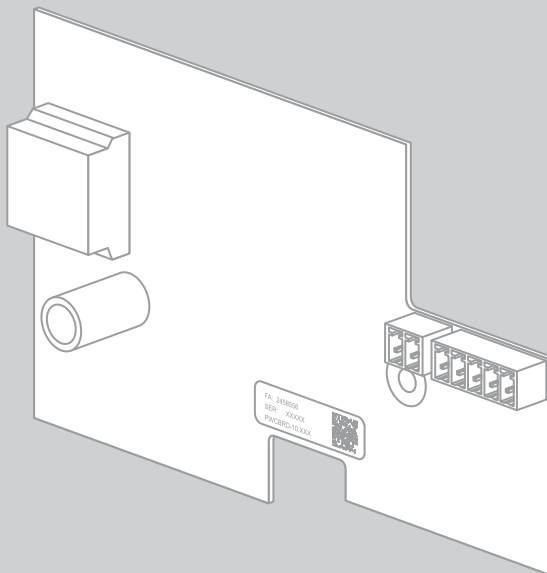




Installation Manual

SMA POWER CONTROL MODULE



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1 Information on this Document

1.1 Validity

This document is valid for device type "PWCBRD-10" (SMA Power Control Module) from hardware version A1.

1.2 Target Group

The tasks described in this document must be performed by qualified persons only. Qualified persons must have the following skills:





- Training in how to deal with the dangers and risks involved in installing and operating electrical devices and plants
- Training in the installation and commissioning of electrical devices and plants
- Knowledge of all applicable standards and directives
- Knowledge of and adherence to this document and all safety precautions

1.3 Additional Information

Links to additional information can be found at www.SMA-Solar.com:

Document title	Document type
Measured Values and Parameters	Technical Description

1.4 Symbols

Symbol	Explanation
 DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury
 WARNING	Indicates a hazardous situation which, if not avoided, can result in death or serious injury
 CAUTION	Indicates a hazardous situation which, if not avoided, can result in minor or moderate injury
NOTICE	Indicates a situation which, if not avoided, can result in property damage
	Information that is important for a specific topic or goal, but is not safety-relevant
<input type="checkbox"/>	Indicates a requirement for meeting a specific goal
<input checked="" type="checkbox"/>	Desired result
x	A problem that might occur

1.5 Typography

Typography	Explanation	Example
bold	<ul style="list-style-type: none"> • Display texts • Elements of a user interface • Terminals • Elements to be selected • Elements to be entered 	<ul style="list-style-type: none"> • The value can be read from the Energy field. • Select Settings. • Enter the value 10 in the Minutes field.
>	<ul style="list-style-type: none"> • Connects several elements to be selected 	<ul style="list-style-type: none"> • Select Settings > Date.
[Button/Key]	<ul style="list-style-type: none"> • Button or key to be selected or pressed 	<ul style="list-style-type: none"> • Select [Next].

1.6 Nomenclature

Complete designation	Designation in this document
SMA BLUETOOTH® Wireless Technology	BLUETOOTH
SMA Power Control Module	Module
Sunny Tripower, Windy Tripower	Inverter

2 Safety

2.1 Appropriate Usage

The SMA Power Control Module is a multifunction interface which enables grid management services to be implemented for one inverter.

The module is available as a retrofit kit or is pre-installed in the inverter.

The inverter still complies with the standard after the product has been installed.

The module may be used in parallel with the multifunction relay in the inverter. If you want to use the module at the same time as the multifunction relay in the inverter, you must ensure that no more than 30 V DC or 25 V AC are connected to the multifunction relay.

The relays of the ripple control receiver may only be supplied by the 12 V output of the module.

Do not supply the relays of the ripple control receiver with any other voltage sources.

Use this module only in accordance with the enclosed documentation and with the locally applicable standards and directives. Any other use can result in personal injury or property damage.

For safety reasons, it is not permitted to modify the product or install components that are not explicitly recommended or distributed by SMA Solar Technology AG for this product.

The type label must be permanently attached to the product.

The enclosed documentation is an integral part of this product.

- Read and observe the documentation.
- Keep the documentation in a convenient place for future reference.

2.2 Safety Precautions

This section contains safety precautions that must be observed at all times when working on or with the product. To prevent personal injury or property damage and to ensure long-term operation of the product, read this section carefully and follow the safety precautions at all times.

⚠ DANGER

Danger to life due to electric shock when opening the inverter

High voltages are present in the live components of the inverter. Touching live components results in death or serious injury.

- Prior to performing any work on the inverter, always disconnect the inverter from all voltage sources on the AC and DC sides (see inverter installation manual). Observe the waiting time to allow the capacitors to discharge.

⚠ CAUTION

Risk of burns due to hot enclosure parts

Some parts of the inverter enclosure can get hot during operation. Touching these enclosure parts can result in burn injuries.

- Do not touch any parts other than the lower enclosure lid of the inverter during operation.

NOTICE

Damage to the inverter due to electrostatic discharge

The internal components of the inverter can be irreparably damaged by electrostatic discharge.

- Earth yourself before touching any inverter component.

2.3 Supported Products

SMA Inverters

The module must only be installed in the following inverters with at least the given firmware version:

Sunny Tripower	from firmware version
<ul style="list-style-type: none"> • STP 5000TL-20 • STP 6000TL-20 • STP 7000TL-20 • STP 8000TL-20 • STP 9000TL-20 	2.51.05.R
<ul style="list-style-type: none"> • STP 10000TL-20 • STP 12000TL-20 	all
Windy Tripower	from firmware version
<ul style="list-style-type: none"> • WTP 5000TL-20 • WTP 6000TL-20 • WTP 7000TL-20 • WTP 8000TL-20 • WTP 9000TL-20 	2.51.05.R

Additional SMA Products

The module can be configured with the following communication products:

- Sunny Explorer from software version 1.06
- Sunny WebBox with BLUETOOTH from firmware version 1.03

3 Scope of Delivery

Check the scope of delivery for completeness and any externally visible damage. Contact your specialist dealer if the delivery is incomplete or damaged.

If the module has already been installed in the inverter at the factory, only those parts necessary for electrical connection are included in the scope of delivery.

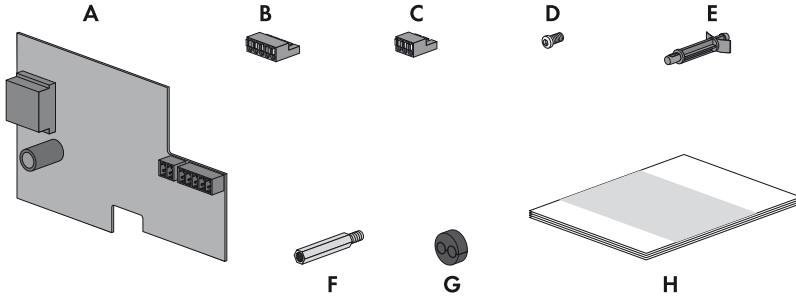


Figure 1: Components included in the scope of delivery

Position	Number	Designation
A	1	SMA Power Control Module*
B	1	Five-pole plug
C	1	Two-pole plug**
D	1	M4x10 screw*
E	2	Plastic spacer*
F	1	Metal spacer*
G	1	Cable support sleeve with two holes for M25 cable gland**
H	1	Installation manual

* Only included in the scope of delivery of the retrofit kit

** Store the components for the connection to the S0 interface until the S0 interface is allocated.

4 Product Description

4.1 SMA Power Control Module

The SMA Power Control Module is a multifunction interface which enables grid management services to be implemented for one inverter.

For the implementation of grid management services, the module receives the specifications of the network operator via a ripple control receiver.

The module can convert the active power limitation in staged intervals of 0%, 30%, 60% and 100% of the agreed connected load.

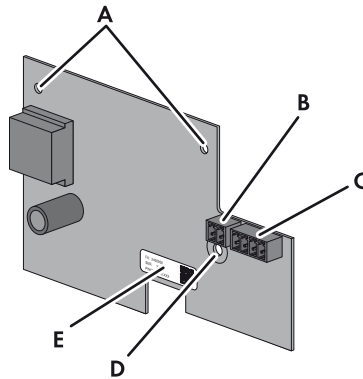


Figure 2: Design of the SMA Power Control Module

Position	Designation
A	Holes for attachment with plastic spacers
B	Socket for connecting to the S0 interface*
C	Socket for connecting the ripple control receiver
D	Hole for attachment with the metal spacer
E	Type label

* The S0 interface is not allocated.

4.2 Type Label

The type label clearly identifies the product. The type label is located on the front of the product.

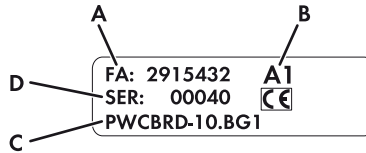


Figure 3: Layout of the type label (example)

Position	Designation	Explanation
A	FA	Number of the production order
B	-	Hardware version
C	-	Device type
D	SER	Serial number

You will require the information on the type label to use the product safely and when seeking customer support from the SMA Service Line.

5 Electrical Connection

5.1 Mounting Position and Cable Route

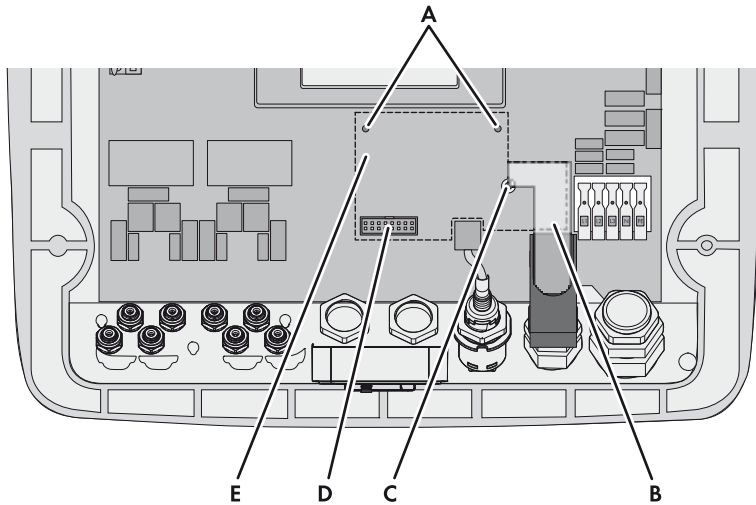


Figure 4: Mounting position and cable route in the inverter with the enclosure lid open

Position	Designation
A	Holes for inserting the plastic spacers
B	Cable route
C	Hole for screwing in the metal spacer
D	Socket for plugging in the module
E	Mounting position

5.2 Installing the Module

NOTICE

Damage to the inverter due to electrostatic discharge

The internal components of the inverter can be irreparably damaged by electrostatic discharge.

- Earth yourself before touching any inverter component.

Procedure:

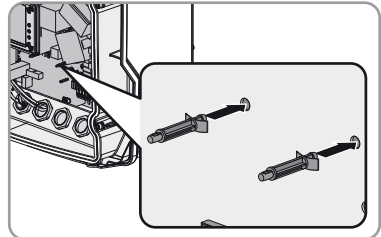
1. Ensure that the firmware version of the inverter is supported (see Section 2.3, page 9).
If necessary, update the firmware of the inverter (see the inverter installation manual).

2. **⚠ DANGER**

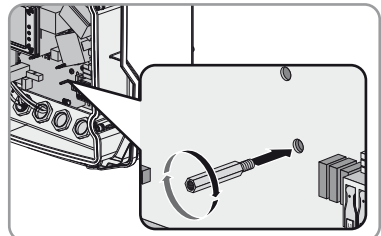
Danger to life due to electric shock when opening the inverter

High voltages are present in the live components of the inverter. Touching live components results in death or serious injury.

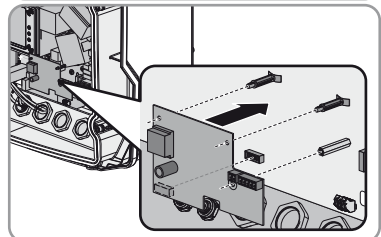
- Disconnect the inverter from all voltage sources on the AC and DC sides (see the inverter installation manual). Observe the waiting time to allow the capacitors to discharge.
3. Attach all spacers in the inverter:
 - Insert the plastic spacers into the holes.



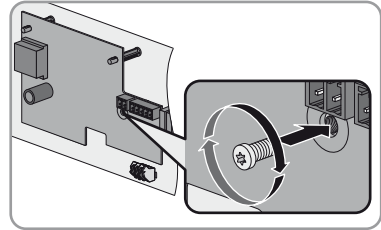
- Screw the metal spacer into the screw connection (torque: 3.5 Nm).



4. Insert the module into the inverter. Insert the plug at the bottom of the module into the socket and lead the spacers through the holes in the module.



- Fasten the module using the screw M4x10 and a Torx screwdriver (T 20) (torque: 1.5 Nm).



5.3 Connecting the Ripple Control Receiver

Additionally required material (not included in scope of delivery):

- Ripple control receiver with at least three outputs
- One connection cable

Cable requirements:

- Cable cross-section: 5 mm to 13 mm
- Conductor cross-section: 0.5 mm² to 1.5 mm²
- Maximum cable length: 100 m
- Cables to be laid outdoors must be UV-resistant or routed in a UV-resistant cable channel.
- Required number of insulated wires for connecting the ripple control receiver: five insulated wires

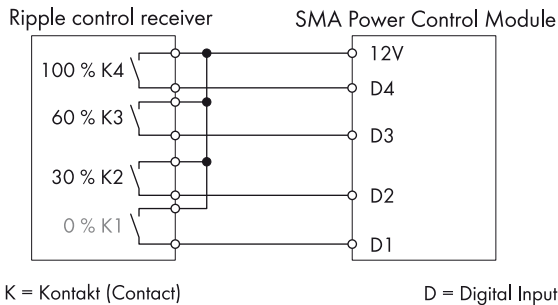


Figure 5: Wiring overview for a ripple control receiver with four relays (example)

Functions of Signals D1 to D4 in Operating Mode "Active Power Limitation" (Default Settings)

Digital input D1	Digital input D2	Digital input D3	Digital input D4	Display in the communication product	Value
Open	Open	Open	Open	D1: 0 D2: 0 D3: 0 D4: 0	- 1%**
Closed	Open	Open	Open	D1: 1 D2: 0 D3: 0 D4: 0	0%
Open	Closed	Open	Open	D1: 0 D2: 1 D3: 0 D4: 0	30%
Closed	Closed	Open	Open	D1: 1 D2: 1 D3: 0 D4: 0	- 1%**
Open	Open	Closed	Open	D1: 0 D2: 0 D3: 1 D4: 0	60%
Closed	Open	Closed	Open	D1: 1 D2: 0 D3: 1 D4: 0	- 1%**
Open	Closed	Closed	Open	D1: 0 D2: 1 D3: 1 D4: 0	- 1%**
Closed	Closed	Closed	Open	D1: 1 D2: 1 D3: 1 D4: 0	- 1%**
Open	Open	Open	Closed*	D1: 0 D2: 0 D3: 0 D4: 1	100%
Closed	Open	Open	Closed	D1: 1 D2: 0 D3: 0 D4: 1	- 1%**
Open	Closed	Open	Closed	D1: 0 D2: 1 D3: 0 D4: 1	- 1%**
Closed	Closed	Open	Closed	D1: 1 D2: 1 D3: 0 D4: 1	- 1%**
Open	Open	Closed	Closed	D1: 0 D2: 0 D3: 1 D4: 1	- 1%**
Closed	Open	Closed	Closed	D1: 1 D2: 0 D3: 1 D4: 1	- 1%**
Open	Closed	Open	Closed	D1: 0 D2: 1 D3: 1 D4: 1	- 1%**
Closed	Closed	Open	Closed	D1: 1 D2: 1 D3: 1 D4: 1	- 1%**

* Not used for ripple control receivers with three relays
 ** The value "- 1%" blocks the entry combination.

NOTICE**Damage to the module due to high voltage**

- Only connect a ripple control receiver with a relay that is exclusively supplied by the 12 V output of the module.

**Operating the SMA Power Control Module and the multifunction relay in the inverter in parallel**

- If you want to operate the SMA Power Control Module and the multifunction relay in parallel, make sure that no more than 30 V DC or 25 V AC are connected to the multifunction relay.

Procedure:1. **⚠ DANGER****Danger to life due to electric shock from faulty connection of the ripple control receiver**

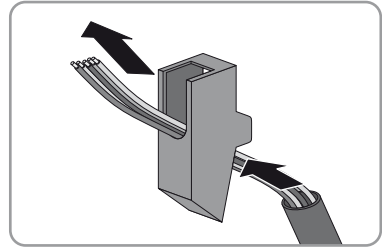
In the event of faulty connection of the connection cable to the ripple control receiver, mains voltage may be present in the module.

- Do not connect insulated wires of the connection cable to the phase conductors of the ripple control receiver.
 - When connecting, ensure that no bridge is being used in the ripple control receiver.
2. Dismantle the connection cable by 4 cm.
 3. Trim unused insulated wires flush with the cable sheath.
 4. Strip the wire insulation by 6 mm.
 5. Connect the connection cable to the ripple control receiver (see ripple control receiver manual) and write down the wire colours.

Signal	Insulated wire colour
D1	
D2	
D3	
D4	
+12 V	

6. If you want to insert two cables through the cable gland M25 of the inverter, remove the cable support sleeve of the cable gland. If necessary, loosen the swivel nut of the cable gland.
7. Lead the connection cable through the cable support sleeve with two holes and the cable gland. Push the cable support sleeve with two holes into the cable gland.

8. Remove the protective cover of the multifunction relay and insert the cable through the opening of the protective cover.

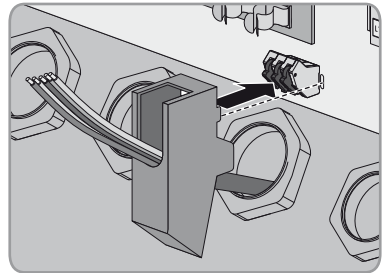


9. **⚠ DANGER**

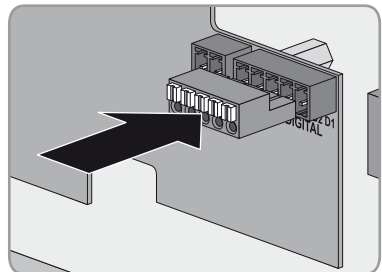
Danger to life due to live cables

If an insulated wire, e.g. L1, L2 or L3 comes loose from the AC terminal, and touches the connection cable of the ripple control receiver for example, the connection cable is live.

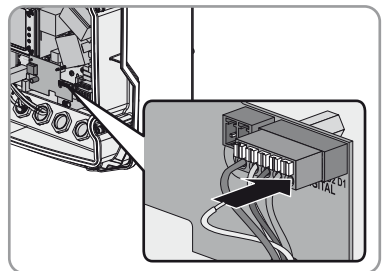
- Attach the protective cover of the multifunction relay. This isolates the AC connection area in the inverter from other terminals.



10. Plug the five-pole plug into the **DIGITAL** socket on the module.



11. Connect the connection cable to the five-pole plug. Plug the conductor into the conductor entry. Make sure that the noted wire colours correspond.



12. Tighten the swivel nut hand-tight on the cable gland.
13. Recommission the inverter (see inverter installation manual).

5.4 Information on Module Configuration

Active power reduction to one of the 16 values set is realised within five seconds in the inverter. Grid disconnection is possible within two seconds. In order to block an entry combination, the value " – 1%" must be set in the communication product (see table on page 16). This allows that unassigned entry combinations can be blocked.

If the network operator does not allow that the inverter still feeds in a low amount of active power when limited to 0%, you must set the following parameter for grid disconnection. Setting this parameter additionally opens the grid relays at a command of 0%. The inverter disconnects from the electricity grid and grid feed-in is interrupted. Depending on the type of communication and the communication product used, the parameter name may vary:

Type of communication	Parameter name	Setting
BLUETOOTH	Equipment & device control system >	Yes
	Configuration of the feed-in management >	No
	Grid disconn. at 0% specif. by feeding management	
RS485	P-GriSwOpnZerW	Yes
		No

When the parameter is activated (**Yes**), the inverter disconnects from the electricity grid when the signal "0%" is issued. When the parameter is deactivated (**No**), the inverter continues to feed in with minimum power when the signal "0%" is issued.

6 Troubleshooting

Problem	Cause and corrective measures
The inverter with module is not displayed in Sunny Explorer.	The inverter with module has not been commissioned.
	<p>Corrective measure:</p> <ul style="list-style-type: none"> • Commission the inverter with module (see the inverter installation manual).
	<hr/> <p>The module is not properly installed.</p>
	<p>Corrective measure:</p> <ul style="list-style-type: none"> • Ensure that the module is installed correctly and that the connections have been made correctly.
	<hr/> <p>The firmware version of the inverter is not supported (see Section 2.3 "Supported Products", page 9).</p>
	<p>Corrective measure:</p> <ul style="list-style-type: none"> • Update the firmware of the inverter (see the inverter installation manual).
	<hr/> <p>The software version of Sunny Explorer is older than version 1.06.</p>
	<p>Corrective measure:</p> <ul style="list-style-type: none"> • Make sure that Sunny Explorer from software version 1.06 is installed on the computer.

7 Decommissioning

7.1 Removing the Module

NOTICE

Damage to the inverter due to electrostatic discharge

The internal components of the inverter can be irreparably damaged by electrostatic discharge.

- Earth yourself before touching any components.

Procedure:

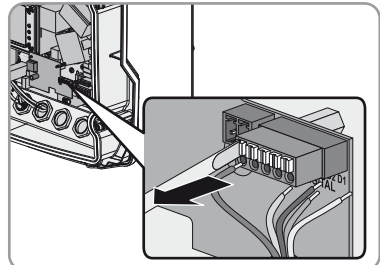
1. **⚠ DANGER**

Danger to life due to electric shock when opening the inverter

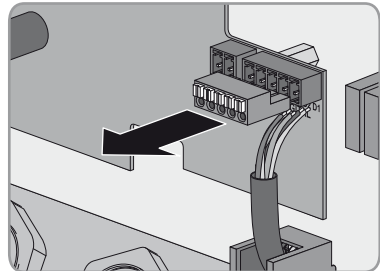
High voltages are present in the live components of the inverter. Touching live components results in death or serious injury.

- Disconnect the inverter from all voltage sources on the AC and DC sides (see the inverter installation manual). Observe the waiting time to allow the capacitors to discharge.

2. Remove the insulated wires of the connection cable from the multi-pole plug. Insert a flat-blade screwdriver (blade width: max. 3 mm) into the actuation lever and take out the insulated wires.

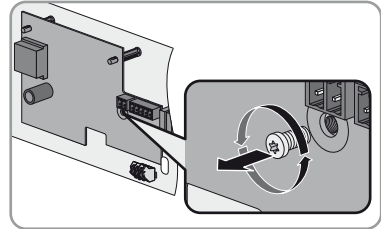


3. Remove the multi-pole plug of the ripple control receiver from the module.

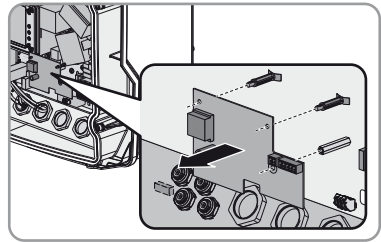


4. Slightly loosen the swivel nut of the cable gland and remove the connection cable from the inverter.

5. Loosen the screw M4x10 fastening the module to the inverter using a Torx screwdriver (T 20).



6. Remove the module from the inverter. The spacers remain in the inverter.



7. Close the inverter and recommission it (see the inverter installation manual).

7.2 Packing the Module for Shipment

- Pack the module for shipment. Use the original packaging or packaging that is suitable for the weight and size of the module (see Section 8 "Technical Data", page 23).

7.3 Disposing of the Module

- Dispose of the module in accordance with the disposal regulations for electronic waste applicable at the installation site.

8 Technical Data

Inputs

Ripple control receiver	4 digital inputs
S0 interface	No function

Voltage Supply

Voltage supply	Via the inverter
----------------	------------------

General Data

Dimensions (width x height x depth)	127 mm x 77 mm x 39 mm
Weight	55 g
Mounting location	In the inverter
Degree of protection according to IEC 60529	IP20
Required degree of protection of the inverter according to IEC 60629	IP65

Ambient Conditions for Storage/Transport

Ambient temperature	- 40°C to +70°C
Relative humidity, non-condensing	10% to 95%
Maximum height above mean sea level	3,000 m

Ambient Conditions during Operation

Ambient temperature	- 25°C to +85°C
Relative humidity, non-condensing	4% to 100%
Maximum height above mean sea level	3,000 m

9 Contact

If you have technical problems concerning our products, please contact the SMA Service Line. We require the following data in order to provide you with the necessary assistance:

- Inverter:
 - Serial number
 - Firmware version
 - Special country-specific settings (if applicable)
- Module:
 - Serial number
 - Hardware version
- Communication product (e.g. Sunny Explorer)
 - Type
 - Serial number or software version
- Detailed description of the problem

Australia	SMA Australia Pty Ltd. Sydney	Toll free for Australia:	1800 SMA AUS (1800 762 287)
		International:	+61 2 9491 4200
Belgien/ Belgique/ België	SMA Benelux BVBA/SPRL Mechelen	+32 15 286 730	
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		Hybrid Energy Solutions Sunny Island:	+49 561 9522-399 +49 561 9522-3199
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		Power Plant Solutions Sunny Central:	+49 561 9522-299

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Magyarország	lásd Česko (Csehország)		
Nederland	zie Belgien (België)		
Österreich	Siehe Deutschland		
Perú	Ver España		
Polska	Patrz Česko (Czechy)		
Portugal	SMA Solar Technology Portugal, Unipessoal Lda Lisboa	Isento de taxas em Portugal: Internacional:	800 20 89 87 +351 2 12 37 78 60
România	Vezi Česko (Cehia)		
Schweiz	Siehe Deutschland		
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