

Technical description of the Solar-Log¹⁰⁰⁰ PM

Power management for photovoltaic systems of more than 100 kWp

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

➔ Interface



Easy to install

- The Solar-Log¹⁰⁰⁰ PM includes corresponding hardware and software to meet the requirements of the network safety management system.
- For this the Solar-Log¹⁰⁰⁰ PM has an additional interface to which a ripple control receiver can be connected.
- The ripple control receiver's outputs can be connected using 4 potential-free contacts.

The 6 pin plug is assigned as follows:

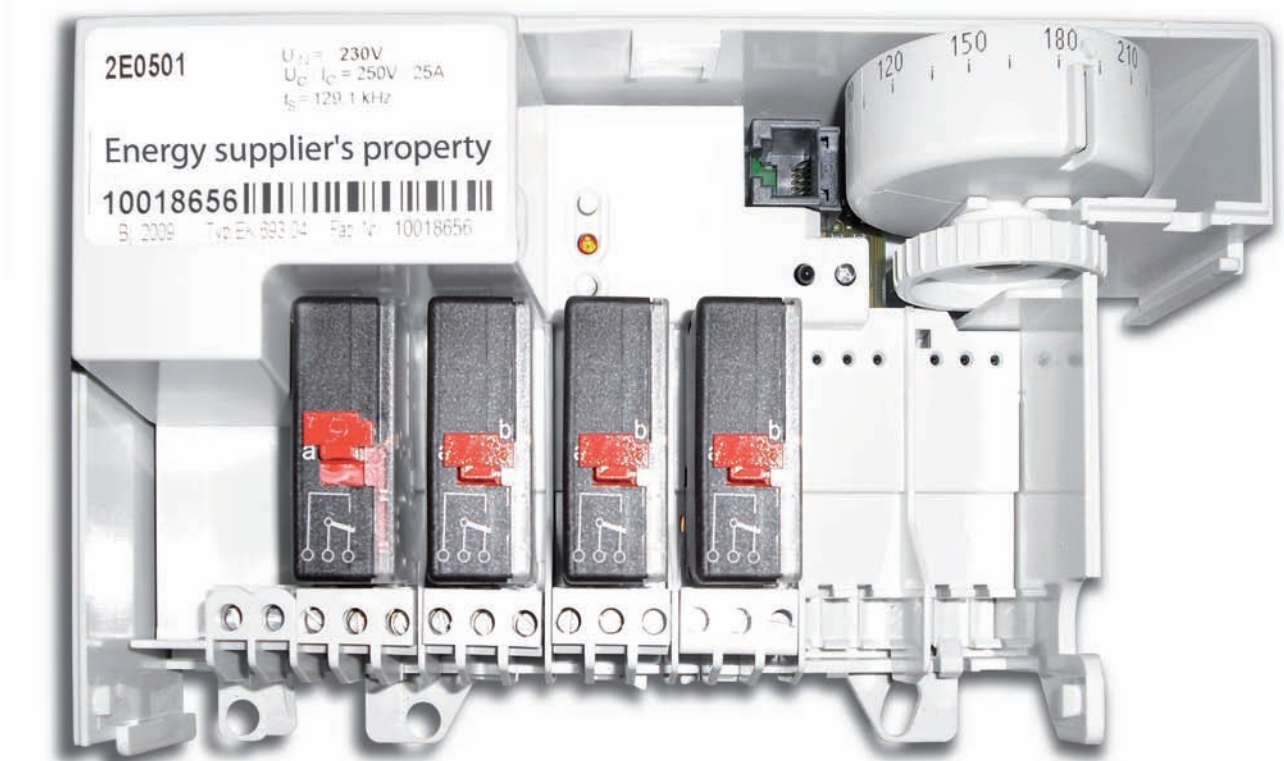
To achieve the greatest flexibility the allocation of the digital inputs for a power reduction can be configured in any way. Therefore, the description above is only one of the possible configurations.

➔ 6 pin plug

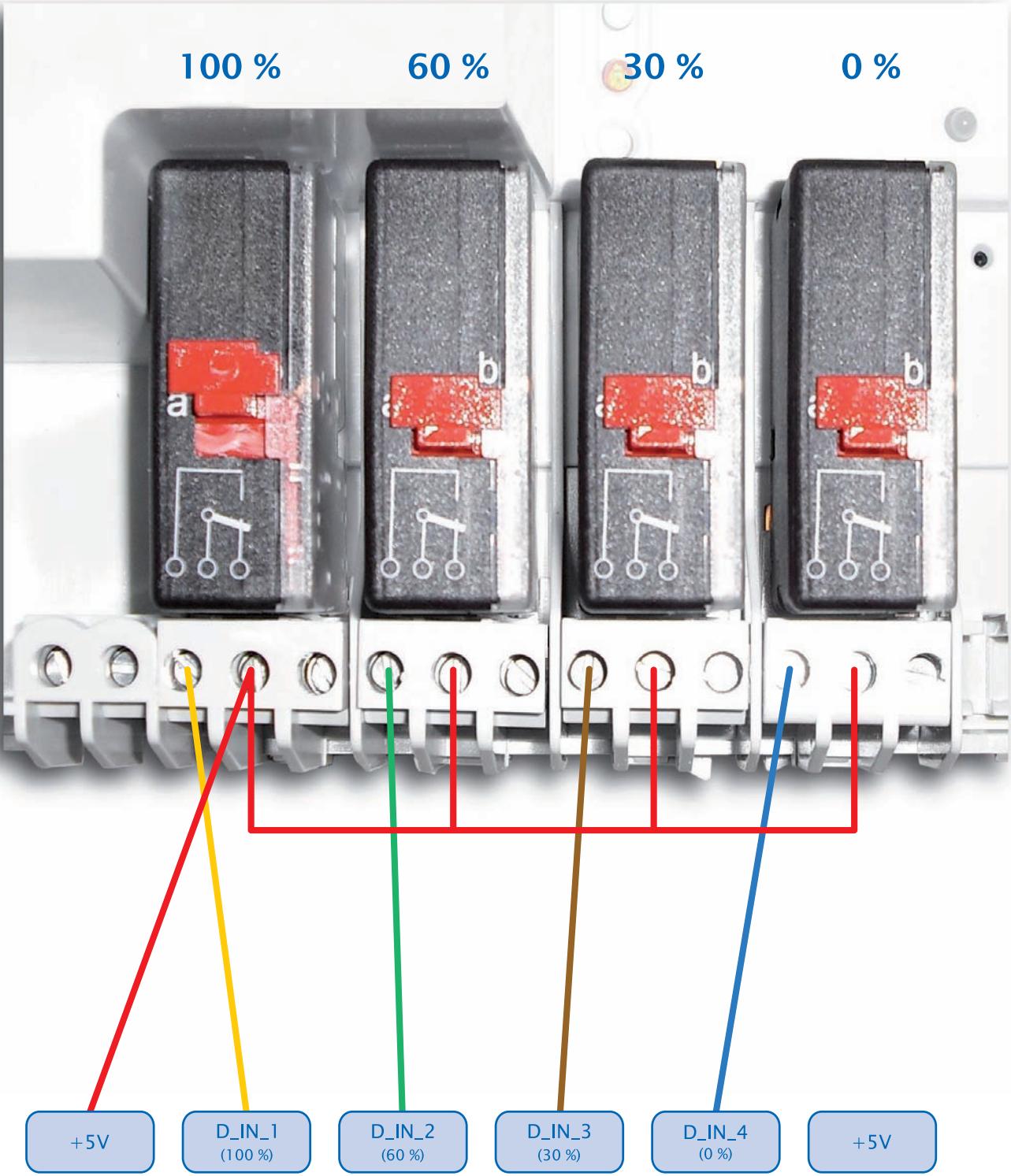


Pin	Allocation	Description
1	+5V	
2	D_IN_1	Level 1 (100%)
3	D_IN_2	Level 2 (60%)
4	D_IN_3	Level 3 (30%)
5	D_IN_4	Level 4 (0%)
6	+5V	

➔ Ripple control receiver (example)

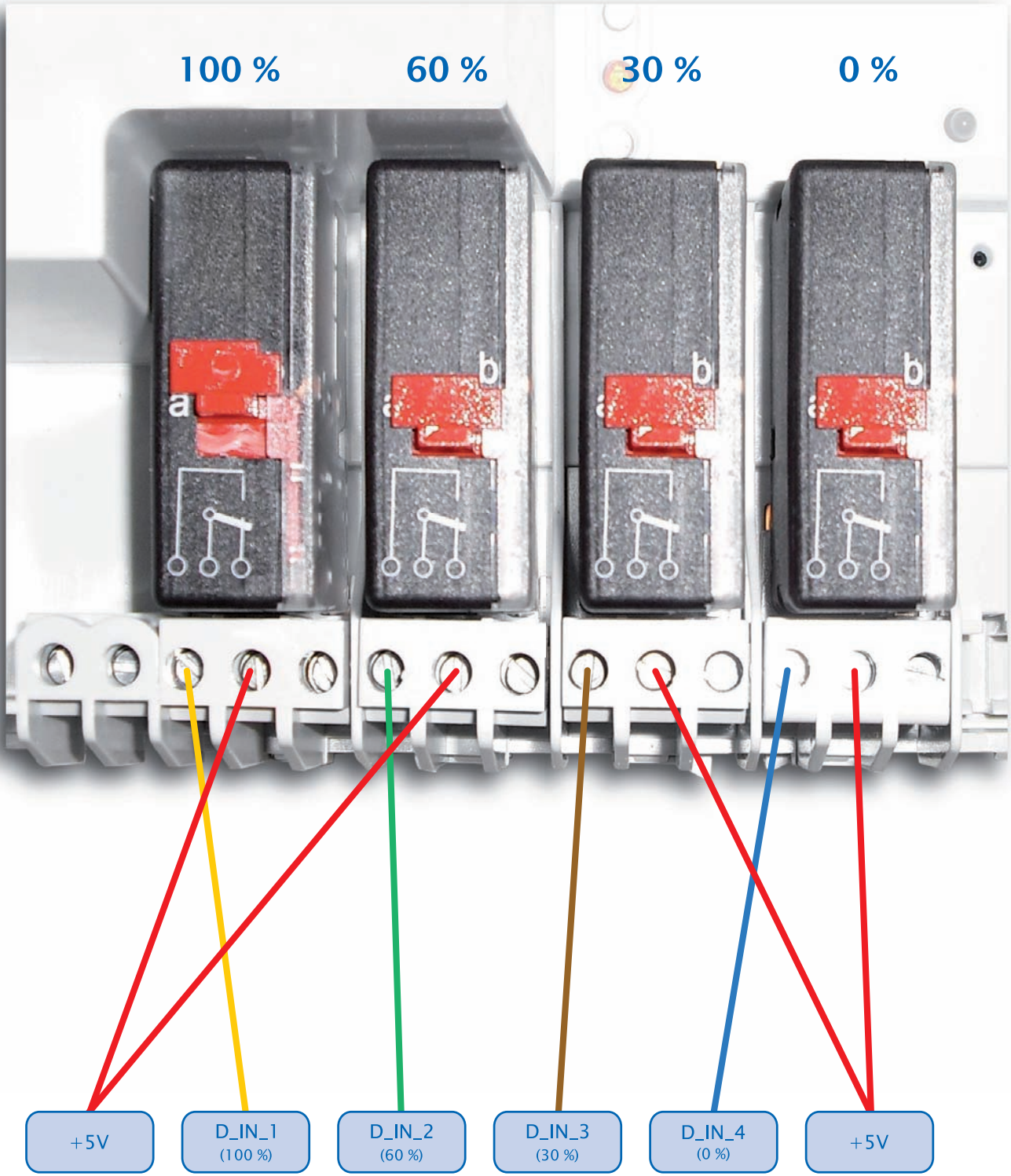


Solar-Log™ PM - ripple control receiver wiring



Solar-Log™ 6 pin plug

Alternative wiring



Solar-Log™ 6 pin plug

The feed-in management system is further configured by the Solar-Logs web interface.

The dialogue box "Config. / Advanced / Feed-in management" is available:

■ Monitoring and logging

By default monitoring and logging of the feed-in management system is disabled and must be enabled here. After this has been done the Solar-Log™ logs any change in power indicated by the digital inputs in an event log with 200 memory cells.

If data export has been enabled an event log is sent to the server within 5 minutes as a ".js" and as a ".csv" file for further analysis. On the Solar-Log™ itself a reduction in power is indicated by a flashing P LED so that a simple visual check is possible.

■ Adjusting inverters

Depending on the inverter manufacturer the ripple control receiver signals can be connected directly to the inverters that here then reduce the power automatically and independently of the Solar-Log™.

As the inverter normally has no logging or Internet connection, it is therefore sensible to connect the Solar-Log™ to it at the same time in order to perform monitoring and logging. In this case the power reduction adjustment is therefore disabled by the Solar-Log™.

➔ Configuration

The screenshot shows the 'Configuration' page with a sidebar on the left containing 'Basic', 'Extended', and 'Internal' sections. The 'Extended' section is active, showing 'Power Managmt.' selected. The main content area is titled 'Configuration // Extended // Power Management' and contains the following sections:

- Monitoring and protocoling:** Radio buttons for 'Activated' and 'Deactivated', with 'Deactivated' selected.
- Inverter adjustment:** Radio buttons for 'Activated' and 'Deactivated', with 'Activated' selected. A note states: 'Note: Function is dependent on type of inverter'.
- Channel- and level setup:** A table for configuring digital inputs and power levels.

Dry contact	C1	C2	C3	C4	Power in % (max.nominal power)
Digital input	D_IN_1	D_IN_2	D_IN_3	D_IN_4	
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

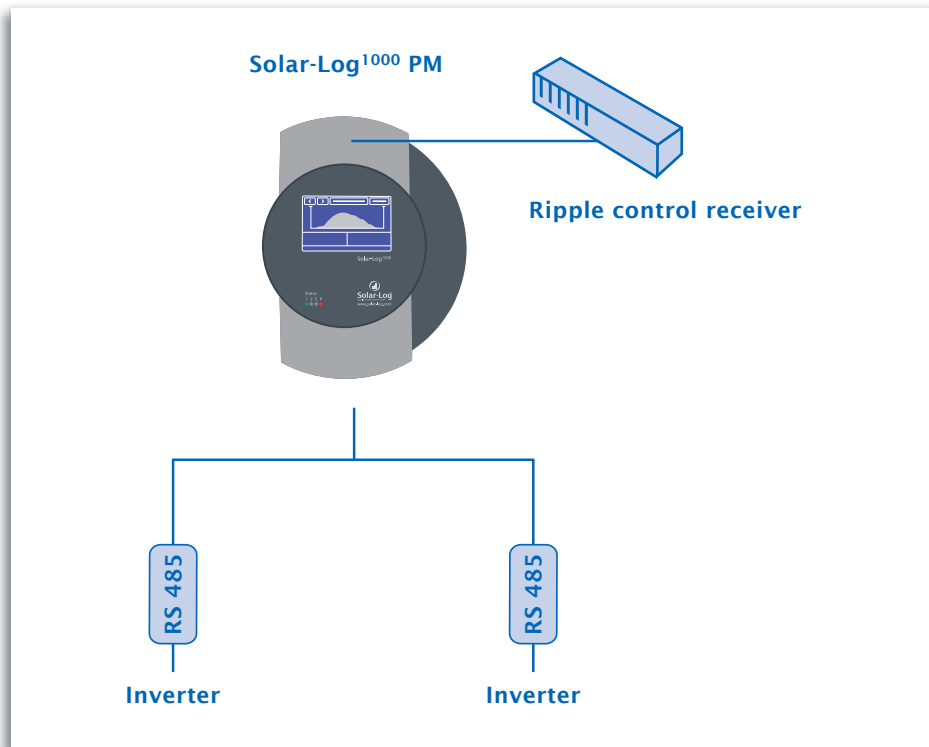
Close dry contact at level 4

To prevent big power changes (e.g. full load throw-off), it is possible to specify the max.power change per interval. 1 interval is usually 15 sec.

max. power change % (10-100)

Network link

Example



■ Channel and power settings

The digital inputs for the prescribed power reduction are allocated here. The default settings are the common allocation of power into 100%, 60%, 30% and 0%. Each power level here is controlled by a single input.

It must be noted that some inverters when reducing to 0% do not reduce completely to 0 watts but supply a certain minimum residual power (e.g. SMA SB versions).

When the power is reduced to 0% (level 4) the Solar-Log™ relay (potential-free output) can also be enabled to trigger any other connections.

As soon as the power is switched to a level other than 4, the relay is opened again.

To prevent large fluctuations in power, e.g. from full load to 0%, a corresponding delay in power reduction can be configured. The default is a 30% change at 15 second intervals.

This means that with a power reduction from 100% to 0% the actual power has only been reduced to 0 in about 60 seconds.

If it is to be switched without a delay 100% must be configured.

■ Commissioning/ testing

A power reduction can be simulated very easily by connecting to a digital input with 5V. Depending on the input the equipment reduces within 60 seconds.

Solar-Log¹⁰⁰⁰ PM compatibility list

Currently (January 2010) the following manufacturers' inverters are supported:

SMA	Danfoss
KACO	Mastervolt
Sunville	Phoenixtec
Ingeteam	
- and others are in preparation	

Feed-in management for large plant

In order to provide feed-in management for large plant, there is the option to operate the Solar-Log¹⁰⁰⁰ PM in a network with several Solar-Log¹⁰⁰⁰.

Function:

- The ripple control receiver signals are received on the Solar-Log¹⁰⁰⁰ PM (master) and distributed to the connected inverters via an RS 485 bus.
- In addition the switching commands of the Solar-Log¹⁰⁰⁰ PM (master) energy supplier are forwarded to other Solar-Log¹⁰⁰⁰ that then in their turn switch the connected inverters on.
- For this procedure the Solar-Log¹⁰⁰⁰ PM (master) is connected to up to 9 Solar-Log¹⁰⁰⁰ (slaves) per network (RJ45 wiring).

Configuration:

- The IP addresses of the connected Solar-Log¹⁰⁰⁰ are entered and stored in the Solar-Log¹⁰⁰⁰ PM (master) configuration.
- After the Solar-Log¹⁰⁰⁰ (slave) has been re-started, a new menu item "Feed-in management" appears under "Configuration" ⇒ "Advanced".
- The "Feed-in management" of the inverters connected to this Solar-LogTM are configured in this menu entry.

➔ Example

