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# 1 Introduction

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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 [Component 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](http://www.solar-log.com).

The descriptions in this manual refer to firmware version 3.5.2

## 2 Notes for the Firmware Update

---

The following models may be updated to the Solar-Log Firmware Version 3.5.2:

- Solar-Log 200
- Solar-Log 250
- Solar-Log 300
- Solar-Log 500
- Solar-Log 1000
- Solar-Log 1200
- Solar-Log 2000

## 3 Updating from Firmware 2.x to 3.x

---

The following note is for the Solar-Log 200, 500 and 1000 models when updating to firmware version 3.x. In order to update to 3.x, the Solar-Log™ must at least be running firmware version 2.x. The latest firmware can be downloaded from our website:

<http://www.solar-log.com/de/service-support/firmware.html>.

### Note!



After installing firmware 3.x, it is no longer possible to downgrade to the previous versions. It is not possible to install older firmware versions.

The following changes occur when upgrading to 3.x:

- The data transfer function is no longer available.
- The Smart Energy 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.
- With the new modern web interface, old web browsers might sometimes cause problems with the functionality. We recommend using the current version of Mozilla's Firefox, Google's Chrome, Microsoft Edge or Microsoft's 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,
- 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 250 (read the additional information below), 300, 1200 and 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.

#### Note!



The Solar-Log 300 functions described in this manual are essentially identical to those of the Solar-Log 250. Refer to the Solar-Log 250 data sheet for the differences.

## 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 on page 37.

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 11.1 on page 37

### 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 IP20.

## 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.

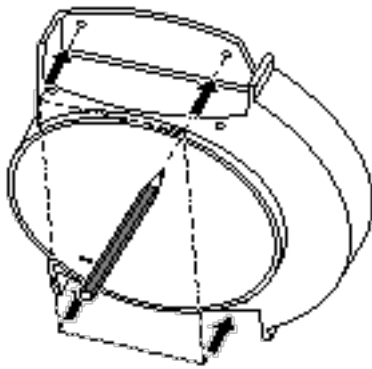
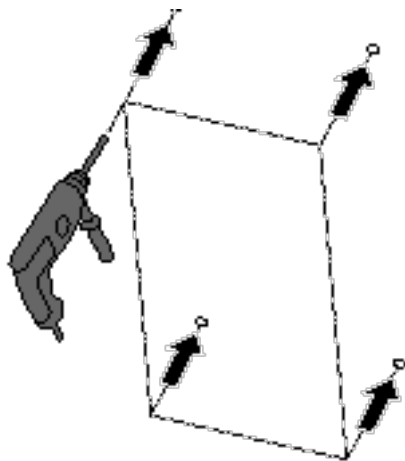


Fig.: Solar-Log™ wall mounting

- 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 34.6 on page 221



Note! concerning  
Solar-Log™ GPRS

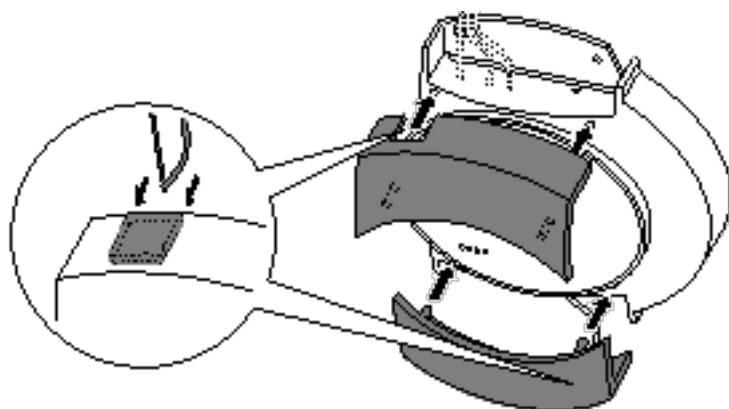


The SIM card should be inserted before attaching the unit, as the insertion slot will no longer be accessible after wall mounting.

- 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

## 8.1 Solar-Log 300 / Solar-Log 250

### Top connections

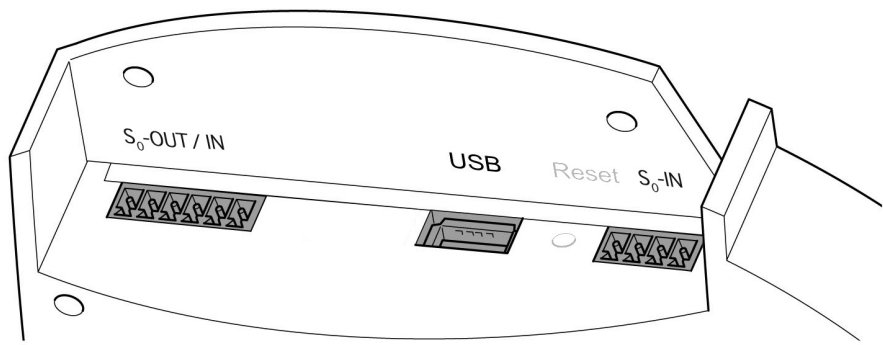


Fig.: Top Connections Solar-Log 300

#### Solar-Log 300\* / Solar-Log 250

|                  |  |
|------------------|--|
| S0-Out<br>S0-IN* | S0 pulse output for connect-<br>ing to a large external display.<br>S0 pulse input for connection<br>to an external power meter.<br>Please note the connection<br>characteristics of the S0 con-<br>nection. |
| USB              | USB connection. Suitable for<br>USB sticks.<br>Not suitable for a connection<br>to a PC  |
| S0-IN            | S0 pulse input for connection<br>to an external power meter.   |

\*Only the Solar-Log 300 is equipped with this connection.



## Bottom connections

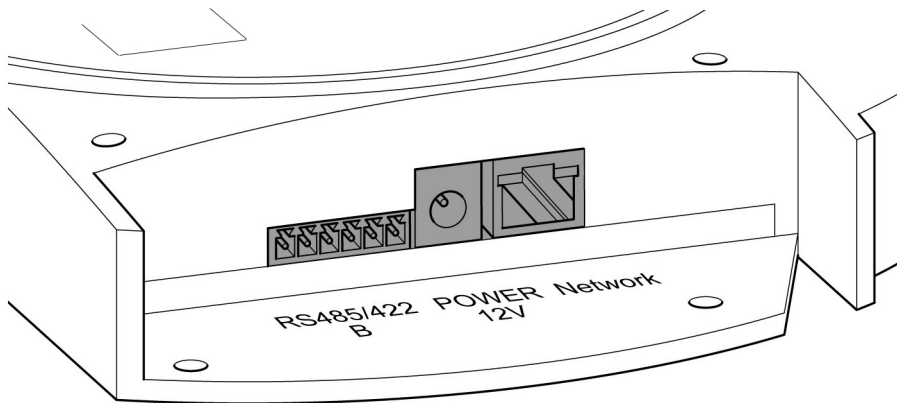


Fig.: Bottom connections Solar-Log 300

### Solar-Log 300 / Solar-Log 250

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

8.2 Solar-Log 1200

Top connections

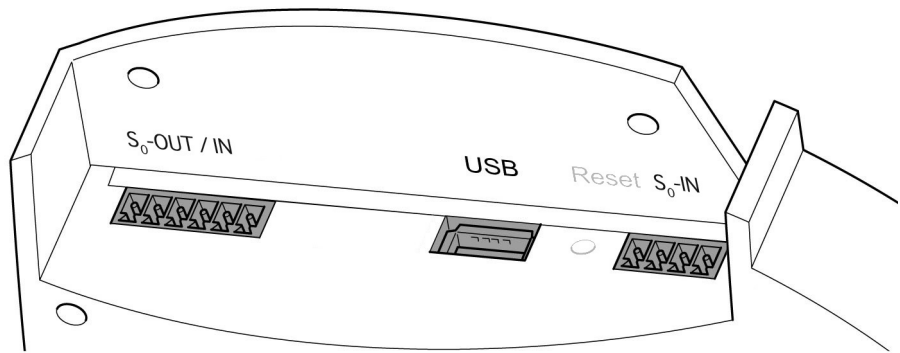


Fig.: Top Connections Solar-Log 1200

Solar-Log 1200

|                 |  |
|-----------------|--|
| S0-Out<br>S0-IN | S0 pulse output for connecting to a large external display. S0 pulse input for connection to an external power meter. Please note the connection characteristics of the S0 connection. |
| USB             | USB connection. Suitable for USB sticks.<br>Not suitable for a connection to a PC  |
| S0-IN           | S0 pulse input for connection to an external power meter.  |

## Bottom connections

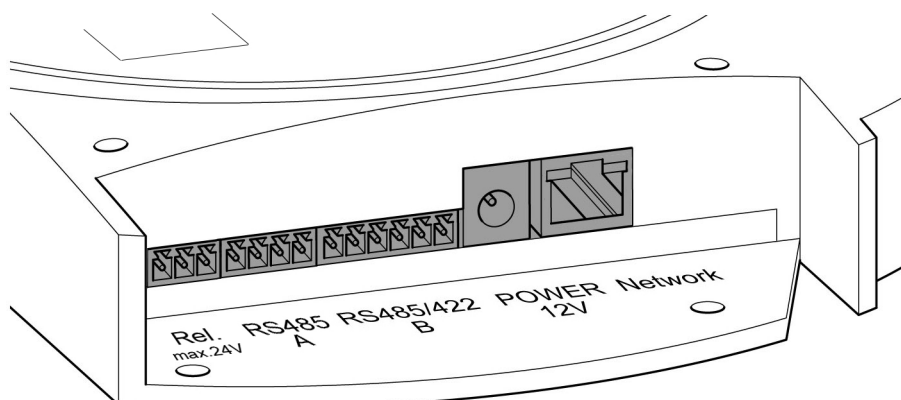


Fig.: Top Connections Solar-Log 1200

### Solar-Log 1200

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

8.3 Solar-Log 2000

Top connections

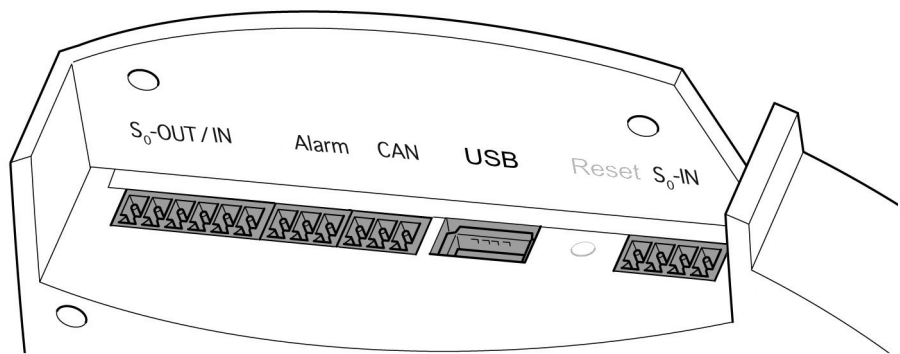


Fig.: Top Connections Solar-Log 2000

Solar-Log 2000

|                 |   |
|-----------------|---|
| S0-Out<br>S0-IN | S0 pulse output for connecting to a large external screen. S0 pulse input for connection to an external power meter. 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.<br>Not suitable for a connection to a PC   |
| S0-IN           | S0 pulse input for connection to an external power meter.   |

## Bottom connections

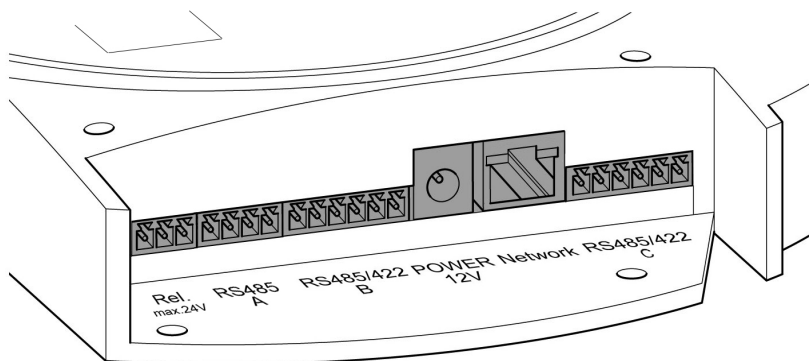


Fig.: Top Connections Solar-Log 2000

### Solar-Log 2000

|               |  |
|---------------|--|
| Relay         | Relay with change-over contact   |
| RS485 - A     | RS485 interface, 4 pin:<br>Connection for inverters and/or accessories (inactive if the optional Bluetooth interface is used)                                  |
| RS485/422 - B | RS485 interface, 6 pin:<br>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:<br>Connection for inverters and additional accessories<br>=> It is not possible to connect a large external display on this interface. |

## 9 Optional Connections

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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

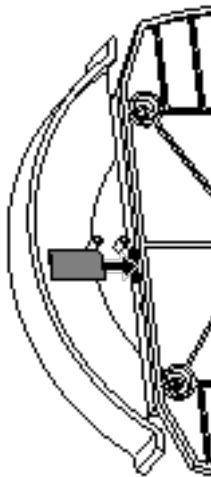


Fig.: Insertion slot for SIM card inside on the right (Solar-Log™ GPRS)

- 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.

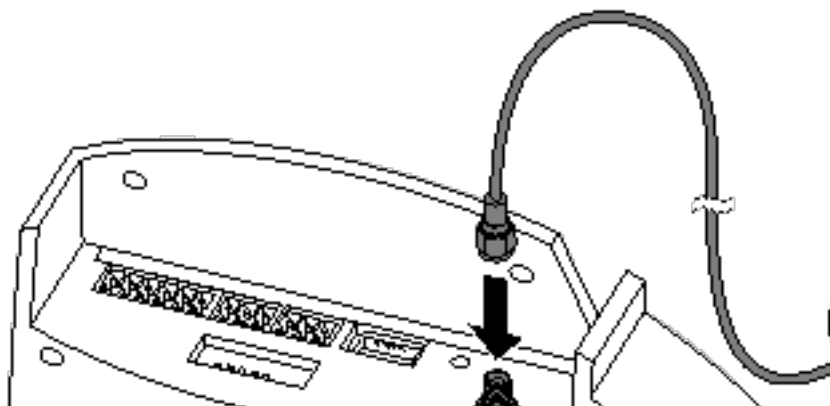


Fig.: Antenna connection on the top of the device (Solar-Log™ GPRS)

**Note!**

We recommend checking and cleaning SIM cards once a year. The contact points of the SIM card could start corroding due to humidity and should be cleaned regularly to ensure trouble-free operations.

## 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.

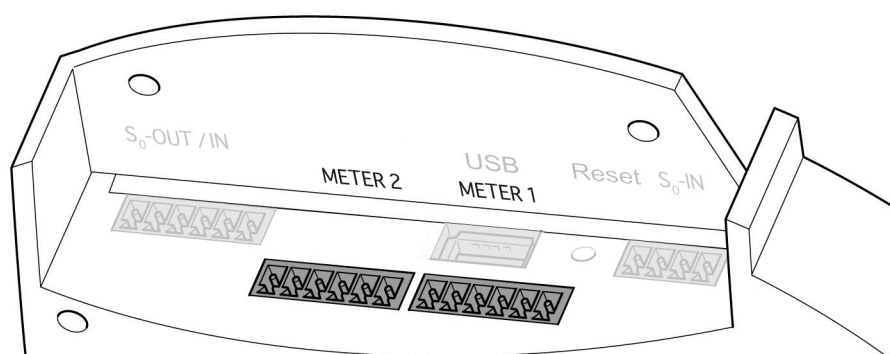


Fig.: Connection for current transformers (Solar-Log™ Meter)

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™.

**Note!**

With the Solar-Log 300 and 1200 Meter, the mounting direction of the current transformer (CT) is not relevant because the energy flow direction cannot be defined. It lacks a direct voltage measurement.



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.

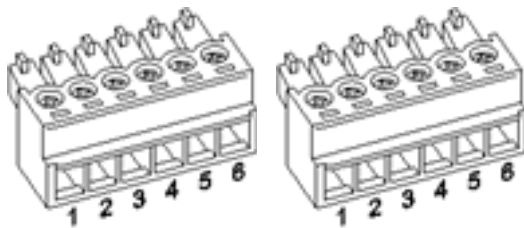


Fig.: Two 6-pin terminal block connectors for the Meter interface

| Solar-Log™ Meter 1 |     |                           |                              |
|--------------------|-----|---------------------------|------------------------------|
| Interface          | PIN | Description               | Label<br>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<br>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<sup>2</sup> for our products.

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

### Note!



Due to the lack of a voltage supply for the measurements, only the apparent power – not the active power – is measured. Since in most cases the active power should be measured, we recommend measuring with a power meter when there is a large percentage of reactive power.

## 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:<br>16A/200mA   | 255639          |
| Solar-Log™ CT 100 A-c | Current measurement 100 A, transformer:<br>100A/200mA<br>sealed transformer                   | 255640          |
| Solar-Log™ CT 100 A-o | Current measurement 100 A, transformer:<br>100A/200mA<br>open transformer (folding mechanism) | 255638          |

9.3 Solar-Log™ PM+

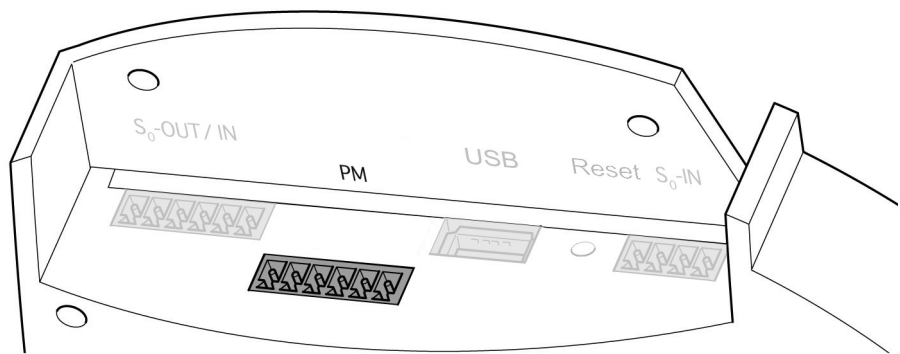


Fig.: 6-pin PM+ interface

| 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  $\geq 0.14\text{mm}^2$  or Cat 5/7 SFTP
- 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

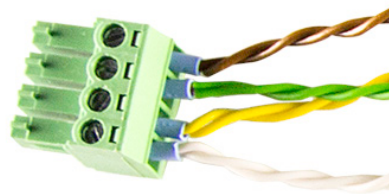


Fig.: Terminal block connector with ferrules

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.

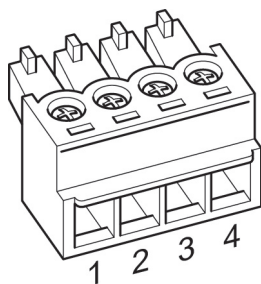


Fig.: 4-pin Terminal block connector

| 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.

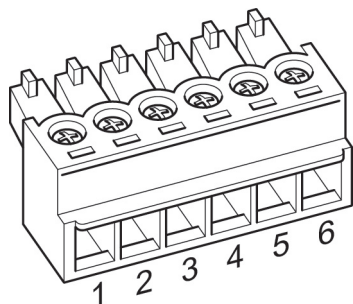


Fig.: 6-pin Terminal block connector

#### 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.

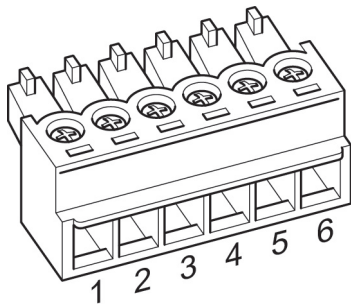


Fig.: 6-pin Terminal block connector

| 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 nterface (e.g. Fronius, AEG, Riello), then it is not possible to connect accessories such as sensors, meters or displays to this bus.



10.5 SO

Solar-Log™ devices are equipped with the following SO interfaces:

- combined SO\_OUT\_IN interface (SO-OUT and SO-IN) and
- SO-IN (only Solar-Log 300, 1200 and 2000)

10.5.1 SO OUT IN (SO-OUT and SO-IN)

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

| SO_OUT_IN |                   |
|-----------|-------------------|
| PIN       | Assignment        |
| 1         | 27 mA output      |
| 2         | 27 mA max. input  |
| 3         | Measuring contact |
| 4         | Ground            |
| 5         | SO Out+           |
| 6         | SO Out-           |

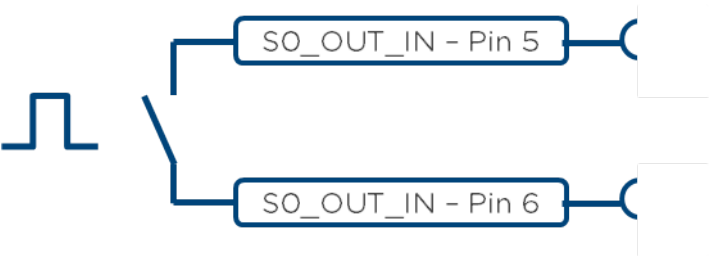


Fig.: Schematic diagram of the SO output



Note!

We recommend not using the SO 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.

10.5.2 S0-IN

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™.

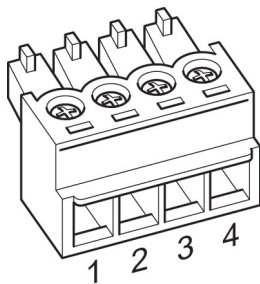


Fig.: 4-pin Terminal block connector

S0-IN

| 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 meters“ on page 46.

## 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.

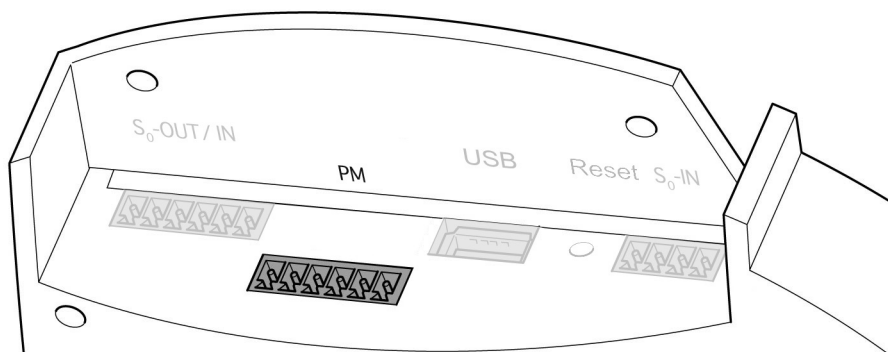


Fig.: 6-pin PM+ interface

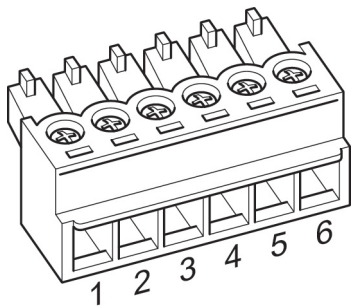


Fig.: 6-pin Terminal block connector

### 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“ for more information

See the appendix for more ripple control receiver connection examples

## 11 Connecting the inverters

---

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

- See Chapter „Belegung und Verkabelung der Anschlüsse“ for terminal block connector wiring diagrams for the connection to the Solar-Log™
- Please refer to the Component 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 the chapter "Switching inverters off."

Always read the installation and safety instructions given in the manual for the corresponding inverter.

## 11.1 Switch off the inverters and the Solar-Log™.

### Switching inverters off

Before 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.

### Turn the Solar-Log™ off.

Unplug the power socket connection

## 12 Connecting accessories

---

### 12.1 Sensor Box Basic and Professional

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
- and snow cover does not interfere disproportionately 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.

### Wiring the Sensor Box Basic and Professional 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 pay attention to the notes in the component database. Sensors cannot be connected to the same bus with some inverters.
- 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). In this case, however, it must be ensured that a power supply voltage of at least 8 V is provided for the Sensor Box Basic at the end of the cable and 10.5 V for the Sensor Box Professional. 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 four 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

### Important!



Replacing the connection wires may cause damage to the sensor.

## Sensor Box Basic and Professional

| RS485 Solar-Log™ | Sensor connection cables      |
|------------------|-------------------------------|
| PIN              | Assignment                    |
| 1 (Data +)       | Brown: Data +                 |
| 2 (+12V)         | Red: 12 V <sub>DC</sub> (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 Professional have to be configured to the desired RS485 interface:

- Select the "Mencke&Tegtmeyer" sensor via the device definition according to the device class and manufacturer.
- Define the bus.
- Perform device detection.
- The Sensor Box Basic and Professional are integrated into the system like an inverter.

## 12.2 Sensor Box Professional Plus

The Sensor Box Professional Plus 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 Professional Pluses 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
- and snow cover does not interfere disproportionately 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 Professional Plus.

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

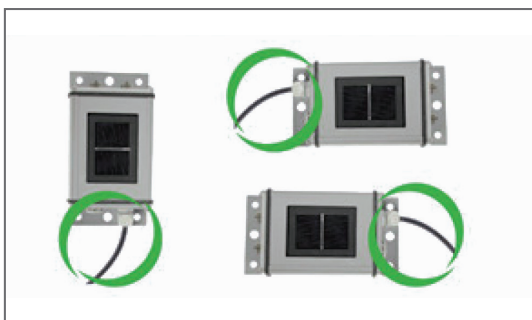
- Solar irradiation (integrated)
- Module temperature  
Module temperature is recorded by an integrated cell sensor, thus avoiding the costly process of mounting a sensor on the back of the module.
- Ambient temperature (optional, Article Number: 220062)
- Wind speed (optional, Article Number: 220061)

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 Professional Plus are UV and weather resistant.

Recommended installation



Not allowed

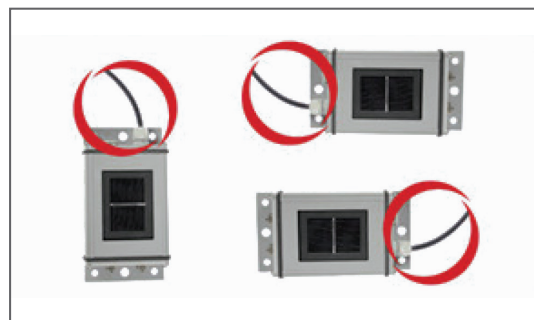


Fig.: Mounting information for the Sensor Box Professional Plus

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 Professional Plus.

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 Professional Plus.

### Caution!



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

The Sensor Box Professional Plus 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 [Component Database](#).

The Sensor Box Professional Plus is connected to the Solar-Log™ using the RS485 interface.

The connection cable between the Sensor Box Professional Plus 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. 50 m). However, an 10.5 V power supply is needed at the end of the cable. For longer stretches please select a larger cable diameter.

## Procedure

- The four 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:

## Important!



Replacing the connection wires may cause damage to the sensor.

### Sensor Box Professional Plus

| RS485 Solar-Log™ | Connection cable<br>Sensor Box Professional<br>Plus |
|------------------|---|
| PIN              | Assignment  |
| 1 (Data +)       | Brown: Data + A                                     |
| 2 (+12V)         | Red: 12 V <sub>DC</sub>                             |
| 3 (Ground)       | Black: GND  |
| 4 (Data -)       | Orange: Data - B                                    |

## Installation

When the Solar-Log™ is switched on, the Sensor Box Professional Plus is also automatically powered. Then the Sensor Box Professional Plus 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 Professional Plus is integrated into the system like an inverter.
- The rest of the configuration for the environmental data is carried out via the Solar-Log™'s 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™.

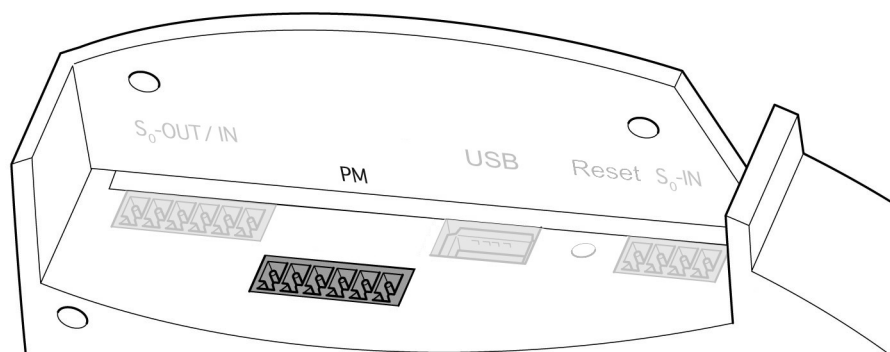


Fig.: 6-pin PM+ interface

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 they are 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.

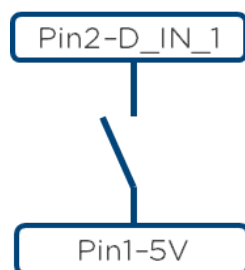


Fig.: The basic principle of wiring the PM+ interface to the ripple control receiver for active power commands

See the [Appendix](#) for more ripple control receiver connection examples on page of this installation manual.

Further configurations of feed-in management are carried out via the Solar-Log™ PM+ web interface in the [Configuration | Feed-in Management](#) menu with the [Active Power | Remote-controlled](#) and [Reactive Power | Remote-controlled shift factor  \$\cos\(\Phi\)\$](#)  functions. See Seite 143 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 be specified.

Note!



It is not possible to connect a large external display on the RS485 / 422 C interface.

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, (3x0.5 mm²) and terminal block connector.

Schneider Large displays

|                  |   |
|------------------|---|
| RS485 Solar-Log™ | Terminal block connector<br>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, (2x0.5 mm<sup>2</sup>) and terminal block connector.

### RiCo Large displays

| RS485 Solar-Log™ | Terminal block connector<br>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<sup>2</sup>, 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 SO input and/or the RS-485 bus.

Solar-Log™ devices have a varying number of SO inputs:

### SO inputs

| Solar-Log™                        | Number of SO inputs                     |
|-----------------------------------|---|
| Solar-Log™<br>300*, 1200 and 2000 | 2 - SO <sub>A</sub> and SO <sub>B</sub> |

\* Solar-Log 200s prior to 2011 do not have an SO 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 Energy 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 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 | Feed-in Management](#).

## External power meters/accumulating meters

With multiple phase meters, a basic distinction is made between phase-exact and accumulating meters.

Accumulating meters provide the total values from all three phases. The meter calculates the total output (also to and from the grid) of the individual phases and provides this total as a single value.

In the example:

Phase 1 supplies 3 kW via an inverter (single phase).

Phase 2 refers to 2 kW (energy)

Phase 3 refers to 1 kW (energy)

With an accumulating meter, this results in a total of 0 kW.

Examples of accumulating meters are the Janitza UMG 104 and the Inepro Pro380-Mod.

12.6 Wiring for S0 meter

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

| S0 meters in general |             |
|----------------------|-------------|
| S0 Solar-Log™        | Power meter |
| PIN                  | Assignment  |
| 1                    | S0+         |
| 2                    | S0-         |
| 3                    |             |
| 4                    |             |

Place a cable bridge between pin 3 and 4 on the Solar-Log™.

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             |             |
| 4             |             |

Place a cable bridge between pin 3 and 4 on the Solar-Log™.



Wiring for Inepro 1250D meter via S0

Article Number: 255421

| Inepro 1250D     |             |
|------------------|-------------|
| S0<br>Solar-Log™ | Power meter |
| PIN              | Assignment  |
| 1                | Pin 9 - S0+ |
| 2                | Pin 8 - S0- |
| 3                |             |
| 4                |             |

Place a cable bridge between pin 3 and 4 on the Solar-Log™.

Wiring for Iskra WS0021 meter via S0

Article Number: 255346

| Iskra WS0021     |             |
|------------------|-------------|
| S0<br>Solar-Log™ | Power meter |
| PIN              | Assignment  |
| 1                | Pin 9 - S0- |
| 2                | Pin 8 - S0+ |
| 3                |             |
| 4                |             |

Place a cable bridge between pin 3 and 4 on the Solar-Log™.

Wiring for Iskra WS0031 meter via S0

Article Number: 255347

| Inepro 1250D     |             |
|------------------|-------------|
| S0<br>Solar-Log™ | Power meter |
| PIN              | Assignment  |
| 1                | S0+         |
| 2                | S0-         |
| 3                |             |
| 4                |             |

Place a cable bridge between pin 3 and 4 on the Solar-Log™.

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 under [Configuration | 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.
- The communication address does not have to be assigned.

Installation steps

- Switch off the inverters and the 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<br><small>Article number: 255420</small> | Inepro 1250D terminal block connector<br><small>Article number: 255421</small> | Utility meter terminal strip<br><small>Article Number: 255385</small> |
|---|--|--|---|
| 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 ff Seite 94for more information.
  - Generator
  - Total yield meter
  - Consumption meter
  - Utility Meter (U) (only Solar-Log 1000 and 2000)
  - Utility Meter (U+I) (only Solar-Log 1000 and 2000)
  - Utility Meter (U+I) + Consumption Meter (bi-directional) (only Solar-Log 1000 and 2000)
  - Sub-consumer

## Note!



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

## 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



All three phases have to be connected for the Solar-Log™ to accurately detect the meter.

If an Inepro 1250D is used, the PRG button on the meter must be pressed and held down during entire detection process.

If it is not possible to hold down the PRG button during the whole process, we recommend provisionally connecting the meter to the Solar-Log™ with a short cable after the installation in order to be able to press and hold down the PRG button during entire detection process.

In a second detection attempt with the inverter, the meter is then detected by the Solar-Log™ even if the PRG button is not pressed.

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 on 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.

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

## 12.8 Installation Utility Meter / Janitza UMG 104 (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 (Although, it is still recommended to perform voltage and current measurements to check that the reduction function is operating properly). 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 / Janitza UMG 104:

- 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.

=> The operating modes Utility Meter (U / U+I) are only possible with the Solar-Log 1000 and 2000.

### Note!



The Utility Meter cannot be connected to the inverters with a single bus.

For this reason, use one RS485 connection for the inverters and one RS485 connection for the Utility Meter.

Connecting the Utility Meter to the power grid

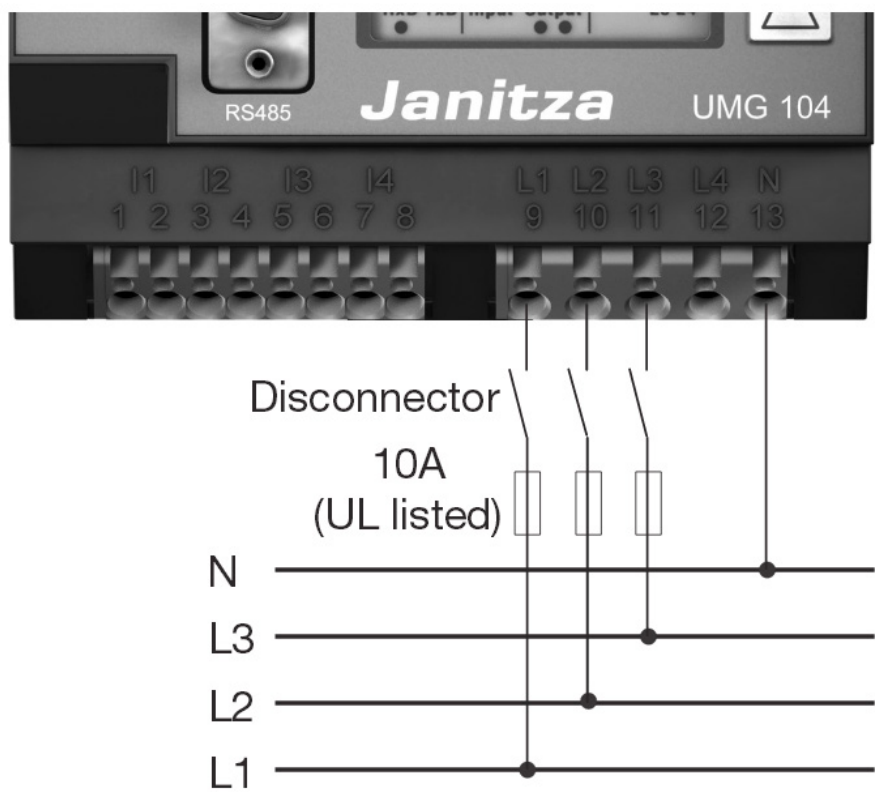


Fig.: Utility Meter connection diagram for voltage measurements in low-voltage power grids

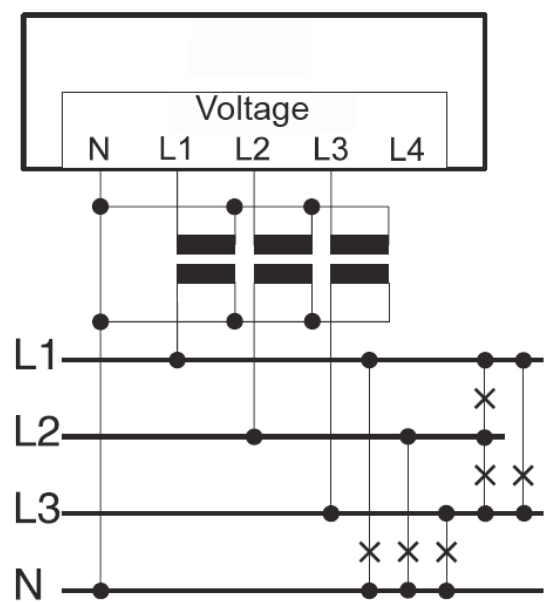


Fig.: Utility Meter connection diagram for voltage measurements with current transformers (medium voltage)

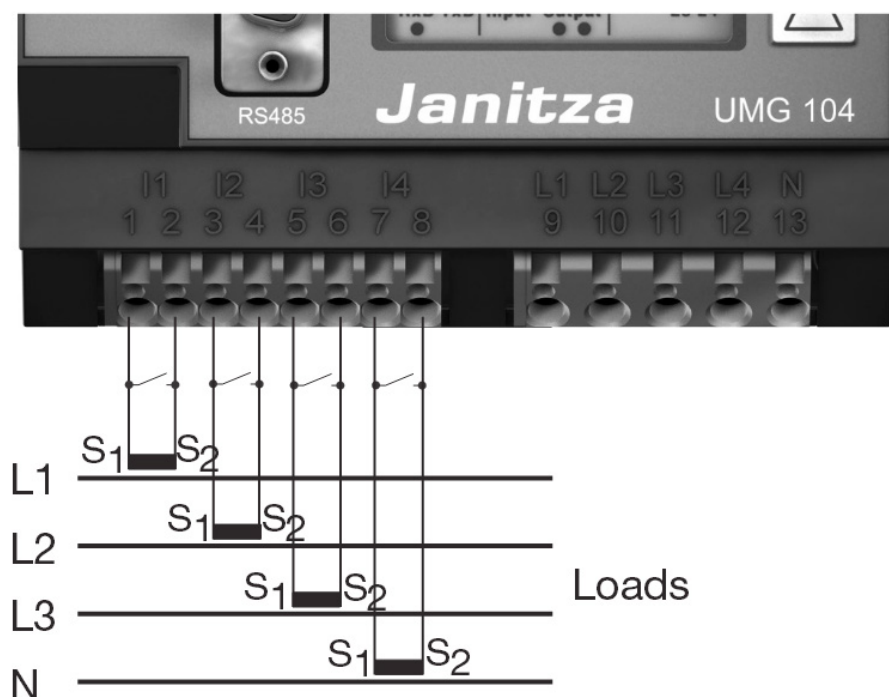


Fig.: Utility Meter connection diagram for current measurements with current transformers

#### 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, 0.25 W 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 the 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, the current output (kW)?  
If this is not the case, the current measurements are incorrectly connected.  
If necessary, switch the polarity of measuring inputs.





When replacing the polarity, the cable must not be energized, since the converter can be destroyed otherwise.

12.9 Solar-Log™ Smart Relay Box

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

The Relay Box has:

- 4 inverter contacts
- 4 make contacts

Characteristics of the relays:

Maximum current load:

0.5 A @ 120 V<sub>AC</sub>

0.25 A @ 240 V<sub>AC</sub>

1 A @ 30V<sub>DC</sub>

0.3 A @ 110V<sub>DC</sub>

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<br>Terminal block connector<br><small>Article Number: 255656</small> |
|---|--|
| 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 | Smart Energy](#) menu to be activated.
- The power comes from the top-hat-rail power supply that was included with the Relay Box.



The Relay Box has to be defined and activated as a switch in the [Configuration | Devices | Definition | Interfaces](#) with the plus symbol to be able to configure it.  
For more information, refer to the chapter:  
"18.1.1 Configuring the device interface" and  
"23.1 Defining Smart Energy Switching."

Note!



The Solar-Log™ Smart 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 the Utility Meter with sensors.

Note!



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

### Relay output assignments

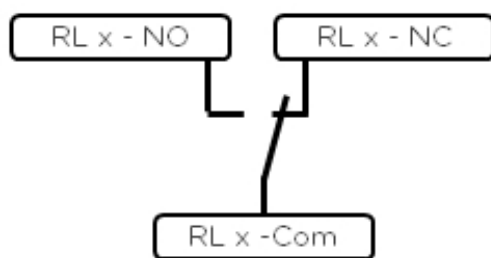


Fig.: Smart Relay Box relay output (change-over contact) diagram

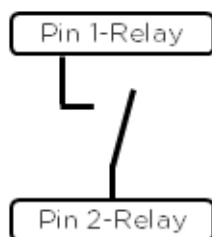


Fig.: Smart Relay Box relay output (make contact) diagram

## 12.10 WeMo Insight Switch

With the WeMo Insight Switch, home appliances and electronic devices can be connected to a Wi-Fi network, allowing the devices to be remotely turned on and off. The Wemo Insight Switch can also monitor the devices and will send information about the device's energy usage directly to your smartphone or tablet. Follow the subsequent instructions to be able to use these functions with the Solar-Log™.

### Procedure:

1. Connect a desktop/laptop and the Solar-Log™ to the router with a LAN cable.
2. Download the WeMo app to your smartphone or tablet.
3. Reset the WeMo Insight Switch (press the reset button for 5 seconds while turning on the power for the WeMo Insight Switch).
4. The WeMo searches for the smartphone or tablet via WiFi.
5. Start the WeMe app and connect the WeMo Insight Switch to the router's WiFi network.
6. Connect to the Solar-Log™'s WEB interface with the desktop/laptop and go to the Configuration | Devices | Definition menu.
7. Select the device class "Switch" with the +plus button.
8. Select "Belkin" as the manufacturer and "WeMo Insight" as the type. Enter the number of devices and click on save.
9. Then start the device detection from the [Configuration | Devices | Detection](#) menu.
10. The connection is now established.

### Note!



A direct connection between the Solar-Log™ WiFi and WeMo is not possible.  
The Solar-Log™ has to be connected to a router via a LAN cable or to be in a network.

## 12.11 Allnet Network Power Socket

Allnet network power sockets can switch connect electronic devices on and off. These switching operations can be set manual, time-controlled or based on consumption levels. Allnet network power sockets can be integrated into the local network with a LAN cable connection. Follow the following steps to be able to use these functions with the Solar-Log™:

### Procedure:

1. Connect the Allnet socket to a laptop or PC with a LAN cable and plug the Allnet device into a power socket.
2. Click on Control Panel
3. and then go to the Network and Sharing Center (for other operating systems, refer to the instructions for setting the IP address).
4. Click on Local Area Connection to open the Status window and then click on Properties.
5. Select the Internet Protocol Version 4 (TCP/IPv4) and then click on Properties

### Important!

Note the displayed values before you change them because you will need them again later.

6. Adjust the displayed values as follows (using the following IP address):  
 IP address: 192.168.0.101  
 Subnet mask: 255.255.255.0  
 Gateway: 0.0.0.0  
 Confirm the settings with "OK."
7. Enter the IP address 192.168.0.100 as the URL in your browser to access the Allnet menu.
8. Click on settings and go to [Configuration | LAN Settings](#).
9. Configure a separate IP address for every Allnet network power socket. The new IP address need to match the range for the existing network (refer to your computer's original settings).  
 For example, if our computer's original IP address was 192.168.178.2 and the next address is free, the Allnet network power sockets would start with 192.168.178.3 and continue. The Subnet mask is 255.255.255.0 by default and must be the same for every device in the subnet. The gateway is typically the IP address of the router or switch to which the computer is connected again later. Save the settings when they are completed.
10. After adjusting the networks settings for the network power sockets, change the values for your computer's networking settings back to the original values.
11. The configuration is then finished.

### Note!



To ensure functionality with the Solar-Log™, the ALL3075v3 still has to be set to remote control in the Allnet socket configuration.

## Connecting the Allnet network power socket to the Solar-Log™

The Allnet socket has to be defined with the device detection function to connect to the Solar-Log™. From the WEB interface of the Solar-Log™ go to [Configuration | Devices | Definition](#) and select the device class "Switch" with the blue plus symbol and then Allnet as the manufacturer followed by the type and number of devices. Confirm the selection with OK and start the detection from the [Configuration | Devices | Detection](#) menu. Let the detection process run completely. After that, select the corresponding devices from the [Configuration | Devices | Configuration](#) menu, enter the IP address and perform the rest of the setup. Click on save once everything is finished.

## 13 Other connections

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### 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:

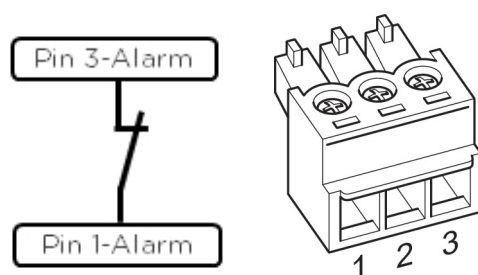


Fig.: Alarm contact connection diagram

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 2 A.

A 230 V appliance has to be connected via another load relay.

### Connection

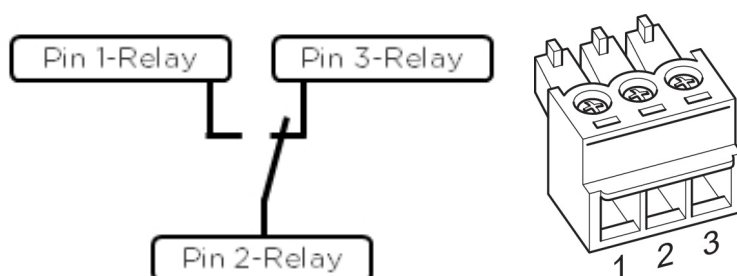


Fig.: Relay connection diagram

### 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

### Note!



If a relay is used for the optimization of self-consumption, it has to be defined as a switch and recognized (see Chapter 18.1.1. "Configuring the device interface"). The operating states are then recorded.

## Acknowledge notification

There are two options to acknowledge a notification of a relay:

- Display
- Solar-Log™ WEB interface

### Display:

A notification is displayed in the top line of the display with a blinking red triangle. Tapping on this triangle is enough to acknowledge the notification. Do not use any pointed objects which may damage the display.

### Solar-Log™ WEB interface:

Go to the [Diagnostic | Notifications](#)

menu to acknowledge the notification via the WEB interface. The acknowledgment is automatic once the notifications have been loaded.

## 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.  
161212 is then 12 December 2016



# 14 Installation

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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 using the current version of Mozilla's Firefox, Google's Chrome, Microsoft Edge 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)

## Note!



The maximum plant size for the various Solar-Log™ devices:

- Solar-Log 300 up to 15 kWp
- Solar-Log 1200 up to 100 kWp
- Solar-Log 2000 up to 2000 kWp (2MW)

## 14.1 Connecting the 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 „Internet-Ports“).

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, 250 and 300

The Solar-Log 200, 250 and 300 devices are configured completely from a connected PC or laptop.

#### Requirements

- All cables and accessories (if any) have been connected to the Solar-Log 200, 250 or 300.
- The Solar-Log 200, 250 or 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, 250 and 300.

The initial configuration of Solar-Log 300 is made via the web browser menu.

### 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 on page 87)
  - Network (Chapter 16.1 on page 79)
  - Device (Chapter 18 on page 91)
  - Plant (Chapter 19 on page 104) and
  - System (Chapter 22 on page 124)

## 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 26.4.1 for 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 on page 87)
  - Network (Chapter 16.1 on page 79)
  - Device (Chapter 18 on page 91)
  - Plant (Chapter 19 on page 104) and
  - System (Chapter 22 on page 124)

## 14.4 Initial installation Solar-Log 1000 and 2000

The initial configuration of Solar-Log<sup>1200</sup> 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 on page 87)
  - Network (Chapter 16.1 on page 79)
  - Device (Chapter 18 on page 91)
  - Plant (Chapter 19 on page 104) and
  - System (Chapter 22 on page 124)

## 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

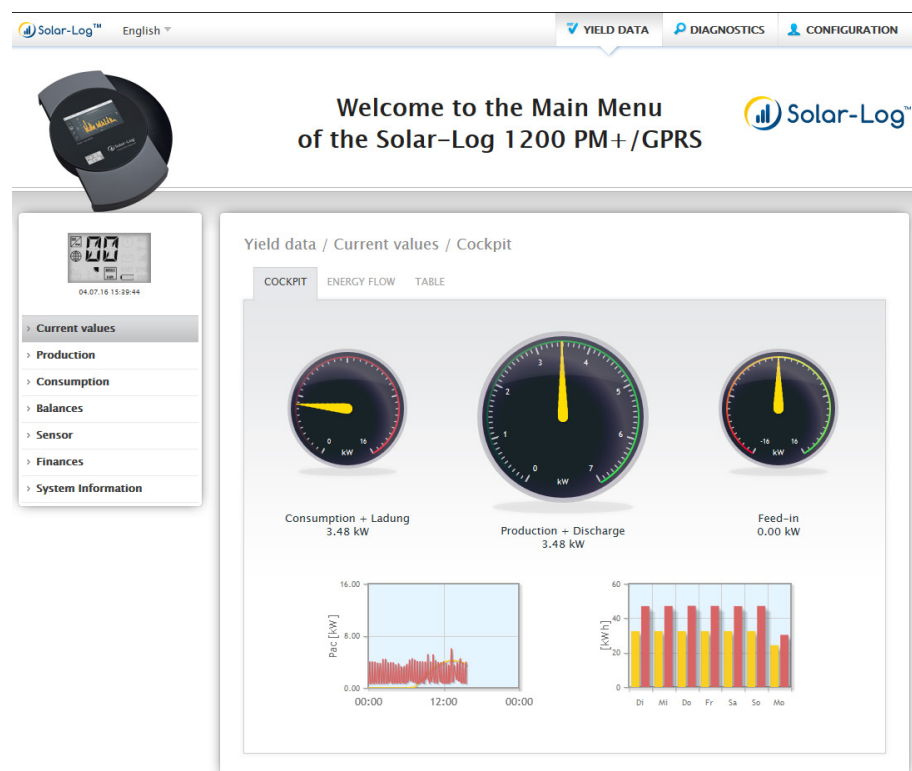


Fig.: Main menu of the Solar-Log 2000 PM+ GPRS

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.

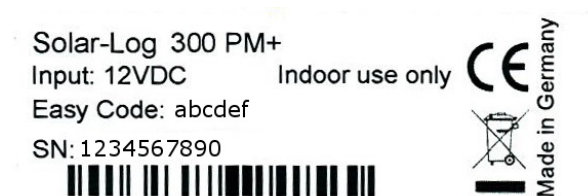


Fig.: Solar-Log™ model tag

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.

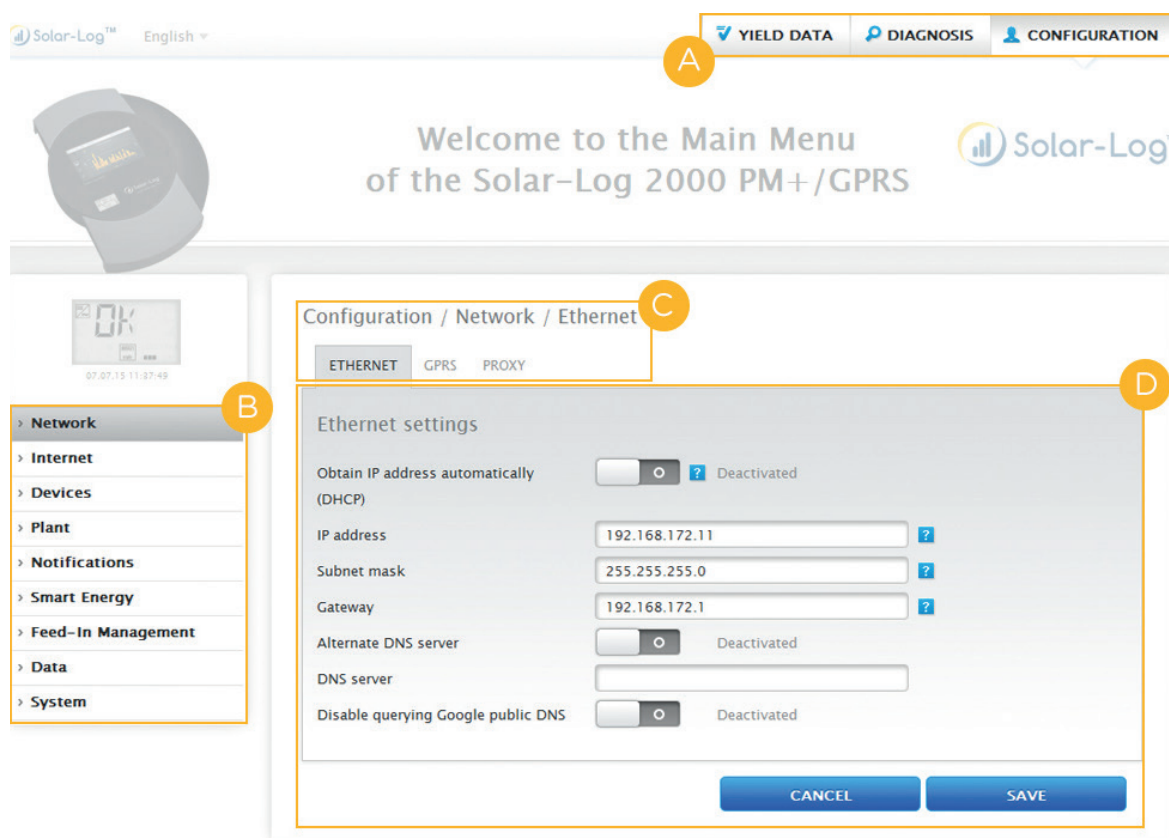


Fig.: Layout of the main menu

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:

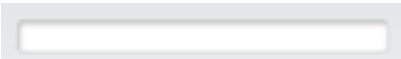
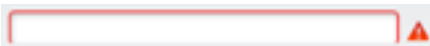
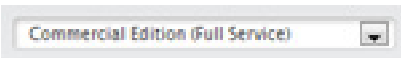


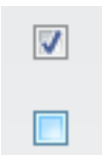


| Control elements in the browser menu   |  |
|--|--|
| Control element  | Meaning  |
|   | Text field   |
|   | Text field with incorrect or missing entry               |
|   | Drop-down selection list                                 |
|   | Virtual switch deactivated and activated                 |
|   | The question mark boxes display additional information   |
|    | Check boxes<br>Several boxes can be selected at one time |
| <br> | 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
- Diagnostics
- Yield data

The sections Diagnostics and Yield data are described in the [User Manual](#).

# 16 Configuration Menu

---

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

- Network
- Internet
- Devices
- Plant
- Notifications
- Smart Energy
- Feed-In Management
- Direct Marketing (as long as a license has been purchased and entered)
- 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)

### Note!



Requests and control commands are sent to the inverters, battery systems and intelligent appliances via the network interface. For this reason, the network should always be available (24/7). If the Solar-Log™ is connected via WiFi, we recommend deactivating the overnight shutdown function.

## 16.2 Ethernet

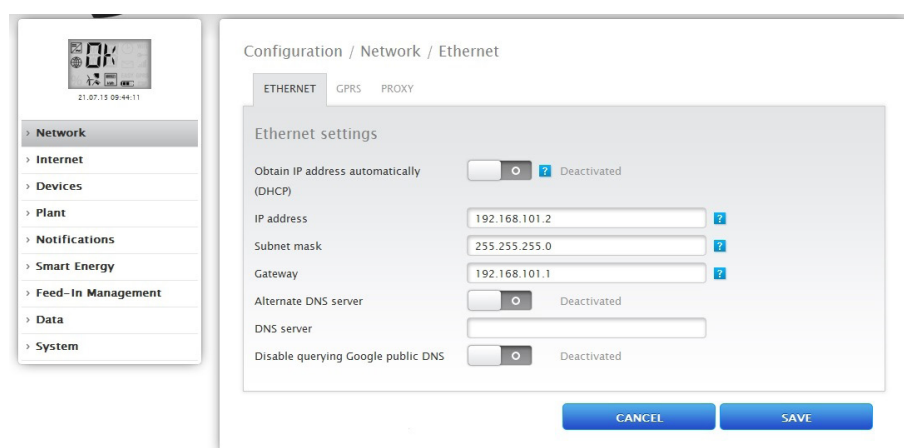


Fig.: Ethernet settings

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 deactivated. 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 on **Save**.

## 16.3 GPRS (only Solar-Log™ GPRS)

Configuration / Network / GPRS

ETHERNET **GPRS** PROXY

#### GPRS settings

APN easy access:

APN:

User name:

Password:

SIM pin:

Restrict dial in attempts:  Activated

Max. dial in attempts:

Always stay online: ☐ Deactivated

Roaming allowed: ☐ Deactivated

#### PUK-entry

SIM-PUK:

**SEND PUK**

#### Status & Test

Status:

Last error:

**CONNECT** **DISCONNECT**

Previous dial in attempts:

**RESET**


**CANCEL** **SAVE**

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!**

The Signal **Strength** of the GPRS connection is indicated on the LCD display with the  symbol.

**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

**Limiting the number of dial-in attempts**

Activating this function provides the option to limit the maximum number of dial-in attempts for the modem per day.

**Note!**

When the number of dial-in attempts allowed is too low, it is possible that certain tasks such as sending error messages or data transfers via FTP export or HTTP can no longer be reliably executed.

**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.

Note!



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

## PUK entry

A locked SIM card can be unlocked in the [SIM PUK](#) menu. Enter the PUK code / super PIN of the SIM card and then go to [Send](#).

Caution!



After sending the PUK code / super PIN, the PIN of the SIM card is reset to the one defined in the [GPRS Settings | SIM PIN](#) menu.

## Status and Test section

The GPRS connection can be tested and disconnected with this function. The error codes displayed under [Last Error](#) are „28.2.1 Fault messages GPRS“ explained.

The number of attempts for the day can be viewed in the field "[Previous Dial-in Attempts](#)."

The count can be reset to 0 by clicking on the "[Reset](#)" button.

Note!



The field "[Previous Dial-in Attempts](#)" and "[Reset](#)" button are only visible once the [Limit Dial-in Attempts](#) function has been activated.

Note!



The dial-in Attempts count is reset once per day or also when the device has been re-booted.

### 16.3.1 General Information about GPRS Devices

We recommend checking and cleaning SIM cards once a year.

The contact points of the SIM card could start corroding due to humidity and should be cleaned regularly with a suitable medium (no screwdriver or cleaning solvents) to ensure trouble-free operations.

#### Caution!



Only remove the SIM card after the Solar-Log™ has been turned off. Removing the SIM card during normal operation may cause a card defect.

Corrosion on the SIM card contact points is an indication that the installation location does conform to the IP20 protection class.

## 16.4 WiFi (only Solar-Log WiFi)

Configuration / Network / WiFi

ETHERNET **WIFI** PROXY

**Status**

Activate WiFi ☒ Activated

Status

Last error

**Network settings**

Network selection   ?

SSID  ?

Encryption  ?

Password  ?

**Address settings**

Obtain IP address automatically (DHCP) ☒ ? Activated

IP address

Subnet mask

Gateway

Alternate DNS server ☐ Deactivated

DNS server

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. For this, the DHCP function has to be deactivated.

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

Configuration / Network / Proxy

ETHERNET WIFI PROXY

Proxy settings

Type of proxyserver: CONNECT

Use for HTTP: ☒ Activated

Use for FTP: ☐ Deactivated

Proxy server: IP or URL

Proxy port: 80

Proxy username: User

Proxy password: •••••

CANCEL SAVE

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 the 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)  
Mobile router (GPRS, UMTS, LTE)
- [SAVE](#) the 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)

The 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](http://company.solarlog-web.de)) in the Portal Server box.
  - Select the transfer interval.
- **SAVE** the 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 as part of the portal registration process. In addition, you also have the option of saving your own address.

#### Note!



Many e-mail providers have switched their servers to secure connections and now only allow e-mail to be sent via these secure connections. Users with such e-mail providers have to adjust the settings in the Solar-Log according to the instructions from the providers.

#### Note!



The certificates from the following providers have been integrated to send e-mail via a secure connection: GMX, WEB.DE, GMAIL and T-ONLINE. Other e-mail servers or certificates cannot be used.

### 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.

### Connection security

The security method from the particular e-mail provider has to be selected next to the point Connection security. The port for the secure connection is to be entered after the SMTP server.

Fig.: Example configuration STARTTLS to send e-mail with GMX

### 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.

## 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.

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

Procedure:

- Go to the plus symbol under "Interface assignments".

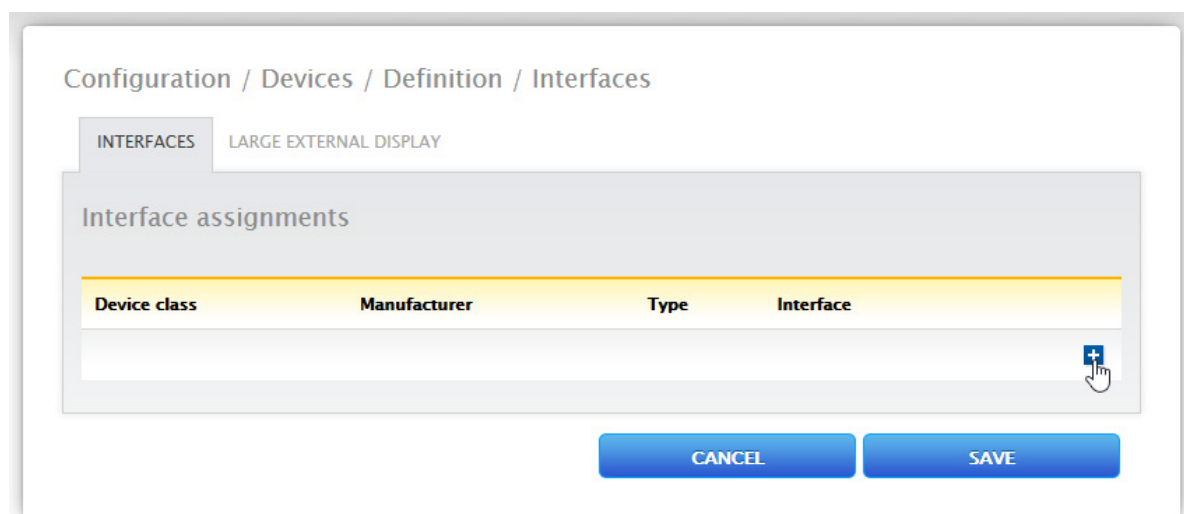


Fig.: Interface definition via the plus symbol

The following window appears:

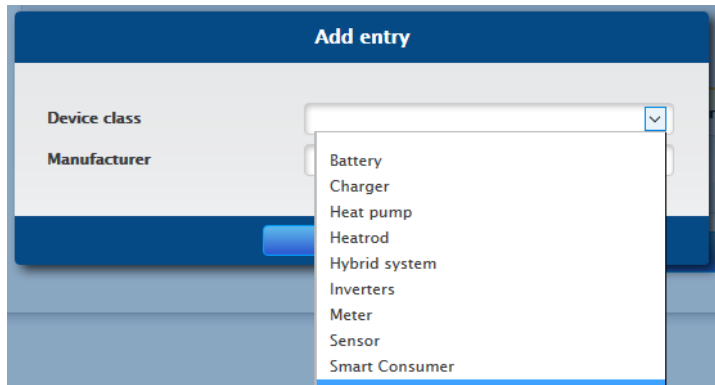


Fig.: Adding components

The connected components are selected in the [Device class](#) box. The following device classes can be defined:

- Battery
- Hybrid System
- Smart Appliances
- Switch
- Sensor
- Inverter
- Meter

Depending on the device class and/or the selected [Manufacturer](#), additional boxes visible:

[Type](#), [Interface](#) and [Baud rate](#).

Furthermore, an existing [Wireless Package](#) can be activated here and the expected reply time for a device connected to this bus is increased.

#### Note!



Caution: Using different manufacturers on the same serial bus may cause communication problems.

Only the network interface (Ethernet) can have multiple assignments according to our component database at [www.solar-log.com](http://www.solar-log.com).

If the device class is correct, confirm the selection with OK. Define additional connected device classes as described.

If all of the connected components have been selected and confirmed with OK, an overview is displayed in the interface assignments. (See illustration: "Overview of the selected components")



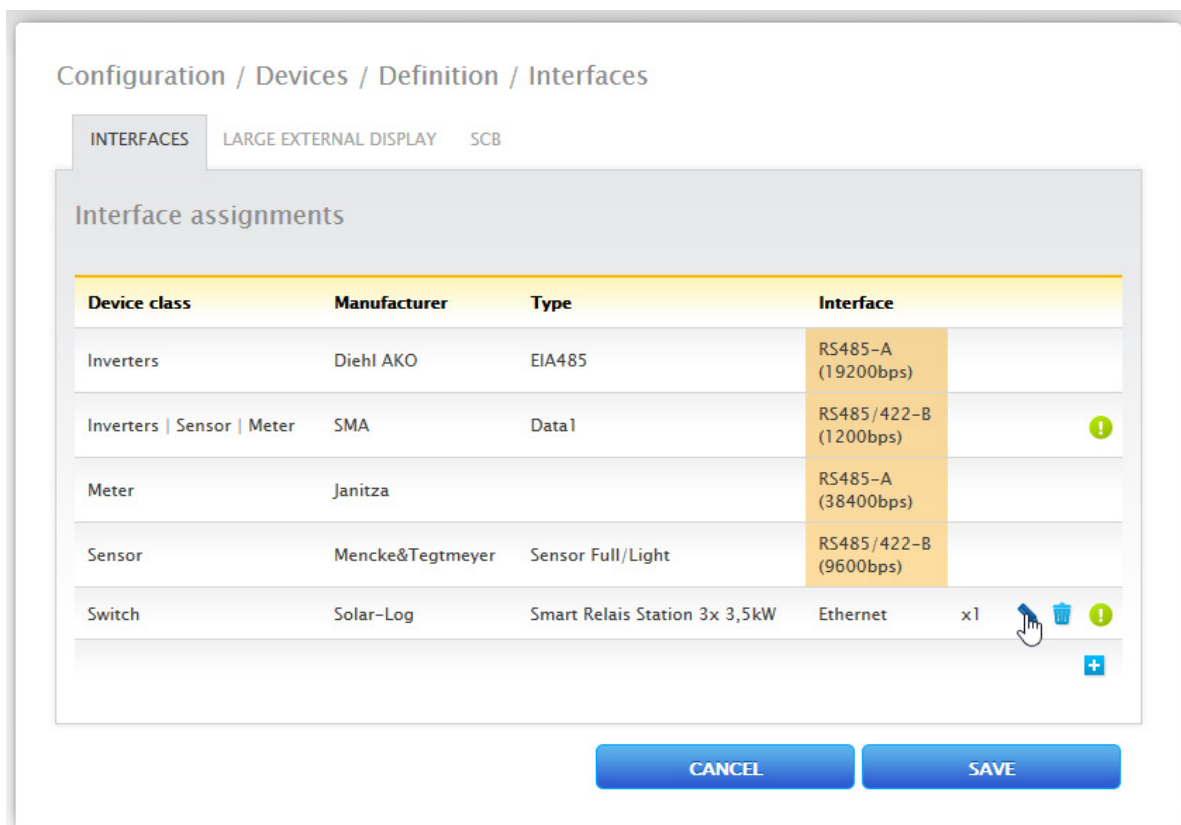




Fig.: Overview of the selected components

From the overview, there is the option to check whether the settings are correct and, if need be, adjust or delete them with the  and  symbols. (The symbols are only displayed by moving the mouse over the components.) Additionally, the following is displayed in the overview of the device interfaces:

- Device class  
The selected devices can be seen here. In the example:
  - Battery
  - Switch
  - Sensor
  - Inverter
- Manufacturer  
The manufacturer is displayed in this column. In the example:
  - Sonnenbatterie
  - Solar Log
  - Mencke&Tegtmeyer
  - Platinum
- Type  
The defined types are listed in this column. In the example:
  - Smart Relay Station 3 x 3.5 kW
  - Sensor Full/Light
  - H-Serie
- Interface  
Interface indicates which interface and baud rate the devices are using.

Click on **SAVE** if all of the definitions are correct.

**Note!**

The number behind the interface (e.g. x1) indicates the number of switching devices for this device type.

## 18.2 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. The following setting options are available from this tab:

- Input definition
- Reference voltage

The Operating Mode section describes the setting for the various operating modes of the Solar-Log™ Meter and is to be selected in the Device Definition before Device Detection. (See figure "Operating mode Solar-Log™ Meter")

Configuration / Devices / Definition / Meter

INTERFACES **METER** SMART ENERGY

Operating mode

2x3 Phases

Input definitions

|                      |                      |
|----------------------|----------------------|
| Transformer "CT1 - 1 | Solar-Log™ CT 16A    |
| Transformer "CT1 - 2 | Solar-Log™ CT 16A    |
| Transformer "CT1 - 3 | Solar-Log™ CT 16A    |
| Transformer "CT2 - 1 | Solar-Log™ CT 100A-c |
| Transformer "CT2 - 2 | Solar-Log™ CT 100A-c |
| Transformer "CT2 - 3 | Solar-Log™ CT 100A-c |

Reference voltage

The voltage measurements are done via connected inverters.

Always use the defined reference voltage ☐ ☒ Deactivated

Reference voltage [V] 241.1

CANCEL SAVE

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

## 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 1000 (200A/0.2A) Enter this value (1000) [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](#).

### Operating mode section:

- Select the desired Operating mode before the device detection in the Device Definition menu.

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 single-phase appliances. Six meters are displayed in this mode.
- The other modes can be used for other measuring combinations.

Fig.: Solar-Log™ Meter Operating Mode

## 18.3 Device Detection

During the Device Detection process, all of the predefined components 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.

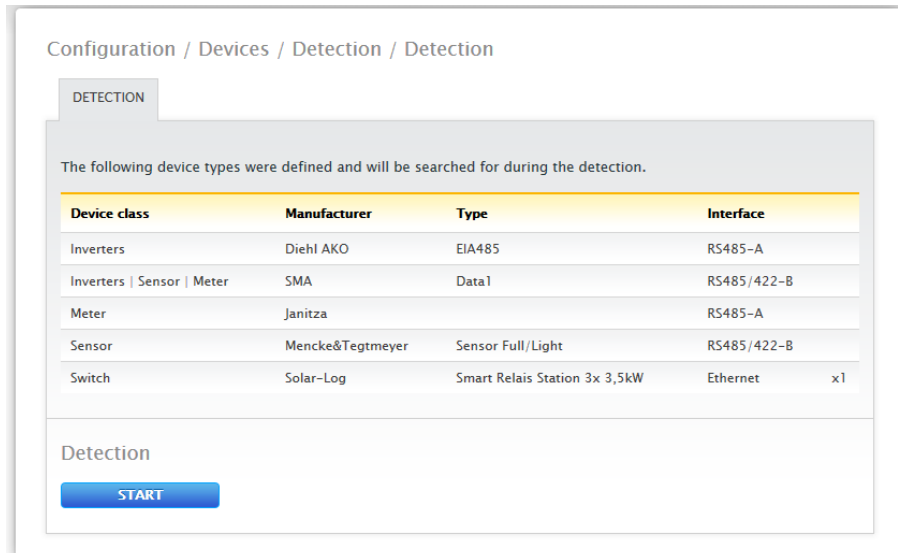


Fig.: Device detection - not started yet


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

The progress of the device detection is displayed in a window that automatically appears.

- **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.
- The Solar-Log™ reboots itself.

**Note!**



Once the detection has been successfully completed, individual device classes can be removed with the  symbol without having to initialize the complete device configuration.

## 18.4 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.

### 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.

### 18.4.1 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:

$$\text{Yield on power meter} / \text{Yield at inverter} * 1000$$

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 „18.4.7 Module Fields“.
- [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.
- A distinct name can be assigned to every generator/MPP tracker in the Label box.
- SAVE the settings.

### 18.4.2 Configuring power meters

An operating mode needs to be assigned to power meters to configure them.

Possible operating modes for power meters:

- Generator (records the individual producers, e.g. PV inverter or CHP)
- Meter for the entire plant (records the complete PV plant output)
- Consumption meter (records the complete consumption)
- Utility Meter (U)
- Utility Meter (U+I)
- Utility Meter (U+I) + Consumption Meter (bi-directional)
- Sub-consumption meter (records the consumption from individual appliances)
- Battery (Bi-directional meter)
- Battery (Bi-directional meter)
- Deactivated

Depending on the selected operating mode and/or meter type, additional selection boxes appear:  
Energy type and/or Impulse rate.

#### 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 needed, assign a plant group to this meter.
- SAVE the settings.

### 18.4.3 Configuring sensors

Under 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** the settings.

### 18.4.4 Module Fields, Power Output and Descriptions

Depending on the device type (power meter, inverter, etc.), different settings can be adjusted from the **Module Fields, Power Output and Descriptions** menu. See the following chapters:

- Configuring inverters
- Configuring power meters
- Configuring sensors

In this section, for example, the device name can be changed and the nominal power (maximum AC output) of the individual devices can be defined.

The nominal power (maximum AC output) if the average consumption or the average energy production of a device and is used, for example, for the profile controls (Smart Energy).

**Note!**



The most exact that the configured nominal power corresponds to the actual consumption, the more accurately the control of consumption via Smart Energy is.



### 18.4.5 Configuring EGO Smart Heaters

EGO Smart Heaters can be selected from the drop-down menu from the Device Configuration menu and configured accordingly.

#### Procedure:

- Select the Smart Heater from the drop-down menu under devices.
- Enter the maximum storage temperature [C°].  
The maximum storage temperature can range from 40°C to 80°C . When 0 is entered, the settings from the Smart Heater for its potentiometer are used.
- Configure and active the minimal temperature as needed. Once the temperature falls below this value, the water is automatically heated to 7° C with the configured output.
- Select the operating mode from the meter configuration menu. The EGO Smart Heater can be configured as a consumption meter or a sub-consumer.
- Enter the description under Module Fields, Power Output and Descriptions.
- **SAVE** the settings.

#### Information on the maximum storage temperature for the EGO Smart Heater

By default, the maximum boiler temperature is adjusted with the rotary switch on the EGO Smart Heater. To be able to control the temperature from the Solar-Log™, the rotary switch on the EGO Smart Heater has to be set higher than the value from the Solar-Log™ because the settings from the rotary switch determine the maximum temperature for external control

#### Example:

If the rotary switch is set to 40°C and the Solar-Log™ to 60°C, the settings from the Solar-Log™ will be ignored and the value from the rotary switch will be applied. The range for the rotary switch has to be set higher so that the Solar-Log™ can assume control. In the example to 60°C.

For this reason, we recommend setting the rotary switch to a maximum of 80°C – or the maximum boiler temperature that is not to be exceeded – when the Solar-Log™ is to control the temperature externally. The Solar-Log™ can control the temperature when it is in the range below the set maximum value.

#### Note!



The EGO Smart heater is an intelligent appliance. The available reported surplus is reported to the intelligent electrical appliances and can be consumed by them. Starting with firmware version 3.5.x, the simultaneous connection of several intelligent electrical appliances is supported.

## 18.4.6 Configuring IDM Heat Pumps

IDM heat pumps can be selected from the drop-down menu from the Device Configuration menu and configured accordingly.

### Procedure:

- Select the IDM heat pumps from the drop-down menu under devices.
- Select the operating mode from the meter configuration menu.
- Configure the device.
- **SAVE** the settings.

The following configuration options are available for the operating mode.

### Operating modes:

- Consumption meter mode:
  - Group selection for PM control with self-consumption.
  - Maximum AC power
  - Name
- Sub-consumption meter mode:
  - Maximum AC power
  - Name

### Note!



The IDM heat pump is an intelligent appliance. The available reported surplus is reported to the intelligent electrical appliances and can be consumed by them. Starting with firmware version 3.5.x, the simultaneous connection of several intelligent electrical appliances is supported.

### 18.4.7 Configuring the Keba Power Charging Stations

The Keba power charging station can be selected and configured accordingly from the Device Configuration section in the [Configuration | Device | Configuration](#) menu.

#### Procedure:

- Select the Keba power charging station from the drop-down menu under devices.
- The model, address and serial number are automatically applied and cannot be modified.
- The following configurations can be made under Charge control:
  - There are different selection options for the [Charge limitation](#) function in this section:
    - [Not controlled](#) - The Solar-Log™ only records the charging data without any control of the charging process.
    - [Surplus](#) - The electric car only charges when there is enough PV power available. The Solar-Log™ takes the defined minimum charge level into consideration. In this case, the release of power for the charging station corresponds to the amount of surplus.
    - [Surplus / minimum charge](#) - This ensures that the car always reaches its minimum charge level even when no PV power is available. When there is an energy surplus, the Solar-Log™ informs the charging station.
    - [Always charge](#) - The Solar-Log™ allows the charging station to consume power without any restrictions, regardless of the production or surplus levels.
  - [min. Charge Current \[mA\]](#) - The defined minimum charging power value is taken into account.
  - [max. Charge Current \[mA\]](#) - The defined maximum charging power value is taken into account.
  - [Off delay \[Min.\] \(only when used with the Charge limitation „Surplus“\)](#) - The switch-off delay option defines when the charging process should be stopped after the previous surplus is no longer available. This option prevents the charging process from being interrupted by short-term fluctuations in the amount of available surplus. The time factor can be defined from 1 to 60.
  - [Forced charge via Switch \(X1\)](#):
    - Activated.
    - Deactivated.
- Select the operating mode from the meter configuration menu. The Keba power charging station can be configured as a consumption meter or a sub-consumer.
- Enter the description under Module Fields, Power Output and Descriptions.
- **SAVE** the settings.

#### Note about forced charging via wall switch (X1)

If a wall switch is installed and connected to X1 on the charging station, the charging station is allowed via the Solar-Log™ to consume the defined maximum power levels without any restrictions, regardless of the production or surplus levels.

If a wall switch has not been installed, the Solar-Log™ configuration defined for the current limiting function can be set to „always charge.“ This also allows for charging according to the defined maximum power level.



## 18.4.8 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 performance monitoring. In contrast, plant groups (Chapter 19.2 auf Seite 104) 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 | Inverter    | 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

## 18.5 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.

## 18.6 Battery

The following configuration options are available for connected batteries from the **Battery** menu (it only appears when a battery is connected).

- Battery size  
Enter the battery size in Wh in this box.
- Consumption meter includes battery charge  
This box enables recording the battery charges from the consumption meter.

Configuration / Devices / Configuration / Battery

CONFIGURATION ORDER BATTERY

Configuration battery

Battery size 7200

Consumption meter includes battery charge Activated

Depending on the location of the consumption meter, the battery charge/discharge is counted by the consumption meter. Please select the battery consumption type.

CANCEL SAVE

Fig.: Battery configuration with help text

### Note!



The following components always have to be used for battery monitoring to work:

- => Inverters
- => Battery
- => Consumption meter

# 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 the Solar-Log™ WEB "Commercial Edition" or Solar-Log™ WEB Classic 2nd Edition is used.

Plant name

- Operator
- Contact e-mail address
- Installation
- Location
- Modules
- Orientation
- Inverter
- Power output

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 Edition" and Solar-Log™ WEB Classic 2nd Edition are only available after this data has been completely configured.

### Environmental performance

The CO<sub>2</sub> factor per kWh can be setup 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, a specific tariff payment and/or a yearly target value can be assigned to each plant group, 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. Plant groups are defined starting with 15 inverters. A maximum of 10 plant groups can be defined.

### Note!




When using several plant groups, only one plant group can be used with a tariff mode with self-consumption refund or self-consumption.

### Note!



Plant groups cannot be created for Solar-Log 200 and Solar-Log 500 devices.

### 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** the settings.

## 19.3 Graphic

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 from 800 to 1000 kWh/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

The plant costs are set in euros in the **General** menu. This value is used for the **Diagnostic | Finances** function.

The Yield offsets field is used to manually add the plant's previously yields,

e.g. in cases when the plant was already operational before having a monitoring system installed. These yields are included in the yield forecast.

#### Note!



When using several plant groups, only one plant group can be used with a tariff mode with self-consumption refund or self-consumption.

### 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 and self-consumption refund 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 grid 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 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 grid.

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.

## Market Integration Model 90/10

To be able to implement the requirements from the German Market Integration Model 90/10, two feed-in tariffs need to be used. The first feed-in tariff covers 90% of the power generated and the second feed-in tariff the remaining 10%.

"Percentage calculation" has to be activated first before adjusting this setting. In the [Configuration | Plant | Tariff](#) menu, active the **Percentage calculation** in the **Tariff settings** section.

When this option is activated, three additional fields are display for each tariff number. (See the following illustration "Tariff - Tariff settings")

1. Shares [%]
2. Amount [ /kWh]
3. Shares [%]

Configuration / Plant / Tariff

GENERAL PLANT GROUPS GRAPHIC FORECAST **TARIFF** ELECTRICITY COSTS

**General**

Financial overview of plant costs  €

Yield offsets for the financial overview  € ?

**Tariff settings**

Percentaged calculation ☒ ? Activated

Plant group

Tariff mode  ?

| Feed-in tariff                        |                                     |                                 |                                     |                                 |
|---------------------------------------|-------------------------------------|---------------------------------|-------------------------------------|---------------------------------|
| Start date                            | Amount [€/kWh]                      | Shares [%]                      | Amount [€/kWh]                      | Shares [%]                      |
| <input type="text" value="01.02.16"/> | <input type="text" value="0.7000"/> | <input type="text" value="40"/> | <input type="text" value="0.1000"/> | <input type="text" value="60"/> |
| <input type="text"/>                  | <input type="text" value="0.0000"/> | <input type="text" value="0"/>  | <input type="text" value="0.0000"/> | <input type="text" value="0"/>  |

Fig.: Tariff - Tariff settings

The following settings based on the market integration model 90/10 are displayed as an example in the illustration "Tariff - Tariff settings:"

- Date (when the calculation is applied).
- Amount (the amount set for the 90% share).
- Shares [%] (90).
- Amount (the amount set for the 10% share).
- Shares [%] (10).

After entering the information and saving the settings, the tariffs will be calculated with these values in the Financial Overview. (Refer to the "[Finances](#)" chapter in the User Manual for more information.)

### Note!



The Percentage calculation can be freely defined to allow for different and future requires to be easily implemented.

## 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.

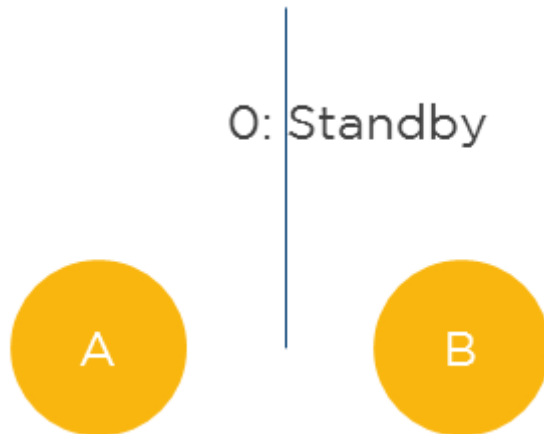


Fig.: Status and fault code groups

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) and/or signaled via a relay**.
- 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** the 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 these devices also have the same status and error codes.

## Configuration example

Status codes 0 to 8, 12 to 15 and 31 to 45 should result in an e-mail notification being sent, and status codes 16-31 for a relay signal. The fault codes 0 to 30 should result in a text messages (SMS) notification being sent.

This results in the following configuration:

|   | Active                              | Status                           | Error                            | From Code | To Code | E-mail                              | Text message (SMS)                  | Relay                               | Activate after X readings ? | Maximum per day ? |
|---|-------------------------------------|----------------------------------|----------------------------------|-----------|---------|-------------------------------------|-------------------------------------|-------------------------------------|-----------------------------|-------------------|
| 1 | <input checked="" type="checkbox"/> | <input checked="" type="radio"/> | <input type="radio"/>            | 1         | 8       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 20                          | 1                 |
| 2 | <input checked="" type="checkbox"/> | <input checked="" type="radio"/> | <input type="radio"/>            | 12        | 15      | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 20                          | 1                 |
| 3 | <input checked="" type="checkbox"/> | <input checked="" type="radio"/> | <input type="radio"/>            | 16        | 31      | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 20                          | 1                 |
| 4 | <input checked="" type="checkbox"/> | <input type="radio"/>            | <input checked="" type="radio"/> | 0         | 30      | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 20                          | 1                 |

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 **Sending time** can be entered in the text field.  
It is recommended to select a sending time when the inverters are no longer feeding power.
- Check the **days** on which the e-mails should be sent. E-mails are only sent on the days checked.
- **SAVE** the settings.

### Text message (SMS) notifications

#### Procedure

- Activate the **Text message (SMS) notification** button.
- The **Sending time** can be entered in the text field.  
It is recommended to select a sending time when the inverters are no longer feeding power.



- Check the days on which the e-mails should be sent. E-mails are only sent on the days checked.
- SAVE the 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 the 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 the 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
- Select the Performance Monitoring mode.  
Select per MPP tracker or for the total of all of the MPP trackers. There is also the option to deactivate the performance monitoring.
- 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 01 November to 30 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.

#### Note!



For PV plants with only one inverter, an inverter failure notification is sent even when the snow cover parameter is active.

- Select **Message as**.
- Activate required options and enter values.
- **SAVE** the 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

In the PM tab, two types of email notification types can be activated:

- Notification for power reductions.
- Notification for master/slave connection problems.

### Procedure

- **Activate** this function to receive an e-mail notification for every change to the power reduction and/or master/slave connection problems.
- **SAVE** the settings.

## Notification for power reductions

When Notifications for power reductions have been activated, an email is sent to the configured receiver e-mail address for every power reduction.

## Notification for master/slave connection problems

When the forwarding of control command has been entered under [Configuration | Feed-in Management | Linking](#), five notifications per day will be sent from each slave when a problem occurs as soon as [Notification for master/slave connection problems](#) is active.

An e-mail is sent as soon as a slave cannot be reached for at least five minutes. An e-mail is sent again once the slave is back online.

This e-mail appears in the Notification Overview with the notification type "PM."

Example when a slave is offline:

- Communication Status Master/Slave: 12.12.16 - 09:04:31 No response from 192.168.100.110.

Example when a slave is back online:

- Communication Status Master/Slave: 12.12.16 - 09:08:37 Response received from 192.168.100.110.

## 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™. The Initial yield can contain production, consumption or self-consumption values.

#### 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 the 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; Production in Wh; Consumption in Wh; Self-consumption in Wh

12.12.16;136435;264371;33684

13.12.16;138219;213145;43476

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 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-digit date  
 DD/MM/YY  
 For example: 12.12.16 for 12 December 2016

The following values can be corrected:

- Daily yield (kWh)
- Daily consumption (kWh)
- Daily self-consumption (kWh)
- Daily self-consumption Battery (kWh)

If consumption or yield values were modified with the data correction option, these corrected values are displayed additionally in the key and in the yield data under the Production | Day and Balances | Day menus.

## 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™ reboots itself.

## Saving configuration to hard disk section

With the function a configuration file can be created and saved to a hard drive.

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.

### Alternative 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\_161212.dat is then the backup from 12 December 2016.
- 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**.
- Backup files are searched for on the USB stick that is directly connected to the Solar-Log™  
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™ reboots 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.

### Alternative 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\_161212.dat is then the backup from 12 December 2016.

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 section

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 when this function is used.

### Note!



The reset button on the device has to be used to delete all of the settings, including network settings, for Solar-Log™ devices without a display (Solar-Log 200, 250 and 300). The Solar-Log™ is then set to automatically receive its IP address from the router. (DHCP)  
=> only with router or switch.

## 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 pin codes or passwords

- 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 **Sections** by checking them.
- **SAVE** the 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 | 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** the settings.

## 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** the settings.

### Country section

**Procedure**

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

The screenshot shows a web-based configuration interface for the 'Time' section. It includes the following elements:

- Title:** Time
- Date / Time (currently):** A text field displaying '21.07.15 16:15:08'.
- Date / Time (new):** An empty text field for setting a new date and time.
- SET:** A blue button to confirm the new date and time.
- Timezone GMT:** A text field displaying '+1:00'.
- Day Light Saving Time settings:** A dropdown menu currently set to 'CEST (Central European Summer Time)'.

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: 12.12.16 4:14:05 PM for 12 December 2016 16 Hours 14 Minutes 05 seconds (2:14 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](#) the 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:

- Dimming at a certain time
- Dimming when all of the inverters are offline
- Dimming after inactivity
- Slide show dialog

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](#) the 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, 60 for 60 minutes.
- [SAVE](#) the settings.

### Slide show section

After a defined period of time, the display changes about every 15 seconds: Overview, Tachometer, Energy Flow, Balance, Forecast, Day, Month, Year, Total, Environmental Contributions 1 - 3.

#### Procedure

- Enter the [desired time in](#) minutes.  
The minutes are to be entered in the mm format,  
for example, 15 for 15 minutes.
- The starting view of the Slide show can be set from the start screen.
- [SAVE](#) the settings.
- Alternatively, a start screen can be set for when the Slide show is deactivated.

## 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 section

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       |
|----------------|------------|------------|
| 3.5.2          | Build 85 - | 12.12.2016 |

## 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 Smart Energy


### 23.1 Defining Smart Energy Switching

The switches that are to be used for the Smart Energy function - switching on appliances in certain consumption or production scenarios - have to be defined and configured (see Chapter 18.1.1. "Configuring the device interface").

These switches, as described below, can be configured under the device class definition.

Up to 10 switches are available. They can be assigned to either the same manufacturer/model or to different combinations of manufacturers/models.

#### Procedure:

- Go to the **Configuration | Devices | Definition** menu. Go to Interface assignments on  and select **Switch** for the device class.

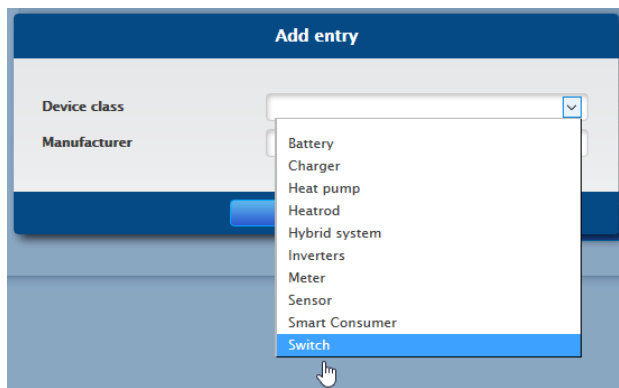


Fig.: Selecting switch for Smart Energy

- The **Manufacturer** box is displayed. The following selection manufacturers are available:
  - AllNet
  - Belkin
  - Gude
  - Solar-Log
- After that, the **Type** has to be defined. Depending on the selected manufacturer, all of the supported models can be selected here.
  - Allnet:
    - 3000RF
    - 3073
    - 3075/3076
    - 3075/3076V2
    - 3075V3
  - Belkin:
    - WeMo Insight
    - WeMo Socket

- Gude:
  - 1002
  - 1100/1001
  - 2104
  - 2110
  - 2301
- Solar-Log:
  - Relay (only Solar-Log 1000, 1200 and 2000)
  - Smart Relay Box
  - Smart Relay Station 1x 3.5kW
  - Smart Relay Station 3x 3.5kW

After that, the number of devices still has to be defined; up to 10 devices are available in total. The Smart Relay Box is the only exception here, instead of the device number box, the interface has to be selected.

- If the definition is complete, confirm by selecting **OK**.
- Define additional switches in the same way.
- Start the detection after defining the interfaces (see Chapter 18.4 "Device Detection").
- Configure the switches after the detection (See Chapter 18.4.4 "Configuring Switches").

### Note



This detection differs from the inverter detection in that it does not proceed according to the principle of the search, but a device is set up for every defined switch.

After they have been detected and configured, the switches are available in the **Hardware** section under **Configuration | Smart Energy | Switch groups** and can be assigned to switch groups.

## 23.2 Smart Energy Switching Groups

There are two tabs under **Configuration | Smart Energy**:

- Switching groups
- Surplus management

The **Switching groups** menu is divided into the following sub-sections:

- Hardware
 

All of the detected switches are displayed in this section.
- Switching groups
 

The switch contacts for the switching groups can be added in this section and new switching groups can be created and configured. Switching contacts in the switching groups are activated by the Solar-Log™. Unassigned contacts are only recorded – as long as the values can be recorded (depends on the hardware).

Up to 10 groups are available. Up to eight contacts can be assigned to each group.

### 23.2.1 Creating switching groups

There are two ways to create a switching group:

**The first method:**

- Left-click on the "Create switch contact here via Drag & Drop" box.

**The second method:**

- Drag a defined switch from the hardware section to the "Create switch contact here via Drag & Drop" box.

**The next steps are identical for both methods.**

- A new window with settings appears. Here, the switching group can be given a name and assigned the operating mode "consumer" or "generator."
- Save the settings by clicking on "Continue."
- The switch group is now visible.

(See illustration: "Creating switching groups")

Click on the [Demo](#) box to start the corresponding help for the procedures. (The Demo box is only visible once a switch has already been created.)

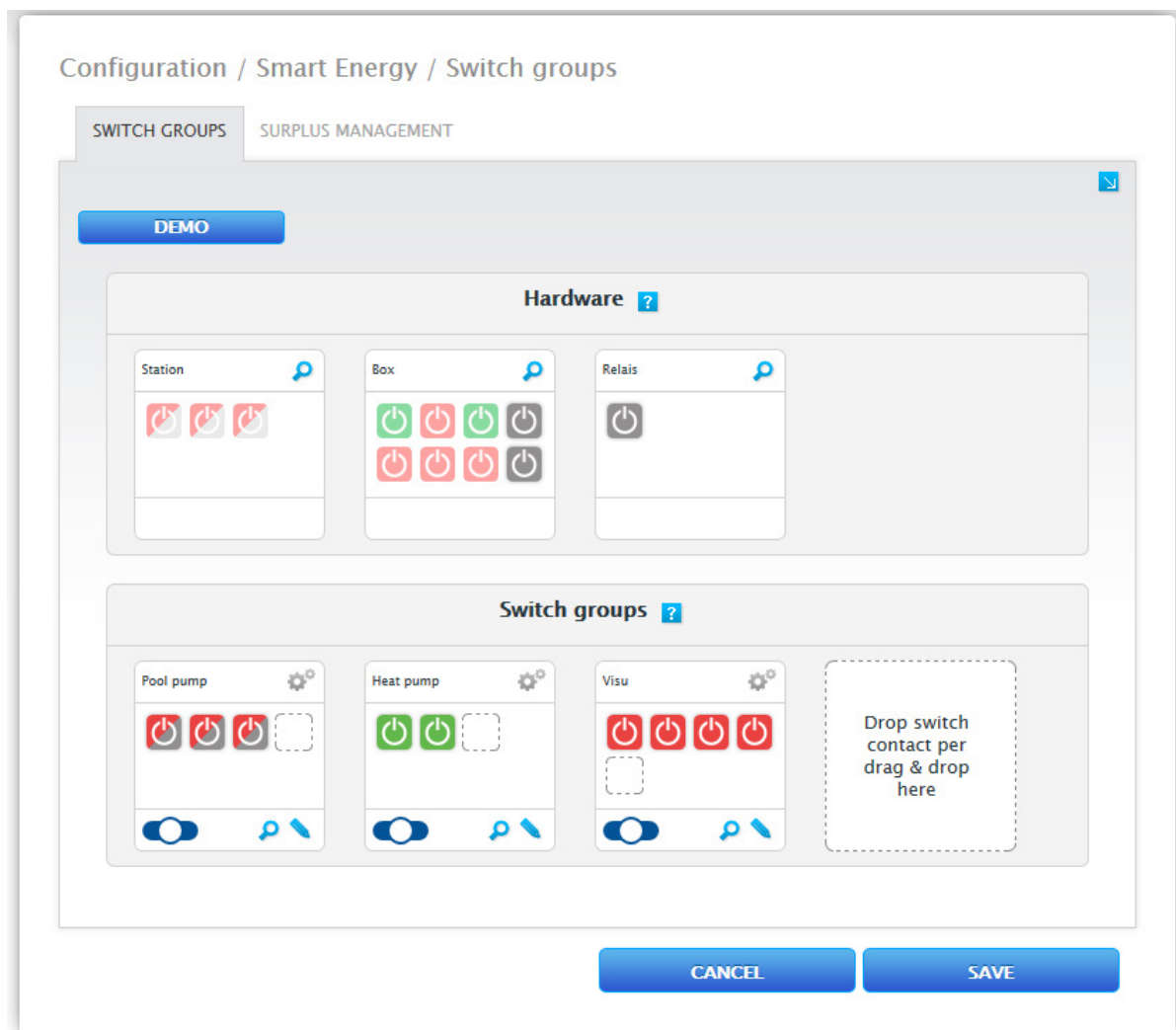



Fig.: Creating switching groups









## Note!



Click on this  symbol to display all of the hardware data that can be accessed and recorded by the Solar-Log™ and to display the target state.

## Switch states / Color Definition

The switching state of each contact is displayed with the following symbols:

| Symbol  | Explanation Text                            | Notes  |
|---|---|--|
|    | Target state: On<br>Actual state: On        | If the hardware does not support the current state being read, this symbol is also used to clearly identify a fault case.  |
|   | Everything OK                               |  |
|    | Target state: Off<br>Actual state: Off      | If the hardware does not support the current state being read, this symbol is also used to clearly identify a fault case.  |
|   | Everything OK                               |  |
|    | Target state: On<br>Actual state: Off       | For example: The Solar-Log™ determined that the switch should be activated (e.g. surplus reached), but the command was not sent to the switch. This can only happen when the switching state can be read.<br><br>=> This state is temporarily valid, but not a longer period without a change.<br>(e.g. the switch does not accept the switching command.)   |
|  | Target state: Off<br>Actual state: On       | For example: The Solar-Log™ determined that the switch should be deactivated (e.g. surplus too low), but the command was not sent to the switch. This can only happen when the switching state can be read.<br><br>=> This state is temporarily valid, but not a longer period without a change.<br>(e.g. the switch does not accept the switching command.) |
|  | Switch state: None<br>Actual state: Unknown | The switch is not assigned to a group.<br>=> No target state<br><br>The switch state cannot be read or the switch is not available.<br><br>=> If no state can be read (hardware does not support this), everything is ok.<br><br>=> Otherwise the hardware is not available (fault).   |
|  | Target state: On<br>Actual state: Unknown   | The switch state can be read, but the hardware is unavailable.   |
|   | Error                                       |  |
|  | Target state: Off<br>Actual state: Unknown  | The switch state can be read, but the hardware is unavailable.   |
|   | Error                                       |  |
|  | Target state: None<br>Actual state: On      | The switch can be read, but the switch is not assigned to a group.<br>=> No target state   |
|   | Everything OK                               |  |
|  | Target state: None<br>Actual state: Off     | The switch can be read, but the switch is not assigned to a group.<br>=> No target state   |
|   | Everything OK                               |  |

The current switching states are display within a few second and are continuously updated.

## Switch definitions

There is the option to assign one of the following states with a mouse click.

(See illustration: "Adjustable switch with help text"):

- All of the contacts are permanently switched off (switch position "left").
- The contacts are switched on according to the configured automatic switching rule.
- All of the contacts are permanently switched on (switch position "right").

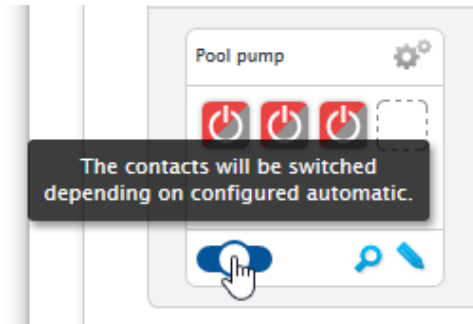

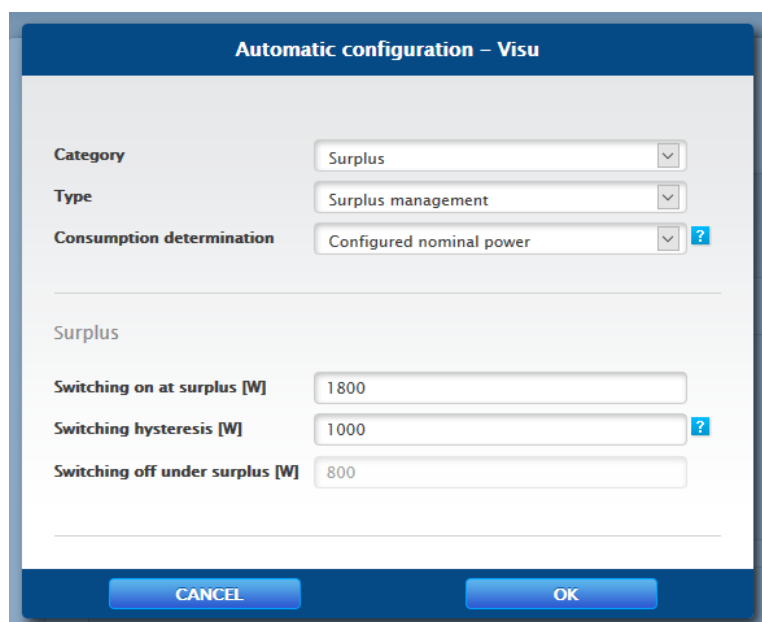


Fig.: Adjustable switch with help text

It is only possible to configure switching groups in the switch position "The contacts are switched according to the configured automatic switching rule. The editing pencil for the switching group is not visible for the other two options. If the switch is set to one of the other modes, the configured logic remains and is active once the mode has been set back. Click on the gear icon to change the name of the switching group, delete it or adjust the mode.

## 23.2.2 Configuring switching groups

Use this  symbol to configure the switching group. The following window appears after clicking on the symbol:



The image shows a software window titled "Automatic configuration - Visu". It contains a configuration interface for switching groups. At the top, there are three dropdown menus: "Category" set to "Surplus", "Type" set to "Surplus management", and "Consumption determination" set to "Configured nominal power". Below these is a section titled "Surplus" which contains three input fields: "Switching on at surplus [W]" with the value 1800, "Switching hysteresis [W]" with the value 1000, and "Switching off under surplus [W]" with the value 800. At the bottom of the window are two buttons: "CANCEL" and "OK".

Fig.: Control logic configuration window

The configuration is divided into two sections. The top section contains the following boxes:

- Category
- Type and
- Consumption determination. If the Consumption meter option is selected for the Consumption determination, an additional selection box is displayed with all of the available (sub) consumption meters. For the temperature profiles, an additional selection box is displayed with all of the available temperature sensors.

The bottom section is automatically determined by the selected category.

### Definition of the control logics

Various control logics can be defined with the input boxes. (See the Smart Energy Manual for more details – available for download from our website –

The individual boxes can be combined differently, depending on the control is used.

The following rules can be selected from the Category box:

- Surplus
- Production
- Consumption
- Device-specific
- Other

Depending on the rule, different types can be set.

## Surplus

The following types can be configured under the Surplus category:

- Surplus management
- Surplus management and Temperature Control
- Surplus management and Time Control
- Surplus management and Runtime Control
- Surplus matrix
- Surplus visualization

### Surplus management:

The following consumption definition can be selected in the Surplus management section:

- Configured nominal power:  
Consumption is calculated from the configured nominal power for the contacts and the switch state. The nominal power can be configured under [Configuration | Device | Configuration](#). If it is available, the current state is used for the calculation, otherwise the target state.
- Measured value from the contacts (can only be selected if at least one contact that provides output values has been assigned to the switching group. This depends on the hardware used and can be viewed by clicking on the magnifying glass icon in the hardware section under [Configuration | Smart Energy | Switching groups](#)):  
Consumption is determined by the measured consumption from the individual contacts as long as these values are provided. This is determined by the configured nominal power for contacts that do not provide these values or when communication is offline.
- Consumption meter:  
Consumption is determined by a separate consumption meter that has to be detected as a device. If this type of consumption determination is selected, the responsible consumption meters also have to be selected.

After the consumption determination has been selected, the threshold values have to be configured in the last step.

- Switching on at surplus [W]
- Switching hysteresis [W]  
The switching hysteresis is to prevent that the switch will be permanently turned on/off at the threshold. It is recommended to have a hysteresis of 100 to 1000 W depending on the switch-on threshold.
- Switching off under surplus [W] (This value is grayed out and cannot be manually modified. It is calculated from the "Switching on at surplus [W]" value minus the "Switching hysteresis (W)" value.)

### Surplus management and Temperature Control:

This Consumption determination is almost completely identical to that of Surplus management. The only difference is that the temperature sensor has to be selected.

After selecting the Consumption determination, the following sections are to be configured:

- Surplus
- Temperature

The Surplus configuration (see Surplus management).



The following settings can be made and/or activated under temperature configuration:

- Switch on when temperature is (C°):
  - greater
  - less
- Runtime (min.):  
If the appliance was activated because of the temperature threshold, it will be deactivated after this time has passed, even if the minimum/maximum temperature has not been reached.
- Minimum/Maximum temperature (C°) (depends on the selection for "Switch on when temperature is (C°) greater or less"):  
It is applied even if the appliances are activated because of a surplus or the temperature.

#### Surplus management and Time Control:

This Consumption determination is identical to Surplus management.

After selecting the Consumption determination, the following sections are to be configured:

- Surplus
- Time

The Surplus configuration (see Surplus management).

Up to two daily runtimes can be set in the time configuration. If only one runtime is needed, the second one can be deleted by clicking on the trash can symbol.

#### Surplus management and Runtime Control:

This Consumption determination is identical to Surplus management.

After selecting the Consumption determination, the following sections are to be configured:

- Surplus
- Daily runtime

The Surplus configuration (see Surplus management).

The following settings can be made and/or activated under Daily runtime configuration:

- Daily runtime [Min.] (this values is determined by the time from 0:00 to 23:59.)
  - Minimal
  - Exact
  - Maximal
- Fill runtime from  
Depending on the situation, it could happen that the period of time from the defined daily runtime could not fulfilled with the surplus rule. In this case, it can be defined in this box at which time the remaining daily runtime should be fulfilled. The process is also carried out when there is no surplus available.
- Minimum continuous switch on time [Min.]
- Minimum continuous switch off time [Min.]
- Max. switch on operations  
The remaining daily runtime is completely fulfilled with the last switching run.

Note!



The daily runtime will be set to the value of the new day starting at 0:00 (midnight). That is why it is not possible to have a runtime extending past the particular day. The devices controlled in this section will be turned off at 0:00 (midnight).

### Surplus matrix:

At least two and no more than three contacts have to be assigned to the switching group to use this function.

This Consumption determination is identical to Surplus management.

In the bottom section, there is a matrix to determine the output of the appliances and with which contacts are linked to in the switching group.

Up to seven surplus levels can be created by clicking on the plus symbol.

Levels that are not needed can be deleted by clicking on the trash can symbol.

### Surplus visualization:

With Surplus visualization, its own surplus threshold can be configured for every contact (1-8) assigned to the group.

Note!



This function is only for the visualization and no loads may be switched on since the Solar-Log™ would then have incorrect calculations which would lead to faulty switching operations.

## Production

With output visualization, its own output threshold can be configured for every contact (1-8) assigned to the group.

Note!



This function is only for the visualization and no loads may be switched on since the Solar-Log™ would then have incorrect calculations which would lead to faulty switching operations.

## Consumption

With Consumption visualization, its own consumption threshold can be configured for every contact (1-8) assigned to the group.

**Note!**

This function is only for the visualization and no loads may be switched on since the Solar-Log™ would then have incorrect calculations which would lead to faulty switching operations.

## Device-specific

The following types can be configured under the Device-specific category:

- Heat pump with a grid company blocking signal
- Vaillant heat pump with a grid company blocking signal
- Heating rod three level digital

### 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 release 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 a maximum of 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

### Vaillant heat pump with a grid company blocking signal:

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

### Heating rod three level digital

At least two and no more than three contacts have to be assigned to the switching group to use this function.

This Consumption determination is identical to Surplus management.

In the bottom section, there is a matrix to determine the output of the heating coil and with which contacts are linked to in the switching group.

Up to seven surplus levels can be created by clicking on the plus symbol.

Levels that are not needed can be deleted by clicking on the trash can symbol.

## Other

The Automatic timer type under Other category operates independent of the current PV production and measured consumption.

Up to ten daily runtimes can be created by clicking on the plus symbol.

Levels that are not needed can be deleted by clicking on the trash can symbol.

## Generation Information on Thresholds

Average values (every 5, 10 or 15 minutes) 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.

## General information about nominal power (maximum AC output):

The nominal power (maximum AC output) is the average consumption of appliances that is controlled by the profile. Appliances, such as 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. This is why the Solar-Log™ calculates the entire runtime with the value configured for the nominal power (maximum AC output) which can be entered in the [Configuration | Devices | Configuration | Configuration](#) in the [Module Fields, Power Output and Descriptions](#) section. (See the Chapter "Module Fields, Power Output and Descriptions" under [Device Configuration](#).)

### Note!



The most exact that the configured nominal power (maximum AC output) corresponds to the actual consumption, the more accurately the control of consumption via Smart Energy is.

### Note!



The configured control rules can be simulated in the Diagnostics menu. Click on the arrow symbol at the top under [Configuration | Smart Energy | Switching groups](#) to switch directly to the Smart Energy Simulation.

(See the User Manual for more information about the Smart Energy Simulation.)

### Note!



A detailed document about Smart Energy with practical examples is available from our website:

<http://www.solar-log.com/en/products-solutions/solar-logtm-smart-energy/homepage.html> for [Download](#).

## 23.3 Smart Energy Surplus Management

The Surplus Management menu is divided into the following sub-sections:

- Settings
- Surplus priority

(See illustration: "Surplus management")

Fig.: Surplus management

The following values can be defined in the **Settings** section:

- Measurement values for control logic
- Surplus offset [%]

The following values for the control logic can be selected under **Measurement values for control logic**:

- Current values  
are the instantaneous values. For systems with constant measurements values (e.g. CHP as producer), current values can also be used to react more quickly.
- Average values  
Average values compensate for power fluctuations and help the control logic to operate more steadily.

### Note!



The average value consists of the 5-, 10- or 15-minute average value depending on the number of connected inverters:

< 30 INV: 5 minutes, 30-59 INV: 10 minutes, >= 60 INV: 15 minutes

#### Surplus offset [%]:

How much nominal plant output is to be fed into the grid and how much should be used for the Surplus manage of the Smart Energy control logics can be defined in this box.

When output reduction is activated, a sensor has to be installed to determine the amount of theoretically available production.

In the **Surplus priority** section, the list of defined switching groups and the detected intelligent appliances are displayed according to their priority (the first entry in the list has the highest priority). This can be adjusted at anytime with the drag and drop function.

#### Note!



The prioritization occurs only for the surplus profiles and not, for example, for the run-time control profiles.

## 24 Feed-In Management

Access Feed-in Management via the menu [Configuration | 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™.

### 24.1 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<br>Utility Meter (U) | Medium voltage<br>Utility Meter<br>(U+I) | Low<br>voltage |
|-----|-------------------------------------|--|----------------|
| UC  | 20000                               | 20000                                    | 398            |
| UNS | 20000                               | 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™.

## Plant passwords

The log-on data can be entered for the inverters in the [Configuration | Feed-in Management | Plant Parameters | Plant Passwords](#) menu – as long as the devices configured support this function..

- **Inverter Password**  
Plant password, if service password is required to access the inverters.
- **Log-on Mode**  
If supported by the inverters, a difference can be made between normal and privileged access. With individual modules, privileged access can be required to gain access to power management functions.
- **Parameter Password**  
Password which is needed to change critical settings for the inverters, e.g. the GridGuard-Code for SMA inverters.

### Note!



Please make sure that the inverter password matches the log-on mode. If separate passwords for an inverter can be assigned to users and installers, the corresponding password has to be assigned to the log-on mode.

### Note!



The Plant Password menu is only displayed when the inverters connected required a password to access the inverters and/or a password to change critical settings.



## 24.2 Active power

The following modes are available from the **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
- Adjustable reduction with the calculation of self-consumption
- Fixed reduction in watts
- Fixed reduction in watts 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 assignments section

The inverters with their assigned interfaces that are connected to the Solar-Log™ are displayed in this section.

Select the inverter(s) to control and activate it/them.

## LCD Display

In the LCD Display section, the values that are displayed can be defined.

The following values can be selected:

- Only error:  
This is displayed when there are PM control errors.
- Target power (% DC):  
This is the value (%DC) that has been selected for the reduction (e.g. 70%).
- Control value power (% AC):  
The control value is the value sent to the inverters in order to reach the target value. The relationship between the nominal power (AC) and the installed DC power (DC) is factored in. The current consumption from the control with self-consumption is also factored in.

The value of 100% is not displayed on the LCD display.

## Dynamic control for different module orientations

Depending on the plant, there might be different module orientations. To integrate these differences with the active power, the switch "Dynamic control for different module orientations" needs to be activated (deactivated by default). This switch is located in the [Feed-In Management | Active Power](#) menu. Activate this.

When this option is activated, different reduction commands are sent to the inverters, e.g. taking their orientation into consideration, to maximize the amount of power fed into the grid without exceeding the limit. The advantage here, for example, is that when some inverters are performing below a 70% limit, the output from other inverters can be adjusted above the 70% to balance the final output to 70%.

### 24.2.1 Active power deactivated

When this menu item is selected, active power is deactivated. After that, the controllable interfaces can be selected when control is via the Modbus PM or via a PM Profile.

### 24.2.2 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 the chapter "Appendix" .

## Channel settings for power reduction section

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

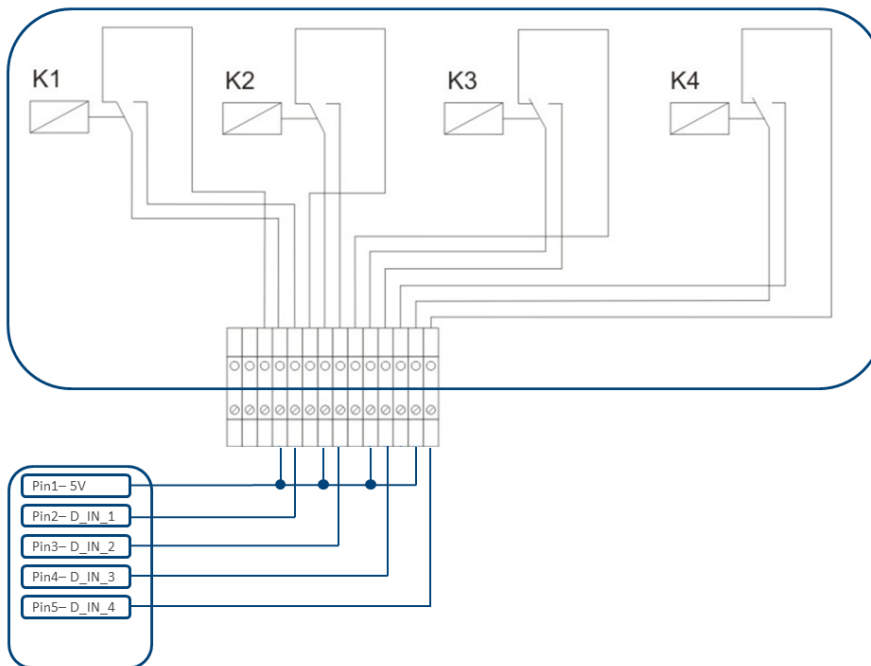


Fig.: Schematic diagram of a ripple control receiver with four relays.

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.

Channel settings for power reduction

| Digital input | D_IN_1                              | D_IN_2                              | D_IN_3                              | D_IN_4                              | Power in % |
|---------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|------------|
| Level 1       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | 100        |
| Level 2       | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 60         |
| Level 3       | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 30         |
| Level 4       | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 0          |

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 these 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 inverter(s) to control in the **Interface assignments** section.
- Enter the **channel settings for power reduction** according to the specifications and wiring.
- Select **options**.
- **SAVE** the 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-Log 2000 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 has to be connected via another load relay.

Please also refer to the additional information on relays in Seite 63 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 has to be connected via another load relay.

Please also refer to the additional information on relays in Seite 63 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 | PM](#) menu.

### 24.2.3 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. This function does not correspond to provisions of the German EEG laws and has to be arranged with the grid operator before being used.

## 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”.

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.

#### Notes about the function!



Self-consumption is taken into account with a command (less than 100% and greater than 0%). The inverter(s) supply a higher output than the command value by taking the current consumption into account.

Self-consumption is not taken into account with the 0% command value. As a safeguard here, the plant is always limited to 0%.

### 24.2.4 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 | Devices | Configuration](#) 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 inverter(s) to control in the Interface assignments section.
- SAVE the settings.

#### Note!



Changes to the **Maximum AC Power** of the inverter in **Configuration | Devices | Configuration** 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).

## 24.2.5 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". 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 inverter(s) to control in the Interface assignments section.
- SAVE the 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 meters“.

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.

## 24.2.6 Adjustable reduction

This function allows the maximum amount of grid feed-in power to be configured. The reduction level in regard to the amount of connected generator power can be freely defined as a percentage (X%). The Solar-Log™ only regulates the inverters when the amount of feed-in power for the grid has reached the limit.

### Procedure:

- Select Adjustable reduction.
- Enter the **percentage** for the adjustable reduction.
- Select the inverter(s) to control **in the** Interface assignments **section**.
- **SAVE** the settings.

## 24.2.7 Adjustable Reduction with the Calculation of Self-Consumption

This function allows the maximum amount of grid feed-in power to be configured. The reduction level in regard to the amount of connected generator power can be freely defined as a percentage (X%). The amount of self-consumption is taken into account for this calculation. The Solar-Log™ only regulates the inverters when the amount of feed-in power for the grid has reached the limit. If there is enough self-consumption, the inverters continue to operate without any reductions.

### Procedure:

- Select Adjustable reduction with the calculation of self-consumption
- Enter the **percentage** for the adjustable reduction.
- Select the inverter(s) to control **in the** Interface assignments **section**.
- **SAVE** the 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 meters".

### 24.2.8 Fixed reduction in watts

This function allows the maximum amount of grid feed-in power to be configured. The reduction level in regard to the amount of connected generator power can be freely defined to a particular output level (W). The Solar-Log™ only regulates the inverters when the amount of feed-in power for the grid has reached the limit.

**Procedure:**

- Select Adjustable reduction.
- Enter the **Output (W)** for the **adjustable reduction**.
- Select the inverter(s) to control in the Interface assignments section.
- **SAVE** the settings.

### 24.2.9 Fixed reduction in watts with the calculation of self-consumption

This function allows the maximum amount of grid feed-in power to be configured. The reduction level in regard to the amount of connected generator power can be freely defined to a particular output level (W). The amount of self-consumption is taken into account for this calculation. The Solar-Log™ only regulates the inverters when the amount of feed-in power for the grid has reached the limit. If there is enough self-consumption, the inverters continue to operate without any reductions.

**Procedure:**

- Select Adjustable reduction with the calculation of self-consumption
- Enter the **Output (W)** for the **adjustable reduction**.
- Select the inverter(s) to control in the Interface assignments section.
- **SAVE** the 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 meters”.

### 24.2.10 Percentage of consumption for an adjustable reduction

This function allows the maximum amount of power generated by the inverter to be configured. The percentage configured (freely adjustable) results in a corresponding reduction in regard to the total consumption at the inverter. There is power feed into the grid with this power reduction type.

**Example:**

The total consumption of an installation is at 2000 W and the reduction of the inverters is configured to 90%, leaving 1800 W. 200 W has to be purchased from the grid to cover the total consumption.

**Procedure:**

- Select the percentage of consumption for the adjustable reduction.
- Enter the **percentage (%)** for the adjustable reduction.
- Select the inverter(s) to control in the Interface assignments section.
- **SAVE** the 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 meters”.

## 24.3 Reactive Power

The following modes are available from the **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+ with Utility Meter)
- 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 under [www.solar-log.com/pm+](http://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](http://en.wikipedia.org/wiki/Electric_current#Reference_direction)

## Interface assignments section

The inverters with their assigned interfaces that are connected to the Solar-Log™ are displayed in this section.

Select the inverter(s) to control and activate it/them.

### 24.3.1 Reactive power deactivated

When this menu item is selected, reactive power control is deactivated. After that, the controllable interfaces can be selected when control is via the Modbus PM or via a PM Profile.

### 24.3.2 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. If an Utility Meter with power measurement is available, the measurements can be performed at the feeding point.

#### Procedure:

- Select Fixed value cos (Phi) shift factor.
- Activate the [interface assignments](#) to control.
- 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).
- If necessary, activate measuring at the feeding point.
- [SAVE](#) the 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 other lines must also be filled with 00:00. It is not necessary to enter the cos (Phi).

### 24.3.3 Fixed reactive power in Var

#### Reactive Power Management

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 the [interface assignments](#) to control
- 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](#) the 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 other lines must also be filled with 00:00. It is not necessary to enter reactive power.

### Reductions

The following configuration options are available in the Reductions section.

- Max. cos(phi) inductive/under excited and max. cos(phi) capacitive/over-excited:  
A maximum shift factor can be defined with this the reduction. With this, it can be that less reactive power is fed-in into the grid than allowed in the partial load range in order to maintain the shift factor limits.

Note!



Entering zero as the value deactivates the particular limit.

### 24.3.4 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 function is also referred to as Phi (P).

The currently generated power (P) is calculated by the Solar-Log™ based on the inverter data. If an Utility Meter with power measurement is available, the output value will be used instead.

#### Note!



Please check that all of the Solar-Logs in a master/slave setup have the same firmware version, especially for the characteristic curve P/Pn with the Utility Meter.

### 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 two points.

##### Procedure

- Select **Variable cos (Phi) shift factor over characteristic curve P/Pn** from the menu.
- Activate the **interface assignments** to control.
- Select **2-point characteristic curve**.
- Define the **characteristic curve points A and B** based on the boxes P/Pn and cos (Phi) and put a check in front of inductive/under-excited.
- **SAVE** the 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 four points.

##### Procedure

- Select **Variable cos (Phi) shift factor over characteristic curve P/Pn** from the menu.
- Activate the **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** the settings.

The characteristic curve displayed changes according to the values entered.

### 24.3.5 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.

#### Reactive Power Management

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™ 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)“ section.

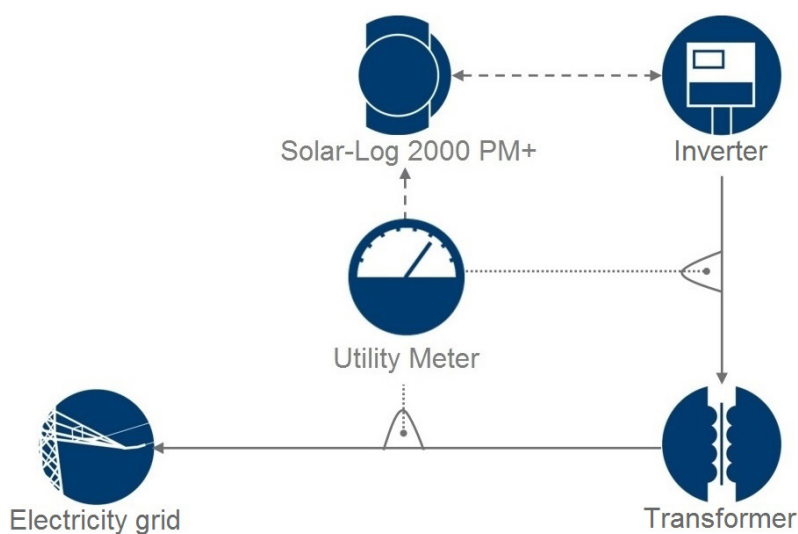


Fig.: Q(U) control function diagram

#### 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 two points.

### Procedure

- Select **Variable reactive power via the characteristic curve Q(U)** as the type.
- Activate the **interface assignments** to control.
- 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** the 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 four points.

#### Procedure:

- Select **variable reactive power via the characteristic curve Q(U)** as the type.
- Activate the **interface assignments** to control.
- 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** the settings.

The characteristic curve displayed changes according to the values entered.

## Reductions

The following configuration options are available in the Reductions section.

- **Gradient limit (adjustment rate):**  
If the power company requires a reduction, it has to be configured in this box. (Enter the values in seconds)
- **Max. cos(phi) inductive/under excited and max. cos(phi) capacitive/over-excited:**  
A maximum shift factor can be defined with this the reduction. With this, it can be that less reactive power is fed-in into the grid than what the characteristic curve allows in the partial load range in order to maintain the shift factor limits.

#### Note!



Entering zero as the value deactivates the particular limit.

### 24.3.6 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™.

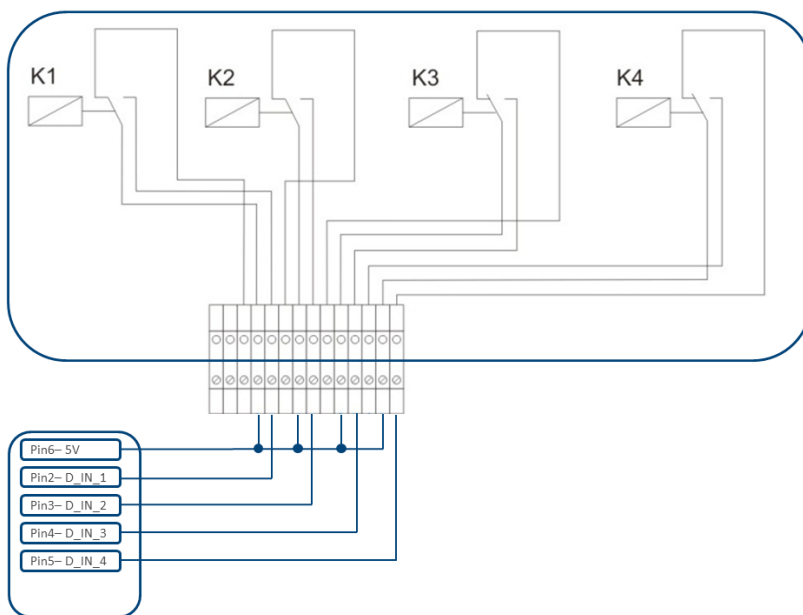


Fig.: Schematic diagram of a ripple control receiver with four relays.

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 a particular shift factor 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.

| Digital input | D_IN_1                              | D_IN_2                              | D_IN_3                              | D_IN_4                   | Cos(Phi) | Inductive/under-excited             |
|---------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|----------|-------------------------------------|
| Level 1       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | 0.97     | <input checked="" type="checkbox"/> |
| Level 2       | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | 1.00     | <input type="checkbox"/>            |
| Level 3       | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 0.97     | <input type="checkbox"/>            |

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 inverter(s) to control in the **Interface assignments** section.
- Enter the **channel settings for power reduction** according to the specifications and wiring.
- Select options.
- SAVE the 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 „24.1.5 Variable reactive power via the characteristic curve Q(U) (only Solar-Log 2000 with Utility Meter)“



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

## 24.4 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 | 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** the settings.

Configuration / Feed-In Management / Linking

PLANT PARAMETERS ACTIVE POWER REACTIVE POWER **LINKING** PROFILE

Distribution of control commands

| Device no. | IP address     | Last response     |
|------------|----------------|-------------------|
| 1          | 192.168.172.17 | 23.07.15 15:11:52 |
| 2          | 0.0.0.0        |                   |

CANCEL SAVE

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 | Feed-in Management | Plant parameters](#) and forecast value under [Configuration | Plant | Forecast](#) have to be set to 0.

## 24.5 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\_pmpofil\_NameGridOperator.dat file format.

### Procedure:

- Select configuration from [Configuration | 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.

The screenshot shows a web-based configuration interface for a PM Package. The breadcrumb navigation at the top reads 'Configuration / Feed-In Management / Profile'. Below this, there are tabs for 'PLANT PARAMETERS', 'ACTIVE POWER', 'REACTIVE POWER', 'LINKING', and 'PROFILE', with 'PROFILE' being the active tab. The main content area is divided into two sections: 'PM profile settings' and 'IO Boxes'. In the 'PM profile settings' section, the 'Current profile' is set to 'EON EDIS'. There are buttons for 'Reset profile' (labeled 'RESET'), 'Select file' (with a 'Durchsuchen...' button and the text 'Keine Datei ausgewählt.'), and 'LOAD PROFILE'. The 'IO Boxes' section contains a list box with three entries: 'ADAM4050', 'ADAM4068A', and 'ADAM4068B'. Below the list box is an 'Interface' dropdown menu currently set to 'Via Master/Slave', with a dropdown arrow. A mouse cursor is hovering over the dropdown menu, which has opened to show three options: 'Via Master/Slave' (highlighted), 'RS485-A', and 'RS485/422-B'. At the bottom of the interface are 'CANCEL' and 'SAVE' buttons.

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 RS485 interfaces or Master/Slave on which the [I/O Boxes](#) are [connected to](#) have to be selected.
- [SAVE](#) the 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.

## 25 Direct Marketing

---

### Note!



With the amendment of the German Renewable Energy Act (EEG 2014), direct marketing is required for all new plants with an output greater than 500 kW. Starting 01 January 2016, the requirement applies to all plants with an output greater than 100 kW.

An interface has been implemented with firmware version 3.3.0 (extra license required) for the simple, efficient and secure communication between the direct marketer and the remote controlled photovoltaic plant. The Solar-Log™ with the firmware version 3.3.0 or newer fulfills the requirements to receive the management bonus for remotely controlled plants. Secure data communication between the plant and direct marketer is mandatory. This has been implemented with VPN encryption (VPN router).

### Note!



A VPN router is required to be able to use the direct marketing function.

The Direct Marketing function is not enabled by default. To use this function the license key has to be entered in the [Configuration | System | Licenses](#) menu.

The following providers are available:

- Energy & Meteo
- Next Kraftwerke (Firmware 3.4.0)

### Energy & Meteo / Next Kraftwerke

Direct marketing via Energy & Meteo or Next Kraftwerke is carried out using remote control options.

The following remote control options are available:

- Modbus
- Ripple Control Receiver
- Ripple control receiver with consideration of self-consumption

We offer different license models via a corresponding license key.

The following license options are available:

- Plant size to 100 kWp
- Plant size to 500 kWp
- Plant size to 1 MWp
- Plant size to 2 MWp
- Plant size to 5 MWp

- Plant size to 10 MWp
- Plant size to 20 MWp

#### Procedure



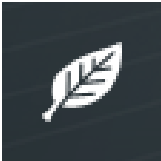

- Select Energy & Meteo or Next Kraftwerke as the provider.
- Select Remote Control options.
- SAVE the settings.

# 26 Direct Device Configurations (Solar-Log 1200 and 2000)

The display of the Solar-Log 1200 and 2000 is a touchscreen. It is operated by touching the menu selections with your finger or by using a stylus.

## 26.1 Display menu structure

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

| Display menu structure  |  |
|---|--|
| Control element   | Meaning  |
|    | Power output   |
|   | Yield History (Balance, Consumption or Production is displayed depending according to the configuration) |
|  | Environmental performance  |
|  | Settings   |

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

## 26.2 Control Elements on the Display

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.

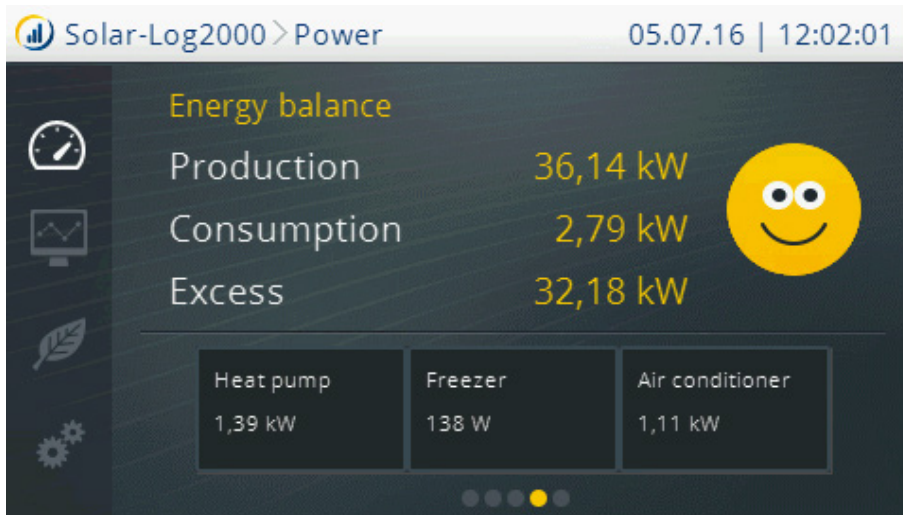


Fig.: Display: Energy balance

## 26.3 Settings on the device

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

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

## 26.4 Start menu (only Solar-Log1200)

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

- Initial configuration
- Device Detection
- Easy Installation

### 26.4.1 Initial configuration (only Solar-Log 1200)

The initial configuration is automatically started for the initial setup. However, it can also be started at any time from the [Start | Initial Configuration](#) menu.

**Procedure:**

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

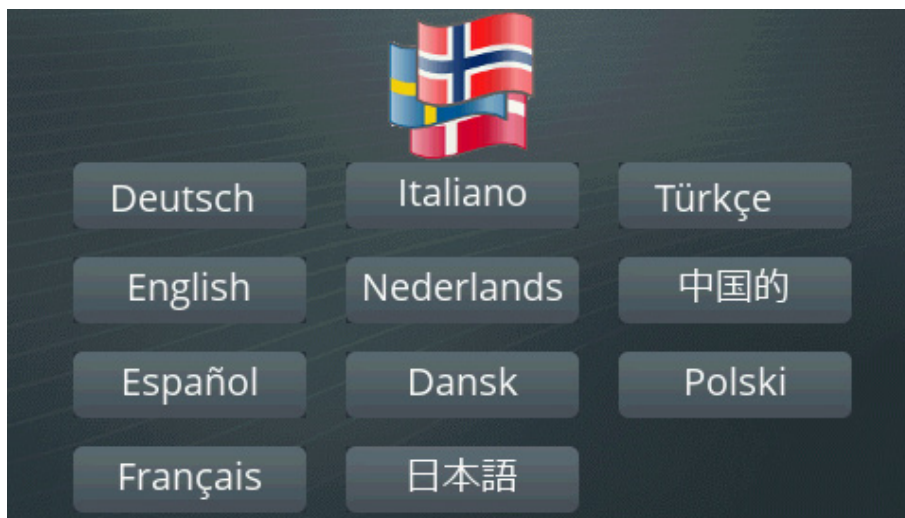


Fig.: Display: Initial configuration language selection

- 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.

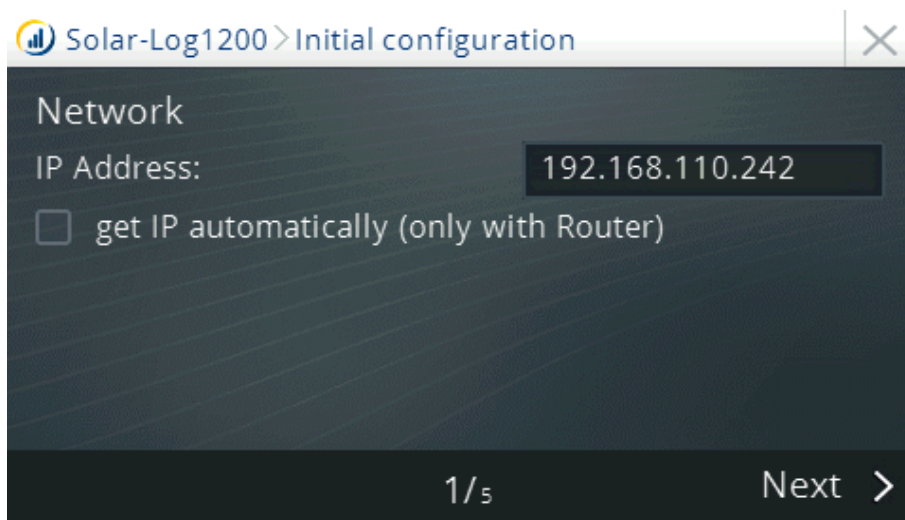


Fig.: Display: IP address settings in the initial configuration



In the next step, select the device class that it to be connected to the interface.

- Go to Add (see illustration "Initial Configuration – Device Selection").
- Select the device or manufacturer in the next window (see illustration "Device Class – Definition").

Selectable device classes

- Inverter
- Sensor
- Power meter
- SolarLog Interface
- Battery
- Hybrid System

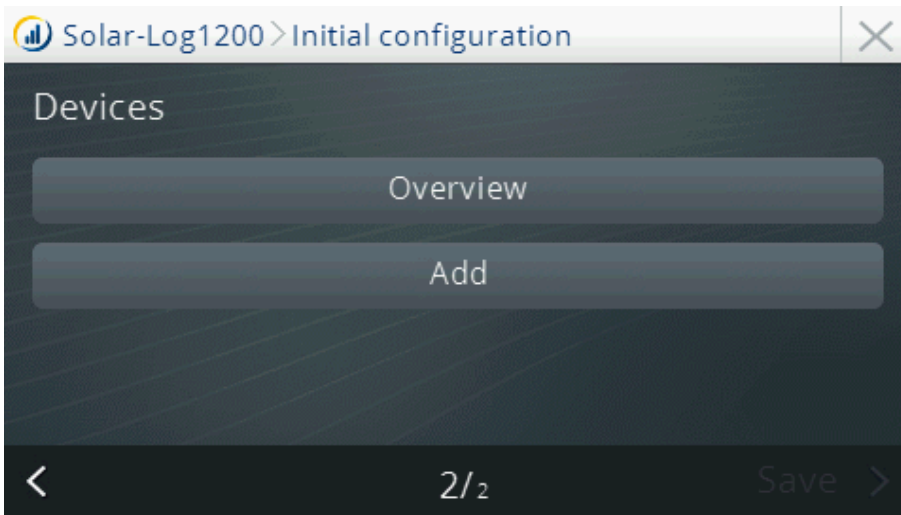


Fig.: Initial configuration – Device selection

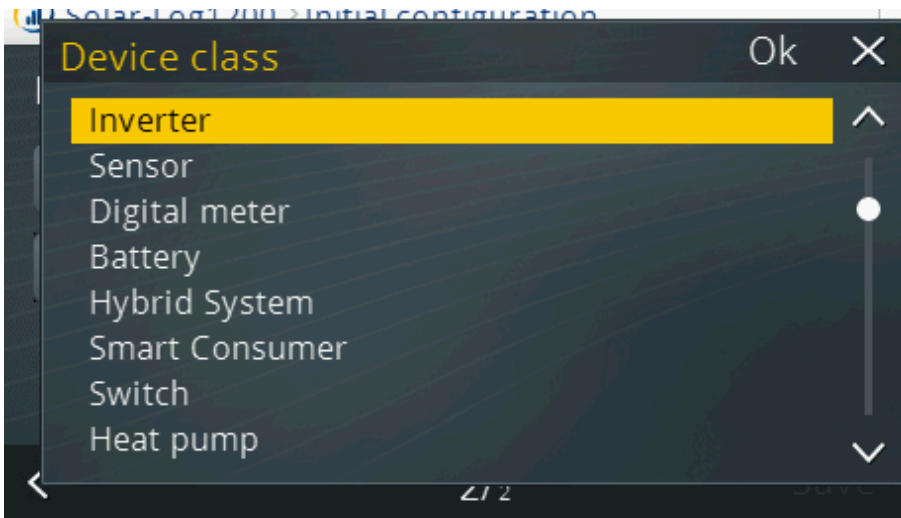


Fig.: Device classes – Definition

The currently supported modules and manufacturers are found in every class type.

Refer to our supported components database on our website for more information:

<http://www.solar-log.com/en/service-support/supported-components/overview.html>

Note!



For the interface definition, it is important to note that devices from different manufacturers cannot be connected to the same bus since this can lead to communication problems.

## Device class selection based on an example

Inverter selection (example: Bonfiglioli)

Procedure:

- Select the inverter.

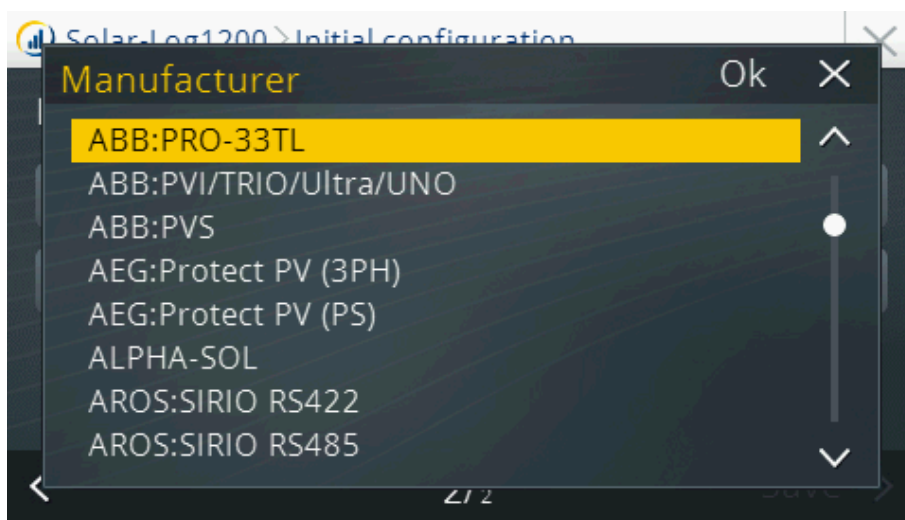


Fig.: Inverter selection

- Defining the interface

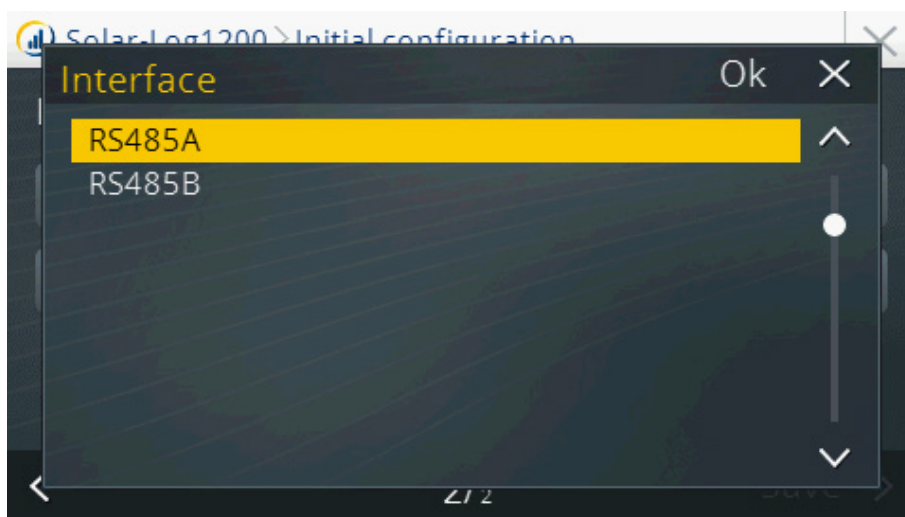


Fig.: Interface definition

- Confirm the inquiry about a possibly connected Wireless Package.

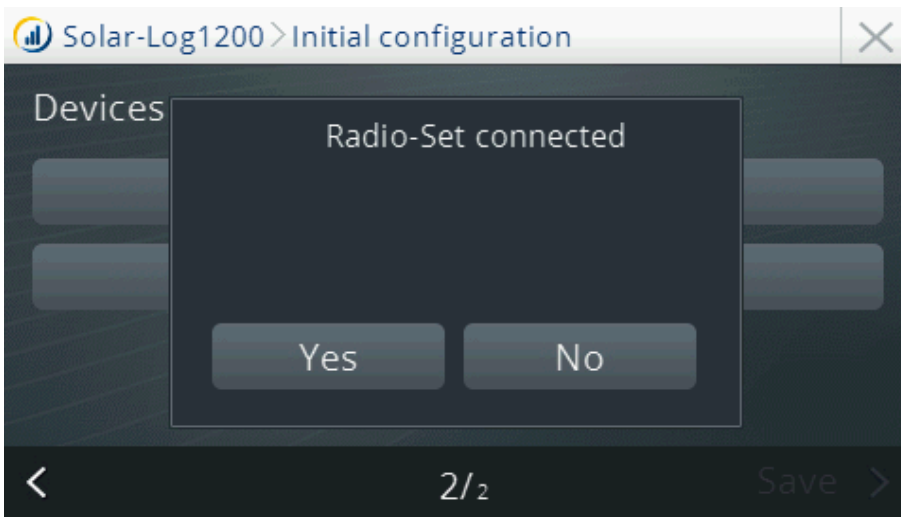


Fig.: Inquiry about a connected Wireless Package.

- Configuring the baud rate

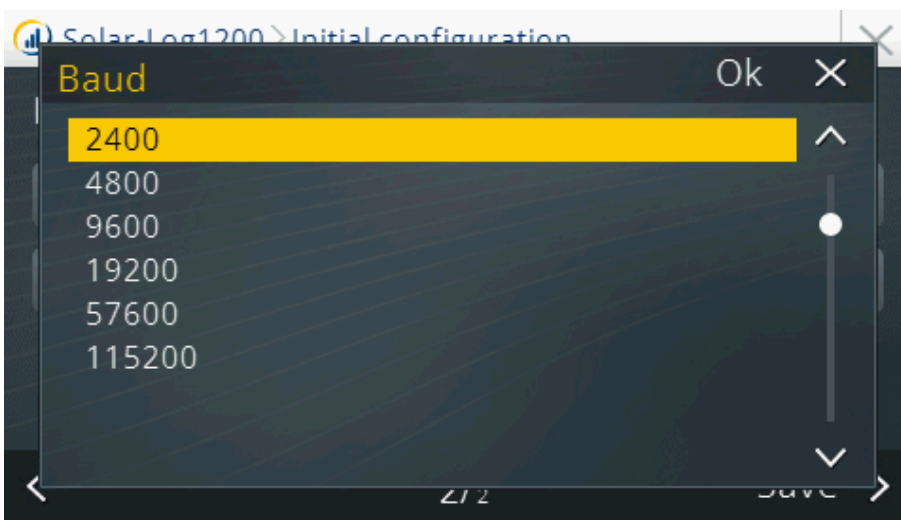


Fig.: Configuring the baud rate

- Click on save after the device definition is completed.

## 26.5 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™.



| Interface | Manufacturer     | Amount |
|-----------|------------------|--------|
| RS485A    | ABB              | 2      |
| RS485B    | Bonfiglioli      | 0      |
| RS485A    | Mencke&Tegtmeyer | ---    |

Cancel 1/30

Fig.: Display: Device Detection

- The display Diehl AKO 2 means that two Diehl AKO inverters have been detected. The yellow typeface indicates that additional SMA inverters are being searched for on RS485 B.
- 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

### 26.5.1 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 „34.2 Country specific inverter detection with Easy Installation“ on page 205.

- Solar-Log™ WEB Internet registration – the device must be connected to a router with the DHCP service enabled.

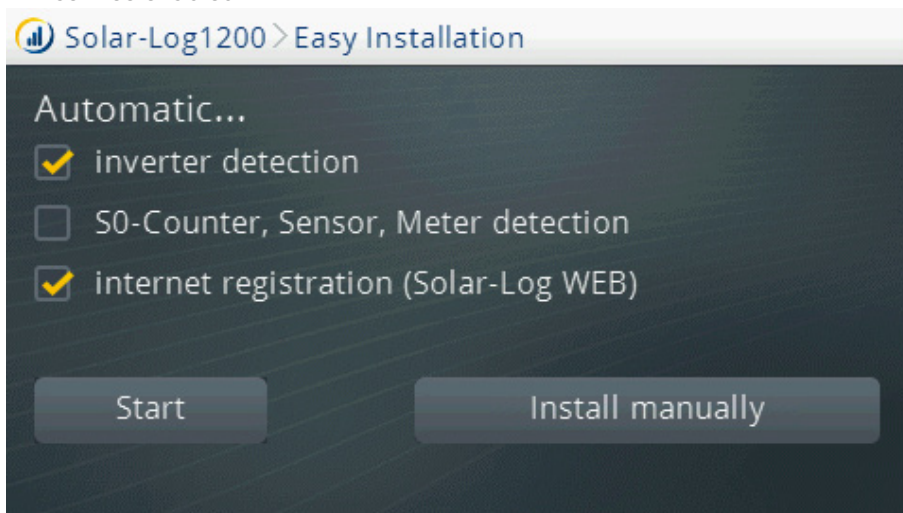


Fig.: Display: Start Easy Installation

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

## 26.6 Basic settings menu

The Basic settings is divided into the following sections:

- Network
- Portal

### 26.6.1 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

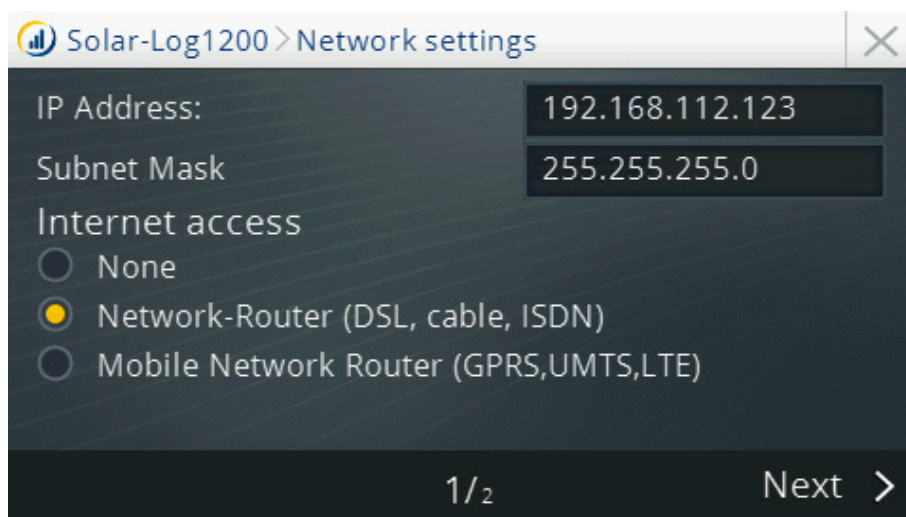



Fig.: Network settings Page1 on Solar-Log 1200 display

#### 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 .

## 26.6.2 Basic Settings | Portal menu

The following selections can be made from this menu:

- Solar-Log™ WEB
- Server

The following portals can be selected under Solar-Log™ WEB:

- Commercial Edition (Full Service)
- Classic 2nd Edition

An HTTP test transmission can be performed from the [Server](#).

**Procedure:**

1. Enter the address listed in the "[Access data](#)" received in the [Server](#) field.
2. Check the [Activate transfers](#) option.
3. Click on [Next](#).
4. After that, start the test transmission by click on the "[Connection Test](#)" button.  
A window with "[The transfer is in progress.](#)" is displayed.
5. After the test is successful, "[Status 0 = OK, no error](#)" is displayed in the same window. Click on [Next](#).
6. In the [Status & Test](#) section, now the date and time of the last export are listed in the [Date](#) field and "OK" in the [Error](#) (last export) field.

## 26.7 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 the 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\_3.5.2-85-16xxx.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

## 26.8 Advanced settings menu

The Advanced settings menu is divided into the following sub-sections:

- System
- Firmware
- Language settings
- Date/country settings

### System section

The System section contains the following configuration options:

- Page 1
  - Display brightness
- Page 2
  - Slide show dialog
- Page 3
  - Display access control
- Page 4
  - Initializing yield data
  - Initializing device configuration
  - Restore factory settings

### Page 1 - Display brightness

The following configurations can be made:

- Turn on at (time)
- Turn off at (time)
- 50% dim (min.)
- 100% dim (min.)
- Dimming when all inverters are offline

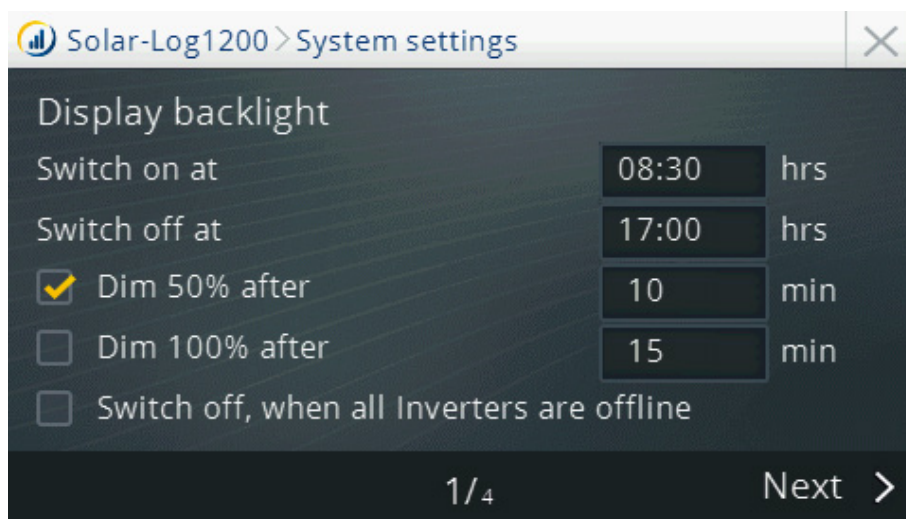


Fig.: Display brightness

### Page 2 - Slide show dialog

The following settings are possible:

- Slide show dialog after (min)
- Start screen (screen that is to be displayed when the Solar-Log™ starts)
- Test LCD (test function to see if all of the symbols are displayed on the LCD display)

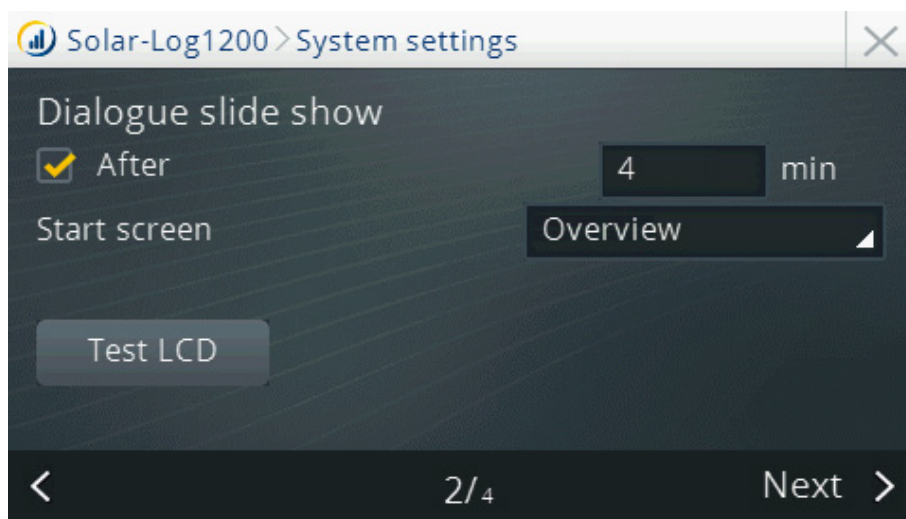


Fig.: Slide show dialog

### Page 3 - Display access control

This section offers the following three options for access control:

- PIN code (freely defined PIN code for access to the display. This has to be entered again.)
- Complete display  
The complete display is protected with PIN code entry.
- Settings  
The configuration section is protected with PIN code entry.
- Activate now  
The access control is activated.



Fig.: Display access control

### Page 4

The following functions can be performed from this section:

- Initialize yield data  
All the yield data is deleted.
- Initializing device configuration  
The entire device configuration is deleted.
- Restore factory settings  
The Solar-Log™'s factory settings are restored, all of the settings, yield data and device configurations are lost.

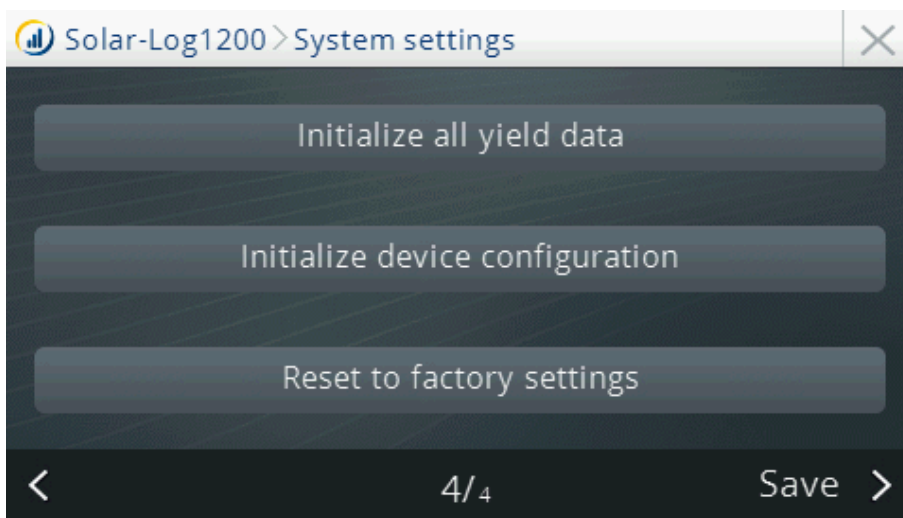


Fig.: System settings – Initialize yield data

## Firmware section

This section displays the following information:

- Solar-Log™ serial number
- Installed firmware version

The section has the following functions:

- Check Firmware version automatically  
After activating this function, a firmware version with bugs is automatically updated.
- Check for new firmware now  
When an Internet connection is available, it checks if the device's current firmware version is up-to-date and performs an update if needed.



Fig.: Display Firmware

## Language section

The language for the Solar-Log™ can be changed in this section.

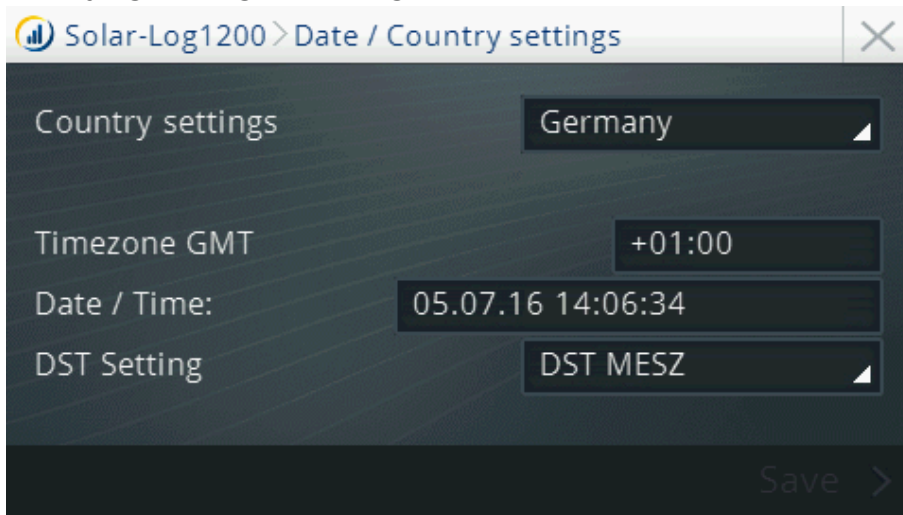


Fig.: Language selection

## Date/country settings section

The following configuration options are available in this section:

- Country settings
- Timezone GMT
- Date / Time
- Day Light Saving Time settings



The screenshot shows a software window titled "Solar-Log1200 > Date / Country settings". The window has a dark background with light text. It contains four settings:

- Country settings:** A dropdown menu showing "Germany".
- Timezone GMT:** A text field showing "+01:00".
- Date / Time:** A text field showing "05.07.16 14:06:34".
- DST Setting:** A dropdown menu showing "DST MESZ".

At the bottom right of the window, there is a "Save" button with a right-pointing arrow.

Fig.: Country settings

## 26.9 Error and Fault Messages on the Display

Error and fault messages on the display can be recognized with the blinking red triangle. (Refer to the figure below.) To view these message, tap on this triangle. A window with the messages opens and includes additional details. Select a message and confirm with OK.

It is enough to just tap on the blinking triangle to acknowledge a relay message.

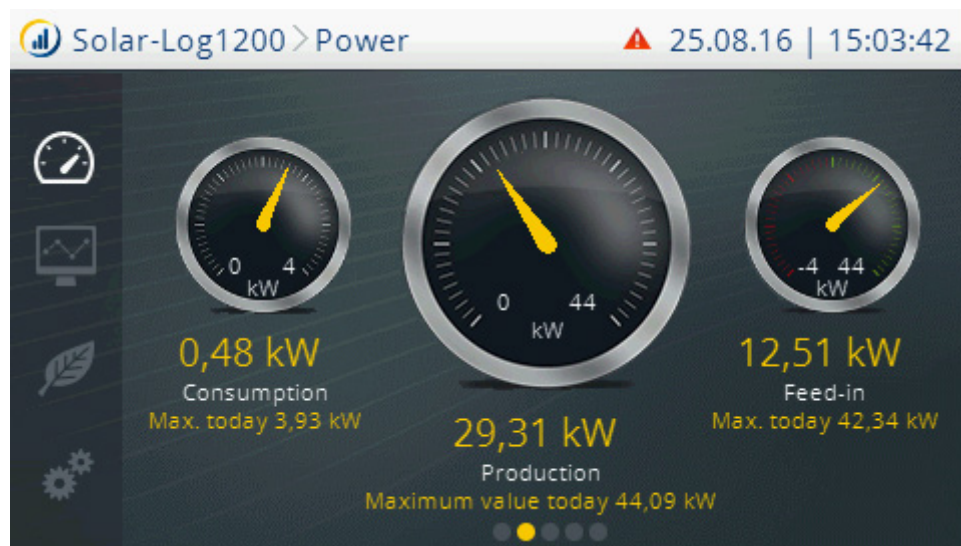


Fig.: Tachometer – with a warning (red triangle) in the top line

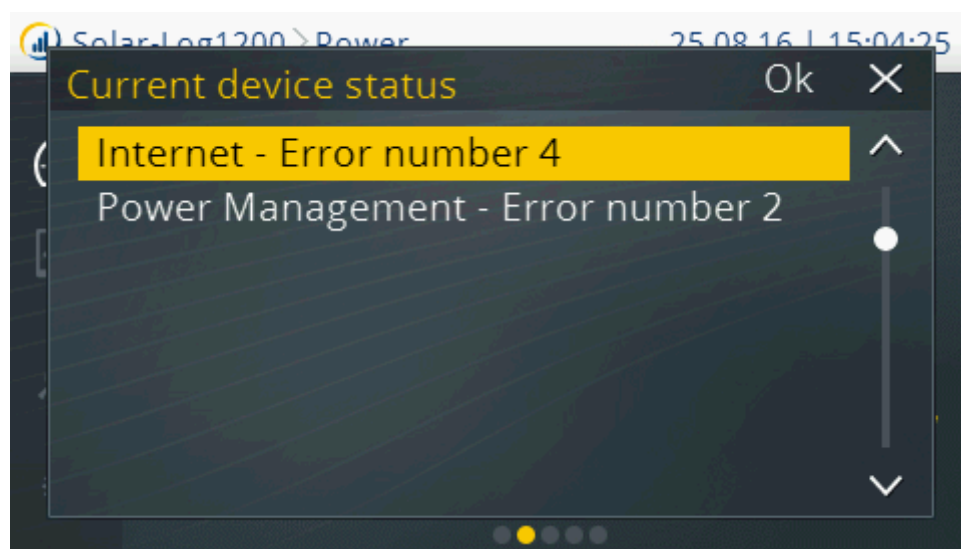


Fig.: Loaded notifications



# 27 Notifications on the LCD Status Display (Solar-Log 250, 300, 1200 and 2000)

The Solar-Log 250, 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:

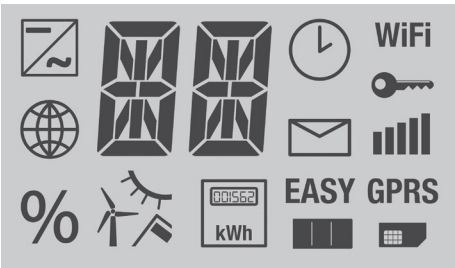






Fig.: LCD display - All symbols active

| Meaning of the symbols on the LCD display   |   |
|---|---|
| Symbol  | Meaning   |
|  | Inverter  |
|  | Internet or Network                                     |
|  | Firmware update progress                                |
|  | Sensors for<br>- Irradiation<br>- Wind<br>- Temperature |











|   |   |
|---|---|
|    | Meter   |
|    | Booting progress  |
|    | SIM card  |
|    | Easy Installation active  |
|    | GPRS available  |
|    | Notifications from the Solar-Log™                                 |
|  | Signal strength<br>in combination with GPRS,<br>WiFi or Bluetooth |
|  | Encrypted WiFi connection   |
|  | 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.

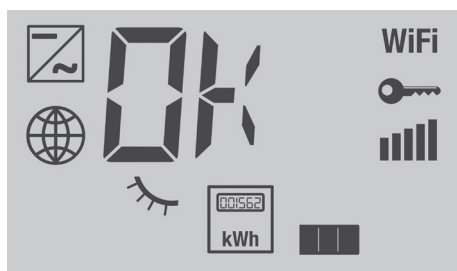


Fig.: LCD display during normal operation

#### Explanation:

The following devices are connected: inverter, irradiation sensor and meter

Communication: WiFi encrypted, strong signal and Internet communication established.

### 27.4 Power reduction

When a power reduction (<100%) is active, this is indicated on the LCD or VLC display (left display field of the Solar-Log™ WEB interface). It is indicated even when it is just a fixed reduction.

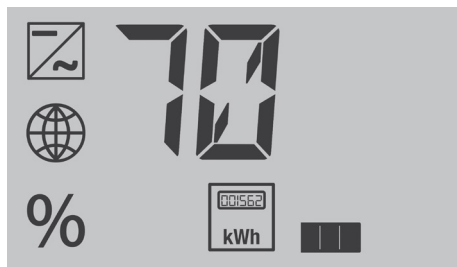


Fig.: Display 70% fixed reduction

## 28 Faults

### 28.1 Restarting and resetting

#### 28.1.1 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.

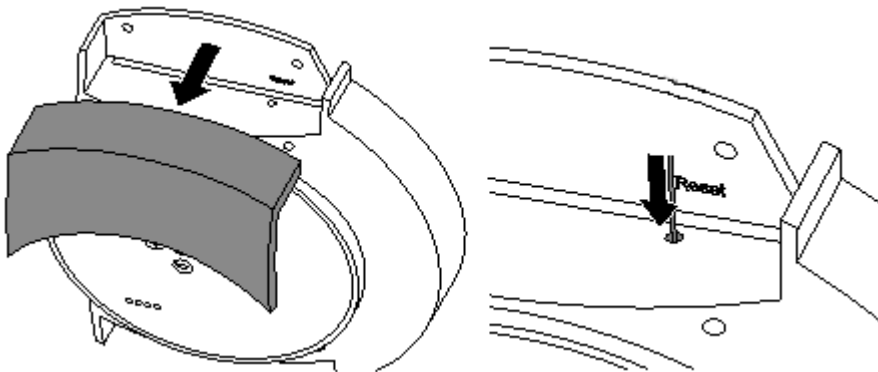


Fig.: Reset buttons

#### 28.1.2 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

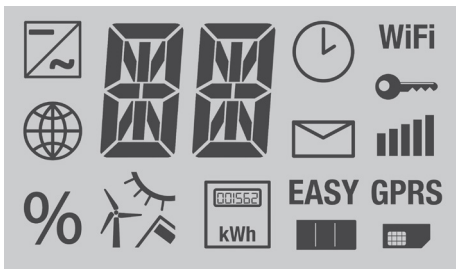
- The Solar-Log™ beeps and the following is displayed on the LCD:



- 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!

### 28.1.3 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 21.3).
- Data (See Chapter 21.4);

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 non-conducting pointed object

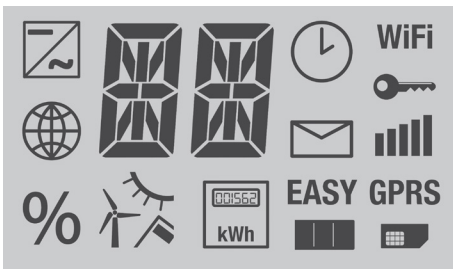
- The Solar-Log™ beeps and the following is displayed on the LCD:



- After about 15 seconds, the Solar-Log™ beeps three times and the following is displayed:



- Now release the button, the following is then displayed



- The Solar-Log™ is reset to the 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.

## 28.1.4 Rebooting and Resetting via the web menu

Resetting the inverter configuration and deleting yield data:


See Chapter 21.5.

## 28.2 Fault messages

### 28.2.1 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/remedy   |
|---|---------------------------------------|---|
|  |                                       |   |
| -101  | Too many failed attempts              | After several failed attempts, the modem goes into an error state. Reboot the device and observe 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.<br>The antenna has not been properly attached.  |
| 10  | No SIM card                           | No SIM card has been inserted.<br>The SIM card has not been inserted correctly.   |
| 11  | Pin required                          | No pin or the wrong pin has been entered.<br>The pin lock has not been removed.   |
| 12  | PUK required / card locked            | Possible causes: <ul style="list-style-type: none"> <li>• The wrong pin has been entered three times.</li> <li>• The SIM card has not yet been unlocked.</li> </ul> |
| 16  | Wrong password                        | Enter the correct APN password.   |
| 111   | Connection to the network not allowed | The SIM card cannot find an allowed network.<br>Try connecting to other providers.  |
| 268   | Roaming required                      | To connect to the network the roaming option is required, but is currently deactivated.   |

## 28.2.2 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<br>The names have been changed with Firmware 3.0.2.    |

## 28.2.3 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/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.<br>The encryption type entered is wrong.                 |
| 99  | Unknown error                                    | An unexpected error occurred. If this error continues to occur, contact our technical support. |

## 28.2.4 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 <a href="#">Configuration   Network   Ethernet</a> is not available.<br>Check the configurations. |
| 3   | No DNS server available<br>Check the configurations and make sure that the correct DNS server has been entered.                          |
| 4   | The configured DNS server is not available.<br>Please enter the correct DNS server.  |
| 5   | DNS server could not resolve the server address. Check the DNS server and the server address.  |
| 7   | Wrong APN entered. (Only GPRS devices)   |



## 28.2.5 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 the 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                                | Unspecified log in error   |
| 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.<br>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.<br>Use another FTP server or check the configuration.<br>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 <a href="#">Diagnosis   Report</a> 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<br>=> make the necessary firewall configurations to allow the connection.<br>Server overloaded => try again later.             |
| 117        | Unknown error                                 |  |
| 118        | STOR failed.                                  | There is a fault on the FTP server => try again later.<br>=> Restart the server.<br>=> 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.<br>The connection is being blocked by a firewall<br>=> make the necessary firewall configurations to allow the connection.             |
| 121        | Time exceeded, transmission error             | Server overloaded => try again later.<br>The Internet connection has been disrupted.<br>=> Check the Internet connection.  |
| 122        | No answer                                     |  |
| 123        | Transmission failed.                          | An FTP server error occurred => try again later.<br>Restart the server.<br>=> Check free space on the server.  |
| 124        | Incorrect number of bytes transferred.        | Server overloaded => try again later.<br>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 NTLM domain is not in the user name | The user name with NTLM 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/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.<br>=> 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. |

## 28.2.6 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](#).

### Fault message e-mail transfer

| Error code  | Message                       | Possible cause/remedy  |
|---|-------------------------------|--|
|  |                               |  |
| <b>General error when sending e-mail</b>  |                               |  |
| 1   | DNS error                     | Type of Internet access set to "None"<br>=> Set the correct access type.<br>An extra DNS server must be entered.<br>=> Enter correct DNS.<br>There is no connection to the network.<br>=> 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 the socket. | The connection is blocked by a firewall.<br>=> Adjust the firewall settings.<br>The server is overloaded.<br>=> Try again later.   |

### Error when sending e-mail via a secure connection

|    |                                       |  |
|----|---------------------------------------|--|
| 51 | SSL session could not be established. | This is an internal error.<br>=> Contact support if this error continues to occur.   |
| 52 | Could not set SSL proposals           | This is an internal error.<br>=> Contact support if this error continues to occur.   |
| 53 | Could not set TCP option SSL_CLIENT   | This is an internal error or the e-mail server or security settings do not support the port entered.<br>=> 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 settings do not support the port entered.<br>=> 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 settings do not support the port entered.<br>=> 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.<br>=> 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.<br>=> 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).<br>=> Try to solve the problem based on the error message from the first e-mail sent. |
| 99 | Unknown error                   | The cause of this problem could not be determined.<br>=> Contact support if this error continues to occur.   |

## 28.2.7 Portal Transfer Fault messages

### Portal Transfer Fault messages


| Error code  | Message   | Possible cause/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 the 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.  |
| 222         | Connection to the server, but not response to request | Check the portal server entered. This can occasionally happen with GPRS connections. Try it again.   |
| Other       | General errors  | There is detailed description of this error. If this error continues to occur, contact our technical support.  |

## 28.2.8 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/remedy  |
|---|--|
|  |  |
| 1   | Undefined status for the PM+ interface or an invalid channel setting for the active and reactive power management.<br>=> Check the wiring and configuration.   |
| 2   | Communication error with the I/O Box<br>=> Check the wiring and the power supply for the I/O Box.<br>=> Check the interface selected under Configuration   Special Functions   Feed-in Management   Profile. |

## 28.2.9 Special cases

### The e-mail symbol blinks

There are unread notifications. These can be read from

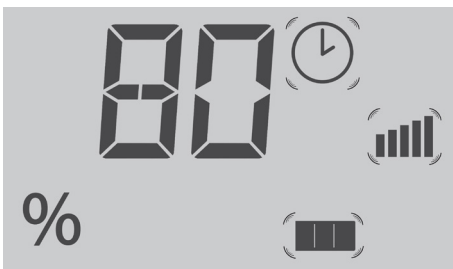
- the  display (only Solar-Log 1200 and 2000) or
- in the browser from the [Diagnostic | Event Log](#) menu.

### 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 is displayed in the text field.

## 29 Disposal

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### 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

# 30 Technical Data

| Product comparison |   | Solar-Log 300                                       | Solar-Log 1200   | Solar-Log 2000   |
|--------------------|---|---|--|--|
| Basic functions    | PM+ <sup>(2)</sup>  | ●   | ●  | ●  |
|                    | PM+ / WiFi <sup>(2)</sup>   | ●   | ●  | -  |
|                    | PM+ / GPRS <sup>(2)</sup>   | ●   | ●  | ●  |
|                    | Bluetooth (BT) <sup>(2)</sup>                                     | ●   | ●  | -  |
|                    | WiFi (Wireless LAN) <sup>(2)</sup>                                | ●   | ●  | -  |
|                    | Bluetooth (BT) / WiFi <sup>(2)</sup>                              | ●   | ●  | -  |
|                    | GPRS <sup>(2)</sup>   | ●   | ●  | ●  |
|                    | Solar-Log™ Meter (CT)   | ●   | ●  | -  |
|                    | Central inverter SCB and SMB                                      | -   | -  | ●  |
|                    | Communication interface   | 1 x RS485 / RS422<br>(one INV manufacturer per bus) | 1 x RS485<br>1 x RS485 / RS422<br>(one INV manufacturer per bus) | 1 x RS485, 2x RS485 / RS422, 1 x CAN<br>(one INV manufacturer per bus) |
| Plant monitoring   | Max. plant size   | 15 kWp /<br>one INV manufacturer                    | 100 kWp<br>max 2 inv. manufacturer                               | 2000 kWp<br>up to 3 inv. manufacturer                                  |
|                    | max. cable length   | max. 1000 m <sup>1)</sup>                           | max. 1000 m <sup>1)</sup>  | max. 1000 m <sup>1)</sup>  |
|                    | MPP tracker monitoring (depending on inverter type)               | ●   | ●  | ●  |
|                    | Inverter failure, status of fault and power monitoring            | ●   | ●  | ●  |
|                    | Sensor system connection (irradiation/ temp./ wind)               | ● <sup>3)</sup>                                     | ● <sup>3)</sup>  | ● <sup>3)</sup>  |
|                    | E-mail and Text Message (SMS) Alarm                               | ●   | ●  | ●  |
|                    | Alarm (local)   | -   | -  | ●  |
|                    | Yield forecast and degradation calculation                        | ●   | ●  | ●  |
|                    | Self-produced energy consumption:<br>Digital electricity meter    | ●   | ●  | ●  |
|                    | Self-produced energy consumption:<br>Managing external appliances | ●   | ●  | ●  |



| Product comparison |  | Solar-Log 300  | Solar-Log 1200         | Solar-Log 2000         |
|--------------------|--|--|------------------------|------------------------|
| Visualization      | Integrated web server  | ●  | ●                      | ●                      |
|                    | Graphic visualization – PC local and Internet                        | ●  | ●                      | ●                      |
|                    | LCD Status Display   | ●  | ●                      | ●                      |
|                    | Display on the device  | -  | 4.3" TFT color display | 4.3" TFT color display |
|                    | Controls on the device   | -  | via touch screen       | via touch screen       |
|                    | Large external display RS485 / S <sub>0</sub> pulse                  | ●  | ●                      | ●                      |
| Interface          | Ethernet network   | ●  | ●                      | ●                      |
|                    | USB flash drive  | ●  | ●                      | ●                      |
|                    | Potential-free contact (relay)                                       | -  | ●                      | ●                      |
|                    | Alarm contact (anti-theft)   | -  | -                      | ●                      |
| General Data       | Input / Output voltage   | 115 V – 230 V / 12 V / 3 W   |                        |                        |
|                    | Power consumption  |  |                        |                        |
|                    | 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](http://www.solar-log.com).

3) Using every inverter on the same bus is not always possible, please see the inverter database at [solar-log.com](http://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.<br>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: <a href="http://solar-log">http://solar-log</a> . |  |  |
| Additional functions               | Monitoring, optimization and managing of self-consumption with a fixed regulation of active power including the calculation of self-consumption.  |  |  |
|                                    | 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 support from 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 – in-<br>terface usage  | RS485 / RS422<br>– combined in-<br>terface usage   | RS485 – interface,<br>RS485 / RS422<br>– combined in-<br>terface usage   | RS485 A –<br>interface,<br>RS485 / RS422 B<br>– / RS485 / RS422<br>C* - combined<br>interface usage                   |  |
|  | Inverter connection   |  |  |   |  |
|  | RS485 – interface usage   | Connection of a Sen-<br>sor Basic to record<br>environmental data<br>(irradiance and<br>module sensor)     | Connection of a Sensor Box Commercial to<br>record environmental data (irradiance, module<br>and ambient temperature, wind sensor) |   |  |
|  |   | Connection of meter for self-consumption according to IEC 60870  |  |   |  |
|  |   | -  | Connection of the display panels produced by<br>Schneider<br>Displaytechnik, Rico or HvG   |   |  |
|  |   | -  | -  | Connecting the<br>Utility<br>Meter and I/O Box<br>for PM remote<br>control technology                                 |  |
|  | RS422 – interface usage   | RS 422 Fronius / Sunville connectible with-<br>out additional interface converters                         |  |   |  |
|  | CAN bus   | -  | -  | For example,<br>connecting<br>Vollwerk INV  |  |
|  | Additional function interfaces  | S <sub>0</sub> pulse input – for optional recording and<br>calculation of self-produced power consumption. |  |   |  |
|  |   | 2x S <sub>0</sub> In / 1x S <sub>0</sub> Out   | Second input to connect an additional power meter.   |   |  |
| S <sub>0</sub> pulse output to connect large external dis-<br>plays, pulse factor can be set to any value. |   |  |  |   |  |
| Relay  |   | -  | External switch control<br>e.g. heat pumps   |   |  |
| Alarm  |   | -  | -  | Connection for anti-<br>theft protection via<br>contact loop for ex-<br>ternal alarms via po-<br>tential-free contact |  |
| USB connection   |   | To access data   |  |   |  |
| Import firmware updates at plants  |   |  |  |   |  |
| PM+ (Power Management)   |   |  |  |   |  |
| PM+ interface (optional)   |   | For the connection of a ripple-control receiver to regulate the plant.                                     |  |   |  |
| Fulfills the EEG 2012 requirements.  |   |  |  |   |  |
| Solar-Log™ Me-<br>ter (optional)   | Current measurements via transformers (extra acces-<br>sory) 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 So-<br>lar-Log™ with integrated GPRS.                             |  |   |  |

\* not with GPRS models

## 31 Appendix

### 31.1 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™:

| Function                | Protocol | Port (outgoing)  | Server used  | Notes  |
|-------------------------|----------|------------------|--|--|
| Name resolution         | DNS      | 53               | According to the network configuration or 8.8.8.8 (Google Public DNS) when the name cannot be resolved with the dedicated DNS.             | Normally, only the name server from the local network is used.   |
| Time synchronization    | NTP      | 123              | 0.pool.ntp.org to 3.pool.ntp.org<br>ntp1-1.cs.tu-berlin.de<br>bonehed.lcs.mit.edu<br>navobs1.gatech.edu<br>130.149.17.8<br>130,207,244,240 | This function ensures that the correct time is always in the logs. The Solar-Log™ has an internal clock, but it loses the time during a long power outage. |
| Easy Installation (WEB) | HTTP     | 80               | pool0.solarlog-web.com to pool9.solarlog-web.com   | A ping test is performed by the Easy Installation to test the Internet connection and if the DNS server functions.   |
|                         | ICMP     | -                | solar-log.com  |  |
| FTP Export              | FTP      | 21 (and others)  | According to the configuration.  | Since it is a passive FTP connection, additional ports beyond 21 are required, depending on which FTP server is used (High Port > 1023).                   |
| FTP Backup              | FTP      | 21 (and others)  | According to the configuration.  | Since it is a passive FTP connection, additional ports beyond 21 are required, depending on which FTP server is used (High Port > 1023).                   |
| HTTP Export             | HTTP     | 80               | According to the configuration.  |  |
| Sending E-mails         | SMTP     | 25 or 465 or 587 | According to the configuration.  | Depending on which SMTP server is used, other ports could also be required.  |
| Firmware update         | HTTP     | 80               | pool0.solarlog-web.com to pool9.solarlog-web.com   |  |

## 31.2 Country specific inverter detection with Easy Installation.

After selecting the language and country, the initial set up can be carried out with the "Easy Installation" configuration wizard.

This configuration wizard automatically detects connected inverters and completes the Internet configuration.

Please refer to the table below for the available countries and corresponding inverters.

If a particular country is not listed, the "Easy Installation" configuration wizard searches for all compatible inverters (This process may take some time).

For GPRS devices, the inverter detection is only carried via "Easy Installation" and no Internet configuration is performed.

| 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/Platinum/Kaco            |
| Czech Republic | SMA/PowerOne/Platinum/Kaco            |
| Slovakia       | SMA/PowerOne/Platinum/Kaco            |
| Austria        | SMA/PowerOne/Kaco/SolarMax/Fronius    |
| Slovenia       | SMA/PowerOne/Platinum/Kaco            |
| Bulgaria       | SMA/PowerOne/Platinum/Kaco            |
| Greece         | SMA/PowerOne/Platinum/Kaco            |
| Israel         | SMA/Platinum/Fronius/Kaco/PowerOne    |
| United States  | SMA/Fronius/PowerOne/Kaco             |
| 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                  |

### 31.3 Wiring meters to record self-consumption

To record self-consumption, an additional meter also has to be installed. There are two options on how to install the meter.

### 31.3.1 Meter connection options to record the total consumption via an RS485/S0 interface.

This meter has to measure the total consumption of the house.

The meters installed by grid operators, or two-way meters, cannot be used to implement this function.

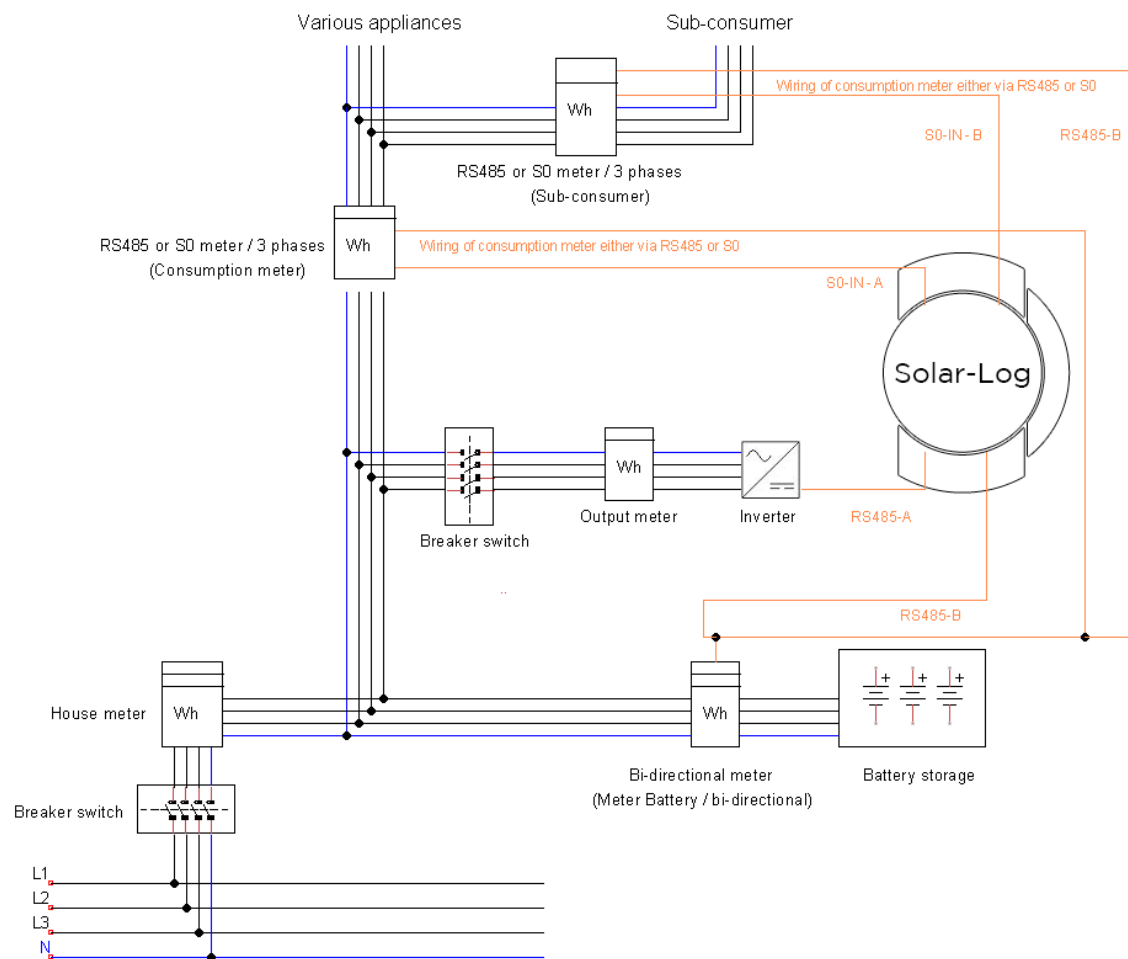


Fig.: Wiring diagram for recording self-consumption

The PV output meter displayed is optional.

### 31.3.2 Meter connection options for bi-directional recording of the total consumption via only an RS485 interface.

If there is feed-in in a sub-distribution, the option mentioned above can be used. In this case, the the amount of feed-in power and power obtained from the grid can be recorded with a bi-directional meter. With this, the Solar-Log™ can calculate the consumption.

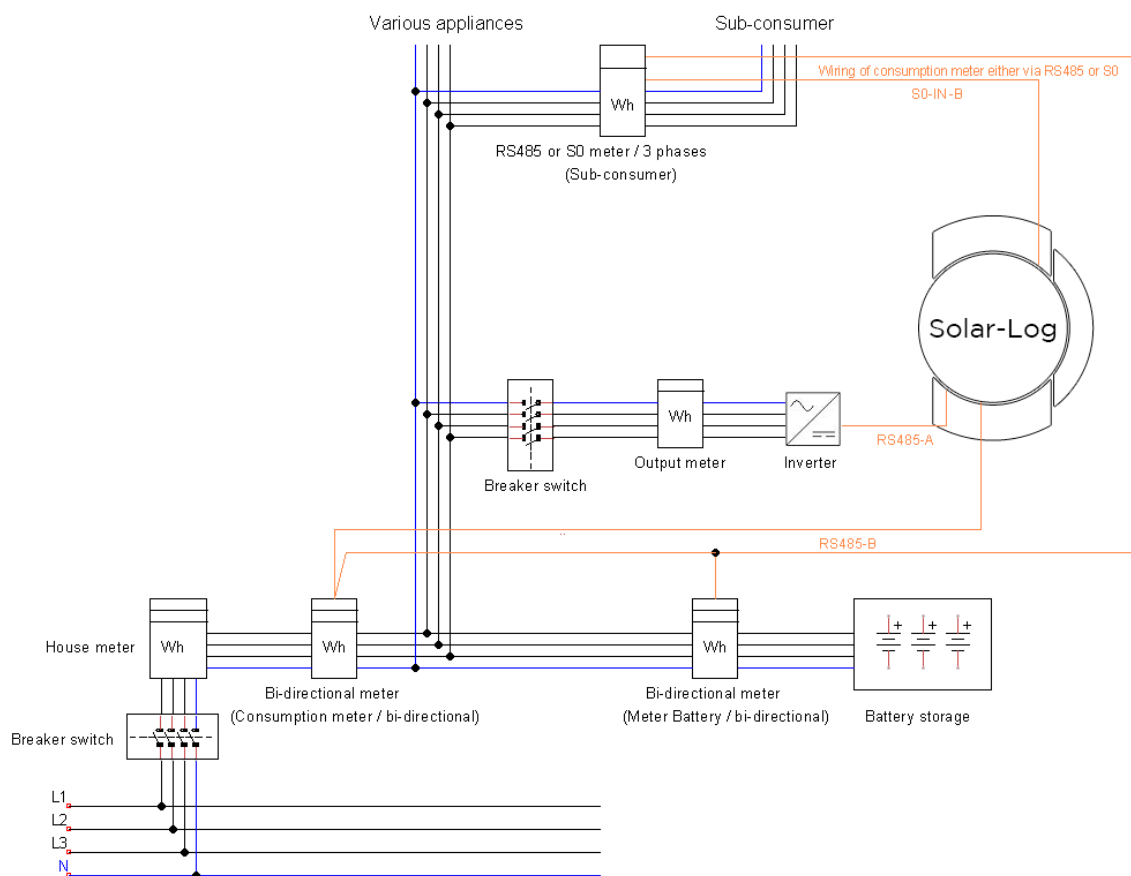


Fig.: Wiring diagram for recording self-consumption – bidirectional meter

## 31.4 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.



### 31.4.1 Variation with 4 relays (ENBW >100kWp)

#### Specifications

##### Ripple control receiver signals

| Level | K1  | K2  | K3  | K4  | Power out-put |
|-------|-----|-----|-----|-----|---------------|
| 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

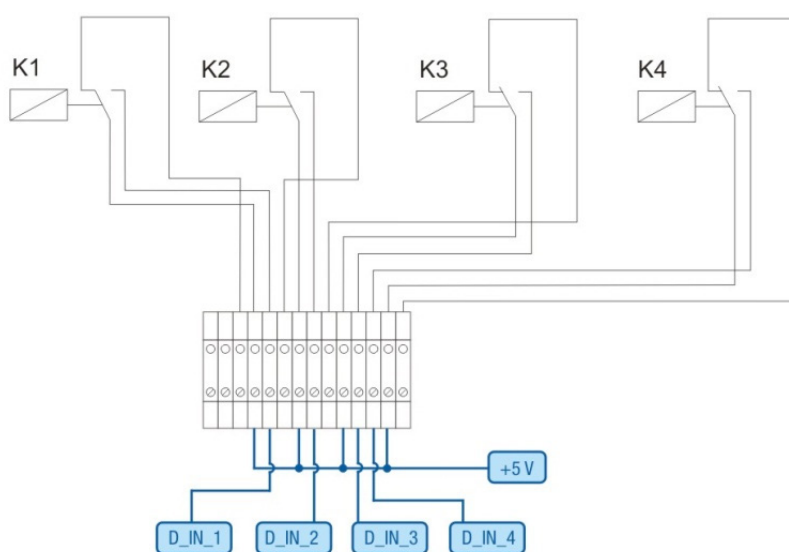


Fig.: Wiring a ripple control receive with two relays - example 1

##### Connecting PM+ terminal connector and ripple control receiver

| PIN | Assignment | Meaning                                     |
|-----|------------|---|
| 1   | +5V        | Control voltage for active power            |
| 2   | D_IN_1     | Level 1<br>100%                             |
| 3   | D_In_2     | Level 2<br>60%                              |
| 4   | D_In_3     | Level 3<br>30%                              |
| 5   | D_In_4     | Level 4<br>0%                               |
| 6   | +5V        | Control voltage for reactive power (unused) |

## Configuration in browser menu

Remote controlled active power reduction [Configuration](#) | [Feed-in Management](#) | [Active Power](#)

Channel settings for power reduction

| Digital input | D_IN_1                              | D_IN_2                              | D_IN_3                              | D_IN_4                              | Power in %                       |
|---------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|----------------------------------|
| Level 1       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="text" value="100"/> |
| Level 2       | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="text" value="60"/>  |
| Level 3       | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="text" value="30"/>  |
| Level 4       | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="text" value="0"/>   |

Fig.: Channel settings for active power reduction - example 1

31.4.2 Variation with two relays

Specifications

Ripple control receiver signals

| Level | K5  | K6  | Power out-put |
|-------|-----|-----|---------------|
| 1     | Off | Off | 100%          |
| 2     | On  | Off | 60%           |
| 3     | Off | On  | 30%           |
| 4     | On  | On  | 0%            |

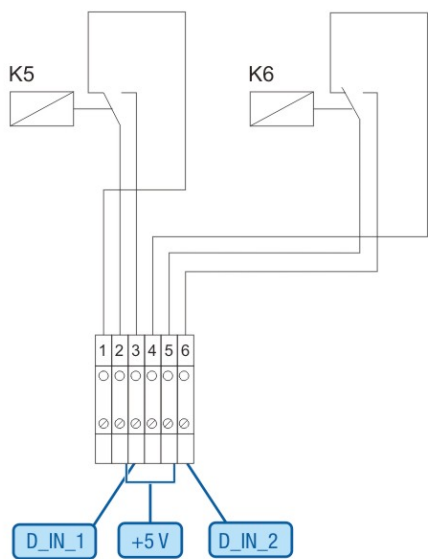


Fig.: Wiring a ripple control receive with two relays - example 2

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](#) | [Feed-in Management](#) | [Active Power](#)

Channel settings for power reduction

| Digital input | D_IN_1                              | D_IN_2                              | D_IN_3                   | D_IN_4                   | Power in %                       |
|---------------|-------------------------------------|-------------------------------------|--------------------------|--------------------------|----------------------------------|
| Level 1       | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="text" value="100"/> |
| Level 2       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="text" value="60"/>  |
| Level 3       | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="text" value="30"/>  |
| Level 4       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="text" value="0"/>   |

Fig.: Channel settings for active power reduction - example 2

31.4.3 Variation with three relays

Specifications

Ripple control receiver signals

| Level | K2  | K3  | K4  | Power out-put |
|-------|-----|-----|-----|---------------|
| 1     | Off | Off | Off | 100%          |
| 2     | On  | Off | Off | 60%           |
| 3     | Off | On  | Off | 30%           |
| 4     | Off | Off | On  | 0%            |

Wiring

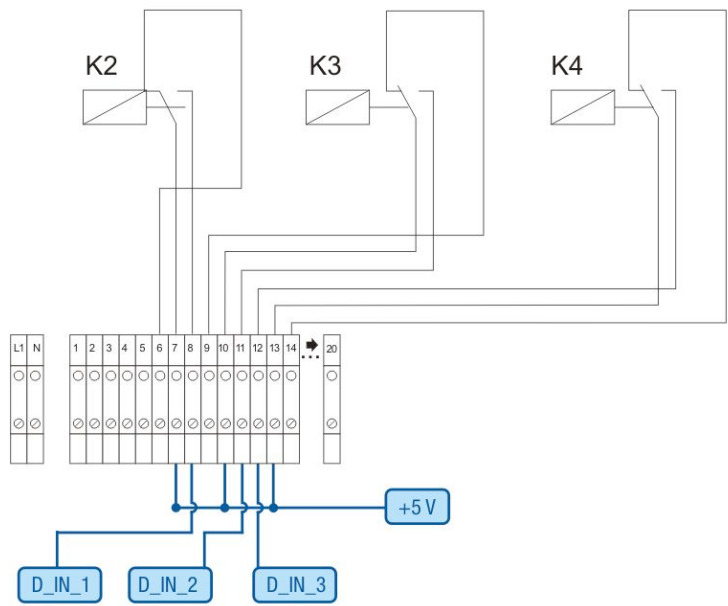


Fig.: Wiring a ripple control receive with two relays - example 3

Connecting PM+ terminal connector and ripple control receiver

| PIN | Assignment | Meaning                                      |
|-----|------------|--|
| 1   | +5V        | Control voltage for active power             |
| 2   | D_IN_1     | Level 2<br>60%                               |
| 3   | D_In_2     | Level 3<br>30%                               |
| 4   | D_In_3     | Level 4<br>0%                                |
| 5   | D_In_4     | unused                                       |
| 6   | +5V        | Control voltage for reac-tive power (unused) |

## Configuration in browser menu

Remote controlled active power reduction [Configuration](#) | [Feed-in Management](#) | [Active Power](#)

Channel settings for power reduction

| Digital input | D_IN_1                              | D_IN_2                              | D_IN_3                              | D_IN_4                   | Power in %                       |
|---------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|----------------------------------|
| Level 1       | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="text" value="100"/> |
| Level 2       | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="text" value="60"/>  |
| Level 3       | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="text" value="30"/>  |
| Level 4       | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="text" value="0"/>   |

Fig.: Channel settings for active power reduction - example 3

### 31.4.4 Variation with 5 relays (including emergency stop)

#### Specifications

##### Ripple control receiver signals

| Level | K1  | K2  | K3  | K4  | K5  | Power output   |
|-------|-----|-----|-----|-----|-----|----------------|
| 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.

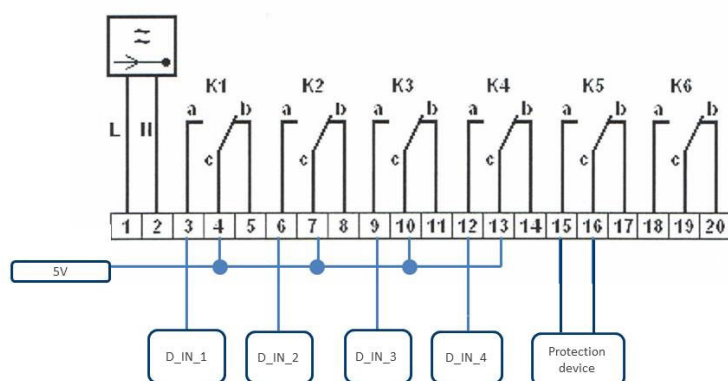


Fig.: Wiring a ripple control receive with two relays - example 4

#### 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<br>100%                             |
| 3   | D_In_2     | Level 2<br>60%                              |
| 4   | D_In_3     | Level 3<br>30%                              |
| 5   | D_In_4     | Level 4<br>0%                               |
| 6   | +5V        | Control voltage for reactive power (unused) |

### Configuration in browser menu

Remote controlled active power reduction [Configuration](#) | [Feed-in Management](#) | [Active Power](#)

| Channel settings for power reduction |                                     |                                     |                                     |                                     |            |
|--------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|------------|
| Digital input                        | D_IN_1                              | D_IN_2                              | D_IN_3                              | D_IN_4                              | Power in % |
| Level 1                              | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | 100        |
| Level 2                              | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | 60         |
| Level 3                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | 30         |
| Level 4                              | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | 0          |

Fig.: Channel settings for active power reduction - example 4



## 31.5 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.

Wikipedia is a source for general information:  
[http://en.wikipedia.org/wiki/Ajax\\_\(programming\)](http://en.wikipedia.org/wiki/Ajax_(programming))

### 31.5.1 Modbus TCP

The intention of this interface is to give easy access to the Solar-Log™ internal data for external SCADA like systems. The interface is designed to read out live data of the attached PV-system.

The interface is not designed to configure the Solar-Log™ or the attached devices. All configuration must be done via the standard Solar-Log™ Web access either local or remote.

ModbusTCP port:

- 502

Required Solar-Log™ firmware:

- 2.8.1 Build 49

Slave ID:

- 1

Implemented Modbus functions:

- 04 to read one or multiple 16 bit words
- 06 to write one 16 bit word
- 16 to write multiple 16 bit words

The Solar-Log™ Modbus implementation uses different byte and word orders. The Modbus protocol byte order follows the big-endian Modbus specification and is thus compatible with standard Modbus implementations. Therefore, the higher byte in value is transferred first.

The proprietary-specific register order for 32-bit values uses a little-endian word order. For a 32-bit value, the lower value word is stored in the first register and the higher value word in the second register.

## 31.6 Live data compact – summarized (complete plant)

Live data “compact” summarized is mapped from register 3500-3999.

| Data                  | Unit  | Value-Range    | Address | Number<br>Reg. | Func<br>Code | Since<br>Firmware | Description  |
|-----------------------|-------|----------------|---------|----------------|--------------|-------------------|--|
| lastUpdateTime        | Sec   | 32bit unsigned | 3500    | 2              | 04           |                   | Unixtime when last register update has happened.<br>0=no live data yet |
| Pac                   | W     | 32bit unsigned | 3502    | 2              | 04           |                   | Total Pac of all inverters and inv-type meters                         |
| Pdc                   | W     | 32bit unsigned | 3504    | 2              | 04           |                   | Total Pdc of all inverters   |
| Uac                   | V     | 16bit unsigned | 3506    | 1              | 04           |                   | Average Uac of all inverters   |
| Udc                   | V     | 16bit unsigned | 3507    | 1              | 04           |                   | Average Udc of all inverters   |
| Daily yield           | Wh    | 32bit unsigned | 3508    | 2              | 04           |                   | Summarized daily yield of all inverters                                |
| Yesterday yield       | Wh    | 32bit unsigned | 3510    | 2              | 04           |                   | Summarized daily yield of all inverters                                |
| Monthly yield         | Wh    | 32bit unsigned | 3512    | 2              | 04           |                   | Summarized monthly yield of all inverters                              |
| Yearly yield          | Wh    | 32bit unsigned | 3514    | 2              | 04           |                   | Summarized Yearly yield of all inverters                               |
| Total yield           | Wh    | 32bit unsigned | 3516    | 2              | 04           |                   | Summarized Total yield of all inverters                                |
| Pac consumption       | W     | 32bit unsigned | 3518    | 2              | 04           |                   | Total Pac of all consumption meters                                    |
| Daily yield cons.     | Wh    | 32bit unsigned | 3520    | 2              | 04           |                   | Summarized daily yield of all consumption meters                       |
| Yesterday yield cons. | Wh    | 32bit unsigned | 3522    | 2              | 04           |                   | Summarized daily yield (yesterday) of all consumption meters           |
| Monthly yield cons.   | Wh    | 32bit unsigned | 3524    | 2              | 04           |                   | Summarized monthly yield of all consumption meters                     |
| Yearly yield cons.    | Wh    | 32bit unsigned | 3526    | 2              | 04           |                   | Summarized Yearly yield of all consumption meters                      |
| Total yield cons.     | Wh    | 32bit unsigned | 3528    | 2              | 04           |                   | Summarized Total yield of all consumption meters                       |
| TotalPower            | Wh/Wp | 32bit unsigned | 3530    | 2              | 04           |                   | Total installed generator power  |

### 31.6.1 JSON Interfaces

The JavaScript Object Notation (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];
```

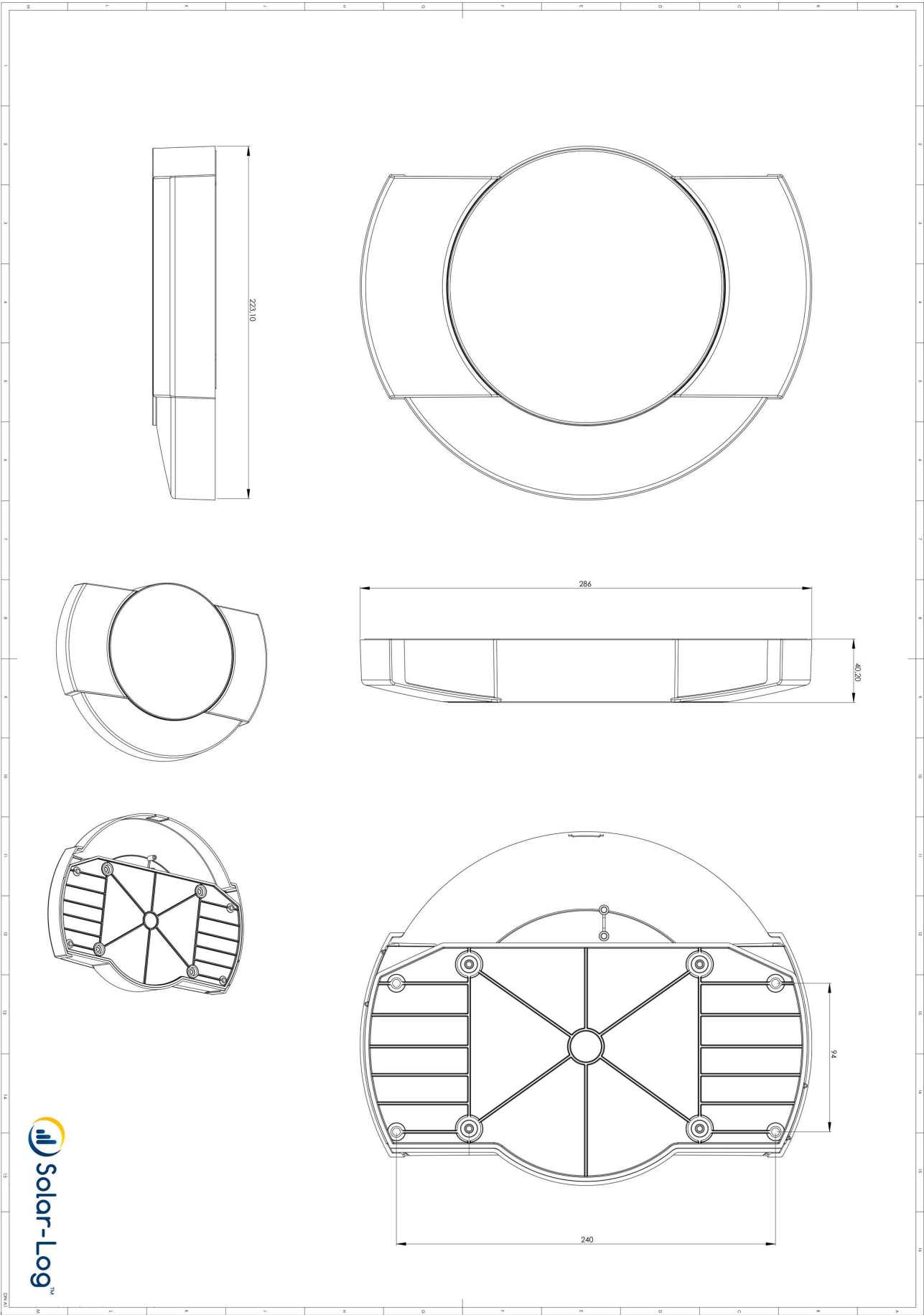
After that the individual data fields can be accessed via the indexes specified in the following table. For example, the current  $P_{AC}$  output is displayed as follows:

```
alert(„The current AC output is: „ + LiveDaten[101] + „ W“);
```

## JSON Objects

| Data point         | Value range | Unit   | Index | Description  |
|--------------------|-------------|--|-------|--|
| lastUpdateTime     | DWORD       | Time in the format dd.mm.yy; hh.minmin, secsec | 100   | Time   |
| Pac                | DWORD       | W  | 101   | Total output PAC from all of the inverters and meters in inverter mode |
| Pdc                | DWORD       | W  | 102   | Total output PAC from all of the inverters                             |
| Uac                | WORD        | V  | 103   | Average voltage UAC from the inverter                                  |
| DC voltage:        | WORD        | V  | 104   | Average voltage UDC from the inverter                                  |
| yieldDay           | DWORD       | Wh   | 105   | Total yield for the day from all of the inverters                      |
| yieldYesterday     | DWORD       | Wh   | 106   | Total yield for the previous day from all of the inverters             |
| yieldMonth         | DWORD       | Wh   | 107   | Total yield for the month from all of the inverters                    |
| yieldYear          | DWORD       | Wh   | 108   | Total yield for the year from all of the inverters                     |
| yieldTotal         | DWORD       | Wh   | 109   | Total yield from all of the inverters                                  |
| consPac            | DWORD       | W  | 110   | Current total consumption PAC from all of the consumption meters       |
| consYieldDay       | DWORD       | Wh   | 111   | Total consumption from all of the consumption meters                   |
| consYieldYesterday | DWORD       | Wh   | 112   | Total consumption for the previous day; all of the consumption meters  |
| consYieldMonth     | DWORD       | Wh   | 113   | Total consumption for the month; all of the consumption meters         |
| consYieldYear      | DWORD       | Wh   | 114   | Total consumption for the year; all of the consumption meters          |
| consYieldTotal     | DWORD       | Wh   | 115   | Accumulated total consumption, all Consumption meter                   |
| totalPower         | DWORD       | Wp   | 116   | Installed generator power  |

31.7 Dimensions



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