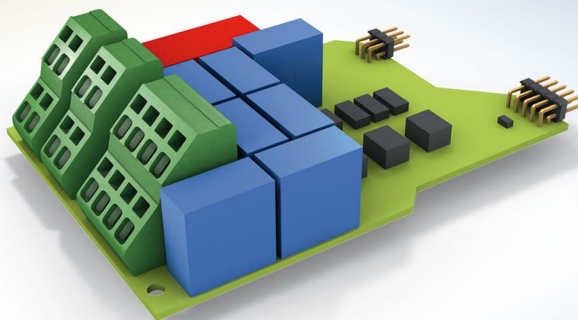


SolarMax P series

I/O module

Installation manual



Sputnik Engineering AG
Länggasse 85
CH-2504 Biel/Bienne
Email: info@solarmax.com

© Sputnik Engineering AG 2014

Contents

1	About this installation manual	4
1.1	Scope	4
1.2	Target groups	4
1.3	Where to keep this manual	4
1.4	Symbols used	4
2	Safety	5
2.1	Intended use	5
2.2	Safety Instructions	5
2.3	Symbols on the I/O module	5
3	Description	6
3.1	Identification	6
3.2	Connections	7
4	Installation	8
4.1	Storing the I/O module	8
4.2	Checking the delivery	8
4.3	Installing the I/O module	9
4.4	Cabling	11
4.4.1	External shutdown	12
4.4.2	External power control	13
4.4.3	SPI logic	14
4.4.4	Multi-function relay	15
4.4.5	Lightning protection monitor	16
4.4.6	S0 interface	17
4.4.7	Control of self-consumption	18
5	Configuration	22
5.1	Configuring the status signaling contact	22
5.1.1	Graphics display configuration	22
5.1.2	Configuration with MaxTalk 2	23
5.2	Configuring the lightning protection monitor	23
5.2.1	Graphics display configuration	23
5.2.2	Configuration with MaxTalk 2	23
5.3	Control of self-consumption	24
5.3.1	Configuring the "Pac electric meter" operating mode	24
5.3.2	Configuring the "Pac inverter" operating mode	25
6	Replacement	27
6.1	I/O module disassembly	27
6.2	I/O module disposal	27
7	Warranty	28

1 About this installation manual

1.1 Scope

This installation manual is valid for the I/O module, item no. 10005981 and item no. 10005380 (accessory component for the SolarMax inverter 2000P, 3000P, 4000P, 4600P and 5000P).

1.2 Target groups

The I/O module may only be installed by qualified electricians (e.g. electrical contractors, electrical plant installers, electromechanics, industrial electronic engineers).

1.3 Where to keep this manual

The plant operator must ensure that this installation manual is available to the relevant persons at all times. If this original document is lost, an up-to-date version of this installation manual can be downloaded from our website at any time (www.solarmax.com).

1.4 Symbols used

The following safety instructions and general information are used within this instruction manual.



DANGER!

Non-observance of these safety instructions may immediately cause serious injuries or death.



WARNING!

Non-observance of these safety instructions may cause serious injuries.



CAUTION!

Non-observance of these safety instructions may cause minor or medium injuries.



ATTENTION!

Non-observance of these safety instructions may cause material damage.



Note

Notes contain extended information or facilitate the operation of the inverter and/or I/O module.

2 Safety

2.1 Intended use

The I/O module is intended exclusively for extending the interface for SolarMax P series inverters. Any other use is contrary to the design purpose.

2.2 Safety Instructions



DANGER!
Fatal electric shock hazard!

- Never open the inverter while it is in operation.
- Before you start installation work, ensure that all connectors and cables are de-energized.
- Remove the cover and the contact protection on the inverter as described in the instruction manual.
- Observe the safety instructions in the inverter instruction manual.

2.3 Symbols on the I/O module

Symbol	Description
	The I/O module can be damaged by electrostatic discharge (ESD). Take all necessary measures to avoid ESD.

3 Description

The I/O module offers extra functions and interfaces for monitoring and remote control of the PV power plant. It is inserted into the slot provided in the inverter.

3.1 Identification

The I/O module can be identified by a sticker on the printed circuit board, see Figure 1/ Pos 1).

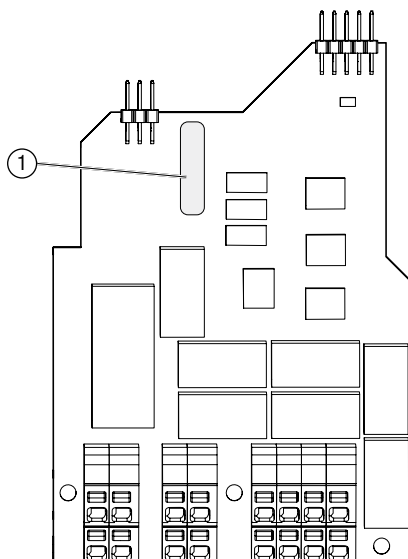


Figure 1 Identification

Item no. - I/O module	Printed circuit board
10 005 380	BG10418
10 005 981	10 005 980

3.2 Connections

The connection terminals of the I/O module are illustrated in Figure 2.

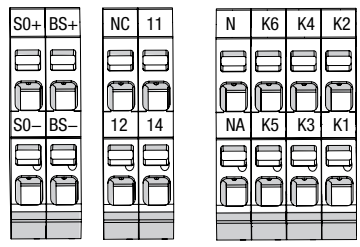


Figure 2 I/O module connections

Contact	Description
S0+	S0 interface* (control of self-consumption)
S0-	
BS+	Lightning protection monitor
BS-	
N	External shutdown / external power control / SPI frequency monitoring
NA	External shutdown
NC	not used
11	Multi-function relay (status signaling contact / control of self-consumption)
12	
14	
K1	External power control
K2	
K3	
K4	
K5	
K6	External power control / SPI frequency monitoring

*only available for the I/O module, item no. 10005981

4 Installation

4.1 Storing the I/O module

Store the I/O module in the special ESD-protected bag at room temperature in a dry location.

4.2 Checking the delivery

Check the contents of the delivered package for completeness and possible damage. In the case of an inadequate delivery, please contact your dealer or the SolarMax Service Center.

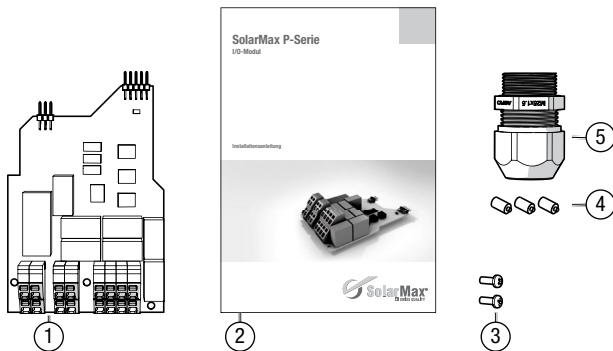


Figure 3 Content of delivery

No.	Quantity	Object
1	1	I/O module (packed in ESD-protected bag)
2	1	Installation manual
3	2	M3 x 8 Phillips head screw
4	3	Locking pins (for plugging unused holes in multiple cable connectors)
5	1	M25 multi-cable gland

4.3 Installing the I/O module

The slot for the I/O module is inside the inverter.

**DANGER!****Fatal electric shock hazard!**

Components within the inverter are charged with mains voltage.

- Never open the inverter while it is in operation.
- Before you start installation work, ensure that all connectors and cables are de-energized.
- Remove the cover and the contact protection on the inverter as described in the instruction manual.
- Observe the safety instructions in the inverter instruction manual.

**ATTENTION!****Damage due to electrostatic discharge!**

- Avoid electrostatic discharge (ESD) when handling the I/O module.

Procedure

1. Open the inverter as described in the inverter instruction manual.
2. Remove the blind plug from the middle cable pass-through on the inverter.
3. Install the M25 cable gland on the middle cable pass-through. The M25 cable gland is included in the delivery package.
4. Insert the I/O module.
5. Tighten the I/O module with the M3 Phillips head screws.

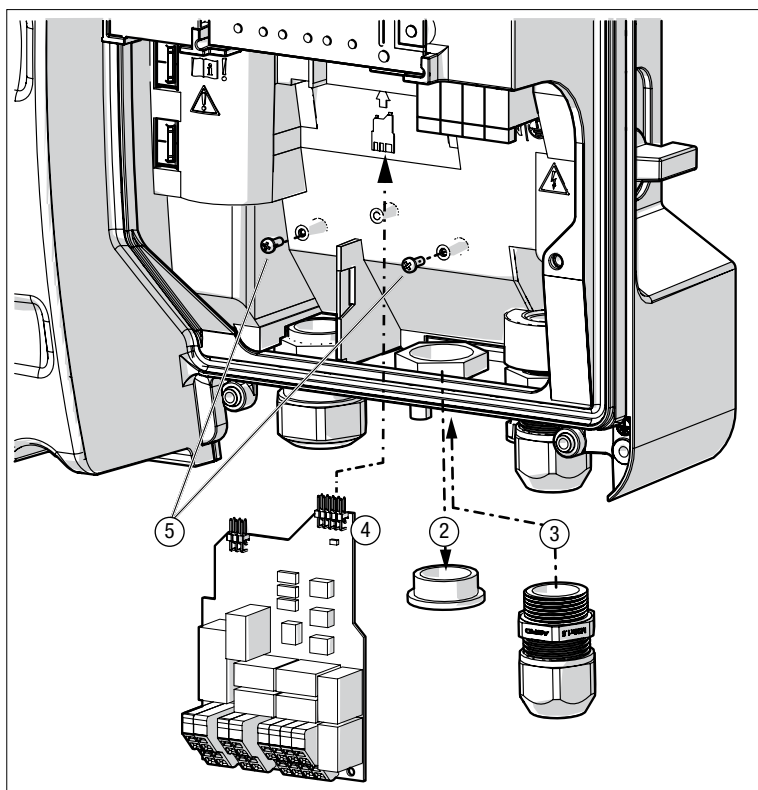


Figure 4 Installing the I/O module

6. Connect the wiring to the interfaces as described in Section 4.4.
7. Complete the installation of the I/O module
 - by inserting the contact protection such that you hear the snap closures engage;
 - then fit the cover and tighten.

4.4 Cabling

The cabling of the I/O module passes exclusively through the middle and left cable glands of the inverter.



WARNING! Fatal electric shock hazard!

Cables conducting mains voltage must be covered by the contact protection inside the inverter.

- Always route mains voltage cables through the middle cable gland (Figure 5/Pos. 2).

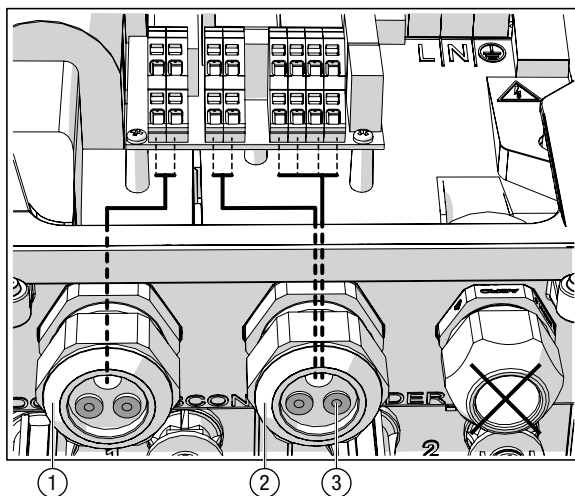


Figure 5 Wiring of connections in the inverter

No.	Description	
1	Left cable gland	For lightning protection monitor / S0 interface* (energy counter)
2	Middle cable gland	For external shutdown / external power control (ripple control receiver) / SPI frequency monitoring / multi-function relay
3	Locking pin	

*only available for the I/O module, item no. 10 005981

In order to ensure that the inverter remains sealed, unused apertures in the cable glands must be closed with the locking pins (see Figure 5/Pos 3). The locking pins are included in the delivery package.

4.4.1 External shutdown

This interface can be used to connect the inverter to an external grid monitoring system which disconnects the inverter from the mains grid when this is needed.

While the external grid monitoring signal (the phase voltage) is connected to the "NA" contact, the inverter feeds into the grid. When the signal stops, the grid relays of the inverter are opened. This immediately disconnects the inverter from the grid.

The interface is configured with the free MaxTalk 2 Pro service software.

Connection conditions

- Connectable cable diameter: min. 9.5 mm / max. 12.5 mm
- Connectable conductor cross-sections: min. 0.25 mm² / max. 2.5 mm²
- Max. input current: 25 mA
- Max. input voltage: 230 V_{ac}

Procedure

1. Open the inverter as described in the instruction manual.



WARNING!

Fatal electric shock hazard!

Cables conducting mains voltage must be covered by the contact protection inside the inverter.

- Always route the connecting cable through the middle cable gland (Figure 5/Pos. 2).

2. Connect the wires as follows:
 - Wire stripping length: 7 mm

Contact	Description
NA	Control line
N	Neutral conductor

3. Close the unused holes in the cable gland using the locking pins.
4. Tighten the cable gland (wrench size: 34 mm).
5. Check the cable strain relief.
6. Close the inverter by
 - engaging the contact protection;
 - then tighten the cover.

You can now switch the inverter on as described in the instruction manual.

**WARNING!****Fatal electric shock hazard!**

Cables conducting mains voltage must be covered by the contact protection inside the inverter.

- Always route the cable through the middle cable gland (Figure 5/Pos. 2).

2. Connect the wires as follows:
 - Wire stripping length: 7 mm

Contact	Description
K1	Control signal relay K1
K2	Control signal relay K2
K3	Control signal relay K3
K4	Control signal relay K4
K5	Control signal relay K5
K6	Control signal relay K6 (this input is not evaluated for the external output control if the SPI logic is used at the same time)
N	Neutral conductor

3. Close the unused holes in the cable gland using the locking pins.
4. Tighten the cable gland (wrench size: 34 mm).
5. Check the cable strain relief.
6. Close the inverter:
 - engaging the contact protection;
 - then tighten the cover.

You can now switch the inverter on as described in the instruction manual.

4.4.3 SPI logic

With this interface it is possible to connect the inverter to an external SPI frequency monitoring device ("Segnale Esterno" is only available when "Italy" is selected in the country setting).

The interface is configured with the free MaxTalk 2 Pro service software.

Procedure

1. Open the inverter as described in the instruction manual.

**WARNING!****Fatal electric shock hazard!**

Cables conducting mains voltage must be covered by the contact protection inside the inverter.

- Always route the connecting cable through the middle cable gland (Figure 5/Pos. 2).

2. Connect the wires as follows:
 - Wire stripping length: 7 mm

Contact	Description
K6	Control line
N	Neutral conductor

3. Close the unused holes in the cable gland using the locking pins.
4. Tighten the cable gland (wrench size: 34 mm).
5. Check the cable strain relief.
6. Close the inverter by
 - inserting the contact protection;
 - then tighten the cover.

You can now switch the inverter on as described in the instruction manual.

4.4.4 Multi-function relay

The multi-function relay can be used as status signaling contact for the remote control of the inverter or for the control of self-consumption (see section 4.4.7). The configuration as status signaling contact is either done using the inverter's graphics display (see section 5.1) or with MaxTalk 2.

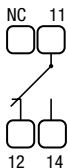


Figure 7 Contact scheme of multi-function relay

Connection conditions

- Connectable cable diameter: min. 9.5 mm / max. 12.5 mm
- Connectable conductor cross-sections: min. 0.25 mm² / max. 2.5 mm²
- Max. switching voltage: 250 V_{AC} / 30 V_{DC}
- Max. switching current: 1.5 A (no internal fuse present)

- Max. cable length: 50 m

Procedure

1. Open the inverter as described in the instruction manual.



WARNING!

Fatal electric shock hazard!

Cables conducting mains voltage must be covered by the contact protection inside the inverter.

- Always route the connecting cable through the middle cable gland (Figure 5/Pos. 2).

2. Connect the wires as follows:
 - Wire stripping length: 7 mm

Contact	Description
11	COM
12	Opener (when used as status signaling contact: opener in the case of error)
14	Closer (when used as status signaling contact: closer in the case of error)
NC	not used

3. Close the unused holes in the cable gland using the locking pins.
4. Tighten the middle cable gland (wrench size: 34 mm).
5. Check the cable strain relief.
6. Close the inverter by
 - engaging the contact protection;
 - then tighten the cover.

You can now switch the inverter on as described in the instruction manual.

4.4.5 Lightning protection monitor

This interface can be used for monitoring an external lightning protection module. The configuration is done using the inverter's graphics display (see section 5.2.1) or with MaxTalk 2.

When the remote signaling contact of the lightning protection module connected to the input closes, the inverter displays the corresponding status message/warning on the graphics display. It is possible to connect multiple lightning protection modules in parallel to the lightning protection input.

Connection conditions

- Connectable cable diameter: min. 9.5 mm / max. 12.5 mm
- Connectable conductor cross-sections: min. 0.25 mm² / max. 2.5 mm²

- Max. cable length: 50 m
- Do not connect any external power sources.

Procedure

1. Remove the cover of the inverter as described in the instruction manual.
 - Do not remove the contact protection.
2. Route the cable through the left cable gland (Figure 5/Pos. 1).
3. Connect the wires as follows:
 - Wire stripping length: 7 mm

Contact	Description
BS+	Remote signaling contact of the lightning protection module (potential-free)
BS-	COM

4. Close the unused holes in the cable gland using the locking pins.
5. Tighten the cable gland (wrench size: 34 mm).
6. Check the cable strain relief.
7. Close the inverter by fitting and tightening the cover.

You can now switch the inverter on as described in the instruction manual.

4.4.6 S0 interface

In accordance with DIN EN 62053-31 this interface (only available for the I/O module, item no. 10005981) can be used to connect an energy counter to the inverter for the purpose of the control self-consumption. From experience, SolarMax can recommend the following electronic energy counters: Berg MCI32WP and Berg B23 311.

Connection conditions

- Energy counters are only permitted with S0 pulses for feed-in (S0 pulses for both directions of energy flow are not permitted).
- The pulse rate of the energy meter must be between 1 000 and 10 000 pulses per kWh.
- Connectable cable diameter: min. 9.5 mm / max. 12.5 mm
- Connectable conductor cross-sections: min. 0.25 mm² / max. 2.5 mm²
- Max. cable length: 50 m
- Do not connect any external power sources.

Procedure

1. Remove the cover of the inverter as described in the instruction manual.
 - Do not remove the contact protection.
2. Route the cable through the left cable gland (Figure 5/Pos. 1).

3. Connect the wires as follows:
 - Wire stripping length: 7 mm
 - Ensure the polarity is right.

Contact	Description
S0+	Pulse input (plus pole)
S0–	COM (minus pole)

4. Close the unused holes in the cable gland using the locking pins.
5. Tighten the cable gland (wrench size: 34 mm).
6. Check the cable strain relief.
7. Close the inverter by fitting and tightening the cover.

You can now switch the inverter on as described in the instruction manual.

4.4.7 Control of self-consumption

The inverter has functions for the control of self-consumption. Connection is via the interfaces of the I/O module. Several different operating modes can be selected.

Operating mode	Description
Grid feed-in limitation	As the inverter controls self-consumption it keeps within a maximum feed-in power at the grid connection point. This operating mode is available only for the I/O module, item no. 10 005 981.
Pac electric meter	The inverter controls the consumer loads in accordance with the power fed into the grid. The power output is measured with an energy counter. This operating mode is available only for the I/O module, item no. 10 005 981.
Pac inverter	The inverter controls the consumer loads in accordance with its output power.

4.4.7.1 Grid feed-in limitation

For the connection diagram in "Grid feed-in limitation" mode see Figure 8: the energy counter that measures the power fed in at the grid connection point is connected to the S0 interface of the I/O module.

The grid feed-in limitation is configured using the free MaxTalk 2 Pro service software.

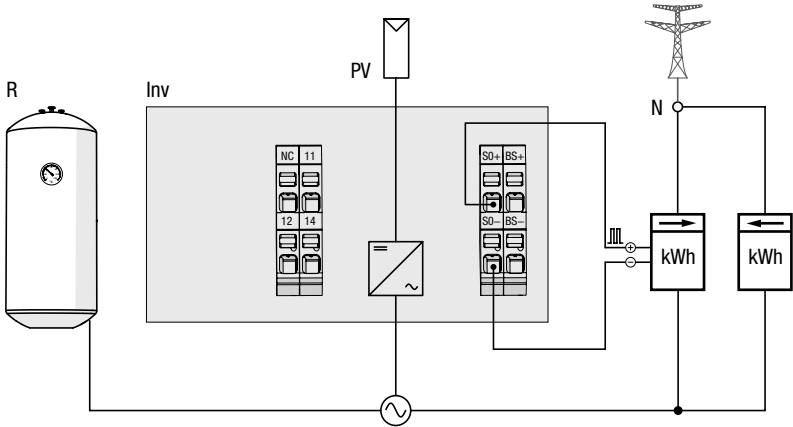


Figure 8 Wiring in "Grid feed-in limitation" operating mode

Legend: R: consumer / Inv: inverter / PV: PV generator / N: grid connection point / kWh: energy counter

Procedure

- Connect the energy counter as described in section 4.4.6.
- Use MaxTalk 2 Pro to configure the max. feed-in power and the S0 interface (energy counter).

4.4.7.2 Pac electric meter

For the connection diagram in "Pac electric meter" operating mode see Figure 9: the consumer loads are controlled via the inverter's multi-function relay and a contactor. The energy counter that measures the power fed in at the grid connection point is connected to the S0 interface of the I/O module.

The "Pac electric meter" operating mode is configured on the inverter's graphics display or using MaxTalk2. The S0 interface (energy counter) is configured with MaxTalk 2 Pro.

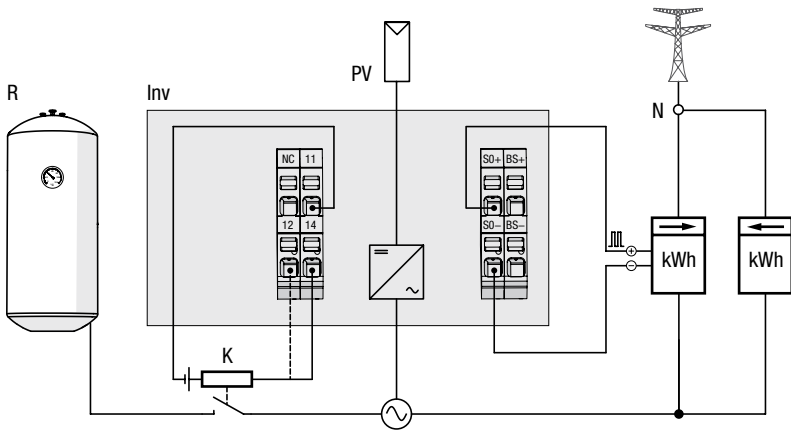


Figure 9 Wiring in "Pac electric meter" operating mode

Legend: R: consumer / Inv: inverter / PV: PV generator / N: grid connection point / kWh: energy counter / K: contactor, relay

Procedure

- Connect the multi-function relay as described in section 4.4.4.
- Connect the energy counter as described in section 4.4.6.
- Configure the self-consumption as described in section 5.3.1.
- Use MaxTalk 2 Pro to configure the S0 interface (energy counter).

4.4.7.3 Pac inverter

Connection diagram for “Pac inverter” operating mode see Figure 10: the consumer loads are controlled via the inverter’s multi-function relay and a contactor.

The “Pac inverter” operating mode is configured on the inverter’s graphics display or using MaxTalk 2.

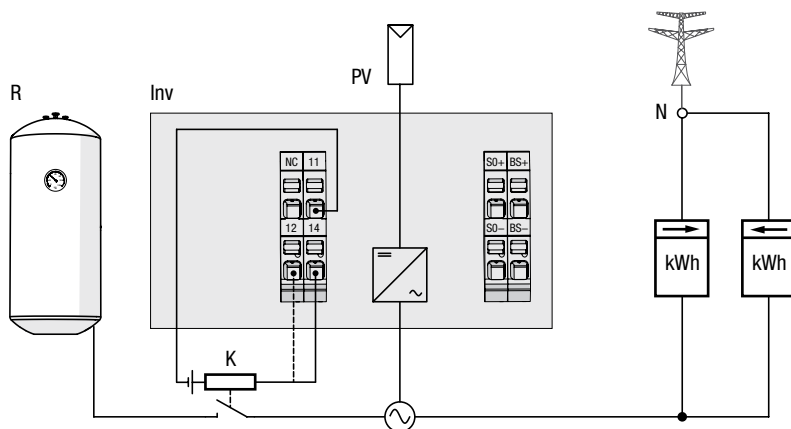


Figure 10 Wiring in “Pac inverter” operating mode

Legend: R: consumer / Inv: inverter / PV: PV generator / N: grid connection point / K: contactor, relay

Procedure

- Connect the multi-function relay as described in section 4.4.4.
- Configure the self-consumption as described in section 5.3.2.

5 Configuration

The I/O module will be detected automatically by the inverter. The I/O module inputs can be configured individually. The following functions can only be configured with the free MaxTalk 2 Pro service software:

- External shutdown
- External power control
- SPI logic
- Grid feed-in limitation
- SO interface (energy counter)

The required "SolarMax P series parameter configuration using MaxTalk 2 Pro" operating manual can be downloaded from our website (www.solarmax.com "Downloads" area).

5.1 Configuring the status signaling contact

The status signaling contact for the remote monitoring of the inverter offers four setting options. These can be configured on the graphics display of the inverter or with MaxTalk 2.

5.1.1 Graphics display configuration

Procedure

1. Go to the "Settings" menu and select the "I/O module" submenu.
2. In "MF relay" select the "Status relay" setting.
3. Select the required setting under "Mode":

Setting	Description
Off	The status signaling contact is always open.
Grid	If the inverter starts mains operation, the status signaling contact is closed immediately and remains closed as long as the inverter feeds into the grid. If the inverter does not feed into the grid, the status signaling contact is opened after expiry of the adjustable delay.
Error	When a warning, a failure, or a device error occurs on the inverter (for error messages see the instruction manual), the status signaling contact is closed after expiry of the adjustable delay. The status signaling contact is immediately opened when the fault is no longer present (factory setting).
On	When the inverter is switched on (sufficiently high DC input voltage), the status signaling contact closes. The status signaling contact will not re-open unless the inverter is switched off (DC input voltage too low).

4. Select "Delay".
5. Adjust the required delay time:

Parameter	Description	Value range	Unit
Delay	Delay time of status relay	0...99	min

5.1.2 Configuration with MaxTalk 2

Procedure

1. Start MaxTalk 2
2. Connect MaxTalk 2 to the inverter.
3. Select the inverter in the plant tree.
4. In the "Device" menu, click "Settings". The "Settings" tab will be opened.
5. In the "Status relay function" menu select the setting of your choice.
 - For a description of settings see section 5.1.1.

5.2 Configuring the lightning protection monitor

The lightning protection monitor can be configured on the graphics display of the inverter or with the free MaxTalk 2 service software.

5.2.1 Graphics display configuration

Procedure

1. In the "Settings" menu, select the "SPD Monitor" parameter.
2. Select the required setting:

Setting	Description
Off	The lightning protection monitoring is deactivated.
Warning	When the lightning protection operates, the warning "Failure, lightning protection" is displayed (on the graphics display and in MaxTalk). The inverter will continue to feed into the mains. The status signaling contact will be closed (factory setting).
Error	When the lightning protection operates, the status message "SPD failure" is displayed (on the graphics display and in MaxTalk). The inverter will disconnect from the mains. The status signaling contact will be closed.

5.2.2 Configuration with MaxTalk 2

Procedure

1. Start MaxTalk 2
2. Connect MaxTalk 2 to the inverter.

3. Select the inverter in the plant tree.
4. In the "Device" menu, click "Settings". The "Settings" tab will be opened.
5. In the "Lightning protection" menu, select the necessary setting.
 - Description of the settings: see section 5.2.1.

5.3 Control of self-consumption

The control of self-consumption can be configured to suit the user's requirements.

5.3.1 Configuring the "Pac electric meter" operating mode

The functionality of the "Pac electric meter" operating mode is illustrated in Figure 11.

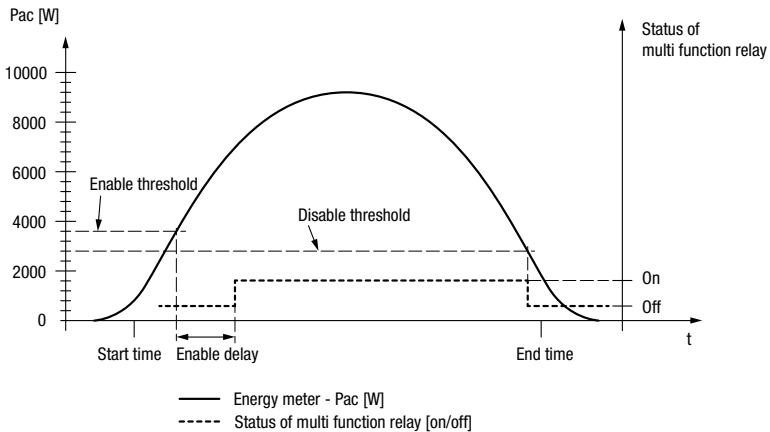


Figure 11 "Pac electric meter" operating mode

The time window of the control of self-consumption is defined by the "Start time" and "End time" parameters. Outside this time window the control of self-consumption is inactive.

When control of self-consumption is active, the multi-function relay closes when the power output measured with the energy counter at the grid connection point reaches the "Enable threshold". The consumers are then switched on. The "Enable delay" timer can be used to delay activation. When the output power falls below the "Disable threshold", the multi-function relay opens. The consumers are switched off.

Procedure

1. Go to the "Settings" menu and select the "I/O module" submenu.
2. In "MF relay" select the "Self-consumption" setting.

- Under "Mode" select the "Pac electric meter" operating mode.
- Configure the parameters:

Parameter	Description	Value range	Unit
Enable threshold	Activation value	1 000 ... 10 000	W
Disable threshold	De-activation value	1 000 ... 10 000	W
Enable delay	Activation delay	0 ... 60	min
Start time	Activation time	00:00 ... 23:59	hh:mm
End time	De-activation time		

- Use MaxTalk 2 Pro to configure the S0 interface (energy counter).

Procedure using MaxTalk 2

- Start MaxTalk 2
- Connect MaxTalk 2 to the inverter.
- Select the inverter in the plant tree.
- In the "Device" menu, click "Settings". The "Settings" tab will be opened.
- In the "Mode" menu (Multi-function relay) select the "PacEm" setting.
- Configure the parameters.

5.3.2 Configuring the "Pac inverter" operating mode

The functionality of the "Pac inverter" operating mode is illustrated in Figure 12.

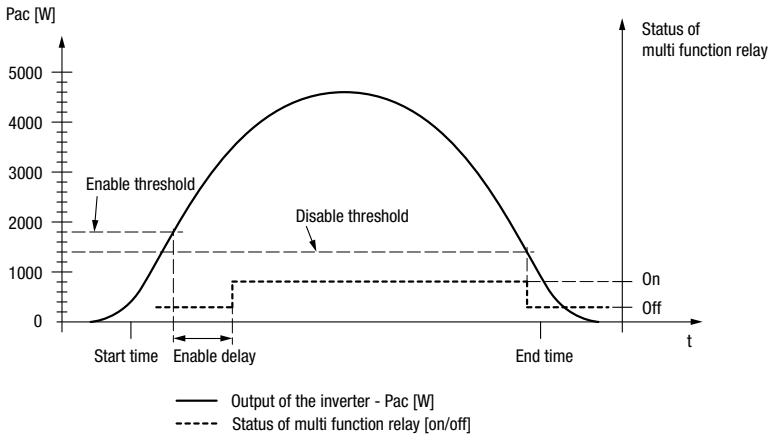


Figure 12 "Pac inverter" operating mode

The time window of self-consumption is defined by the "Start time" and "End time" parameters. Outside this time window the inverter's control of self-consumption is inactive.

When control of self-consumption is active, the multi-function relay closes when the inverter's output power reaches the "Enable threshold". The consumers are then switched on. The "Enable delay" timer can be used to delay activation. When the output power falls below the "Disable threshold", the multi-function relay opens. The consumers are switched off.

Procedure

1. Go to the "Settings" menu and select the "I/O module" submenu.
2. In "MF relay" select the "Self-consumption" setting.
3. In "Mode" select the "Pac inverter" operating mode.
4. Configure the parameters:

Parameter	Description	Value range	Unit
Enable threshold	Activation value	100 ... 10 000	W
Disable threshold	De-activation value	100 ... 10 000	W
Enable delay	Activation delay	0 ... 60	min
Start time	Activation time	00:00 ... 23:59	hh:mm
End time	De-activation time		

Procedure using MaxTalk 2

1. Start MaxTalk 2
2. Connect MaxTalk 2 to the inverter.
3. Select the inverter in the plant tree.
4. In the "Device" menu, click "Settings". The "Settings" tab will be opened.
5. In the "Mode" menu (Multi-function relay) select the "PacInv" setting.
6. Configure the parameters.

6 Replacement

6.1 I/O module disassembly



DANGER!
Fatal electric shock hazard!

- Never open the inverter while it is in operation.
- Before you start installation work, ensure that all connectors and cables are de-energized.
- Remove the cover and the contact protection on the inverter as described in the instruction manual.
- Observe the safety instructions in the inverter instruction manual.

Procedure

1. Open the inverter as described in the instruction manual.
2. Use a voltage tester to check that all connections at the inverter and I/O module are de-energized.
3. Remove all conductors connected to the I/O module.
4. Remove the 2 fixing screws.
5. Pull the I/O module out of the slot.
6. Close the inverter by
 - engaging the contact protection;
 - then tighten the cover.

6.2 I/O module disposal

Dispose of the I/O module as indicated by the local waste disposal regulations.

7 Warranty

Sputnik Engineering AG (hereafter SPUTNIK) guarantees full function and lack of defects of its technical devices for a warranty period as specified below for each type of device. Such warranty period can be extended by means of a warranty extension, subject to the conditions named below.

This manufacturer's warranty exists next to the seller's warranty (if any) as prescribed by law. As far as identical with regards to the content, the rights under this manufacturer's warranty supersede any rights under the seller's warranty. Please contact the seller with regard to any claims based on the seller's warranty.

1. Warranty Period (Basic)

- Central inverters and accessories: 24 months from the date of purchase, but at maximum 30 months after dispatch of the device by SPUTNIK.
- String inverters: 60 months from the date of purchase, but at maximum 72 months after dispatch of the device by SPUTNIK.

If in individual cases SPUTNIK has agreed in writing to a different warranty period, such arrangement supersedes the above provisions.

2. Scope of Manufacturer's Warranty

In case of defect or malfunction of a device within the manufacturer's warranty period, and upon fulfillment of the conditions for warranty claims named hereafter, the device will be repaired or replaced by SPUTNIK-service personnel within a reasonable time, in either case free of charge, unless this is impossible or disproportionate. SPUTNIK may decide at its own discretion whether a device will be repaired or replaced.

- Replacement: Exchange of device free of charge. SPUTNIK's separate conditions for exchange of devices apply: This warranty covers the free delivery of an equivalent replacement device. Further, your installer is entitled to claim a flat rate compensation for the replacement work from SPUTNIK. Please do not hesitate to ask us about the current amount of such flat rate compensation.
- Repair: Repair of device free of charge. This warranty covers costs for material, work and travel by SPUTNIK personnel or by personnel authorized by SPUTNIK.

Please be aware that the performances of SPUTNIK under this warranty are only free of charge in countries approved by SPUTNIK. Please contact your seller for details. A current list of approved countries can be found on our homepage. Repair and replacement outside of the approved countries are only possible after prior consultation of and approval by SPUTNIK. In such case, travel and shipment costs are borne by the customer.

Any further claims, especially claims for compensation of damages resulting directly or indirectly from the defect or claims for replacement of further costs in connection with the installation and removal of devices or claims for loss of profits are not covered by this warranty.

3. Extent of Repair and Replacement

SPUTNIK will maintain repair material and stock of each type of device during the warranty period only at its own reasonable discretion. In case repair materials for a certain type of inverter and/or an identical replacement device are not in stock anymore, the following applies:

- SPUTNIK is allowed to replace the defective inverter with a comparable device of the same or superior performance. The costs (time and material) for technical adjustments necessary for the installation of such comparable devices are covered by this warranty only up to a limited amount; any flat rate compensation owed by SPUTNIK for the replacement is deductible. Please do not hesitate to ask us about the currently applicable amount. The exchange and connection of peripheral devices due to possible non-compatibility with the replacement device or other necessary adjustments to the surrounding installations of the device (including power lines, ventilation and safety installations) are not covered by this warranty. However, SPUTNIK shall within the bounds of reasonability do its best to minimize the effort of such adaptation work.
- In case repair materials are not available with reasonable efforts anymore, SPUTNIK is allowed to replace the inverter, subject to the conditions mentioned in the paragraph above.

4. Warranty Period in Case of Repair/Replacement

In case of repair or replacement of devices under this warranty, the repaired respectively replaced device will inherit the remaining warranty time of the original device.

5. Exclusion of Warranty

Especially in the following cases, this manufacturer's warranty does not apply:

- Transport damage;
- Technical intrusions, modifications or repairs of the devices not authorized by SPUTNIK;
- Use of devices for purposes they are not intended for, incorrect or unreasonable manipulation, incorrect or unreasonable installation;
- Failure to observe the manufacturer's operating, installation and maintenance directions;
- Inadequate environmental conditions (e.g. insufficient ventilation of the device; humidity etc.);
- Superior force (e.g. lightning strike, overvoltage, floods, fire, etc.).

6. Handling of Warranty Cases

For the processing of warranty cases, use of SPUTNIK's hotline is mandatory. The handling of warranty cases must take place in accordance with the instructions provided by the hotline.

The hotline number for your country can be found on SPUTNIK's homepage. Please hold the serial number, article description, a short description of the defect and the purchase receipt ready for transmission to the hotline.

Any repair action taken by the buyer or third parties without authorization by SPUTNIK will not be compensated.

In case these terms on the handling of warranty cases are not respected, SPUTNIK may refuse its warranty performances.

7. Suspension of Warranty

Sputnik reserves its right to suspend this manufacturer's warranty temporarily or definitely in case a specific installation does not allow a correct functioning of the inverters (e.g. in case of one of the circumstances listed in cipher 5).

The suspension of the warranty can be lifted upon approval by SPUTNIK. Such approval must be issued by SPUTNIK in writing, confirming that the warranty has again become effective.

8. Warranty Extension

The warranty period can be extended through purchase of a warranty extension within the time limits mentioned hereafter. For certain types of devices, such warranty extensions can also be purchased only for a limited scope of warranty performances. The purchase of a warranty extension will be confirmed by SPUTNIK in form of a warranty certificate (including serial number of affected product). In case of replacement of a device, the serial number in such warranty certificate remains unchanged, without any influence on the validity of the warranty extension.

a) Time limits

String inverters: The extension of the basic warranty can be ordered within 60 months after purchase, but the latest within 72 months after dispatch of the device by SPUTNIK.

Central Inverters: The extension of the basic warranty can be ordered within 3 months after purchase, but the latest within 12 months after dispatch by SPUTNIK.

b) Extent

Full warranty extension – FULL (available for central inverters and string inverters): A full warranty extension includes all the warranty performances as described in the manufacturer's basic warranty terms.

Limited warranty extension – LIMITED (available only for central inverters):

A limited warranty extension covers only the costs for the material required for the repair. The costs for travelling, labor and other expenses are not covered and will be invoiced on a time and expenses basis by SPUTNIK.

c) Effectiveness of Warranty Extension

It is a mandatory requirement for the warranty extension to provide the completely filled out application form to SPUTNIK. The warranty extension becomes effective only after written confirmation and provision of the warranty certificate by SPUTNIK.

9. After Expiration of Warranty Period

The costs for repair or replacement of devices after expiration of the warranty period are invoiced by SPUTNIK on a time and material basis. SPUTNIK will maintain repair and replacement capabilities beyond the warranty time only at its own discretion.

10. Applicable Law, Jurisdiction

Only Swiss Law applies. The exclusive place of jurisdiction lies in Biel/Bienne, Switzerland. (v2013/05)

Notes

SolarMax Service Center:

hotline@solarmax.com

www.solarmax.com/service