



SUNNY BOY 1.5 / 2.0 / 2.5

Legal Provisions

The information contained in these documents is the property of SMA Solar Technology AG. No part of this document may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, be it electronic, mechanical, photographic, magnetic or otherwise, without the prior written permission of SMA Solar Technology AG. Internal reproduction used solely for the purpose of product evaluation or other proper use is allowed and does not require prior approval.

SMA Solar Technology AG makes no representations or warranties, express or implied, with respect to this documentation or any of the equipment and/or software it may describe, including (with no limitation) any implied warranties of utility, merchantability, or fitness for any particular purpose. All such representations or warranties are expressly disclaimed. Neither SMA Solar Technology AG nor its distributors or dealers shall be liable for any indirect, incidental, or consequential damages under any circumstances.

The exclusion of implied warranties may not apply in all cases under some statutes, and thus the above exclusion may not apply.

Specifications are subject to change without notice. Every attempt has been made to make this document complete, accurate and up-to-date. Readers are cautioned, however, that product improvements and field usage experience may cause SMA Solar Technology AG to make changes to these specifications without advance notice or per contract provisions. SMA Solar Technology AG shall not be responsible for any damages, including indirect, incidental or consequential damages, caused by reliance on the material presented, including, but not limited to, omissions, typographical errors, arithmetical errors or listing errors in the content material.

SMA Warranty

You can download the current warranty conditions from the Internet at www.SMA-Solar.com.

Software licenses

The licenses for the installed software modules (open source) can be found in the user interface of the product.

Trademarks

2

All trademarks are recognized, even if not explicitly identified as such. Missing designations do not mean that a product or brand is not a registered trademark.

SMA Solar Technology AG

Sonnenallee 1 34266 Niestetal Germany Tel. +49 561 9522-0 Fax +49 561 9522-100 www.SMA.de E-mail: info@SMA.de Status: Monday, December 2, 2024 Copyright © 2021 SMA Solar Technology AG. All rights reserved.

Table of Contents

1	Info	rmation	on this Document	6		
	1.1	Validity.		. 6		
	1.2	Target G	broup	. 6		
	1.3	Content	and Structure of this Document	. 6		
	1.4	Levels of Warning Messages Symbols in the Document				
	1.5	Symbols in the Document				
	1.6	Typographies in the document				
	1.7	Designations in the Document				
	1.8	8 Additional Information				
2	Safe	ety		9		
	2.1	Intendec	Use	. 9		
	2.2	IMPORT	ANT SAFETY INFORMATION	. 10		
3	Sco	pe of de	livery	14		
4	Proc	duct ove	rview	15		
	4.1		Description	. 15		
	4.2	Symbols on the Product				
	4.3	Symbols on the Product Interfaces and Functions				
	4.4	LED Signals				
	4.5	System (Overview	. 22		
		4.5.1	Circuitry Overview	. 23		
		4.5.2	Communication Overview			
5	Μοι	unting		25		
	5.1	1 Requirements for Mounting				
	5.2	Mounting the product 2				
6	Elec	trical Co	onnection	30		
	6.1	0.1 Overview of the Connection Area				
	6.2	AC Con	nection	. 30		
		6.2.1	Requirements for the AC Connection	. 30		
		6.2.2	Connecting the Inverter to the Utility Grid			
		6.2.3	Connecting Additional Grounding			
	6.3	Connecting the Network Cables				
	6.4					
		6.4.1 6.4.2	Requirements for the DC Connection			
		6.4.2 6.4.3	Assembling the DC Connectors Connecting the PV Array			
		0.4.0		. 40		

		6.4.4	Disassembling the DC Connectors	41
7	Comr	nissionir	ng	43
	7.1	Commissic	oning Procedure	43
	7.2	Commissic	ning the Inverter	44
	7.3	Selecting o	a configuration option	45
	7.4	Starting the	e Self-Test (for Italy and Dubai)	47
8	Oper	ation		48
	8.1	Establishin	g a connection to the user interface	48
		8.1.1	Establishing a Direct Connection via Ethernet	
		8.1.2	Establishing a direct connection via WLAN	
		8.1.3	Establishing a Connection via Ethernet in the local network	
	8.2	8.1.4	Establishing a Connection via WLAN in the Local Network and Out of the User Interface	51 52
	8.3		Design of the User Interface	
	8.4		e Installation Assistant	
	8.5	0	/PS Function	
	8.6		WLAN On and Off	
	8.7	0	the Dynamic Power Display Off	
	8.8	0	the Password	
	8.9		Operating Parameters	
	8.10	0 0	g the Country Data Set	
	8.11		g the Active Power Mode	
	8.12	-	g the Modbus Function	
	8.13		the Receipt of Control Signals (Only for Italy)	
	8.14	-	ng Grounding Conductor Monitoring	
	8.15		g the Energy Meter	
	8.16	0	IA ShadeFix	
	8.17	-	Configuration in a File	
	8.18	-	a Configuration from a File	
	8.19		Jpdate	
	0.17	8.19.1	Activating Automatic Firmware Update	
		8.19.2	Updating Firmware with Update File via the User Interface	
		8.19.3	Searching for and Installing New Firmware via the User Interface	
9	Disco	nnectinç	g the Inverter from Voltage Sources	68
10	Clean	ing the	Product	70
11	Troub	leshoot	ing	71
•••	11.1		Password	• •
		rorgonen	. 03311010	1

4

	11.2	Event messages	72
	11.3	Checking the PV System for Ground Faults	88
	11.4	Problems with streaming services	92
12	Deco	nmissioning the Inverter	93
13	Techn	ical Data	94
14	Spare Parts		
15	Contact		
16	EU Declaration of Conformity10		01

1 Information on this Document

1.1 Validity

- SB1.5-1VL-40 (Sunny Boy 1.5) from firmware version ≥ 3.11.00.R
- SB2.0-1VL-40 (Sunny Boy 2.0) from firmware version ≥ 3.11.00.R
- SB2.5-1VL-40 (Sunny Boy 2.5) from firmware version ≥ 3.11.00.R

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

1.3 Content and Structure of this Document

This document describes the mounting, installation, commissioning, configuration, operation, troubleshooting and decommissioning of the product as well as the operation of the product user interface.

You will find the latest version of this document and further information on the product in PDF format and as eManual at www.SMA-Solar.com. You can also call up the eManual via the user interface of the product.

Illustrations in this document are reduced to the essential information and may deviate from the real product.

1.4 Levels of Warning Messages

The following levels of warning messages may occur when handling the product.

A DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

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

NOTICE
Indicates a situation which, if not avoided, can result in property damage.

1.5 Symbols in the Document

Symbol	Explanation
i	Information that is important for a specific topic or goal, but is not safety-rele- vant
	Indicates a requirement for meeting a specific goal
I	Required result
	Example

A QUALIFIED PERSON Sections describing activities to be performed by qualified persons only

1.6 Typographies in the document

Typography	Use	Example
bold	 Messages Terminals Elements on a user interface Elements to be selected Elements to be entered 	 Connect the insulated conductors to the terminals X703:1 to X703:6. 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 [Enter].
#	 Placeholder for variable components (e.g., parameter names) 	Parameter WCtlHz.Hz#

1.7 Designations in the Document

Complete designation	Designation in this document
Sunny Boy	Inverter, product

1.8 Additional Information

For more information, please go to www.SMA-Solar.com.

Title and information content	Type of information
"PUBLIC CYBER SECURITY - Guidelines for a Secure PV System Communication"	Technical Information
"SMA GRID GUARD 10.0 - Grid Management Services via Inverter and System Controller"	Technical Information
"Efficiency and Derating" Efficiency and derating behavior of the SMA inverters	Technical Information
"Parameters and Measured Values" Device-specific overview of all parameters and measured values and their setting options Information about the SMA Modbus registers	Technical Information
"SMA and SunSpec Modbus® Interface" Information on the Modbus interface	Technical Information
"Modbus® parameters and measured values" Device-specific list of the Modbus register	Technical Information
"SMA SPEEDWIRE FIELDBUS"	Technical information

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.

The product must only be operated with PV modules of protection class II in accordance with IEC 61730, application class A. The PV modules must be compatible with this product.

The product is not equipped with an integrated transformer and therefore has no galvanic isolation. The product must not be operated with PV modules whose outputs are grounded. This can cause the product to be destroyed. The product may be operated with PV modules whose frame is grounded.

PV modules with a high capacity to ground must only be used if the coupling capacity of all PV modules does not exceed 900 nF (for information on how to determine the coupling capacity, see the Technical Information "Leading Leakage Currents" at www.SMA-Solar.com).

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

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

The products by SMA Solar Technology AG are not suitable for use in

- Medical devices, in particular products for supplying life-support systems and machines,
- Aircraft, the operation of aircraft, the supply of critical airport infrastructure and airport systems,
- Rail vehicles, the operation and supply of rail vehicles and their critical infrastructure.

The above list is not exhaustive. Contact us if you are unsure whether products by SMA Solar Technology AG are suitable for your application.

Use SMA products only in accordance with the information provided in the enclosed documentation and with the locally applicable laws, regulations, standards and directives. Any other application may cause personal injury or property damage.

The documentation must be strictly followed. Deviations from the described actions and the use of materials, tools, and aids other than those specified by SMA Solar Technology AG are expressly forbidden.

Alterations to the SMA products, e.g., changes or modifications, are only permitted with the express written permission of SMA Solar Technology AG. Unauthorized alterations as well as failure to observe the documentation will void guarantee and warranty claims and in most cases terminate the operating license. SMA Solar Technology AG 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 documentation supplied is an integral part of SMA products. Keep the documentation in a convenient, dry place for future reference and observe all instructions contained therein.

This document does not replace any regional, state, provincial, federal or national laws, regulations or standards that apply to the installation, electrical safety and use of the product. SMA Solar Technology AG assumes no responsibility for the compliance or non-compliance with such laws or codes in connection with the installation of the product.

The type label must remain permanently attached to the product.

2.2 IMPORTANT SAFETY INFORMATION

Keep the manual for future reference.

This section contains safety information that must be observed at all times when working.

The product has been designed and tested in accordance with international safety requirements. As with all electrical or electronical devices, some residual risks remain despite careful construction. 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.

\Lambda DANGER

Danger to life due to electric shock when live components or DC cables are touched

When exposed to light, the PV modules generate high DC voltage which is present in the DC cables. Touching live DC cables results in death or lethal injuries due to electric shock.

- Do not touch non-insulated parts or cables.
- Disconnect the product from voltage sources and ensure it cannot be reconnected before working on the device.
- Do not disconnect the DC connectors under load.
- Wear suitable personal protective equipment for all work on the product.

\Lambda DANGER

Danger to life due to electric shock when live components are touched on opening the product

High voltages are present in the live parts and cables inside the product during operation. Touching live parts and cables results in death or lethal injuries due to electric shock.

• Do not open the product.

Danger to life due to electric shock from touching an ungrounded PV module or array frame

Touching ungrounded PV modules or array frames results in death or lethal injuries due to electric shock.

• Connect and ground the frame of the PV modules, the array frame and the electrically conductive surfaces so that there is continuous conduction. Observe the applicable local regulations.

Danger to life due to electric shock when touching live system components in case of a ground fault

If a ground fault occurs, parts of the system may still be live. Touching live parts and cables results in death or lethal injuries due to electric shock.

- Disconnect the product from voltage sources and ensure it cannot be reconnected before working on the device.
- Only touch the cables of the PV modules on their insulation.
- 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.

A DANGER

Danger to life due to electric shock in case of overvoltages and if surge protection is missing

Overvoltages (e.g., in the event of a flash of lightning) can be further conducted into the building and to other connected devices in the same network via the network cables or other data cables if there is no surge protection. Touching live parts and cables results in death or lethal injuries due to electric shock.

- Ensure that all devices in the same network are integrated in the existing overvoltage protection.
- When laying the network cable outdoors, ensure that there is suitable surge protection at the network cable transition from the product outdoors to the network inside the building.
- The Ethernet interface of the product is classified as "TNV-1" and offers protection against overvoltages of up to 1.5 kV.

Danger to life due to fire and explosion

In rare cases, an explosive gas mixture can be generated inside the product under fault conditions. In this state, switching operations can cause a fire inside the product or explosion. Death or lethal injuries due to hot or flying debris can result.

- In the event of a fault, do not perform any direct actions on the product.
- Ensure that unauthorized persons have no access to the product.
- Do not operate the DC load-break switch on the inverter in case of an error.
- Disconnect the PV array from the inverter via an external disconnection device. If there is no disconnecting device present, wait until no more DC power is applied to the inverter.
- Disconnect the AC circuit breaker, or keep it disconnected in case it has already tripped, and secure it against reconnection.
- Only perform work on the product (e.g., troubleshooting, repair work) when wearing personal protective equipment for handling of hazardous substances (e.g., safety gloves, eye and face protection, respiratory protection).

Risk of injury due to toxic substances, gases and dusts

In rare cases, damages to electronic components can result in the formation of toxic substances, gases or dusts inside the product. Touching toxic substances and inhaling toxic gases and dusts can cause skin irritation, burns or poisoning, trouble breathing and nausea.

- Only perform work on the product (e.g., troubleshooting, repair work) when wearing personal protective equipment for handling of hazardous substances (e.g., safety gloves, eye and face protection, respiratory protection).
- Ensure that unauthorized persons have no access to the product.

WARNING

Danger to life due to electric shock from destruction of the measuring device due to overvoltage

Overvoltage can damage a measuring device and result in voltage being present in the enclosure of the measuring device. Touching the live enclosure of the measuring device results in death or lethal injuries due to electric shock.

• Only use measuring devices with a DC input voltage range of 1000 V or higher.

Risk of burns due to hot enclosure parts

Some parts of the enclosure can get hot during operation. Touching hot enclosure parts can result in burn injuries.

• During operation, do not touch any parts other than the enclosure lid of the inverter.

Risk of injury due to weight of product

Injuries may result if the product is lifted incorrectly or dropped while being transported or mounted.

- Transport and lift the product carefully. Take the weight of the product into account.
- Wear suitable personal protective equipment for all work on the product.

NOTICE

High costs due to inappropriate Internet tariff

Depending on use, the data volume of the product transferred via the Internet may vary in size. The data volume depends, for example, on the number of devices in the system and the frequency of device updates. High costs for the Internet connection can be the result.

• SMA Solar Technology AG recommends using an Internet flat rate.

NOTICE

Damage to the product due to cleaning agents

The use of cleaning agents may cause damage to the product and its components.

• Clean the product and all its components only with a cloth moistened with clear water.

i Communication disturbances in the local network

The IP address range 192.168.12.0 to 192.168.12.255 is occupied for communication amongst SMA products and for direct access to SMA products.

Communication problems might occur if this IP address range is used in the local network.

• Do not use the IP address range 192.168.12.0 to 192.168.12.255 in the local network.

i Change to the names and units of grid parameters to comply with the gridconnection requirements in accordance with Regulation (EU) 2016/631 (valid from April 27, 2019)

To comply with the EU grid-connection requirements (valid from April 27, 2019) the names and units of grid parameters were changed. This change is valid from firmware version $\geq 3.00.00$.R if a country data set for fulfilling the EU grid-connection requirements (valid from 2019-04-27) is set. Names and units of grid parameters for inverters with firmware version $\leq 2.99.99$.R are not affected by this change and remain valid. This also applies from firmware version $\geq 3.00.00$.R if a country data set that is valid for countries outside the EU is set.

i A country data set must be set for feed-in operation

From firmware version 3.11.00.R, the activation conditions for feed-in operation were changed.

To ensure the inverter begins feed-in operation during initial commissioning, a country data set must be set (for instance via the installation assistant on the user interface of the product, or via a communication product).

If no country data set is set, then feed-in operation will be stopped. This state is signaled by the green and red LEDs flashing simultaneously.

The inverter will automatically start feed-in operation only after the inverter configuration is completed.

i The country data set must be set correctly.

If you select a country data set which is not valid for your country and purpose, it can cause a disturbance in the PV system and lead to problems with the grid operator. When selecting the country data set, you must always observe the locally applicable standards and directives as well as the properties of the PV system (e.g. PV system size, grid-connection point).

• If you are not sure which standards and directives are valid for your country or purpose, contact the grid operator.

3 Scope of delivery

Check the scope of delivery for completeness and any externally visible damage. Contact your distributor if the scope of delivery is incomplete or damaged.

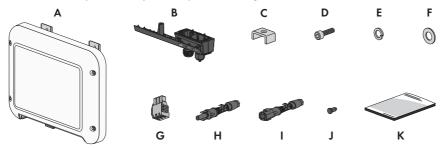


Figure 1: Components included in the scope of delivery

Position	Quantity	Designation	
А	1	Inverter	
В	1	Connection cap	
С	1	Clamping bracket	
D	1	Cylindrical screw M5 x 16	
E	1	Spring lock washer	
F	1	Washer M5	
G	1	Terminal block for the AC connection	
Н	1	Positive DC connector	
	1	Negative DC connector	
J	2	Sealing plug	
К	1	 Quick reference guide with password label on the rear side The label contains the following information: PIC (Product Identification Code) identification key for registering the system in Sunny Portal RID (Registration Identifier) registration ID for registering the system in Sunny Portal WLAN password WPA2-PSK (WiFi Protected Access 2 - Preshared Key) for direct connection to the inverter via WI 	

4 Product overview

4.1 Product Description

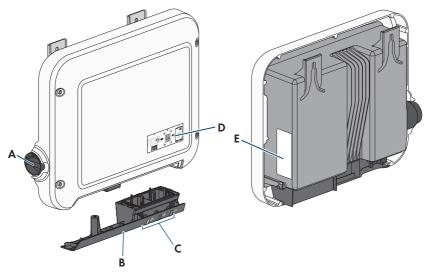


Figure 2: Design of the product

Position	Designation	
А	DC load-break switch	
В	Connection cap	
	Connection area with cable glands for connection to the utility grid and the local network	
С	LEDs	
	The LEDs indicate the operating state of the product.	

Position	Designation
D	Label with QR Code for scanning via the SMA 360° App and easy con- nection to the inverter's user interface via WLAN
Ε	 Type label The type label clearly identifies the product. 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. or S/N) Date of manufacture Identification key (PIC) for registration in Sunny Portal Registration ID (RID) for registration in Sunny Portal Wi-Fi password (WPA2-PSK) for the direct connection to the user interface of the product via Wi-Fi Device-specific characteristics

4.2 Symbols on the Product

Symbol	Explanation
\land	Beware of a danger zone This symbol indicates that the product must be additionally grounded if addi- tional grounding or equipotential bonding is required at the installation site.
	Beware of electrical voltage The product operates at high voltages.
	Beware of hot surface The product can get hot during operation.
5 min	Danger to life due to high voltages in the inverter; observe a waiting time of 5 minutes.
	High voltages that can cause lethal electric shocks are present in the live components of the inverter.
	Prior to performing any work on the inverter, disconnect it from all voltage sources as described in this document.
	Observe the documentations Observe all documentations supplied with the product.

Symbol	Explanation
~	Inverter Together with the green LED, this symbol indicates the operating state of the in- verter.
i	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 con- nection.
	Grounding conductor This symbol indicates the position for connecting a grounding conductor.
AC- GRID	Alternating current
DC	Direct current
X	The product has no galvanic isolation.
X	WEEE designation Do not dispose of the product together with the household waste but in accor- dance with the disposal regulations for electronic waste applicable at the in- stallation site.
\triangle	The product is suitable for outdoor installation.
IP65	Degree of protection IP65 The product is protected against the penetration of dust and water that is di- rected as a jet against the enclosure from all directions.
CE	CE marking The product complies with the requirements of the applicable EU directives.
UK CA	UKCA marking The product complies with the regulations of the applicable laws of England, Wales and Scotland.
Rohs	RoHS labeling The product complies with the requirements of the applicable EU directives.

Symbol	Explanation
	RCM (Regulatory Compliance Mark) The product complies with the requirements of the applicable Australian stan- dards.
I CASA APPROVED	ICASA The product complies with the requirements of the South African standards for telecommunication.
03931-16-03337	ANATEL The product complies with the requirements of the Brazilian standards for telecommunication. Este equipamento opera em caráter secundário, isto é, não tem direito a pro- teção contra interferência prejudicial, mesmo de estações do mesmo tipo, e não pode causar interferência a sistemas operando em caráter primário.
6	The product complies with the Moroccan safety and EMC requirements for electronic products.

4.3 Interfaces and Functions

The product is equipped with the following interfaces and functions:

User interface for configuration and monitoring

The product is equipped as standard with an integrated webserver, which provides a user interface for configuring and monitoring the product.

Once the connection has been established to the smart device, use a terminal (e.g. smartphone, tablet or laptop) to connect to the product's user interface using a web browser.

Smart Inverter Screen

The Smart Inverter Screen enables you to view the status display and to display the current power and consumption on the user interface login page. This gives you an overview of the most important product data without having to log into the user interface.

The Smart Inverter Screen is deactivated by default. The Smart Inverter Screen can be activated via the user interface once the product has been commissioned.

SMA Speedwire

The product is equipped with SMA Speedwire as standard. SMA Speedwire is a type of communication based on the Ethernet standard. SMA Speedwire is designed for a data transfer rate of 100 Mbps and enables optimum communication between Speedwire devices within systems.

The products supports the encrypted system communication with SMA Speedwire Encrypted Communication. In order to be able to use the Speedwire encryption in the system, all Speedwire devices, except for the SMA Energy Meter, must support the function SMA Speedwire Encrypted Communication.

SMA Webconnect

The product is equipped with a Webconnect function as standard. The Webconnect function enables direct data transmission between the product and Internet portals Sunny Portal and Sunny Places without any additional communication device and for a maximum of 4 products per visualized system. In PV systems with more than 4 products, there is the option of establishing data transmission between the products and Sunny Portal via the data logger (e.g.,

SMA Data Manager) or distributing the inverters over several systems. If there is an existing Wi-Fi or Ethernet connection, you can directly access your visualized system via the web browser on your smart device (e.g. smartphone, tablet or laptop).

Webconnect enables - for PV systems operated in Italy - the connection or disconnection of the inverter to or from the utility grid and the specifying of the frequency limits to be used via IEC61850-GOOSE messages.

WLAN connection to SMA 360° app

The product has a QR code. By scanning the QR Code attached to the product via the SMA 360° app, access to the product is established via WLAN and the connection to the user interface is made automatically.

Wi-Fi

The product is equipped with a Wi-Fi 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 connects the inverter automatically with a smart device (e.g. smartphone, tablet or laptop). You can activate the WPS function by tapping on the enclosure lid twice in quick succession. The open interface will then be signalized via the rapid flashing of the blue LED on the inverter.

i Limited function in the event of frost

The integrated WLAN interface of the product is only designed for temperatures down to -20 $^\circ\text{C}.$

• Deactivate the WLAN interface at low temperatures (see Section 8.6, page 58).

Grid management services

The product is equipped with service functions for grid management.

Depending on the requirements of the grid operator, you can activate and configure the functions (e.g. active power limitation) via operating parameters.

SMA ShadeFix

The inverter is equipped with the shade management system SMA ShadeFix. SMA ShadeFix uses an intelligent MPP tracking system to determine the operating point with the highest output during shading conditions. With SMA ShadeFix, inverters use the best possible energy supply from the PV modules at all times to increase yields in shaded systems. SMA ShadeFix is enabled by default. The time interval of SMA ShadeFix is usually 6 minutes. This means that the inverter determines the optimum operating point every 6 minutes. Depending on the PV system or shading situation, it may be useful to adjust the time interval.

All-pole sensitive residual-current monitoring unit

The all-pole sensitive residual-current monitoring unit detects alternating and direct differential currents. In single-phase and three-phase inverters, the integrated differential current sensor detects the current difference between the neutral conductor and the line conductor(s). If the current difference increases suddenly, the inverter disconnects from the utility grid.

Connection of the SMA Energy Meter

If an SMA Energy Meter is installed in the PV system, the inverter can receive data on the household energy consumption directly from this.

SMA Smart Connected

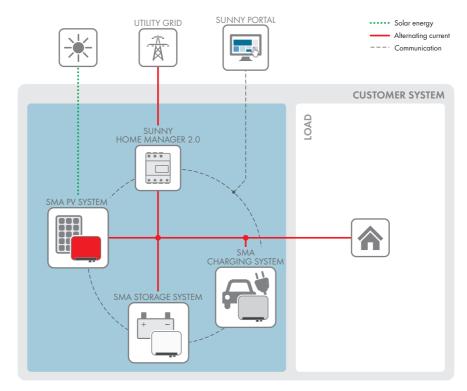
SMA Smart Connected is the free monitoring of the product via the SMA Sunny Portal. Thanks to SMA Smart Connected, the operator and qualified person will be informed automatically and proactively about product events that occur.

SMA Smart Connected is activated during registration in Sunny Portal. In order to use SMA Smart Connected, it is necessary that the product is permanently connected to Sunny Portal and the data of the operator and qualified person is stored in Sunny Portal and up-to-date.

4.4 LED Signals

LED signal	Explanation
Green LED and red LED flash simultaneously (2 s on and 2 s off)	No country data set set Operation of the product is stopped because no country data set is set. Once the configuration has been completed (for instance using the installation assistant or via a communication product), the prod- uct will start operation automatically.
The green LED is flashing (two seconds on and two seconds off)	Waiting for feed-in 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.
The green LED flashes quickly	Update of central processing unit The central processing unit of the inverter is being updated.
The green LED is glowing	Feed-in operation The inverter feeds in with a power of at least 90%.
The green LED is pulsing	Feed-in operation The inverter is equipped with a dynamic power display via the green LED. Depending on the power, the green LED pulses fast or slow. If necessary, you can switch off the dynamic power display via the green LED.
The green LED is off	The inverter is not feeding into the utility grid.

LED signal	Explanation
The red LED is glowing	Event occurred If an event occurs, a distinct event message and the corresponding event number will be displayed in addition on the product user inter- face or in the communication product (e.g. SMA Data Manager).
The blue LED flashes slowly for approx. 1 minute	Communication connection is being established The product is establishing a connection to a local network or is es- tablishing a direct connection to a smart device via Ethernet (e.g. smartphone, tablet or laptop).
The blue LED flashes quickly for approx. two minutes (0.25 s on and 0.25 s off).	WPS active The WPS function is active.
The blue LED is glowing	Communication active There is an active connection with a local network or there is a di- rect connection via Ethernet with a smart end device (e.g. smart- phone, tablet or laptop).



4.5 System Overview

Figure 3: System design

4.5.1 Circuitry Overview



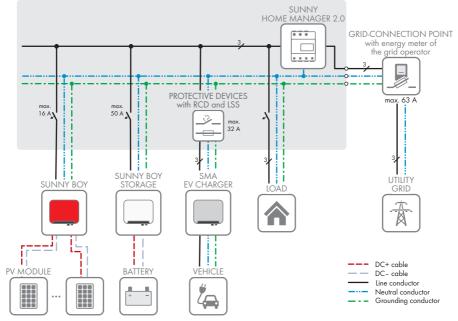
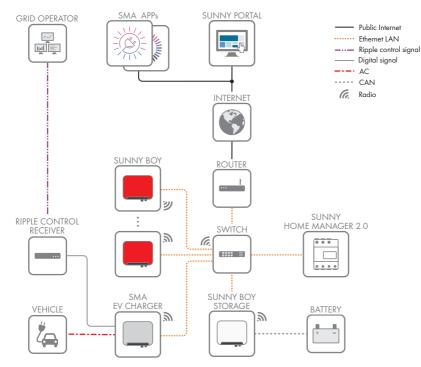


Figure 4: Circuitry overview (example)



4.5.2 Communication Overview

Figure 5: Design of system communication

5 Mounting

5.1 Requirements for Mounting

Requirements for the Mounting Location:

WARNING

Danger to life due to fire or explosion

Despite careful construction, electrical devices can cause fires. This can result in death or serious injury.

- Do not mount the product in areas containing highly flammable materials or gases.
- Do not mount the product in potentially explosive atmospheres.

Requirements:

- Do not mount the inverter on a pillar.
- □ A solid, flat support surface, e.g. concrete or masonry, must be available for mounting. The difference between the outer anchoring points must not exceed 5 mm.
- □ The mounting location must be inaccessible to children.
- □ The installation site must be suitable for the weight and dimensions of the product (see Section 13, page 94).
- □ The installation site must not be exposed to direct solar irradiation. If the product is exposed to direct solar irradiation, the exterior plastic parts might age prematurely and overheating might occur. When becoming too hot, the product reduces its power output to avoid overheating.
- □ The installation site should be freely and safely accessible at all times without the need for any auxiliary equipment (such as scaffolding or lifting platforms). Non-fulfillment of these criteria may restrict servicing.
- □ The DC load-break switch of the product must always be freely accessible.
- □ All ambient conditions must be met (see Section 13, page 94).
- $\Box\,$ To ensure optimum operation, the ambient temperature should be between -25 °C and +40 °C.

Permitted and prohibited mounting positions:

- □ The product may only be mounted in a permitted position. This will ensure that no moisture can penetrate the product.
- □ The product should be mounted such that the LED signals can be read off without difficulty.

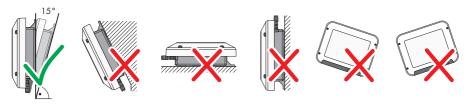


Figure 6: Permitted and prohibited mounting positions

Dimensions for mounting:

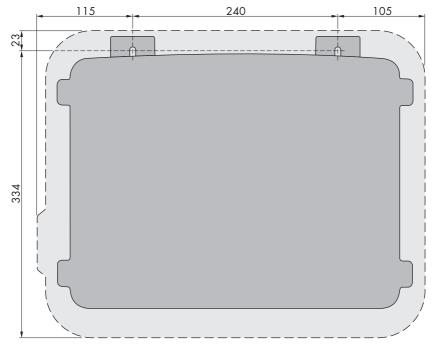


Figure 7: Position of the anchoring points(Dimensions in mm)

Recommended clearances:

If you maintain the recommended clearances, adequate heat dissipation will be ensured. Thus, you will prevent power reduction due to excessive temperature.

- □ Maintain the recommended clearances to walls as well as to other inverters or objects.
- □ If multiple products are mounted in areas with high ambient temperatures, increase the clearances between the products and ensure sufficient fresh-air supply.

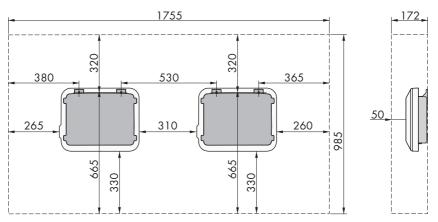


Figure 8: Recommended clearances(Dimensions in mm)

5.2 Mounting the product

Additionally required material (not included in the scope of delivery):

- 2 stainless steel hexagon head wood screws (AF 10, diameter 6 mm), screw length must be suitable for the support surface and the weight of the product (fastening bracket thickness: 4 mm)
- Where necessary, 2 screw anchors suitable for the support surface and the screws

ACAUTION

Risk of injury due to weight of product

Injuries may result if the product is lifted incorrectly or dropped while being transported or mounted.

- Transport and lift the product carefully. Take the weight of the product into account.
- Wear suitable personal protective equipment for all work on the product.

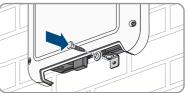
Procedure:

- 1. Mark the position of the drill holes. Align the markings horizontally.
- 2. Drill the holes.
- 3. Insert screw anchors into the drill holes if the support surface requires them.
- 4. Insert the screws until there is at least 6 mm clearance between the screw head and the support surface.

5. Hang the product onto the screws using the metal brackets.



6. Tighten the screws hand-tight using a ratchet or box wrench. When doing this you can compensate for any misalignment of the drill holes by aligning the metal brackets accordingly.



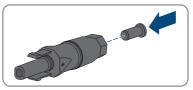
7. Ensure that the product is securely in place.

NOTICE

Damage to the product due to sand, dust and moisture ingress if the DC inputs are not closed

The product is only properly sealed when all unused DC inputs are closed with DC connectors and sealing plugs. Sand, dust and moisture penetration can damage the product and impair its functionality.

- Seal all unused DC inputs using the DC connectors and sealing plugs as described in the following. When doing so, do not plug the sealing plugs directly into the DC inputs on the inverter.
- 9. For unused DC connectors, push down the clamping bracket and push the swivel nut up to the thread.
- 10. Insert the sealing plug into the DC connector.



8.

SMA Solar Technology AG

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



☑ The DC connectors snap into place.

12. Ensure that the DC connectors with sealing plugs are securely in place.

6 Electrical Connection

6.1 Overview of the Connection Area

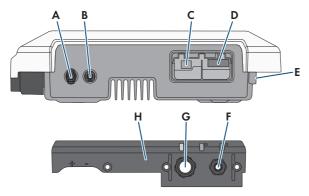


Figure 9: Connection areas and enclosure openings at the bottom of the inverter

Position	Designation
А	Positive DC connector
В	Negative DC connector
С	RJ45 pin connector for the network cable
D	Pin connector for the AC connector
E	Connection of the grounding terminal for additional grounding
F	Cable gland for the AC cable
G	Cable gland with filler plug for the network cable
Н	Connection cap

6.2 AC Connection

6.2.1 Requirements for the AC Connection

AC cable requirements as follows:

- □ Conductor type: copper wire
- □ External diameter: 5 mm to 13 mm
- □ Conductor cross-section: 1.5 mm² to 4 mm²
- □ Insulation stripping length: 15 mm
- □ Sheath stripping length: 70 mm

□ The cable must be dimensioned in accordance with the local and national directives for the dimensioning of cables. The requirements for the minimum wire size derive from these directives. Examples of factors influencing cable dimensioning are: nominal AC current, type of cable, routing method, cable bundling, ambient temperature and maximum desired line losses (for calculation of line losses, see the design software "Sunny Design" from software version 2.0 at www.SMA-Solar.com).

Load-break switch and cable protection:

NOTICE

Damage to the inverter due to the use of screw-type fuses as load-break switches

Screw-type fuses (e.g. DIAZED fuse or NEOZED fuse) are not load-break switches.

- Do not use screw-type fuses as load-break switches.
- Use a load-break switch or circuit breaker as a load disconnection unit (for information and design examples, see the Technical Information "Miniature circuit breaker" at www.SMA-Solar.com).
- In PV systems with multiple inverters, protect each inverter with a separate circuit breaker. Make sure to observe the maximum permissible fuse protection (see Section 13, page 94). This will prevent residual voltage from being present at the corresponding cable after disconnection.
- □ Loads installed between the inverter and the circuit breaker must be fused separately.

Residual-current monitoring unit:

The inverter does not require an external residual-current device when operating. If local regulations require the use of a residual-current device, the following must be observed:

□ The inverter is compatible with type A and B residual-current devices that have a rated residual current of 30 mA or higher (information about the selection of a residual-current device see technical information "Criteria for Selecting a Residual-Current Device" at www.SMA-Solar.com). Each inverter in the system must be connected to the utility grid via a separate residual-current device.

Overvoltage category:

The product can be used in grids of overvoltage category III or lower in accordance with IEC 60664-1. That means that the product can be permanently connected to the grid-connection point of a building. In case of installations with long outdoor cabling routes, additional measures to reduce overvoltage category IV to overvoltage category III are required (see the Technical Information "Overvoltage Protection" at www.SMA-Solar.com).

Grounding conductor monitoring:

The inverter is equipped with a grounding conductor monitoring device. This grounding conductor monitoring device detects when there is no grounding conductor connected and disconnects the inverter from the utility grid if this is the case. Depending on the installation site and grid configuration, it may be advisable to disable the grounding conductor monitoring. This can be necessary, for example, in a Delta IT system or other grid configurations if there is no neutral conductor present and you intend to install the inverter between two line conductors. If you are uncertain about this, contact your grid operator or SMA Solar Technology AG.

• Grounding conductor monitoring must be disabled after initial start-up depending on the grid configuration (see Section 8.14, page 64).

i Safety in accordance with IEC 62109 when the grounding conductor monitoring is deactivated

In order to guarantee safety in accordance with IEC 62109 when the grounding conductor monitoring is deactivated, you have to connect additional grounding:

• In order to guarantee safety in accordance with IEC 62109 when the grounding conductor monitoring is deactivated, you have to connect additional grounding (see Section 6.2.3, page 34): The additional grounding conductor must have the same cross-section as the connected grounding conductor at the connecting terminal plate for the AC cable. This prevents touch current if the grounding conductor at the connecting terminal plate for the AC cable fails.

i Connection of additional grounding

In some countries, additional grounding is generally required. In each case, observe the locally applicable regulations.

• If additional grounding is required, connect an additional grounding that has at least the same cross-section as the connected grounding conductor to the connecting terminal plate for the AC cable (see Section 6.2.3, page 34). This prevents touch current if the grounding conductor at the connecting terminal plate for the AC cable fails.

6.2.2 Connecting the Inverter to the Utility Grid

A QUALIFIED PERSON

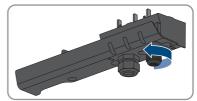
Requirements:

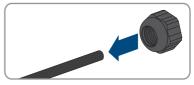
- □ Only the terminal block supplied may be used for the AC connection.
- □ The connection requirements of the grid operator must be met.
- □ The grid voltage must be within the permissible range. The exact operating range of the inverter is specified in the operating parameters.

Procedure:

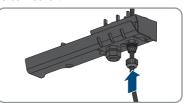
1. Disconnect the AC circuit breaker and secure it against reconnection.

- 2. Unscrew the swivel nut from the cable gland for the AC connection at the connector cap.
- 3. Thread the swivel nut over the AC cable.

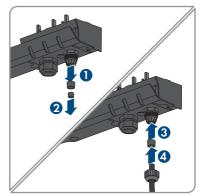




- 4. Thread the AC cable through the cable gland of the AC connection:
 - If the external diameter of the cable is 5 mm to 7 mm, thread the AC cable through the cable gland directly.

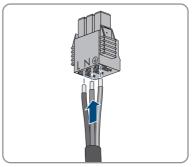


• If the external diameter of the AC cable is 8 mm to 13 mm, first remove the inner sealing ring from the cable gland and then thread the AC cable through the cable gland. When doing so, ensure that the outer sealing ring is positioned correctly in the cable gland.

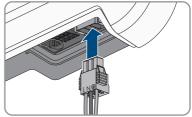


- 5. Dismantle 70 mm of the AC cable.
- 6. Shorten L and N by 5 mm each. Thus, the grounding conductor will be released from the terminal block last when tensile load is applied.
- 7. Strip 15 mm of the insulation of L, N and the grounding conductor.

8. Connect L, N and the grounding conductor to the terminal block for the AC connection in accordance with the labeling. When doing so, ensure that the conductors are plugged completely into the terminals up to the insulation. Tip: To release the conductors from the terminals, the terminals must be opened. To do this, stick a flat-blade screwdriver (blade width: 3 mm) as far as it can go into the rectangular opening behind the terminal.



- 9. Ensure that all terminals are allocated to the correct conductors.
- 10. Make sure that all conductors are securely in place.
- Plug the terminal block with the connected conductors for the AC connection into the slot in the inverter until the terminal block clicks into place.



12. Ensure that the terminal block is securely in place by slightly pulling it.

6.2.3 Connecting Additional Grounding

A QUALIFIED PERSON

If additional grounding or equipotential bonding is required locally, you can connect additional grounding to the product. This prevents touch current if the grounding conductor at the terminal for the AC cable fails.

The required clamping bracket, the cylindrical screw M5x16, the washer and the spring lock washer are part of the scope of delivery of the inverter.

Cable requirements:

i Use of fine-stranded conductors

You can use an inflexible or a flexible, fine-stranded conductor.

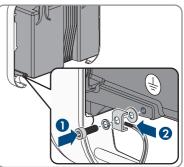
• When using a fine-stranded conductor, it has to be double crimped by a ring terminal lug. Make sure that no insulated conductor is visible when pulling or bending. This will ensure sufficient strain relief by means of the ring terminal lug.

□ Grounding cable cross-section: max. 10 mm²

Procedure:

- 1. Strip off 12 mm of the grounding cable insulation.
- 2. Insert the screw through the spring lock washer, the clamping bracket and the washer.

- 3. Lightly screw the screw into the thread of the connection point for the additional grounding.
- Guide the grounding cable between the washer and clamping bracket and tighten the screw (TX25) (torque: 6 Nm).



6.3 Connecting the Network Cables

A QUALIFIED PERSON

Danger to life due to electric shock in case of overvoltages and if surge protection is missing

Overvoltages (e.g., in the event of a flash of lightning) can be further conducted into the building and to other connected devices in the same network via the network cables or other data cables if there is no surge protection. Touching live parts and cables results in death or lethal injuries due to electric shock.

- Ensure that all devices in the same network are integrated in the existing overvoltage protection.
- When laying the network cable outdoors, ensure that there is suitable surge protection at the network cable transition from the product outdoors to the network inside the building.
- The Ethernet interface of the product is classified as "TNV-1" and offers protection against overvoltages of up to 1.5 kV.

Additionally required material (not included in the scope of delivery):

- \Box One network cable
- □ Where required: Field-assembly RJ45 connector for the network cable. SMA Solar Technology AG recommends the connector "MFP8 T568 A Cat.6A" from "Telegärtner".

Network cable requirements:

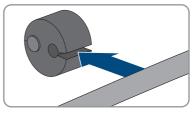
The cable length and quality affect the quality of the signal. Observe the following cable requirements:

- □ Cable type: 100BaseTx
- □ Cable category: minimum CAT5e
- □ Plug type: RJ45 of Cat5, Cat5e or higher
- □ Shielding: SF/UTP, S/UTP, SF/FTP or S/FTP

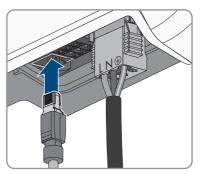
- $\Box\,$ Number of insulated conductor pairs and insulated conductor cross-section: at least 2 x 2 x $0.22\ mm^2$
- $\hfill\square$ Maximum cable length between 2 nodes when using patch cables: 50 m
- \square Maximum cable length between 2 nodes when using installation cables: 100 m
- \Box UV-resistant for outdoor use.

Procedure:

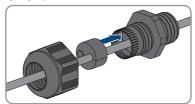
- 1. When using a self-assembly network cable, assemble the RJ45 connector and connect to the network cable (see connector documentation).
- 2. Remove the swivel nut from the cable gland for the network connection on the connection cap.
- 3. Thread the swivel nut over the network cable.
- 4. Press the cable support sleeve out of the cable gland.
- 5. Remove one filler plug from the cable support sleeve.
- 6. Route the network cable through an opening in the cable support sleeve.



- 7. Thread the network cable through the cable gland.
- 8. Insert the RJ45 plug of the network cable into the network pin connector on the inverter until it snaps into place.



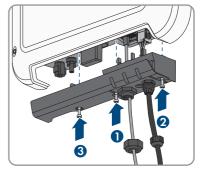
- 9. Ensure that the RJ45 plug is securely in place by pulling slightly on the network cable.
- 10. Press the cable support sleeve back into the cable gland.



11. Screw the swivel nut hand-tight onto the cable gland.

SMA Solar Technology AG

12. Tighten the connection cap with the three screws (TX20, torque: 3.5 Nm).



- 13. Screw the swivel nuts hand-tight onto the cable gland of the AC connection and the cable gland of the network cable.
- 14. If the inverter is installed outdoors, install overvoltage protection.
- 15. If you would like to establish a direct connection, connect the other end of the network cable directly to the computer.
- 16. If you would like to integrate the inverter into a local network, connect the other end of the network cable to the local network (e.g. via a router).

Also see:

• Disconnecting the Inverter from Voltage Sources ⇒ page 68

6.4 DC connection

6.4.1 Requirements for the DC Connection

Requirements for the PV modules:

- □ All PV modules should be of the same type.
- \Box All PV modules should be aligned and tilted identically.
- □ On the coldest day based on statistical records, the open-circuit voltage of the PV array must never exceed the maximum input voltage of the inverter.
- □ The same number of series-connected PV modules must be connected to each string.
- □ The maximum input current per string must be maintained and must not exceed the through fault current of the DC connectors (see Section 13, page 94).
- □ The thresholds for the input voltage and the input current of the inverter must be adhered to (see Section 13, page 94).
- □ The positive connection cables of the PV modules must be equipped with positive DC connectors (see Section 6.4.2, page 38).
- □ The negative connection cables of the PV modules must be equipped with the negative DC connectors (see Section 6.4.2, page 38).

i Use of Y adapters for parallel connection of strings

The Y adapters must not be used to interrupt the DC circuit.

- Do not use the Y adapters in the immediate vicinity of the inverter. The adapters must not be visible or freely accessible.
- In order to interrupt the DC circuit, always disconnect the inverter as described in this document (see Section 9, page 68).

6.4.2 Assembling the DC Connectors

A QUALIFIED PERSON

🛕 DANGER

Danger to life due to electric shock when live components or DC cables are touched

When exposed to light, the PV modules generate high DC voltage which is present in the DC cables. Touching live DC cables results in death or lethal injuries due to electric shock.

- Do not touch non-insulated parts or cables.
- Disconnect the product from voltage sources and ensure it cannot be reconnected before working on the device.
- Do not disconnect the DC connectors under load.
- Wear suitable personal protective equipment for all work on the product.

For connection to the inverter, all PV module connection cables must be fitted with the DC connectors provided. Assemble the DC connectors as described in the following. The procedure is identical for both connectors (+ and -). The graphics for the procedure are shown for only the positive connector as an example. Pay attention to the correct polarity when assembling the DC connectors. The DC connectors are marked with the symbols "+" and "-".

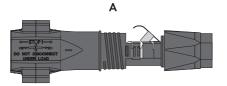


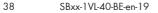
Figure 10: Negative (A) and positive (B) DC connectors

Cable requirements:

- □ External diameter: 5.5 mm to 8 mm
- □ Conductor cross-section: 2.5 mm² to 6 mm²
- □ Qty single wires: minimum 7
- □ Nominal voltage: minimum 1000 V
- □ Using bootlace ferrules is not allowed.

Procedure:

1. Strip approx. 15 mm of the cable insulation.

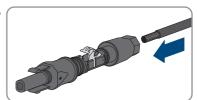




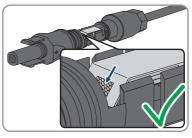
В

SMA Solar Technology AG

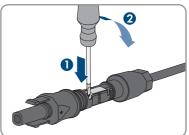
- Insert the stripped cable into the DC connector up to the stop. When doing so, ensure that the stripped cable and the DC connector are of the same polarity.
- 3. Press the clamping bracket down until it audibly snaps into place.
 - ☑ The stranded wire can be seen inside the clamping bracket chamber.







- If the stranded wire is not visible in the chamber, the cable is not correctly inserted and the connector must be reassembled. To do this, the cable must be removed from the connector.
- 5. To take out the cable, loosen the clamping bracket. To do so, insert a screwdriver (blade width: 3.5 mm) into the clamping bracket and pry the clamping bracket open.



- 6. Remove the cable and go back to step 2.
- 7. Push the swivel nut up to the thread and tighten (torque: 2 Nm).



6.4.3 Connecting the PV Array

A QUALIFIED PERSON

NOTICE

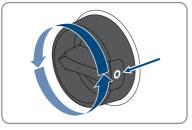
Damage to the DC connectors due to the use of contact cleaner of other cleaning agents

Some contact cleaners or other cleaning agents may contain substances that decompose the plastic of the DC connectors.

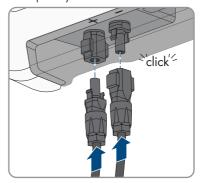
• Do not use contact cleaners or other cleaning agents for cleaning the DC connectors.

Procedure:

- 1. Ensure that the circuit breaker is switched off and that it cannot be reconnected.
- 2. If an external DC load-break switch is installed, disconnect the external DC load-break switch from all voltage sources.
- Set the DC load-break switch of the inverter to position O.



- 4. Measure the PV array voltage. Ensure that the maximum input voltage of the inverter is adhered to and that there is no ground fault in the PV array.
- 5. Check whether the DC connectors have the correct polarity. If the DC connector is equipped with a DC cable of the wrong polarity, the DC connector must be reassembled. The DC cable must always have the same polarity as the DC connector.
- 6. Connect the assembled DC connectors to the inverter.



☑ The DC connectors snap into place.

7. Ensure that all DC connectors are securely in place.

6.4.4 Disassembling the DC Connectors

A QUALIFIED PERSON

To disassemble the DC connectors for connection to the pv modules (e.g. due to faulty assembly), proceed as follows.

A DANGER

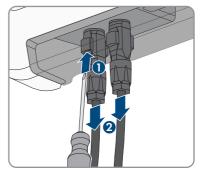
Danger to life due to electric shock when touching exposed DC conductors or DC plug contacts if the DC connectors are damaged or loose

The DC connectors can break or become damaged, become free of the DC cables, or no longer be connected correctly if the DC connectors are released and disconnected incorrectly. This can result in the DC conductors or DC plug contacts being exposed. Touching live DC conductors or DC plug connectors will result in death or serious injury due to electric shock.

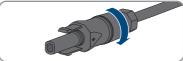
- Wear insulated gloves and use insulated tools when working on the DC connectors.
- Ensure that the DC connectors are in perfect condition and that none of the DC conductors or DC plug contacts are exposed.
- Carefully release and remove the DC connectors as described in the following.

Procedure:

 Release and remove the DC connectors. To do so, insert a flat-blade screwdriver or an angled screwdriver (blade width: 3.5 mm) into one of the side slots and pull the DC connectors out. When doing so, do not lever the DC connectors out, but insert the tool into one of the side slots only to release the locking mechanism, and do not pull on the cable.

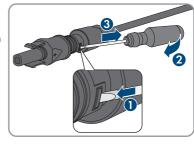


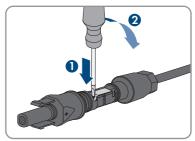
2. Remove the DC connector swivel nut.



- 3. Unlock the DC connector. To do this, insert a flatblade screwdriver (blade width: 3.5 mm) into the side catch mechanism and pry the catch mechanism open.
- 4. Carefully pull the DC connector apart.
- 5. Release the clamping bracket. To do so, insert a flatblade screwdriver (blade width: 3.5 mm) into the clamping bracket and pry the clamping bracket open.

6. Remove the cable.





7 Commissioning

7.1 Commissioning Procedure

A QUALIFIED PERSON

This section describes the commissioning procedure and gives an overview of the steps you must perform in the prescribed order.

i Commissioning an inverter that is captured in a communication device

When the inverter is captured in a communication device, the communication device (e.g. SMA Data Manager) is the unit for configuring the total system. The configuration is transferred to all inverters in the system. The system password assigned via the communication device is also the password for the user interface of the inverter.

- Commission the inverter (see Section 7.2, page 44).
- The initial configuration of the inverter is made via the communication device. The configuration is transferred to the inverter and the settings of the inverter are overwritten.
- Deactivate the Webconnect function of the inverter via the Sunny Portal. This prevents unnecessary connection attempts of the inverter with Sunny Portal.

i A country data set must be set for feed-in operation

From firmware version 3.11.00.R, the activation conditions for feed-in operation were changed.

To ensure the inverter begins feed-in operation during initial commissioning, a country data set must be set (for instance via the installation assistant on the user interface of the product, or via a communication product).

If no country data set is set, then feed-in operation will be stopped. This state is signaled by the green and red LEDs flashing simultaneously.

The inverter will automatically start feed-in operation only after the inverter configuration is completed.

Proced	Jre	See		
1.	Commission the inverter.	Section 7.2, page 44		
2.	 Establish a connection to the user interface of the inverter. Section 8.1, page 48 There are various connection options to choose from for this: 			
	Direct connection via WLAN			
Direct connection via Ethernet				
	Connection via WLAN in the local network			
	 Connection via Ethernet in the local network 			
3.	Log into the user interface.	Section 8.2, page 52		

Proced	ure	See
4.	Select the inverter configuration option. Please note that the SMA Grid Guard code for changing the grid-relevant parameters must be available after completion of the first ten feed-in hours or installation assistant. You can request the SMA Grid Guard code via the Online Service Center.	Section 7.3, page 45
5.	Configure the product and set country data set. Then the product will begin operation.	Section 8.10, page 61
6.	For PV systems in Italy or Dubai: Start the self-test.	Section 7.4, page 47
7.	Make further inverter settings as needed.	Section 8, page 48

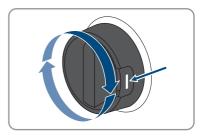
7.2 Commissioning the Inverter

A QUALIFIED PERSON

Requirements:

- \Box The AC miniature circuit breaker must be correctly rated and mounted.
- □ The product must be correctly mounted.
- \Box All cables must be correctly connected.

- 1. Switch on the AC circuit breaker.
- 2. Turn the DC load-break switch of the inverter to position **I**.



- ☑ All 3 LEDs light up. The start-up phase begins.
- ☑ All 3 LEDs go out again after approximately 90 seconds.
- If the green and red LEDs flash simultaneously during initial commissioning, operation is stopped because no country data set has been set yet. For the inverter to begin operation, the configuration must be completed and a country data set must be set.
- 4. If the green LED is still flashing, the conditions for activating feed-in operation are not yet met. As soon as the conditions for feed-in operation are met, the inverter starts with feed-in operation and, depending on the available power, the green LED will light up continuously or it will pulse.
- 5. If the red LED lights up, an event has occurred. Find out which event has occurred and, if necessary, initiate countermeasures.

Also see:

• Troubleshooting \Rightarrow page 71

7.3 Selecting a configuration option

A QUALIFIED PERSON

After you have assigned the password for the user groups **Installer** and **User** and logged in as **Installer**, the **Configuring the Inverter** page opens.

				1 - 0 -
	Configuring the Inverter			O User Information
	Sunny Boy			Configuring the Inverter
	Device name:			Information: In order to configure the inverter, you require a personal SMA Grid Guard code (application form is available at www.SMA-
A	Serial number:			Solar.com).
	Firmware version:			Adopting the configuration from a file With this configuration option, you can adopt a previously saved configuration from a file.
	Select a configuration option:			Configuration with Installation Assistant With this configuration option, you are guided
				step by step through the configuration process by means of the installation assistant. Manual Configuration With this configuration option, you can configure
E				all parameters of the inventor manually.
	Adopting the configuration from a file	Configuration with Installation Assistant	Manual Configuration	
D	Do not show this dialog again.]	Skip configuration]C

Figure 11: Layout of the Configuring the Inverter page

Position	Designation	Description
А	Device information	Provides the following information:
		Device name
		 Inverter serial number
		Inverter firmware version
В	User information	Provides brief information on the listed configuration options
С	Skip configuration	Offers the option of skipping the inverter configura- tion and go directly to the user interface (not recom- mended)
D	Checkbox	Allows you to choose not to have the displayed page displayed again when the user interface is called up again
E	Configuration options	Provides a selection of the various configuration op- tions

Configuration options:

On the **Configuring the Inverter** page, different configuration options are available to choose from. Select one of the options and proceed for the selected option as described below. SMA Solar Technology AG recommends carrying out the configuration with the installation assistant. This way, you ensure that all relevant parameters are set for optimal inverter operation.

- Adoption of configuration from a file
- Configuration with the installation assistant (recommended)
- Manual configuration

i 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.

Adopting the Configuration from a File

You can adopt the inverter configuration from a file. To do this, there must be an inverter configuration saved to a file.

Procedure:

- 1. Select the configuration option Adopting configuration from a file.
- 2. Select [Browse...] and select the desired file.
- 3. Select [Import file].

Configuring the Installation Assistant (Recommended)

- 1. Select the configuration option Configuration with Installation Assistant. ☑ The installation assistant will open.
- 2. Follow the installation assistant steps and make the settings appropriate for your system.
- 3. For every setting made in a step, select [Save and next]. In the last step, all made settings are listed in a summary.
- 4. To correct settings you made, select [Back], navigate to the desired step, correct settings and select [Save and continue].
- 5. Once all settings are correct, select [Next] in the summary.
- 6. To save the settings to a file, select [Export a summary] and save the file on your smart device.
- 7. To export all parameters and their settings, select [Export all parameters]. This exports all parameters and their settings into an HTML file.
- ☑ The start page of the user interface opens.

Manual configuration

You can configure the inverter manually by setting the desired parameters.

Procedure:

- 1. Select the configuration option Manual Configuration.
 - The **Device Parameters** menu on the user interface will open and all available parameter groups of the inverter will be displayed.
- 2. Select [Edit parameters].
- 3. Select the desired parameter group.
 - All available parameters of the parameter group will be displayed.
- 4. Set the desired parameters.
- 5. Select [Save all].
- ☑ The inverter parameters are set.

7.4 Starting the Self-Test (for Italy and Dubai)

A QUALIFIED PERSON

The self-test is only required for inverters that are to be commissioned in Italy or Dubai. The Italian standard CEI 0-21 and the DEWA (Dubai Electricity and Water Authority) stipulate that all inverters that feed into the utility grid are equipped with a self-test function. During the self-test, the inverter will consecutively check the reaction times for overvoltage, undervoltage, maximum frequency and minimum frequency.

The self-test changes the upper and lower disconnection values for each protective function on a linear basis for frequency monitoring and voltage monitoring. As soon as the measured value exceeds the permitted disconnection threshold, the inverter disconnects from the utility grid. In this way, the inverter determines the reaction time and checks itself.

After the self-test has been completed, the inverter automatically switches back to feed-in operation, resets the original disconnection conditions and connects to the utility grid. The test takes approximately three minutes.

Requirements:

□ The country data set of the inverter must be set to CEI 0-21 internal or DEWA 2016 internal.

- 1. Select the menu Device Configuration.
- 2. Select [Settings].
- 3. Select [Starting the Self-Test] in the subsequent context menu.
- 4. Follow the instructions appearing in the dialog and save the report of the self-test where necessary.

8 Operation

8.1 Establishing a connection to the user interface

8.1.1 Establishing a Direct Connection via Ethernet

Requirements:

- □ The product must be commissioned.
- □ A smart device (e.g. laptop) with an Ethernet interface must be available.
- □ The product must be connected directly to the smart device.
- □ The respective latest version of one of the following web browsers must be installed on the smart device: Chrome, Edge, Firefox or Safari.
- □ The installer's SMA Grid Guard code must be available to change network-relevant settings after the first 10 hours of feed-in operation, or after completing the installation assistant. You can request the SMA Grid Guard code via the Online Service Center.

i IP address of the inverter

• Standard inverter IP address for the direct connection via Ethernet: 169.254.12.3

Procedure:

- 1. Open the web browser of your smart device and enter the IP address **169.254.12.3** in the address bar.
- 2. Press the enter key.

3. **i** Web browser signals a security vulnerability

After the IP address has been entered, a message might appear indicating that the connection to the user interface of the product is not secure. SMA Solar Technology AG guarantees the security of the user interface.

• Continue loading the user interface.

 \blacksquare The login page of the user interface opens.

8.1.2 Establishing a direct connection via WLAN

You have several options to connect the product to a smart device. The procedure can be different depending on the devices. If the procedures described do not apply to your device, establish the direct connection via Wi-Fi as described in the manual of your device.

The following connection options ar available:

- Connection to SMA 360° App
- Connection with WPS
- Connection with Wi-Fi network search

Requirements:

- □ The product must be commissioned.
- □ A smart device (e.g. smartphone, tablet or laptop) must be available.

- □ The respective latest version of one of the following web browsers must be installed on the smart device: Chrome, Edge, Firefox or Safari.
- □ JavaScript must be enabled in the web browser of the smart device.
- □ The installer's SMA Grid Guard code must be available to change network-relevant settings after the first 10 hours of feed-in operation, or after completing the installation assistant. You can request the SMA Grid Guard code via the Online Service Center.

i SSID, IP address and WLAN password

- SSID in WLAN: SMA[serial number] (e.g. SMA0123456789)
- Device-specific WLAN password: see WPA2-PSK on the type label of the product or the rear side of the manual included in delivery
- Standard access address for a direct connection via WLAN outside of a local network: http://smalogin.net or 192.168.12.3

i Importing and exporting files with smart 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 and parameters) is not possible with smart devices having an iOS operating system.

• Use a smart device that does not have an iOS operating system for importing and exporting files.

Connection to SMA 360° App

Requirements:

- □ A smart device with camera (e.g. smartphone or tablet) must be available.
- □ The SMA 360° App must be installed on the smart device.
- □ An user account for Sunny Portal must already exist.

Procedure:

- 1. Open the SMA 360° App and login with the Sunny Portal account details.
- 2. Select **QR-Code Scan** in the menu.
- 3. Scan the QR Code on you product via the SMA 360° App.
 - ☑ The smart device automatically connects to the product. The web browser of your smart device opens and the login page of the user interface is displayed.
- If the web browser of the smart end device does not open automatically and the login page of the user interface is not displayed, open the web browser and enter http://smalogin.net in the address bar.

Connection with WPS

Requirement:

 $\hfill\square$ The smart device must have a WPS function.

Procedure:

- 1. Enable the WPS function on the inverter. To do this, tap on the enclosure lid of the inverter twice.
 - ☑ The blue LED flashes quickly for approx. two minutes. The WPS function is active during this time.
- 2. Enable the WPS function on your smart device.
- 3. Open the web browser of your smart end device and enter **http://smalogin.net** in the address bar.

Connection with Wi-Fi network search

- 1. Search for Wi-Fi networks with your smart device.
- 2. Select the SSID of the product **SMA[serial number]** in the list with the detected Wi-Fi networks.
- 3. Enter the device-specific Wi-Fi password (see WPA2-PSK on the type label of the product or the rear side of the manual included in delivery).
- 4. Open the web browser of your smart end device and enter **http://smalogin.net** in the address bar.

 \blacksquare The login page of the user interface is displayed.

 If the login page of the user interface does not open, enter the IP address 192.168.12.3 or, if your smart device supports mDNS services, SMA[serial number].local or http:// SMA[serial number] in the address bar of the web browser.

8.1.3 Establishing a Connection via Ethernet in the local network

i New IP address for connecting with a local network

If the product is connected to a local network (e.g. via a router), the product 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 product can only be reached via the following access addresses:

- Generally applicable access address: IP address manually assigned or assigned by the DHCP server (router) (identification via network scanner software or network configuration of the router).
- Access address for Apple and Linux systems: SMA[serial number].local (e.g. SMA0123456789.local)
- Access address for Windows and Android systems: http://SMA[serial number] (e.g., http://SMA0123456789)

Requirements:

- □ The product must be connected to the local network via a network cable (e.g. via a router).
- □ The product must be integrated into the local network. Tip: There are various methods of integrating the product into the local network with the aid of the installation assistant.
- □ A smart device (e.g. smartphone, tablet or laptop) must be available.

- □ The smart device must be in the same local network as the product.
- □ The respective latest version of one of the following web browsers must be installed on the smart device: Chrome, Edge, Firefox or Safari.
- □ The installer's SMA Grid Guard code must be available to change network-relevant settings after the first 10 hours of feed-in operation, or after completing the installation assistant. You can request the SMA Grid Guard code via the Online Service Center.

Procedure:

1. Open the web browser of your smart device. Enter the IP address of the product in the address bar of the web browser. Then press Enter key.

2. **i** Web browser signals a security vulnerability

After the IP address has been entered, a message might appear indicating that the connection to the user interface of the product is not secure. SMA Solar Technology AG guarantees the security of the user interface.

• Continue loading the user interface.

☑ The login page of the user interface opens.

8.1.4 Establishing a Connection via WLAN in the Local Network

i New IP address for connecting with a local network

If the product is connected to a local network (e.g. via a router), the product 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 product can only be reached via the following access addresses:

- Generally applicable access address: IP address manually assigned or assigned by the DHCP server (router) (identification via network scanner software or network configuration of the router).
- Access address for Apple and Linux systems: SMA[serial number].local (e.g. SMA0123456789.local)
- Access address for Windows and Android systems: http://SMA[serial number] (e.g., http://SMA0123456789)

Requirements:

- □ The product must be commissioned.
- □ The product must be integrated into the local network. Tip: There are various methods of integrating the product into the local network with the aid of the installation assistant.
- □ A smart device (e.g. smartphone, tablet or laptop) must be available.
- \Box The smart device must be in the same local network as the product.
- □ The respective latest version of one of the following web browsers must be installed on the smart device: Chrome, Edge, Firefox or Safari.
- □ The installer's SMA Grid Guard code must be available to change network-relevant settings after the first 10 hours of feed-in operation, or after completing the installation assistant. You can request the SMA Grid Guard code via the Online Service Center.

i Importing and exporting files with smart 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 and parameters) is not possible with smart devices having an iOS operating system.

• Use a smart device that does not have an iOS operating system for importing and exporting files.

Procedure:

Enter the IP address of the product in the address bar of the web browser.
 The login page of the user interface opens.

8.2 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.

Log in as Installer or User for the First Time

i Password assignment for user and installer

The passwords for the user groups **Installer** and **User** must be assigned when accessing the user interface for the first time. If the inverter was registered in a communication device (e.g., SMA Data Manager) and the system password was assigned, the system password is also the installer password. In this case, only the user password must be assigned.

- If you as a specialist assign the user password, only pass the password on to persons to access the inverter data via the user interface.
- If you as a user assign the installer password, only pass the password on to persons to receive access to the system.

i Installer password for inverters registered in a communication device or in Sunny Portal

To be able to register the inverter in a communication device (e.g., SMA Data Manager) or in a Sunny Portal system, the password for the user group **Installer** must match the system password. If you assign a password for the user group **Installer** via the user interface of the inverter, the same password must also be used as the system password.

• Assign a uniform installer password to all SMA devices in the system.

Procedure:

1. In the drop-down list Language, select the desired language.

- 2. In the **Password** field, enter a password for the **User** user group.
- 3. In the Repeat password field, enter the password again.
- 4. Click on **Save**.
- In the New password field, enter a password for the Installer user group. Assign a uniform
 password to all SMA devices to be registered in a system. The installer password is also the
 system password.

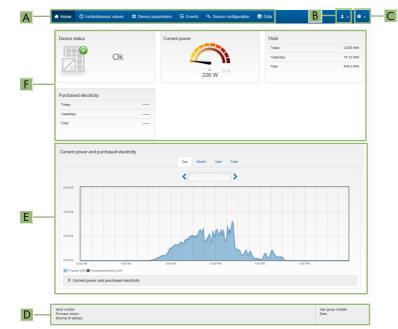
- 6. In the Repeat password field, enter the password again.
- 7. Click on Save and log in.
- ☑ The **Configuring the Inverter** page opens.

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].
- ${oxedsymbol {arepsilon}}$ The login page of the user interface opens. The logout was successful.



8.3 Start Page Design of the User Interface

Figure 12: Design of the user interface's home page (example)

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. Device configuration Various settings for the inverter can be made 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. Data You will find all data that is saved in the internal memory of the inverter or on an external storage medium on this page.		
В	User settings	Provides the following functions, depending on the user group logged in: • Starting the installation assistant • SMA Grid Guard login • Logout		
С	Help	Provides the following functions:Displaying information on Open Source licenses usedLink to the website of SMA Solar Technology AG		

Position	Designation	Description
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 With WLAN connection: Signal strength of WLAN connection User group logged in Date and device time of the inverter
E	Current power and cur- rent consumption	Temporal progression of the PV power and the power consumption of the household over the selected time pe- riod. Please note, the power consumption will only be dis- played if an energy meter is installed in the PV system.
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 Error or Warning present. Current power Displays the power currently being generated by the inverter. Yield Displays the energy yield of the inverter. Grid supply Displays the energy supply from the utility grid. Power at the grid-connection point Indicates which power is currently fed in or obtained at the grid-connection point.

8.4 Starting the Installation Assistant

A 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

											1.0.	
	1 Network configuration	2 Date and device time	\geq	3 Country standard	\rightarrow	4 Meter configuration	>	5 Feed-in mana	gement	>	6 Summary	
Net	work configuration								🔁 User I	nformat	ion	1
Nam		Type of communication		IP address of the is	nverter	Status No connection			network cabl WLAN.	er integrate le-based vis	the inverter in your local Ethernet or wireless via	
		Ethernet		10.1.8.205		© No connector			respective of Configuring	ption. g Communi	of communication in the cation via Ethernet rork settings either from a	
i i i	e of communication themet WLAN								the required configuration	option in th on switches		L
	tomatic configuration switched o	n O							manually, yo data addition	u have to e nally.	the network settings nter the required network	
							Save at	tion but	to the inverte activate the Ethernet inte	o connect y er via a netr automatic o erface. Sele	ction our local device directly rork cable, you need to onfiguration of the ct the option Yes under on switched on.	

Figure 13: Layout of the installation assistant (example)

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.
В	User information	Information about the current configuration step and the setting options of the configuration step.
С	Configuration field	You can make settings in this field.

Requirement:

□ The SMA Grid Guard code must be available to change network-relevant parameters after the first 10 hours of feed-in operation, or after completing the installation assistant. You can request the SMA Grid Guard code via the Online Service Center.

- 1. Open the user interface (see Section 8.1, page 48).
- 2. Log in as Installer.
- 3. Select the menu **User Settings** (see Section 8.3, page 54) on the start page of the user interface.
- 4. In the context menu, select [Starting the installation assistant].
- ☑ The installation assistant will open.

8.5 Activate WPS Function

8.6 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.

i 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 8.9, page 59).

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.

- 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.

8.7 Switching the Dynamic Power Display Off

As standard, the product 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 product. 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 8.9, page 59).

Procedure:

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

8.8 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.

i PV systems registered in a communication product

With PV systems that are registered in a communication product (e.g. Sunny Portal, Sunny Home Manager), 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 8.1, page 48).
- 2. Log into the user interface (see Section 8.2, page 52).
- 3. Call up the menu **Device Parameters**.
- 4. Select [Edit parameters].
- In the parameter group User Rights > Access Control change the password of the desired user group.
- 6. Select [Save all] to save the changes.

8.9 Changing Operating Parameters

The parameters of the inverter are set to certain values by default. You can change the 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. You can request the SMA Grid Guard code via the Online Service Center.

i 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 Solar Technology AG does not accept liability for missing or incorrect data and possibly resulting yield losses.

• Use the inverter's user interface for configuration.

Requirements:

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

Procedure:

- 1. Open the user interface (see Section 8.1, page 48).
- 2. Log into the user interface (see Section 8.2, page 52).
- 3. Call up the menu Device parameters.
- 4. Click on [Edit parameters].
- 5. Navigate to the parameter or use the search function. In the view and search, it is possible to switch between channel and name.
- 6. Log in using the SMA Grid Guard code to change those parameters designated by a lock (only for installers). In the menu, select User Settings > SMA Grid Guard Login, enter the SMA Grid Guard code and select [Login].
- 7. Change the required parameters.
- 8. Select [Save all] to save the changes.
- ☑ The parameters are set.

i 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.

8.10 Configuring the Country Data Set

A QUALIFIED PERSON

For the product to begin operation, a country data set must be set (for instance via the installation assistant on the user interface of the product, or via a communication product). As long as no country data set is set, operation of the product will remain stopped. This state is signaled by the green and red LEDs flashing simultaneously. Once configuration of the product is completed, the product will start operating automatically.

By default, the inverter is set to a universally valid country data set. You must adjust the country data set for the installation site.

i The country data set must be set correctly.

If you select a country data set which is not valid for your country and purpose, it can cause a disturbance in the PV system and lead to problems with the grid operator. When selecting the country data set, you must always observe the locally applicable standards and directives as well as the properties of the PV system (e.g. PV system size, grid-connection point).

• If you are not sure which standards and directives are valid for your country or purpose, contact the grid operator.

i Change to the names and units of grid parameters to comply with the gridconnection requirements in accordance with Regulation (EU) 2016/631 (valid from April 27, 2019)

To comply with the EU grid-connection requirements (valid from April 27, 2019) the names and units of grid parameters were changed. This change is valid from firmware version \geq 3.00.00.R if a country data set for fulfilling the EU grid-connection requirements (valid from 2019-04-27) is set. Names and units of grid parameters for inverters with firmware version \leq 2.99.99.R are not affected by this change and remain valid. This also applies from firmware version \geq 3.00.00.R if a country data set that is valid for countries outside the EU is set.

The basic procedure for changing operating parameters is explained in another section (see Section 8.9, page 59).

Procedure:

• In the parameter group Grid monitoring > Grid monitoring select the parameter Set country standard and set the required country data set.

8.11 Configuring the Active Power Mode

A QUALIFIED PERSON

Starting the Installation Assistant

- 1. Open the user interface (see Section 8.1, page 48).
- 2. Log in as Installer.
- 3. Start the installation assistant (see Section 8.4, page 56).
- 4. Select [Save and continue] after each step up until the step Grid management service.
- 5. Make the settings as described in the following.

Setting the connected line conductors

• In the tab **Active power mode** from the drop-down list **Connected line conductors**, select the line conductor to which the inverter is connected.

Make the settings for systems with external setpoint

- 1. Set the Grid connection point regulation to [Off].
- 2. In the tab Active power mode set the switch Active power setpoint to [On].
- 3. In the drop-down list **Operating mode active power setpoint**, select the entry **External setpoint**.
- 4. In the drop-down list Fallback behavior, select the entry Apply fallback values.
- 5. In the field **Fallback value of maximum active power** enter the value to which the inverter is to limit its rated power in case of a communication failure to the higher control unit at the end of the timeout time.
- 6. In the field **Timeout**, enter the time that the inverter is to wait before it limits its rated power to the set fallback value.
- 7. If, in the event of a 0% or 0 W specification, the inverter is not permitted to feed small amounts of active power into the utility grid, select the entry Yes in the drop-down list Grid disconnection for 0% active power setting. This ensures that in the event of a 0% or 0 W specification, the inverter disconnects from the utility grid and does not feed in active power.

Make the settings for systems with manual setpoint

- 1. In the tab Active power mode set the switch Grid connection point regulation to [On].
- 2. Enter the total power of the PV modules in the field **Nominal PV system power**.
- 3. In the drop-down list **Operating mode of act. power limit. at grid connection pt**, select whether active power limitation is to be performed via a fixed specification in percent or in watts.
- 4. In the field **Set active power limit at grid connection point**, enter the value to which the active power at the point of interconnection is to be limited. The value must be set to **0** for zero power output.
- 5. Set Active power setpoint to [On].
- 6. For the manual preset, in the drop-down list **Operating mode active power setting**, select **Manual setting in %** or **Manual setting in W** and enter the respective default value in the field **Active power**.
- 7. If the inverter itself is to control the active power at the point of interconnection, select External setting in the Operating mode active power setting drop-down list, select Apply fallback values in the Fallback behavior drop-down list, and select No in the Grid disconnection for 0% active power setting drop-down list.

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 and SunSpec Modbus® Interface" at www.SMA-Solar.com.

For information on which Modbus registers are supported, see the technical information "Modbus® parameters and measured values" at www.SMA-Solar.com.

i Measures for 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.

To ensure data security, 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 the default settings or deactivate the activated parameter again.

Procedure:

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

Activating the Receipt of Control Signals (Only for 8.13 Italy)

QUALIFIED PERSON

In order for PV systems in Italy to receive control commands from the grid operator, set the following parameters.

The basic procedure for changing operating parameters is explained in another section (see Section 8.9, page 59).

Parameter	Value/range	Resolution	Default
Application ID	0 to 16384	1	16384
GOOSE-Mac address	01:0C:CD:01:00:00 to 01:0C:CD:01:02:00	1	01:0C:CD:01:00:00

Procedure:

1. Select the parameter group **External communication > IEC 61850 configuration**.

- 2. In the field **Application ID**, enter the application ID of the grid operator gateway. You will receive this value from your grid operator. You can enter a value between 0 and 16384. The value 16384 indicates "deactivated".
- 3. In the field GOOSE-Mac address, enter the MAC address of the grid operator gateway from which the inverter is to receive the control commands. You will receive this value from your grid operator.
- I The receipt of control signals from the grid operator is activated.

Deactivating Grounding Conductor Monitoring 8.14 QUALIFIED PERSON

If the inverter is to be installed in an IT network or another grid configuration in which deactivation of the grounding conductor monitoring is required, deactivate the grounding conductor monitoring as follows.

The basic procedure for changing operating parameters is explained in another section (see Section 8.9, page 59).

Procedure:

 In the parameter group Grid monitoring > Grid monitoring > Country standard set the parameter PE connection monitoring to Off.

Configuring the Energy Meter 8.15

You can add an energy meter to your PV system or replace an existing energy meter.

The basic procedure for changing operating parameters is explained in another section (see Section 8.9, page 59).



i Removing a detected energy meter from the PV system

If only one energy meter is detected by the inverter, this will be added to the PV system automatically. Removal via the menu Device configuration is not possible in this case. To remove the energy meter from the PV system, proceed as follows:

 In the parameter group System communication > Measured values > Meter on Speedwire, set the parameter Serial number to any number (e.g. 1). In this way, instead of the energy meter detected, the PV system will add a fictitious energy meter to which the inverter cannot establish communication.

- 1. Activate the user interface (see Section 8.1, page 48).
- 2. Log in as Installer.
- 3. Start the installation assistant (see Section 8.4, page 56).
- 4. In the context menu, select [Starting the installation assistant].
- 5. Select [Save and next] until you get to the step Meter configuration.
- 6. Add or replace the desired energy meter.

8.16 Setting SMA ShadeFix

A QUALIFIED PERSON

You can set the time interval in which the inverter has to determine the optimum operating point and to optimize the MPP of the PV system. If you do not want to use SMA ShadeFix, you can disable the feature.

The basic procedure for changing operating parameters is explained in another section (see Section 8.9, page 59).

Procedure:

- In the parameter group DC Side > DC settings > SMA ShadeFix, select the parameter Cycle time of SMA ShadeFix and set the required time interval. The ideal time interval is usually 6 minutes. This value should only be increased if the shading situation changes extremely slowly.
- In order to disable the SMA ShadeFix feature, in the parameter group DC Side > DC settings
 SMA ShadeFix, set the parameter SMA ShadeFix to Off.

8.17 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 from the same type or device family to configure the inverter. When saving, only the device parameters will be saved, not any passwords.

Procedure:

- 1. Activate the user interface (see Section 8.1, page 48).
- 2. Log into the user interface (see Section 8.2, page 52).
- 3. Select the menu **Device Configuration**.
- 4. Select [Settings].
- 5. In the context menu, select [Saving the configuration in a file].
- 6. Follow the instructions in the dialog.

8.18 Adopting a Configuration from a File A 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 from the same type or device family in a file (see Section 8.17, page 65). When saving, only the device parameters will be adopted, not any passwords.

Requirements:

- □ Changes to grid-relevant parameters must be approved by the responsible grid operator.
- □ The SMA Grid Guard code must be available. You can request the SMA Grid Guard code via the Online Service Center.

Procedure:

- 1. Open the user interface (see Section 8.1, page 48).
- 2. Log into the user interface as an Installer (see Section 8.2, page 52).
- 3. Select the menu Device Configuration.
- 4. Select [Settings].
- 5. In the context menu, select [Adopting the configuration from a file].
- 6. Follow the instructions in the dialog.

8.19 Firmware Update

You can activate an automatic firmware update in the inverter or in the communication product.

If no automatic update is set in the communication product (e.g. SMA Data Manager or Sunny Home Manager) or in Sunny Portal, you have the option of carrying out a manual firmware update.

You have the following options to update the firmware:

- Automatic Firmware Update (Recommended)
- Update the firmware with the existing update file via the user interface of the inverter.
- Search and install the firmware via the user interface of the inverter.

8.19.1 Activating Automatic Firmware Update

A QUALIFIED PERSON

You can activate the automatic firmware update in the inverter or in the communication product. If the automatic firmware update is activated in the inverter, the inverter searches for updates and carries out the update.

If the automatic firmware update is activated in the communication product, the communication product searches for updates for the inverter and carries out the update of the inverter. In this case, the automatic firmware update is deactivated by default in the inverter. This prevents multiple downloads of updates.

In this section we describe how to activate the automatic firmware update in the inverter. The procedure for activating the automatic firmware update for detected devices in the communication product can be found in the manual for the communication product.

The basic procedure for changing operating parameters is explained in another section (see Section 8.9, page 59).

Procedure:

 In the parameter group Device > Update, select the Automatic Update parameter and set to Yes.

8.19.2 Updating Firmware with Update File via the User Interface

A QUALIFIED PERSON

Requirements:

□ 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. Open the user interface (see Section 8.1, page 48).
- 2. Log into the user interface as an Installer (see Section 8.2, page 52).
- 3. Click on [Edit parameters].
- 4. Select the menu Device Configuration.
- 5. In the inverter row, click on the gear icon and select **Update firmware**.
- 6. Select [Browse] and select the update file for the inverter.
- 7. Select Update firmware.
- 8. Follow the instructions in the dialog.

8.19.3 Searching for and Installing New Firmware via the User Interface

A QUALIFIED PERSON

Requirement:

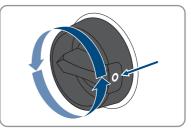
□ The inverter must be connected to the Internet.

- 1. Open the user interface (see Section 8.1, page 48).
- 2. Log into the user interface as an Installer (see Section 8.2, page 52).
- 3. Click on [Edit parameters].
- 4. Go to Device > Update.
- 5. Select the parameter Check for update and install it and set it to Execute.
- 6. Click on [Save all].
- ☑ The firmware is updated in the background.

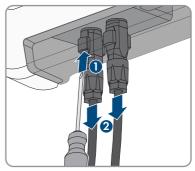
9 Disconnecting the Inverter from Voltage Sources A QUALIFIED PERSON

Procedure:

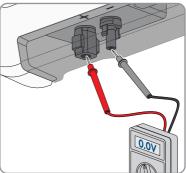
- 1. Disconnect the circuit breaker and secure it against reconnection.
- 2. If an external DC load-break switch is installed, disconnect the external DC load-break switch from all voltage sources.
- 3. Set the DC load-break switch of the inverter to **O**.



- 4. Wait until the LEDs have gone out.
- 5. Use a current clamp to ensure that no current is present in the DC cables.
- 6. Release and remove all DC connectors. To do this, insert a flat-blade screwdriver or an angled screwdriver (blade width 3.5 mm) into one of the slide slots and pull the DC connectors out in a downward direction. Do not pull on the cable.



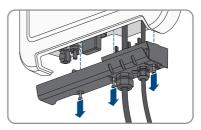
7. Ensure that no voltage is present at the DC inputs on the inverter using a suitable measuring device.



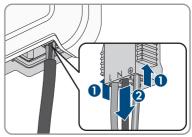
8. Loosen the swivel nuts.

SMA Solar Technology AG

9. Loosen the screws of the connection cap and remove the connection cap.



- 10. Use a suitable measuring device to check that no voltage is present at the AC connector between L and N and between L and the grounding conductor. To do so, insert the test probe (maximum diameter: 2 mm) into each round opening of the terminal block.
- 11. Release and disconnect the AC connector using the sliders located on the side.



10 Cleaning the Product

NOTICE

Damage to the product due to cleaning agents

The use of cleaning agents may cause damage to the product and its components.

• Clean the product and all its components only with a cloth moistened with clear water.

Procedure:

• Ensure that the product is free of dust, leaves and other dirt.

11 Troubleshooting

11.1 Forgotten Password

i Password assignment for inverters that are registered in a communication product

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

 In the communication product, assign the changed password of the user group Installer as the new system password (see the manual of the communication product).

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 1 PUK for each user group (**User** and **Installer**). Tipp: With PV systems that are registered in a communication product, you can also assign a new password for the user group **Installer** via the communication product. The password for the user group **Installer** is the same as the system password in the communication product.

- 1. Request PUK (application form available at www.SMA-Solar.com).
- 2. Open the user interface (see Section 8.1, page 48).
- 3. Enter the PUK instead of the password into the field **Password**.
- 4. Select Login.
- 5. Call up the menu **Device parameters**.
- 6. Click on [Edit parameters].
- 7. In the parameter group **User Rights > Access Control** change the password of the desired user group.
- 8. Select [Save all] to save the changes.

11.2 Event messages

Event number	Message, cause and corrective measures
101	A QUALIFIED PERSON
102 103 105	Grid incident 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: • 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.
202 203 205 206	 A QUALIFIED PERSON Grid incident 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: Ensure that the miniature circuit breaker is switched on. Ensure that the AC cable is not damaged and that it is connected correctly.

- Ensure that the country standard 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.

Event number	Message, cause and corrective measures
302	A QUALIFIED PERSON
	Temperature AC voltage
	The inverter has reduced its power due to a too-high grid voltage to ensure grid stability.
	Corrective measures:
	• If possible, check the grid voltage 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 approval, discuss any changes to the operating parameters with the Service.
401	A QUALIFIED PERSON
404	Grid incident
	The inverter has disconnected from the utility grid. A stand-alone grid or a very large change in the grid frequency was detected.
	Corrective measures:
	Check the grid connection for significant short-term frequency fluctuations.
501	A QUALIFIED PERSON
	Grid incident
	The grid frequency is not within the permissible range. The inverter has discon- nected from the utility grid.
	Corrective measures:
	 If possible, check the grid 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 approval, discuss any changes to the operating parameters with the Service.

601

Event number Message, cause and corrective measures

507 **A QUALIFIED PERSON**

Temperature Active power limit AC frequency

The inverter has reduced its power due to a too-high power frequency to ensure grid stability.

Corrective measures:

• If possible, check the grid 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 approval, discuss any changes to the operating parameters with the Service.

A QUALIFIED PERSON

Grid incident

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.

701 **A QUALIFIED PERSON**

Frequency not permitted > Check parameter

The grid frequency is not within the permissible range. The inverter has disconnected from the utility grid.

Corrective measures:

• If possible, check the grid 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 approval, discuss any changes to the operating parameters with the Service.

Event number	Message, cause and corrective measures
801	A QUALIFIED PERSON
	Waiting for grid voltage > Grid failure > Check AC circuit breaker
	The AC cable is not correctly connected or the country data set is not correctly configured.
	Corrective measures:
	 Ensure that the miniature circuit breaker is switched on.
	 Ensure that the AC cable is not damaged and that it is connected correctly.
	 Ensure that the country standard 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.
901	A QUALIFIED PERSON
	Grounding connection missing > Check connection
	The grounding conductor is not correctly connected.
	The grounding conductor is not correctly connected. Corrective measures:
	с с ,
1001	Corrective measures:
1001	Corrective measures: • Ensure that the grounding conductor is correctly connected.
1001	Corrective measures: • Ensure that the grounding conductor is correctly connected. A QUALIFIED PERSON
1001	Corrective measures: • Ensure that the grounding conductor is correctly connected. A QUALIFIED PERSON L / N swapped > Check connection The connection of L and N is swapped. Corrective measures:
1001	Corrective measures: • Ensure that the grounding conductor is correctly connected. A QUALIFIED PERSON L/N swapped > Check connection The connection of L and N is swapped.
1001	Corrective measures: • Ensure that the grounding conductor is correctly connected. A QUALIFIED PERSON L / N swapped > Check connection The connection of L and N is swapped. Corrective measures:
	Corrective measures: • Ensure that the grounding conductor is correctly connected. A 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.
	Corrective measures: • Ensure that the grounding conductor is correctly connected. A 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. A QUALIFIED PERSON
	Corrective measures: • Ensure that the grounding conductor is correctly connected. 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. QUALIFIED PERSON Installation fault > Check connection

Event number	Message, cause and corrective measures
1302	A QUALIFIED PERSON
	Waiting for grid voltage > Grid connection installation failure > Check grid and fuses
	L or N not connected.
	Corrective measures:
	Ensure that L and N are connected.
	 Ensure that the miniature circuit breaker is switched on.
	 Ensure that the AC cable is not damaged and that it is connected correctly.
1501	A QUALIFIED PERSON
	Reconnection fault grid
	The changed country standard 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 standard has been configured correctly. To do this, select the parameter Set country standard and check the value.
3302-3303	
	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.

Event number	Message, cause and corrective measures
3401	A 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:
	• Immediately disconnect the inverter from all voltage sources.
	• 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 DC connectors 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.
3501	A 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.
3601	A QUALIFIED PERSON
	High discharge current > 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.
3701	
	Residual current too high > Check generator
	The inverter has detected a residual current through brief grounding of the PV array.
	Corrective measures:
	Check the PV system for ground faults.

Event number	Message, cause and corrective measures
3801	A QUALIFIED PERSON
	DC overcurrent > Check PV array
	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	A QUALIFIED PERSON
3902	Waiting for DC start conditions > Start conditions 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.
6001-6438	A QUALIFIED PERSON
	Self-diagnosis > Device disturbance The cause must be determined by the SMA Service Line. Corrective measures: • Contact Service.
6501	The cause must be determined by the SMA Service Line. Corrective measures:
6502	The cause must be determined by the SMA Service Line. Corrective measures: • Contact Service. A QUALIFIED PERSON
	The cause must be determined by the SMA Service Line. Corrective measures: Contact Service. QUALIFIED PERSON Self-diagnosis > Overtemperature
6502	The cause must be determined by the SMA Service Line. Corrective measures: • Contact Service. A QUALIFIED PERSON
6502	The cause must be determined by the SMA Service Line. Corrective measures: Contact Service. QUALIFIED PERSON Self-diagnosis > Overtemperature The inverter has switched off due to excessive temperature.
6502	The cause must be determined by the SMA Service Line. Corrective measures: Contact Service. QUALIFIED PERSON Self-diagnosis > Overtemperature The inverter has switched off due to excessive temperature. Corrective measures: Corrective measures: Clean the cooling fins on the rear of the enclosure and the air ducts on
6502	The cause must be determined by the SMA Service Line. Corrective measures: • Contact Service. A QUALIFIED PERSON Self-diagnosis > Overtemperature The inverter has switched off 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 +40°C has not been exceeded.
6502	The cause must be determined by the SMA Service Line. Corrective measures: Contact Service. QUALIFIED PERSON Self-diagnosis > Overtemperature The inverter has switched off 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. Clean the inverter has sufficient ventilation.
6502	The cause must be determined by the SMA Service Line. Corrective measures: • Contact Service. A QUALIFIED PERSON Self-diagnosis > Overtemperature The inverter has switched off 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 +40°C has not been exceeded.

Event number	Message, cause and corrective measures
6603	A QUALIFIED PERSON
6604	Self-diagnosis > Overload The cause must be determined by the Service. Corrective measures: • Contact Service.
7001	A QUALIFIED PERSON
7002	 Sensor error A temperature sensor in the inverter is defective and the inverter interrupts the feed-in operation. The cause must be determined by the Service. Corrective measures: Contact Service.
7201	A QUALIFIED PERSON
7202	Data storage not possible Internal error. The inverter continues to feed into the utility grid. Corrective measures: • Contact Service.
7303	A QUALIFIED PERSON
	Update main CPU failed The cause must be determined by the Service. Corrective measures: • Contact Service.
7320	The device with serial number [x] was successfully updated to firmware version [x]. The firmware update was completed successfully.
7329	Condition test successful
	The testing of the update conditions was successful. The firmware update package is suitable for this inverter.

	-
7330	A QUALIFIED PERSON
	Condition test failed
	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.
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	A 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 Wi-Fi network, a poor connection quality can be the cause.
	Corrective measures:
	Retry update.
	• For Wi-Fi connection: Improve the Wi-Fi connection quality (e.g., via Wi-Fi repeater) or establish connection with the inverter via Ethernet.
	 If this message is displayed again, contact the Service.
7341	Update Bootloader
	The inverter is performing a bootloader update.
7342	A QUALIFIED PERSON
	Update Bootloader failed
	The bootloader update failed.
	Corrective measures:
	Retry update.
	• If this message is displayed again, contact the Service.

Event number	Message, cause and corrective measures
7347	A 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	A 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.
7349	Incorrect login rights for configuration file
	The user group logged in does not have the user rights necessary to be able to import a configuration.
	Corrective measures:
	 Log in as Installer.
	Import configuration file again.
7350	Transfer of a configuration file has started
	The configuration file is being transferred.
7351	Update Wi-Fi
	The inverter is updating the Wi-Fi module.
7352	A QUALIFIED PERSON
	Update of Wi-Fi not successful
	The update of the Wi-Fi module failed.
	Corrective measures:
	Retry update.
	 If this message is displayed again, contact the Service.
7353	Update time zone database
	The inverter is updating the time zone database.

Event number	Message, cause and corrective measures
7354	A 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.
7355	Update WebUI
	The inverter is updating the inverter user interface.
7356	A QUALIFIED PERSON
	Update of WebUI not successful
	The update of the inverter user interface failed.
	Corrective measures:
	Retry update.
	• If this message is displayed again, contact the Service.
7619	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 Wi-Fi connection: Improve the Wi-Fi connection quality (e.g., via Wi-Fi repeater) or connect the inverter with the DHCP server (router) via Ethernet.
7701	A QUALIFIED PERSON
7702	Self-diagnosis > Device disturbance
7703	The cause must be determined by the Service.
	Corrective measures:
	Contact Service.

Event number	Message, cause and corrective measures
8003	A QUALIFIED PERSON
	Temperature derating
	The inverter has reduced its power output for more than 10 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 +40°C has not been exceeded.
	• Ensure that the inverter is not exposed to direct solar irradiation.
8708	A QUALIFIED PERSON
	Timeout in communication for active power limitation
	Communication to the system control absent. Depending on the fall-back set- ting, 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.
8709	A QUALIFIED PERSON
	Timeout in communication for reactive power setpoint
	Communication to the system control absent. Depending on the fall-back set- ting, either the last received values will be retained or the reactive power will be set to the set value.
	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.
8710	A QUALIFIED PERSON
	Timeout in communication for cos phi setpoint
	Communication to the system control absent. Depending on the fall-back set- ting, either the last received values will be retained or the displacement power factor will be set to the set value.

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.

Event number	Message, cause and corrective measures
9002	A 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.
9005	A 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. DC voltage at the DC input is not sufficient to run the main computer. 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).
9007	QUALIFIED PERSON Abort self-test The self-test (Italy only) was terminated. Corrective measures: Ensure that the AC connection is correct. Restart the self-test.
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	[Interface]: network busy
	The network is busy. Data exchange between the devices is not at an optimum and is greatly delayed.
	Corrective measures:
	 Increase the query intervals.
	• If necessary, reduce the number of devices in the network.
10249	[Interface]: network overloaded
	The network is overloaded. There is no data exchange between the devices.
	Corrective measures:
	• Reduce the number of devices in the network.
	 If necessary, increase the data query intervals.
10250	A QUALIFIED PERSON
	[Interface]: faulty data packages [ok / high]
	The package error rate has changed. If the package error rate is high, the net- work is overloaded or the connection to the network switch or DHCP server (router) is impaired.
	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	A 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	A 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	A 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	A QUALIFIED PERSON
	WiFi module faulty
	The Wi-Fi module integrated into the inverter is defective.
	Corrective measures:
	Contact Service.

Event number	Message, cause and corrective measures
10284	 No WiFi connection possible The inverter does not currently have a Wi-Fi connection to the selected network. Corrective measures: Ensure that the SSID, the Wi-Fi password and the encryption method have been entered correctly. The encryption method is specified by your Wi-Fi router or Wi-Fi access point and can be changed there. Ensure that the Wi-Fi router or Wi-Fi access point is in range and is signalizing correct operation. If this message is displayed often, improve the Wi-Fi connection by using a Wi-Fi repeater.
10285	WiFi connection established Connection to the selected Wi-Fi network has been established.
10286	 Wi-Fi connection lost The inverter has lost Wi-Fi connection to the selected network. Corrective measures: Ensure that the Wi-Fi router or Wi-Fi access point is still active. Ensure that the Wi-Fi router or Wi-Fi access point is in range and is signalizing correct operation. If this message is displayed often, improve the Wi-Fi connection by using a Wi-Fi repeater.
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.
29004	Grid parameter unchanged Changing the grid parameters is not possible.
20901	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 automati- cally locked again after 10 feed-in hours.
20906	Self-test The self-test is in progress.

Event number	Message, cause and corrective measures
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 automati- cally locked again after 10 feed-in hours.
29006	Self-test

Also see:

- Contact \Rightarrow page 100
- Starting the Self-Test (for Italy and Dubai) \Rightarrow page 47
- Connecting the Inverter to the Utility Grid \Rightarrow page 32
- Disconnecting the Inverter from Voltage Sources ⇒ page 68
- Checking the PV System for Ground Faults ⇒ page 88

11.3 Checking the PV System for Ground Faults

A 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.

If the red LED is glowing and the event number 3501, 3601 or 3701 is being displayed in the **Results** menu on the inverter user interface, there may be a ground fault present. The electrical insulation from the PV system to ground is defective or insufficient.

\Lambda DANGER

Danger to life due to electric shock when touching live system components in case of a ground fault

If a ground fault occurs, parts of the system may still be live. Touching live parts and cables results in death or lethal injuries due to electric shock.

- Disconnect the product from voltage sources and ensure it cannot be reconnected before working on the device.
- Only touch the cables of the PV modules on their insulation.
- 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.

Danger to life due to electric shock from destruction of the measuring device due to overvoltage

Overvoltage can damage a measuring device and result in voltage being present in the enclosure of the measuring device. Touching the live enclosure of the measuring device results in death or lethal injuries due to electric shock.

• Only use measuring devices with a DC input voltage range of 1000 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.

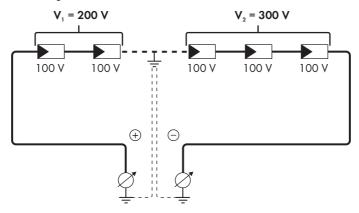
A DANGER

Danger to life due to high voltages

- Disconnect the inverter from all voltage sources (see Section 9, page 68).
- 2. Measure the voltage between the positive terminal and the ground potential (PE).
- 3. Measure the voltage between the negative terminal and the ground potential (PE).
- 4. Measure the voltage between the positive and negative terminals.
- 5. 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.
- 6. 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.
- 7. If a definite ground fault cannot be measured and the message is still displayed, measure the insulation resistance.
- 8. Reconnect the strings without ground faults to the inverter and recommission the inverter (see inverter installation inverter).

Location of the ground fault

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



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.

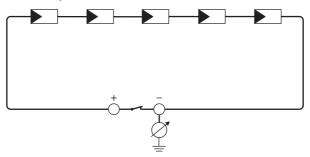


Figure 14: Schematic diagram of the measurement

i Calculating the insulation resistance

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

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

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:

- \Box Suitable device for safe disconnection and short-circuiting
- $\hfill\square$ Measuring device for insulation resistance

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

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

Procedure:

- 1. Calculate the expected insulation resistance per string.
- 2.

A DANGER

Danger to life due to high voltages

- Disconnect the inverter from all voltage sources (see Section 9, page 68).
- 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.
- 13. If the inverter still displays an insulation error, contact the Service (see Section 15, page 100). The PV modules might not be suitable for the inverter in the present quantity.

11.4 Problems with streaming services

If you use the streaming service in your local network (in which the inverter is also included), there may be interference to the transfer of data. In this case, the IGMP settings of the inverter can be changed via operating parameters.

• Contact the Service and change IGMP settings in consultation with the Service department.

12 Decommissioning the Inverter

A QUALIFIED PERSON

To decommission the inverter completely upon completion of its service life, proceed as described in this Section.

Risk of injury due to weight of product

Injuries may result if the product is lifted incorrectly or dropped while being transported or mounted.

- Transport and lift the product carefully. Take the weight of the product into account.
- Wear suitable personal protective equipment for all work on the product.

Procedure:

Danger to life due to high voltages

- Disconnect the inverter from all voltage sources (see Section 9, page 68).
- 2.

1

ACAUTION

Risk of burns due to hot enclosure parts

- Wait 30 minutes for the enclosure to cool down.
- 3. If an additional grounding or an equipotential bonding is connected, remove the cylindrical screw using a Torx screwdriver (TX25) and remove the grounding cable.
- 4. Remove the inverter from the wall.
- 5. If the inverter is to be stored or shipped, pack the inverter. Use the original packaging or packaging that is suitable for the weight and dimensions of the inverter.
- 6. Dispose of the inverter in accordance with the locally applicable disposal regulations for electronic waste.

13 Technical Data

DC input

	SB1.5-1VL-40	SB2.0-1VL-40	SB2.5-1VL-40
Maximum PV array power	3000 Wp	4000 Wp	5000 Wp
Maximum input voltage	600 V	600 V	600 V
MPP voltage range	160 V to 500 V	210 V to 500 V	260 V to 500 V
Rated input voltage	360 V	360 V	360 V
Minimum input voltage	50 V	50 V	50 V
Initial input voltage	80 V	80 V	80 V
Maximum input current	10 A	10 A	10 A
Maximum short-circuit current*	18 A	18 A	18 A
Maximum reverse cur- rent into the PV array	0 A	0 A	0 A
Number of indepen- dent MPP inputs	1	1	1
Surge category in ac- cordance with IEC 60664-1	II	II	II

* In accordance with IEC 62109-2: $\rm I_{SC\,PV}$

AC Output

	SB1.5-1VL-40	SB2.0-1VL-40	SB2.5-1VL-40
Rated power at 230 V, 50 Hz	1500 W	2000 W	2500 W
Maximum apparent power at $\cos \varphi = 1$	1500 VA	2000 VA	2500 VA
Rated apparent power at $\cos \varphi = 1$	1500 VA	2000 VA	2500 VA
Rated grid voltage	220 V / 230 V / 240 V	220 V / 230 V / 240 V	220 V / 230 V / 240 V
Rated grid voltage	230 V	230 V	230 V
Voltage range*	180 V to 280 V	180 V to 280 V	180 V to 280 V
Rated current at 220 V	7 A	9 A	11 A
Rated current at 230 V	6.5 A	9 A	11 A

	SB1.5-1VL-40	SB2.0-1VL-40	SB2.5-1VL-40
Rated current at 240 V	6.25 A	8.6 A	10.5 A
Maximum output cur- rent	7 A	9 A	11 A
Total harmonic distor- tion of the output cur- rent with total harmonic distortion of the AC voltage <2%, and AC power >50% of the rated power	≤3 %	≤3 %	≤3 %
Maximum output cur- rent under fault condi- tions	12 A	16 A	19 A
Inrush current	< 20% of the nominal AC current for a maximum of 10 ms	< 20% of the nominal AC current for a maximum of 10 ms	< 20% of the nominal AC current for a maximum of 10 ms
Rated grid frequency	50 Hz	50 Hz	50 Hz
Grid frequency*	50 Hz / 60 Hz	50 Hz / 60 Hz	50 Hz / 60 Hz
Operating range at grid frequency 50 Hz	45 Hz to 55 Hz	45 Hz to 55 Hz	45 Hz to 55 Hz
Operating range at grid frequency 60 Hz	55 Hz to 65 Hz	55 Hz to 65 Hz	55 Hz to 65 Hz
Power factor at rated power	1	1	1
Displacement power factor cos φ, adjustable	0.8 underexcited to 1 to 0.8 overexcited	0.8 underexcited to 1 to 0.8 overexcited	0.8 underexcited to 1 to 0.8 overexcited
Feed-in phases	1	1	1
Connection phases	1	1	1
Surge category in ac- cordance with IEC 60664-1	III	III	III

* Depending on the configured country data set

Efficiency

	SB1.5-1VL-40	SB2.0-1VL-40	SB2.5-1VL-40
Maximum efficiency, η_{max}	97.2 %	97.2 %	97.2 %
European weighted ef- ficiency, η _{ευ}	96.1 %	96.4 %	96.7 %
Protective devices			
DC reverse polarity protec	ction	Short-circ	cuit diode
Input-side disconnection p	oint	DC load-b	reak switch
AC short-circuit current ca	pability	Current	control
Grid monitoring		SMA Grid (Guard 10.0
Maximal output overcurre	nt protection	16	δA
Ground fault monitoring		Insulation monito	pring: $R_{iso} > 1 M\Omega$
All-pole sensitive residual-	current monitoring unit	Available	
Active anti-islanding metho	od	Frequency shift	
General data			
Width x height x depth		460 mm x 357	′ mm x 122 mm
Weight		9.2	kg
Length x width x height of	the packaging	597 mm x 399 mm x 238 mm	
Weight including packagi	ng	11.5 kg	
Climatic category in accordance with IEC 60721-3-4		4K	4H
Environmental category		Outo	doors
Pollution degree outside th	ne inverter	3	
Pollution degree inside the	e inverter	2	
Operating temperature ra	nge	-40°C to +60°C	
Max. permissible value for relative humidity (condensing)		100 %	
Maximum operating altitude above mean sea level (MSL)		300)0 m
Noise emission, typical		< 23	5 dB
Power loss in night mode		5	W

550 MB/month
600 kB/hour
Communication via Modbus interface
EMETER-20, HM-20
DRMO
Transformerless (Non-isolated)
Convection
IP65
I
WLAN 802.11 b/g/n
2.4 GHz
100 mW
32
TN-C, TN-S, TN-CS, TT (if V _{N_PE} < 30 V), IT, Delta IT, split phase

Installation in accordance with IEC 60721-3-4, Class 4K4H

Extended temperature range	-40°C to +60°C	
Extended humidity range	0 % to 100 %	
Extended air pressure range	79.5 kPa to 106 kPa	

Transport in accordance with IEC 60721-3-4, Class 2K3

Extended temperature range	-25°C to +70°C	
quipment		
DC terminal	SUNCLIX DC connector	
AC connection	Spring-cage terminal	
Speedwire interface	As standard	
Webconnect interface	As standard	
Wi-Fi	As standard	

DC Load-Break Switch

Electrical endurance in the event of short circuit, at nominal current of 10 A	At least 50 switching operations
Maximum switching current	35 A
Maximum switching voltage	800 V
Maximum PV power	11 kW
Torques	
Screws wall mounting	Hand-tight
Screws of terminal cover	3.5 Nm
SUNCLIX swivel nut	2.0 Nm
AC swivel nut	Hand-tight
Network swivel nut	Hand-tight
Additional grounding terminal	6.0 Nm
Data Storage Capacity	
Energy yields in the course of the day	63 days
Daily yields	30 years
Event messages for users	1024 events
Event messages for installers	1024 events

14 Spare Parts

You will find the spare parts for your product in the following overview. If required, these can be ordered from SMA Solar Technology AG or your distributor.

Designation	Brief description	SMA order number
Enclosure lid	Enclosure lid red	90-157500.02
Connection cap	Connection cap for covering the connection area	90-133100.06
accessory kit	Accessory kit with DC connectors, grounding ter- minal for additional grounding and AC connec- tor	85-101600.01
Switching lever of the DC load-break switch	Switching lever of the DC load-break switch as spare part	90-206200.01

15 Contact

If you have technical problems with our products, please contact the SMA Service Line. The following data is required in order to provide you with the necessary assistance:

- Device type
- Serial number
- Firmware version
- Event message
- Installation site and mounting height
- Type and number of PV modules
- Optional equipment, e.g. communication products
- Use the name of the system in Sunny Portal (if available)
- Access data for Sunny Portal (if available)
- Special country-specific settings (if available)

You can find your country's contact information at:



https://go.sma.de/service

16 EU Declaration of Conformity

within the scope of the EU directives

- Radio Equipment Directive 2014/53/EU (22.5.2014 L 153/62) (RED)
- Restriction of the use of certain hazardous substances 2011/65/EU (L 174/88, June 8, 2011) and 2015/863/EU (L 137/10, March 31, 2015) (RoHS)

SMA Solar Technology AG confirms herewith that the products described in this document are in compliance with the fundamental requirements and other relevant provisions of the aforementioned directives. More information on the availability of the entire declaration of conformity can be found at https://www.sma.de/en/ce-ukca.

Radio technology	WLAN 802.11 b/g/n
Radio spectrum	2.4 GHz
Maximum transmission power	100 mW

CE





www.SMA-Solar.com

