data for this system is saved in the Solar-Log™ on an SD card. In Parallel to this the data is saved in Solar-Log™ WEB, which can be viewed on any internet-capable PC or mobile phone. Furthermore, it is possible to extract data manually using a USB pen drive. Importing old yield values to act as historical data can be done as a manual input, or by applying a CSV file.

Updates

Firmware updates can be downloaded free of charge and at any time from www.solar-log.com. You can apply a new firmware to a Solar-Log™ through the local web-browser interface. On the Solar-Log^{1000} you can complete a firmware update with a USB stick. Inverters that are not already supported at the time of purchasing the Solar-Log™ can be retrofitted at any time by means of a firmware update.

Memory size

The Solar-Log™ can record data for a 30-year period with data granularity of 5 minute intervals. The memory hardware is buffered every 50 days of run-time (Goldcap condenser) and delivers optimised runtime security.

Cable sheathing

The attractive design of the Solar-Log™ is perfectly suited for residential viewing applications as well as placement in the lobbies of office buildings. You are able to conceal the cables by routing them through the wall and into the back of the Solar-Log™. This is thanks to the design of the attractive Solar-Log™ covers.

Product comparison

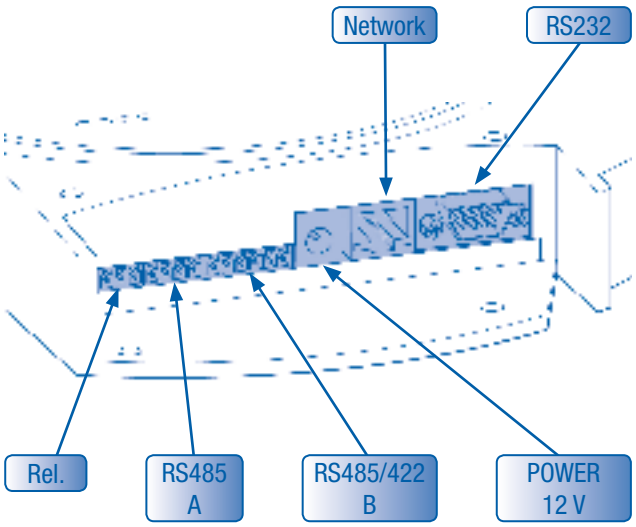
	Solar-Log^{200}	Solar-Log^{500}	Solar-Log^{1000}
Inverter communication / inverter = WR			
Bluetooth (BT) [2]	●	●	●
WiFi (wireless LAN) [2]	● NEW	● NEW	● NEW
Bluetooth (BT) / WiFi [2]	● NEW	● NEW	● NEW
Powermanagement (PM+) [2]	–	–	●
GPRS [2]	–	–	● NEW
Powermanagement (PM+) / GPRS [2]	–	–	● NEW
Central inverter SCB [2]	–	–	●
max. number of inverters	**1**	**up to 10**	**up to 100**
Communication interface	**1 x RS485 / RS422**	**1 x RS485 / RS422**	**1 x RS485, 1 x RS485 / RS422**
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)	●	●	●
Inverter failure, status of fault and power monitoring	●	●	●
Connection of sensors (temp. / wind)	●	●	●
Connection of digital current meters	●	●	●
E-mail and SMS alarm	●	●	●
Local alarm (pot.-free contact)	–	–	●
Yield forecast and degradation calculation	●	●	●
EEG “own power consumption” Digital current meters (RS485)	●	●	●
EEG “own power consumption” Control of ext. consumers	–	–	●
Visualisation			
Integrated web servers	●	●	●
Graphic visualisation - PC local and internet	●	●	●
Graphic visualisation - USB pen 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/S0 impulse	–	●	●
Interfaces			
Ethernet network	●	●	●
USB pen 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 to +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)	●	●	●
Memory, Micro-SD, 2 GB, Endless-loop data recording	●	●	●
Warranty cover	**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, power management, „own power“ consumption and SCB central inverters can be found on our website.

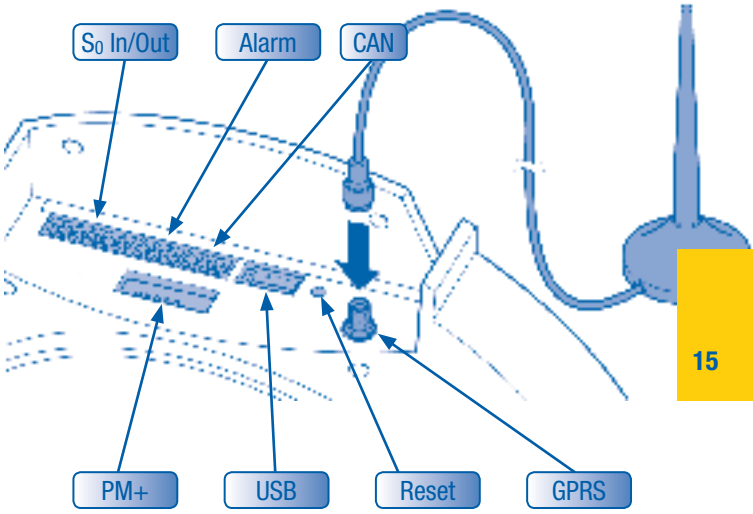
Connection options

		Solar-Log^{200} interfaces	Solar-Log^{500} interfaces	Solar-Log^{1000} interfaces
Inverter interfaces	**RS485 / RS422 – interface usage**	**RS 485/RS 422 –** multi-purpose interface	**RS 485/RS 422 –** multi-purpose interface	**RS 485 A –** interface **RS 485/RS 422 B –** multi-purpose interface
	Number of inverters	Max. 1 inverter	Max. 10 inverters (various inverters from the same manufacturer)	**Per interface** - Max 50 inverters - various inverters from the same manufacturer
	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 consumption of self-produced power	S_0 Impulse input – for optional recording and calculation consumption of self-produced power	S_0 Impulse input – for optional recording and calculation consumption of self-produced power
		–	S_0 Impulse output for connection of external display units from any manufacturer, impulse factor can be set to any value	S_0 Impulse output for connection of external display units from any manufacturer, 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+ (Power management)** - For connection of an EVU all-round 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

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



View bottom



View top

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Inverter

Network / Internet

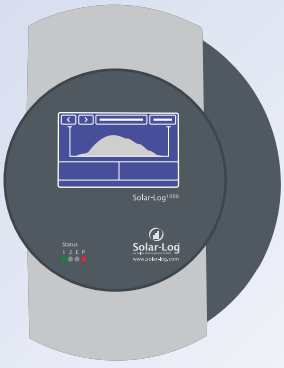
RS485 out / S0 out:
- XL display, Solar-Log$^{500/1000}$ only

for Internet:
- Solarfox

Solar-Log™ APP

Wireless:
- Bluetooth (BT models)
- RS485 Wireless Package

By cable:
- RS485
- RS422
- CAN-Bus (Solar-Log^{1000})



Wireless:
- Solar-Log$^{200/500/1000}$ WIFI

By cable:
- Ethernet
- DLAN

GPRS:
- Solar-Log^{1000} GPRS

Analogue:
- Solar-Log^{1000} with Modem Package

Solar-Log™ WEB

RS485 sensors:
- irradiation
- temperature
- wind force

S0 meter as:
- grid meter
- consumption meter
- unknown inverter meter

Ripple Control Receiver
- power managment+
- power reduction
- reactive power control

Customer:
Access to the data logger or WEB portal

Solar-Log™ WEB

Our Online-Monitoring Portfolio

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

With Solar-Log™ WEB we offer you three options for monitoring and evaluation:

1. Solar-Log™ WEB Commercial Edition

For the "Full Service" option from the installer – installation, monitoring, maintenance.

With Solar-Log™ WEB Commercial Edition, the installer or dealer can issue the plant owner with a maintenance contract and can therefore offer his customers an extended and professional form of plant monitoring. This enhances the level of customer support offered to the end-user. Solar-Log™ supports this Full Service maintenance concept through online access to the plant. The installer offers the complete package, with monitoring, maintenance and servicing of the solar power plant. This enables the installer to respond rapidly to fault messages and save valuable time, effort and costs. Changes to the Solar-Log™ configuration can be made conveniently from your office chair. The plant owner always has access to yield and plant data. **Pricing in specific countries may be subject to change due to other PV size limits; please check accordingly.*

2. Solar-Log™ WEB "Classic II"

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

Classic II 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 II is free of charge up to 30 kWp, above which modest fees are applicable. **Pricing in specific countries may be subject to change due to other PV size limits; please check accordingly.*

3. Solar-Log™ WEB "Self Made"

For the experienced plant owner, who has HTML expertise and can create and set up his own homepage.

Self Made contains simple basic functions and graphic display options. The homepage kit for self-installation can be downloaded free of charge from www.solar-log.com/service-support/downloads/homepagekit.htm. The monitoring of the solar power system is conducted by the private plant owner independently; not intended for commercial use.

Solar-Log™ WEB Commercial Edition offers many advantages

Simple and fast integration of PV systems in a WEB portal

With Solar-Log™ WEB Easy Installation, the Solar-Log™ registers itself automatically on the central WEB registration server. Then the Solar-Log™ WEB Commercial Edition enables the plant to be taken over using the corresponding Easy Code.

Convenient handover and connection to the WEB

- "Solar-Log™ Easy Install" enables all important plant parameters to be set at the same time, in a time-saving process.
- Configuration of the data logger can be performed locally, or conveniently from your office chair.
- This data can be called up and changed in the familiar fashion at any time.

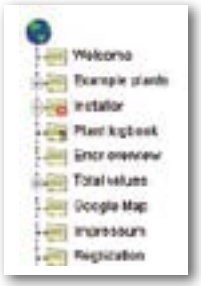
The settings on the Solar-Log™ can be edited remotely using the 'SolarLog Config' WEB module.

Solar-Log™ Device Label

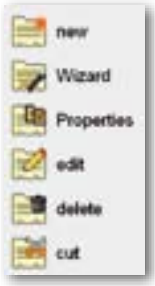
SolarLog Config WEB module

Clear page layout and WEB display format

The page layout of Solar-Log™ WEB Commercial Edition can be reconfigured and filled with content in any desired way. Pages can be added, composed and removed again at any time. For each page, a decision is taken about whether or not to make it viewable for all website visitors.



Page layout



Page editing

Modules

Individual Solar-Log™ WEB Training on request

The page layout is based on a Content Management System

- Various modules are provided for page layout purposes.
- The modules can be augmented by variable text, numerical or graphical elements.
- With various templates, different colour schemes are available to help design the page's layout.

Page layout wizard produces complete layouts with a single click. Various structures can be selected, enabling page layouts to be created automatically and modules to be positioned automatically.

Fully scalable analysis and evaluation options for error messages

The Solar-Log™ WEB module "Inverter error messages" offers the installer the option of monitoring and presenting the error messages from the inverters coming from several plants.

Faults or failures can, within a short period of time, be analysed and remedied

In this module settings can be changed related to:

- Which inverter error messages should be displayed.
- From which fault duration the message should actually be categorised as a fault.
- In which sequence the faults should be listed.

The primary advantage of this module is its fast response time, its maximum level of operational readiness and the resultant low level of lost yield. The error messages are often displayed for fast and simple recording purposes and are then acknowledged by means of a simple cross/tick in a box. If so desired, these can then be deleted or left in place.

Data input plant Logbook

Perfect organization in Solar-Log™ WEB

With the Plant Logbook module, error messages and activities can be administered and documented in an ongoing manner.

The Plant Logbook module facilitates the following functions

- With the help of an integrated, professional ticket system, activities and tasks are defined and can be assigned to users.
- Fault categories can be defined and results can be commented upon.
- Activities can be categorized using the status dialog.

This module supports the installer with the maintenance of a solar power system and simplifies the administration of tasks and compliance with start and completion deadlines.

The perfect overview for the installer and for the plant owner

Our presentation modules offer versatile options for viewing monitored systems on the internet.

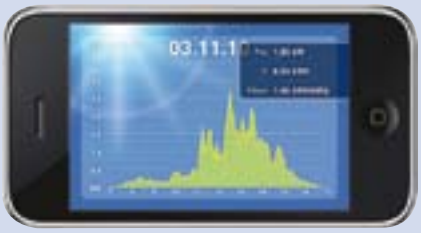
Clear Internet Overview:

- In the plant group module up to 10 solar power plants can be viewed in a single graphic.
- „SolarLogInfo“ offers information related to plant-specific data. Location data, owner information or a system image can be uploaded on a case-by-case basis.
- In „DataVolumeBlock“, you can select pre-calculated values such as avoided CO_2 emissions and installed capacity. This is then displayed on the web.
- By means of maps, ”Google References” offers a geographical overview of monitored plants.
- Use the Solar-Log™ APP (iPhone®, iPod touch® or iPad®) to check your system any time and from anywhere in the world.
- The Solarfox module acts as an interface to the Solarfox large public display.

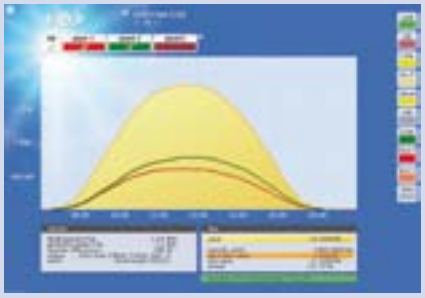
The installer defines which details should be viewable to all page users, and which information should remain concealed from the general public.

DataVolumeBlock

GoogleReferences module



Solar-Log™ APP



plant group graphic

plant group graphic

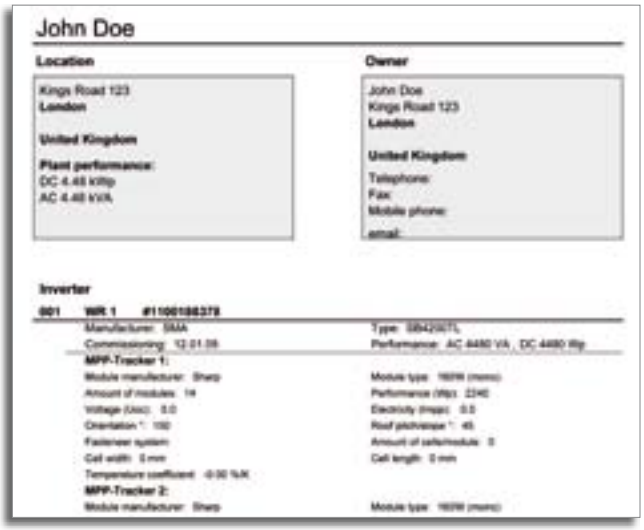
„SolarLogInfo“

Data administration made easy

There are many tools at the disposal of the installer that can be used for a simple and structured administration of Solar-Log™ WEB.

With Solar-Log™ WEB, data management is made easy

- In the “User administration” area users rights and passwords are assigned.
- In the “Project data” section, besides general information, additional details can be saved such as string diagrams.
- The “Open items” box offers a detailed overview of all active plants, as well as plants to be billed.



Project data sheet

Various additional services are available

Use Solar-Log™ WEB as a promotional platform, present yourself with your Corporate Image and clearly distinguish yourself from your competitors.

Solar-Log™ WEB offers you much much more

- With various page layouts and your logo, you can adapt Solar-Log™ WEB to your Corporate Image.
- Optional and individual domains facilitate an easy-to-find portal on the internet.
- As a service, Solare Datensysteme offers the creation of individual templates for your convenience.
- In order to fully maximize the various functions available to you in Solar-Log WEB, we recommend a half-day training session as an introduction. This may take place in Geislingen, Germany or via the internet.

	Plant monitored by:	Plant owner or by third party		Installer / Wholesaler/ OEM
	Product Name	**Self Made** (at no charge)	**Classic 2nd Edition** (< 30 kWp at no charge, > 30 kWp charged)	**Commercial / Full Service** (charged)
Basis functions	Event log (error / status messages of the inverters)	●	●	●
	Overview of the yields per kWp	●	●	●
	Performance comparison of the individual inverters and strings	●	●	●
	Data and fault messages via e-mail	●	●	●
	Compatible with Solarfox Public Display and Solar-Log™ APP	●	●	●
Extended functions	Registration	–	Online	by installer
	Number of email addresses for performance / fault messages	–	1	4
	Evaluation scripts for data preparation	Download	integrated	integrated
	Data transfer from 1st Edition / 2nd Edition	–	manual	automated
	Simple configuration due to „Easy Installation“	–	●	●
	Compatible with SMA Sunny WebBox and internal Kostal data logger	–	–	●
	Central fault message monitoring of all plants (stop light view)	–	–	●
	Remote configuration of the Solar-Log™ device	–	–	●
	String-Connection-Box monitoring	–	–	●
	Powermanagement with report	–	–	●
Commercial functions	User administration	–	–	●
	Efficient troubleshooting and management	–	–	●
	Invoicing module (outstanding items with respect to the plant owner in CSV or PDF format)	–	–	●
	Over 10 standard templates	–	–	●
	Individual page composition due to flexible Content Management System (CMS)	–	–	●
	Plant project administration (location, owner, inverter, module and performance data)	–	–	●
	To-Do list with termination and logbook	–	–	●
	Configuration assistant for the plant presentation	–	–	●
	Graphical arrangement of multiple Solar-Logs on one page	–	–	●
	Performance Ratio evaluation	–	–	●
	Connection or transfer of plants from Classic 1st /2nd Edition	–	–	●
	Individual Corporate-Identity template	–	–	charged
	Domain name of your choice	–	–	charged
Data transfer	Data storage (30 years)	●	●	●
	Storage intervals: 5 min, 10 min or 15 min (depending on inverter)	●	●	●
	Standard transfer intervals: 30 min, 1h, 2h, 4h, 8h, daily	Standard and every 10 or 15 min	only standard	Standard and every 10 or 15 min

Changes & additions subject to change without notice. *Pricing in specific countries may be subject to change due to other PV size limits; please check accordingly.

Monitoring of large plants

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

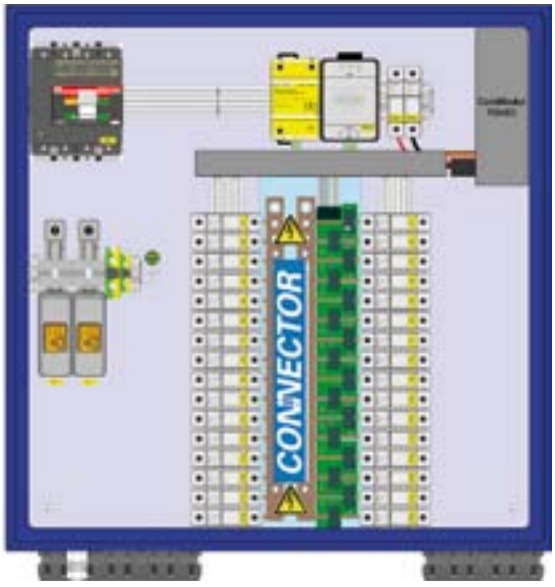
Large systems generate high levels of profitable sales revenue. For this reason good monitoring is all the more important and monitoring of individual strings is simply essential.

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" is comprised of high-quality standardized components and adheres to the highest standards of quality.

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.



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 / wiring.
- 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 of "synchronicity").

Ease of assembly

The powder-coated aluminium housing complies with protection standard IP65 and is able to withstand severe weathering without issue. 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 for provisioning.

Type	Art.-No.
Solar-Log™ SCB 12 DC/DC	**255115**
Solar-Log™ SCB 16 DC/DC	**255123**
Planned options	
Solar-Log™ SCB 12 AC/DC	**on request**
Solar-Log™ SCB 16 AC/DC	**on request**
Solar-Log™ SCB 12 AC/DC "F" (fire brigade emergency stop switch)	**on request**
Solar-Log™ SCB 16 AC/DC "F" (fire brigade emergency stop switch)	**on request**

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
Line cross-section, flexible	1 – 16 mm^2	1 – 16 mm^2
Input voltage – DC	440 – 900 V [1]	440 – 900 V [1]
Line 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
Line 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
Earthing equipment	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

[1] *Voltage supply direct via the pv generator*
[2] Voltage supply via external AC 230 V connection

Monitoring of large plants

Solar-Log[1000] PM+

German feed-in Power Management (PM+) for photovoltaic systems with an output of 100+ kWp

Since January 2009 photovoltaic systems in Germany with an output of more than 100 kWp must have the capability of being reduced by network operators to the supplied effective power (German Law § 6.1 EEG). In practice this is done by ripple control receivers that can start a 4 stage effective power reduction.

In addition, since 1 July 2010 there have been extended reactive power control regulation requirements. Here, according to the medium voltage guidelines, the network operator can prescribe a cos φ shift factor to operate photovoltaic systems. 3 options are possible here: Setting a fixed value cos receiver φ, setting the cos φ depending on a P/Pn characteristic curve or setting one that can be controlled by a ripple control.

Easy to install

- The Solar-Log[1000] PM+ includes corresponding hardware and software to meet the requirements of the network safety management system. Because of the large number of requirements from the operators the Solar-Log [1000] PM+ is restricted to the most common connection and configuration options.
- The Solar-Log[1000] PM+ contains an additional interface to which up to two ripple control receivers can be connected.
- The ripple control receiver's outputs can be connected using 4 potential-free contacts. If necessary, using another contact between the signals of two different ripple control receivers a distinction can be made as to the requirements for output reduction and reactive power control.

Feed-in management for large systems

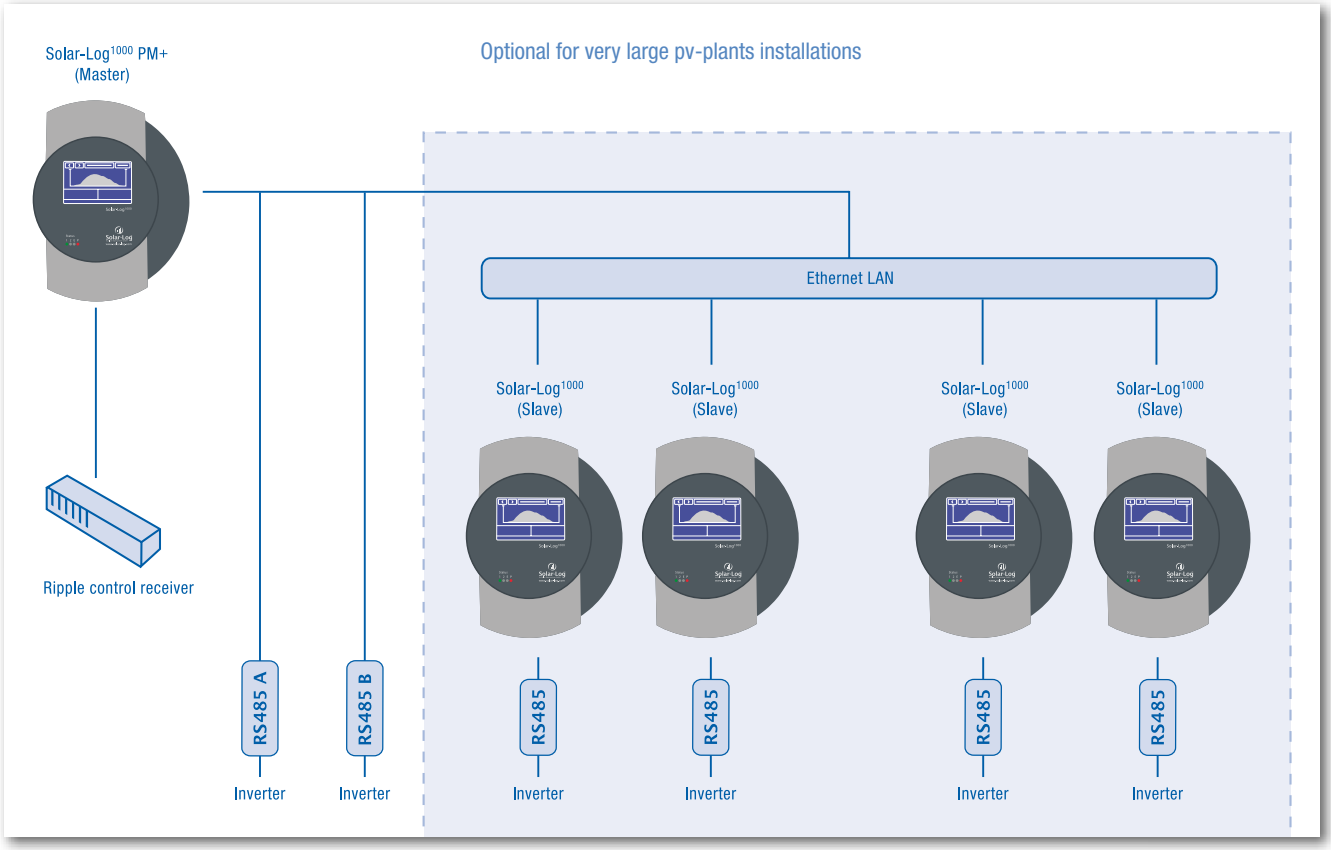
In order to provide feed management for large plants, there is the option to operate the Solar-Log^{1000} PM+ in a network with several Solar-Log^{1000} units.

Function:

- The ripple control receiver signals are received on the Solar-Log^{1000} PM+ (Master) and distributed to the connected inverters via an RS 485 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 their 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 “extends” 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

Cable sets / interface

	Type	Interface / Canbus	Art.-No.
RS485 – interface / cable set			
	Cable set connection to SMA (3 m)	RS485	**220037**
	Cable set connection to Kaco (3 m)	RS485	**220038**
	Cable set connection to Sunways (3 m)	RS485	**220039**
	Cable set connection to SolarMax (3 m)	RS485	**220040**
	Cable set connection to Danfoss Unilynx (3 m)	RS485	**220042**
	Cable set connection to Power-One (3 m)	RS485	**220043**
	Cable set connection to Mitsubishi (3 m)	RS485	**220049**
	Cable set connection to Vaillant (3 m)	RS485	**220044**
	Cable set connection to Solutronic (3 m) (not for type 100, 120, 150)	RS485	**220050**
	Cable set connection to Schuco (3 m)	RS485	**220051**
	Cable set connection to Mastervolt (3 m)	RS485	**220054**
	Cable set connection to Kostal/Convert (3 m)	RS485	**220055**
	Cable set connection to Refu (3 m)	RS485	**220056**
	Cable set connection to Diehl AKO (3 m)	RS485	**220064**
	Cable set connection to Vectron (3 m)	RS485	**255012**
	Cable set connection to Effekta (3 m)	RS485	**255034**
	Cable set connection to Steca 200 / 500 / 1000	RS485	**255066**
	Cable set BKL2 Universal / Alphasol / Powercom / Winaico	RS485	**255107**
	Cable set BRJ2 Universal / Motech / Central Solar	RS485	**255157**
	Cable set Santerno-Solar-Log™ (from Solar-Log™ to 1. Inverter incl. connector) – always required	RS485	**255109**
	Cable set Santerno inverter (from one inverter to the next one)	RS485	**255110**
	Cable set connection to Delta (3 m)	RS485	**255125**
	Cable set connection to Hyundai HPC-250 HT-E	RS485	**255154**
	Cable set connection to Hyundai HPC-050 / 100 HT-E	RS485	**255156**
	Cable set connection, Sustainable Energy	RS485	**255155**
RS422 – interface			
	Cable set connection to Fronius (3 m)	RS422	**220041**
	Cable set connection to Phoenixtec / Sunville (3 m)	RS422	**220057**
	Cable set BKL1 Universal / Salicru (EQX) / SE SunEzy	RS422	**255106**
	Cable set BRJ1 Universal/Europa Solar / Ever-Solar	RS422	**255108**

	Type	Interface / Canbus	Art.-No.
RS422 – Canbus			
	Cables set connection to Voltwerk/Conergy (from Solar-Log™ to 1. Inverter incl. connector) – always required	Canbus	**255001**
	Cables set connection to Voltwerk/Conergy (from one inverter to another)	Canbus	**255002**
Extension cable			
	Extension cable RS485, 4-pin, sheathed, length 8 m	RS485	**255145**
	Extension cable RS422, 6-pin, sheathed, length 8 m	RS422	**255146**
RS485 for self-wiring			
	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**

Solar-Log™ RS485 Wireless Package

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.

compatible with Solar-Log200 / 500 / 1000 (800e)

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

- 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 29).
- 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 therefore, are turnkey units.
- **Attention:** Not compatible with Fronius / Phoenixtec / Sunville

Technical data	
Range inside buildings	up to 80 m (up to three concrete walls)
Range over open ground	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
Antenna	Dipole antenna, 2.1 dBi amplification

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

Outdoor and directional radio antennas for RS485 Wireless Package

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

Advantages of external and directional radio antennas

- 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-back-ratio	15 db
Load-bearing capability	50 W (cw)
Impedance	50 Ohm
Connection	N connection (female)

Type	Art.-No.
Directional radio antenna for RS485 Wireless Package, for external use, incl. **3 m** cable and assembly material	**220059**
Zubehör	
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-Logs.
- 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 range in direct 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” (= the 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™.

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 the 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).

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 isolated from one another and offer insulation protection of 6.5 kV.

Compatibility	Art.-No.
Compatible with SMA inverter	
Special PiggyBack (RS485) for SMA WR – only for Solar-Log™ systems (not compatible with SB3000 / SB4000 / 5000 TL-20 and Tripower)	**220020**
Data Module SMA (RS485) SB3000 / SB4000 / 5000TL-20 (Next Generation)	**220053**
Fronius and identical inverter designs	
ComCard Retrofit Fronius and identical designs	**220022**

Sensors including irradiance sensor and integrated module temperature sensor

The sensors record variances between the possible and the actual power production levels and deliver key indicators relating to the quality of the system as a whole. The Solar-Log™ continuously compares the yield data from the solar power plant with the measurement results from the various sensors. If a variance exists, the Solar-Log™ generates an error message.

Sensor Box

The most important element in the Sensor Box is the irradiance sensor. This delivers a reference value for solar radiation ("solarization") and enables conclusions to be drawn about possible power generation. Even at low levels of solarization, power dips can be identified reliably and error messages can be generated. Due to the installed internal module temperature sensor, a power 'dip. is easier to analyse.

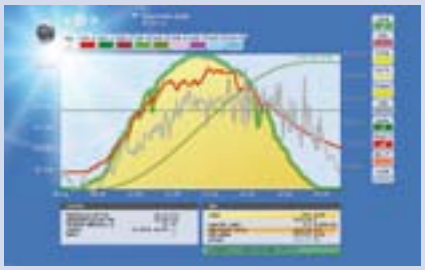
Communication benefits between the Solar-Log™ and the Sensor Box:

- Solar-Log™ generates an error message in response to any variance that occurs.
- Errors and malfunctions can be filtered out and analysed 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-Log^{1000}.

- Sensor Box
- Wind sensor
- Ambient temperature sensor

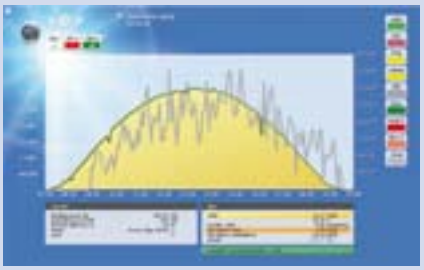
compatible with all current Solar-Log™ models

The irradiance sensor is equipped with a high-quality mono crystalline cell, which is rugged and specifically designed for long-term use in outdoor locations. The sensors are installed directly to the solar power plant and are connected to the Solar-Log™ via the 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

Accessories

Ambient temperature sensor

The optional ambient temperature sensor delivers additional information. Low yields can result from a combination of sunshine and low temperatures. The presence of this problem can be confirmed with the help of the sensor.

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.

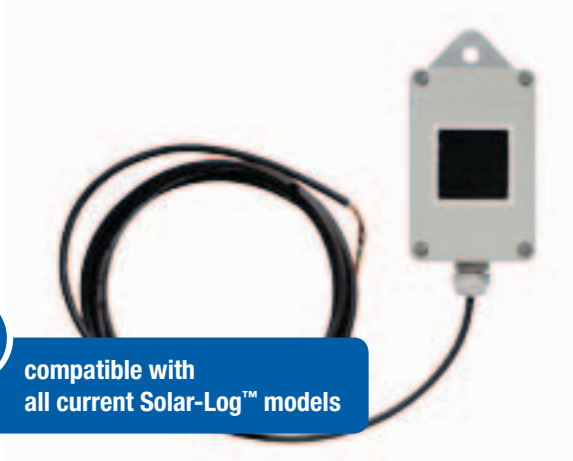
Technical data	
Solar cell, single-lamination behind glass	Mono crystalline silicon (5 cm x 3.3 cm)
Dimensions (W x D x H)	14.5 cm x 8.5 cm x 4.0 cm
Housing	Powder-coated aluminium housing, compliant with protection mode IP65
Temperature range	-20°C to +70°C
Power supply	Via RS485 data cable from Solar-Log™ (10 – 28 VDC), no further power supply required
Tolerance	Irradiance sensor: +/-5%
Installation	On module assembly rails, suitable screws are provided. Not necessary to open up the sensor – all sensors are screwed shut.
Installation	4-pin, 3 m, UV and weather-resistant
Warranty	24 months

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 the basic requirements for a irradiance sensor.

- Delivers irradiance values and module temperature data.
- Suitable for all Solar-Logs
- Only 3 % less precise than the Sensor Box.
- No connection possible for wind sensor or ambient temperature sensor.
- Connection of one sensor per system.



Technical data	
Solar cell	Amorphous thin layer silicon cell (3.5 cm x 3.5 cm)
Dimensions (W x D x H)	64 mm x 99 mm x 36 mm
Housing	Polycarbonate, UV-stabilised IP65
Temperature range	-25°C to +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 to 1400 W/m²
Tolerance	Irradiance sensor: +/-8%
Installation	On module mounting rails. Not necessary to open up the sensor - all sensors are screwed shut.
Connection cable	4-pin, 3 m, UV and weather-resistant
Warranty	12 months

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

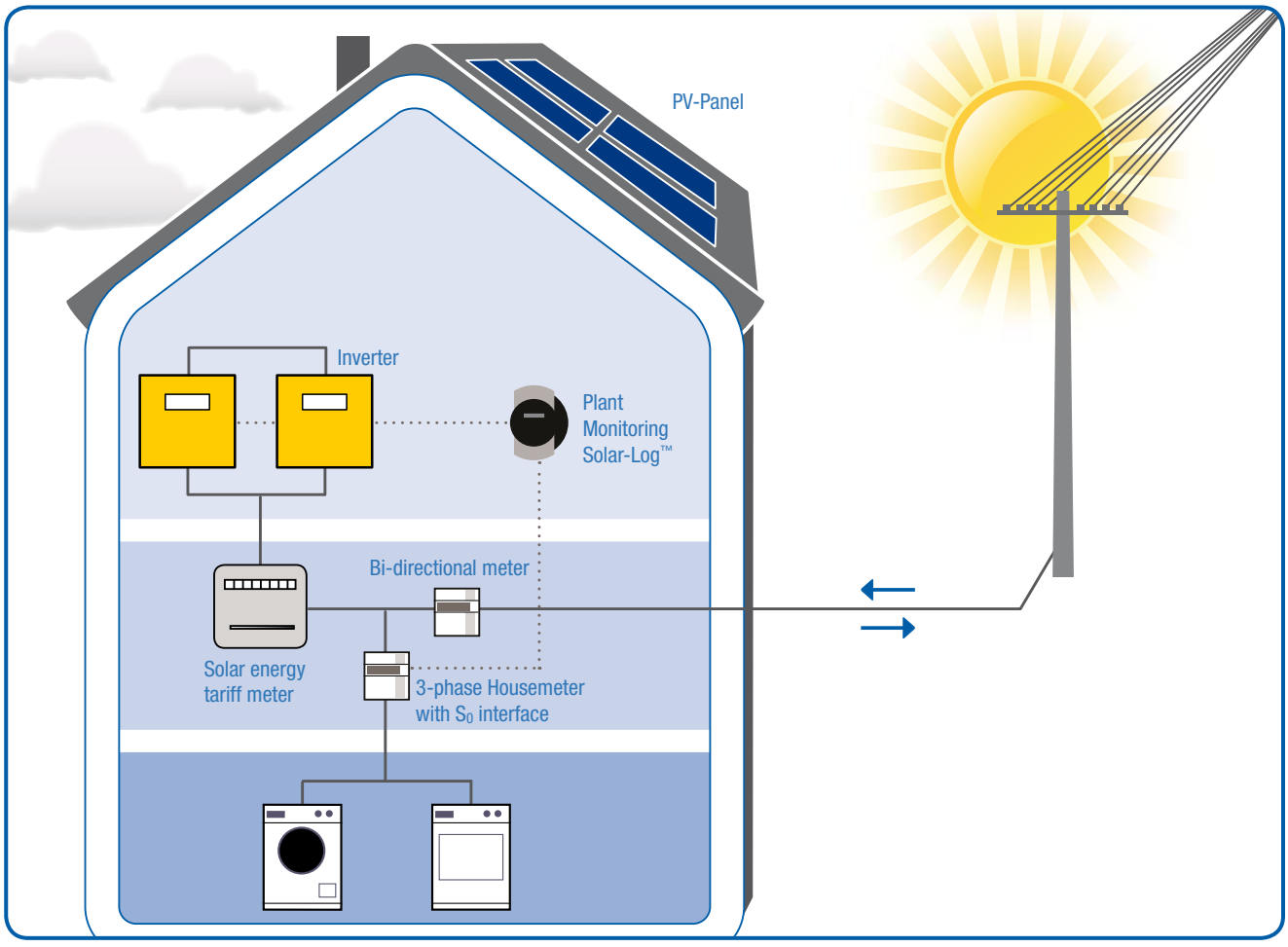
Solar-Log™ Smart Metering – optimisation of self-produced power

**The Solar-Log™ is able to optimize use of self-produced power.
This has been being promoted in Germany since 1 January 2009 through funding in response to the Renewables Law, Germany (for further information, refer to: www.eeg-aktuell.de).**

Details of the funding support scheme:

The great advantage of self-produced and consumed power 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 (for plants up to 500 kWp). The surplus power can also be directed into the mains supply for remuneration.

Daily summary with presentation of yield and power consumption balance, 1 inverter drawing down power (red), power generation (yellow), self-produced power (green)



Monitoring of power consumption

The Solar-Log$^{200/500/1000}$ is able to record electricity generation as well as power consumption, often referred to as Smart Metering. To enable the Solar-Log™ to do this, it combines the integrated S_0 interface (on the top of the device) with the S_0 output of a digital power meter.

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

The Solar-Log^{1000}, with installed firmware 2.3.0-30 or later, 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 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 consumers. Depending on that surplus, a "Smiley" emoticon indicates whether or not manual engagement of consumers is meaningful or not 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.

Optimisation of self-produced power consumption

As the rate of payment is increased yet again for your own consumption of the solar power that you generate, optimum control of consumers is a must. The Solar-Log^{1000} offers the capability of using self-produced power at precisely the times at which sufficient electricity is being generated.

The rate of consumption of self-produced power can be increased efficiently on the basis of changes in electricity characteristics, which increases the financial yield.

- The Solar-Log^{1000} can engage up to 4 consumers and shuts them down when necessary.
- Devices are engaged via mains power sockets (available as accessories, page 37) or via the internal relay.
- Various options can be configured, e.g. a later (delayed) engagement time in the program.

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

3-phase Housemeter or digital electricity meter

Various uses are made of an additional electricity meter on solar power systems. One can be used to transmit the measurement of current to the Solar-Log™. If you wish to consume self-produced power from a solar power system, the meter (functioning as a power consumption meter) measures the electricity used, and compares this figure against the electricity generated.

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

Connection to the Solar-Log to a digital meter involves the use of an S_0 input Solar-Log$^{200/500/1000}$.

S_0 Housemeter

- **The meter can be configured and used on the Solar-Log™ in three modes:**

  1) Measurement of power consumption to optimise self-produced power levels.

  2) Measurement of total current being fed into the system.

  3) Inverter measurement of power production from a non-supported make of inverter.

- The S_0 connection involves the use of a 6-pin S_0 In/Out connector on the Solar-Log$^{200/500/1000}$. Do not exceed a cable length of 10 metres.

Technical data	uncalibrated	calibrated and authorised
Direct connection	Up to 63 A	Up to 80 A
Voltage Un	3 x 230V / 400V -25%/ + 15%	3 x 230 V / 400 V
Measuring range	0.015 to 63 A	0.025 to 80 A
Self-produced power	0.7W / phase	< 0.6 W / phase
Start-up current	<15 mA	14 mA
Mains frequency	50 Hz	50 Hz
Weight	320 g	330 g
Protection class	IP20	IP20
LCD display	7-digit, 1 decimal place	6-digit, 1 decimal place
S_0 impulse	Length 40 ms, 1000 Imp/KWh **Voltage:** 18 VDC – 30 VDC **Current:** 5 – 15 mA	Length 30 ms, 1000 Imp/KWh **Voltage:** 18 – 27 VDC **Current:** 27 mA
Other	Complies with IEC 1036 Precision class 1 acc. to EN 62053-21	Complies with IEC 1036 Precision class II

Type	Art.-No.
3-phase Housemeter, S_0 impulse, uncalibrated	**220035**
3-phase Housemeter, S_0 impulse, calibrated and authorised	**255091**

Mains power socket

The Solar-Log[1000] enables the consumption of self-produced power to be optimised. Engagement 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 engaged 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.

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

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

compatible with Solar-Log[1000]

Technical data	
Maximum load	1500 watts
Maximum current	8 A
Control	TCP/IP
Statuses	On / Off
Connector	Euro connector

Type	Art.-No.
Mains power socket	**255065**

Mobile Wireless Package

If you do not have a Solar-Log[1000] GPRS this Mobile Wireless Package will export your data on a mobile communications network.

Mobile Wireless Package (GPRS)

- 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-Log[1000].
- The mobile wireless connection is performed via the RS232 interface.

compatible with Solar-Log[1000] / (800e)

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 and weight	77 mm x 67 mm x 26 mm, 100 g
Temperature range	-40° C to +80° C
Scope of delivery	Mains power unit, RS232 cable, magnetic foot antenna

GPRS external antenna to improve data connection via GPRS

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 / weight	370 mm x 155 mm 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

Type	Art.-No.
Terminal Mobile Wireless Package (GSM), Siemens CT63 complete kit	**220047**
Antenna extension for (Siemens) GPRS modem **5 m**, internal / external area	**255014**
Antenna extension for (Siemens) GPRS modem **10 m**, internal / external area	**255015**
Antenna extension for (Siemens) GPRS modem **15 m**, internal / external area	**255016**
GPRS antenna for greater wireless range	**255221**
Mounting Pack (“top hat rail”) for Mobile Wireless Package	**220048**

Modem Package

The Modem Package accesses the internet via a telephone line. The data logger needs this access to the internet to send messages by e-mail or by SMS and, if so desired, to supply Solar-Log™ WEB with on-line data.

- Wireless data transmission takes place via an analogue telephone connection.
- The analogue modem “Home” is suitable for home use.
- The analogue modem “Industry” is very rugged and is intended for industrial use.
- The modem connection is made via the RS232 interface.

Industry

Home

compatible with Solar-Log$^{1000\ /\ (800e)}$

Technical data		
Type	**Home Modem**	**Industry Modem**
Transmission speed	up to 56 kbps	up to 56 kbps
Error correction	ITU-T V.42 / MNP 2-4	V.42 and MNP Class 4
Dial-up process	Impulse and multi-frequency dialling	Impulse and multi-frequency dialling
Exchange connection	By flash key or numeral	By flash key or numeral
Power intake	500 mA type.; sleep mode 370 mA type.	500 mA type.; sleep mode 370 mA type
Power supply	Linear 9 V, 1 A EuP-compliant	9 – 30 V DC
Dimensions (W x H x D)	136 mm x 95 mm x 30 mm	108 mm x 38 mm x 140 mm
Weight	165 g	165 g
Material	aluminium housing	aluminium housing
Temperature range	Temperature 0°C – 60°C Humidity 5% ~ 95%, non-condensing	Temperature 0 – 50°C Humidity 0 ~ 80%, non-condensing
Scope of delivery	Modem, Wire + Plug, Quigg	V.24 cable adapter 9-25-pol., Telephone connection cable RJ11-RJ11

Type	Art.-No.
Analogue modem package (home use)	**255082**
Develo ML 56 Kb analogue modem set (industrial usage)	**220046**

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 router. This involves data being modulated and transmitted onto the domestic mains power supply.

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.

compatible with Solar-Log$^{200/500/1000}$

Technical data	
Transmission speed	14 Mbit/s
dLAN connection	EURO mains connector
Device connection	Connector type: RJ 45 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 countries in the EU and in Switzerland: EN 55022 / EN 50024 / EN 60950
Dimensions (H x W x D)	80 x 63 x 37 mm
Weight	130 gr.

Type	Art.-No.
Develo DLan – PowerLine Package Duo (2 units)	**220015**
Develo DLan – PowerLine Package Single (1 unit)	**220016**

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

External presentation

Solar-Log™ APP

Everything visible, at all times, from wherever you Earth

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 if so desired.
- The configurable slideshow scrolls automatically through all the views.
- The system 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 “slideshow” 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, up-to-date and visible to all!

With Solarfox displays, you can present your customers and guests with visually appealing live data from your solar power system, combined with your own distinctive advertising. The power rating of your facility is presented in the form of attractive diagrams. You can add to it at any time with distinctive graphics and logos. 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 USB pen drive

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

The SF-400 series is equipped with a sturdy housing and makes use of air conditioning. When installed outdoors, it is thereby protected from humidity, moisture, heat as well as 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 screen frame. Only requires one power socket.

Included features:

- USB connection, card scanner for SD/SDHC, MMC, MC, xD and CF cards
- Integrated speaker 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 presupposes having a Solar-Log$^{200/500/1000}$.

Other Solarfox® products
Contact details: www.solar-fox.de

For information and orders:

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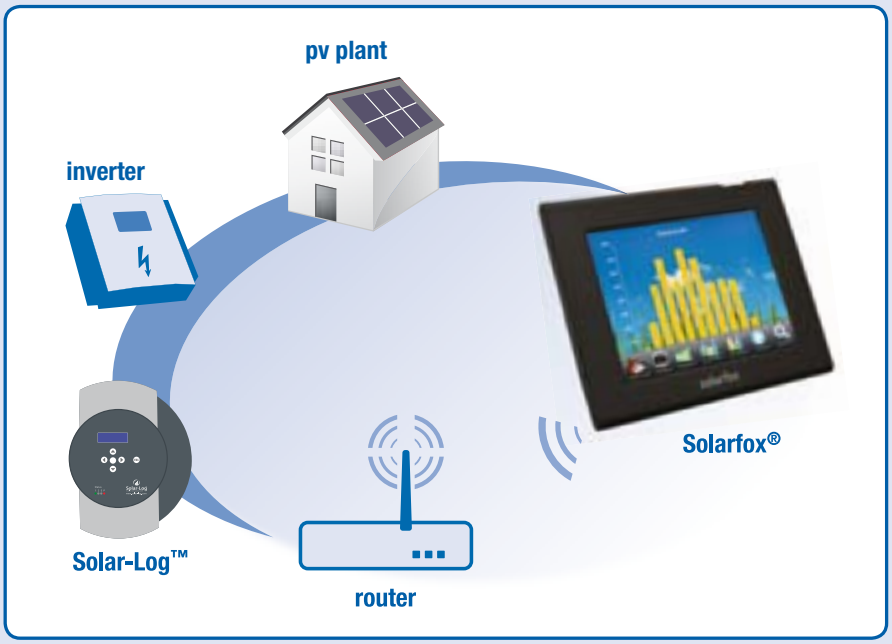
www.solar-fox.de



Solar-Log™ Universal Installation Box for outdoor use

The Solar-Log™ Universal Installation Box is made of polycarbonate and ABS plastic, which equips the Solar-Log™ reliably for mounting in outdoor locations. The housing complies with protection class IP65 and protects the data logger reliably from dust and moisture. Thanks to the transparent housing cover, data on the Solar-Log^{1000} display can be read at any time.

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

Technical data	
Universal housing	The housing material comprises polycarbonate and ABS plastic.
	The holes for mounting the Solar-Log™ are pre-drilled on the relevant wall.
	The cover of this universal housing is transparent.
	Free spaces are still available for the accessories.
Mounting	5 PG connections are available for mains power connection and other connections.
	To secure the data logger, disassemble the mounting plate from the universal housing, remove it from the housing 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 colour for the housing	Grey / RAL 7035
Surface	The housing is non-fading.
Protection class	IP 65 Only if the corresponding cable screw connections are used and if the cable conduits are be closed properly.
Dimensions (W x H x D)	300 mm x 600 mm x 132 mm

Type	Art.-No.
Solar-Log™ – Universal housing IP65 for outdoor use including power connection 3 m, mounting plate	**220063**
Hinges (2 units) for universal housing	**220072**

Solar-Log™ CASH accounting software

We are now able to watch over the financial aspects of solar energy systems as well as monitor PV systems. 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.
- Advance 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 from 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 a financial report.

Data security:

- Stand-Alone Application, local installed, based on Microsoft .NET platform
- Compatible with Windows XP, Vista & Windows 7

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

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Solar-Log™ is compatibel with:

AEG Power Solutions
Europa Solar AG
PCM Powercom Complete Power Solution
SOLUTRONIC
alpha
EFFEKTA
power-one Changing the Shape of Power
steca Elektronik
AROS Solar Technology
Fronius
Sustainable Energy Technologies
Conergy
REFU SOL
SUN TENSION Photovoltaic Systems and Components
CONVERTEAM The Power Conversion Company
HYUNDAI Heavy Industries Co.,Ltd.
Satcru Equinox
sunways Photovoltaic Technology
Danfoss
Ingeteam
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MITSUBISHI ELECTRIC
socomec Innovative Power Solutions SOLAR
MOTECH
SIEMENS
SolarMax Swiss Quality
CARLO GAVAZZI

IDS, Schüco

many more to come

Qualitäts-Management-System ISOZERT DIN EN ISO 9001
Umwelt-Management-System ÖKOZERT DIN EN ISO 14001

Solar-Log™ by Solare Datensysteme GmbH

Solar-Log™
by Solare Datensysteme GmbH

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