

Installation manual

AUTOMATIC BACKUP UNIT

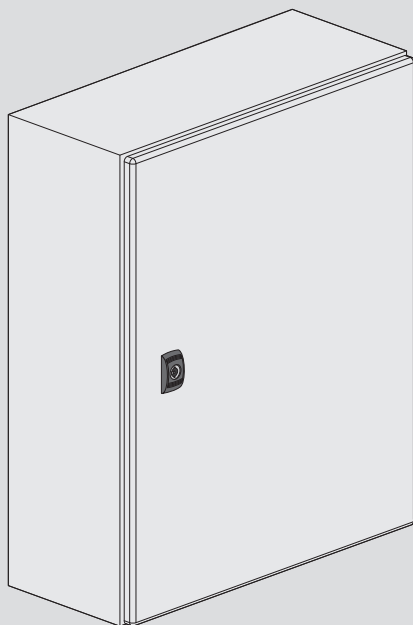


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1 Information on this Document

1.1 Validity

This document is valid for:

- SBS-ABU-63.1-AU-10 (Automatic Backup Unit)




1.2 Target Group

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




- Training in how to deal with the dangers and risks associated with installing, repairing and using electrical devices and installations
- Training in the installation and commissioning of electrical devices and installations
- Knowledge of all applicable laws, standards and directives
- Knowledge of and compliance with this document and all safety information

1.3 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.

1.4 Symbols in the Document

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

Symbol	Explanation
☑	Desired result
✘	A problem that might occur

1.5 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"> • Select 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].

1.6 Designation in the document

Complete designation	Designation in this document
Automatic Backup Unit	Backup Unit, automatic transfer switch, product

2 Safety

2.1 Intended Use

The Backup Unit is an automatic transfer switch. In the event of grid failure, the automatic transfer switch disconnects the PV system, loads and the Sunny Boy Storage from the utility grid and creates a battery-backup grid. The battery-backup grid supplies loads that should continue to be supplied with electricity in the event of grid failure. In the event of grid failure, the Sunny Boy Storage supplies the loads with energy after a short switching time. The PV system supplies additional energy that can be used to supply the loads and charge the battery.

The product is certified for use with the following SMA inverters:

- SBS3.7-10 / SBS5.0-10

Use of the product with inverters of manufacturers other than SMA Solar Technology AG is not permitted.

The product is suitable for indoor and outdoor use.

The product may only be operated with one of the energy meters approved by SMA Solar Technology AG. An updated list of energy meters approved by SMA Solar Technology AG is available at www.SMA-Solar.com.

The product is not suitable for supplying life-sustaining medical devices. A power outage must not lead to personal injury.

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

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

Alterations to the product, e.g. changes or modifications, are only permitted with the express written permission of SMA Solar Technology AG. Unauthorized alterations 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 the intended use.

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

The type label must remain permanently attached to the product.

2.2 Safety Information

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

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

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

Touching live parts and cables results in death or lethal injuries due to electric shock.

- Do not touch non-insulated parts or cables.
- Disconnect the system from voltage sources and make sure it cannot be reconnected before working on the device.
- Only disassemble the protective covers, if the product is disconnected from all voltage sources.
- Observe all safety information on components associated with the product.

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

Sand, dust and moisture penetration can damage the product 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.
- The product must only be closed during operation.
- Close tightly all enclosure openings.
- Only use the supplied cable glands when inserting cables.

3 Scope of Delivery

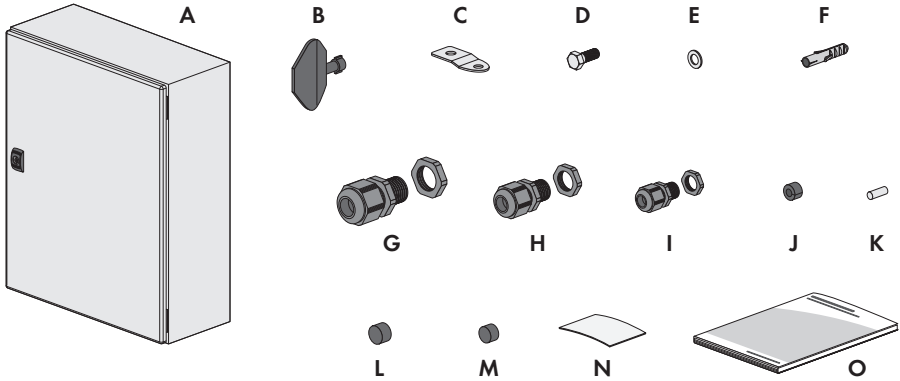


Figure 1: Components included in the scope of delivery

Position	Quantity	Designation
A	1	Automatic Backup Unit
B	1	Switch cabinet key
C	4	Wall bracket
D	4	Hexagon wood screw
E	4	Washer
F	4	Screw anchor (10 mm)
G	2	Cable gland M32 with counter nut
H	3	Cable gland M25 with counter nut
I	2	Cable gland M20 with counter nut
J	1	Cable support sleeve
K	1	Filler plug for cable support sleeve
L	1	Sealing plug for cable gland M25
M	1	Sealing plug for cable gland M20
N	1	Warning label
O	1	Installation manual

4 Product Description

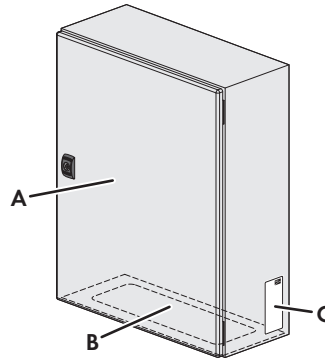






Figure 2: Design of the Product

Position	Designation
A	Enclosure door
B	Connecting plate
C	Type label The type label clearly identifies the product. The type label must remain permanently attached to the product. You will find the following information on the type label: <ul style="list-style-type: none"> • Device type (Model) • Serial number (Serial No. or S/N) • Date of manufacture • Device-specific characteristics

Symbols on the Product and on the Type Label

Symbol	Explanation
	Danger to life due to electric shock The product operates at high voltages. Prior to performing any work on the product, disconnect the product from voltage sources. All work on the product must be carried out by qualified persons only.
	Observe the documentation Observe all documentation supplied with the product.

Symbol	Explanation
	CE marking The product complies with the requirements of the applicable EU directives.
	RCM (Regulatory Compliance Mark) The product complies with the requirements of the applicable Australian standards.

5 System Structure

The system consisting of battery inverters, PV inverters and an automatic transfer switch must be set up in accordance with the following schematic diagram. At the same time, the local regulations and standards must be observed.

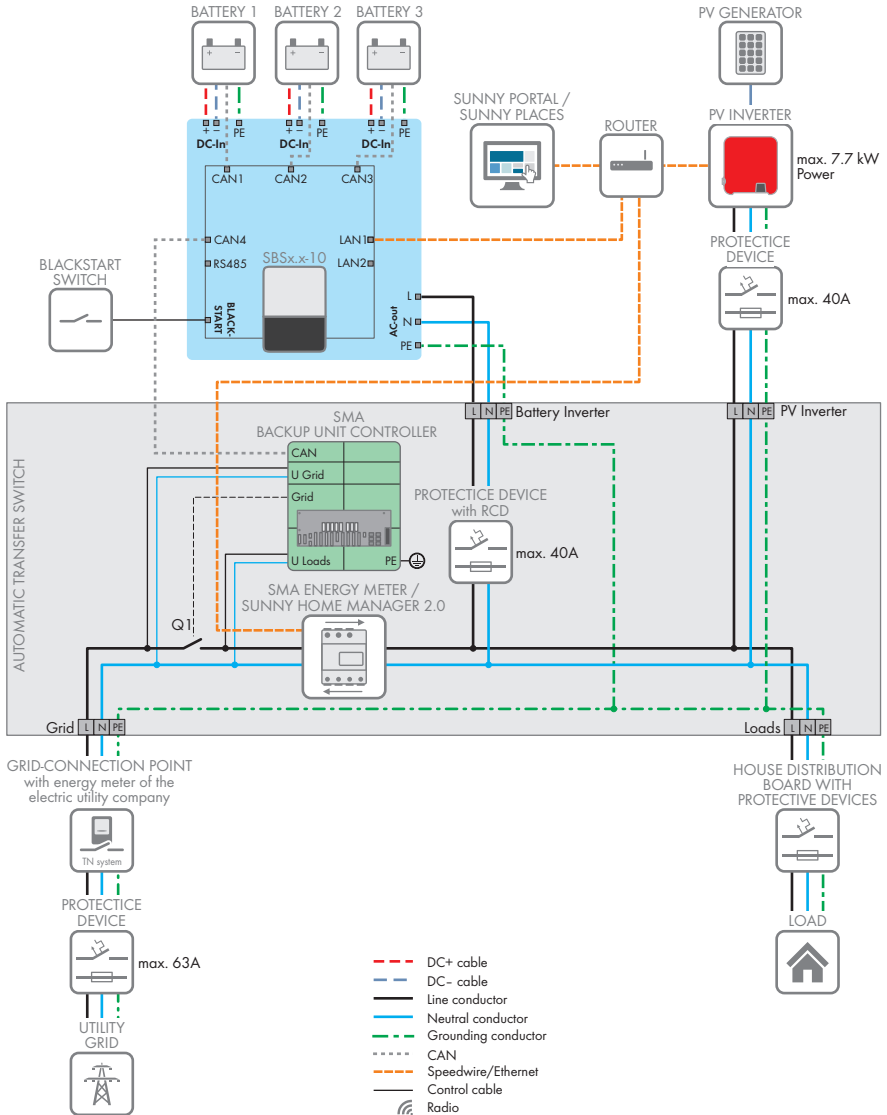


Figure 3: System overview of the battery-backup system with Sunny Boy Storage

Delivery of overload and short-circuit current

- During ramp-up: delivery of overload current for a maximum of one minute. Thereafter, the inverter shuts down.
- During operation: overload current for a maximum of 500 ms. Thereafter, the inverter shuts down.
- Automatic restart after shutdown: maximum of three reconnect attempts
- Waiting time between each reconnect attempt: 90 s

Measures for guaranteeing the fail-safe operation in the battery inverter

- Insulation monitoring of the battery voltage
- Monitoring of the N-PE terminal of the battery inverter
- Redundant grid disconnection relays in the battery inverter

6 Mounting

6.1 Requirements for Mounting

⚠ WARNING

Danger to life due to fire or explosion

Despite careful construction, electrical devices can cause fires.

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

Requirements for the mounting location

- The device must be mounted on a stable supporting surface, e.g. concrete or masonry.
- The mounting location must be suitable for the weight and dimensions of the product (see Section 9, page 20).
- The mounting location must be freely and safely accessible at all times without the need for any auxiliary equipment (such as scaffolding or lifting platforms). Non-fulfillment of these criteria may restrict servicing.
- The mounting location must not hinder access to disconnection devices.
- The mounting location must not be exposed to direct solar irradiation. Direct solar irradiation can cause the product to overheat.
- Climatic conditions must be met (see Section 9, page 20).
- The product may only be mounted in a permitted mounting position.

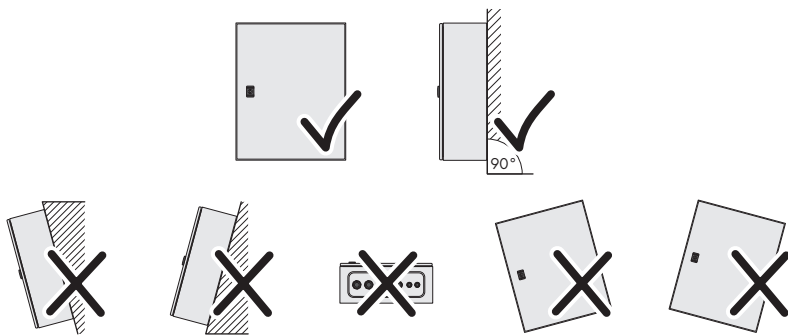


Figure 4: Permitted and prohibited mounting positions

6.2 Mounting the product

Procedure:

1. Attach the wall bracket to the enclosure.
2. Mark the position of the drill holes and drill the holes (diameter: 10 mm).

3. Attach the product to the wall using the fastening material provided.
4. Ensure that the product is securely in place.

7 Electrical Connection

7.1 Overview of the Connection Area

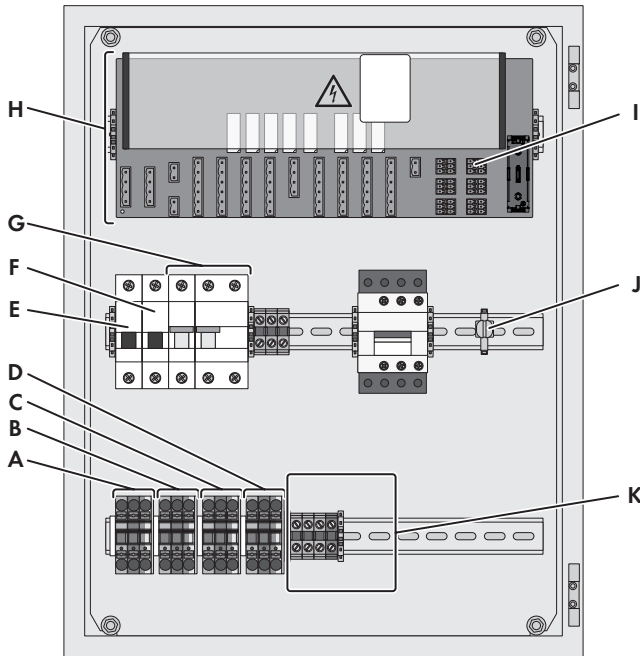


Figure 5: Connection areas in the interior of the product

Position	Designation
A	Terminal blocks Grid for connection to the utility grid
B	Terminal blocks Loads for connection to the household distribution system
C	Terminal blocks Battery Inverter for connecting the battery inverter
D	Terminal blocks PV Inverter for connecting the PV inverter (optional)
E	Circuit breaker for connecting to the utility grid
F	Circuit Breaker for connecting to the household distribution
G	Circuit breaker for connecting the power cable of the battery inverter
H	SMA Backup Unit Controller
I	Jack -X2504 for connecting the communication cable to the battery inverter

Position	Designation
J	Shield connection terminal Shield for the communication cable of the battery inverter
K	Installation location for an energy meter (optional)

7.2 Inserting the Cables

Always insert the cables into the product according to the following procedure.

NOTICE

Property damage due to dust intrusion and moisture penetration

Dust intrusion or moisture penetration can damage the product.

- Protect the product against dust and moisture.
- Do not open the product at high humidity or high dust levels.
- Close the enclosure after performing any work on the product.

Procedure:

1. Open the product using the switch cabinet key.
2. Unscrew the seven screws of the dead front using a flat-blade screwdriver (blade width: 5 mm to 8 mm) and then remove it.
3. Insert the cable gland from the outside into the enclosure opening and tighten it from the inside with the counter nut.
4. Route the cable into the inverter through the cable gland. If necessary, slightly loosen the swivel nut of the cable gland.
5. Ensure that the amount of conductor inserted is of a sufficient length for the selected terminal block.
6. Tighten the swivel nut of the cable gland.

7.3 Connecting the communication cable of the battery inverter

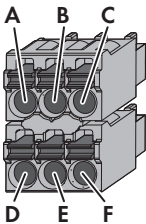
Additionally required material (not included in the scope of delivery):

- One communication cable between inverter and automatic transfer switch

Cable requirements:

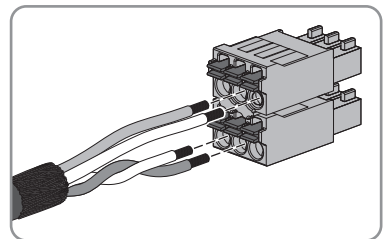
- Twisted pair conductors
- Cable category: minimum CAT5e
- Shielding: yes
- Conductor cross-section: 0.25 mm² to 0.34 mm²
- Recommended number of conductor pairs: 4
- External diameter: 6 mm to 8 mm

- Maximum cable length between battery and inverter and, in battery-backup systems, between automatic transfer switch and inverter: 10 m
- UV-resistant for outdoor use.
- Comply with the requirements of the battery manufacturer.

Terminal block	Position	Assignment
	A	Not assigned
	B	Enable
	C	GND
	D	CAN L
	E	CAN H
	F	+12 V

Procedure:

1. Insert the communication cable (see Section 7.2, page 15).
2. Strip the communication cable 130 mm.
3. Trim the cable shield to a length of 20 mm and fold it over the cable sheath.
4. Strip the insulation on the insulated conductors each by 6 mm. The **CAN L** and **CAN H** must be a twisted pair.
5. If necessary, trim unused insulated conductors flush with the cable sheath or fold it over the cable sheath.
6. Connect the conductors of the communication cables to the 6-pole terminal block. Pay attention to the assignment of the terminal block and communication connection on the battery inverter and make sure that **CAN L** and **CAN H** consist of a pair of conductors.



7. Make sure that the conductors are plugged into the terminal points tightly by pulling slightly on the conductors.
8. Insert the terminal block for the communication connection into the jack **X2504** on the Backup Unit Controller.
9. Connect the communication cable with cable shield to the grounding terminal.
10. Ensure that the rotary switches **S2101** and **S2100** is on position **0**.

7.4 Connecting to utility grid and household distribution system

Requirements:

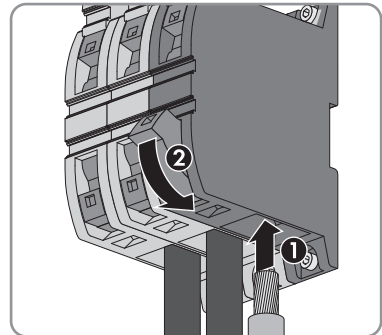
- The connection requirements of the grid operator must be met.
- The grid voltage must be within the permissible range.

Requirements on the AC conductors:

- The maximum permitted temperature for the terminal block of the AC connection of 105°C must be observed.
- Maximum permissible conductor temperature class: 75°C and 90°C
- Conductor type: copper wire
- The conductors must be made of solid wire, stranded wire or fine stranded wire. When using fine stranded wire, bootlace ferrules must be used.
- Conductor cross-section: 0.5 mm² to 16 mm²

Procedure:

1. Insert the cables (see Section 7.2, page 15).
2. Strip off the L, N and PE conductor insulation of the utility grid and the household distribution (see Section 9, page 20).
3. Connect the conductors L, N and PE of the utility grid to the terminal block **Grid** in accordance with the labeling. Insert and press down the screwdriver into the square-shaped opening of the terminal block.



4. Connect the conductors L, N and PE of the household distribution system to the terminal block **Loads** in accordance with the labeling. Insert and press down the screwdriver into the square-shaped opening of the terminal block.
5. Ensure that the conductors sit securely in the terminal point of the terminal block.

7.5 Connecting the power cables of the inverter

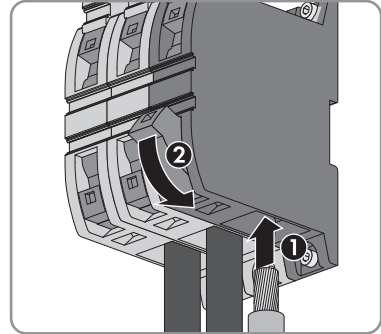
Requirements on the AC conductors:

- Maximum permissible conductor temperature class: 75°C and 90°C
- Conductor cross-section: 0.5 mm² to 16 mm²

- Conductor type: copper wire
- The conductors must be made of solid wire, stranded wire or fine stranded wire. When using fine stranded wire, bootlace ferrules must be used.

Procedure:

1. Insert the inverter cables (see Section 7.2, page 15).
2. Strip off the conductor insulation of L, N and PE by 18 mm.
3. Connect the conductors L, N and PE of the battery inverter to the terminal blocks **Battery Inverter**. Insert and press down the screwdriver into the square-shaped opening of the terminal block.



4. Connect the conductors L, N and PE of the PV inverter to the terminal blocks **PV Inverter**. Insert and press down the screwdriver into the square-shaped opening of the terminal block.
5. Ensure that the conductors sit securely in the terminal point of the terminal block.

8 Commissioning the battery-backup system

1. Attach the provided warning label with the information about the installed battery-backup system to the AC main distribution board.
2. Make sure that the product is correctly mounted and connected.
3. Insert the dead front and tighten the four screws using a flat-blade screwdriver (blade width: 5 Nm to 8 mm).
4. Lock up the product using the switch cabinet key.
5. Switch on the AC circuit breaker of the battery inverter and the PV system.
6. Commission the inverters (see inverter manual).
7. Configure the battery-backup system via the user interface of the battery inverter:
 - Activate the battery inverter user interface.
 - Log in as **Installer**.
 - Start the installation assistant.
 - Select [**Start the installation assistant**] in the context menu.
 - Select [**Save and next**] up to the step **Configure battery-backup system**.
8. Carry out communication test.

9 Technical Data

Connection to utility grid and household distribution

Rated grid voltage	230 V (240 V)
Rated power frequency	50 Hz
Maximum input and output current	63 A
Maximum overcurrent protection of the upstream fuse or circuit breaker	63 A
External diameter of AC cables	13 mm to 18 mm
Conductor cross-section	0.5 mm ² to 16 mm ²
Clamping range of terminals X1 and X2	0.75 mm ² to 16 mm ²
Insulation stripping length L/N/PE	18 mm
Sheath stripping length	80 mm

Connection of battery inverters and PV battery inverters

Maximum overcurrent protection of circuit breaker of battery inverter	40 A
External diameter of the power cable	9 mm to 18 mm
Conductor cross-section	0.5 mm ² to 16 mm ²
Clamping range of terminals X3 and X4	0.75 mm ² to 16 mm ²
Insulation stripping length L/N/PE	18 mm
Sheath stripping length	80 mm

General data

Width x height x depth	400 mm x 500 mm x 155 mm
Weight without packaging	approx. 15 kg
Operating temperature range	-25 °C to +50 °C
Degree of protection	IP65
Grid configurations	230 V (240 V) / TN grid
Approvals and national standards, as per 03/2018	CE, RCM

Battery-backup system

	SBS3.7-10	SBS5.0-10	SBS6.0-10
Maximum overload current (root-mean-square value)	20 A	28 A	32 A
Maximum residual output current (< 200 µs)	198 A	198 A	198 A

	SBS3.7-10	SBS5.0-10	SBS6.0-10
Voltage against ground potential during delivery of short-circuit current	< 20 V	< 20 V	< 20 V
Transient current load of the grounding conductor of the stand-alone grid (5s)	240 A	240 A	240 A
Permanent current load of the ground conductor of the stand-alone grid	63 A	63 A	63 A
Interval until deactivation when exceeding overload current	80 ms	80 ms	80 ms
Interval until deactivation when exceeding 55 A peak (short circuit)	250 μ s	250 μ s	250 μ s

10 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

Deutschland	SMA Solar Technology AG	Belgien	SMA Benelux BVBA/SPRL
Österreich	Niestetal	Belgique	Mechelen
Schweiz	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	België	+32 15 286 730
		Luxemburg	SMA Online Service Center: www.SMA-Service.com
		Luxembourg	
		Nederland	
		Česko	SMA Service Partner TERMS a.s.
		Magyarország	+420 387 6 85 111
		Slovensko	SMA Online Service Center: www.SMA-Service.com
		Türkiye	SMA Service Partner DEKOM Ltd. Şti. +90 24 22430605 SMA Online Service Center: www.SMA-Service.com
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Other countries	International SMA Service Line Niestetal 00800 SMA SERVICE (+800 762 7378423) SMA Online Service Center: www.SMA-Service.com		

