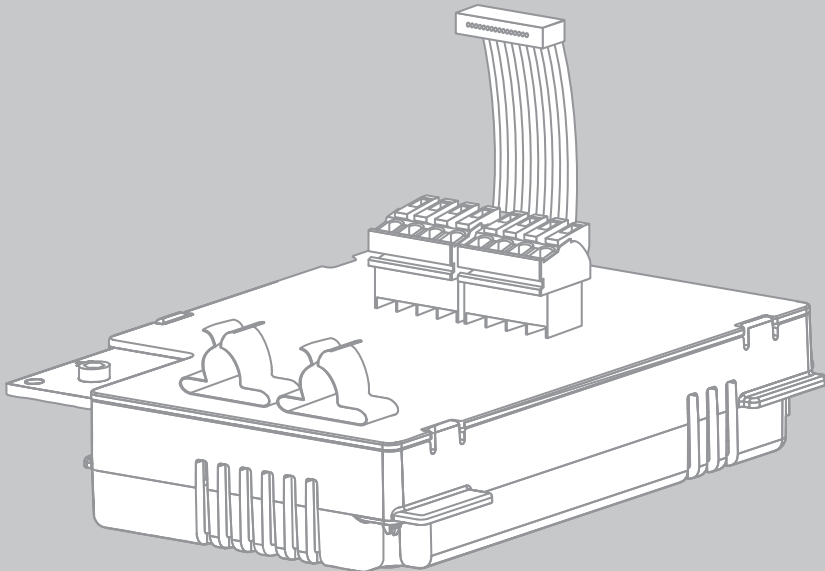


Communication Interface for SMA Inverters

485 Data Module

Installation Manual



Legal Provisions

The information contained in this document is the property of SMA Solar Technology AG. Publishing its content, either partially or in full, requires the written permission of SMA Solar Technology AG. Any internal company copying of the document for the purposes of evaluating the product or its correct implementation is allowed and does not require permission.

SMA Warranty

You can download the current warranty conditions from the Internet at www.SMA-Solar.com.

Trademarks

All trademarks are recognized even if these are not marked separately. Missing designations do not mean that a product or brand is not a registered trademark.

The *Bluetooth*[®] word mark and logos are registered trademarks owned by Bluetooth SIG, Inc. and any use of such marks by SMA Solar Technology AG is under license.

QR Code[®] is a registered trademark of DENSO WAVE INCORPORATED.

SMA Solar Technology AG

Sonnenallee 1
34266 Niestetal
Germany

Tel. +49 561 9522-0
Fax +49 561 9522-100
www.SMA.de
E-mail: info@SMA.de

© 2004 to 2014 SMA Solar Technology AG. All rights reserved

Table of Contents

1	Information on this Document	4
2	Safety	6
2.1	Intended Use	6
2.2	Qualification of Skilled Persons	6
2.3	Safety Precautions	7
3	Scope of Delivery	8
3.1	Order Option "485 Data Module" Pre-Installed in the Inverter	8
3.2	Order Option "485 Data Module" as Retrofit Kit	8
4	Product Description	9
4.1	485 Data Module	9
4.2	Type Label	10
4.3	Cable Gland	11
5	Connection	12
5.1	Device Overview	12
5.2	Installing the 485 Data Module in the Inverter	13
5.3	Connecting the 485 Data Module	14
6	Decommissioning	18
6.1	Disassembling the 485 Data Module	18
6.2	Packaging the 485 Data Module for Shipping	19
6.3	Disposing of the 485 Data Module	19
7	Troubleshooting	20
8	Technical Data	21
9	Contact	22

1 Information on this Document





Validity

This document is valid for device type "485I-MOD-G1 BGCB" as of hardware version B5 and firmware version 4.00.

Target Group

This document is for skilled persons. Only skilled persons with appropriate qualification are allowed to perform the tasks set forth in this document (see Section 2.2 "Qualification of Skilled Persons", page 6).

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

Typographies

Typography	Explanation	Example
bold	<ul style="list-style-type: none"> • Display messages • Elements of a user interface • Connections • 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 that are 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].

Nomenclature

Complete designation	Designation in this document
Electronic Solar Switch	ESS
PV plant	Plant
SMA inverter	Inverter

Abbreviations

Abbreviation	Designation	Explanation
AC	Alternating Current	-
DC	Direct Current	-

Figures

The figures in this document can vary slightly for inverters of types STP 1x000TL-10, STP xx000TLHE-10, STP xx000TLEE-10, STP xx000TL-30, SB x000TL-21 and WB xx00TL-21.

2 Safety

2.1 Intended Use

The 485 Data Module enables you to setup cable-connected RS485 communication for SMA inverters of type:

Sunny Boy	Sunny Tripower	Windy Boy
SB 3000TL-20	STP 8000TL-10	WB 3600TL-20
SB 3600TL-20	STP 10000TL-10	WB 5000TL-20
SB 4000TL-20	STP 12000TL-10	WB 3000TL-21
SB 5000TL-20	STP 15000TL-10	WB 3600TL-21
SB 3000TL-21	STP 17000TL-10	WB 4000TL-21
SB 3600TL-21	STP 15000TLHE-10	WB 5000TL-21
SB 4000TL-21	STP 20000TLHE-10	
SB 5000TL-21	STP 15000TLEE-10	
SB 6000TL-21	STP 20000TLEE-10	
SB 2500TLST-21	STP 20000TL-30	
SB 3000TLST-21	STP 25000TL-30	

The 485 Data Module is only suitable for use with the above mentioned inverter types. The 485 Data 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.

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. Only use the 485 Data Module in accordance with the information provided in the enclosed documentation. Any other use may result in personal injury or property damage.

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 Qualification of Skilled Persons

The work described in this document must only be performed by skilled persons. Skilled persons must have the following qualifications:

- Training in the installation and commissioning of electrical devices and plants
- Knowledge of how to deal with the dangers and risks associated with installing and using electrical devices and plants
- Knowledge of all applicable standards and directives
- Knowledge of how an inverter works and is operated
- Knowledge of and compliance with this document and all safety precautions

2.3 Safety Precautions

Electric Shock

Lethal voltages are present in the conductive parts of the inverter.

- Prior to performing any work on the inverter, disconnect the inverter from any voltage sources on the AC and DC sides (see inverter installation manual).

Burn Hazards

Some parts of the inverter enclosure can get hot during operation.

- During operation, touch the inverter on the enclosure lid only.

Electrostatic Discharge

By touching electronic components, you can damage or even destroy the inverter through electrostatic discharge (ESD).

- Earth yourself before touching any inverter components.

Disturbance of Data Transmission due to AC Cables

During operation, AC cables generate an electromagnetic field which may induce interference in plant communication.

- Lay the cables for RS485 communication using suitable fastening material and with a minimum clearance of 50 mm to the AC cables.

3 Scope of Delivery

3.1 Order Option "485 Data Module" Pre-Installed in the Inverter

Check the delivery for completeness and any visible external damage. Contact your specialist dealer if the delivery is incomplete or you find any damage.

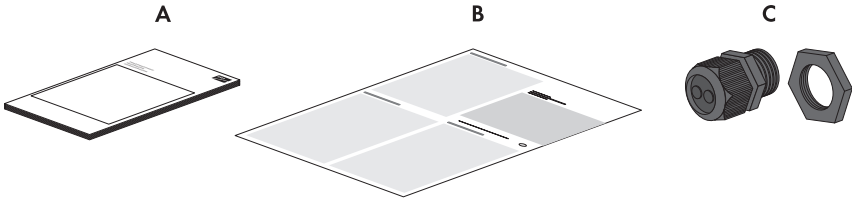


Figure 1: Components included in the scope of delivery: 485 Data Module pre-installed in the inverter

Position	Quantity	Description
A	1	Installation manual
B	1	Technical Description "RS485 Cabling Plan"
C	1	Cable gland

3.2 Order Option "485 Data Module" as Retrofit Kit

Check the delivery for completeness and any visible external damage. Contact your specialist dealer if the delivery is incomplete or you find any damage.

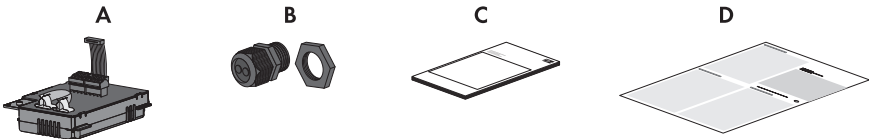


Figure 2: Components included in the scope of delivery for the 485 Data Module as retrofit kit

Position	Quantity	Description
A	1	485 Data Module with: <ul style="list-style-type: none"> • 2 conductive adhesive foils • 1 plug • 1 plug with a connected terminator
B	1	Cable gland
C	1	Installation manual
D	1	Technical Description "RS485 Cabling Plan"

4 Product Description

4.1 485 Data Module

The 485 Data Module enables you to setup cable-connected RS485 communication for SMA inverters.

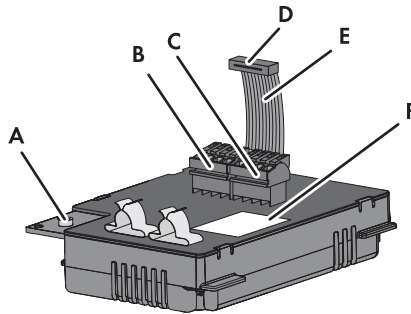


Figure 3: Design of the 485 Data Module

Position	Description
A	Hexagon socket screw
B	Plug
C	Plug with connected resistor
D	Ribbon cable plug
E	Ribbon cable
F	Type label

4.2 Type Label

The type label clearly identifies the 485 Data Module. The type label is located at the bottom right on the back of the 485 Data Module.

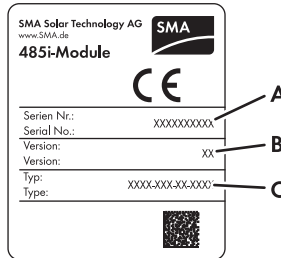


Figure 4: Information on the type label

Position	Description	Explanation
A	Serial No.	Serial number of the 485 Data Module
B	Version	Hardware version of the 485 Data Module
C	Type	Device type

You require the information on the type label to use the 485 Data Module safely and for customer support from the SMA Service Line. The type label must be permanently affixed to the 485 Data Module.

Symbol on the Type Label

Symbol	Description	Explanation
CE	CE marking	The 485 Data Module complies with the requirements of the applicable EC directives.

4.3 Cable Gland

The cable gland provides a sturdy, tightly sealed connection of the cables with the inverter enclosure. The cable gland also protects the inverter from dust intrusion and moisture penetration.

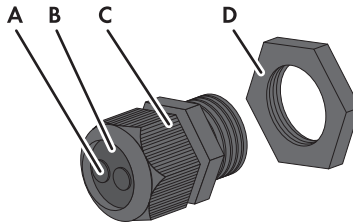


Figure 5: Product description: Cable gland

Position	Description
A	Filler-plug
B	Seal
C	Swivel nut
D	Counter nut

5 Connection

5.1 Device Overview

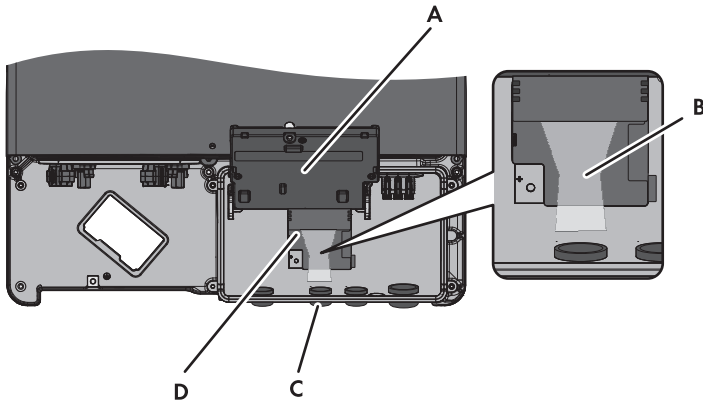


Figure 6: Overview of the connection area

Position	Description
A	Flipped up display with screw
B	Cable route to the plugs of the 485 Data Module
C	Inverter enclosure opening for cable gland
D	Mounting position of the 485 Data Module in the inverter

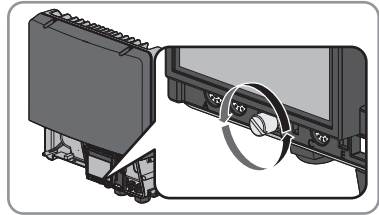
5.2 Installing the 485 Data Module in the Inverter

1. **⚠ DANGER**

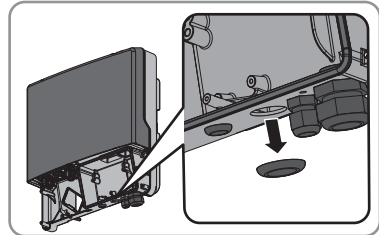
Danger to life due to electric shock when opening the inverter

Death or serious injuries

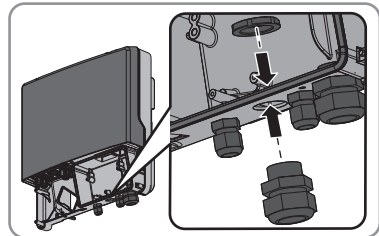
- Disconnect the inverter from voltage sources on the AC and DC sides and open it (see the inverter installation manual).
2. Loosen the screw of the display until the display can be flipped up.



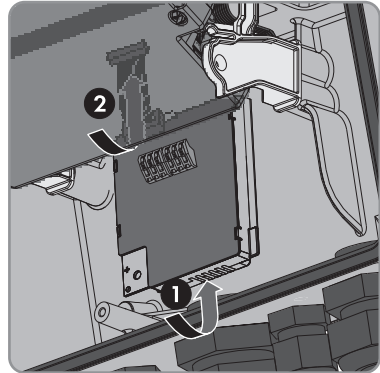
3. Flip up the display until it clicks into place.
4. Push the pre-mounted filler-plug out of the second hole from the left in the inverter enclosure.



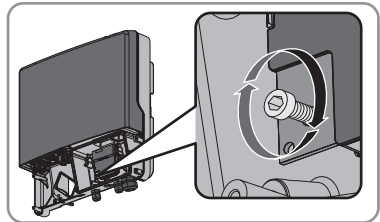
5. Attach the cable gland with the counter nut to the enclosure opening.



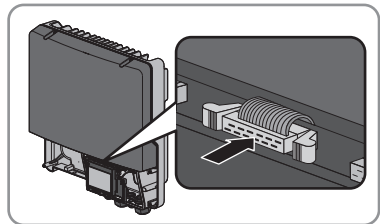
6. Insert the 485 Data Module and slide the ribbon cable upwards behind the display. The key on the top edge of the 485 Data Module must fit into the hole in the plastic retainer in the inverter.



7. Fasten the 485 Data Module hand-tight with the hexagon socket screw (AF 3, torque: 1,5 Nm).



8. Flip down the display.
9. Plug the ribbon cable plug onto the centre connector strip.



5.3 Connecting the 485 Data Module

To achieve a good signal quality, observe the cable recommendation (see technical description "RS 485 Cabling Plan")

i Disturbance of Data Transmission due to AC Cables

During operation, AC cables generate an electromagnetic field which may induce interference in plant communication.

- Lay the RS485 communication cables using suitable fastening material and with a minimum clearance of 50 mm to the AC cables.

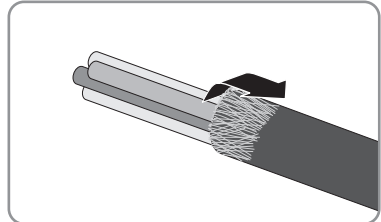
Procedure:

To connect the 485 Data Module, perform the following actions in the prescribed sequence. The following sections show the exact sequence.

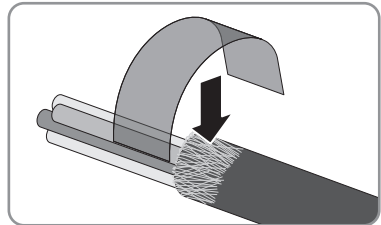
- Preparing the cable
- Connecting the cable to the 485 Data Module

Preparing the Cable

1. Remove 40 mm of the cable sheath at the end of the cable which is to be connected to the 485 Data Module.
2. Shorten the cable shield to 15 mm.
3. Fold the surplus cable shield back onto the cable sheath.



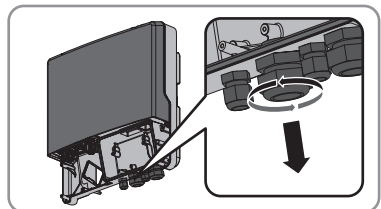
4. Wrap the cable shield with conductive adhesive foil.



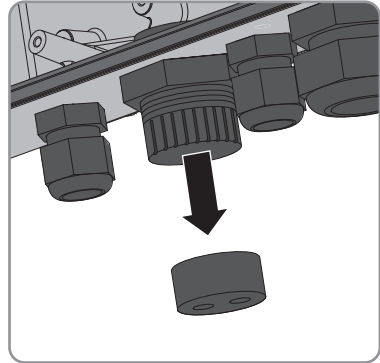
5. Strip the insulation on the three wires by 6 mm. Two wires for communication must be a twisted pair.
6. Shorten all other wires flush with the cable sheath.

Connecting the Cable to the 485 Data Module

1. Flip up the display until it clicks into place.
2. Unscrew the swivel nut of the cable gland on the inverter.

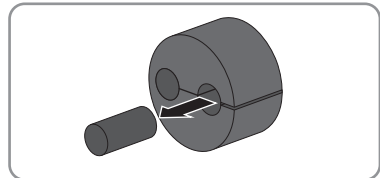


3. Press the seal out of the cable gland from the inside.

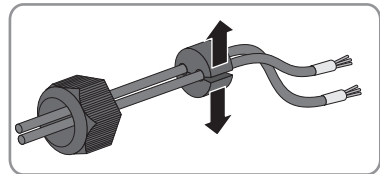


4. Route the cable from the outside into the inverter through the loose swivel nut and the cable gland.

5. Remove one of the filler-plugs from the seal for each cable.



6. Insert the cable into the seal.



7. Push the seal into the cable gland. Make sure that any unused cable openings are sealed with filler-plugs.


8. Screw the swivel nut of the cable gland on lightly.

9. Remove or connect the terminator:

- If two cables are connected, open the spring clamp terminals of the plug with the connected terminator and remove the terminator.
- If one cable is connected, the terminator in the unused plug must be connected in terminals 2 and 7.

10. Open the spring clamp terminals on the plug.

11. Connect the wires to the plug terminals and note down the colour of the wires. The cables can be allocated to any plugs of your choosing.

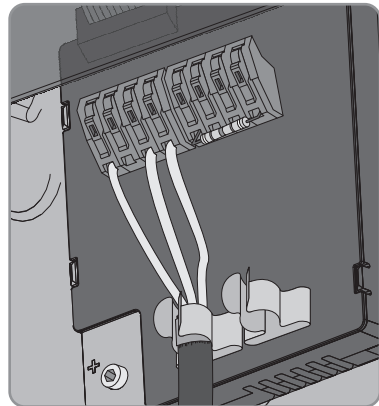
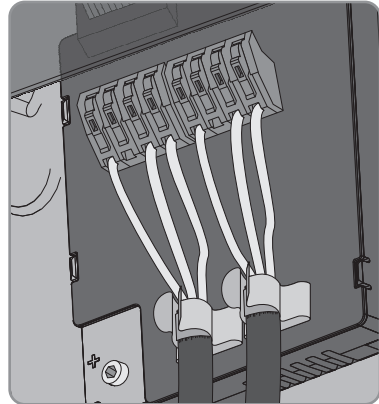
	Signal	485 Data Modules	RS485 bus	Insulated wire colour
	GND	5	5	
	Data+	2	2	
	Data-	7	7	

12. Close the spring clamp terminals.
13. Push the cable with the cable shield into the shield connection terminal on the 485 Data Module.

- Two cables are connected to the 485 Data Module.

or

- One cable is connected to the 485 Data Module.



14. Fasten the swivel nut on the cable gland hand-tight. This relieves pull strains on the cables.
15. Flip the display down and fasten it hand-tight with the display screw.
16. Close the inverter (see inverter installation manual).
17. Connect the other cable end to the RS485 bus (for information on the terminal assignment and wiring in the system, see the technical description "RS485 Cabling Plan").

6 Decommissioning

6.1 Disassembling the 485 Data Module

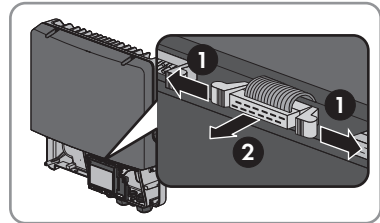
1. **⚠ DANGER**

Danger to life due to electric shock when opening the inverter

Death or serious injuries

- Disconnect the inverter from voltage sources on the AC and DC sides and open it (see the inverter installation manual).

2. Press the left-hand and right-hand lock hooks outwards and remove the ribbon cable plug from the centre connector strip of the inverter.



3. Loosen the screw of the display until the display can be flipped up.
4. Flip up the display until it clicks into place.
5. Unscrew the swivel nut of the cable gland.
6. Open the spring clamp terminals of the plug on the 485 Data Module.
7. Remove the cables from the 485 Data Module.
8. Unscrew the counter nut of the cable gland
9. Pull the cable gland and cables out of the inverter.
10. Release the screw of the 485 Data Module and remove the 485 Data Module.
11. Close the spring clamp terminals of the plugs on the 485 Data Module.
12. Flip down the display and fasten the display screw hand-tight.
13. Seal the inverter enclosure opening with the filler-plug for enclosure openings.
14. Close the inverter (see inverter installation manual).

6.2 Packaging the 485 Data Module for Shipping

- Pack the 485 Data Module. Use the original packaging or packaging that is suitable for the weight and size of the 485 Data Module.

6.3 Disposing of the 485 Data Module

- Dispose of the 485 Data Module in accordance with the regulations for the disposal of electronic waste applicable at the installation site.

or

Return the 485 Data Module to SMA Solar Technology AG at your own expense labelled "ZUR ENTSORGUNG" ("FOR DISPOSAL") (see Section 9 "Contact", page 22).

7 Troubleshooting

Problem	Cause and corrective measures
<p>The emergency channel list "Emergency" or "EmgncyXX" is displayed in the communication product (e. g. Sunny WebBox, Sunny Explorer).</p> <p>The inverter is displayed by device class "Other" in the Sunny Portal.</p>	<p>The 485 Data Module is installed in an inverter without first disconnecting the inverter on the AC and DC sides. That prevents the inverter detecting the new 485 Data Module.</p> <p>Corrective measures:</p> <ul style="list-style-type: none"> • Prior to performing any work on the inverter, disconnect the inverter from any voltage sources on the AC and DC sides (see inverter installation manual).
	<hr/> <p>Several SMA communication products query data simultaneously from the devices via <i>Bluetooth</i> (e.g. Sunny Explorer, Sunny Beam with <i>Bluetooth</i>) and RS485 communication (e.g. Sunny WebBox).</p> <p>This can cause data congestion if a lot of data is transmitted simultaneously. If this condition lasts for more than five minutes, the inverter resets the 485 Data Module. Due to the data congestion, the inverter cannot detect the 485 Data Module after the reset.</p> <p>Corrective measures:</p> <ul style="list-style-type: none"> • Wait until the inverter restarts the next morning, then the inverter will detect the 485 Data Module. <p>or</p> <p>Disconnect the inverter from voltage sources on the AC and DC sides and recommission it (see the inverter installation manual).</p> <hr/>

8 Technical Data

Mechanical Data

Width x height x depth	73 mm x 88 mm x 34 mm
Weight	71 g

Communication

Communication interface	RS485
Maximum cable length	1,200 m

Connections

Type of plug	4-pole spring clamp terminal
Number of RS485 connections	2

Ambient Conditions during Operation

Ambient temperature	- 25°C ... +85°C
Relative humidity, non-condensing	5% ... 95%
Maximum height above sea level (MSL)	3,000 m

Ambient Conditions for Storage/Transport

Ambient temperature	- 40°C ... +85°C
Relative humidity, non-condensing	5% ... 95%
Maximum height above sea level (MSL)	3,000 m

9 Contact

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

- Type, serial number and firmware version of the inverter
- Type, serial number, hardware and firmware version of the 485 Data Module
- Number of 485 Data Modules connected

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	
Brasil	Vide Espanha (Espanha)		
Česko	SMA Central & Eastern Europe s.r.o. Praha	+420 235 010 417	
Chile	Ver España		
Danmark	Se Deutschland (Tyskland)		
Deutschland	SMA Solar Technology AG Niestetal	Medium Power Solutions Wechselrichter: Kommunikation: SMA Online Service Center: www.SMA.de/Service	+49 561 9522-1499 +49 561 9522-2499
		Hybrid Energy Solutions Sunny Island: PV-Diesel Hybridsysteme:	+49 561 9522-399 +49 561 9522-3199
		Power Plant Solutions Sunny Central:	+49 561 9522-299
España	SMA Ibérica Tecnología Solar, S.L.U. Barcelona	Llamada gratuita en España: Internacional:	900 14 22 22 +34 902 14 24 24
France	SMA France S.A.S. Lyon	Medium Power Solutions Onduleurs : Communication :	+33 472 09 04 40 +33 472 09 04 41
		Hybrid Energy Solutions Sunny Island :	+33 472 09 04 42
		Power Plant Solutions Sunny Central :	+33 472 09 04 43

India	SMA Solar India Pvt. Ltd. Mumbai	+91 22 61713888
Italia	SMA Italia S.r.l. Milano	+39 02 8934-7299
Κύπρος/ Kıbrıs	Βλέπε Ελλάδα/ Bkz. Ελλάδα (Yunanistan)	
Luxemburg/ Luxembourg	Siehe Belgien Voir Belgique	
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	
Slovensko	pozri Česko (Česká republika)	
South Africa	SMA Solar Technology South Africa Pty Ltd. Centurion (Pretoria)	08600 SUNNY (08600 78669) International: +27 (12) 643 1785
United Kingdom	SMA Solar UK Ltd. Milton Keynes	+44 1908 304899
Ελλάδα	SMA Hellas AE Αθήνα	801 222 9 222 International: +30 212 222 9 222
България	Вижте Ελλάδα (Γърция)	
ไทย	SMA Solar (Thailand) Co., Ltd. ประเทศไทย	+66 2 670 6999
대한민국	SMA Technology Korea Co., Ltd. 서울	+82 2 508-8599
中国	SMA Beijing Commercial Company Ltd. 北京	+86 10 5670 1350
+971 2 698-5080	SMA Middle East LLC أبو ظبي	الإمارات العربية المتحدة

Other countries	International SMA Service Line Niestetal	Toll free worldwide: 00800 SMA SERVICE (+800 762 7378423)
-----------------	---	--

SMA Solar Technology

www.SMA-Solar.com

