Solar Data Technology
SUNNY BEAM with *Bluetooth* Wireless Technology
User Manual

CA US

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IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This manual contains important instructions for Sunny Beam with *Bluetooth*® system monitoring,

that must be followed during installation and maintenance of the system monitoring.

The Sunny Beam with *Bluetooth*® is designed and tested according to international safety requirements, but as with all electrical and electronic equipment, certain precautions must be observed when installing and/or operating the Sunny Beam with *Bluetooth*®. To reduce the risk of personal injury and to ensure the safe installation and operation of the Sunny Beam with *Bluetooth*®, you must carefully read and follow all instructions, cautions and warnings in this User Manual.

Warnings in this document

A warning describes a hazard to equipment or personnel. It calls attention to a procedure or practice, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the SMA equipment and/or other equipment connected to the SMA equipment or personal injury.

> ⚠ **DANGER**
>
> DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

> ⚠ **WARNING**
>
> WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ **CAUTION**

CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

⚠ **NOTICE**

NOTICE is used to address practices not related to personal injury.

Other Symbols in this document

In addition to the safety and hazard symbols described on the previous pages, the following symbol is also used in this User Manual:

Information

This symbol accompanies notes that call attention to supplementary information that you must know and use to ensure optimal operation of the system.

General Warnings

<table>
<tr>
<td>⚠</td>
<td>

General Warnings

All electrical installations must be done in accordance with the local and *National Electrical Code*® ANSI/NFPA 70 or the *Canadian Electrical Code*® CSA C22.1. This document does not and is not intended to replace any local, state, provincial, federal or national laws, regulation or codes applicable to the installation and use of the system monitoring, including without limitation applicable electrical safety codes. All installations must conform with the laws, regulations, codes and standards applicable in the jurisdiction of installation. SMA assumes no responsibility for the compliance or noncompliance with such laws or codes in connection with the installation of the system monitoring.

Before installing or using the Sunny Beam with *Bluetooth*® read all of the instructions, cautions, and warnings on the Sunny Beam with *Bluetooth*® in this User Manual.

</td>
</tr>
</table>

Table of Contents

1 Notes on this Manual

1.1 Validity

This manual is valid for Sunny Beam with firmware version 1.0 and later.

Information concerning the connected equipment is available from the manufacturer of the equipment.

1.2 Target Group

This manual is for the operator.

1.3 Storage of the documentation

Keep all Sunny Beam with *Bluetooth*® manuals in a convenient place for future reference.

1.4 Additional Information

You can find further information on the following subjects in the download section of www.SMA-America.com.

- SMA *Bluetooth* Wireless Technology
- CO_2 factor - What the CO_2 factor is and why it is different for every region.

1.5 Nomenclature

In this document SMA America Production, LLC is referred to in the following as SMA.

In this document Sunny Beam with *Bluetooth*® is referred to in the following as Sunny Beam.

The following terminology is used in this document.

Type	Example of terminology
Main menu item	Select "Settings".
Submenu item	Select "Settings > Date".

2 Sunny Beam with *Bluetooth*

2.1 Field of Application

Sunny Beam is a communication device which requests, displays and saves data from up to 12 inverters in a *Bluetooth* PV system from SMA. Communication with the inverters takes place via *Bluetooth*.
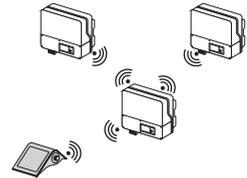
2.2 Functions

The most important Sunny Beam functions are:

- Processing data from up to 12 inverters.

- Connection to the inverters via *Bluetooth* Class 1.

- Range of up to 328 ft (100 m) in the open with direct visual contact. In closed rooms the range depends on various factors.

- Display of errors and warnings on the integrated display.

- Acoustic alarms to indicate errors in the PV system and low battery states.

- Connection to the computer via the USB connection cable (max. 9 ft (3 m) cable length).

- Saving system data in CSB files for at least 90 days (see chapter 8 "PV System Data" (page 76)).

  The storage volume depends on the number of inverters. Once the memory is full, the Sunny Beam will begin to overwrite old data.

- Graphical display of the following data for the whole system and for each inverter on the integrated display:
    - Performance today/Performance yesterday.
    - Energy for the last 31 days/Energy for the last 12 months.
    - Specific annual yield.
    - Revenue for current day / Revenue for entire runtime of the PV system.
    - CO_2 avoided for current day/CO_2 avoided for entire runtime of the system.
- Display of the following values for the entire system and for individual inverters:
    - Present AC power.
    - Daily yield (E-Today).
    - Energy yield yesterday (E-Yday) when calling up the chart "Power yesterday".
    - Total energy yield (E-Total).

3 Safety

3.1 Appropriate Usage

Sunny Beam is only suitable for indoor use. The ambient temperature must be between +32 °F and +104 °F (0 °C ... +40 °C).

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

3.1.1 Supported Products

Sunny Beam is only suitable for use with original accessories from SMA or accessories recommended by SMA. The power supply for Sunny Beam may only be provided by rechargeable nickel-metal hydride batteries (NiMH), type Mignon (AA) with low self-discharge, e.g. Eneloop batteries.

The Sunny Beam supports the following products by SMA:

- SMA inverters with integrated *Bluetooth:*
    - SB 3000TL-20 / SB 4000TL-20 / SB 5000TL-20: from software version 2.06
    - SB 2000HF / SB 2500HF / SB 3000HF
    - STP 10000TL-10 / STP 12000TL-10 / STP 15000TL-10 / STP 17000TL-10
- SMA inverters with SMA *Bluetooth* Piggy-Back upgrade. A list of supported inverters can be found in the SMA *Bluetooth* Piggy-Back installation manual.
- SMA *Bluetooth* Repeater

3.2 Safety Instructions

Please follow all operating and safety instructions in this manual. Failure to follow these instructions may result in damage to the device and risk of personal injuries.

> ⚠ **NOTICE**
>
> Damage to Sunny Beam caused by leaking batteries.
>
> Batteries of the wrong type may leak into the Sunny Beam and damage the device.
>
> - Do not use non-rechargeable batteries under any circumstances.
> - You must only use rechargeable nickel-metal hydride batteries (NiMH), type Mignon (AA) with low self-discharge, e.g. Eneloop batteries (see section 14 "Accessories" (page 95)).

ℹ **Safety of your PV system**

It is absolutely necessary that you change the preset system passwords for both user groups (installer and user). Otherwise your PV system will not be protected from unauthorized access. You can only change the passwords by using a computer with *Bluetooth* and the Sunny Explorer software. You can obtain the Sunny Explorer for free in the download section of www.SMA-America.com.

4 Unpacking

4.1 Packing List

A   B   C   D
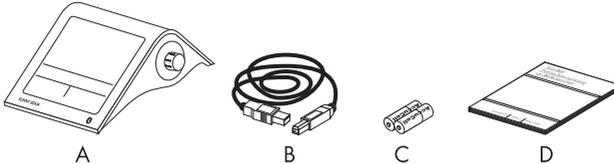
Position	Number	Name
A	1	Sunny Beam with *Bluetooth* Wireless Technology
B	1	USB connection cable for connection to the computer
C	2	Nickel-metal hydride batteries (NiMH), type Mignon (AA) with low self-discharge
D	1	User Manual

4.2 Identifying the Sunny Beam

Type Plate

You can identify the Sunny Beam by the type plate. The type plate is located on the lower side of the Sunny Beam.

Firmware Version

You can check the firmware version of the Sunny Beam in the Menu "Service > Diagnostics > Device information > Sunny Beam".

5 Installation Location

5.1 Installation Location Requirements

- Sunny Beam is only suitable for indoor use.
- The ambient temperature must be between +32 °F and +104 °F (0 °C ... +40 °C).
- The indoor location must have access to sunlight in order for the integrated solar cells of the Sunny Beam to be able to recharge it.
- Protect the Sunny Beam from dust, wet conditions and caustic substances.
- The maximum total length of the USB connection cable is 9 ft (3 m).
- Certain ambient conditions can reduce the connection quality and data transmission speed between *Bluetooth* devices.
  - Install the *Bluetooth* device at a distance of at least 3 ft (1 m) from the following devices:
    - WLAN devices
    - Microwave ovens
    - Other devices that use the 2.4 GHz frequency band.

5.2 Installing the Sunny Beam

As long as the requirements for the location are observed (see section 5.1), the Sunny Beam can be installed at any indoor location. If the installation location is suitable for a good connection quality, can be found out after during commissioning of the Sunny Beam.

6 Commissioning

6.1 Notes

| i | A *Bluetooth* PV system must only be commissioned with 1 master (e.g. Sunny Beam with *Bluetooth*, Sunny Explorer). |

Always commission a *Bluetooth* PV system with 1 master only. As soon as the *Bluetooth* network is up and running, you can introduce further masters into the *Bluetooth* network.

| i | Before commissioning the PV system, a free NetID needs to be detected. |

Before you can start operating your *Bluetooth* PV system, you need to detect a free NetID using the Sunny Beam. For more information see section 6.3 "Determining free NetID" (page 25).

Alternatively, you can also determine a free NetID using a computer with *Bluetooth* and the Sunny Explorer software by SMA. For more information on how to do this, refer to the Sunny Explorer help. You can obtain the Sunny Explorer for free in the download section of www.SMA-America.com.

6.2 Sunny Beam Controls

The Sunny Beam is operated using the push button that can be turned and pressed.
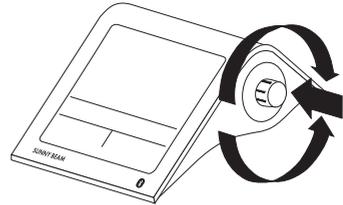
Moving the selection frame

The selection frame (see fig. on the right) indicates which menu item is currently selected. By turning the push button, you can move the selection frame to the next or the previous menu item.
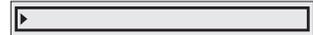
Selecting a menu item, setting values

When the selection frame is placed over a menu item, you may open the menu item by pressing the push button. When you have opened a menu item with a colon, you can set the values by turning the button.

Selecting a button

When the selection frame is placed over a button (see example in the fig. on the right), the button will be shaded. The selection frame is not displayed.

Navigating backwards in the menu

You can use the arrow icon to go back in the menu. By selecting the house icon, you will go straight to the main menu.

6.3 Determining free NetID

PV systems with SMA *Bluetooth* operating in close proximity to one another are distinguished by their individual NetID. All devices in a PV system must have the same NetID. The NetID can be a number from 1 to 9 or a letter from A to F. NetID 1 is not possible for Sunny Beam.

A free NetID is a NetID that is used by no other PV system with SMA *Bluetooth* in your vicinity.

Commission the Sunny Beam as described in section 6.4. During the commissioning process, you will receive instructions on how to detect a free NetID.

Overview of the NetIDs and their functions

NetID 0 and NetID 1 have special functions. Sunny Beam cannot detect any devices with the NetID set to 1.

NetID	Function
0	*Bluetooth* is switched off.
1	*Bluetooth* is switched on.
(Status upon delivery)	The inverter or the SMA *Bluetooth Repeater* can only connect to a maximum of 2 computers with Sunny Explorer from SMA. A connection to the Sunny Beam is not possible.
2 to 9 and A to F	*Bluetooth* is switched on.
	The inverter or the SMA *Bluetooth* Repeater can interlink with all SMA *Bluetooth* products with the same NetID.

6.4 Commissioning the Sunny Beam

The first steps are described in detail, so that you can familiarize yourself with the controls of Sunny Beam. Sunny Beam will guide you through the commissioning procedure. If a fault occurs during commissioning, you can restart commissioning by pressing the push button for about 10 seconds, until the SMA logo is displayed.

1. Insert the included batteries into the battery compartment of the Sunny Beam according to the indication.
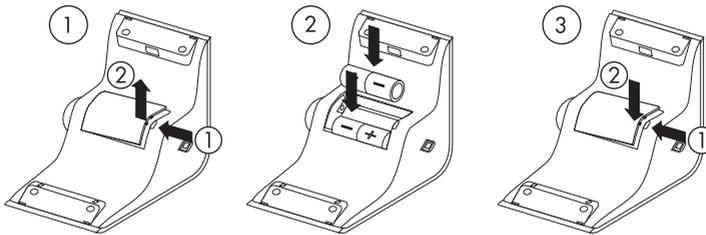
2. Press the button.

   ☑ The start screen appears.

3. Press the button.

☑ The page for setting the language appears. This page appears automatically after 10 seconds.

> Language / Sprache / Langue /
> Lingua / Idioma - Country / Land /
> Pays / Paese / País
>
> ▶ English (USA)
>
> ▶▶
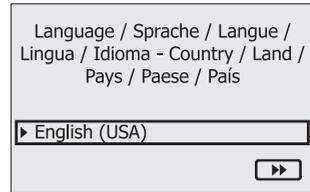
Setting the language and the country

4. If you want to change the selected language and country, press the button.

   ☑ The background of the selected language and country becomes dark.

5. Turn the button until the required language and country are displayed.

6. Press the button.

   ☑ No items remain dark. The language and country have ben set.

7. Move the selection frame to the button ">>" (next) by turning the button.

   ☑ The button becomes dark.

> Language / Sprache / Langue /
> Lingua / Idioma - Country / Land /
> Pays / Paese / País
>
> English (USA)
>
> ▶▶

8.   Press the button.

☑ The page for setting the time zone appears.

<table>
<tr><td align="center">Time zone</td></tr>
<tr><td>▶ -8 - Pacific (USA, Canada)</td></tr>
<tr><td align="right">⏩</td></tr>
</table>

Setting the time zone

| ℹ | Inverters with SMA *Bluetooth* Piggy-Back |

If you use inverters with SMA *Bluetooth* Piggy-Backs, you must set the correct values for date, daylight saving time, time and time zone in the Sunny Beam. If you change these values after commissioning, thereby resetting the time, the data for this time difference will be deleted from the inverter.

Please note that the time may also be reset if you change the settings for time zone or daylight saving time.

| ℹ | Confirming the time settings |

Due to the extensive time management in your PV system, the first attempt to change the time settings may not be successful, if, for example, time has already been set using Sunny Explorer. This can occur, for example if the time has already been changed with the Sunny Explorer. Check the time settings again after commissioning and correct them, if required.

The time you set in the Sunny Beam is also applied by the inverters.

9.   To change the time zone, press the button.

☑ The time zone will become dark.

10.   Turn the button until the required time zone is displayed.

11. Press the button.

    ☑ No items remain dark. The time zone has been set.

12. Move the selection frame to the button ">>" by turning the button.

    ☑ The button becomes dark.

13. Press the button.

    ☑ The page for setting the date and time appears.

```
┌─────────────────────────────┐
│        Date & time          │
├─────────────────────────────┤
│▶Date            : 03/03/2009 │
│ Daylight saving time: ☐      │
│ Time            : 07:32am    │
│                             │
│                             │
│                      [ ▶▶ ] │
└─────────────────────────────┘
```

Setting the date

14. Press the button.

    ☑ The first adjustable digits of the date become dark.

```
┌─────────────────────────────┐
│        Date & time          │
├─────────────────────────────┤
│▶Date            : 03/03/2009 │
│ Daylight saving time: ☐      │
│ Time            : 07:32am    │
│                             │
│                             │
│                      [ ▶▶ ] │
└─────────────────────────────┘
```

15. Turn the button until the required value is displayed.

16. Press the button and repeat the steps until no digits are dark.

    To change incorrect values, press the push button until the value that you need to change becomes dark.

    ☑ The date has been set.

Activating daylight saving time

17. To activate daylight saving time, move the selection frame to "Daylight saving time:" by turning the button, then press the button to tick the box.

    ☑ Daylight saving time is activated.

Date & time	
Date	: 03/03/2009
▸Daylight saving time: ☑	
Time	: 07:32am
	▸▸

Setting the time

18. Move the selection frame to "Time" by turning the button.

Date & time	
Date	: 03/03/2009
Daylight saving time: ☑	
▸Time	: 07:32am
	▸▸

19. Press the button.

    ☑ The first adjustable digits of the time become dark.

20. Turn the button until the required value is displayed.

21. Press the button and repeat the steps until no digits are dark.

    The time will start counting again as soon as no digits in the menu item "Time" are dark.

    ☑ The time has been set.

22. Move the selection frame to the button ">>" by turning the button.

    ☑ The button becomes dark.

Date & time	
Date	: 03/03/2009
Daylight saving time: ☑	
Time	: 07:32am
	▸▸

23. Press the button.

    ☑ The page for searching for systems appears.

System search
Would you like to search for a system?
Start detection
Main menu

Determining free NetID

In order to check which NetID is still available, you need to perform a search for systems with the Sunny Beam at the installation location of every single device of your *Bluetooth* PV system, as described in the following.

24. Place the Sunny Beam near a device of your *Bluetooth* PV system.

25. If the "Start detection" button has not become dark, turn the operating button.

    ☑ The button becomes dark.

System search
Would you like to search for a system?
Start detection
Main menu

26. Press the button.

    ☑ The system search will begin.

    ☑ The Sunny Beam detects all *Bluetooth* PV systems within range and lists the NetIDs of the detected *Bluetooth* PV systems. In the list, the NetIDs are sorted according to connection quality. The NetID with the best connection quality is placed at the top. The listed NetIDs are already in use on *Bluetooth* PV systems in the vicinity. You may not use these NetIDs.

```
┌─────────────────────────────────┐
│         System search           │
├─────────────────────────────────┤
│ Detecting all systems within range...│
│                                 │
│     ▣▨▨▨▨▨▨▨▨▨▨▨▨░░░             │
│                                 │
└─────────────────────────────────┘
```
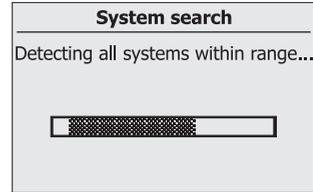
    – If the Sunny Beam does not list any NetIDs, there are no *Bluetooth* PV systems within the radio range of the Sunny Beam. All NetIDs are free.

27. Note down the NetIDs already in use, or cross them out in the following illustration.

28. Repeat the system search with the Sunny Beam for each device in the PV system and at the desired installation site of the Sunny Beam itself. Note down the NetIDs already in use, or cross them out in the following illustration.

    ☒1   2   3   4   5   6   7   8

    9   A   B   C   D   E   F
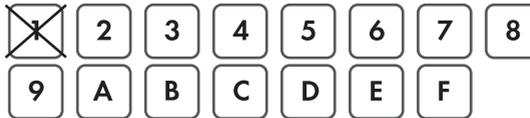
Sunny Beam cannot detect any devices with the NetID set to 1. Therefore, NetID 1 has already been crossed out in this illustration.

29. Once the system search has been carried out for all the devices, choose a NetID for your PV systems which was not displayed by the Sunny Beam.

    ☑ The free NetID is determined.

30. Set the NetID on all inverters and available SMA *Bluetooth* Repeaters, as described in the respective manual.

31. Commission all devices of your *Bluetooth* PV system as described in the respective manual.

Search for your own *Bluetooth* PV system

Do not start the Sunny Beam again until you have set the free NetID on the inverters and available SMA *Bluetooth* Repeaters and have commissioned these devices.

32. Set up the Sunny Beam at its intended installation site.

33. To search for your *Bluetooth* PV systems, choose "Repeat search".

    You can also start the system search via the menu "Settings > PV plant > New plant search".

    ☑ The system search will begin.
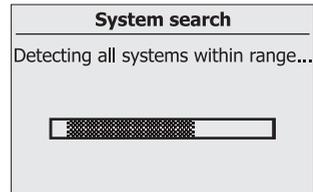
System search
Detecting all systems within range...
�

    ☑ The Sunny Beam detects all *Bluetooth* PV systems within range and lists the NetIDs of the detected *Bluetooth* PV systems.

    – If the Sunny Beam does not list the NetID of your *Bluetooth* PV system, please refer to section 12 "Troubleshooting" (page 84).

Systems found	
▶■ NetID 6	
■ NetID 2	
Repeat query	Cancel
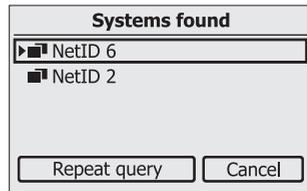
Setting the NetID for your own *Bluetooth* PV system

During commissioning, the Sunny Beam will display the NetIDs of all PV systems with SMA *Bluetooth* which are within its radio range. You then need to select the NetID of your *Bluetooth* PV system, as described in the following:

34. Move the selection frame to the NetID of your own *Bluetooth* PV system by turning the button.

Systems found
▶■▊ NetID 6
■▊ NetID 2
Repeat query   Cancel

35. Press the button.

   ☑ The Sunny Beam will establish a connection to your *Bluetooth* PV system.

   ☑ The Sunny Beam then lists the serial numbers of the detected inverters.

   – If not all inverters of your *Bluetooth* PV system are listed, or if inverters from other systems are listed, please refer to section 12 "Troubleshooting" (page 84).

Devices found	
▶283617063	☑
554326782	☑
Repeat query	OK
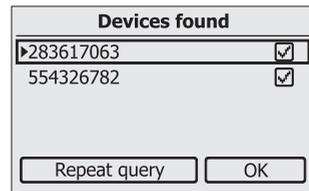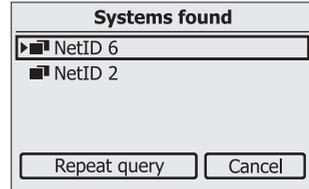
Selecting the required inverters (only applies when more than 12 inverters are available)

The Sunny Beam can only manage a maximum of 12 inverters. If your *Bluetooth* PV system comprises more than 12 inverters, you must select the 12 inverters that you want the Sunny Beam to manage.

36. Press the button to select the inverters that are to be managed by the Sunny Beam.

☑	selected
☐	not selected

Establish connection to the devices

37. Move the selection frame to "○K" by turning the button.

☑ The field "○K" becomes dark.

38. Press the button.

☑ The Sunny Beam establishes the connection to the selected inverters and retrieves the data.
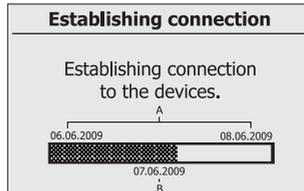
Position	Meaning
A	The start date and end date of the time period from which the Sunny Beam will retrieve data.
B	The date for which the Sunny Beam is currently retrieving data from the inverters.

When you establish a connection with your PV system through the Sunny Beam for the first time, the Sunny Beam will retrieve all data for the last two days and the data for the current day. If you are re-detecting your PV system, the Sunny Beam will retrieve data from the days that have been saved in the inverter since the last retrieval.

   ☑ The Sunny Beam then lists the serial numbers of the
      connected inverters.

←	**Devices connected**
283617063	✓
554326782	✓
System password	OK

System password

The system password protects your *Bluetooth* PV system from
unauthorized access to your device. All devices in a *Bluetooth*
PV system must have the same system password.

The Sunny Beam uses the same system password for the "User"
user group. The factory setting for the default Sunny Beam password is 0000.

Inverters that are marked with a checkmark (✓) have the same system password as the Sunny Beam.
Sunny Beam can only manage data for inverters which have the same system password. If the
inverters have a different system password than the Sunny Beam, they are marked with a lock (🔒).

39. Depending on whether the inverters are marked with a checkmark or a lock, the according steps
    are to be taken.

If	Then
All inverters are marked with a checkmark.	The inverters all still have the factory default password. • Changing the system password as described in section "Changing the system password of the inverters with Sunny Explorer" (page 37).

If	Then
All inverters are marked with a lock.	The factory default password for the inverters has already been changed using Sunny Explorer.
	• Enter the system password of the PV system into the Sunny Beam, as described in section "Enter the new system password in the Sunny Beam" (page 38).
Some inverters are marked with a lock, others have a checkmark.	• See section 12 "Troubleshooting" (page 84).

Changing the system password of the inverters with Sunny Explorer

The Sunny Beam can only manage data for inverters whose system password matches that of the Sunny Beam. You can only change the password by using a computer with *Bluetooth* and the Sunny Explorer software. You can obtain the Sunny Explorer for free in the download section of www.SMA-America.com.

40. Change the system password for inverters using Sunny Explorer, as described in the Sunny Explorer Help. Notify the system owner of the new system password for users.

Enter the new system password in the Sunny Beam

41. Move the selection frame to "System password" by turning the button.

    ☑ The field "System password" becomes dark.

42. Press the button.

    ☑ The input page appears.

43. Choose the button with the arrow and press the button again to delete the set system password.

⬅	Arrow: deletes the character which was entered last.
☒	Cross: cancels the input action.
☑	Checkmark: saves the system password for the Sunny Beam.

```
a b c d e f g h i j k l m n o p q r s t u v w
x y z A B C D E F G H I J K L M N O P
Q R S T U V W X Y Z 0 1 2 3 4 5 6 7 8 9 -
_ ! ?

    ←          ✕          ✓

0000
```
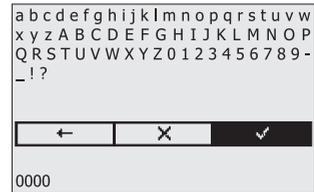
44. In order to enter the new system password, turn the button until the desired character is highlighted. Then press the button in order to select the character. Enter the new system password for users.

45. Select the check mark to save the entered system password.

    ☑ The list of connected inverters is displayed.

46. Select "OK".

☑ The first chart for the complete PV system, "Power today", is displayed. The Sunny Beam is now in operation.

7 Operation

7.1 Display

The Sunny Beam display is divided into two sections. The top section contains the menu and chart view, the lower section contains the power and energy display.
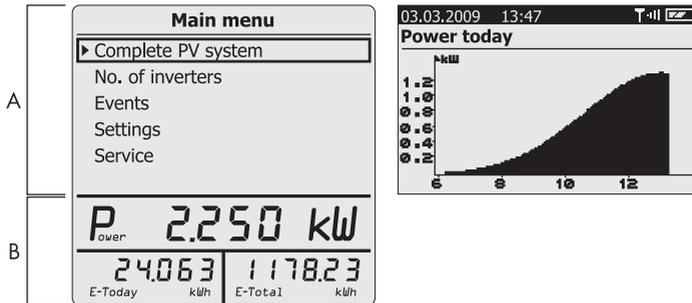
Position	Explanation
A	Menu and chart view
B	Power and energy display

When the Sunny Beam attempts to establish a connection to the inverters in order to retrieve the current data, the hourglass appears in the middle of the display.

7.1.1 Switching on the Display/Calling up the Main Menu

You can switch on the display by pressing or turning the button. The Sunny Beam opens the first chart, "Power today", in the chart view for the complete system. The chart view is described in section 7.3 "Chart View" (page 42).

You can switch from the chart view to the main menu by pressing the button. After 3 minutes, the Sunny Beam will always switch from the menu to the chart "Power today" for the complete system automatically, unless the display switches off automatically first.

Automatic switching off the display

To save energy the Sunny Beam will automatically switch off its display after being idle for 1 minute. You can change this duration as described in section 7.8.2 "Changing the Display Switch-Off" (page 55).

7.2 Menu

Using the menu, you can change settings on the Sunny Beam and the call up information of your complete PV system and about the individual inverters.
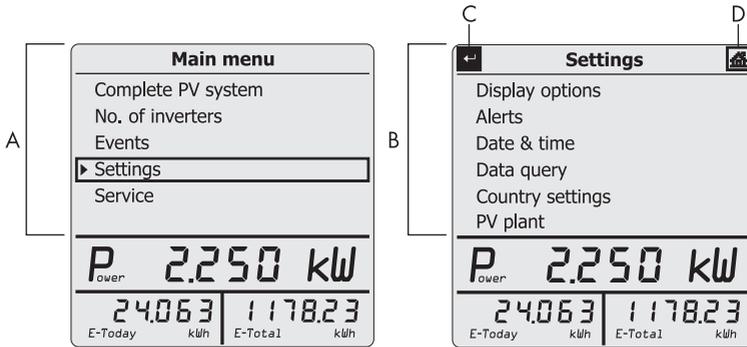
Position	Explanation	
A	Main menu	
B	Submenu (example page)	
C		Arrow icon: go backwards in the menu.
D		House icon: go straight to the main menu.

An overview of the whole menu is depicted in section 9 "Menu Overview" (page 79).

7.3 Chart View

The Sunny Beam can visualize the data for the complete system and for each individual inverter in charts. The following charts exist:

- Power today

  When the chart "Power today" is open, the Sunny Beam will query the current power and total energy yield (E-Total) one time.

- Power yesterday
- Yield values of last 31 days
- Yield values of last 12 months
- Specific annual yield (only as chart view for complete PV system)
- Revenue for current day
- Revenue for entire runtime of the PV system
- CO_2 avoided for current day
- CO_2 avoided for entire runtime of the PV system

i	SMA *Bluetooth* Piggy-Back
	If you are using the SMA *Bluetooth* piggy-back, the inverter may not have switched on in the morning, which is why the chart "Power today" may still display the data from yesterday.

7.3.1 Calling up the Chart "Complete PV System"

1. Select "Complete PV system" in the main menu.

   ☑ The first chart, "Power today", is displayed.

2. Turn the button to see the next chart for the complete system.

☑ The chart view for the complete system is displayed.

To return to the main menu, press the button.

Complete PV system

When you call up the chart "Power yesterday", the power and energy display will switch from "E-Today" (PV system energy today) to "E-Yday" (PV system energy yesterday).
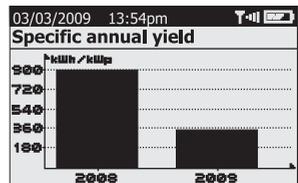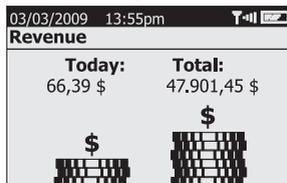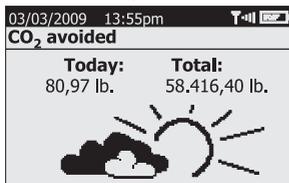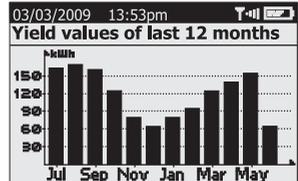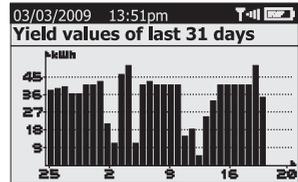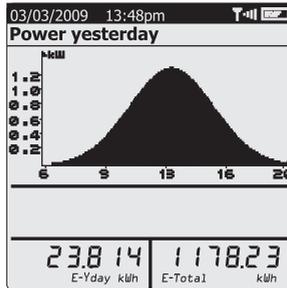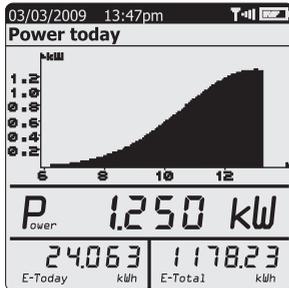
7.3.2 Calling up the Chart "No. of Inverters"

The Sunny Beam can visualize the data of each individual inverter graphically. How to call up the chart view for an inverter:

1. Select "No. of inverters" in the main menu.

    ☑ The list of inverters appears.

2. Select an inverter.

    ☑ The first chart, "Power today", is displayed.

3. Turn the button to view the next inverter chart.

☑   The chart view of an inverter is displayed.

To return to the menu, press the button.

Individual inverter

When you access the "Power yesterday" chart, the power and energy display will switch from "E-Today" (energy of the inverter today) to E-Yday (energy of the inverter yesterday).
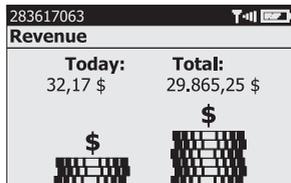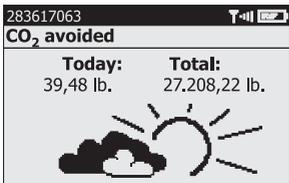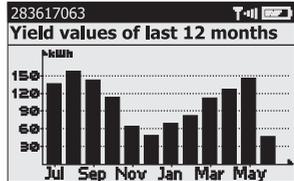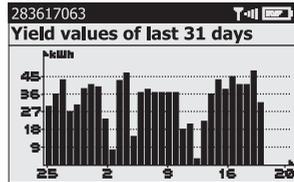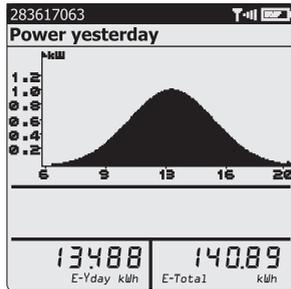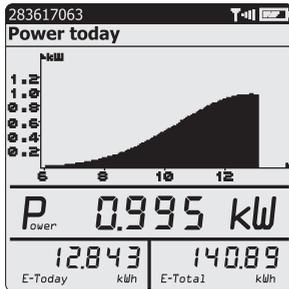
7.4 Power and Energy Display

In the power and energy display you can view the energy and power values of your PV system. The power and energy display in shown in the chart view. The power value is blanked out after 60 seconds, since the data is no longer valid. The power and energy display is not shown when the menu is open.
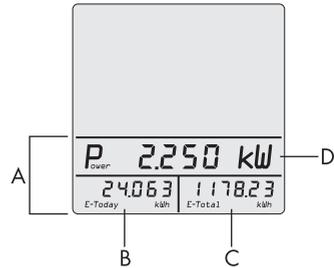
Position	Meaning		
A	Power and energy display		
		Chart view of the complete PV system:	Chart view for individual inverters:
B	E-Today	PV system energy today	Inverter energy today
	E-Yday	PV system energy yesterday	Inverter energy yesterday
C	E-total	Total energy yield of the PV system	Total energy yield of the inverter
D	Power	Current AC power of the PV system	Current AC power of the inverter.

7.5 Symbols in the Chart View

Sunny Beam shows the date, time, and symbols in the chart view. The symbols are explained in this section.
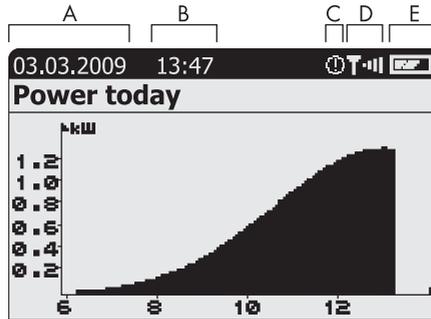
Position	Meaning	Section
A	Date	Section 7.13
B	Time	
C	• Symbol for recent or unread warnings.	Section 7.5.3
	• Symbol for recent or unread errors.	
	• If there are no unread warnings or errors, no symbol will be displayed.	
D	Symbol for the connection quality	Section 7.5.1
E	Battery symbol which indicates the battery state of charge	Section 7.5.2

7.5.1 Symbol for the Connection Quality

The symbol for connection quality indicates whether the Sunny Beam is connected to a device in your PV system and the quality of this connection.

The Sunny Beam only shows the symbol together with the "Power today" chart.
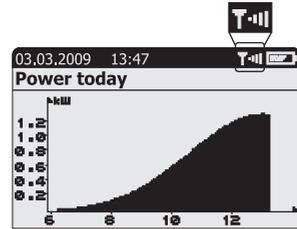
Symbol	Connection quality
	very good
	good
	unreliable
	critical
	none

When the Sunny Beam is establishing a connection, this is indicated by the following symbol: .

A larger view of the connection quality and the serial number of the device (inverter or SMA *Bluetooth* repeater) through which the Sunny Beam is connected to the entire PV system can be found in the menu "Service > Diagnosis > Connection quality" (section 7.10.1 "Checking the Connection Quality" (page 59)).

7.5.2 Battery Symbol/Charging the Batteries

The battery symbol indicates the state of charge of the Sunny
Beam batteries. If the state of charge of the batteries is too low, a
short acoustic signal will sound as soon as you use the Sunny
Beam. The Sunny Beam also displays an additional message.

Symbol	Meaning
	The battery is fully charged.
	The battery is no longer fully charged.
	The battery is empty.
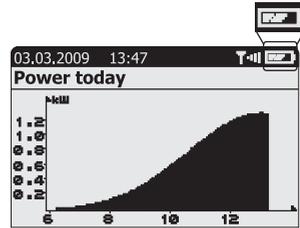
If you are charging the batteries via the Sunny Beam USB connection, the Sunny Beam will visualize
the charging process by displaying the battery symbols one after the other.

Charging the batteries when there is sufficient daylight

Put the Sunny Beam in a place with as much light as possible, ideally in direct sunlight, so that sufficient
light hits the solar cell.

Charging the batteries when there is insufficient daylight

Connect the Sunny Beam to a USB port on the computer with the USB connection cable which is
delivered with the Sunny Beam. The computer needs to remain switched on. If no computer is
available, use the USB plug-in power supply. The USB plug-in power supply is not included in the
scope of delivery (see section 14 "Accessories" (page 95)).

i USB hubs

When using a USB hub to connect to the computer, only use self-powered USB hubs.

7.5.3 Info, Error, and Warning Symbol

The Sunny Beam indicates information, errors, or warnings for the inverter through an according symbol in the chart view.

You can find details about existing information, errors, or warnings in the "Events" menu (see chapter 7.6 "Calling up Events" (page 52)). As soon as you call up the "Events" menu, the Sunny Beam will no longer display the symbol.

The Sunny Beam additionally indicates errors through a warning sound (7.7.1 "Enable / Disable Alarm for Errors" (page 54)). If there are no unread warnings or errors, no symbol is displayed.

Symbol	Meaning
Info ![info]	An error or warning is finished.
Warning ![warning]	An error may occur in the foreseeable future. The warning symbol is displayed if, for example, there is a frequent grid overvoltage.
Error ![error]	There is an error in an inverter. The error symbol is displayed if an inverter requires external help (from an installer) in order to function properly. Open the details for this event as described in section 7.6 "Calling up Events" (page 52). Contact your installer and inform him about the event message and the serial number of the inverter for which the event occurred.

7.6 Calling up Events

The Sunny Beam shows the events for the inverters in the "Events" menu. Events can be information, errors, or warnings. Finished errors or warnings are changed to information by the Sunny Beam.

The Sunny Beam shows unread events as symbols in the chart view, see chapter 7.5.3 "Info, Error, and Warning Symbol" (page 51).

Events menu
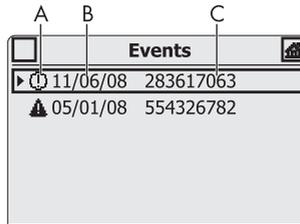
Position	Meaning
A	Symbol of the event (information, warning, error)
B	Date of the event
C	Name or serial number of the inverter where the event occurred.

1. Select "Events".

2. Select the event for which you wish to see detailed information.

☑ The details of the selected event are displayed.

Details of an event

Position	Meaning
A	Symbol of the event (information, warning, error)　　　　　　　 🔲 🔆 ⚠
B	Date of the event
C	Name of the event (information, warning, error)
D	Name or serial number of the inverter where the event occurred.
E	• Start time ("since"), if the event has not yet ended or the end time is not known. • Start time to end time ("from: to:"), if the event has ended. • End time ("to:"), if the event has ended and the start time is unknown.
F	• Duration of the event in hours : minutes : seconds format • "–:–:–", if the event has not yet ended or the duration could not be calculated because the start time is unknown.
G	Symbol for errors. Contact your installer and inform him about the event message (H) and the serial number of the inverter (I) for which the event occurred.
H	Event message

Position	Meaning
I	Serial number of the inverter where the event occurred.

7.7 Sunny Beam Alarms

The Sunny Beam has a buzzer which emits an alarm when an "Error" event occurs or when the battery state is too low. For more information see section 12 "Troubleshooting" (page 84).

7.7.1 Enable / Disable Alarm for Errors

When the "Error" event occurs, an alarm will be sounded and the error symbol will be shown in the chart view. The alarm is repeated after a certain interval set by the user until you press the button, however, not for more than 24 hours.

1. **Select** "Settings > Alerts".

2. **Select** "Signal every".

3. Set interval after which to repeat the alarm.

   The default setting is 30 minutes. Select "- - -" if you do not want an alarm to be sounded for errors.

☑ The alarm for errors has been set.
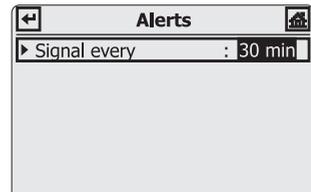
7.8 Display Settings

7.8.1 Changing the Contrast

1. Select "Settings > Display options > Contrast".
2. Select "Upper contrast" or "Lower contrast".
3. Set the contrast.
☑ The contrast is changed.
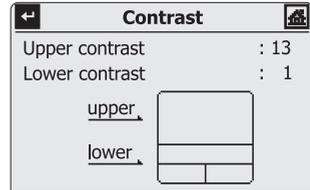
7.8.2 Changing the Display Switch-Off

To save energy the Sunny Beam will automatically switch off its display after being idle for 1 minute. You can adjust the duration or set the display to always remain switched on (Setting "-").

1. Select "Settings > Display options > Display off after:".
2. Set the interval.
☑ The switch-off has been set up.

i   Power consumption

     The longer the display remains switched on, the higher the power consumption of the Sunny Beam.

7.8.3 Setting the Coefficients of Balance

The coefficients of balance are used to calculate revenue and CO_2 avoided.

Revenue / kWh

The coefficient used for calculating revenue is the feed-in rate per kWh.

CO_2 / kWh

The coefficient (CO_2 factor) used for calculating CO_2 avoided depends on the energy mix of the location where the PV system is installed. You can find out how high the CO_2 factor of the location is by asking your power supplier.

i	You will find further information on the CO_2 coefficient in the download area of www.SMA-America.com.

1. **Select** "Settings > Display options > Coefficients of balance".
2. **Select** "Revenue / kWh:" **or** "CO2 / kWh:".
3. Set the coefficient.
☑   The coefficients of balance are now set.

7.9 Data Query

7.9.1 Changing the Data Query Frequency

You can change the frequency at which the Sunny Beam is to query data from the inverters. The default setting is 1 hour.

1. **Select** "Settings > Data query > Data query every:".

2. Set frequency.

☑ The frequency for data queries has been changed.

```
┌─┬──────────────────────────┬─┐
│←│      Data query          │⌂│
├─┴──────────────────────────┴─┤
│▶ Data query every    :  1 h  │
│  Live query                  │
│  Overnight Shutdown          │
│                              │
│                              │
│                              │
└──────────────────────────────┘
```

---
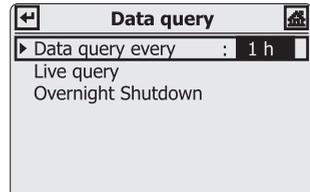
i Power consumption

The higher the data query frequency is, the more energy the Sunny Beam will consume. One query per hour is sufficient. The data is cached in the inverter.

---

i Overnight shutdown of the Sunny Beam

By default, the Sunny Beam will not query any data from the inverter overnight. Once the sun has set, solar inverters no longer feed in power; therefore they no longer produce data either. If you are using a wind inverter by SMA, you need to deactivate the Sunny Beam overnight shutdown to be able to query the complete data of the wind inverter (overnight deactivation, see section 7.9.2)

7.9.2 Deactivating Overnight Shutdown

By default, the Sunny Beam will not query any data from the inverter overnight. Once the sun has set, solar inverters no longer feed in power; therefore they no longer produce data either. If you are using a wind inverter by SMA, you need to deactivate the Sunny Beam overnight shutdown to be able to query the complete data of the wind inverter.

In order to deactivate overnight shutdown, proceed as follows:

1. **Select** "Settings > Data query > Overnight Shutdown".
2. Remove the checkmark from the "active" box.

☑ Overnight shutdown is now deactivated.

In order to prevent the batteries from discharging when overnight shutdown is deactivated, connect the Sunny Beam to a power source, as described in section 7.5.2 "Battery Symbol/Charging the Batteries" (page 50), part "Charging the batteries when there is insufficient daylight" (page 50).

7.10 Service Functions

7.10.1 Checking the Connection Quality

In the menu "Service > Diagnosis > Connection quality", you can check the connection quality of the connection from the Sunny Beam to the device via which the Sunny Beam is connected to the complete PV system.
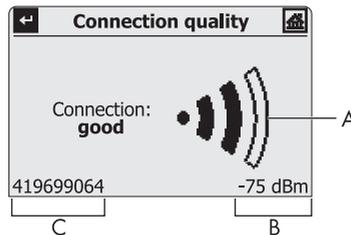
Position	Meaning
A	The connection quality as a symbol
B	The connection quality in decibel, relating to 1 mW
C	Serial number of the device (inverter or SMA *Bluetooth* Repeater) with SMA *Bluetooth* to which the Sunny Beam is connected.

> **i** Very high power consumption
>
> When the menu "Connection quality" is displayed, the Sunny Beam is continuously retrieving new data from the inverters and will not switch off automatically. The power consumption of the Sunny Beam is therefore very high.

Levels of connection quality

Symbol	Connection quality	Decibel in relation to 1 mW
•)))	very good	more than − 68 dBm
•)))	good	− 82 to − 68 dBm
•)))	unreliable	− 90 to − 82 dBm
•)))	critical	− 100 to − 90 dBm
◦)))	none	less than − 100 dBm

7.10.2 Accessing Device Information

1. Select "Service > Diagnosis > Device information".

2. Select "Sunny Beam" or one of the inverters.

☑ The information about the selected device is displayed.

The device information contains the following details:

Sunny Beam

- Serial number
- Firmware version
- Hardware
- *Bluetooth* version
- Battery voltage
- NetID

←	**Sunny Beam**	🏠
Serial number	:	14139243
Firmware version	:	1.0
Hardware	:	W1
Bluetooth version	:	V1.208.2
Battery voltage	:	2.85V
NetID	:	E

Inverter

- Type
- Serial number
- The software package of the inverter with integrated *Bluetooth* or of the SMA *Bluetooth* Piggy-Back with retrofitted *Bluetooth*.

←	1777039812	🏠
Type	:	SB5000TL-20
Serial number	:	1777039812
Software package:		V0.5.0

7.10.3 Performing an Update

When the Sunny Beam is updated, all the settings and data will be saved.

To perform an update, you will need:

- A computer with an Internet connection, in order to download the update file from the Internet.
- An operating system that supports connecting the Sunny Beam (see section 8.1 "System Requirements" (page 77)).
- The enclosed USB connection cable.

1. Download the update file in the download section of www.SMA-America.com and save it to your computer. The file is named "SBeam2.UPD". Do not rename the update file, or the Sunny Beam will not recognize the file.
2. Select "Service > Update" in the Sunny Beam main menu.
3. Connect the Sunny Beam to the computer with the supplied USB connection cable.

   ☑ The computer will recognize the Sunny Beam as a removable storage device. The drive "SBEAM 2 UPD" is added to the computer.
4. Open the folder "UDPATE" on the drive "SBEAM 2 UPD".

i	The Sunny Beam must remain connected to the computer
	Do not unplug the USB connection cable from the Sunny Beam and do not switch the computer off until chart "Power today" is shown. Otherwise, the Sunny Beam will not be able to perform the update.

5. Copy the file "SBeam2.UPD" to the folder "UPDATE". You can overwrite the existing file.

6. Select "○K" on the Sunny Beam.

   ☑ The menu "Update" is displayed.

7. Remove the Sunny Beam using the icon "Safely Remove Hardware" in the task bar of the computer. Otherwise, the Sunny Beam will not be able to perform the update correctly. The icon "Safely Remove Hardware" as displayed in the operating system Windows XP is depicted on the right.
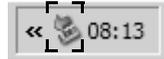
   The Sunny Beam must remain connected to the computer via the USB connection cable.

8. To start the update, confirm the request by pressing "Yes".

   ☑ The update starts.

   As soon as the update is completed, a message is displayed.

9. Select ">>".

   ☑ The first chart for the complete PV system, "Power today", is displayed.

10. Unplug the USB connection cable from the computer and the Sunny Beam.

☑ The update is complete.

7.10.4 Resetting the Sunny Beam

Resetting the Sunny Beam will restore the factory settings on the Sunny Beam.

i	All system data for the PV system, CSV files, and settings in the Sunny Beam are erased when it is reset!

If required, save the CSV files on your computer, as described in section 8.2 "Copying PV System Data to the Computer" (page 77). After resetting you need to commission the Sunny Beam as described in section 6.4 "Commissioning the Sunny Beam" (page 26).

1. Select "Service > Reset".

2. To perform the reset, confirm the request with "Yes".

    ☑ The Sunny Beam performs the reset. This may take a few minutes. When the reset is complete, the Sunny Beam is switched off.

☑ The reset is complete.

7.11 System Settings

7.11.1 Calling up the List of Connected Inverters

You can call up a list of all inverters which are connected to the Sunny Beam. The Sunny Beam does not display SMA *Bluetooth* Repeaters to which there is a connection.

1. Select "Settings > PV plant > Devices connected".

☑ The list of connected inverters appears.

⏎	**Devices connected**	
283617063		✓
554326782		✓
System password		OK

Inverters that are marked with a checkmark (✓) have the same system password as the Sunny Beam. If the inverters have a different system password than the Sunny Beam, they are marked with a lock (🔒). Inverters to which the Sunny Beam temporarily cannot establish a connection are marked with a cross (see section 12 "Troubleshooting" (page 84)).

7.11.2 Entering the System Password

If you have changed your system password with Sunny Explorer, you can enter the changed system password into the Sunny Beam.

1. Select "Settings > PV plant > Devices connected".

   ☑ The list of devices that are connected to Sunny Beam is displayed.

2. Perform the steps from section "Enter the new system password in the Sunny Beam" (page 38).

←	**Devices connected**	
283617063		🔒
554326782		🔒
	System password	OK

7.11.3 Repeating the System Search

You need to repeat the system search, e.g., if one or more inverters have been added to the PV system. When performing the system search, all CSV files and settings in the Sunny Beam will be saved.

i	Resetting the Sunny Beam before performing the system search is necessary in the following cases:

- You want to register an external PV system with the Sunny Beam.
- An inverter has been exchanged in the PV system.

A reset is necessary in order for the data from the previously registered PV system or the exchanged inverter to be deleted from the Sunny Beam.

i	No search for *Bluetooth* PV systems with NetID 1

The Sunny Beam cannot search for *Bluetooth* PV systems with the NetID 1. Only NetIDs from 2 to 9 and from A to F are possible.

3. Select "Settings > Plant > New plant search".

4. Select "Start detection" to start the system search.

   ☑ The system search will begin.

If	Then
A free NetID is already set on the devices of your *Bluetooth* PV system.	Perform the steps from section "Search for your own Bluetooth PV system" (page 33).
No free NetID has been set on the devices in your *Bluetooth* PV system.	Perform the steps from section "Determining free NetID" (page 31).

7.11.4 Changing the Device Name

The device names of the detected inverters are displayed as serial numbers in the Sunny Beam. You can change the serial numbers to a descriptive device name, in order to better distinguish between the inverters in the Sunny Beam. The names you give the devices are only shown on the Sunny Beam and will not be transferred to the inverters or displayed on any other communication device (e.g. Sunny Explorer).

1. **Select** "Settings > PV plant > Change device name".

   ☑ The list of inverters that the Sunny Beam manages is displayed.

2. Select the serial number or a previously assigned device name.

   ```
   ┌─────────────────────────────┐
   │ ← │  Change device name  │ 🏠 │
   ├─────────────────────────────┤
   │ ▶ 1777039812                │
   │   1926007910                │
   │   2077048192                │
   │   283617063                 │
   │   554326782                 │
   │                             │
   └─────────────────────────────┘
   ```
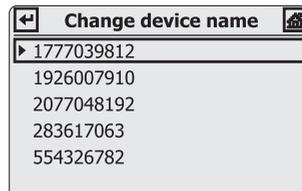
   ☑ The input page appears.

3. Select the button with the arrow and press the button again to delete the set device name.

⇐	Arrow: deletes the character which was entered last.
☒	Cross: cancels the input action.
☑	Checkmark: the entered device name is saved.

   ```
   ┌─────────────────────────────┐
   │ a b c d e f g h i j k l m n o p q r s t u v w │
   │ x y z A B C D E F G H I J K L M N O P │
   │ Q R S T U V W X Y Z   0 1 2 3 4 5 6 7 8 │
   │ 9 : - _ ! ? .               │
   │                             │
   ├─────────────────────────────┤
   │   ←    │    ✗    │    ✓    │
   ├─────────────────────────────┤
   │ 1777039812                  │
   └─────────────────────────────┘
   ```
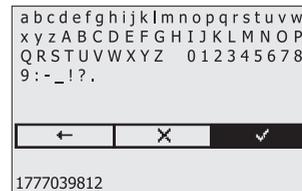
4. In order to enter the new device name, turn the button until the desired character is highlighted. Then press the button in order to select the character.

> **i** Umlauts in device names are not displayed correctly in the CSV files.

5. To save the device name, select the checkmark.

☑ The device name has been changed.

7.11.5 Adjusting the Energy Meter when Switching Devices

The energy meter shows the value for the total generated energy (E-total) for every inverter. If you need to exchange in inverter in your PV system, you can set the value for the total energy of the previous inverter on the new inverter.

1. Note down the E-total value of the previous inverter (see section 7.4 "Power and Energy Display" (page 47)).
2. Select "Settings > PV plant > Offset energy meter".
3. Select the new inverter.
4. Select "Display".
5. Enter the value of the previous inverter.

☑ The energy meter has been adjusted.

7.11.6 Setting the Maximum System Power in kWp

The system power in kWp (kilowatt peak) is the maximum possible power of the PV system. You can find out the value in kWp from your installer. The Sunny Beam requires the system power in kWp to calculate the specific annual yield (kWh/kWp). The specific annual yield makes it possible to directly compare PV systems of different sizes. The calculated specific annual yield indicates the energy yield for a system size with 1 kWp of power installed.

The specific annual yield is one of the charts of the Sunny Beam (see figure on the right). The Sunny Beam can display the system performance for the last 20 years. The more years are included, the more narrow the columns will be.
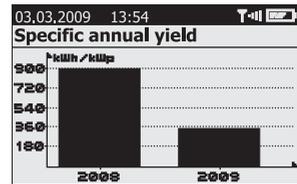
1. **Select** "Settings > PV plant > Plant power in kWp".

2. Set the system power in kWp.

☑ The system power in kWp has been set.

i	Requires data from January to December

The specific annual yield for one year is only representative if the Sunny Beam can use data for an entire year. If your PV system with the Sunny Beam was commissioned in July, for instance, data from the previous months are lacking. The present data (from July to December) will then be projected to the entire year by the Sunny Beam.

i	Expanding your *Bluetooth* PV system

If your *Bluetooth* PV system is to be expanded with more PV modules, you need to set the new system power in kWp on the Sunny Beam. The new inverters can be added to the Sunny Beam by performing a new system search (see section 7.11.3 "Repeating the System Search" (page 67)).

	Automatic calculation of the specific annual yield with the Sunny Beam
i	The Sunny Beam calculates the specific annual yield as follows:

- kWh (kilowatt hour) divided by kWp (kilowatt peak) = specific annual yield.

You can find out the value in kWp from your installer.

The value for kWh is calculated as follows:

The total of all daily energy values (E-day), which the Sunny Beam has been provided with for this year, divided by the number of daily energy values, multiplied by 365 days:

- (E-day 1) + (E-day 2) + (E-day 3) + (E-day n) divided by the number of daily energy values, multiplied by 365 days = the value for kWh.

Example:

(E-day 1) + (E-day 2)....+ (E-day 250) divided by 250 days, multiplied by 365 days = x (kWh).

x (kWh) divided by kWp = specific annual yield.

7.12 Country Settings

In the menu "Settings > Country settings", you can make country-specific settings. If you change the country, the settings in the menu items below the line will automatically be adjusted to the selected country. In addition, you can change the settings manually.

←	**Country settings**	⌂
Country: English (USA)		
Language	: English	
Currency	: $	
CO_2 avoided	: lbs.	
Formats		

- Country
  - Language
  - Currency
  - CO_2 avoided
  - Formats
    - Decimal separator
    - Date format
    - Timestamp format
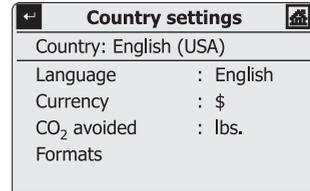
7.12.1 Changing Languages

1. **Select** "Settings > Country settings > Country".
2. Set the language.
☑   The language has been changed.

7.12.2 Changing the Currency

1. **Select** "Settings > Country settings > Currency".
2. Set the currency.
☑ The currency has been changed.

7.12.3 Changing the Unit of CO_2 Avoided

1. **Select** "Settings > Country settings > CO_2 avoided".
2. Set the unit.
☑ The unit of CO_2 avoided has been changed.

7.12.4 Changing the Decimal Separator

1. **Select** "Settings > Country settings > Formats".
2. **Select** "Decimal separator:" and change the setting.
☑ The decimal separator has been changed.

The decimal separator in the power and energy display (section 7.4) on the Sunny Beam cannot be changed and will always be a point.

7.13 Time Settings

i	**Change time settings when the sun has set.** Changing the time settings (date, daylight saving time, time, time zone) of the Sunny Beam is only possible if the sun has set and the inverters are no longer feeding in. The time difference therefore has no effect on the charts on the display of the Sunny Beam.

i	**Inverters with SMA *Bluetooth* Piggy-Back** If you use inverters with SMA *Bluetooth* piggy-backs, you must set the correct values for date, daylight saving time, time and time zone in the Sunny Beam. If you change these values after commissioning, thereby resetting the time, the data for this time difference will be deleted from the inverter. Please note that the time may also be reset if you change the settings for time zone or daylight saving time.

7.13.1 Changing the Date

1. Select "Settings > Date & time".
2. Select "Date" and change it.
☑ The date has been changed.

7.13.2 Changing the Time

1. Select "Settings > Date & time".
2. Select "Time" and change it.
☑ The time has been changed.

7.13.3 Changing the Date Format

Abbreviations: D= day, M= month, Y= year

1. **Select** "Settings > Country settings > Formats".
2. **Select** "Date format" and change the setting.
☑ The date format has been changed.

7.13.4 Changing the Timestamp Format

Possible settings: 12h or 24h (e.g. 6:00 pm or 18:00)

1. **Select** "Settings > Country settings > Formats".
2. **Select** "Timestamp format" and change the setting.
☑ The timestamp format has been changed.

7.13.5 Activating/Deactivating Daylight Saving Time

1. **Select** "Settings > Date & time".
2. Set or remove a checkmark in the box for "Daylight saving time". When there is a checkmark in the box, daylight saving time is activated. The time settings on the Sunny Beam and on the inverters will switch to daylight saving time.
☑ Daylight saving time is activated/deactivated.

7.13.6 Changing the Time Zone

1. **Select** "Settings > Date & time".
2. **Select** "Time zone" and change the setting.
☑ The time zone is changed.

8 PV System Data

The Sunny Beam will save the following CSV files for at least 90 days.

File	Content
Daily file A file for every day with daily values.	• Values for the generated power of the individual inverters for this day. A value is saved every 10 minutes. • Value for the generated total energy of the individual inverters for this day. • Value for the total energy generated so far by the individual inverters.
Monthly file A file for every month with final values for each day.	• Values for the generated total energy of the individual inverters for every day of this month.
Event file	• Errors and warnings of all inverters.

For inverters with integrated SMA *Bluetooth* Piggy-Back, it can take as long as until noon the next day, before the Sunny Beam can save the CSV files. The storage volume depends on the number of registered inverters. Once the memory is full, the Sunny Beam will begin to overwrite old data. How to copy the PV system data from the Sunny Beam to your computer is described in section 8.2 "Copying PV System Data to the Computer" (page 77).

8.1 System Requirements

Supported operating systems for connecting the Sunny Beam to the computer:

- Windows XP, Windows Vista, Windows 7
- Linux (SUSE, RedHat, Ubuntu, Debian etc.) with support for USB and mass storage devices
- Mac OS X, 10.3 and later.
- Mac OS classic, 8.6 and later with support for USB

8.2 Copying PV System Data to the Computer

The Sunny Beam signs on to the computer as an inverter. This means that you can copy your PV system data to the computer as with a USB memory stick.

To copy the system data to the computer, proceed as follows:

1. Connect the Sunny Beam to the computer with the supplied USB connection cable.

    ☑ The computer will recognize the Sunny Beam as a removable storage device. A drive is added to the computer. The drive contains the folder "SBEAM".

2. Open the "SBEAM" folder and copy the CSV data to the computer.

☑ The data has now been saved to the computer.

8.2.1 CSV File

The CSV files can be opened in Microsoft Excel and used to create charts.

File name

The name of the file is always the date that the data was generated by the inverter. The sequence is always year, month, and day. The separator is always a hyphen.

Daily file: YY-MM-DD.csv = Example: 09-07-15.csv

Monthly file: YYYY-MM,csv = Example: 2009-11.csv

Data format in the file

Individual data is separated by a semicolon in the file. The decimal separator and the timestamp format in the files are determined by the country settings. For information on how to change the decimal separator and the timestamp format, please refer to section 7.12.4 "Changing the Decimal Separator" (page 73) and 7.13.4 "Changing the Timestamp Format" (page 75).

i	Umlauts in device names are not displayed correctly in the CSV files.

9 Menu Overview

Complete PV system			
Inverter			
Events			
Settings	Display options	Contrast	Upper contrast
			Lower contrast
		Display off after	Upper display
			Lower display
		Balance coefficients	Revenue/kWh
			CO_2/kWh
	Alarm	Signal every	
	Date & time	Date	
		Daylight saving time	
		Time	
		Time zone	
	Data Query	Data query every	
		Overnight shutdown	active
	Country settings	Country	
		Language	
		Currency	
		CO_2 avoided	
		Formats	Decimal separator
			Date format
			Timestamp format
	PV system	Connected devices	
		New system search	
		Change device name	
		Offset energy meter	
		System power in kWp	
Service	Diagnose	Connection quality	
		Device information	
	Update		
	Reset		

10 Maintenance and Care

10.1 Maintenance

10.1.1 Replacing the Batteries

The batteries must be replaced when they no longer charge properly and this adversely affects the operation of the Sunny Beam.

<table>
<tr>
<td>⚠</td>
<td>NOTICE</td>
</tr>
<tr>
<td colspan="2">

Risk of damage to the Sunny Beam due to unsuitable batteries.

- Do not use non-rechargeable batteries under any circumstances.
- Batteries of the wrong type may leak into the Sunny Beam. You must only use rechargeable nickel-metal hydride batteries (NiMH), type Mignon (AA) with low self-discharge, e.g. Eneloop batteries (see section 14 "Accessories" (page 95)).
- Batteries with different states of charge damage the Sunny Beam. Always use and replace the batteries in pairs.

</td>
</tr>
</table>

1. Replace the batteries as illustrated below.
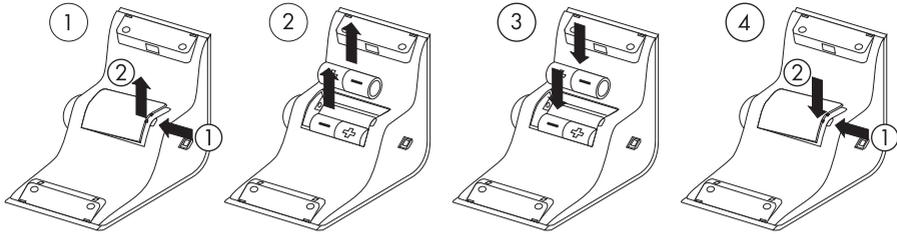
2. Press the button to switch the Sunny Beam on.

    ☑ The Sunny Beam checks whether an update file has been saved on the Sunny Beam.

If	Then
An update file has been saved on the Sunny Beam.	The Sunny Beam will perform the update.
No update file has been saved on the Sunny Beam.	The Sunny Beam will start up.

☑ The chart view for the complete system is displayed. The batteries have been replaced.

Make sure that the time and date settings of the Sunny Beam are correct. If the settings are incorrect, change time and date (section 7.13 "Time Settings" (page 74)).

10.2 Care

> ⚠ **NOTICE**
>
> Damage to the Sunny Beam due to ingress of liquids.
>
> The Sunny Beam is not waterproof.
>
> - Only use a soft, damp cloth.
> - Do not use aggressive or corrosive cleaning agents.

11 Decommissioning

11.1 Decommissioning the Sunny Beam

Remove the batteries from the Sunny Beam as illustrated below.
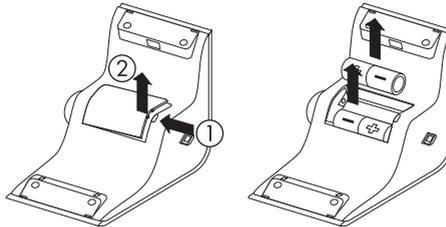
11.2 Disposing of the Sunny Beam

Dispose of the Sunny Beam at the end of its service life in accordance with the disposal regulations for electronic waste which apply at the installation site at that time. Alternatively, send it back to SMA with shipping paid by sender, and labeled "FOR DISPOSAL". For the adress see section 15 „Contact", page 96.

11.3 Disposing of the Batteries

Dispose of the batteries at the end of their service life in accordance with the disposal regulations for batteries which apply at the installation site at that time.

You can order new batteries for the Sunny Beam from SMA (see section 14 "Accessories" (page 95)).

12 Troubleshooting

Problem	Cause	Rectification
System search The Sunny Beam does not list the NetID of your *Bluetooth* PV system.	Your *Bluetooth* PV system has no device within the radio range of your Sunny Beam.	• Place the Sunny Beam closer to a device of your *Bluetooth* PV system. If this is not possible, use the SMA *Bluetooth* Repeater to bridge the radio gap.
	The devices of your *Bluetooth* PV system are not in operation.	• Determine a free NetID again, as described in section "Determining free NetID" (page 31). Afterwards, commission the devices as described in the respective manual.
	The NetID 0 (*Bluetooth* off) or NetID 1 may have been assigned to the devices. The Sunny Beam cannot detect devices with NetID 1.	• Set the free NetIDs of your *Bluetooth* PV system on the inverters and any available SMA *Bluetooth* Repeaters, as described in the respective manual. If no NetID has been determined for the *Bluetooth* PV system, determine a free NetID as described in section "Determining free NetID" (page 31).

Problem	Cause	Rectification
Devices not found The Sunny Beam does not list all inverters in your *Bluetooth* PV system.	For PV systems with many devices, it could take a while for all of the devices to become integrated in the *Bluetooth* network. The Sunny Beam will end the system search before all devices are integrated into the *Bluetooth* network.	• Repeat the system search.
	Inverters with upgraded SMA *Bluetooth* Piggy-Back switch off over night. Therefore, the Sunny Beam cannot establish a connection to these inverters.	• As soon as the inverters switch on in the morning, the Sunny Beam is able to establish a connection to them again.
	The NetID of your *Bluetooth* PV system has not been set on the missing inverters.	• Check whether the NetID of your *Bluetooth* PV system has been set on the inverters and SMA *Bluetooth* Repeaters, as described in the respective manual.
	The Sunny Beam was not able to establish a radio connection to the missing inverters.	• Check the connection quality of the inverters and SMA *Bluetooth* Repeaters, as described in the respective manual. The connection quality of each device must be at least good.

Problem	Cause	Rectification
Unknown devices detected The Sunny Beam lists your inverters as well as other inverters.	There is another *Bluetooth* PV system within the radio range of the Sunny Beam, which uses the same NetID as your *Bluetooth* PV system.	• By determining a free NetID this should not occur. Determine a free NetID again, as described in the section "Determining free NetID" (page 31).
Commissioning of connected devices Some inverters are marked with a lock symbol (🔒), others have a checkmark (✔).	Different system passwords for users are set in the inverters.	• Set the same system password for all users in Sunny Explorer for all inverters, as described in the Sunny Explorer help section.
Cross after commissioning Inverters are sometimes marked with a cross (✖).	For inverters with SMA *Bluetooth* Piggy-Back, the cross symbol is displayed when the inverters switch off at night. Since the Sunny Beam cannot establish a connection to this inverter, it interprets this as an incorrectly entered password.	• As soon as the inverters are switched on in the morning, the cross symbol will disappear.
	The Sunny Beam cannot establish a connection to these inverters.	• As soon as the Sunny Beam has established a connection to these inverters again, the cross will disappear.

Problem	Cause	Rectification
Radio connection The radio connection to the Sunny Beam is unreliable.	The Sunny Beam is too far away from your *Bluetooth* PV system, or the radio connection between the Sunny Beam and your *Bluetooth* PV system is subject to interference. Reasons for the interference could be, for example, walls or ceilings which weaken the radio waves.	• Place the Sunny Beam closer to a device of your *Bluetooth* PV system. If this is not possible, use the SMA *Bluetooth* Repeater to bridge the radio gap.
Time The time settings were not saved.	Due to the extensive time management in your PV system, the first attempt to change the time settings may not be successful, if, for example, the time has already been set using Sunny Explorer. The time you set in the Sunny Beam is also applied by the inverters.	• Check the time settings after commissioning and correct them, if required.

Problem	Cause	Rectification
Connection to the computer The computer displays a message that the USB device could perform better.	The message does not influence the functionality or speed of the Sunny Beam transmission.	• You can switch the message off, but then other USB error messages will not be displayed. Proceed as follows. These steps are for Windows XP and may be different in other operating systems: – Right-click on "My Computer" and select "Device Manager." – Open the "USB Controller" in the Device Manager. – Right-click on the item "Host Controller". – Select "Properties". – Select "Advanced". – Tick the box that says "Do not display USB errors".

Problem	Cause	Rectification
Chart view Gaps or extreme characteristics in the chart data.	After commissioning the Sunny Beam, the time in the Sunny Beam was set forward or backwards. This behavior only affects the chart data on the Sunny Beam display, and not the calculated data (total energy, energy today, energy yesterday, etc.).	• Do not change the time settings (date, daylight saving time, time, time zone) in the Sunny Beam more than necessary. • Only change the time settings of the Sunny Beam if the sun has set. The time difference therefore has no effect on the charts on the display of the Sunny Beam.
Alarm sound for the Sunny Beam An alarm sound can be heard.	An error has occurred in an inverter.	• Open the details for this event as described in section 7.6 "Calling up Events" (page 52). Contact your installer and inform him about the event message and the serial number of the inverter for which the event occurred.
	The state of charge of the battery is low.	• Charge the batteries as described in section 7.5.2.
Display The display does not switch on anymore.	The state of charge of the batteries is so low that reliable operation is impossible.	• Charge the batteries as described in section 7.5.2.
Warning symbol (🔳) The Sunny Beam displays a warning symbol.	An error may occur in the foreseeable future.	• No action is required.

Problem	Cause	Rectification
Error symbol (⚠) The Sunny Beam displays an error symbol.	There is an error in an inverter.	• Open the details for this event as described in section 7.6 "Calling up Events" (page 52). Contact your installer and inform him about the event message and the serial number of the inverter for which the event occurred.
The computer is to be restarted After connecting the Sunny Beam to the computer, the computer will signal that it needs to be restarted.	The Sunny Beam was connected to this computer for the first time. An update has been performed for the Sunny Beam.	• No action is required. It does not affect the computer or the Sunny Beam if you do not restart the computer.

> **i** Further information about SMA *Bluetooth* Wireless technology can be found in the download section at www.SMA-America.com.

13 Technical Data

This product meets the applicable Industry Canada technical specifications.

Communication	
Inverter communication	*Bluetooth*
Computer communication	USB 2.0
Interfaces	
USB	
Max. number of devices	
Bluetooth	12
Max. communication range	
Bluetooth in free field	up to 328 ft (100 m)
Power supply	
Power supply	integrated solar cell, USB connection cable, USB plug-in power supply
Number of batteries	2
Type of battery	Rechargeable nickel-metal hydride batteries (NiMH), type Mignon (AA), 1.2 V DC with low self-discharge, e.g. Eneloop
Environmental conditions for operation	
Ambient temperature	+32 °F ... +104 °F (0 °C ... +40 °C)
Protection rating	IP20
General data	
Dimensions, width x height x depth	5 in. x 3 in. x $7\frac{3}{4}$ in. (127 mm x 75 mm x 195 mm)
Weight	approx. 12 $\frac{1}{3}$ oz. (350 g) (with batteries)
Mounting location	indoors

Status display	LCD
Software language	German, English, Spanish, French, Italian, Greek, Dutch, Portuguese, Czech
Features	
Display	LCD
Operation	Rotary push button
Information displayed	
General information	Time, date
PV system data	Current power, power today and power yesterday, total energy, daily energy, energy yesterday, energy for the last 31 days and the last 12 months, and specific annual yield, revenue today and total revenue, CO_2 avoided today and total, warnings, errors
Accessories	
USB plug-in power supply	
Replacement batteries	

13.1 FCC Compliance Information

SMA system monitoring unit, model SMA *Sunny* Beam *Bluetooth*.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

(1) This device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.
- The user is cautioned that changes or modifications not expressly approved by SMA, could void the user's authority to operate this equipment.

Contact SMA for more information.

RF-exposure Statement

The SMA *Sunny* Beam *Bluetooth* contains a modular transmitter. Thus it must have a separation of at least $7\frac{7}{8}$ in. (200 mm) between the antenna and the body of the user or nearby persons, excluding hands, wrists, feet, and ankles.

14 Accessories

14.1 USB Plug-in Power Supply

The USB plug-in power supply can be used to connect the Sunny Beam to a socket, to charge the batteries via the mains instead of using the solar cell.

Order number: BEAM-BT-SUPPLY
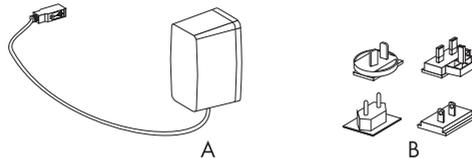
Position	Number	Name
A	1	USB plug-in power supply
B	4	Adapter

14.2 Replacement Batteries

Order number: BEAM-BT-BATTERY
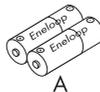
Position	Number	Name
A	2	Eneloop rechargeable batteries

15 Contact

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

- Hardware version of the Sunny Beam (see section 7.10.2)
- Sunny Beam with *Bluetooth* firmware version (see section 7.10.2)
- Firmware version of the SMA *Bluetooth* Piggy-Back in the inverter, if present
- Type and serial number of the inverter

In case you need to send in the Sunny Beam, remove the batteries first.

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