



Sunny Beam Wireless PV Plant Monitoring for SMA Inverters



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1 Notes on Using these Instructions

1.1 Target Group

This documentation is intended for installers and users. It includes a description of the system and instructions for the commissioning and operation of the device. Some of the activities described in this document may only be performed by qualified electricians. They are marked with a danger notice.

1.2 Validity

This operating manual for the Sunny Beam applies from Sunny Beam firmware version 2.17EU. You can call up the firmware version as described in chapter "Calling up the Firmware Versions" on page 64.

1.3 Symbols used

In order to ensure optimal use of these instructions, please note the following explanation of symbols used.

This symbol identifies a notice where failure to follow the advice will make the procedure or operation more difficult.



This symbol identifies a warning, which indicates a fact or feature which, if ignored, can cause serious damage to the device.



This symbol indicates a statement which, if ignored, could possibly damage the device and above all, lead to serious injury or death.

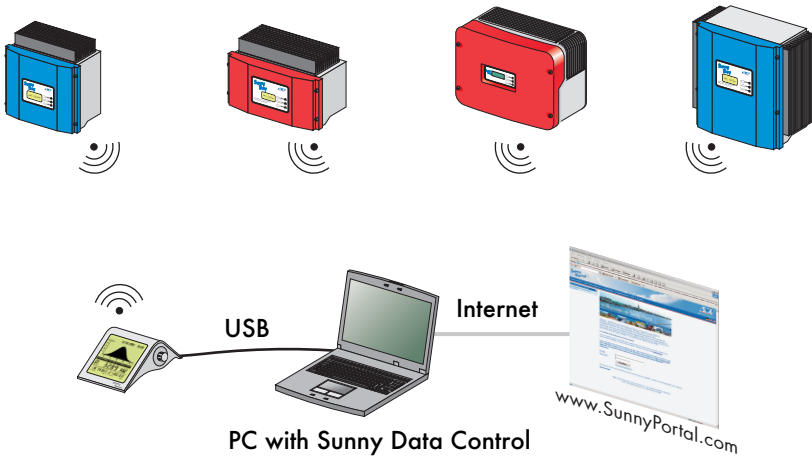


2 Sunny Beam

2.1 Applications

The Sunny Beam allows you to monitor up to four inverters in your photovoltaic system. All the inverters must be equipped with a Radio Piggy-Back. The Sunny Beam collects the data wirelessly from the inverters and shows it on the Sunny Beam display.

The Sunny Beam also allows you to store the recorded data long-term using a PC and the SMA Sunny Data Control software and to send it to the [Sunny Portal](http://www.SunnyPortal.com) in the internet.



The Sunny Beam can be used wirelessly almost everywhere as a tabletop or wall-mounted unit. Power is supplied via the enclosed AccuCell AC 1800 batteries, which are recharged via the integrated solar cell.

2.2 Functions

The device can be connected to the inverters via:

- Wireless (radio) (up to approx. 100 m in the open air, up to approx. 30 m in buildings, max. 4 inverters)

Supported inverters:

- All Sunny Boys type SB
- All Sunny Boys type SWR
 - except SWR 1100 (no "E"), SWR 1700 (no "E"), SWR 1600
 - SWR 1500 and SWR 2000 require the SBEAMPB-ISO-NR intermediate adapter
- All Sunny Mini Central

The device can be connected to the PC via:

- USB (max. 2 m)

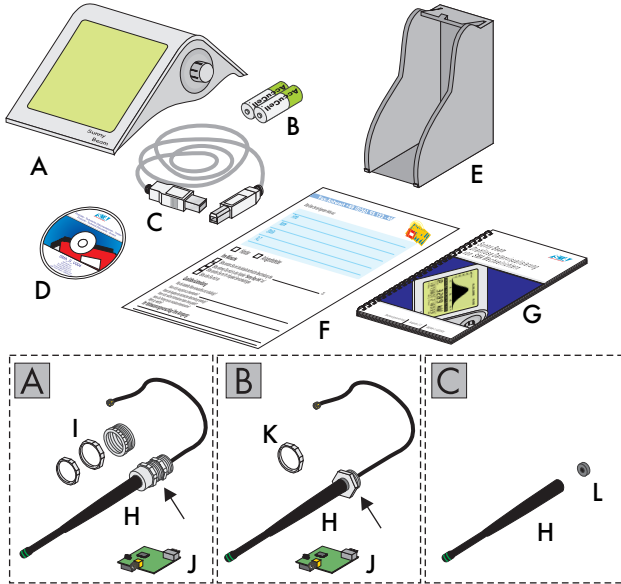
System data displayed via:

- Integrated display in Sunny Beam
- [Sunny Portal](#) (via Sunny Data Control and connected PC)

Sunny Beam installation site requirements:

- Protect the Sunny Beam from dust, wet conditions and aggressive substances.
- The ambient temperature must be between 0 °C and +40 °C.
- The Sunny Beam is not suitable for outdoor installation.
- Select a sunlit location in the house, so that the batteries can be charged via the integrated solar cell of the Sunny Beam.

2.3 Scope of Delivery



- A Sunny Beam
- B 2 AccuCell AC 1800 type rechargeable batteries (rechargeable only in the Sunny Beam!)
- C USB connecting cable
- D Software CD
- E Wall bracket for Sunny Beam
- F Service sheet (fax answer)
- G Technical documentation

Scope of delivery in dotted box:

The number of parts in the dotted box depends on your order. The parts in either dotted box A, B or C will be delivered.

The scope of delivery in dotted box C will be delivered if the Radio Piggy-Back comes from the factory built in and is contained in your inverter.

- H Radio antenna
- I Grooved antenna screw fittings (PG13.5 and PG16 with an adapter)
- J Radio Piggy-Back
- K PG 16 grooved antenna screw fittings
- L Sealing

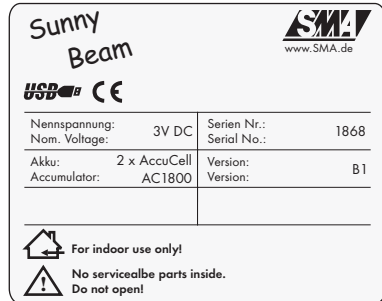
2.4 Accessories

- USB power supply unit
SMA order number: SBEAM-NT
- External antenna kit
SMA order number: BEAM-AW15 (with 1.5 m antenna extension cable)
SMA order number BEAM-AW100 (with 10 m antenna extension cable)
- Intermediate adapter for Radio Piggy-Back on SWR 1500 and SWR 2000
SMA order number: SBEAMPB-ISO-NR
- Radio Piggy-BackRadio Piggy-Back retrofit it
SMA order number: BEAMPB-NR
- Spare batteries (AccuCell AC 1800)
SMA order number: SBEAM-BAT

2.5 Identifying the Sunny Beam

2.5.1 Type Plate

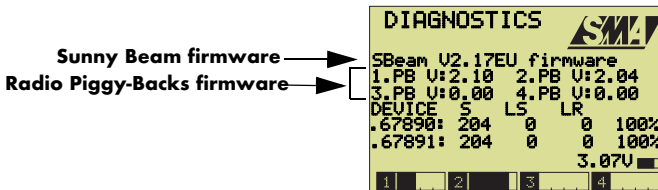
You can identify the Sunny Beam using the type plate (see figure at right). The type plate is located on the underside of the Sunny Beam.



2.5.2 Firmware Version

You can call up the firmware version of your Sunny Beam and the Radio Piggy-Back via the menu in the registered inverters.

1. Select "SETUP" in the main menu.
2. Select "SERVICE".
3. Select "DIAGNOSTICS". This allows you to view the firmware version of your Sunny Beam in the first line below the menu heading. Firmware version SBeam V2.17EU is shown in the figure below. The firmware versions of the Radio Piggy-Backs (PB=Piggy-Back) in the registered inverters are listed below this.



Before you can call up the firmware version in the menu, you must make initial settings as described in chapter "Initial Settings" on page 42.



3 Safety Instructions

Please follow all operating and safety instructions in this manual. Failure to do so could result in damage to the device and cause personal injury.

All work on the inverters may only be performed by qualified electricians! Please follow all safety instructions contained in the inverter documentation!



You can change the safety-related inverter parameters of your PV system using the Sunny Beam. Such parameters may only be changed after consulting with your electricity supply company.



The Sunny Beam may only be opened by qualified SMA staff. This does not apply to battery changes.



Operating instructions

Our Sunny Boy Service Hotline is available for questions on details not covered in this manual. See chapter "Contact" on page 89.



Data collected by the Sunny Beam regarding the power generated by your solar system can deviate from the electricity meter. The Sunny Beam data cannot be used for billing purposes.



4 Mounting the Sunny Beam

The Sunny Beam can be used as a tabletop device or mounted on the wall bracket.

Suitable installation and assembly site

- Protect the Sunny Beam from dust, wet conditions and aggressive substances.
- Select a sunlit location in the house, so that the batteries can be charged via the integrated solar cell of the Sunny Beam.
- The ambient temperature must be between 0 °C and +40 °C.
- If you use the wall bracket, make sure that there is sufficient mounting space around the wall bracket.

4.1 Tabletop Device

The Sunny Beam can be installed anywhere in the building if the above points on selecting a suitable installation site are observed.

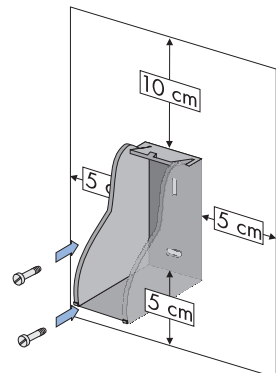
4.2 Wall Mounting

You can mount the Sunny Beam to a wall in the building using the enclosed wall bracket (see figure). The Sunny Beam can be removed from the wall bracket at any time and used as a tabletop device.

Before installing the wall bracket, check whether the reception of the Sunny Beam from the inverters is good (see chapter "Calling up the Communication Quality" on page 63).

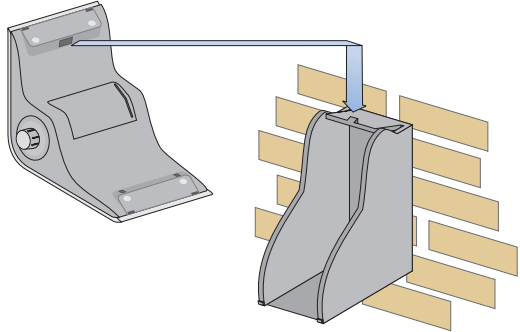


1. Mark the drill holes on the wall, taking the mounting clearance into account.
2. Drill the holes.
3. Secure the wall bracket with screws.

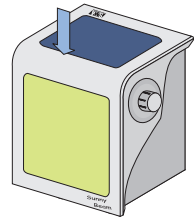


Mount the Sunny Beam on the wall bracket.

1. Align the upper edge of the Sunny Beam with the recess on the catch of the wall bracket.



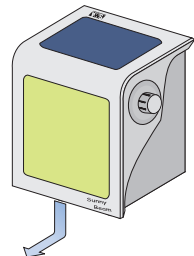
2. Press downwards against the Sunny Beam. The two recesses in the Sunny Beam lock audibly into place on the catches of the wall bracket.



Make sure that the Sunny Beam does not fall down and fits securely on the wall bracket.

Remove the Sunny Beam from the wall bracket

1. Pull the Sunny Beam slightly downwards and outwards at the same time.



5 Installing a Radio Piggy-Back in an Inverter

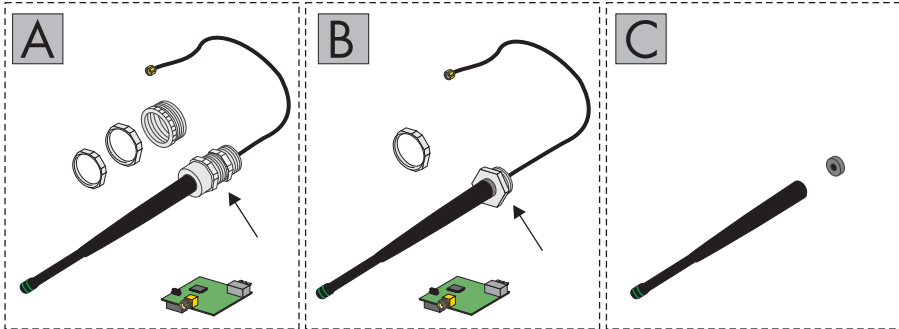
This chapter is intended solely for qualified electricians!

All work on the inverter may only be performed by qualified electricians! Please follow all safety instructions contained in the inverter documentation!



5.1 Ways of Installation

The installation of the Radio Piggy-Back and the antenna is determined by the scope of delivery.



Scope of delivery (A)

Scope of delivery (B)
with unscrewable
Antenna tip

Scope of delivery (C)
equipped with Radio
Piggy-Back by default
(enclosed with
the inverter)

For scope of delivery (A) please refer to section "Installation(A): Radio Piggy-Back and Antenna" on page 20 .

For scope of delivery (B) please refer to section "Installation(B): Radio Piggy-Back and Antenna" on page 22 .

For scope of delivery (C), with the Radio Piggy-Back installed at the factory, please refer to section "Installation(C): Antenna, Piggy-Back ex Factory" on page 24.

5.1.1 Installation(A): Radio Piggy-Back and Antenna

This section refers solely to scope of delivery (A). For the different scopes of delivery, please refer to section "Installing a Radio Piggy-Back in an Inverter" on page 19.

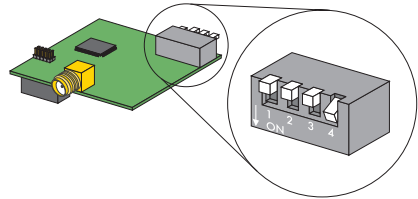


This chapter is intended solely for qualified electricians! All work on the inverter may only be performed by qualified electricians! Please follow all safety instructions contained in the inverter documentation!



The Radio Piggy-Back may only be connected to the radio antenna via the enclosed coax antenna cable! Only the enclosed coax antenna cable ensures sufficient safety of the persons involved.

1. Open the inverter as described in the inverter documentation.
2. The DIP switches on the Radio Piggy-Back are set to group 1 by default. Even if you intend to leave group 1 set, check the DIP switch setting on the Radio Piggy-Back using the figure below. DIP switch 4 should be the only one pressed down.



DIP switch

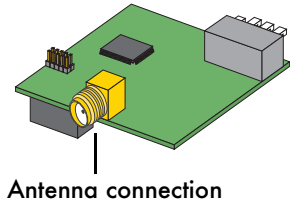
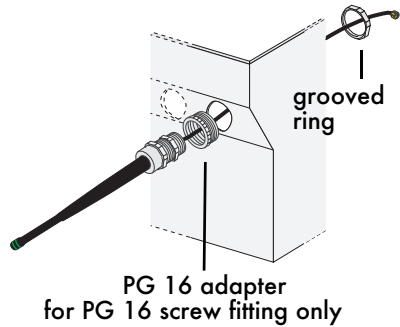
See chapter "DIP Switch Setting on the Radio Piggy-Back" on page 25 for further information on setting the group.

3. Attach the Radio Piggy-Back to the slot provided for it in the inverter without exerting excessive force on the pins as shown in the inverter documentation. Make sure that you do not attach the Piggy-Back the wrong way around. The extreme right-hand pin on the lower, short row of pins is left free.



DIP switches set to group 1

4. Rotate the PG cover away from the inverter housing. The PG screw fitting which fits your inverter is specified on the PG cover.
5. For a PG 16 screw fitting, screw the enclosed PG 16 adapter to the PG screw fitting of the antenna as shown in the figure.
6. Insert the end of the antenna cable through the PG opening on the inverter housing.
7. Tighten the PG screw fitting from the interior of the housing with the grooved ring of the corresponding PG screw fitting. Make sure that you tighten the grooved ring so tightly that the paint on the enclosure is damaged and thus contact is made with the bare metal of the inverter enclosure.
8. Screw the antenna cable to the antenna connection of the Radio Piggy-Back (see figure at right).
9. Lay the antenna cable as described in the inverter documentation.
10. Do not mount any jumpers on the inverter.
11. Close the inverter as described in the inverter documentation.



5.1.2 Installation(B): Radio Piggy-Back and Antenna

This section refers solely to scope of delivery (B). For the different scopes of delivery, please refer to section "Installing a Radio Piggy-Back in an Inverter" on page 19.

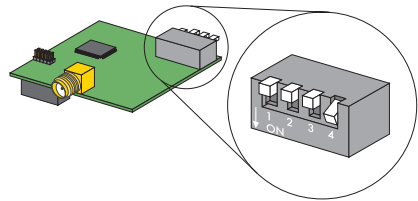


This chapter is intended solely for qualified electricians! All work on the inverter may only be performed by qualified electricians! Please follow all safety instructions contained in the inverter documentation!



The Radio Piggy-Back may only be connected to the radio antenna via the enclosed coax antenna cable! Only the enclosed coax antenna cable ensures sufficient safety of the persons involved.

1. Open the inverter as described in the inverter documentation.
2. The DIP switches on the Radio Piggy-Back are set to group 1 by default. Even if you intend to leave group 1 set, check the setting of the DIP switches on the Radio Piggy-Back using the figure below. DIP switch 4 should be the only one pressed down. See chapter "DIP Switch Setting on the Radio Piggy-Back" on page 25 for further information on setting the group.



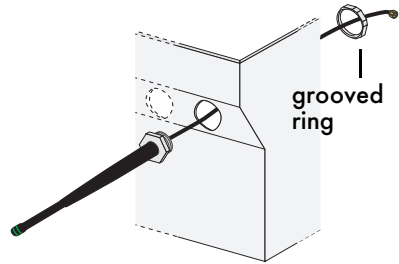
DIP switches

3. Attach the Radio Piggy-Back to the slot provided for it in the inverter without exerting excessive force on the pins as shown in the inverter documentation. Make sure that you do not attach the Piggy-Back the wrong way around. The extreme right-hand pin on the lower, short row of pins is left free.

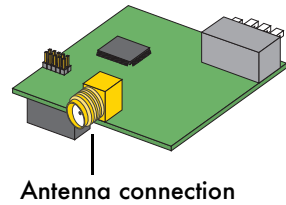


DIP switches set to group 1

4. Insert the end of the antenna cable through the PG opening on the inverter housing.
5. Tighten the PG screw fitting from the interior of the housing with the grooved ring. Make sure that you tighten the grooved ring so tightly that the paint on the enclosure is damaged and thus contact is made with the bare metal of the inverter enclosure.



6. Screw the antenna cable to the antenna connection of the Radio Piggy-Back (see figure at right).
7. Lay the antenna cable as described in the inverter documentation.
8. Do not mount any jumpers on the inverter.
9. Close the inverter as described in the inverter documentation.



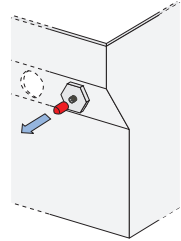
5.1.3 Installation(C): Antenna, Piggy-Back ex Factory



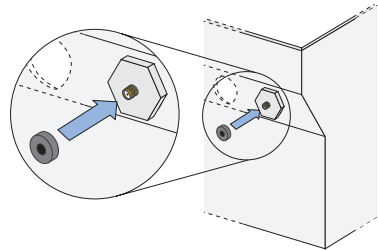
**This chapter is intended solely for qualified electricians!
All work on the inverter may only be performed by qualified electricians! Please follow all safety instructions contained in the inverter documentation!**

If the Radio Piggy-Back has already been installed at the factory, the antenna can be fastened to the inverter as follows.

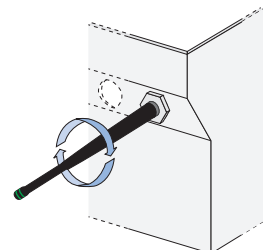
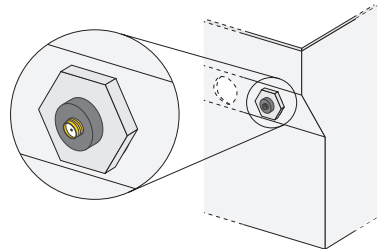
1. Remove the protective cap from the thread of the antenna on the inverter housing.



2. Plug the sealing on the thread of the antenna on the inverter housing.



3. Screw the antenna tip to the thread of the antenna on the inverter housing.



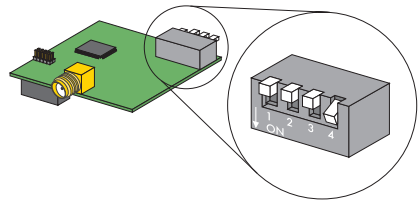
5.2 DIP Switch Setting on the Radio Piggy-Back

This chapter is intended solely for qualified electricians!
All work on the inverter may only be performed by qualified electricians! Please follow all safety instructions contained in the inverter documentation!



The Radio Piggy-Backs can be set to groups via the DIP switches (0 to 15, see figures below). This allows you to exclude other inverters when recording data with the Sunny Beam, if too many other inverters in the vicinity are set to the same group. The Sunny Beam and the Radio Piggy-Backs must always be set to a common group. The Piggy-Backs are set to group 1 by default.

You can change the group for the Radio Piggy-Back by pushing the white DIP switches on the Radio Piggy-Back (see figure at right) up or down. Please refer to the overview to find out which position of the switches corresponds to which group. See chapter "Setting a Group for the Sunny Beam" on page 59 on how to change the group setting for the Sunny Beam.



DIP switches

Overview of Radio Piggy-Back group settings

	0		6		12
	1 (factory setting)		7		13
	2		8		14
	3		9		15
	4		10		
	5		11		

5.3 Installation of the external Antenna Kit

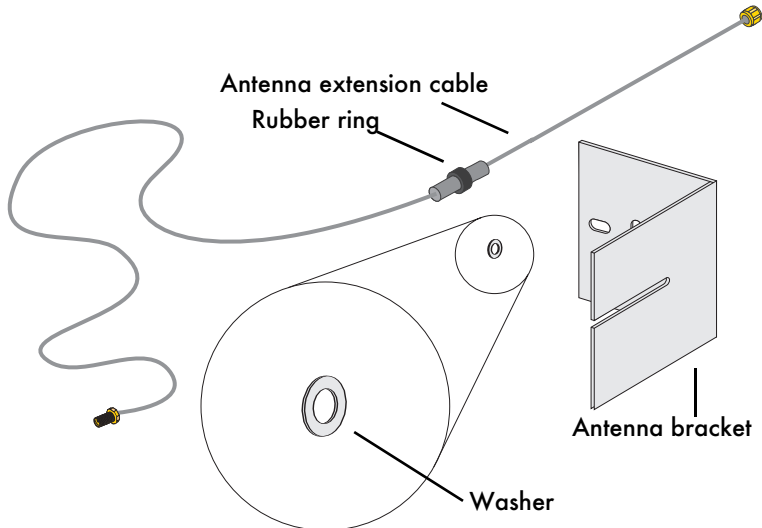


**This chapter is intended solely for qualified electricians!
All work on the inverter may only be performed by qualified electricians! Please follow all safety instructions contained in the inverter documentation!**



The external antenna is not suitable for mounting outdoors!

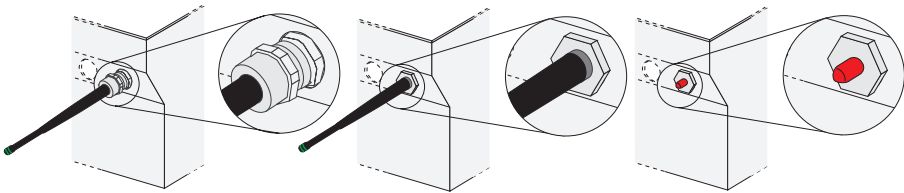
The external antenna kit (see chapter 2.4 Accessories) allows you to improve the antenna alignment, if you are unable to install the inverter and Sunny Beam in an optimal position. If necessary, walls or a ceiling can be bridged. If this is the case, lay the antenna cable through the wall or ceiling and mount the antenna bracket on the other side.



Scope of delivery for external antenna kit

Differences in the initial situation

The installation of an external antenna kit is determined by the initial situation at the inverter.



Initial situation (A)

Initial situation (B)
with unscrewable antenna

Initial situation (C)
equipped with Radio
Piggy-Back by default

For initial situation **(A)** please refer to section "Retrofitting for initial Situation (A)" on page 28 .

For initial situation **(B)** please refer to section "Retrofitting for initial Situation (B)" on page 32.

For initial situation **(C)**, with the Radio Piggy-Back installed at the factory, please refer to section "Installation for initial Situation (C)" on page 34

5.3.1 Retrofitting for initial Situation (A)

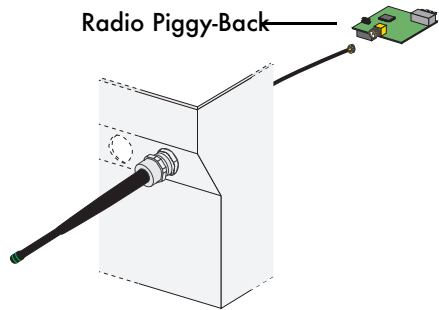


**This chapter is intended solely for qualified electricians!
All work on the inverter may only be performed by qualified electricians! Please follow all safety instructions contained in the inverter documentation!**

This section refers solely to initial situation (A). For the different initial situations, please refer to section "Installation of the external Antenna Kit" on page 26.

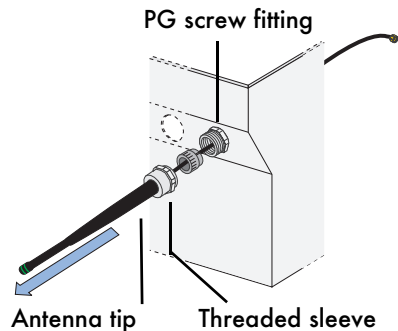
Remove existing antenna.

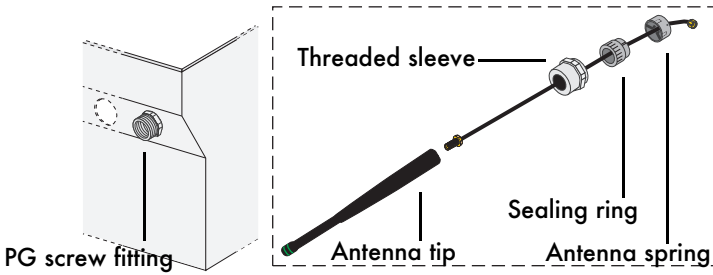
1. Open the inverter as described in the inverter documentation.
2. Unscrew the antenna cable from the antenna connection on the Radio Piggy-Back in the inverter housing.



3. Unscrew the threaded sleeve of the PG screw fitting.
4. Remove the entire antenna cable from the inverter housing by pulling the antenna tip.

In the process, the antenna spring is also removed from the PG screw fitting. The PG screw fitting itself remains permanently attached to the inverter housing (see figure on the following page).

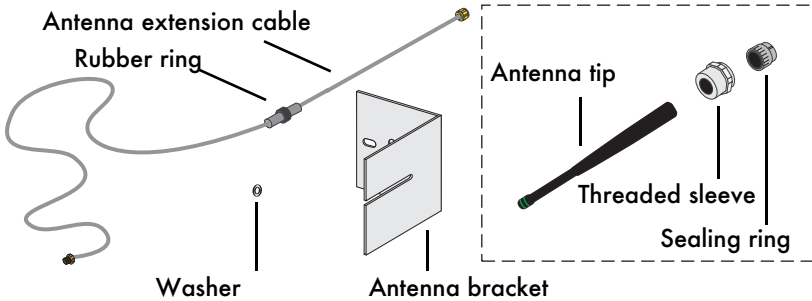




5. Unscrew the antenna tip and remove the threaded sleeve and the sealing ring from the antenna cable. The antenna cable and the antenna spring are no longer required.

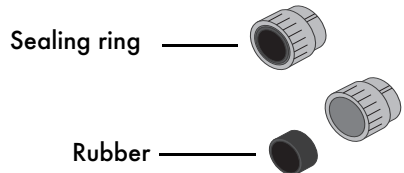
Install antenna extension cable

You need the parts shown in the figure to install the external antenna.

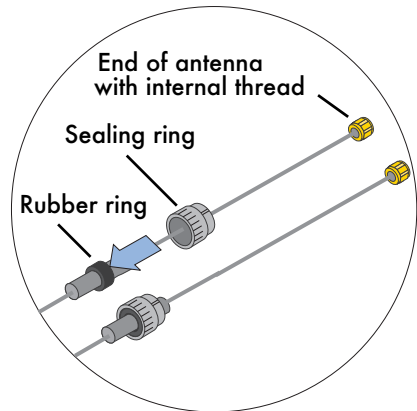


The parts of the old antenna in the dotted box (see figure above) are now mounted to the cable of the external antenna.

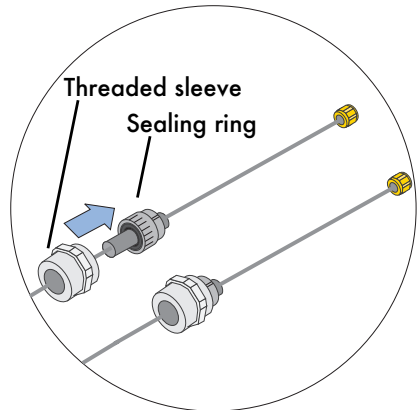
6. Remove the rubber from the sealing ring.



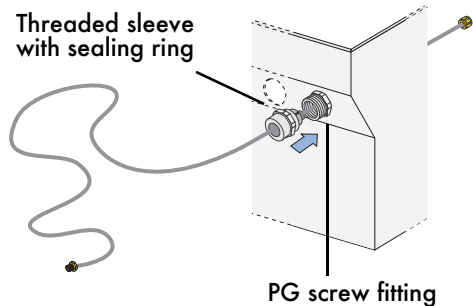
7. Take the antenna extension cable and attach the sealing ring to the rubber ring as shown in the figure on the right. Ensure that the rubber ring is in the centre of the thick part of the cable.



8. Attach the threaded sleeve to the sealing ring as shown in the figure.



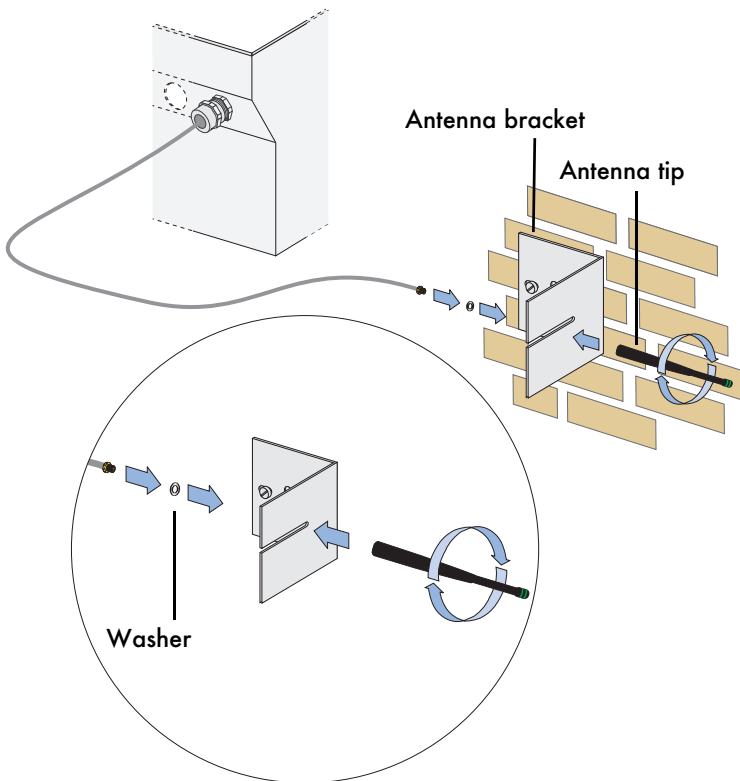
9. Insert the end of the cable with the internal thread through the opening of the PG screw fitting on the inverter housing.
10. Insert the threaded sleeve with the sealing ring into the PG screw fitting, rotating it slightly until the catch of the sealing ring locks into place in the recesses.
11. Attach the threaded sleeve to the PG screw fitting on the inverter housing.
12. Connect the end of the antenna cable in the inverter to the antenna connection on the Radio Piggy-Back.



Fasten antenna bracket

1. Remove the protective foil from the antenna bracket.
2. Secure the antenna bracket with screws in a suitable position relative to the inverter. See chapter 5.4.2 External Antenna Kit on the advantages of horizontal or vertical mounting.
3. Place the washer on the external thread of the antenna cable and insert the external thread through the slit in the antenna bracket.
4. Screw the antenna tip to the external thread of the antenna cable from the other side of the antenna bracket.

Avoid major kinking in the antenna cable.



5.3.2 Retrofitting for initial Situation (B)

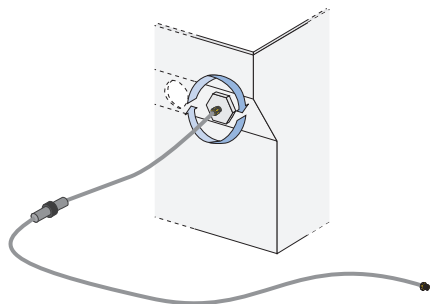
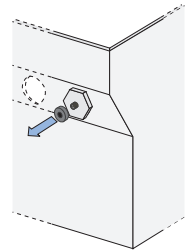
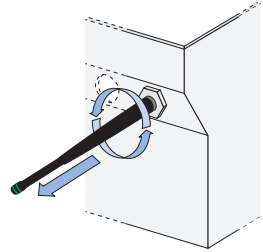


**This chapter is intended solely for qualified electricians!
All work on the inverter may only be performed by qualified electricians! Please follow all safety instructions contained in the inverter documentation!**

This section refers solely to initial situation (B). For the different initial situations, please refer to section "Installation of the external Antenna Kit" on page 26.

Fasten antenna extension cable

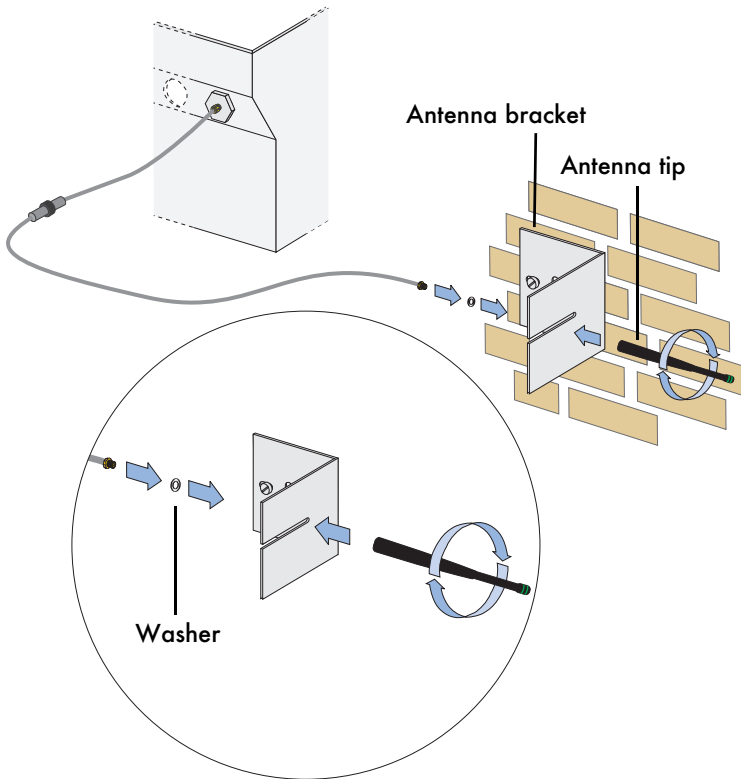
1. Unscrew the antenna tip from the inverter housing. It will still be required later.
2. Remove the sealing from the thread of the antenna.
3. Screw the antennaextension cable to the thread of the antenna on the inverter housing.



Fasten antenna bracket

1. Remove the protective foil from the antenna bracket.
2. Secure the antenna bracket with screws in a suitable position relative to the inverter. See chapter "External Antenna Kit" on page 38 on the advantages of horizontal or vertical mounting.
3. Place the washer on the external thread of the antenna cable and insert the external thread through the slit in the antenna bracket.
4. Screw the antenna tip to the external thread of the antenna cable from the other side of the antenna bracket.

Avoid major kinking in the antenna cable.

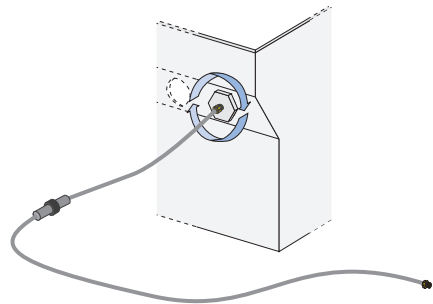
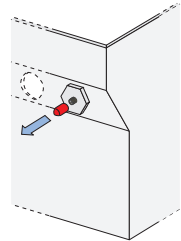


5.3.3 Installation for initial Situation (C)

This section refers solely to initial situation (C). If the Radio Piggy-Back has already been installed at the factory, the external antenna kit can be fastened to the inverter as follows. For the different initial situations, please refer to section "Installation of the external Antenna Kit" on page 26.

Fasten antenna extension cable

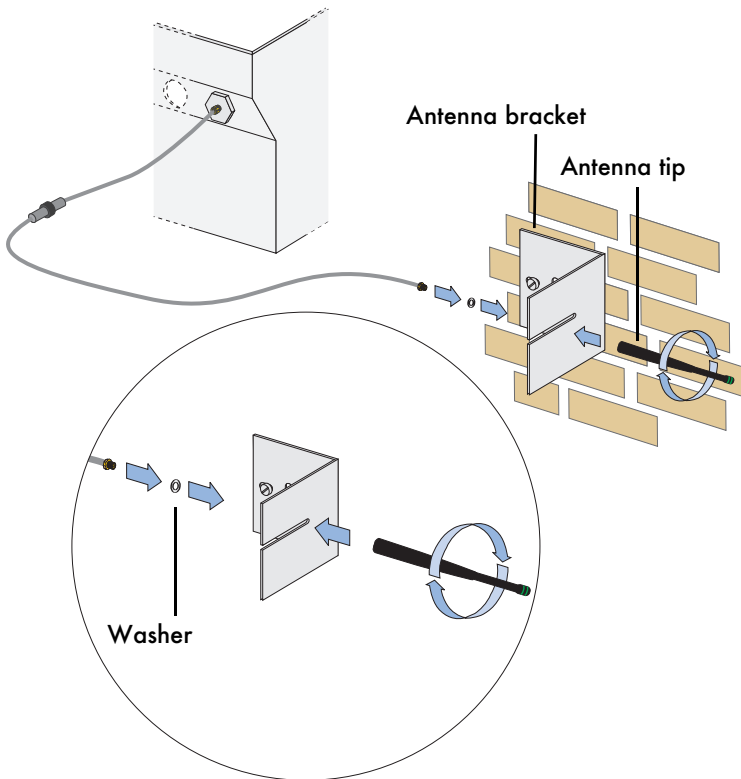
1. Remove the protective cap from the thread of the antenna on the inverter housing.
2. Screw the antenna extension cable to the thread of the antenna on the inverter housing.



Install antenna bracket

3. Remove the protective foil from the antenna bracket.
4. Secure the antenna bracket with screws in a suitable position relative to the inverter. See chapter 5.4.2 External Antenna Kit on the advantages of horizontal or vertical mounting.
5. Place the washer on the external thread of the antenna cable and insert the external thread through the slit in the antenna bracket.
6. Screw the antenna tip to the external thread of the antenna cable from the other side of the antenna bracket.

Avoid major kinking in the antenna cable.



5.4 Basic Information on Radio Transfer

The radio range of the antenna for the Sunny Beam in buildings is 30 m and up to 100 m in the open air. The ambient conditions and the distance from the Sunny Beam to the antenna are the critical factors for the radio range. The greater the absorbing qualities of walls, doors etc., the lower the range.

If the ideal location of the inverter relative to the Sunny Beam as described in chapter "Antenna on Inverter" on page 37 cannot be selected, you can bridge walls or ceilings etc. using the external antenna kit (see chapter "Accessories" on page 12 for the SMA order number).

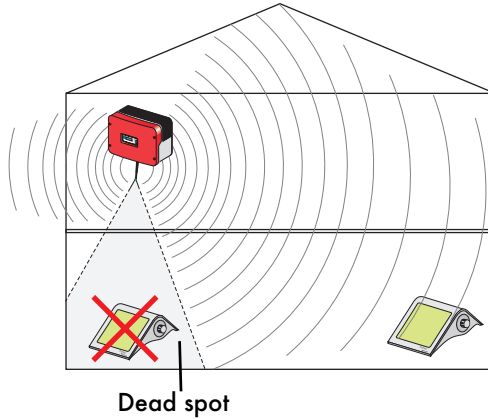


The external antenna is not suitable for mounting outdoors!

5.4.1 Antenna on Inverter

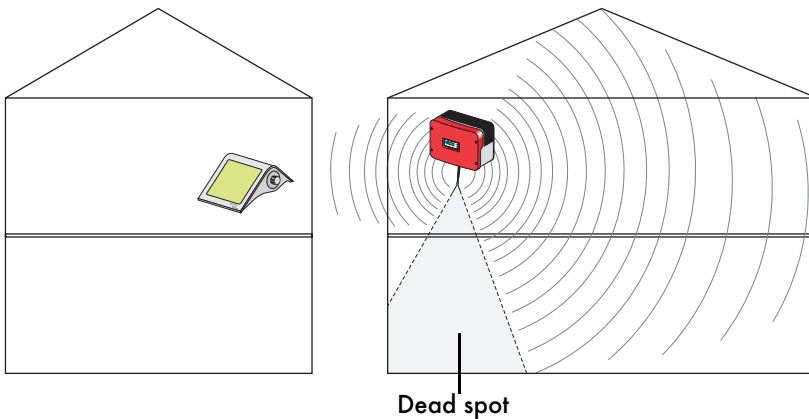
Standard case from storey to storey

If you installed your inverter e.g. in the attic of your building, ensure that the Sunny Beam is not in the dead spot directly below the inverter in the building. If you still have poor reception in the building, you can use the external antenna kit to bridge ceilings or walls, as described in chapter "External Antenna Kit" on page 38.



From building to building

For example, if you have installed your inverter in an adjacent building on your site, vertical mounting of the antenna is appropriate.



5.4.2 External Antenna Kit

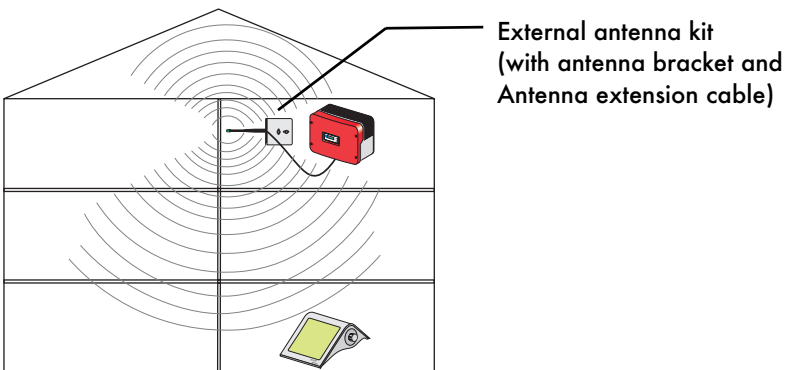
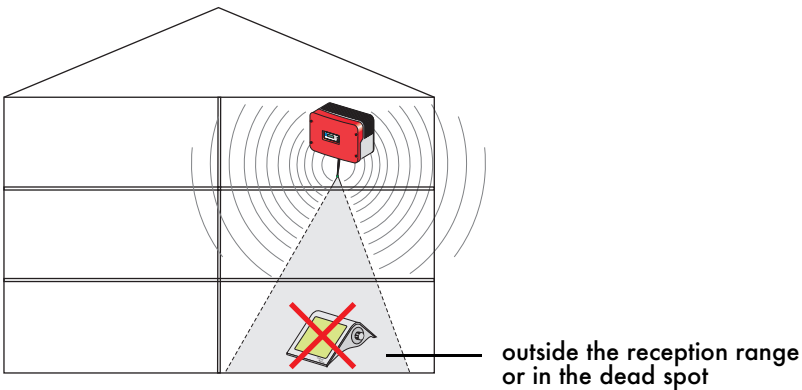
The external antenna kit (see chapter "Accessories" on page 12 for SMA order number) can be installed horizontally and vertically, which allows the antenna position to be adjusted for local conditions.



The external antenna is not suitable for mounting outdoors!

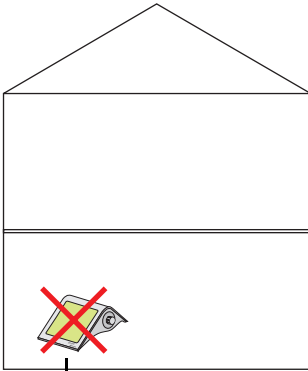
From storey to storey with an external antenna

If you have very absorbent walls or ceilings in your building which impair the radio connection between the inverter and the Sunny Beam, you can circumvent this problem using the external antenna and antenna bracket. Simply lay the antenna cable through a wall or ceiling and mount the antenna bracket on the other side. The antenna bracket must then be mounted horizontally as shown in the figure.

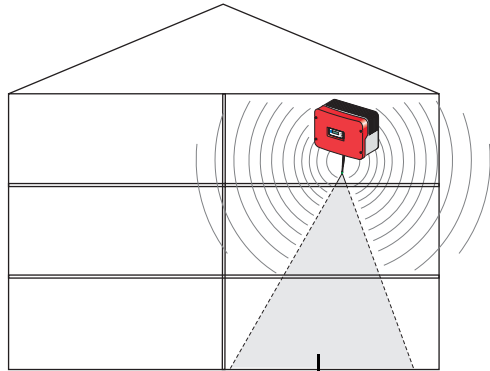


From building to building with an external antenna

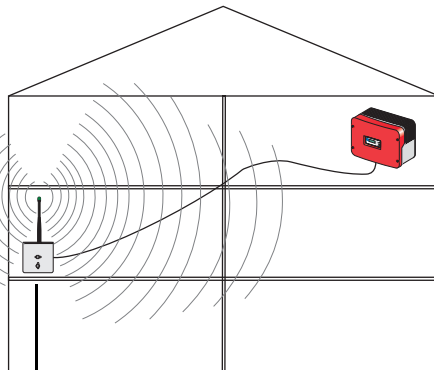
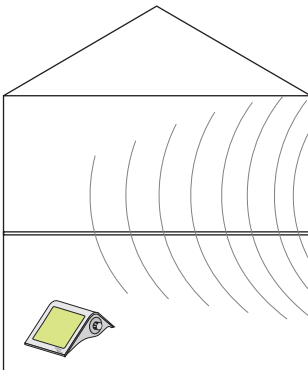
If the radio connection from building to building is not sufficient, you can bridge walls using the antenna bracket by laying the antenna cable through the wall and mounting the antenna bracket on the other side. The antenna bracket must then be mounted vertically as shown in the figure.



outside the reception range



Dead spot



External antenna kit
(with antenna bracket and extension cable)

6 Operating the Sunny Beam

6.1 Inserting the Batteries

Use only the enclosed AccuCell AC 1800 type batteries! Other accumulators or batteries are not suitable and may leak! Please observe all the indications on the accumulators and under the battery compartment cover.



Charge the batteries only in the Sunny Beam! Other chargers destroy the batteries! Do not use the Sunny Beam as a charger for other batteries or for different types of accumulator as the Sunny Beam and/or the other batteries or accumulators will be damaged.



The batteries must be at the same charge level. You should therefore always use the batteries in pairs and always replace both batteries at the same time.

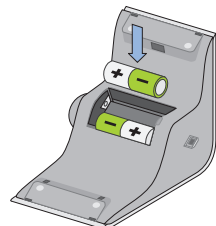
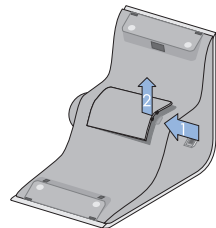


The batteries may not be used for other devices, as the higher discharge rate damages the batteries.



Before you can start the Sunny Beam, you must insert the enclosed batteries, even if the display is already on because there is sufficient sunlight.

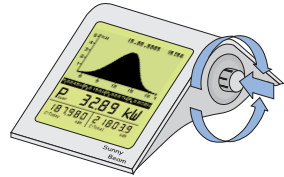
1. Open the battery compartment on the underside of the Sunny Beam.
2. Insert the enclosed AccuCell AC 1800 type batteries the right way around as shown in the figure at right.



6.2 Initial Startup

6.2.1 The Rotating Push Button

The "rotating push button" can be pressed and turned back and forth (see figure at right). Rotating the "rotating push button" on the Sunny Beam allows you to select the individual menu items. The selection frame with an arrow always shows the selected menu item (see example figures below).

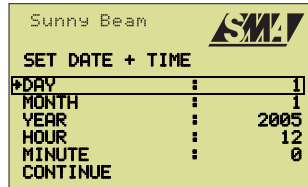
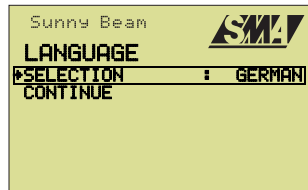


Pressing the "rotating push button" on the Sunny Beam allows you to open or activate the selected menu item. Menu items are activated when settings can be made. You can then change a setting by rotating the "rotating push button". In the remainder of the manual, the "rotating push button" will only be referred to as "button".

6.2.2 Initial Settings

On initial startup, after the batteries are inserted, the "LANGUAGE" menu is automatically displayed (see figure at right).

1. If you want to change the language, press the button once to activate the menu item. The background of the "GERMAN" setting becomes dark and it can now be changed.
2. Rotate the button and set the required language. Then press the button to save the selection.
3. Select the "CONTINUE" menu point and press the button to activate the menu item. The menu for setting the date and time opens automatically.
4. Set date and time.
If you have finished the settings, select the "CONTINUE" menu point. The settings are saved.



You now need to register your inverter with the Sunny Beam.

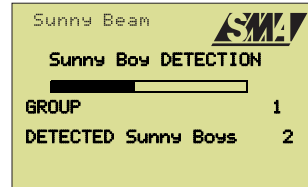
The inverters you want to detect with the Sunny Beam must be ready for feeding.



5. Turn the button and set the radiofrequency which you have set for the Radio Piggy-Back in the inverter.
6. Press the button to begin registering the inverter.

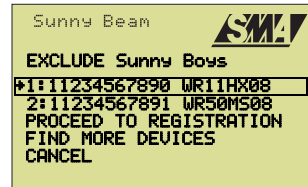


The Sunny Beam will now look for inverters set to the group that you have selected (see figure at right). The number of inverters detected will be indicated as shown in the figure. Wait for the search to end.



The group setting for the Radio Piggy-Back and the Sunny Beam must always match. Press the button to cancel the search process. Set the Sunny Beam group as described in chapter "Setting a Group for the Sunny Beam" on page 59 and detect the inverters again as described in chapter "Detecting and Selecting Inverters" on page 59.

When the search is completed, the "Exclude Sunny Boys" menu opens automatically and the inverters found are listed with their serial numbers and device type (see figure at right).

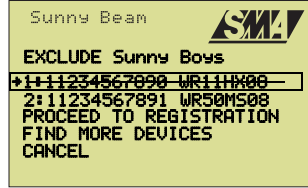


If you want to register all inverters displayed (max. four), continue reading at point 9 "Register inverters".

If other inverters are shown, or your inverters which you do not want to monitor, they must be excluded before you can register the remaining inverters. If this is the case, continue reading at point 7 "Excluding inverters".

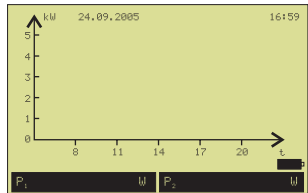
Excluding inverters

7. Select an inverter you want to exclude from monitoring and press the button. The serial number and the device type are crossed out on the display (see figure at right). Repeat this procedure to exclude other inverters.
8. Activate the "FIND MORE DEVICES" menu item to search for other inverters. Continue with point 9 when all inverters you want to monitor are displayed.



Registering inverters

9. Activate the "PROCEED TO REGISTRATION" menu item. Sunny Beam then saves the inverters and switches automatically to the normal view at the end of the registration process (see the figure at right). That completes the registration process.



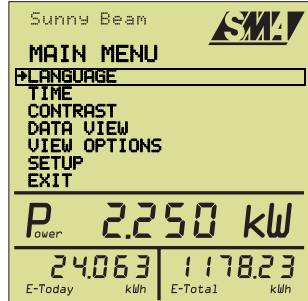
It may take a few minutes before the first system values are displayed.

If the Sunny Beam does not find any inverters, you can cancel the search by pressing the button. The "EXCLUDE Sunny Boys" menu opens automatically. Activate the "CANCEL" menu item. The main menu opens. Chapter 8 Troubleshooting/Problem Solving contains troubleshooting instructions.

6.3 The display Elements

6.3.1 Menu View

The individual menu items are listed in the menu view. List of menu items (see examples in figure at right). Select "EXIT" in the main menu to return from the menu view to the normal view.



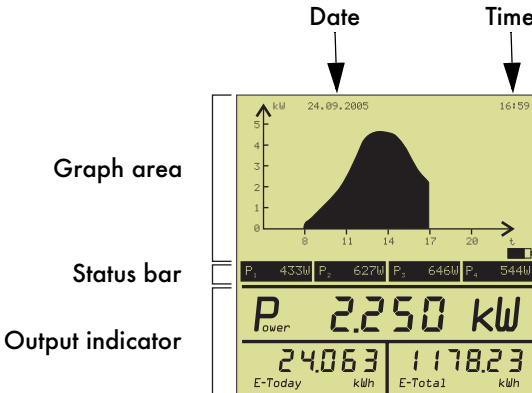
6.3.2 Normal View

The normal view is divided into three sections:

- Graph area
- Status bar
- Output indicator

The time, the date and the battery status are shown in the normal view. The output indicator is always displayed except between 9:00 pm and 4:00 am in night mode.

The night mode on a Sunny Beam firmware version larger than V2.17 will automatically adapt to the inverter's behaviour.

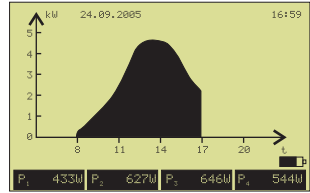


Press the button to return from the normal view to the menu view.

6.3.3 Graph Area

Total output

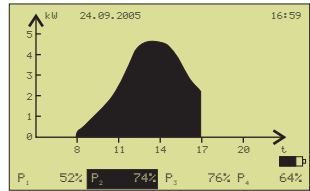
In the graph area of the normal view, the total output data of your inverters is shown graphically (see figure at right).



Individual output

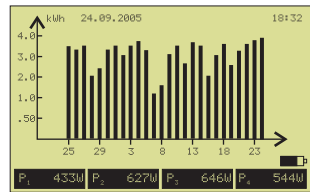
Rotate the button to show the individual output data of the inverters graphically (P1, P2, P3, P4). You can call up the inverters to which P1 to P4 are assigned in the menu (see chapter "Adjusting the Energy Meter in the Sunny Beam" on page 55).

After all data of the individual inverters has been forwarded, all daily energy yields will be indicated when you rotate the button.



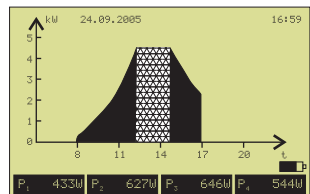
Daily energy yield

The total daily energy yield will be displayed as a bar chart. You can choose to set whether the daily energy yield is shown for the current month or for the previous 31 days (see chapter "History" on page 57).



Hatched surfaces

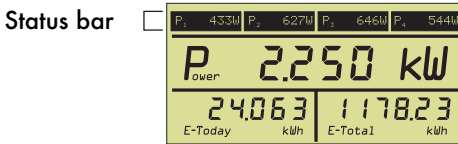
Hatched surfaces indicate that the radio contact between the inverter and the Sunny Beam was faulty or interrupted. (for troubleshooting see section "Hatched Surfaces" on page 79).



6.3.4 Status Bar

The following information is shown in the status bar by default:

- Output of the individual inverters (P1, P2, P3, P4)



Additional information which can be set:

- Percentage output of the inverters
- Inverter device types
- Inverter serial numbers
- Yield in Euro
- CO₂ savings

The information is displayed alternately in the status bar. See chapter "Setting the Status Bar" on page 56 on how to change the view options for the status bar.

If there is a system error, the current status and error messages are displayed in the status bar. If an inverter indicates a fault, first the current output, then the error (e.g. Uac-Bfr) and finally the status message (or Error) are displayed.

Error messages are specific to each inverter and are described in the "error messages" section of your inverter documentation. You can find the current inverter documentation at any time in the download section at www.SMA.de.

6.3.5 Output Indicator

The current output, the daily energy yield and the overall energy yield of the system are displayed in the output indicator. The yields and the output of the individual inverters are displayed when you rotate the button.

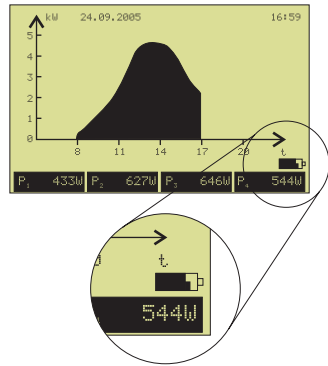
The output indicator is also displayed when the Sunny Beam switches to energy saving mode after a certain period (default setting: 5 minutes). The output indicator only switches itself off between 9:00 pm and 4:00 am in night mode. The night mode on a Sunny Beam firmware version larger than V2.17 will automatically adapt to the inverter's behaviour.



6.3.6 Battery Symbol/Charging the Batteries

Battery symbol

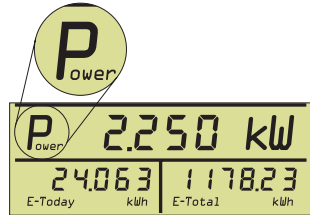
The battery symbol is displayed above the status bar in the normal view. The battery symbol fill level decreases in line with the decreasing charge level.



Charging the batteries

When the "P" in the "Power" indicator flashes or the battery symbol is empty, proceed as follows to charge the batteries:

- Place the Sunny Beam in a sunny location, so that sufficient sunlight strikes the solar cell. The batteries are charged via the integrated solar cell.
- If the sunlight is insufficient, the Sunny Beam can be charged via the USB interface of a PC using the enclosed USB connecting cable. If no PC is available, you can use the SMA USB power supply unit (not included). You can order it from SMA under the SMA order number: SBEAM-NT.



Use only the enclosed AccuCell AC 1800 type batteries! Other accumulators or batteries are not suitable and may leak! Follow all instructions on the batteries and on the inside of the battery compartment cover.



Charge the batteries only in the Sunny Beam! Other chargers destroy the batteries! Do not use the Sunny Beam as a charger for other batteries or other types of accumulator as the Sunny Beam and/or the batteries or accumulators will be damaged.



The batteries must be at the same charge level. You should therefore always use the batteries in pairs and always replace both batteries at the same time.

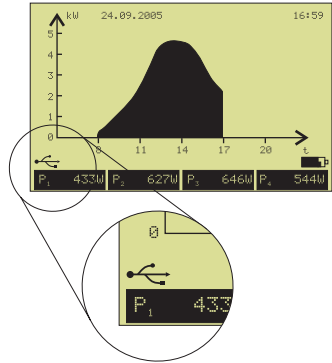


The batteries may not be used for other devices, as the higher discharge rate damages the batteries.



6.3.7 USB Symbol

The USB symbol is displayed in the status bar in the normal view when the Sunny Beam is connected to the PC using the USB connecting cable.

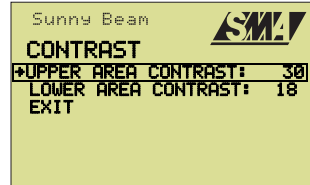


6.4 Sunny Beam Basic Settings

6.4.1 Setting the Contrast

You can set the contrast of the display to adjust the legibility to the sight conditions. The contrast of the upper (graph area, status bar) and the lower display sections (output indicator) can be set separately from one another.

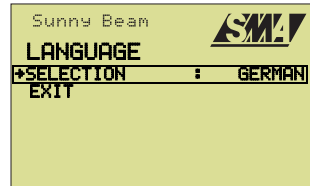
1. Select "CONTRAST" in the main menu.
2. Select "UPPER AREA CONTRAST" or "LOWER AREA CONTRAST".
3. Rotate the button and set the required contrast. The changes can be seen immediately and are saved.



6.4.2 Setting the Language

The Sunny Beam menu can be set to various languages.

1. In the main menu, "LANGUAGE" in the main menu.
2. Select "SELECTION" and set the required language. The language changes immediately to that set, and the setting is saved.



6.4.3 Setting the Date and Time

The time is displayed in the top right corner of the display in the normal view.

1. Select "TIME" in the main menu.
2. Select "SET DATE + TIME".
3. Set the date and time.
4. Select "EXIT" repeatedly until the prompt window opens to save the setting.
5. Select "Yes" in the prompt window. The settings are saved.

Sunny Beam		SMA
SET DATE + TIME		
DAY	:	1
MONTH	:	1
YEAR	:	2005
HOUR	:	12
MINUTE	:	0
EXIT		



It is important that the correct time is set for the Sunny Beam to function properly, as there are time-dependent reactions (night mode).



The 12-hour format will display the time between midday and 23:59 as "pm" (post meridiem, latin for "after midday") and the time between midnight and 11:59 as "am" (ante meridiem, latin for "before midday").

Formatting the date

1. In the main menu, "TIME" in the main menu.
2. Select "DATE FORMAT".
3. Set the required date format.
4. Select "DATE SEPARATOR".
5. Set the required date separator.
6. Select "EXIT" repeatedly until the prompt window opens to save the setting.
7. Select "Yes" in the prompt window. The settings are saved.

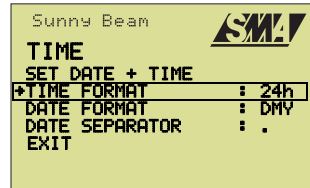
Sunny Beam		SMA
TIME		
SET DATE + TIME		
TIME FORMAT	:	24h
DATE FORMAT	:	DMY
DATE SEPARATOR	:	.
EXIT		

Sunny Beam		SMA
TIME		
SET DATE + TIME		
TIME FORMAT	:	24h
DATE FORMAT	:	DMY
DATE SEPARATOR	:	.
EXIT		

Setting the time format

The time can be set to 24 hour or 12 hour format.

1. Select "TIME" in the main menu.
2. Select "TIME FORMAT".
3. Set the required time format (24h or 12h).
4. Select "EXIT" repeatedly until the prompt window opens to save the setting.
5. Select "Yes" in the prompt window. The settings are saved.



The 12-hour format will display the time between midday and 23:59 as "pm" (post meridiem, latin. for "after midday") and the time between midnight and 11:59 as "am" (ante meridiem, latin for "before midday").




6.4.4 Energy Saving Options

If the button on the Sunny Beam is not used for a certain amount of time, the device switches to energy saving mode (default setting: 5 minutes). In this mode, the graph area and the status bar are switched off. The output indicator is always displayed (except between 9:00 pm and 4:00 am in night mode).

The night mode on a Sunny Beam firmware version larger than V2.17 will automatically adapt to the inverter's behaviour.

The period which expires before the Sunny Beam switches to energy saving mode can be set. The energy saving mode is switched off if no value is set (- - -).

1. In the main menu, "VIEW OPTIONS".
2. Select "DISPLAY OFF DELAY".
3. Set the required time.
4. Select "EXIT" repeatedly until the prompt window opens to save the setting.
5. Select "Yes" in the prompt window. The settings are saved.


Sunny Beam		
VIEW OPTIONS		
DATA CHANGE FREQ.	:	5s
DATA REQUEST FREQ.	:	30s
DISPLAY OFF DELAY	:	5m
HISTORY	:	31D
EXIT		

You can set the data request frequency at which the Sunny Beam requests data from the inverters between 15 s and 120 s. The higher the value set for the data request frequency, the lower the Sunny Beam's energy consumption.



Lower values (under 15 seconds) should only be set for commissioning purposes (testing the radio connection) and not long-term.

1. In the main menu, "VIEW OPTIONS" in the main menu.
2. Select "DATA REQUEST FREQ.".
3. Set the required data request frequency.
4. Select "EXIT" repeatedly until the prompt window opens to save the setting.
5. Select "Yes" in the prompt window. The settings are saved.

Sunny Beam		
VIEW OPTIONS		
DATA CHANGE FREQ.	:	5s
DATA REQUEST FREQ.	:	30s
DISPLAY OFF DELAY	:	5m
HISTORY	:	31D
EXIT		

6.4.5 Adjusting the Energy Meter in the Sunny Beam

The individual yield values (kWh) of the registered inverters can be adjusted in the Sunny Beam. This may be necessary if an inverter is replaced and the yield of the old inverter is to be used.

1. Select "SETUP" in the main menu.
2. Select "ENERGY METER ADJUSTMENT". In addition to the numbers 1, 2, 3 and 4 (depending on the number of inverters registered), the device type and the serial number of the inverters are also listed. This allows you to see which number is assigned to each inverter in the Sunny Beam. In the table below, in addition to the inverter number, there is:
 "OUTPUT" = the inverter's previous total output
 "OFFSET" = the value to be added to the OUTPUT
 "DISPLAY" = the newly calculated output based on the values taken from OUTPUT and OFFSET
3. Select the inverter whose values you want to change.

Inverter device type/serial numbers →

Yield, offset, view →

ENERGY METER ADJUSTMENT			
1:	WR11HX08	SN:	1234567890
2:	WR50MS08	SN:	1234567891
	YIELD	OFFSET	VIEW
1:	2.0	1.5	3.5
2:	3.0	0.0	3.0
	5.0	1.5	6.5
ACCEPT			
CANCEL			

4. Rotate the button and change the yield value of the inverter as required. Positive and negative values can be set.
5. Select "EXIT" repeatedly until the prompt window opens to save the setting.
6. Select "Yes" in the prompt window. The settings are saved.

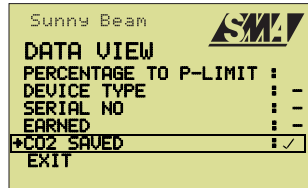
6.5 Setting the Status Bar

The status bar is described in chapter "Status Bar" on page 47.

6.5.1 Adding Information to the Status Bar

The total and individual output of the inverters are displayed alternately in the status bar. Other information can be selected, which is then also displayed in the status bar:

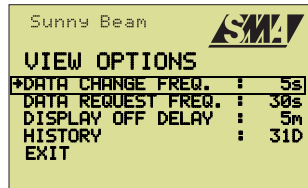
- Percentage output of the inverters
 - Device types of the inverters (in the individual output display, if more than one inverter is registered)
 - Serial numbers of the inverters (in the individual output display, if more than one inverter is registered)
 - Yield in Euro
 - CO₂ savings
1. Select "DATA VIEW" in the main menu. A dash after the colon indicates that this information is not shown in the status bar. A tick indicates that the information is shown.
 2. Select the required information and set whether the information in the status bar is to be displayed or not.
 3. Select "EXIT" repeatedly until the prompt window opens to save the setting.
 4. Select "Yes" in the prompt window. The settings are saved.



6.5.2 Changing the Data Change Frequency

Information alternates in the status bar; the time interval between display changes can be set.

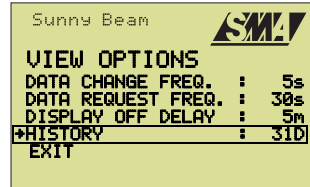
1. In the main menu, select "VIEW OPTIONS".
2. Select "DATA CHANGE FREQ.".
3. Set the required data change frequency.
4. Select "EXIT" repeatedly until the prompt window opens to save the setting.
5. Select "Yes" in the prompt window. The settings are saved.



6.5.3 History

The graph area will display the total daily energy yield (see chapter 6.3.3 Graph Area). You can choose to set whether the daily energy yield is shown for the previous 31 days or the current month.

1. Select "VIEW OPTIONS" in the main menu.
2. Select "HISTORY".
3. Rotate the button and set the required period.
4. Select "EXIT" repeatedly until the prompt window opens to save the setting.
5. Select "Yes" in the prompt window. The settings are saved.




6.5.4 Setting Factors

6.5.4.1 Setting Yield per kWh

The yield per kWh depends on the location and system type.


1. Select "SETUP" in the main menu.
2. Select "COEFFICIENTS OF BALANCE".
3. Select "EARNING/kWh".
4. Rotate the button and set the required value.
5. Select "EXIT" repeatedly until the prompt window opens to save the setting.
6. Select "Yes" in the prompt window. The settings are saved.

Sunny Beam		
COEFFICIENTS OF BALANCE		
EARNING/kWh	:	0.5740
CURRENCY	:	\$
k9 CO2/kWh	:	0.70
EXIT		

6.5.4.2 Setting the Currency

You can select different currencies.


1. In the main menu, "SETUP" in the main menu.
2. Select "COEFFICIENTS OF BALANCE".
3. Select "CURRENCY".
4. Rotate the button and set the required currency.
5. Select "EXIT" repeatedly until the prompt window opens to save the setting.
6. Select "Yes" in the prompt window. The settings are saved.

Sunny Beam		
COEFFICIENTS OF BALANCE		
EARNING/kWh	:	0.5740
CURRENCY	:	\$
k9 CO2/kWh	:	0.70
EXIT		

6.5.4.3 Setting the CO₂-savings Factor


Your photovoltaic system contributes to reducing CO₂ emissions. The CO₂savings, e.g. compared with the current German electricity mix, is calculated with a factor of 0.7. This factor is set by default. The calculation factors are country-specific.

1. Select "SETUP" in the main menu.
2. Select "COEFFICIENTS OF BALANCE".
3. Select "k9 CO₂/kWh".
4. Rotate the button and set the corresponding value.
5. Select "EXIT" repeatedly until the prompt window opens to save the setting.
6. Select "Yes" in the prompt window. The settings are saved.

Sunny Beam		
COEFFICIENTS OF BALANCE		
EARNING/kWh	:	0.5740
CURRENCY	:	\$
k9 CO2/kWh	:	0.70
EXIT		

6.6 Service Settings

6.6.1 Setting a Group for the Sunny Beam

The Radio Piggy-Backs in the inverters and the Sunny Beam must be set to a common group. 

The Piggy-Backs are set to group 1 by default. You only have to change the group if you want to detect several other inverters in group 1. Check the group setting for the Sunny Beam as follows:

1. Select "SETUP" in the main menu.
2. Select "PLANT".
3. Select "RADIO FREQUENCY".
4. Rotate the button and set the required group (0 to 15).
5. Select "EXIT" repeatedly until the prompt window opens to save the setting.
6. Select "Yes" in the prompt window. The settings are saved.



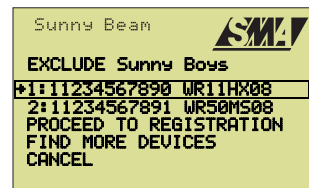
6.6.2 Detecting and Selecting Inverters

If you wish to select inverters retrospectively for monitoring with the Sunny Beam, they must first be detected by the Sunny Beam. No more than four inverters can be monitored. The Radio Piggy-Backs and the Sunny Beam must be set to the same group for the Sunny Beam to be able to detect the inverters. Before detection, ensure that the group settings match (see chapter "Setting a Group for the Sunny Beam" on page 59 and chapter "DIP Switch Setting on the Radio Piggy-Back" on page 25).

Detecting inverters

1. Select "SETUP" in the main menu.
2. Select "PLANT".
3. Select "Sunny Boy DETECTION".

The Sunny Beam then searches for inverters set to the same group. When the search is complete, the "EXCLUDE Sunny Boys" menu opens automatically again and the inverters found are listed with their serial number and device type (see figure above).

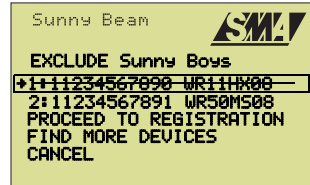


If you want to register all inverters displayed (max. four), continue reading at point 6 "Register inverters".

The Sunny Beam radio range may also have reached and found "other" inverters, e.g. those that are fitted in neighbouring buildings. If other inverters are shown, or your inverters which you do not want to monitor, they must be excluded before you can register the remaining inverters. If this is the case, continue reading at point 4 "Excluding inverters".

Excluding inverters

4. Select the serial number of the inverter you wish to exclude from monitoring. The serial number is then crossed out on the display. Repeat this procedure to exclude other inverters.
5. Select "FIND MORE DEVICES" if you want to search for other devices. Continue with point 6.



Registering inverters

6. Select "PROCEED TO REGISTRATION". The device then registers the listed inverters automatically and returns to the "PLANT" menu at the end of the registration process. The settings are saved immediately.

6.6.3 Setting the Data Request Frequency

You can set the data request frequency at which the Sunny Beam requests data from the inverters between 15 s and 120 s.

Lower values (under 15 seconds) should only be set for commissioning purposes (testing the radio connection) and not long-term.



1. In the main menu, "VIEW OPTIONS" in the main menu.
2. Select "DATA REQUEST FREQ."
3. Set the required data request frequency.
4. Select "EXIT" repeatedly until the prompt window opens to save the setting.
5. Select "Yes" in the prompt window. The settings are saved.

Sunny Beam	
VIEW OPTIONS	
DATA CHANGE FREQ.	: 5s
DATA REQUEST FREQ.	: 30s
DISPLAY OFF DELAY	: 5m
HISTORY	: 31D
EXIT	

The lower the data request frequency value, the higher the Sunny Beam's energy consumption.

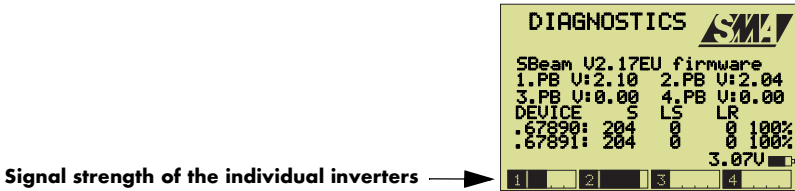


6.6.4 Signal Strength of the Registered Inverters

The signal strength of the registered inverters specifies the strength of the signal between the Sunny Beam and the Radio Piggy-Back in the inverters.

1. Select "SETUP" in the main menu.
2. Select "SERVICE".
3. Select "DIAGNOSTICS".

The signal strength of the individual registered inverters (1, 2, 3, 4) is illustrated by the bar graph (see figure below). The longer the bar, the better the signal strength.



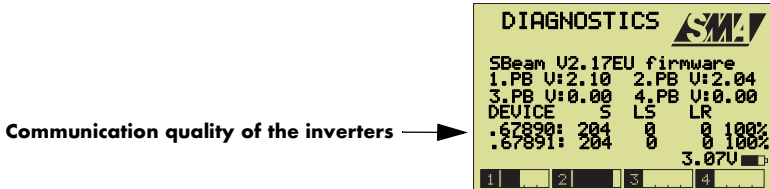
→ *Fluctuations in the bar graph are normal. In this context, you should also note the communication quality in chapter "Calling up the Communication Quality" on page 63.*

6.6.5 Calling up the Communication Quality

The communication quality specifies the relationship between received and sent data packets of the registered inverters.

1. Select "SETUP" in the main menu.
2. Select "SERVICE".
3. Select "DIAGNOSTICS".

This displays the communication quality of the registered inverters (see figure below).



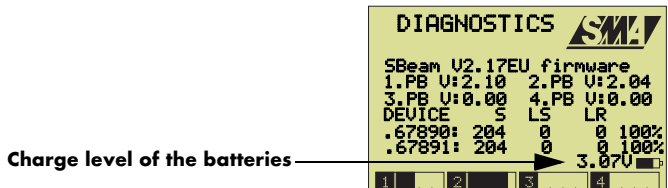
The registered inverters are listed with the last five digits of the serial number. The following values are also specified: "S"= data packets sent, "LS"= data packets lost on sending and "LR" = data packets lost on receipt. This is followed by the communication quality calculated in "%".

If the communication quality is less than 30 %, check the antenna alignment as described in chapter "Calling up the Communication Quality" on page 63. ←

6.6.6 Calling up the exact Battery Level

You can call up the exact charge level of the batteries in volts in the menu.

1. Select "SETUP" in the main menu.
2. Select "SERVICE".
3. Select "DIAGNOSTICS". You can view the exact charge level of the batteries in volts in front of the battery symbol (see figure below).



6.6.7 Transmitting Power

The transmitting power of the Piggy-Backs can be changed for tests. The following values can be set:

- **test** for temporary testing of the radio connection only
- **norm** for maximum permitted transmitting power in continuous operation (Piggy-Back firmware version 2.04 and higher)
- **---** The firmware version of the Piggy-Back is lower than 2.04 - the transmitting power of the Piggy-Back can therefore not be queried



*Only the **norm** setting is permitted for permanent operation, or **---** for Piggy-Backs of firmware versions lower than 2.04.*

1. Select "SETUP" in the main menu.
2. Select "SERVICE".
3. Select "TRANSMITTING POWER".
4. Select the Sunny Beam or a Piggy-Back and set the transmitting power accordingly.

Sunny Beam		SMA	
TRANSMITTING POWER			
Sunny Beam	:	:	norm
SBBeamPB 1	:	:	test
SBBeamPB 2	:	:	norm
SBBeamPB 3	:	:	---
SBBeamPB 4	:	:	---
EXIT			

6.6.8 Calling up the Firmware Versions

You can call up the firmware version of your Sunny Beam and the Radio Piggy-Backs in the menu in the registered inverters.

1. Select "SETUP" in the main menu.
2. Select "SERVICE".
3. Select "DIAGNOSTICS".

This allows you to view the firmware version of your Sunny Beam and the Radio Piggy-Backs (PB = Piggy-Back) in the registered inverters.

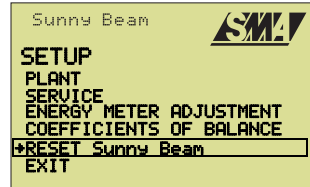
Sunny Beam firmware →
 Radio Piggy-Backs firmware →

DIAGNOSTICS		SMA	
SBBeam U2.17EU firmware			
1. PB U:	2.10	2. PB U:	2.04
3. PB U:	0.00	4. PB U:	0.00
DEVICE	S	LS	LR
.67890:	204	0	0 100%
.67891:	204	0	0 100%
3.07V			
1	2	3	4

6.6.9 Resetting the Sunny Beam

You can reset the Sunny Beam to delete your configuration settings. You must then search for and register the inverters again. The date and time settings are not affected.

1. Select "SETUP" in the main menu.
2. Select "RESET Sunny Beam". The prompt window opens.
3. Select "Yes" in the prompt window. The Sunny Beam is reset.
4. The "LANGUAGE" menu opens when the device is restarted. You can select "CONTINUE", as the device has stored the language, the date and the time.
5. The menu for setting the group opens. Set the group to which you set the Radio Piggy-Backs in the inverter.



When you have selected and confirmed the group, the Sunny Beam automatically searches for inverters whose Piggy-Backs are set to this group. Now you may have to exclude extraneous inverters and register the required inverters (see chapter "Detecting and Selecting Inverters" on page 59).

7 Connecting the Device to the PC

You can manage the Sunny Beam data with a PC and the SMA Sunny Data Control Software. The following possibilities are available:

- Saving and displaying the monthly Sunny Beam data
- Parameterizing the inverters via the Sunny Beam (for qualified staff only)
- Sending system data to the [Sunny Portal](#) in the internet

The Sunny Portal allows you to store your system data long-term, display them and compare them with other PV systems. See www.SunnyPortal.com for more information on the Sunny Portal.

7.1 Detecting Sunny Beam with Sunny Data Control

In order to detect the Sunny Beam with Sunny Data Control you need:

- a PC with a USB connection
- the enclosed SMA-CD with Sunny Data Control Software and USB driver (available also from the download area at www.SMA.de)
- the Sunny Beam and the enclosed USB connecting cable

First, you install the USB driver and the Sunny Data Control software in order to be able to detect the Sunny Beam with Sunny Data Control.



The data can only be recorded if the Sunny Beam has registered inverters before. Moreover, the Sunny Beam must be in normal view (not menu view).

7.1.1 Installing the USB Driver

Operating systems supported by the USB driver: **WINDOWS 2000/XP.**

1. Switch on your PC and wait until the operating system has booted up completely.

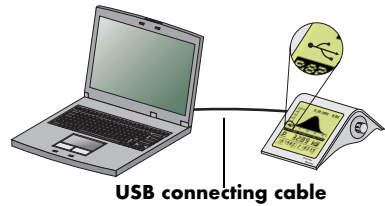
Once you have installed the USB driver, connect the Sunny Beam (in the normal view) to the PC using the USB connecting cable and install the Sunny Data Control as described in chapter "installing Sunny Data Control" on page 69.

2. Put the supplied SMA CD into the CDROM drive. If you have activated AutoPlay, the window shown at right opens automatically. If the window does not open, click "install.exe" in the folder on the CD.



3. Connect the Sunny Beam (in normal view) to your PC using the enclosed USB connecting cable. The USB symbol is then shown in the display of the Sunny Beam.

The driver installation wizard is started automatically after the operating system detects the new hardware.



During the installation process of an SMA Windows driver, Windows XP will warn you that the software you have just installed for the hardware has not passed the Windows logo test.



This warning is generally displayed when third party drivers are installed. It indicates that the manufacturer's driver was not tested in the Microsoft "Windows Hardware Quality Labs (WHQL)". This commercial service by Microsoft to grant a digital signature for a driver is often not available of.

We have tested the functioning of the driver particularly carefully and approved it. Therefore, you can ignore the recommendation by Microsoft to abort the installation now and install the driver by clicking the "Continue installation" button.

4. Follow the on-screen instructions.

7.1.2 installing Sunny Data Control

1. Now install Sunny Data Control (enclosed SMA CD) in the desired language by clicking on the corresponding flag. Only the colored flags may be installed.
2. Follow the installation program's on-screen instructions.
3. After installing, close all windows.

7.1.3 Setting up Sunny Data Control

1. Start Sunny Data Control.
2. Open the "Setup" menu in Sunny Data Control.
3. Under "connection via", set "SunnyBeamUSB".
4. Open the "Detect" menu and click on "detect".
5. Now you can drag the Sunny Beam to the right part of the window in the the current value display using the "drag and drop" function in order to request the measurement values.

In the Sunny Data Control Help (on the CD or in the download area of www.SMA.de) there is further information on Sunny Data Control and how you can send data to the [Sunny Portal](#) in the internet.

7.2 Parameterizing the Inverters

Safety-related inverter parameters may only be changed after consulting with your electricity supply company.



Inverter parameterization is described in the Sunny Data Control Help. The device is parameterized via a radio connection between the Sunny Beam and the inverters. Before you can parameterize the device, you must first detect the Sunny Beam with the SMA Sunny Data Control software (see chapter "Detecting Sunny Beam with Sunny Data Control" on page 68).

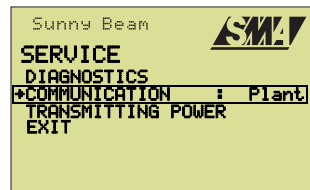
The parameterization of inverters with Sunny Data Control and the Sunny Beam for older inverters with a firmware <8.0 (e.g. SWR 1500 and SWR 2000) is only supported with a Radio Piggy-Back from firmware version 1.55.



Parameterizing

The Sunny Beam is switched briefly to "Plant" mode, so that the PC can communicate with the inverters via the Sunny Beam. This mode cannot be used for continuous operation and must be reset to "SBeam" when parameterization is complete.

1. Select "SETUP" in the main menu.
2. Select "SERVICE".
3. Select "COMMUNICATION".
4. Set "Plant".
5. Select "EXIT".
6. Select "EXIT" repeatedly until the prompt window opens to save the setting.
7. Select "Yes" in the prompt window. The settings are saved.
8. Record the data with Sunny Data Control as described in the Help. Data can only be recorded in normal view.



The inverter data can only be displayed properly if the radio connection is excellent. See chapter "Troubleshooting/Problem Solving" on page 75 for further information on testing the radio connection.



Please switch the mode in the Sunny Beam back to "SBeam" after parameterization is complete.



7.3 Updating the Firmware

You can call up the firmware version of your Sunny Beam via the menu, as described in section "Calling up the Firmware Versions" on page 64.

To update the Sunny Beam Firmware, you require:

- a PC with a USB connection and internet connection
- the enclosed SMA CD for the USB driver
(also available from the download area at www.SMA.de)
- the Sunny Beam and the enclosed USB connecting cable
- the latest firmware update (available from the download area at www.SMA.de)

The latest Sunny Beam user manual is also available from the download area at www.SMA.de.



When you update the Sunny Beam firmware, all settings and data in the Sunny Beam are deleted. The batteries may not be removed from the Sunny Beam during the procedure.

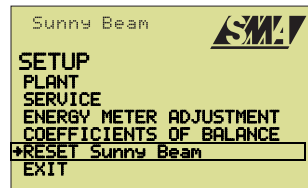
Installing the USB driver

1. Install the USB driver as described in chapter "Installing the USB Driver" on page 68.

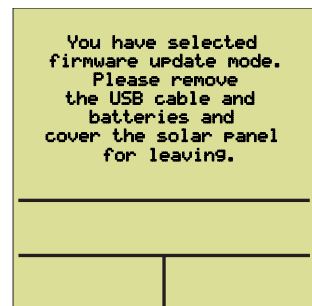
Once you have installed the USB driver, connect the Sunny Beam (in the normal view) to the PC using the USB connecting cable. Then set the Sunny Beam to the update mode as described below.

Set the Sunny Beam to the update mode

2. Select „SETUP" in the main menu.
3. Select "RESET Sunny Beam". The prompt window opens.



4. In the prompt window, if you click "Yes", **hold the button down** until the update mode is shown on the display (see figure at right).



Starting the update program

5. Start the "Sunny Beam Update" software to update the firmware of your Sunny Beam (available from the download area at www.SMA.de) and follow the instructions on the screen of your PC.

If the USB connector is removed during the update procedure, or the update is otherwise interrupted, it may not be possible to reset the Sunny Beam to its normal operating mode.

1. Remove the batteries and insert them again while pressing the rotating push button.
2. Connect your Sunny Beam to the PC again using the USB connecting cable and restart the update procedure.

If the Sunny Beam still does not indicate normal operation, contact the Sunny Boy Hotline (see chapter "Contact" on page 89).

8 Troubleshooting/Problem Solving

8.1 Radio Connection

All work on the inverters may only be performed by qualified electricians! Please follow all safety instructions contained in the inverter documentation!

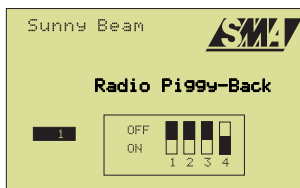


Problem	Checklist
No reception from inverters	Compare the group settings. See section "Compare the Group Setting" on page 76.
	Checking radio contact. See chapter "Checking Radio Contact" on page 77.
	Checking antenna alignment and position. See section "Checking Antenna Alignment and Position" on page 77.
	Checking antenna attachment. See section "Checking Antenna Attachment" on page 78.
	Checking installation of Radio Piggy-Back. See section "Checking Installation of Radio Piggy-Back" on page 78.
Radio connection only over short distance	Checking the grounding of the inverter. See section "Checking the Grounding of the Inverter" on page 79.
Radio connection with interruptions	Checking antenna alignment and position. See section "Checking Antenna Alignment and Position" on page 77.

8.1.1 Compare the Group Setting

The group set for the Radio Piggy-Back must match the group set in the Sunny Beam for the Sunny Beam to detect the inverter. The Radio Piggy-Backs and the Sunny Beam are set to group 1 by default. If more than one device is to be detected (max. four), they must all be set to the same group.

1. Check the group setting for the Radio Piggy-Back as described in chapter "DIP Switch Setting on the Radio Piggy-Back" on page 25 (permitted only for qualified electricians).
2. Check the group setting for the Sunny Beam as follows:
Select "SETUP" in the main menu.
3. Select "PLANT".
4. Select "GROUP".
5. Compare the group setting of your Sunny Beam in the menu with the DIP switch setting on the Radio Piggy-Back.
6. If the Sunny Beam is not set to the same group as the Piggy-Backs, rotate the button and set the corresponding group (0 to 15).
7. Select "EXIT" repeatedly until the prompt window opens to save the setting.
8. Select "Yes" in the prompt window. The settings are saved.



8.1.2 Checking Radio Contact

Proceed as follows to check whether the Sunny Beam has radio contact to the inverters:

1. Position the Sunny Beam approx. three metres (not less) away from the inverter (sight contact, same height).
2. Select "VIEW OPTIONS" in the main menu of the Sunny Beam.
3. Select "DATA REQUEST FREQ.".
4. Set the data request frequency to the maximum frequency (the minimum selectable interval).

After finishing this test, it is important that you set the data request frequency back to minimum 15 seconds. Lower values (under 15 seconds) should only be set for commissioning purposes (testing the radio connection) and not long-term.



The lower the data request frequency value, the higher the Sunny Beam's energy consumption.



5. Restart inverter detection as described in chapter "Detecting and Selecting Inverters" on page 59.
6. If the Sunny Beam has no radio connection even when 3m away from the inverter, the radio communication may be subject to interference from other devices. Try to position other radio devices outside the range of the Sunny Beam.

8.1.3 Checking Antenna Alignment and Position

1. Turn the Sunny Beam so that the internal antenna is optimally adjusted.
2. Check whether the antenna alignment is suitable for the radio gap to be bridged between the Sunny Beam and the inverters (see chapter "Basic Information on Radio Transfer" on page 36).

Select a location for the Sunny Beam that is closer to the inverter, taking into account the installation site requirements (see "Mounting the Sunny Beam" on page 17).

8.1.4 Checking Antenna Attachment



**This chapter is intended solely for qualified electricians!
All work on the inverter may only be performed by qualified electricians! Please follow all safety instructions contained in the inverter documentation!**

1. Check whether the antenna cable is securely fastened to the antenna connection of the Radio Piggy-Back.
2. Check whether the grooved ring used to secure the PG screw fitting to the interior of the enclosure has electrical contact to the bare metal enclosure.

Check the low resistance connection of the metallic PG screw fitting to the enclosure (PE) in the inverter (e.g. using a multimeter).

8.1.5 Checking Installation of Radio Piggy-Back



**This chapter is intended solely for qualified electricians!
All work on the inverter may only be performed by qualified electricians! Please follow all safety instructions contained in the inverter documentation!**

1. Check that the Radio Piggy-Back is fitted and positioned correctly in the inverter, as described in the inverter documentation (see also chapter "Installing a Radio Piggy-Back in an Inverter" on page 19, of the Sunny Beam user manual).

8.1.6 Checking the Grounding of the Inverter

**This chapter is intended solely for qualified electricians!
All work on the inverter may only be performed by qualified electricians! Please follow all safety instructions contained in the inverter documentation!**



1. Check the grounding of the inverter as described in the inverter documentation.
2. Check that the inverter's earth wire (PE) is connected to the distributor.
3. Check the quality of the grounding.

One indication of a missing PE, is if a radio connection is only possible over relatively short distances.



8.2 Hatched Surfaces

Hatched surfaces occur in the curves if the radio connection between the Sunny Beam and the Radio Piggy-Backs is reduced. Check the radio contact ("Checking Radio Contact" on page 77), the antenna attachment ("Checking Antenna Attachment" on page 78) and the antenna alignment ("Checking Antenna Alignment and Position" on page 77).

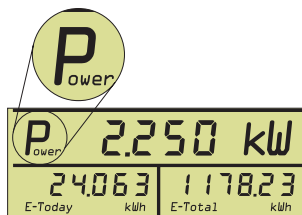
8.3 The Display switches off completely

If the Sunny Beam's display switches off completely (including the power indicator), this may be for the following reasons:

- The Sunny Beam automatically goes into night mode if the inverter has switched itself off as no feed-in occurs at night. When the inverter starts to feed in again in the morning and switches itself on, the Sunny Beam display automatically switches itself back on as well.
- No inverter is yet registered on the Sunny Beam. Detect your inverters with the Sunny Beam as described in chapter "Detecting and Selecting Inverters" on page 59.
- The batteries are too weak or too old. Recharge the batteries as described in chapter "Battery Symbol/Charging the Batteries" on page 48.
If the battery output remains low in spite of this, replace the two batteries with two of the same type (SMA order number: SBEAM-BAT), as described in section "Replacing the Batteries" on page 81 .

8.4 The "P" in the "Power" Indicator flashes

The "P" in the "Power" indicator flashes when the batteries must be charged. Recharge the batteries as described in chapter "Battery Symbol/Charging the Batteries" on page 48.



8.5 Interruption during Firmware Update

If the USB connector is removed during the update procedure, or the update is otherwise interrupted, it may not be possible to reset the Sunny Beam to its normal operating mode.

1. Remove the batteries and insert them again while pressing the rotating push button.
2. Connect your Sunny Beam to the PC again using the USB connecting cable and restart the update procedure.
3. If the Sunny Beam still does not indicate normal operation, contact the Sunny Boy Hotline (see chapter "Contact" on page 89).

8.6 Error Messages in the Status Bar

If there is a system error, the current status and error messages are displayed in the status bar. If an inverter indicates a fault, first the current output, then the error (e.g. U_{ac}-Bfr) and finally the status message (or Error) are displayed.

Error messages are specific to each inverter and are described in the "error messages" section of your inverter documentation. The current inverter documentation can be found at any time in the download section at www.SMA.de.

9 Maintenance and Cleaning

9.1 Replacing the Batteries

The batteries must be replaced when they no longer charge properly and this adversely affects the operation of the Sunny Beam. You can order them from SMA under the SMA order number: SBEAM-BAT.

Use only AccuCell AC1800 type batteries. Follow all instructions on the batteries and on the inside of the battery compartment cover.



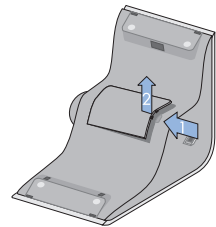
You must use batteries with the same charge level, so you should therefore always use the batteries in pairs and always replace both batteries at the same time.



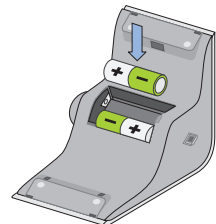
The batteries may not be used for other devices, as the higher discharge rate damages the batteries.



1. Open the cover of the battery compartment at the base of the Sunny Beams.
2. Remove the old batteries.



3. Insert the enclosed AccuCell type batteries the right way around as shown in the figure at right.
4. Close the cover of the battery compartment.



Dispose of the batteries as described in chapter "Notes on Disposal" on page 83.



9.2 Cleaning

To clean your Sunny Beam, use a mild, non-corrosive cleaning agent or a damp cloth. Make sure that the cloth is made of scratch-free material so the surface of the Sunny Beam will not be damaged.

10 Disposal

10.1 Decommissioning

Remove the batteries as described in chapter 9.1 Replacing the Batteries.

10.2 Notes on Disposal

10.2.1 Batteries

The AccuCell type batteries are environmentally friendly alkali-manganese cells (without lead, cadmium or mercury). However, they must still be disposed of correctly. Please dispose of the batteries correctly. You can order them from SMA under the SMA order number: SBEAM-BAT.

10.2.2 Sunny Beam

Please dispose of the Sunny Beam at an authorized disposal company.

10.3 Packaging for Shipment

When returning the device to us, please be sure to use packaging, which adequately protects the device from damage during transport (if possible, the original packing).

11 Technical Data

11.1 Sunny Beam

Interfaces

Radio connection to inverters	868 MHz acc. to ETSI EN 300 220 Duty Cycle < 1 %
Connection to the PC	USB 1.1, power limited acc. to EN 60950-1:2001

Dimensions

Size	127 x 75 x 195 mm (as tabletop device)
	127 x 140 x 115 mm (as wall-mounted device)
Weight	approx. 350 g (with batteries)

Power supply

Integrated solar cell	via two AccuCell AC 1800 type batteries which are charged by the integrated solar cell
USB	the AccuCell AC 1800 batteries can also be charged by connecting the device to a PC using a USB cable

Batteries

Type	RAM cells (1.5 V _{DC})
Type	AccuCell AC 1800 (Mignon AA)

Operating environment

Ambient temperatures	0 °C to +40 °C
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11.2 Radio Piggy-Back

Operating environment

Ambient temperatures
Piggy-Back -25 °C to +85 °C

Radio antenna ambient
temperature -25 °C to +65 °C

Operational voltage 5 V ± 5 % from a reduced capacity power source in accordance with EN 60950-1:2001 (These values are guaranteed in all SMA inverters.)

11.3 CE Declaration of Conformity

CE Declaration of Conformity



for Data Logging Equipment

Product: Sunny Beam (Desktop Device) , SBEAM PB (Radio Piggy-Back)

We declare that the above specified device is compliant with the regulations of the European Community, in terms of the design and the version fabricated by SMA. This especially applies for the EMC Regulation defined in 89/336/EWG and the low voltage regulation defined in 73/23/EWG.

The device is compliant with the following standards:

Radio Transmission	R&TTE 1999/5/EG ETSI EN 300 220-3 V1.1.1: 2000-09
EMC:	ETSI EN 301 489-3 V1.4.1: 2002-08
Health:	EN 50371: 2002
Device Safety:	EN 60950-1: 2001

The above mentioned device is therefore marked with a CE sign.

Note:

This declaration of conformity becomes invalid in case

- the product is modified, complemented or changed,
 - and/or components, other than those belonging to the SMA accessories, are installed in the product,
 - as well as in case of incorrect connection or improper usage
- without explicit written confirmation by SMA.

Niestetal, 09th of May 2005

SMA Technologie AG

Peter Drews
(Board of Manager)

SMA Technologie AG

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SBEAMCE11BE07/06

12 Contact

If you have any questions or queries, please contact us. A team of qualified engineers and technicians is at your disposal.

Help us to help you by having the following information ready when you call us:

- Type of Sunny Beam (see chapter "Identifying the Sunny Beam" on page 13)
- Firmware of the Sunny Beam and the Radio Piggy-Backs (see chapter Table 2.5 on page 13)
- Type of inverter and serial number (see inverter documentation)



Address:

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Germany

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12.1 Suggested Improvements

You can use the e-mail address SUNNYBEAM@SMA.de for suggested improvements.

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- Altering the product or supplied software without authority
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