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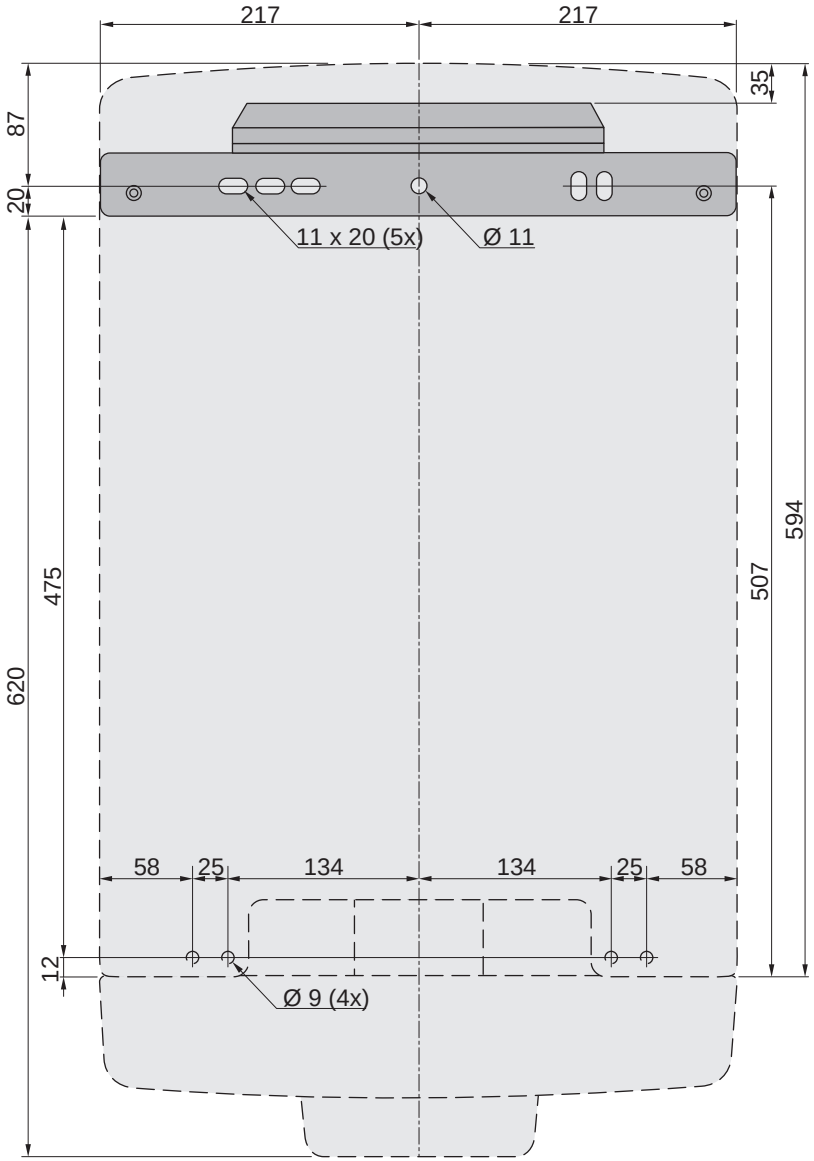
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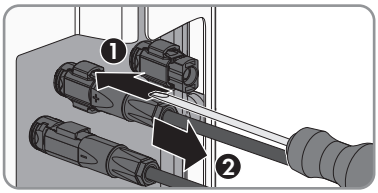
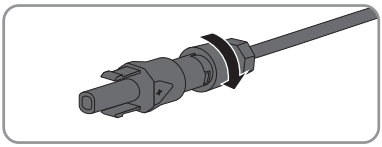
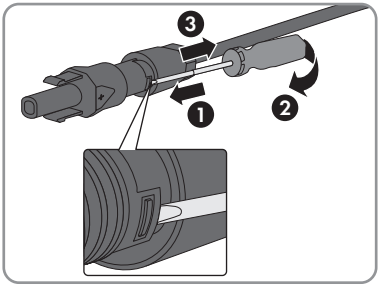
1. Release and remove all DC connectors. To do this, insert a flat-blade screwdriver or an angled screwdriver (blade width 3.5 mm) into one of the slide slots and pull the DC connectors out in a downward direction. Do not pull on the cable.



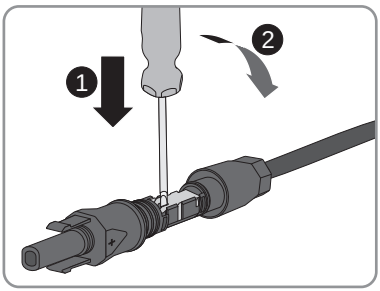
2. Remove the DC connector swivel nut.



3. Unlock the DC connector. To do this, insert a flat-blade 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 flat-blade screwdriver (blade width: 3.5 mm) into the clamping bracket and pry the clamping bracket open.



6. Remove the cable.

3 % * ' * & ! 2 # * + 2 % * # $ (

3 % - 2 + % % * ' * & . 2 # * + 2 % *

⚠ QUALIFIED PERSON

% - 2

1. Select for which operating mode you would like to use the multifunction relay. Section 6.5.2, page 36

% - 2		
2.	Connect to the multifunction relay according to the operating mode and the associated connection variant.	Section 6.5.3, page 36 and Section 6.5.4, page 40
3.	After commissioning the inverter, change the operating mode of the multifunction relay, if necessary.	Section 9.4, page 61

3 6 $ * ' ! - + * & ! 2 # * + 2 % * # $ (

6 $ * ' . - + . 2 # % 6 * + 2 % * # $ (E ! # * 6 ! - F	
= $ 2 # * - % $ *	The multifunction relay controls a display device (e.g. a warning light) which, depending on the type of connection, signals either an error or the undisturbed operation of the inverter.
# + % . 6 F 2 . 6 *	The multifunction relay switches loads on or off, depending on the power production of the PV system.
* #) $ % . . 2 * E . * # F	The multifunction relay switches loads on or off according to commands transmitted by a communication product.
$ * * (0 $ / E $ *	The multifunction relay controls the charging of the batteries depending on the power production of the PV system.
= $ % * # E = $	The multifunction relay controls an external fan, depending on the temperature of the inverter.
, * % & ' * $ * 2 # $ (E , 6 (F	The local grid operator may require that a signal is transmitted as soon as the inverter connects to the utility grid. The multifunction relay can be used to trigger this signal.

3 5 % * 6 *

The connection procedures vary, depending on the operating mode.

6 $ * ' . - % * 6 *	
= $ 2 # * - % $ *	Using the Multifunction Relay as a Fault Indicator Contact
# + % . 6 F 2 . 6 *	Controlling loads via the multifunction relay or charging batteries depending on the power production of the PV system
* #) $ % . . 2 * E . * # F	Controlling loads via the multifunction relay or charging batteries depending on the power production of the PV system
$ * * (0 $ / E $ *	Controlling loads via the multifunction relay or charging batteries depending on the power production of the PV system

6 $ * ' . - % * 6 *	
= $ % * # E = $ * # E	Connecting the external fan (see fan documentation)
, * % & ' * $ * 2 # $ (E , 6 (F	Reporting the switching status of the grid relay

' * & ! 2 # * + 2 % * # $ ($ $ = $ 2 # * - % $ * * $ %

You can use the multifunction relay as a fault indicator contact and have an error or smooth operation of the inverter displayed or signaled via a suitable display device. You can connect multiple inverters to one fault indicator or operation indicator, as needed.

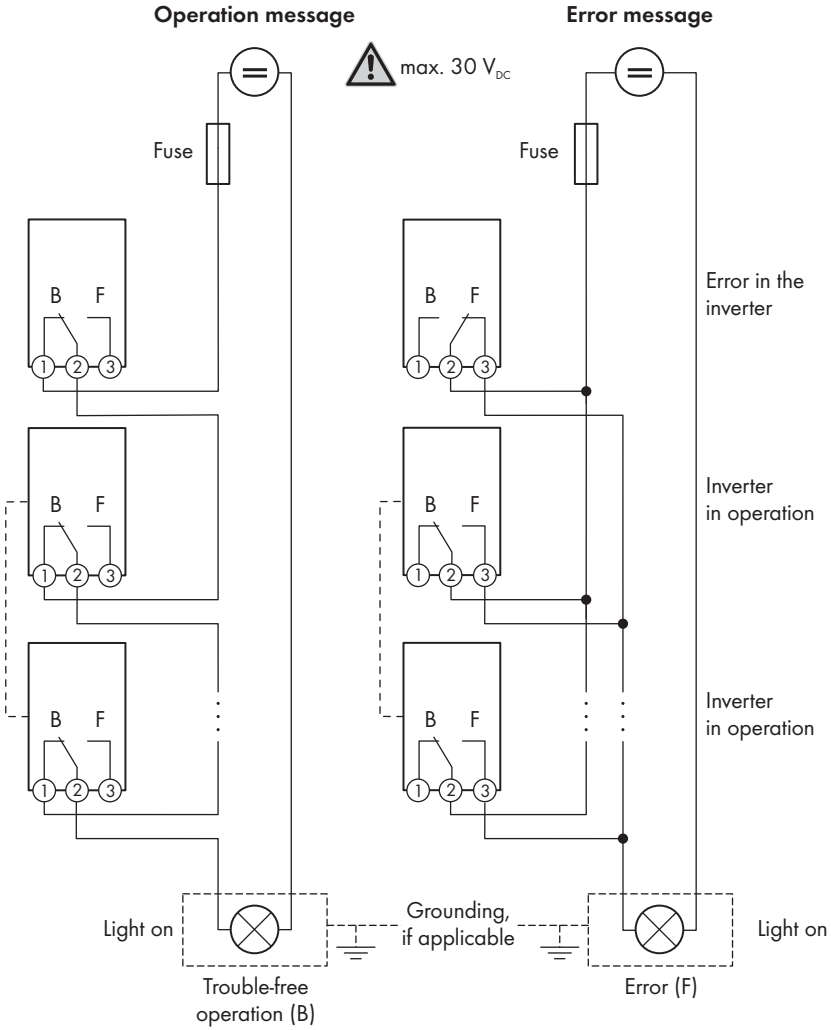


Figure 10: Circuit diagram with multiple inverters for connection to an operation indicator and circuit diagram for connection to a fault indicator (example)

* # # ' # $ -) $ * & . 2 # * + 2 % * # $ (% & $ ' ' * & 6 , 6 - 2 % * + * & (* .

The multifunction relay can control loads or charge batteries power-dependently. To enable this function, you must connect a contactor (K1) to the multifunction relay. The contactor (K1) switches the operating current for the load on or off. If you want batteries to be charged depending on the available power, the contactor activates or deactivates the charging of the batteries.

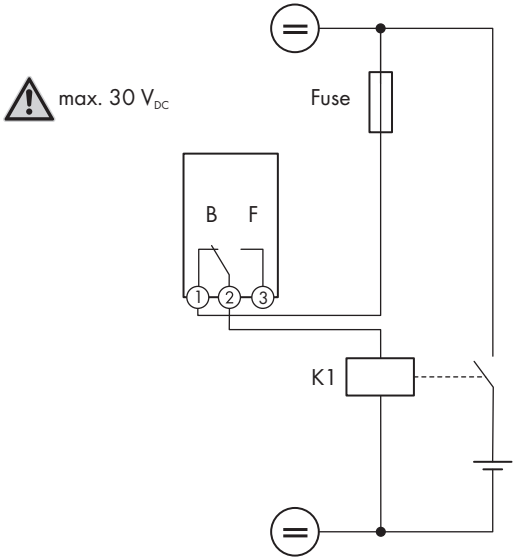


Figure 11: Wiring diagram for connection for controlling a load or for the power-dependent charging of the batteries

6 * ' * & , * % & ' * $ * 2 + * & ' - # $ (

The multifunction relay can trip a signal to the grid operator as soon as the inverter connects to the utility grid. To enable this function, the multifunction relays of all inverters must be connected in parallel.

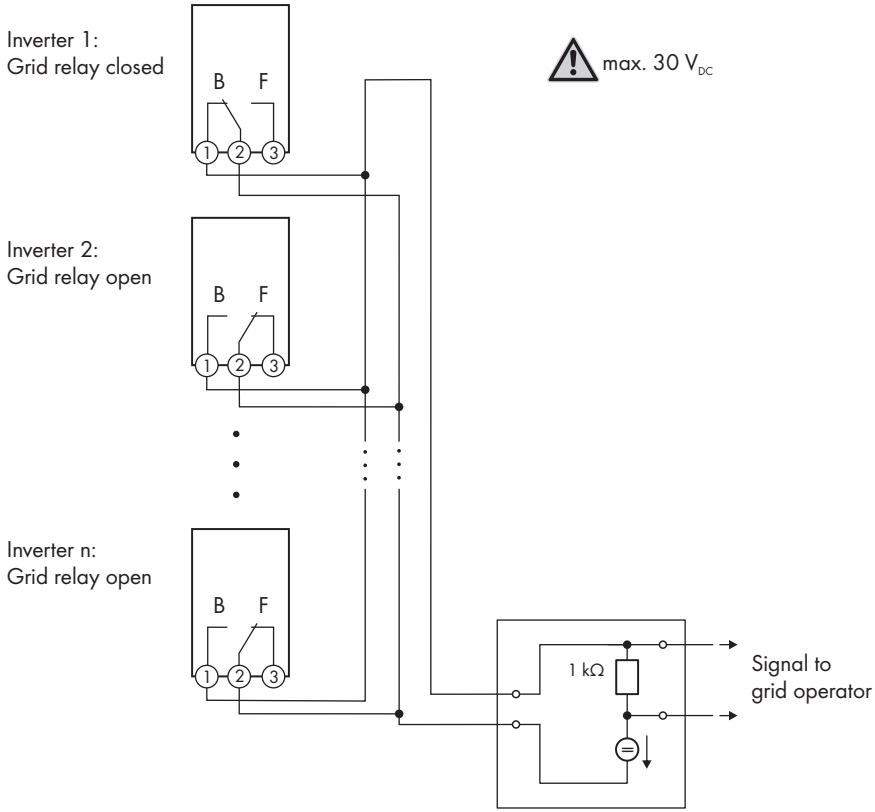


Figure 12: Wiring diagram for signaling the switching status of the grid relay (example)

3 % * * * & ! 2 # * + 2 % * # $ (

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☐ The technical requirements of the multifunction relay must be met (see Section 14 "Technical Data", page 96).

$ 0 # A 2 . * B

- Conductor cross-section: 0.2 mm² to 1.5 mm²
- The cable type and cable-laying method must be appropriate for the application and location.

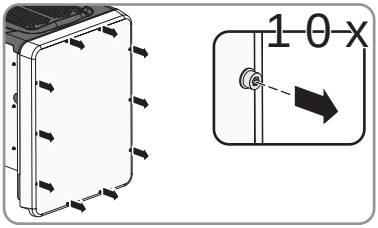
% - 2 B

1. **⚠ 1 "**

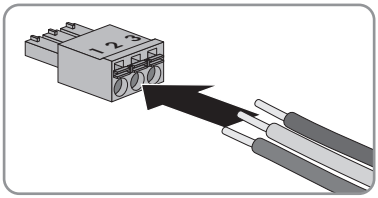
   1 $ ' * # + - 2 * & ' &) # * $ '

   - Disconnect the inverter from all voltage sources (see Section 10, page 69).

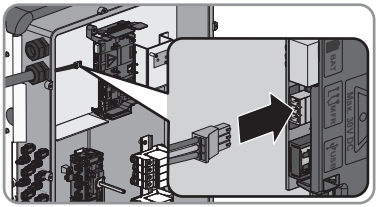
2. If the enclosure lid of the DC Connection Unit is closed, remove it as follows: Unscrew all ten screws with a Torx screwdriver (TX 25) and remove the enclosure lid carefully forward.



3. Set the screws and the enclosure lid aside and store safely.
4. Remove the swivel nut from the cable gland for the communication cable.
5. Remove the two-hole cable support sleeve from the cable gland and insert the cable into the enclosure opening of the two-hole cable support sleeve.
6. Press the two-hole cable support sleeve with the cable into the cable gland and guide the cable to the communication assembly in the DC Connection Unit. Ensure that any unused enclosure openings of the two-hole cable support sleeve are sealed with sealing plugs.
7. Strip 9 mm of the cable insulation at maximum.
8. Connect the cable to the 3-pole terminal block according to the circuit diagram, depending on the operating mode (see Section 6.5.3, page 36). Ensure that the conductors are plugged completely into the terminal points up to their insulation.



9. Stick the 3-pole terminal block with the connected conductors into the ! = slot on the communication assembly in the inverter.



10. Ensure that the terminal block is securely in place.
11. Ensure that all conductors are correctly connected.
12. Ensure that the conductors sit securely in the terminal points. Tip: To release the conductors, open the terminal points using a suitable tool.
13. Tighten the swivel nut on the cable gland hand-tight.

3 3 % * ' * & * , / $ 0

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1 "

1 $ ' * # + - 2 * # % * % & % /

Overvoltages (e. g. in the case of a flash of lightning) can be further conducted into the building and to other connected devices in the same network via the network cable if there is no overvoltage protection.

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

" - - * $ # # (A 2 - . $ * $ # E * % # 2 - - * & % 6 + - #

- ☐ Network cables
- ☐ Where required: Field-assembly RJ45 connector.

$ 0 # A 2 . * B

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

- ☐ Cable type: 100BaseTx
- ☐ Cable category: Cat5, Cat5e, Cat6, Cat6a or Cat7
- ☐ Plug type: RJ45 of Cat5, Cat5e, Cat6 or Cat6a
- ☐ Shielding: SF/UTP, S/UTP, SF/FTP or S/FTP
- ☐ Number of insulated conductor pairs and insulated conductor cross-section: at least 2 x 2 x 0.22 mm²
- ☐ Maximum cable length between two nodes when using patch cables: 50 m
- ☐ Maximum cable length between two nodes when using installation cables: 100 m
- ☐ UV-resistant for outdoor use

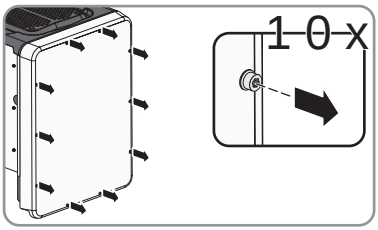
% - 2 B

1. **1 "**

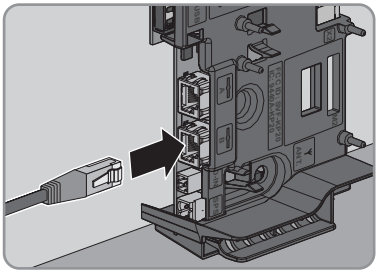
   1 $ ' * # + - 2 * # % * % & % /

   - Disconnect the inverter from all voltage sources (see Section 10, page 69).

2. If the enclosure lid of the DC Connection Unit is closed, remove it as follows: Unscrew all ten screws with a Torx screwdriver (TX 25) and remove the enclosure lid carefully forward.



3. Set the screws and the enclosure lid aside and store safely.
4. Remove the swivel nut from the cable gland for the communication cable.
5. Thread the swivel nut over the network cable.
6. Remove the two-hole cable support sleeve from the cable gland.
7. Remove the sealing plug from one of the enclosure openings of the two-hole cable support sleeve and insert the network cable into the enclosure opening.
8. Press the two-hole cable support sleeve with the cable into the cable gland and guide the network cable to the communication assembly in the DC Connection Unit. Ensure that any unused enclosure openings of the two-hole cable support sleeve are sealed with sealing plugs.
9. When using a self-assembly network cable, assemble the RJ45 connector and connect to the network cable (see connector documentation).
10. Put the RJ45 plug of the cable into one of the network sockets of the communication assembly.



11. Ensure that the RJ45 plug is securely in place by pulling slightly on the cable.
12. Tighten the swivel nut on the cable gland hand-tight. This will secure the network cable in place.
13. If the inverter is installed outdoors, install overvoltage protection for all components in the network.
14. 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).

8 . . ’

8 . . ’ % - 2

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

% - 2		
1.	Commission the inverter.	Section 7.2, page 44
2.	Establish a connection to the user interface of the inverter. There are various connection options to choose from for this: • Direct connection via WLAN • Connection via WLAN in the local network • Connection via Ethernet in the local network	Section 8.1, page 50
3.	Log into the user interface.	Section 8.2, page 53
4.	Select the inverter configuration option. Please note that the SMA Grid Guard code (a charge is levied for this code) for changing the grid-relevant parameters must be available after completion of the first ten feed-in hours or installation assistant (see "Application for the SMA Grid Guard code" available at www.SMA-Solar.com).	Section 7.4, page 46
5.	Ensure that the country data set has been configured correctly.	Section 9.3, page 61
6.	For PV systems in Italy: Start the self-test.	Section 7.3, page 45
7.	Make further inverter settings as needed.	Section 9, page 59

8 . . ’ * &) *

⚠ QUALIFIED PERSON

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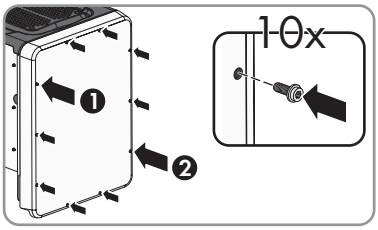
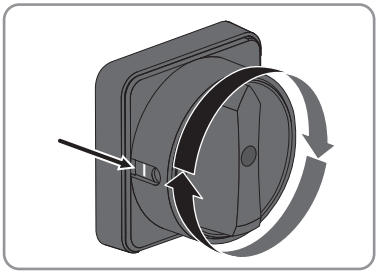
- ☐ The AC circuit breaker must be correctly rated and mounted.
- ☐ The inverter must be correctly mounted.
- ☐ All cables must be correctly connected.
- ☐ Unused enclosure openings must be sealed tightly with sealing plugs.

% - 2 B

1. Position the enclosure lid of the AC connection unit on the AC connection unit and first tighten the upper-left and lower-right screws, and then the remaining screws crosswise using a Torx screwdriver (TX 25) (torque: 6 Nm).



2. Position the enclosure lid of the DC connection unit on the DC connection unit and first tighten the upper-left and lower-right screws, and then the remaining screws crosswise using a Torx screwdriver (TX 25) (torque: 6 Nm).
3. Turn the DC load-break switch of the inverter to position . To do so, first remove the padlock.



4. Switch on the AC circuit breaker.

☑ All three LEDs light up. The start-up phase begins.

☑ All three LEDs go out again after approximately 90 seconds.

☑ Depending on the available power, the green LED pulses or is continuously illuminated. The inverter is feeding in.

✖ 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.

✖ The red LED is glowing?

An event has occurred.

- Find out which event has occurred and, if necessary, initiate countermeasures.

8 5 * $ * ' * & # + * E = * $ # (# (F

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The self-test is only required for inverters to be commissioned in Italy. The Italian standard requires that all inverters feeding into the utility grid are equipped with a self-test function in accordance with CEI 0-21. 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.

A 2 . * B

☐ The country data set of the inverter must be set to * . $ #

% - 2 B

1. Select the menu 1) % + ' 2 $ *
2. Select [* *].'
3. Select [* $ * ' * &] in the subsequent context menu.
4. Observe the instructions shown in the dialog and save the report of the self-test, if necessary.

8 # % * ' $ % + ' 2 $ * 6 *

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After you have logged onto the user interface as * $ # the + ' 2 ' * & page * opens.

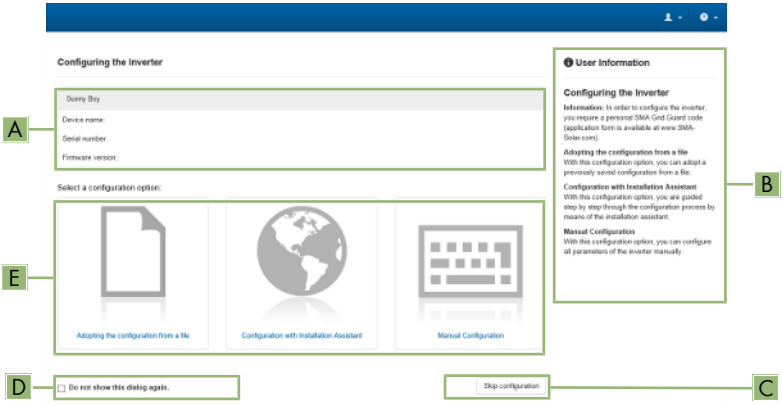


Figure 13: Layout of the + ' 2 ' * & page *

* 1 ' $ *	1 % 6 *	
A	Device information	Provides the following information: • Device name • Inverter serial number • Inverter firmware version

* 1 ' $ *	1 % 6 *
B User information	Provides brief information on the listed configuration options
C Skip configuration	Offers the option of skipping the inverter configuration and go directly to the user interface (not recommended)
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 options

% - 2 B

On the + ' 2 ' * & 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

" % % 6 * ' * & * * '

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

" - 6 * ' * & + ' 2 $ * + . $ = #

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

% - 2 B

1. Select the configuration option " - 6 * ' % + ' 2 $ * . + . $ + #
2. Select [,] and select the desired file.
3. Select [. 6 *] + #

+ ' 2 ' * & * $ # # $ * " * $ * E % . . - - F

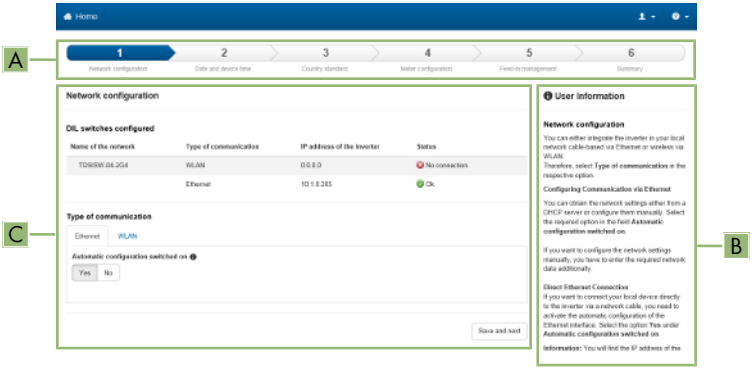


Figure 14: Layout of the installation assistant (example)

*	1 ' $ *	1 % 6 *
A	Configuration steps	Overview of the installation assistant steps. The number of steps depends on the type of device and the additionally installed modules. The current step is highlighted in blue.
B	User information	Information about the current configuration step and the setting options of the configuration step.
C	Configuration field	You can make settings in this field.

% - 2 B

1. Select the configuration option + ' 2 $ * , * & * $ # #.$ * " * $ *
   ☑ 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 [$) $ -]. 9 *
   ☑ In the last step, all made settings are listed in a summary.
4. To save the settings to a file, select [9 6 * $ 2 .].$ and save the file on your computer, tablet PC or smartphone.
5. To correct settings you made, select [$ %] navigate to the desired step, correct settings and select [$) $ - %]. * 2
6. Once all settings are correct, select [9] * in the summary.

☑ The start page of the user interface opens.

! $ 2 $ # % + ' 2 $ *

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

% - 2 B

1. Select the configuration option ! $ 2 $ # + ' 2. $ *
   ☑ The 1) % $ $. měnu on the user interface will open and all available parameter groups of the inverter will be displayed.
2. Select [- * 6 $ $.]. *
3. Select the desired parameter group.
   ☑ All available parameters of the parameter group will be displayed.
4. Set the desired parameters.
5. Select [$) $ # #

☑ The inverter parameters are set.

7 ' * &) * * + $ %

7 * $ 0 # & ' $ % % * * * & 2

7 * $ 0 # & ' $ - % * % % *) $ "

A 2 . * B

- ☐ The product must be commissioned.
- ☐ An end device (e.g. computer, tablet PC or smartphone) must be available.
- ☐ The respective latest version of one of the following web browsers must be installed: Chrome, Edge, Firefox, Internet Explorer or Safari.
- ☐ JavaScript must be enabled in the web browser of the end device.
- ☐ The SMA Grid Guard code of the Installer must be available for the changing of grid-relevant settings after completion of the first ten feed-in hours or installation assistant (see "Application for SMA Grid Guard Code" at www.SMA-Solar.com). A charge is levied for this code.

i) * 1 $ - $ - - $ - % $ (6 $, -

- Inverter SSID in WLAN: SMA[serial number] (e.g. SMA0123456789)
- Standard WLAN password (usable until completion of the configuration by means of the installation assistant or prior to the end of the first ten feed-in hours): SMA12345
- Device-specific WLAN password (usable for initial configuration to completion of the first ten feed-in hours): see WPA2-PSK on the type label of the inverter or on the back of the manual included in the delivery
- Standard IP inverter address for a direct connection via WLAN outside of a local network: 192.168.12.3

i . 6 * ' $ - 9 6 * ' + # , * & - -) % & $) ' $ (* . * 6 0 #

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

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

The procedure can be different depending on the end devices. If the procedure described does not apply to your end device, establish the direct connection via WLAN as described in the manual of your end device.

% - 2 B

1. If your end device has a WPS function:
   - Activate the WPS function on the inverter. To do this, tap twice in succession on the enclosure lid of the DC connection unit next to the LEDs.
     - ☑ The blue LED flashes quickly for approx. two minutes. The WPS function is active.

- Activate the WPS on your end device.
  - ☑ The connection with your end device will be established automatically. It can take up to 20 seconds for this connection to be established.

2. If your end device has not a WPS function:
   - Search for WLAN networks with your end device.
   - Select the SSID of the inverter ! " G $ # 2 in the list with the found WLAN networks.
   - Enter the inverter WLAN password. Within the first ten feed-in hours and prior to completing the configuration by means of the installation assistant, you must use the standard WLAN password ! " 5 . After the first ten feed-in hours or after completing the configuration by means of the installation assistant, you must use the device-specific WLAN password (WPA2-PSK) of the inverter. You find the WLAN password (WPA2-PSK) on the type label.
3. Enter the IP address 4 3 7 or, if your device supports mDNS services, ! " G $ # 2 . 0 H # or % & $ * # 6 B ? ? ! " G $ # in the address line of the web browser and press the enter key.
4. ℹ 0 0 , ' $ # $ % 2 * ( ) 2 # $ 0 # * (
   After the IP address has been confirmed by pressing the enter key, a message might appear indicating that the connection to the user interface of the inverter is not secure. SMA Solar Technology AG guarantees that calling up the user interface is secure.
   - Continue loading the user interface.

   ☑ The login page of the user interface opens.

7 * $ 0 # & ' $ % *) $ " * & 0

ℹ , $ - - + % % * ' , * & $ # % $ # * , /

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 SMA Connection Assist, 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: https://SMA[serial number] (e.g. https://SMA0123456789)

A 2 . * B

☐ 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.

☐ The end device must be in the same local network as the product.

- ☐ An end device (e.g. computer, tablet PC or smartphone) must be available.
- ☐ JavaScript must be enabled in the web browser of the end device.
- ☐ The respective latest version of one of the following web browsers must be installed: Chrome, Edge, Firefox, Internet Explorer or Safari.
- ☐ The SMA Grid Guard code of the Installer must be available for the changing of grid-relevant settings after completion of the first ten feed-in hours or installation assistant (see "Application for SMA Grid Guard Code" at www.SMA-Solar.com). A charge is levied for this code.

i . 6 * ' $ - 9 6 * ' + # , * & - -) % & $) ' $ (* . * 6 0 #

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

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

% - 2 B

1. Enter the IP address of the inverter in the address bar of the web browser.
2. i 0 0 , ' $ # $ % 2 * ( ) 2 # $ 0 # * (

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

   - Continue loading the user interface.

   ☑ The login page of the user interface opens.

7 5 * $ 0 # & ' $ % *) $ * & * * & * , /

i , $ - - + % % * ' , * & $ # % $ # * , /

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 SMA Connection Assist, 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: https://SMA[serial number] (e.g. https://SMA0123456789)

A 2 . * B

- ☐ 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.
- ☐ An end device (e.g. computer, tablet PC or smartphone) must be available.
- ☐ The end 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: Chrome, Edge, Firefox, Internet Explorer or Safari.
- ☐ The SMA Grid Guard code of the Installer must be available for the changing of grid-relevant settings after completion of the first ten feed-in hours or installation assistant (see "Application for SMA Grid Guard Code" at www.SMA-Solar.com). A charge is levied for this code.

% - 2 B

1. Open the web browser of your end device, enter the IP address of the inverter in the address line of the web browser and press the enter key.
2. ℹ 0 0 , ' $ # $ % 2 * ( ) 2 # $ 0 # * (

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

   - Continue loading the user interface.

☑ The login page of the user interface opens.

7 ' ' ' $ - 2 * + * & * + $ %

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.

ℹ $ ' + % /

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

' $ * $ # # + * & = * .

ℹ $, - + (* . * & $ * $ ' * - $ % . . 2 % $

The password for the user group * $ # # is also the system password. If you assign a password for the user group * $ # # in the user interface of the inverter, the password must match the PV system password. If the new password for logging onto the user interface does not match the system password in the communication product, the inverter cannot be reached by the communication product.

- A uniform password is assigned for all Speedwire devices in the PV system.

% - 2 B

1. In the drop-down list $ ' 2 $,' select the desired language.
2. In the ' 2 6 drop-down list, select the entry * $ # # .
3. In the , 6 $, field, enter a new password for the selected user group.

4. In the 6 $ * 6 $ field, enter the new password again.
5. Select ' .

☑ The + ' 2 ' * & page opens.

' $ * & * $ # #

1. In the drop-down list $ ' 2 $ ' select the desired language.
2. In the ' 2 6 drop-down list, select the entry * $ # # .
3. Enter the password in the field $, .-
4. Select ' .

☑ The start page of the user interface opens.

' 2 * $ * & * $ # #

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

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

7 5 * $ * $ ' 1 ' + * & * + $ %

Figure 15: Start page design of the user interface (example)

	1 ' $ * 1 % 6 * *	
A	Menu	Provides the following functions: • . Opens the user interface homepage • * $ * $ 2) $ # 2 Current measured values of the inverter • 1) % $ $. * The various operating parameters of the inverter can be viewed and configured here depending on the user group. •) * All events that have occurred in the selected time period are displayed here. The event types are + . $ *, $ 'and . Currently existing events of the types and $ ' will be additionally displayed in the 1) % *$*2 view. 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. • 1) % % + ' 2 $ * 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. • 1 $ * $ You will find all data that is saved in the internal memory of the inverter or on an external storage medium on this page.
B	User settings	Provides the following functions, depending on the user group logged in: • Starting the installation assistant • SMA Grid Guard login • Logout
C	Help	Provides the following functions: • Displaying information on Open Source licenses used • Link to the website of SMA Solar Technology AG

*	1 ' $ * 1 % 6 *	
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 current consumption	Temporal progression of the PV power and the power consumption of the household over the selected time period. Please note, the power consumption will only be displayed 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. • 1) % * $ * 2 Displays whether the inverter is currently in a fault-free operating state or whether there is an Error or Warning present. • 2 * 6 , Displays the power currently being generated by the inverter. • 2 * % 2 . 6 * Displays the current consumption of the household if an energy meter is installed in the PV system. • # - Displays the energy yield of the inverter. • 2 . 6 * Displays the energy consumption of the household if an energy meter is installed in the PV system. • = - . $ $ ' . * Displays whether the inverter is currently limiting its active power. • $ - $ * ? , - 6 - Depending on the connected sensors, displays the current solar irradiation and/or wind speed. • . 6 $ * 2 . $ 2 . * Depending on the connected sensors, displays the current temperature of the PV modules and/or the ambient temperature.

7 1 6 # $ (' $ - 1 , # $ - ' * & * - 1 $ *

If an external storage device is plugged in, you can display and download the stored data.

% - 2 B

1. Activate the user interface (see Section 8.1, page 50).
2. Log into the user interface (see Section 8.2, page 53).
3. Select the menu 1 $ * $
4. Select the folder 1 $ * $
5. To call up the data, select the respective folder and click on the required file.
6. To download the data, select the data type to be exported in the drop-down list. Then apply the time filter and select 1 $ * $ 9.6 *

7 & $ ' ' * & $, -

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

(* . ' * - $ % . . 2 % $ * 6 - 2 % *

With PV systems that are registered in a communication product (e.g. Sunny Portal, Cluster Controller), you can also assign a new password for the user group * $ # via the communication product. The password for the user group * $ # is also the system password. If you assign a password for the user group * $ # 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 * $ # is the same as the system password in the communication product.

% - 2 B

1. Activate the user interface (see Section 8.1, page 50).
2. Log into the user interface (see Section 8.2, page 53).
3. Call up the menu 1) % $ $. *
4. Select [- * 6 $ $.].*
5. In the parameter group ' & * : " % % change the password of the desired user group.
6. Select [$) $ to save the changes.

4 + ' 2 $ * + * &) *

4 & $ ' ' 6 $ * ' $ $. *

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

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

A 2 . * B

- ☐ The changes to the grid-relevant parameters must be approved by the grid operator.
- ☐ When changing grid-relevant parameters, the SMA Grid Guard code must be available (see "Application for SMA Grid Guard Code" at www.SMA-Solar.com). A charge is levied for this code.

% - 2 B

1. Activate the user interface (see Section 8.1, page 50).
2. Log into the user interface (see Section 8.2, page 53).
3. Call up the menu 1) % $ $. *
4. Select [- * 6 $ $.].*
5. Log in using the SMA Grid Guard code to change those parameters designated by a lock (only for installers):
   - Select the menu * * (see Section 8.3, page 55).
   - In the subsequent context menu, select [! " - @ 2 $ -]# '
   - Enter the SMA Grid Guard code and select ['].
6. Expand the parameter group that contains the parameter which is to be configured.
7. Change the desired parameters.
8. Select [$) $ # # to save the changes.

☑ The inverter parameters are set.

i " % % 6 * ' * & * * '

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.

4 * $ * ' * & * $ # # $ * " * $ *

⚠ QUALIFIED PERSON

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

$ (2 * + * & * $ # # $ * $ * $ *

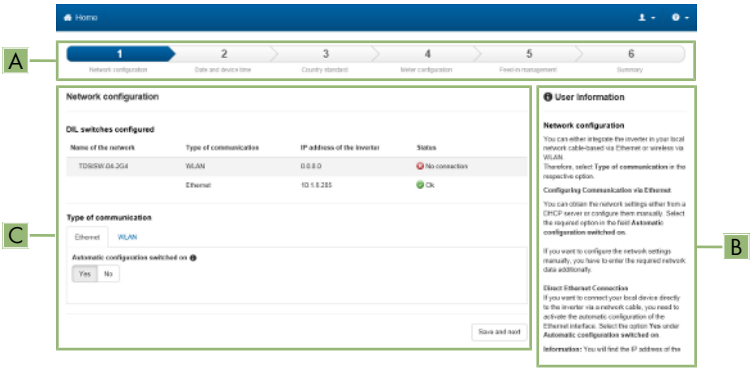


Figure 16: Layout of the installation assistant (example)

* 1 ' $ *	1 % 6 *	
A	Configuration steps	Overview of the installation assistant steps. The number of steps depends on the type of device and the additionally installed modules. The current step is highlighted in blue.
B	User information	Information about the current configuration step and the setting options of the configuration step.
C	Configuration field	You can make settings in this field.

A 2 . * B

☐ When configuring after completion of the first ten feed-in hours or after exiting the installation assistant, the SMA Grid Guard code must be available in order to change the grid-relevant parameters (see "Application for SMA Grid Guard Code" at www.SMA-Solar.com). A charge is levied for this code.

% - 2 B

1. Activate the user interface (see Section 8.1, page 50).
2. Log in as * $ # #
3. Select the menu * * (see Section 8.3, page 55) on the start page of the user interface.
4. In the context menu, select [* $ * * & * $ # # $]: $ * $ *

☑ The installation assistant will open.

4 5 + ' 2 ' * & 2 * (1 $ * $ *

⚠ QUALIFIED PERSON

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

i & % 2 * (- $ * $ * . 2 * 0 * % % * # (

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 country data set is valid for your country or purpose, contact your grid operator for information on which country data set is to be configured.

The basic procedure for changing operating parameters is explained in another section (see Section 9.1 "Changing Operating Parameters", page 59).

% - 2 B

- In the parameter group - . * ' : - . select the parameter * % 2 * (* $ and set the required country data set.

4 & $ ' ' * & 6 $ * ' ! - + * & ! 2 # * + # $ (

⚠ QUALIFIED PERSON

The default operating mode of the multifunction relay is = $ 2 # * - % $ * . If you decide to use another operating mode and have established the correct electrical connection for this operating mode and the associated connection variant, you will have to change the operating mode of the multifunction relay and make other settings, if necessary.

The basic procedure for changing operating parameters is explained in another section (see Section 9.1 "Changing Operating Parameters", page 59).

% - 2 B

1. Call up the menu 1) % $ $. *
2. Select [- * 6 $ $.].*
3. In the parameter group 1) % : ! 2 # * + 2 % * # $ (: select the parameter 6 $ * ' . - + . 2 # * + 2 % ! # * 6 ! # $ (and set the desired operating mode.
4. Once you have set the operating mode # + % 2 . 6 * # + , you can configure other settings:
   - In the parameter group 1) % : ! 2 # * + 2 % * # $ (: # + % 2 . 6 ! . 2 . 6 , select the parameter ! . 2 . 6 , + ! = # + % 2 . 6 * or ! # * ! , and set the desired value. This will configure the power threshold from which a load is to be activated.

- In the parameter group 1) % : ! 2 # * + 2 % * # $ (: # + % 2 . 6 ! . 2 . 6 , * select the parameter ! . 2 . 6 , * . D ! = # + % 2 . 6 * or ! # * ! , . and set the desired value. This will configure the minimum time for which the power must have exceeded the minimum switch-on power threshold in order to trip activation of the load.
- In the parameter group 1) % : ! 2 # * + 2 % * # $ (: # + % 2 . 6 ! . 2 . 6 , select the parameter ! . 2 . * . + ! = # + % 2 . 6 * or ! # * ! . and set the desired value. This will configure the minimum time for which the load remains activated.

5. If you have set the operating mode * #) $ % . . 2 or % $. * * # in the parameter group 1) % : ! 2 # * + 2 % * # $ (: * #) $ % . . 2 % select the parameter * $ * 2 + ! = , * & % * #) $ or % # * . 2 . % # $ * , and set the desired value. This determines whether the multifunction relay can be controlled via a communication product.
6. If you have set the operating mode $ * * (0 $ / $ * & make further settings:
   - In the parameter group 1) % : ! 2 # * + 2 % * # $ (: $ * * (0 $ / 6 , select the parameter ! . 2 . 6 , + ! = 0 $ * * or (0 $ / ! # * $ * & $ and, set the desired value. This will configure the power threshold from which the battery is to be charged.
   - In the parameter group 1) % : ! 2 # * + 2 % * # $ (: $ * * (0 $ / * . 0 + % select the parameter ! . 2 . * . 0 + % % * + ! = 0 $ * * or 0 $ * / $ * & $ and set the desired value. This will configure the minimum time which must elapse after charging the battery before the battery can be charged again.
7. Select [$) $ to save the changes.

4 + ' 2 ' * & ! - 0 2 @ = 2 % *

⚠ QUALIFIED PERSON

The Modbus interface is deactivated by default and the communication ports 502 set.

In order to access SMA invertes with SMA Modbus® or SunSpec® Modbus®, the Modbus interface must be activated. After activating the interface, the communication ports of both IP protocols can be changed. For information on commissioning and configuration of the Modbus interface, see the Technical Information "SMA Modbus® Interface" or in the Technical Information "SunSpec® Modbus® Interface" at www.SMA-Solar.com.

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

1 $ * $ % 2 * (- 2 ' $ % *) $ * - ! - 0 2 * + $ %

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

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

% - 2 B

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

4 3 * * ' * & 6 6 ' & & # - + * & 1) %

QUALIFIED PERSON

If a residual-current device with a tripping threshold of < 500 mA is used, you must change the tripping threshold in the inverter accordingly. For further information, see the Technical Information “"Leading Leakage Currents"” at www.SMA-Solar.com).

The basic procedure for changing operating parameters is explained in another section (see Section 9.1 "Changing Operating Parameters", page 59).

- In the parameter group 1) % : ,)select the parameter 1 $ - C 2 *and set it to the tripping threshold of the residual-current device that is used.

4 8 + ' 2 ' = - ! $ $ ' . *

QUALIFIED PERSON

If required by the grid operator, the inverter can provide grid management services. You can configure these via the inverter feed-in management. Coordinate the configuration of the feed-in management with your grid operator beforehand.

The basic procedure for changing operating parameters is explained in another section (see Section 9.1 "Changing Operating Parameters", page 59).

% - 2 B

1. Activate the user interface (see Section 8.1, page 50).
2. Log into the user interface as an * $ # #
3. On the right-hand side of the menu bar, select the menu * * (see Section 8.3 "Start Page Design of the User Interface", page 55).
4. In the context menu, select [* $ * ' * & * $ # # $].* $ * $ *

5. Select [$) $ -] until you reach the = - . $ $ ' .step.
6. Configure the feed-in management as desired.

4 7 * * ' ! " 6 * $ % # 0 $ # $ /

⚠ QUALIFIED PERSON

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

The basic procedure for changing operating parameters is explained in another section (see Section 9.1 "Changing Operating Parameters", page 59).

% - 2 B

- In the parameter group 1 - : 1 * * ' : 6 * $ %, set the parameter $ / (% # * . + * & 6 * $ % # 0 $ # and set the required time interval. The ideal time interval is usually six minutes. This value should only be increased if the shading situation changes extremely slowly.
  ☑ The inverter optimizes the MPP of the PV system at the predetermined time interval.
- In order to deactivate the SMA OptiTrac Global Peak feature, in the parameter group 1 - : 1 * * ' : 6 * $ %, set the parameter $ / 6 * $ % # 0 $ # $ / , * % & to +.+

4 4 " % *) $ * ' * & % 6 * + * # ' $ # * $ # (F

⚠ 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 9.1 "Changing Operating Parameters", page 59).

$ $. *	$ # 2 ? $ '	# 2 *	1 + $ 2 # *
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

% - 2 B

1. Select the parameter group 9 * $ # % . . 2 % $ * : 3 7 . % + ' 2 $

2. In the field " 6 6 # % $ *, enter the 1 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 ! $ % $ - - , 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.

☑ The receipt of control signals from the grid operator is activated.

4 " % *) $ * ' * ' = $ # 2 1 * % *

⚠ QUALIFIED PERSON

1. Activate the user interface (see Section 8.1, page 50).
2. Log into the user interface as an * $ # #
3. On the right-hand side of the menu bar, select the menu * * (see Section 8.3 "Start Page Design of the User Interface", page 55).
4. In the context menu, select [* $ * ' * & * $ # # $]. * $ * $ * *
5. Select [$) $ -] until you reach the * ' % + ' 2 step $ *
6. Activate string-failure detection and configure it as required.

4 $) ' * & + ' 2 $ * $ =

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.

% - 2 B

1. Activate the user interface (see Section 8.1, page 50).
2. Log into the user interface (see Section 8.2, page 53).
3. Select the menu 1) % + ' 2 $ *
4. Select [* *].'
5. In the context menu, select [$) ' * & % + ' 2 $ *]. $ + #
6. Follow the instructions in the dialog.

4 " - 6 * ' $ + ' 2 $ * + . $ =

⚠ 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 9.11 "Saving the Configuration in a File", page 65). When saving, only the device parameters will be adopted, not any passwords.

A 2 . * B

- ☐ The SMA Grid Guard code must be available (see "Application for SMA Grid Guard Code" at www.SMA-Solar.com). A charge is levied for this code.
- ☐ Changes to grid-relevant parameters must be approved by the responsible grid operator.

% - 2 B

1. Activate the user interface (see Section 8.1, page 50).
2. Log into the user interface as an * $ # #
3. Select the menu 1) % + ' 2 $ *
4. Select [* *].'
5. In the context menu, select [" - 6 * ' * & % + ' 2 $ *]. + . $ + #
6. Follow the instructions in the dialog.

4 5 , * % & ' * & 1 ($. % , 1 6 # $ (+ +

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

The basic procedure for changing operating parameters is explained in another section (see Section 9.1 "Changing Operating Parameters", page 59).

% - 2 B

- In the parameter group 1) % : 6 , select the parameter 1 ($. % 6 , - 6 # $ ( ) $ ' and set this to +.+

4 , * % & ' " $ - + +

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 , * % & ' * & " + 2 % * # (6 0 #) $ * &

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 9.1 "Changing Operating Parameters", page 59).

, * % & ' " + +

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.

% - 2 B

- To switch off the direct connection in the parameter group (* . % . . 2 % $ * : " , select the parameter + * $ % % 6 * and set this to 2 .
- To switch off the connection in the local network in the parameter group (* . % . . 2 % $ * :, select the parameter " * 2 -and set this to .

, * % & ' "

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.

A 2 . * B

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

% - 2 B

- To switch on the WLAN direct connection, in the parameter group (* . % . . 2 % $ * :, select the parameter + * $ % % 6 * and set this to 2 .
- To switch on the WLAN connection in the local network, in the parameter group (* . % . . 2 % $ * :, select the parameter " * 2 -and set this to .

4 " % *) $ * = 2 % *

The WPS function can be used for different purposes:

- Automatic connection to a network (e.g. via router)
- Direct connection between the product and an end device

Depending on the intended application of the WPS function, the procedure for activation will vary.

" % *) $ * ' + 2 % * + $ 2 * . $ * % % % * * $ *

Requirements:

☐ WLAN must be activated in the product.

☐ WPS must be activated on the router.

% - 2 B

1. Activate the user interface (see Section 8.1, page 50).
2. Log in as * $ # #
3. Start the installation assistant (see Section 9.2, page 60).
4. Select * , / % + ' 2 . $ *
5. Select + " * , button in the " tab.
6. Select " % *) $ * .
7. Select $) $ - 9 * and exit the installation assistant.

☑ The WPS function is activated and the automatic connection to the network can be established.

" % *) $ * ' * & + 2 % * + - % * % % * * * &

- Activate the WPS function on the inverter. To do this, tap twice in succession on the enclosure lid of the DC connection unit next to the LEDs.
  - ☑ The blue LED flashes quickly for approx. two minutes. The WPS function is active.

1 % % * ' * &) * + . # * $ '

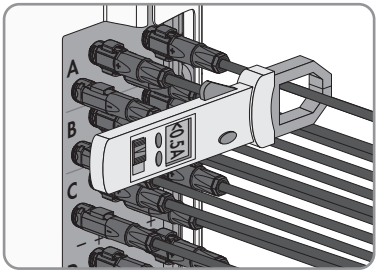
⚠ QUALIFIED PERSON

Prior to performing any work on the inverter, always disconnect it from all voltage sources as described in this section. Always adhere to the prescribed sequence.

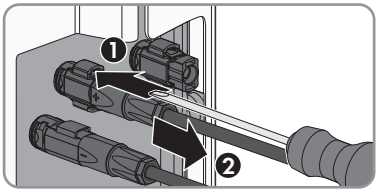
1 * 2 % * + * & . $ 2 ' -) % - 2 *)) # * $ ' • Only use measuring devices with a DC input voltage range of 1000 V or higher.

% - 2 B

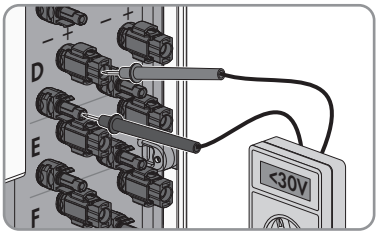
1. Disconnect the AC circuit breaker and secure it against reconnection.
2. Set the DC load-break switch of the inverter to position .
3. Secure the DC load-break switch against reconnection using a suitable padlock.
4. If the multifunction relay is used, switch off any supply voltage to the load.
5. Wait until the LEDs have gone out.
6. Use a current clamp to ensure that no current is present in the DC cables.



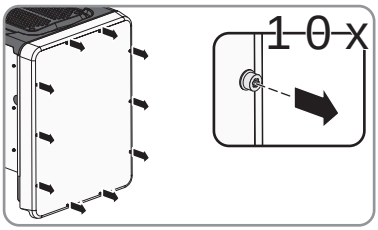
7. Release and remove the DC connectors. To do this, insert a flat-blade screwdriver or an angled screwdriver (blade width: 3.5 mm) into one of the slide slots and pull the DC connectors out in a downward direction. Do not pull on the cable.



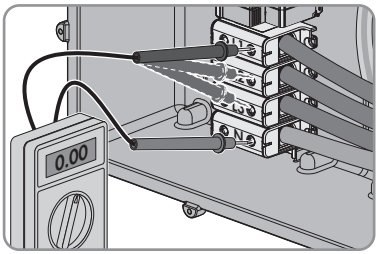
8. Ensure that no voltage is present at the DC inputs on the inverter using a suitable measuring device.



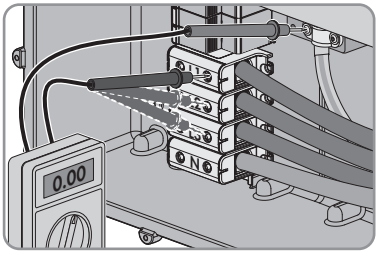
9. Unscrew all ten screws of the enclosure lid of the AC connection unit using a Torx screwdriver (TX 25) and remove the enclosure lid towards the front.



10. Set the screws and the enclosure lid aside and store safely.
11. Ensure there is no voltage on the AC terminal block between L1 and N, L2 and N, and L3 and N using a suitable measuring device. To do so, insert the test probe (maximum diameter: 2.5 mm) into the measuring points of the respective terminal blocks.



12. Ensure there is no voltage on the AC terminal block between L1 and PE, L2 and PE, and L3 and PE using a suitable measuring device. To do so, insert the test probe (maximum diameter: 2.5 mm) into the measuring points of the respective terminal blocks.



$ ' * &) *

1 $. $ ' * * & * (6 # $ 0 # - 2 * * & 2 + % # $ ' $ ' * • If the inverter is dirty, clean the enclosure, the enclosure lid, the type label and the LEDs with a damp cloth and clear water only.

2 0 # & * '

) * ! $ '

) * 2 . 0 ! $ ' D % $ 2 $ - % % *) . $ 2	
101	**⚠ QUALIFIED PERSON** - + $ 2 # * The grid voltage or grid impedance at the connection point of the inverter is too high. The inverter has disconnected from the utility grid. % *) . $ 2 B • Check whether the grid voltage at the connection point of the inverter is permanently in the permissible range. If the grid voltage is outside the permissible range due to local grid conditions, contact the grid operator. The grid operator must agree with an adjustment of the voltage at the feed-in point or with a change of the monitored operating limits. If the grid voltage is permanently within the permissible range and this message is still displayed, contact the Service (see Section 16 "Contact", page 102).
301	**⚠ QUALIFIED PERSON** - + $ 2 # * The ten-minute average value of the grid voltage is no longer within the permissible range. The grid voltage or grid impedance at the connection point is too high. The inverter disconnects from the utility grid to maintain power quality. % *) . $ 2 B • During the feed-in operation, check whether the grid voltage at the connection point of the inverter is permanently in the permissible range. If the grid voltage is outside the permissible range due to local grid conditions, contact the grid operator. The grid operator must agree with an adjustment of the voltage at the feed-in point or with a change of the monitored operating limits. If the grid voltage is permanently within the permissible range and this message is still displayed, contact the Service (see Section 16 "Contact", page 102).

) * 2.0 ! $ ' D % $ 2 $ - % % *) . $ 2	
401	**⚠ QUALIFIED PERSON** - + $ 2 # * The inverter has disconnected from the utility grid. A stand-alone grid or a very large change in the power frequency was detected. % *) . $ 2 B • Check the grid connection for significant short-term frequency fluctuations.
501	**⚠ QUALIFIED PERSON** - + $ 2 # * The power frequency is not within the permissible range. The inverter has disconnected from the utility grid. % *) . $ 2 B • If possible, check the power frequency and observe how often fluctuations occur. If fluctuations occur frequently and this message is displayed often, contact the grid operator and request approval to change the operating parameters of the inverter. If the grid operator gives his approval, discuss any changes to the operating parameters with Service (see Section 16 "Contact", page 102).
601	**⚠ QUALIFIED PERSON** - + $ 2 # * The inverter has detected an excessively high proportion of direct current in the grid current. % *) . $ 2 B • 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.

) * 2.0 ! $ ' D % $ 2 $ - % % *) . $ 2	
801	**⚠ QUALIFIED PERSON** $ * ' + ' -) # * $ ' : - + $ # 2 : & % / " % The AC cable is not correctly connected or the country data set is not correctly configured. % *) . $ 2 B • Make sure that the circuit breaker is switched on. • Ensure that the AC cable is not damaged and that it is connected correctly. • Ensure that the country data set has been configured correctly. • Check whether the grid voltage at the connection point of the inverter is permanently in the permissible range. If the grid voltage is outside the permissible range due to local grid conditions, contact the grid operator. The grid operator must agree with an adjustment of the voltage at the feed-in point or with a change of the monitored operating limits. If the grid voltage is permanently within the permissible range and this message is still displayed, contact the Service (see Section 16 "Contact", page 102).
901	**⚠ QUALIFIED PERSON** % . ' : & % / % % * The grounding conductor is not correctly connected. % *) . $ 2 B • Ensure that the grounding conductor is correctly connected.
3401 to 3407	**⚠ QUALIFIED PERSON** 1)) # * $ ' : 1 % % * ' $ * Overvoltage at the DC input. This can destroy the inverter. This message is signalized additionally by rapid flashing of the LEDs. % *) . $ 2 B • . . - $ * disconnect the inverter from all voltage sources (see Section 10, page 69). • 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 (see Section 16 "Contact", page 102).

) * 2.0 ! $ ' D % $ 2 $ - % % *) . $ 2	
3501	**⚠ QUALIFIED PERSON** 2 # $ * + $ # 2 : & % / ' $ * The inverter has detected a ground fault in the PV array. % *) . $ 2 B • Check the PV system for ground faults (see Section 12.4, page 87).
3701	**⚠ QUALIFIED PERSON** - % 2 * & ' & : & % / ' $ * The inverter has detected a residual current due to temporary grounding of the PV array. % *) . $ 2 B • Check the PV system for ground faults (see Section 12.4, page 87).
3801 to 3805	**⚠ QUALIFIED PERSON** 1) % 2 * : & % / ' $ * Overcurrent at the DC input. The inverter briefly interrupts feed-in operation. % *) . $ 2 B • If this message is displayed frequently, ensure that the PV array has been correctly rated and wired.
6002 to 6412	**⚠ QUALIFIED PERSON** # + - $ ' : * + % -) % The cause must be determined by the Service. % *) . $ 2 B • Contact the Service (see Section 16 "Contact", page 102).
6502	**⚠ QUALIFIED PERSON** # + - $ ' :) * . 6 $ * 2 The inverter has switched off due to excessive temperature. % *) . $ 2 B • 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 +35 °C has not been exceeded. • Ensure that the inverter is not exposed to direct solar irradiation.
6512	! . 2 . 6 $ * ' * . 6 $ * 2 * $ % & - The inverter will only recommence grid feed-in once the temperature has reached at least −25 °C.

) * 2 . 0 ! $ ' D % $ 2 $ - % % *) . $ 2	
6603 to 6604	**⚠ QUALIFIED PERSON** # + - $ ' :) # $ - The cause must be determined by the Service. % *) . $ 2 B • Contact the Service (see Section 16 "Contact", page 102).
6701 to 6702	**⚠ QUALIFIED PERSON** . . 2 % $ * - * 2 0 - Error in the communication processor, the inverter continues feeding in, however. The cause must be determined by the Service. % *) . $ 2 B • If this message is displayed frequently, contact the Service (see Section 16 "Contact", page 102).
7102	**⚠ QUALIFIED PERSON** $ $. * + # * + 2 - - + % *) The parameter file was not found or is defective. Loading the parameter file has failed. The inverter continues feeding power into the grid. % *) . $ 2 B • Copy the parameter file to the correct folder again.
7105	**⚠ QUALIFIED PERSON** $ $. * * ' + $ # - Parameters could not be set using the memory card. The inverter continues feeding power into the grid. % *) . $ 2 B • Ensure that the parameters are set correctly. • Ensure that the SMA Grid Guard code is available.
7106	6 - $ * + # - + % * The update file is defective. The update failed. The inverter continues feeding power into the grid.
7110	2 6 - $ * + # + 2 - No new update file was found on the SD memory card. The update failed. The inverter continues feeding power into the grid.
7112	6 - $ * + # 2 % % + 2 # # (% 6 -
7113	& . . (% $ - + 2 # # , * 6 * % * -
7201 to 7202	1 $ * $ * $ ' * 6 0 #

) * 2.0 ! $ ' D %$2 $ - % %*) . $ 2	
7303	**⚠ QUALIFIED PERSON** 6 - $ * . $ + $ # - The cause must be determined by the Service. %*) . $ 2 B • Contact the Service (see Section 16 "Contact", page 102).
7320	& -) % , *& $# 2.0 G99H ,$ 2%% +2# + .,$) G999H The firmware update was completed successfully.
7330	- * * * +$ # - The testing of the update conditions was not successful. The firmware update package is not suitable for this inverter.
7331	6 - $ * * $ 6 * *$ * - Update file is being copied.
7332	6 - $ * * $ 6 * 2%% +2# Update file was copied successfully to the inverter's internal memory.
7333	**⚠ QUALIFIED PERSON** 6 - $ * * $ 6 * +$ # - Update file could not be copied to the inverter's internal memory. In the event of connection with the inverter via WLAN, a poor connection quality can be the cause. %*) . $ 2 B • Retry update. • For WLAN connection: Improve the WLAN connection quality (e.g. via WLAN repeater) or establish connection with the inverter via Ethernet. • If this message is displayed again, contact the Service (see Section 16 "Contact", page 102).
7341	6 - $ * *# $ - The inverter is performing a bootloader update.
7342	**⚠ QUALIFIED PERSON** 6 - $ * *# $ - +$ # - The bootloader update failed. %*) . $ 2 B • Retry update. • If this message is displayed again, contact the Service (see Section 16 "Contact", page 102).

) * 2 . 0 ! $ ' D % $ 2 $ - % % *) . $ 2	
7347	⚠ QUALIFIED PERSON % . 6 $ * 0 # + # The configuration file is not suitable for this inverter. % *) . $ 2 B • Ensure that the selected configuration file is suitable for this inverter. • Retry import.
7348	⚠ QUALIFIED PERSON % % * + # + . $ * The configuration file is not of the required format or is damaged. % *) . $ 2 B • Ensure that the selected configuration file is of the required format and is not damaged. • Retry import.
7350	$ + + $ % + ' 2 $ * + # & $ * $ * - The configuration file is being transferred.
7351	6 - $ * " The inverter is updating the WLAN module.
7352	6 - $ * + " * 2 % % + 2 # The update of the WLAN module failed. % *) . $ 2 B • Retry update. • If this message is displayed again, contact the Service (see Section 16 "Contact", page 102).
7353	6 - $ * * . ; - $ * $ 0 $ The inverter is updating the time zone database.
7354	⚠ QUALIFIED PERSON 6 - $ * + * . ; - $ * $ 0 $ * 2 % % + 2 # The update of the time zone database failed. % *) . $ 2 B • Retry update. • If this message is displayed again, contact the Service (see Section 16 "Contact", page 102).
7355	6 - $ * 0 The inverter is updating the inverter user interface.

) * 2.0 ! $ ' D % $ 2 $ - % % *) . $ 2	
7356	**⚠ QUALIFIED PERSON** 6 - $ * + * & 0 * 2 % % + 2 # The update of the inverter user interface failed. % *) . $ 2 B • Retry update. • If this message is displayed again, contact the Service (see Section 16 "Contact", page 102).
7500 to 7501	**⚠ QUALIFIED PERSON** = $ + $ 2 # * : & % /) * # % * % $ - + $
7619	**⚠ QUALIFIED PERSON** . . 2 % $ * + $ 2 # * , * & . * 2 * : & % / % . . 2 % The inverter is not receiving any data from the energy meter. % *) . $ 2 B • Ensure that the energy meter is correctly integrated into the same network as the inverter (see energy meter manual). • For WLAN connection: Improve the WLAN connection quality (e.g. via WLAN repeater) or connect the inverter with the DHCP server (router) via Ethernet.
7702	**⚠ QUALIFIED PERSON** * + % -) % The cause must be determined by the Service. % *) . $ 2 B • Contact the Service (see Section 16 "Contact", page 102).
8003	**⚠ QUALIFIED PERSON** " % *) 6 , # . * - - $ * ' The inverter has reduced its power output for more than ten minutes due to excessive temperature. % *) . $ 2 B • 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 +35 °C has not been exceeded. • Ensure that the inverter is not exposed to direct solar irradiation.

) * 2 . 0 ! $ ' D % $ 2 $ - % % *) . $ 2	
8101 to 8104	**⚠ QUALIFIED PERSON** . . 2 % $ * - * 2 0 - The cause must be determined by the Service. % *) . $ 2 B • Contact the Service (see Section 16 "Contact", page 102).
9002	**⚠ QUALIFIED PERSON** ! " - 2 $ - % -) $ # - The SMA Grid Guard code entered is incorrect. The operating parameters are still protected and cannot be changed. % *) . $ 2 B • Enter the correct SMA Grid Guard code.
9003	- 6 $ $. * # % / - 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	**⚠ QUALIFIED PERSON** & $ ' ' + ' - 6 $ $. * * 6 0 # : 2 1 2 This error can have the following causes: • The parameters to be changed are protected. • The DC voltage at the DC input is not sufficient to run the main CPU. % *) . $ 2 B • 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** " 0 * # + * * The self-test (Italy only) was terminated. % *) . $ 2 B • Ensure that the AC connection is correct. • Restart the self-test.
10108	. $ - C 2 * - ? # - * .
10109	. $ - C 2 * - ? , * .

) * 2.0 ! $' D %$2 $ - % %*) . $ 2	
10110	**⚠ QUALIFIED PERSON** . (%& ;$* +$ # -B 99 No time information could be called up from the set NTP server. %*) . $ 2 B • Ensure that the NTP server was configured correctly. • Ensure that the inverter is integrated into a local network with Internet connection.
10118	$ $. * 26# $- % .6# * The configuration file was loaded successfully.
10248	**⚠ QUALIFIED PERSON** G * +$% HB *, / 02 (The network is busy. Data exchange between the devices is not at an optimum and is greatly delayed. %*) . $ 2 B • Increase the query intervals. • If necessary, reduce the number of devices in the network.
10249	**⚠ QUALIFIED PERSON** G * +$% HB *, /) # $- - The network is overloaded. There is no data exchange between the devices. %*) . $ 2 B • Reduce the number of devices in the network. • If necessary, increase the data query intervals.
10250	**⚠ QUALIFIED PERSON** G * +$% HB 6$%/$' $* G / ? & '&H The package error rate has changed. If the package error rate is high, the network is overloaded or the connection to the network switch or DHCP server (router) is disturbed. %*) . $ 2 + *& 6$%/$' $* & '& • 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.

) * 2.0 ! $' D %$2 $ - % %*) . $ 2	
10251	G * +$% HB % ..2 %$* *$*2 ' * G > ? $ * % %* -H The communication status to the network switch or DHCP server (router) has changed. An additional error message may be displayed.
10252	**⚠ QUALIFIED PERSON** G * +$% HB % ..2 %$* - 26* - There is no valid signal on the network line. %*) . $ 2 B • 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.
10253	**⚠ QUALIFIED PERSON** G * +$% HB % %* 6 - ' * G @!0 * ? 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. %*) . $ 2 + *& *$*2 G !0 *HB • Ensure that with an Ethernet connection, the network cable and the network connector are not damaged and that the network connectors are correctly plugged. • Ensure that the DHCP server (router) and any network switches are signalizing correct operation.
10254	**⚠ QUALIFIED PERSON** G * +$% HB -26# 9 . - ' * G=2## ? $#+H 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. %*) . $ 2 + *& *$*2 G $#+HB • 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.

) * 2.0 ! $ ' D %$2 $ - % %*) . $ 2	
10255	⚠ QUALIFIED PERSON G * +$% HB *, / # $- > The network load has returned to a normal range after being busy.
10282	G ' 26H ') $ G6 * % #H # %/ - 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. %*) . $ 2 B • Wait until the given time has expired and then retry login.
10283	⚠ QUALIFIED PERSON " . -2# +$2#*(The WLAN module integrated in the inverter is defective. %*) . $ 2 B • Contact the Service (see Section 16 "Contact", page 102).
10284	⚠ QUALIFIED PERSON " % %* 6 0# The inverter does not currently have a WLAN connection to the selected network. %*) . $ 2 B • Ensure that the SSID, the WLAN password and the encryption method have been entered correctly. The encryption method is specified by your WLAN router or WLAN Access Point and can be changed there. • Ensure that the WLAN router or WLAN Access Point is in range and is signalizing correct operation. • If this message is displayed often, improve the WLAN connection by using a WLAN repeater.
10285	" % %* *$0# & - Connection to the selected WLAN network has been established.

) * 2.0 ! $' D %$2 $ - % %*) . $ 2		
10286	**⚠ QUALIFIED PERSON** " % %* # * The inverter has lost WLAN connection to the selected network. %*) . $ 2 B • Ensure that the WLAN router or WLAN Access Point is still active. • Ensure that the WLAN router or WLAN Access Point is in range and is signalizing correct operation. • If this message is displayed often, improve the WLAN connection by using a WLAN repeater.	
10339	0% %* $0# -	
10340	0% %* - $0# -	
10341	0% %* B % %*	
10343	0% %* B 1 +$2#* '$* ,$(* % + '2 -	
10344	0% %* B 1) * % + '2 -	
10345	0% %* B 6#(* 1 A2 * 99	
10346	0% %* B / , 6 9(99	
10347	0% %* B / ,) G99H	
10348	0% %* B 6#(* A2 * *	)
10349	0% %* B 6#(* 6* 6$%/	
10350	0% %* B ' * $* C %* - 0(	' *
10351	0% %* B / , ' * $ 99	
10352	0% %* B =$2#*(% ..2 %$*	
10353	0% %* B ' * $* + *& ' *	(&$
10502	"%*) 6 , # . * - " + A2 %(	
10901	*$ * #+ * * G99H	
10902	$% G999H	
10903	$% !$9 G999H	
10904	$% ! G999H	
10905	$% ! =$ * G999H	
10906	=$% ,!$9 G999H ;	
10907	=$% ,! G999H ;	
10908	=$% !$9 G999H ;	

) * 2.0 ! $' D %$2 $ - % %*) . $ 2	
10909	=$% ! G999H ;
10910	1 % *& & #- G999H G99H
10911	*$ - $# G999H G99H
10912	1 % * . G99H
27103	* 6$ $. * The parameter changes are being adopted.
27104	$ $. * * 2%% +2##(The parameter changes were successfully adopted.
27107	6-$* + # > The update file found is valid.
27301	6-$* % ..2 %$* The inverter is updating the communication component.
27302	6-$* .$ The inverter is updating the inverter component.
27312	6-$* % .6# * - The inverter has successfully completed the update.
29001	* % -)$# - The entered Grid Guard code is valid. Protected parameters have now been unlocked and you can adjust the parameters. The parameters will be automatically locked again after ten feed-in hours.
29004	- 6$ $. * 2 %&$ ' - Changing the grid parameters is not possible.

1 ' $#

The LEDs indicate the operating state of the inverter.

1 ' $#	96#$ $*
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%.

1 ' $ #	9 6 # $ $ *
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.
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 inverter user interface or in the communication product.
The blue LED flashes slowly for approx. one minute	Communication connection is being established The inverter is establishing a connection to a local network or is establishing a direct connection to an end device via Ethernet (e.g. computer, tablet PC or smartphone).
The blue LED flashes quickly for approx. two minutes.	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 direct connection with an end device via Ethernet (e.g. computer, tablet PC or smartphone).

5 = ' * * $, -

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

% - 2 B

1. Request PUK (application form available at www.SMA-Solar.com).
2. Activate the user interface (see Section 8.1, page 50).
3. Enter the PUK instead of the password into the field $, .-
4. Select ' .
5. Call up the menu 1) % $ $. *
6. Select [- * 6 $ $.].*
7. In the parameter group ' & * : " % % change the password of the desired user group.
8. Select [$) $ to save the changes.

(* . 2 (@ * $ #

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

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

& % / ' * & (* . + 2 - = $ 2 # *

QUALIFIED PERSON

If the red LED is glowing and the event number 3501, 3601 or 3701 is being displayed in the 2 # * 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.

"

1 $ ' * # + - 2 * # % * % & % /

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

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

1 * 2 % * + * & . $ 2 ' -) % - 2 *)) # * $ '

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

% - 2 B

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.

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

% - 2 B

1. **1 "**

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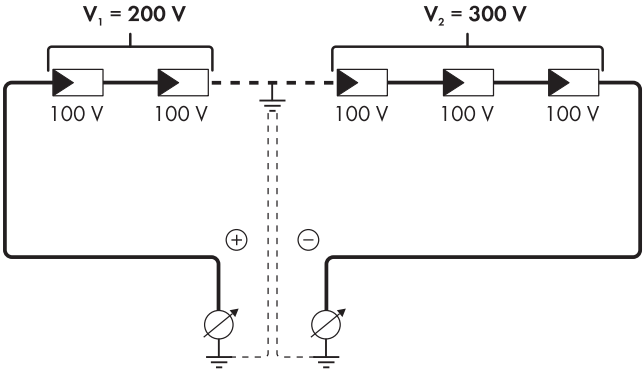
   - Disconnect the inverter from all voltage sources (see Section 10, page 69).
2. Measure the voltages:
   - Measure the voltage between the positive terminal and the ground potential (PE).

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

9 $. 6 # B % $ * + * & ' 2 - + $ 2 # *

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



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

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

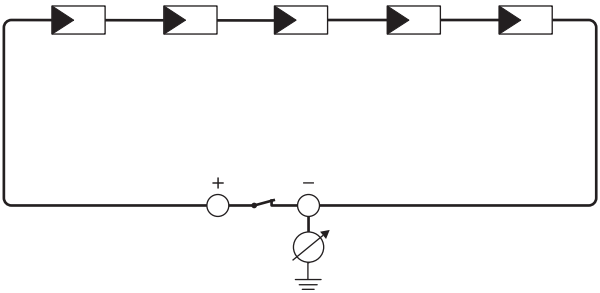

Figure 17: Schematic diagram of the measurement

$ # % 2 # $ * ' * & 2 # $ * * $ %

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

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

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).

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

1) % A 2 - + $ + - % % * $ - & * % % 2

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

% - 2 B

1. Calculate the expected insulation resistance per string.
2. ⚠ 1 "

   1 $ ' * # + - 2 * & ' &) # * $ '

   - Disconnect the inverter from all voltage sources (see Section 10, page 69).
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 16 "Contact", page 102). The PV modules might not be suitable for the inverter in the present quantity.

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⚠ QUALIFIED PERSON

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

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

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☐ 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.

% - 2 B

1. Activate the user interface (see Section 8.1, page 50).
2. Log into the user interface (see Section 8.2, page 53).
3. Select the menu (* . + ' 2 .$ *
4. Select [* *].'
5. In the context menu, select [6 - $ * ' * & +]. . , $
6. Follow the instructions in the dialog.

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A 2 . * B

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

% - 2 B

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

   1 $ ' * # + - 2 * & ' &) # * $ '

   - Disconnect the inverter from all voltage sources and open the enclosure lid of the DC connection unit (see Section 10, page 69).
4. Insert the USB flash drive in the USB port on the communication assembly.
5. Commission the inverter (see Section 7.2, page 44).

   ☑ During start-up phase of the inverter, the desired firmware is being installed.

6. **⚠ 1 "**

   1 $ ' * # + - 2 * & ' &) # * $ '

   - Disconnect the inverter from all voltage sources and open the enclosure lid of the DC connection unit (see Section 10, page 69).

7. Pull the USB flash drive out of the USB port.
8. Commission the inverter (see Section 7.2, page 44).
9. Call up the user interface of the inverter and check the events to see whether a firmware update has been successfully completed.
10. If the firmware update has not been successfully completed, perform the firmware update again.

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

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The inverter weighs 84 kg. You risk injury if you lift the inverter incorrectly or if it is dropped while being transported or mounted.

- Carry and lift the inverter in an upright position with several people without tilting it.

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☐ A pallet must be available.

☐ Original packaging with paddings must be available.

☐ All transport handles must be in place.

% - 2 B

1. **⚠ 1 "**

   1 $ ' * # + - 2 * & ' &) # * $ '

   - Disconnect the inverter from all voltage sources (see Section 10, page 69).

2. **⚠ "**

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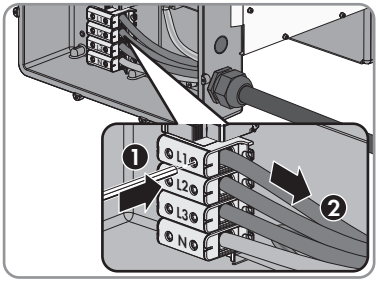
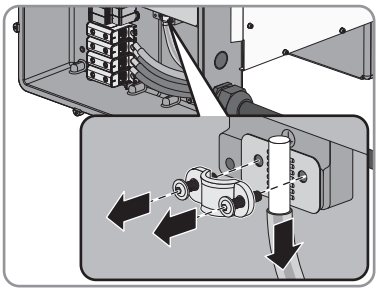
   - Wait 30 minutes for the enclosure to cool down.

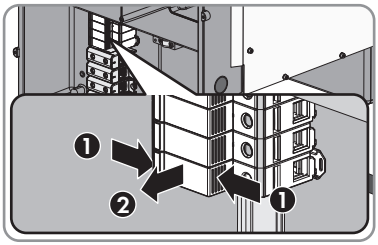
3. Remove the AC cable from the inverter. Loosen the screws with an Allen key (AF 8) and pull the cables out of the terminal.



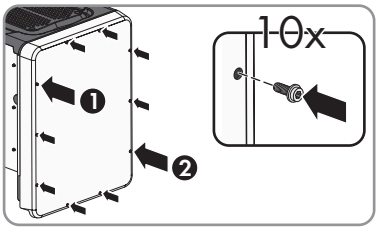
4. Disconnect the grounding conductor from the grounding terminal. To do so, loosen the screws with a Torx screwdriver (TX 25) and pull the grounding conductor out under the clip.



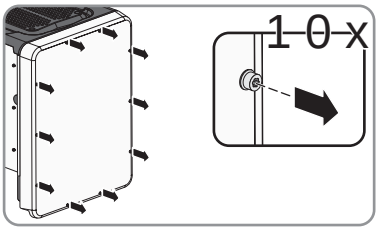
5. Remove the AC cable from the inverter.
6. Remove the M63 cable gland from the enclosure opening in the AC connection unit. To do so, remove the inside counter nut and remove the cable gland from the enclosure opening.
7. When the AC surge arresters are inserted, pull the surge arresters out of the slots. To do so, squeeze the grooved areas on the left and right sides of the surge arrester.



8. Position the enclosure lid of the AC connection unit on the AC connection unit and first tighten the upper-left and lower-right screws, and then the remaining screws crosswise using a Torx screwdriver (TX 25) (torque: 6 Nm).

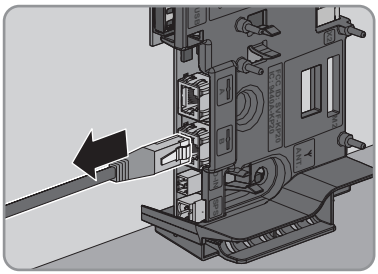


9. Unscrew all ten screws of the enclosure lid of the DC connection unit with a Torx screwdriver (TX 25) and remove the enclosure lid towards the front.

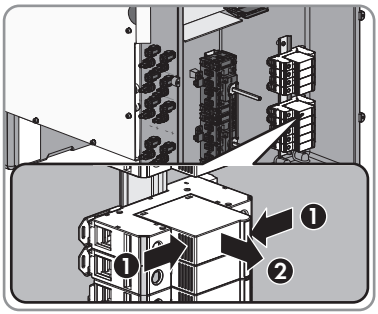


10. Set the screws and the enclosure lid aside and store safely.

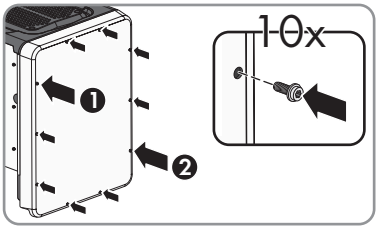
11. Remove all connection cables from the communication assembly and pull out the connection cables out of the DC connection unit.



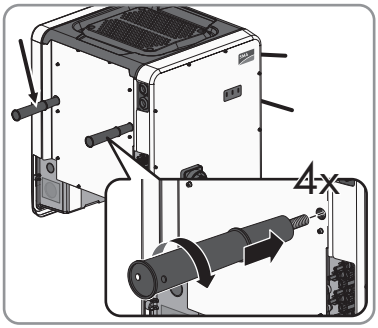
12. Remove all cable glands from the inverter. To do so, unscrew the counter nut from inside and remove the cable glad from the enclosure opening.
13. When the DC surge arresters are inserted, pull the surge arresters out of the slots. To do so, squeeze the grooved areas on the left and right sides of the surge arrester.



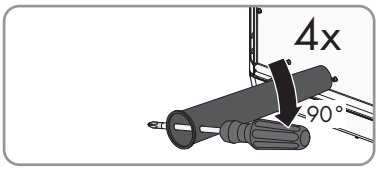
14. Position the enclosure lid of the DC connection unit on the DC connection unit and first tighten the upper-left and lower-right screws, and then the remaining screws crosswise using a Torx screwdriver (TX 25) (torque: 6 Nm).



15. Screw all four transport handles as far as they will go into the taps on the right- and left-hand side until they lie flush with the enclosure. When doing so, ensure that the transport handles are screwed into the taps so that they are perfectly straight. If the transport handles are not screwed in straight, this can make it more difficult or even impossible to unscrew them later on and can damage the taps to the extent that transport handles can no longer be screwed into them.



16. Insert a screwdriver into the holes in the transport handle and turn the screwdriver through 90°. This ensures that the transport handles are securely tightened.



17. To remove the feet or profile rails, lay the inverter carefully on the AC connection unit side.
18. If the inverter is to be stored or shipped, pack the inverter in its original packaging.
    - Place the lower part of the original packaging with padding on the pallet
    - Place the inverter with padding on the pallet. For this purpose, put the AC connection unit side of the inverter on top of the padding.
    - Remove all four transport handles from the taps. If necessary, insert a screwdriver into the holes on the transport handle and use the screwdriver to remove the transport handle.
    - Pull the upper part of the original packaging over the inverter.
    - Insert the upper padding.
    - Close the packaging.
    - Secure the packaging and pallet with strapping or with fastening belts.
19. Dispose of the inverter in accordance with the locally applicable disposal regulations for electronic waste.

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Maximum PV array power	75000 Wp STC
Maximum input voltage	1000 V
MPP voltage range	500 V to 800 V
Rated input voltage	670 V
Minimum input voltage	150 V
Initial input voltage	188 V
Maximum input current per DC connector	20 A
Maximum input current per input	20 A
Maximum short-circuit current per input*	30 A
Maximum reverse current from the inverter in the system for max. 1 ms**	–
Number of independent MPP inputs	6
Strings per MPP input	2
Overvoltage category in accordance with IEC 62109-1	II

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

** The topology prevents a reverse current from the inverter in the system

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Rated power at 230 V, 50 Hz	50000 W
Maximum apparent AC power	50000 VA
Rated grid voltage	230 V
Nominal AC voltage	400 V / 230 V
AC voltage range*	202 V to 264 V
Nominal AC current at 230 V	72.5 A
Maximum output current	72.5 A
Maximum output current under fault conditions	86 A
Total harmonic distortion of the output current with total harmonic distortion of the AC voltage <2%, and AC power >50% of the rated power	< 2 %
Inrush current	< 10% of the nominal AC current for a maximum of 10 ms

Rated power frequency	50 Hz
AC power frequency*	50 Hz / 60 Hz
Operating range at AC power frequency 50 Hz	44 Hz to 55 Hz
Operating range at AC power frequency 60 Hz	54 Hz to 65 Hz
Power factor at rated power	1
Displacement power factor, adjustable	0.0 overexcited to 0.0 underexcited
Feed-in phases	3
Phase connection	3 (+1)
Overvoltage category in accordance with IEC 62109-1	III

* Depending on the configured country data set

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Maximum DC switching voltage	30 V
Maximum AC switching current	1.0 A
Maximum DC switching current	1.0 A
Minimum load	0.1 W
Minimum electrical endurance when the maximum switching voltage and maximum switching current are complied with*	100000 switching cycles

* Corresponds to 20 years at 12 switching operations per day

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Maximum efficiency, η_{max}	> 98.1 %
European weighted efficiency, η_{EU}	> 97.8 %

* % *) 1) %

DC reverse polarity protection	Short-circuit diode
Input-side disconnection point	DC load-break switch
DC overvoltage protection	Surge arrester type II (optional)
AC short-circuit current capability	Current control
Grid monitoring	SMA Grid Guard 4
Maximum permissible fuse protection	100 A
Ground fault monitoring	Insulation monitoring: R_{iso} > 34 kΩ
All-pole sensitive residual-current monitoring unit	Available

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Width x height x depth, without feet or DC load-break switch	592 mm x 733 mm x 679 mm
Weight	84 kg
Length x width x height of the packaging	800 mm x 600 mm x 886 mm
Transport weight	100 kg
Climatic category in accordance with IEC 60721-3-4	4K4H
Environmental category	Outdoors
Pollution degree of all enclosure parts	2
Operating temperature range	-25 °C to +60 °C
Maximum permissible value for relative humidity, non-condensing	100 %
Maximum operating altitude above mean sea level (MSL)	3000 m
Typical noise emission	64 dB(A)
Power loss in night mode	5 W
Topology	Transformerless
Cooling method	SMA OptiCool
Number of fans	3
Degree of protection for electronics in accordance with IEC 60529	IP65
Protection class in accordance with IEC 62109-1	I
Radio technology	WLAN 802.11 b/g/n
Radio spectrum	2.4 GHz
Maximum transmission power	100 mW
Grid configurations	TN-C, TN-S, TN-C-S, TT (when V_{N_PE} < 20 V)

National standards and approvals, as per 05/2017*	ANRE 30, AS 4777, BDEW 2008, C10/11:2012, CE, CEI 0-16, CEI 0-21, EN 50438:2013, G59/3, IEC 60068-2-x, IEC 61727, IEC 62109-1/2, IEC 62116, MEA 2013, NBR 16149, NEN EN 50438, NRS 091-2-1, PEA 2013, PPC, RD 1699/413, RD 661/2007, Res. n°7:2013, SI4777, TOR D4, TR 3.2.2, UTE C15-712-1, VDE 0126-1-1, VDE-ARN 4105, VFR 2014, P.O.12.3, NTCO-NTCyS, GC 8.9H, PR20, DEWA

* @ 5 7 B 5 Does not apply to all country standard deviations of EN 50438
@ 3 4 B In order to meet the requirements of this standard, the inverter must either be equipped with a multifunction relay used as a fault indicator contact or there must be a connection to Sunny Portal with the fault alarm in Sunny Portal activated.

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Extended temperature range	-25°C to +60°C
Extended humidity range	0% to 100%
Threshold for relative humidity, non-condensing	100 %
Extended air pressure range	79.5 kPa to 106 kPa

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Temperature range	-40°C to +70°C

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DC connection	SUNCLIX DC connector
AC connection	Screw terminals
Multifunction relay	As standard
Surge protection devices Type II for AC and/or DC	Optional

A 2

Screws for the DC Connection Unit and AC Connection Unit enclosure lids	6 Nm
Screws for AC terminals with conductor cross-section of 35 mm² to 95 mm²	20 Nm
Screws for AC terminals with conductor cross-section of 120 mm²	30 Nm

Screws for attaching the feet or profile rails	16 Nm
Screws for the cover on the top of the inverter	6 Nm
Counter nut of M63 cable gland	14 Nm
Swivel nut for M63 cable gland	33 Nm
Swivel nut for M32 cable gland	5 Nm
SUNCLIX swivel nut	2 Nm

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Daily energy yields	63 days
Daily yields	30 years
Event messages for users	1024 events
Event messages for installers	1024 events

" % %

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

1 ' $ *	& * - ' $ *	! " - 2 . 0
SMA Antenna Extension Kit	Accessory set for one SMA inverter for the optimization of the SMA inverter's WLAN radio range.	EXTANT-40
SMA Sensor Module	Interface for one SMA inverter as retrofit kit for capturing environmental data (e.g. solar irradiation, ambient temperature, cell temperature, wind speed or S0 meters).	MD.SEN-40
SMA 485 Module	Interface for establishing cable-bound communication via RS485	MD.485-40
SMA I/O modules	Interface to implement of grid management services	MD.IO-40
AC overvoltage protection elements	Surge protection devices Type II for AC side	AC_SPD_Kit1-10
DC overvoltage protection elements	Surge protection devices Type II for DC side	DC_SPD_Kit4-10

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

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

Deutschland Österreich Schweiz	SMA Solar Technology AG Niestetal Sunny Boy, Sunny Mini Central, Sunny Tripower: +49 561 9522-1499 Monitoring Systems (Kommunikationsprodukte): +49 561 9522-2499 Fuel Save Controller (PV-Diesel-Hybridsysteme): +49 561 9522-3199 Sunny Island, Sunny Boy Storage, Sunny Backup: +49 561 9522-399 Sunny Central, Sunny Central Storage: +49 561 9522-299 SMA Online Service Center: www.SMA-Service.com	Belgien Belgique België Luxemburg Luxembourg Nederland	SMA Benelux BVBA/SPRL Mechelen +32 15 286 730 SMA Online Service Center: www.SMA-Service.com
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South Africa	SMA Solar Technology South Africa Pty Ltd. Cape Town 08600SUNNY (08600 78669) International: +27 (0)21 826 0600 SMA Online Service Center: www.SMA-Service.com	Argentina Brasil Chile Perú	SMA South America SPA Santiago de Chile +562 2820 2101
Other countries	International SMA Service Line Niestetal 00800 SMA SERVICE (+800 762 7378423) SMA Online Service Center: www.SMA-Service.com		

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within the scope of the EU directives

- Electromagnetic compatibility 2014/30/EU (29.3.2014 L 96/79-106) (EMC)
- Low Voltage Directive 2014/35/EU (29.3.2014 L 96/357-374) (LVD)
- Radio Equipment Directive 2014/53/EU (22.5.2014 L 153/62) (RED)

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 above-mentioned directives. The entire EU Declaration of Conformity can be found at www.SMA-Solar.com.

ENERGY
THAT
CHANGES

SMA