Installation instructions | for electricians

sonnenProtect 2500

for sonnenBatterie hybrid 9.53

EN

IMPORTANT

- This entire document must be read carefully.
- This document must be kept for reference purposes.

Publisher	
sonnen GmbH	
Am Riedbach 1	
D-87499 Wildpoldsried	
Service number	+61 13 7666
Email	info@sonnen.com.au

Document	
Document number / Version	675 / 01
Part number / Revision	1001837 / 01
Valid for	AU, NZ
Publication date	31/03/2022
The latest version can be accessed at	https://documents.sonnen.de/s/manual-sonnenProtect-2500-en

18014398772049419

Table of contents

1 Information about this document

This document describes the installation of the sonnenProtect 2500 in connection with the sonnenBatterie hybrid 9.53 storage system.

- ▶ Make sure you read this entire document carefully.
- ▶ Keep this document for reference purposes.

1.1 Target group of this document

This document is intended for licensed electricians. The actions described here must only be performed by licensed electricians.

1.2 Designations in this document

The following designations are used in this document:

Complete designation	Designation in this document
sonnenProtect 2500	sonnenProtect
sonnenBatterie hybrid 9.53	Storage system

1.3 Explanation of symbols

⚠ DANGER **Extremely dangerous situation leading to certain death or serious injury if the safety information is not observed.**

⚠ WARNING **Dangerous situation leading to potential death or serious injury if the safety information is not observed.**

⚠ CAUTION **Dangerous situation leading to potential injury if the safety information is not observed.**

NOTICE **Indicates actions that may cause material damage.**

Important information not associated with any risks to people or property.

Symbol	Meaning
▶	Work step
1. 2. 3. ...	Work steps in a defined order
✓	Condition
·	List

2 Safety

2.1 Intended use

The sonnenProtect 2500 is an backup power unit designed to supplement the sonnenBatterie hybrid 9.53. The sonnenProtect- in conjunction with the appropriate storage system of the sonnen GmbH - serves to supply power in the event of a power failure. Any other use is considered improper use.

Improper use poses a risk of death or injury to the user or third parties as well as damage to the product and other items of value. The following points must therefore be observed in order to comply with the intended use of the product:

- Only operate the sonnenProtect together with the right storage system.
- The minimum capacity of the storage system required for the operation of the sonnenProtect is 5 kWh (2 battery modules).
- The sonnenProtect must be installed by a licensed electrician.
- The sonnenProtect must only be connected to the storage system as described here.
- Generators (e. g. a PV system) must never be connected after the output of the sonnenProtect.
- Intended use includes observing this document as well as all accompanying product documentation of the appropriate storage system.
- The sonnenProtect must only be installed and used at suitable installation location.
- The transport and storage conditions must be observed.

Especially the following uses are not permissible:

- Operation in flammable environments or areas at risk of explosion.
- Operation in locations at risk of flooding.
- Operation outdoors.

Failure to comply with the conditions of the warranty and the information specified in this document invalidates any warranty claims.

2.2 Requirements for the electrician

Improper installation can result in personal injury and/or damage to components. For this reason, the sonnenProtect must only be installed and commissioned by licensed electricians. Licensed electricians must meet the following criteria:

- The electrician must be a person with a technical knowledge or sufficient experience to enable him/her to avoid dangers which electricity may create.
- The electrician must has successfully completed the sonnen Australia installer training and have valid installer accreditation at the time of installation.

2.3 Operating the product

Incorrect operation can lead to injury to yourself or others and cause damage to property.

- The sonnenProtect must only be operated as described in the product documentation.
- This device can be used by children from the age of eight (8) years old and individuals with impaired physical, sensory or mental capabilities or individuals with limited knowledge and/or experience of working with the device, as long as they are supervised or have been trained to safely use the device and understand the resulting risks of doing so. Children must not play with the device.

2.4 Product modifications or changes to the product environment

- The sonnenProtect must only be used in its original state without any user modifications and only when in perfect working order.
- Safety devices must never be overridden, blocked or tampered with.
- The interfaces of the sonnenProtect and the storage system must be connected in accordance with the product documentation.
- All repairs on the sonnenProtect must be performed by authorised service technicians only.

2.5 Voltage inside the sonnenProtect

The sonnenProtect contains live electrical parts, which poses a risk of electrical shock. The storage system inverter also contains capacitors which carry voltage even after the storage system is switched off. As the sonnenProtect is connected to the inverter of the storage system, this means that the voltage from the inverter also flows into the sonnenProtect.

Therefore:

▶ Disconnect the sonnenProtect and the storage system from the power supply (see Disconnecting the sonnenProtect from the power supply [P. 23]).

Only then can the sonnenProtect be opened.

3 Product description

3.1 Technical data

	sonnenProtect 2500
System data	
Rated active power	2,500 W
Rated apparent power	2,500 VA
Rated active power (30 sec.)	3,000 W
Rated apparent power (30 sec.)	3,000 VA
Output voltage	230 VAC +/- 10 %
Nominal frequency	50 Hz
Power factor range	0 capacitive ... 0 inductive
Max. input current	20 A
Max. output current	13 A
Short-circuit current	19.5 A
Network configuration in emergency operation	TN
Mains connection	single-phase, L / N / PE
Mains connection fuse	Miniature circuit breaker | Type B | 20 A
Operating concept	Single-phase power supply via emergency circuit(s). The switch to emergency operation takes place automatically through the storage system.
Switchover time	max. 15 seconds
Threshold power	none (starting from 0 W)
Dimension/Weight	
Dimension (H/W/D) in mm	230/200/122
Weight in kg	4.3
Safety / Protective devices	
Protection class	I / PE conductor
Degree of Protection	IP30
Overvoltage category	III
Protective functions	Overcurrent protection, fault current protection
Residal current device (RCD)	integrated (Type A | 30 mA)
Ambient conditions	
Environment	Indoor (conditional)
Pollution degree	2
Operating temperature range	-5 °C ... 45 °C
Max. rel. humidity	90%, non-condensing
Permissible installation altitude	2,000 m above sea level
Additional ambient conditions	The ambient conditions prescribed for the storage system apply.

Table 1: Technical data

3.2 System components of the sonnenProtect

NOTICE

Observe permissible product combinations

The sonnenProtect 2500 with article number 3000352 may only be installed as an accessory for the sonnenBatterie hybrid 9.53 with article number 3000350 or 3000351. Installation with any other storage systems may result in damage!

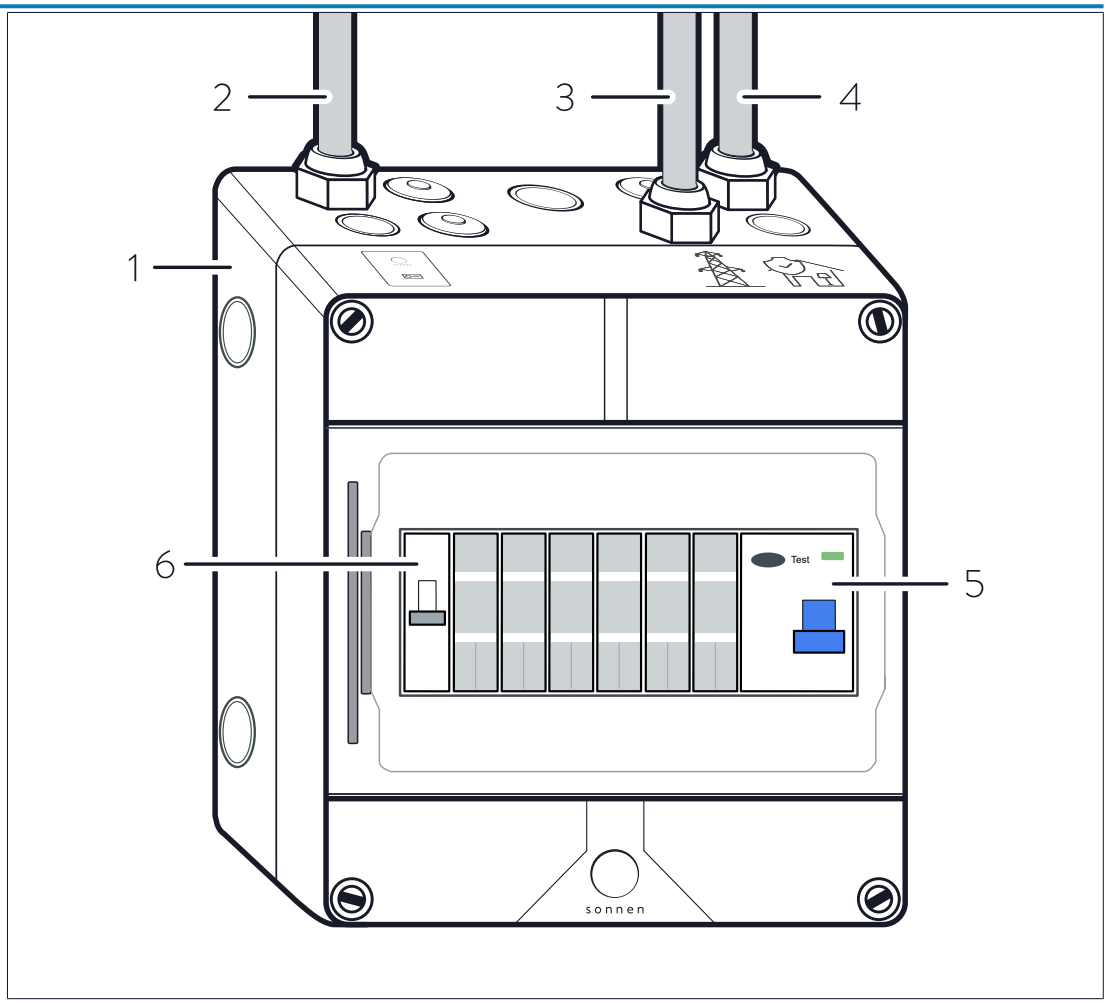


Illustration 1: System components of the sonnenProtect

1 sonnenProtect
2 Line from storage system
3 Line from electrical distributor
4 Line to backup circuit
5 Residual current device (F4.P)
6 Miniature circuit breaker (F3.P)

3.3 Type plate

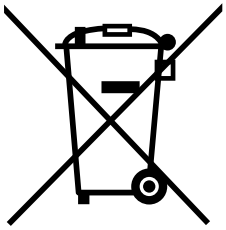
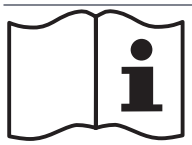
The type plate is located on the outer surface of the sonnenProtect. The type plate can be used to uniquely identify the sonnenProtect. The information on the type plate is required for the safe use of the system and for service matters.

The following information is specified on the type plate:

- Item designation
- Item number
- Technical data

A duplicate of the type plate for the sonnenProtect 2500 must be affixed by the installer to the storage system (see Attaching type label to storage system [P. 19]).

3.4 Symbols on the outside of the sonnenProtect

Symbol	Meaning
	Warning: electrical voltage.
	Warning: electrical voltage. Wait five minutes after switching off (capacitor de-energising time).
	CE mark. The product meets the requirements of the applicable EU Directives.
	WEEE mark. The product must not be disposed of in household waste, dispose of it through environmentally friendly collection centres.
	Observe the documentation. The documentation contains safety information.
	RCM mark. The product meets the requirements of the applicable regulations.

3.5 Storage and transport

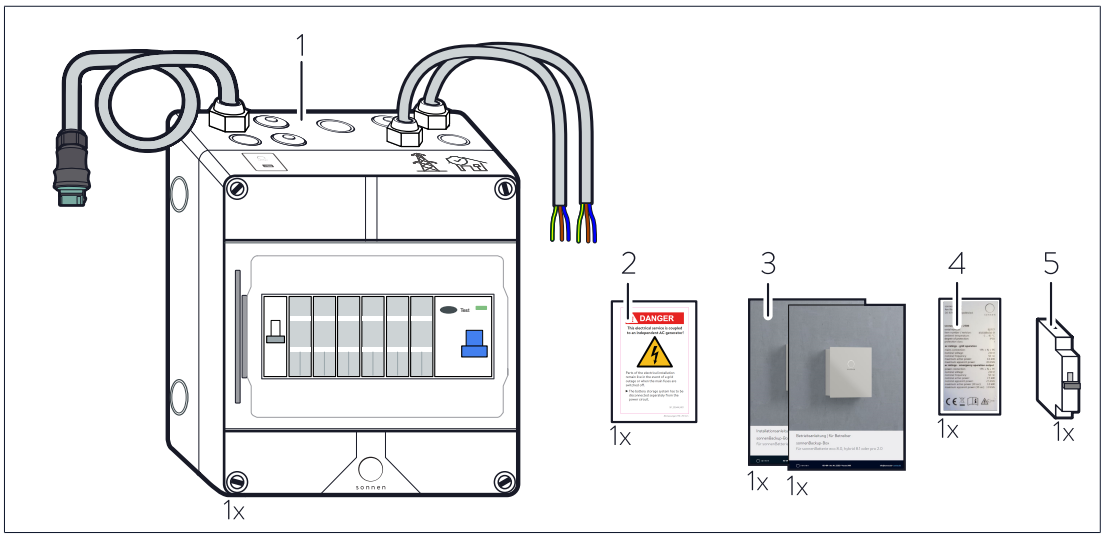
Storage and transport conditions are defined in the product documentation of the storage system.

- ▶ Observe the same storage and transport conditions for the sonnenProtect.

4 Mounting

4.1 Scope of delivery

▶ Check the following scope of delivery to ensure it is complete.



1 sonnenProtect incl. connection cables (each about 4.75 m)
2 Safety label
3 Installation and operating instructions
4 Type plate sonnenProtect 2500
5 Miniature circuit breaker B20

4.2 Additional parts required

▶ The following components are not included in delivery and must be selected and ordered by the qualified electrician accordingly:

- **Miniature circuit breaker** (for ‘Positioning components in the electrical distributor [P. 16]’)
  - Tripping characteristics: B
  - Nominal current: 20 A
- **Components for forming the backup circuit(s)** (for ‘Installing the backup circuit(s) [P. 15]’)
  - This includes all electrical lines, necessary circuit breakers and any possibly necessary components such as distributor housings.

4.3 Selecting the installation location

4.3.1 Requirements for the installation location

- ▶ Observe the required ambient conditions (see Technical data [P. 8]).

4.3.2 Observe minimum distances

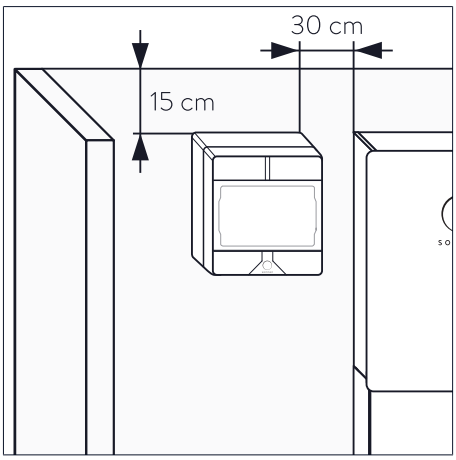


Illustration 2: Minimum distances

- ▶ Observe the specified minimum distances between the device and the storage system and neighbouring objects.
- ▶ Install the sonnenProtect at the same level as the top edge of the storage system, if possible. This keeps the cable length as short as possible.

The minimum distances ensure that

- the sonnenProtect can be easily reached and
- there is sufficient space for installation and maintenance work.

4.4 Mounting the sonnenProtect

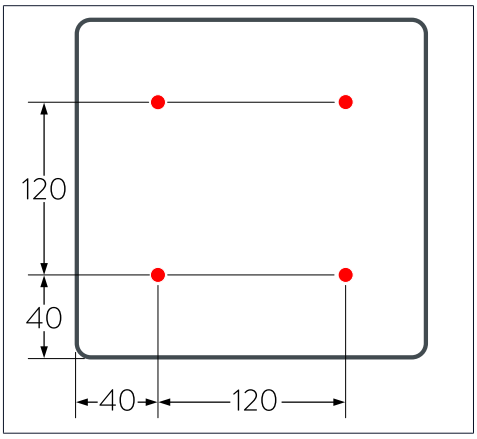


Illustration 3: Drill template for sonnenProtect (figure is not to scale - all specifications are in millimetres)

- ▶ Drill the holes shown in red in the illustration on the left.
- ▶ Secure the sonnenProtect using appropriate fastening material.

5 Electrical installation

⚠ DANGER **Electrical work on the storage system and electrical distributor**

Danger to life due to electrocution!

- ▶ Switch off the storage system to electrically isolate it.
- ▶ Disconnect the relevant electrical circuits.
- ▶ Secure against anyone switching on the device again.
- ▶ Wait five minutes so the capacitors can discharge.
- ▶ Check that the device is disconnected from the power supply.
- ▶ Only licensed electricians are permitted to carry out electrical work.

Due to the extension of the storage system hybrid 9.53 by a sonnenProtect 2500, the system is ready for emergency power as well as operation in islanding mode. These are functionalities that may need to be specified when registering a storage system with the distribution system operator (DSO).

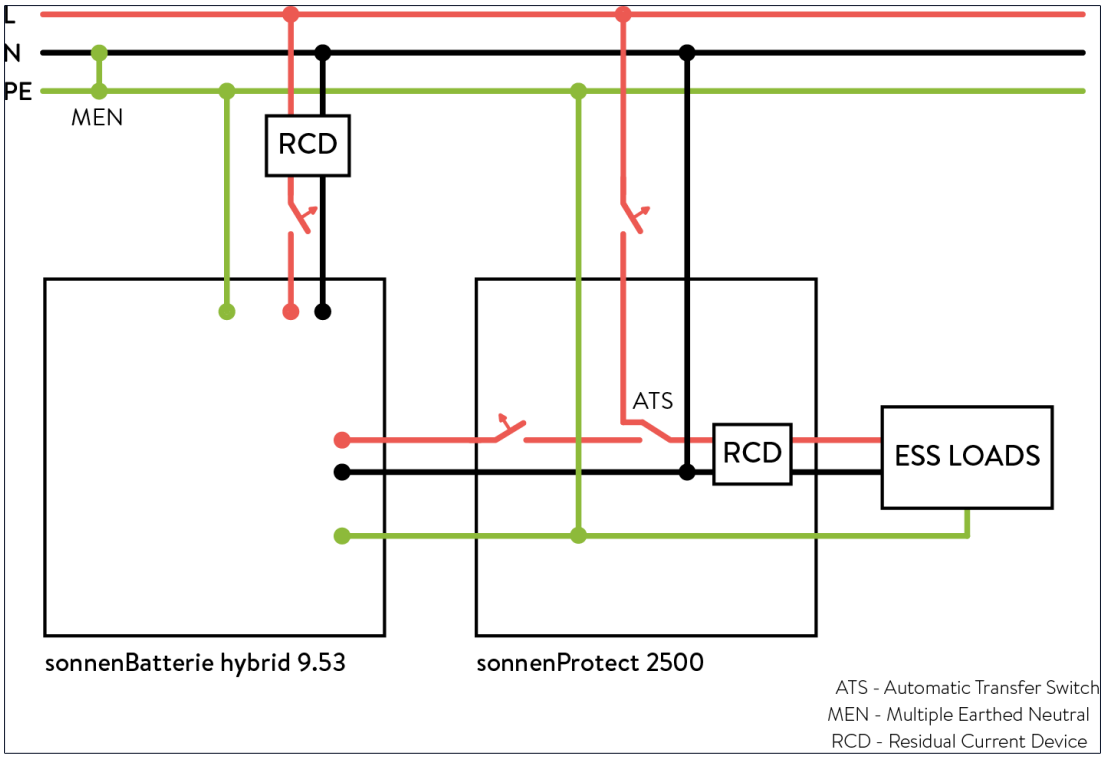
This means that under certain circumstances it may be necessary to change information on the storage system at the DSO or to re-register it.

Recommended procedure for the electrical installation

Carry out the steps in the following order to ensure the smooth electrical installation of the sonnenProtect:

1. Read sections ‘Electrical consumers in backup operation [P. 15]’ and ‘Implementing the backup circuit(s) [P. 15]’ and, together with the operator of the storage system and the sonnenProtect, define how the backup circuit or circuits are to be set up. The on-site circumstances must always be taken into account during this process, because with electrical installations where there are few separate circuits, it can be difficult to integrate all of the desired electrical consumers in the backup circuit or to integrate only the consumers which should be supplied with backup power.
2. Carry out the necessary revision work on the distributor in the building. It is essential to ensure that all electrical cables meet local and national regulations in terms of their dimensioning.
3. If the backup circuit or circuits are installed accordingly, the sonnenProtect can be connected and the necessary additions can be made to the storage system (see the following sections).
4. When all steps have been implemented and the electrical installation is complete, continue with section ‘Commissioning [P. 21]’.

Neutral conductor overview



In Australia and New Zealand the neutral continuity in backup operation must be maintained at all times. This is achieved internally within the sonnenProtect.

5.1 Installing the backup circuit(s)

5.1.1 Electrical consumers in backup operation

Prior to installation, the following points must be explained to or clarified with the operator by the electrician performing the installation:

- Backup operation does not offer the same output as grid operation.
- Three-phase current is not available during backup operation (as only one phase is supplied with power).
- **Which electrical consumers should be supplied with power in backup operation?** The current paths in the building network must be installed in such a way that the consumers which are relevant in the event of a grid outage are connected to an independent circuit (backup circuit). The electrical consumers which are crucial for the electrical supply to the building in backup operation are relevant here. Different consumers which may be important during a grid outage are specified in the sample calculation presented below.
- **How much capacity of the storage system should be reserved as an backup buffer?** The following example, in which a utility room and other important functions within a single-family home are to be supplied with power, can be used to determine this. This example is based on a grid outage lasting one hour (the individual power consumption values are estimated values).

Electrical consumer	Power consumption [kW]	Active during grid outage [h]	Electrical work [kWh]
Lighting	0.5	1	0.5
Freezer	0.6	0.25	0.15
Heating	0.7	0.25	0.175
Router, telephone	0.01	1	0.01
Refrigerator	0.6	0.25	0.15
Alarm system, grid-connected smoke detector	0.05	1	0.05
		Total	**1.04**

In this example, the total power requirement for a grid outage lasting one hour is approx. 1.1 kWh, which must be covered in order to maintain the function of all of the listed consumers.

▶ Use this calculation to determine with the operator which backup buffer should be set, taking the total capacity of the storage system and other requirements (e.g. from sonnenFlat tariff) into account (see Setting the backup buffer [P. 21]).

5.1.2 Implementing the backup circuit(s)

Basics for the formation of the backup circuits:

- For systems with backup power capability, the power distribution must be separated into backup power authorised and not backup power authorised parts.
- All components within the backup power authorised part must be clearly identified by lettering (or graphic symbols).

▶ **At any time observe further local and national requirements and guidelines regarding backup power supply!**

When undertaking electrical work on the distributor in the building, the following must be taken into account, among other things:

1. How is the wiring set up to the desired backup consumers?
   - Is independent wiring already in place?
   - Do the existing circuits include electrical consumers that should not be supplied with power in backup operation?
   - Can the existing wiring be split?
   - If the circuits cannot be split, the connected wattage of the consumers which should not be supplied with backup power needs to be taken into account. If loads are too high, the circuit breaker for the sonnenProtect will trip, and then none of the electrical consumers in the backup circuit will be supplied with power.
2. Can the electrical distributor in the building be adapted to suit the new circumstances?
   - Is there enough space to install the necessary circuit breakers and other components in the distributor?

5.2 Positioning components in the electrical distributor

The following components must be installed in the electrical distributor for the sonnenProtect:

- **Miniature circuit breaker (MCB) | type B | 20 A**

A miniature circuit breaker with type B tripping characteristics and a nominal current of 20 A must be installed *upstream of the input* for the sonnenProtect.

5.3 Wiring components in the electrical distributor

Prerequisite:

✓ The backup circuit has been properly installed. The information in section Installing the backup circuit(s) [P. 15] was observed at all times.

▶ Connect the sonnenProtect and the other components in the electrical distributor as shown in the following figure.

Note:

- The figures ‘Circuit diagram overview - electrical connection at single-phase mains [P. 17]‘ and ‘Circuit diagram overview - electrical connection at three-phase mains [P. 18]’ show the installation of a sonnenBatterie hybrid 9.53 as an example, which has been installed in a single- or three-phase network in accordance with the specifications in the product documentation and to which a sonnenProtect has been added (grey marked area).

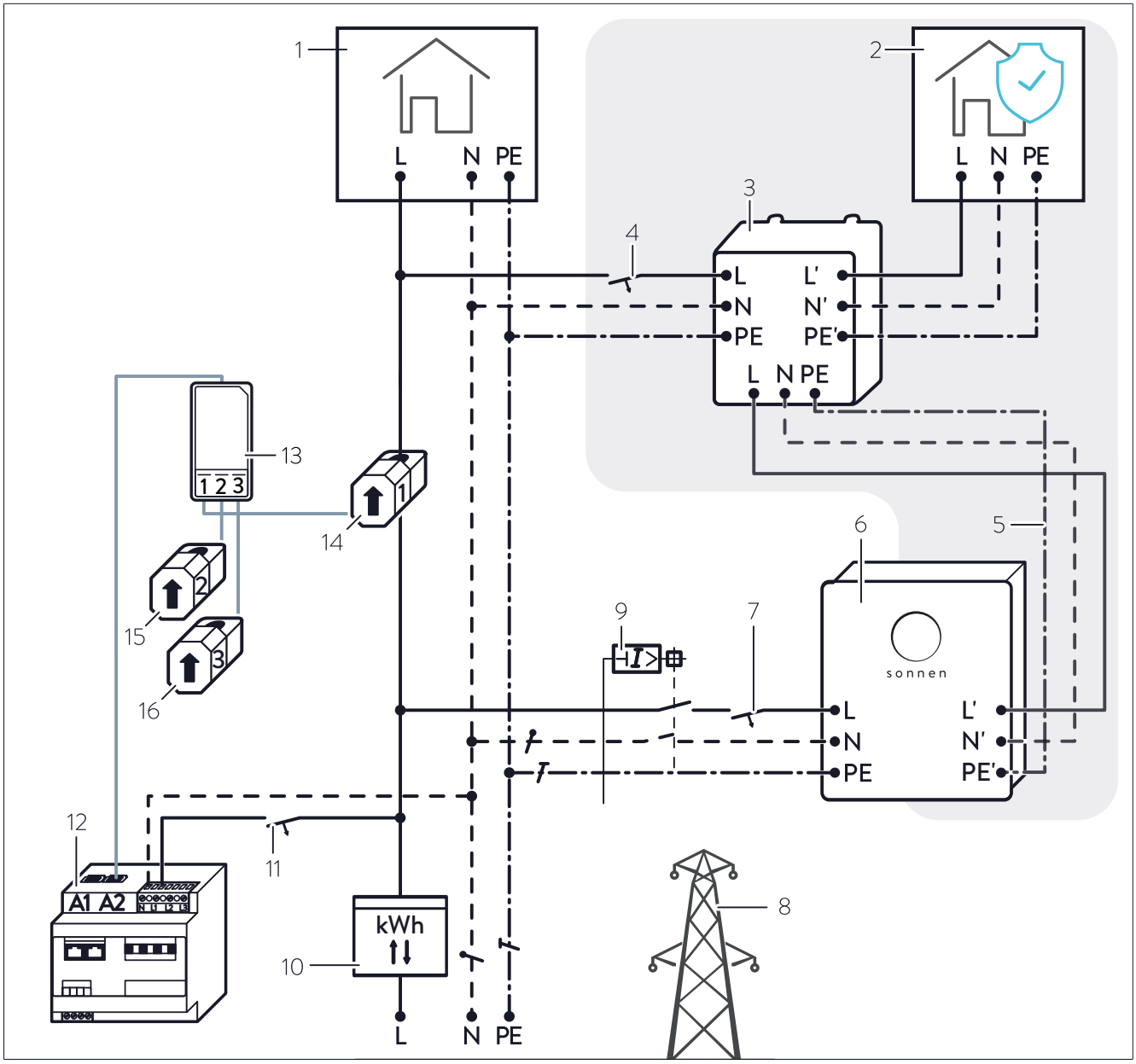


Illustration 4: Circuit diagram overview - electrical connection at single-phase mains

1	Consumers in building	9	RCD | Type B | 30 mA
2	Consumers in backup circuit	10	Bidirectional counter
3	sonnenProtect with integrated RCD	11	Power meter Miniature circuit breaker
4	Miniature circuit breaker | Type B | 20 A	12	Power meter
5	Line from storage system	13	Transformer interface consumption (A2)
6	Storage system	14	Current transformer for consumption - L1
7	Storage system Miniature circuit breaker	15	Current transformer for consumption - L2
8	Public electrical mains	16	Current transformer for consumption - L3

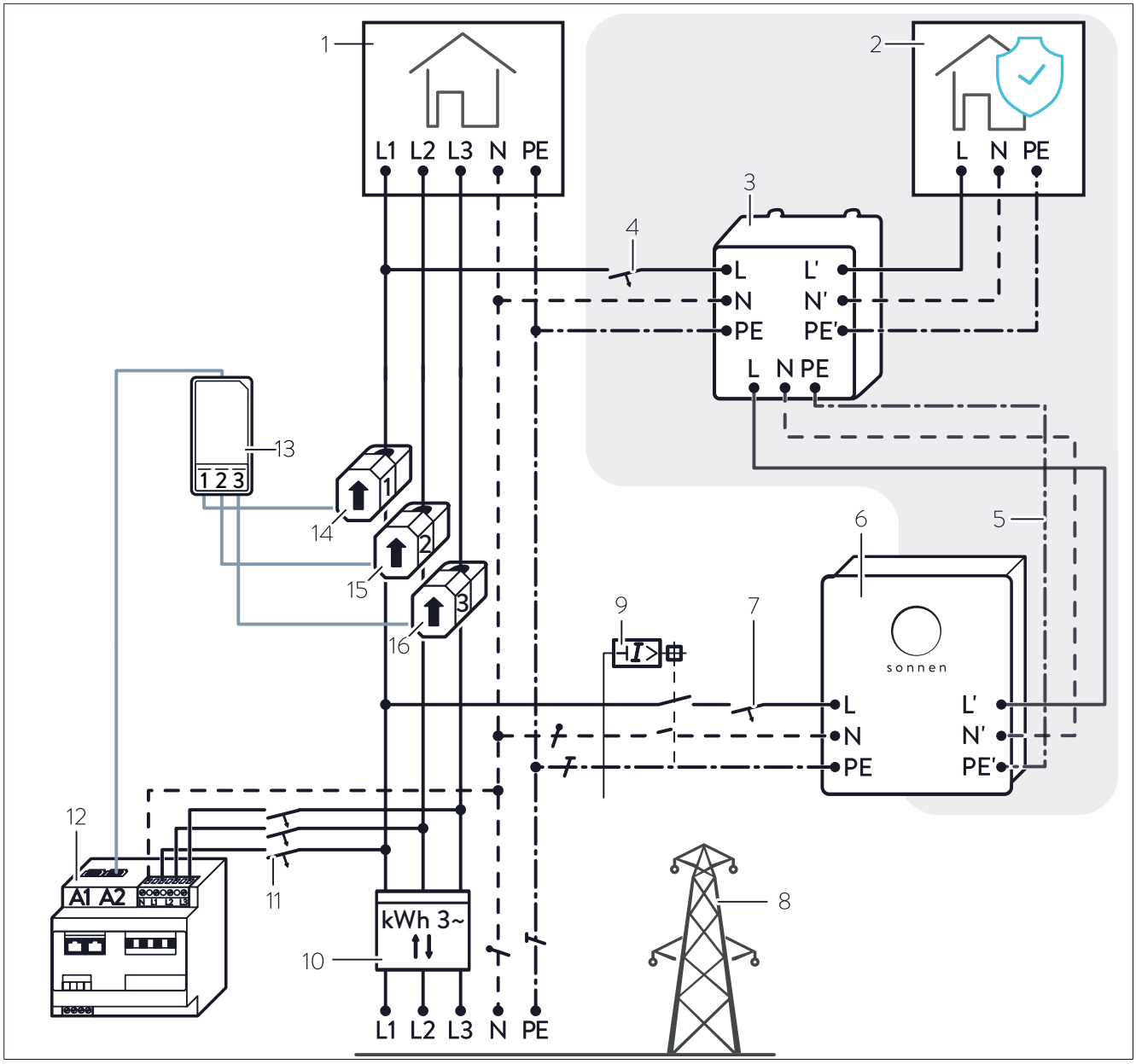


Illustration 5: Circuit diagram overview - electrical connection at three-phase mains

1	Consumers in building	9	RCD | Type B | 30 mA
2	Consumers in backup circuit	10	Bidirectional counter
3	sonnenProtect with integrated RCD	11	Power meter Miniature circuit breaker
4	Miniature circuit breaker | Type B | 20 A	12	Power meter
5	Line from storage system	13	Transformer interface consumption (A2)
6	Storage system	14	Current transformer for consumption - L1
7	Storage system Miniature circuit breaker	15	Current transformer for consumption - L2
8	Public electrical mains	16	Current transformer for consumption - L3

5.4 Connecting sonnenProtect to storage system

- Connect the line of the sonnenProtect to the socket of the storage system (2) using the pre-mounted plug (1).

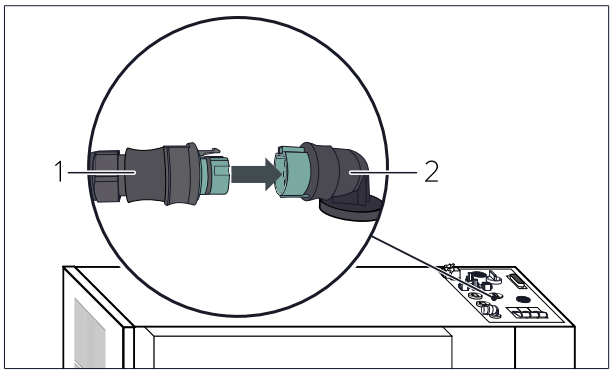


Illustration 6: Connecting sonnneProtect and storage system

5.5 Attaching safety label to the distributor

⚠ DANGER

Electrical installation remains live in event of grid outage

Danger to life due to electrocution!

To warn electricians:

- Attach the safety label shown below (included in scope of delivery) to the relevant electrical distributor.

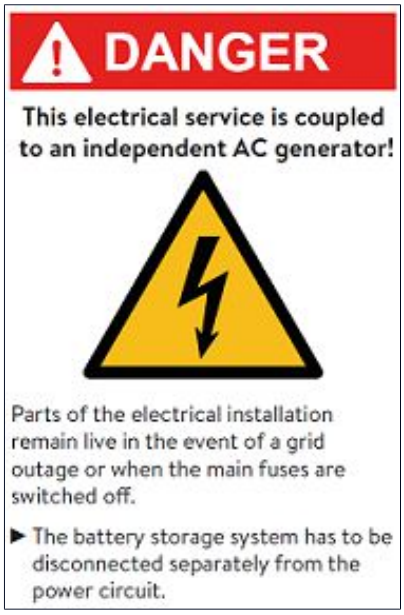


Illustration 7: Label for attachment to the electrical distributor

5.6 Attaching type label to storage system

As the sonnenProtect 2500 constitutes an add-on to the storage system, a duplicate of the type plate for the sonnenProtect must be affixed to the storage system.

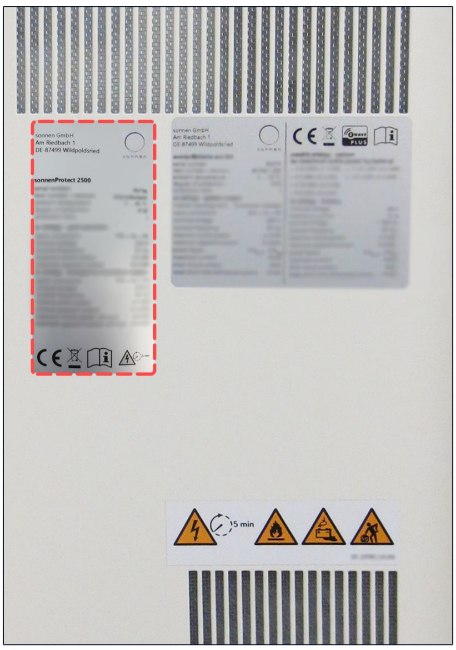


Illustration 8: Affixing an additional type plate to the storage system

- Affix the type plate for the sonnenProtect 2500, which is included in delivery, to the outside of the storage system next to the type plate for the storage system itself.

6 Commissioning

6.1 Commissioning checklist

Check the following points before switching on the storage system and therefore also the sonnenProtect:

- ✓ The sonnenProtect is mounted in a suitable installation location.
- ✓ All cables are completely and correctly connected.
- ✓ A miniature circuit breaker (type B - 20 A) is installed upstream of the input for the sonnenProtect.
- ✓ The electrical cables meet the requirements of all local and national guidelines for cable dimensions.

6.2 Switching on the sonnenProtect and the storage system

To switch on the storage system and the sonnenProtect, the following steps must be performed in the given order:

1. Ensure, that storage system and sonnenProtect are disconnected from the power supply.
2. Ensure, that miniature circuit breaker (F3.P) and the RCD (F4.P) inside the sonnenProtect are switched on.
3. Switch on the grid voltage to the storage system and the sonnenProtect.
4. Switch on the storage system as described in the respective installation instructions.

6.3 Setting up the sonnenProtect

Conditions:

✓ The storage system is connected to the router of the home network.

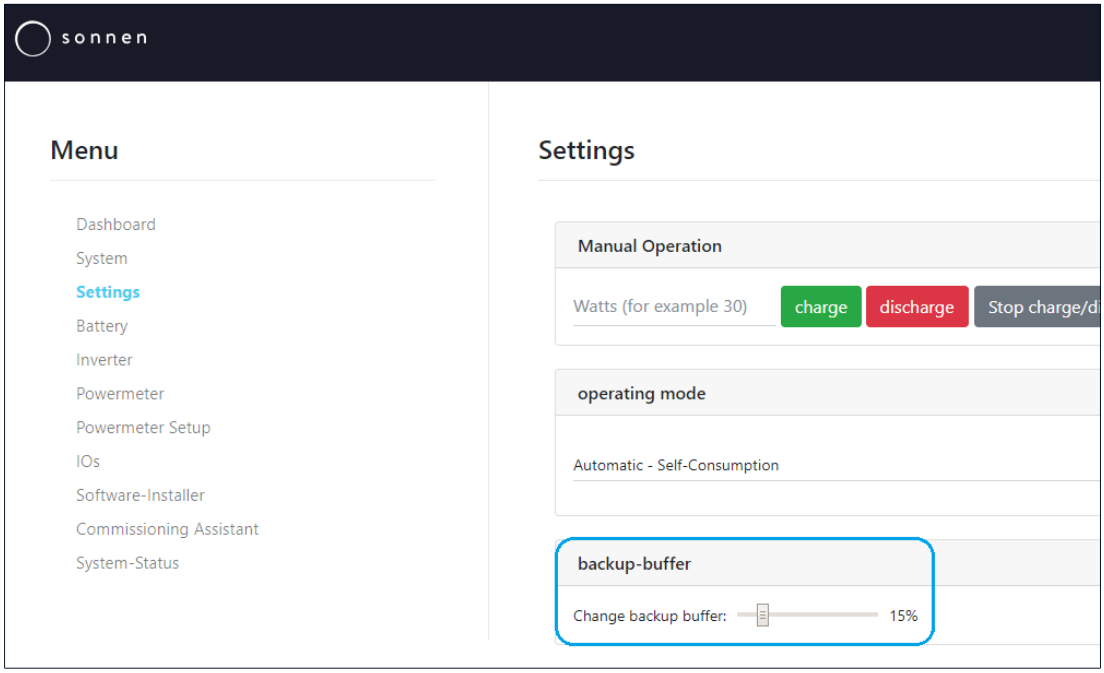
✓ Your laptop or PC also accesses the home network.

- ▶ Navigate to the following internet address: https://find-my.sonnen-batterie.com
- ▶ Start the ***commissioning assistant 2.***
- ▶ Run through the commissioning assistant and activate the sonnenProtect at the appropriate point. The backup buffer can also be set. This buffer can be changed at a later point as described in the following section.

6.4 Setting the backup buffer

Proceed as follows to set what percentage of the capacity of the storage system should be available for the sonnenProtect in the event of a grid outage.

- ▶ On the web interface of the storage system, navigate to the Settings page.
- ▶ Change the percentage for backup-buffer to a desired value.



6.5 Testing backup operation

1. Simulate a grid outage

- Switch the main fuses in the building off, so that the sonnenProtect and storage system are no longer connected to the public electricity grid. The storage system switches to backup operation after switching off the fuses.

2. Activate a consumer

- Activate an electrical consumer connected to the backup circuit.

3. Check backup power supply

Backup operation works properly when the consumer connected to the backup circuit is receiving electrical energy.

If the backup operation does not work:

1. Check the electrical wiring (see Electrical installation [P. 13])..
2. Check if there is a malfunction which is mentioned in the troubleshooting [P. 25] section and follow the suggestions for rectification.
3. Contact the sonnen service team if the problem cannot be resolved.

7 Decommissioning

NOTICE

Deep-discharge of the battery modules

Destruction of the battery modules!

- ▶ Do not disconnect the storage system from the public electricity grid for long periods of time.
- ▶ Never continue to operate battery modules which have been deep-discharged.

7.1 Switching off the sonnenProtect

To switch off the sonnenProtect manually, the following procedure can be carried out. In order to be able to work on the sonnenProtect safely it must be disconnected from the power supply (see next section).

1. Switch off the storage system as described in the relevant product documentation.
2. Wait at least five minutes until the internally stored energy inside the storage system inverter has discharged.

7.2 Disconnecting the sonnenProtect from the power supply

Before **working on** the sonnenProtect, it must be completely disconnected from the power supply.

1. Switch off the sonnenProtect by disconnecting the power supply to the storage system (as described in the relevant product documentation).
2. Switch off the grid voltage using the miniature circuit breaker for the sonnenProtect.
3. Take steps to ensure that these switches cannot be switched on again.
4. Wait at least five minutes until the internally stored energy inside the storage system inverter has discharged.
5. Carefully check that there is no voltage inside the sonnenProtect.

8 Uninstallation and disposal

8.1 Uninstallation

⚠ DANGER **Improper uninstallation of the sonnenProtect**

Danger to life due to electrocution!

- ▶ The sonnenProtect must only be uninstalled by authorised electricians.

8.2 Disposal

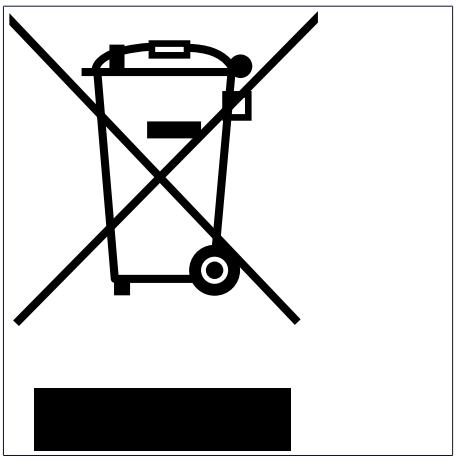


Illustration 9: WEEE symbol

The sonnenProtect must not be disposed of as domestic waste!

- ▶ Dispose of the sonnenProtect in an environmentally friendly way through suitable collection systems.

9 Troubleshooting

Fault	Possible causes	Rectification
Grid operation (no grid outage)		
The electrical consumers in the backup circuit are not supplied with energy in grid operation.	The lines of the backup circuit have not been connected correctly.	Check the electrical wiring of the backup circuit.
	The miniature circuit breaker in the supply line of the sonnenProtect is switched off.	Switch on the miniature circuit breaker in the supply line of the sonnenProtect.
	The miniature circuit breaker (F3.P) in the sonnenProtect is switched off.	Switch on the miniature circuit breaker (F3.P) inside the sonnenProtect.
	The RCD (F4.P) in the sonnenProtect is switched off.	Switch on the RCD (F4.P) inside the sonnenProtect.
Backup operation (grid outage) - Backup operation does not start		
Backup operation doesn't start. The eclipse of the storage system is **off**.	The batteries of the storage system have discharged so much that further discharging would lead to a deep discharge state and therefore damage the batteries.	If the PV system generates electrical power, the backup operation will continue as soon as excess power is available. If the PV system does not generate electrical power the only thing to do is wait until the grid outage passes and the public electrical grid once again starts supplying electrical energy. Then the sonnenProtect automatically switches to grid operation.
	The storage system is switched off.	Switch on the storage system.
Backup operation doesn't start. The eclipse of the storage system is **green**.	The miniature circuit breaker (F3.P) in the sonnenProtect is switched off.	Switch on the miniature circuit breaker (F3.P) inside the sonnenProtect.
	The RCD (F4.P) in the sonnenProtect is switched off.	Switch on the RCD (F4.P) inside the sonnenProtect.
Backup operation doesn't start. The eclipse of the storage system is **orange**.	Electrical consumers with too high power consumption are connected to the backup circuit.	Switch off electrical consumers or reduce their power consumption.
		Only connect electrical consumers to the backup circuit when they have a power consumption that does not exceed the nominal power or (when switching on) the maximum power of the sonnenProtect.

Fault	Possible causes	Rectification
Backup operation (grid outage) - Backup operation stops		
Backup operation stops. The miniature circuit breaker and the RCD in the sonnenProtect have not switched off. The eclipse of the storage system is **off**.	The batteries of the storage system have discharged so much that further discharging would lead to a deep discharge state and therefore damage the batteries.	If the PV system generates electrical power, the backup operation will continue as soon as excess power is available. If the PV system does not generate electrical power the only thing to do is wait until the grid outage passes and the public electrical grid once again starts supplying electrical energy. Then the sonnenProtect automatically switches to grid operation.
Backup operation stops. The miniature circuit breaker (F3.P) in the sonnenProtect has switched off. The eclipse of the storage system is **green**.	The miniature circuit breaker detected an overload, this means electrical consumers with too high power consumption are connected to the backup circuit.	Switch off electrical consumers so that the power consumption does not exceed the nominal power or (when switching on) the maximum power of the sonnenProtect. Then switch on the miniature circuit breaker (F3.P) again. The storage system automatically restarts the backup operation.
Backup operation stops. The RCD (F4.P) in the sonnenProtect has switched off. The eclipse of the storage system is **green**.	The RCD has detected fault currents in the backup circuit.	Check the wiring and the connected electrical consumers of the backup circuit and correct the error. Then switch on the RCD (F4.P) again. The storage system automatically restarts the backup operation.
Backup operation stops. The miniature circuit breaker and the RCD in the sonnenProtect have not switched off. The eclipse of the storage system is **orange**.	The control of the storage system detected an overload, this means there are electrical consumers connected to the backup circuit with a too high power consumption.	Switch off electrical consumers so that the power consumption does not exceed the nominal power or (when switching on) the maximum power of the sonnenProtect. The storage system automatically restarts the backup operation. The eclipse of the storage system is green. If the backup operation does not start and the eclipse stays orange, the storage system has already unsuccessfully tried three times to start the backup operation. Then the only thing to do is wait until the connection to the public electrical grid can restored.

sonnen

energy is yours

sonnen GmbH
Am Riedbach 1
D-87499 Wildpoldsried