

# InterLink Solar

## V2

Display and monitoring of solar  
installations

## Manual

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Caution!

This symbol indicates possible danger to persons and a risk of material damage in case of non-observance.



## **About Interlink®-Solar V2**

**Interlink®-Solar V2** is a hardware platform for the display and monitoring of photo voltaic (PV) systems via the Internet portal [www.pvlog.de](http://www.pvlog.de).

### ***What's new...***

The new, integral system bus connects main and optional modules to create a perfect, scalable hardware platform. Control of 50 counters or more, an uninterruptible power supply, and RS 485 modules for connecting to local large-screen displays are the most important new features.

### ***Flexible***

Data transfer is done via a telephone, ISDN or DSL connection (provided that such a link is available on-site anyway) or via a mobile radio link with low fixed costs (flat rate). You simply select the most suitable solution.

### ***Standardized***

By means of reliable sensors installed on-site, the **Interlink®-Solar V2** continuously measures the performance data of your PV system. In this way, the operational data of your system are made available in a uniform, non-proprietary manner. The data are transmitted to the [Computer Center](http://www.pvlog.de) for further processing, together with time stamp and status information. The results are visualized and are accessible worldwide – even publicly, if required. More information is provided under [www.pvlog.de](http://www.pvlog.de)

### ***User-friendly***

The measured values transmitted to the Computer Center by the **Interlink®-Solar V2** are processed there for assessing system performance. In case of differences between the possible and actual amount of energy being produced, an error signal is generated. The system then transmits messages to the system's operator and/or to the service technician on duty. All adjustments are done in a user-friendly manner via the portal [www.pvlog.de](http://www.pvlog.de). In addition, detailed reports are available on this portal for downloading by the system's operator.

## ***Functional description***

The **Interlink®-Solar V2** continuously measures the performance data of your PV system, thus providing the basis for yield assessment and notification:

### **Solar energy.**

The central "Main" module comes with two analog measurement inputs plus a power supply for connecting irradiation and temperature sensors. The sensor values are measured once per second, totalized in 10-minute intervals, and stored in a non-volatile memory. In this way, the irradiated solar energy of your PV system is measured directly on-site very accurately and with a high time resolution.

### **Generated electrical energy:**

The amount of electrical energy generated by your PV system is measured with power meters, and is also stored in 10-minute intervals. For this purpose, the main module of the **Interlink®-Solar V2** is fitted with two counter inputs.

By means of expansion modules, e.g. the Module 61 with six S0 interfaces, the system can handle up to 50 and more counter inputs.

The integral memory saves the measured values of the main module and all connected expansion modules, whereby the values are protected also in case of a power failure.

## Scope of delivery

The **Interlink®-Solar V2** set consists of the following components:

- 1 **Interlink®-Solar V2** basic unit
- 3 connecting terminals for counter, sensor and sensor energization
- 1 ground terminal
- 1 segment expansion bus
- 1 mains adapter for 85...264 VAC or 120...370VDC, efficiency typ. 84%
- 1 installation manual with access data for [www.pvlog.de](http://www.pvlog.de)

### Version-dependent connecting cables:

- Analog version: 1 TAE cable, 6 m
- ISDN version : 1 ISDN cable, 3 m
- LAN/DSL version : 1 Ethernet cable, green, 3 m  
1 Configuration adaptor

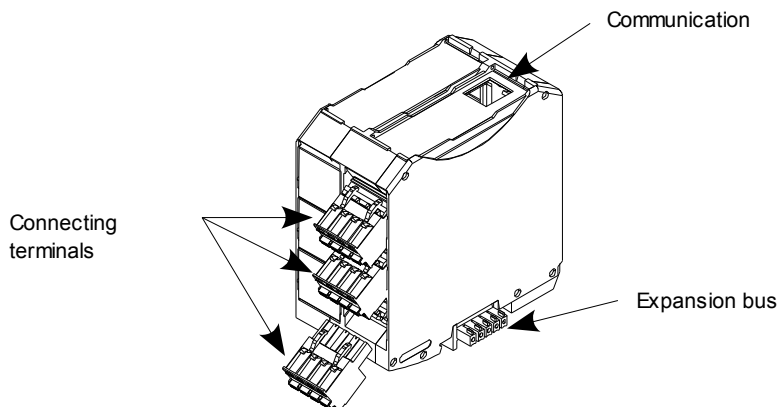


Figure 1: Interlink-Solar V2 basic unit with connecting terminals



Figure 2: Mains adapter for 100...230 VAC

## Options

- M61, Expansion module with six additional S0 inputs
- M02, Battery module for energizing the system in case of a power failure
- M33, Bus coupler for connecting large displays through RS485

In preparation:

- DC power meter module for galvanically isolated measurement on the DC side
- Bus coupler for connecting different bus systems

## Installation



### **Please note:**

The **Interlink®-Solar V2** is to be installed on a 35 mm 'top-hat' DIN rail type NS35/7,5 or NS35/15 in a control cabinet on site.

The control cabinet must provide the required degree of protection – **Interlink®-Solar V2** has protection class **IP20**, i.e. it must be protected from humidity and dust.

When selecting the installation site, the permissible operating conditions must be taken into account. For details, see the section "Technical data".

For the Modem/ISDN version, a TAE telephone socket or ISDN S0 connection must be provided. For the GSM/GPRS version, a suitable location for the antenna must be found.

### **Caution:**

Neither the antenna nor its cable may be run together/in parallel with voltage supply cables. The antenna cable may not be coiled, and the antenna must be mounted vertically.

Grounding of the **Interlink®-Solar V2** is carried out via the DIN rail – a suitable ground terminal is provided.

- **Installation may only be done by qualified personnel !**
- **All applicable safety regulations and standards must be observed !**



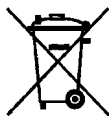
## Preparation

- Unpack the device
- Check the scope of delivery

Save the original packaging, as it will be required in case of a warranty claim/repair, or if the unit must be returned to the manufacturer for correct disposal.

### Note on disposal:

This piece of electronic equipment may not be disposed in the domestic waste bin. At the end of its service life, you can return the **Interlink®-Solar V2** to the manufacturer for free disposal.



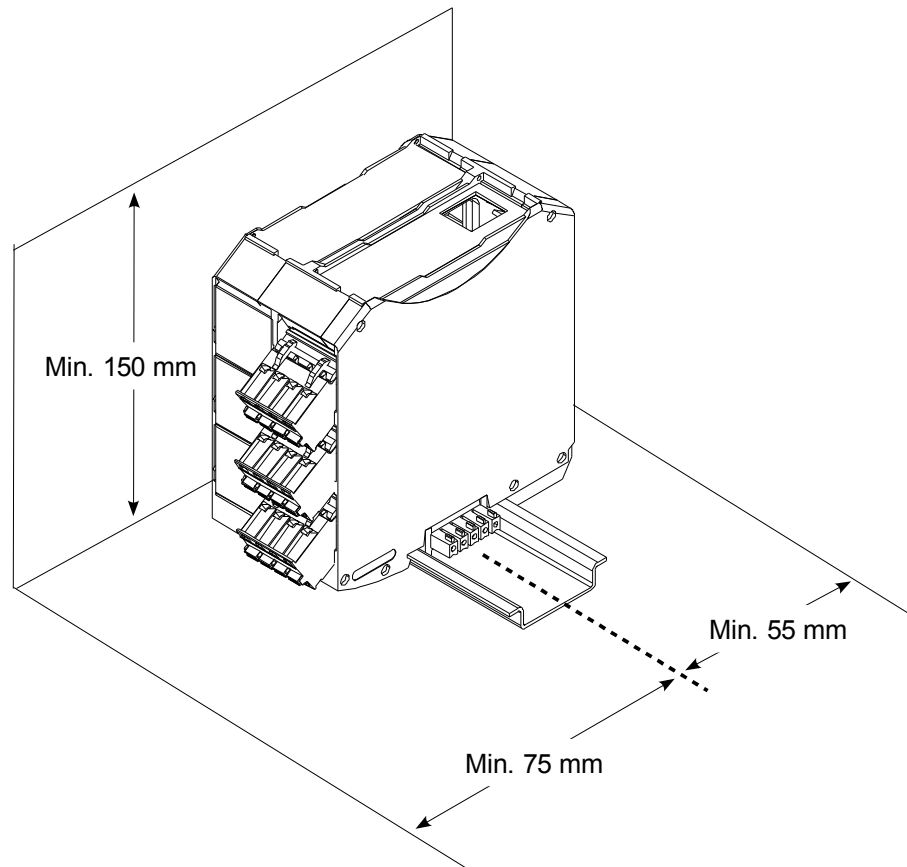
**Space requirement in the control cabinet**

Figure 3: Clearance dimensions for installation

Control cabinets with a transparent cover have been proved to be best for the installation. This permits the indicator LEDs to be seen easily at all times. See Figure 3 for the necessary clearance height and depth – the required installation width is determined as follows:

Device	Quantity	Width	Total
Interlink®-Solar V2 basic unit incl. earth terminal	1	60mm	60mm
Mains adapter	1	25 mm	25 mm
Expansion module with 6 counter channels (Module 61)	0-8	22,5 mm	
Single-phase counter, 32 A (depending on manufacturer)	0-50	17,5 mm	
Single-phase counter, 64 A (depending on manufacturer)	0-50	35 mm	
Three-phase counter, 64 A (depending on manufacturer)	0-50	70mm	
		<b>Overall width:</b>	

## Mounting on DIN rail

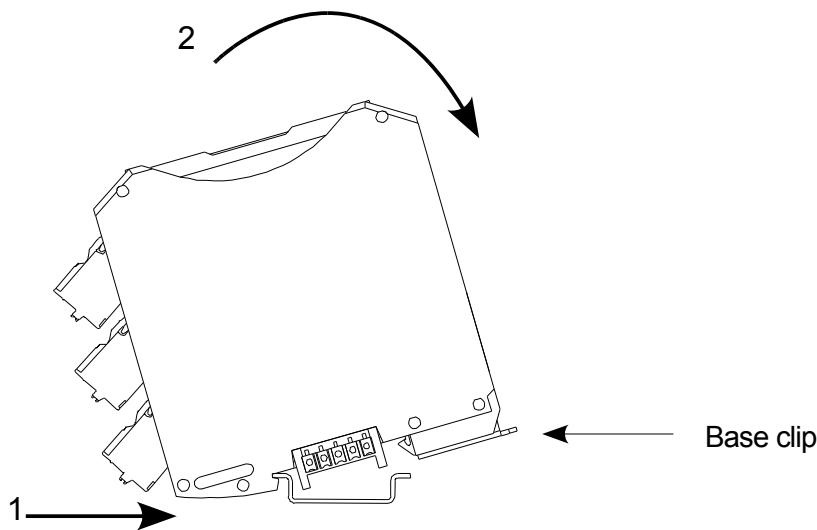


Figure 4: Mounting on the DIN rail

### Main module

As shown in Figure 4, the **Interlink®-Solar V2** is mounted on the DIN rail simply by positioning the unit on the rail in the direction of arrow (1), and then rotating it in the direction of arrow (2) until it clicks securely into place.

### Expansion modules

In order to mount an expansion module, the enclosed system bus connector must first be clipped securely onto the DIN rail at a distance of approx. 10 mm. Next, it is pushed to the left until it clips into the socket of the main module. Finally, the expansion module is mounted on the DIN rail, as shown in Figure 4. For more details, see the separate manual of the expansion module.

## Unmounting

To unmount a module from the DIN rail, the base clip – shown at the right in Fig. 4 – is simply released, and the module is pulled away in the opposite direction of arrow (2). The bus contact set remains on the NS35 rail.

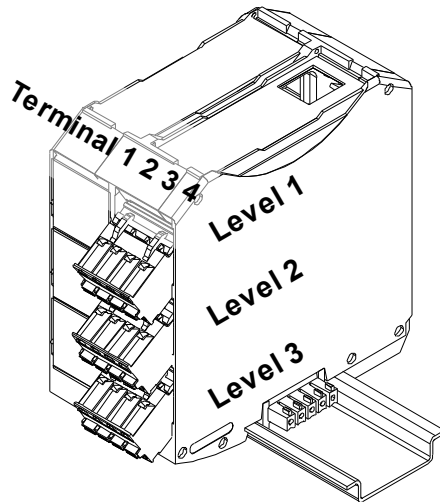
## Address assignment

Every module connected to the system bus must have its own bus address. Eight (8) addresses are available per module type. If several modules of the same type are connected, the addresses used must all be different. Addresses are assigned by means of the rotary switch at the front of the expansion module. Delivery status is address 1.

Example:

8 expansion modules are to be connected to a basic unit. As all the modules are of the same type (Module 61) the assigned addresses must all be different. Therefore, an individual address from 1 to 8 in ascending order is assigned to each module by means of the rotary switch.

## Connecting terminals



The levels are numbered from top to bottom, and the terminals are numbered from left to right.

Figure 5: Terminal description

## Terminal description - main module

### Analog signals: Level 1

Level	Terminal	Signal	Function
1	1	An 1	Analog input 1
1	2	AGND	Reference ground for analog inputs
1	3	Vcc	Sensor energization, approx. 5 V / max. 100 mA
1	4	An 2	Analog input 2

### Counters: Level 2

Level	Terminal	Signal	Function
2	1	Imp1	Pulse input 1
2	2	GND1*	Reference ground for pulse input 1
2	3	Imp2	Pulse input 2
2	4	GND2*	Reference ground for pulse input 2

\*GND1 and GND2 are connected internally

### Power supply: Level 3

Level	Terminal	Signal	Function
3	1	V+	Supply voltage 12...24 VDC
3	2	GND	Ground
3	3	NC	Not connected
3	4	Iout	Current source 1 mA



## Connecting the analog sensors

<b>Level</b>	<b>Terminal</b>	<b>MacSolar 3500</b>	<b>RC7</b>	<b>PT1000</b>	<b>Spectron 300</b>
1	1	white	brown	-	2
1	2	brown/black	white	1	6
1	3	-	-	-	4
1	4	blue	-	2	-
3	1	-	-	2	-

## Connecting the counters

One or two pulse sources can be connected to the terminals on Level 2. For this, only potential-free NO contacts may be used. In case of semiconductor switches, the polarity must be observed. The terminals are numbered in ascending order from left to right.

<b>Level</b>	<b>Terminal</b>	<b>Signal</b>	<b>Function</b>	<b>Counter</b>
2	1	Imp1	Pulse input 1	S0+
2	2	GND1*	Reference ground for pulse input 1	S0-
2	3	Imp2	Pulse input 2	S0+
2	4	GND2*	Reference ground for pulse input 2	S0-

\*GND1 and GND2 are connected internally

## Terminal description - extension module

### Counters: Level 1 to 3

<b>Level</b>	<b>Terminal</b>	<b>Signal</b>	<b>Function</b>
1	1	Imp1	Pulse input 1
1	2	GND1*	Reference ground for pulse input 1
1	3	Imp2	Pulse input 2
1	4	GND2*	Reference ground for pulse input 2

<b>Level</b>	<b>Terminal</b>	<b>Signal</b>	<b>Function</b>
2	1	Imp3	Pulse input 3
2	2	GND3*	Reference ground for pulse input 3
2	3	Imp4	Pulse input 4
2	4	GND4*	Reference ground for pulse input 4

<b>Level</b>	<b>Terminal</b>	<b>Signal</b>	<b>Function</b>
3	1	Imp5	Pulse input 5
3	2	GND5*	Reference ground for pulse input 5
3	3	Imp6	Pulse input 6
3	4	GND6*	Reference ground for pulse input 6

\*GND1 to GND6 are connected internally

## **Commissioning and activation**

Proceed as follows when the installation has been completed:

- Make sure that the sensors and pulse sources have been connected correctly.
- With analog/ISDN versions: Connect the device to the telephone or ISDN socket. Make sure that the telephone or ISDN link is active (for incoming and outgoing calls), and test the dial-up number with a suitable telephone.
- With GSM/GPRS versions: Mount the antenna in a suitable location, and connect it to the antenna socket. Make sure that the antenna is vertical and that the cable has not been coiled.
- With LAN/DSL versions: Make sure that the network parameter are configured before the activation. For more details refer to the chapter “ Network settings with LAN version”
- Switch on the supply voltage.

## **Activation**

Apart from installation and commissioning the **Interlink®-Solar V2** , the PV system must be configured by means of the portal [www.pvlog.de](http://www.pvlog.de) . Subsequently, the configuration is transmitted to the **Interlink®-Solar V2**, which activates the system. The green “Ready” LED lights up. The necessary access data are specified in the installation instructions supplied with every unit. The configuration procedure is described in detail under [www.pvlog.de](http://www.pvlog.de)

**Tip for the GPRS and LAN version:** If the PV system has already been configured when the **Interlink®-Solar V2 GPRS** is switched on, activation is carried out automatically within 5 minutes. Otherwise, the first activation might take all night. (version dependent). When activation is completed, the blue “Data” LED flashes.

## Displays and error messages

Several indicator LEDs and a piezo buzzer for acoustic fault signalling have been integrated in the **Interlink®-Solar V2** for monitoring the unit's function and its connection to the service network.

The LEDs and the buzzer are fitted to the module defined as "Main".

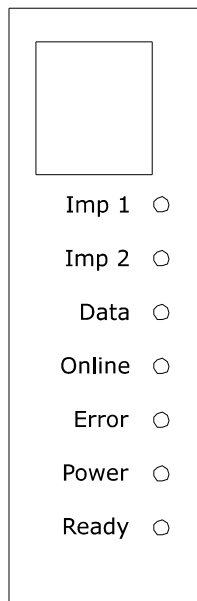


Figure 6: LED indicators

- 1: Yellow "**Imp 1**" LED: Flashes when a pulse has been detected at pulse input no. 1.
- 2: Yellow "**Imp 2**" LED: Flashes when a pulse has been detected at pulse input no. 2.
- 3: Blue "**Data**" LED: Flashes once per second after successful activation, and indicates that a measured value has been read.
- 4: Yellow "**Online**" LED: Lights up as long as a connection with the service network exists.
- 5: Red "**Error**" LED: Flashes if the modem cannot be initialized, or if no connection has been established in spite of several attempts. Moreover, with GSM/GPRS versions it indicates that the internal modem cannot connect with the mobile communications network. In this case, try to improve the antenna location.
- 6: Green "**Power**" LED: Lights up as soon as power is connected.
- 7: Green "**Ready**" LED:
  - Blinks after a mains supply failure until a connection to the service network has been established successfully.
  - Lights up as soon as a connection to the service network has been established.
  - Flashes in case of a detected hardware or communication error (unsuccessful connection attempt).

### **Piezo buzzer**

A piezo buzzer has been integrated in the **Interlink®-Solar V2** for acoustic signalling of important faults. If a fault is detected, the buzzer is activated for one second every 60 seconds. A detected fault is transmitted to the service network automatically.

### **GSM field strength monitoring (only for GSM/GPRS version)**

In versions with a GSM/GPRS module, the GSM field strength is monitored regularly in 60-second intervals. If the field strength falls below a defined minimum value required for reliable data transmission, this is indicated by the flashing "Error" LED and simultaneous brief activation of the buzzer. As soon as the field strength returns to an adequate value, the fault signalling is reset.

## Special features of ISDN / GSM / GPRS versions

### ***ISDN:***

The ISDN version can be connected either to the internal or to the external S0 bus. During activation, it might be necessary to take a dialling prefix into account. If possible, a dedicated call number (MSN) should be reserved for the **Interlink®-Solar V2** .

### ***GSM/GPRS:***

The integrated GSM modem is re-initialized automatically at regular intervals, and logged into the mobile communications network. During this initialization phase, the flashing 'Error' LED can indicate a modem fault for a duration of one to two minutes. This error message stops as soon as the modem returns to normal operation.

## Network settings with LAN Version

By factory default, the **Interlink®-Solar V2 LAN** is using the *Dynamic Host Configuration Protocol* to draw the necessary network configuration automatically from a DHCP server on the network. The service of the DHCP server is usually provided by the DSL router of your Internet connection.

### ***Sequence of the automatic configuration:***

1. Make sure that your DSL router and DHCP is turned on. For details, see the documentation of the router.
2. Connect the **Interlink®-Solar V2 LAN** with a free LAN port on the DSL router. Use the enclosed green cable.
3. Power on the **Interlink®-Solar V2 LAN**

Once the **Interlink®-Solar V2 LAN** is switched on, it automatically applies the needed configuration. Subsequently, the device builds up a ssl-secured connection to the data center, will be activated and is ready for operation.

### Success:

The "Ready" LED will change to steady green after the connection was made to the data center. The "Data" LED flashes blue when the unit was activated.

### ***Sequence of the manual configuration:***

If a DHCP server is not available, or you want to perform manual network configuration, you will find a free tool that allows you to connect to the device. Check "Service & Downloads" on [www.pvlog.de](http://www.pvlog.de) to download that tool. Follow the instructions of the tool to connect to the **Interlink®-Solar V2 LAN**.

The final configuration is done via web pages that are integrated in the device. They are called by your Internet browser. Logon with:

Username: admin  
Password: PASS

InterLink-Solar LAN

Status	<b>Gerätestatus</b>
Netzwerk	
Neustart	

MAC Adresse:	00:20:4a:bc:fb:2f
IP Adresse:	192.168.0.130 / 255.255.255.0
Verbindung:	Auto 10/100 Mbps Auto Half/Full (100 Mbps Full)
Standard-Gateway:	192.168.0.1
Erster DNS:	<None>
Zweiter DNS:	<None>

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[Support](#)

Select in the left bar: „Netzwerk“

InterLink-Solar LAN

Status	<b>Netzwerkeinstellungen</b>	<p>Auf dieser Seite können Sie die Netzwerkeinstellungen Ihres InterLink verändern. Die veränderten Einstellungen werden nach einem Neustart aktiviert.</p> <p>Änderungen an den Einstellungen für DHCP und IP Adresse benötigen einen Neustart. Bei eingeschaltetem DHCP werden die Einstellungen für IP Adresse, Netzmaske und Standard Gateway ignoriert.</p> <p>Die IP Adresse kann in CIDR-Format oder mit expliziter Netzmaske angegeben werden:  192.168.1.1 (automatisch)  192.168.1.1/24 (CIDR-Format)  192.168.1.1.255.255.255.0 (explizit)</p> <p><b>Wenn das Beziehen der Netzwerkeinstellungen via DHCP fehl schlägt, wird automatisch eine IP Adresse aus dem Bereich 169.254.x.x verwendet.</b></p>
Netzwerk		
Neustart		

Details Link

Anzeigen Einstellen

**Netzwerk 1 (eth0) Konfiguration**

DHCP:	<input type="radio"/> Ein <input checked="" type="radio"/> Aus
IP Adresse:	<input type="text" value="192.168.0.130/24"/>
Standard Gateway:	<input type="text" value="192.168.0.1"/>
Erster DNS:	<input type="text" value="&lt;None&gt;"/>
Zweiter DNS:	<input type="text" value="&lt;None&gt;"/>

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Fill in the network konfiguration of your choice.

InterLink-Solar LAN

Status	<b>Neustart</b>	<p>Nach dem Neustart wird die Statusseite nach etwas 30 Sekunden wieder angezeigt. Bitte beachten Sie, dass dies nur funktioniert wenn die IP-Adresse nicht verändert wurde.</p>
Netzwerk		
Neustart		

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To save your changes click on „Neustart“, then on „Jetzt neu starten“. With this, the configuration is completed.

## Technical data

### General:

- Supply voltage: 12...24 VDC, max. 0,5 A
- Operating temperature: 0...50 °C
- Storage temperature: -10...60 °C
- Humidity: ~10...85% rel. humidity, non-condensing
- Protection class: IP20 to IEC 60529
- Mounting: on rail to DIN-EN 50 022 (35 mm rail Type NS35/7,5 or NS35/15)
- Earthing: via the DIN rail and earthing terminal supplied
- Connecting terminals: plug-in spring clamp terminals
- Cable lengths: max. 250 m, depending on cable type and cross-section
- Cable cross-section: 0,2...2,5 mm<sup>2</sup> (24...12 AWG)

### Main module:

#### Interlink®-Solar V2 "Main"

- Power consumption: max. 0,80 W (normal operation)
- Power consumption: max. 0,15 W (power save mode or battery operation)
- Dimensions: approx. 92 x 85 x 45 mm
- Weight: approx. 140...220 g, depending on version
- Sensor inputs:
  - 2 voltage inputs 0...4 V, error less than  $\pm 0,5\%$
  - 2 pulse inputs, max. 50 pulses/sec for connecting power meters with pulse output acc. to EN 62053-31, Class B
  - 1 current source for Pt 1000 sensor: 1mA  $\pm 0,5\%$

### Expansion modules:

#### Interlink®-Solar V2 Module61

*Expands the system with 6 additional S0-inputs*

- Power consumption: max. 0,15 W (normal operation)
- Power consumption: max. 0,075 W (power save mode or battery operation)
- Dimensions: approx. 92 x 85 x 22,5 mm
- Weight: approx. 70 g, depending on version
- Sensor inputs: 6 pulse inputs, max. 50 pulses/sec for connecting power meters with pulse output acc. to EN 62053-31, Class B

Optionally, the inputs of the first expansion module can also be configured as fault signalling inputs. The signalling contacts to be monitored must be potential-free NO contacts. In case of semiconductor switches, the polarity must be observed.

Trigger levels:

- Contact open: resistance > 6,8 k $\Omega$  / voltage > 3,0 V
- Contact closed: resistance < 3,3 k $\Omega$  / voltage < 2,0 V

**Interlink®-Solar V2 Module02**

*Expands the system uninterruptable power supply*

- Power consumption: max. 4,00 W (while charging the battery)
- Power consumption: max. 0,04 W ( battery maintenance)
- Dimensions: approx. 92 x 85 x 22,5 mm
- Weight: approx. 150 g, depending on version

***Service and maintenance***

The **Interlink®-Solar V2** system requires no maintenance. Unauthorized opening of the device results in the voiding of all warranty claims, and can lead to damage of the electronics. Use a dry cloth to clean the modules. Do not use any solvents or cleaning agents.

***Warranty***

The manufacturer grants a 24-month warranty on the product regarding material and workmanship. Any damage resulting from overvoltage or improper use is excluded from the warranty. Similarly, any further claims, e.g. for consequential damage, are excluded.

***Technical support***

If you have any questions regarding installation and operation, please contact your sales agent or send an e-mail to [support@pvlog.de](mailto:support@pvlog.de) .

Equipment that is to be returned to the manufacturer for diagnosis or repair requires an RMA number. This number will be provided after you have sent a description of the fault via e-mail to [support@pvlog.de](mailto:support@pvlog.de). Equipment that is returned without an RMA number will not be accepted.

## ***EU Certificate of Conformity***

in compliance with Directive 2004/108/EC

### **The manufacturer**

Common-Link AG  
Koellestrasse 30b  
D-76189 Karlsruhe,

### **herewith declares that the product**

Product description: Data logger

Make: Interlink®-Solar V2

Type: Interlink®-Solar V2 Analog

Interlink®-Solar V2 GPRS

Interlink®-Solar V2 ISDN

Interlink®-Solar V2 LAN

Interlink®-Solar V2 Module02

Interlink®-Solar V2 Module33

Interlink®-Solar V2 Module61

**complies with the above Directive, including any amendments in force at the time this certificate was issued.**

### **The following harmonized standards were applied:**

EN 61326-1:2006

Karlsruhe, 15.07.2009

A handwritten signature in black ink, appearing to be 'W. Edel', written over a faint, illegible stamp or background.

Board of Management



**APPENDIX B – Block diagram of Interlink®-Solar V2**

