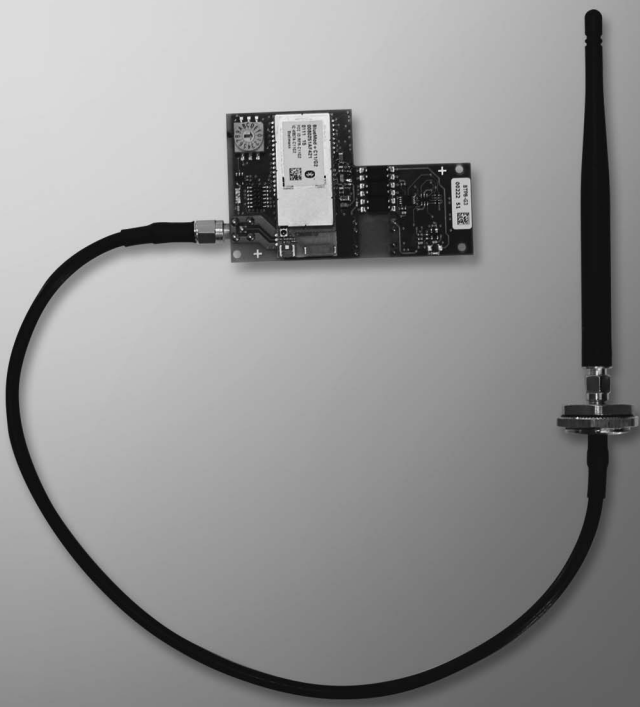




Communication Interface for SMA Inverters

SMA BLUETOOTH® PIGGY-BACK PLUS

Installation Guide



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IMPORTANT SAFETY INSTRUCTIONS

SAVE THESE INSTRUCTIONS

This Installation Guide contains important instructions for the communication device *SMA Bluetooth Piggy-Back Plus*, that must be followed during installation and maintenance of the *SMA Bluetooth Piggy-Back Plus*.

The *SMA Bluetooth Piggy-Back Plus* 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 *SMA Bluetooth Piggy-Back Plus*. To reduce the risk of personal injury and to ensure the safe installation and operation of the *SMA Bluetooth Piggy-Back Plus*, you must carefully read and follow all instructions, cautions and warnings in this Installation Guide.

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 Installation Guide:



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



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 SMA *Bluetooth Piggy-Back Plus*, 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 SMA *Bluetooth Piggy-Back Plus*.

The SMA *Bluetooth Piggy-Back Plus* contains no user-serviceable parts. For all repair and maintenance, always return the unit to an authorized SMA Service Center.

Before installing or using the SMA *Bluetooth Piggy-Back Plus*, read all of the instructions, cautions, and warnings on the SMA *Bluetooth Piggy-Back Plus* in this Installation Guide.

Wiring of the SMA *Bluetooth Piggy-Back Plus* must be made by qualified personnel only.

Table of Contents

| | | |
|-----------|--|-----------|
| 1 | Information on this Manual. | 8 |
| 2 | Safety | 9 |
| 2.1 | Appropriate Usage | 9 |
| 2.2 | Target Group Qualification | 9 |
| 2.3 | Safety Instructions | 9 |
| 3 | Description of the <i>Bluetooth</i> Piggy-Back. | 11 |
| 4 | Scope of Delivery. | 12 |
| 5 | Identifying the <i>Bluetooth</i> Piggy-Back | 13 |
| 6 | Preparing <i>Bluetooth</i> Communication | 14 |
| 6.1 | Detecting a Free NetID. | 14 |
| 6.2 | Setting the NetID | 14 |
| 7 | Mounting. | 16 |
| 7.1 | Installation Site Requirements | 16 |
| 7.2 | Installing the <i>Bluetooth</i> Piggy-Back. | 16 |
| 7.3 | Connecting the Antenna to the <i>Bluetooth</i> Piggy-Back. | 18 |
| 8 | Establishing <i>Bluetooth</i> Communication. | 21 |
| 9 | Updating the Firmware | 22 |
| 10 | Decommissioning | 23 |
| 10.1 | Removing the <i>Bluetooth</i> Piggy-Back | 23 |
| 10.2 | Disposing of the <i>Bluetooth</i> Piggy-Back | 25 |
| 11 | Troubleshooting | 26 |

12 Technical Data 28

12.1 *Bluetooth Piggy-Back* 28

12.2 Antenna 29

12.3 Antenna Cable 29

13 FCC Compliance Information 30

14 IC Compliance Information 31

15 Contact 32

1 Information on this Manual

Validity

This manual is valid for the SMA *Bluetooth* Piggy-Back Plus, firmware version 02.00.03.R and higher.

Target Group

This manual is intended for skilled workers. Only qualified personnel are allowed to perform the tasks set forth in this manual (see section 2.2 "Target Group Qualification" (page 9)).

Additional Information

Additional information is available at www.SMA-America.com:

| Document title | Document type |
|--|-----------------------|
| SMA <i>Bluetooth</i> - SMA <i>Bluetooth</i> ® Wireless Technology in Practice. | Technical Information |
| SMA <i>Bluetooth</i> ® Wireless Technology | Technical description |

Nomenclature

- In this manual, SMA America Production, LLC and SMA Solar Technology Canada Inc. are hereinafter referred to as SMA.
- This manual refers to PV plants and small wind turbine systems collectively as "plants."
- In this manual the SMA *Bluetooth* Piggy-Back Plus is referred to as *Bluetooth* Piggy-Back.

2 Safety

2.1 Appropriate Usage

The *Bluetooth Piggy-Back* is a communication interface und is used to connect the inverter with other SMA *Bluetooth*-enabled devices. Only skilled workers may install and uninstall the *Bluetooth Piggy-Back*.

The *Bluetooth Piggy-Back* may only be used with the following inverters:

| Photovoltaic inverters | Wind power inverters |
|------------------------|----------------------|
| Sunny Boy (SB) | Windy Boy (WB) |
| SB 3000US | WB 3000US |
| SB 3800-US-10 | WB 5000US |
| SB 4000US | WB 6000US |
| SB 5000US | WB 7000US |
| SB 6000US | WB 8000US |
| SB 7000US | |
| SB 8000US | |
| SB 8000TLUS-10 | |
| SB 9000TLUS-10 | |
| SB 10000TLUS-10 | |

2.2 Target Group Qualification

An electrically skilled person has received training and has demonstrated skills and knowledge regarding the functions and operation of the device. An electrically skilled person is trained to deal with the dangers and hazards involved in installing electrical systems.

2.3 Safety Instructions



DANGER

There is a risk of lethal electric shock when touching conductive parts of the inverter.

- Prior to performing any work on the inverter, disconnect the inverter on the AC and DC sides (see inverter installation guide).
- Only skilled persons may work on the inverter.



CAUTION

Possible damage to health as a result of the effects of radiation.

- Do not stay closer than 8 in. (20 cm) to the inverter with *Bluetooth Piggy-Back* for any length of time.



NOTICE

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

- Ground yourself before touching a component by touching the protective conductor (PE) or a non-coated part of the inverter enclosure.
- Avoid coming into contact with components and plug contacts.

3 Description of the *Bluetooth* Piggy-Back

The *Bluetooth* Piggy-Back allows you to establish a connection via SMA *Bluetooth* Wireless Technology to other SMA inverters and communication products with SMA *Bluetooth* (e.g., Sunny Explorer, Sunny Beam with *Bluetooth*).

The *Bluetooth* Piggy-Back reads inverter data and sends the data to a communication product with SMA *Bluetooth* Wireless Technology. You can read or configure the inverter data using the communication product.

4 Scope of Delivery

Check the scope of supply for completeness and any visible external damage. Please contact your dealer if the scope of supply is not complete or you find any damage.

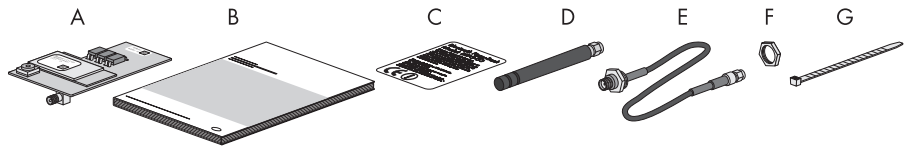


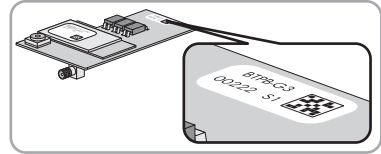
Fig 1: Scope of delivery

| Item | Quantity | Designation |
|------|----------|--|
| A | 1 | SMA <i>Bluetooth</i> Piggy-Back Plus: BTPB-G3 |
| B | 1 | Installation guide |
| C | 1 | Label with FCC certification, IC certification and CE mark |
| D | 1 | Antenna |
| E | 1 | Antenna Cable |
| F | 1 | Counter nut for antenna cable |
| G | 1 | Cable tie |

5 Identifying the *Bluetooth Piggy-Back*

Serial Number, Assembly Name, Production Version

You can find the serial number, assembly name and production version of the *Bluetooth Piggy-Back* on the type label. The type label is located on the front of the *Bluetooth Piggy-Back*.



Firmware version

The firmware version of the *Bluetooth Piggy-Back* is displayed by means of the communication product, e.g., Sunny Explorer or Sunny Beam with *Bluetooth* (see manual of the communication product).

6 Preparing *Bluetooth* Communication

6.1 Detecting a Free NetID

The NetID serves to distinguish PV plants with SMA *Bluetooth* in close proximity of each another.

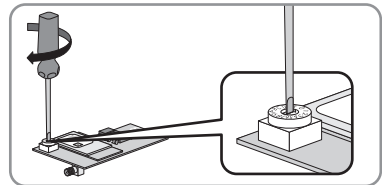
If another plant with SMA *Bluetooth* is located within 1.640 t. (500 m) of your plant, you will have to detect a free NetID. This way you will prevent setting a NetID for your plant that is already set for by another plant. If no other plant is located within 1.640 ft. (500 m), you may choose any NetID for your plant.

- Detecting a free NetID using the Sunny Explorer software (see Sunny Explorer help).

6.2 Setting the NetID

Requirement:

- A free Net ID has been detected (see section 6.1).
- Use a screwdriver to turn the arrow of the rotary switch to the plant's NetID. Use a screwdriver with a width of $\frac{1}{8}$ in. (2.5 mm).



Functions of the NetIDs

| NetID | Function |
|-----------------------------|---|
| 0 | <i>Bluetooth</i> is switched off. |
| 1 (status upon delivery) | <p><i>Bluetooth</i> is switched on.</p> <p>The device can connect with up to 2 of the following communication products:</p> <ul style="list-style-type: none"> • Computer with <i>Bluetooth</i> and Sunny Explorer software <p>The device cannot establish a connection with the following devices:</p> <ul style="list-style-type: none"> • Inverters with integrated SMA <i>Bluetooth</i> • Inverters with SMA <i>Bluetooth</i> Piggy-Back • Sunny Beam with <i>Bluetooth</i> • SMA <i>Bluetooth</i> Repeater • SMA <i>Bluetooth</i> Repeater Outdoor • SMA Power Injector with <i>Bluetooth</i> |
| 2 to 9 and A to F | <p><i>Bluetooth</i> is switched on.</p> <p>The device can connect with all SMA <i>Bluetooth</i> products with the same NetID.</p> |

7 Mounting

7.1 Installation Site Requirements

- Keep a distance of at least 3 ft. (1 m) from devices using the 2.4 GHz frequency band (e.g., WLAN devices, microwave ovens, devices with *Bluetooth* Wireless Technology). This will prevent reduced connection quality and data transmission speed.

7.2 Installing the *Bluetooth* Piggy-Back

Requirement:

- The NetID of the plant has been set on the *Bluetooth* Piggy-Back (see section 6.2).

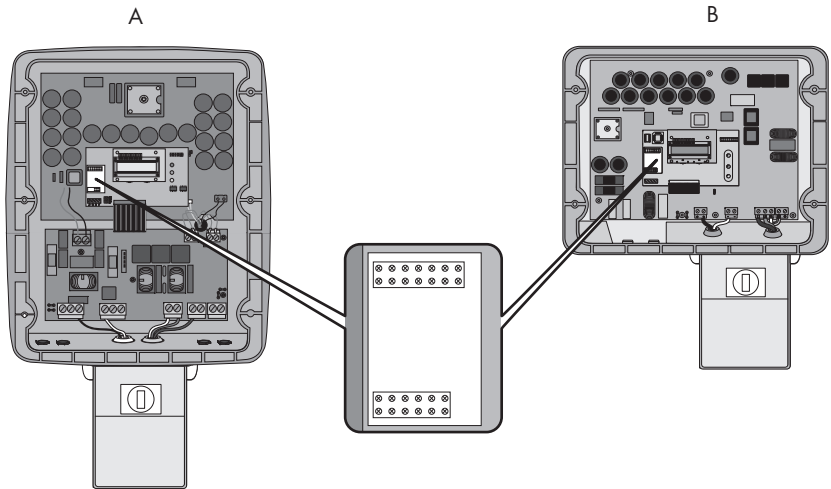


Fig. 2: Position of the interface socket

| Item | Inverter ^{*)} |
|------|--|
| A | From SB 5000US to SB 10000TLUS-10 as well as WB 5000US to WB 8000US referred to as " Enclosure type A " in the following. |
| B | From SB 3000US to SB 4000US as well as WB 3000US, referred to as " Enclosure type A " in the following. |

^{*)}"From [...] to [...]" refers to the list of supported inverters, see section 2.1.

**DANGER**

Risk of lethal electric shock when opening the inverter.

Death or serious injuries.

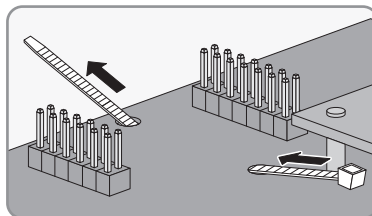
- Disconnect the inverter on the AC and DC side (see inverter installation guide).

**NOTICE**

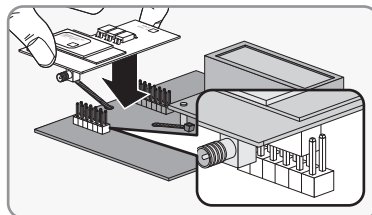
Electrostatic discharge can damage the inverter.

- Ground yourself before touching components by touching the protective conductor (PE) or a non-coated part of the inverter enclosure.

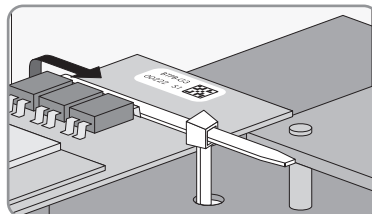
1. Disconnect and open the inverter (see inverter installation guide).
2. If another communication interface is installed on the interface socket, remove the installed communication interface (see communication interface manual).
3. Pass the cable tie through the mounting holes of the display assembly. Make sure to pass the cable tie below the display assembly.



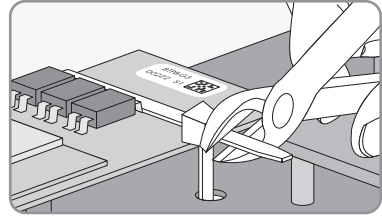
4. Plug the *Bluetooth Piggy-Back* onto the interface socket, aligned to the left. Make sure to leave the two pins on the right side of the lower row of pins free.



5. Fasten the cable tie.



6. Cut off the surplus end of the cable tie and remove it from the inverter.



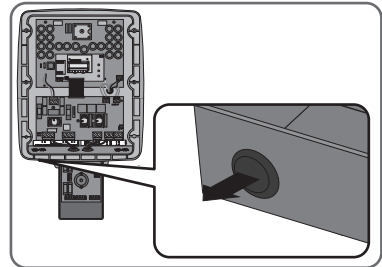
7. Connect the antenna to the *Bluetooth Piggy-Back* (see section 7.3).

7.3 Connecting the Antenna to the *Bluetooth Piggy-Back*

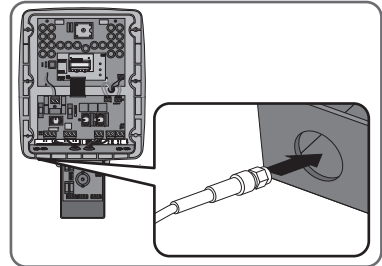
Requirement:

- You have installed the *Bluetooth Piggy-Back* in the inverter (see section 7.2)

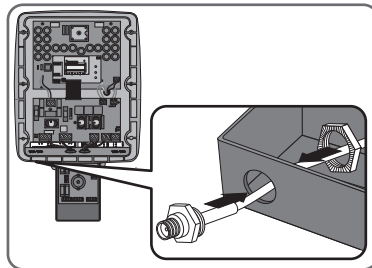
1. Press the left filler plug out of the inverter's enclosure opening.



2. Insert the antenna cable with the cable end and the plug through the enclosure opening into the inverter.



3. Attach the counter nut onto the antenna cable with the serrated edges facing towards the inverter enclosure.



4. First tighten the counter nut by hand, then screw it onto the antenna cable's thread with a torque of 80 in-lbs (9 Nm). Spanner size of the torque wrench: 1 in. (25.4 mm).

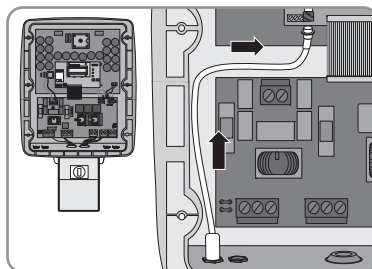


NOTICE

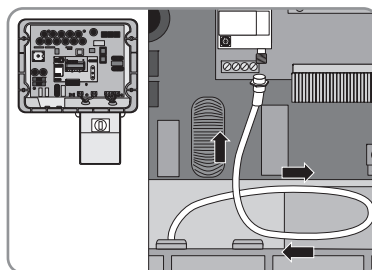
The antenna cable can be damaged.

- Do not bend the antenna cable.
- Keep the antenna cable away from heat-conducting component parts.

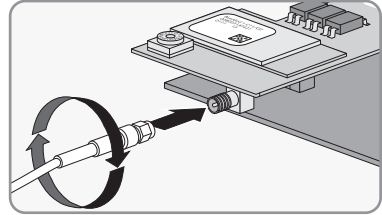
5. Install the antenna cable in the inverter:
 - For inverters with enclosure type A: pass the antenna cable towards the antenna connection of the *Bluetooth Piggy-Back*.



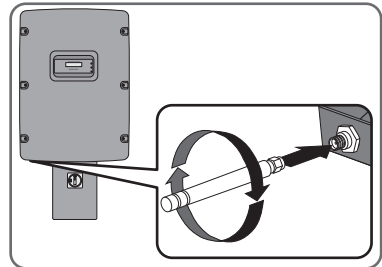
- For inverters with enclosure type B: pass the antenna cable along the lower edge of the inverter enclosure. Pass the antenna cable towards the antenna connection of the *Bluetooth Piggy-Back* in a loop.



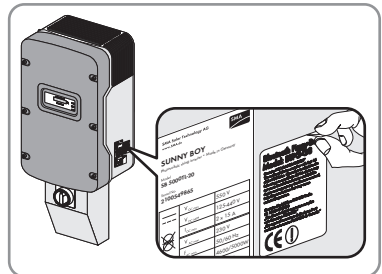
6. Screw the antenna cable plug to the antenna connection by hand without tools.



7. Close the inverter (see inverter installation guide).
8. Screw the antenna onto the antenna cable by hand without tools.



9. Attach the label with the FCC and IC certifications and CE mark to the right side of the inverter enclosure, on the right next to the type label.



8 Establishing *Bluetooth* Communication

Requirement:

- Free NetID has been detected (see section 6.1).
- The NetID of the plant has been set on the *Bluetooth* Piggy-Back (see section 6.2).
- You have installed the *Bluetooth* Piggy-Back in the inverter (see section 7.2).

or

- The *Bluetooth* Piggy-Back is pre-installed in the inverter.
 - The antenna has been connected to the *Bluetooth* Piggy-Back (see section 7.3).
1. Commission the communication product (e.g., Sunny Explorer, Sunny Beam with *Bluetooth*; see manual of the communication product).
 2. Commission the inverter with *Bluetooth* Piggy-Back (see inverter installation guide).
 3. If the inverter with *Bluetooth* Piggy-Back has a different password than the plant, change the password of the inverter with *Bluetooth* Piggy-Back to the plant password using the Sunny Explorer software (see Sunny Explorer help).
- ☒ The *Bluetooth* Piggy-Back is establishing a connection to other devices with SMA *Bluetooth*. You can read or configure the inverter data using the communication product.

9 Updating the Firmware

You can update the firmware of the *Bluetooth* Piggy-Back using the Sunny Explorer software. The *Bluetooth* Piggy-Back remains in the inverter while the update is being performed.

Requirement:

- The inverter's feed-in power is at least 50 W.
-
1. Update firmware using Sunny Explorer (see Sunny Explorer help).
 2. Restart Sunny Explorer.

10 Decommissioning

10.1 Removing the *Bluetooth* Piggy-Back



DANGER

Risk of lethal electric shock when opening the inverter.

Death or serious injuries.

- Disconnect the inverter on the AC and DC side (see inverter installation guide).

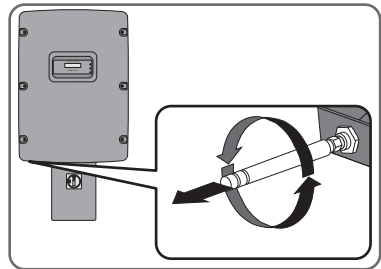


NOTICE

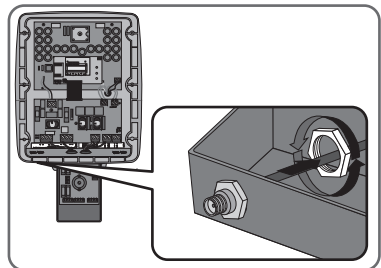
Electrostatic discharge can damage the inverter.

- Ground yourself before touching components by touching the protective conductor (PE) or a non-coated part of the inverter enclosure.

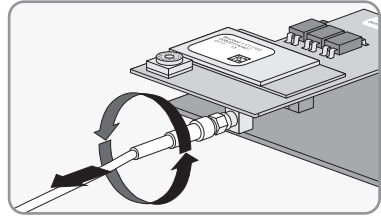
1. Unscrew the antenna from the antenna cable.



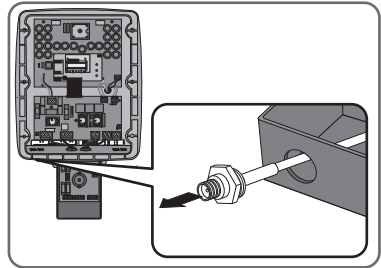
2. Disconnect and open the inverter (see inverter installation guide).
3. Unscrew the counter nut from the thread of the antenna cable.



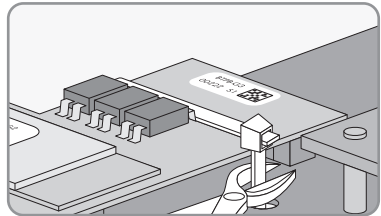
4. Unscrew the antenna cable plug from the antenna connection of the *Bluetooth Piggy-Back*.



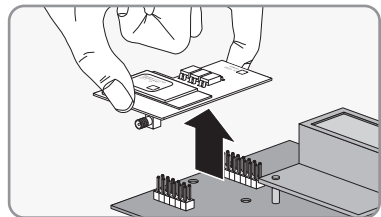
5. Pull the antenna cable out of the inverter through the enclosure opening.



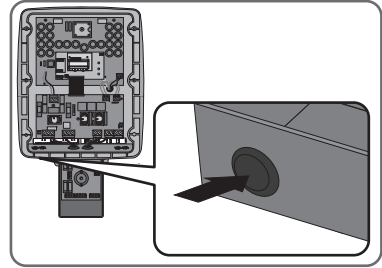
6. Cut the cable tie and remove it from inverter.



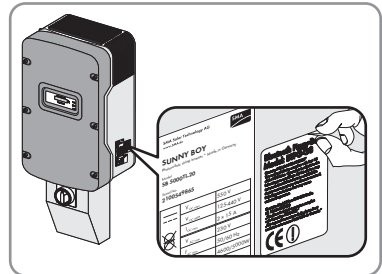
7. Remove the *Bluetooth Piggy-Back* from the interface socket.



8. Close the enclosure opening with the filler-plug.



9. Close the inverter (see inverter installation guide).
10. Remove the label with the FCC and IC certifications and the CE mark from the inverter.



10.2 Disposing of the *Bluetooth Piggy-Back*

- Observe the disposal regulations for electronic waste that apply at the installation site when disposing of the *Bluetooth Piggy-Back*.
- In order to have us dispose of the *Bluetooth Piggy-Back*, send the *Bluetooth Piggy-Back* back to SMA at your own cost, labeled "FOR DISPOSAL".

11 Troubleshooting

| Problem | Cause | Measure |
|--|---|---|
| The inverter with <i>Bluetooth</i> Piggy-Back is not shown by the communication product. | The inverter with <i>Bluetooth</i> Piggy-Back has not been commissioned. | <ul style="list-style-type: none"> Commission the inverter with <i>Bluetooth</i> Piggy-Back (see inverter installation guide). |
| | The inverter with <i>Bluetooth</i> Piggy-Back is not in feed-in operation. | <ul style="list-style-type: none"> Wait until the inverter switches to feed-in operation. |
| | The <i>Bluetooth</i> Piggy-Back has not been installed correctly on the interface socket. | <ul style="list-style-type: none"> Ensure that the <i>Bluetooth</i> Piggy-Back has been correctly installed on the interface socket (see section 7.2). |
| | NetID "0" is set on the <i>Bluetooth</i> Piggy-Back. | <ul style="list-style-type: none"> Set the NetID of the plant on the <i>Bluetooth</i> Piggy-Back (see section 6.2). |
| | NetID "1" is set on the <i>Bluetooth</i> Piggy-Back. | <ul style="list-style-type: none"> Set another NetID on the <i>Bluetooth</i> Piggy-Back. |

| Problem | Cause | Measure |
|--|---|---|
| The connection between the inverter with the <i>Bluetooth</i> Piggy-Back and the communication product is disturbed. | The distance between the inverter with <i>Bluetooth</i> Piggy-Back and the communication product is too large. | <ul style="list-style-type: none"> Decrease the distance between the inverter with <i>Bluetooth</i> Piggy-Back and the communication product. If required, use an SMA <i>Bluetooth</i> Repeater to cover the dead zones. |
| | The <i>Bluetooth</i> radio waves are being weakened by obstacles (e.g., walls, ceilings, doors). | <ul style="list-style-type: none"> Position the communication product in such a manner as to prevent obstacles from disturbing the <i>Bluetooth</i> radio waves. If required, use an SMA <i>Bluetooth</i> Repeater to cover the dead zones. |
| | The distance between the inverter with <i>Bluetooth</i> Piggy-Back and other devices using the 2.4 GHz frequency band is too small. | <ul style="list-style-type: none"> Make sure that the requirements for the installation site of the inverter with <i>Bluetooth</i> Piggy-Back are met (see section 7.1). |
| | The antenna has not been connected correctly to the <i>Bluetooth</i> Piggy-Back. | <ul style="list-style-type: none"> Ensure that the antenna is screwed onto the antenna cable correctly (see section 7.3). |
| | | <ul style="list-style-type: none"> Ensure that the antenna cable plug is correctly screwed onto the antenna connection of the <i>Bluetooth</i> Piggy-Back (see section 7.3). |
| The <i>Bluetooth</i> Piggy-Back firmware cannot be updated. | The inverter's feed-in power is less than 50 W. | <ul style="list-style-type: none"> Only update the firmware if the feed-in power is at least 50 W. |

12 Technical Data

12.1 Bluetooth Piggy-Back

Mechanical Data

| | |
|----------------|---|
| Width x length | 2 in. x 3 $\frac{1}{8}$ in. (50 mm x 81 mm) |
| Weight | 2 $\frac{1}{8}$ oz (60 g) |

Communication

| | |
|---|------------------|
| Communication interface | <i>Bluetooth</i> |
| Maximum free-field communication range when installed, if inverter lid is closed and antenna is connected | 328 ft. (100 m) |

Connections

| | |
|---|---|
| Number of 10-pin socket connectors | 1 |
| Number of 14-pin socket connectors | 1 |
| Number of 1-pin reverse polarity sub-miniature A-socket | 1 |

Ambient Conditions

| | |
|-------------------------------------|---|
| Ambient temperature | - 40 °F ... +185 °F (- 40 °C ... +85 °C) |
| Relative humidity ^{*)} | 5 % ... 95 % |
| Maximum height ^{**)} | 9.84 ft. (3.00 m) |
| Degree of protection when installed | NEMA 3 R |

^{*)} Non-condensing

^{**) Above mean sea level}

12.2 Antenna

Mechanical Data

| | |
|-------------------|---|
| Diameter x length | $1\frac{3}{32}$ in. x $5\frac{1}{8}$ in. (10 mm x 130 mm) |
| Weight | $\frac{7}{16}$ oz (12 g) |

Ambient Conditions

| | |
|----------------------|---|
| Ambient temperature | - 40 °F ... +185 °F (- 40 °C ... +85 °C) |
| Relative humidity | 5 % ... 95 % |
| Maximum height | 9.84 ft. (3.00 m) |
| Degree of protection | NEMA 3 R |

Connections

| | |
|---|---|
| Number of 1-pin reverse polarity sub-miniature A-socket | 1 |
|---|---|

12.3 Antenna Cable

Mechanical Data

| | |
|-------------------|---|
| Diameter x length | $\frac{1}{5}$ in. x $16\frac{1}{2}$ in. (5 mm x 420 mm) |
| Weight | $\frac{15}{18}$ oz (51 g) |

Ambient Conditions

| | |
|---------------------|--------------------|
| Ambient temperature | - 40 °C ... +85 °C |
| Relative humidity | 5 % ... 95 % |
| Maximum height | 9.84 ft. (3.00 m) |

Connections

| | |
|---|---|
| Number of 1-pin reverse polarity sub-miniature A-socket | 1 |
| Number of 1-pin reverse polarity sub-miniature A panel jack | 1 |

13 FCC Compliance Information

The SMA communication device *Bluetooth Piggy-Back Plus* contains FCC ID: SVF-BTPBG3.

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 A & 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 America, Inc. could void the user's authority to operate this equipment.

RF-exposure Statement

The SMA *Bluetooth Piggy-Back Plus* contains a modular transmitter. Thus it must have a separation of at least 8 in. (20 cm) between the antenna and the body of the user or nearby persons, excluding hands, wrists, feet, and ankles.

14 IC Compliance Information

The SMA communication device *Bluetooth Piggy-Back Plus* contains IC: 9440A-BTPBG3.

This device complies with Part 15 of the FCC Rules and with Industry Canada licence-exempt RSS standard(s).

Operation is subject to the following two 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.

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:

- Inverter type
- Type and number of modules connected
- Way of communication
- Sunny Boy failure or warning number
- Display of the Sunny Boy

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