



SMA Backup 1P

BU-SBSE-1P-50

eManual



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1 Information on this Document

1.1 Validity

This document is valid for:

- BU-SBSE-1P-50 (SMA Backup 1P)

1.2 Target Group

The tasks described in this document must only be performed by qualified persons. Qualified persons must have the following skills:

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

1.3 Content and Structure of this Document

This document describes the installation, commissioning and decommissioning of the product.

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

1.4 Levels of Warning Messages

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

DANGER

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

WARNING

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



CAUTION



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

NOTICE

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

1.5 Symbols in the Document

Symbol	Explanation
	Information that is important for a specific topic or goal, but is not safety-relevant
	Indicates a requirement for meeting a specific goal

Symbol	Explanation
	Required result
	Example





1.6 Typographies in the document







Typography	Use	Example
bold	<ul style="list-style-type: none"> • Messages • Terminals • Elements on a user interface • Elements to be selected • Elements to be entered 	<ul style="list-style-type: none"> • Connect the insulated conductors to the terminals X703:1 to X703:6. • Enter 10 in the field Minutes.
>	<ul style="list-style-type: none"> • Connects several elements to be selected 	<ul style="list-style-type: none"> • Go to Settings > Date.
[Button] [Key]	<ul style="list-style-type: none"> • Button or key to be selected or pressed 	<ul style="list-style-type: none"> • Select [Enter].
#	<ul style="list-style-type: none"> • Placeholder for variable components (e.g., parameter names) 	<ul style="list-style-type: none"> • Parameter WChHz.Hz#

1.7 Designations in the Document

Complete designation	Designation in this document
SMA Backup 1P	Product, automatic transfer switching device
Sunny Boy Smart Energy	Inverter, hybrid inverter
SMA Home Energy Solution	System

1.8 Symbols on the Product

Symbol	Explanation
	<p>Beware of electrical voltage</p> <p>The product operates at high voltages.</p>
	<p>Observe the documentations</p> <p>Observe all documentations supplied with the product.</p>
	<p>RCM (Regulatory Compliance Mark)</p> <p>The product complies with the requirements of the applicable Australian standards.</p>
	<p>WEEE designation</p> <p>Do not dispose of the product together with the household waste but in accordance with the disposal regulations for electronic waste applicable at the installation site.</p>

Symbol	Explanation
	CE marking The product complies with the requirements of the applicable EU directives.
	The product is suitable for outdoor installation.
	Grounding conductor This symbol indicates the position for connecting a grounding conductor.
	Beware of hot surface The product can get hot during operation.
	RoHS labeling The product complies with the requirements of the applicable EU directives.
	Protection class II The product has a reinforced or double insulation between grid current circuit and output voltage.
IP65	Degree of protection IP65 The product is protected against the penetration of dust and water that is directed as a jet against the enclosure from all directions.

1.9 Additional Information

When installing the automatic transfer switching device, also observe the manuals for the other components used in the system.

Additional information is available at www.SMA-Solar.com.

Title and information content	Type of information
Operating manual SUNNY BOY SMART ENERGY 3.6 / 4.0 / 5.0 / 6.0 / 8.0 / 9.9	Operating manual

2 Safety

2.1 Intended Use

SMA Backup 1P is an automatic transfer switching device that enables single-phase battery-backup operation in the SMA Home Energy Solution with the SMA inverters listed below. In the event of a power failure, the hybrid inverter ensures that SMA Backup 1P automatically switches to battery-backup operation and the hybrid inverter can supply the entire household with power from the battery and the PV system.

The SMA Backup 1P must only be used with the following SMA inverters:

- SBSE3.6-50 (Sunny Boy Smart Energy 3.6)
- SBSE4.0-50 (Sunny Boy Smart Energy 4.0)
- SBSE5.0-50 (Sunny Boy Smart Energy 5.0)
- SBSE6.0-50 (Sunny Boy Smart Energy 6.0)
- SBSE8.0-50 (Sunny Boy Smart Energy 8.0)
- SBSE9.9-50 (Sunny Boy Smart Energy 9.9)

The product is intended for installation as a separate accessory.

The product must be mounted on a sufficiently load-bearing and closed wall.

The product is intended for use in residential and industrial environments.

The product is suitable for indoor and outdoor use.

The product must not be installed in areas exposed to direct solar irradiation or must be protected from direct solar irradiation by appropriate measures.

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

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

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

Alterations to the SMA products (except those described here), e.g., changes or modifications, are only permitted with the express written permission of SMA Solar Technology AG. Unauthorized alterations as well as failure to observe the documentation will void guarantee and warranty claims and in most cases terminate the operating license. SMA Solar Technology AG shall not be held liable for any damage caused by such changes.

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

The documentation supplied is an integral part of SMA products. Keep the documentation in a convenient, dry place for future reference and observe all instructions contained therein.

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

2.2 IMPORTANT SAFETY INSTRUCTIONS

Keep the manual for future reference.

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

The product has been designed and tested in accordance with international safety requirements. As with all electrical or electronic devices, some residual risks remain despite careful construction. To prevent personal injury and property damage and to ensure long-term operation of the product, read this section carefully and observe all safety information at all times.

⚠ DANGER**Danger to life due to electric shock when live components or conductors within the system are touched**

The neutral conductor of the product is not switched depending on the configuration. As a result, capacitive leakage currents from the PV modules may flow to the neutral conductor and the neutral conductor is live if the connection to the grounding conductor is interrupted.

- For any work during which the neutral conductor connection is interrupted, the battery-backup system must be taken out of operation and secured against being switched back on.

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

The DC cables connected to a battery or a PV module may be live. Touching live DC cables results in death or serious injury due to electric shock.

- Disconnect the system from voltage sources and make sure it cannot be reconnected before working on the device.
- Wait five minutes before working on the inverter.
- Observe all safety information of the battery manufacturer.
- Do not touch non-insulated parts or cables.
- Do not pull the DC conductors under load out of the terminal blocks.
- Wear suitable personal protective equipment for all work on the product.

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

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

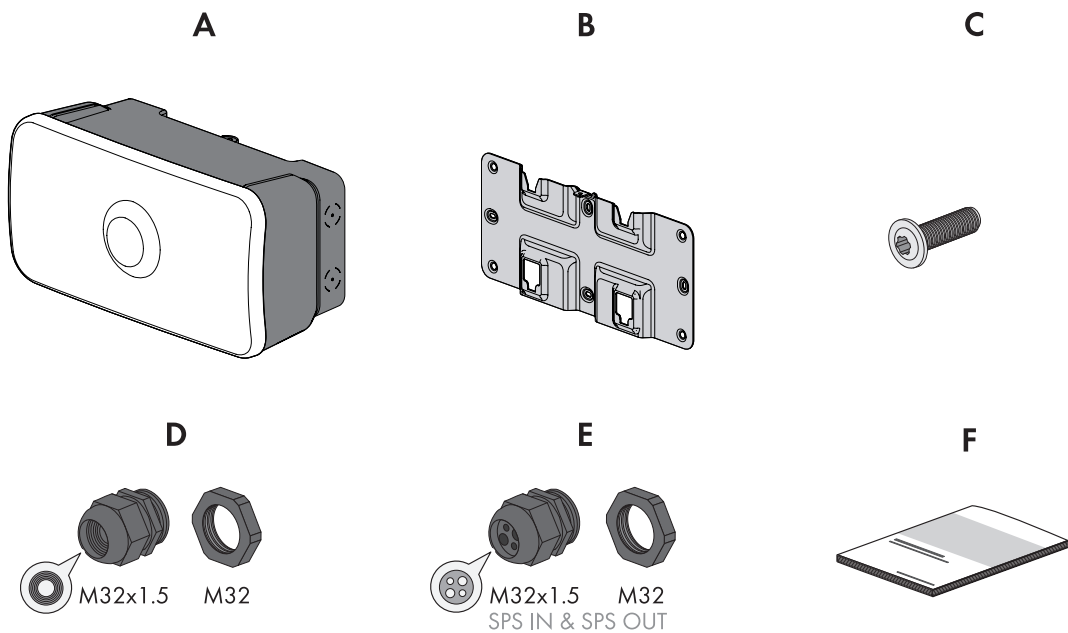
- Disconnect the system from voltage sources and make sure it cannot be reconnected before working on the device.
- Only touch the cables of the PV modules on their insulation.
- Do not touch any parts of the substructure or frame of the PV array.
- Do not connect PV strings with ground faults to the inverter.
- Once disconnected from voltage sources, wait five minutes before touching any parts of the PV system or the system.

NOTICE**Damage to the system due to sand, dust and moisture ingress**

Sand, dust and moisture penetration can damage the products of the system and impair its functionality.

- Only open the product if the humidity is within the thresholds and the environment is free of sand and dust.
- Do not open the product during a dust storm or precipitation.
- Close the product in case of interruption of work or after finishing work.
- Only operate the product when it is closed.
- Close tightly all enclosure openings.

3 Scope of Delivery



Position	Quantity	Designation
A	1	Automatic transfer switching device
B	1	Wall mounting bracket
C	1	Screw (M4x16) for securing the automatic transfer switching device to the wall mounting bracket
D	3	M32x1.5 cable gland with cable support sleeve for the AC connections
E	1	M32x1.5 cable gland with four-hole cable support sleeve with 2 differently sized enclosure openings for connecting PLC IN and PLC OUT
F	1	Documentation package consists of: <ul style="list-style-type: none">• Safety information booklet• Quick reference guide poster with illustrated instructions for initial installation and commissioning• Poster with circuitry overview

4 Product overview

4.1 Information about the battery-backup system

4.1.1 Purpose of a Battery-Backup System

Any time a grid failure happens, a PV system disconnects from the utility grid and the loads connected to the household grid are no longer supplied with energy.

A grid failure lasting for a longer period can have serious consequences for the parties concerned such as:

- Households and companies would have to manage without heat, light, telephone and computer.
- Cold chains could be interrupted.
- For example, if stable ventilation systems or heat lamps lose power in a farming business.

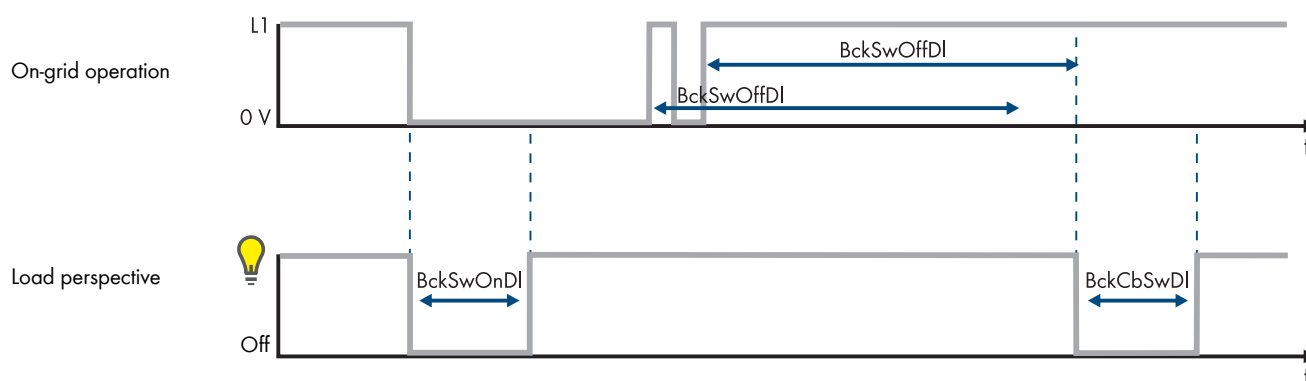
Possible solutions for bridging this supply gap is to convert existing PV systems into battery-backup systems, or to design new systems as battery-backup systems.

The automatic transfer switching device takes care of the uninterrupted supply of the loads with electricity during a grid failure. The automatic transfer switching device disconnects the household grid with the PV system from the utility grid. The hybrid inverter then creates a battery-backup grid, and the PV system can thus continue to supply power to the loads. When the energy demand of the active loads exceeds the current power of the PV system, the battery will provide the energy shortfall.

4.1.2 Function of the automatic transfer switching device

Function	Description
Grid Disconnection	The grid disconnection isolates the battery-backup grid from the utility grid if there is a grid failure.

4.1.3 How battery-backup operation works



Operation.BckSwOnDI = 5 s
 Operation.BckSwOffDI = 300 s
 Operation.BckCbSwDI = 5 s

4.2 System Overview

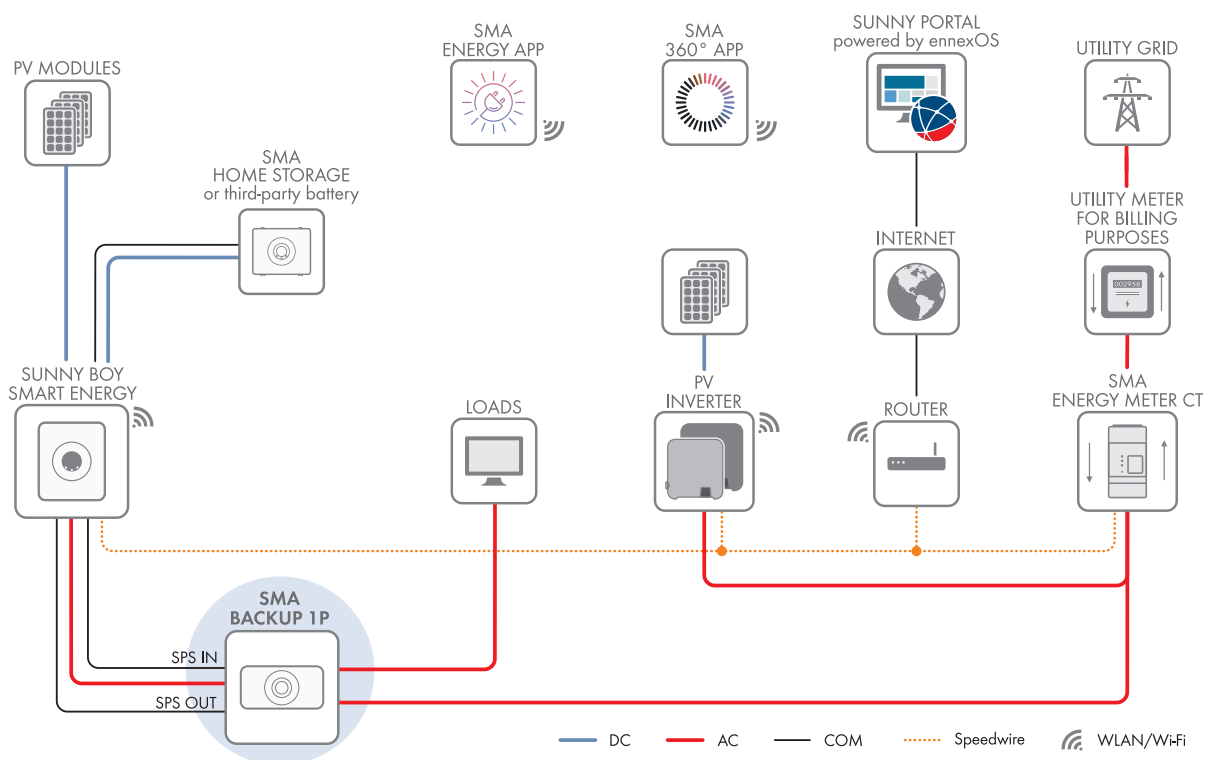
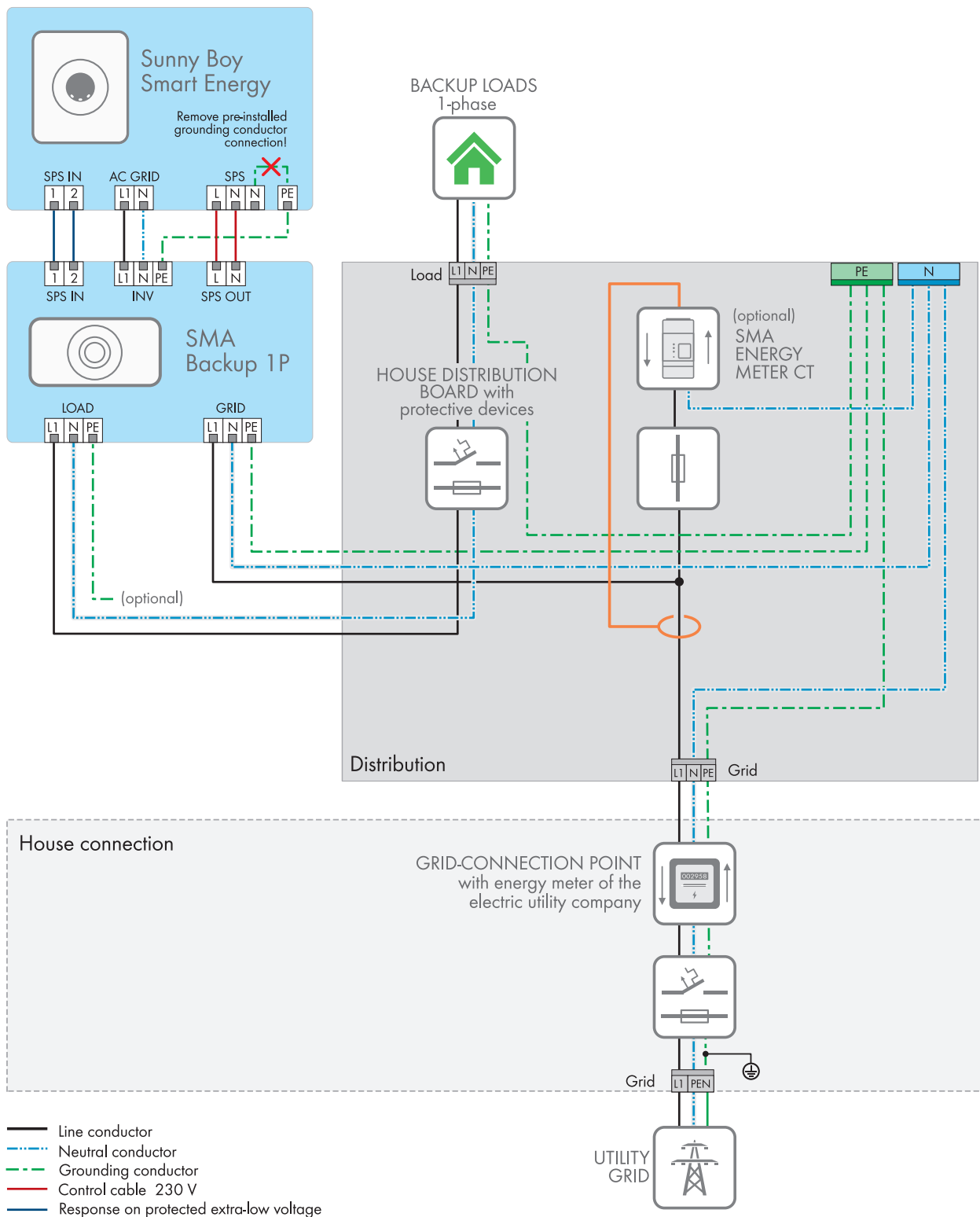


Figure 1: System overview with SMA Backup 1P

4.3 Circuitry Overview



4.4 Product Description

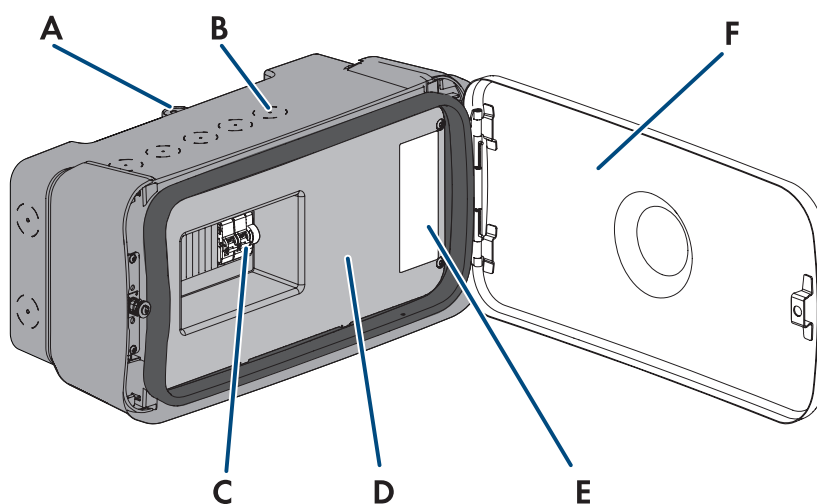


Figure 2: Design of the product

Position	Designation
A	Fastening for attachment to the wall mounting bracket
B	Holes for enclosure opening
C	Fuses
D	Installation cover
E	Type label
F	Lid

5 Mounting

5.1 Optional: Prepare the enclosure

Holes for enclosure opening are already provided on the top and bottom of the enclosure of the automatic transfer switching device. If the automatic transfer switching device is to be mounted in a different location, for example to the right or left of the inverter, you have the option of adapting the enclosure to meet your requirements. Possible holes are marked on the right, left, top and bottom.

Procedure:

1. Drill the required holes with a step drill. The holes must not be larger than the size marked on the enclosure. When drilling, make sure that no internal cables or components of the automatic transfer switching device are damaged. If necessary, remove components from the automatic transfer switching device before drilling.
2. Remove drilling chips from the enclosure.

5.2 Wall Mounting

Additionally required material:

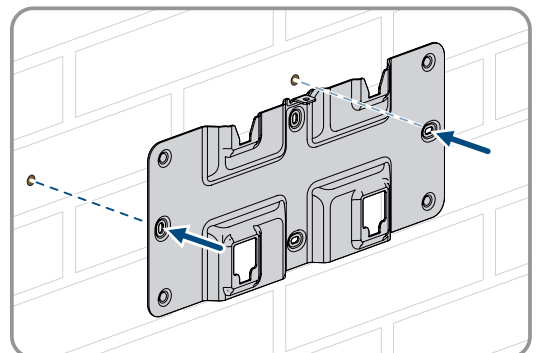
- 2 screws that are suitable for the support surface and the weight of the automatic transfer switching device
- 2 washers that are suitable for the support surface and the weight of the automatic transfer switching device.
- Where necessary, 2 screw anchors suitable for the support surface and the screws

Requirements:

- ☐ To avoid overheating, do not install the automatic transfer switching device where it is exposed to direct solar irradiation, or it must be protected from direct solar irradiation by appropriate measures.

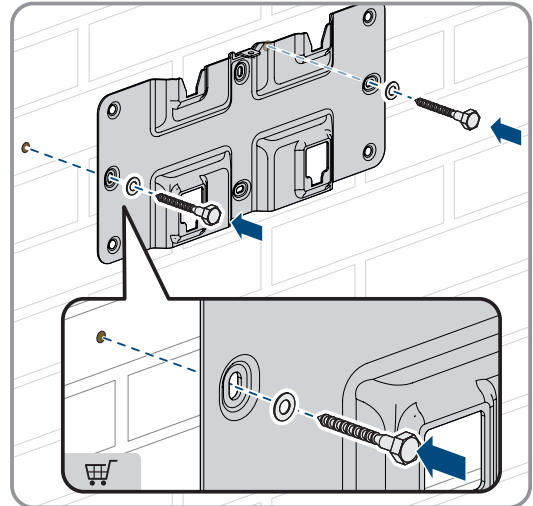
Procedure:

1. Set the position for the automatic transfer switching device. Consider the possible cable route. The automatic transfer switching device can be installed to the right or left of the inverter, or under the inverter. SMA Solar Technology recommends installing the automatic transfer switching device under the inverter. The automatic transfer switching device must be mounted on a sufficiently load-bearing and closed wall.
2. Align the wall mounting bracket horizontally on the wall and mark the position of the drill holes.

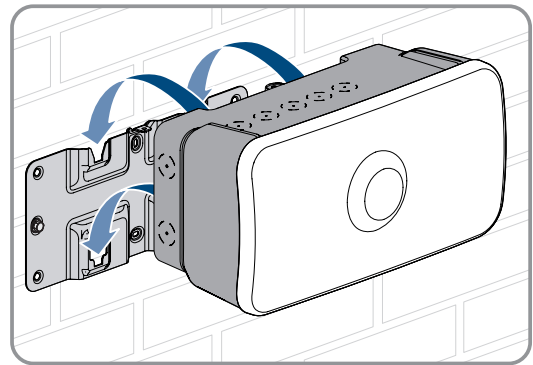


3. Set the wall mounting bracket aside and drill the marked holes.
4. Insert screw anchors into the drill holes if the support surface requires them.

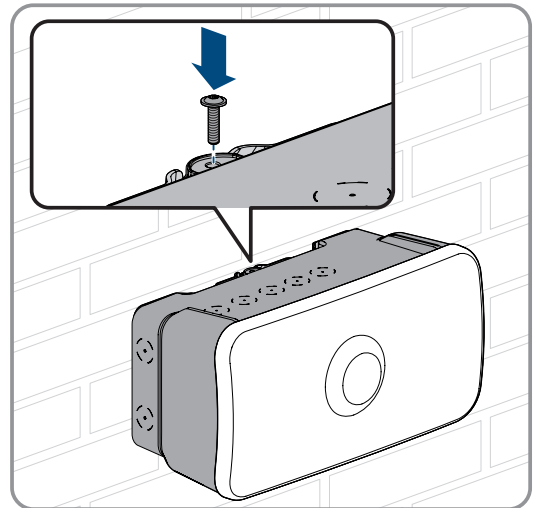
5. Secure the wall mounting bracket horizontally using screws and washers.



6. Hang the automatic transfer switching device onto the wall mounting bracket from above.



7. Make sure that the automatic transfer switching device is correctly mounted on the wall mounting bracket.
8. Insert the supplied screw (M4x16, TX20) into the hole to secure the automatic transfer switching device to the wall mounting bracket and tighten the screw.

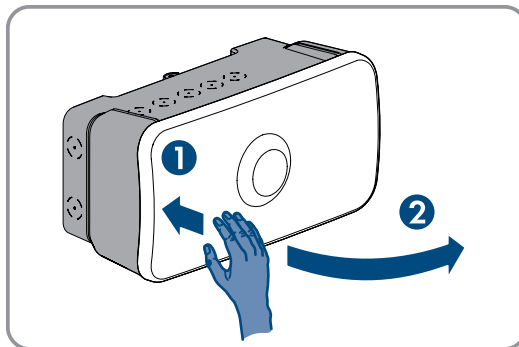


5.3 Optional: Remove lid

If necessary, you can remove the lid of the enclosure of the automatic transfer switching device. This can be helpful during installation or electrical connection, for example.

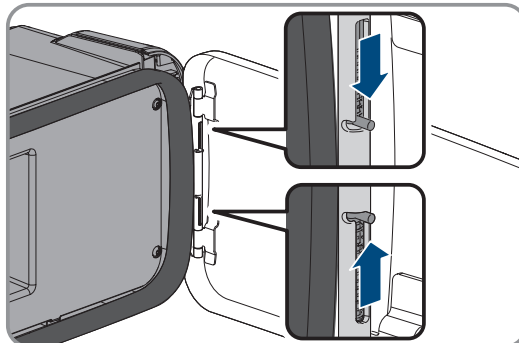
Procedure:

1. Open the lid of the enclosure. To do this, press on the left side of the lid with your hand.

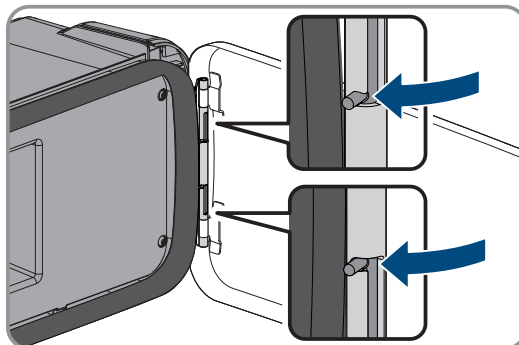


2. Open the closing mechanism. To do this, press the two latches down or up.

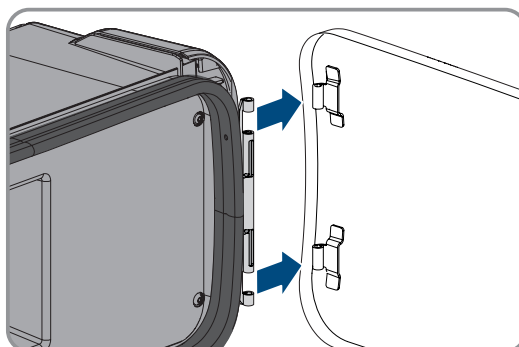
Tip: The closing mechanism is easier to open if the lid of the enclosure is not folded all the way back.



3. Slide the two latches into the opening of the hinge.



4. Remove the lid.



5.4 Removing the installation cover

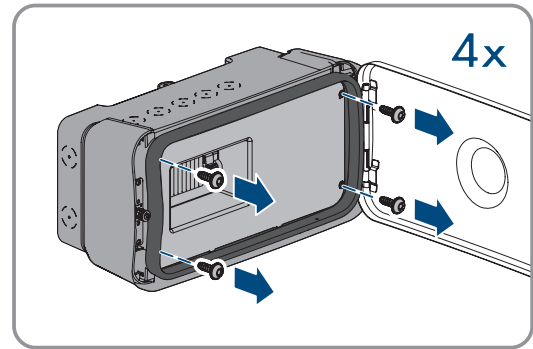
Requirements:

- ☐ The lid of the enclosure of the automatic transfer switching device has been opened or removed.

Procedure:

1. Disconnect the inverter from voltage sources (see inverter manual).
2. Switch off the battery (see battery manual).

3. Loosen the 4 screws (TX20) for fastening the installation cover.



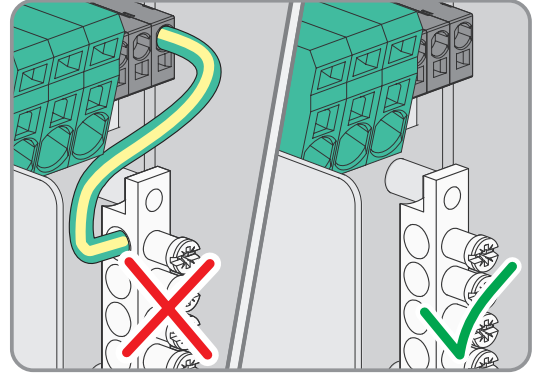
4. Remove the installation cover.

6 Electrical Connection

6.1 Removing the grounding conductor connection on the inverter

Procedure:

1. Disconnect the inverter from voltage sources (see inverter manual).
2. If present, remove the grounding conductor connection between **N** and the busbar \oplus . To do this, unlock the terminal with a flat-blade screwdriver (3.5 mm).



6.2 Requirements for the electrical connection

6.2.1 Permitted grid configurations

The automatic transfer switching device is approved for operation in the following utility grids:

- TN-C
- TN-S
- TN-C-S
- TT¹⁾
- Delta-IT

6.2.2 PLC IN signal cable requirements

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

- ☐ Conductor type: copper wire
- ☐ The conductors must be solid or stranded wire.
- ☐ Conductor cross-section: 0.2 mm² to 1.5 mm²
- ☐ Outer diameter: max. 9 mm
- ☐ Insulation stripping length: 8 mm to 10 mm
- ☐ Nominal voltage: at least 600 V
- ☐ Maximum length of conductors: 30 m
- ☐ The cable type and cable-laying method must be appropriate for the application and location.

6.2.3 Requirements on the PLC OUT AC cable for connection to the inverter

- ☐ Conductor type: copper wire
- ☐ Permissible temperature: at least 90°C
- ☐ The conductors must be solid or stranded wire.

¹⁾ It must be ensured that the local grounding has a sufficiently low-impedance connection to the grounding of the transformer, otherwise operational leakage currents can lead to potential differences. For error-free operation, the ground potential at the neutral point of the transformer must be the same as that of the grounding conductor connection on the inverter. Improper implementation of the transformer/grid connection with regard to low-impedance grounding of the neutral point can lead to a device defect that is not covered by the warranty.

- ☐ Conductor cross-section: 1.5 mm² to 2.5 mm²
- ☐ Outer diameter: max. 9 mm
- ☐ Insulation stripping length: 8 mm to 10 mm
- ☐ Maximum length of conductors: 30 m
- ☐ The cable type and cable-laying method must be appropriate for the application and location.

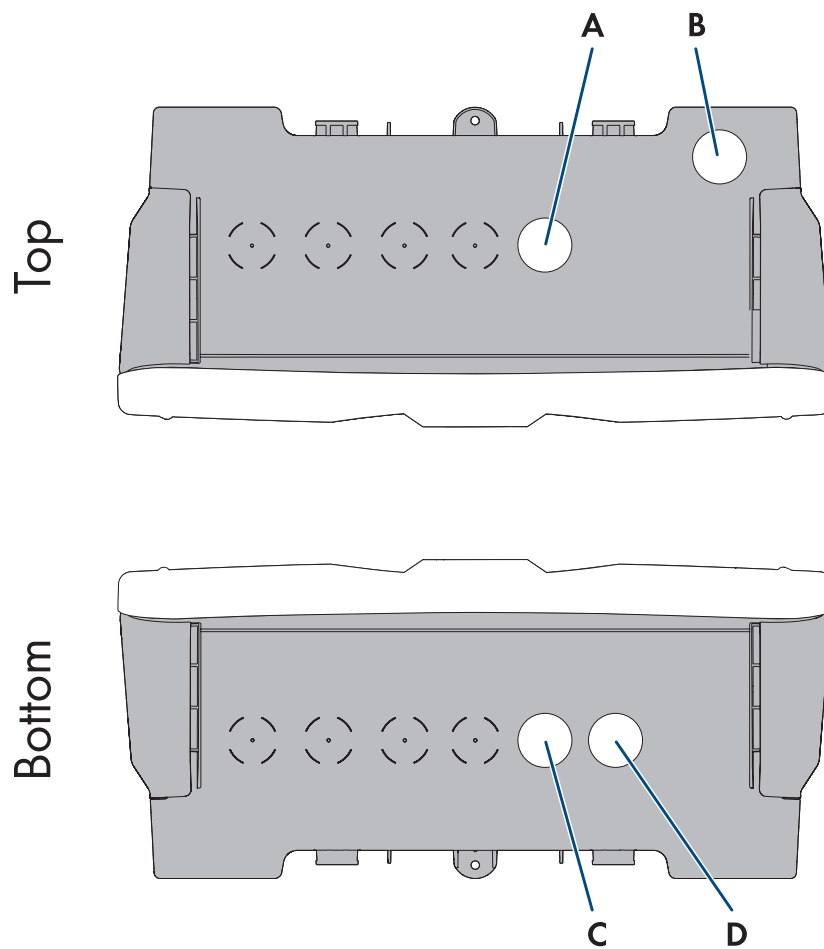
6.2.4 Requirements on the AC cables for the connections to the battery back-up loads and to the utility grid

- ☐ Conductor type: copper wire
- ☐ The conductors must be solid or stranded wire.
- ☐ Connectable conductor cross-section: 10 mm² to 16 mm²
- ☐ Connectable conductor cross-section, fine wire, when using bootlace ferrules: 10 mm² to 16 mm²
- ☐ Connectable conductor cross-section, fine wire, without bootlace ferrules: 10 mm² to 16 mm²
- ☐ Connectable conductor cross-section, multi-wire: 10 mm² to 16 mm²
- ☐ Insulation stripping length: 18 mm to 20 mm
- ☐ Maximum length of conductors: 30 m
- ☐ The cable and conductor cross-sections must always be dimensioned according to the local and national directives and within the range specified by the manufacturer (SMA Solar Technology AG).¹ If the manufacturer (SMA Solar Technology AG) requires a higher conductor cross-section than the standard, the range of the manufacturer must be observed. Examples of factors influencing cable dimensioning are: nominal AC current, type of cable, routing method, cable bundling, ambient temperature and maximum desired line losses (for calculation of line losses, see the design software "Sunny Design" from software version 2.0 at www.SMA-Solar.com).

6.2.5 Requirements on the AC cable to the inverter

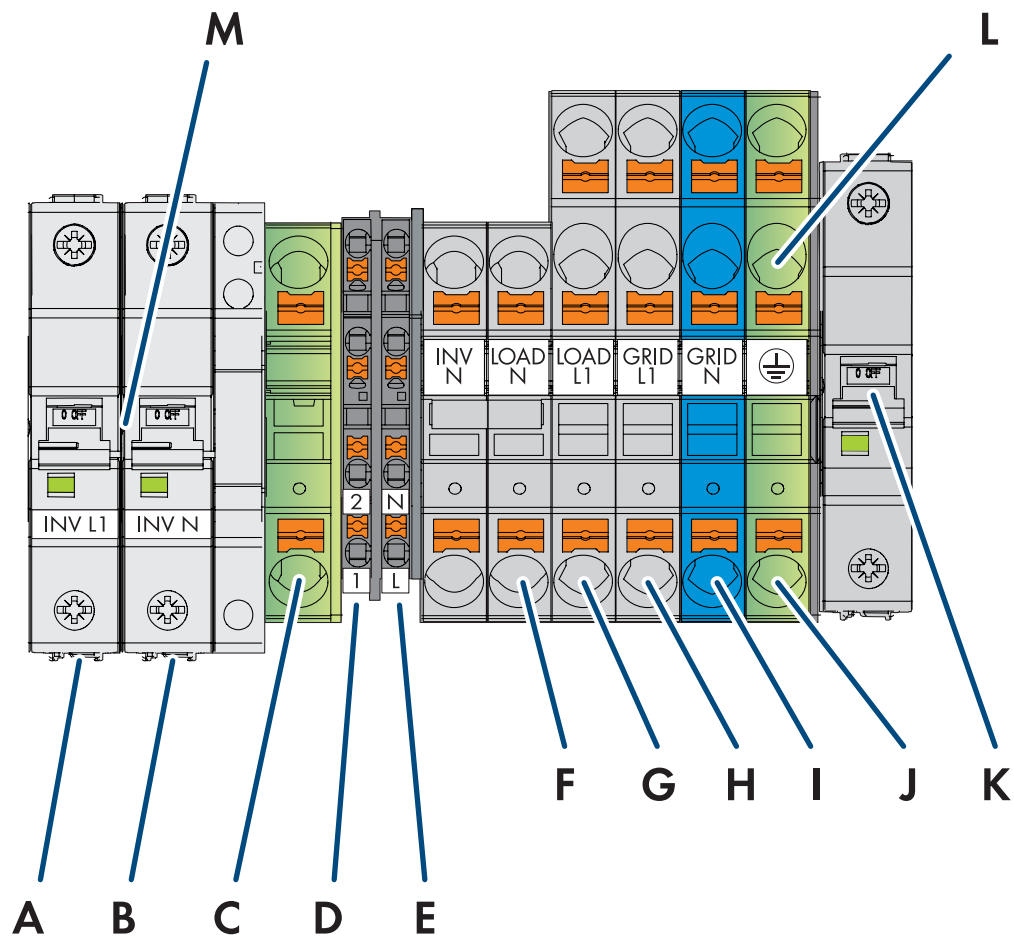
- ☐ Conductor type: copper wire
- ☐ The conductors must be made of solid wire, stranded wire or fine stranded wire, with or without bootlace ferrules. When using fine stranded wire without bootlace ferrules, a flat-blade screwdriver must be used to unlock the terminal.
- ☐ Conductor cross-section: 4 mm² to 10 mm²
- ☐ The cross-section of the grounding conductor must not be smaller than the cross-section of the other conductors.
- ☐ External diameter: 10 mm to 25 mm
- ☐ Insulation stripping length: 18 mm
- ☐ The cable and conductor cross-sections must always be dimensioned according to the local and national directives and within the range specified by the manufacturer (SMA Solar Technology AG).¹ If the manufacturer (SMA Solar Technology AG) requires a higher conductor cross-section than the standard, the range of the manufacturer must be observed. Examples of factors influencing cable dimensioning are: nominal AC current, type of cable, routing method, cable bundling, ambient temperature and maximum desired line losses (for calculation of line losses, see the design software "Sunny Design" from software version 2.0 at www.SMA-Solar.com).

6.3 Enclosure opening



Position	Cable
A	AC cable PLC IN and PLC OUT
B	AC cable for the AC connection on the inverter
C	AC cable for connection of backup loads
D	AC cable for connection to the utility grid

6.4 Overview of the Connection Area



Position	Designation
A, B, C	Connection for the AC cable for the connection on the inverter
D	Connection for the AC cable PLC IN
E	Connection for the AC cable PLC OUT
F, G	Connection for the AC cable for backup loads
H, I, J	Connection for the AC cable for the utility grid
K	6 A back-up fuse of the monitoring relay
L	optional connection for the grounding cable
M	32 A miniature circuit breaker to protect the cable to the inverter

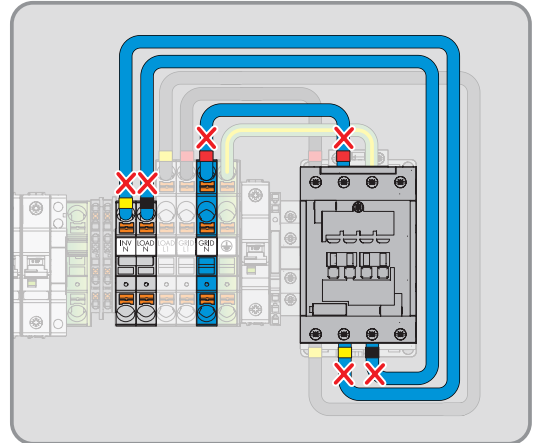
6.5 TN-C-S grid configuration

If the neutral conductor has to be opened during backup operation, the automatic transfer switching device is ready for use without any additional configuration of the pre-installed cables.

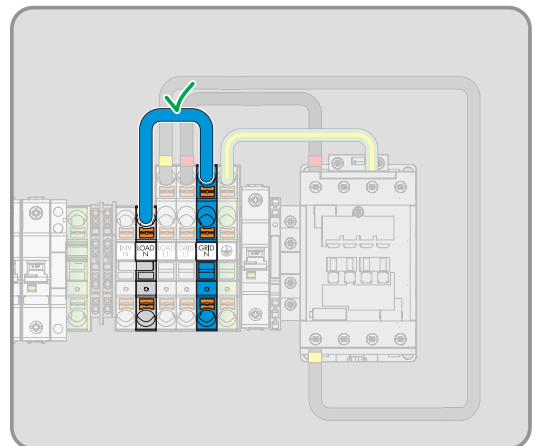
If the neutral conductor needs to remain connected in backup operation, the automatic transfer switching device must be configured as described below.

Procedure:

1. Remove the cables at the **INV N**, **LOAD N** and **GRID N** connections of the automatic transfer switching device.



2. Use a previously removed cable to establish a connection between the **LOAD N** and **GRID N** connections of the automatic transfer switching device.



6.6 Connecting the connections to the automatic transfer switching device

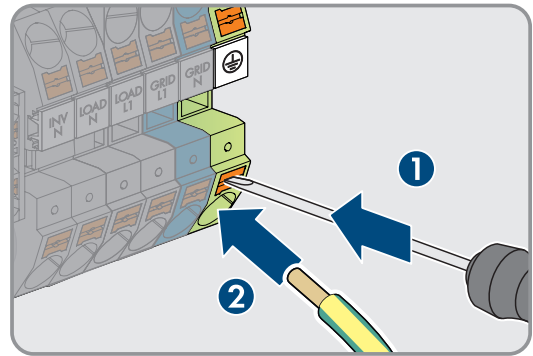
Requirements:

- ☐ The lid of the enclosure of the automatic transfer switching device has been opened or removed.
- ☐ The installation cover of the automatic transfer switching device has been removed.

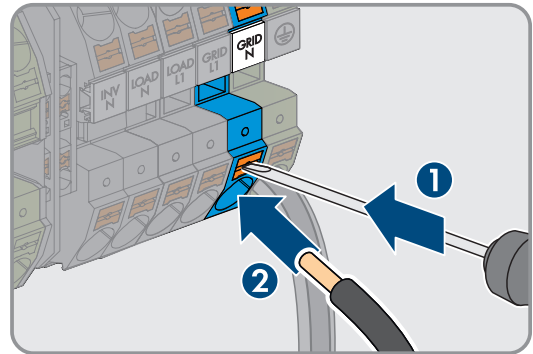
Procedure:

1. Disconnect the inverter from voltage sources (see inverter manual).
2. Switch off the battery (see battery manual).
3. Switch off the AC fuse in the meter cabinet.

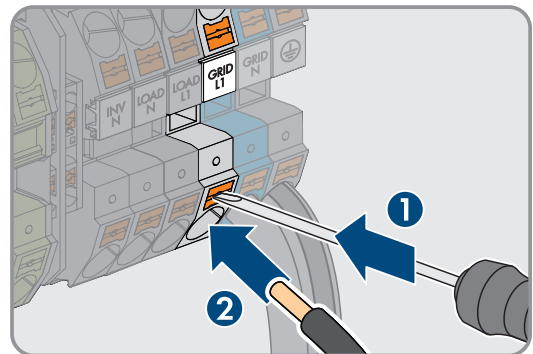
4. Connect the grounding cable to the connection \oplus on the automatic transfer switching device. To do this, unlock the terminal with a suitable tool (blade width 5.5 mm).



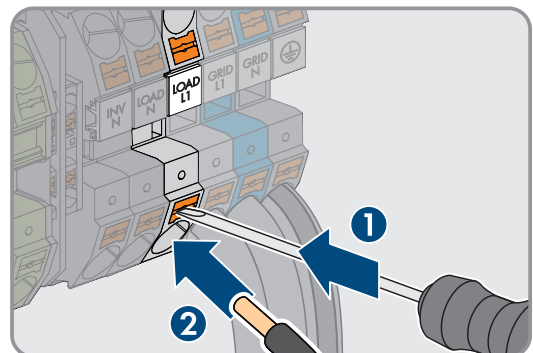
5. Connect conductor N for connection to the utility grid to the **GRID N** connection on the automatic transfer switching device. To do this, unlock the terminal with a suitable tool (blade width 5.5 mm).



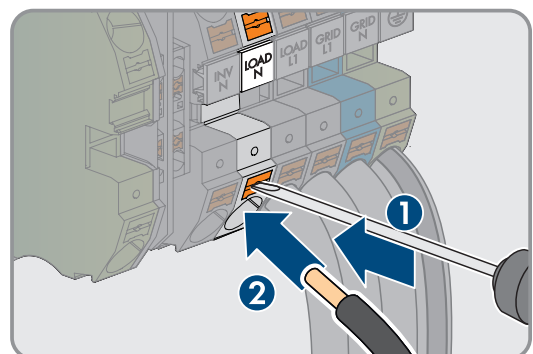
6. Connect conductor L1 for connection to the utility grid to the **GRID L1** connection on the automatic transfer switching device. To do this, unlock the terminal with a suitable tool (blade width 5.5 mm).



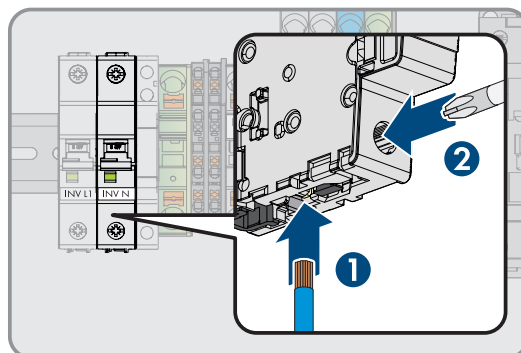
7. Connect conductor L1 for the backup loads to the **LOAD L1** connection on the automatic transfer switching device. To do this, unlock the terminal with a suitable tool (blade width 5.5 mm).



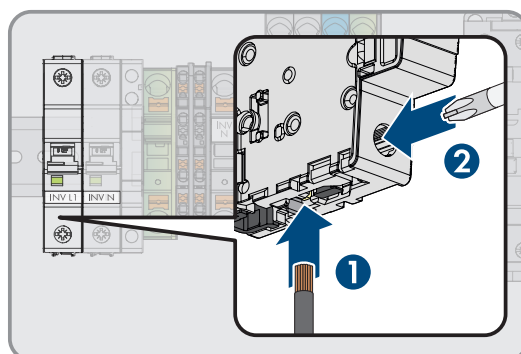
8. Connect conductor N for the backup loads to the **LOAD N** connection on the automatic transfer switching device. To do this, unlock the terminal with a suitable tool (blade width 5.5 mm).



9. Connect conductor N to the **INV N** connection on the fuse block in the automatic transfer switching device.

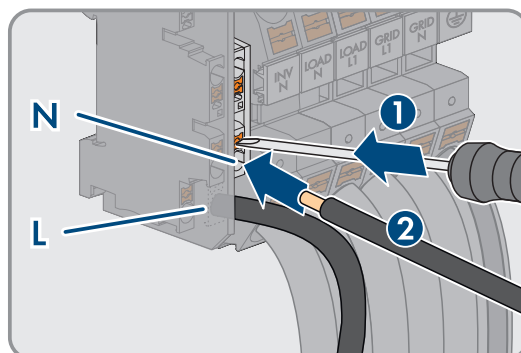


10. Connect conductor L1 to the **INV L1** connection on the fuse block in the automatic transfer switching device.

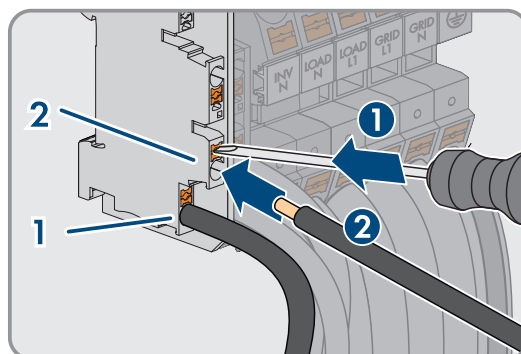


11. Connect conductors **L1, N and PE** to the inverter (see inverter manual).

12. Connect the **PLC OUT** AC cable to the **L** and **N** connections on the automatic transfer switching device as labeled. To do this, unlock the terminal with a suitable tool (blade width 3.5 mm).



13. Connect the **PLC IN** AC cable to the **1** and **2** connections on the automatic transfer switching device as labeled. To do this, unlock the terminal with a suitable tool (blade width 3.5 mm).



14. Tug lightly to ensure that all conductors are secured in the terminals.

6.7 Optional: Connecting residual-current device

In some countries, a residual-current device must be installed on the supply side of the inverter. You have the option of installing a residual-current device in the enclosure of the automatic transfer switching device. Space is provided for this on the DIN rails. The residual-current device must be coupled to ensure common tripping.

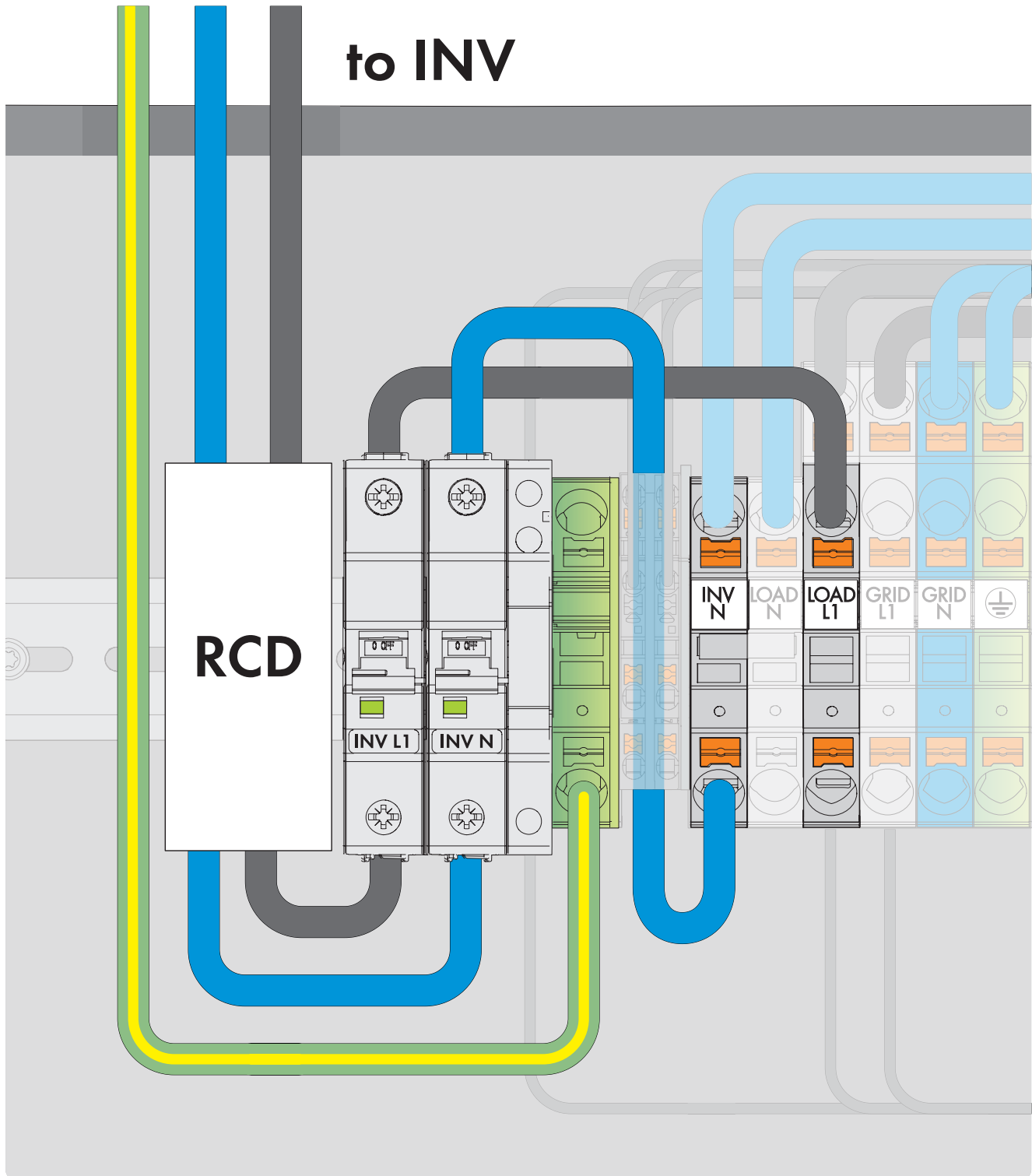


Figure 3: Overview graphic for additional residual-current device

Additionally required material:

- ☐ 2 suitable cables

Requirements:

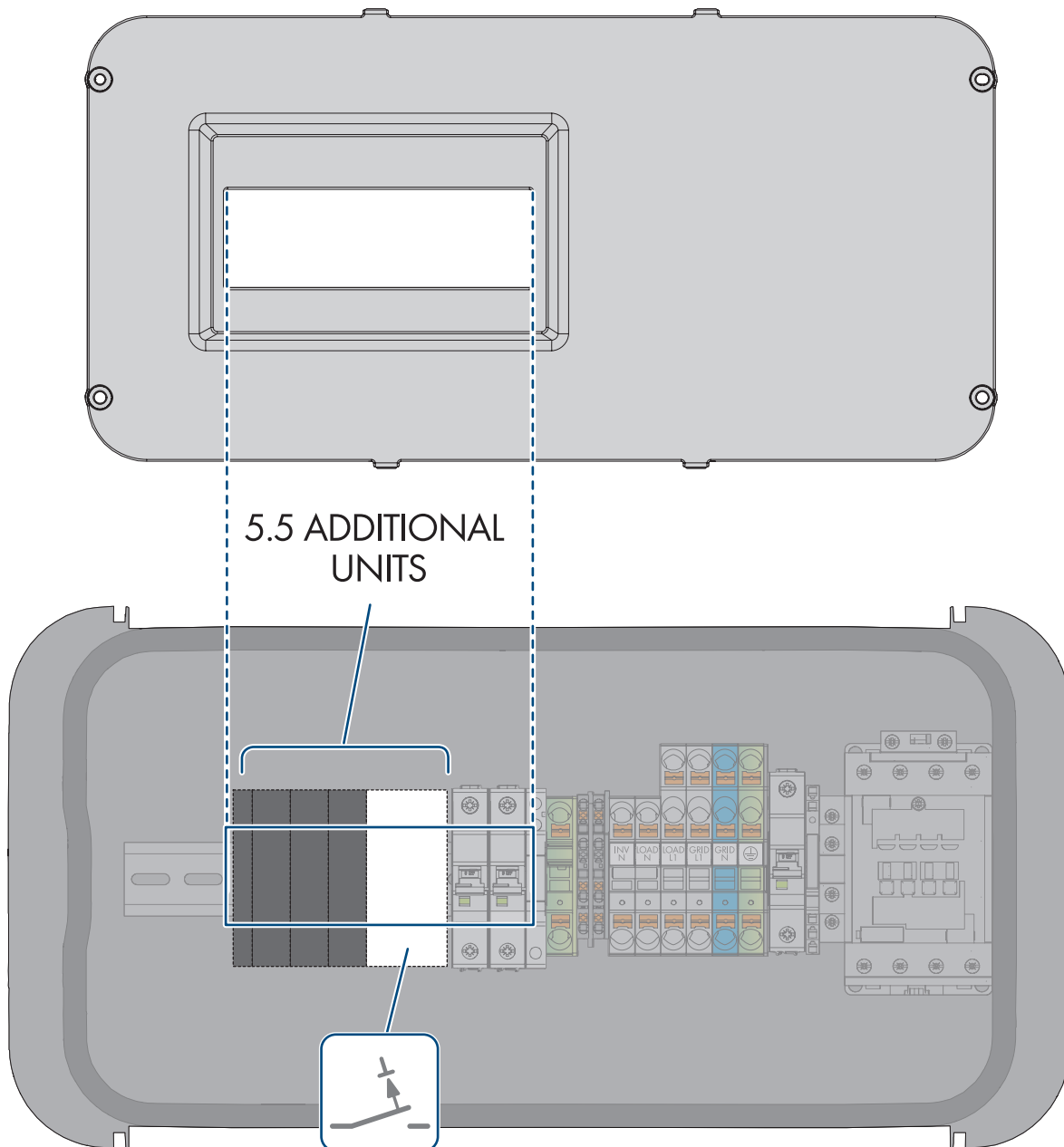
- ☐ There is sufficient space for the fuse block in the enclosure of the automatic transfer switching device.

Procedure:

1. Disconnect the inverter from voltage sources (see inverter manual).
2. Switch off the battery (see manual from the battery manufacturer).
3. Disconnect the automatic transfer switching device from voltage sources.
4. Connect the residual-current device.
5. Pull the cables as a test to ensure that all conductors are secured in the terminals.

6.8 Optional: Connecting additional Energy Meter CT and additional miniature circuit breakers

You have the option of expanding the automatic transfer switching device with an Energy Meter CT and additional miniature circuit-breakers. Space is provided for this on the DIN rails.



Requirements:

- ☐ There is sufficient space in the enclosure of the automatic transfer switching device.

Procedure:

1. Disconnect the inverter from voltage sources (see inverter manual).
2. Switch off the battery (see manual from the battery manufacturer).

3. Disconnect the automatic transfer switching device from voltage sources.
4. Connect Energy Meter CT or additional miniature circuit breakers.
5. Pull the cables as a test to ensure that all conductors are secured in the terminals.

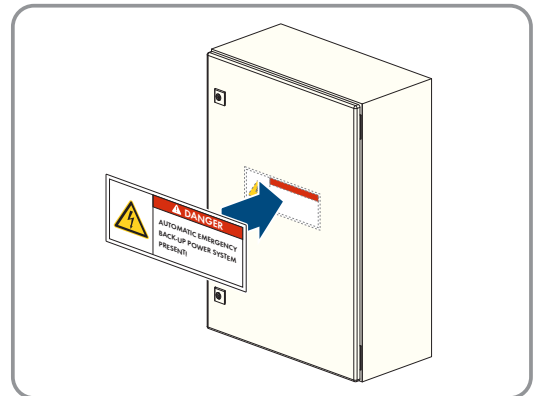
6.9 Placing a notice about backup operation on the meter cabinet

Additionally required material:

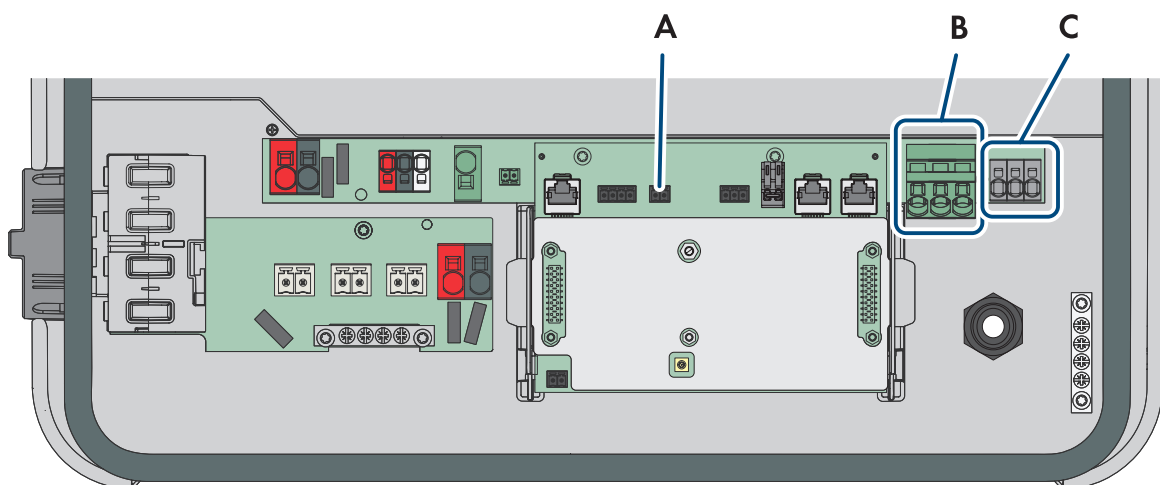
- ☐ Label with notice for attaching to the meter cabinet, indicating backup operation (not included in the scope of delivery). Observe the local regulations when selecting the label.

Procedure:

- Place a notice on the meter cabinet indicating the backup operation of the inverter.



6.10 Connection Area of the Inverter



Position	Designation
A	PLC slot for connection of the PLC IN cable
B	AC terminal block for connection of the AC INV cable
C	PLC terminal block for connection of the PLC OUT cable

7 Operation

7.1 Changing parameters

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

This section describes the basic procedure for changing parameters. Always change parameters as described in this section.

Requirements:

- ☐ The user interface must be open and you must be logged in.
- ☐ Changes to grid-relevant parameters must be approved by the responsible grid operator, and can only be made as an **installer**.

Procedure:

1. Choose the product in the focus navigation.
2. Select the menu **Configuration**.
3. Select the **Parameters** menu item.
4. Call up the parameter via the search function or navigate to the parameter.
5. Change the parameter value.
6. Click on [**Save**].

7.2 Updating the inverter firmware version

Before commissioning the product, the firmware version of the inverter must be updated to version $\geq 3.12.8.R$ (see product manual).

7.3 Setting parameters for battery-backup operation

Procedure:

Automatic secure power supply operation must be set in the **Operation.BckTyp** parameter (**Configuration of the backup type**) so that the automatic transfer switching device can automatically switch to battery-backup operation in the event of a grid failure.

A part of a new installation, the parameters are set to the default values recommended by SMA Solar Technology AG. If it is not a new installation, set the following parameters to the default values recommended by SMA Solar Technology AG Changing parameters.

Channel	Name	Settings	Description
Operation.BckTyp	Configuration of the backup type	Off Secure Power Supply Operation Auto-matic se-cure power supply operation	Set Automatic secure power supply operation so that the automatic transfer switching device can automatically switch to battery-backup operation in the event of a grid failure.

Channel	Name	Settings	Description
Operation.BckSwOnDI	Minimum time that a grid fault ought to be gone for, before an automatic transition from backup to feed-in operation is initiated.	0 s to 600 s	Time after a grid failure before switching to battery-backup operation. 5 s is set by default.
Operation.BckSwOffDI	Minimum time of grid fault before automatic transition to backup operation is initiated.	1 s to 600 s	Time after restoration of the AC grid before switching back to parallel grid operation. 300 s is set by default.
Operation.BckCbSwDI	Delay time between the opening of the grid-side relays and the opening of the backup contactor during the transition from backup to feed-in operation.	0 s to 60 s	Time during which backup loads are not supplied while switching from battery-backup operation to parallel grid operation. 5 s is set by default.
Operation.ManRstr.ManRstr-BckSc	Activation of manual restart after repeated occurrence of short-circuit faults in secure power supply/battery-backup operation.	On Off	On: If a fault occurs in battery-backup operation, an attempt is made to restart the inverter until the fault no longer occurs. Off: The inverter remains in fault mode. On is set by default. To fulfil the requirements of VDE-AR-E-2510, this parameter must be set to On . The parameter settings must be made differently depending on the country-specific standards.
Bck.AMaxLim	Limit for maximum AC continuous current in backup operation	Entering value in A	Maximum continuous AC current in backup operation, depending on the inverter.

7.4 Testing battery-backup operation

Requirements:

- ☐ The automatic transfer switching device for battery-backup operation must be connected.
- ☐ The inverter must be commissioned (see product manual).
- ☐ The **Automatic secure power supply operation** parameter must have been configured during commissioning.
- ☐ Parallel grid operation must be configured.
- ☐ The battery must be sufficiently charged or there must be sufficient PV energy available.

Procedure:

1. To simulate a grid failure, switch off the central miniature circuit breaker (pre-meter fuse).

2. Wait for the set time in the **Operation.BckSwOnDI** parameter (**Minimum time that a grid fault ought to be gone for, before an automatic transition from backup to feed-in operation is initiated.**).
 - ☒ The automatic transfer switching device switches to battery-backup operation with an audible click.
 - ☒ When the time set in the **Operation.BckSwOnDI** parameter (**Minimum time that a grid fault ought to be gone for, before an automatic transition from backup to feed-in operation is initiated.**) has elapsed, all loads in the battery-backup circuit should be supplied with electric current.
3. Switch on the central miniature circuit breaker (pre-meter fuse) in the junction box again.
4. Wait for the set time in the **Operation.BckSwOffDI** parameter (**Minimum time of grid fault before automatic transition to backup operation is initiated.**).
 - ☒ The automatic transfer switching device switches to parallel grid operation with an audible click.

8 Closing the enclosure

Requirements:

- ☐ The automatic transfer switching device and inverter must be de-energized.

Procedure:

1. Check that the miniature circuit breaker of the fuse is switched on (see Section 6.4, page 22).
2. Fasten the installation cover. To do this, tighten the 4 screws (TX20) for fastening the installation cover.
3. Close the lid of the enclosure. The lid engages audibly when closing.

9 Troubleshooting

Behavior	Possible causes and remedy
The residual-current device trips.	<ul style="list-style-type: none"> The grounding conductor connection between N and the busbar  in the inverter has not been removed. Remove grounding conductor connection (see Section 6.1, page 19).
After the automatic transfer switching device has switched to battery-backup operation with an audible click, the loads in the battery-backup circuit are not supplied with electric current.	<ul style="list-style-type: none"> The AC cables for the LOAD and GRID connections have been swapped over. Do not reconnect to the utility grid. Switch off the inverter and battery and set the Operation.BckTyp parameter (Configuration of the backup type) to Off. Check the installation of the automatic transfer switching device. Check whether the contactors have switched. Contact Service if the contactors have switched and the loads in the battery-backup circuit are still not supplied with electric current. The inverter carries out a cyclical insulation test at least every 24 h during the night. If the system is in battery-backup operation during the insulation test, the backup loads are not supplied for a short time until the insulation test has been completed successfully.
The automatic transfer switching device does not switch to battery-backup operation in the event of a grid failure. The connected backup loads are not supplied with electric current.	<ul style="list-style-type: none"> Check both fuses of the automatic transfer switching device. There is not enough PV energy available or the battery is not sufficiently charged. Check the battery. The Operation.BckTyp parameter (Configuration of the backup type) is not set to Automatic secure power supply operation. Set the Operation.BckTyp parameter (Configuration of the backup type) to Automatic secure power supply operation Changing parameters. A firmware version of at least 3.12.08.R is required to be able to set the parameters for backup operation. If a firmware version lower than this is installed, update the firmware of the inverter. The time set in the Operation.BckSwOnDI parameter (Minimum time that a grid fault ought to be gone for, before an automatic transition from backup to feed-in operation is initiated.) has not yet expired. Check the time set in the parameter and adjust if necessary Changing parameters. The PLC IN and PLC OUT cables are not connected to the inverter correctly or have been swapped over. Check the cable connections of PLC IN and PLC OUT.
If external factors lead to an impermissibly high temperature of the closure system of the automatic transfer switching device, the lid of the automatic transfer switching device can no longer be opened.	<ul style="list-style-type: none"> Remove the external heat source and wait until the automatic transfer switching device is back within the permitted temperature range. The lid can then be opened again.
The LED on the automatic transfer switching device does not light up even though the utility grid is available.	<ul style="list-style-type: none"> The back-up fuse of the monitoring relay is switched off. Switch the fuse back on. The monitoring relay is damaged.

10 Decommissioning the Product

Procedure:

1. Disconnect the inverter from voltage sources (see inverter manual).
2. Switch off the battery (see manual from the battery manufacturer).
3. Disconnect the automatic transfer switching device from voltage sources.
4. Open the lid of the automatic transfer switching device. To do this, press on the left side of the box.
5. Remove the installation cover of the automatic transfer switching device. To do this, loosen the 4 screws (TX20) for fastening the installation cover using a suitable tool.
6. Remove the connected cables from the automatic transfer switching device.
7. Pull the cable out of the enclosure opening holes.
8. Loosen the screw for fastening the automatic transfer switching device on the wall mounting bracket.
9. Remove the automatic transfer switching device from the wall mounting bracket.
10. Use a suitable screwdriver to loosen the screws securing the wall mounting bracket and remove the washers.
11. Remove the wall mounting bracket.

11 Disposal

The product must be disposed of in accordance with the locally applicable disposal regulations for waste electrical and electronic equipment.



12 Technical Data

12.1 General Data

Width x height x depth (with wall mounting bracket)	506 mm x 260 mm x 236 mm
Width x height x depth (without wall mounting bracket)	506 mm x 260 mm x 226 mm
Weight	6.16 kg
Length x width x height of the packaging	600 mm x 400 mm x 320 mm
Degree of protection (according to IEC 60529)	IP65
Mounting type	Wall mounting bracket
Operating temperature range	−40 °C to +55 °C
Storage temperature range	−40 °C to +70 °C
Maximum permissible value for relative humidity (non-condensing)	0% to 100%
Maximum operating altitude above mean sea level (MSL)	3000 m
Grid configurations	TN-C, TN-S, TN-C-S, TT, Delta-IT

12.2 Parallel grid operation

Input voltage	230 V
AC grid frequency	50 Hz / 60 Hz
Maximum pre-fuse on the grid side	63 A
Self-consumption	< 1 W

12.3 Battery backup

Compatible with the following inverters	SBSE3.6-50 / SBSE4.0-50 / SBSE5.0-50 / SBSE6.0-50 / SBSE8.0-50 / SBSE9.9-50
Rated power (at 230 V, 50 Hz):	7300 W
Max. apparent AC power (at 230 V, 50 Hz)	7300 VA
Output power / Output apparent power < 100 ms	11040 W / 11040 VA
Output power / Output apparent power < 30 s	9200 W / 9200 VA
Nominal AC voltage	230 V
Active power limit AC frequency	50 Hz
Switching mode	automatically

12.4 Switchover times (adjustable parameters)

Parallel grid operation in battery-backup system	0 s to 600 s (default: 5 s)
Battery-backup system in parallel grid operation	0 s to 600 s (default: 5 s)

13 Contact

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

- Device type
- Serial number
- Detailed description of the problem



<https://go.sma.de/service>

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