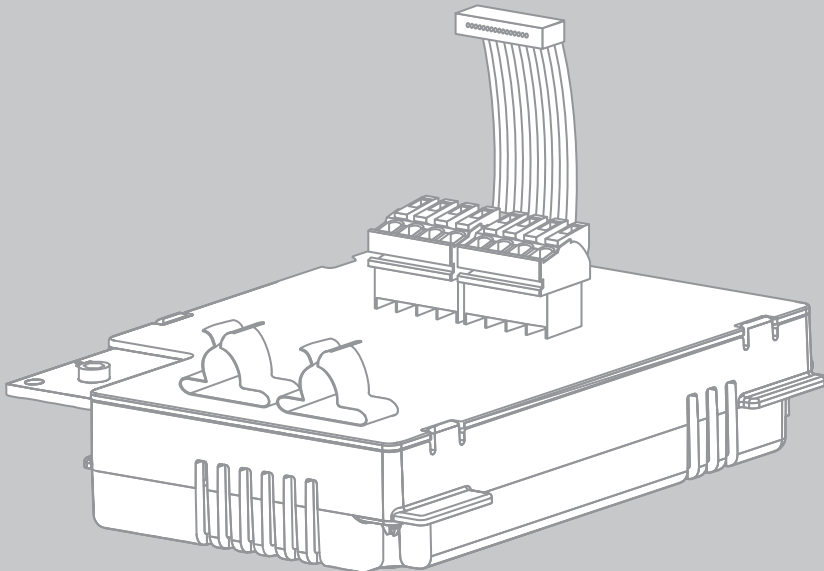


Communication Interface for SMA Inverters

485 Data Module

Installation Manual



Legal Provisions

The information contained in these documents is the property of SMA Solar Technology AG. Any publication, whether in whole or in part, requires prior written approval by SMA Solar Technology AG. Internal reproduction used solely for the purpose of product evaluation or other proper use is allowed and does not require prior approval.

SMA Warranty

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

Trademarks

All trademarks are recognized, even if not explicitly identified as such. 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 these marks by SMA Solar Technology AG is under license.

Modbus® is a registered trademark of Schneider Electric and is licensed by the Modbus Organization, Inc.

QR Code is a registered trademark of DENSO WAVE INCORPORATED.

Phillips® and Pozidriv® are registered trademarks of Phillips Screw Company.

Torx® is a registered trademark of Acument Global Technologies, Inc.

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 until 2016 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	Skills of Qualified Persons	7
2.3	Safety Information	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	9
4.3	Cable Gland	10
5	Connection	11
5.1	Device Overview	11
5.2	Installing the 485 Data Module in the Inverter	12
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" with hardware version B5 and firmware version 4.00 or higher.

Target Group

This document is intended for qualified persons. Only persons with the appropriate skills are allowed to perform the activities described in this document (see Section 2.2 "Skills of Qualified Persons", page 7).

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

Typographies

Typography	Explanation	Example
bold	<ul style="list-style-type: none"> • Display texts • Elements on a user interface • Terminals • Elements to be selected • Elements to be entered 	<ul style="list-style-type: none"> • The value can be found in the field Energy. • Select Settings. • Enter the value 10 in the field Minutes.
>	<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].

Nomenclature

Complete designation	Designation in this document
Electronic Solar Switch	ESS
PV System	System
SMA Inverter	Inverter

Abbreviations

Abbreviation	Designation	Explanation
AC	Alternating Current	Alternating current
DC	Direct Current	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 the setup of 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 15000TL-30	
SB 3000TLST-21	STP 20000TL-30	
	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 can 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 Skills of Qualified Persons

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

- Training in the installation and commissioning of electrical devices and installations
- Knowledge of how to deal with the dangers and risks associated with installing and using electrical devices and installations
- 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 information

2.3 Safety Information

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 all 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, do not touch any parts other than the enclosure lid of the inverter.

Electrostatic Discharge

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

- Ground yourself before touching any inverter component.

Interference in 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.

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 distributor if the delivery is incomplete or damaged.

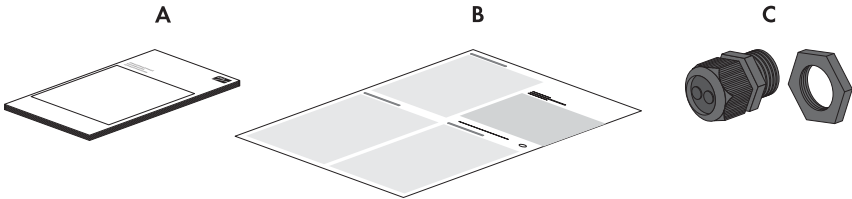


Figure 1: Components included in scope of delivery: 485 Data Module pre-installed in the inverter

Position	Quantity	Designation
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 distributor if the delivery is incomplete or damaged.

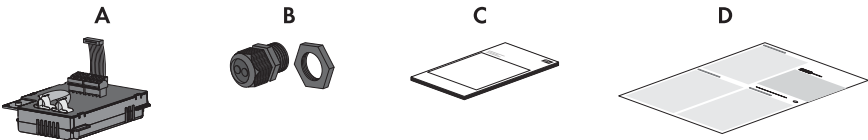


Figure 2: Components included in the scope of delivery: 485 Data Module as retrofit kit

Position	Quantity	Designation
A	1	485 Data Module with: <ul style="list-style-type: none"> • 2 conductive adhesive foil labels • 1 plug • 1 plug with 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 the setup of wired RS485 communication for SMA inverters.

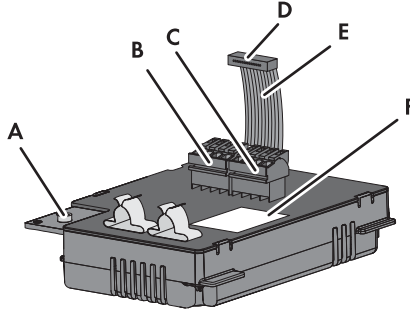


Figure 3: Design of the 485 Data Module

Position	Designation
A	Hexagon socket screw
B	Plug-in connector
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.

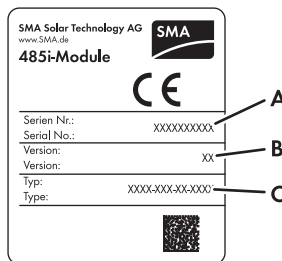



Figure 4: Information on the type label

Position	Designation	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 will require the information on the type label to use the 485 Data Module safely and when seeking customer support from the SMA Service Line. The type label must remain permanently attached to the 485 Data Module.

Symbol on the Type Label

Symbol	Designation	Explanation
	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 to the inverter enclosure. The cable gland also protects the inverter from dust and moisture intrusion.

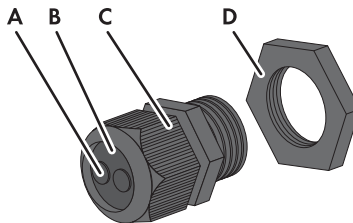


Figure 5: Product description: Cable gland

Position	Designation
A	Filler plug
B	Seal
C	Swivel nut
D	Counter nut

5 Connection

5.1 Device Overview

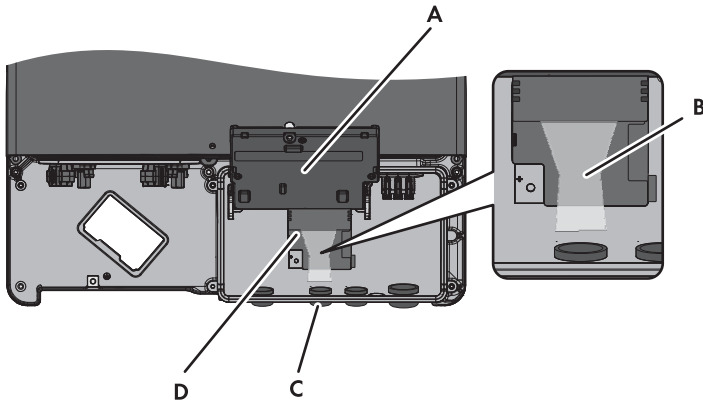


Figure 6: Overview of the connection area

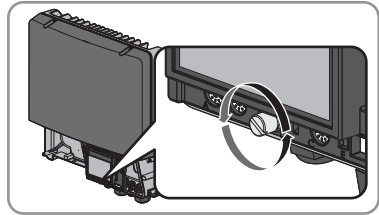
Position	Designation
A	Flipped up display with screw
B	Cable route to the plugs of the 485 Data Module
C	Inverter enclosure opening for cable gland
D	Mounting position of the 485 Data Module in the inverter

5.2 Installing the 485 Data Module in the Inverter

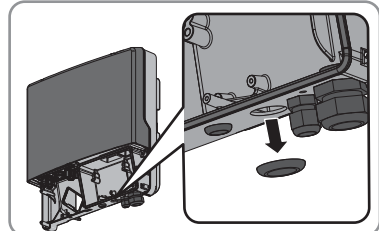
1. **⚠ DANGER**

**Danger to life due to electric shock when opening the inverter
Death or serious injuries**

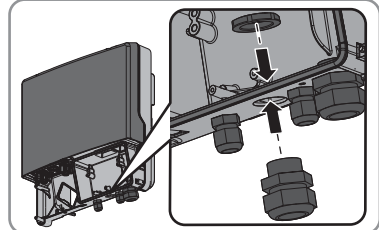
- Disconnect the inverter from all voltage sources on the AC and DC sides and open it (see the inverter installation manual).
2. Release the screw of the display far enough to allow the display to be flipped up.



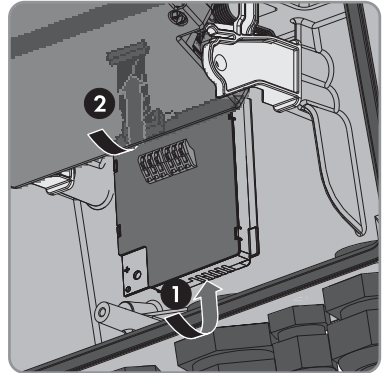
3. Flip the display up until it snaps into place.
4. Push the pre-mounted filler plug out of the second hole from the left in the inverter enclosure.



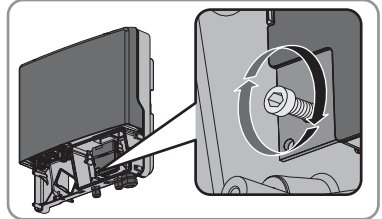
5. Attach the cable gland to the enclosure opening using the counter nut.



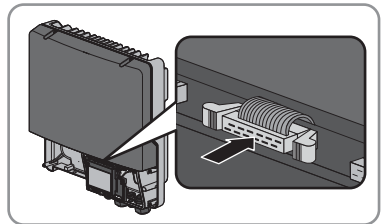
6. Insert the 485 Data Module and push the ribbon cable upwards behind the display. The key on the top edge of the 485 Data Module must fit into the hole in the plastic retainer in the inverter.



7. 485 Data Module hand-tight using a hexagon socket screw (AF 3, torque: 1.5 Nm).



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



5.3 Connecting the 485 Data Module

To achieve a good signal quality, observe the cable recommendation (see Technical Description "RS485 Cabling Plan").

i Interference in 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.

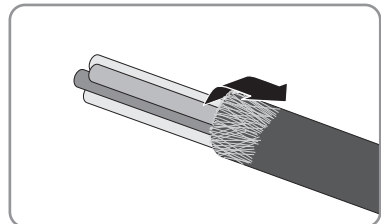
Procedure:

To connect the 485 Data Module, perform the following work steps in the prescribed sequence. The exact procedure is described in the following sections.

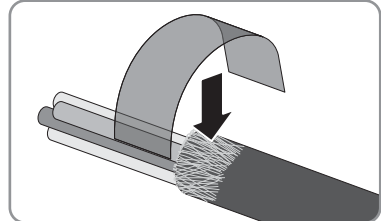
- Prepare the cable
- Connect the cable to the 485 Data Module

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 over the cable sheath.



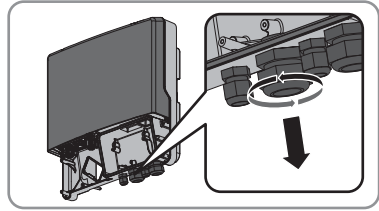
4. Wrap the cable shield in conductive adhesive foil.



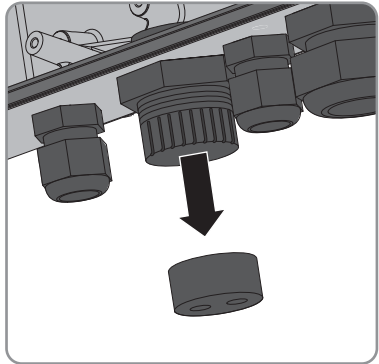
5. Strip off the insulation of the three insulated conductors by 6 mm. The two insulated conductors used for communication must be a twisted pair.
6. Shorten all other conductors flush with the cable sheath.

Connecting the Cable to the 485 Data Module

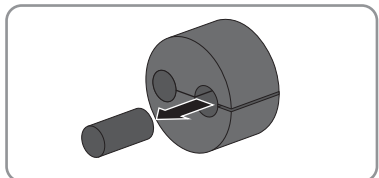
1. Flip the display up until it snaps into place.
2. Unscrew the swivel nut of the cable gland on the inverter.



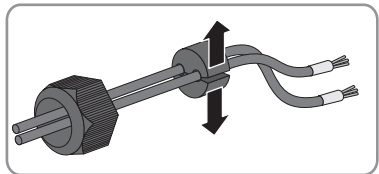
3. Press the seal out of the cable gland from the inside.



4. Route the cable from the outside into the inverter through the unfastened 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. Press the seal into the cable gland. Ensure that any unused cable openings are sealed with filler plugs.
8. Screw the swivel nut of the cable gland on loosely.

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.

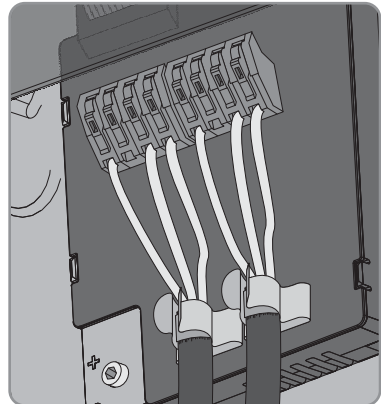
11. Connect the insulated conductors to the plug terminals and note down the color of the insulated conductors. The allocation of cables to plugs can be done in any order.

Signal	485 Data Module	RS485 bus	Insulated conductor color
GND	5	5	
 Data+	2	2	
 Data-	7	7	

12. Close the spring clamp terminals.

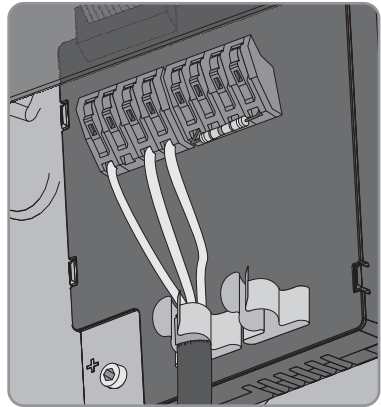
13. Push the cable with the cable shield into the shield connection terminal on the 485 Data Module.

- 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 the screw of the display hand-tight.
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

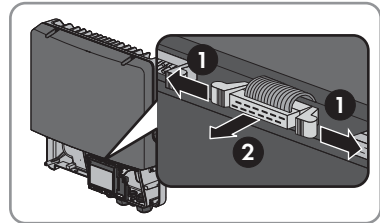
6.1 Disassembling the 485 Data Module

1. **⚠ DANGER**

Danger to life due to electric shock when opening the inverter

Death or serious injuries

- Disconnect the inverter from all 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 center connector strip of the inverter.



3. Release the screw of the display far enough to allow the display to be flipped up.
4. Flip the display up until it snaps into place.
5. Unscrew the swivel nut from 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 the display down and fasten the display screw hand-tight.
13. Seal the opening in the inverter enclosure 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. To do so, 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 labeled "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 485 Data Module has been installed in an inverter without first disconnecting the inverter on the AC and DC sides. This prevents the inverter detecting the new 485 Data Module.</p>
<p>The inverter is displayed with the device class "Others" in Sunny Portal.</p>	<p>Corrective measures:</p> <ul style="list-style-type: none"> • Prior to performing any work on the inverter, disconnect the inverter from all voltage sources on the AC and DC sides (see inverter installation manual).
	<hr/> <p>Several SMA communication products are simultaneously querying data 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 state lasts for more than five minutes, the inverter carries out a reset of 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	1200 m

Terminals

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

Ambient Conditions during Operation

Ambient temperature	- 25 °C to +85 °C
Relative humidity, non-condensing	5% to 95%
Maximum height above mean sea level	3000 m

Ambient Conditions for Storage/Transport

Ambient temperature	- 40 °C to +85 °C
Relative humidity, non-condensing	5% to 95 %
Maximum height above mean sea level	3000 m

9 Contact

If you have technical problems with our products, please 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

Danmark	SMA Solar Technology AG	Belgien	SMA Benelux BVBA/SPRL
Deutschland	Niestetal	Belgique	Mechelen
Österreich	SMA Online Service Center: www.SMA-Service.com	België	+32 15 286 730
Schweiz	Sunny Boy, Sunny Mini Central, Sunny Tripower: +49 561 9522-1499	Luxemburg	
	Monitoring Systems (Kommunikationsprodukte): +49 561 9522-2499	Luxembourg	
	Fuel Save Controller (PV-Diesel Hybridsysteme): +49 561 9522-3199	Nederland	
	Sunny Island, Sunny Backup, Hydro Boy: +49 561 9522-399	Česko	SMA Service Partner TERMS a.s.
	Sunny Central: +49 561 9522-299	Magyarország	+420 387 6 85 111
		Slovensko	
		Polska	SMA Polska +48 12 283 06 66
		Ελλάδα	SMA Hellas AE
		Κύπρος	Αθήνα +30 210 9856666
España	SMA Ibérica Tecnología Solar, S.L.U.	France	SMA France S.A.S.
Portugal	Barcelona +34 935 63 50 99		Lyon +33 472 22 97 00
Bulgaria	SMA Italia S.r.l.	United Kingdom	SMA Solar UK Ltd.
Italia	Milano		Milton Keynes
România	+39 02 8934-7299		+44 1908 304899
United Arab Emirates	SMA Middle East LLC Abu Dhabi +971 2234 6177	India	SMA Solar India Pvt. Ltd. Mumbai +91 22 61713888

대한민국	SMA Technology Korea Co., Ltd. 서울 +82-2-520-2666	ประเทศไทย	SMA Solar (Thailand) Co., Ltd. กรุงเทพฯ +66 2 670 6999
South Africa	SMA Solar Technology South Africa Pty Ltd. Cape Town 08600SUNNY (08600 78669) International: +27 (0)21 826 0600	Argentina Brasil Chile Perú	SMA South America SPA Santiago +562 2820 2101
Australia	SMA Australia Pty Ltd. Sydney Toll free for Australia: 1800 SMA AUS (1800 762 287) International: +61 2 9491 4200	Other countries	International SMA Service Line Niestetal 00800 SMA SERVICE (+800 762 7378423)

SMA Solar Technology

www.SMA-Solar.com

