Solar-Log™

Installation manual

Solar-Log™

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Table of Contents

1 Introduction

This installation manual is intended for use by solar energy technicians and professional electricians.
User manuals are available for operating the Solar-Log™.
The wiring for the inverters is described in detail in the Inverter Installation Manual.

The Solar-Log™ must only be used by persons who have fully read and understood this installation manual before installing, operating and/or servicing the device.

Our product documentation is being constantly updated and expanded.
The current versions of the documents can be downloaded from our website:
www.solar-log.com.

The descriptions in this manual refer to firmware version 3.1.

2 Notes for the Firmware Update

The following models are upgradeable with the Solar-Log Firmware Version 3.1:

- Solar-Log 200
- Solar-Log 300
- Solar-Log 500
- Solar-Log 1000
- Solar-Log 1200
- Solar-Log 2000

3 Updating from Firmware 2.x to 3.1

The following note is for the Solar-Log 200, 500 and 1000 models when updating to firmware version 3.1.

Note

After installing firmware 3.1, it is no longer possible to downgrade to the previous versions.

The following changes occur when changing from major releases:

- The data transfer function is no longer available.
- The Smart Home section has been completely revised. If the function External Switch (only Solar-Log 1000) is used, this part needs to be reconfigured after the update.
- The settings and function of the power management have to be checked and, if need be, reconfigured.
- The new modern web interface may cause compatibility problems with older browser versions. We recommend using the latest version of "Mozilla Firefox," "Google Chrome" or "Microsoft Internet Explorer."

As part of the update, the Solar-Log™ has a data reformatting process running in the background. This process starts once the update is finished. This process could last several hours and the Solar-Log™ will operate and react slower until the update finishes.

4 Safety information

4.1 Target group for this manual

In order to protect people, the product itself, and other equipment, please pay attention to the following before handling the product:

- the content of this manual,
- particularly the safety information,
- the warning signs and type plates attached to the product.

This manual is intended for solar energy technicians and qualified electricians who are installing a Solar-Log 300, Solar-Log 1200 and Solar-Log 2000, wiring them to inverters, configuring them to operate in particular systems, and putting them into operation.

All the actions described in this manual for wiring and working on inverters must be carried out only by specially trained electricians. All repairs should only be carried out by similarly trained personnel, or by the manufacturers themselves.

Solare-Datensysteme GmbH is not liable for any personal injuries, property damages and system malfunctions and their consequences which result from not adhering to the product documentation.

4.2 Hazard Classes

The safety instructions in this document are represented with standard signs and symbols. Two classes of risk are identified, depending on their probability of occurrence and the seriousness of their consequences.

DANGER

Indicates an imminently hazardous situation to life
Non-compliance with this warning can lead to severe and irreversible injuries or death

Caution

Indicates an imminently hazardous situation to people, or a risk of material damage
Non-compliance with this warning can lead to irreversible injuries or to material damage.

5 Electric current

DANGER

Risk of death by electric shock if inverters are opened.
Never open the inverter housing when the inverter is connected to power.
See Switching off the inverters Page 42.
Always read the installation and safety instructions given in the manual for the corresponding inverter.

DANGER

Danger of death if there is condensation in the power supply unit when started!
Condensation can occur if the power supply unit is moved directly from a cold environment to a warm environment.
Wait until the temperatures have equalized before doing this.

Caution

Damage to the electrical components in inverters and on interface cards due to electrostatic discharge.
Avoid contact with component connections and plug contacts.
Before picking up the component, ground yourself by holding the protective conductor (PE) or the unpainted part of the inverter housing.

Caution

Damage to the electrical components of the Solar-Log™ due to the wiring of the Solar-Log™!
Switch the Solar-Log™ off;
See Chapter 9.1 on page 42

Caution

Risk of electric shock.
Do not use the unit if the housing of the external power supply unit is damaged. A damaged power supply unit must be replaced by one of the same type and from the same manufacturer in order to avoid danger.

Caution

The Solar-Log™ may only be used indoors or enclosed spaces.
The device has the protection class IP21.

6 Package contents

Check the package contents before proceeding to assembly and install.

Report any damage or missing parts to the forwarding agent and dealer immediately.

The unit is supplied with the following components:

- Solar-Log™ basic unit
- 2x cover panels to be fitted to the top and bottom of the unit to protect the connections and reset button
- 12 V power supply with country-specific adapters
- Terminal block connector for all connections
- 4x wall plugs and screws for wall mounting
- CD with the user manual as a PDF file

7 Wall mounting

The device is produced according to protection class IP20 and is intended only for installation in interior areas that are dry and dust-free.
Suitable wall plugs and screws are supplied for wall mounting.

Please remember that an electrical outlet and a local network connection are required near the Solar-Log™ in order for it to operate. GPRS and WiFi models do not require the network connection.

- Put the housing where it is to be fitted and mark the drill holes.

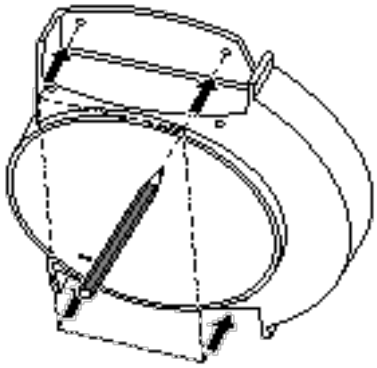
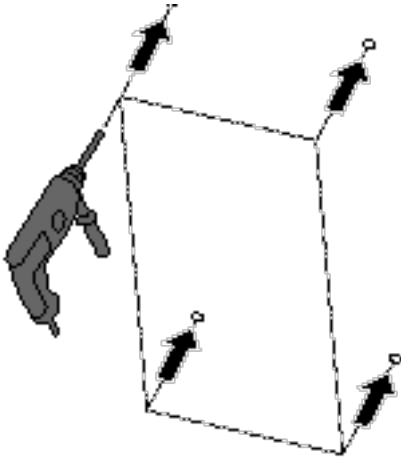


Fig.: Solar-Log™ wall mounting

- The Solar-Log™ should be fitted in an easily accessible place.
- Drill the holes and insert the wall plugs
- The information on dimensions of the case and the mounting points is in chapter 30.6 on page 224

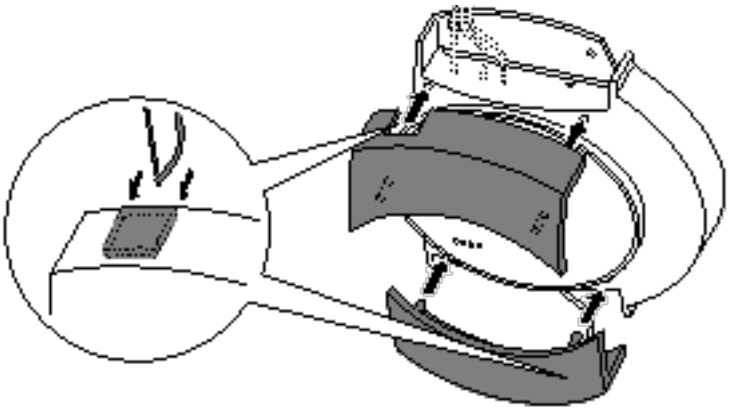


Note concerning Solar-Log GPRS

The SIM card should be inserted (see Chapter 7.1 on page 29) before attaching the unit, as the insertion slot will no longer be accessible after wall mounting.

- Fasten the housing with the screws

- Cable feed through – top and/or bottom covers.
  Using a file or a saw, clear the cable feed holes.
  The top and bottom covers are identical.
- Plug all cable connectors into their connections.
- Attach the covers



8 Unit connections

Solar-Log 200

Top connections

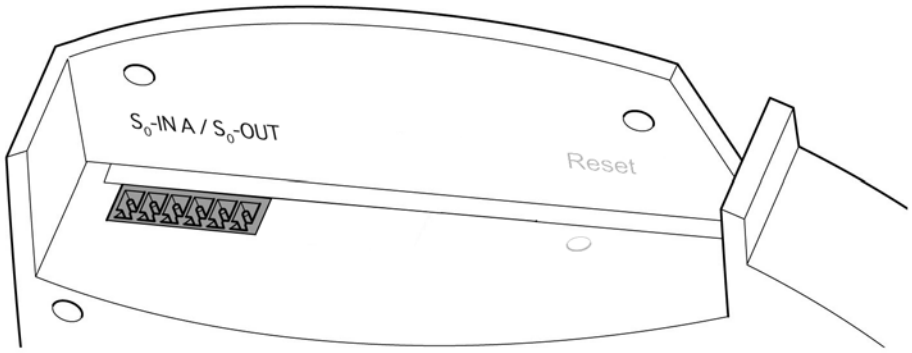


Fig.: Top Connections Solar-Log 200

Solar-Log 200	
S0-IN A S0-Out	S0 pulse input for connection to an external power meter. S0 pulse output for connecting to a large external screen. Please note the connection characteristics of the S0 connection.

Bottom connections

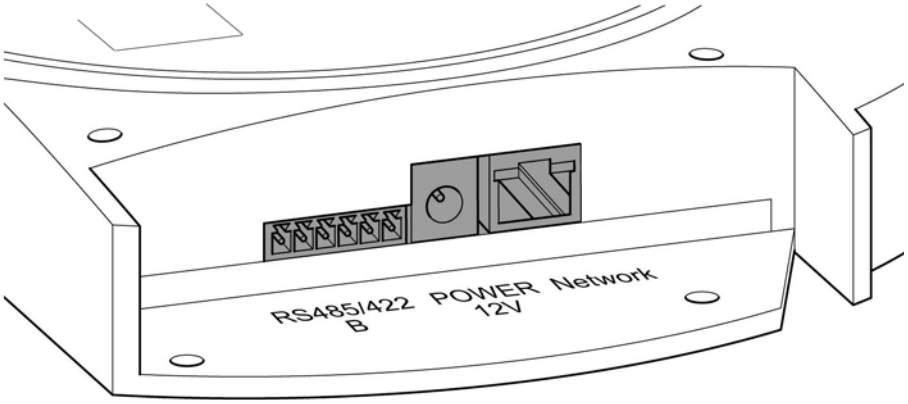


Fig.: Bottom connections Solar-Log 200

Solar-Log 200	
RS485/422 - B	RS485 interface, 6 pin: Connection for inverters and additional accessories
Power 12 V	12 volt DC input
Network	Ethernet network interface, 10/100 Mbit

8.1 Solar-Log 300

Top connections

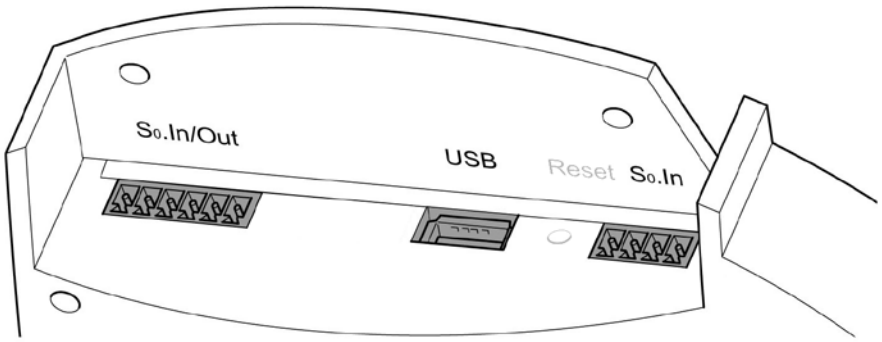


Fig.: Top Connections Solar-Log 300

Solar-Log 300	
S0-IN A S0-Out	S0 pulse input for connection to an external power meter. S0 pulse output for connecting to a large external screen. Please note the connection characteristics of the S0 connection.
USB	USB connection. Suitable for USB sticks. Not suitable for a connection to a PC
S0-IN B	S0 pulse input for connection to an external power meter.

Bottom connections

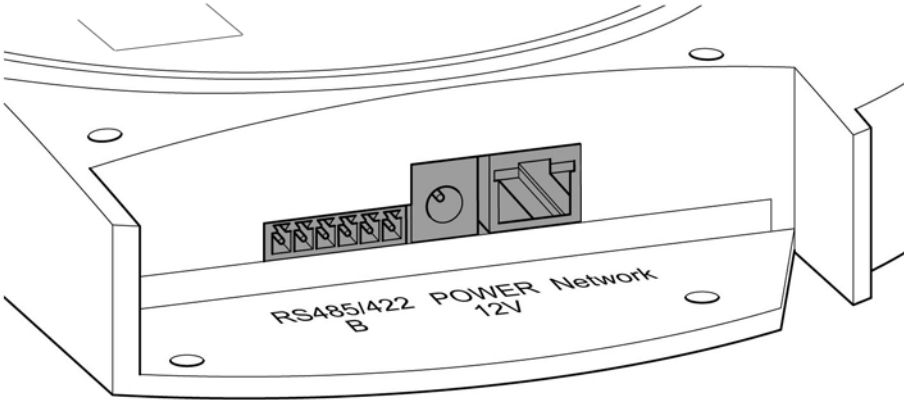


Fig.: Bottom connections Solar-Log 300

Solar-Log 300	
RS485/422 - B	RS485 interface, 6 pin: Connection for inverters and additional accessories
Power 12 V	12 volt DC input
Network	Ethernet network interface, 10/100 Mbit

8.2 Solar-Log 500

Top connections

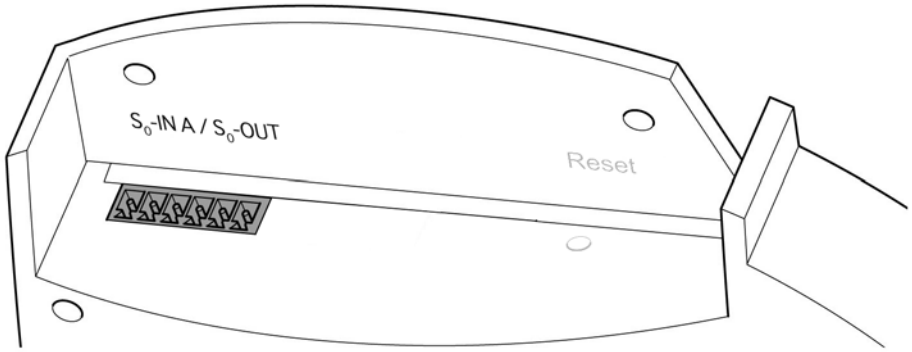


Fig.: Top Connections Solar-Log 500

Solar-Log 500	
S0-IN A S0-Out	S0 pulse input for connection to an external power meter. S0 pulse output for connecting to a large external screen. Please note the connection characteristics of the S0 connection.

Bottom connections

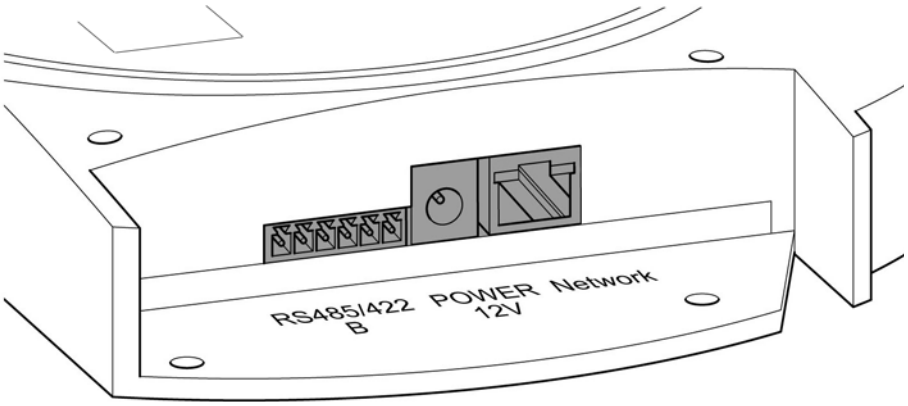


Fig.: Bottom connections Solar-Log 500

Solar-Log 500	
RS485/422 - B	RS485 interface, 6 pin: Connection for inverters and additional accessories
Power 12 V	12 volt DC input
Network	Ethernet network interface, 10/100 Mbit

8.3 Solar-Log 1000

Top connections

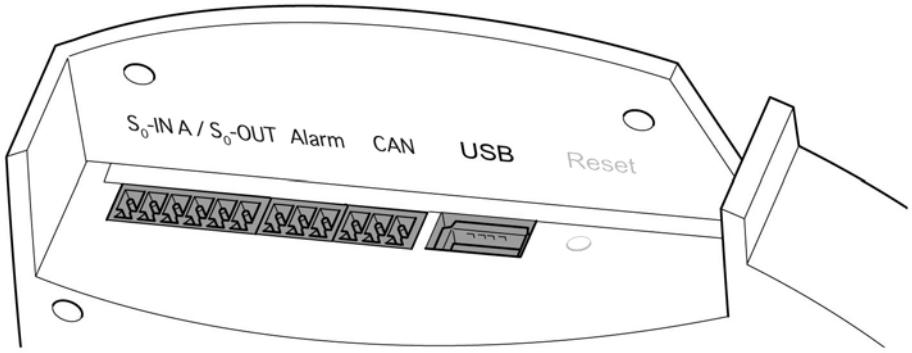


Fig.: Top Connections Solar-Log 1000

Solar-Log 1000	
S0-IN A S0-Out	S0 pulse input for connection to an external power meter. S0 pulse output for connecting to a large external screen. Please note the connection characteristics of the S0 connection.
Alarm	Connection for contact strip for anti-theft protection.
CAN	CAN bus — which, for example, can be used to connect Voltwerk, Conergy or Suntechnics inverters
USB	USB connection. Suitable for USB sticks. Not suitable for a connection to a PC

Bottom connections

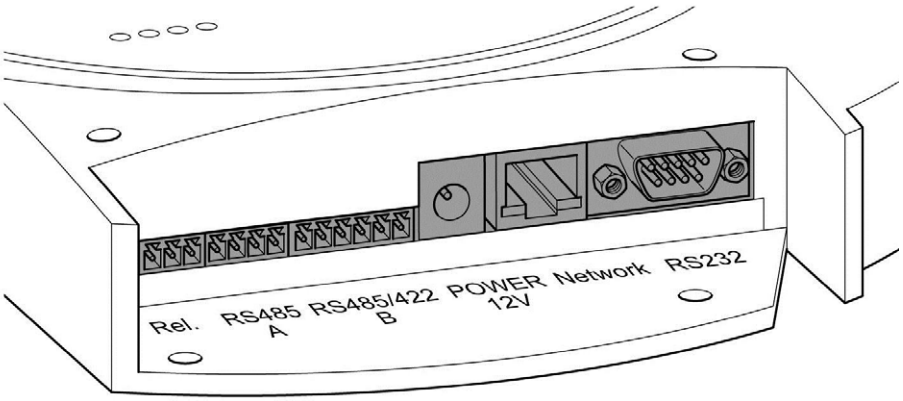


Fig.: Bottom Connections Solar-Log 1000

Solar-Log 1000	
Relay	Relay with change-over contact
RS485 - A	RS485 interface, 4 pin: Connection for inverters and/or accessories (inactive if the optional Bluetooth interface is used)
RS485/422 - B	RS485 interface, 6 pin: Connection for inverters and additional accessories
Power 12 V	12 volt DC input
Network	Ethernet network interface, 10/100 Mbit
RS232	RS232 modem interface. Connection to GPRS modem

8.4 Solar-Log 1200

Top connections

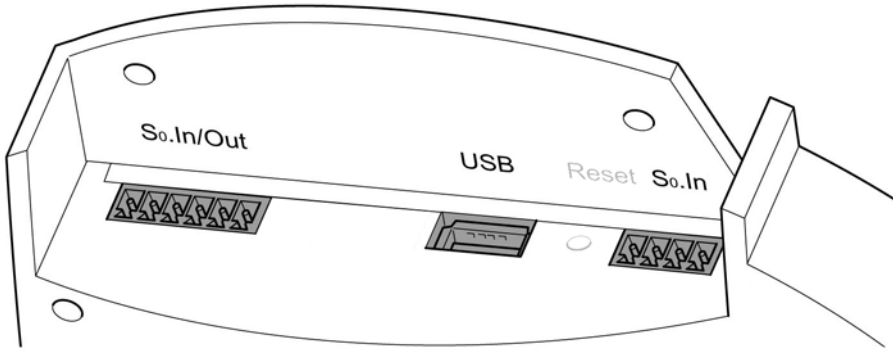


Fig.: Top Connections Solar-Log 1200

Solar-Log 1200	
S0-IN A S0-Out	S0 pulse input for connection to an external power meter. S0 pulse output for connecting to a large external screen. Please note the connection characteristics of the S0 connection.
USB	USB connection. Suitable for USB sticks. Not suitable for a connection to a PC
S0-IN B	S0 pulse input for connection to an external power meter.

Bottom connections

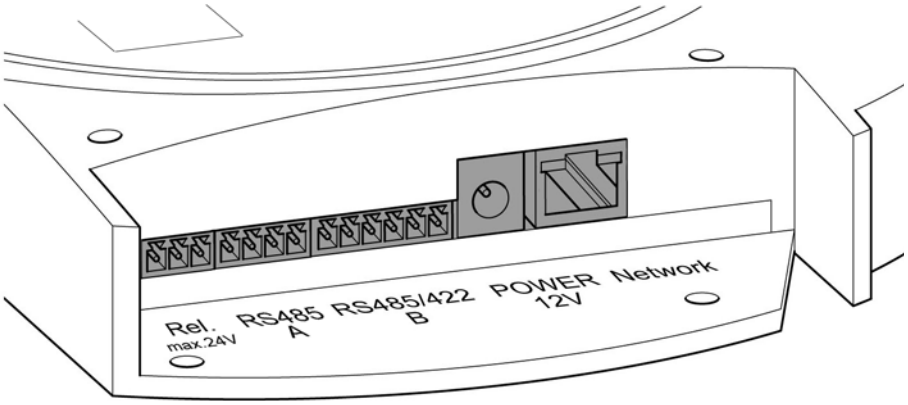


Fig.: Bottom Connections Solar-Log 1200

Solar-Log 1200	
Relay	Relay with change-over contact
RS485 - A	RS485 interface, 4 pin: Connection for inverters and/or accessories (inactive if the optional Bluetooth interface is used)
RS485/422 - B	RS485 interface, 6 pin: Connection for inverters and additional accessories
Power 12 V	12 volt DC input
Network	Ethernet network interface, 10/100 Mbit

8.5 Solar-Log 2000

Top connections

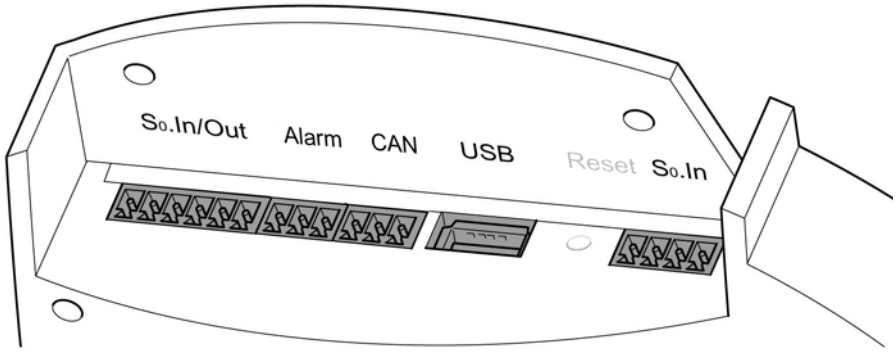


Fig.: Top Connections Solar-Log 2000

Solar-Log 2000	
S0-IN A S0-Out	S0 pulse input for connection to an external power meter. S0 pulse output for connecting to a large external screen. Please note the connection characteristics of the S0 connection.
Alarm	Connection for contact strip for anti-theft protection.
CAN	CAN bus — which, for example, can be used to connect Voltwerk, Conergy or Suntechnics inverters
USB	USB connection. Suitable for USB sticks. Not suitable for a connection to a PC
S0-IN B	S0 pulse input for connection to an external power meter.

Bottom connections

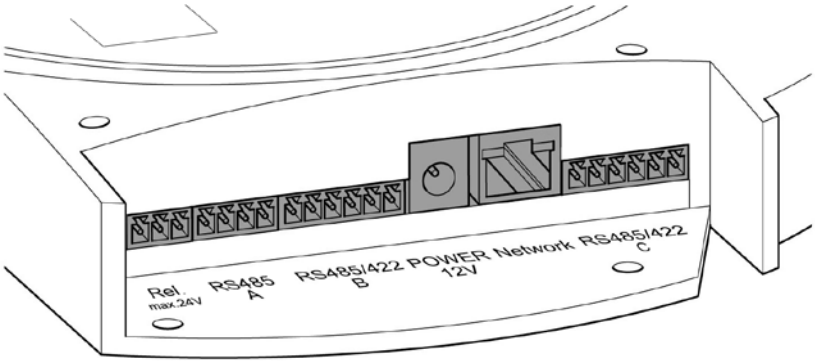


Fig.: Top Connections Solar-Log 2000

Solar-Log 2000	
Relay	Relay with change-over contact
RS485 - A	RS485 interface, 4 pin: Connection for inverters and/or accessories (inactive if the optional Bluetooth interface is used)
RS485/422 - B	RS485 interface, 6 pin: Connection for inverters and additional accessories
Power 12 V	12 volt DC input
Network	Ethernet network interface, 10/100 Mbit
RS485/422 - C	RS485 interface, 6 pin: Connection for inverters and additional accessories

9 Optional Connections

Solar-Log™ devices are available as different models which can be equipped accordingly with additional interfaces and connections depending on the application.

9.1 Solar-Log™ GPRS

Antenna connection and SIM card slot

In addition to the connections on the standard Solar-Log™, the Solar-Log™ GPRS model with an integrated GPRS modem has a SIM card slot and a screw connection for an antenna.

- Insert the SIM card in the slot on the rear right, inside the Solar-Log™ GPRS

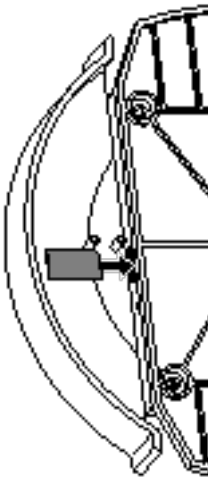


Fig.: Insertion slot for SIM card inside on the right (Solar-Log™ GPRS)

- Screw the external antenna into the antenna connection on the bottom of the unit.
  Find a suitable position with good reception quality for the magnetic base antenna.

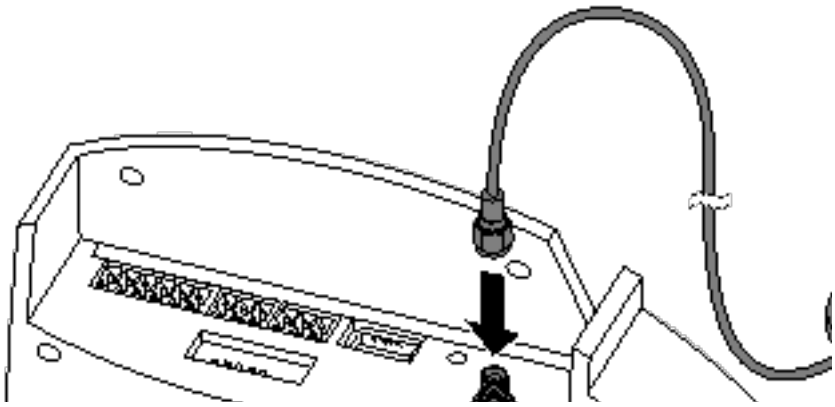


Fig.: Antenna connection on the top of the device (Solar-Log™ GPRS)

Note

We recommend a yearly inspection and cleaning of the SIM card.
The contact points of the SIM card can corrode due to humidity and should be cleaned regularly even when functioning properly.

9.2 Solar-Log™ Meter (Solar-Log 300 and 1200)

The Solar-Log Meter version of the Solar-Log™ has an integrated interface to connect up to six current transformers (CTs). This optional Meter interface makes it possible to measure generating units (production meter) and consumption from individual appliances.

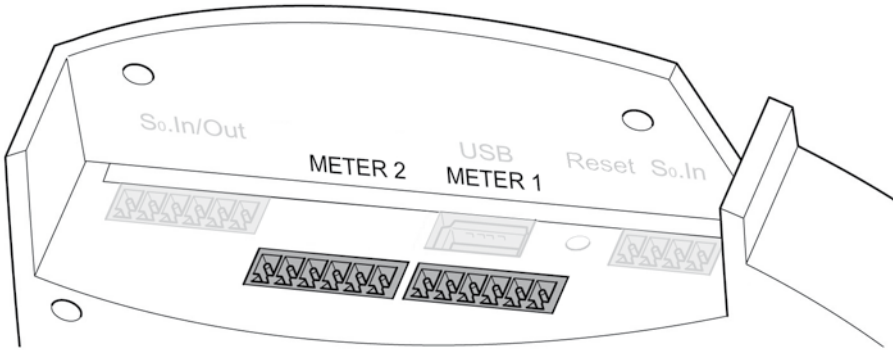


Fig.: Connection for current transformers (Solar-Log™ Meter)

The current transformers (CTs) can record the current flow (AC) of one or two phase appliances in various combinations. The output is calculated based on a defined reference voltage or one calculated by the Solar-Log™.

Combinations:

- 2x3 Phases
- 1x3 Phases + 3x1 Phase
- 6x1 Phase
- 3x2 Phases
- 2x2 Phases + 2x1 Phase
- 1x2 Phases + 4x1 Phase

The current transformers have to be connected to the Meter interface with the secondary side.

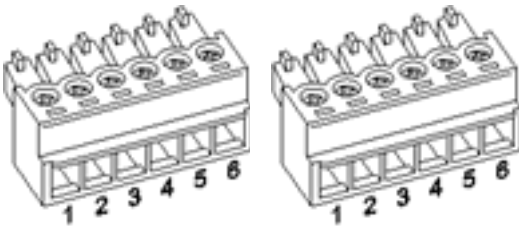


Fig.: Two 6-pin terminal block connectors for the Meter interface

Solar-Log™ Meter 1			
Interface	PIN	Description	Label Current transformer
Meter 1	1	Current transformer/CT 1a	S1/k
	2	Current transformer/CT 1b	S2/i
	3	Current transformer/CT 2a	S1/k
	4	Current transformer/CT 2b	S2/i
	5	Current transformer/CT 3a	S1/k
	6	Current transformer/CT 3b	S2/i

Solar-Log™ Meter 2			
Interface	PIN	Description	Label Current transformer
Meter 2	1	Current transformer/CT 1a	S1/k
	2	Current transformer/CT 1b	S2/i
	3	Current transformer/CT 2a	S1/k
	4	Current transformer/CT 2b	S2/i
	5	Current transformer/CT 3a	S1/k
	6	Current transformer/CT 3b	S2/i

Characteristics of the Meter interface

The current transformer may not exceed a maximum output or secondary current of 200 mA. The input / rated current is calculated by the maximum amount of power that is to be measured and has to be selected for each measuring point.
The current transformer's rated measuring ratio can be defined for each current transformer input.

The current transformers have to be set up in a way so that only one current-carrying conductor is measured. Cables with multiple wires cannot be measured.

The maximum cable length between the current transformers and Solar-Log™ depends on the cable diagram and the load of the current transformer.

We recommend a maximum cable length of 30 meters with a diameter of 0.75 mm^2 for our products.

For other current transformers, please consult the manufacturer's specifications in regard to cable length and the wiring diagram.

Current transformers from Solare-Datensysteme GmbH

Solare-Datensysteme offers the following current transformers that are specially tailored to the Solar-Log™ Meter:

Current transformer

Name	Description	Article Number:
Solar-Log™ CT 16 A	Current measurement 16 A, transformer: 16A/200mA	255639
Solar-Log™ CT 100 A-c	Current measurement 100 A, transformer: 100A/200mA sealed transformer	255640
Solar-Log™ CT 100 A-o	Current measurement 100 A, transformer: 100A/200mA open transformer (folding mechanism)	255638

9.3 Solar-Log™ PM+

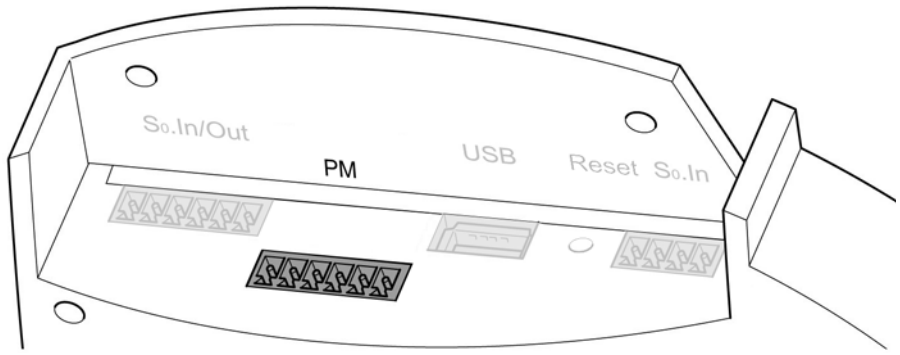


Fig.: 6-pin PM+ interface

PM+

PIN	Assignment	Description
1	+5V	Control voltage for active power control
2	D_IN_1	Control input 1
3	D_In_2	Control input 2
4	D_In_3	Control input 3
5	D_In_4	Control input 4
6	+5V	Control voltage for reactive power reduction

10 Connector Assignments and Wiring

The following connecting cables, which may be needed for various purposes, are not included in the package content.

- To connect a router, you need a network cable with the appropriate length. If you want to connect the Solar-Log™ directly to your PC or laptop, you need to use a crossover cable.
- Cable to connect the Solar-Log™ to an inverter.
- Sets of prefabricated cables are available as accessories suitable for the inverter concerned. The length of these cable sets is 3 m.
- If you want to connect several inverters to Solar-Log™, you need suitable cables and connectors to connect the inverters to each other.
- For each connection to the Solar-Log™ (RS485 - A and RS485/422 - B or - C) a separate cable must be used.
- When wiring with CAT cables, the twisted pair of wires should be used.

10.1 Notes on wiring the connections

The wiring of the inverters and accessories needs to be carried out with the greatest care and attention. The most frequent source of errors when installing the Solar-Log™ is faulty wiring.

For this reason, we recommend:

- Wiring with high quality cables
  For example: LIYCY >=0.14mm or Cat 5/7 SSTP
- Refer to the manufacturer's specifications in regard to UV resistance and mounting type when wiring in outside areas.
- A larger cable diameter is recommended for longer distances.
- Use ferrules with flexible wires
- Twist the corresponding wire pairs and shielding
- Wire from left-to-right.
- Wire from light to dark.

Fig.: Example wiring on a 4-pin terminal block connector

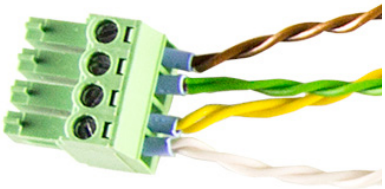


Fig.: Terminal block connector with ferrules

10.2 RS485-A (only Solar-Log 1000, 1200 and 2000)

Use the provided terminal block connectors when connecting inverters or accessories to the RS485 A interface.

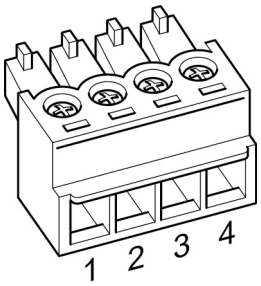


Fig.: 4-pin Terminal block connector

RS485 - A

PIN	Assignment
1	Data +
2	12 V
3	Ground
4	Data -

10.3 RS485/422 - B

Use the provided terminal block connectors when connecting inverters or accessories to the RS485/422 - B interface.

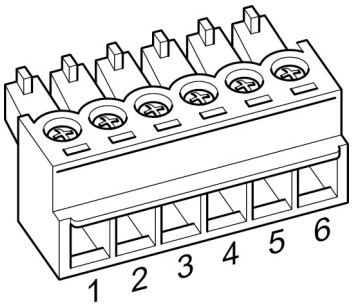


Fig.: 6-pin Terminal block connector

RS485/422 - B

PIN	Assignments RS485	Assignments RS422
1	Data +	T/RX+
2	12 V	12V
3	Ground	Ground
4	Data -	T/RX-
5		R/TX+
6		R/TX-

Note

If inverters that use the RS422 connection are connected to this interface (e.g. Fronius, AEG, Riello), then it is not possible to connect accessories such as sensors, meters or displays to this bus.

10.4 RS485/422 - C (only Solar-Log 2000)

Use the provided terminal block connectors when connecting inverters or accessories to the RS485/422 C interface.

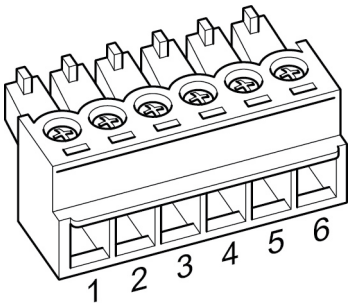


Fig.: 6-pin Terminal block connector

RS485/422 C		
PIN	Assignments RS485	Assignments RS422
1	Data +	T/RX+
2	12 V	12V
3	Ground	Ground
4	Data -	T/RX-
5		R/TX+
6		R/TX-

Note

If inverters that use the RS422 connection are connected to this interface (e.g. Fronius, AEG, Riello), then it is not possible to connect accessories such as sensors, meters or displays to this bus.

10.5 S0

Solar-Log 300, 1200 and 2000 have the following S0 interfaces:

- S0-IN B and
- combined S0_OUT_IN interface (S0-IN A and S0-OUT)

10.5.1 S0-IN B

The S0 In interface is a hardware interface used for recording measurement values from power meters. Use the supplied terminal block connector for the connection to the Solar-Log™.

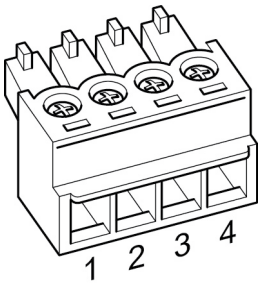


Fig.: 4-pin Terminal block connector

S0-IN A

PIN	Assignment
1	S0 + Output 27mA
2	S0 - Input max 27mA
3	Measuring contact
4	Ground

Installation instructions for external power meters are also in chapter “12.5 External power meter” on page 52.

10.5.2S0 OUT IN (S0-IN A and S0-OUT)

The S0 OUT IN interface is a hardware interface used for recording measurement values from power meters and an output for S0 pulses. Use the supplied terminal block connector for the connection to the Solar-Log™.

S0_OUT_IN	
PIN	Assignment
1	27 mA output
2	27 mA max. input
3	Measuring contact
4	Ground
5	So Out+
6	S0 Out-

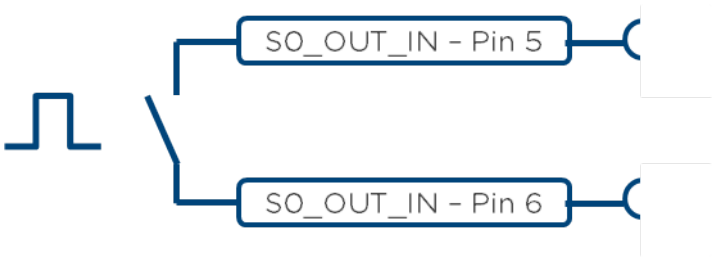


Fig.: Schematic diagram of the S0 output

Note

We recommend not using the S0 output for sending current feed amount response signals to your grid operator.
Due to the internal calculating processes of the Solar-Log™, there would be a delay in sending the pulses.

10.6 PM+

The Solar-Log™ PM+ models come with a 6-pin PM+ interface on the top side of the Solar-Log™.
The interface has been designed to link the ripple control receivers or telecontrol plants with potential-free signal contacts. Up to two ripple control receivers can be connected. This allows the commands from grid operators for active and reactive power to be interpreted.

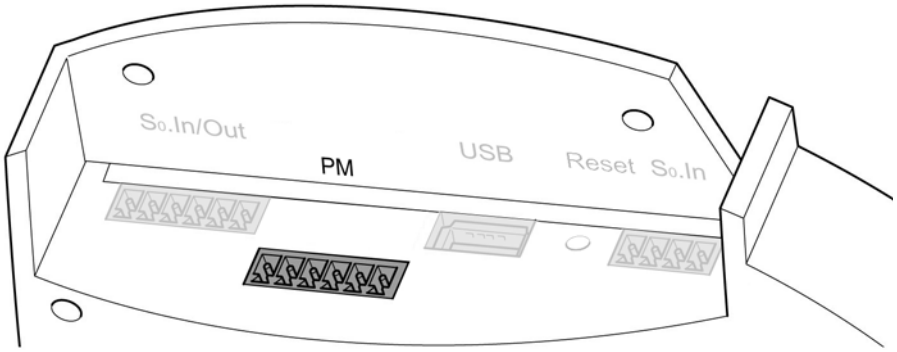


Fig.: 6-pin PM+ interface

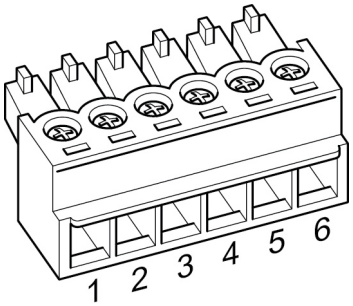


Fig.: 6-pin Terminal block connector

PM+

PIN	Assignment	Description
1	+5V	Control voltage for active power control
2	D_IN_1	Control input 1
3	D_In_2	Control input 2
4	D_In_3	Control input 3
5	D_In_4	Control input 4
6	+5V	Control voltage for reactive power reduction

To provide the highest possible flexibility, the individual active and reactive power values can be assigned to inputs D_IN_1 to D_IN_4

See Chapter “Feed-in Management” on page 121 for more information
See the appendix for ripple control receiver connection examples Page 211

11 Connecting the inverters

As each inverter manufacturer uses different wiring connections and connectors, the corresponding data cables must be adapted correctly.

- See Chapter"8 Connector Assignments and Wiring" on page 33 for terminal block connector wiring diagrams for the connection to the Solar-Log™
- Please refer to the Inverter Connection Manual when connecting inverters supported by the Solar-Log™.

Note

Solare Datensysteme GmbH supplies suitable connection cables for most inverter manufacturers.

Always read the manufacturer-specific instructions for connecting the data cable. You will find these instructions in the manufacturer's documentation.
However, when assigning the inverter wiring on the Solar-Log™, follow the instructions in this manual, otherwise the inverters will not be detected by Solar-Log™.

DANGER

Risk of death by electric shock if inverters are opened.
Never open the inverter housing when the inverter is connected to power.
See Switching off the inverters Page 42.
Always read the installation and safety instructions given in the manual for the corresponding inverter.

11.1 Switch off the inverters and Solar-Log™.

Switching inverters off

Before a making a cable connection between the Solar-Log™ and the connections inside the inverter and before installing an interface card in the inverter, always turn off all of the inverters first.

To do this, read the manufacturer's documentation for the inverter, and proceed as follows:

- Disconnect the AC side
- Disconnect the DC side
- Wait at least 5 minutes until the condensers in the inverters have discharged.

Switching the Solar-Log™ off

Unplug the power socket connection

12 Connecting accessories

12.1 Sensor basic and Sensor Box Commercial

These sensors record both Irradiation sensor and module temperature values.
The solar radiation sensor must be fitted in such a way that the sensor's solar cell and the plant's modules are aligned as similarly as possible to the sun, i.e. the sensor must have the same alignment and inclination.

The sensors should be positioned in a way to best ensure that:

- as little overshadowing as possible occurs
- snow cover does not interfere disproportionally with the sensor functions

To achieve this, it is best to fit the sensor on the side or above the solar module. Fitting bars can normally be used as a fitting surface with modules that are parallel to the roof protrusion. In other cases, a suitable fitting support may have to be added.

Note

When using inverters with RS422 communication, do not operate the sensor on the same bus.

Caution

When using inverters with RS422 communication, do not operate the sensor on the same bus.

Wiring the Sensor basic and Sensor Commercial to the Solar-Log™

The wiring is done using a

- 4-wire data cable which also includes the 12 V power supply and the data connection to the Solar-Log™
- The sensors are connected to the Solar-Log™ via the RS485 interface parallel to the inverter bus or via a free RS485 interface. Please consult the instructions in our inverter database. Some inverters cannot be connected to the same bus as the sensor.

- The cable shielding must be connected with an equipotential bonding system.

A separate power supply is generally not required.
The connection cable can be extended (max. 50 m). However, at least an 8 V power supply is needed at the end of the cable. If necessary, a separate power supply can be integrated into the bus wiring.
The cable must also be suitably protected in outside areas. The cabling in inside areas can consist of a shielded data cable.

Procedure

- The 4 wires in the connection cable must be connected to the 4 pin terminal block connector on the Solar-Log™.
- The connection assignments are printed on the back of the sensor.

Connect the wires according to the following diagram

Sensor basic and Sensor Box Commercial	
RS485 Solar-Log™	Sensor connection cables
PIN	Assignment
1 (Data +)	Brown: Data +
2 (+12V)	Red: 12 V_{DC} (VCC)
3 (Ground)	Black: 0V (GND)
4 (Data -)	Orange: Data -

Installation

When the Solar-Log™ is switched on, the sensor is also automatically powered.
Then the Sensor basic and Sensor Commercial must be configured to the desired RS485 interface:

- Select "M&T Sensor" and the corresponding bus for the initial configuration
- Perform device detection
- Sensor basic and Sensor Commercial are integrated into the system like an inverter.

12.2 Sensor Box Commercial

The Sensor Box Commercial is used to record the Irradiation from the sun. This accessory allows the Solar-Log™ to calculate the deviations in the current output compared to the potential output.
Up to 9 Sensor Box Commercials can be connected to the Solar-Log™. The solar radiation sensor must be fitted in such a way that the sensor's solar cell and the plant's modules are aligned as similarly as possible to the sun, i.e. the sensor must have the same alignment and inclination.

The sensors should be positioned in a way to best ensure that:
- as little overshadowing as possible occurs
- snow cover does not interfere disproportionally with the sensor functions

To achieve this, it is best to fit the sensor on the side or above the solar module. Fitting bars can normally be used as a fitting surface with modules that are parallel to the roof protrusion. In other cases, a suitable fitting support may have to be added.

If there are various module alignments at a plant, every alignment should be fitted with a Sensor Box Commercial.

The Solar-Log™ can record and save additional environmental data with the Sensor Box Commercial (with optional accessories). This environmental data includes:

- Solar irradiation (integrated)
- Module temperature
  Module temperature is recorded by an integrated cell sensor, thus avoiding the costly process of mounting a sensor on the back of the module.
- Ambient temperature (optional, Article Number: 220062)
- Wind speed (optional, Article Number: 220061)

The above data form important parameters in further evaluations and analyses to measure yield.

Notes on roof mounting

The irradiation sensor is specially designed for continuous use in outside areas (IP65). The cables supplied with the Sensor Box Commercial are UV and weather resistant.

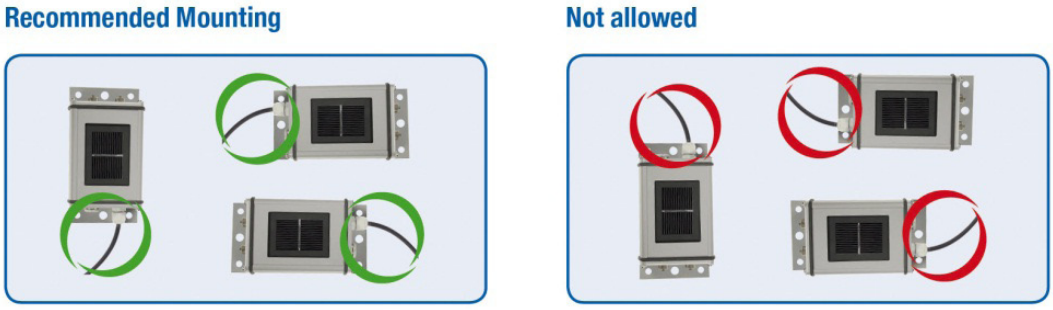


Fig.: Mounting instructions for the Sensor Box Commercial

Please note when fitting the sensor that the connection cable must be arranged as shown in the drawing.

Fitting optional sensors

The ambient temperature sensor must be fitted in a shady place with a wall bracket. The connection plug is screwed firmly into the 3 pin input on the Sensor Box Commercial.

It is best to install the wind sensor in a high, exposed position using the mounting bracket. The connection plug is screwed firmly into the 2 pin input on the Sensor Box Commercial.

CAUTION

Risk of damage to the unit!
Penetrating moisture can cause short circuiting and can destroy the Sensor Box Commercial and
Solar-Log™.

WARNING

It is not necessary to open the sensor to fit it. All components are simply screwed on. If the housing is opened, water resistance and proper operation cannot be guaranteed.

Wiring the Sensor Box Commercial to the Solar-Log™

The sensor box can also be integrated in the bus wiring of the inverters.

Note

When using inverters with RS422 communication, do not operate the sensor on the same bus.
For inverters using RS485 communication, please check the compatibility in our Inverter Database.

The Sensor Box Commercial is connected to the Solar-Log™ using the RS485 interface.
The connection cable between the Sensor Box Commercial and the Solar-Log™ consists of 4 wires and includes the 12 volt power supply and the data connection to the Solar-Log™.
The cable shielding must be connected with an equipotential bonding system.
A separate power supply unit is not required.

The connection cable can be extended (max. 100 m). However, an 8 V power supply is needed at the end of the cable. For longer stretches please select a larger cable diameter.

Procedure

- The 4 wires in the connection cable must be connected to the 4 pin terminal block connector on the Solar-Log™.
- Connect the wires according to the following diagram:

Sensor Box Commercial	
RS485 Solar-Log™	Connection cable Sensor Box Commercial
PIN	Assignment
1 (Data +)	Brown: Data + A
2 (+12V)	Red: 12 V_{DC}
3 (Ground)	Black: GND
4 (Data -)	Yellow: Data - B

Installation

When the Solar-Log™ is switched on, the Sensor Box Commercial is also automatically powered. Then the Sensor Box Commercial must be configured to the desired RS485 interface:

- Select "M&T Sensor" and the corresponding bus for the initial configuration.
- Perform device detection:
- The Sensor Box Commercial is integrated into the system like an inverter.
- The rest of the configuration for the environmental data is carried out via the Solar-Log™' web interface.

12.3 Ripple Control Receiver

The Solar-Log™ PM+ series contains an additional 6-pin interface which allows up to two ripple control receivers or telecontrol plants each with four signals to be connected.

Wiring

The relay contacts for the ripple control receiver are connected to the Solar-Log™ PM+ via the 6 pin PM+ interface on the top side of the Solar-Log™.

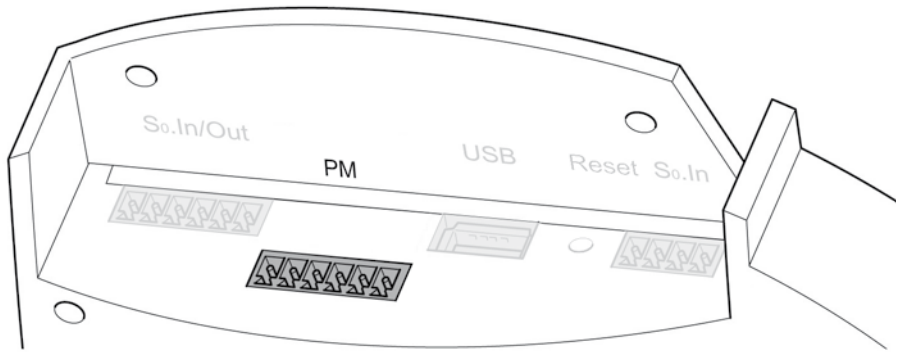


Fig.: 6-pin PM+ interface

The ripple control receivers used by grid operators utilize various numbers of relays. These relays are labeled differently and have different reduction levels and/or shift factors cos (Phi).
To ensure the highest degree of flexibility, the reduction levels specified by the grid operators, together with their signals from the ripple control receiver, can be evaluated by the Solar-Log™ via a maximum of four digital inputs for each.
In order that the Solar-Log™ PM+ can evaluate the signal from the ripple control receiver, it needs to be wired to the control voltage (for active and reactive power) from the PM+ interface. The control contracts normally operate as make contracts; that means the closed for the respective command.
The control voltage from Pin 1 is used for the active power command.
The control voltage from Pin 6 is used for the reactive power command.
The control voltage is connected to the common contact of each relay. The relay output (closed contact) is then connected to a digital input of the PM+ interface.

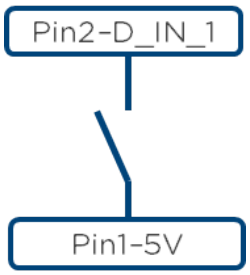


Fig.: The basic principle of wiring the PM+ interface to the ripple control receiver for active power commands

See the appendix for more ripple control receiver connection examples on page Page 211 of this installation manual.

Further configurations of feed-in management are carried out via the Solar-Log™ PM+ web interface in the Configuration | Special Functions | Feed-in Management menu with the Active Power | Remote-controlled and Reactive Power | Remote-controlled shift factor cos(Phi) functions. See Page 121 for more information.

12.4 Large External Displays

Large external displays can be connected to the Solar-Log™ via two interfaces:

- Connection via RS485
- S0 pulse output

The connection via RS485 is preferred Cable lengths can be up to 1000 meters and the data which is displayed on the Solar-Log™ can specified.

The large external display function is not enabled by default. To use a proxy Display advanced configuration needs to be activated under Configuration | System.

Note

If inverters that use the RS422 connection are connected to this interface (e.g. Fronius, AEG, Riello), then it is not possible to connect a display to this bus.
If the display is connected via the same cable as the inverters, the display must be configured accordingly in the interface parameters.

Connection via the RS485/422 interface

Wiring for displays made by Schneider Displaytechnik

The wiring consists of a 3 pin control cable, (3 0.5 mm) and terminal block connector.

Schneider Large displays	
RS485 Solar-Log™	Terminal block connector Schneider Display
PIN	Assignment
1 (Data +)	A
3 (Ground)	GND
4 (Data -)	B

Further information about the connection can be obtained from the manufacturer of the display.

Wiring for displays from RiCo Electronic

The wiring consists of a 2 pin control cable, (2 0.5 mm) and terminal block connector.

RiCo Large displays	
RS485 Solar-Log™	Terminal block connector RiCo Display
PIN	Assignment
1 (Data +)	Pin 1 - Data +
4 (Data -)	Pin 2 - Data -

Further information about the connection can be obtained from the manufacturer of the display.

Connection through S0 output

If the S0 output is used, only the current feed-in power can be transmitted in the form of a pulse sequence. The display has to calculate the power output and total yield by itself.

Wiring for a contact-controlled S0 output

Example: RiCo Electronic
The wiring consists of a 2-pin shielded cable (2 0.6 mm)
(max. length 100 m) and terminal block connector.

RiCo Large displays	
RS485 Solar-Log™	Display
PIN	Assignment
5	S0-
6	S0+

Further information about the connection can be obtained from the manufacturer of the display.

Pulse factor

In the standard setting, Solar-Log™ sends 1000 pulses/kWh over the S0 output. The pulse factor must be configured according to the size of the plant (kWp) in the Configuration | Devices | Definition | External Display menu.

Pulse factor / plant size	
Plant size kWp	Pulse factor
30 kWp	2000
60 kWp	1000
100 kWp	600
150 kWp	400
300 kWp	200
600 kWp	100

Note

The impulse factor in the Solar-Log™ and the connected device has to be identical.

12.5 External power meter

External power meters can be connected to every Solar-Log™ model via the S0 input and/or the RS-485 bus.
Solar-Log™ devices have a varying number of SO inputs:

S0 inputs

Solar-Log™	Number of S0 inputs
Solar-Log™ 300*, 1200 and 2000	2 - $S0_A$ and $S0_B$

* Solar-Log 200s prior to 2011 do not have an S0 input

The energy recorded by these meters can be used for numerous applications:

- Inverter mode
  This mode is used for inverters that are not directly supported by Solar-Log™.
- Total yield meter
  This mode is used to record the energy production of several inverters.
- Consumption meter
  This mode is used to measure power consumption and to make it possible to display this data and to use Smart-Timing functions.
- Utility Meter (U) (only Solar-Log 1000, 2000)
  This mode is used for voltage measurements for reactive power control with the characteristic curve Q(U).
- Utility Meter (U+I) (only Solar-Log 1000, 2000)
  This mode is used to record the measurement data needed for the response signals sent to the grid operator and for cos phi control at the feeding point.

Note

We recommend using the meters that we have tested and offer.
We cannot guarantee the functionality of other products.

Note

Consumption meters can be assigned to plant groups.
It is only possible to assign a meter after a rule with the calculation of self-consumption has been activated in the power management configuration Configuration | Special Functions | Feed-in Management.

12.6 Wiring for S0 meter

The SO connection for external power meters is connected to a 6-pin S0A-In/Out connection (S0-IN A and S0-OUT) or 4-pin S0-IN B as follows:

SO meters in general	
S0 Solar-Log™	Power meter
PIN	Assignment
1	S0+
2	S0-
3	Connecting a bridge between pins 3 and 4.
4	

The maximum cable length between the power meter and Solar-Log™ is 10 meters.

Wiring for Inepro 75D meter via S0

Article Number: 255420

Inepro 75D	
S0 Solar-Log™	Power meter
PIN	Assignment
1	Pin 6 - S0+
2	Pin 5 - S0-
3	Connecting a bridge between pins 3 and 4.
4	

Wiring for Inepro 1250D meter via S0

Article Number: 255421

Inepro 1250D	
S0 Solar-Log™	Power meter
PIN	Assignment
1	Pin 9 - S0+
2	Pin 8 - S0-
3	Connecting a bridge between pins 3 and 4.
4	

Wiring for Iskra WS0021 meter via S0

Article Number: 255346

Iskra WS0021	
S0 Solar-Log™	Power meter
PIN	Assignment
1	Pin 9 - S0+
2	Pin 8 - S0-
3	Connecting a bridge between pins 3 and 4.
4	

Wiring for Iskra WS0031 meter via S0

Article Number: 255347

Inepro 1250D	
S0 Solar-Log™	Power meter
PIN	Assignment
1	S0+
2	S0-
3	Connecting a bridge between pins 3 and 4.
4	

Note

After selecting S0 from the menu Configuration | Device | Definition, a device detection needs to be performed.
After the detection is finished, the detected meter can be configured underConfiguration | Device | Configuration.

12.7 Wiring for RS485 meter

The meter's RS485 output can be connected to any RS485 interface (A, B and C) on the Solar-Log™.

Overview

- 2-pin wiring
- Communication address does not have to be assigned.

Installation steps

- Switch off the inverters and Solar-Log™.
- Connect the meter to the Solar-Log™.

The wiring is done using a self-made, shielded 2-wire data cable and a 4-pin or 6-pin terminal block connector

Procedure

- Connect the wires for the connecting line as shown in the following diagram.

Wiring for RS485 meter

Solar-Log™ RS485 terminal block connector	Inepro 75D terminal block connector Article number: 255420	Inepro 1250D terminal block connector Article number: 255421	Utility meter terminal strip Article Number: 255385
PIN	PIN	PIN	PIN
1	8 - 485A	11 - 485A	22 - B
4	7 - 485B	10 - 485B	23 - A

- Insert the terminal block connector into the Solar-Log™ RS485 A, RS485/422 B or RS485/422 C socket.
- Perform a device detection: The power meter is connected to the system as if it were an inverter.
- Configure the power meter functions under Configuration | Device | Configuration. See Page 93for more information.
  - Inverter mode
  - Total yield meter
  - Consumption meter
  - Utility Meter (U) (only Solar-Log 1000 and 2000)
  - Utility Meter (U+I) (only Solar-Log 1000 and 2000)
  - Sub-consumer

Note

Only one Inepro RS 485 meter can be used for each Solar-Log™ interface.

Note

Use one RS485 connection per inverter and Utility Meter. The Utility Meter cannot be connected with inverters to a single bus.

Note

These meters cannot be used together at the same bus input with inverters that are connected to RS422 (e.g. Fronius).

Note Inepro 1250D

If an Inepro 1250D is used the PRG button on the meter must be pressed during detection.
If it is not possible to press the PRG button, we recommend connecting the meter to the Solar-Log™ prior to installation in order to be able to press the PRG button during detection.
In a second detection attempt the meter is then detected by the Solar-Log™ even if the PRG button is not pressed.

Note Inepro 1250D

The detection of an Inepro 1250D in an existing installation can take up to 15 minutes. After the detection, a restructuring of the data takes places which can take up to 45 minutes depending on the amount of data in the devices.

Note Inepro meter

Inepro meters are automatically given the mod bus address 234 by Solar-Log™ during the detection process.
This address is therefore not allowed to be used for other devices.
After the configuration, the display on the Inepro meter alternates between the meter status and the address display (ID=EA). This can be used to check if Solar-Log™ has correctly detected the meter.

Note Ine-pro meter

All RS485 meters have to be terminated with an 120ff resistor between the two pins used.

12.8 Installation Utility Meter (only Solar-Log 1000 and 2000)

The Solar-Log™ Utility Meter is a universal metering device. It can be integrated in both low- and medium-voltage networks (via a transformer) and is needed for various functions:

- controlling voltage-dependent reactive power via the Q(U) function
- controlling reactive power at the feeding point
- recording the measurement data needed for the response signals sent to the grid operator

Only the voltage measurements are needed to control voltage-dependent reactive power via the Q(U) function Current and voltage measurements are needed for the other functions.

The previous chapter explains how to wire the Utility Meter to the Solar-Log™. This chapter deals with connecting the Utility Meter for measurements in low- and medium-voltage power grids.

Utility Meter supply voltage:

- 95-240Vac, 45-65Hz or 135-340Vdc

The Utility Meter's measuring inputs have the following limits:

- Voltage line conductor AC (without a voltage transformer): 10...300 V AC
- Voltage phase AC (without a voltage transformer): 17...520 V AC
- Current (without a current transformer) 0.005, 7.5 A
- Frequency of the fundamental component: 45 ..65 Hz

The limit may not be exceeded. For this reason, a measuring transformer needs to be installed for most applications.
We recommend the following transformer ratio:

- Voltage: Secondary 100V
  e.g. at 20kV grid converter 20000:100V
- Current: Secondary 5A
  e.g. 100:5A

Note

The Utility Meter that we use is produced by the company Janitza.
Refer to the Janitza UMG 104 manual for further technical details.
We cannot guarantee the functionality of other Janitza devices.

Connecting the Utility Meter to the power grid

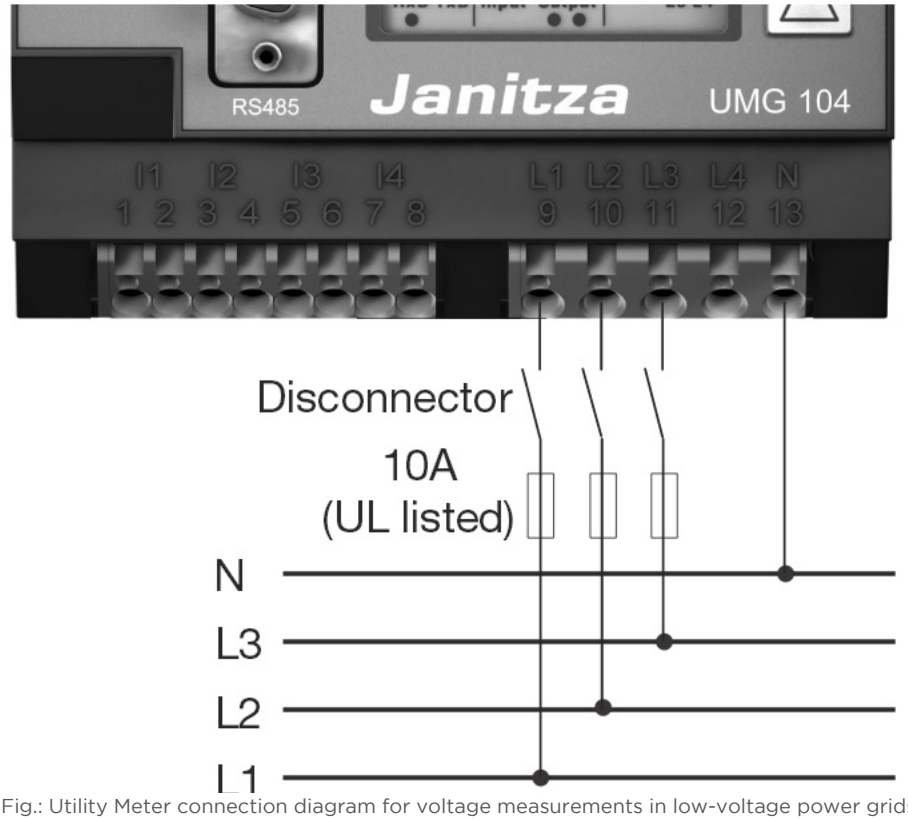


Fig.: Utility Meter connection diagram for voltage measurements in low-voltage power grids

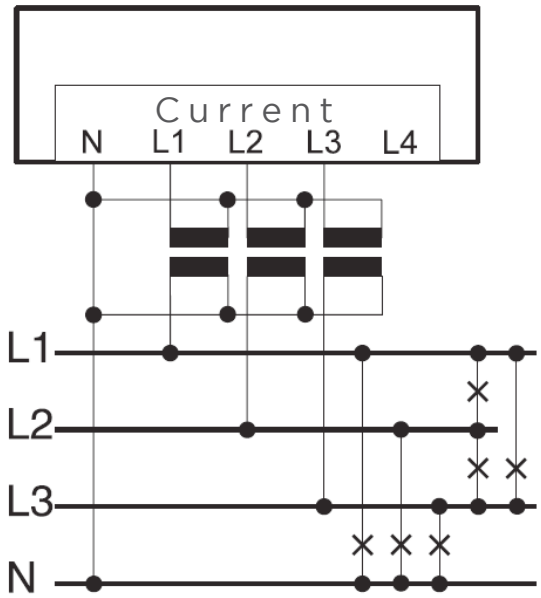


Fig.: Utility Meter connection diagram for voltage measurements with current transformers (medium voltage)

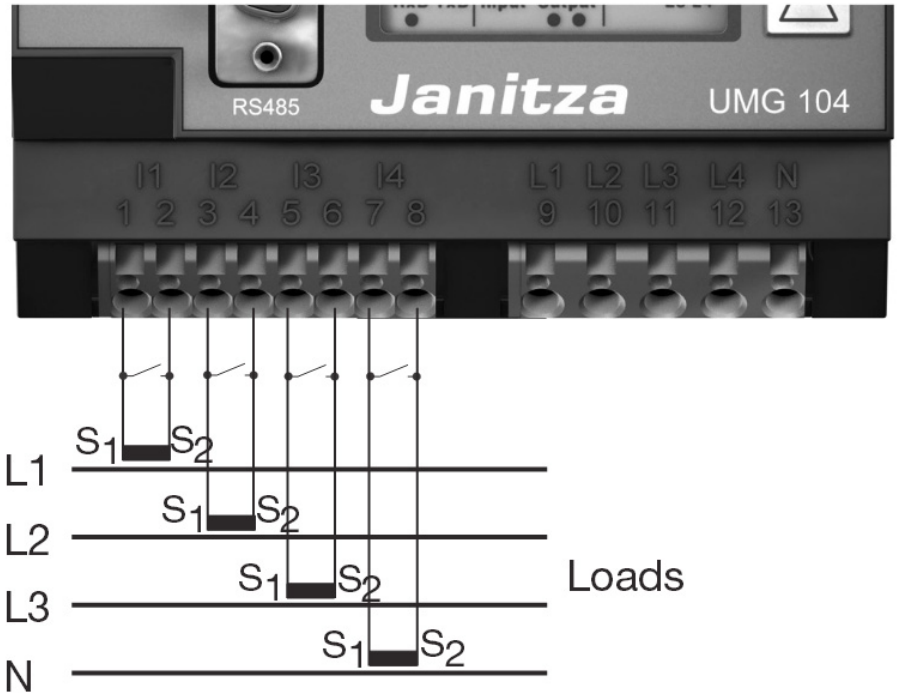


Fig.: Utility Meter connection diagram for current measurements with current transformers

Procedure

- Enter the supply voltage into the Utility Meter

Note

We recommend using a fuse to safeguard the connection lines for the supply voltage. Please follow the instructions in the Janitza UMG 104 manual.

Note

Supply voltages that do not correspond to the specifications on the rating plate can cause malfunctions and damage the device.

Caution

The inputs for the supply voltage are dangerous to touch.

- Connect the measurement lines for current and/or voltage to the bottom of the Utility Meter.

Note

The measurement voltage must in effect be at least 10V or an exact measurement is not possible.

- Connect the Utility Meter to the RS485 bus of the Solar-Log™ according to the following diagram:

Wiring
the Utility Meter

Terminal block connector RS485 Solar-Log™ only Solar-Log 1000 and 2000	Utility meter Terminal block connector Article Number: 255385
PIN	PIN
1	22 - B
4	23 - A

- The RS485 bus must be terminated.
  Install a 120 Ohm, 1/4W resistor between Pin 22 and 23 of the Utility Meter to terminate.
- Configuring the Utility Meter from the display
  Setting MODBUS Address (PRG 200 = 1)
  Setting Baud rate RS485 (PRG 202 = 2)
  Setting Mode (PRG 203 = 0)
  Setting Current converter primary (PRG 000)
  Setting Current converter secondary (PRG 001)
  Setting Voltage converter primary (PRG 002)
  Setting Voltage converter secondary (PRG 003)
  Refer to the accompanying manual of device for the UMG 104 configuration procedure.

Note

The parameter settings need to be adjusted before device detection.
If the parameters differ, the Utility Meter will not be detected by the Solar-Log™.

- Perform an inverter detection
  See the installation manual, Chapter "Performing inverter detections."
- Configure the Utility-Meter under Configuration | Devices | Configuration, select the corresponding Operating mode and click on Save.

Check

- Does the Utility Meter display a positive value for inverters feeding power?
  If this is not the case, the current and voltage measurements are incorrectly connected.
  If necessary, switch the polarity of measuring inputs.

12.9 Solar-Log™ Smart Home Relay Box

The Smart Home Relay Box makes it possible to switch 8 relays via the Smart Home control logic depending on the current production (surplus).

The Relay Box has:

- 4 inverter contacts
- 4 make contracts

Characteristics of the relays:

Maximum current load:

0.5 A @ 120 V_{AC}

0.25 A @ 240 V_{AC}

1 A @ 30V_{DC}

0.3 A @ 110V_{DC}

Procedure:

- Connect the Relay Box to the RS485 bus of the Solar-Log™ according to the following diagram:

Relay Box Wiring

Terminal block connector RS485 Solar-Log™	Relay Box Terminal block connector Article Number: 255385
PIN	PIN
1	Data + (Y)
4	Data - (G)

- Device detection is not necessary for this device.
- The device only has to be selected from the Configuration | Special Functions | Smart Home menu to be activated.
- The power comes from the top-hat-rail power supply that was included with the Relay Box.

Note

The Solar-Log™ Smart Meter Relay Box cannot be connected together with inverters on an RS485 interface. The Relay Box requires its own separate RS485 bus.
It is possible to combine with Utility Meter, RS485 meters and sensors.

Note

The Solar-Log™ Smart Meter Relay Box cannot be connected together with PM+ packages on a Solar-Log™.

Relay output assignments

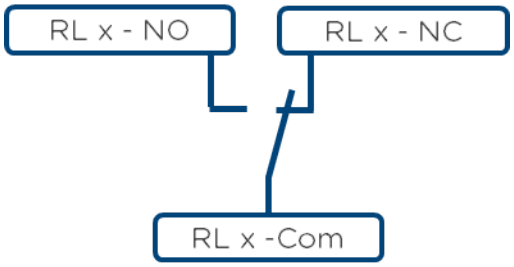


Fig.: Smart-Home Relay Box relay output (change-over contact) diagram

13 Other connections

13.1 Alarm contact (only Solar-Log 1000 and 2000)

The Solar-Log 1000 and 2000 have an alarm contact which is triggered if the connection is broken.

This function can be used for various applications:

- Anti-theft protection for the modules or inverters
- For wiring to the mounting frame or to the modules, use a thin weather-resistant cable that breaks when strained. The maximum cable length is around 500 meters.
- Access control via door contact
- Monitoring of circuit breakers
- Connection to an uninterruptible power supply (UPS).

If the connection is broken, the Solar-Log™ can carry out the following actions:

- Switch a relay
- Send e-mail
- Send text message (SMS)
- Produce an audible signal

The notification actions can be set on the Solar-Log 2000 in the section Configuration | Notifications | Alarm .

Connection

The connection is done using a 3-pin terminal block connector according to the following diagram:

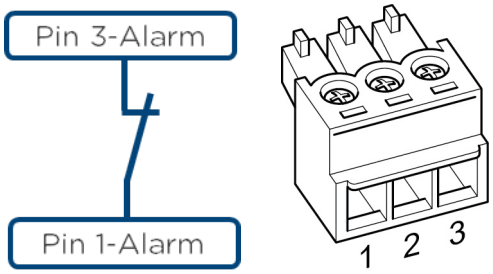


Fig.: Alarm contact connection diagram

If the connection between pin 1 and pin 3 is broken, the alarm is triggered and the configured action is carried out.

13.2 Relay (only Solar-Log 1000, 1200 and 2000)

The Solar-Log™ has a potential-free control relay, which is activated under the following conditions:

- Alarm contact triggered
- Active power reduction activated
- Optimization of self-consumption

The relay may be loaded with a maximum of 24 V DC and 5 A.
A 230 V appliance must be connected via another load relay.

Connection

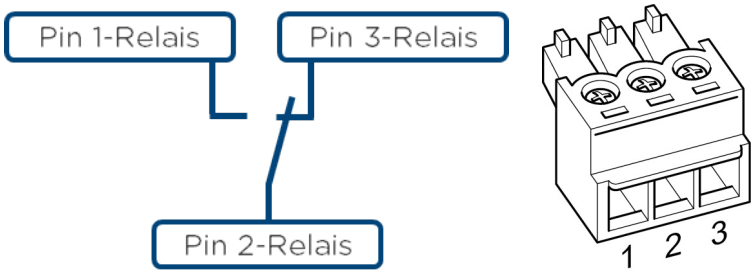


Fig.: Relay connection diagram

Wiring

The wiring is done using the supplied 3-pin connector;

usually pin 1 and pin 2 are used.
In the Off state,

- pin 1-2 are open
- and pin 2-3 are closed.

In the On state (alarm/fault/power reduction activated),

- and pin 1-2 are closed.
- pin 2-3 are open

13.3 USB

Solar-Log™ 300, 1000, 1200 and 2000 have a USB connection. This USB connection can only be used for USB sticks and not for a direct PC connection.

Note

When a USB stick is connected, the Solar-Log™ automatically saves a backup in the backup folder. A maximum of 10 backup files are saved in the directory. Older backup files are automatically deleted.

The backup is saved on the USB stick in the directory /Backup with the following file names:

- solarlog_backup_YYMMDD.dat
  YYMMDD = year, month and day - each two digits, e.g.
  140312 is then 12 March 2014

14 Installation

The Solar-Log™ has an integrated web server, which contains all the software necessary for operation and configuration.
No additional software needs to be installed on the PC to access the Solar-Log™.
A common web browser with JavaScript enabled is required.
We recommend the current version of Mozilla's Firefox, Google's Chrome or Microsoft's Internet Explorer.

To run the web browser, a network connection is required between the PC and Solar-Log™, and Solar-Log™ must be up and running.
It is recommended to have DHCP enabled on the router.

- Before setting up, ensure that there is no damage to the power supply. If in doubt, please contact the address indicated on the back cover of this manual.
- Before startup, check that the input voltage on the unit is the same as the voltage supply in your country.
- The unit must be operated only with the power supply unit supplied.
- The unit is intended only for installation in interior areas that are dry and dust-free.
  (IP20)

14.1 Connecting Solar-Log™ to a network / PC

The Solar-Log™ is equipped with a standard Ethernet RJ45 socket, which can be connected through any commercially available network cable. Speeds of 10 Mbit and 100 Mbit are supported.

In general, any PC networking technology can be used for connecting the Solar-Log™. The following technologies are available:

- Connection through an Internet router
  Ethernet RJ45 network cable
- Direct cable connection from PC to Solar-Log™
  Ethernet RJ45 network patch cable
- If connecting directly to a PC, the cable must be the crossover network cable type (patch cable).
- Connection through a power network (PowerLine package)
- Connection through a wireless network (Solar-Log™ WiFi)

If the Solar-Log™ is operated via a router, ensure that the necessary ports have been activated (see Chapter “30.1 Internet ports” on page 207).

Since the Solar-Log™ obtains its IP address while booting, it needs to be connected to the network before being turned on.

14.1.1 Instructions for connection through the PowerLine package

If using the Solar-Log™ PowerLine package, the Solar-Log™ can be connected to the PowerLine adapter using the network cable supplied.
Next, connect the PC, switch or Internet router through the second PowerLine adapter.
The two power connectors are connected to each other automatically and then act as "power supply network cables".
The PowerLine adapters should not be connected to a multi-outlet power strip, as other power adapters will affect the data quality.

Note

The Solar-Log™ may not be connected directly to a TNV (Telecommunication Network Voltage) circuit.

14.2 Initial installation Solar-Log 200 and 300

The Solar-Log^{300} is configured completely from a connected PC or laptop.

Requirements

- All cables and accessories (if any) have been connected to the Solar-Log^{300}.
- The Solar-Log^{300} is connected to an Internet router.
- The DHCP service is enabled on the Internet router.

or

- The DHCP service is enabled when connecting directly to the Solar-Log™ with a PC. (We recommend using a patch cable.)

Easy Installation

After selecting the language and country, the initial set up can be carried out with the "Easy Installation" configuration wizard. However, Easy Installation can currently only be used with certain inverters. Depending on the country, different inverter brands are integrated into the Easy Installation mode. Easy Installation cannot be performed with GPRS.
The Solar-Log™ then carries out the initial set up intuitively step by step.
For more information, please refer to the Quick Start Guide that was included with the device.

14.2.1 Carrying out the initial set up of the Solar-Log 200 and 300

The initial configuration of Solar-Log 300 is made via a Web browser.

Procedure:

- Enter the address http://solar-log in the address bar of the web browser.
- A selection of display languages is displayed.
- Select the desired Display Language.
- The welcome screen then appears.
- In the navigation bar at the top, click on Configuration
- The following menus have to be configured:
  Internet (Chapter “17 Internet Configuration” on page 82)
  Network (Chapter “16.1 Configuring network settings” on page 75)
  Device (Chapter “18 Configuring connected devices” on page 87)
  Plant (Chapter “19 Configuring Plant Data” on page 96) and
  System (Chapter “22 System Configuration” on page 114).

14.3 Initial set up of the Solar-Log 1200

The initial configuration of Solar-Log 1200 can be made via a Web browser or via the touch display.
See Chapter “22.4.1 Initial configuration (only Solar-Log 1200)” on page 143for details on configuring the device.

Requirements

- All cables and accessories (if any) have been connected to the Solar-Log^{1200}.
- The Solar-Log^{1200} is connected to an Internet router.
- The DHCP service is enabled on the Internet router.
- The DHCP service is also enabled on the PC or laptop.

Easy Installation

After selecting the language and country, the initial set up can be carried out with the "Easy Installation" configuration wizard. However, Easy Installation can currently only be used with certain inverters. Depending on the country, different inverter brands are integrated into the Easy Installation mode.
The Solar-Log™ then carries out the initial set up intuitively step by step.
For more information, please refer to the Quick Start Guide that was included with the device.

14.3.1 Carrying out the initial set up of the Solar-Log 1200

The initial configuration of Solar-Log 1200 is made via a Web browser.

Procedure:

- Enter the address http://solar-log in the address bar of the web browser.
- A selection of display languages is displayed.
- Select the desired Display Language.
- The welcome screen then appears.
- In the navigation bar at the top, click on Configuration
- The following menus have to be configured:
  Internet (Chapter “17 Internet Configuration” on page 82)
  Network (Chapter “16.1 Configuring network settings” on page 75)

Device (Chapter “18 Configuring connected devices” on page 87)
Plant (Chapter “19 Configuring Plant Data” on page 96) and
System (Chapter “22 System Configuration” on page 114).

14.4 Initial installation Solar-Log 1000 and 2000

The initial configuration of Solar-Log[1200] is made via a Web browser. All of the device connections need to be established and it is best to connect the Solar-Log 2000 to an internet router.
All settings made at the initial startup can be changed at a later time.

14.4.1 Carrying out the initial set up of the Solar-Log 2000

The initial configuration of Solar-Log 2000 is made via a Web browser.

Procedure:

- Enter the address http://solar-log in the address bar of the web browser.
- A selection of display languages is displayed.
- Select the desired Display Language.
- The welcome screen then appears.
- In the navigation bar at the top, click on Configuration
- The following menus have to be configured:
  Internet (Chapter “17 Internet Configuration” on page 82)
  Network (Chapter “16.1 Configuring network settings” on page 75)
  Device (Chapter “18 Configuring connected devices” on page 87)
  Plant (Chapter “19 Configuring Plant Data” on page 96) and
  System (Chapter “22 System Configuration” on page 114).

14.5 Starting the configuration

The various options to open the main menu of the Solar-Log™ are listed below:

Device URL

- Start the web browser
- Enter http://solar-log in the address bar and press the ENTER key
- The main menu of the Solar-Log™ is displayed

Fig.: Main menu of the Solar-Log 2000 PM+ GPRS

Alternatively, the Solar-Log™ can also be accessed as follows:

IP address from an automatic IP range

- Start web browser
- Enter http://169.254.wx.yz in the address bar and press the ENTER key.

  Here wxyz stands for the last 4 digits from serial number of the Solar-Log™. The serial number is printed on the model tag.

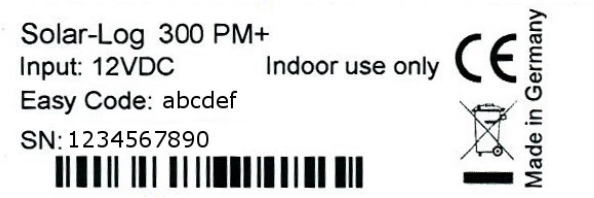


Fig.: Solar-Log™ model tag

The main menu of the Solar-Log™ is displayed

IP address that was entered during the initial configuration

- Start the web browser
- Enter IP address from the Initial Configuration in the address bar and press the ENTER key.
- The main menu of the Solar-Log™ is displayed

Device URL when there are several Solar-Log™ devices on the network

- Start the web browser
- Enter http://solar-log-wxyz in the address bar and press the ENTER key
  Here wxyz stands for the last 4 digits from serial number of the Solar-Log™. The serial number is printed on the model tag.
- The main menu of the Solar-Log™ is displayed

14.6 Using the browser menu

The browser menu of the Solar-Log™ functions like a website.
The menu is divided into three main sections:

- Main menu (A)
- Left navigation (B)
- Tab (C)
- Configuration page (D)

The sections Yield data and Diagnostic are described in the user manuals of the respective models.

The browser menu has various operation menus.

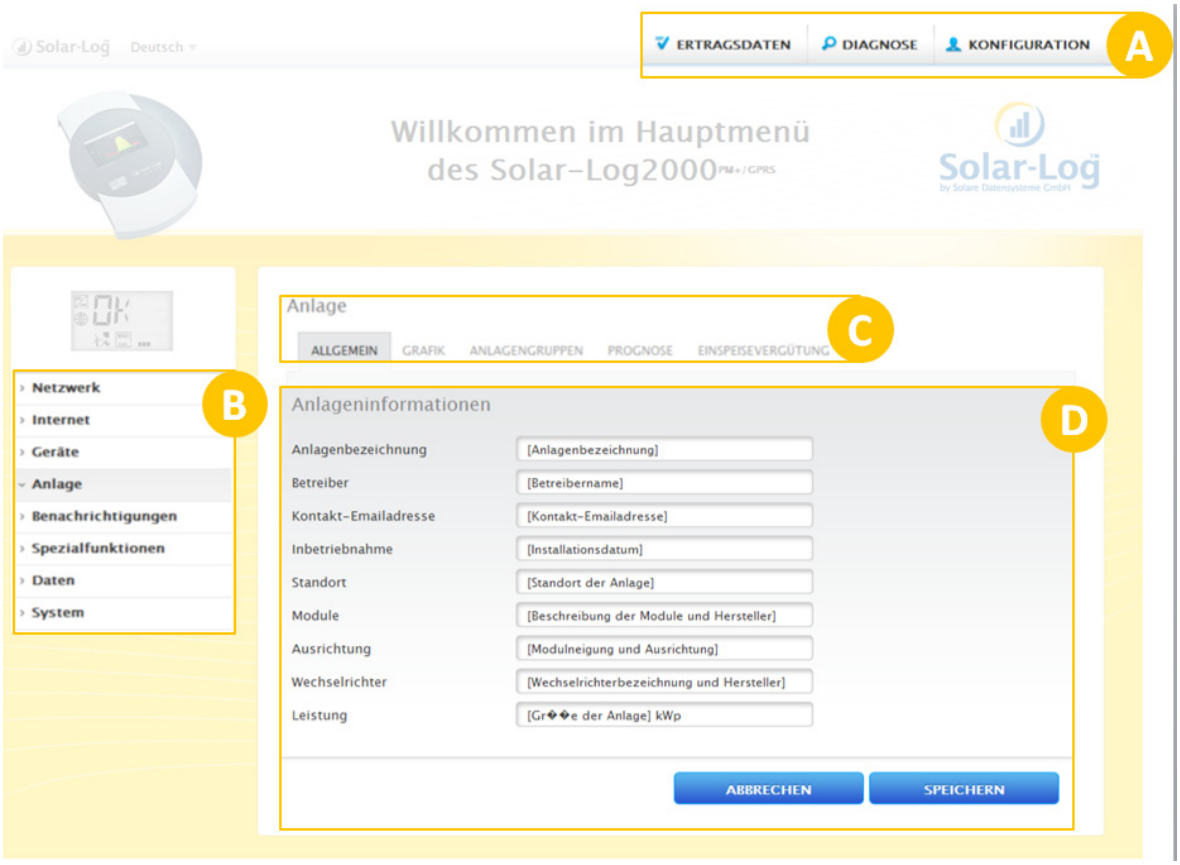


Fig.: Layout of the main menu

In the Solar-Log™ manuals, the following convention is used in describing how to navigate the menu.
Main menu | Left Navigation | Tab
For example:
Configuration | Network | Ethernet
In parts, there are several sections within this tab.

Control elements

The following control elements are used in the browser menu:

Control elements in the browser menu

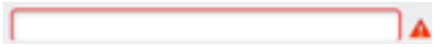
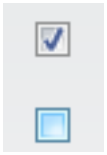
Control element	Meaning
	Text field
	Text field with incorrect or missing entry
	Drop-down selection list
	Virtual switch deactivated and activated
	The question mark boxes display additional information
	Check boxes Several boxes can be selected at one time
	Command buttons for various functions

Fig.: Control elements in the browser menu

After making changes in the browser menu, the follow message is displayed at the bottom of the page:
The changes have not been saved.

After clicking on the Save button the following message is displayed:
The changes have been saved.

15 Main menu

The main menu is divided into the following sections:

- Configuration
- Diagnostic
- Yield data

The sections Diagnostic and Yield data are described in the user manuals.

16 Configuration Menu

The Configuration menu is divided into the following sub-sections:

- Network
- Internet
- Devices
- Plant
- Notifications
- Special functions
- Data
- System

The following sub-sections of the menu will be explained separately in the following chapters.

16.1 Configuring network settings

Open the dialog box

Select Configuration | Network from the menu

The Network menu is divided into the following sub-sections:

- Ethernet
- GPRS (only Solar-Log™ GPRS)
- WiFi (only Solar-Log™ WiFi)
- Proxy (advanced configuration activated)

16.2 Ethernet

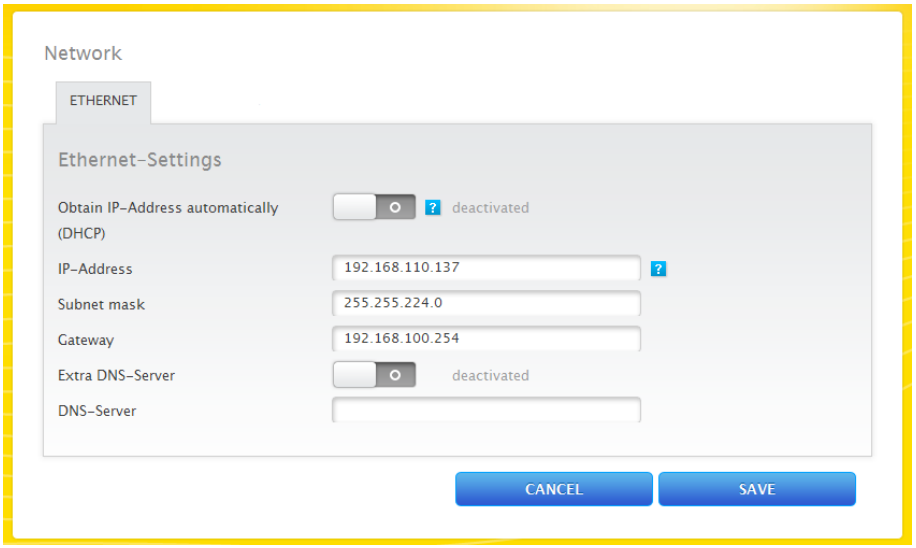


Fig.: Ethernet settings

The Ethernet settings for the Solar-Log™ are adjusted in this tab.

Obtain IP address automatically (DHCP)

Here the following options are available:

- Activate Obtain IP address automatically
- Deactivate Obtain IP address automatically.

.

With the default settings of the Solar-Log™, the Obtain IP address automatically option is already activated.
If the Solar-Log™ should Obtain its IP address automatically (DHCP), this switch needs to be activated. This is only possible if the Solar-Log™ is connected to an Internet router with DHCP enabled. When the search is started, the Solar-Log™ attempts to obtain an IP address through an Internet router. This can take up to 60 seconds.
If the DHCP server is disabled in the router, the network settings must be configured manually. If necessary, please consult a network specialist who can assign a suitable network address in regard to IP address, Subnet mask and Gateway, for example.
If the Solar-Log™ is to have a fixed IP address, the Obtain IP address automatically (DHCP) switch needs to be deactivated. The following fields need to be adjusted according the network's configurations.

IP address

The address needs to be entered manually in order to allow remote PC access, when using a direct PC connection or a router without DHCP service.

Subnet mask

The Subnet mask is 255.255.255.0 by default and must be the same for every device in the subnet.

Gateway

The gateway is typically the IP address of the router to which Solar-Log™ is connected. That IP address is to be entered here.

Alternate DNS server

In some networks, the DNS server is a separate address for resolving Internet addresses (unlike a gateway). If an Alternate DNS server is needed, switch the function to activated and enter the IP address of the DNS server.

Once finished, click onSave.

16.3 GPRS (only Solar-Log™ GPRS)

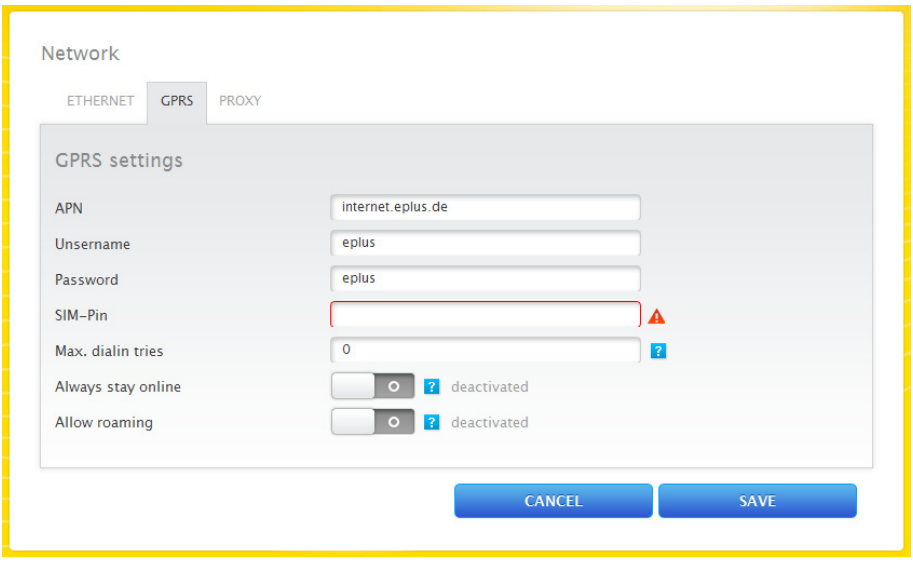


Fig.: GPRS settings

In many cases where no DSL or telephone connection is available, a GPRS mobile network is the only option to connect to the Internet to send e-mails, text messages (SMS) and data to the homepage.
In order to establish a GPRS connection, the data from the GPRS service provider needs to be entered in the following fields.

Note

Lists of international APN settings and providers is available at http://www.solar-log.com/en/service-support/apn-settings.html.

APN shortcut

Selection of major mobile service providers (APN user and password are automatically filled in)

APN

APN (Access Point Name) of the mobile service provider

Users

User name for your mobile phone account

Password

Password for the mobile phone account

SIM PIN

PIN number of the SIM card

Max. dial in attempts

The box "max. dial in attempts" allows you to define how many times per day the modem tries to connect. This setting allows you to limit the total number of dial-in attempts per day.

Note

If the number of maximum dial-in attempts is too low, a reliable transmission of fault messages cannot be guaranteed.

Always stay online

Activate this option when continuous data transmissions are required.
If this option is activated, the GPRS modem is continuously connected to the service provider. This setting is only recommended for flat-rate data plans.

Roaming allowed

By activating the roaming function, the Solar-Log™ can also connect to other mobile networks when the home network is unavailable.

Status and Test section

Function to test the GPRS connection. The error codes displayed under Last Error are “29.2.1 Fault messages GPRS” on page 189 explained.

Note

Activating the roaming function could potentially result in enormous additional costs.

16.4 WiFi (only Solar-Log WiFi)

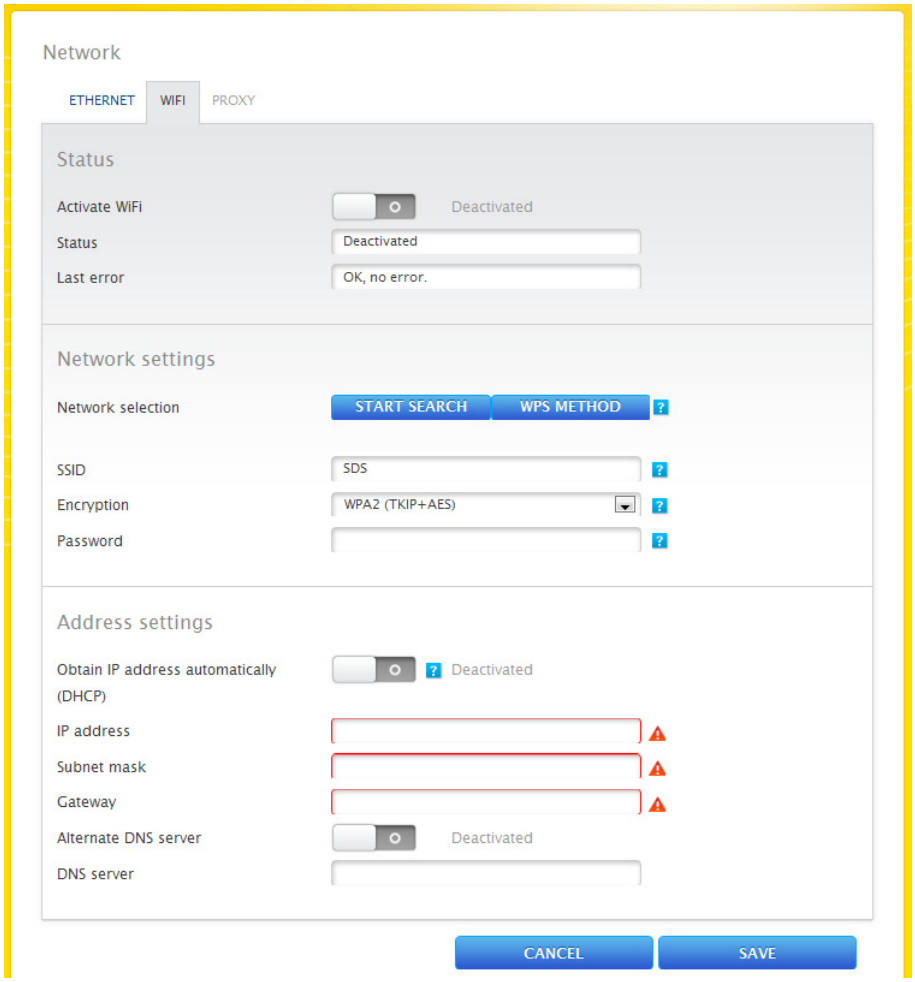


Fig.: WiFi settings

The Solar-Log™ WiFi models are equipped to be connected in a wireless local area network.

Status section

The WiFi function can be switched on and off with the Activate WiFi function. In the status box, the current status of this function is displayed.

Possible Status:

- Initializing
- Initialization error
- Disconnected
- Connected
- Connecting
- Connection lost
- Searching
- Search finished

The Signal Quality is indicated on the LCD display with the symbol.

Network Settings section

The Start search button is used to initiate a search for wireless networks. The status Searching is displayed.
Once the search is completed, the wireless networks found are listed and can be selected from the SSID. The Solar-Log™ automatically switches to the encryption used by this network. If the network name is hidden ("Hidden SSID"), the Access Point is not displayed by the network scan. In this case, enter the network name and security key.

The following encryption options are available:

- WEP
- WPA-AES
- WPA-TKIP
- WPA2-AES
- WPA2-TKIP

After selecting a network, the network's security method is automatically selected. Enter the network's security key in the password box. Save the settings.

Network address settings section

Note

These settings apply to the wireless connection to the router. We recommend using DHCP. The IP address is obtained automatically if the Solar-Log™ is connected to an Internet router with the DHCP service enabled. After saving and the automatic restart, the new IP address is displayed.

All routers usually come with the DHCP service enabled by default, so that all the subsequent data are entered automatically:

IP address, Subnet mask, Gateway and DNS server

The settings can also be manually configured in these boxes. The DHCP function then needs to be deactivated in the Solar-Log™.

If necessary, please consult a network specialist who can assign a suitable network address in regard to IP address, Subnet mask and Gateway, for example.

Alternate DNS server

In some networks, the DNS server is a separate address for resolving Internet addresses (unlike a gateway). In this case, the IP address of the DNS server is entered here. The alternate DNS server can also be configured manually from the Network | Ethernet menu.

16.5 Proxy

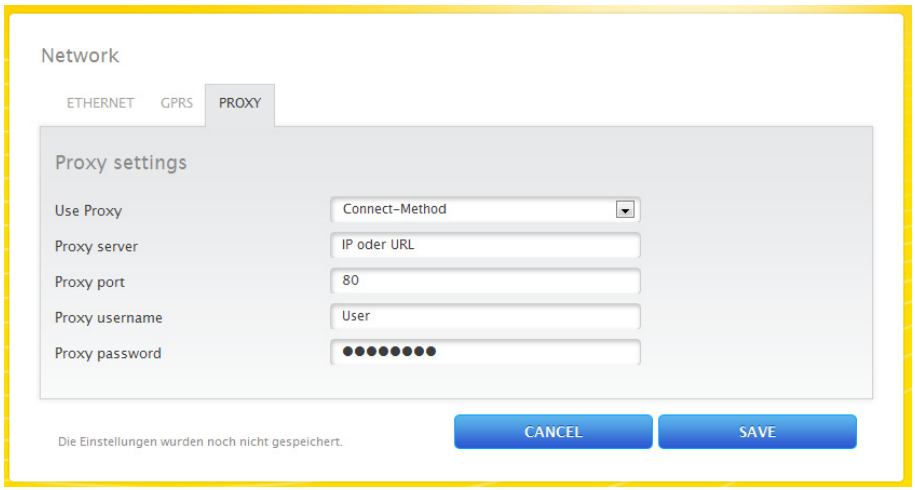


Fig.: Proxy settings

The proxy function is not enabled by default. To use a proxy Display advanced configuration needs to be activated under Configuration | System.

The proxy settings need to be configured in the Solar-Log™ to enable Internet communication via the proxy server. Proxy servers are typically used in the networks of organizations and companies.

The data transfer only refers to the FTP transfer.

Procedure

- When using a proxy, select Connect Method
- Enter proxy server, port, user name and password.
- SAVE settings

17 Internet Configuration

Select Configuration | Internet from the menu.
The following tabs can be displayed:

- Access type
- Portal

When local monitoring is activated under Configuration | Internet | Portal , the following tabs are visible:

- E-mail
- Text message (SMS)
- Export
- Backup

17.1 Access type

The type of Internet access that the Solar-Log™ uses to connect to a portal or server is adjusted in this tab.
Procedure

- Select the type of Internet Access
  Selection options:
  Network Router (DSL, cable, WiFi)
  GPRS (mobile network)
- SAVE settings

17.2 Portal

The following functions are available in this tab:

- Select the Internet portal platform for the transmission of the data from the Solar-Log™
- Local monitoring can be activated
- Automatic portal log-in can be started

WEB-Portal settings section

In this section, the type of portal used can be selected. The following selection options are available:

- No portal
- Commercial Edition (Full Service)
- Classic 2nd Edition
- Self-made (Solar-Log 200, 500 and 1000)
- Classic 1st Edition (only Solar-Log 200, 500 and 1000)

Th function is activated from the portal selection box by checking the Local Monitoring box. After selecting local monitoring, additional tabs appear.

Procedure

- Select the type of Portal
- In the Transfer Settings section
  - Activate transfers
  - Enter the portal server (e.g. company.solarlog-web.de) in the Portal Server box.
  - Select the transfer interval
- SAVE settings

Status and Test - Solar-Log™ WEB section

Procedure

- Click on start
- The Status is displayed

17.3 E-mail

The settings in this section serve as the basic configuration for sending e-mails via the e-mail client integrated into the Solar-Log™. The Solar-Log™ can send e-mails in the following situations:

- Daily yield overview
- Inverter faults
- Inverter failure
- Deviation from target power

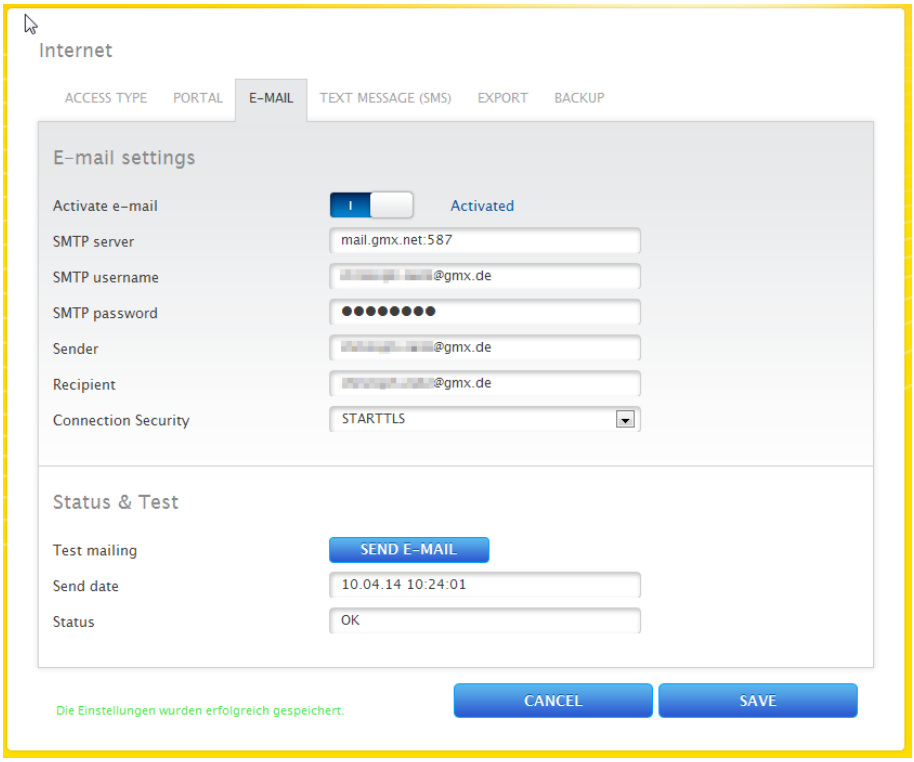
We recommend using the e-mail address provided by Solare Datensysteme GmbH for sending e-mails. This is sent to you by e-mail in the framework of the portal registration process.
In addition, you also have the option of saving your own address.

E-mail settings section

Enter the settings for sending e-mail via the Solar-Log™'s e-mail client in this section. The data for the boxes SMTP Server, SMTP user name, SMTP password and sender is in the confirmation message from the portal registration. Enter this data in the corresponding boxes. Enter the recipient's e-mail address in the corresponding box.

Status & Test e-mail section

In this section, the e-mail settings can be tested and the information from the last sent e-mail displayed.



Figg: Example for configuration with connection security

17.4 Text message (SMS)

The Solar-Log™ text message (SMS) program sends customized messages with any of the following content:

- Daily yield overview
- Inverter faults
- Inverter failure
- Deviation from target power

There are two options to send text messages (SMS):

- Text messages (SMS) direct via GSM modem
  This option is only available with GPRS models.
- Text messages (SMS) via e-mail forwarding
  Text messages (SMS) are sent in two stages: First, an e-mail message is sent to an e-mail service provider who provides the text message (SMS) service. From a keyword in the Subject line, this provider detects that the message is to be forwarded as a text message (SMS) to a certain number. For the incoming e-mails, some e-mail providers forward a text message (SMS) free of charge with the Subject line for information.

17.5 Export

The automatic data export allows the yield data to be periodically transferred to the server.
Various data formats and export intervals are available.

Exporting settings to an external server

Procedure

- Activate Export switch
- Enter the name of the server name in the FTP server box.

- Enter the FTP user name and password from the FTP server access data.
- An FTP directory only has to be entered here if the Solar-Log™ homepage is not to be located directly in the main directory of your homepage. Otherwise, this box can be left empty.
- The Export Interval determines how often the Solar-Log™ transmits the data to the server.

Note

When using local monitoring, the option for a daily export is available.

Note

The same target server may not be configured for both the HTTP (portal) and FTP (export to external server and backup) transfers.

- The following export data formats are available: CSV, Solar-Log™ or both CSV and Solar-Log™.
- SAVE settings

Status & Test external server section

In this section, the export settings can be tested The information from the last export is displayed.

17.6 Backup

Periodic data backups can be configured on any homepage by FTP protocol. The data backups include overall statistical data. The size of each backup depends on the plant size and the number of devices connected.

Backup settings section

Procedure

- Activate Backup switch
- Enter the name of the server in the FTP server box.
- Enter the FTP user name and password from the FTP server access data.
- An FTP Directory only has to be entered here if backup should not be saved directly in the main directory of your homepage. Otherwise, this box can be left empty.
- SAVE settings

Status & Test section

In this section, the backup settings can be tested The information from the last backup is displayed.

18 Configuring connected devices

From the menu Configuration | Devices, the PV plant components connected to the Solar-Log™ can be

- defined
- detected
- and configured.

We recommend the following procedures for new installations:

- First define the interface to be used for the connected devices
- Device detection
- Device configuration

18.1 Device definition

The Configuration | Devices | Definition menu is divided into the following sub-sections:

- Interfaces
- Smart Home
- CT (only Solar-Log™ Meter)
- Large external display (advanced settings have to be activated)
- SCB (only Solar-Log 1000 and 2000)

18.1.1 Configuring the device interface

The interface for the connected devices needs to be defined from the Configuration | Devices | Definition | Interfaces menu before performing a device detection.

S0-IN A

Here you can configure whether an S0 meter is connected to this input.

S0-IN B

Here you can configure whether an S0 meter is connected to this input.

RS485-A (only Solar-Log 1000, 1200 and 2000)

Here you can configure components that are connected to this input. These components can be:

- Inverters
- Power meters or
- Sensors

If a wireless package is used in this bus, the wireless package button needs to be activated.

Section RS485-B

RS485-B is a combined interface on which an RS422 inverter can also be connected.
Here you can configure components that are connected to this input. These components can be:

- Inverters
- Power meters or
- Sensors

If a wireless package is used in this bus, the wireless package button needs to be activated.

Section RS485-C (only Solar-Log 2000)

RS485-B is a combined interface on which an RS422 inverter can also be connected.
Here you can configure components that are connected to this input. These components can be:

- Inverters
- Power meters or
- Sensors

If a wireless package is used in this bus, the wireless package button needs to be activated.

Network section

If an inverter is connected to the Solar-Log™ via Network / LAN, please select the corresponding inverter brand here.

CAN (only Solar-Log 1000 and 2000)

If an inverter is connected to the Solar-Log™ via the CAN Bus, please select the corresponding inverter brand here.

Procedure

- Define the interface for each connected device
- SAVE settings

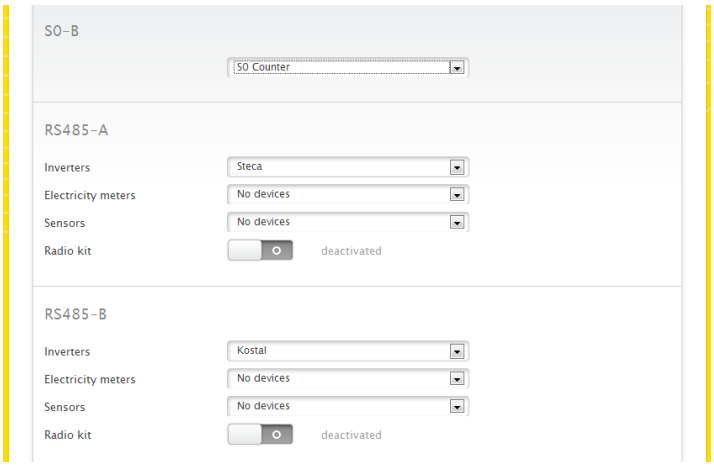


Fig.: Example of a device definition

In the example, the following inverters are connected:
S0 B: S0 meter
RS485 A: 2x Steca Stecagrid 10000 inverters
RS485 B: 1x Kostal inverter

18.2 Defining the Smart Home switches

The switches that are to be used for the Smart Home function - switching on appliances in certain production scenarios - have to be defined and configured. A maximum of 10 switches is available.
The devices need to be defined in the Configuration | Devices | Definition menu. The next step is to configure these in the Configuration | Devices | Configuration menu. The control logic for the defined devices can be programmed in the Configuration | Special Functions | Smart Home menu.

Switch configuration menu

In the section, the switches 1-10 can be selected and their hardware can be defined.
Procedure:

- Select switch place
- Define the switch type
- The following switch types are available:
  - Internal relay (only Solar-Log 1200 and 2000)
  - Allnet 3075/3076
  - Allnet 3000
  - Gude 1100/1101
  - Gude 1002
  - Allnet 3075/3076 V2
  - Allnet 3073
  - Solar-Log™ Smart Home Relay Box (The connection via RS485 cannot be combined with inverters connected to the RS485 bus)
  - Gude 2301
- Select the corresponding switch type
- Activate the switch
- The IP address of the switch needs to be entered when the switch is to be controlled via an IP address (all of the relays other than the internal relay and the Smart Home Relay box).
  The RS485 used needs to be selected for the Smart Home Relay Box.
- There is a prompt for the RE485 connection and also the desired relay with the Smart Home Relay Box. Enter the number of the relay (0-7) is this field.
- The sub-address (1-4 for each relay) also needs to be defined when using the Gude 1002 (4 Relay).
- SAVE settings
- If several switches are to be used, repeat these steps for each switch.

Note

Refer to the manufacturer's manuals to configure the IP addresses for the IP sockets.

Note

When a new device is configured in the switch configuration section, a detection needs to be performed, otherwise the measured values are not recorded.

18.3 Defining the Solar-Log™ Meter (only Solar-Log™ Meter)

With this model version, an extra tab Meter is displayed in the Configuration | Devices | Definition menu.

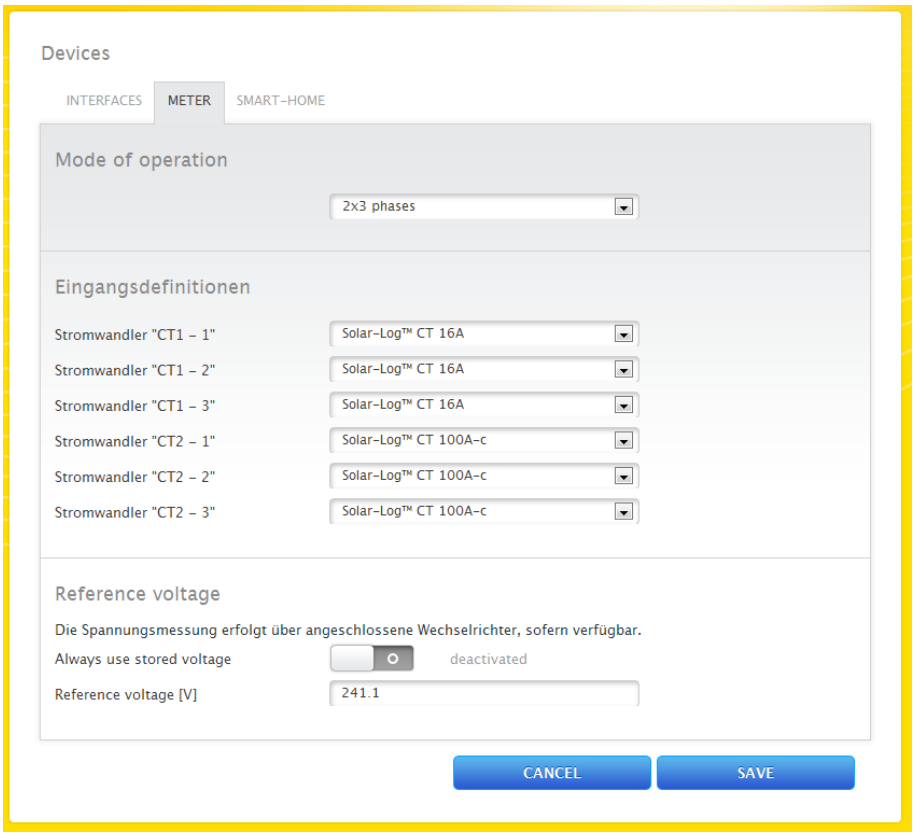


Fig.: Device definition for the Solar-Log™ Meter

Operating mode

- Select the desired operating mode

The listed operating modes refer to the different possible measuring combinations.

- 2x3 phases stand for the recording of two 3-phase appliances. Here the six current transformers are combined together as two meters.
- 1x3 and 3x1 phases stand for the recording of one 3-phase appliance and three 1-phase appliances. Here the six current transformers are combined together as four meters.
- 6x1 phase stands for the recording of six 1-phase appliances. Six meters are then displayed in this mode.
- The other modes can be used for other measuring combinations.

Input definition section

- The following CTs are available:
  Solar-Log™ CT 16A
  Solar-Log™ CT 100A - C
  Solar-Log™ CT 100A - o
  user-defined
- The settings for the Solar-Log™ CTs have been pre-defined for the current ratio
- When using other CTs, select user-defined.
  An additional input box appears for the current ratio of the installed CT.
  The current ratio is calculated with the ratio between primary and secondary current

Example

200A of primary current results into 200mA of secondary current with a user-defined current transformer. There is then a the current ratio of 100 (200A/0.2A) Enter this value (100) in the field Current Ratio.

Reference voltage section

In addition to the current measured by the CT, a reference voltage is needed for the power output calculation. This reference voltage can either be

- recorded via the inverters and/or calculated by the Solar-Log™
- or set in the box reference voltage [V].

If the Solar-Log™ does not receive voltage values from the inverters (for example during night), an average value is calculated and used.

By activating the Always use stored voltage button, the value entered in the reference voltage [V] input box is always used for the power output calculation.

Note

The reference voltage value is predefined by the country settings. Please check this value.
It is best to measure the reference voltage and enter this value.

During the Device Detection process, the CT defined here is recognized as a meter and can be adjusted and named accordingly in the meter configuration menu under Configuration | Devices | Configuration.

18.4 Device detection

During the Device Detection process, all of the predefined devices in the Device Definition menu which are connected to the Solar-Log™ interfaces are searched for and recognized. During the Device Detection process, the Solar-Log™'s internal data structure is prepared for these devices.

Procedure:

- Select Configuration | Devices | Detection from the menu
- The devices which were predefined in the Device Definition menu are displayed in the overview.

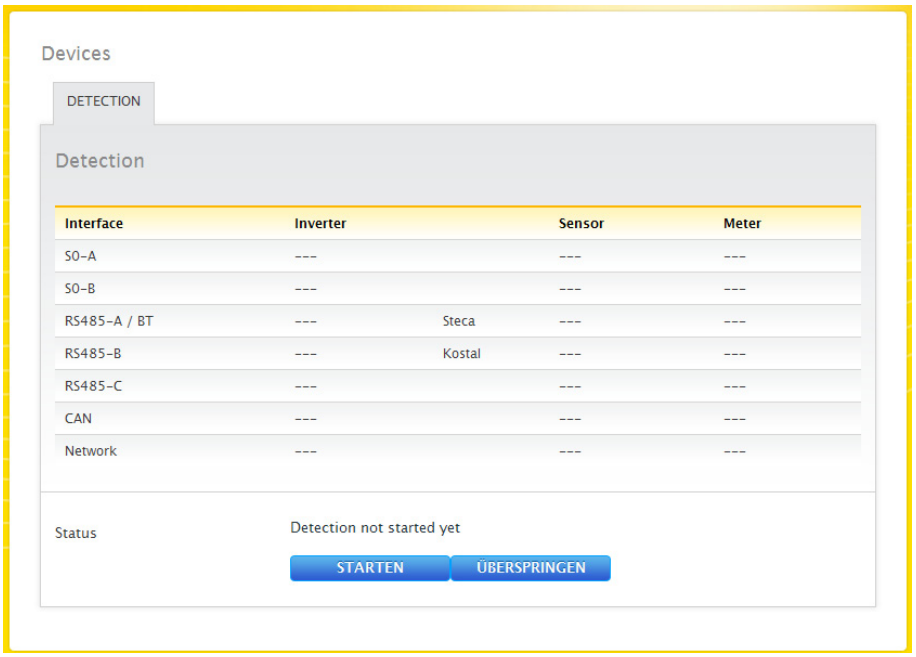


Fig.: Device detection - not started yet

- START Device Detection
- The Device Detection goes from the top listed interface to the bottom listed interface when searching for devices.

The status of the Device Detection is displayed in the progress bar

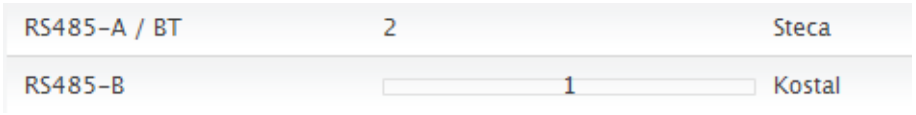


Fig.: Progress of the Device Detection

- The detected devices are displayed with the number of devices per bus.
- If all of the devices on a bus have been detected, the rest of the search can be skipped. The search is then continued on the next bus.
- The Device Detection is completed once all of the buses have been checked.
  Status message: New device detected, the data is being reformatted.
- Restart the Solar-Log™

18.5 Configuring devices

After the Device Detection has been successfully completed, the detected devices have to be defined in the Configuration | Devices | Configuration menu.
Depending on the device, different settings might be needed for the configuration.

The following devices are listed in the device overview:

- Inverters
- Power meters and current transformers (with Solar-Log METER)
- Sensors

Procedure:

- Select the device that needs to be configured in the Device Configuration section.
- Depending on the device type, different configuration boxes appear.
- The sections below—Module Fields, Power Output and Descriptions—are to a large extent identical
  Enter the module field, connected generator power and description

18.5.1 Configuring inverters

The following values have to be configured for inverters:

- Maximum AC Power
- Pac Correction Factor
- Module field
- Generator Power and MPP tracker output (according to the string plan)
- Labels or names of the inverters and/or MPP trackers.

Procedure:

- Select Device
- Enter
- the maximum AC power from the inverter's data specification in the section: Module Field, Power and Name.
- Enter the Pac correction factor
  If the power yield displayed by the inverter is compared with the calibrated current meter, deviations are detected. An approximate correction factor can be defined in order to compensate for this inaccuracy.
  All yield data are stored internally without any correction factor. This factor is applied only when the data are displayed. The factor can therefore be adjusted at any time.
  The formula for calculating the correction factor is as follows:
  Yield on power meter / Yield at inverter * 1000
  If the inverter does not have a display, the correction factor must be left at 1000 initially, and the factor can then be determined after about a week or at later times.
- Define the module field
  Inverters can be assigned to be different module fields. See Chapter “18.5.4 Module Fields” on page 95.
- The generator power
  The connected power of the individual inverters in Wp. The total power can be calculated using the formula: Module power * Number of modules. The output does not have to be entered. It is calculated from the total generator power values that have been entered for the Mpp Tracker.
- The generator power for every tracker needs to be entered if the inverter has several MPP trackers.

- IA distinct name can be assigned to every generator/MPP tracker in the Label box.
- Save settings

18.5.2 Configuring power meters

A function needs to be assigned to power meters to configure them.

Possible functions for power meters:

- Consumption meter
- Meter for the entire plant
- Utility Meter (U)
- Utility Meter (U+I)
- Sub-consumer

Note

Several consumption meters can be defined for every plant. Their measurements are added to the total consumption.

Note

A sub-consumption meter is a consumption meter whose consumption has already been recorded by another meter. It is used to visualize the consumption from a particular appliance or group.

Procedure

- Select Device
- Select the desired operating mode from the Meter configuration section.
- If need be, assign a plant group to this meter
- SAVE settings

18.5.3 Configuring sensors

With sensors, the configuration only comprises of activating other sensors.

Procedure:

- Use the Ambient Temperature and/or Wind button to activate the sensors
- If needed, make assignments to the module field.
- SAVE settings

18.5.4 Module Fields

Each connected MPP tracker is assigned to a module field. Module fields are subdivided according to the type of the solar module, angles of inclination and alignment. If all modules within a system are of the same type and have the same alignment, only one module field, e.g. "1", is defined. MPP trackers that are not used must be switched off (switched to "0"),
Additional module fields need to be defined for modules with different alignments and module types. Ideally, each field should be made up of at least two individual MPP trackers, which monitor each other. The module fields are used for the performance monitoring. In contrast, plant groups (Chapter 17.2 on page 96) are used for the commercial calculations.

Example module fields:

A plant with 23.6 kWp is divided into:
3 x SMA SB5000TL and
2 x SMA SB2500.
18 kWp is located on a barn roof with 30° inclination, 20° South-East deviation, and 5 kWp on an adjoining garage roof, 32° inclination, 0° South deviation.

This results in two module fields according to the following table:

Division of the module fields

Location	Inverters	MPP Tracker output	Module field
Barn	1. SB5000TL	2000	1
Barn	1. SB5000TL	2000	1
Barn	1. SB5000TL	2200	1
Barn	2. SB5000TL	2000	1
Barn	2. SB5000TL	2000	1
Barn	2. SB5000TL	2200	1
Barn	3. SB5000TL	2000	1
Barn	3. SB5000TL	2000	1
Barn	3. SB5000TL	2200	1
Garage	1. SB2500	2500	2
Garage	2. SB2500	2500	2

Fig.: Example of the module field division

18.6 Changing the device order

The sequential order of the inverters and other devices is determined during inverter detection. They are normally sorted by their serial number or communications address.
The order can be changed through drag and drop from the Configuration | Devices | Configuration | Order menu.

19 Configuring Plant Data

There are settings for the following sections in the Plant menu:

- General
- Graphic
- Plant groups
- Forecast
- Tariff and Costs

19.1 General

Plant information

The general plant information is to be entered in the plant information menu. This tab is only displayed when Export and Backup is activated. These values need to be entered in the portal when Solar-Log™ WEB Commercial and Solar-Log™ WEB Classic 2nd Edition are used.

Plant name

- Operator
- Contact e-mail address
- Installation Date
- Location
- Modules
- Orientation
- Inverters
- Power

Note

It is necessary to enter this data in the portal for the Forecast function. The Forecast data from the portals Solar-Log™ WEB Commercial and Solar-Log™ WEB Classic 2nd Edition are only available after this data has been completely configured.

Environmental performance

The CO2 factor per kWh can be set up for each electricity tariff. The value is displayed in g/kWh. Contact your power company for the exact number for this value. The default setting for this value is 700g/kWh.

19.2 Plant groups

Since the Solar-Log™ can manage up to 100 inverters at the same time, it is helpful to divide these inverters into groups. To provide a clearer overview, these groups are then shown in all selection dialog boxes. The data from each plant group can be presented on its own large external display. Each plant group can also be combined with its own consumption meter.

A name can be assigned to each plant group, or even a specific tariff payment and a yearly target value. Plant groups are therefore also suitable for managing system expansions.

Example: If a plant initially has 5 inverters and 30 kWp and is extended at a later date with 3 more inverters and 20 kWp, this addition can be conveniently managed as a separate group with one Solar-Log™. Individual inverters can then be selected from the group concerned. Starting with 15 inverters, plant groups are defined. A maximum of 10 plant groups can be defined.

Procedure:

- Select Configuration | Plant | Plant groups from the menu
- To use Plant buttons, the button needs to be activated.
- Under Name, a plant group can be uniquely labeled.
- The devices recognized during the Device Detection are now allocated into the device groups.
- Click on  to display a list of all of the devices.
- Place a check in the box next to the devices that belong to this plant group and select Apply.
- For the next steps, additional plant groups and their devices can be defined in the same way.
- SAVE settings

19.3 Graphic

This function is deactivated by default. Advanced Configuration needs to be activated under Configuration | System.
The scale of the graphic for individual devices can be adjusted in the graphic menu. Nothing usually has to be changed here, as Solar-Log™ automatically calculates the values for the generator power input. The values can be adapted to your own data.

For each period (day, month, year, total) the maximum value represented in kW can be entered (except Day, which is a value in W).
The graph shows these values on the Y-axis.
Changes become effective when a new graph is displayed or after updating a displayed graph.

The function can be activated in general with the switch Graphic Auto scaling The auto scaling option always scales the graphics up as much as possible in the yield data section. The auto scaling can be disabled again for the respective graphics.
If the advanced configuration and this menu are deactivated, the graphics are always automatically scaled.

19.4 Defining the PV plant's forecast data

By setting forecast values for the yield data, you can check on the graph whether the plant is reaching the desired annual yield or not.
To do this, a percentage rate is allocated to each month. This is deduced from the yield statistics over the previous years.
Solar-Log™ always calculates the target value cumulatively, per day. This means that, at the beginning of the month, it is not the total monthly target that is set, but the target for days already passed, plus that of the current day.
In the forecast, Solar-Log™ also takes account of the yields in all previous years, and in this way can allow for local weather events (in most cases, snow in December). The yearly forecast is therefore usually fairly accurate by September.

Yearly target section

Enter the yearly target value from the installer's plant project planning. The unit of this value is kWh/kWp. Fundamentally, this value depends on the overall irradiation at the plant's location and local factors such as the plant's alignment and shadowing.

In Central Europe, this value is roughly in the range of 800 to 1000 kW/kWp.

If plant groups are used, it is possible to define a separate yearly target for each for each plant group.

Monthly shares & course of sun section

In this section, the settings for the following can be configured for each month:

- Percentage of the yearly target
- Sunrise and
- Sunset

.

Please note that the sum of all of the monthly percentages of the yearly has to always add up to 100%.
This menu is activated by enabling the "Display advanced configuration" setting.

19.5 Defining the Feed-in tariff

The feed-in tariff is generally used to calculate a PV plant's output in financial terms.
Considering that self-consumption is used at more and more plants, there are also other calculation modes.

General

In the “General” section the plant costs need to be entered in Euro. This value is calculated for the function: Yield Data | Finances | Overview
By means of the “Yield Offset” space you also have the possibility to enter manually the yields that the plant has already rendered.
(eg., when the plant already rendered yields before the monitoring system was installed).
These values are then taken into consideration by the financial prognosis.
“Yield Offset” therefore stands for yields rendered by a plant before the installation of the monitoring system.

Tariff settings

The Solar-Log™ provides four different modes:

- Feed-in tariff
- Feed-in tariff + Self-consumption refund
- Feed-in tariff + Self-consumption
- Consumption of Self-produced power

Feed-in tariff mode

All of the power output from the PV plant is completely fed into the grid. Every kilowatt hour is reimbursed according to the valid remuneration rate.
In this mode, the From date and the corresponding rate in cents for the feed-in tariff need to be defined.
The Solar-Log™ calculates the amount of power fed into the grid based on the inverter information.

Feed-in tariff + Self-consumption refund mode

Here a distinction is made between generated power that is fed into the grid and that is directly consumed (self-consumption). In accordance with feed-in tariff agreements (or renewable energy laws), a bonus is paid for self-consumption. This provides a financial incentive for self-consumption. To implement this function, the Solar-Log™ requires an additional consumption meter.
In this mode, the From date and the corresponding rate in cents for the feed-in tariff need to be defined.
The electricity prices are entered in an extra tab. The

Solar-Log™ calculates the amount of power fed into the grid based on the inverter information.

Feed-in tariff + Self-consumption mode

In this mode, only the fed-in power is reimbursed. There is still an incentive for self-consumption because generally the costs for power obtained from the gird are higher than the production costs of self-produced power.
To implement this function, the Solar-Log™ requires an additional consumption meter.
In this mode, the From date and the corresponding rate for the feed-in tariff need to be defined. The self-consumption tariffs also need to be defined. The electricity prices are entered in an extra tab. The Solar-Log™ calculates the amount of power fed into the grid based on the inverter information.

Self-consumption mode

This mode is used in cases in which there is no reimbursement from a feed-in tariff. There is a financial incentive for using self-produced power when its production costs are lower than the costs for power obtained from the gird.
To implement this function, the Solar-Log™ requires an additional consumption meter. In this mode, the electricity price needs to be defined in an extra tab. The feed-in tariff has to be defined as zero (0).
The Solar-Log™ calculates the amount of power fed into the grid based on the inverter information.

20 Configuring Notifications

Various types of notifications can be configured in the Notifications menu.
The following tabs can be displayed:

- Recipient
- Device notifications
- Yield
- Alarm
- Power & Failure
- PM

20.1 Recipient

The Solar-Log™ contains an e-mail program which can send messages in the following situations:

- Daily yield overview
- Inverter faults
- Inverter failure
- Deviation from target power

E-mail

The e-mail addresses can be entered in the box. The Solar-Log™ sends all e-mail notifications to these e-mail addresses.

SMS (only with GPRS)

A mobile number can be entered in the box. The text message (SMS) is then sent to this mobile number.

20.2 Device notifications

If certain status or fault codes occur, Solar-Log™ can send messages by e-mail or text message (SMS). The Solar-Log™ retrieves fault messages from the connected inverters. Therefore, the status and fault codes can vary depending on the inverters installed.
The codes are always divided into two groups.

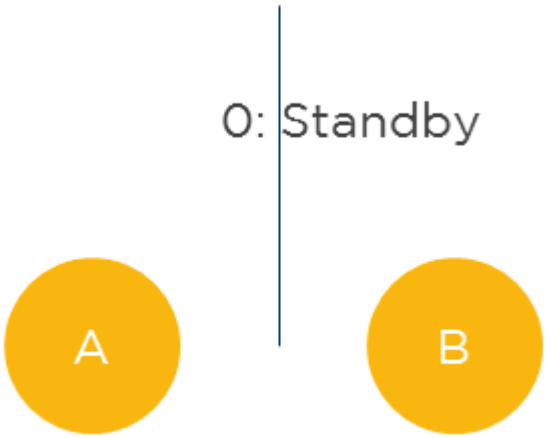


Fig.: Status and fault code groups

In group A, inverter specific messages are numbered in ascending order, starting with 0. The code which is automatically determined is used for the filter function.
In group B, the actual messages from the inverters are displayed. The meaning of these fault messages can be found in the particular manufacturer's manual.

Note

When making support inquiries with the inverter manufacturer, please use the messages from group B.

Open the dialog box

Select Configuration | Notifications | Device messages from the menu
This is divided into the following sections:

- Device
- Status codes
- Fault codes
- Filter

Status and fault codes section

The status and fault codes that are available depend on the inverter type. To find out which status and fault codes are relevant for automatic messaging, please refer to the inverter user manual.

Filter status and fault codes section

The default setting is that messages are sent for all fault codes. Custom limits to sending notifications can be configured in this section.
The status and fault messages that do not have any influence on the inverter operation can be filtered out with this function.

Procedure

- Select the relevant code groups based on the list for status and fault codes.
- Check the Active box
- Select whether the filter applies to status or fault messages
- Determine which codes are to trigger a notification with the From Code and To Code box.
- Select whether the notifications should be sent by e-mail and/or text message (SMS).
- By activating After X active readings, brief, temporary fault notifications can be filtered out.

Note

A corresponding status or fault message is also sent from the inverters for very brief, temporary faults. To filter out brief faults, the After X active readings function should be set to at least 20. A measurement usually takes 15 seconds.

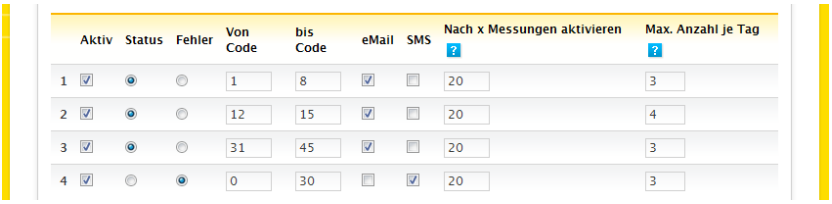
- The Max. per day box defines how many notifications per day should be sent from this code range.

Note

If the maximum number of notifications per day is defined too low, this can lead to important messages not being sent.

- SAVE settings

Configuration example
Status codes 0 to 8, 12 to 15 and 31 to 45 should result in an e-mail notification being sent. The fault codes 0 to 30 should result in a text messages (SMS) notification being sent.
This results in the following configuration:



	Aktiv	Status	Fehler	Von Code	bis Code	eMail	SMS	Nach x Messungen aktivieren	Max. Anzahl je Tag
1	☑	◉	○	1	8	☑	☐	20	3
2	☑	◉	○	12	15	☑	☐	20	4
3	☑	◉	○	31	45	☑	☐	20	3
4	☑	○	◉	0	30	☐	☑	20	3

Fig.: Configuration example for filtering status and fault codes

Note

This filter can also be used for status notifications from other devices such as meters and sensors as an option to deactivate notifications.

20.3 Yield

Yield notifications can be configured in this tab.

Notifications per e-mail section

Procedure

Select the extent of the yield notification message in this section. The following selection options are available:

- Deactivated
- Yield overview short
- Yield overview (all INV)
- Yield overview (all INV & groups)
- The Send Time can be entered in the text box.
  It is best to use the send time for the point when the inverters stopped feeding power.
- Check the days on which the e-mails should be sent. E-mails are only sent on the days checked.
- SAVE settings

Text message (SMS) notifications

Procedure

- Activate the Text message (SMS) notification button
- The Send Time can be entered in the text box.
  It is best to use the send time for the point when the inverters stopped feeding power.
- Check the days on which the e-mails should be sent. E-mails are only sent on the days checked.
- SAVE settings

20.4 Alarm (only Solar-Log 1000 and 2000)

The Solar-Log™ continuously monitors its internal alarm contact. If this contact is opened, it sets off an alarm which can be indicated in various ways. In the Alarm tab, the alarm contact can be activated and different types of notification can be configured.

Activating alarm contact

Procedure:

- Select Configuration | Plant | Plant groups from the menu
- Activate the Activate Alarm Contact button
- SAVE settings

After activating alarm notifications, a triggered alarm can be indicated by:

- E-mail
- Text message (SMS)
- Relay
- Speaker

.

The e-mail and text message (SMS) settings must be pre-configured.

Procedure

- Activate the desired Notifications
- SAVE settings

Test section

Here you have the option to perform an alarm test.

20.5 Power & Failure

Performance monitoring is based on a comparison of the power out from all of the inverters, including individual trackers in the case of inverters with more than one tracker or, as the case may be, sensors. If the target power deviates from the actual power by more than a certain tolerance (= min. feed-in power), a notification can be sent by e-mail and/or text message (SMS) after the selected fault duration has been reached.

If an individual module loses power, the string power for the same level of irradiation will drop, and can thus be detected and reported.

Power comparison always works reliably, even if the weather is cloudy. The important thing is that all modules should not be overshadowed. Therefore, the monitoring period should be scheduled for periods when there are no shadows.

As power measurement in the inverter is very inaccurate under a certain threshold, a minimum percentage value can also be specified below which monitoring is interrupted.

Procedure

- Select the device that is to be monitored
- Activate Performance Monitoring switch
- Set the monitoring parameters
- Enter the monitoring begin
- Enter the monitoring end
- Enter the Minimum amount of feed-in power

- Enter the Deviation as a percentage
- Enter the fault duration in intervals
  This indicates how long a fault should be continuously present, before it is recognized as a fault. The minimum fault duration is 5 minutes, but a longer one should be selected.
  An interval corresponds to 5 minutes. The fault duration is determined by the number of intervals entered and display under the input box.
  Enter the Maximum number of message to be sent per day
  So that malfunctions are not reported too often, a maximum number of messages per day can be defined.
- Maximum number of messages per day
- Snow cover
  False messages may occur if the unit is covered in snow. These are messages from the power comparison that occur if modules are partially covered, or failure messages if the inverter is no longer switched on because it is fully covered by snow.
  There are two ways to minimize this problem:
  The minimum percentage value above which power monitoring starts should be set as high as possible, e.g. 30%. For example, if the generator power is 4500 Wp, power monitoring will start only at 1350 watts. The partly shaded modules reduce the power from the unshaded modules so that the required 1350 watts is rarely or never reached. This is how the problem of partial covering is resolved.
  Failure messages are always sent when the inverter is not working or when it is not online at times that have been configured as unshaded. It is then assumed that there is a fault. Complete snow covering would therefore be reported as a failure. To solve this problem, check the box for snow coverage. If the box is checked, no failure message is sent if all of the inverters are offline. This is not taken into account in the period from the start of November to the end of April. Outside of this period, the snow covering function is automatically disabled. Monitoring then works as usual and also reports complete failures of all of the inverters.
- Select Message as
- Activate required options and enter values.
- SAVE settings

In the Save menu, there are three different options:

- SAVE
- SAVE MULTIPLE
- SAVE ALL

Save

When using this button, the settings for the device selected as the device are saved.

Save multiple

When using this button, a selection box appears from which other devices can be added by checking them.

Save all

When using this button, all of the settings are saved for all of the detected devices.

Using the same settings for several or all of the devices is a good idea when the devices can be compared with each other. Other than production meters, meters can be largely excluded from this section.

20.6 PM

E-mail notifications are sent when a power reduction activated has been activated via the PM+ interface can be configured in this tab.

Procedure

- Activate this function to receive an e-mail notification for every change to the power reduction.
- SAVE settings

21 Editing Data

The Configuration | Data menu offers several functions in regard to the data recorded by the Solar-Log™ and contains the following options:

- Initial yield
- Data correction
- System backup
- Backup
- Reset

21.1 Initial yield

This function manually imports initial yields from previous recorded daily data into the Solar-Log. This is useful any time that a large amount of data has to be changed and would take too long with the "Data correction" function.
The Data import deletes the existing data memory completely before the daily data is imported from a CSV file. Therefore, the data import should be carried out immediately after the startup of Solar-Log™.

Note

A data import can only be made if all inverters have been correctly detected and configured or if a valid system configuration has been imported.

The data has to be in CSV format for the import. Files in the CSV format can be created with simple text editors or spreadsheet programs like MS Excel or Open Office Calc.
The import file must consist of individual rows of text, in which the date and daily yield value in "Wh" (not kWh!) are separated by semicolons (CSV format).
Example:
DD.MM.YY; energy in Wh
01.04.13;136435
02.04.13;138219
etc.
Note: Here, the year value should also consist of 4 digits.

Procedure

- Click on Browse
- The file manager of your OS appears
- Select the CSV file that is to be imported
- The selected firmware's file name is displayed
- Click on Upload
- The progress and status of the data import are displayed
  Upload file
  End current measuring
  Delete all of the old data and initialize structure

Import daily data
Calculate monthly/yearly data
restart

- The Solar-Log™ resets itself
- Check the imported data in the yield data section.

21.2 Data correction

Here you can adjust the values for previous days or change daily totals.

Procedure

- Enter a 6 digital date
  DD/MM/YY
  For example: 05.08.13 for 5 August 2013
- Enter the generated power output for this day in kWh
- The day value must correspond to the power meter reading, i.e. the real value for that day.
- Click on Apply
- The data will be applied.

21.3 System backup

The Configuration | Data | Backup menu offers the following functions:

- Restore configuration from hard disk
- Save configuration to hard disk
- Save configuration to USB
- Restore configuration from USB

The system data consist of all the data that have been saved in the configuration. It is recommended always to make a backup of the system data before changing the configuration or updating the firmware.

Restoring configuration from hard disk section

This function imports the configuration file from the solarlog_config.dat file into the Solar-Log™.

Procedure

- Click on Browse
- The file manager of your OS appears
- Select the DAT file that is to be imported
- The selected firmware's file name is displayed
- Click on Upload
- The configuration is being imported. Please wait a moment.
- The Solar-Log™ resets itself

Saving configuration to hard disk section

With the function a configuration file can be created and saved to a hard disk.
A Solar-Log configuration file has the following file name:
solarlog_config.dat.

Procedure

- Click on Prepare
- After the data has been prepared, the Download option is displayed.
- Click on Download
- Depending on your browser settings, a window pops up with the options to open the file with a program or save file.
- Select Save file
- The file is saved in the download folder.

Alternate procedure

- Click on Prepare
- After the data has been prepared, the Download option is displayed.
- Right click with the mouse on Download
- Select Save link as
- The file manager of your OS appears
- Select the desired location to save the file to
- Select save
- The file is saved in the selected folder.

Saving configuration to USB section

With this function, a backup can be saved to a USB stick which is directly connected to the device.

Procedure

- Touch Save.
- The configuration is being created. Please wait a moment
- The progress and status of the update are displayed
  Finish current measurement
  Select the USB storage device
  Save configuration
- The solarlog_config_YYMMDD.dat file is saved in the /Backup directory of the USB stick.
  YYMMDD = year, month and day - each two digits, e.g. solarlog_config_140313.dat is then the backup from 12 March 2014
- The configuration file can be saved elsewhere as a backup or imported into the Solar-Log™ again.

Restoring configuration from USB section

This function imports the solarlog_config.dat (or solarlog_config_YYMMDD.dat) configuration file from a USB stick which is directly connected to the device into the Solar-Log™.

Procedure

- Click on RESTORE
- A configuration file is searched for on the connected USB stick.
  First it looks in the main directory of the USB stick for solarlog_config.dat, then it looks in the /backup directory. And lastly it looks in the backup directory for solarlog_config_YYMMDD.dat. When it looks for the solarlog_config_YYMMDD.dat. file, it loads the latest file.
- Start this search
- When a configuration file is found on the USB stick, click on Restore to import it.
  The data is being imported
  Please wait
- The Solar-Log™ reboots itself
- The configuration file was imported

21.4 Backup

The Configuration | Data | Backup menu offers the following functions:

- Restore data backup from hard drive
- Save data backup to hard drive
- Restore data backup from USB
- Save data backup to USB

Restore data backup from hard drive section

This function restores the backup file with the name solarlog_backup.dat to the Solar-Log™.

Procedure

- Click on Upload
- The file manager of your OS appears
- Select the DAT file that is to be imported
- The selected backup's file name is displayed
- Click on Upload

  The backup is being restored. Please wait a moment.
- The Solar-Log™ resets itself

Saving data backup to hard drive section

With the function a backup can be created and saved to a hard disk.
A Solar-Log backup file has the following file name:
solarlog_backup.dat.

Procedure

- Click on Prepare
- The progress and status of the update are displayed
  End current measuring
  Select the USB storage device
  Save configuration. After the data has been prepared, the Download option is displayed.
- Click on Download
- Depending on your browser settings, a window pops up with the options to open the file with a program or save file.
- Select Save file
- The file is saved in the download folder.

Alternate procedure

- Click on Prepare
- The progress and status of the update are displayed
  End current measuring
  Select the USB storage device
  Save configuration
- After the data has been prepared, the Download option is displayed.
- Right click with the mouse on Download
- Select Save link as
- The file manager of your OS appears
- Select the desired location to save the file to
- Select save
- The file is saved in the selected folder.

Saving data backup to USB section

With this function, a backup can be saved /Backup directory of a USB stick which is directly connected to the device.

Procedure

- Touch Save.
- The backup is being created. Please wait a moment
- The progress and status of the update are displayed
  End current measuring
  Select the USB storage device
  Save configuration
- The solarlog_backup_YYMMDD.dat file is saved in the /Backup directory of the USB stick.
  YYMMDD = year, month and day - each two digits, e.g. solarlog_backup_140313.dat is then the backup from 12 March 2014

The Solar-Log™ backup can be copied to another storage medium or imported into the Solar-Log™ again.

Restoring backup from USB section

This function restores a backup file with the name solarlog_backup.dat from the USB stick connected directly to the device to the Solar-Log™.

Procedure

- Click on RESTORE
- A configuration file is search for on the connected USB stick
  First it looks in the main directory of the USB stick for solarlog_backup.dat, then it looks in the /backup directory. And lastly it looks in the backup directory for solarlog_backup_YYMMDD.dat. When it looks for the solarlog_config_YYMMDD.dat. file, it loads the latest file.
- Start this search
- When a configuration file is found on the USB stick, click on Restore to import it.
- The backup is being restored. Please wait a moment.
- The Solar-Log™ reboots itself
- The configuration file was imported

21.5 Reset

The Configuration | Data | Reset menu offers the following functions:

- Reset the yield data
- Reset the inverter configuration
- Restore factory settings

Resetting the yield data section

In certain circumstances after an inverter detection, it may occur that incorrect or unusable data is displayed. In this case, the stored data can be deleted without having to reconfigure the Solar-Log completely.

Procedure

- Click on RESET
- If you are sure that the data should be deleted, click on Continue. Otherwise click on Cancel.
- The data is being deleted.
- The Solar-Log™ reboots itself

Resetting inverter configuration section

If the Device Detection needs to be started again, it is recommended to delete the previous inverter configuration with this function.

Procedure

- Click on RESET
- If you are sure that the inverter configuration should be deleted, click on Continue. Otherwise click on Cancel.
- The data and inverter configuration are deleted.
- The Solar-Log™ reboots itself

Restore factory settings

This function restores the Solar-Log™ to its factory settings. All of the yield data and configuration is deleted.

Procedure

- Click on RESET
- If you are sure that the data should be deleted, click on Continue. Otherwise click on Cancel.
- The factory settings are being restored
- The Solar-Log™ reboots itself

Note:

The network settings remain with the Solar-Log 1200 and 2000.
DHCP is enabled with the Solar-Log 300

22 System Configuration

The Configuration | System menu has the basic settings for the Solar-Log™ and contains the following tabs:

- Access control
- Language/Country/Time
- Display
- Licenses
- Firmware

22.1 Access control

Access protection for different parts of the Solar-Log™ can be configured in this menu. The following sections can be restricted with a pin code or password

- Access protection for the display
- Access protection for the browser menu
- Displaying advanced configuration

Access protection for the display (only Solar-Log 1000, 1200 and 2000)
A pin code can be activated to restrict access to the Solar-Log™'s display. The pin code may contain a maximum of 8 numerical digits.
Access at the display can be restricted for the entire display or just the settings section.
Procedure:

- Enter the pin code
- Enter the pin code again
- Select restricted Sectionsby checking them.
- SAVE settings

Access protection for the browser menu

In this section, the following parts of the Solar-Log™'s browser menu can be restricted with a password:

- User
  General access to the Browser menu
- Installer
  Access to the Configuration menu
- Feed-in management
  Access to the Configuration | Special Functions | Feed-in Management menu

The default password for access to the Feed-in Management menu is PM. Access for users and installers is not restricted.

Note

We advise installers to discuss with their customers the scope of the settings in the area of feed-in management, to block the configuration menu using a password and to assign an individual password.

Procedure

- Activate the password restriction for the desired menus
- Enter a secure password for each of the menus
- Enter the password again
- SAVE settings

Display advanced configuration section

By activating the option Display advanced configuration, additional configuration options are displayed in many sections.

By activating the Advanced configuration the following menus appear:

- Configuration | Network | Proxy
- Configuration | Devices | Large External Display
- Configuration | Plant | Forecast | Monthly Shares & Day Length
- Configuration | Special Functions | Direct Marketing

22.2 Language/Country/Time

The following options are available from the Configuration | System | Language/Country/Time menu:

- System language of the Solar-Log™
- Country/Location of the Solar-Log™
- System time of the Solar-Log™
- Time synchronization

Language section

Procedure

- Select the desired language from the menu
  The selected display language applies both to the display and the web browser.
- SAVE settings

Country section

Procedure

- Select your Country from the menu
  The country setting affects how the date, time and currency formats are displayed.
- SAVE settings

Time section

Solar-Log™ has an integrated real-time clock which can maintain the clock time even in the case of a power failure or grid disconnection, and for a long period (50 days).
The clock time is factory-set, but it may be lost due to long periods of storage.
The time zone, date and summertime values must be set correctly, so that no incorrect statuses or results are obtained during monitoring and graph display, e.g. when e-mail messages are sent or when a curve is displayed on the day graph.

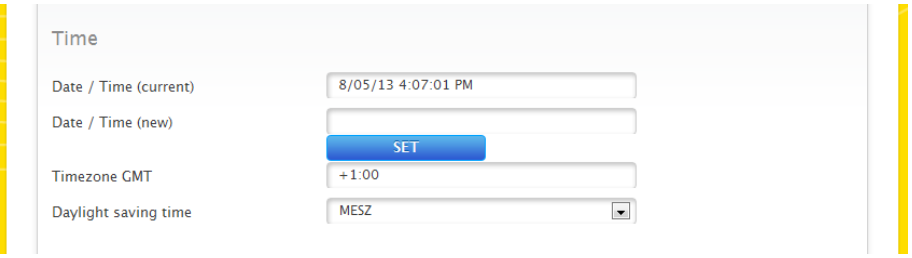


Fig.: Configuring the time on the Solar-Log™

Adjust the time in the Configuration | System | Language/Country/Time menu.

Adjust the new system time

Procedure

- The current system time is displayed
- To change the time, enter the new time in the following format
  DD/MM/YY HH:MM:SS
  For example: 05.08.13 15:57:00 for 5 August 2013 15 Hours 57 Minutes 0 seconds (3:57 p.m.)
- SET a new date and time

Adjust the time zone

Procedure

- Enter the time difference in hours
  Default: GMT +1
- Save Entry

Set Day Light Saving Time

Procedure

- Select the corresponding Day Light Saving Time settings
  Options: no, CEST (Central European Summer Time), USA
- SAVE settings

Automatic time synchronization section

To automatically synchronize the system time, the Solar-Log™ regularly contacts a network time protocol (NTP) server.
If the Solar-Log™ is connected to the internet via a router, the synchronization occurs during the night.
With a GPRS connection, the time synchronization occurs during a data transfer.

Procedure

- Activate the Automatic time synchronization button
- SAVE settings

Update now function, the time synchronization with the NTP server can be manually started. The NTP port 123 needs to be enabled in the gateway or firewall.

22.3 Display

The following options are available from the Configuration | System | Display menu:

- Power off display
- Dimming function for the display
- Slide show

The settings refer to the touch display. The small LCD display is continuously in operation.

Dimming at a certain time

The display brightness can be limited to a certain period. If the display is touched, the screen lights up again.

Procedure

- Enter the Turn on at and Turn off at time
  Times are to be entered in the hh:mm format
  For example: 19:30 (for 7:30 p.m.)
- SAVE settings

Dimming when all of the inverters are offline

When this function is active, the Solar-Log™ automatically dims when all of the inverters are offline (no more power feed). The Solar-Log automatically resumes from the sleep the next morning and starts recording again.

Dimming after inactivity

The display brightness can be dimmed by 50% and/or 100% after a certain period. If the display is touched, the screen lights up again completely.

Procedure

- Activate Dimming level switch
- Enter the Period of inactivity in minutes on the display
  The minutes are to be entered in the mm format
  for example, 35 for 35 minutes
- SAVE settings

Slide show section

After the selected time, the display shows "Overview graph – Daily graph – Monthly graph – Yearly graph – Overall graph – Large display graph" at 15 second intervals.

Procedure

- Enter the desired time in minutes
  The minutes are to be entered in the mm format
  for example, 35 for 35 minutes
- SAVE settings

22.4 Licenses

Certain Solar-Log™ functions have to be activated by entering a license code. You receive a license certificate after purchasing a license for a particular function. The licenses are always linked to the serial number of the particular Solar-log™ and can only be used with the device with this serial number.

Procedure

- Enter the license code in the license code section
- Activate license code

Activating licenses

In the Active licenses section, all of the activated functions and license codes are displayed.

Entering a license code

Enter a License code to activate this function. The name of the license is displayed in the Active License section.

22.5 Firmware

The firmware tab offers the following functions:

- Information about the current firmware version
- Firmware Update

Status section

The firmware version currently installed on the Solar-Log™ is displayed. The version number contains three sections:

Version number	Build	Date
3.0.1	Build 63 -	23.03.2013

Updating firmware manually section

This function allows a new firmware to be imported from a disk.

Note

Before manual updating, it is important to save the current system data and make a backup.

Note

Clear the browser's cache after updating the firmware to prevent any possible display errors.

Procedure

- Click on Browse
- The file manager of your OS appears
- Select the firmware file that is to be imported
- The selected firmware's file name is displayed
- Click on Upload
- Then you are asked if system and data backups have been made. If you click "Cancel" on these queries, the process is aborted.
- The progress and status of the update are displayed
  Upload the file
  Finish current measurement
  Restart
  Unzip the file
  Restart
- FW for firmware update is shown in the LCD Display.
- The Solar-Log™ reboots itself
- The Current Firmware Version is shown in the display and in this menu.

Check for Update from the Internet section

With this function, the Solar-Log™ contacts the Solare Datensysteme GmbH firmware servers to check if a new version is available and offers to install it.

Check for Update from USB

With this function, the Solar-Log™ checks the USB stick connected directly to the device if a new version is available.

When this function is used, the progress and status of the update are displayed

- Finish current measurement
- Select the USB storage device

Automatic Firmware Updates

With this function, the Solar-Log™ regularly checks the firmware servers to see if a new version is available. When a new version is available, it is automatically downloaded and installed during the night.

Note

By activating this function, you give Solare Datensysteme GmbH permission to automatically load minor updates. This function is not intended to replace manual firmware updates.

23 Special functions

The following functions are available in the special functions section:

- Smart Home
- Feed-In Management
- Direct Marketing (has to be activated with a license code)

23.1 Feed-in Management

Access Feed-in Management via the menu Configuration | Special Functions| Feed-in Management
In this section you have the possibility to implement the grid operator's requirements in regard to active and reactive power control.

Note

The Solar-Log™ is not equipped with protection functions such as grid and plant protection, section switches and Q/U protection. When it comes to such functions, special protection hardware needs to be installed. All protection commands, for example the emergency stop, cannot be switched on with or via the Solar-Log™.

23.1.1 Plant parameters

The plant data is entered in the plant parameters tab.

- Maximum apparent power from the generating plant
  Enter the maximum plant power output in volt-ampere (VA) here. This value has to match the value registered with the grid company.
  Typically, this calculation is based the total module power output.

When using the Utility Meter, these additional boxes need to be defined

- UC
  In this field the agreed grid voltage in the grid operator's medium-voltage network is entered. This value is specified by the grid operator. As a rule the network voltage at medium voltage levels corresponds to 20,000 V.
- UNS
  The reference voltage to be entered depends on the sensor used. The medium voltage measuring factory setting is 100.0 V for the Solar-Log™ Utility Meter.

UC and UNS settings

	Medium voltage Utility Meter (U)	Medium voltage Utility Meter (U+I)	Low voltage
UC	20000	20000	230
UNS	100	20000	398

Fig.: Configuration of UC and UNS at different voltage levels

Note

In a master-slave setup, only the connected power on the particular device may be entered for each Solar-Log™.

23.1.2 Active power

The following modes are available from the Special Functions | Feed-in Management | Active power menu:

- Deactivated
- Remote controlled
- Remote controlled with the calculation of self-consumption
- 70% fixed reduction
- 70% Fixed reduction with the calculation of self-consumption
- Adjustable reduction with the calculation of self-consumption

Note

The active power reduction mode that needs to be implemented for a particular PV plant is determined by the current national laws, standards and grid operator's requirements. The planner and/or installer of your plant or the respective grid operator can provide you with information regarding the mode of active power reduction that needs to be used.

Note

The feed-in management functions are not supported by all makes and models of inverters.
Prior to installation please check whether power management and reactive power control are supported by the inverters used.
Please consult our inverter database for an overview of all the inverters supported by Solar-Log™ devices and more details on supported functions of a particular inverter: http://www.solar-log.com/en/service-support/supported-inverters.html.

Interface section

Depending on the type of Solar-Log™, the interfaces for communication with the connected inverters are shown here.
Depending on the model used, this list can also contain different entries.
Select the interface or interfaces that correspond to those of the connected inverters.

23.1.3 Remote controlled active power reduction (only Solar-Log™ PM+)

This option should be selected if you want the active power reduction to be remotely controlled by the grid operator.
To enable this function, a ripple control receiver or similar device is required. Typically, these devices are provided by the grid operator for a fee.
The type of ripple control receiver or telecontrol technology used depends on the level of development of the respective grid operator. The control signals emitted by the grid operator are converted to potential-free signal contacts by the ripple control receiver and can be evaluated by the Solar-Log™ PM+ models via the digital PM+ interface.

Note

The function of the PM+ interface is only possible when the contacts of the ripple control receiver are potential free and are wired with a supply voltage of 5VDC from the PM+ interface.

Examples of ripple control receiver connections and the corresponding configuration are in chapter “30 Appendix” on page 207.

Channel settings for power reduction section

The relay outputs for the ripple control receiver are connected to the PM+ input of the Solar-Log™. This allows the grid operator's signals to be evaluated by the Solar-Log™.

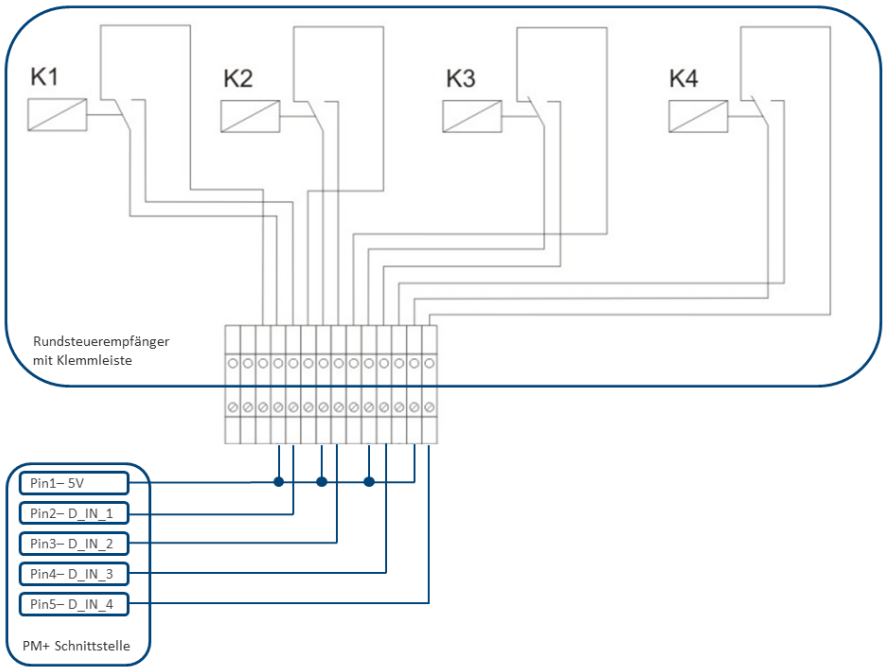


Fig.: Schematic diagram of a ripple control receiver with four relays.

The relay for active power control is wired to the PM+ interface.

Note

The function of the PM+ interface is only possible when the contacts of the ripple control receiver are potential free and are wired with a supply voltage of 5VDC from the PM+ interface.

In practice, various ripple control receivers with varying numbers of relays and different signal codes are used. The configuration matrix for the Solar-Log™ PM+ thus offers maximum flexibility – most common versions can be configured.
Ripple control receivers generally possess 2 to 5 relays. The assignment of the individual relay states for certain reduction levels is specified by the respective network operator and stored in the Solar-Log™ using this matrix. In this way the connected inverters can be adjusted to meet the specified reduction levels.

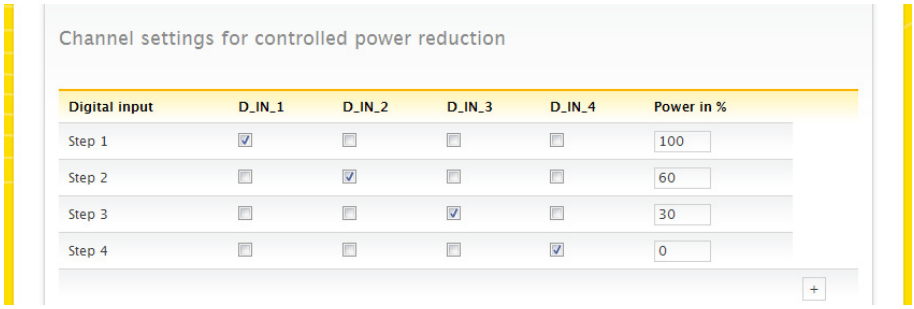


Fig.: Channel settings for power reduction

For each level, the input signal combination and a value for the power in % is entered.
Checking the box next to the digital inputs of the PM+ interface (D_IN_1 to D_IN_4) means that theses inputs are supplied with 5V from pin1 to reduce to the percentage of the set in the box "Power in %".

Four levels are shown in the basic setting. The "+" sign can be used to extend the list by additional levels.

Procedure:

- Select remote controlled
- Select the interface of the inverter that is to be reduced
- Enter the channel settings for power reduction according to the specifications and wiring
- Select options
- SAVE settings

More Options

Closing relays at level 4 (only Solar-Log 1200 PM+ and 2000 PM+)

By selecting this function the potential-free control relay for the Solar-Log2000 PM+ is closed when level 4 is activated.

- The relay may be loaded with a maximum of 24 V DC and 5A.
- A 230 V appliance must be connected via another load relay.

Please also refer to the additional information on relays in Page 65 of this installation manual.

Closing relay during power reduction (only Solar-Log 1200 PM+ and 2000 PM)

Select this option in order to signal any power reduction via the relay output on the Solar-Log 2000 PM+.

- The relay may be loaded with a maximum of 24 V DC and 5A.
- A 230 V appliance must be connected via another load relay.

Please also refer to the additional information on relays in Page 65 of this installation manual.

Max. change in power in %:

A jerky reduction or increase in active power could have a negative impact on inverters in the long-term.
The "max. change in power" field is used to specify how high the maximum percentage change in power is per period of time (15 seconds).
This value refers to the power reduction but is also used when starting up the plant after a power reduction.

Note

The notifications per e-mail for active power reductions can be activated from the Configuration | Notifications | PMmenu.

23.1.4 Remote controlled active power reduction with the calculation of self-consumption (only Solar-Log™ PM+)

This function is an enhancement to the Remote controlled active power reduction function described in the previous chapter.

Note

The Solar-Log PM+ needs to be
linked to a consumption meter to implement this function. Please note the instructions in chapter"12.5 External power meter" on page 52.

The configuration of this corresponds to that already described for the remote controlled active power reduction.
The instruction for integrating the meters into the electric wiring of the house or building are found in the appendix on Page 209.

23.1.5 70% fixed reduction

By activating this menu item the inverter(s) are controlled to be fixed at 70% of the installed DC power.
Enter the Maximum AC Power and Connected Generator Power as reference values in the Configuration | Basic | Inverter menu.
The maximum power output for the inverters can be calculated from the connected generator power value that has been entered.

Procedure

- Select 70% fixed reduction
- Select the interface of the inverter that is to be reduced
- SAVE settings

Note

Changes to the Maximum AC Power of the inverter in Configuration | Basic | Inverter menu are disabled.
Enter your password via the Log-on as Installer / PM to enable changes.

Note

The 70% reduction is always applied to the entire plant.
All of the inverters are controlled on the same level by the Solar-Log™, independent of their alignments (east-west orientation). This can lead to a lower feed-in amount than the maximum allowed.

Example 1

DC power 12kWp
AC power 12kW
70% of the DC power corresponds to 8.4kW
As the AC and DC power are identical, the down-control is correct.

Example 2

DC power 12 kWp
AC power 10kW
70% of the DC power corresponds to 8.4kW
For this reason the inverter controlled by the Solar-Log™ is reduced to 84% (8.4kW) and not only to 70% (7kW).

23.1.6 70% Fixed reduction with the calculation of self-consumption

This function is an enhancement to the 70% fixed reduction described in the previous chapter.
The Solar-Log™ needs to be linked to a consumption meter to implement this function. Please note the instructions in chapter"12.5 External power meter" on page 52.
The configuration of this corresponds to that already described for the 70% fixed reduction.

Procedure

- Select 70% Fixed reduction with the calculation of self-consumption
- Select the interface of the inverter that is to be reduced
- SAVE settings

Note

The Solar-Log™ needs to be linked to a consumption meter to implement this function. Please note the instructions in chapter"12.5 External power meter" on page 52.

The current amount of self-consumption is calculated by employing a power meter for self-consumption. The consumption is calculated with the energy generated by the inverter.
If the difference between the current production and consumption is lower than 70% of the module's power output, the inverters are regulated accordingly, so that the amount of power at the feeding point is still only at 70% of the connected generator power.

23.1.7 Remote controlled active power reduction with the calculation of self-consumption

By activating this function, the power output at the feeding point is adjusted to the value entered for the Percentage for an adjustable reduction of the connected generator power.

Procedure:

- Select Adjustable reduction with the calculation of self-consumption
- Enter the percentage for the adjustable reduction
- Select the interface of the inverter that is to be reduced
- SAVE settings

Note

The Solar-Log™ needs to be linked to a consumption meter to implement this function. Please note the instructions in chapter"12.5 External power meter" on page 52.

23.2 Reactive power

The following modes are available from the Special Functions | Feed-in Management | Reactive power menu:

- Deactivated
- fixed value cos (Phi) shift factor
- fixed reactive power in Var
- variable cos (Phi) shift factor over characteristic curve P/Pn
- variable reactive power over characteristic curve Q(U) (only Solar-Log^{2000} PM+)
- Remote controlled fixed value cos (Phi) shift factor(only Solar-Log™ PM+)

Note

The active power reduction mode that needs to be implemented for a particular PV plant is determined by the national laws and guidelines.
The planner and/or installer of your plant or the respective grid operator can provide you with information regarding the method of reactive power control.

Note

The feed-in management function is not available for all supported inverters. Prior to installation please check whether PM+ is supported by the inverters used.
Additional information as well as our inverter database can be found at www.solar-log.com/pm+.

Note

The configuration for reactive power is always emanated from the reference direction, from the side of the Solar-Log™.
The power companies define the requirements from their point of view. PV plants are usually defined in the consumption direction (with negative totals).
For more information, refer to http://en.wikipedia.org/wiki/Electric_current#Reference_direction

Interface section

Depending on the type of Solar-Log™, the interfaces for communication with the connected inverters are shown here. Depending on the model used, this list can also contain fewer entries.
Select the interface or interfaces that correspond to those to which the inverters that will be controlled are connected.

23.2.1 Reactive power deactivated

When this menu item is selected, reactive power control is deactivated. This is how the Solar-Log™ is set at the time of delivery.

23.2.2 Fixed value cos (Phi) shift factor

With this function it is possible to adjust the connected inverters to a fixed shift factor.
Using this matrix it is possible to specify a fixed cos (Phi) for certain periods of time. If over the course of one day various shift factors must be adhered to, they can be configured here.

Procedure:

- Select Fixed value cos (Phi) shift factor
- Activate Interfaces
- Enter the from (time)
- Enter the cos (Phi) for this time period
- Check the box Inductive/under-excited for cos (Phi)
- If necessary, enter additional times and the accompanying cos (Phi)
- SAVE settings

If a certain cos (Phi) must be maintained for 24 hours, the time 00:00 as well as the cos (Phi) have to be entered in the first line. The time 00:00 also has to be entered in the other lines. It is not necessary to enter the cos (Phi).

23.2.3 Fixed reactive power in Var

This function allows the connected inverters to generate a certain reactive power in Var for a definable period of time.

Procedure:

- Select Fixed reactive power in Var
- Activate Interfaces
- Enter the from (time)
- Enter the Reactive power for this time period
- Check the box Inductive/under-excited for reactive power
- If necessary, enter additional times and the accompanying reactive power
- SAVE settings

If a certain reactive power in Var must be supplied for 24 hours, the time 00:00 as well as the value in Var have to be entered in the first line along with checking the Inductive box. The time 00:00 also has to be entered in the other lines. It is not necessary to enter the reactive power.

23.2.4 Variable cos (Phi) shift factor over characteristic curve P/Pn

The function allows the Cos (Phi) to be adjusted according to characteristic curve P/Pn.
With a characteristic curve P/Pn, the ratio of the currently generated power (P) to nominal power (maximum output) (Pn) is determined. A Cos (Phi) is assigned to ratio by a characteristic curve.

The currently generated power (P) is calculated by the Solar-Log™ based on the inverter data. Measuring the power output intended.
The function is also referred to as Phi (P).

Type of characteristic curve section

Using this menu item a characteristic curve specified by the grid operator can be stored. In principle a distinction is made here between a 2 point and a 4 point characteristic curve.

2 point characteristic curve

By selecting "2 point characteristic curve" it is possible to define a characteristic curve using 2 points.

Procedure

- Select Variable cos (Phi) shift factor over characteristic curve P/Pn from the menu
- Activate Interfaces
- Select 2 point characteristic curve
- Define the characteristic curve points A, B, C and D based on the boxes P/Pn and cos (Phi) and put a check in front of "inductive."
- SAVE settings

The characteristic curve displayed changes according to the values entered.

4 point characteristic curve

By selecting "4 point characteristic curve" it is possible to define a characteristic curve using 4 points.

Procedure

- Select Variable cos (Phi) shift factor over characteristic curve P/Pn from the menu
- Activate Interfaces
- Select 4 point characteristic curve
- Define the characteristic curve points A, B, C and D based on the boxes P/Pn, cos (Phi) and put a check in front of inductive/under-excited.
- SAVE settings

The characteristic curve displayed changes according to the values entered.

23.2.5 Variable reactive power via the characteristic curve Q(U)

(only Solar-Log^{2000} with Utility Meter)

In order to be able to achieve this function, the Solar-Log™ Utility Meter is required in addition to a Solar-Log 2000.

The Solar-Log™ Utility Meter is linked to the Solar-Log™ via the RS485 bus and continually transmits the measured voltage values to the Solar-Log™. The measured values can be recorded at either the low or medium voltage side (when the corresponding converter and its configuration are present). Using the stored characteristic curve the Solar-Log^{1000} PM+ continually calculates the reactive power to be supplied and controls the connected inverter accordingly.

Note

Information on connecting and configuring the Utility Meter is found in the “12.8 Installation Utility Meter (only Solar-Log 1000 and 2000)” on page 58 section.

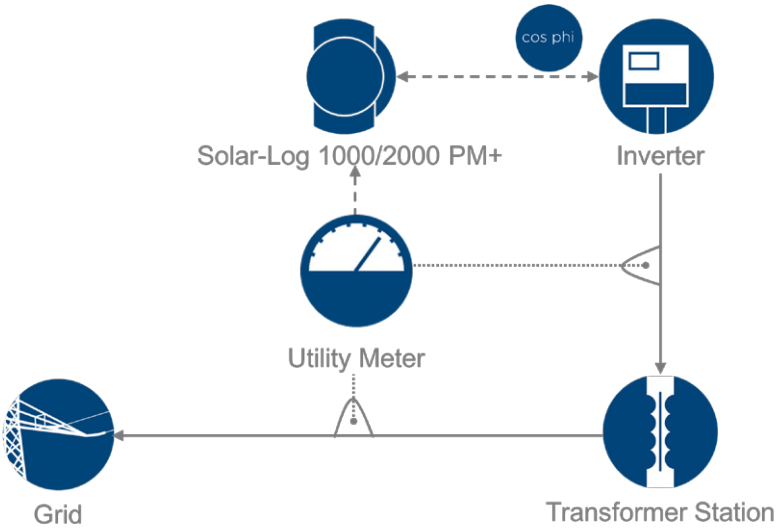


Fig.: Q(U) control function diagram

Type of characteristic curve section

Using this menu item a characteristic curve specified by the grid operator can be stored. In principle a distinction is made here between a 2 point and a 4 point characteristic curve.

2 point characteristic curve

By selecting "2 point characteristic curve" it is possible to define a characteristic curve using 2 points.

Procedure

- Select Variable reactive power via the characteristic curve Q(U) as the type
- Activate Interfaces
- Select 2 point characteristic curve
- Define the characteristic curve points A and B based on the boxes U/Uc, Q/SAmax and put a check in front of inductive/under-excited.
- SAVE settings

The characteristic curve displayed changes according to the values entered.

4 point characteristic curve

By selecting "4 point characteristic curve" it is possible to define a characteristic curve using 4 points.

Procedure:

- Select variable reactive power via the characteristic curve Q(U) as the type
- Activate Interfaces
- Select 4 point characteristic curve
- Define the characteristic curve points A, B, C and D based on the boxes U/Uc, Q/SAmax and put a check in front of inductive/under-excited.
- SAVE settings

The characteristic curve displayed changes according to the values entered.

23.2.6 Remote-controlled fixed value cos (Phi) shift factor (only Solar-Log™ PM+)

This option allows the cos (Phi) shift factor to be remotely controlled by the grid operator. To enable this function, a ripple control receiver or similar device is required. Typically, these devices are provided by the grid operator for a fee.
The type of ripple control receiver or telecontrol technology used depends on the level of development of the respective grid operator. The control signals emitted by the grid operator are converted to potential-free signal contacts by the ripple control receiver and can be evaluated by the Solar-Log™ PM+ models via the digital PM+ interface.

Note

The ripple control receiver's potential-free commands have to be present for the duration of the command. Command impulses cannot be processed.

Channel settings for power reduction section

The relay outputs for the ripple control receiver are connected to the PM+ input of the Solar-Log™. This allows the grid operator's signals to be evaluated by the Solar-Log™.

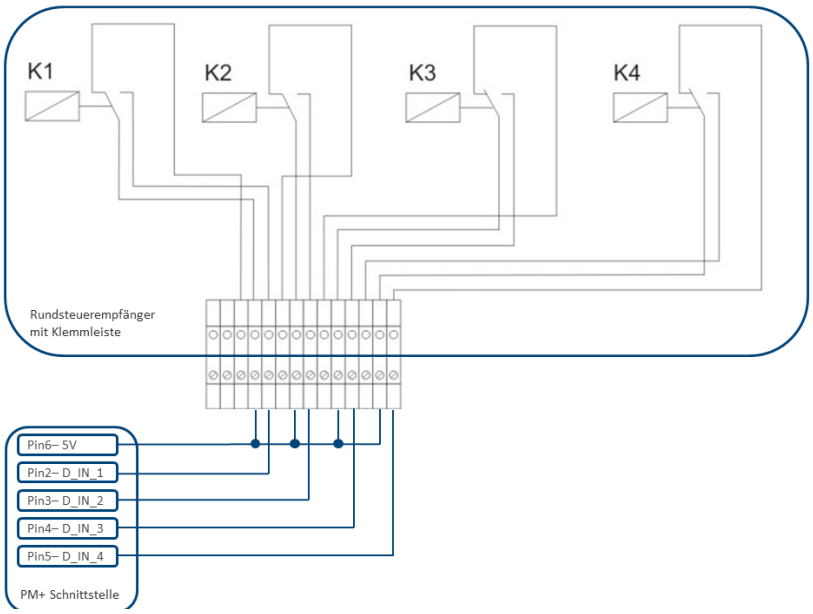


Fig.: Schematic diagram of a ripple control receiver with four relays.

The relay for reactive power control is wired to the PM+ interface.

Note

The function of the PM+ interface is only possible when the contacts of the ripple control receiver are potential free and are wired with a supply voltage of 5VDC from the PM+ interface.

In practice, various ripple control receivers with varying numbers of relays and different signal codes are used. The configuration matrix for the Solar-Log™ PM+ thus offers maximum flexibility – most common versions can be configured.
Ripple control receivers generally possess 2 to 5 relays. The assignment of the individual relay states for certain reduction levels is specified by the respective grid operator and stored in the Solar-Log™ using this matrix. In this way the connected inverters can be adjusted to meet the specified reduction levels.

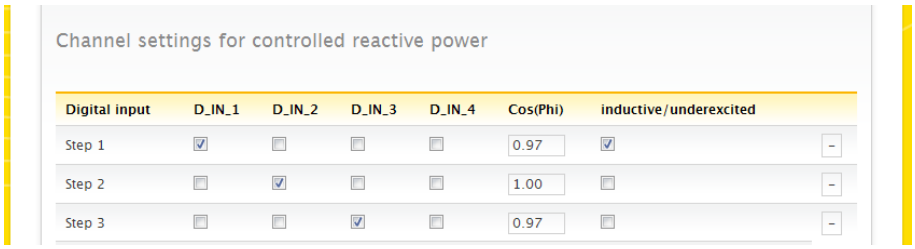


Fig.: Channel settings for remote controlled cos (Phi)

For each level, the input signal combination and a value for the shift factor in cos (Phi) is entered.
Checking the box next to the digital inputs of the PM+ interface (D_IN_1 to D_IN_4) means that the input is supplied with 5V from pin 6 to reduce the output on the cos phi defined in the box "cos (Phi)".
Four levels are shown in the basic setting. The "+" sign can be used to extend the list by additional levels.

Procedure:

- Select remote controlled
- Select the interface of the inverter that is to be reduced
- Enter the channel settings for power reduction according to the specifications and wiring
- Select options
- SAVE settings

More Options

Switching from the remote-controlled cos (Phi) to the possible characteristic curves can be implemented via assigned combinations of signals to the PM+ interface.

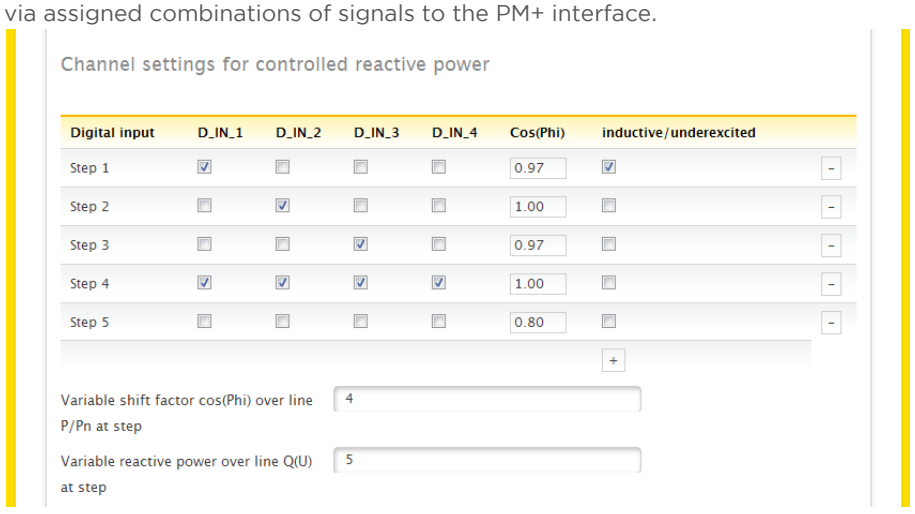


Fig.: Switching to reactive power characteristic curves with certain signals

If a switch to the characteristic curve operating mode (P/Pn and Q(U)) is required due to a certain ripple control receiver signal, the respective levels for the switch can be entered in the input box. If no switch should take place, enter 0 in the input box.

When the switch is activated, the configuration page reloads itself. The corresponding characteristic

curves need to be defined. The settings for the characteristic curves correspond to the procedures described in “21.2.5 Variable reactive power via the characteristic curve Q(U) (only Solar-Log2000 with Utility Meter)” on page 131.

Examples of ripple control receiver connections and the corresponding configuration are in the appendix of this manual.

23.3 Linking (only Solar-Log 1000 and 2000)

The linking function is to be used when there are not enough interfaces on one Solar-Log™ or the cable lengths between the Solar-Log™ and the various inverters exceeds the RS485 specifications.
The link between the data loggers is established with an Ethernet connection. This TCP/IP connection can be established with various technologies such as fiber optics, wireless LAN, radio relay. For the Solar-Log™ network it is only relevant that the connection is fast and reliable.
The master within Solar-Log™ network always has to be a Solar-Log 2000 PM+. The Solar-Log 2000 can be used as the slaves.

The link is used to exchange control commands and responses between the Solar-Log™ devices.
Each Solar-Log™ has to transfer yield data itself to a server.

Procedure:

- Select configuration from Configuration | Special Functions | Feed-in Management | Networking
- Enter the IP address of the first slave.
- Click next to the box with the mouse.
- After entering the IP address an additional input box appears.
- A maximum of nine slaves can be active inside of a network.
- SAVE settings

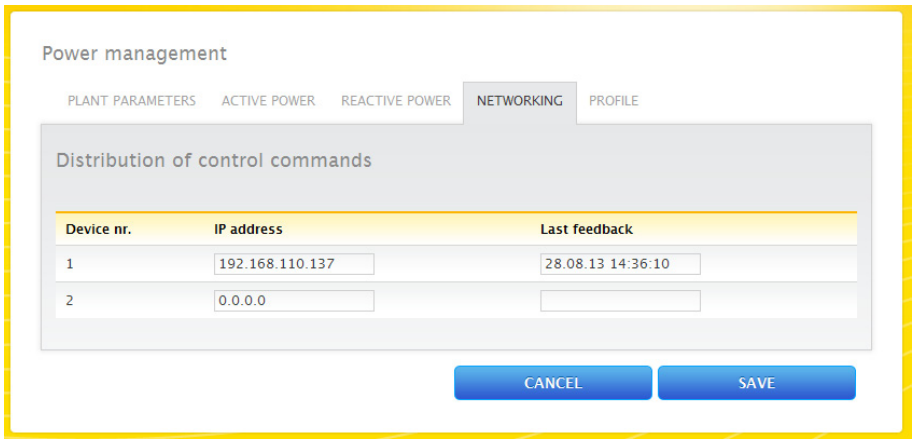


Fig.: Solar-Log™ network configuration

Note

If there are no inverters connected to the master in the master/slave mode, the plant parameter under Configuration | Special Functions | Feed-in Management | Plant parameters and forecast value under Configuration | Plant | Forecast have to be set to 0.

23.4 Profile

For feed-in management, PM+ profiles come with the Solar-Log™ PM Package equipment. These profiles contain the pre-configured settings for feed-in management and enable the PM+ Package I/O Boxes

The profiles are delivered in the
config_pmprofil_NameGridOperator.dat file format.

Procedure:

- Select configuration from Configuration | Special Functions | Feed-in Management | Profile
- Click on Browse to import the profile and select the file to open it.
- Select load profile
- The Solar-Log™ reboots itself. The status is displayed in the progress bar.

The following window appears after the reboot.

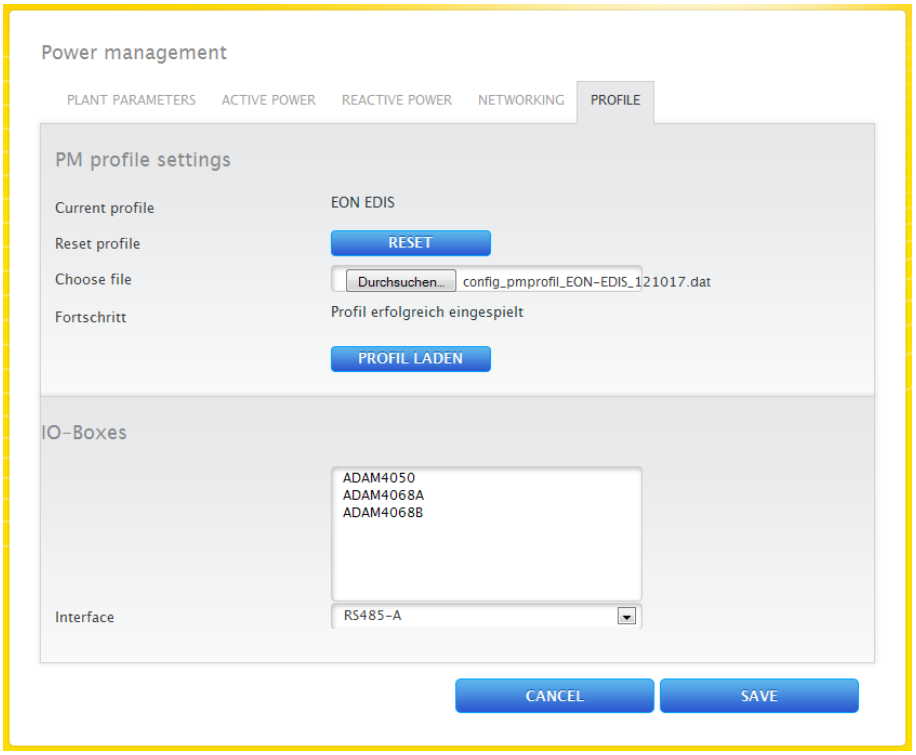


Fig.: Activated PM+ Profile for a PM Package

- The name of the grid operator / profile are displayed in the Current Profile section
- At the bottom of the page, the I/O Boxes that are used in the corresponding PM+Package are displayed.
- In the interface section, the interfaces on which the I/O Boxes are connected to have to be selected.
- SAVE settings

Note

If a new PM+Profile needs to be imported, the current profile has to be reset first.

Note

A special operator specific installation manual is included for the installation of the PM+ Package.

23.5 Direct Marketing

The Direct Marketing function is not enabled by default. To use this function enter the license key in the Configuration | System | Licenses menu and activate Display Advanced Configuration from the Configuration | System menu.
The special Direct Marketing function allows Solar-Log™ data to be directly transmitted directly to the Energy2market Direct Marketing server.

Procedure

- Select Energy2Market from the Provider menu
- An input box appears for the server data of the direct marketer
- Enter Plant data
- SAVE settings

23.6 Programming the Smart Home control logic

The Smart Home function is managed according to pre-defined profiles. The following profile options are available:

- Surplus management
  This profile is defined based on two thresholds. The threshold is defined with an upper threshold for activation and a lower threshold for deactivation .

- Deep freezer - with a temperature sensor
  A switchable socket with a temperature sensor (option with the Gude connection) is required to use this profile. The threshold is defined with an upper threshold for activation and a lower threshold for deactivation. A temperature limit is defined as an additional parameter. When the defined temperature limit is reached, the Solar-Log™ switches the deep freezer on for a period of time according to the settings.

- Deep freezer - without a temperature sensor
  This profile is defined based on two thresholds. The threshold is defined with an upper threshold for activation and a lower threshold for deactivation.
  In addition to the thresholds, two safeguard periods to switch on the appliance can be defined.

- Heat pump with a grid company blocking signal
  Heat pumps can have a control input for a grid company blocking signal. This input is used by grid operators via ripple control receivers to switch on heat pumps at a certain time. If a heat pump can now be run with PV power, this input can be used to switch on the heat pumps in relation to the amount of power being produced. The relay is then turned off during periods with a PV surplus--when the heat pumps "may" run. When no PV surplus is available, the heat pumps remain deactivated. There are three configurable periods available to avoid a cool down during periods with a longer deactivation, e.g. during periods of bad weather. During such periods, the heat pumps are enabled and - if required - power is purchased from the grid.
  This profile is defined based on two thresholds and three periods of continuous operation. The periods of continuous operation are defined based on the:
  - Time from/to and
  - Month from/to

  .
- Vailant heat pump with a grid company blocking signal

This profile is especially pre-configured for Vailant heat pumps. The function and configuration corresponds to the profile heat pump with a grid company blocking signal.

- Automatic timer
  The automatic time profile operators independent of the current PV production. Up to 10 periods can be defined based on the time.

- Performance Visualization
  The performance visualization profile can be used in connection with the Solar-Log™ Smart Home Relay Box. The Relay Box has 8 relays. The relays can be switched on in stages. The value for the activation the individual relays needs to be defined.

- Threshold and Time Control
  With this profile, appliances can be controlled based on the configured switching thresholds and also with optional automatic timer settings. An upper threshold for activation and a lower threshold for deactivation need to be configured. Additionally, a time period can be defined in which the appliance is switched on or off if this has not already been done via the threshold control. The minimum duration the appliance has to be switched on for is defined in the previous duration box. If this duration is not covered with the threshold control, the appliance is switched on for the entire defined duration.

Procedure:

- Open the Configuration | Special functions | Smart Home dialog
- Select Profile position
- Select Type
- Activate Profile via the switch
- Select the Switch
  This switch has to be configured in the Configuration | Devices | Smart-Home menu.
- Enter the typical Nominal power in watts
- Enter the profile dependent parameters
- SAVE settings

Generation Information on Thresholds

Five-minute values are generated to balance the fluctuations in PV production (e.g. due to clouds) for managing appliances. The average value is aligned to the threshold set in the respective logic control.

Generation Information on typical nominal power.

The typical nominal power is the average consumption of appliances that is controlled by the profile. Appliances, such a laundry dryer, have a short high peak of power consumption and times in which little power is required. Based on this, it would be problematic to calculate the current power consumption for power management control. For this reason, the Solar-Log™ calculates with the configured value for typical nominal power during the entire duration of operation.

24 Direct Device Configurations (Solar-Log 1200 and 2000)

The display on the Solar-Log 1200 und 2000 consists of a touchscreen, which is operated by touching the appropriate control element with the finger.

24.1 Display menu structure

The main menu on the device is divided into the following sections:

Display menu structure

Control element	Meaning
	Power
	Yield History
	Environmental performance
	Settings

Only the Settings menu will be covered in this installation manual. The other functions are described in the user manual.

24.2 Display control elements

You can access the sub menus by tapping on the symbol on the right side of the screen.
You can always view the power output for the current day by tapping on the top area with the time and date. The current Dashboard is displayed by tapping on it twice.

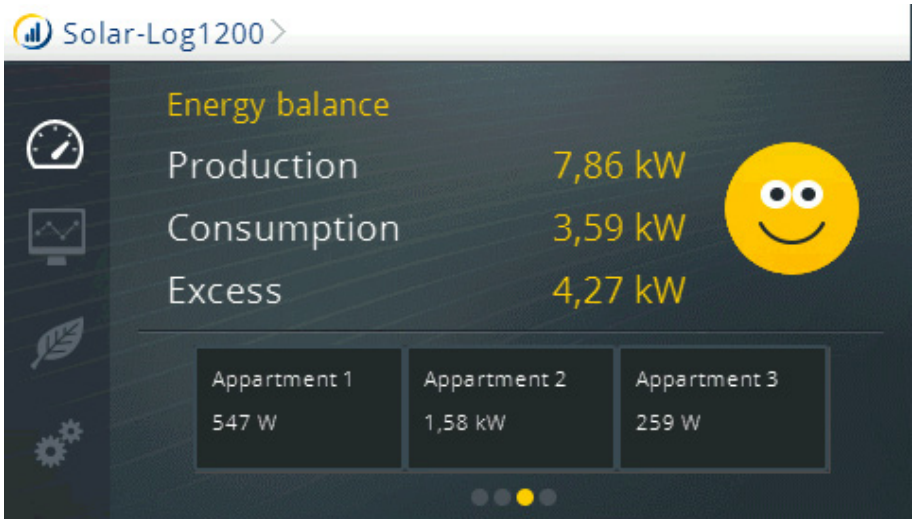


Fig.: Display: Energy balance

24.3 Settings on the device

The Settings menu is divided into the following sub-sections:

- Start (only Solar-Log 1200)
- Basic settings
- USB
- Advanced settings

24.4 Start menu (only Solar-Log1200)

The Start menu is divided into the following sub-sections:

- Initial configuration
- Device Detection
- Easy Installation

24.4.1 Initial configuration (only Solar-Log 1200)

The "Initial configuration" menu is opened automatically at the initial startup. However, it can be opened again at any time by going to Start | Initial configuration.

Procedure:

- After the Solar-Log 1200, 2000 starts, select the system language

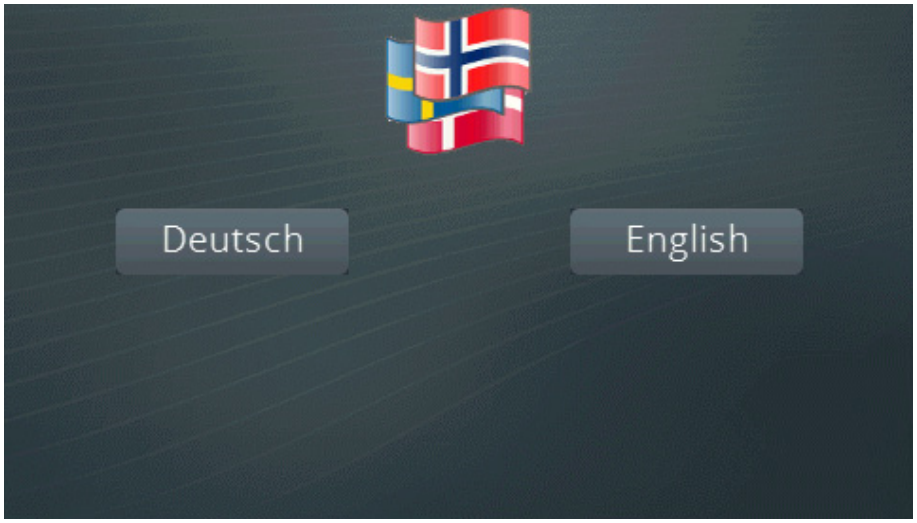


Fig.: Display: Initial configuration language selection

- Enter the IP address for the Solar-Log™ in the second step.
  Alternately, check obtained IP address automatically if the Solar-Log™ is connected to a router with the DHCP service enabled.

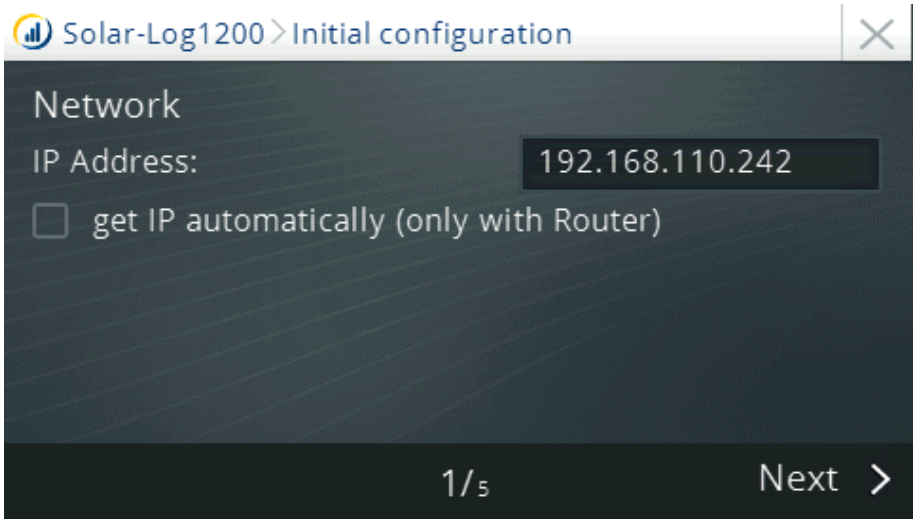


Fig.: Display: IP address settings in the initial configuration

- The next step refers to the interfaces of the connected devices. The Solar-Log™ inquiries about each connected device per interface. Select the respective device or manufacturer.

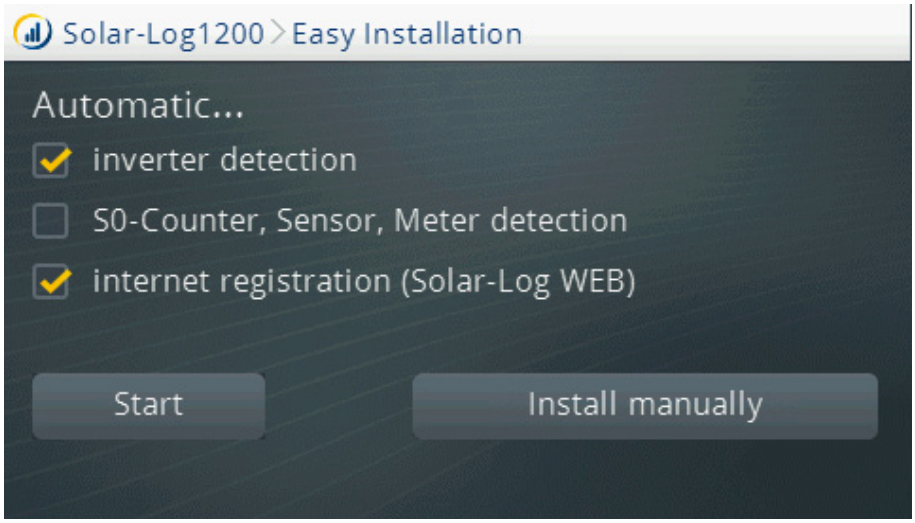


Fig.: Display: Device selection in the initial configuration

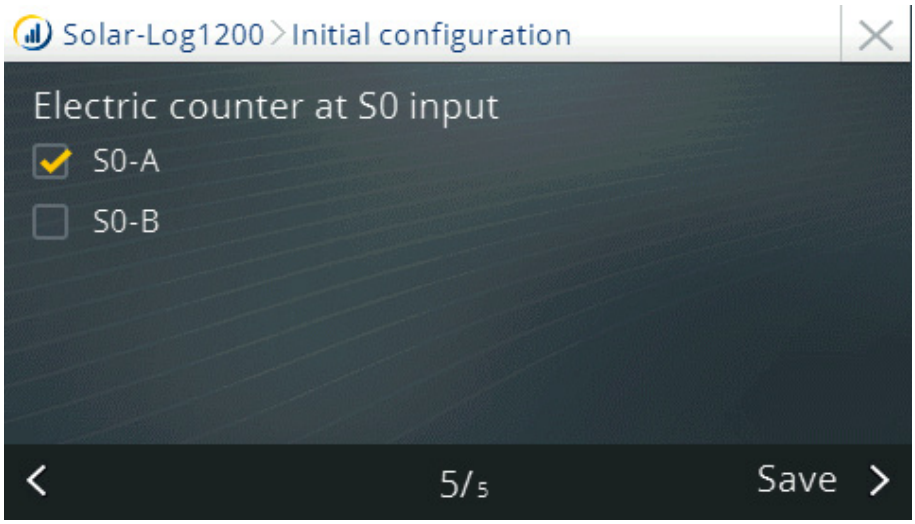


Fig.: Display: Power meter selection in the initial configuration

- The connected meters are selected on the last page. Touch Save to apply these settings.

24.5 Device Detection (only Solar-Log 1200)

- Access this function from the Configuration | Start | Device Detection menu.
- The components entered during the initial configuration are searched for on each interface of the Solar-Log™.

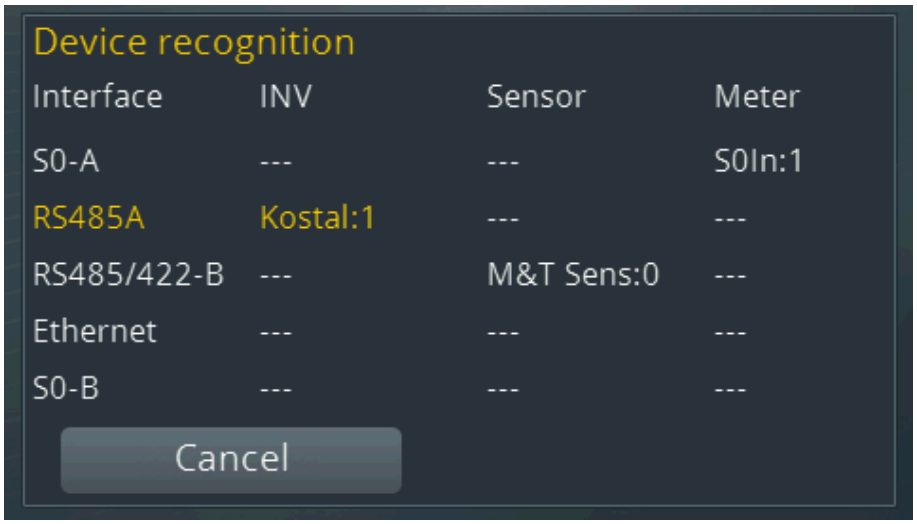


Fig.: Display: Device Detection

- The indication Steca 2 means that two Steca inverters have already been found. The yellow typeface indicates that additional Steca inverters are being searched for on RS485 A.

- This is also shown in the LCD Display.
  When the inverter symbol is blinking, the number of recognized inverters is displayed.

Fig.: LCD: Number of detected inverters

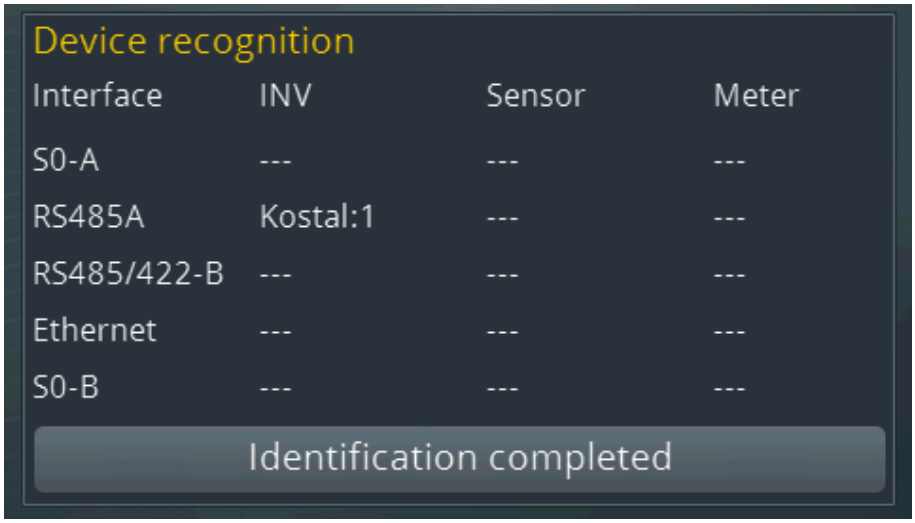


Fig.: Display: Device detection completed

24.5.1 Easy Installation (only Solar-Log 1200)

After selecting the language and country, the initial setup can be carried out with the Easy Installation configuration wizard. Easy Installation can be started for initial setup and carries out the initial set up intuitively step by step.
The Easy Installation can also be performed at any time from the Configuration | Start | Easy Installation menu on the display.

Easy Installation contains the following configuration steps:

- Automatic Device Detection
  To do this, the inverters must be connected to the Solar-Log™ and feeding into the grid so that the communication module is working. Please note chapter “30.2 Country specific inverter detection with Easy Installation” on page 208.
- Solar-Log™ WEB Internet registration – the device must be connected to a router with the DHCP service enabled.

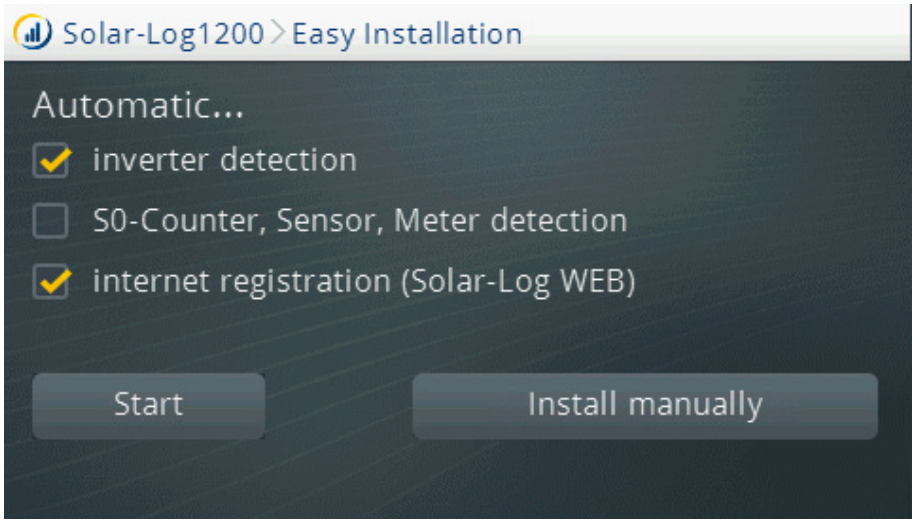


Fig.: Display: Start Easy Installation

For more information, please refer to the Quick Start Guide that came with the device.

24.6 Basic settings menu

The Basic settings is divided into the following sections:

- Network
- Portal

24.6.1 Basic Settings | Network menu

The menu Configuration | Basic Settings | Network menu consists of two configuration pages.

Page 1 is divided into the following sections:

- IP Address and Subnet Mask
- Internet access

Page 2 is divided into the following sections:

- Network Router – Obtain IP address automatically (DHCP)
- Gateway and alternate DNS

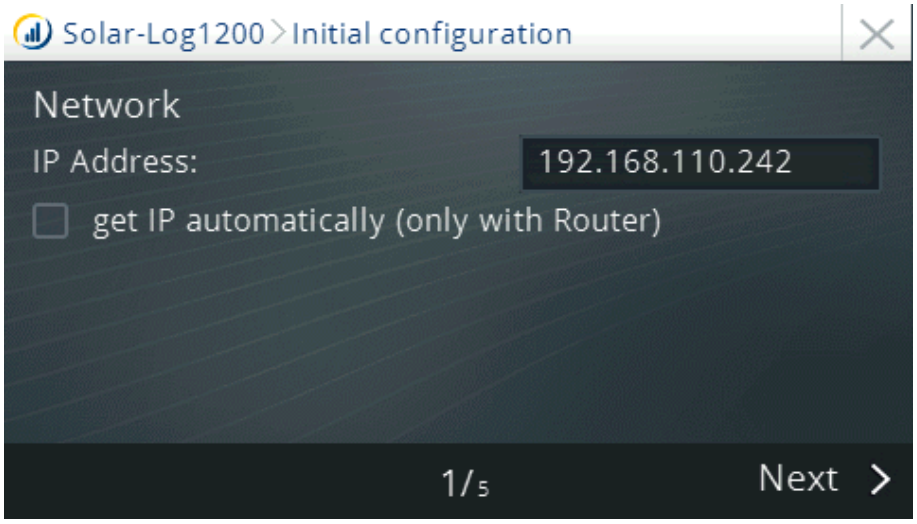


Fig.: Network settings Page1 on Solar-Log 1200 display

Procedure

Configuring the IP Address and Subnet Mask

- Touch the IP address and/or Subnet Mask input box with your finger
- A virtual numeric keypad appears
- Enter the desired IP address or Subnet Mask by tapping on the corresponding numbers
- Tap on OK
- The values entered are shown in the display
- Tab on Next or
- End the settings with 
  Then tab the desired option (Save, Discard or Back)

By tapping on Next, the second page of network settings appears.

On the second page of the menu, the

- network router,
- gateway and alternate DNS server can be configured.

The configuration can be saved and ended by tapping on Save or  .

24.6.2 Basic Settings | Portal menu

- Commercial Edition
- Classic 2nd Edition

are selected.
The respective portal servers are entered in the following steps.

24.7 USB menu

The USB connection on Solar-Log™ devices allows data such as firmware, configurations and yield information to be imported and backups to be saved.
The USB menu contains the following functions:

- Save all data
- Import yield data
- Import configuration
- Firmware update

Saving all data section

The function saves all of the inverter data and the configuration file to the USB stick.
Procedure:

- Select Save all data
- Start Data backup
- Data is prepared
- The data is copied to the \backup directory on the USB stick.
- The following files are now saved in the backup folder on the USB stick:
  solarlog_backup.dat
  solarlog_config.dat
- This data can be saved elsewhere as a backup or imported into the Solar-Log™ again.

Importing the yield data section

This function imports the yield data from the solarlog_backup.dat file
into the Solar-Log™.

Note:
The Solar-Log™ has to be configured or the configuration file needs to be imported before yield data can be imported.

Procedure:

- Select Import yield data
- Backup files are searched for on the USB stick that is directly plugged into the Solar-Log™
- Start this search
- When a backup is found on the USB stick, click on Next to import it
- The data is being imported
  Please wait
- The Solar-Log™ reboots itself
- The yield data has been imported.

Importing configuration section

This function imports configuration file from the solarlog_config.dat file into the Solar-Log™.

Note:

The firmware file needs to be in the USB stick's root directory.

Procedure:

- Select Import configuration
- Backup files are searched for on the USB stick that is directly plugged into the Solar-Log™
- Start this search
- When a configuration file is found on the USB stick, click on Next to import it.
- The data is being imported
  Please wait
- The Solar-Log™ reboots itself
- The configuration file has been imported.

Firmware update section

This function imports a new firmware version into the Solar-Log™ without using a computer.

Solar-Log™ firmware files have the following names:
firmware_2000e_3.0.0-60-130910.bin

Note:

The firmware file needs to be in the USB stick's root directory.

Procedure

- Select firmware update
- A firmware file is searched for on the USB stick that is directly plugged into the Solar-Log™
- Start this search
- When a firmware file is found on the USB stick, click on Next to import it.
- The data is being imported
  Please wait
- The Solar-Log™ reboots itself
- The new firmware has been imported

25 Direct Device Configurations (Solar-Log 500)

25.1 Display: normal operation

During normal operations, the current value and the day's value are shown in the two-line text display.

25.2 Configuration with the keypad

The Solar-Log 500 can be operated via the keypad located under the display.
Using the keys, you can navigate the menu:

Configuration with the keypad

Mode	Action	Key
Navigation	Open the configuration menu on the initial screen	Any key
	Select menu item	▲ ▼
	Open the selected menu/ submenu item	ENTER
	Go back one menu level (up to initial screen)	ESC
Input	Enter a digit/letter at cursor position	▲ ▼
	Move cursor one digit forward/back	◀ ▶
	Save input/open a selection	ENTER
	Go back without saving/ accept the input/selection	ESC

25.3 Defining system settings

Under System settings the following settings are made:

- Language
- Country
- Date and time
- Large External Display
- Firmware

25.3.1 System | Language

The display language for the Solar-Log™ can be set in this menu. The selected display language applies both to the display and the web browser.

- Select System | Language from the menu
- Select the desired display language from the list
- Press ENTER to save

25.3.2 System | Country

The country setting affects how the date, time and currency formats are displayed.

- Select System | Country from the menu
- Select the desired country from the list
- Press ENTER to save

25.3.3 System | Date/Time

The clock time is factory-set, but it may be lost due to long periods of storage.
The time zone, date and summertime values must be set correctly, so that no incorrect statuses or results are obtained during monitoring and graph display, e.g. when e-mail messages are sent or when a curve is displayed on the day graph.

Any incorrect settings can be corrected in the System | Date/Time submenu.

Correcting the time zone

- Select System | Date/Time | Time zone from the menu.
- Enter the time difference in hours (Default: GMT +1).
- Press ENTER to save

Correcting the date

- Select System | Date/Time | Date from the menu.
- Correct the date
- Press ENTER to save

Correcting the time

- Select System | Date/Time | Time from the menu.
- Correct the time
- Press ENTER to save

25.3.4 Correcting the Day Light Saving Time settings

- Select System | Date/Time | Day Light Saving Time settings from the menu.
- Select the desired Day Light Saving Time settings
- Press ENTER to save

25.3.5 System | Large External Display

Large displays can be connected to the Solar-Log^{500} using two different technologies.

- with S0 pulse output
- with RS485 (recommended)

It is recommended to use the RS485 connection, as in this case the numerical values in Solar-Log™ are synchronized with the values shown on the display.

If certain inverters are used (such Fronius, Eaton/Sunville or other inverters with a RS422 bus wiring), however, the S0 interface must be used since parallel operation is not possible.

In this case, data on the large display can only be used correctly if inverter configuration has been completed and the inverters are feeding in.

Setting the Large External Display on the S0 output

- Select System | Large External Display | Display S0 from the menu.
- Enter the pulse factor (Default: 1000)

Note

The pulse factor set in the Solar-Log™ has to match the settings for the display.

- Press ENTER to save

Setting the Large External Display on RS485

1 Select System | Large External Display | Display RS485 from the menu
2 Select Large External Display OFF or ON
3 Press ENTER to save

If no inverters are configured on the RS485 interface (e.g. in Bluetooth mode), the Solar-Log^{500} transmits at 9600 Baud, 8N1.

If an inverter is detected on the RS485 interface, the brand and baud rate used are displayed. This baud rate should be used for the communication with the large external display.

25.4 Configuring network settings ("Network" menu)

The network configuration, i.e. allocation of an IP address for the local network, can be performed either automatically or manually.

25.4.1 Obtain an IP address automatically (Network / Automatic)

For automatic configuration, the Solar-Log^{500} must be connected to an Internet router which has the automatic network addressing service (DHCP). All routers are usually pre-configured to attempt automatic detection first.

Procedure:

- Select Automatic from the Network menu
- Press ENTER
- Confirm with Yes to start searching for the IP address
- Press ENTER to save

When the search is started, the Solar-Log™ attempts to obtain an IP address through an Internet router. This can take up to 60 seconds.
If an IP address has been obtained for Solar-Log^{500}, it is shown on the display. All other settings, such as Subnet Mask, Gateway and DNS Server if necessary, are also entered automatically.
Take note of the address. This address is used for accessing from a PC later.

25.4.2 Setting an IP address manually (Network / Manual)

If the Solar-Log^{500} is not connected to a router, or if the DHCP server is disabled in the router, the network configuration must be carried out manually.
The default address option only has to be adjusted when using a direct PC connection or a router without the DHCP service, in order to allow access from the PC.
If necessary, please consult a network specialist to assign a suitable network address in regard to IP address, subnet mask and gateway.

Procedure

- Select Manual from the Network menu
- Select IP Address
- Press ENTER
- Enter the IP Address (with the ◀▼▲▶ buttons)
- Press ENTER to save

- Select the subnet mask
- Press ENTER
- Enter the Subnet Mask
- Press ENTER to save

- Select Gateway
  The gateway is the router to which Solar-Log^{500} is connected. Its IP address is entered here automatically, if the DHCP service is enabled on the router.
- Enter the IP address of the router
- Press ENTER to save

- Turn DNS Server on/off
  In some networks, the DNS server is a separate address for resolving Internet addresses, and is not the same as the Internet router (gateway).
- Select DNS Server
- Yes or No depending on whether a DNS server is to be used.
- Press ENTER to save

- If Yes has been selected,
- Enter the IP address of the DNS server
- Press ENTER to save

25.5 Configuring inverters

In this configuration menu the inverters used can be allocated to the Solar-Log^{500} interfaces and inverter detection can be carried out.

25.5.1 Inverter selection for Bluetooth (only Solar-Log 500 BT)

Note

This menu item appears only in Solar-Log 500 BT models with integrated Bluetooth module.
Activate the Bluetooth function only if the Solar-Log™ is to communicate wirelessly with the SMA inverters.

- Select Inverter Bluetooth from the menu
- Activate Bluetooth functionality
- Press ENTER to save

If other inverters are to be configured, select the corresponding interface and assign the inverter to it.

- To complete the inverter configuration, perform inverter detection

25.5.2 Inverter selection on RS485/422 B interface

- Select RS485/422 from the menu Inverter
- Select the inverter manufacturer
- Press ENTER to save
- To complete the inverter configuration, perform inverter detection

25.5.3 Inverter selection on Ethernet interface

- Select Inverter Ethernet the menu
- Select the inverter manufacturer
- Press ENTER to save
- To complete the inverter configuration, perform inverter detection

25.5.4 Setting Power meter on S0 input

If an external S0 power meter is used, it must be activated here.
The S0 meter can be configured flexibly and used in 3 operating modes:

- as a consumption meter.
- as the power meter for an inverter
  (In inverter mode, the meter has a limited monitor function for inverters whose data protocol is not supported for direct monitoring.)
- as total yield meter
  In this mode, the yield from several inverters is recorded.

Procedure:

- Select Inverter SO meter from the menu
- Select the operating mode: Consumption, Inverter or Total yield
- The pulse factor must then be set to match the pulse factor of the meter.
- Press ENTER to save
- To complete the setup, perform inverter detection

25.5.5 Power meter via RS485

Meters are connected via RS485 and configured from this menu.
Procedure:

- Select power meter from the menu Inverter
- Select the meter manufacturer
- Press ENTER to save
- To complete the setup, perform inverter detection

25.5.6 Perform inverter detection.

Inverter detection can be started here. To be detected, the inverters must be feeding in power.

Procedure:

- Select detection from the menu Inverter
- Start the inverter detection by pressing "Start search Yes."

Provided they have been activated, the individual interfaces of the Solar-Log 500 are queried in order:

- Bluetooth
  First, all SMA Bluetooth interfaces are shown in a list. Since more inverters may be detected than are actually installed (e.g. those in a neighboring house may also be detected), the listed inverters have to be checked.
- RS485/422
- SO Meter
  The meter must send at least 1 pulse within 60 seconds.

During detection, the inverters that have been detected are displayed immediately. Detection can take some time. "Channel lists" are loaded for SMA inverters. This can take several minutes for each inverter. After inverter detection, the total number of inverters detected is displayed.

Inverter detection can be repeated at any time, or canceled completely.

25.5.7 Re-detecting inverters

If new inverters have been added to the system or replaced, it will also be necessary to carry out a new detection. This will not cause any loss of data, as Solar-Log 500 automatically re-formats the data.

Note

Before preforming detection, it is important to save the current system data and make a backup.

25.6 Internal Settings

25.6.1 Reset

There are three options in the Internal | Reset menu

- Delete data
  In certain circumstances after an inverter detection, it may occur that incorrect or unusable data are displayed. In this case, the stored can be deleted without having to reconfigure the Solar-Log 500 completely.
- Delete inverter
  If another inverter detection has to be started, it is possible to delete the inverter data only, without having to delete the rest of the configuration.
- Restore factory settings
  This is used to reset the device to its factory settings. The network configuration remains unaffected.

Procedure:

- Go to the Internal | Reset menu
- Select Delete data, Delete inverter or Factory settings.
- Select Yes
- Confirm by pressing ENTER

25.6.2 PIN lock (Internal | PIN lock)

Here, a 4 digit PIN code can be entered to restrict access to the configuration menu on the Solar-Log 500 display.
This PIN code has no effect on the operation through the web browser. This can be protected separately.
Procedure:

1 Goto the Intern | PIN Lock menu
2 Select Active (select Inactive to remove the PIN lock.)

- Enter a 4-digit PIN code
- Press ENTER to save

Note

For the PIN lock to become active, the Solar-Log 500 needs to be re-started. After it is up and running, the PIN code is then required in order to open the configuration menu.

26 Direct Device Configurations (Solar-Log 1000)

26.1 Working with the touchscreen

The display on the Solar-Log 1000 consists of a touchscreen, which is operated by touching the appropriate control element with the finger.

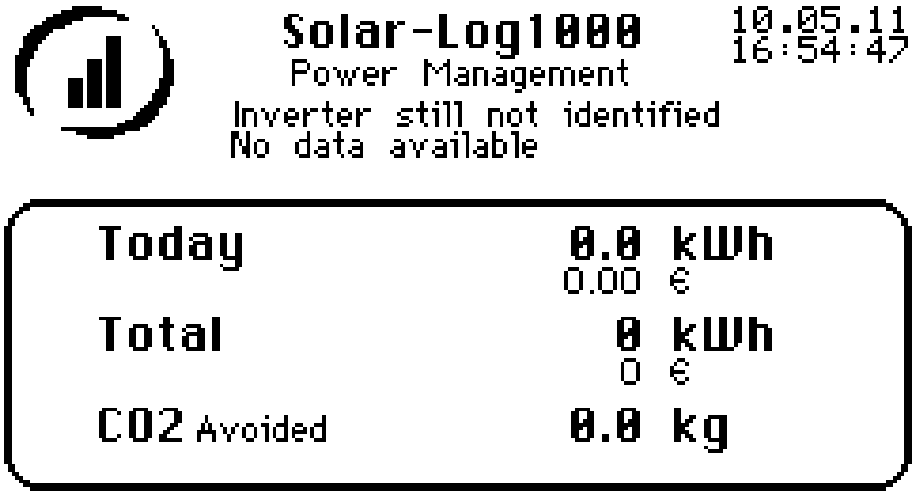


Fig.: Initial screen: Overview screen

On the initial screen in normal operation, the unit display gives an overview of system information, with the date, time, the connected inverters, and various measurements and calculation data.

26.2 Display menu structure

The main menu consists of the following four sections:

- Graphic
- Diagnostic
- USB and
- Config.

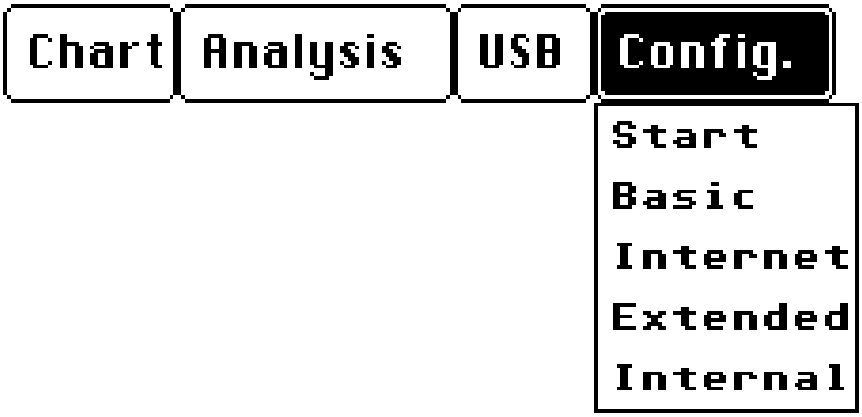


Fig.: Basic structure of the Main Menu of the Solar-Log 1000 display

Touch a submenu item to open the related configuration dialog.

Note

This manual describes only the menu items under Config.for the configuration. (Depending on the equipment variant, the items in this menu may differ slightly from those in the figure.)
The other menu items are explained in the User Manual.

26.3 Configuration Menu

The Configuration menu is divided into the following sub-sections:

- Start
- Basic
- Internet
- Advanced
- Internal

26.4 Initial configuration

The "Initial configuration" menu is opened automatically at the initial startup. However, it can be opened again at any time afterwards by going to the Config. | Start | Initial Configuration menu.

The initial configuration is made through dialog boxes:

- Time settings and IP address
- Inverter selection
- Power meter on S0 input
- Performing inverter detection (Config. / Start / Inverter detection)

Procedure:

- Select the Config. | Start | Initial Configuration menu.
- The time setting and IP address are displayed in the dialog box.

26.4.1 Time settings and IP address

The clock time is factory-set, but it may be lost due to long periods of storage.

System settings

The time zone, date and summertime (day light savings) values must be set correctly, so that no incorrect statuses or results are obtained during monitoring and graph display, e.g. when e-mail messages are sent or when displaying a curve on the daily graph.

Network Settings section

IP Address

In general, the IP address only needs to be changed or checked if Solar-Log 1000 is to be connected to a router without the DHCP service, or connected directly to a PC.
The IP address is to DHCP by default. This can be changed here to a network address which is appropriate for the local network.
After saving, the Solar-Log[1000].restarts automatically

Obtain IP address automatically

The IP address can be obtained automatically if Solar-Log[1000] is connected to an Internet router which provides the DHCP service.
After saving and the automatic restart, the new IP address is displayed accordingly. The Solar-Log[1000] can now be reached at this address and it has automatic access to the Internet.

Procedure

- Enter all the related data (see above list)
- Touch Save and then Next to go to the next dialog.

26.4.2 Inverter selection

In the inverter selection, manufacturers of the inverters connected to Solar-Log 1000 can be selected and assigned to all interfaces through a series of dialog boxes.
Inverter selection order:

- RS485-A
- RS485/422-B
- CAN
- Network
- S0

The inverter selection dialog boxes are structured differently depending on the interface.

Procedure

- Connect the device with the interface
  And then select the buttons
- A selection list of devices is displayed:
- Select a connected device and touch Select to continue
- If no interface is assigned, select None
- After each switch selection, touch Save and then Next to go to the next dialog
- Set up each of the connected devices for all of the interfaces
- For the power meter on the SO input, select Yes or No
  Yes (= activate input) or No (= deactivate input)
- When all of the devices have been properly defined, touch Continue to Inverter Detection

or

- If inverter detection is to be performed at a later time using the Inverter detection menu, the settings made up to this point can be saved: Touch Save

26.4.3 Perform inverter detection

The inverter detection function is used to find all of the inverters connected to the Solar-Log 1000 and assigns them an address number. The inverter detection is based on the defined connected devices from the initial configuration

The number and types of devices are automatically detected here.
If the number of inverters changes, the internal database needs to be restructured, and this can be a lengthy process depending on the amount of data already stored.
The "Inverter detection" menu is opened automatically after the initial startup and the initial configuration. However, it can be opened again at any time afterwards.

Procedure

- Select Config./Start/Inverter detection from the menu
- For the initial detection, the following dialog box is opened
- Touch Start
- The following overview screen then appears.

Wechselrichtererkennung			
	Typ	Erkannt	Status
S0-Eingang	Aktiv	- /M1	Fertig
RS485-A	Kostal	-	WR
RS485-B	Diehl AKO	-	---
CAN-Bus	---	-	---
Netzwerk	---	-	---

Suche beenden

...Bitte warten...
3/220

All interfaces are scanned one after the other and any inverters found are listed under the predefined inverter types. This process can last different lengths of time depending on the inverters connected.

Note

For inverter detection, all inverters must be active. Detection cannot therefore be carried out after dark.

- After detection is complete, the number of inverters detected should be checked in the list. If an inverter is missing, check the inverter setting and the wiring and repeat the detection process.
  The other settings in the inverter configuration should be made only after all inverters have been successfully detected.
  If no inverters have been detected, this is also indicated on the display. In this case, the detection process must be repeated.
  Once detection has been completed successfully, you are asked whether inverter configuration is to be carried out.
- If all inverters have been detected,
  Confirm with by selecting Yes.

26.5 Changing network settings

Configuring the network settings – if this is necessary after the initial configuration – covers the following points from the menu Basic | Network:

- Changing the network access
- Changing the DHCP settings
- Settings for analog modem
- Settings for GPRS modem
- Solar-Log 1000 WiFi WLAN configuration (Basic/WLAN)

To configure the basic network settings:

Go to the Config. menu | Basic | Network

Here, the IP address and Subnet mask of the Solar-Log 1000 can be configured if necessary.
However, all routers with the DHCP service enabled are pre-set so that this data is entered automatically.

IP Address, Subnet Mask

The default address is to set to be automatically obtained from DHCP and can be adjusted when using a

direct PC connection or a router without the DHCP service, in order to allow access from the PC.
If necessary, please consult a network specialist to assign a suitable network address in regard to IP address, subnet mask and gateway.

Internet access

In this section, the type of Internet access used can be configured.

None

The Solar-Log 1000 can only be accessed locally, i.e. through a direct PC connection or through a network router without Internet access.

Network router

The Internet is accessed through an Internet router. The Internet router must be connected to the network interface of Solar-Log 1000. This router handles all dial up access and data transfers over the Internet. A DSL, cable modem or wireless router can be connected.
The important thing is that Internet dial up should always be possible from the Solar-Log[1000]. The Internet router should not be switched off, otherwise ordinary messaging will no longer possible when there is a fault and the homepage will not be correctly supplied with data.

Analog modem

Internet access is provided by the analog modem package and using an analog telephone connection; this is configured in a later dialog box.

GPRS modem

Internet access is provided by the mobile communications package or in Solar-Log1000 GPRS through the mobile phone network; this is configured in a later dialog box.

Procedure

- Enable the required option.
- Touch the input boxes beside IP Address and Subnet Mask.
- The virtual keyboard is displayed.
- Enter the relevant data and touch OK to confirm.
- Touch Save and then Next to go to the next dialog.

Network router

Obtain IP address automatically
The IP address can be obtained automatically if Solar-Log[1000] is connected to an Internet router with the DHCP service enabled.
After saving and the automatic restart, the new IP address is displayed accordingly. The Solar-Log1000 can now be reached at this address and it has automatic access to the Internet.

Gateway

The gateway is the router to which Solar-Log1000 is connected. Its IP address is entered here automatically, if the DHCP service is enabled on the router.

Alternate DNS server

In some networks, the DNS server is a separate address for resolving Internet addresses, and is not the same as the Internet router (gateway).
In this case, tick the check box and enter the IP address of the DNS server.

Settings for analog modem

If Internet access by analog modem has been selected, the access data of the telephone service provider must be entered here.

Note

Since the cost of analog Internet access has risen drastically in recent years, we recommend checking if it might be more cost effective to use a mobile service provider for the data transmission.

Settings for GPRS modem

In many cases where no DSL or telephone connection is available, a mobile phone connection to the Internet is the only option for sending e-mails, text messages (SMS) and data over the Internet to the homepage.

All of the data for the German networks is pre-configured. These pre-configurations are available when configuring via a web browser. When configuring via the display of the Solar-Log 1000, this data has be entered manually.

Enter the following configuration information here; this information can be obtained from your mobile service provider:

APN
APN (Access Point Name) of the mobile service provider
Users
User name for your mobile phone account
Password
Password for the mobile phone account
SIM PIN code
PIN number of the SIM card

Procedure

- Enter All of the Data
  The mobile service provider recommends leaving the user name and password empty; however, sometimes it is necessary to type in some text in order to establish the data connection successfully.
- Touch Save and then Next to go to the next dialog.
- Setting options and testing the GPRS modem connection

Test field strength
If the network connection has been set up through a GPRS modem, this button can be used to test the connection and the signal quality.

Always stay online
If this option is enabled, the modem remains online continuously. Only use Always stay online if you are using an appropriate mobile communication tariff contract.

Note

If you use this option and do not have a suitable mobile phone contract, the charges can be very high.

Text message (SMS) directly over modem

If this option is enabled, text messages (SMS) are sent and billed directly through the SIM card.

Procedure

- First, touch Test field strength
- A box opens and indicates the signal quality
- Touch Back to close the test window
- Touch Save
- Desired option(s) Always stay online and/or
- Activate text message (SMS) directly over modem
- Touch Save

26.6 Configuring WiFi (only the WiFi models)

The wireless Internet access can be configured from the Config. | Basic | WiFi.

Procedure

- Go to the menu Config. | Basic | WiFi
- Touch Activate WiFi, then Choose network, to start the network scan.
- A list of the detected networks is displayed for selection.
- Select the desired network from the list and touch Select to configure it.
- Enter all of the relevant data
- Touch on Connection test
  A window opens and shows the reception quality:
- Touch Back to close the test window
- Touch Save and then Next to go to the next dialog.

IP settings for WiFi operation

Dialog boxes

- Obtain automatically (DHCP)
  The IP address can be obtained automatically if Solar-Log1000 is connected to an Internet router which allows the DHCP service. After saving and the automatic restart, the new IP address is displayed. The Solar-Log1000 can now be reached at this address and it has automatic access to the Internet. All routers usually come with the DHCP service enabled, so that all the subsequent data are entered automatically:
- IP address, Subnet mask
  If needed, the IP address and subnet mask can be configured here for the Solar-Log 1000. Generally, though, all routers have the DHCP service enabled so that this data is automatically entered. The default address option only has to be adjusted when using a direct PC connection or a router without the DHCP service, in order to allow access from the PC. In this case, please consult a network specialist

who can assign a suitable network address, make the other gateway settings, and so on.

- Gateway
  The gateway is the router to which Solar-Log 1000 is connected. Its IP address is entered here automatically, if the DHCP service is enabled on the router.
- DNS Server
  In some networks, the DNS server is a separate address for resolving Internet addresses, and is not the same as the Internet router (gateway).
  In this case, tick the check box and enter the IP address of the DNS server.

26.7 Defining Plant groups

As the Solar-Log 1000 can manage up to 100 inverters at the same time, it is helpful to divide these into groups. To provide a clearer overview, these groups are then shown in all selection dialog boxes.
Up to 10 plant groups can be defined, each containing up to 15 inverters
Each system group can also be shown on a special large display.
However, individual inverters can still be selected from the group concerned.

Procedure:

- Go to the Config. menu | Basic | Plant Groups
- There are two options to select from:

- All INV belong to one plant
  If this option is enabled, the inverters are not divided into groups and can be accessed individually.

- The INV are to be assigned to different plant groups
  If this option is enabled, one or more groups have to be defined.
- Enable the desired option.

To define groups

- Option Inverters are divided into groups has been activated
- Touch Group definition.
- A selection list of plant groups is displayed
- Select a group and touch Back to continue
- The "Plant group" sub dialog box opens.
- The bottom area shows a list of the inverters already assigned
- Touch Add to select from the inverters list, then touch Back to close the list.
- Under Name you can change the name of the group using the virtual keyboard, then confirm with OK.
- In the "Plant group" sub dialog box, touch Back.
- Define any other groups required in the initial dialog
- When all groups have been defined, touch Save the initial dialog box.

26.7.1 Configuring inverter data

Inverter configuration consists of a number of sub dialog boxes, but only the first two are important for the initial configuration.
The other settings are related to plant monitoring and graph scaling, which are already pre-set with realistic values. Nothing usually needs to be changed here.

The following individual dialogs are available for inverter configuration:

- Changing the inverter data

- Assigning a new number (only for inverters without their own addressing function)

Changing the name

- Entering a pulse factor (only for S0 meter)
- Set up the SO meter (only SO meter)
- Setting the module and power data
- Configuring the monitoring
- Configuring the graph display

All the dialog boxes apply only to the inverters that have been selected.

- Select Config./Basic/Inverter from the menu
- A dialog box opens for selecting the inverters.
- To select an inverter, touch the corresponding Number
- A list of the inverters available in the initial configuration is displayed.
- Select the desired inverter, then confirm with Select.

Changing the inverter data

Note

The entries in the inverter configuration dialog boxes shown in the example can differ according to the inverter and the interface.

The following dialog boxes can be configured:

Number

Indicates the internal position at which the inverter (or plant group) was detected.

New number

Input box for entering a new number.

Unit name, Address / Serial number

Display fields only, not editable: the internal device name of the inverter
The device designation and serial number are read off automatically for most manufacturers. In the case of other inverter manufacturers, the communication address is displayed.

Pulse factor (only when selecting an S0 meter)

In the default setting, Solar-Log 1000 sends 1000 pulses/kWh over the S0 output. The pulse factor must be configured to match the pulse factor of the meter.

Name

Short description of the inverter.

Assigning a new number

(only for inverters without their own addressing function)
Inverters that do not have the ability to set their own communication address, e.g. SMA and Kyocera / PowerLynx, are listed in random order or in the ascending order of their serial numbers.
This order should then be changed to the actual installed order.
The order should be changed immediately after inverter detection, as the data relating to the inverter can-

not be deleted or switched to the new number afterwards.

How to assign a new number:

- Touch the input box for the New Number
  The virtual keyboard appears.
- Enter the desired communication address and confirm with OK.

Changing the name

You should always change the name, or at least check the displayed names. You should choose a name that is unique and meaningful, as the it will be appearing in numerous selection lists and displays.

Procedure

In order to change the inverter name:

- Touch the input box for the Name
  The virtual keyboard appears.
- Enter the desired name and confirm with OK.
- Touch Save and then Next to go to the next dialog.

Entering a pulse factor (only for S0 meter)

In the standard setting, most meters send 1000 pulses/kWh over the S0 output. The pulse factor of the Solar-Log™ must be the same as the pulse factor of the connected meter.

Note

The pulse factor of Solar-Log 1000 and of the S0 meter must be set to the same value.

How to change the pulse factor:

- Touch the input box for the Pulse Factor
  The virtual keyboard appears.
- Enter the desired pulse factor and confirm with OK.
- Touch Save and then Next to go to the next dialog.

Setting up SO meters

This sub dialog box is available only if a power meter is connected to Solar-Log 1000 and has been selected.

The S0 meter is flexible and can be set in 3 modes:

- in Inverter mode for inverters with data protocols that are not supported
- as Overall yield meter to count the total output from the entire plant
- as Consumption meter to visualize and to calculate the system's own consumption rate.

Connected module power

A value for the connected module power is needed in inverter mode, in order to make power comparisons between the different inverters and offset them against each other.

Module field (1-9)

In the module field, the same types of strings are placed together for plant monitoring and to be monitored together. For a roof with equal modules, which have the same alignment and the same angle of inclination on the roof, all strings are assigned to module field "1". If there are other inverters connected, which are

operatingwith a different roof alignment, these strings are given the module field number "2" etc.

Procedure

- Enable required mode Inverter mode, Overall yield meter or Consumption meter.
- Touch the input box for the Connected Module Power
  The virtual keyboard is displayed.
- Enter the desired module power and confirm with OK.
- Touch the input box for the module field
  The virtual keyboard appears.
- Enter the number of the module field and confirm with OK.
- Touch Save and then Next to go to the next dialog.

Setting the module and power data

Dialog for standard inverters
In standard inverters, the individual strings are interconnected internally.

Connected module power

A value for the connected module power at the inverter is needed in order to make power comparisons between the different inverters and offset them against each other.

Module field (1-9)

In the module field, the same types of strings are placed together for plant monitoring and to be monitored together. For a roof with equal modules, which have the same alignment and the same angle of inclination on the roof, all strings are assigned to module field "1". If there are other inverters connected, which are operating with a different roof alignment, these strings are given the module field number "2" etc.

How to enter the module and power data:

- Touch the input box for the Connected Module Power
  The virtual keyboard is displayed.
- Enter the desired module power and confirm with OK.
- Touch the input box for the module field
  The virtual keyboard appears.
- Enter the number of the module field and confirm with OK.
- Touch Save and then Next to go to the next dialog.

Dialog for multi-string inverters

String

Display field only, not editable: Module string numbers

Module field

Module field numbers can be used to assign the same types of strings or inverters. In the plant monitoring, only strings or inverters with the same module field number are offset against each other.

Connected module power

For inverters or strings (in multi-string inverters only), the connected module power must be indicated in the exact total module power.
Example: 28 160 Watt modules = 4480

Name

The name of the string that is shown on the homepage or yield overview (for multi-string inverters only).

How to enter the module and power data:

- Touch the input box for the module field
  The virtual keyboard appears.
- Enter the number of the module field and confirm with OK.
- Touch the input box for the module power
  The virtual keyboard appears.
- Enter the desired module power and confirm with OK.
- Touch the input box for the Name
  The virtual keyboard appears.
- Enter the name of the string and confirm with OK.
- Touch Save and then Next to go to the next dialog.

Configuring graphic scaling

Only the Y-axis representation (power output displayed) can be configured from the display for the graphic display of yield data.
Nothing usually has to be changed here, as Solar-Log 1000 automatically calculates the values for the generator power input. However, these values can be adapted to your own data.

To set the representation on the y-axis:

- Touch the required input box beside Day, Month, Year and/or All Years.
  The virtual keyboard appears.
- Enter the maximum value to be represented on the Y-axis and confirm with OK.
- Touch Save

26.8 Defining the solar plant's forecast data

By setting forecast values for the yield data, you can check on the graph whether the plant is reaching the desired annual yield or not.
To do this, a percentage rate is allocated to each month. This is deduced from the yield statistics over the previous years.
Solar-Log 1000 always calculates the target value cumulatively, per day. This means that, at the beginning of the month, it is not the total monthly target that is set, but the target for days already passed, plus that of the current day.
In the forecast, Solar-Log 1000 also takes account of the yields in all previous years, and in this way can allow for local weather events (in most cases, snow in December). The yearly forecast is therefore usually fairly accurate by September.
All the dialog boxes apply only to the inverters that have been selected.

To define the forecast data:

- Select the Config./Basic/Forecast menu
  The dialog for entering forecast data is displayed.
- Defining inverter / plant groups and feed-in

Dialog boxes

Plant group

If plant groups are defined, forecast data can be defined here for a certain plant group or for the whole plant.

Yearly target

The annual target in kWh/kWp is entered here for the inverter or for the plant group. The yield in the se-

lected currency is calculated on the graph using this factor.

How to configure the feed-in tariff and yearly target:

- Touch the button next to the plant group
  A list of inverters is displayed, or plant groups if these have been defined.
- Select the desired entry, and touch Back to continue.
- Touch the input box for the yearly target
  The virtual keyboard appears.
- Enter the forecast value in kWh/kWp and confirm with OK.
- Touch Save and then Next to go to the next dialog.

Setting monthly values for Target / Actual calculation

Enter the monthly percentage of the annual target here. The monthly values can be adapted to suit the local conditions.

Procedure

- Touch the input box next to the particular month
  The virtual keyboard appears.
- The monthly percentages must add up to 100% of the yearly target.
- Enter the monthly percentage of the yearly target and confirm with OK.
- Touch Save

Note

The monthly percentages must add up to 100%.

26.9 Setting up plant monitoring

From the menu Config. | Advanced | Plant monitoring, all of the settings can be centrally defined for the fault types that set off the alarm function. We recommend setting these parameters as the final step in the configuration.

How to activate plant monitoring:

- Go to the menu Config. | Advanced | Plant monitoring
  The following options can be selected:
- Close relay
  The potential-free contact (relay) in Solar-Log 1000 closes if there is a fault. This function can be used, for example, to switch on an external alarm light in order to have a rapid visual indication.
- Send e-mail
  If there is a fault, an e-mail message is sent to the configured address.
- Send text message
  If there is a fault, a text message (SMS) is sent to the configured mobile phone number.
- Turn on the "E" LED
  If there is a fault, the "E" LED on Solar-Log 1000 starts flashing. This function is useful if Solar-Log 1000 is being used without an Internet connection, and the owner of the system would like to have a simple form of monitoring.
- Activate all of the desired options
- Touch Save

26.10 Configuring the large external display connection

The large external display connection can be configured in the Config. | Advance | Large External Display menu.
Large external displays can be connected either through the RS485 bus (RS485/422 B, RS485 A interface) or through the S0 pulse output.
If the RS485 bus is already occupied by inverters, the large display can often be connected in parallel. To do this, the baud rate of the display must match the baud rate of the inverters using the bus.

Note

Always follow the instructions of the display manufacturer regarding the wiring and any initial configuration that may be necessary.

How to configure the connection to the large display:

- Select Config./Advanced/Large External Display from the menu
- Next, enter the option for how the display is connected.
- RS485-A, RS485-B, S0-Output
  These check boxes are used to activate the display on the corresponding interface, and appear in the various dialog boxes that appear one after the other in the dialog sequence.
- Each interface can be selected by marking it and saving
- On the right of the interface name, the display field indicates if and how the interface has already been assigned. It also displays the inverter manufacturer and the baud rate used.
- Select the large external display manufacturer used

- If plant groups have been defined, you can select here which plant group is shown on the large external display. If no groups are used, the whole plant is shown.

Note

If the display is being configured on the S0 output, a pulse factor has to be entered. The pulse factor in Solar-Log 1000 must be the same as the pulse factor on the large display.

26.11 Configuring alarm messages and signals for the alarm contact

The Solar-Log 1000 continuously monitors its internal alarm contact. If this contact is opened, it sets off an alarm which can be indicated in various ways.

Note

Only set the alarm contact to active if you have connected an alarm circuit to the alarm contact connection (a circuit between both pins of the alarm contact).

How to configure alarm signals and messages for the alarm contact:

- Select the Config./Advance/Alarm Contact menu
  The dialog for alarm contact settings is displayed.
- Configuring the alarm messages for the alarm is triggered
  Alarms can be communicated by E-mail, Relay, the Error-LED on the front panel, text message (SMS) and/or through the internal Speaker of Solar-Log 1000. The e-mail, SMS and relay settings must be already configured.
- Enable the desired options (see above list).
- If required, the alarm can be tested. Touch Test for 10 seconds
- Touch Save

26.12 RS485 wireless communications package: Testing the connection

This dialog box is used to test the wireless connection to the optional RS485 wireless communications package.

After testing an RS485 interface with the Connection Test, it has to be configured in the dialog Config. | Start Initial Configuration and the transmission speed for the wireless module has to be set to that of the inverters.
A red test adapter (loop back) is available for testing the wireless connection.

Note

For detailed instructions on how to install and set up the RS485 wireless communications package, see the manual that accompanies the package.

How to test the RS485 wireless connection:

- Select the Config./Advance/RS485 Wireless Package menu

The dialog to test the RS485 Wireless Package is displayed.

- RS485-A
  Display field which indicates the inverter to which the wireless package on the RS485 A interface is assigned, or whether the connection is still free.
- RS485-B
  Display field which indicates the inverter to which the wireless package on the RS485/422 B interface is assigned, or whether the connection is still free.
- Test
  This button is used to start the transmission test.
  A window displaying the connection quality appears.
- Touch Back to close the test window

Note

The wireless package is only working correctly if the test signal reaches 100%.

26.13 Making data corrections

You can adjust the values for previous days or change daily totals from the Config.| Internal | Data Corrections menu:

How to make data corrections:

- Select the Config. | Internal | Data Corrections menu
  The data correction dialog box opens:
- Date
  Enter the day for which the data is to be adjusted.
- Day value
  The day value must correspond to the power meter reading, i.e. the real value for that day.

- For Date enter the desired date in the format "DD.MM.YY" using the virtual keyboard and confirm with OK.
- Enter the correction value for the day in kWh using the virtual keyboard and confirm with OK.
- The value must correspond to the power meter reading, i.e. the real value for that day.
- Touch Save

26.14 Configuring internal device settings

The internal settings of the device can be configured from Config. |Intern | System menu in the following dialogs

- Setting the display brightness
- Setting access protection for the menus
- Serial and license number
- Delete data

How to configure the internal device settings:

- Select the Config./Internal/System menu
  The dialog for display settings is displayed.
- Touch Next to jump to the desired dialog.
- Setting the display brightness
- Switch on at ... hrs, Switch off at ... hrs
  The display backlight can be set to operate only at certain times. Touch the display and the screen lights up again.
- Dim 50% after ... min, Dim 100% after ... min
  The display can be set to dim 50% and/or 100% after a certain number of minutes. If the display is touched, the screen lights up again completely.
- Dialog Slide Show after ... min
  After the selected time, the display shows "Overview graph – Daily graph – Monthly graph – Yearly graph – Overall graph – Large display graph" at 15 second intervals.

- Enable the desired options (see above list).
- Touch the desired input boxes for Hour and Minute.
  The virtual keyboard is displayed.
- Enter the desired times and confirm with OK.
- Touch Save and then Next to go to the next dialog if required.

Setting access protection for the menus

Access to the menu items can be protected by a PIN code (up to 8 digits). The protected menu can be accessed from the initial screen (or menu items from an unprotected menu) only after the correct PIN code is entered when asked for.

Dialog boxes

Pin Code, Repeat

These input boxes are used to enter and confirm a PIN code to block access to the selected menu items.

Diagnosis, Configuration, USB

Access to all or some of these menus can be protected by the PIN code.

Procedure

- Tick all the menus which are to have access protection.
- Touch the input box for the Pin code
  The virtual keyboard appears.
- Enter the PIN code (up to 8 digits) and confirm with OK.
- Touch the input box for Repeat
  The virtual keyboard appears.
- Enter the PIN code (up to 8 digits) and confirm with OK.
- Touch Save and then Next to go to the next dialog if required.

Note

If there was an error in the PIN code confirmation (in the Repeat box), an error message is displayed when exiting this dialog box and the PIN code remains unchanged.

Displaying the serial and license number

These show the Solar-Log™ serial number and license key if applicable. These values cannot be changed.

Delete data

Note

Before carrying out any of the following delete options, we recommend making a data backup either at the PC, see “15.6 Backup” on page 86, or on a USB stick at the device (see user manual), so that the data can be restored if necessary.

Selection options:

- Initialize yield data
  This button deletes all the yield data.
- Initialize inverter configuration
  This button deletes all inverter configuration data.
- Restoring the factory settings is necessary if Solar-Log 1000 is to be used in another system or if a faulty configuration is to be deleted. All settings made on the unit are lost, as well as all data collected during run-time.

Procedure

- Touch the desired delete option (see above list).
- You are prompted for confirmation, with a warning that all data will be lost.
- To delete all the data touch Yes - Save,
  to cancel the delete operation, touch No - Cancel.
- If the delete is confirmed, the device is restarted.

26.15 Updating firmware automatically or manually

To download firmware updates, the Solar-Log 1000 must be connected to the Internet.
Before every firmware update, please make a data backup.

How to configure the settings for firmware updates:

- Go to the Config. menu | Intern | Firmware
  A dialog box opens for configuring the firmware updates.

Selection options:

- Update automatically via the Internet
  If this option is enabled, Solar-Log 1000 is updated automatically, if new firmware is available from Solare Datensysteme GmbH. To complete the update, Solar-Log 1000 restarts after downloading the firmware.
- Also with Analog and GPRS Modems
  If this option is enabled, the firmware is also updated automatically through the modem connection. If you wish to avoid the higher connection costs, leave this option switched off.
- Current Firmware
  Display field: For information, this field shows the firmware version currently installed on the device, along with the firmware date.
- Check for new firmware
  Use this button to search for new firmware immediately.

- Touch the desired option(s)
- Touch Save
- If you want to immediately check for and install firmware updates,
- touch Check for new firmware now
- A status window opens.

If a new firmware version is found, the corresponding information is displayed, and the firmware is downloaded and installed automatically; the device is then restarted.

Note

After restarting, installation of the firmware can take up to 15 minutes to complete. Do not switch off the device during this time!

26.16 Setting the display language

The selected display language applies both to the display and the web browser.

How to set the display language:

- Select the Config. | Intern | Language Settings
  A dialog box opens to set the display language.
- Touch the desired language
- Solar-Log 1000 changes back to the initial startup screen. This is now displayed in the selected language.

26.17 Setting the country settings

The country settings set the currency, date format and time format (independently of the language setting).

How to configure the country settings:

- Select the Config. | Intern | Country Settings
  A list of countries is displayed for selection:
- Select the desired country
- Touch Select to save the country setting.

27 Notifications on the LCD Status Display (Solar-Log 300, 1200 and 2000)

The Solar-Log 300, 1200 and 2000 have an LCD status display for notification on the during installation and operation.

27.1 Meaning of the symbols on the LCD display

The following symbols are shown on the Solar-Log™ LCD display:

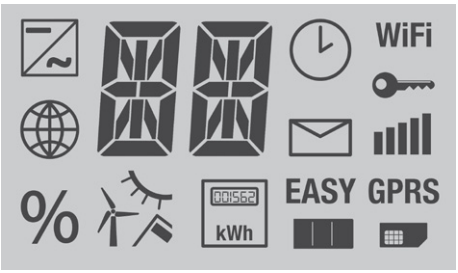


Fig.: LCD display - All symbols active

Meaning of the symbols on the LCD display

Symbol	Meaning
	Inverters
	Internet or Network
	Firmware update progress
	Sensors for - Irradiation - Wind - Temperature

	Meter
	Booting progress
	SIM card
	Easy Installation active
	GPRS available
	Notifications from the Solar-Log™
	Signal strength in combination with GPRS, WiFi or Bluetooth
	Encrypted WiFi connec-tion
	Wireless Internet
	Time
	Input box for fault codes

Fig.: LCD Display - Meaning of the symbols

In this manual, the blinking symbols are depicted like this:

Fig.: Blinking Internet symbol

27.1.1 Fault messages

Fault messages from the connected devices

If a device cannot be contacted by the Solar-Log™ (offline), the respective symbol blinks.
OK is not displayed.

Fault codes for connected devices

The respective component symbol blinks and an "E" is in the first position of the text box.
A blinking code is displayed in the second position of the text box. The fault code sequence always starts with "R." That is followed by a blank and then the code numbers are displayed in the sequence.

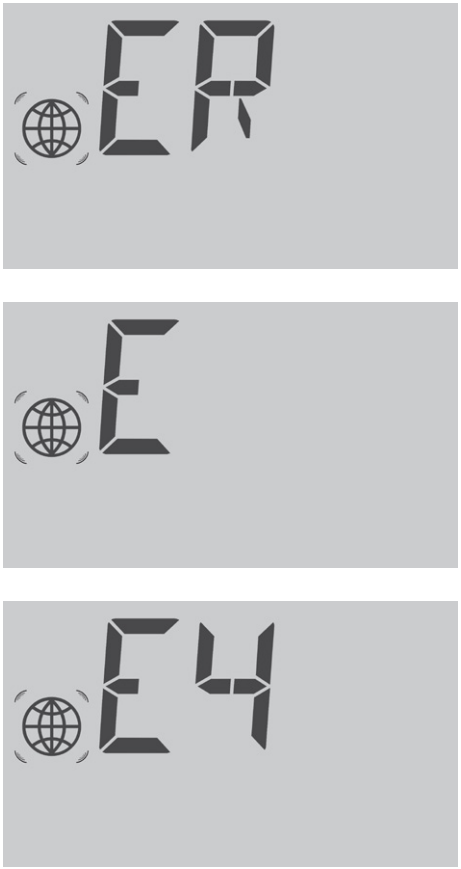


Fig.: Example for a blinking code sequence for Internet - Fault 4

27.2 Notifications on the LCD display

There is a difference between the Easy Installation mode and normal operation in regard to the notifications on the LCD display.

27.3 Normal operation

The symbol for the connected components is continuously illuminated.
When there are no problems or faults, OK is displayed.

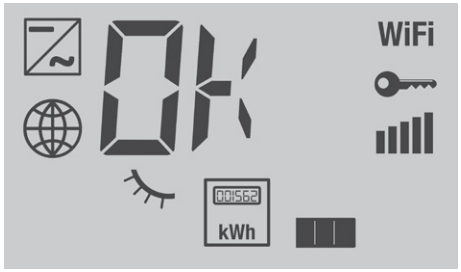


Fig.: LCD display during normal operation

Explanation:

The following devices are connected: inverter, irradiation sensor and meter
Communication: WiFi encrypted, strong signal and internet communication established

28 Notifications by LED (Solar-Log 200, 500 and 1000)

28.1 LED status indications

On the front of the unit at the bottom left are four LEDs that show the operating status of the unit.

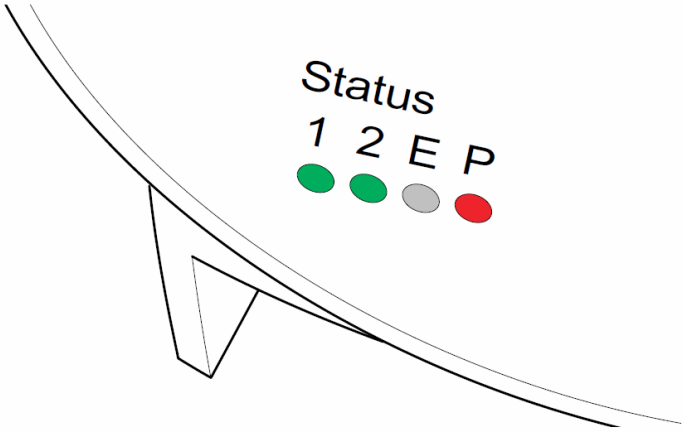


Fig.: Status LEDs

Depending on the operating status, LED 1, LED 2 and LED E may flash quickly or slowly, and may be lit steadily or switched off.
The red LED P indicates the presence of the power supply.
LED E is not lit during normal fault-free operation.. If lit or flashing, it indicates that a malfunction has occurred.

Normal operation

LED 1	LED 2	LED E	LED P	Meaning
quickly	quickly	off		Max. 5 min.: Device starts
lit	slow	off		The time is synchronized via the Internet.
off	quickly	off		The configuration is being imported from the inverters.
lit	lit	off		Normal operation, inverter online
lit	off	off		Normal operation, inverter offline

Faults

LED 1	LED 2	LED E	LED P	Meaning and possible remedy
quickly	quickly	off		For 5 min. during initialization: Error! » Pull out power plug and plug in again.
lit	slow	slow		Failed to synchronize the time via the Internet. » Set the time manually. » Check Internet connection.
off	slow	slow		Configuration invalid or not readable: » Check interface. » Check cable. » Restarting.
		lit		Only with Fronius inverters: No data communication! » Wait for inverter feed-in » Check the wiring.
		quickly		Plant has reported a fault.
			slow	If the P LED is blinking, this indicates that the inverter is being controlled (power reduction) by the feed-in power management.

29 Faults

29.1 Restarting and resetting

29.1.1 Reset buttons

Effects of reset button:

- Device is restarted (reset)
- Factory settings are restored

The reset button is located on the top of the housing.
If the cover is in place, it must be removed to allow access to the reset button.

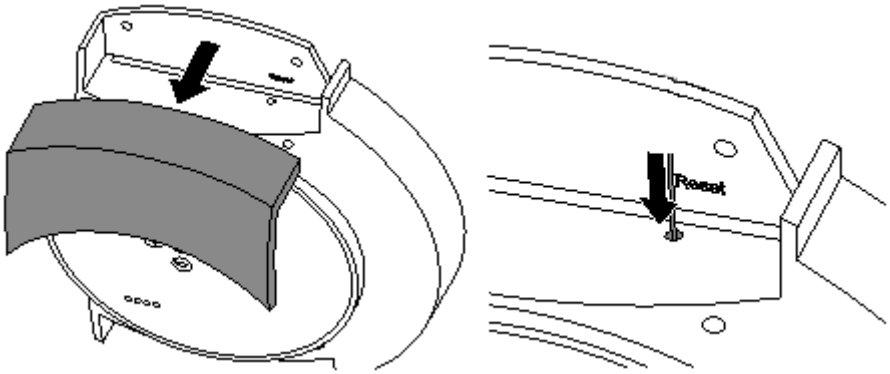


Fig.: Reset buttons

29.1.2 Reset

A reset is necessary if Solar-Log™ is no longer responding to inputs from control buttons or from the PC.
All settings made on the unit are maintained, as well as all data collected during run-time.

Note

If the IP address is changed, Solar-Log™ restarts automatically when the new address is saved.

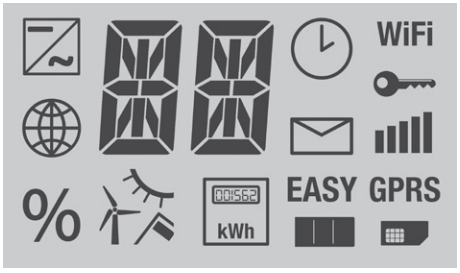
Restarting

Press the reset button with a paper clip or similar pointed object

- The Solar-Log™ beeps and the following is displayed on the LCD:

- After about 5 seconds, the Solar-Log™ beeps three times and the following is displayed:

- Now release the button, the following is then displayed



- The Solar-Log™ reboots itself

Under no circumstances should the power plug simply be disconnected. Do not restart by pulling out the power plug!

29.1.3 Restoring the factory settings

Restoring the factory settings is necessary if Solar-Log™ is to be used on another system or if an incorrect configuration is being deleted.

All settings made on the unit are lost, as well as all data collected during run-time. It is therefore advisable to back up the data before resetting

- System (See Chapter 19.3 on page 108)
- Data (See Chapter 19.4 on page 110);

Status after restoring factory settings

Time: Retained

IP address: Retained with Solar-Log 1200 and 2000, DHCP active with Solar-Log 300

Passwords: Deleted

Configuration data: Deleted

Yield data: Deleted

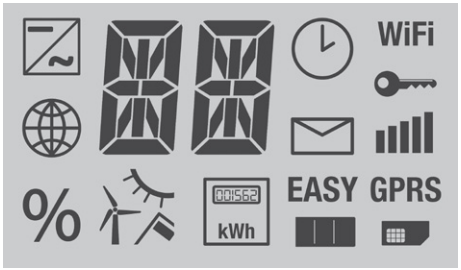
Restoring the factory settings

Press and hold the reset button with a paper clip or similar pointed object

- The Solar-Log™ beeps and the following is displayed on the LCD:

- After about 15 seconds, the Solar-Log™ beeps three times and the following is displayed:

- Now release the button, the following is then displayed



- Resetting the Solar-Log™ to factory settings
- Reboot the Solar-Log™ with the new initial configuration

After the reset button is released, it is still possible to stop the reset to factory settings:

- Press the reset button *again within the first 5 seconds of* the initialization phase.

29.1.4 Rebooting and Resetting via the web menu

Resetting the inverter configuration and deleting yield data

See Chapter 19.5 on page 112.

29.2 Fault messages

29.2.1 Fault messages GPRS

These fault messages are shown in the LCD display and also in the Status box under Configuration | Network | GPRS.

Fault messages GPRS

Error code	Message	Possible cause or remedy
		
-101	Too many failed attempts	After several failed attempts, the modem goes into an error state. Reboot the device and observer which fault code is displayed first.
-111	Wrong parameter	No SIM pin, user name or password was entered. Enter these parameters even if they are not needed. (e.g. 0000 for the pin or "user" for the user name)
-135	Connection error	There is no GSM network coverage or the signal is too weak. The antenna has not been properly attached.
10	No SIM card	No SIM card has been inserted. The SIM card has not been inserted correctly.
11	Pin required	No pin or the wrong pin has been entered. The pin lock has not been removed.
16	Wrong password	Enter the correct APN password.
111	Connection to the network not allowed	The SIM card cannot find an allowed network. Try connecting to other providers.
268	Roaming required	To connect to the network the roaming option is required, but is currently deactivated.

29.2.2 Fault messages time

These fault messages are displayed on the LCD display

Fault messages Time

Error code	Message	Possible cause or remedy
		
1	No time/date set	Set the time and date or use the automatic time synchronization function
TM		Just like error 1 The names have been changed with Firmware 3.0.2.

29.2.3 Fault messages WiFi

These fault messages are shown in the LCD display and also in the Status box under Configuration | Network | WiFi.

Fault messages WiFi

Error code	Message	Possible cause or remedy
		
10	Initialization error	
11	Incorrect WiFi configuration	Please check if all of the required parameters were configured.
12	Error while initializing the wireless LAN module	Potential hardware failure Contact technical support
20	Error while connecting	The signal is too weak. Other network signals are interfering with the connection.
21	No access point found	The access point is turned off or not available. The SSID was entered incorrectly.
30	Authentication failure	The network key entered is incorrect. The encryption type entered is wrong.
99	Unknown error	An unexpected error occurred. If this error continues to occur, contact our technical support.

29.2.4 Fault messages Internet

These fault messages are displayed on the LCD display.
The Internet symbol blinks and the corresponding error code is displayed.

Fault messages Internet

Error code	Possible cause or remedy
	
1	Check the Internet connection and network configuration.
2	The active DNS server configured under Configuration | Network | Ethernet is not available. Check the configurations.
3	No DNS server available Check the configurations and make sure that the correct DNS server has been entered.
4	The configured DNS server is not available. Please enter the correct DNS server.
5	DNS server could not resolve the server address. Check DNS server, and server address.

29.2.5 Fault messages Export to External Server and Backup

These messages are shown in the Status box under Configuration | Network | Export and Configuration | Network | Backup

Fault messages Export (FTP)

Error code	Message	Possible cause or remedy
101	The server address could not be resolved.	The access type was not configured. An alternative DNS server is required. The wrong server was entered. The network connection was disconnected and could not be reestablished.
102	Cannot open socket.	Possible causes: Unknown. If this error continues to occur, contact our technical support.
103	Cannot connect to socket	Possible causes: The connection is blocked by a firewall or a router. The wrong server was entered. The server is offline.
104	"No response from the server."	There is a fault on the FTP server.
105	Wrong response from the server.	The FTP server used is not supported or not configured properly.
106	User / password incorrect.	The user name or password for FTP access was entered incorrectly.
107	Wrong directory.	An incorrect directory was set for the transfer.
108	Unable to send the backup file	The connection was closed. The speed was too limited. Not enough disk space is available
109	Too many users	Too many users are logged in with this account.
110	Log in error	The user name or password for FTP access was entered incorrectly. Too many users are logged in with this account.
111	Error with the remote file names	This is an internal error. Contact support.
112	Error when setting the representation type.	The FTP server used is not supported or not configured properly. Use another FTP server or check the configuration.
113	Error when setting the passive mode.	The FTP server used is not supported or not configured properly. Use another FTP server or check the configuration. The connection is being blocked by a firewall => make the necessary firewall configurations to allow the connection. There is a problem with the Internet connection => check if there is a problem with the settings or with the connection in general.
114	Socket could not be opened.	This is an internal error => create a diagnosis report from the Diagnosis | Report and send it to support.
115	IP address could not be changed.	This is an internal error => Contact support.

Fault messages Export (FTP)

Error code	Message	Possible cause or remedy
116	Socket could not be connected.	The connection is being blocked by a firewall => make the necessary firewall configurations to allow the connection. Server overloaded => try again later.
117	Unknown error	
118	STOR failed.	There is a fault on the FTP server => try again later. => Restart the server => Check free space on the server
119	File could not be opened.	This is an internal error => Contact support.
120	Time exceeded, no answer	Server overloaded => try again later. The connection is being blocked by a firewall => make the necessary firewall configurations to allow the connection.
121	Time exceeded, transmission error	Server overloaded => try again later. There is a problem with the Internet connection => check if there is a problem with the settings or with the connection in general.
122	No answer	
123	Transmission failed.	An FTP server error occurred => try again later. => Restart the server => Check free space on the server
124	Incorrect number of bytes transferred.	Server overloaded => try again later. There is a problem with the Internet connection => check if there is a problem with the settings or with the connection in general.
131 - 144	Connection error	This can occasionally happen with GPRS connections. Try it again. The network cable has a loose connection. There are problems with your Internet connection.
150	Error when renaming the remote file	Multiple access attempts => terminate other connections to the FTP server.
160	The proxy NTML domain is not in the user name	The user name with NTML authentication has to have the format domain\user.
161	Proxy NTLM authentication failed	There is a problem with the NTLM authentication. Check the proxy user and password.
162	No proxy NTLM challenge received	The proxy server did not send a challenge. Check the proxy settings.
163	Proxy could not reserve the buffer	Internal error Create a diagnosis report and contact support.
164	Proxy basic authentication failed	There is a problem with the authentication. Check the proxy user and password.

Fault messages Export (FTP)		
Error code	Message	Possible cause or remedy
165	Proxy no authentication header	The proxy server did not request a supported authentication set to switch to basic or NTLM.
166	Proxy unexpected server reply	Check the proxy settings.
199	Last transmission attempt failed but no known error.	This is an internal error => contact support.
200	Error when creating files	Incorrect serial number. Error during firmware update.
222	HTTP transfer to the same server	The HTTP and FTP transfer have been configured with the same server. Please enter only the transfer type that was configured for the portal.

29.2.6 Fault message e-mail transfer

These fault messages are shown in the LCD display and also in the Status box under Configuration | Network | E-mail.

Portal Transfer Fault messages		
Error code	Message	Possible cause or remedy
		
General error when sending e-mail		
1	DNS error	Type of Internet access set to "None" => Set the correct access type An extra DNS server needs to be entered => enter the correct DNS server There is no connection to the network =>Check the cable
2	User / password incorrect.	The user name or password for SMTP access was entered incorrectly => Double check the password if entered correctly
3	Cannot connect to socket	The connection is being blocked by a firewall => make the necessary firewall configurations to allow the connection. Server overloaded => try again later

Error when sending e-mail via a secure connection		
51	SSL session could not be established.	This is an internal error => If this error continues to occur, contact support.
52	Could not set SSL proposals	This is an internal error => If this error continues to occur, contact support.
53	Could not set TCP option SSL_CLIENT	This is an internal error or the e-mail server or security option is not supported at the port entered. => If this error continues to occur, contact support or use a supported e-mail server.
54	Could not set TCP option SSL_SESSION	This is an internal error or the e-mail server or security option is not supported at the port entered. => If this error continues to occur, contact support or use a supported e-mail server.
55	Could not start SSL client	This is an internal error or the e-mail server or security option is not supported at the port entered. => If this error continues to occur, contact support or use a supported e-mail server.
56	Error with SSL Handshake	The e-mail server or security option is not supported at the port entered. => Use a supported e-mail server or check the options for sending secure e-mail.
57	No SSL port?	The e-mail server or security option is not supported at the port entered. => Use a supported e-mail server or check the options for sending secure e-mail (wrong port?).
General / Group error when sending e-mail		
98	Canceled due to previous errors	E-mail send aborted due to previous errors (there are several e-mails to send, but the send failed with the first e-mail. This error is entered for all of the following e-mails rather than trying to send them as well.) => Try to solve the problem based on the error message from the first e-mail sent.
99	Unknown error	The source of this error could not be determined => If this error continues to occur, contact support.

29.2.7 Portal Transfer Fault messages

Portal Transfer Fault messages

Error code	Message	Possible cause or remedy
101	The server address could not be resolved.	The access type was not configured. An alternative DNS server is required. The wrong server was entered. The network connection was disconnected and could not be reestablished.
102	Cannot open socket.	Possible causes: Unknown. If this error continues to occur, contact our technical support.
103	Cannot connect to socket	Possible causes: The connection is blocked by a firewall or a router. The wrong server was entered. The server is offline.
104 and 106	Connection error	This can occasionally happen with GPRS connections. Try it again. The network cable has a loose connection. There are problems with your Internet connection.
220	Authentication failure (portal)	The portal registration was done incorrectly. The portal was not configured for HTTP transfers. The wrong server was entered.
Other	General errors	There is detailed description of this error. If this error continues to occur, contact our technical support.

.

29.2.8 Fault messages Feed-in Management

These fault messages are displayed on the LCD display.

The percentage symbol blinks and the corresponding error code is displayed.

Fault messages Feed-in Management

Error code	Possible cause or remedy
	
1	Undefined status for the PM+ interface or an invalid channel setting for the active and reactive power management. => Check the wiring and configuration.
2	Communication error with the I/O Box => Check the wiring and the power supply for the I/O Box. => Check the interface selected under Configuration | Special Functions | Feed-in Management | Profile.

29.2.9 Special cases

The e-mail symbol blinks

There are unread notifications. These can be read from

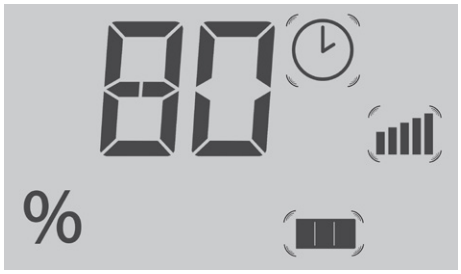
- the display (only Solar-Log 1200 and 2000) or
- in the browser from the Diagnostic | Event Log

menu.

Firmware update

During a firmware update, the installation status is shown on the LCD display.

Step 1 of the firmware update



Step 2 of the firmware update: The progress is displayed as a percentage.

After the firmware has been completely imported, the Solar-Log™ reboots itself and BOOT in displayed in the text field.

30 Disposal

WARNING

Solar-Log™ contains electronic components that can release highly toxic substances if burned or disposed of along with domestic waste.

Please send the Solar-Log™ back to the manufacturer:

Solare Datensysteme GmbH
Fuhrmannstraße 9
72351 Geislingen-Binsdorf
Germany

31 Technical Data

	Product comparison	Solar-Log^{200}	Solar-Log^{500}	Solar-Log^{1000}
Inverter communication / inverter = INV	PM+ (2)	●	●	●
	PM+ / WiFi (2)	●	●	●
	PM+ / GPRS (2)	●	-	●
	Bluetooth (BT) (2)	●	●	●
	WiFi (Wireless Lan) (2)	●	●	●
	Bluetooth (BT) / WiFi (2)	●	●	●
	GPRS (2)	●	-	●
	Central inverter SCB and SMB (2)	●	-	●
	Max. number of inverters (depends on the INV manufacturer)	1/1 manufacturer	up to 10/1 manufacturer	up to 10/1 manufacturer
	Communication interface	1 x RS485/RS422	1 x RS485 / RS422 (one INV manufacturer per bus)	1 x RS485, 2x RS485 / RS422, 1 x CAN (one INV manufacturer per bus)
	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 / tracker level)	●	●	●
	Inverter failure, status of fault and power monitoring	●	●	●
	Sensor system connection (irradiation/ temp./ wind)	● 3)	● 3)	●
	E-mail and text message (SMS) Alarm	●	●	●
	Local alarm (potential-free contact)	-	-	●
	Yield forecast and degradation calculation	●	●	●
	Self-produced energy consumption: Digital electricity meter	●	●	●
	Self-produced energy consumption: Control of ext. consumer Appliance	-	-	●
Visualization	Integrated web servers	●	●	●
	Graphic visualization – PC local and Internet	●	●	●
	Graphic visualization – USB flash drive	-	-	●
	LED – status display	●	●	●
	Display on device	-	2-line text display	full-graphic display
	Controls on the device	-	Keypad	via touch screen
	Large external display RS485 / S_0 pulse	-	●	●

Product comparison	Solar-Log200	Solar-Log500	Solar-Log1000
Ethernet network	●	●	●
USB flash drive	-	-	●
External Analog / GPRS (GSM) modem (RS232)	-	-	●
Potential-free contact (relay)	-	-	●
Alarm contact (anti-theft)	-	-	●
Power supply 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 Mounting / protection level	Plastic/22.5 x 4 x 28.5/Wall-mounted/ IP 20 (indoor use only)		
Connection to Solar-Log™ WEB	●	●	●
Multi-lingual (DE, EN, ES, FR, IT, NL, DK)	●	●	●
Memory, Micro SD card, 2 GB, endless data logging	●	●	●
Warranty	5 years		

Interfaces

General Data

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, self-consumption and SCB and SMB inverters can be found on our website www.solar-log.net.
3) Operation with RS422 inverter is not possible on the same bus.

Details	Solar-Log200	Solar-Log500	Solar-Log1000
Accessories	Ready-to-install cable kits for most supported inverters		
	Digital electricity meter		
	PowerLine Package		
	RS485 Wireless Package		
	Sensors		
	-	-	Mobile Service Package
	-	-	Modem Package
	Surge protection		
Accessories for SMA inverters	Special PiggyBack RS485 (except TL-20 series)		
	Data Module SMA RS485		

Top Features	Solar-Log^{200}	Solar-Log^{500}	Solar-Log^{1000}
Compatibility	Compatible with all major inverters on the market, see www.solar-log.com for more details.		
Software	Web interface, no software installation requried.		
Easy Installation	Installation is possible without PC and installation expertise.		
	The inverter detection and Internet registration is enabled by default and is started automatically.	Query for additional information, then automatic inverter detection and Internet registration.	
Network recognition	Automatic search for the DHCP server and assignment of a valid IP address on the local network.		
Local network accessibility	Registration is done with its name and the Solar-Log™ can be accessed directly from a web browser by entering http://solar-log in the address bar.		
	The IP address of the Solar-Log™ no longer needs to be known, unless there are several Solar-Logs in the network.		
Additional function	Monitor and optimize the consumption of self-produced power		
	Evaluation of Sensor Box Commercial data		
	-	-	Monitoring of central inverters
	Evaluation of Sensor Box data		
Support for the Solar-Log™ SCB and Solar-Log™ SMB	-	-	Monitoring large plants with the support of the Solar-Log^{1000} or Solar-Log^{1000} PM+ with active power reduction.
	-	-	Solar-Log^{1000} PM+ reactive power control.

	Product comparison	Solar-Log 300	Solar-Log 1200	Solar-Log 2000
Basic functions	PM+ (2)	●	●	●
	PM+ / WiFi (2)	●	●	-
	PM+ / GPRS (2)	●	●	●
	Bluetooth (BT) (2)	●	●	-
	WiFi (Wireless Lan) (2)	●	●	-
	Bluetooth (BT) / WiFi (2)	●	●	-
	GPRS (2)	●	●	●
	Solar-Log™ Meter (CT)	●	●	-
	Central inverter SCB and SMB	-	-	●
	Communication interface	1 x RS485 / RS422 (one INV manufacturer per bus)	1 x RS485 1 x RS485 / RS422 (1 INV manufacturer per bus)	1 x RS485, 2x RS485 / RS422, 1 x CAN (one INV manufacturer per bus)
	Max. plant size	15 kWp / 1 inv. manufacturer	100 kWp max 2 inv. manufac-turer	2000 kWp up to 3 inv. manufac-turer
	max. cable length	max. 1000 m 1)	max. 1000 m 1)	max. 1000 m 1)
Plant monitoring	MPP tracker monitoring (depending on inverter type)	●	●	●
	Inverter failure, status of fault and power monitoring	●	●	●
	Sensor system connection (irradiation/ temp./ wind)	● 3)	● 3)	● 3)
	E-mail and text message (SMS) Alarm	●	●	●
	Alarm (local)	-	-	●
	Yield forecast and degradation calculation	●	●	●
	Self-produced energy consumption: Digital electricity meter	●	●	●
	Self-produced energy consumption: Managing external appliances	●	●	●

	Product comparison	Solar-Log 300	Solar-Log 1200	Solar-Log 2000
Visualization	Integrated web servers	●	●	●
	Graphic visualization – PC local and Internet	●	●	●
	LCD Status Display	●	●	●
	Display on the unit	-	4.3″ TFT color display	4.3″ TFT color display
	Controls on the unit	-	via touch screen	via touch screen
	Large external display RS485 / S_0 pulse	●	●	●
Interface	Ethernet network	●	●	●
	USB flash drive	●	●	●
	Potential-free contact (relay)	-	●	●
	Alarm contact (anti-theft)	-	-	●
General Data	Input / Output voltage Power 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 Mounting / protection level	Plastic / 22.5 x 4 x 28.5 / Wall-mounted / IP 20 (indoor use only)		
	Connection to Solar-Log™ WEB "Commercial Edition"	●	●	●
	Multi-lingual (DE, EN, ES, FR, IT, NL, DK)	●	●	●
	Memory, Micro-SD, 2 GB, Endless-loop data recording	●	●	●
	Warranty	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, self-consumption and SCB and SMB inverters can be found on our website www.solar-log.com.
3) Using every inverter on the same bus is not always possible, see the inverter database www.solar-log.com

Top Features	Solar-Log 300	Solar-Log 1200	Solar-Log 2000
LCD-Status-Display	Status display for installation and operations		
	Installation is possible without PC and installation expertise.		
Easy Installation	The inverter detection and Internet registration is enabled by default and is started automatically.	Query for additional information, then automatic inverter detection and Internet registration.	-
Network recognition	Automatic search for the DHCP server and assignment of a valid IP address on the local network.		
Local network accessibility	Registration is done with its name. The IP address of the Solar-Log™ no longer needs to be known unless there are several Solar-Logs in the network. The Solar-Log™ can be accessed directly from a web browser with this address: http://solar-log.		
	Monitoring, optimization and managing of self-consumption with a fixed regulation of active power including the calculation of self-consumption.		
Additional function	Evaluation of Sensor Box Commercial data		
	-	-	Monitoring of central inverters
Solar-Log™ Meter	Monitoring, feed-in management and power meter.		-
Support for the Solar-Log™ SCB/SMB	-	-	Individual string monitoring
Solar-Log™ PM+ functionality	Remote controlled active power reduction and reactive power adjustments		Monitoring large plants with the support of the Solar-Log 2000 or Solar-Log 2000 PM+ with active power reduction and reactive power control along with response signals.

	Interfaces	Solar-Log 300	Solar-Log 1200	Solar-Log 2000
Inverter interface	RS485/RS422 – interface usage	RS485 / RS422 – combined interface usage	RS485 – interface, RS485 / RS422 – combined interface usage	RS485 A – interface, RS485 / RS422 B – / RS485 / RS422 C* - combined interface usage
	RS485 – interface usage	Inverter connection		
		Connection of a Sensor Basic to record environmental data (irradiance and module sensor)	Connection of a Sensor Box Commercial to record environmental data (irradiance, module and ambient temperature, wind sensor)	
		Connection of meter for self-consumption according to IEC 60870		
		-	Connection of the display panels produced by Schneider Displaytechnik, Rico or HvG	
		-	-	Connecting the Utility Meter and I/O Box for PM remote control technology
	RS422 – interface usage	RS 422 Fronius / Sunville connectible without additional interface converters		
	CAN bus	-	-	For example, connecting Voltwerk INV
Additional function interfaces	2x S_0 In / 1x S_0 out	S_0 pulse input – for optional recording and calculation of self-produced power consumption.		
		Second input to connect an additional power meter		
		S_0 pulse output to connect large external displays, impulse factor can be set to any value		
	Relay	-	External switch control e.g. heat pumps	
	Alarm	-	-	Connection for anti-theft protection via contact loop for external alarms via potential-free contact
	USB connection	To access data		
		Import firmware updates at plants		
	PM+ interface (optional)	PM+ (Power Management)		
		For connection of a ripple-control receiver to regulate the plant		
		fulfills the EEG 2012 requirements		
	Solar-Log™ Meter (optional)	Current measurements via transformers (extra accessory) up to 2 x 3 phases or 6 single phases		

Network

Network	Connection to the Internet (Ethernet, fixed IP address or DHCP)
GPRS (optional)	Antenna connection and SIM card slot for Solar-Log™ with integrated GPRS

* not with GPRS models

32 Appendix

32.1 Internet ports

If the Solar-Log™ is connected to the Internet via a router, you must ensure that the following ports on the router have been unblocked for the Solar-Log™:

Port	Protocol	Connection type
21	TCP	FTP data transfer (passive mode)
25	TCP	SMTP e-mail protocol
53	UDP/TCP	DNS name resolution (separate DNS possible)
80	TCP	HTTP Web server
123	UDP	HTTP Web server

32.2 Country specific inverter detection with Easy Installation

During the Easy Installation, the Solar-Log 1200 and 2000 interfaces are check for connected county specific inverters.

The countries and country specific settings for the available inverters brands are listed in the table.

If the installed inverter brand is not listed for your country, Easy Installation cannot be used.

Country	Inverter brand
Germany	SMA/PowerOne/Kaco/SolarMax/Fronius
Spain	SMA/Fronius/PowerOne/SolarMax
France	SMA/Fronius/PowerOne/RefuSol/SolarMax
Italy	SMA/PowerOne/Fronius/Kaco/SolarMax
Switzerland	SMA/SolarMax/Kostal/Fronius/PowerOne
Luxembourg	SMA/PowerOne/Kostal/Danfoss/Sunways
Belgium	SMA/PowerOne/Kostal/Danfoss/Sunways
Netherlands	SMA/PowerOne/Kostal/Danfoss/Sunways
United Kingdom	SMA/PowerOne/Fronius
Poland	SMA/PowerOne/Diehl/Kaco
Czech Republic	SMA/PowerOne/Diehl/Kaco
Slovakia	SMA/PowerOne/Diehl/Kaco
Austria	SMA/PowerOne/Kaco/SolarMax/Fronius
Slovenia	SMA/PowerOne/Diehl/Kaco
Bulgaria	SMA/PowerOne/Diehl/Kaco
Greece	SMA/PowerOne/Diehl/Kaco
Israel	SMA/Diehl/Fronius/Kaco/PowerOne
United States	SMA/Fronius/PowerOne/Kaco/Eaton
Canada	SMA/Fronius/PowerOne/Kaco
Australia	SMA/PowerOne/Fronius/Delta
Finland	SMA/Danfoss/PowerOne/Fronius
Denmark	SMA/Danfoss/PowerOne/Fronius
Malaysia	SMA/Delta
Liechtenstein	SMA/SolarMax/Kostal/Fronius/PowerOne
Japan	SMA
Ireland	SMA/PowerOne/Fronius

32.3 Wiring meters to record self-consumption

To record self-consumption, an additional meter has to be installed. There are two possibilities how to install the meter.

32.3.1 Detection of entire consumption

This meter must measure the total consumption of the house. The meters installed by grid operators, or two-way meters, cannot be used to implement this function.

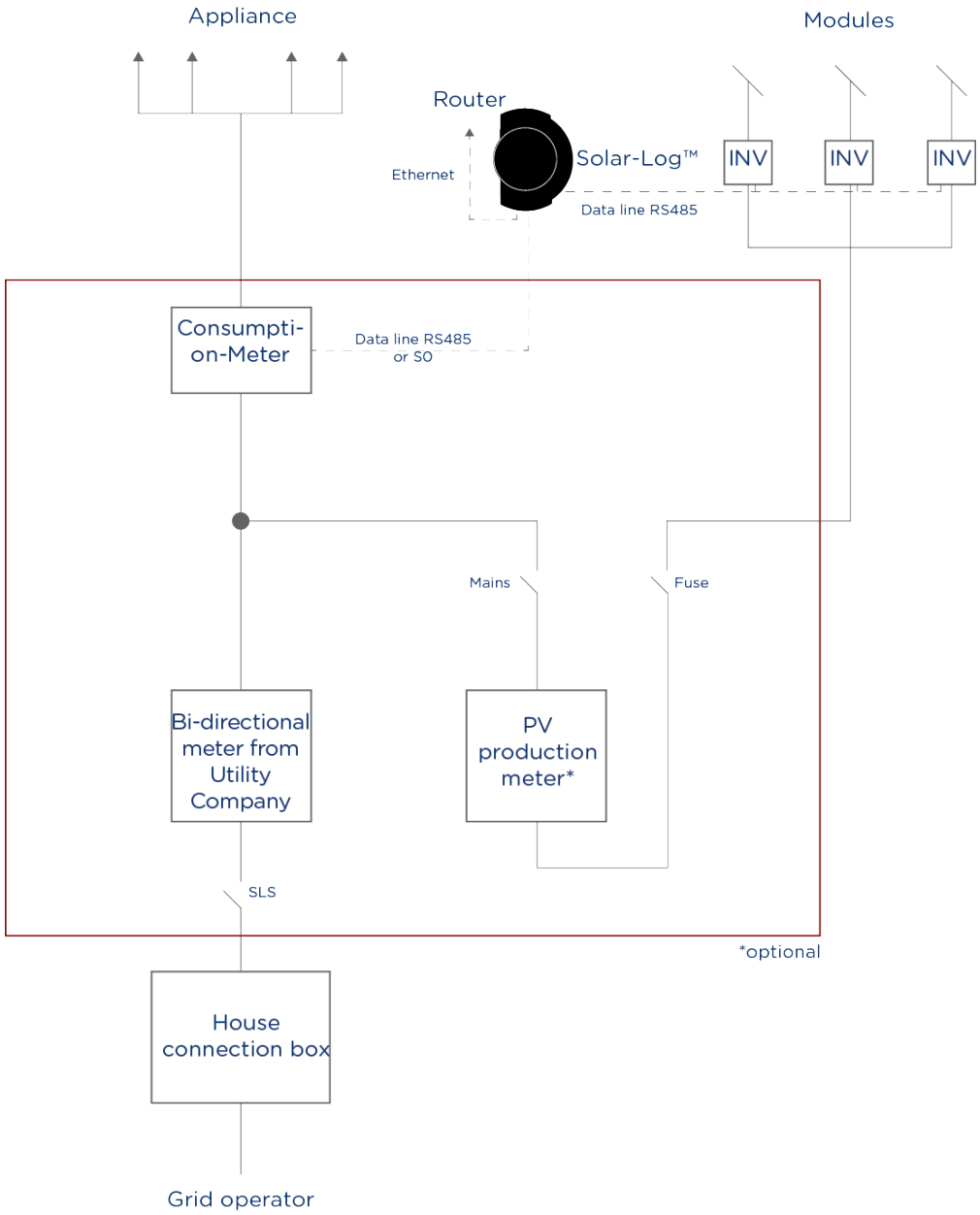


Fig.: Wiring diagram for recording self-consumption with consumption meter

The PV output meter displayed is optional.

32.3.2 Detection via bidirectional counter

When it is fed into a sub-distribution, the above variant can not be applied. In this case, the consumption can be detected via a bidirectional meter. Solar-Log ™ can thereby calculate the consumption.

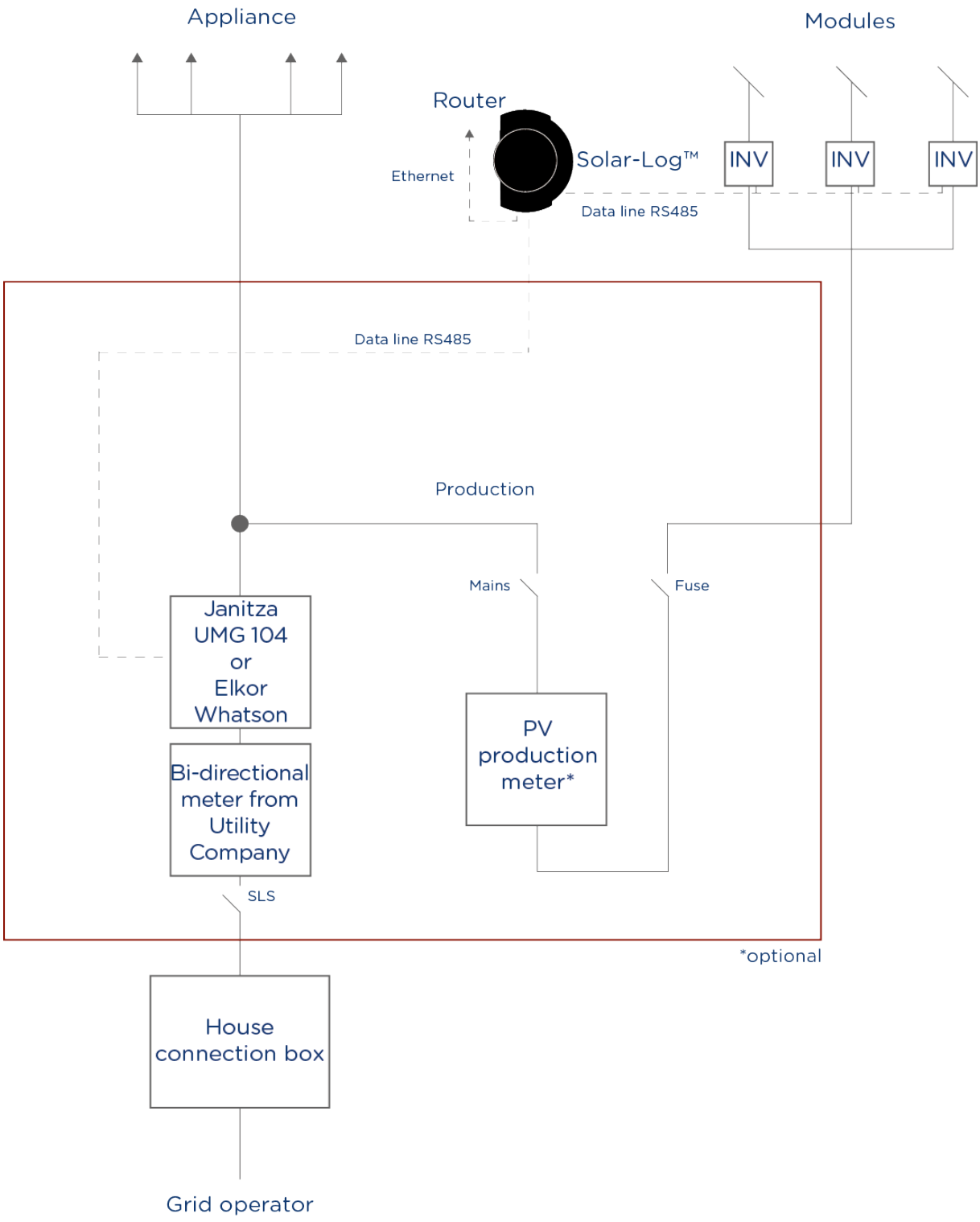
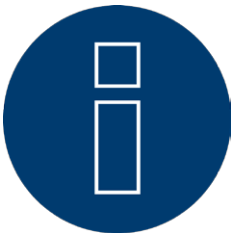


Fig.: Wiring diagram for recording self-consumption with bidirectional meter

32.4 Connection examples for ripple control receivers

Grid operators have not agreed on a universal standard for ripple control receiver signals. As result, there are several variations with the respective wiring and configuration in the Solar-Log™ firmware.
All of the examples refer to active power reduction. When ripple control receivers are used for reactive power, they are configured in the same way.

Note



The following connection examples are requirements from different grid operators. The labels for the relays in the wiring diagram and in the Solar-Log™'s configuration matrix can differ.

WARNING

Please note the specifications for the load of the ripple control receiver's relays. In certain circumstances, the relays have to be connected to intermediate relays.
In any case, the inputs D_IN_X have to be supplied with the control voltage (5V DC) from the Solar-Log™ (PM+ interface Pin 1 and 6).

WARNING

When connecting two ripple control receivers: If the ripple control receiver uses binary signal coding, signal feedback via the ripple control receiver for the reactive power must be prevented by fitting diodes.

WARNING

Emergency stop commands may not be processed via the Solar-Log™ These commands have to function directly with the corresponding protection equipment such as grid and plant protection, section switches and Q/U protection.

32.4.1 Variation with 4 relays (ENBW >100kWp)

Specifications

Ripple control receiver signals

Level	K1	K2	K3	K4	Power
1	On	Off	Off	Off	100%
2	Off	On	Off	Off	60%
3	Off	Off	On	Off	30%
4	Off	Off	Off	On	0%

Wiring

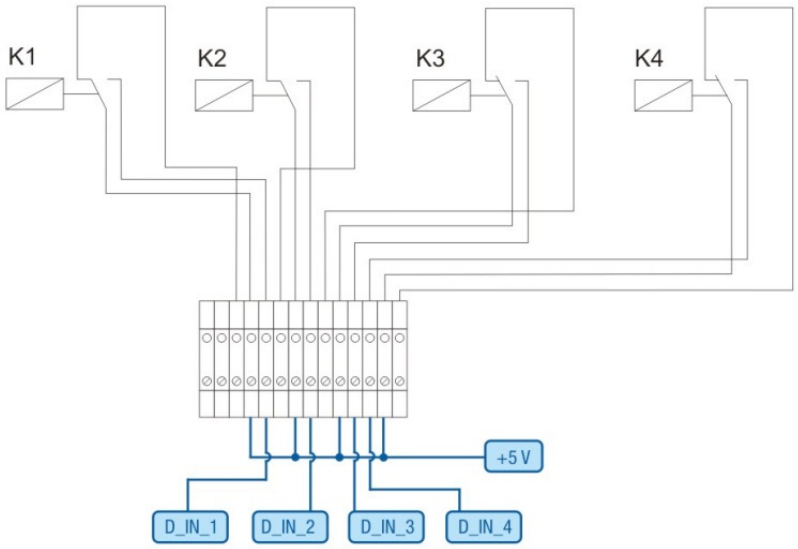


Fig.: Wiring a ripple control receive with 4 relays - example 1

Connecting PM+ terminal connector and ripple control receiver

PIN	Assignment	Meaning
1	+5V	Control voltage for active power
2	D_IN_1	Level 1 100%
3	D_In_2	Level 2 60%
4	D_In_3	Level 3 30%
5	D_In_4	Level 4 0%
6	+5V	Control voltage for reactive power (unused)

Configuration in browser menu

Remote controlled active power reduction Configuration | Special Functions | Feed-in Management | Active Power

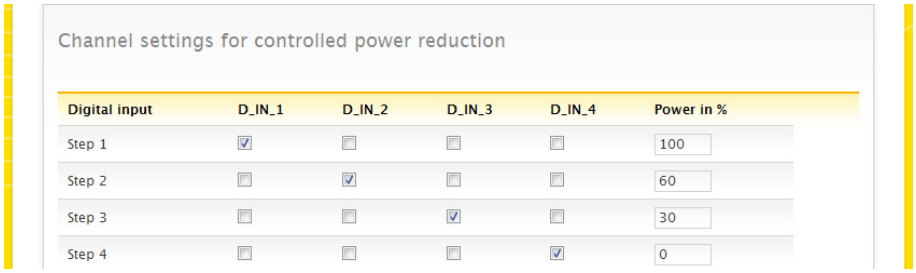


Fig.: Channel settings for active power reduction - example 1

32.4.2 Variation with 2 relays

Specifications

Ripple control receiver signals

Level	K1	K2	Power
1	Off	Off	100%
2	On	Off	60%
3	Off	On	30%
4	On	On	0%

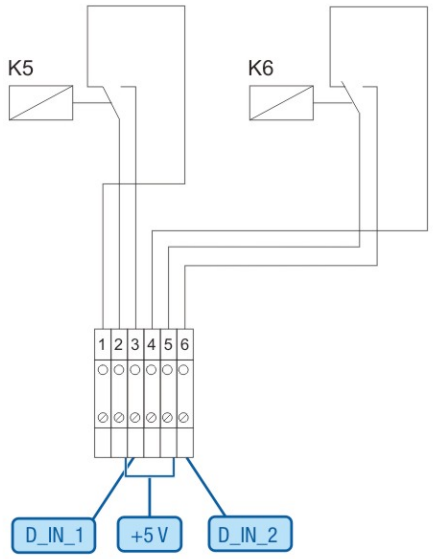


Fig.: Wiring a ripple control receive with 2 relays - example 2

Connecting PM+ terminal connector and ripple control receiver

PIN	Assignment	Meaning
1	+5V	Control voltage for active power
2	D_IN_1	K5 switched
3	D_In_2	K6 switched
6	+5V	Control voltage for reactive power (unused)

Configuration in browser menu

Remote controlled active power reduction Configuration | Special Functions | Feed-in Management | Active Power

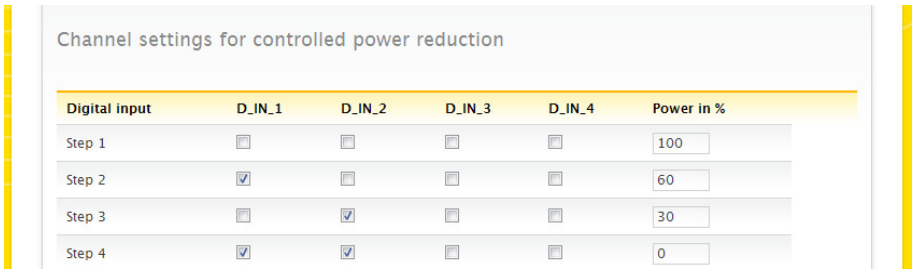


Fig.: Channel settings for active power reduction - example 2

32.4.3 Variation with 3 relays

Specifications

Ripple control receiver signals

Level	K1	K2	Power
1	Off	Off	100%
2	On	Off	60%
3	Off	On	30%
4	On	On	0%

Wiring

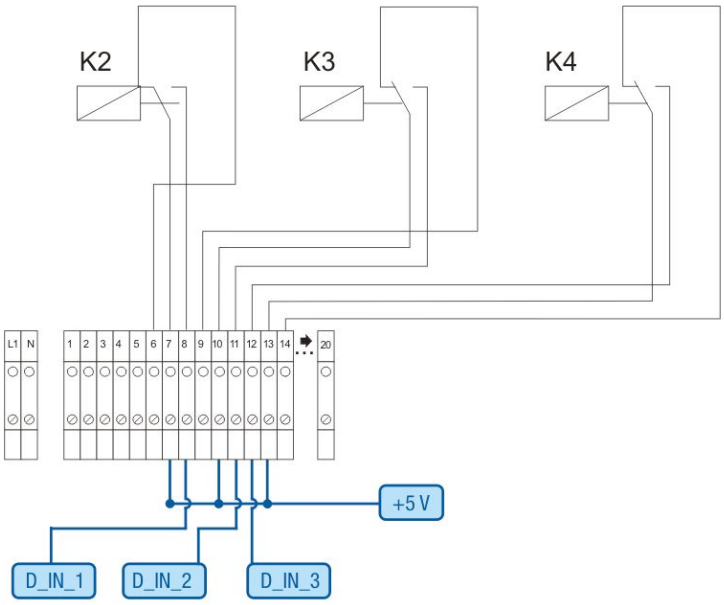


Fig.: Wiring a ripple control receive with 3 relays - example 3

Connecting PM+ terminal connector and ripple control receiver

PIN	Assignment	Meaning
1	+5V	Control voltage for active power
2	D_IN_1	Level 2 60%
3	D_In_2	Level 3 30%
4	D_In_3	Level 4 0%
5	D_In_4	unused
6	+5V	Control voltage for reactive power (unused)

Configuration in browser menu

Remote controlled active power reduction Configuration | Special Functions | Feed-in Management | Active Power

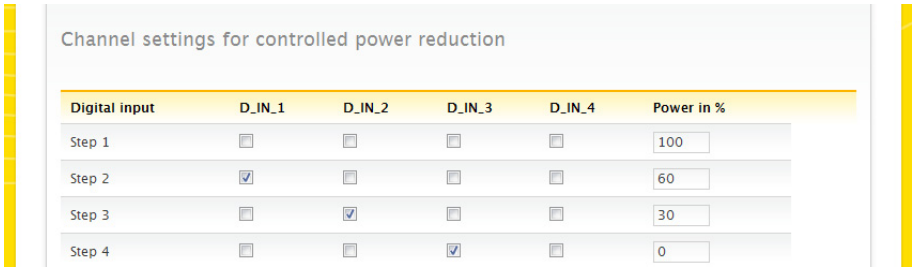


Fig.: Channel settings for active power reduction - example 3

32.4.4 Variation with 5 relays (including emergency stop)

Specifications

Ripple control receiver signals						
Level	K1	K2	K3	K4	K5	Power
1	On	Off	Off	Off	Off	100%
2	Off	On	Off	Off	Off	60%
3	Off	Off	On	Off	Off	30%
4	Off	Off	Off	On	Off	0%
5					On	Emergency stop

The relay is continuously activated for a particular level (condition). There is always only one relay that is activated.

Wiring

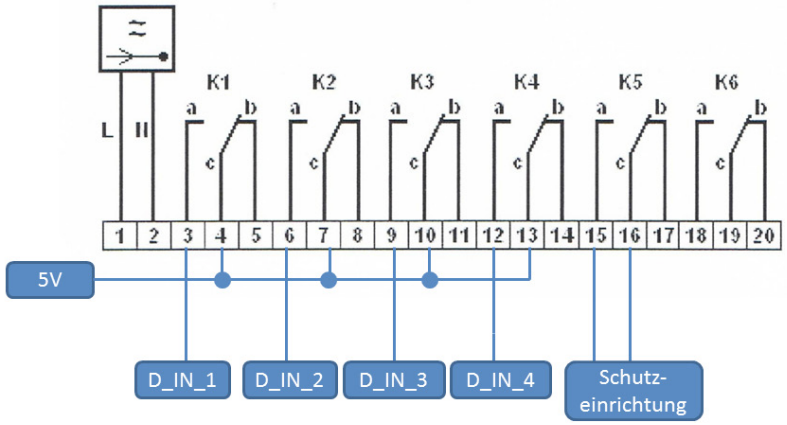


Fig.: Wiring a ripple control receive with 5 relays - example 4

WARNING

Emergency stop commands may not be processed via the Solar-Log™ These commands have to function directly with the corresponding protection equipment such as grid and plant protection, section switches and Q/U protection.

Connecting PM+ terminal connector and ripple control receiver

PIN	Assignment	Meaning
1	+5V	Control voltage for active power
2	D_IN_1	Level 1 100%
3	D_In_2	Level 2 60%
4	D_In_3	Level 3 30%
5	D_In_4	Level 4 0%
6	+5V	Control voltage for reactive power (unused)

Configuration in browser menu

Remote controlled active power reduction Configuration | Special Functions | Feed-in Management | Active Power

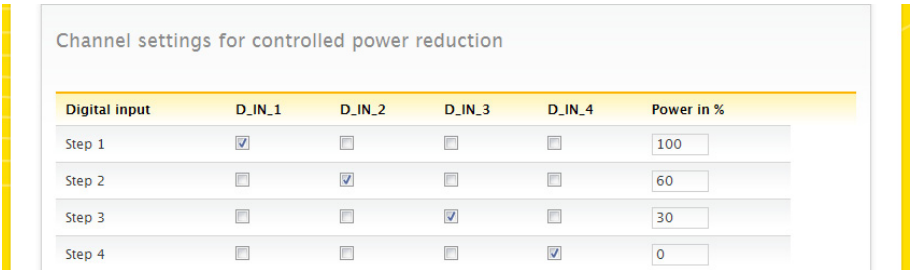


Fig.: Channel settings for active power reduction - example 4

32.5 Digital Interfaces

Solar-Log™provides two interfaces for exporting the current data. The data is updated every 15-60 seconds.

WARNING

The following descriptions for two interfaces are intended for users with a technical background. Solare Datensysteme provides these interfaces without any guarantee and with the exclusion of any legal liability. We do not offer any telephone support for these two interfaces.
General information can be found, for example, in Wikipedia:
http://en.wikipedia.org/wiki/Ajax_(programming)

32.5.1 Modbus TCP

The software interface function allows external systems to have access to internal data on the Solar-Log ™. The interface has been designed so that live data can be retrieved. The function is available for every Solar-Log™ with the current firmware version.
The interface cannot be used to configure the Solar-Log ™ and the devices connected to it. The entire configuration is carried out via the Solar-Log ™ Internet browser interface.

Modbus TCP Port: 502
Slave ID: 1
Implementing Modbus functions:
Read 04 or several 16 bit words

MODBUS TCP free

Data	Unit	Value Range	Address	Number Reg.	Func Codec	since Firmware	Description
lastUpdate-Time	Sec	32bit unsigned	3500	2	04		Unixtime when last register update has happened. 0=no live data yet
Pac	W	32 bit unsigned	3502	2	04		Total Pac of all inverters and inverter type meters
Pdc	W	32 bit unsigned	3504	2	04		Total Pdc of all inverters
Uac	V	16bit unsigned	3506	1	04		Average Uac of all inverters
DC voltage:	V	16bit unsigned	3507	1	04		Average Udc of all inverters
Daily yield	Wh	32 bit unsigned	3508	2	04		Summarized daily yield of all inverters
Yesterday yield	Wh	32 bit unsigned	3510	2	04		Summarized daily yield of all inverters
Monthly yield	Wh	32 bit unsigned	3512	2	04		Summarized monthly yield of all inverters
Yearly yield	Wh	32 bit unsigned	3514	2	04		Summarized Yearly yield of all inverters
Total yield	Wh	32 bit unsigned	3516	2	04		Summarized Total yield of all inverters
Pac consumption	W	32 bit unsigned	3518	2	04		Total Pac of all consumption meters
Daily yield cons.	Wh	32 bit unsigned	3520	2	04		Summarized daily yield of all consumption meters
Yesterday yield cons.	Wh	32 bit unsigned	3522	2	04		Summarized daily yield of all consumption meters
Monthly yield cons.	Wh	32 bit unsigned	3524	2	04		Summarized monthly yield of all consumption meters
Yearly yield cons.	Wh	32 bit unsigned	3526	2	04		Summarized Yearly yield of all consumption meters
Total yield cons.	Wh	32 bit unsigned	3528	2	04		Summarized Total yield of all consumption meters
Total Power	Wh/ Wp	32 bit unsigned	3530	2	04		Total installed generator power

32.5.2 JSON interfaces

The JavaScript Object Notatio (JSON) is a compact data format to transmit data between applications. The objects documented here can be used in connection with other programs.
The current data can be accessed via HTTP protocol. To do this an HTTP Post Inquiry needs to be sent to the Solar-Log™. The object requested has to be in the body:

```
POST /getjp HTTP/1.1
Host: solar-log-xxxx
...
Content-Length: 20
Connection: keep-alive
Pragma: no-cache
Cache-Control: no-cache

{„801“:{„170“:null}}
```

The reply contains a JSON object as a character string in the body:

```
HTTP/1.1 200 OK
Date: Mon, 31 Mar 2014 10:42:32 GMT
Server: IPC@CHIP
Content-Type: text/plain
Transfer-Encoding: chunked

{„801“:{„170“:{„100“:“31.03.14 10:42:15“,“101“:0,“102“:0,“103“:0,“104“:0,“105“:0,“106“:0,“107“:3527647,
“108“:0,“109“:0,“110“:0,“111“:0,“112“:0,“113“:1132434,“114“:0,“115“:0,“116“:45000}}}
```

The JSON character sting needs to be converted to an object first before it can be data can be processed in a Java script. For example, when the JSON character string contains the variable “tdata” the conversation looks like this:

```
var LiveDaten=JSON.parse(tdata)[801][170];
```

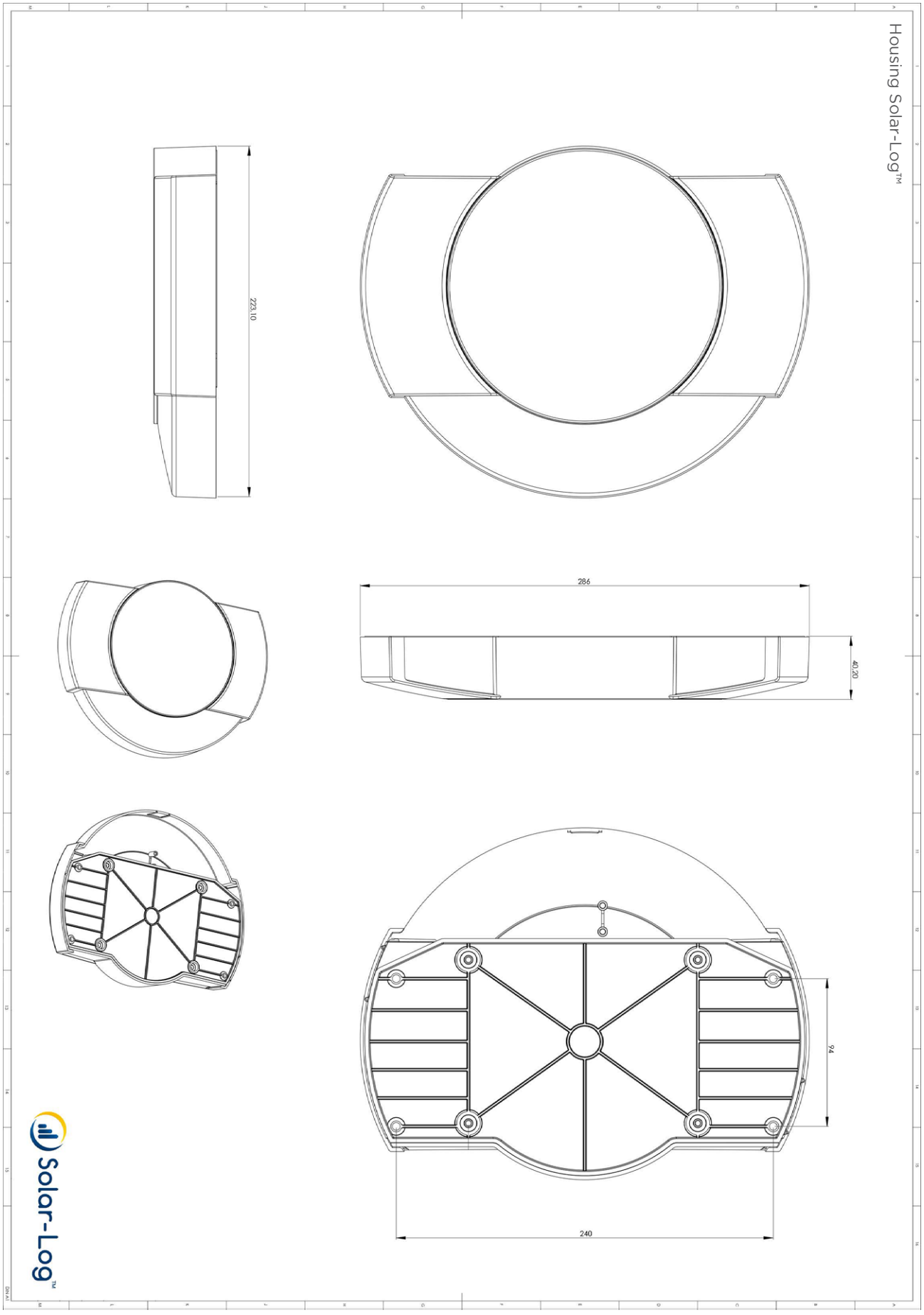
After that the individual data fields can be accessed via the indexes specified in the following table.
For example, the current PAC output is displayed as follows:

```
alert(„The current AC output is:„ + LiveDaten[101] + „ W“);
```

JSON objects

Data	Value Range	Unit	Index	Description
lastUpdateTime	DWORD	Time in the format dd.mm.yy; hh.minmin,secsec	100	Real time
Pac	DWORD	W	101	Total Pac of all inverters and inverter type meters
Pdc	DWORD	W	102	Total Pdc of all inverters
Uac	WORD	V	103	Average Uac of all inverters
Udc	WORD	V	104	Average Udc of all inverters
yieldDay	DWORD	Wh	105	Summarized daily yield of all inverters
yieldYesterday	DWORD	Wh	106	Summarized daily yield of all inverters
yieldMonth	DWORD	Wh	107	Summarized monthly yield of all inverters
yieldYear	DWORD	Wh	108	Summarized Yearly yield of all inverters
yieldTotal	DWORD	Wh	109	Summarized Total yield of all inverters
consPac	DWORD	W	110	Total Pac of all consumption meters
consYieldDay	DWORD	Wh	111	Summarized daily yield of all consumption meters
consYieldYesterday	DWORD	Wh	112	Summarized daily yield of all consumption meters
consYieldMonth	DWORD	Wh	113	Summarized monthly yield of all consumption meters
consYieldYear	DWORD	Wh	114	Summarized Yearly yield of all consumption meters
consYieldTotal	DWORD	Wh	115	Summarized Total yield of all consumption meters
totalPower	DWORD	Wp	116	Total installed generator power

32.6 Dimensions



33 List of figures

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