PV Inverter

SUNNY BOY 3300 / 3800

Installation Guide

SB33_38-IEN100540 | IME-SB3800 | Version 4.0

EN

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1 Notes on this Manual

1.1 Area of validity

This manual describes the assembly, installation, commissioning and maintenance of the following SMA inverters:

- Sunny Boy 3300 (SB 3300) from firmware version GRX33_2.94/2.94,
- Sunny Boy 3800 (SB 3800) from firmware version GRX38_2.94/2.94.

The firmware version will be indicated in the display once you have commissioned the inverter.

Store this manual where it can be accessed at all times.

1.2 Target Group

This manual is for qualified personnel. The tasks described in this manual may be performed by qualified personnel only.

1.3 Additional Information

You will find further information on special topics such as designing a line circuit breaker or the description of the operating parameters in the download area at www.SMA.de/en.

Refer to the user manual for detailed information on operating the inverter.

1.4 Symbols Used

The following types of safety instructions and general information appear in this document as described below:

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 indicates a situation that can result in property damage, if not avoided.

Information

Information provides tips that are valuable for the optimal installation and operation of your product.

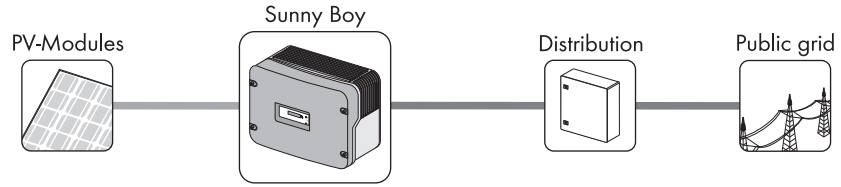
☑ This symbol indicates an outcome.

2 Safety

2.1 Appropriate Usage

The Sunny Boy is a PV inverter, which converts the DC current of the PV generator to AC current and feeds it into the public grid.

Principle of a PV system with this Sunny Boy



The Sunny Boy may only be operated with PV generators (modules and cabling) of protection class II. Do not connect any sources of energy other than PV modules to the Sunny Boy.

When designing the PV system, ensure that the values comply with the permitted operating range of all components at all times. The free design program "Sunny Design" (www.SMA.de/en/SunnyDesign) will assist you. The manufacturer of the PV modules must have approved the modules for use with this Sunny Boy device. You must also ensure that all measures recommended by the module manufacturer for long-term maintenance of the module properties are taken (see also Technical Information "Module Technology" in the download area of www.SMA.de/en).

Do not use the Sunny Boy for purposes other than those described here. Alternative uses, modifications to the Sunny Boy or the installation of components not expressly recommended or sold by SMA Solar Technology AG void the warranty claims and operation permission.

Certified countries

The Sunny Boy 3300 / 3800 (with according configuration) fulfill the requirements specified in the following standards and directives (dated: 02/2010):

- VDE 0126-1-1 (02.2006)
- RD 1663/2000 (2000)
- G83/1 (09.2003)
- CER/06/190 (10.2006)
- E 2750 (11.2004)
- PPC (06.2006)
- EN 50438 (12.2007)
- C10/C11 (08.2003)
- DK 5940 Ed.2.2 (02.2006) (only applies for SB 3300-IT/ 3800-IT)
- AS4777 (2005)
- IEC utility meeting 216

SMA Solar Technology AG can preset special grid parameters for other countries / installation locations according to customer requests after evaluation by SMA Solar Technology AG. You can make later modifications yourself by changing software parameters with respective communication products (e.g. Sunny Data Control or Sunny Explorer). See section 5.7 "Setting the Grid Parameters and Country Parameters" (page 35). To change the grid-relevant parameters, you need a personal access code, the so-called SMA grid guard code. The application form for the personal access code can be found in the download area at www.SMA.de/en in the category "Data Sheet" of the respective inverter.

2.2 Safety Instructions

DANGER!

Danger to life due to high voltages in the inverter!

- All work on the inverter may be carried out by qualified personnel only.
- The appliance is not to be used by children or persons with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction.
- Children should be supervised to ensure that they do not play with the appliance.

CAUTION!

Danger of burn injuries due to hot enclosure parts!

- Do not touch the inverter's enclosure during operation.

NOTICE!

Dust and water in the inverter can damage it!

Once the Electronic Solar Switch has been pulled out, the inverter only provides protection rating IP21. It is then no longer protected against dust and water! In order to keep the protection rating IP65 during temporary decommissioning, proceed as follows:

- Release and remove all DC plug connectors.
- Open all DC plug connectors and remove the cables.
- Close all DC inputs with the corresponding DC plug connectors and the sealing plugs provided.
- Firmly attach the Electronic Solar Switch again.

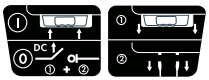
Grounding the PV generator

Comply with the local requirements for grounding the modules and the PV generator. SMA Solar Technology AG recommends connecting the generator frame and other electricity conducting surfaces so that there is continuous conduction and to ground them in order to achieve maximum protection of the system and personnel.

2.3 Explanation of Symbols

This section gives an explanation of all the symbols shown on the inverter and on the type label.

2.3.1 Symbols on the Inverter

Symbol	Explanation
	Operation Display. Shows the operating status of the inverter.
	Ground fault or varistor defective. Read section 9.3 "Red LED is Glowing Continuously" (page 52).
	Fault or disturbance. Read section 9 "Troubleshooting" (page 46).
	Tap to switch on the display light and switch to the next message.
	DC circuit breaker Electronic Solar Switch (ESS) • ❶ If the Electronic Solar Switch connects, then the DC circuit is completed. • ❼ To interrupt the DC circuit and disconnect the inverter securely under load, you have to first pull out the Electronic Solar Switch ❶ and then remove all DC plug connectors ❷, as described in section 7.2 "Opening the Inverter" (page 37).

2.3.2 Symbols on the Type Label

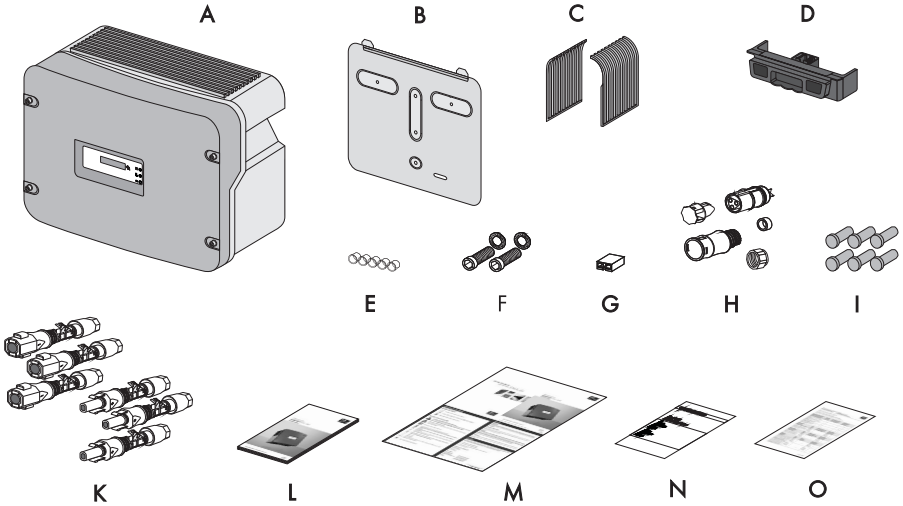
Symbol	Explanation
	Beware of dangerous electrical voltage. The inverter operates at high voltages. All work on the inverter may be carried out by qualified personnel only.
	Beware of hot surface. The inverter can become hot during operation. Avoid contact during operation.
	Observe all documentation accompanying the inverter.

Symbol	Explanation
	The inverter must not be disposed of with the household waste. For further information on disposal, see section 10.4 "Disposing of the Inverter" (page 58).
CE	CE mark. The inverter complies with the requirements of the applicable EC guidelines.
	The inverter has a transformer.
	Direct Current (DC)
	Alternating Current (AC)
	Protection rating IP65. The inverter is protected against penetration by dust particles and water jets from any angle.
	RAL quality mark for solar products. The inverter complies with the requirements of the German Institute for Quality Assurance and Labeling.

3 Unpacking

3.1 Packing List

Check the delivery for completeness and for visible external damage, such as cracks in the enclosure or in the display. Contact your dealer if anything is damaged or missing.



Object	Number	Description
A	1	Sunny Boy
B	1	Wall mounting bracket (rear panel)
C	2	Air grills (1 x right / 1 x left)
D	1	Electronic Solar Switch (ESS)
E	5	Sealing plug for wall mounting bracket (sealing)
F	2	Cylinder head screws and M6 contact washers
G	1	Jumper for communication / fan test
H	1	AC coupling socket: socket unit, protective cap for socket unit, threaded sleeve, sealing ring, clamping nut.
I	6	Sealing plugs for DC plug connectors
K	6	DC plug connectors (3 x positive / 3 x negative)
L	1	Installation guide
M	1	User manual
N	1	Document set
O	1	Supplement with the factory settings of the inverter

3.2 Identifying the Inverter

You can identify the inverter by the type label. The type label is on the right side of the enclosure.

The serial number (Serial No.) and the type (Type / Model) of the product, as well as device-specific characteristics are specified on the type label.

4 Installation

4.1 Safety

DANGER!

Danger to life due to fire or explosion!

Despite careful construction, electrical devices can cause fires.

- Do not mount the inverter on flammable construction materials.
- Do not install the inverter in areas where highly flammable materials are stored.
- Do not install inverters in areas with a risk of explosion.

CAUTION!

Danger of burn injuries due to hot enclosure parts!

- Mount the inverter in such a way that it cannot be touched inadvertently during operation.

CAUTION!

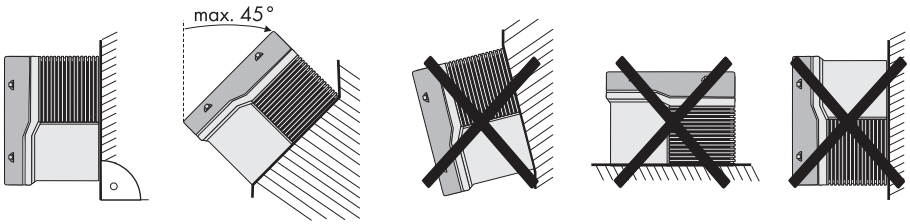
Risk of injury due to the heavy weight of the inverter!

- Take the inverter's weight of approx. 38 kg into account for mounting.

4.2 Selecting the Mounting Location

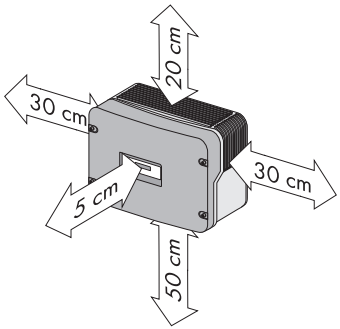
Consider the following points when selecting where to install:

- The installation method and location must be suitable for the inverter's weight and dimensions (see section 11 "Technical Data" (page 59)).
- Mount on a solid surface.
- It must be possible to access the installation location freely and safely at all times without the need for additional tools such as scaffolding or lifting platforms. Service actions are otherwise limited.



- Vertical installation or tilted backward by max. 45°.
- The connection area must point downward.

- Never install the device with a forward tilt.
- Do not install horizontally.
- Install at eye level in order to allow the operating status to be read at all times.
- The inverter must be easy to remove from the mounting location at any time.
- The ambient temperature should be below 40 °C to ensure optimal operation.
- Do not expose the inverter to direct sunlight to avoid a power reduction due to excessive heating.
- In living areas, do not mount the unit on plasterboard walls or similar in order to avoid audible vibrations. The inverter can make noises when in use which may be perceived as a nuisance in a living area.
- Observe the minimum clearances to walls, other inverters or objects as shown in the diagram in order to guarantee sufficient heat dissipation and to have enough space for removing the Electronic Solar Switch.



Multiple inverters installed in areas with high ambient temperatures

If necessary, increase the clearances between the individual inverters. In addition, make sure there is enough ventilation to ensure sufficient cooling of the inverters.

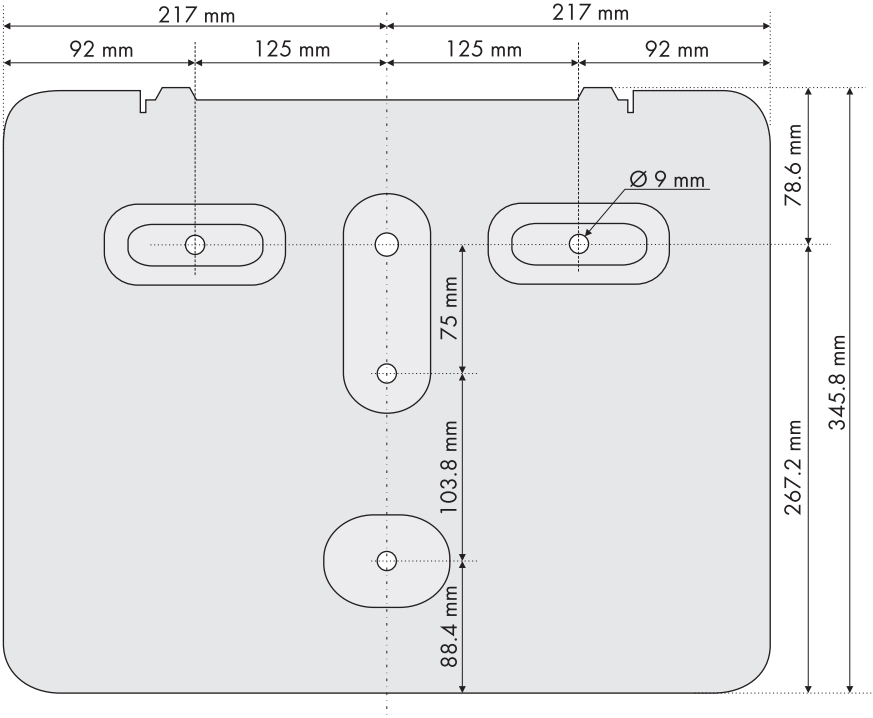
4.3 Mounting the Inverter with Wall Mounting Bracket

CAUTION!

Risk of injury due to the heavy weight of the inverter!

- Remember that the inverter weighs approx. 38 kg.

1. Use the wall mounting bracket as a drilling template and mark the positions of the drill holes.

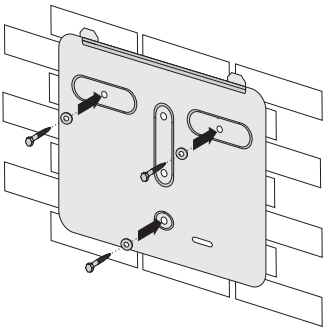


Mounting material

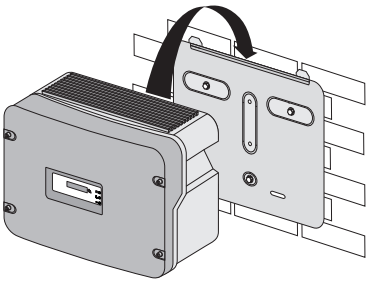
When mounting the bracket, use fastening material suitable for the material

2. Fill in holes that are not required in the wall mounting bracket using the sealing plugs. Insert the sealing plugs into the wall mounting bracket from the outside (the side that will later be placed against the wall).

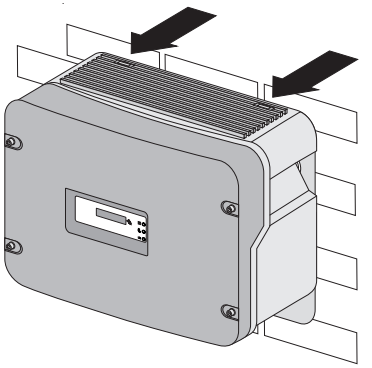
3. Attach the wall mounting bracket to the wall using appropriate screws and washers.



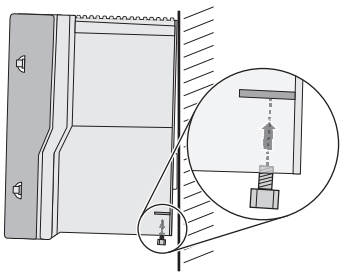
4. Mount the inverter with the upper fastening plates on the wall mounting bracket so that both plates on the upper edge of the bracket pass through the cutouts on the inverter.



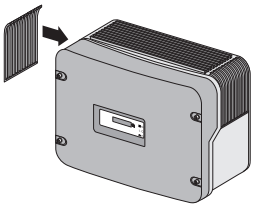
5. **Visual inspection**: The inverter is only correctly mounted when both rear panel mounting plates slightly protrude through the cutouts.



6. Secure the inverter in position by screwing the supplied M6 contact screw, located on the underside of the enclosure. Use the contact washers provided with the toothing against the enclosure. Tighten the screw with a torque of approximately 5 Nm.



7. Check to ensure the inverter is firmly secured. The wall mounting bracket is designed so that the inverter tilts backward slightly on a perfectly vertical wall.
8. Attach the air grills provided to the inverter. To help you identify the sides, "links/left" or "rechts/right" is printed on the inside of the air grills.



☑ The inverter is now mounted.

5 Electrical Connection

5.1 Safety

NOTICE!

Electrostatic discharge can damage the inverter!

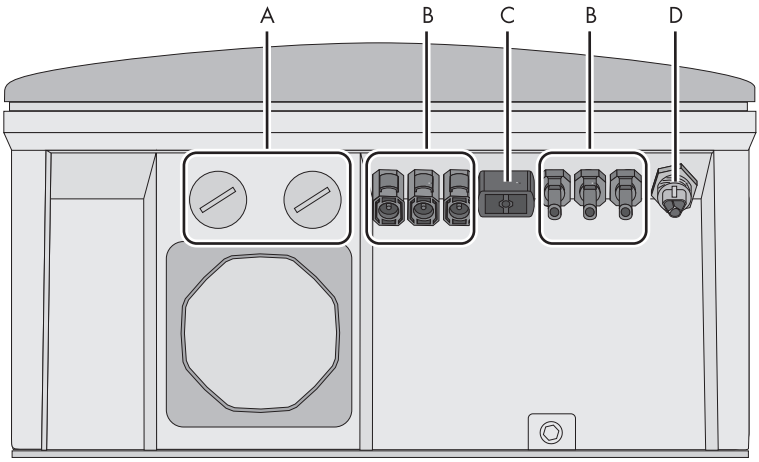
Internal components of the inverter can be irreparably damaged by static discharge.

- Before you touch a component inside the inverter, ground yourself by touching a grounded object.

5.2 Overview of the Connection Area

5.2.1 Exterior View

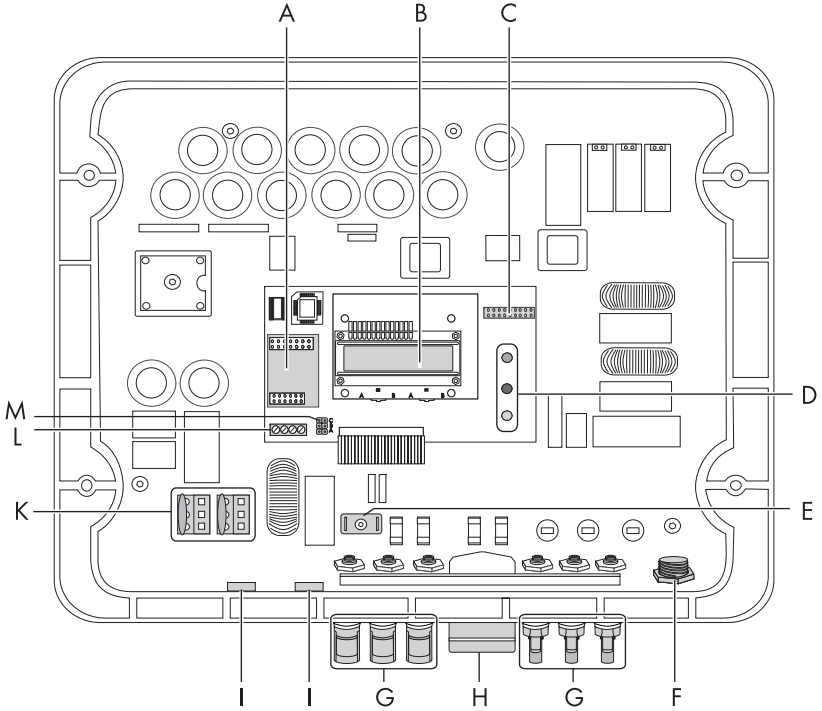
The following figure shows the assignment of the individual connection areas on the bottom of the inverter.



Object	Description
A	Enclosure openings for communication (with dummy plugs)
B	DC plug connectors for connecting the PV strings
C	Socket for the connection of the Electronic Solar Switch (ESS) DC load disconnection unit
D	AC socket for grid connection

5.2.2 Interior View

The following illustration shows the various components and connection areas of the open inverter.



Object	Description
A	Slot for communication
B	Display
C	Jumper slot for fan test
D	Operating status LEDs
E	Tab for grounding the cable shield with line-conducted communication
F	AC socket for grid connection
G	DC plug connectors for connecting the PV strings
H	Electronic Solar Switch (ESS) socket
I	Enclosure opening with sealing plugs for communication
K	Varistors
L	Communication connector
M	Jumper slot for communication

5.3 Connection to the Public Grid (AC)

5.3.1 Conditions for the AC Connection

Connection requirements of the utility operator

Always observe the connection requirements of your utility operator!

Cable Sizing

For optimum operation of the inverter, the grid impedance of the AC cable must not exceed 1 Ohm. This is necessary, amongst other things, for the correct operation of the inverter.

The conductor cross-section should be dimensioned in a way that output losses do not exceed 1 % at nominal power. Use "Sunny Design" (www.SMA.de/en/SunnyDesign) for this.

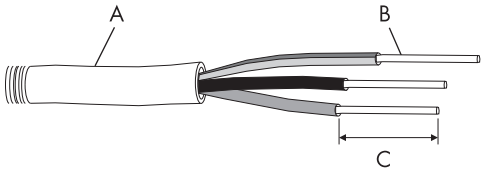
The maximum cable lengths are shown in the following table. Do not exceed the maximum cable length.

Conductor cross-section	Maximum cable length	
	SB 3300	SB 3800
4 mm²	18.5 m	16 m

The conductor cross-sectional area required in individual cases depends on the following factors:

- Ambient temperature,
- Routing method,
- UV resistance,
- Conduction losses,
- Valid installation guidelines of the respective country (of the installation location).

Cable Requirements



Position	Description	Value
A	External diameter	6 mm ... 14 mm
B	Conductor cross-section	4 mm²
C	Strip insulation	8 mm

Load Disconnection Unit

You must install a **separate** line circuit breaker for each inverter in order to ensure that the inverter can be securely disconnected under load. The maximal permissible fuse protection is located in section 11 "Technical Data" (page 59).

Detailed information and examples for the rating of a line circuit breaker can be found in the Technical Information "Line Circuit Breaker" in the SMA Solar Technology AG download area at www.SMA.de/en.

DANGER!

Danger to life due to fire!

When more than one inverter is connected to the same line circuit breaker, the protective function of the line circuit breaker is no longer guaranteed. It can result in a cable fire or the destruction of the inverter.

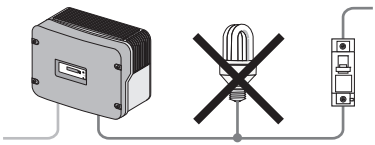
- Never connect several inverters to a single line circuit breaker.
- Comply with the maximum permissible fuse protection of the inverter when selecting the circuit breaker.

DANGER!

Danger to life due to fire!

When a generator (inverter) and a consumer are connected to the same line circuit breaker, the protective function of the line circuit breaker is no longer guaranteed. The current from the inverter and the grid can accumulate to overcurrent which is not detected by the line circuit breaker.

- Never connect loads between the inverter and the line circuit breaker without protection.
- Always protect loads separately.



NOTICE!

Damage to the inverter by using screw type fuse elements as a load disconnection unit!

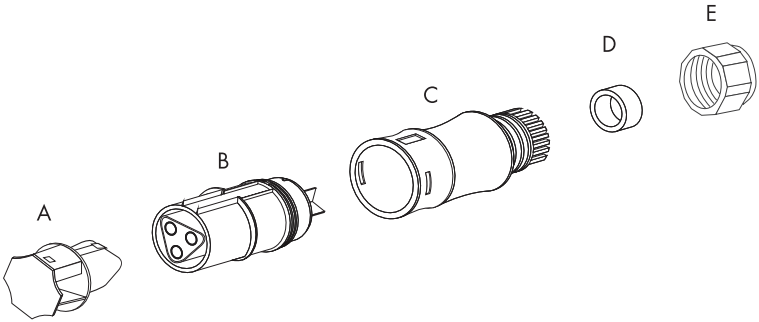
A screw type fuse element, e.g. D system (Diazed) or D0 system (Neozed) is not a load disconnection device, and thus may **not** be used as a load disconnection unit. A screw type fuse element is only used as cable protection.

When disconnecting under load using a screw type fuse element, the inverter can be damaged.

- Use only a load disconnecting switch or a line circuit breaker as a load disconnecting unit.

5.3.2 Connecting to the Public Grid (AC)

Overview AC connection socket

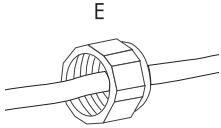


Object	Description
A	Protective cap for socket element
B	Socket element
C	Threaded sleeve with sealing ring for cable diameters of 10 mm to 14 mm
D	Sealing ring for cable diameters of 6 mm to 10 mm
E	Clamping nut

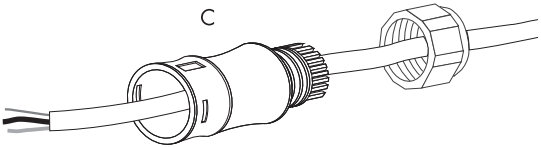
Procedure

1. Check the grid voltage and compare with "$V_{AC\ nom}$" on the type label.

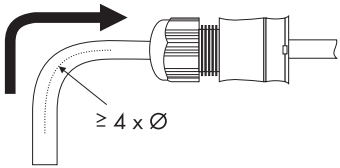
   The exact operating range of the inverter is specified in the operating parameters. The corresponding document is available in the download area at www.SMA.de/en in the category "Technical Description" of the respective inverter.
2. Disconnect the line circuit breaker and secure it to prevent it from being reactivated.
3. If necessary, exchange the sealing ring of the threaded sleeve with the sealing ring provided.
   - Pull the sealing ring out of the threaded sleeve.
   - Insert the smaller sealing ring.
4. Thread the clamping nut (E) over the AC cable.



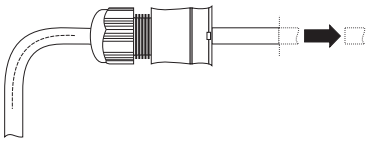
5. Thread the threaded sleeve (C) with sealing ring over the AC cable.



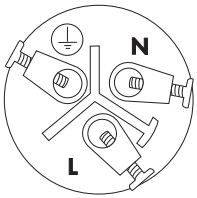
6. Bend the AC cable. The bend radius must be at least four times the cable diameter.



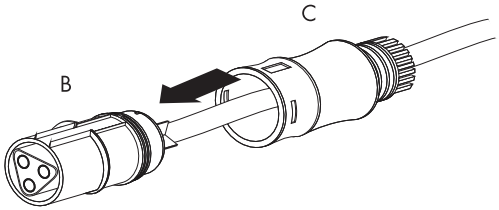
7. Shorten the cable.
8. Shorten phase L and neutral conductor N 4 to 5 mm.



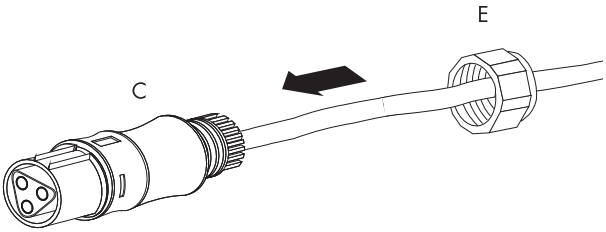
9. Insert the PE protective conductor (green-yellow) into the screw terminal with the earth sign on the socket element and tighten the screw. The PE protective conductor must be longer than the connection wires of N and L.
10. Insert the neutral conductor N (blue) in the screw terminal N on the socket element and tighten the screw.
11. Insert phase L (brown or black) into the screw terminal L on the socket element and tighten the screw.



12. Make sure the wires are securely connected.
13. Push the threaded sleeve (C) onto the socket element (B) until it audibly snaps into place.



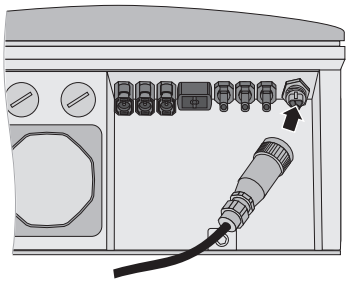
14. Screw the clamping nut (E) tightly onto the threaded sleeve (C). The clamping nut serves to seal and relieve strain.



☑ The AC connection socket has been screwed together.

15. Close the socket element with the protective cap provided, if the inverter has not yet been connected.

16. Insert the AC connection socket into the AC socket on the inverter. Remove the protective cap beforehand as required.



☑ The AC cable is now connected to the inverter.

DANGER!

Danger to life due to high voltages in the inverter!

- Do not switch on the line circuit breaker until the PV generator has been connected and the inverter is securely closed.

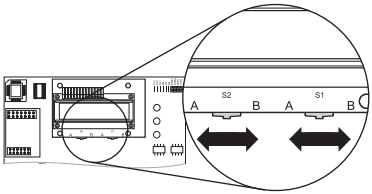
5.4 Setting the Display Language

You can set the language of the display using the switches on the underside of the display assemblies inside the inverter.

Procedure

1. Open the inverter as described in section 7.2 "Opening the Inverter" (page 37).
2. Set the switches for the required language, as shown below.

Language	Switch S2	Switch S1
German	B	B
English	B	A
French	A	B
Spanish	A	A



3. Close the inverter as described in section 7.2 "Closing Sunny Boy" (page 33).

☑ The display language is now set.

5.5 Connection of the PV Generator (DC)

5.5.1 Conditions for the DC Connection

Use of Adaptors

Adaptors (branch connectors) are not to be visible or freely accessible in the immediate surrounding of the inverter.

- The DC current flow may not be interrupted via adaptors.
- Disconnect the inverter, as described in section 7.2 "Opening the Inverter" (page 37).

- Requirements for the PV modules of the connected strings:
  - Same type
  - Same number
  - Identical alignment
  - Identical tilt
- The connection cables of the PV modules must be equipped with plug connectors. You will find the necessary DC plug connectors for the DC connection in the delivery.
- The following limiting values at the DC input of the inverter may not be exceeded:

Maximum input voltage	Maximum input current
500 V (DC)	20 A (DC)

DANGER!

Risk of lethal electric shock or fire!

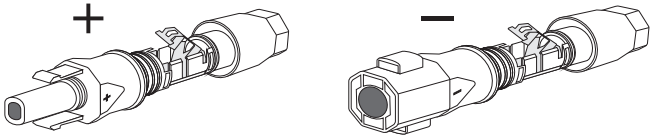
The maximum possible input current per string is limited by the plug connectors used. If the plug connectors are overloaded, an electric arc may occur and there is a risk of fire.

- Ensure that the input current for each string does not exceed the maximum flow current of the plug connectors used.

5.5.2 Assembling the DC Plug Connectors

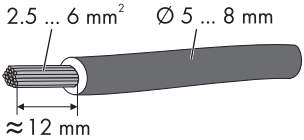
The connection cables of the PV modules must be equipped with the DC plug connectors provided for connecting the inverter.

To assemble the DC plug connectors, proceed as follows: Make sure the plug connectors have the correct polarity. The DC plug connectors have the symbols "+" and " – ".



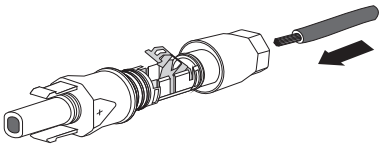
Cable Requirements

- Use a PV1-F cable.

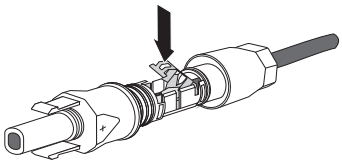


Procedure

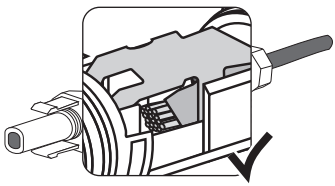
1. Insert the stripped cable into the plug connector as far as it will go.

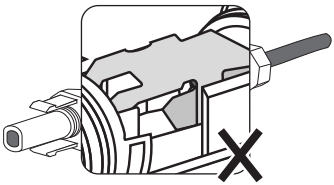
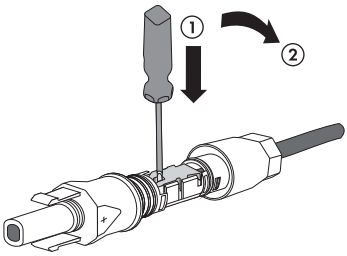


2. Press the clamping bracket down until it audibly snaps into place.

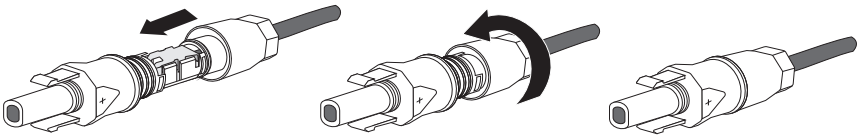


3. Ensure the cable is correctly in place.

Result	Action
☑ If the conductor is visible in the hollow cavity of the clamp, the cable is in the correct position. 	• Proceed to step 4.

Result	Action
☑ If the conductor is **not** visible in the hollow cavity of the clamp, the cable is not in the correct position. 	• Loosen the clamping bracket with the help of a screwdriver.  • Remove the cable and start again from step 1.

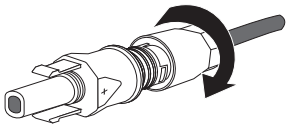
4. Push the threaded joint to the thread and screw into place.



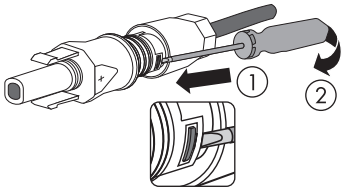
☑ The DC plug connectors are now assembled and can be connected to the inverter as described in section 5.5 "Connection of the PV Generator (DC)" (page 28).

5.5.3 Opening the DC Plug Connector

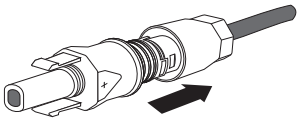
1. Screw the threaded joint off.



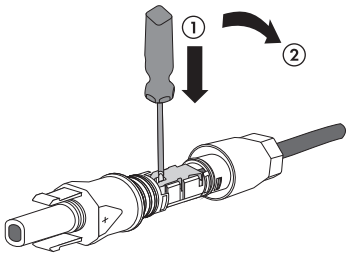
2. To release the plug connector, slot a screw driver into the side catch mechanism and lever out.



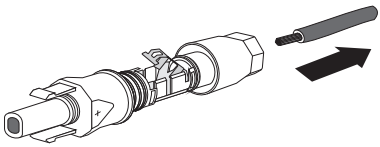
3. Carefully pull apart the DC plug connector.



4. Loosen the clamping bracket with the help of a screwdriver.



5. Remove cable.



☑ The cable is removed from the DC plug connector.

5.5.4 Connecting the PV Generator (DC)

DANGER!

Danger to life due to high voltages in the inverter!

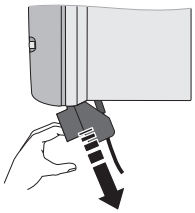
- Before connecting the PV generator, ensure that the line circuit breaker is switched off and that it cannot be reactivated.

NOTICE!

Excessive voltages can destroy the measuring device!

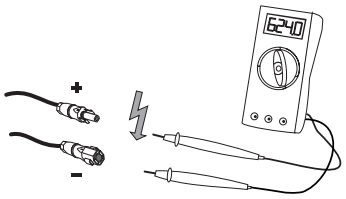
- Only use measuring devices with a DC input voltage range up to at least 600 V.

1. Disconnect the line circuit breaker and secure it to prevent it from being reactivated.
2. Pull the Electronic Solar Switch downward, slightly toward the wall.



3. Check the connection cables of the PV modules for correct polarity and that the maximum input voltage of the inverter is not exceeded.

   With an ambient temperature over 10 °C, the open circuit voltage of the PV modules should not exceed 90 % of the maximum input voltage of the inverter. Otherwise, check the system design and the PV module connection. At lower ambient temperatures, the maximum input voltage of the inverter can otherwise be exceeded.



NOTICE!

Exceeding the maximum input voltage can destroy the inverter!

If the voltage of the PV modules exceeds the maximum input voltage of the inverter, it can be destroyed by the overvoltage. All warranty claims become void.

- Do not connect strings with an open circuit voltage greater than the maximum input voltage of the inverter.
- Check the system design.

4. Check the strings for ground faults, as described in section 9.3.1 "Checking the PV Generator for a Ground Fault" (page 52).

NOTICE!

Excessive currents can damage the inverter!

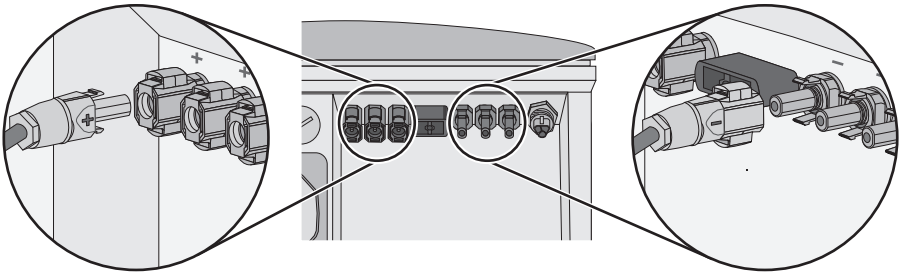
- The maximum current per DC connector plug may not exceed 16 A.

DANGER!

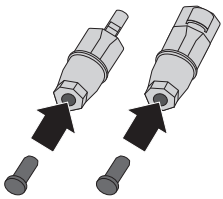
Risk of lethal electric shock!

- Do not connect strings with ground faults.
- First, rectify the ground fault in the respective string.

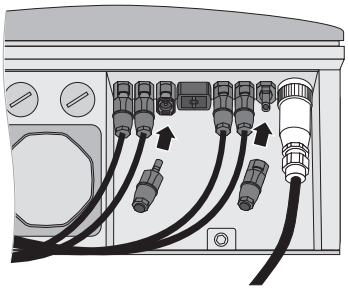
5. Check the DC plug connectors for correct polarity and connect them.
   To release the DC plug connectors, see section 7.2 "Opening the Inverter" (page 37).



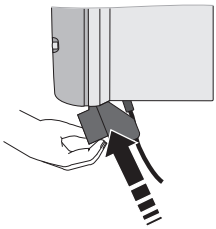
6. To create the sealing on the inverter, all the DC inputs have to be closed as follows:
   - Insert the sealing plugs provided into the DC plug connectors that are not required.
     Do **not** insert the sealing plugs into the DC inputs on the inverter.



   - Insert the DC plug connectors with sealing plugs into the corresponding DC inputs on the inverter.



7. Check the Electronic Solar Switch for wear, as described in section 8.2 "Checking the Electronic Solar Switch for Wear" (page 45) and attach it firmly.



NOTICE!

The Electronic Solar Switch can be damaged if it is inserted incorrectly!

The Electric Solar Switch can be damaged by high voltages if it has not been attached properly.

- Do not tighten the screw inside the handle.
- Insert the handle of the Electronic Solar Switch securely in the socket on the underside of the enclosure until you hear an audible click.
- Check the handle of the Electronic Solar Switch is securely connected.

☑ The PV generator is now connected.

5.6 Communication

The inverter is equipped with a slot for communication interfaces in order to communicate with special data acquisition devices (e.g. Sunny WebBox) or a PC with corresponding software (e.g. Sunny Data Control or Sunny Explorer).

See the respective communication interface manual for a detailed wiring diagram and an installation description for the interface.

5.7 Setting the Grid Parameters and Country Parameters

Changing grid-relevant parameters and country parameters

To change the grid-relevant parameters, you need a personal access code, the so-called SMA grid guard code. The application form for the personal access code can be found in the download area at www.SMA.de/en in the category "Data Sheet" of the respective inverter.

Ensure that you discuss the changes to these parameters with your utility operator.

A detailed description of the operating parameter for the inverter is available in the download area at www.SMA.de/en in the category "Technical Description" of the respective inverter.

5.7.1 Setting the Installation Country

Using the "Default" parameter you can set the installation country and/or the grid connection standard valid for the country via a communication device (e.g. Sunny WebBox) or a PC with appropriate software (e.g. Sunny Data Control or Sunny Explorer). This, however, is only required if the inverter was originally ordered for another country. You can see the standard to which the inverter was set upon delivery on the type label and the enclosed data sheet with the factory settings.

5.7.2 Setting Off-Grid Operation

To operate the inverter in a Sunny Island system, you must set the inverter via the "Default" parameter to off-grid ("OFF-Grid") operation.

You have several possibilities to set the inverter to off-grid operation:

- Setting via Sunny WebBox

  or

- Setting via Sunny Data Control or Sunny Explorer

DANGER!

Danger to life due to high voltages if there is an outage of the public grid.

If you set the inverter to off-grid operation, it does not fulfill any country-specific standards and regulations. Therefore if there is an outage of the public grid there is a danger of back feed.

- **Never** operate the inverter directly on the public grid when set to off-grid operation.

6 Commissioning

1. Check the following requirements before commissioning:
   - Ensure the inverter is firmly secured
   - Correct connection of the AC cable (grid)
   - Full connection of the DC cables (PV strings)
   - DC inputs that are not needed are closed with the corresponding DC plug connectors and sealing plugs.
   - The enclosure lid is securely screwed in place
   - The Electronic Solar Switch (ESS) is securely plugged
   - The line circuit breaker is laid out correctly
2. Switch on the line circuit breaker.

   ☑ Green LED glows: commissioning has been successful.

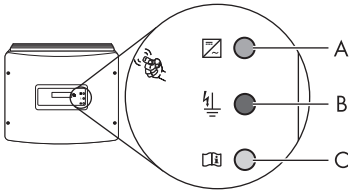
   or

   ☑ Green LED flashes when there is insufficient radiation: network connection conditions have not yet been yet reached. Wait for sufficient radiation.

   or

   ☑ Red or yellow LED is glowing or flashing: there has been an error. Proceed to step 3.

A	Green LED	In operation
B	Red LED	Ground fault or varistor defective
C	Yellow LED	Disturbance



3. Read section 9 "Troubleshooting" (page 46) and if necessary, eliminate the disturbance.

7 Opening and Closing

7.1 Safety

DANGER!
Risk of lethal electric shock!

Pay attention to the following points before opening the inverter:

- Ensure that there are no hazardous voltages present on the AC side.
- Ensure that there are no hazardous currents or voltages present on the DC side.

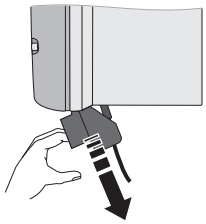
NOTICE!
Static discharges can damage the inverter!

Internal components of the inverter can be irreparably damaged by electrostatic discharge.

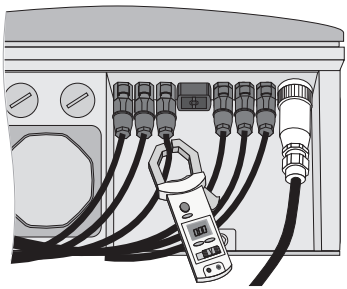
- Ground yourself before touching a component.

7.2 Opening the Inverter

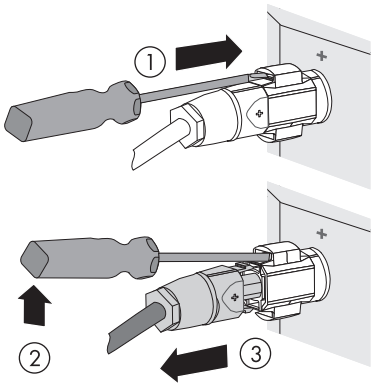
1. Disconnect the line circuit breaker and secure it to prevent it from being reactivated.
2. Pull the Electronic Solar Switch downward, slightly toward the wall.



3. Using a current probe, ensure that there is no current to all DC cables.
   ☑ If current is detected, check the installation!



4. Release all DC plug connectors with the help of a screwdriver:
   - Insert a screwdriver into one of the side slits (1).
   - Lever the screwdriver upward (2) and pull out the plug connector (3).

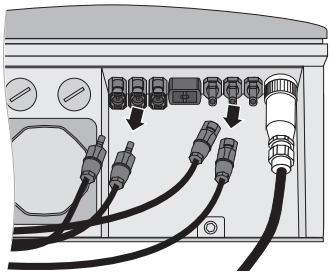


DANGER!

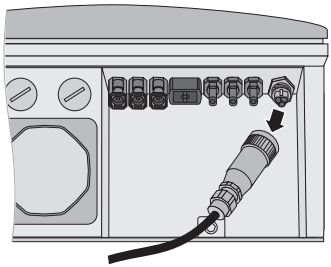
Danger to life due to unsafe disconnection from the PV generator!

A secure separation from the PV generator is only guaranteed after pulling off the Electronic Solar Switch **and** all DC connectors.

- Remove all DC plug connectors to completely disconnect the PV generator from the inverter.



5. Ensure that there is no voltage to the DC plug connectors on the inverter.
   ☑ If there is a voltage present, check the installation!
6. Pull out the AC plug.



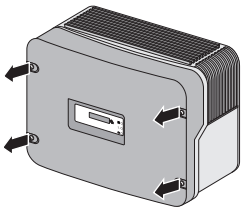
7. Check whether all LEDs and the display have gone out.

DANGER!
Danger to life due to high voltages in the inverter!

The capacitors in the inverter require 15 minutes to discharge.

- Wait 15 minutes before opening the inverter.

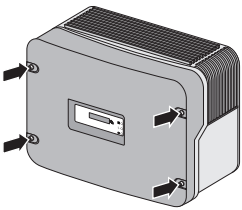
8. Loosen the screws of the enclosure lid.
9. Carefully remove the lid forward.



☑ The inverter is open and there is no voltage present.

7.3 Closing the Inverter

1. Secure the lid with the 4 screws and the lock washers with the toothing facing toward the lid. The screws must be tightened with approximately 6 Nm torque to ensure the sealing of the enclosure and the grounding of the lid.

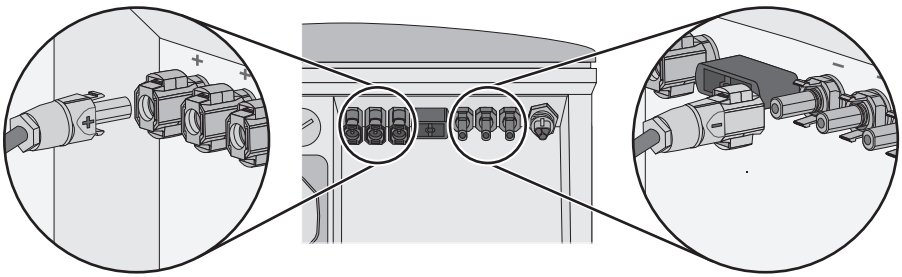


DANGER!
Danger to life due to live lid!

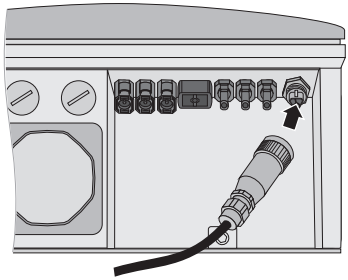
The grounding of the lid is ensured by the toothed lock washers.

- Fasten the lock washers for all screws with the toothing facing toward the lid.

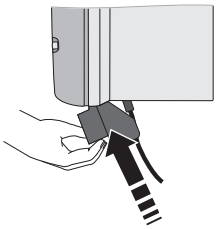
2. Check the DC plug connectors for correct polarity and connect them.
   To release the DC plug connectors, see section 7.2 "Opening the Inverter" (page 37).



3. Close all the DC inputs that are not needed as described in section 5.5.4 "Connecting the PV Generator (DC)" (page 32) in order to create the sealing on the inverter.
4. Connect the AC plug.



5. Check the Electronic Solar Switch for wear, as described in section 8.2 "Checking the Electronic Solar Switch for Wear" (page 45) and attach it firmly.

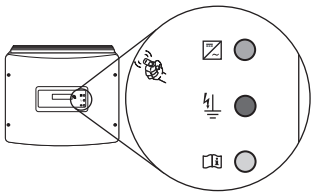


NOTICE!

The Electronic Solar Switch can be damaged if it is inserted incorrectly!

- Do not tighten the screw inside the handle.
- Insert the handle of the Electronic Solar Switch securely in the socket on the underside of the enclosure.
- Check the handle of the Electronic Solar Switch is securely connected.

6. Switch on the line circuit breaker.
7. Check whether the inverter's display and LED display indicate normal operating mode (see section 6 "Commissioning" (page 36)).



☑ The inverter is closed and in operation.

8 Maintenance and Cleaning

Check for proper inverter operation at regular intervals. Impurities such as dust or airborne blossoms can cause heat concentration that can lead to yield losses. Also check the inverter and the cables for visible external damage. Undertake repairs if necessary.

8.1 Checking Heat Dissipation

You only need to check the heat dissipation of the inverter if, during a visual inspection, you notice a marked build-up in the fan grill or the inverter is increasingly observed to be in derating mode. Whether the inverter switches to derating mode depends on the ambient temperature and cooling efficiency.

8.1.1 Cleaning the Fan

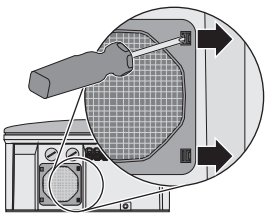
If the fan grill is only covered in loose dust it can be cleaned with a vacuum cleaner. If you do not achieve satisfactory results with a vacuum cleaner, dismantle the fans for cleaning.

Proceed as follows:

1. Disconnect the inverter from both the DC and AC connections, as described in section 7.2 "Opening the Inverter" (page 37).
2. Wait for the fan to stop rotating.

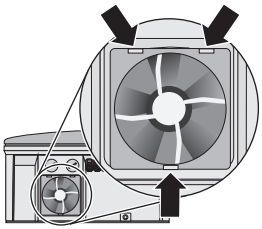
Cleaning the Fan Grills

3. Remove the fan grill:
   - Press the two latches on the right edge of the fan grill to the right using a screwdriver and loosen it from the bracket.
   - Carefully remove the fan grill.
4. Clean the fan grill with a soft brush, a paint brush, a cloth or pressurized air.



Cleaning the Fan

5. Push the two upper plastic clips backward and the lower plastic clip forward.
6. Remove the fan by pulling it slowly and carefully downward.



7. Unlock and unplug the fan plug inside the inverter.

   The fan cables are long enough that you can lift the fan far enough out to disconnect the internal plug connector in the inverter.

8. Remove the fan.
9. Clean the fan with a soft brush, a paint brush, or a damp cloth.

NOTICE!

Damage to the fan through the use of pressurized air.

- Under no circumstances should you use pressurized air to clean the fan. This can damage the fan.

10. After cleaning, assemble everything in reverse order.
11. Check the functioning of the fans as described in the following section.

8.1.2 Checking the Fans

You can check that the fans are working in 2 ways:

- Set the "Fan Test" parameter to "1" in the installer mode using Sunny Data Control, Sunny Explorer or Sunny WebBox.

  or

- Plug the jumper provided into the system control board.

Setting Parameters

1. Request the installer password from the SMA Serviceline (contact: see page 66).
2. Set the "Fan Test" parameter to "1" in the installer mode.
3. Check the air-flow of the fan.

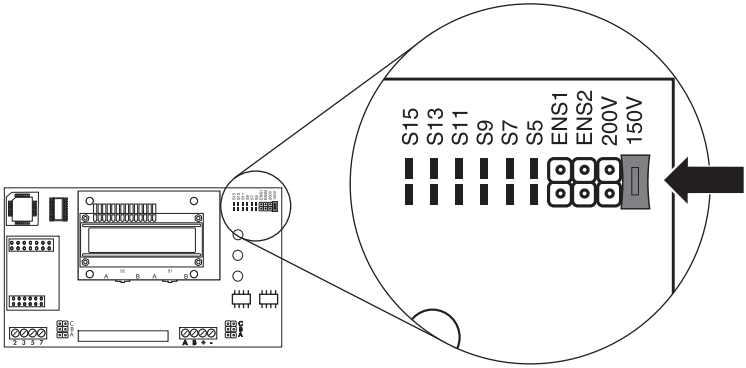
   The inverter sucks air in from underneath and then blows it back out on the upper left side. Listen for any unusual noise that could indicate incorrect installation or that the fan is faulty.
4. After checking the fan, set the "Fan Test" parameter back to 0.

☑ You have finished checking the fan.

Plugging the Jumper

The inverter recognizes the jumper only after the system has been restarted (i.e. all LEDs must have gone out before a restart).

1. Open the inverter as described in section 7.2 "Opening the Inverter" (page 37).
2. Plug the jumper provided into the slot on the system control board as shown below.



3. Close the inverter as described in section 7.3 "Closing the Inverter" (page 39).
4. Restart the inverter.
5. Check the air-flow of the fan.

   The inverter sucks air in from underneath and then blows it back out on the upper left side. Listen for any unusual noise that could indicate incorrect installation or that the fan is faulty.
6. Remove the jumper. Open and close the inverter as described in section 7 "Opening and Closing" (page 37).

☑ You have finished checking the fan.

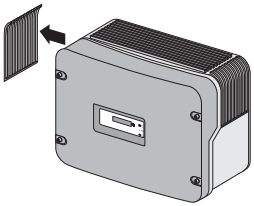
8.1.3 Cleaning the Air Grills

There are fan gills on either side of the inverter. The inverter sucks air in from underneath through the fan and blows it out again on the upper left side via the air grills. For optimal heat dissipation of the inverter, you only have to clean the left air grill.

Procedure

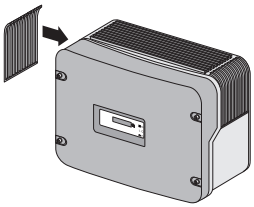
1. Remove the left air grill.

   Insert your finger in the space between the air grill and the upper part of the enclosure and remove the air grill to the side.



2. Clean the air grill with a soft brush, a paint brush, or pressurized air.
3. Re-attach the air grill to the inverter.

   To help you identify the sides, the air grills are marked with "links/left" or "rechts/right" on the inside.



☑ The air grills are cleaned.

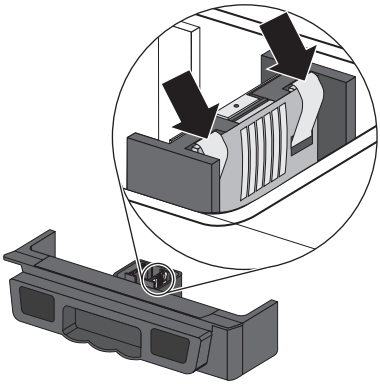
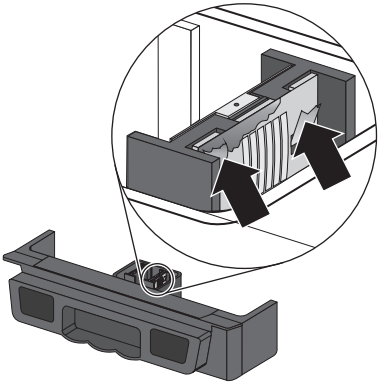
NOTICE!

Risk of damage to the inverter if insects enter it!

- The air grills must not be removed permanently, because otherwise the device is not protected against the entrance of insects!

8.2 Checking the Electronic Solar Switch for Wear

Check the Electronic Solar Switch for wear before plugging it in.

Result	Action
☑ The metal tongues inside the connector are not damaged or discolored. 	1. Insert the handle of the Electronic Solar Switch securely in the socket on the underside of the enclosure. 2. Commission the inverter as described in section 6 "Commissioning" (page 36).
☑ The metal tongues inside the connector have a brown discoloration or are burned through. 	The Electronic Solar Switch can no longer safely disconnect the DC side. 1. Replace the Electronic Solar Switch handle before attaching it again (order number see section 12 "Accessories" (page 65)). 2. Commission the inverter as described in section 6 "Commissioning" (page 36).

9 Troubleshooting

If the inverter displays blink codes or error messages other than those described in the following section, contact the SMA Serviceline.

You will find descriptions of the display messages during operation, status messages and measuring channels in the enclosed user manual.

Do not try to carry out repairs other than those described here. Instead, use the SMA Solar Technology AG 24-hour replacement service (the inverter will be ready for dispatch within 24 hours and sent to a forwarding agency) and repair service.

9.1 Blink Codes

Green	Red	Yellow	Status
Glows continuously	Is not glowing	Is not glowing	OK (feeding operation)
	Glows continuously	Is not glowing	Ground fault or varistor defective
		Glows continuously	OK (initialization)
Flashes quickly (3 x per second)	Is not glowing	Is not glowing	OK (stop)
	Glows continuously	Is not glowing	Ground fault or varistor defective
Flashes slowly (1 x per second)	Is not glowing	Is not glowing	OK (waiting, grid monitoring)
Briefly goes out (Approx. 1x per second)	Is not glowing	Is not glowing	OK (derating)
	Glows continuously	Is not glowing	Ground fault or varistor defective
Is not glowing	Is not glowing	Is not glowing	OK (night shutdown)
		Is not glowing	Disturbance
	Glows continuously	Is not glowing	Ground fault or varistor defective
		Glows/flashes	Ground fault or varistor defective and disturbance

9.2 Error Messages

When a disturbance occurs, the inverter generates a message that depends on the operating mode and the disturbance detected.

Message	Description and corrective measure
!PV- Overvoltage! !Disconnect DC!	Overvoltage at DC input. The inverter can be destroyed by overvoltage.
	Corrective measures Disconnect the inverter from the grid immediately. 1. Turn off the line circuit breaker. 2. Remove the Electronic Solar Switch. 3. Disconnect all the DC plug connectors. 4. Check DC voltage: – If the DC voltage is above the maximum input voltage, check the system design or contact the installer of the PV generator. – If the DC voltage is under the maximum input voltage, reconnect the inverter to the PV generator as described in section 5.5 "Connection of the PV Generator (DC)" (page 28). If the message occurs again, disconnect the inverter again and contact the SMA Serviceline (see section 13 "Contact" (page 66)).
ACVtgRPro	The 10-minute-average grid voltage is no longer within the permissible range. This can be caused by either of the following: • The grid voltage at the connection point is too high. • The grid impedance at the connection point is too high. The inverter disconnects to assure compliance with the voltage quality of the grid.
	Corrective measures Check the grid voltage at the point of connection of the inverter: • If, due to the local grid conditions, the grid voltage increases to 253 V or more, ask the utility operator whether the voltage at the feed-in point can be adjusted, or whether it would agree to an alteration of the limiting value ACVtgRPro for voltage quality monitoring. • If the grid voltage is continually within the acceptable range, and this error is still displayed, contact the SMA Serviceline.
Bfr-Srr	Internal measurement comparison fault or hardware defect.
	Corrective measures • Contact the SMA Serviceline if this disturbance occurs frequently.

Message	Description and corrective measure
Derating	The "Derating" operating mode is a normal operating mode that may occur occasionally and can have several causes. Once the inverter enters the "Derating" mode, it will display the "Derating" warning until the next total shutdown of the device (at the end of the day).
	Corrective measures • Check heat dissipation, as described in section 8.1 "Checking Heat Dissipation" (page 41).
dZac-Bfr **dZac-Srr**	Sudden changes in grid impedance exceed the permissible range ("Bfr" or "Srr" are internal messages of no relevance for the user). For safety reasons, the inverter disconnects itself from the grid.
	Corrective measures Check the grid impedance and observe how often major deviations occur. • If repeated frequency variations occur and this is causing "dZac-Bfr" or "dZac-Srr" errors, ask the utility operator if it would agree to modify the operating parameter (dZac-Max). • Discuss changing the operating parameter with the SMA Serviceline.
EEPROM	Transition disturbance during reading or writing of EEPROM data. The data is not relevant for safe operation. • The disturbance has no effect on the performance of the inverter.
EEPROM dBh	EEPROM data is defective, the device has switched off because the loss of data has disabled important functions of the inverter.
	Corrective measures • Contact the SMA Serviceline.
EeRestore	One of the duplicate data sets in the EEPROM is defective and has been reconstructed without loss of data. • The error message only serves to inform you and has no effect on the performance of the inverter.
Fac-Bfr **Fac-Srr** **FacFast**	The grid frequency is no longer within the permissible range ("Bfr" or "Srr" is an internal message of no relevance for the user). For safety reasons, the inverter disconnects itself from the grid.
	Corrective measures • If the grid frequency is within the tolerance range, yet "Fac-Bfr", "Fac-Srr" or "FacFast" faults are still being displayed, contact the SMA Serviceline.

Message	Description and corrective measure
Imax	Overcurrent on the AC side. This fault code is displayed if the current in the AC grid is larger than specified.
	Corrective measures • Check the system design and grid conditions.
K1-Close **K1-Open**	Fault during relay test.
	Corrective measures • Contact the SMA Serviceline if this problem occurs frequently or several times in succession.
MSD-Fac	Internal measurement comparison fault or hardware defect.
	Corrective measures • Contact the SMA Serviceline if this disturbance occurs frequently.
MSD-Vac	Internal measurement comparison fault or hardware defect.
	Corrective measures • Contact the SMA Serviceline if this disturbance occurs frequently.
NUW-Timeout	Internal measurement comparison fault or hardware defect.
	Corrective measures • Contact the SMA Serviceline if this disturbance occurs frequently.
MSD-Timeout	Internal measurement comparison fault or hardware defect.
	Corrective measures • Contact the SMA Serviceline if this disturbance occurs frequently.
Offset	The "Derating" operating condition is a normal operating condition that occurs prior to grid monitoring. If "offset" is displayed as an error, then there is a disturbance in the data logging.
	Corrective measures • Contact the SMA Serviceline if this disturbance occurs frequently.
Riso	The electrical insulation between the PV system and ground is faulty. The resistance between the DC plus and/or DC minus connection and ground is outside the defined limit range.
	Corrective measures • Check the insulation of the system. • Check the system for ground faults as described in section 9.3.1 "Checking the PV Generator for a Ground Fault" (page 52).
ROM	The inverter's firmware is faulty.
	Corrective measures • Contact the SMA Serviceline if this disturbance occurs frequently.

Message	Description and corrective measure
Shutdown	Temporary inverter fault.
	Corrective measures • Contact the SMA Serviceline.
Trafo-Temp-F	Temperatures in the transformer have exceeded the acceptable limit. The inverter stops feeding the grid until the temperature reverts to within the admissible range.
	Corrective measures • If this problem recurs, check the heat dissipation of the inverter, as described in section 8.1 "Checking Heat Dissipation" (page 41).
Trafo-Temp-W	Temperatures in the transformer have exceeded the acceptable limit. The inverter stops feeding the grid until the temperature reverts to within the admissible range. The Trafo-Temp-W warning is displayed until final shutdown (at the end of the day).
	Corrective measures • Check the heat dissipation of the inverter, as described in section 8.1 "Checking Heat Dissipation" (page 41).
Vac-Bfr **Vac-Srr**	The grid voltage is no longer within the permissible range ("Bfr" or "Srr" is an internal message of no relevance for the user). This code can be caused by any of the following conditions: • Grid disconnected (line circuit breaker, fuse), • AC cable is broken or • AC cable is high-resistance. For safety reasons, the inverter disconnects itself from the grid.
	Corrective measures • Check the grid current and the grid connection on the inverter. • If the grid voltage lies outside the acceptable range because of local grid conditions, ask the utility provider if the voltage can be adjusted at the feed-in point or if it would agree to changes in the values of the monitored operational limits (operating parameters: Vac-Min and Vac-Max). • If the grid frequency is within the tolerable range, yet "Vac-Bfr," or "Vac-Srr" faults are still being displayed, contact the SMA Serviceline.

Message	Description and corrective measure
VpvMax	Overvoltage at DC input. The inverter may be damaged.
	Corrective measures Disconnect the inverter from the grid immediately. 1. Turn off the line circuit breaker. 2. Remove the Electronic Solar Switch. 3. Disconnect all the DC plug connectors. 4. Check DC voltage: – If the DC voltage is above the maximum input voltage, check the system design or contact the installer of the PV generator. – If the DC voltage is under the maximum input voltage, reconnect the inverter to the PV generator as described in section 5.5 "Connection of the PV Generator (DC)" (page 28). If the message occurs again, disconnect the inverter again and contact the SMA Serviceline (see section 13 "Contact" (page 66)).
Watchdog **Watchdog Srr**	Internal program run fault.
	Corrective measures • Contact the SMA Serviceline if this disturbance occurs frequently.
Zac-Bfr **Zac-Srr**	The grid impedance is no longer within the permissible range ("Bfr" or "Srr" is an internal message of no relevance for the user). For safety reasons, the inverter disconnects itself from the grid. The impedance is calculated from both the grid impedance and the impedance of the AC cable of the inverter.
	Corrective measures • Check the grid impedance and grid connection on the inverter. • Use an AC cable with an adequate cross-sectional area (= low impedance) as described in section 5.3 "Connection to the Public Grid (AC)" (page 22). If required, check and re-tighten the screws on the AC terminals. • If this fault recurs, please contact the SMA Serviceline.

9.3 Red LED is Glowing Continuously

If the red LED of the status display is continuously on during operation, there is either a ground fault in the PV generator or at least one of the varistors for the overvoltage protection is defective.

9.3.1 Checking the PV Generator for a Ground Fault

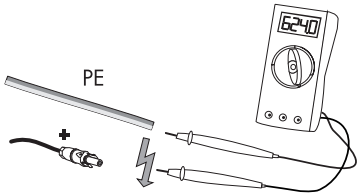
1. Open the inverter as described in section 7.2 "Opening the Inverter" (page 37).

NOTICE!

Excessive voltages can destroy the measuring device!

- Only use measuring devices with a DC input voltage range up to at least 600 V.

2. Measure the voltages between the positive pole of the strings and the ground potential.
3. Measure the voltages between the minus pole of the strings and the ground potential.



Result	Action
☑ **A voltage** is measurable for at least one of the two measurements.	If voltage is found, there is a ground fault in the corresponding string. • Correct the ground fault and reconnect the PV generator to the inverter as described in section 5.5 "Connection of the PV Generator (DC)" (page 28).
☑ **No voltage** can be measured.	It is likely that one of the thermally monitored varistors is defective. • Check the function of the varistors as described in section 9.3.2 "Checking the Function of the Varistors" (page 53).

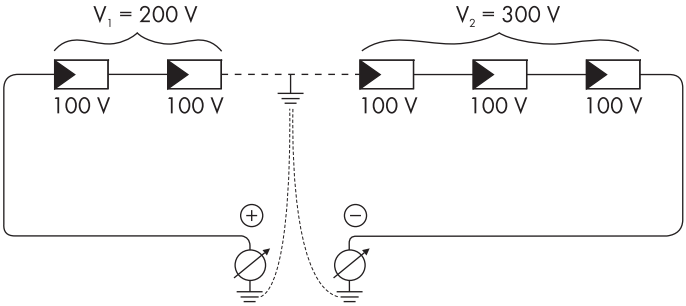
DANGER!

Danger to life due to live PV generator!

- Do not touch the frame of the PV generator.
- Wait until no voltage can be measured.
- Do not connect strings with ground faults to the inverter.

The approximate position of the ground fault can be determined from the ratio of the measured voltages between plus against ground potential and minus against ground potential.

Example:



The ground fault is between the second and third module in this case.

☑ The ground fault check is finished.

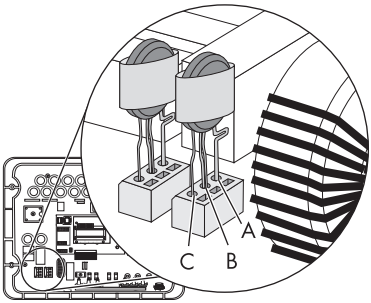
9.3.2 Checking the Function of the Varistors

Varistors are wear parts. Their functional efficiency diminishes with age or following repeated responses as a result of overvoltages. It is therefore possible that one of the thermally monitored varistors has lost its protective function.

Position of varistors

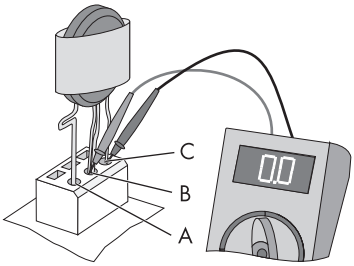
You can determine the position of the varistors with the help of the illustration below. Observe the following allocation of the terminals:

- Terminal A: outer terminal (varistor connection **with crimp**)
- Terminal B: middle terminal
- Terminal C: outer terminal (varistor connection **without crimp**)



You can check the functionality of the varistors in the following manner:

1. Open the inverter as described in section 7.2 "Opening the Inverter" (page 37).
2. Use a multimeter to check all the varistors in the installed state to ascertain whether there is a conducting connection between connectors B and C.



Result	Action
☑ There is **a conducting** connection.	There is probably a different fault in the inverter. • Close the inverter as described in section 7.3 "Closing the Inverter" (page 39). • Contact the SMA Serviceline (see section 13 "Contact" (page 66)).
☑ There is **no conducting** connection.	The respective varistor is defective and must be replaced. Varistor failure is generally due to influences which affect all varistors similarly (temperature, age, induced overvoltage). SMA Solar Technology AG recommends that you replace all varistors. The varistors are specially manufactured for use in the inverter and are not commercially available. You must order replacement varistors directly from SMA Solar Technology AG (see section 12 "Accessories" (page 65)). • To replace the varistors, proceed to step 3.

NOTICE!

Destruction of the inverter by overvoltage.

If varistors are missing, the inverter is no longer protected against overvoltages.

- Procure replacement varistors as soon as possible and replace the defective ones immediately.
- For systems with a high risk of overvoltage, do **not** operate inverters with faulty varistors or no varistors at all.

3. Insert an insertion tool into the openings of the terminal contacts (1).

   ☑ The terminal clamps loosen.

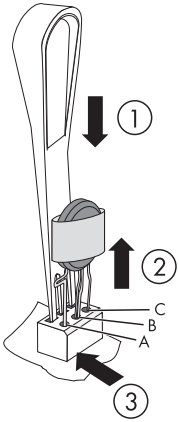
   If you do not receive an insertion tool for operating the terminal clamps with your replacement varistors, contact SMA Solar Technology AG. As an alternative, the individual terminal contacts can be operated using a 3.5 mm wide screwdriver.

4. Remove the varistor (2).
5. Insert new varistor (3).

   The pole with the small loop (crimp) must be fitted to terminal A when remounting (3).

6. Close the inverter as described in section 7.3 "Closing the Inverter" (page 39).

☑ The check and replacement of the varistors is completed.



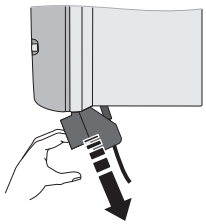
10 Decommissioning

10.1 Dismantling the Inverter

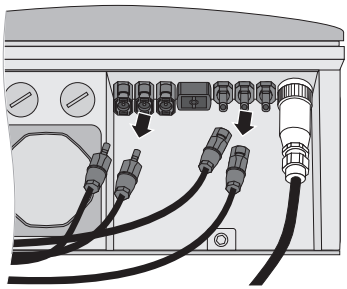
DANGER!
Danger to life due to high voltages in the inverter!

- Disconnect the line circuit breaker and secure it to prevent it from being reactivated.

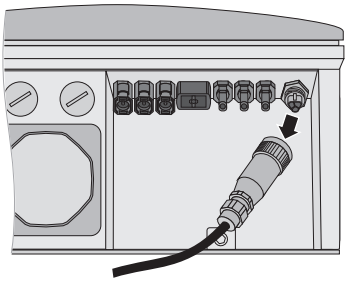
1. Remove the Electronic Solar Switch.



2. Release and remove all DC plug connectors (see section 7.2 "Opening the Inverter" (page 37)).



3. Remove the AC plug connector from the inverter.



4. Close the AC flange plug with the protecting cap.
5. Close all DC inputs with the corresponding DC plug connectors and sealing plugs.

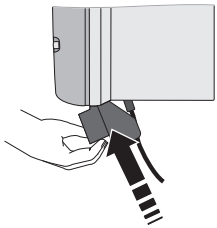
CAUTION!

Danger of burn injuries due to hot enclosure parts!

The inverter's enclosure can become hot during operation.

- Wait until the enclosure has cooled down.

6. If a communication cable is available:
   - Open the inverter as described in section 7.2 "Opening the Inverter" (page 37).
   - Remove the communication cable from the inverter.
   - Close the inverter as described in section 7.3 "Closing the Inverter" (page 39).
7. Connect the Electronic Solar Switch.

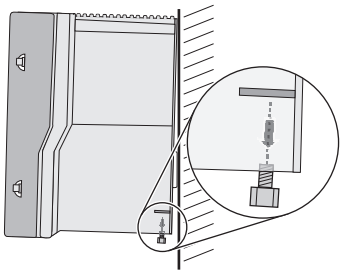


NOTICE!

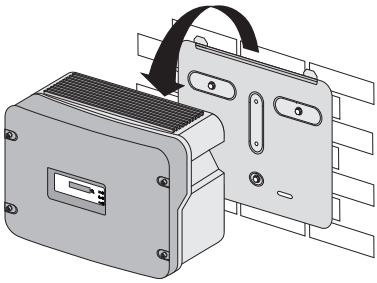
The Electronic Solar Switch can be damaged if it is inserted incorrectly!

- Do not tighten the screw inside the handle.
- Insert the handle of the Electronic Solar Switch securely in the socket on the underside of the enclosure.
- Check the handle of the Electronic Solar Switch is securely connected.

8. Remove the securing screw.



9. Remove the inverter upward from the wall mounting bracket.



☑ The inverter is dismantled.

10.2 Packing the Inverter

If possible, always pack the inverter in its original packaging. If it is no longer available, you can also use an equivalent box. The box must be capable of being closed completely and made to support both the weight and the size of the inverter.

10.3 Storing the Inverter

Store the inverter in a dry place where ambient temperatures are always between -25 °C and +60 °C.

10.4 Disposing of the Inverter

Dispose of the inverter at the end of its service life in accordance with the disposal regulations for electronic waste which apply at the installation location at that time. Alternatively, send it back to SMA Solar Technology AG with shipping paid by sender, and labeled "ZUR ENTSORGUNG" ("for disposal") (see section 13 "Contact" (page 66).

11 Technical Data

11.1 Sunny Boy 3300

DC Input

Maximum DC power	$P_{DC\ Max}$	3,820 W
Maximum DC voltage *	$U_{DC\ Max}$	500 V
MPP input voltage range	U_{PV}	200 V ... 400 V
DC nominal voltage	$U_{DC\ Nenn}$	200 V
PV start voltage, adjustable	$V_{PV\ Start}$	250 V
Maximum input current	$I_{PV\ Max}$	20 A
Number of MPP trackers		1
Maximum number of parallel strings		3
Internal consumption during operation		< 7 W

* The maximum open circuit voltage, which can occur at a cell temperature of - 10 °C, may not exceed the maximum input voltage.

AC Output

AC nominal power	$P_{AC\ Nenn}$	3,300 W
Maximum AC power	$P_{AC\ Max}$	3,600 W
Maximum output current	$I_{AC,\ Max}$	18 A
Maximum permissible fuse protection		25 A
Harmonic distortion of output current at AC T_{HD} voltage < 2 %, AC power > 0.5 AC nominal power		< 3 %
Nominal AC voltage	$U_{ac\ Nenn}$	220 V / 230 V / 240 V
AC voltage range	V_{ac}	180 V ... 260 V
AC grid frequency	$f_{AC\ Nenn}$	50 Hz / 60 Hz
Tolerance at AC grid frequency	f_{AC}	± 4.5 Hz
Power factor at nominal AC power	cos φ	1
Overvoltage category		III
Test voltage at 50 Hz		1.4 kV
Test surge voltage		4 kV
Surge testing voltage with serial interface		6 kV
AC Connection		Single-phase
Internal consumption in night mode		< 0.1 W

Mechanical Data

Width x height x depth	450 mm x 352 mm x 236 mm
Weight	38 kg

Climatic Conditions

Extended temperature range *	− 25 °C ... +60 °C
Extended humidity range *	0 % ... 100 %
Extended air pressure range *	79.5 kPa ... 106 kPa
Temperature range **	− 25 °C ... +70 °C
Operation temperature range	− 25 °C ... +60 °C
Maximum operating altitude above mean sea level	2,000 m

* according to DIN EN 50178:1998-04, installation type C, class 4K4H

** according to DIN EN 50178:1998-04, transport type E, class 2K3

Features

Topology	LF transformer
Cooling concept	OptiCool
Fan connection	Designed for safe disconnection In accordance with DIN EN 50178:1998-04

General Data

Protection rating *	IP65
Protection class	I
Noise emission (typical)	≤ 40 dB(A)

* according to DIN EN 60529

Protective Equipment

All-pole DC disconnection unit	Electronic Solar Switch, DC plug system SUNCLIX
DC overvoltage protection	Thermally monitored varistors
Personal protection (R_{iso} > 1 M Ω)	Insulation monitoring
Pole confusion protection	Short circuit diode
AC short-circuit protection	Current control
All-pole AC disconnection unit	Automatic disconnection device SMA Grid Guard 2.1

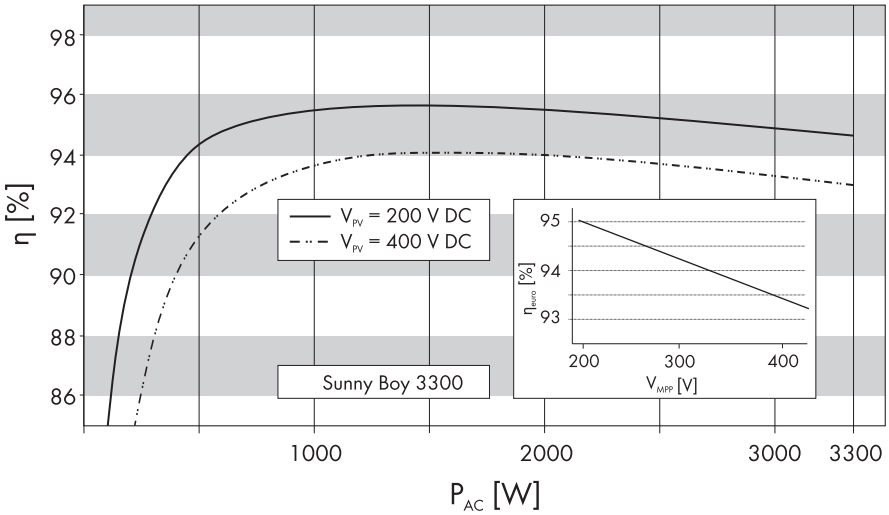
Communication Interfaces

RS485 (galvanically isolated)	Optional
Radio	Optional
Bluetooth® Wireless Technology	Optional

Electronic Solar Switch

Electrical service life in the event of a short circuit, with a nominal current of 30 A	A minimum of 50 switching operations
Maximum switching current	30 A
Maximum switching voltage	800 V
Maximum PV power	10 kW
Protection rating when plugged	IP65
Protection rating when unplugged	IP21

Efficiency



Peak efficiency	η_{max}	95.2 %
European efficiency	η_{euro}	94.4 %

11.2 Sunny Boy 3800

DC Input

Maximum DC power	$P_{DC\ Max}$	4,040 W
Maximum DC voltage *	$U_{DC\ Max}$	500 V
MPP input voltage range	U_{PV}	200 V ... 400 V
DC nominal voltage	$U_{DC\ Nenn}$	200 V
PV start voltage, adjustable	$V_{PV\ Start}$	250 V
Maximum input current	$I_{PV\ Max}$	20 A
Number of MPP trackers		1
Maximum number of parallel strings		3
Internal consumption during operation		< 7 W

* The maximum open circuit voltage, which can occur at a cell temperature of - 10 °C, may not exceed the maximum input voltage.

AC Output

AC nominal power	$P_{AC\ Nenn}$	3,800 W
Maximum AC power	$P_{AC\ Max}$	3,800 W
Maximum output current	$I_{AC,\ Max}$	18 A
Maximum permissible fuse protection		25 A
Harmonic distortion of output current at AC T_{HD} voltage < 2 %, AC power > 0.5 AC nominal power		< 3 %
Nominal AC voltage	$U_{AC\ Nenn}$	220 V / 230 V / 240 V
AC voltage range	V_{AC}	180 V ... 260 V
AC grid frequency	$f_{AC\ Nenn}$	50 Hz / 60 Hz
Tolerance at AC grid frequency	f_{AC}	± 4.5 Hz
Power factor at nominal AC power	cos φ	1
Overvoltage category		III
Test voltage at 50 Hz		1.4 kV
Test surge voltage		4 kV
Surge testing voltage with serial interface		6 kV
AC Connection		Single-phase
Internal consumption in night mode		< 0.1 W

Mechanical Data

Width x height x depth	450 mm x 352 mm x 236 mm
Weight	38 kg

Climatic Conditions

Extended temperature range *	− 25 °C ... +60 °C
Extended humidity range *	0 % ... 100 %
Extended air pressure range *	79.5 kPa ... 106 kPa
Temperature range **	− 25 °C ... +70 °C
Operation temperature range	− 25 °C ... +60 °C
Maximum operating altitude above mean sea level	2,000 m

* according to DIN EN 50178:1998-04, installation type C, class 4K4H

** according to DIN EN 50178:1998-04, transport type E, class 2K3

Features

Topology	LF transformer
Cooling concept	OptiCool
Fan connection	Designed for safe disconnection In accordance with DIN EN 50178:1998-04

General Data

Protection rating *	IP65
Protection class	I
Noise emission (typical)	≤ 42 dB(A)

* according to DIN EN 60529

Protective Equipment

All-pole DC disconnection unit	Electronic Solar Switch, DC plug system SUNCLIX
DC overvoltage protection	Thermally monitored varistors
Personal protection (R_{iso} > 1 M Ω)	Insulation monitoring
Pole Confusion Protection	Short circuit diode
AC short-circuit protection	Current control
All-pole AC disconnection unit	Automatic disconnection device SMA Grid Guard 2.1

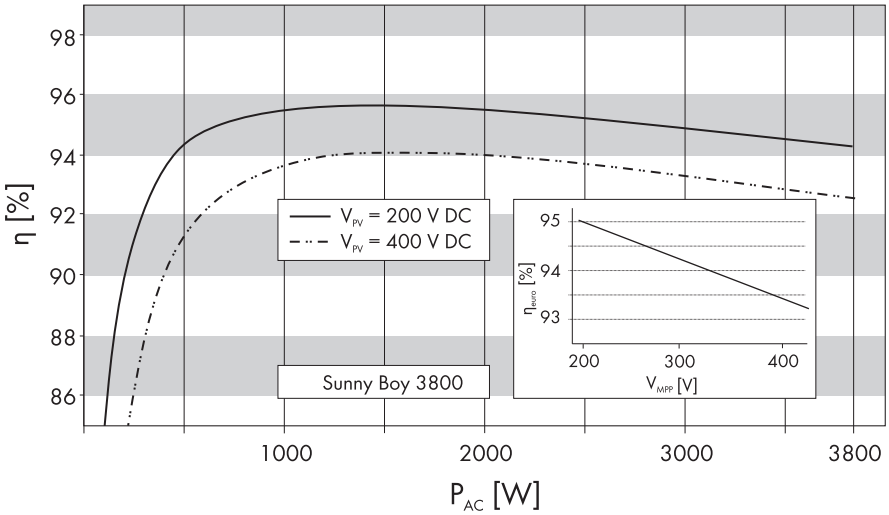
Communication Interfaces

RS485 (galvanically isolated)	Optional
Radio	Optional
Bluetooth	Optional

Electronic Solar Switch

Electrical service life in the event of a short circuit, with a nominal current of 30 A	A minimum of 50 switching operations
Maximum switching current	30 A
Maximum switching voltage	800 V
Maximum PV power	10 kW
Protection rating when plugged	IP65
Protection rating when unplugged	IP21

Efficiency



Peak efficiency	η_{max}	95.6 %
European efficiency	η_{euro}	94.7 %

12 Accessories

You will find the corresponding accessories and replacement parts for your product In the following overview. If required, you can order these from SMA Solar Technology AG or your dealer.

Description	Brief description	SMA order number
Air grills	Air grill set "right and left" as spare part	45-7202
Electronic Solar Switch	ESS handle replacement part	ESS-HANDLE:02
Replacement varistors	Set of thermally monitored varistors (2) including insertion tool	SB-TV4
Insertion tool for replacing the varistors	Installation tool for varistors	SB-TVWZ
Positive grounding set	Upgrade kit for the positive connection to ground of the DC input	ESHV-P-NR
Negative grounding set	Upgrade kit for the negative connection to ground of the DC input	ESHV-N-NR
RS485 upgrade kit	RS485 interface	485PB-NR
Radio upgrade kit	Radio Piggy-Back for upgrading a Sunny Boy for communication with Sunny Beam, including antenna, coaxial cable, and PG threaded joint (metal)	BEAMPB-NR
Bluetooth upgrade kit	*Bluetooth* interface	BTPBINV-NR
SUNCLIX DC plug connectors	Field plug for conductor cross sections of 2.5 mm^2 ... 6 mm^2	SUNCLIX-FC6-SET

13 Contact

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

- Inverter type
- Inverter serial number
- Type and number of connected PV modules
- Blink code or display message of the inverter
- Optional equipment, e.g. communication devices

SMA Solar Technology AG

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SMA Serviceline

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E-Mail:	Serviceline@SMA.de

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- Operating the product in an unintended environment
- Operating the product whilst ignoring relevant, statutory safety regulations in the deployment location
- Ignoring safety warnings and instructions contained in all documents relevant to the product
- Operating the product under incorrect safety or protection conditions
- Altering the product or supplied software without authority
- The product malfunctions due to operating attached or neighboring devices beyond statutory limit values
- In case of unforeseen calamity or force majeure

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