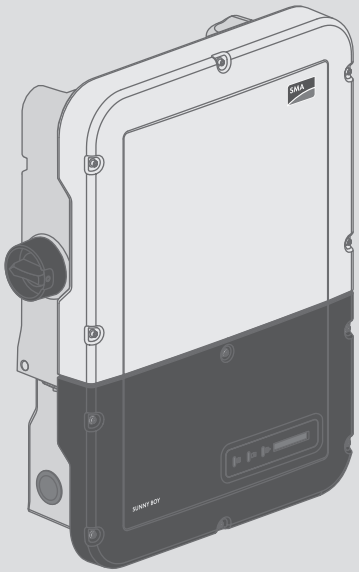
User Manual

SUNNY BOY 3.0-US / 3.8-US / 5.0-US / 6.0-US / 7.0-US / 7.7-US



ENGLISH

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Important Safety Instructions

SAVE THESE INSTRUCTIONS

This manual contains important instructions for the following products:

- SB3.0-1SP-US-40 (Sunny Boy 3.0-US)
- SB3.8-1SP-US-40 (Sunny Boy 3.8-US)
- SB5.0-1SP-US-40 (Sunny Boy 5.0-US)
- SB6.0-1SP-US-40 (Sunny Boy 6.0-US)
- SB7.0-1SP-US-40 (Sunny Boy 7.0-US)
- SB7.7-1SP-US-40 (Sunny Boy 7.7-US)

This manual must be followed when using this product.

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

Warnings in this Document

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

Symbol	Description
⚠ 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.

Warnings on this Product

The following symbols are used as product markings with the following meanings.

Warning regarding dangerous voltage

The product works with high voltages. All work on the product must only be performed as described in the documentation of the product.

Beware of hot surface

The product can become hot during operation. Do not touch the product during operation.

Observe the operating instructions

Read the documentation of the product before working on it. Follow all safety precautions and instructions as described in the documentation.

General Warnings

⚠ WARNING

All electrical installations must be carried out in accordance with the local electrical standards and the *National Electrical Code*® ANSI/NFPA 70 or the *Canadian Electrical Code*® CSA C22.1. This document does not replace and is not intended to replace any local, state, provincial, federal or national laws, regulations or codes applicable to the installation and use of the product, 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 non-compliance with such laws or codes in connection with the installation of the product.

The product contains no user-serviceable parts.

Before installing or using the product, read all of the instructions, cautions, and warnings in this manual.

Before connecting the product to the electrical utility grid, contact the local utility company. This connection must be made only by qualified personnel.

Wiring of the product must be made by qualified personnel only.

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1 Information on this Document

1.1 Validity

This document is valid for the following device types:

- SB3.0-1SP-US-40 (Sunny Boy 3.0-US)
- SB3.8-1SP-US-40 (Sunny Boy 3.8-US)
- SB5.0-1SP-US-40 (Sunny Boy 5.0-US)
- SB6.0-1SP-US-40 (Sunny Boy 6.0-US)
- SB7.0-1SP-US-40 (Sunny Boy 7.0-US)
- SB7.7-1SP-US-40 (Sunny Boy 7.7-US)

1.2 Target group

This document is intended for qualified persons and end users. Only qualified persons are allowed to perform the activities marked in this document with a warning symbol and the caption "Qualified person". Tasks that do not require any particular qualification are not marked and can also be performed by end users. Qualified persons must have the following skills:

- Knowledge of how an inverter works and is operated
- Training in how to deal with the dangers and risks associated with installing and using electrical devices and installations
- Training in the installation and commissioning of electrical devices and installations
- Knowledge of the applicable standards and directives
- Knowledge of and compliance with this document and all safety information

1.3 Symbols

Symbol	Explanation
⚠ QUALIFIED PERSON	Sections describing activities to be performed by qualified persons only
	Information that is important for a specific topic or goal, but is not safety-relevant
☐	Indicates a requirement for meeting a specific goal
☑	Desired result
✖	A problem that might occur

1.4 Additional Information

Links to additional information can be found at www.SMA-Solar.com:

Document title	Document type
Mounting, installation, commissioning and decommissioning	Installation Manual

Document title	Document type
"Application for SMA Grid Guard Code"	Form
"Webconnect Systems in Sunny Portal" Registration in Sunny Portal	User Manual
"SMA Modbus® Interface" Information on the commissioning and configuration of the SMA Modbus interface	Technical Information
"SunSpec® Modbus® Interface" Information on the commissioning and configuration of the SunSpec Modbus interface	Technical Information
"SMA Modbus® Interface" List with the product specific SMA Modbus registers	Technical Information
"SunSpec® Modbus® Interface" List with the product specific SunSpec Modbus registers	Technical Information

1.5 Nomenclature

Complete designation	Designation in this document
Sunny Boy	Inverter, product
SMA Solar Technology America LLC	SMA
SMA Solar Technology Canada Inc.	

1.6 Typographies

Typography	Use	Example
bold	• Display texts • Elements on a user interface • Terminals • Elements to be selected • Elements to be entered	• The value can be found in the field **Energy**. • Select **Settings**. • Enter **10** in the field **Minutes**.
>	• Connects several elements to be selected	• Select **Settings > Date**.
[**Button**] [**Key**]	• Button or key to be selected or pressed	• Select [**Next**].

2 Safety

2.1 Intended Use

The Sunny Boy is a transformerless PV inverter which converts the direct current of the PV array to grid-compliant alternating current and feeds it into the utility grid.

The product is suitable for indoor and outdoor use.

All components must remain within their permitted operating ranges at all times.

The product must only be operated with PV arrays (PV modules and cabling) that are approved by the electrical standards applicable on-site and the *National Electrical Code*® ANSI/NFPA 70 or the *Canadian Electrical Code*® CSA C22.1.

i No galvanic isolation

The product is not equipped with a transformer and therefore has no galvanic isolation.

- Do not operate grounded PV modules together with the product. If grounded PV modules are connected to the product, an event will occur which will appear on the product display. The event will also be displayed, along with the associated message, in the event list on the user interface of the product.
- Only ground the mounting frames of the PV modules.
- The neutral conductor of the AC output is not bonded to ground within the product.
- The neutral conductor of the AC output for secure power supply operation is bonded to ground within the product.

PV modules with a high capacity to ground may only be used if their coupling capacity does not exceed 2.5 µF.

To protect the PV system against excessive reverse currents under fault conditions, the *National Electrical Code*®, Section 690.9, requires overcurrent protection for PV source circuits where possible short-circuit currents exceed the ampacity of source circuit conductors or the maximum series fuse rating of the PV modules. Typically, this requires string fusing where more than two strings are combined in parallel. Where overcurrent protection is required, *National Electrical Code*®, Section 690.35, requires that both positive and negative conductors have overcurrent protection for ungrounded PV arrays.

The product must only be used in countries for which it is approved or released by SMA and the grid operator.

Use this product only in accordance with the information provided in the enclosed documentation and with the locally applicable standards and directives. Any other application may cause personal injury or property damage.

Alterations to the product, e.g. changes or modifications, are only permitted with the express written permission of SMA. Unauthorized alterations will void guarantee and warranty claims and in most cases terminate the operating license. SMA shall not be held liable for any damage caused by such changes.

Any use of the product other than that described in the Intended Use section does not qualify as appropriate.

The enclosed documentation is an integral part of this product. Keep the documentation in a convenient place for future reference and observe all instructions contained therein.

The type label must remain permanently attached to the product.

2.2 Safety Information

This section contains safety information that must be observed at all times when working on or with the product.

To prevent personal injury and property damage and to ensure long-term operation of the product, read this section carefully and observe all safety information at all times.

⚠ DANGER

Danger to life due to electric shock in case of a ground fault

If a ground fault occurs, parts of the system may still be live. Touching live components can lead to lethal electric shocks.

- Ensure that no voltage is present and wait five minutes before touching any parts of the PV system or the inverter.

⚠ CAUTION

Risk of burns from hot surfaces

The surface of the inverter can get very hot. Touching the surface can result in burns.

- Mount the inverter in such a way that it cannot be touched inadvertently.
- Do not touch hot surfaces.
- Wait 30 minutes for the surface to cool sufficiently.
- Observe the safety messages on the inverter.

NOTICE

Damage to the inverter due to moisture and dust intrusion

Dust or moisture intrusion can damage the inverter and impair its functionality.

- Close all enclosure openings of the inverter tightly.
- Never open the inverter when it is raining or snowing, or the humidity is over 95%.

NOTICE

Damage to the display or the type label due to the use of cleaning agents

- If the inverter is dirty, clean the enclosure, the enclosure lid of the Connection Unit, the enclosure lid of the Power Unit, the type label, the display and the LEDs with a damp cloth and clear water only.

3 Product Description

3.1 Sunny Boy

The Sunny Boy is a transformerless PV inverter which converts the direct current of the PV array to grid-compliant alternating current and feeds it into the utility grid.

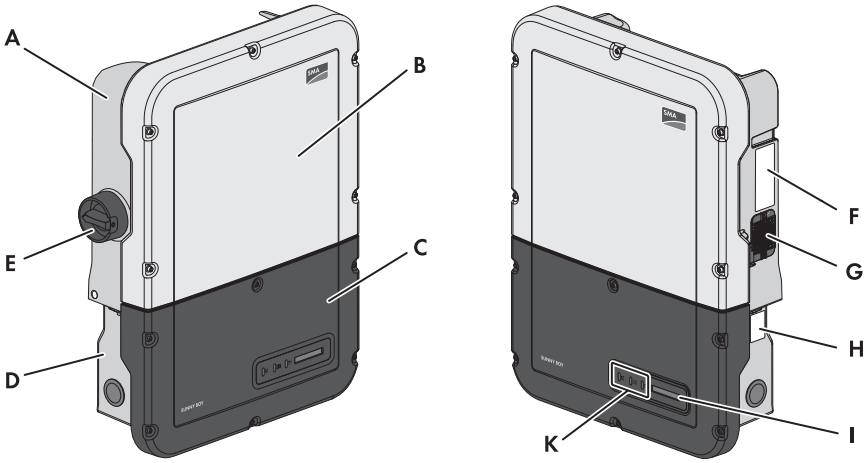


Figure 1: Design of the Sunny Boy

Position	Designation
A	Power Unit
B	Enclosure lid of the Power Unit
C	Enclosure lid for the Connection Unit
D	Connection Unit
E	DC load-break switch The inverter is equipped with a DC load-break switch. If the DC load-break switch is set to the position **I**, it establishes a conductive connection between the PV array and the Power Unit. Switching the DC load-break switch to the **O** position will interrupt the DC electric circuit.

Position	Designation
F	Inverter type label The type label uniquely identifies the inverter. You will require the information on the type label to use the product safely and when seeking customer support from the SMA Service Line. The type label must remain permanently attached to the product. You will find the following information on the type label: • Device type (Model) • Serial number (Serial No.) • Date of manufacture • Device-specific characteristics
G	Fan (only with Sunny Boy 7.0 and 7.7)
H	Type label of the Connection Unit The type label clearly identifies the Connection Unit. The type label must remain permanently attached to the product. You will find the following information on the type label: • Identification key (PIC) for registration in Sunny Portal • Registration ID (RID) for registration in Sunny Portal • WLAN password (WPA2-PSK) for the direct connection to the user interface of the inverter via WLAN
I	Display The display shows the current operating data and events or errors.
K	LEDs The LEDs indicate the operating state of the inverter.

Symbols on the Inverter and on the Type Label

Symbol	Explanation
	Inverter Together with the green LED, this symbol indicates the operating state of the inverter.
	Observe the documentation Together with the red LED, this symbol indicates an error.
	Data transmission Together with the blue LED, this symbol indicates the status of the network connection.
	Equipment Grounding Terminal This symbol indicates the position for the connection of an equipment grounding conductor.

Symbol	Explanation
	Warning label with FCC Compliance and IC Compliance
	Risk of burns due to hot surfaces The product can get hot during operation. Avoid contact during operation. Prior to performing any work on the product, allow the product to cool down sufficiently.
	Danger to life due to electric shock The product operates at high voltages. Prior to performing any work on the product, disconnect the product from voltage sources. All work on the product must be carried out by electrically qualified persons only.
	Observe the documentation Observe all documentation supplied with the product.
	UL 1741 is the standard applied by Underwriters Laboratories to the product to certify that it meets the requirements of the *National Electrical Code®*, the *Canadian Electrical Code®* CSA C22.1; the IEEE 929-2000 and IEEE 1547.

3.2 Interfaces and Functions

The inverter is equipped with the following interfaces and functions:

User interface for the monitoring and configuration of the inverter

The inverter is standard-equipped with an integrated web server, which provides a user interface for configuring and monitoring the inverter. The inverter user interface can be called up via the web browser if there is an existing WLAN or Ethernet connection to a computer, tablet PC or smartphone.

SMA Speedwire

The inverter is equipped with SMA Speedwire as standard. SMA Speedwire is a type of communication based on the Ethernet standard. This enables inverter-optimized 10 or 100 Mbit data transmission between Speedwire devices in PV systems and the user interface of the inverter.

Class 1 wiring methods are to be used for field wiring connection to the terminals of the communication interface.

SMA Webconnect

The inverter is equipped with a Webconnect function as standard. The Webconnect function enables direct data transmission between the inverters of a small-scale system and the Internet portal Sunny Portal without any additional communication device and for a maximum of 4 inverters per Sunny Portal system. In large-scale PV power plants with more than 4 inverters, there is the option of establishing data transmission between the inverters and the Sunny Portal web-based monitoring platform via the SMA Cluster Controller or to distribute the inverters over several plants in the Sunny Portal. If there is an existing WLAN or Ethernet connection, you can directly access your Sunny Portal system via the web browser on the computer, tablet PC or smartphone.

WLAN

The inverter is equipped with a WLAN interface as standard. The inverter is delivered with the WLAN interface activated as standard. If you do not want to use WLAN, you can deactivate the WLAN interface.

In addition, the inverter has a WPS (WiFi Protected Setup) function. The WPS function is for automatically connecting the inverter to a device in the same network as the inverter (e.g. router, computer, tablet PC or smartphone).

Expanding the radio range in the WLAN network

In order to expand the radio range of the inverter in the WLAN network, you can install the Antenna Extension Kit accessory set in the inverter.

Modbus

The inverter is equipped with a Modbus interface. The Modbus interface is deactivated by default and must be configured as needed.

The Modbus interface of the supported SMA devices is designed for industrial use and has the following tasks:

- Remote query of measured values
- Remote setting of operating parameters
- Setpoint specifications for system control

Parallel Operation of the DC Inputs A and B

The DC inputs A and B of the inverter can be operated in parallel and up to three strings can be connected to it in parallel. As a result, as opposed to normal operation, up to three strings can be connected directly to inverters with two DC inputs and up to four strings to inverters with three DC inputs. The inverter automatically detects the parallel operation of the DC inputs A and B.

Module slots

The inverter is standard-equipped with two module slots. The module slots are located on the communication assembly and allow additional modules to be connected (e.g. SMA Sensor Module). The modules are available as accessories. The installation of two identical modules is not permissible.

Secure power supply operation

You can connect an external outlet and a switch to the inverter in order to activate the outlet. In case of a grid failure, the outlet supplies a load with current from the PV system. When the outlet is activated via the switch, the load is supplied with current from the PV system. The inverter automatically regulates the energy supply of the outlet depending on the solar irradiation on the PV system. When the outlet is activated and a load is supplied with current from the PV system, the inverter is disconnected from the utility grid and does not feed into the utility grid.

Do not connect loads that require a stable electricity supply to the outlet for secure power supply operation

Secure power supply operation must not be used for loads that require a stable electricity supply. The power available during secure power supply operation depends on the solar irradiation on the PV system. Therefore, power output can fluctuate considerably depending on the weather or may not be available at all.

- Do not connect loads to the outlet for secure power supply operation if they are dependent on a stable electricity supply for reliable operation.

Multifunction relay

The inverter is equipped with a multifunction relay as standard. The multifunction relay is a multifunctional interface that can be configured for the operating mode used by a particular system.

Arc-Fault Circuit Interrupter (AFCI)

In accordance with the *National Electrical Code®*, Article 690.11, the inverter has a system for arc fault detection and interruption.

An electric arc with a power of 300 W or greater must be interrupted by the AFCI in the time specified by UL 1699B. A detected electric arc causes the inverter to interrupt feed-in operation: In order to restart feed-in operation, the feed-in operation must be activated manually. If the installation conditions allow it, you can deactivate the arc-fault circuit interrupter.

3.3 LED Signals

The LEDs indicate the operating state of the inverter.

LED	Status	Explanation
Green LED	flashing: 2 s on 2 s off	Waiting for connection conditions The conditions for feed-in operation are not yet met. As soon as the conditions are met, the inverter will start feed-in operation.
	flashing: 1.5 s on 0.5 s off	Secure power supply operation The secure power supply operation is activated and the inverter supplies the outlet with current from the PV system.
	flashing quickly	Update of central processing unit The central processing unit of the inverter is being updated.
	glowing	Feed-in operation (Power: ≥ 90%, relative to the active power limit set) The inverter feeds in with a power of at least 90%.
	pulsing	Feed-in operation (Power: ≥ 20% to max. 90%, relative to the set active power limit) The inverter is equipped with a dynamic power display via the green LED. The green LED pulses faster or slower, depending on the power. If necessary, you can switch off the dynamic power display via the green LED.
Red LED	glowing	Event occurred In addition to the glowing red LED, the display indicates the following information about the event: • Event type • Event number • Date and time at wich the event occurred
Blue LED	flashes slowly for approx. one minute	Communication connection is being established The inverter is establishing a connection to a local network or is establishing a direct connection to an end device via Ethernet (e.g. computer, tablet PC or smartphone).
	flashes quickly for approx. two minutes	WPS active The WPS function is active.
	glowing	Communication active There is an active connection with a local network or there is a direct connection with an end device via Ethernet (e.g. computer, tablet PC or smartphone).

4 Operation of the Inverter

4.1 Activating and Operating the Display

You can activate and operate the display by tapping on the enclosure lid of the Connection Unit.

Procedure:

1. Activate the display. Tap on the enclosure lid of the Connection Unit once.
   ☑ The backlight is switched on.
2. To move to the next message, tap on the enclosure lid of the Connection Unit once.

4.2 Activate WPS Function

- Tap twice on the enclosure lid of the Connection Unit.
  ☑ The blue LED flashes quickly for approx. two minutes.

4.3 Secure Power Supply Operation

4.3.1 Activating Secure Power Supply Operation

If an outlet and a switch for secure power supply operation are connected to the inverter, you can supply a load with current from the PV system in case of a grid failure during the day. If you activate the secure power supply operation, the inverter supplies loads that are connected to the outlet for secure power supply operation.

In case of overload, underload or insufficient solar irradiation, the voltage supply of the outlet is briefly interrupted. The inverter automatically attempts to reestablish the voltage supply 20 seconds after the interruption. This can lead to inadvertent starting of the load that is connected to the outlet. Ensure that the load connected to the outlet does not consume too much power. If necessary, reduce the power consumption of the load.

In case of a grid failure during the night, secure power supply operation is not possible

During the night, secure power supply operation cannot be activated since the PV system does not produce power that is required to supply the load.

- In case of a grid failure during the night, do not activate secure power supply operation.
- Continue to operate the inverter on the utility grid and wait for restoration of grid operation.
- In the event of a persistent grid failure, switch to secure power supply operation after sunrise.

Do not connect loads that require a stable electricity supply to the outlet for secure power supply operation

Secure power supply operation must not be used for loads that require a stable electricity supply. The power available during secure power supply operation depends on the solar irradiation on the PV system. Therefore, power output can fluctuate considerably depending on the weather or may not be available at all.

- Do not connect loads to the outlet for secure power supply operation if they are dependent on a stable electricity supply for reliable operation.

Procedure:

1. If no load is connected to the outlet, connect a load.
2. Turn the switch of the outlet to secure power supply operation.
3. Wait one minute.

☑ The inverter commences secure power supply operation. As soon as the inverter supplies the outlet with power, the green LED flashes (1.5 s on and 0.5 s off) and the message **SPS-mode active** is shown in the display along with the amount of power being supplied from the inverter to the outlet. In addition, the control light of the outlet for secure power supply operation glows.

✖ The green LED does not flash and no message that the secure power supply operation mode is activated appears on the display or the control lamp of the outlet does not glow?

The output power of the PV system is too low. Irradiation on the PV system is probably too low or the connected load requires more power than currently available.

- Ensure that the outlet's switch is set to secure power supply operation.
- If irradiation is too low, wait for it to increase.
- Connect a load with lower power consumption to the outlet.

✖ No voltage can be measured at the outlet?

- Ensure that the outlet's switch is set to secure power supply operation.
- Ensure that the switch, outlet and control light for secure power supply operation are correctly connected.

4.3.2 Deactivating Secure Power Supply Operation

1. If necessary, disconnect the load from the outlet.
2. Turn the switch of the outlet to grid operation.
   ☑ Grid operation is activated.
3. Switch on the circuit breaker of the PV system.

☑ The inverter connects to the utility grid and starts feed-in operation.

5 Using the Inverter User Interface

5.1 Establishing a connection to the user interface

5.1.1 Establishing a direct connection via WLAN

Requirements:

- ☐ The inverter must be commissioned.
- ☐ A computer, tablet PC or smartphone with WLAN interface must be available.
- ☐ In the case of a computer connection, one of the following web browsers must be installed: Firefox (as of version 25), Internet Explorer (as of version 10), Safari (as of version 7), Opera (as of version 17) or Google Chrome (as of version 30).
- ☐ In the case of a tablet PC or smartphone connection, one of the following web browsers must be installed: Firefox (as of version 25), Safari (as of version iOS 7) or Google Chrome (as of version 29).
- ☐ The personal SMA Grid Guard code of the Installer must be available for the changing of grid-relevant settings after completion of the first ten operating hours (see "Application for SMA Grid Guard Code" at www.SMA-Solar.com).

Inverter SSID and IP address and necessary passwords

- Inverter SSID in WLAN: SMA[serial number] (e.g. SMA2130019815)
- Standard WLAN password (usable for initial configuration to completion of the first ten operating hours): SMA 12345
- Device-specific WLAN password (usable for initial configuration to completion of the first ten operating hours): see WPA2-PSK on the type label of the inverter or on the back of the manual included in the delivery
- Standard IP inverter address for a direct connection via WLAN outside of a local network: 192.168.12.3

Importing and exporting files with end devices having an iOS operating system is not possible.

For technical reasons, importing and exporting files (e.g. importing an inverter configuration, saving the current inverter configuration or exporting events) is not possible with mobile end devices having an iOS operating system.

- Use an end device that does not have an iOS operating system for importing and exporting files.

The procedure can be different depending on the terminal devices used (e.g. computer, tablet PC or smartphone). If the procedure described does not apply to your device, establish the direct connection via WLAN as described in the manual of your device.

Procedure:

1. If your computer, tablet PC or smartphone has a WPS function:
   - Activate the WPS function on the inverter. To do this, tap twice on the enclosure lid of the Connection Unit.
     ☑ The blue LED flashes quickly. The WPS function is active.
   - Activate the WPS on your device.
     ☑ The connection with your device will be established automatically. It can take up to 20 seconds for this connection to be established.
2. If your computer, tablet PC or smartphone does not have a WPS function:
   - Search for WLAN networks with your device.
   - Select the SSID of the inverter **SMA[serial number]** in the list with the found WLAN networks.
   - Enter the inverter WLAN password. Within the first 10 operating hours, you must use the standard WLAN password **SMA12345**. After the first 10 operating hours, you must use the device-specific WLAN password (WPA2-PSK) of the inverter. The WLAN password (WPA2-PSK) is printed on the type label.
3. Enter the IP address **192.168.12.3** or, if your device supports mDNS services, **SMA[serial number].local** in the address line of the web browser and press the enter key.
4. **Web browser signals a security vulnerability**
   After the IP address has been confirmed by pressing the enter key, a message might appear indicating that the connection to the user interface of the inverter is not secure. SMA guarantees that calling up the user interface is secure.
   - Continue loading the user interface.

☑ The login page of the user interface opens.

5.1.2 Establishing a Direct Connection via Ethernet

Requirements:

☐ The inverter must be commissioned.

☐ A computer with an Ethernet interface must be available.

☐ The inverter must be connected directly to a computer.

☐ One of the following web browsers must be installed: Firefox (as of version 25), Internet Explorer (as of version 10), Safari (as of version 7), Opera (as of version 17) or Google Chrome (as of version 30).

☐ The personal SMA Grid Guard code of the Installer must be available for the changing of grid-relevant settings after completion of the first ten operating hours (see certificate "Application for SMA Grid Guard Code" at www.SMA-Solar.com).

Importing and exporting files with end devices having an iOS operating system is not possible.

For technical reasons, importing and exporting files (e.g. importing an inverter configuration, saving the current inverter configuration or exporting events) is not possible with mobile end devices having an iOS operating system.

- Use an end device that does not have an iOS operating system for importing and exporting files.

Procedure:

1. Tap on the enclosure lid of the Connection Unit and continue to switch up to the message **E-IP: 169.254.xxx.xxx**.
2. Read off the displayed IP address for the direct connection via Ethernet and either remember it or write it down.
3. Open the web browser of your device, enter the IP address in the address line of the web browser and press the enter key.
4. **Web browser signals a security vulnerability**

   After the IP address has been confirmed by pressing the enter key, a message might appear indicating that the connection to the user interface of the inverter is not secure. SMA guarantees that calling up the user interface is secure.

   - Continue loading the user interface.

☑ The login page of the user interface opens.

5.1.3 Establishing a Connection via Ethernet in the local network

New IP address for connecting with a local network

If the inverter is connected to a local network via a network cable (e.g. via a router), the inverter will receive a new IP address. Depending on the type of configuration, the new IP address will be assigned automatically by the DHCP server (router) or manually by you. Upon completion of the configuration, the inverter is only reachable via this new IP address or the alternative addresses.

Access addresses of the inverter:

- Generally applicable access address, e.g. for android products: IP address manually assigned or assigned by the DHCP server (router) (identification via network scanner software or router manual).
- Alternative access address for Apple products: SMA[serial number].local (e.g. SMA2130019815.local)
- Alternative access address for certain Windows products: SMA[serial number] (e.g. SMA2130019815)

Requirements:

☐ The inverter must be connected to the local network via a network cable (e.g. via a router).

☐ The inverter must be integrated in the local network.

- ☐ A computer, tablet PC or smartphone must be available and the computer, tablet PC or smartphone must be connected with the network to which the inverter is also connected.
- ☐ In the case of a computer connection, one of the following web browsers must be installed: Firefox (as of version 25), Internet Explorer (as of version 10), Safari (as of version 7), Opera (as of version 17) or Google Chrome (as of version 30).
- ☐ In the case of a tablet PC or smartphone connection, one of the following web browsers must be installed: Firefox (as of version 25), Safari (as of version iOS 7) or Google Chrome (as of version 29).
- ☐ The personal SMA Grid Guard code of the Installer must be available for the changing of grid-relevant settings after completion of the first ten feed-in hours (see certificate "Application for SMA Grid Guard Code" at www.SMA-Solar.com).

Importing and exporting files with end devices having an iOS operating system is not possible.

For technical reasons, importing and exporting files (e.g. importing an inverter configuration, saving the current inverter configuration or exporting events) is not possible with mobile end devices having an iOS operating system.

- Use an end device that does not have an iOS operating system for importing and exporting files.

Procedure:

1. Open the web browser of your device, enter the IP address of the inverter in the address line of the web browser and press the enter key.
2. **Web browser signals a security vulnerability**

   After the IP address has been confirmed by pressing the enter key, a message might appear indicating that the connection to the user interface of the inverter is not secure. SMA guarantees that calling up the user interface is secure.

   - Continue loading the user interface.

☑ The login page of the user interface opens.

5.2 Logging In and Out of the User Interface

After a connection to the user interface of the inverter has been established, the login page opens. Log onto the user interface as described below.

Usage of cookies

For the correct display of the user interface, cookies are required. The cookies are used for convenience only. By using this user interface you agree to the placement of cookies.

Log in as installer or user for the first time

Procedure:

1. In the drop-down list **Language**, select the desired language.
2. In the **User group** drop-down list, select the entry **Installer** or **User**.
3. In the **New password** field, enter a new password for the selected user group.

4. In the **Repeat password** field, enter the new password again.
5. Select **Login**.

☑ The **Configuring the Inverter** page or the user interface start page opens.

Log in as the User or Installer

1. In the drop-down list **Language**, select the desired language.
2. In the **User group** drop-down list, select the entry **Installer** or **User**.
3. Enter the password in the field **Password**.
4. Select **Login**.

☑ The start page of the user interface opens.

Log Out as the User or Installer

1. On the right-hand side of the menu bar, select the menu **User Settings**.
2. In the subsequent context menu, select [**Logout**].

☑ The login page of the user interface opens. The logout was successful.

5.3 Start Page Design of the User Interface

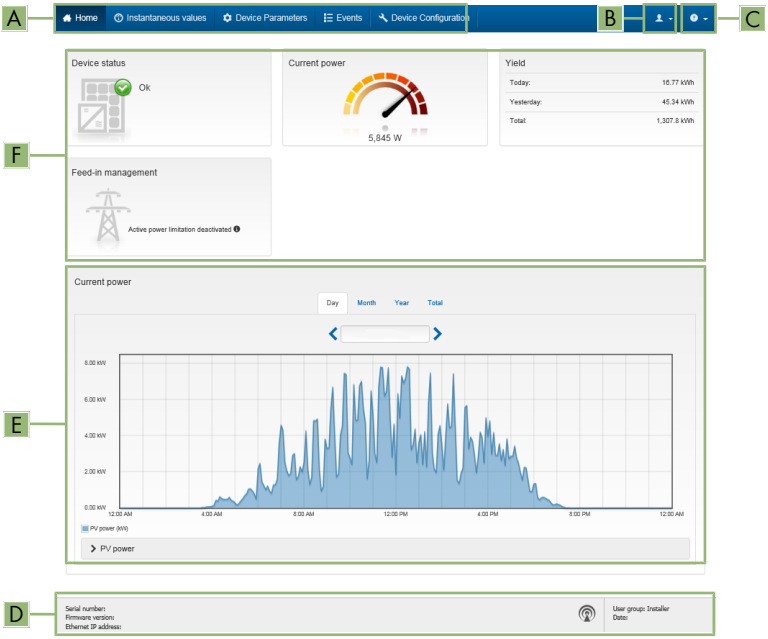


Figure 2: Start Page Design of the User Interface

Position	Designation	Description
A	Menu	Provides the following functions: • **Home** Opens the user interface homepage • **Instantaneous values** Current measured values of the inverter • **Device Parameters** The various operating parameters of the inverter can be viewed and configured here depending on the user group. • **Events** All events that have occurred in the selected time period are displayed here. The event types are **Information**, **Warning** and **Error**. Currently existing events of the types **Error** and **Warning** will be additionally displayed in the **Device status** viewlet. However, only the higher-priority event is displayed. If, for example, there is a Warning and an Error present at the same time, only the Error will be displayed. • **System Configuration** The following settings for the inverter can be performed here. The selection available is dependent on which user group you are logged in as and the operating system of the device with which the user interface has been called up. – Changing device names – Updating firmware (not available with devices having an iOS operating system) – Saving a configuration to file (not available with devices having an iOS operating system) – Loading a configuration from a file (not available with devices having an iOS operating system) – Importing a proxy certificate (not available with devices having an iOS operating system)
B	User settings	Provides the following functions, depending on the user group logged in: • Start the installation assistant • SMA Grid Guard login • Logout

Position	Designation	Description
C	Help	Provides the following functions: • Displaying information on Open Source licenses used • Link to the website of SMA
D	Status bar	Displays the following information: • Inverter serial number • Inverter firmware version • IP address of the inverter within the local network and/or IP address of the inverter during WLAN connection • User group logged in • Date and device time of the inverter
E	PV power curve	Temporal progression of the PV power of the household over the selected time period.
F	Status display	The various areas display information on the current status of the PV system. • **Device status** Displays whether the inverter is currently in a fault-free operating state or whether there is an event type **Error** or **Warning** present. • **Current power** Displays the power currently being generated by the inverter. • **Yield** Displays the energy yield of the inverter. • **Feed-in management** Displays whether the inverter is currently limiting its active power.

5.4 Starting the Installation Assistant

⚠ QUALIFIED PERSON

The installation assistant leads you step-by-step through the steps necessary for the initial configuration of the inverter.

Layout of the installation assistant

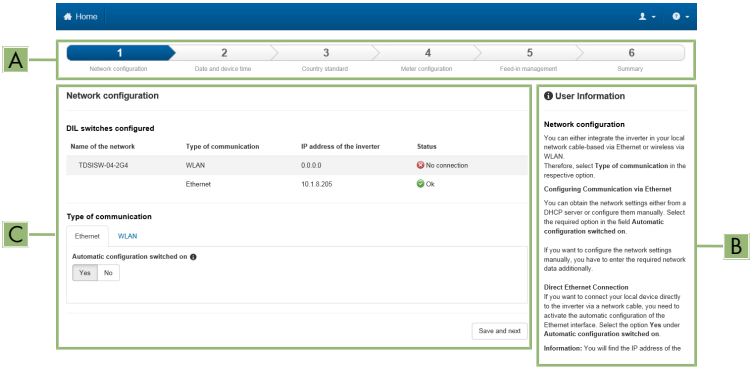


Figure 3: Layout of the installation assistant

Position	Designation	Description
A	Configuration steps	Overview of the installation assistant steps. The number of steps depends on the type of device and the additionally installed modules. The current step is highlighted in blue.
B	User information	Information about the current configuration step and the setting options of the configuration step.
C	Configuration field	You can make settings in this field.

Requirement:

☐ When configuring after completion of the first ten operating hours, the SMA Grid Guard code must be available (see "Application for SMA Grid Guard Code" at www.SMA-Solar.com).

Procedure:

1. Activate the user interface (see Section 5.1, page 20).
2. Log in as **Installer**.
3. Select the menu **User Settings** (see Section 5.3, page 25) on the start page of the user interface.
4. In the context menu, select [**Start the installation assistant**].

☑ The Installation Assistant will open.

5.5 Changing the Password

The password for the inverter can be changed for both user groups. Furthermore, the user group **Installer** can change the password for the user group **User** as well as its own password.

PV systems registered in a communication product

With PV systems that are registered in a communication product (e.g. Sunny Portal, Cluster Controller), you can also assign a new password for the user group **Installer** via the communication product. The password for the user group **Installer** is also the system password. If you assign a password for the user group **Installer** via the user interface of the inverter that does not correspond to the system password in the communication product, the inverter can no longer be reached by the communication product.

- Ensure that the password for the user group **Installer** is the same as the system password in the communication product.

Procedure:

1. Activate the user interface (see Section 5.1, page 20).
2. Log into the user interface (see Section 5.2, page 23).
3. Call up the menu **Device Parameters**.
4. Select [**Edit parameters**].
5. In the parameter group **User Rights > Access Control** change the password of the desired user group.
6. Select [**Save all**] to save the changes.

6 Configuration of the Inverter

6.1 Changing Operating Parameters

The operating parameters of the inverter are set to certain values by default. You can change the operating parameters to optimize the performance of the inverter.

This section describes the basic procedure for changing operating parameters. Always change operating parameters as described in this section. Some function-sensitive parameters can only be viewed by qualified persons and can only be changed by qualified persons by entering the personal SMA Grid Guard code.

No configuration via Sunny Explorer

Sunny Explorer does not support the configuration of inverters with their own user interface. The inverter can be detected via Sunny Explorer, however it is expressly not recommended to use Sunny Explorer to configure this inverter. SMA does not accept liability for missing or incorrect data and possibly resulting yield losses.

- Use the user interface for the configuration of the inverter.

Requirements:

☐ The changes to the grid-relevant parameters must be approved by the grid operator.

☐ When changing grid-relevant parameters, the SMA Grid Guard code must be available (see "Application for SMA Grid Guard Code" at www.SMA-Solar.com).

Procedure:

1. Activate the user interface (see Section 5.1, page 20).
2. Log into the user interface (see Section 5.2, page 23).
3. Call up the menu **Device Parameters**.
4. Select [**Edit parameters**].
5. Log in using the SMA Grid Guard code to change those parameters designated by a lock (only for installers):
   - Select the menu **User Settings** (see Section 5.3, page 25).
   - In the subsequent context menu, select [**SMA Grid Guard login**].
   - Enter the SMA Grid Guard code and select [**Login**].
6. Expand the parameter group that contains the parameter which is to be configured.
7. Change the desired parameters.
8. Select [**Save all**] to save the changes.

☑ The inverter parameters are set.

Accepting the settings

Saving the made settings is indicated by an hourglass symbol on the user interface. If the DC voltage is sufficient, the data is transferred directly to the inverter and accepted. If the DC voltage is too low (e. g. in the evening), the settings are saved, but they cannot be directly transferred to or accepted by the inverter. As long as the inverter has not yet received and accepted the settings, the hourglass symbol will continue to be displayed on the user interface. The settings will be accepted when there is sufficient DC voltage applied and the inverter restarts. As soon as the hourglass symbol appears on the user interface, the settings have been saved. The settings will not be lost. You can log off of the user interface and leave the system.

6.2 Configuring the Country Data Set

⚠ QUALIFIED PERSON

As standard, the inverter is meant for connection to a utility grid with a 208 V wye connection or a 240 V split-phase system, and the associated country data set **UL1741/2010/120** is factory-set. If the default country data set does not correspond with the grid configuration, the country data set can be adapted to the connected grid configuration.

The basic procedure for changing operating parameters is explained in another section (see Section 6.1 "Changing Operating Parameters", page 30).

Grid configuration	Country data set
208 V delta connection	UL1741/2010/208
208 V wye connection	UL1741/2010/120
240 V delta connection	UL1741/2010/240
240 V split-phase system	UL1741/2010/120

Procedure:

- Select the parameter **Set country standard** and set the required country data set.

6.3 Deactivating the Arc-Fault Circuit Interrupter (AFCI)

⚠ QUALIFIED PERSON

The basic procedure for changing operating parameters is explained in another section (see Section 6.1 "Changing Operating Parameters", page 30).

Procedure:

- Select the parameter **AFCI switched on** or **AfciIsOn** and set to **No**.

6.4 Changing the Operating Mode of the Multifunction Relay

⚠ QUALIFIED PERSON

The default operating mode of the multifunction relay is **Fault indication (FltInd)** . If you decide to use another operating mode and have established the correct electrical connection for this operating mode and the associated connection variant, you will have to change the operating mode of the multifunction relay and make other settings, if necessary.

The basic procedure for changing operating parameters is explained in another section (see Section 6.1 "Changing Operating Parameters", page 30).

Procedure:

1. Select the parameter **Operating mode of multifunction relay** or **Mlt.OpMode** and set the desired operating mode.
2. Once you have set the operating mode **Self-consumption** or **SelfCsmp**, you can configure other settings:
   - Select the parameter **Minimum On power for MFR self-consumption** or **Mlt.MinOnPwr** and set the desired value. This will configure the power threshold from which a load is to be activated.
   - Select the parameter **Minimum power On time, MFR self-consumption** or **Mlt.MinOnPwrTmm** and set the desired value. This will configure the minimum time for which the power must have exceeded the minimum switch-on power threshold in order to trip activation of the load.
   - Select the parameter **Minimum On time for MFR self-consumption** or **Mlt.MinOnTmm** and set the desired value. This will configure the minimum time for which the load remains activated.
3. If you have set the operating mode **Control via communication** or **ComCtl**, select the parameter **Status of MFR with control via communication** or **Mlt.ComCtl.Sw** and set the desired value. This will configure the status at which the multifunction relay is controlled via a communication product.
4. If you have set the operating mode **Battery bank** or **BatCha**, make further settings:
   - Select the parameter **Minimum On power for MFR battery bank** or **Mlt.BatCha.Pwr** and set the desired value. This will configure the power threshold from which the battery is to be charged.
   - Select the parameter **Minimum time before reconnection of MFR battery bank** or **Mlt.BatCha.Tmm** and set the desired value. This will configure the minimum time which must elapse after charging the battery before the battery can be charged again.

6.5 Configuring the Modbus Function

⚠ QUALIFIED PERSON

The Modbus interface is deactivated by default and the communication ports **502** set. In order to access SMA invertes with SMA Modbus® or SunSpec® Modbus®, the Modbus interface must be activated. After activating the interface, the communication ports of both IP protocols can be changed.

For information on commissioning and configuration of the Modbus interface, see the Technical Information "SMA Modbus® Interface" or in the Technical Information "SunSpec® Modbus® Interface" at www.SMA-Solar.com.

For information on which Modbus registers are supported, see the Technical Descriptions "SMA Modbus® Interface" or "SunSpec® Modbus® Interface" at www.SMA-Solar.com.

i Data security during activated Modbus interface

If you activate the Modbus interface, there is a risk that unauthorized users may access and manipulate the data or devices in your PV system.

- Take appropriate protective measures such as:
  - Set up a firewall.
  - Close unnecessary network ports.
  - Only enable remote access via VPN tunnel.
  - Do not set up port forwarding at the communication port in use.
  - In order to deactivate the Modbus interface, reset the inverter to default settings.

Procedure:

- Activate the Modbus interface and adjust the communication ports if necessary (see the Technical Information "SMA Modbus® Interface" or "SunSpec® Modbus® Interface" at www.SMA-Solar.com).

6.6 Setting SMA OptiTrac Global Peak

⚠ QUALIFIED PERSON

For partially shaded PV modules, you should set the interval at which the inverter is to optimize the MPP of the PV system. If you do not want to use SMA OptiTrac Global Peak feature, you can deactivate the feature.

The basic procedure for changing operating parameters is explained in another section (see Section 6.1 "Changing Operating Parameters", page 30).

Procedure:

- Select the parameter **Cycle time of the OptiTrac Global Peak algorithm** or **MPPShdw.CycTms** and set the required time interval. The ideal time interval is usually six minutes. This value should only be increased if the shading situation changes extremely slowly.
  ☑ The inverter optimizes the MPP of the PV system at the predetermined time interval.
- In order to deactivate the SMA OptiTrac Global Peak feature, select the parameter **OptiTrac Global Peak switched on** or set **MPPShdw.IsOn** to **Off**.

6.7 Saving the Configuration in a File

You can save the current configuration of the inverter in a file. You can use this file as a data backup for this inverter and then import this file into this inverter again or another inverter to configure the inverter. When saving, only the device parameters will be saved, not any passwords.

Procedure:

1. Activate the user interface (see Section 5.1, page 20).
2. Log into the user interface (see Section 5.2, page 23).
3. Select the menu **System Configuration**.
4. Select [**Settings**].
5. In the context menu, select [**Saving the configuration in a file**].
6. Follow the instructions in the dialog.

6.8 Adopting a Configuration from a File

⚠ QUALIFIED PERSON

To configure the inverter, you can adopt the configuration from a file. To be able to do this, you must first save the configuration of another inverter in a file (see Section 6.7 "Saving the Configuration in a File", page 34). When saving, only the device parameters will be adopted, not any passwords.

Requirements:

☐ The SMA Grid Guard code must be available (see "Application for SMA Grid Guard Code" at www.SMA-Solar.com).

☐ Changes to grid-relevant parameters must be approved by the responsible grid operator.

Procedure:

1. Activate the user interface (see Section 5.1, page 20).
2. Log into the user interface as an **Installer**.
3. Select the menu **System Configuration**.
4. Select [**Settings**].
5. In the context menu, select [**Adopting the configuration from a file**].
6. Follow the instructions in the dialog.

6.9 Switching the Dynamic Power Display Off

As standard, the inverter signals its power dynamically via the pulsing of the green LED. When doing so, the LED flashes on and off uniformly or is permanently lit at full power. The various gradations are related here to the set active power limit of the inverter. If this display is not desired, switch this function off in accordance with the following procedure. Once this has been done, the green LED is lit permanently to signalize feed-in operation.

The basic procedure for changing operating parameters is explained in another section (see Section 6.1 "Changing Operating Parameters", page 30).

Procedure:

- In the parameter group **Device > Operation**, select the parameter **Dynamic power display via green LED** and set this to **Off**.

6.10 Switching WLAN On and Off

The inverter is equipped with an activated WLAN interface as standard. If you do not want to use WLAN, you can switch the WLAN function off and switch it on again whenever needed. In doing so, you can switch the WLAN direct connection and the WLAN connection in the local network on independently of each other.

Switching on the WLAN function only possible via Ethernet connection

If you switch off both the WLAN function for the direct connection and for the connection in the local network, access to the inverter user interface and therefore reactivation of the WLAN interface is only possible via an Ethernet connection.

The basic procedure for changing operating parameters is explained in another section (see Section 6.1 "Changing Operating Parameters", page 30).

Switching WLAN Off

If you would like to switch the WLAN function off completely, you must switch off both the direct connection and the connection in the local network.

Procedure:

- To switch off the direct connection in the parameter group **PV system communication > WLAN**, select the parameter **Soft-access-point is turned on** and set this to **No**.
- To switch off the connection in the local network in the parameter group **PV system communication > WLAN**, select the parameter **WLAN is turned on** and set this to **No**.

Switching WLAN On

If you have switched the WLAN function for direct connection or for connection in the local network off, you can switch the WLAN function back on in accordance with the following procedure.

Requirement:

☐ If the WLAN function was previously switched off completely, the inverter must be connected to a computer or router via Ethernet.

Procedure:

- To switch on the WLAN direct connection, in the parameter group **PV system communication > WLAN**, select the parameter **Soft-access-point is turned on** and set this to **Yes**.
- To switch on the WLAN connection in the local network, in the parameter group **System communication > WLAN**, select the parameter **WLAN is turned on** and set this to **Yes**.

7 Cleaning the Inverter

NOTICE

Damage to the display or the type label due to the use of cleaning agents

- If the inverter is dirty, clean the enclosure, the enclosure lid of the Connection Unit, the enclosure lid of the Power Unit, the type label, the display and the LEDs with a damp cloth and clear water only.

8 Troubleshooting

8.1 Forgotten Password

If you have forgotten the password for the inverter, you can unlock the inverter with a Personal Unlocking Key (PUK). For each inverter, there is one PUK for each user group (**User** and **Installer**). Useful hint: With PV systems in Sunny Portal, you can also assign a new password via Sunny Portal for the user group **Installer**. The password for the user group **Installer** is the same as the system password in Sunny Portal.

Procedure:

1. Request PUK (application form available at www.SMA-Solar.com).
2. Activate the user interface (see Section 5.1, page 20).
3. Enter the PUK instead of the password into the field **Password**.
4. Call up the menu **Device Parameters**.
5. Select [**Edit parameters**].
6. In the parameter group **User Rights > Access Control** change the password of the desired user group.
7. Select [**Save all**] to save the changes.

i PV Systems in Sunny Portal

The password for the user group **Installer** is also the system password for the PV system in Sunny Portal. Changing the password of the user group **Installer** can lead to the inverter no longer being able to be reached by Sunny Portal.

- Assign the changed password of the user group **Installer** as the new system password in Sunny Portal (see the Sunny Portal user manual at www.SMA-Solar.com).

8.2 Event Messages

Event number	Message, cause and corrective measures
101 to 105	⚠ QUALIFIED PERSON **Grid fault** The grid voltage or grid impedance at the connection point of the inverter is too high. The inverter has disconnected from the utility grid. **Corrective measures:** • Ensure that the correct country data set has been configured (see Section 6.2, page 31). • Check whether the grid voltage at the connection point of the inverter is permanently in the permissible range. If the grid voltage is outside the permissible range due to local grid conditions, contact the grid operator. The grid operator must agree with an adjustment of the voltage at the feed-in point or with a change of the monitored operating limits. If the grid voltage is permanently within the permissible range and this message is still displayed, contact the Service (see Section 11 "Contact", page 67).
202 to 206	⚠ QUALIFIED PERSON **Grid fault** The utility grid has been disconnected, the AC cable is damaged or the grid voltage at the connection point of the inverter is too low. The inverter has disconnected from the utility grid. **Corrective measures:** • Make sure that the circuit breaker is switched on. • Ensure that the AC cable is not damaged and that it is connected correctly. • Ensure that the country data set has been configured correctly. • Check whether the grid voltage at the connection point of the inverter is permanently in the permissible range. If the grid voltage is outside the permissible range due to local grid conditions, contact the grid operator. The grid operator must agree with an adjustment of the voltage at the feed-in point or with a change of the monitored operating limits. If the grid voltage is permanently within the permissible range and this message is still displayed, contact the Service (see Section 11 "Contact", page 67).

Event number	Message, cause and corrective measures
401 to 404	⚠ QUALIFIED PERSON **Grid fault** The inverter has disconnected from the utility grid. A stand-alone grid or a very large change in the power frequency was detected. **Corrective measures:** • Check the grid connection for significant short-term frequency fluctuations.
501	⚠ QUALIFIED PERSON **Grid fault** The power frequency is not within the permissible range. The inverter has disconnected from the utility grid. **Corrective measures:** • If possible, check the power frequency and observe how often fluctuations occur. If fluctuations occur frequently and this message is displayed often, contact the grid operator and request approval to change the operating parameters of the inverter. If the grid operator gives his approval, discuss any changes to the operating parameters with Service (see Section 11 "Contact", page 67).
601	⚠ QUALIFIED PERSON **Grid fault** The inverter has detected an excessively high proportion of direct current in the grid current. **Corrective measures:** • Check the grid connection for direct current. • If this message is displayed frequently, contact the grid operator and check whether the monitoring threshold on the inverter can be raised.

Event number	Message, cause and corrective measures
701	⚠ QUALIFIED PERSON **Frq. not permitted > Check parameter** The power frequency is not within the permissible range. The inverter has disconnected from the utility grid. **Corrective measures:** • If possible, check the power frequency and observe how often fluctuations occur. If fluctuations occur frequently and this message is displayed often, contact the grid operator and request approval to change the operating parameters of the inverter. If the grid operator gives his approval, discuss any changes to the operating parameters with Service (see Section 11 "Contact", page 67).
1001	⚠ QUALIFIED PERSON **L/N swapped > Check connection** The connection of L and N is swapped. **Corrective measures:** • Ensure that L and N are correctly connected (see installation manual).
1302	⚠ QUALIFIED PERSON **Waiting for grid voltage > Installation failure grid connection > Check grid and fuses** L or N not connected. **Corrective measures:** • Ensure that L and N are connected (see installation manual). • Ensure that the AC conductors are not damaged and correctly connected (see installation manual). • Make sure that the circuit breaker is switched on.
1501	⚠ QUALIFIED PERSON **Reconnection fault grid** The changed country data set or the value of a parameter you have set does not correspond to the local requirements. The inverter cannot connect to the utility grid. **Corrective measures:** • Ensure that the country data set has been configured correctly. To do this, select the parameter **Set country standard** and check the value.

Event number	Message, cause and corrective measures
3301 to 3303	⚠ QUALIFIED PERSON **Unstable operation** There is not enough power at the DC input of the inverter for stable operation. The inverter cannot connect to the utility grid. **Corrective measures:** • Ensure that the PV array is designed correctly. • Ensure that the PV array is not covered by snow or otherwise shaded. • Ensure that the PV array is free of errors.
3401 to 3407	⚠ QUALIFIED PERSON **DC overvoltage > Disconnect generator** Overvoltage at the DC input. This can destroy the inverter. This message is signalized additionally by rapid flashing of the LEDs. **Corrective measures:** • Disconnect the inverter from voltage sources **immediately** (see installation manual). • Check whether the DC voltage is below the maximum input voltage of the inverter. If the DC voltage is below the maximum input voltage of the inverter, reconnect the connecting terminal plate with the connected DC conductors to the inverter. • If the DC voltage exceeds the maximum input voltage of the inverter, ensure that the PV array has been correctly rated or contact the installer of the PV array. • If this message is repeated frequently, contact the Service (see Section 11 "Contact", page 67).
3501	⚠ QUALIFIED PERSON **Insulation failure > Check generator** The inverter has detected a ground fault in the PV array. **Corrective measures:** • Check the PV system for ground faults (see Section 8.4, page 59).

Event number	Message, cause and corrective measures
3601	⚠ QUALIFIED PERSON **High discharge curr. > Check generator** The leakage current of the inverter and the PV array is too high. There is a ground fault, a residual current or a malfunction. The inverter interrupts feed-in operation immediately after exceeding a threshold. When the fault is eliminated, the inverter automatically reconnects to the utility grid. **Corrective measures:** • Check the PV system for ground faults (see Section 8.4, page 59).
3701	⚠ QUALIFIED PERSON **Resid.curr.too.high > Check generator** The inverter has detected a residual current due to temporary grounding of the PV array. **Corrective measures:** • Check the PV system for ground faults (see Section 8.4, page 59).
3801	⚠ QUALIFIED PERSON **DC overcurrent > Check generator** Overcurrent at the DC input. The inverter briefly interrupts feed-in operation. **Corrective measures:** • If this message is displayed frequently, ensure that the PV array has been correctly rated and wired.
3901 to 3902	⚠ QUALIFIED PERSON **Waiting for DC start conditions > Start cond. not met** The feed-in conditions for the utility grid are not yet fulfilled. **Corrective measures:** • Ensure that the PV array is not covered by snow or otherwise shaded. • Wait for higher irradiation. • If this message is displayed frequently in the morning, increase the voltage limit for starting grid feed-in. Change the parameter **Critical voltage to start feed-in**. • If this message is displayed frequently with medium irradiation, ensure that the PV array is correctly rated.

Event number	Message, cause and corrective measures
4301	⚠ QUALIFIED PERSON **Electric arc detected > Check DC generator** The inverter has detected an electric arc. The inverter interrupts grid feed-in and cannot connect to the utility grid. **Corrective measures:** • Resetting the operation inhibition after detection of an arc fault (see Section 8.5, page 62).
6512	**Minimum operating temperature not reached** The inverter will only recommence grid feed-in once the temperature has reached at least −25°C.
6701 to 6702	⚠ QUALIFIED PERSON **Communication disturbed** Error in the communication processor, the inverter continues feeding in, however. The cause must be determined by the Service. **Corrective measures:** • If this message is displayed frequently, contact the Service (see Section 11 "Contact", page 67).
6803	⚠ QUALIFIED PERSON **Self-diagnosis > Input A defective** The cause must be determined by the Service. **Corrective measures:** • Contact the Service (see Section 11 "Contact", page 67).
6903	⚠ QUALIFIED PERSON **Self-diagnosis > Input B defective** The cause must be determined by the Service. **Corrective measures:** • Contact the Service (see Section 11 "Contact", page 67).
7106	**Update file defect.** The update file is defective. The update failed. The inverter continues feeding power into the grid.
7110	**No update file found** No new update file was found on the SD memory card. The update failed. The inverter continues feeding power into the grid.
7112	**Update file successfully copied**
7113	**The memory card is full or write-protected**

Event number	Message, cause and corrective measures
7303	⚠ QUALIFIED PERSON **Update main CPU failed** The cause must be determined by the Service. **Corrective measures:** • Contact the Service (see Section 11 "Contact", page 67).
7324	⚠ QUALIFIED PERSON **Wait for update conditions** The testing of the update conditions was not successful. The firmware update package is not suitable for this inverter. **Corrective measures:** • Retry update. • Ensure that the selected update file is suitable for this inverter. • If this message is displayed again, contact the Service (see Section 11 "Contact", page 67).
7331	**Update transport started** Update file is being copied.
7332	**Update transport successful** Update file was copied successfully to the inverter's internal memory.
7333	⚠ QUALIFIED PERSON **Update transport failed** Update file could not be copied to the inverter's internal memory. In the event of connection with the inverter via WLAN, a poor connection quality can be the cause. **Corrective measures:** • Retry update. • For WLAN connection, improve the WLAN connection quality (e.g. via SMA Antenna Extension Kit) or establish connection with the inverter via Ethernet. • If this message is displayed again, contact the Service (see Section 11 "Contact", page 67).
7340	**Update communication failed**

Event number	Message, cause and corrective measures
7347	⚠ QUALIFIED PERSON **Incompatible file** The configuration file is not suitable for this inverter. **Corrective measures:** • Ensure that the selected configuration file is suitable for this inverter. • Retry import.
7348	⚠ QUALIFIED PERSON **Incorrect file format** The configuration file is not of the required format or is damaged. **Corrective measures:** • Ensure that the selected configuration file is of the required format and is not damaged. • Retry import.
7350	**Transfer of a configuration file has started** The configuration file is being transferred.
7351	**Update WLAN** The inverter is updating the WLAN module.
7352	⚠ QUALIFIED PERSON **Update of WLAN not successful** The update of the WLAN module failed. **Corrective measures:** • Retry update. • If this message is displayed again, contact the Service (see Section 11 "Contact", page 67).
7353	**Update time zone database** The inverter is updating the time zone database.
7354	⚠ QUALIFIED PERSON **Update of time zone database not successful** The update of the time zone database failed. **Corrective measures:** • Retry update. • If this message is displayed again, contact the Service (see Section 11 "Contact", page 67).

Event number	Message, cause and corrective measures
7355	**Update WebUI** The inverter is updating the inverter user interface.
7356	⚠ QUALIFIED PERSON **Update of the WebUI not successful** The update of the inverter user interface failed. **Corrective measures:** • Retry update. • If this message is displayed again, contact the Service (see Section 11 "Contact", page 67).
7619	⚠ QUALIFIED PERSON **Communication fault with meter unit > Check communication to meter** The inverter is not receiving any data from the energy meter. **Corrective measures:** • Ensure that the energy meter is correctly integrated into the same network as the inverter (see energy meter manual). • For WLAN connection, improve the WLAN connection quality (e.g. via SMA Antenna Extension Kit) or connect the inverter with the DHCP server (router) via Ethernet.
8003	⚠ QUALIFIED PERSON **Active power limited derating** The inverter has reduced its power output for more than ten minutes due to excessive temperature. **Corrective measures:** • Clean the cooling fins on the rear of the enclosure and the air ducts on the top using a soft brush. • Ensure that the inverter has sufficient ventilation. • Ensure that the ambient temperature +45°C (113°F) has not been exceeded. • Ensure that the inverter is not exposed to direct solar irradiation.

Event number	Message, cause and corrective measures
8206	⚠ QUALIFIED PERSON **Electr. arc detected > Please confirm by tapping** The inverter has detected an electric arc and was recommissioned after a disconnection. By tapping, you are confirming that you have repaired any possible damage to PV modules, DC conductors or plugs in the PV system. **Corrective measures:** • Tap on the enclosure lid of the Connection Unit within ten seconds of the message appearing in order to recommission the inverter.
8503	⚠ QUALIFIED PERSON **Self-diagnosis > Input C defective** The cause must be determined by the Service. **Corrective measures:** • Contact the Service (see Section 11 "Contact", page 67).
8708	⚠ QUALIFIED PERSON **Timeout in communication for active power limitation** Communication to the system control absent. Depending on the fall-back setting, either the last received values will be retained or the active power will be limited to the set percentage value of the inverter nominal power. **Corrective measures:** • Ensure that the connection to the system manager (e.g. Sunny Home Manager) is intact and that no cables are damaged or that no plugs have been pulled.
8801 to 8803	**No display** No information can be shown on the display.
9002	⚠ QUALIFIED PERSON **SMA Grid Guard code invalid** The SMA Grid Guard code entered is incorrect. The operating parameters are still protected and cannot be changed. **Corrective measures:** • Enter the correct SMA Grid Guard code.
9003	**Grid parameter locked** Changes to the grid parameters are now blocked. In order to be able to make changes to the grid parameters, from now on you must log in using the SMA Grid Guard code.

Event number	Message, cause and corrective measures
9005	⚠ QUALIFIED PERSON **Changing of grid parameters not possible > Ensure DC supply** This error can have the following causes: • The parameters to be changed are protected. • The DC voltage at the DC input is not sufficient to run the main CPU. **Corrective measures:** • Enter the SMA Grid Guard code. • Ensure that at least the DC start voltage is available (green LED is flashing, pulsing or glowing).
9202	⚠ QUALIFIED PERSON **SPS AC overvoltage** An AC source has been connected to the socket connection for secure power supply operation. **Corrective measures:** • Check the connection at the **SPS** slots, and make any necessary corrections.
9203	⚠ QUALIFIED PERSON **Short circuit in the SPS power outlet** The maximum initial load has been overshot or the appliance's initial current is above the maximum permissible load current of the connection for secure power supply operation for more than 5 s. **Corrective measures:** • Reduce the load at the connection for secure power supply operation. • If necessary, select an appliance with a lower initial current.
10110	**Time synchronization failed: [x]** No time information could be called up from the set NTP server. **Corrective measures:** • Ensure that the NTP server was configured correctly. • Ensure that the inverter is integrated into a local network with Internet connection.

Event number	Message, cause and corrective measures
10248 to 10249	**Load reduced through device reduction or increase of query interval** The network is busy. Data exchange between the devices is not at an optimum and is greatly delayed. **Corrective measures:** • Reduce the number of devices in the network. • If necessary, increase the data query intervals. • If necessary, reduce the number of devices in the network.
10250	⚠ QUALIFIED PERSON **[Interface]: package error rate [ok / high]** The package error rate has changed. If the package error rate is high, the network is overloaded or the connection to the network switch or DHCP server (router) is disturbed. **Corrective measures if the package error rate is high:** • Ensure that with an Ethernet connection, the network cable and the network connector are not damaged and that the network connectors are correctly plugged. • If necessary, increase the data query intervals. • If necessary, reduce the number of devices in the network.
10251	**[Interface]: communication status goes to [OK / Warning / Error / Not connected]** The communication status to the network switch or DHCP server (router) has changed. An additional error message may be displayed.
10252	⚠ QUALIFIED PERSON **[Interface]: communication disrupted** There is no valid signal on the network line. **Corrective measures:** • Ensure that with an Ethernet connection, the network cable and the network connector are not damaged and that the network connectors are correctly plugged. • Ensure that the DHCP server (router) and any network switches are signalizing correct operation.

Event number	Message, cause and corrective measures
10253	⚠ QUALIFIED PERSON **[Interface]: connection speed goes to [100 Mbit / 10 Mbit]** The data transfer rate has changed. The cause for the status [10 Mbit] can be a defective plug, a defective cable or the pulling or plugging of the network connector. **Corrective measures if the status is [10 Mbit]:** • Ensure that with an Ethernet connection, the network cable and the network connector are not damaged and that the network connectors are correctly plugged. • Ensure that the DHCP server (router) and any network switches are signalizing correct operation.
10254	⚠ QUALIFIED PERSON **[Interface]: duplex mode goes to [Full / Half]** The duplex mode (data transfer mode) has changed. The cause for the status [Half] can be a defective plug, a defective cable or the pulling or plugging of the network connector. **Corrective measures if the status is [Half]:** • Ensure that with an Ethernet connection, the network cable and the network connector are not damaged and that the network connectors are correctly plugged. • Ensure that the DHCP server (router) and any network switches are signalizing correct operation.
10255	**[Interface]: Network load OK** The network load has returned to a normal range after being busy.
10282	**[User group]-Login via [protocol] locked** After several incorrect login attempts, login has been blocked for a limited time. In this case, the User login will be blocked for 15 minutes, the Grid Guard login for 12 hours. **Corrective measures:** • Wait until the given time has expired and then retry login.
10283	**WLAN module faulty** The WLAN module integrated in the inverter is defective. **Corrective measures:** • Contact the Service (see Section 11 "Contact", page 67).

Event number	Message, cause and corrective measures
10284	⚠ QUALIFIED PERSON **No WLAN connection possible** The inverter does not currently have a WLAN connection to the selected network. **Corrective measures:** • Ensure that the SSID, the WLAN password and the encryption method have been entered correctly. The encryption method is specified by your WLAN router or WLAN Access Point and can be changed there. • Ensure that the WLAN router or WLAN Access Point is in range and is signalizing correct operation. • If this message is displayed often, improve the WLAN connection by using a WLAN repeater (e.g. SMA Antenna Extension Kit).
10285	**WLAN connection established** Connection to the selected WLAN network has been established.
10286	⚠ QUALIFIED PERSON **WLAN connection lost** The inverter has lost WLAN connection to the selected network. **Corrective measures:** • Ensure that the WLAN router or WLAN Access Point is still active. • Ensure that the WLAN router or WLAN Access Point is in range and is signalizing correct operation. • If this message is displayed often, improve the WLAN connection by using a WLAN repeater (e.g. SMA Antenna Extension Kit).
10339	**Webconnect enabled** The inverter can communicate with Sunny Portal without an additional SMA communications product (e.g. Cluster Controller).
10340	**Webconnect disabled** The Webconnect function has been switched off. This means that the inverter can not communicate with Sunny Portal without an additional SMA communications product (e.g. Cluster Controller). • If the inverter is to communicate with Sunny Portal without an additional SMA communication product, switch the Webconnect function on.

Event number	Message, cause and corrective measures
10341	**Webconnect error: no connection** It is likely that there is an error in the network settings. **Corrective measures:** • Check the network components (DLAN, WLAN Access Point etc.). • Ensure that the following ports are not blocked: – Registrar: ied.sma.de:9523 – Proxy: ied.sma.de:9523 – Stun: stun.sma.de:3478 – Domain: ied.sma.de (for SIP URI)
10343	**Webconnect error: Default gateway not configured** It is likely that there is an error in the network settings. **Corrective measures:** • Check the network components (DLAN, WLAN Access Point etc.). • Ensure that the following ports are not blocked: – Registrar: ied.sma.de:9523 – Proxy: ied.sma.de:9523 – Stun: stun.sma.de:3478 – Domain: ied.sma.de (for SIP URI)
10344	**Webconnect error: DNS server not configured** It is likely that there is an error in the network settings. **Corrective measures:** • Check the network components (DLAN, WLAN Access Point etc.). • Ensure that the following ports are not blocked: – Registrar: ied.sma.de:9523 – Proxy: ied.sma.de:9523 – Stun: stun.sma.de:3478 – Domain: ied.sma.de (for SIP URI)
10345	**No reply to DNS request** It is likely that there is an error in the network settings. **Corrective measures:** • Check the network components (DLAN, WLAN Access Point etc.). • Ensure that the following ports are not blocked: – Registrar: ied.sma.de:9523 – Proxy: ied.sma.de:9523 – Stun: stun.sma.de:3478 – Domain: ied.sma.de (for SIP URI)

Event number	Message, cause and corrective measures
10346	**SIP proxy DNS resolution failed** It is likely that there is an error in the network settings. **Corrective measures:** • Check the network components (DLAN, WLAN Access Point etc.). • Ensure that the following ports are not blocked: – Registrar: ied.sma.de:9523 – Proxy: ied.sma.de:9523 – Stun: stun.sma.de:3478 – Domain: ied.sma.de (for SIP URI)
10347	**Stun server DNS resolution failed** It is likely that there is an error in the network settings. **Corrective measures:** • Check the network components (DLAN, WLAN Access Point etc.). • Ensure that the following ports are not blocked: – Registrar: ied.sma.de:9523 – Proxy: ied.sma.de:9523 – Stun: stun.sma.de:3478 – Domain: ied.sma.de (for SIP URI)
10348	**Webconnect error: No reply to request to STUN server** It is likely that there is an error in the network settings. **Corrective measures:** • Check the network components (DLAN, WLAN Access Point etc.). • Ensure that the following ports are not blocked: – Registrar: ied.sma.de:9523 – Proxy: ied.sma.de:9523 – Stun: stun.sma.de:3478 – Domain: ied.sma.de (for SIP URI)

Event number	Message, cause and corrective measures
10349	**Webconnect error: No reply to SIP option packs** It is likely that there is an error in the network settings or a Sunny Portal maintenance message is present. **Corrective measures:** • If a Sunny Portal maintenance message is present, wait until the maintenance has been completed. • Check the network components (DLAN, WLAN Access Point etc.). • Ensure that the following ports are not blocked: – Registrar: ied.sma.de:9523 – Proxy: ied.sma.de:9523 – Stun: stun.sma.de:3478 – Domain: ied.sma.de (for SIP URI)
10350	**Webconnect error: Registration rejected by SIP registrar** It is likely that there is an error in the network settings. **Corrective measures:** • Check the network components (DLAN, WLAN Access Point etc.). • Ensure that the following ports are not blocked: – Registrar: ied.sma.de:9523 – Proxy: ied.sma.de:9523 – Stun: stun.sma.de:3478 – Domain: ied.sma.de (for SIP URI)
10351	**Unknown SIP registry** It is likely that there is an error in the network settings. **Corrective measures:** • Check the network components (DLAN, WLAN Access Point etc.). • Ensure that the following ports are not blocked: – Registrar: ied.sma.de:9523 – Proxy: ied.sma.de:9523 – Stun: stun.sma.de:3478 – Domain: ied.sma.de (for SIP URI)

Event number	Message, cause and corrective measures
10352	**Webconnect error: Faulty communication** It is likely that there is an error in the network settings or a Sunny Portal maintenance message is present. **Corrective measures:** • If a Sunny Portal maintenance message is present, wait until the maintenance has been completed. • Check the network components (DLAN, WLAN Access Point etc.). • Ensure that the following ports are not blocked: – Registrar: ied.sma.de:9523 – Proxy: ied.sma.de:9523 – Stun: stun.sma.de:3478 – Domain: ied.sma.de (for SIP URI)
10353	**Webconnect error: registration of the SIP registry has not responded** It is likely that there is an error in the network settings or a Sunny Portal maintenance message is present. **Corrective measures:** • If a Sunny Portal maintenance message is present, wait until the maintenance has been completed. • Check the network components (DLAN, WLAN Access Point etc.). • Ensure that the following ports are not blocked: – Registrar: ied.sma.de:9523 – Proxy: ied.sma.de:9523 – Stun: stun.sma.de:3478 – Domain: ied.sma.de (for SIP URI)
27107	**Update file OK** The update file is suitable for this inverter and its components and is fully available for the next update step.
27108	**Memory card is being read** The storage medium is being read.
27109	**No new update on the memory card** A new update file was not found on the storage medium.
27301	**Update communication** The inverter is updating the communication component.
27302	**Update main CPU** The inverter is updating the inverter component.
27312	**Update completed** The inverter has successfully completed the update.

Event number	Message, cause and corrective measures
27331	**Update transport started** The inverter has successfully started the update.
27332	**Update transport successful** The update file has been successfully transferred to the communication component.
29001	**Inst. code valid** The entered Grid Guard code is valid. Protected parameters have now been unlocked and you can adjust the parameters. The parameters will be automatically locked again after ten feed-in hours.
29004	**Grid parameters unchanged** Changing the grid parameters is not possible.

8.3 Cleaning the Fan (only with Sunny Boy 7.0-US / 7.7-US)

Procedure:

- Remove and clean the fan.
- Install the fan.

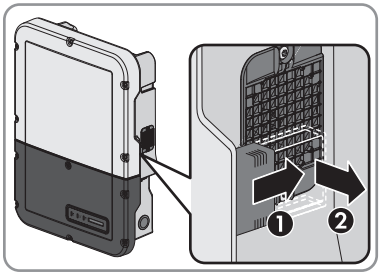
Removing and Cleaning the Fan

1. **⚠ DANGER**

   Danger to life due to high voltages

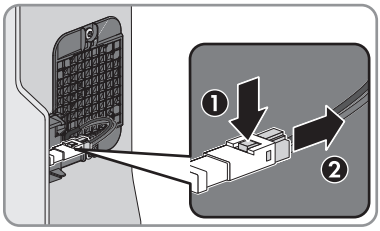
   - Disconnect the inverter from any voltage sources (see the inverter installation manual).

2. Remove the cover of the plug. To do this hold the ribbed surface at the top and button and push the cover as far as possible to the right.

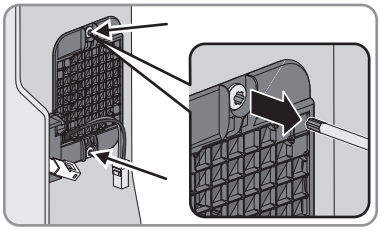


3. Remove the plug from the bracket.

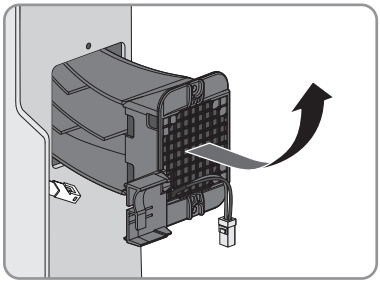
4. Unlock and remove the plug.



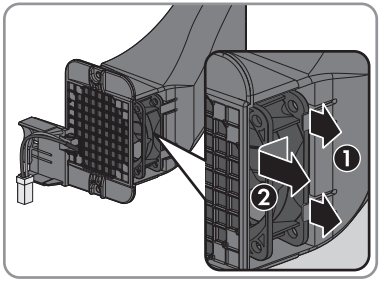
5. Unscrew the screws with a Torx screwdriver (TX 20).



6. Remove the fan guard from the enclosure opening.



7. Remove the fan from the fan guard. To do this, slightly raise the locking tabs and push the fan slightly forward. Remove the fan and the cable together with the plug from the fan guard.



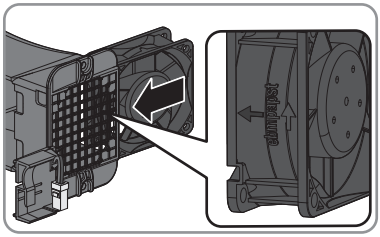
8. | *NOTICE* |
|---|

Damage to the fan due to compressed air

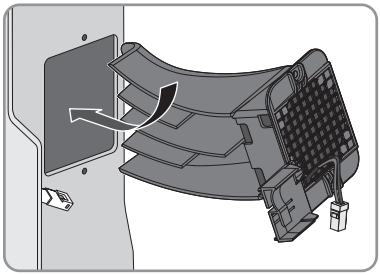
- Clean the fan only with a soft brush, a paint brush, or a damp cloth.

Installing the Fan

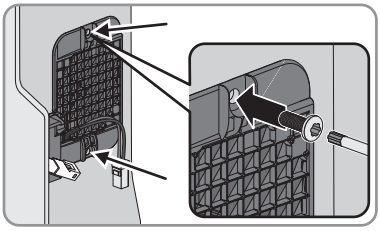
1. Lead the cable into the fan guard and hold the cable at the plug under tension.
2. Insert the fan into the fan guard until it locks into place under the locking tabs. To do this, one arrow must point backwards and one arrow must point upwards.



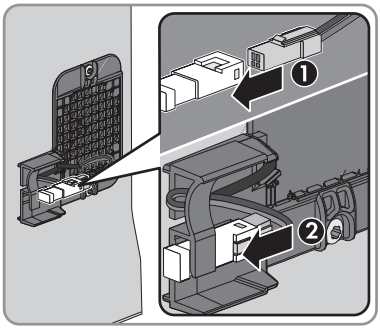
3. Insert the fan guard into the enclosure opening. To do this, the fan guide must point upwards.



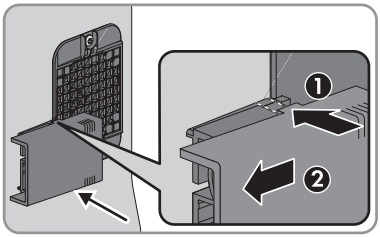
4. Tighten the screws with a Torx screwdriver (TX 20).



5. Insert the plug in the pin connector and clamp the plug into the bracket.



6. Reattach the cover of the plug. To do this, insert the locking tabs of the cover into the guide rails and push the cover to the left.



8.4 Checking the PV System for Ground Faults

⚠ QUALIFIED PERSON

If the inverter displays the event numbers **3501**, **3601** or **3701**, there could be a ground fault. The electrical insulation from the PV system to ground is defective or insufficient.

⚠ WARNING

Danger to life due to electric shock

In the event of a ground fault, high voltages can be present.

- Touch the cables of the PV array on the insulation only.
- Do not touch any parts of the substructure or frame of the PV array.
- Do not connect PV strings with ground faults to the inverter.

NOTICE

Destruction of the measuring device due to overvoltage

- Only use measuring devices with a DC input voltage range of 600 V or higher.

Procedure:

In order to check the PV system for ground faults, perform the following actions in the prescribed order. The exact procedure is described in the following sections.

- Check the PV system for ground faults by measuring the voltage.
- If the voltage measurement was not successful, check the PV system via insulation resistance measurement for ground faults.

Test by Measuring the Voltage

Proceed as follows to check each string in the PV system for ground faults.

Procedure:

1. **⚠ DANGER**

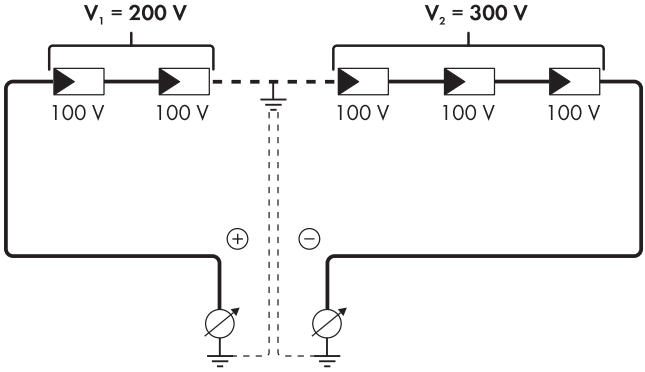
   Danger to life due to high voltages

   - Disconnect the inverter from any voltage sources (see the inverter installation manual).
2. Measure the voltages:
   - Measure the voltage between the positive terminal and the ground potential (PE).

- Measure the voltage between the negative terminal and the ground potential (PE).
- Measure the voltage between the positive and negative terminals.
  If the following results are present at the same time, there is a ground fault in the PV system:
  - ☑ All measured voltages are stable.
  - ☑ The sum of the two voltages to ground potential is approximately equal to the voltage between the positive and negative terminals.
- If a ground fault is present, determine the location of the ground fault via the ratio of the two measured voltages and eliminate the ground fault.

Example: Location of the ground fault

The example shows a ground fault between the second and third PV module.



3. If a definite ground fault cannot be measured and the message is still displayed, measure the insulation resistance.
4. Reconnect the strings without ground faults to the inverter and recommission the inverter (see inverter installation inverter).

Test by Measuring the Insulation Resistance

If the voltage measurement does not provide sufficient evidence of a ground fault, the insulation resistance measurement can provide more exact results.

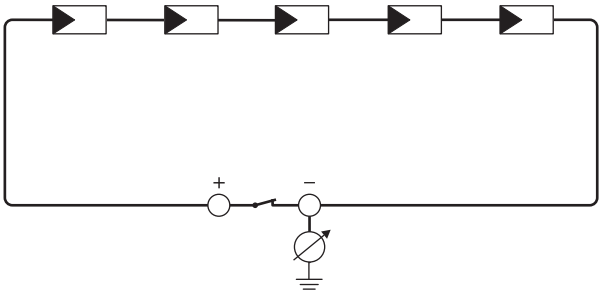


Figure 4: Schematic diagram of the measurement

Calculating the insulation resistance

The expected total resistance of the PV system or of an individual string can be calculated using the following formula:

$$\frac{1}{R_{total}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \ldots$$

The exact insulation resistance of a PV module can be obtained from the module manufacturer or the datasheet.

For the resistance of a PV module an average value can be assumed: for thin-film PV modules approximately 40 MOhm and for polycrystalline and monocrystalline PV modules approximately 50 MOhm per PV module (for further information on calculating the insulation resistance see the Technical Information "Insulation Resistance (Riso) of Non-Galvanically Isolated PV Systems" at www.SMA-Solar.com).

Required devices:

- ☐ Suitable device for safe disconnection and short-circuiting
- ☐ Measuring device for insulation resistance

Device required for safe disconnection and short-circuiting of the PV array

The insulation resistance can only be measured with a suitable device for safe disconnection and short-circuiting of the PV array. If no suitable device is available, the insulation measurement must not be carried out.

Procedure:

1. Calculate the expected insulation resistance per string.
2. **⚠ DANGER**

   Danger to life due to high voltages

   - Disconnect the inverter from any voltage sources (see the inverter installation manual).
3. Install the short circuit device.
4. Connect the measuring device for insulation resistance.
5. Short-circuit the first string.
6. Set the test voltage. The test voltage should be as close as possible to the maximum system voltage of the PV modules but must not exceed it (see datasheet of the PV modules).
7. Measure the insulation resistance.
8. Eliminate the short circuit.
9. Measure the remaining strings in the same manner.
   ☑ If the insulation resistance of a string deviates considerably from the theoretically calculated value, there is a ground fault present in that string.
10. Reconnect to the inverter only those strings from which the ground fault has been eliminated.
11. Reconnect all other strings to the inverter.
12. Recommission the inverter (see inverter installation manual).
13. If the inverter still displays an insulation error, contact the Service (see Section 11 "Contact", page 67). The PV modules might not be suitable for the inverter in the present quantity.

8.5 Resetting the Operation Inhibition after Detection of an Arc Fault

⚠ QUALIFIED PERSON

If the red LED is glowing and the event number **4301** is shown on the display and/or in the event list on the user interface of the inverter, the inverter has detected an electric arc and interrupts feed-in operation.

There are two options for resetting the operation inhibition:

- Reset the operation inhibition by tapping twice on the enclosure lid of the Connection Unit.
- Reset the operation inhibition by parameter setting.

Reset the operation inhibition by tapping twice on the enclosure lid of the Connection Unit

1. **⚠ DANGER**

   Danger to life due to electric shock

   - Disconnect the inverter from any voltage sources (see the inverter installation manual).
2. Ensure that the PV modules, the connected DC cables and the connecting terminal plate for the DC connection are not defective.

   Repair or replace defective PV modules, DC cables or connecting terminal plate for the DC connection.
3. Recommission the inverter (see inverter installation manual).
4. If the event with the event number **4301** appears in the display, immediately tap on the enclosure lid twice in quick succession. Here, the operation inhibition can only be reset if the event is showing in the display when you begin tapping.

☑ This effects resetting of the operation inhibition and the inverter will start feeding in again. At the same time, the blue LED can flash rapidly, indicating that there is an active WPS function. The WPS function deactivates automatically after a short period.

Reset the operation inhibition by parameter setting

1. **⚠ DANGER**

   Danger to life due to electric shock

   - Disconnect the inverter from any voltage sources (see the inverter installation manual).
2. Ensure that the PV modules, the connected DC cables and the connecting terminal plate for the DC connection are not defective.

   Repair or replace defective PV modules, DC cables or connecting terminal plate for the DC connection.
3. Recommission the inverter (see inverter installation manual).
4. Activate the user interface (see Section 5.1, page 20).
5. Log into the user interface as an **Installer** Logging Into the User Interface.
6. Reset the operation inhibition by setting one of the following parameters:

- Select the parameter **Reset operating data** and set to **Reset operation inhibition**.

  or

- Select the parameter **AFCI switched on** and set to **No** and then back to **Yes**.

☑ This effects resetting of the operation inhibition and the inverter will start feeding in again.

8.6 Updating the Firmware

⚠ QUALIFIED PERSON

If no automatic update is set in the communication product (e.g. Cluster Controller) or via the user interface of the inverter, you have two possibilities to update the inverter firmware:

- Updating firmware via the user interface of the inverter.
- Updating the firmware via USB flash drive.

Updating firmware via the user interface

Requirement:

☐ An update file with the desired inverter firmware must be available. The update file is, for example, available for download on the product page of the inverter at www.SMA-Solar.com.

Procedure:

1. Activate the user interface (see Section 5.1, page 20).
2. Log into the user interface Logging Into the User Interface.
3. Select the menu **System Configuration**.
4. Select [**Settings**].
5. In the context menu, select [**Updating the firmware**].
6. Follow the instructions in the dialog.

Updating the firmware via USB flash drive.

Requirement:

☐ A USB flash drive with maximum 32 GB and file system FAT32 must be available.

Procedure:

1. Create an "UPDATE" folder on the USB stick.
2. Save the update file with the desired firmware in the "UPDATE" folder on the USB flash drive. The update file is, for example, available for download on the product page of the inverter at www.SMA-Solar.com.
3. **⚠ DANGER**

   Danger to life due to high voltages

   - Disconnect the inverter from any voltage sources and open the enclosure lid of the Connection Unit (see the inverter installation manual).
4. Insert the USB flash drive in the USB port on the communication assembly.

5. Commission the inverter (see inverter installation manual).
   - ☑ During start-up phase of the inverter, the desired firmware is being installed. At the same time, the status of the update is shown in the display: **Update status: xxxxxxx**
   - ☑ Once the desired firmware has been installed in the inverter, the status **successful** is shown in the display.
   - ✖ The status **error occurred** is shown in the display?

     The firmware update was not successful.
     - Update the firmware again.
6. **⚠ DANGER**

   Danger to life due to high voltages
   - Disconnect the inverter from any voltage sources again and open the enclosure lid of the Connection Unit (see the inverter installation manual).
7. Pull the USB flash drive out of the USB port.
8. Commission the inverter (see inverter installation manual).

9 Accessories

You will find the accessories for your product in the following overview. If required, these can be ordered from SMA or your distributor.

Designation	Short designation	SMA order number
SMA Sensor Module	Multi-function interface for one SMA inverter as retrofit kit for capturing environmental data (e.g. irradiation, ambient temperature, cell temperature, wind speed or S0 meters).	MD.SEN-US-40
SMA Antenna Extension Kit	Accessory set for one SMA inverter for the optimization of the SMA inverter's WLAN radio range.	EXTANT-US-40

10 Compliance Information

FCC Compliance

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

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

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

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

The user is cautioned that changes or modifications not expressly approved by SMA Solar Technology America LLC could void the user's authority to operate this equipment.

IC Compliance

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

11 Contact

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

- Inverter device type
- Inverter serial number
- Inverter firmware version
- Special country-specific settings of the inverter (if applicable)
- Type and number of PV modules connected
- Mounting location and altitude of the inverter
- Inverter message
- Optional equipment, e.g. communication products
- If necessary, system name in the Sunny Portal
- If necessary, access data in the Sunny Portal
- Operating mode of the multifunction relay

United States/ Estados Unidos	SMA Solar Technology America LLC Rocklin, CA	Toll free for USA, Canada and Puerto Rico / Llamada gratuita en EE. UU., Canadá y Puerto Rico: +1 877-MY-SMATech (+1 877-697-6283) International / Internacional: +1 916 625-0870
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