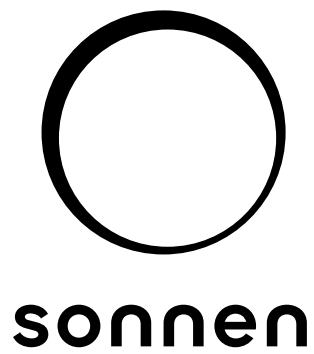




Installation instructions for Electricians

sonnenBatterie 12



- 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

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1 Information about this document

This document describes the installation of the sonnenBatterie 12.
→ 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 authorized electricians. The actions described here must only be performed by authorized electricians.

1.2 Designations in this document

The following designations are used in this document:

Complete designation	Designation in this document
sonnenBatterie 12	Storage system
sonnenInverter 6-1-2	Inverter
sonnenModule 5	Battery module
Authorised electrician	Electrician performing the installation/Installer
The person who purchased the storage system and at whose premises it was installed	Operator

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.
 INFO	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

1.4 Change history

Version / Date	Changes compared to the previous version
00 / 30-09-2026	Initial creation.

2 Safety

2.1 Proper use

The sonnenBatterie 12 is a battery storage system designed to store electrical energy. It consists of the following main components: an inverter, a connection box, and battery modules.

Improper or unintended use may pose a risk to the life and limb of users or third parties and may cause damage to the product and other property.

The following points must be observed at all times in order to ensure **proper use**:

- The transport and storage conditions must be observed.
- The storage system must only be used at a suitable installation location.
- The storage system must be fully installed in accordance with the installation instructions.
- The storage system must be installed by an authorized electrician. Country-specific regulations concerning electrical installations must be observed at all times.
- The interfaces of the storage system must be connected in accordance with the product documentation.
- The storage system may be operated with a maximum of three battery modules.
- The storage system must not be used long-term without connection to the electricity grid.
- No generators may be connected downstream of the contactor for the Easy Backup backup power function.
- Only use the storage system in its original state - without any unauthorised modifications - and when it is in proper working order.
- The inverter may only be operated with PV modules with a class A rating in accordance with IEC 61730.
- The inverter is intended exclusively for use with PV generators in grid-connected PV systems, including zero feed-in systems.
- The inverter must only be used for PV generators whose connectors are not grounded.
- Repairs to the storage system may only be performed by service technicians authorised by sonnen.

Especially the following uses are not permissible:

- Operation in flammable environments or areas at risk of explosion.
- Operation in locations at risk of flooding.
- Use in the medical field or to supply life-sustaining devices.
- Operation of the battery modules without being connected to the connection box and the sonnenInverter, or when installed outside the battery stack.
- Bypassing, blocking or tampering with protective devices.

Danger due to electrical voltage

The components of the storage system contain live parts. This means there is always a risk of electric shock.

Therefore:

→ Disconnect the storage system from the power supply before any work on the system is started (see Switching the storage system off to electrically isolate it [P. 83]).

High voltages may be present on live parts and wires inside the storage system, even when the system is turned off.

→ Do not open the inverter, the connection box, or the battery modules.





Operating the storage system

- The storage system may 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.

INFO

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

2.2 Qualifications of authorized personnel

The storage system must be installed and commissioned by authorised electricians only. Installation by unqualified and/or unauthorised persons may cause injury and/or component damage.

People who meet the following requirements are generally considered authorised electricians:

- A qualified electrician is a person with appropriate technical training, knowledge and experience, enabling them to recognise and avoid the hazards that may arise from electricity.
- The electrician must have valid installer accreditation at the time of installation.

2.3 Handling the inverter



The inverter fulfils international safety requirements, compliance with which has been verified by accredited test laboratories. Nevertheless, as with all electronic devices, there are residual risks.

When exposed to sunlight, the PV generators and cables as well as the DC cables connected to the connection box may be energised. There is a danger to life from electric shock and electrical discharge.

To ensure **intended use**:

- Disconnect the DC and AC connections from the power source before carrying out any work on the inverter and secure them against being switched on again.
- Do not make or disconnect any DC connections during operation.
- Do not make or disconnect any AC connections if the AC connection is live.
- Do not put the inverter into operation until the entire storage system has been installed in accordance with the installation instructions.
- The sonnenInverter 6-1-2 inverter may only be operated in combination with the battery stack and the other components of the storage system.
- The inverter must only be used with PV modules that have a Class A rating in accordance with IEC 61730.
- Always keep access to the disconnection device clear.
- Shut down the inverter immediately and disconnect it from the battery stack and the PV generators if any of the following components are damaged: inverter (no function, visible damage, smoke, liquid ingress, etc.), cables, PV generators, battery module.



The temperature of some parts of the inverter may exceed 60 °C during operation, therefore:

- Do not touch the inverter during operation.

→ Wait until the inverter has cooled down before touching it.

2.4 Handling battery modules



The battery modules compatible with the storage system are protected by multiple protective devices and are safe when used properly. Improper use or a fault may cause the battery cells inside the battery modules to be damaged.

This can have the following effects:

- High heat generation on the surface of the battery cells.
- Leaking of electrolyte, vapours and/or smoke.
- The escaping electrolyte may ignite and cause an explosive flame.
- Irritation or burns to skin, eyes, respiratory tract and mucous membranes due to steam or smoke from burning battery modules.
- Irritation of skin, eyes, respiratory tract and mucous membranes due to leaking electrolyte.

In order to ensure **proper use**:

- Do not open the battery modules.
- Do not inflict mechanical damage (pierce, deform, disassemble, etc.) on the battery modules or otherwise modify them.
- Do not heat the battery modules. Keep them away from sources of ignition and operate them only within the permissible temperature range.
- Do not allow the battery modules to come into contact with water (except to extinguish a fire involving the storage system).
- Do not short-circuit the battery modules.
- Never continue to use the battery modules if they are damaged in any way.
- Do not deep-discharge the battery modules or charge them using external chargers.
- Do not operate battery modules outside of the storage system.
- Remove metal jewellery when handling battery modules.
- Do not place any tools or metal objects on the battery modules.

Transporting battery modules

The battery modules contain lithium-ion batteries. These are classed as hazardous goods and must be transported in compliance with certain regulations.

- Observe the information in section Transporting battery modules [P. 14] at all times.

2.5 Conduct in the event of a fault or fire

If contents of the battery modules are released:

1. Leave or do not enter the room in which the battery stack with the battery modules is located.
2. Avoid contact with released electrolyte. If contact occurs, rinse the affected area thoroughly with water. In the case of irritation of the skin, eyes or mucous membranes, seek medical attention.
3. Contact the sonnen service team (service@sonnen.com.au).

A fire may occur even with electrical devices that are designed with care. A nearby fire can also cause the storage system to ignite. This may also lead to the contents of the battery modules being released.

In the event of fire of the battery stack or inverter:

1. Leave or do not enter the room/the area in which the battery stack and the inverter are located.
2. Avoid contact with escaping smoke or steam. If contact occurs, rinse the affected area thoroughly with water. In the case of irritation of the skin, eyes or mucous membranes, seek medical attention.
3. Contact the fire services.
4. Contact the sonnen service team (service@sonnen.com.au).

There is a danger of electrocution when extinguishing a fire while the storage system is switched on. In the event of a fire in the vicinity of the product or in the storage system itself, proceed as follows before beginning any extinguishing measures:

- De-energize the storage system [P. 83]. The battery modules remain live. The PV generators and cables, as well as the DC cables connected to the inverter, may remain live when exposed to sunlight.
- Switch off the mains fuses in the building.
- Leave or do not enter the room/area in which the battery stack and the inverter are located.

If the storage system or mains fuses cannot be safely switched off:

- Observe the minimum distances applicable for the specific extinguishing means used. The storage system works with a nominal voltage of 230 V (AC) and max. 288 V (DC). The voltage of the PV system of up to 550 V (DC) is applied to the inverter.

Extinguishing agents

- A storage system fire can be extinguished using conventional extinguishing agents.
- Water is recommended as an extinguishing agent in order to cool the battery modules and therefore prevent thermal runaway in battery modules which are still intact.

Information on the battery modules

- A single battery module has a nominal voltage of 96 V (DC).
- Up to three battery modules are connected in series and can thus form an operating voltage of 288 V (DC).
- The battery modules do not contain metallic lithium.

Earth Fault Alarm

In the event of an earth fault at the inverter, a notification is sent via the sonnen App.

2.6 Symbols on the product

Warning: electrical voltage.



Warning: electrical voltage. Wait five minutes after switching off (capacitor de-energising time).



Warning: flammable materials.



Warning: hazards due to batteries.



Warning: product is heavy.



General Warning.



Warning: Risk of arc flash and electric shock. Do not disconnect from the power supply while the unit is under load. Doing so may cause an electric arc, which could result in a fire. Always wear appropriate personal protective equipment (PPE) during installation and removal work.



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.



Recycling symbol for lithium-ion batteries.

Li-ion



Observe the documentation. The documentation contains safety information.



Protective earthing. Labelling of earthing points.

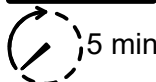
Additional safety markings on the inverter



High-voltage hazard! Work on the inverter may only be performed by qualified personnel.



Warning: electrical voltage. Wait five minutes after switching off (capacitor de-energising time).





Warning: Hot surface.



Do not disconnect while under load, as this may cause a fire.

Do not disconnect under load!

3 Storage and transport

3.1 Storage

Storage refers to the long-term storage of storage system components outside of transport and operation. The components are not installed and are not in operation.

The components must be stored in a weather-protected location, and the specified storage temperature range must be maintained (see Technical Data [P. 92]).

3.1.1 Storing the battery modules

NOTICE

Deep-discharge of the battery modules

Destruction of the battery modules!

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

During storage the battery modules automatically discharge at a minimal level. Battery modules are only permitted to be stored for a limited amount of time, as a deep discharge of the batteries may lead to damage to or destruction of the battery modules.

Observe the following points:

- Battery modules are delivered with a charging status of **30 %**.
- Battery modules are only allowed to be stored for **maximum 6 months**.
- After 6 months at the latest, the battery modules must be installed in a storage system and commissioned.

3.2 Transport

Transport refers to the temporary movement of components between two locations. The components are packaged, not installed, and not in operation.

The components must be transported in a manner that protects them from the elements, and the specified transport temperature range must be maintained (see Technical Data [P. 92]).

3.2.1 Transporting battery modules

⚠ CAUTION

Improper transport of battery modules

Fire outbreak at battery modules or emission of toxic substances!

- Only transport battery modules in packaging that meets applicable regulations.
- Only transport damaged battery modules in accordance with the applicable regulations.

Lithium-ion batteries are hazardous goods. Therefore the following points must be observed when transporting the battery modules:

- Observe the general transport regulations based on the mode of transport as well as all legal regulations.

→ Consult an external hazardous goods expert.

Hazardous goods class	UN number	Battery module mass
9	UN 3480 'lithium-ion batteries'	87 kg

Table 1: Battery module data relevant for transport

3.2.2 Checking for transport damage

CAUTION

Insulation fault when storage system is damaged

Danger of electric shock when touching damaged insulation elements!

- Unpack the storage system immediately after transport and inspect it for transport damage.
- Do not use a damaged storage system under any circumstance.

WARNING

Fault due to use of damaged battery modules

Fire outbreak at battery modules or emission of toxic substances!

- Check each battery module for transport damage.
 - ⇒ If damage (deformation, defects, emission of substances and the like) is discovered:
- Never use damaged battery modules.

- Check each delivery upon arrival in the presence of the shipping agent for completeness and damage.

Reporting transport damage

Report transport damage immediately to the shipping company and to sonnen GmbH.

- Refuse to accept the delivery if the discovered defects are serious.
- Document the defect in a brief report and make the notation 'Conditional acceptance' on the delivery note/shipping slip.
- Have the shipping agent review the report and confirm by countersigning.
- Make note of the name of the shipping agent and the registration number of the delivery vehicle.
- Create a detailed defect report if necessary. Send this within the reporting time frame (seven days for freight forwarders; 24 hours for parcel couriers) to the shipping company and sonnen GmbH.

INFO

Damage claims cannot be settled if the above-mentioned documentation is not submitted within the stated reporting time frames.

3.2.3 Transport to the installation location

WARNING

Risk of injury due to heavy weight of the inverter (~ 16.5 kg)

Crushing or straining due to incorrect lifting or dropping of the inverter!

- Wear appropriate PPE when transporting and installing.
- Use a manual or electric sack truck for the installation.
- Ensure a secure footing.

WARNING

Risk of injury due to the heavy weight of the battery module (~87 kg)

Bruises or contusions caused by lifting or dropping the battery module!

- Always lift and carry the battery module with at least two people.
- Wear appropriate PPE when transporting and assembling.
- Use a manual or electric hand truck to bring it inside.
- Ensure a secure footing.

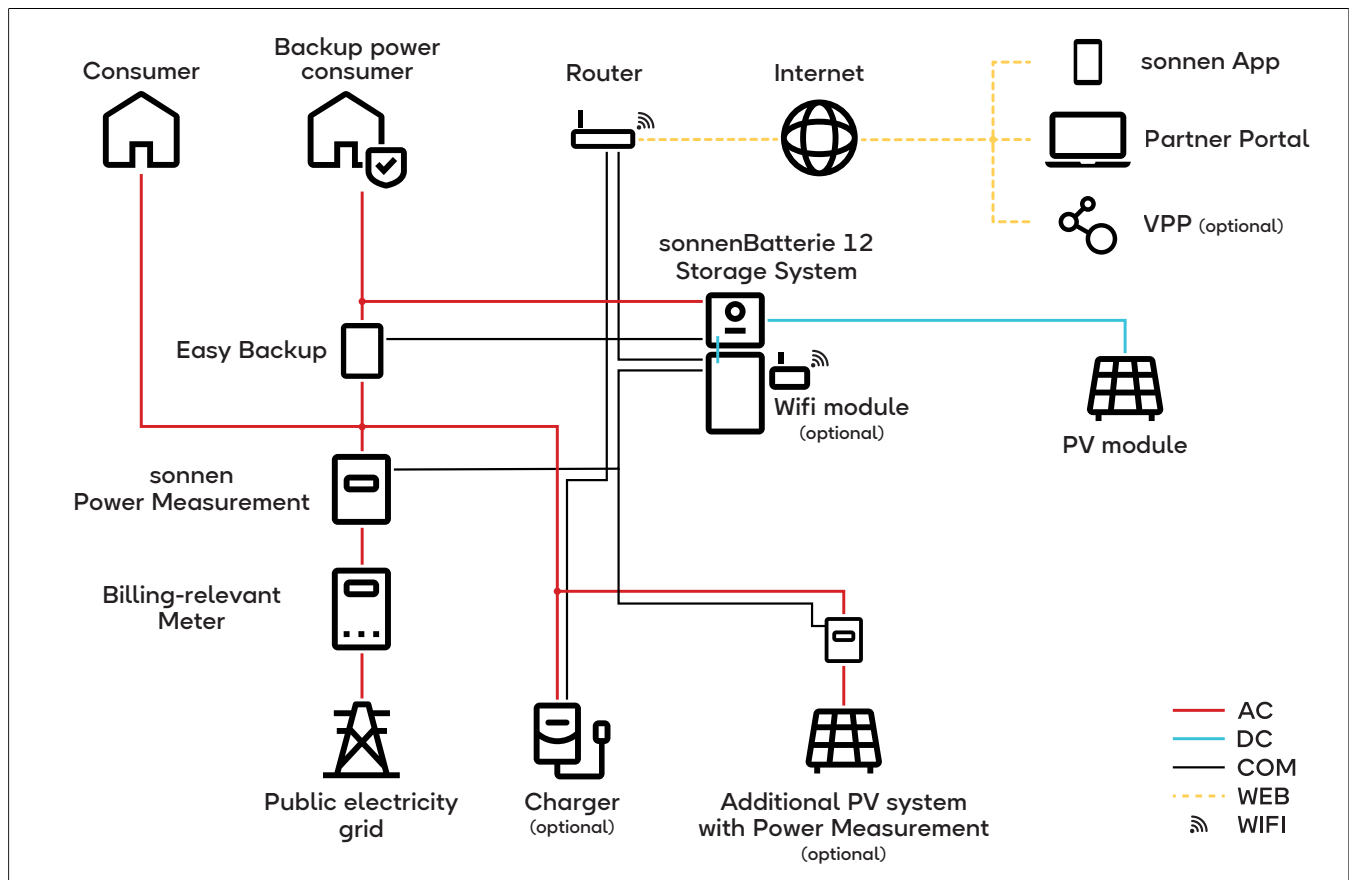
3.2.4 Adjusting the temperature before installation

If components are significantly colder than the ambient temperature at the installation site, condensation may form inside them as they warm up. This condensation is not visible from the outside and can cause damage to electronic components; therefore:

- Store components only in a location with suitable environmental conditions (see Technical Data [P. 92]).
- If there are large temperature differences, allow the components to acclimate for a sufficient amount of time before installation.
- Depending on environmental conditions, the acclimatization time can be up to 24 hours.
- Install and commission the storage system only after this period.

4 Product description

4.1 System overview (sonnen world)



4.2 System components

Storage system overview

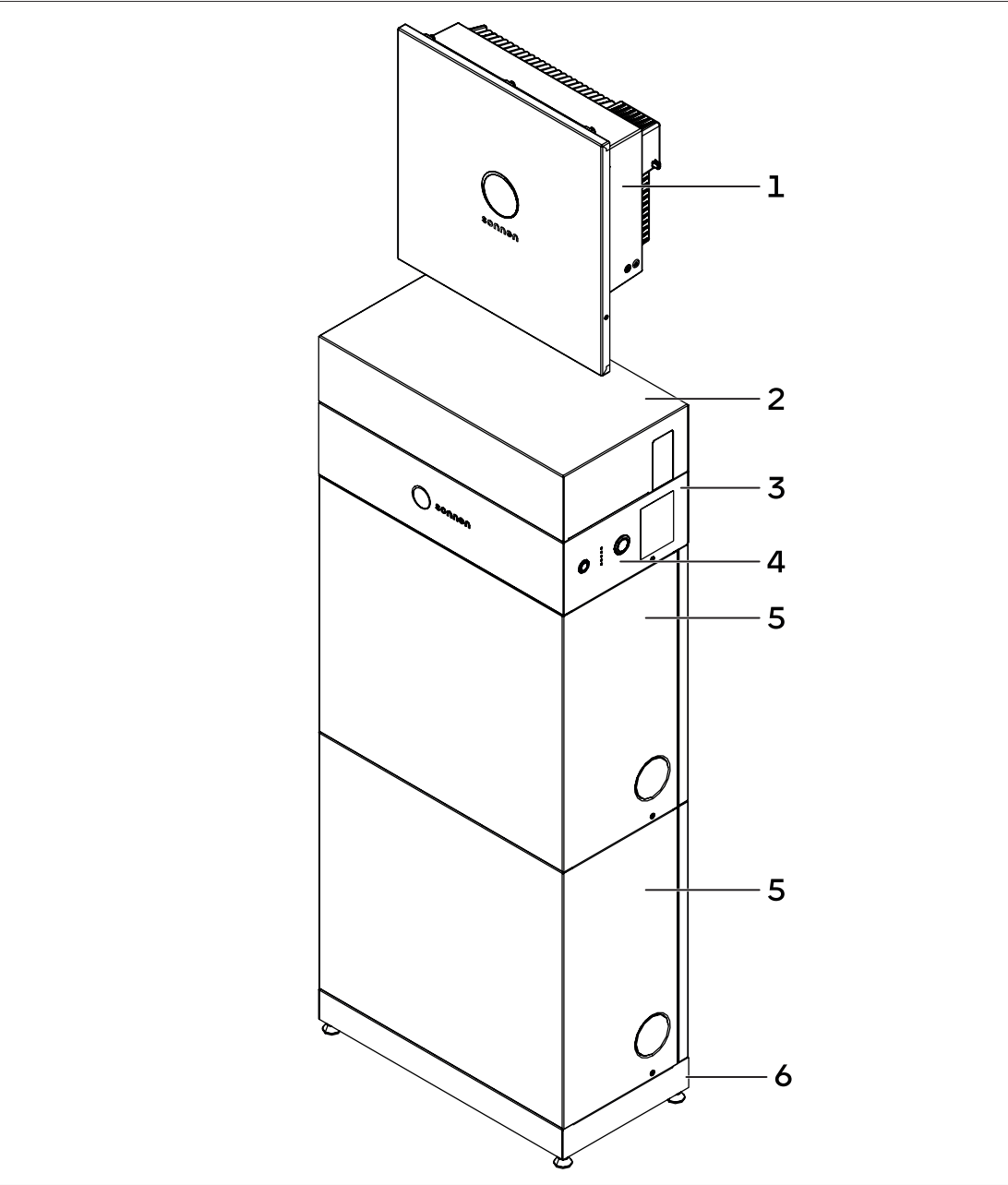


Illustration 1: Overview of the total storage system

No.	Designation	Function
1	sonnenInverter	Inverter for connecting the PV system.
2	Cover	Cover of the connection box and line entry.
3	Connection box	Connections and operating elements of the storage system.
4	Operating panel	Button and LED display for operation and type plate of the storage system.
5	sonnenModule 5	Battery module for storing electrical energy.
6	Base	Compensates for uneven floors and provides stable support for the other components.

Operating panel overview

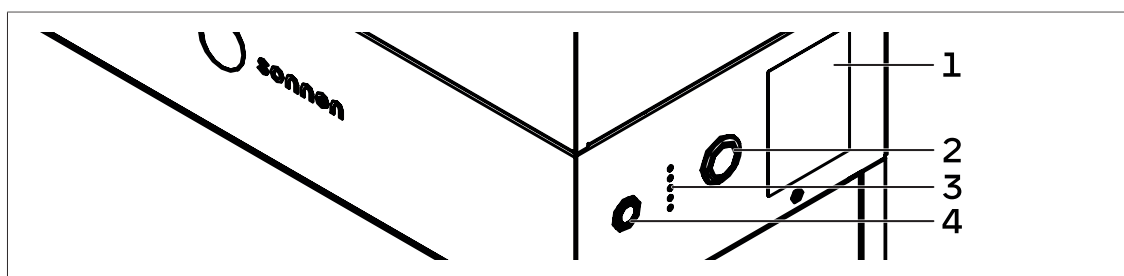


Illustration 2: Overview of the operating panel on the connection box

No.	Designation	Function
1	Type plate	Technical data and further information for identifying the storage system.
2	Backup power button	Button for starting backup power operation after overload and for starting backup power operation when PV generation is missing.
3	Status LED	Information about the current status of the storage system.
4	ON/OFF button	Button for switching the storage system on and off.

Inverter overview

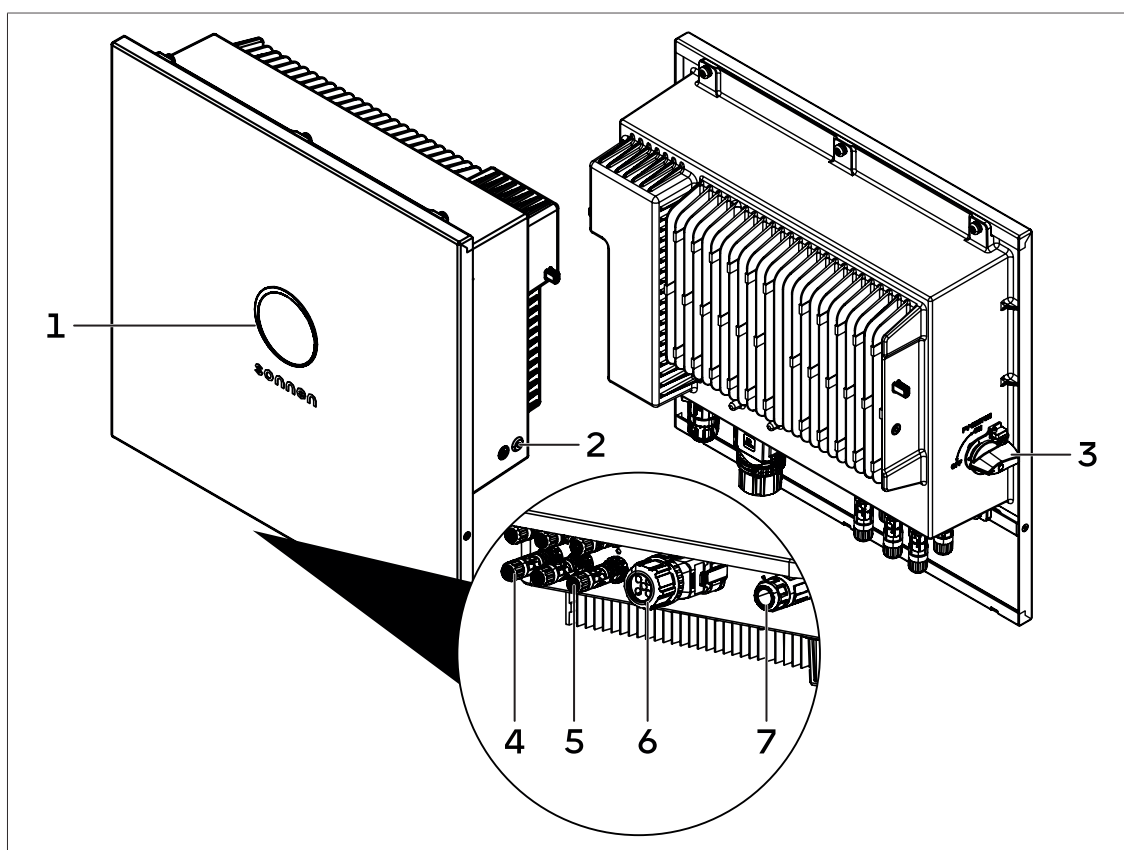


Illustration 3: Overview of the sonnenInverter

No.	Designation	Function
1	sonnen Eclipse	Illuminated ring in the sun logo for status display.
2	Ground connection	Connection to ground.
3	DC disconnect switch	Disconnecting the connection to the PV modules.
4	PV+ / PV- connections	Connection to the PV modules.
5	BAT+ / BAT-connection	Connection to the battery modules via the connection box.

No.	Designation	Function
6	COM connection	Communication with the connection box of the storage system.
7	AC connection	Connection to the electricity grid.

4.3 Function of the sonnen Eclipse and Status LEDs

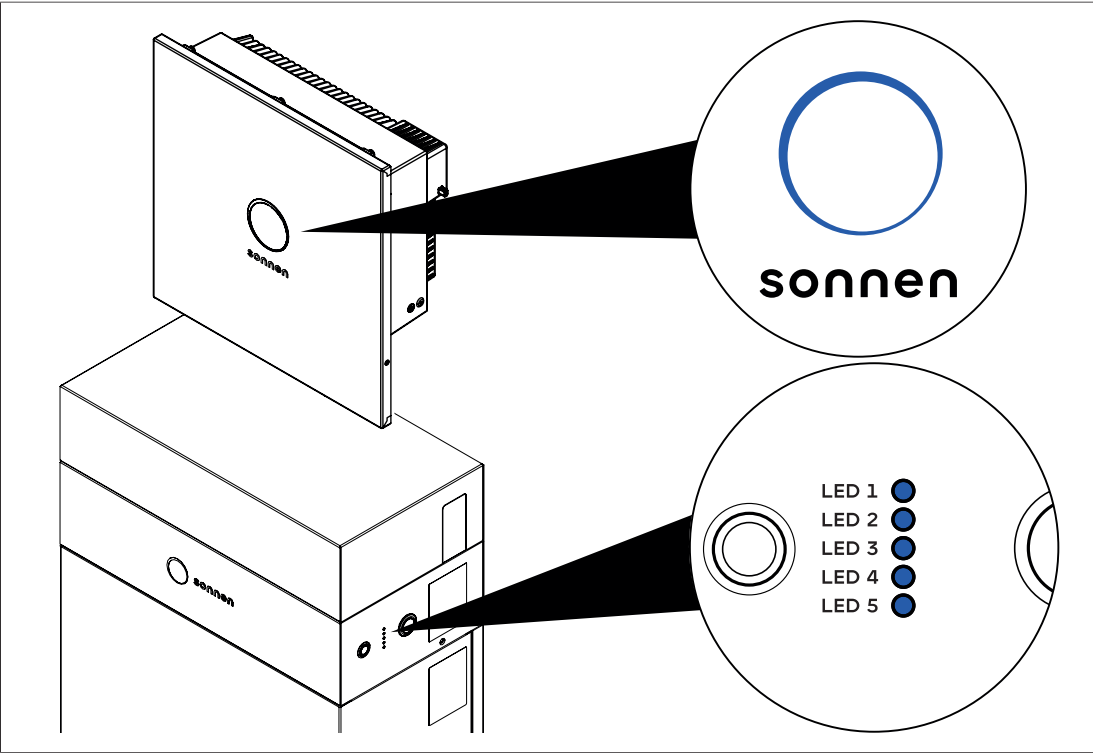


Illustration 4: Illuminated ring and LEDs on the storage system

The sonnen Eclipse (illuminated ring in the sonnen logo on the front of the inverter) and the 5 LEDs on the right side of the connection box indicate the current status of the storage system.

Mode	Description
static	Lights up continuously.
blinking	Turns on and off.
pulsing	Gradually gets brighter and dimmer.
rotating	Lights up sequentially and then turns off.

Table 2: Possible modes for the Eclipse/LEDs

sonnen Eclipse on the inverter

The following operating statuses are displayed:

Colour	Mode	Operating status
blue	blinking	Normal operation starting up.
	pulsing	Normal operation.
green	blinking	Backup operation starting up.
	pulsing	Backup operation. For storage systems without backup power function: No connection to the electricity grid. If this status persists for more than five minutes, the sonnen Eclipse switches off.
orange	blinking	Overload during backup operation.

Colour	Mode	Operating status
	pulsing	No internet connection.
orange/blue (gradient)	rotating	Full charge or trickle charge for battery maintenance.
	static	Updating software or component firmware.
red	blinking	Critical problem with the storage system.
	pulsing	Problem with the connected power meter.
	static	Problem with the storage system.

Status LEDs on the connection box

Colour	Mode	LEDs	Operating status
blue	blinking	1-5 successively	Normal operation starting up.
	static	1-5	Normal operation and display of SOC, see below.
green	blinking	1-5	Backup operation starting up.
	static	1-5	Backup operation and display of SOC, see below.
orange	static	1-5	During normal operation: No internet connection. During backup operation: Overload detected.
red	static	1-5	Problem with the storage system.
	blinking	see below	Battery module error.

State of Charge indicator

In normal or backup power mode, the LEDs indicate the current state of charge (SOC) of the storage system:

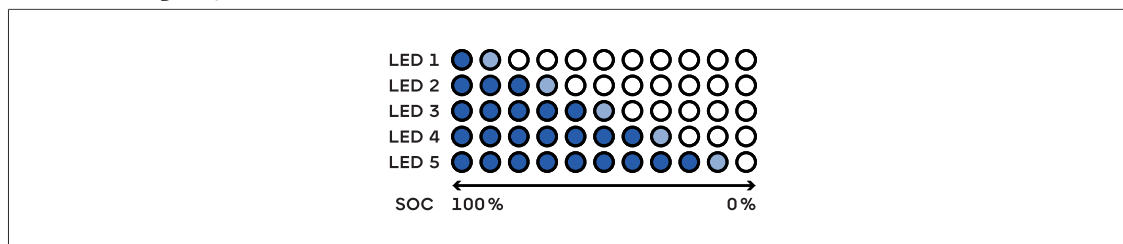


Illustration 5: Display of the SOC via the LEDs

Battery module error indicator

If a battery module fault occurs, blinking LEDs indicate which battery module has detected a fault. The LED number corresponds to the battery module number (see Mounting the battery stack [P. 32] for numbering).

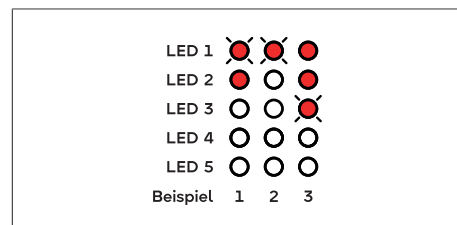


Illustration 6: Examples of the display when a battery module error occurs

Example 1: Two battery modules are installed; battery module 1 has a fault.

Example 2: One battery module is installed, and there is an error with it.

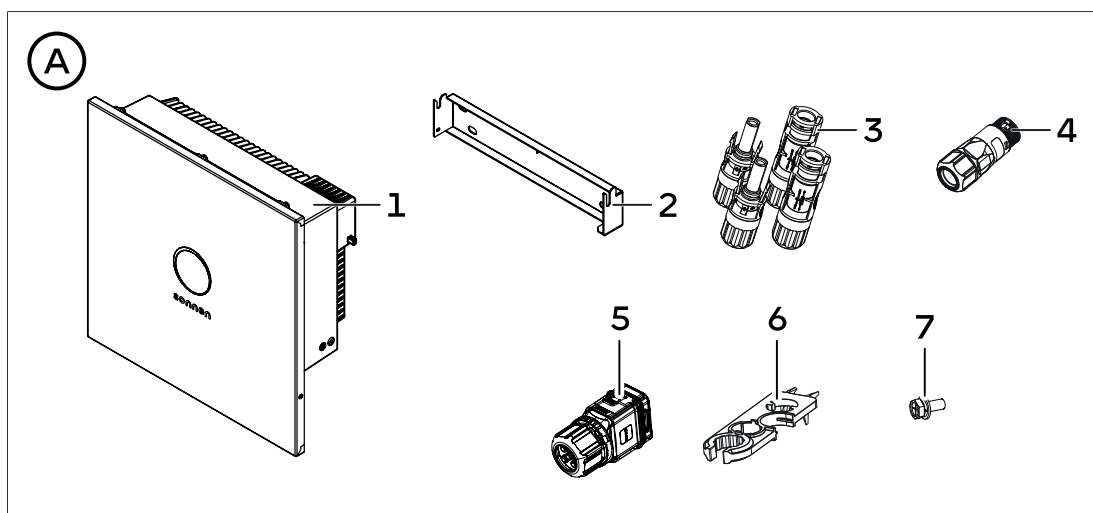
Example 3: There are 3 battery modules installed; battery module 3 has a fault.

LED in the ON/OFF button on the connection box

The ON/OFF button lights up when the storage system is switched on.

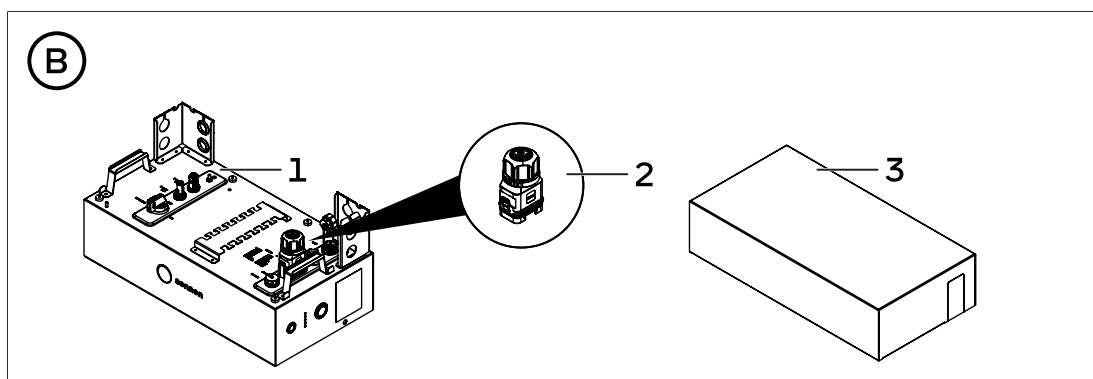
4.4 Scope of delivery

→ Check the scope of delivery for any missing items before installation.



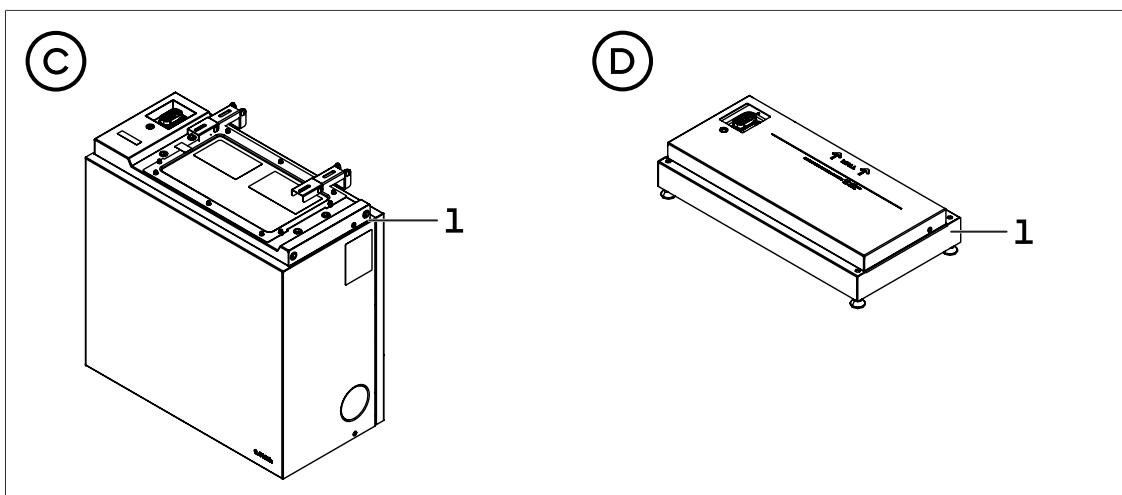
A sonnenInverter 6-1-2

- 1 Inverter
- 2 Wall bracket
- 3 PV connectors (PV+/PV-)
- 4 Mains connection connector
- 5 COM connector (Multicom INV)
- 6 Installation wrench for PV connectors
- 7 Safety screw M4



B Connection box

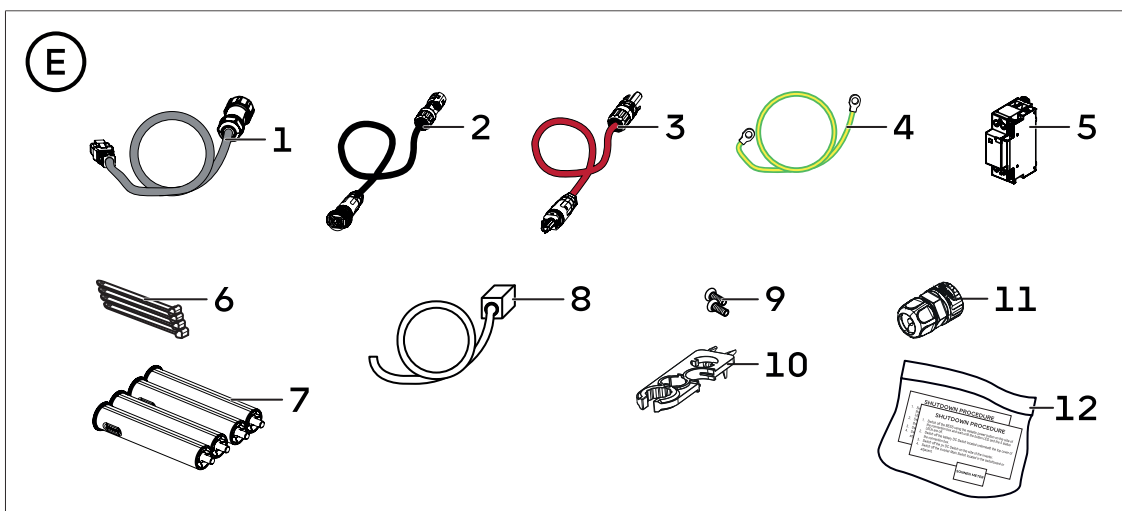
- 1 Connection box
- 2 COM connector (Multicom CB)
- 3 Cover

**C sonnenModule 5**

1 Battery module

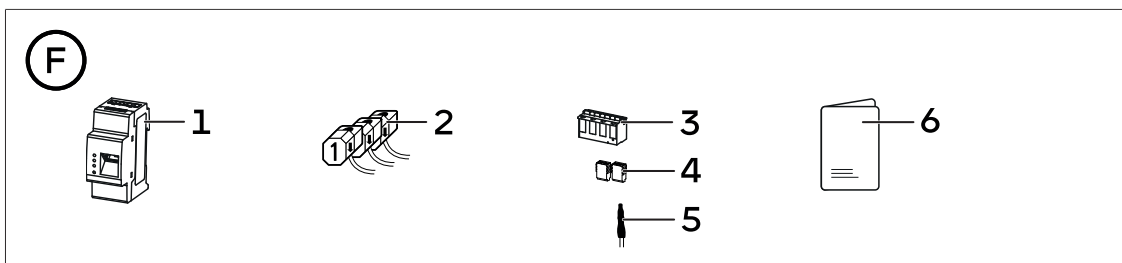
D Base

1 Base

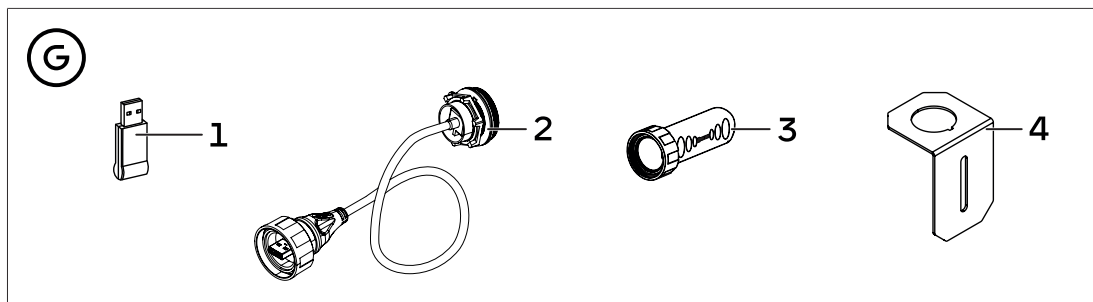
**E Accessory kit**

- 1 Communication line, 3 m
- 2 Minus DC line, 3 m, black
- 3 Plus DC line, 3 m, red
- 4 Earthing line, 3 m
- 5 Backup power components (Easy Backup)
- 6 Cable ties

- 7 Handles for battery module
- 8 Modbus to RJ-45 Adapter
- 9 Torx screws for connection box
- 10 Installation wrench for PV connector
- 11 RJ-45 connector gland with gasket
- 12 Label set (only for Australia)

**F sonnenMeter**

- 1 SU103-63 power meter
- 2 Clamp-on current transformers (CTs)
- 3 Connector
- 4 RTU connector
- 5 Terminating resistor for RTU connector
- 6 Manual

**G Wifi module (optional)**

- 1 Wifi USB dongle
- 2 USB extension cable (1,5 m)
- 3 IP65 protective cap
- 4 Wall bracket

4.5 Type plate

The type plate for the storage system is located on the operating panel of the connection box. In addition, the inverter and the battery modules each have their own type plates.

The type plates allow you to clearly identify the storage system. You will need the information on the type plate for safe use and if you have any questions for the sonnen service team.

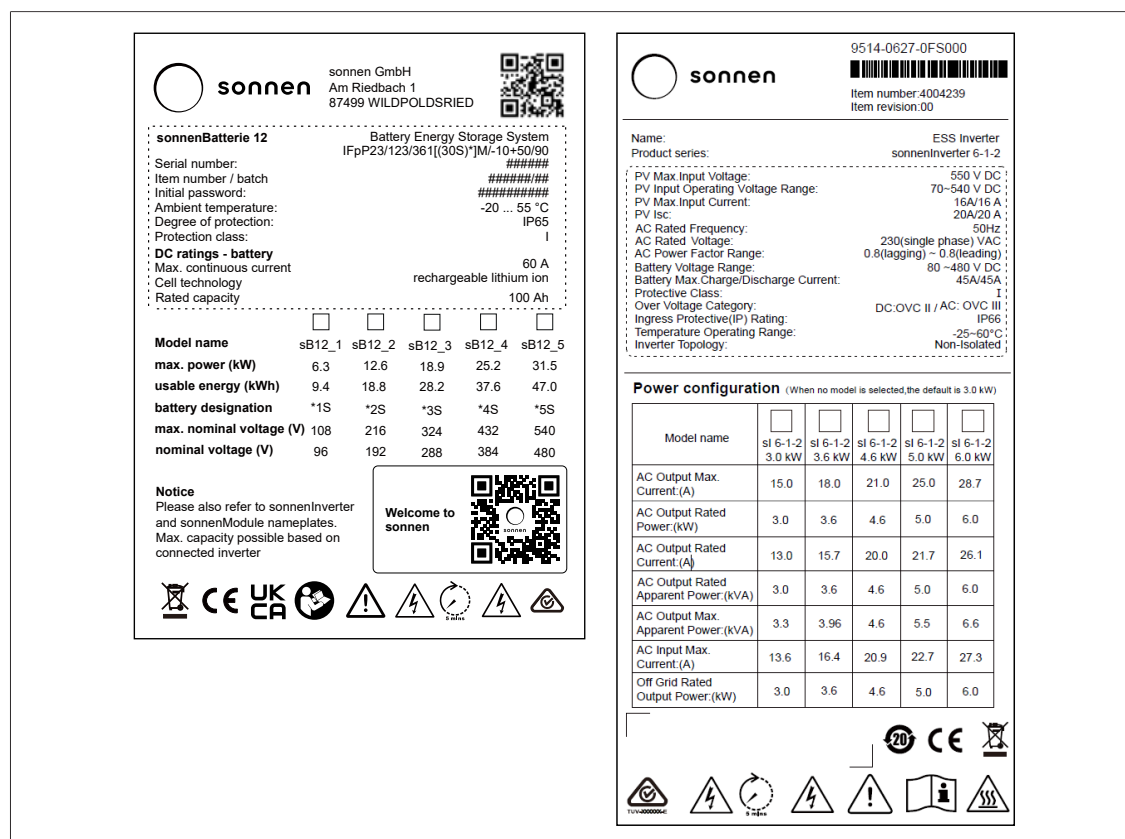


Illustration 7: Type plates of the connection box (left) and the inverter (right)

The following information is specified on the type plate:

- Item designation and number
- Serial number
- Technical data of the storage system
- Initial password

The overall product name and storage capacity (nominal and usable) depend on the number of battery modules installed. The inverter's power rating (and thus that of the storage system) is also variable¹ and must be selected during commissioning.

Therefore, after commissioning, the qualified electrician performing the work must check the boxes on the nameplates of the connection box and the inverter to indicate the number of battery modules installed and the AC output power.

¹ Depending on the country, only certain performance configurations are available. Factory default setting is 3 kW.

4.6 Additional parts and tools required

Lines

Designation	Use	Specification
Plastic-sheathed cable	AC connection	- Cable type: 3-wire (L, N, PE) - Conductor cross-section: 6 mm² - Outer diameter: 11.5 – 13.5 mm - Select the type and length based on on-site conditions; max. 30 m.
DC line	DC connection PV system to inverter, plus and minus	- Quantity depending on number of PV strings. - Conductor cross-section: 6 mm² - Outer diameter: 5.5 – 8 mm - Select the type and length based on on-site conditions.
Earthing line	Equipotential bonding	- Conductor cross-section: 10 mm² - Length adapted to installation situation, max. 30 m.
Ethernet line	Data transfer between router and connection box	- Not required when using the Wifi module. - RJ-45 connector, Category Cat 6, shielded, max. 100 m
Modbus line	For RTU Modbus: Data transfer between power meter and connection box For TCP Modbus: Data transfer between power meter and router/switch of the home network	- RJ-45 connector, Category Cat 6, shielded, max. 150 m - RJ-45 connector, Category Cat 6, shielded, max. 30 m
Signal lines	Digital inputs/outputs	- Cable type: Multi-conductor, fine-stranded cable (e.g., LiYY) - Conductor cross-section per wire: max. 1.5 mm² - Outer diameter: 4.5 – 6.5 mm - The number of wires and the selection of other components (e.g., terminals, contactors, relays) depend on the functions actually connected and the specific installation situation (see Digital inputs/outputs [P. 55]).

Circuit breakers, fuses

Miniature circuit breaker (MCB)	Connection of storage system	- Tripping characteristic: B - Rated current: 32 A max.²
---------------------------------	------------------------------	--

Material

Quantity	Designation	Use
4-12*	Screws with matching washers and wall anchors	Mounting the inverter and battery module(s) on the wall. See Mounting materials [P. 31] for specifications.

*depending on number of battery modules.

² Selection based on the rated power selected during commissioning.

Tools

 INFO

The list of tools refers to the materials contained in the scope of delivery for the storage system. Other individual tools are required based on the type of building installation and the additional parts selected.

Designation	Use
Flat-head screwdriver max. 6.5 × 1.4 mm	Aligning the feet of the base.
Phillips-head screwdriver PZ 2	Opening and closing screw terminals on electrical components.
Torx screwdriver TX 25	Securing the components of the battery stack.
Wrench SW 14	Tightening the feet of the base.
Torque wrench SW 7	Attaching the inverter to the wall bracket. Connecting the earthing line to the inverter.
Torque wrench SW 8	Attaching the earthing line to the connection box.
Sack truck	Transporting the components to the installation site.
Utility knife	Opening packaging.
Drill	Drilling holes for mounting the battery modules and the inverter.
Spirit level	Aligning the base and the inverter wall bracket.
Hammer	Installing wall anchors.
Crimping pliers	Connecting the PV lines using PV connectors.
Multimeter	Measuring the voltage of the PV lines.
Wire cutters	Disconnecting electrical wires or conductors.
Laptop with LAN connection	Establishing a connection to the storage system. Running the commissioning assistant.
Permanent marker (smudge-proof, solvent-resistant, and UV-resistant; e.g., Edding 780 or similar)	Filling out the type plate.

4.7 Additional parts required

- The following additional components are required to install the backup power function [P. 68].
- The lines and circuit breakers required differ depending on the selected connection option.

Lines, circuit breakers

Designation	Use	Specification
Control line	Backup power function connection	• Cable type: Multi-strand (min. 4), fine-strand cable • Conductor cross-sectional area per strand: max. 1.5 mm² • Outer diameter: 4.5 – 6.5 mm • Length: max. 30 m
Connection option 2 (backup power supply for separate backup power circuits)		
Circuit Breaker	Circuit protection for backup power function connection	• Tripping characteristic: B • Rated current: max. 63 A

5 Plan installation

5.1 Mounting variants

- The inverter is mounted on the wall.
- All other components of the storage system are stacked on top of each other (known as a battery stack) and secured to the wall to prevent tipping.
- Up to three battery modules can be stacked on top of each other.

5.2 Selecting the installation location

DANGER

Fire hazard / Explosion hazard if installed in the wrong location

Risk of death from fire and explosion!

- Do not install battery stack and inverter in areas where there is a risk of explosion.
- Do not install battery stack and inverter in areas where highly flammable substances or combustible gases are present.
- Install battery stack and inverter only on load-bearing, vertical, level surfaces (walls) made of non-combustible material.

NOTICE

Insufficient load-bearing capacity of the wall mounting

Damage to the storage system and the surrounding area!

The wall mounting is designed to prevent the battery modules from tipping over and to securely mount the inverter; it must be adequately dimensioned. The mounting hardware and the mounting surface must be able to reliably absorb the forces that occur.

- Use only fasteners that are suitable for the wall material.
- Ensure that the wall and fasteners can safely absorb the forces involved.
- Make full use of all designated mounting points on the respective wall bracket.

NOTICE

Failure to comply with ambient conditions

Damage to the electronic components of the storage system!

- When selecting the installation location, be sure to observe the required ambient conditions (see Technical data [P. 92]).

Requirements for the installation site / the room in which the installation site is located

- To ensure a long service life, the inverter should not be exposed to direct sunlight, rain, or snow. sonnen recommends installing the inverter in a sheltered location.
- The ambient temperature at the installation site must not exceed 55 °C or fall below -20 °C. For optimal operation, temperatures should be between 15 °C and 30 °C. Performance may be reduced outside this temperature range.
- The installation site must be easily accessible.

- The installation site must not be exposed to heavy dust, particularly flour dust and sawdust.
- The installation site must not be exposed to corrosive, flammable, or explosive gases. The ammonia content must not exceed 20 ppm.
- The installation site must not be exposed to vibrations.
- For indoor installation, the room where the system is installed must be ventilated. Forced ventilation is not required.
- The floor at the installation site must be capable of supporting heavy loads. The wall to which the storage system is attached must be load-bearing, vertical, level, and made of non-combustible material.
- When selecting the installation site, additional requirements set forth in state building codes and fire safety regulations must also be met.

Installation Orientation

The inverter and the battery stack must only be mounted on vertical walls. All other mounting options (horizontal, suspended, slanted, diagonal) are not permitted.

Collision Protection / Impact Protection

In areas with an increased risk of mechanical impact from vehicles, additional mechanical protective devices (e. g., bollards) must be installed around the storage system. The minimum clearances must be observed or the protective devices should be removable to allow for future work on the storage system.

5.3 Maintain clearances

- The minimum clearances from walls, ceilings, and any objects ensure adequate heat dissipation from the individual components during operation and provide sufficient space for operating the storage system.
- The recommended clearances ensure sufficient space for installation and service work.
- In addition, the length of the supplied cables (3 m) must be taken into account. All cables must be routed so that no tensile stress is applied to the cable or its connectors.

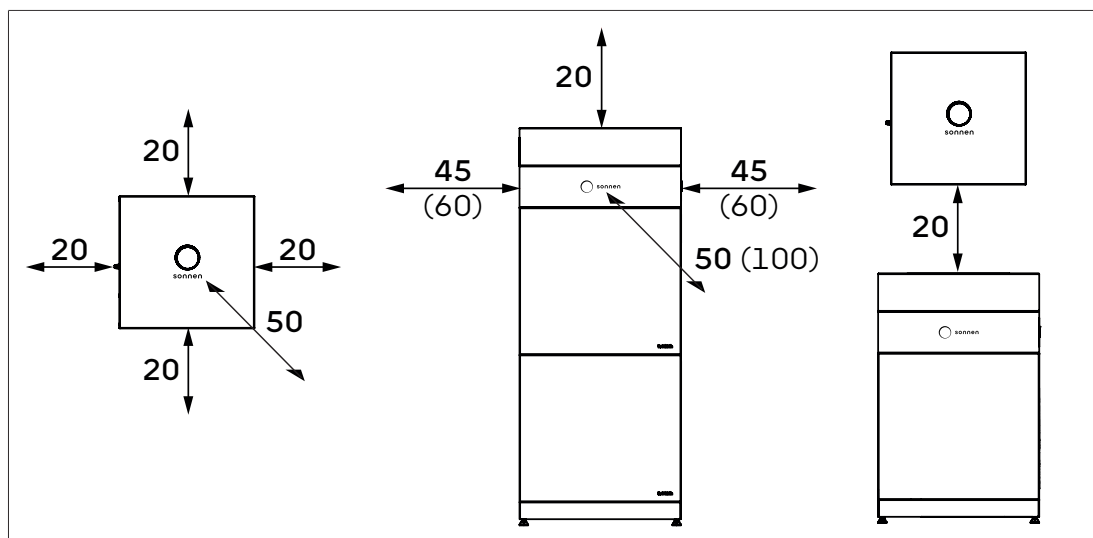


Illustration 8: Minimum and recommended (values in parentheses) clearances around the storage system (cm)

→ Install the storage system so that the distances shown in the illustration are maintained.

5.4 Plan line routing

i INFO

In cable ducts, AC, DC, and communication cables should be separated from each other within a cable duct by suitable partitions or dividers in order to reduce electromagnetic interference.

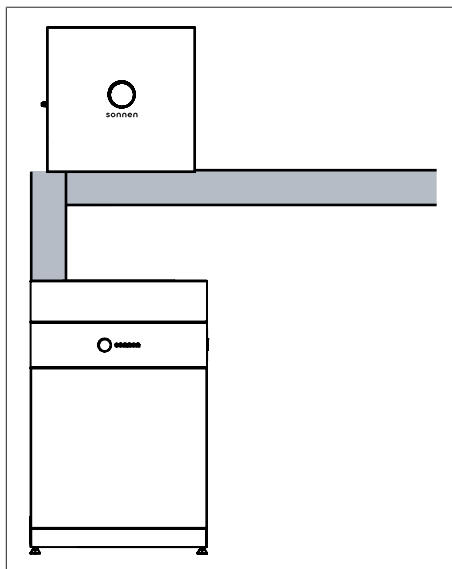


Illustration 9: Cable ducts for standard installation

sonnen recommends routing all cables to the connection area of the inverter and connection box using cable ducts.

The adjacent illustration shows how the cable ducts can be installed. **NOTICE! Cable ducts must not obstruct the airflow to and from the inverter. The cooling fins on the top and bottom must remain unobstructed.**

→ Note the length of the supplied cables (3 m) if the inverter is not positioned as recommended.

5.5 Selecting the mounting materials

	Min. Ø screw head	Max. Ø screw
Wall brackets for battery module	9 mm	7 mm
Wall bracket for inverter	14 mm	12 mm

→ Choose screws and anchors (type and length) that are suitable for the wall material and capable of supporting the weight.

→ Choose washers that fit the screws.

6 Mounting the storage system

⚠ DANGER

Assembly and installation of the storage system in bad weather (Rain, Storms, Thunderstorms, Snowfall, or Ice)

Danger of death from electric shock or lightning strike!

- Stop assembly and installation immediately or do not begin if adverse weather conditions are present.
- Perform work only under dry, safe, and stable weather conditions.
- Check the weather conditions before starting work and monitor them continuously.

6.1 Mounting the battery stack

⚠ WARNING

Risk of injury due to the heavy weight of the battery module (~87 kg)

Bruises or contusions caused by lifting or dropping the battery module!

- Always lift and carry the battery module with at least two people.
- Wear appropriate PPE when transporting and assembling.
- Use a manual or electric hand truck to bring it inside.
- Ensure a secure footing.

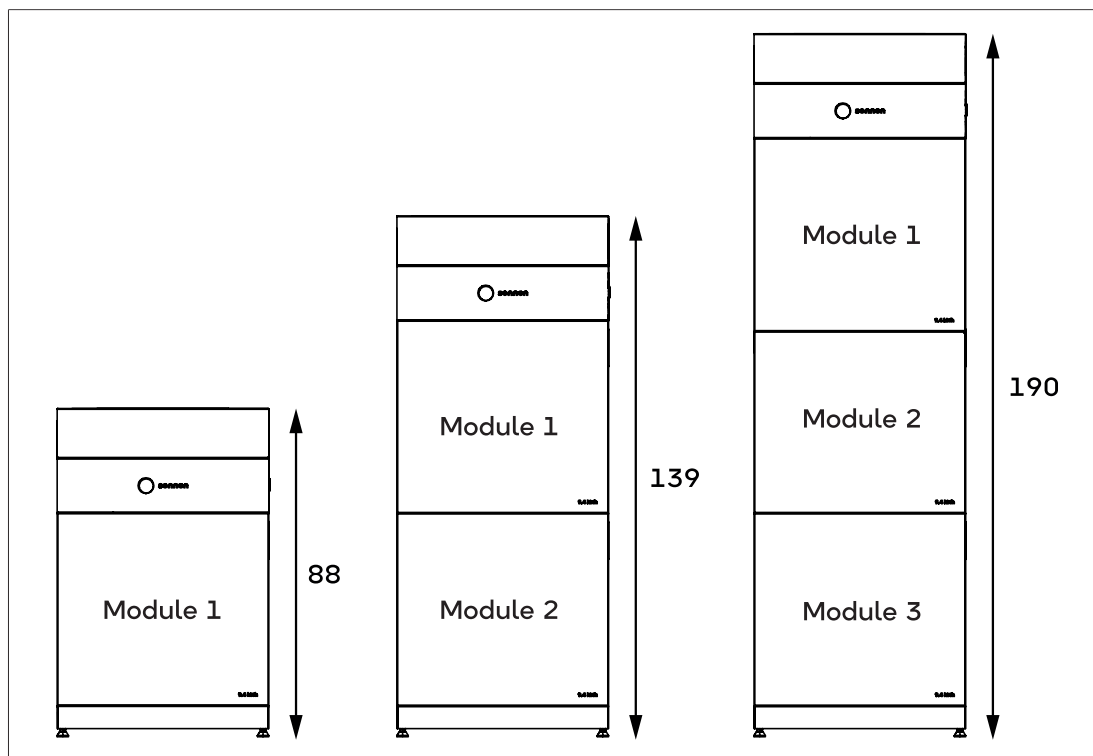


Illustration 10: Numbering of the battery modules and height of the battery stack (in cm) depending on the number of battery modules

Placing the base

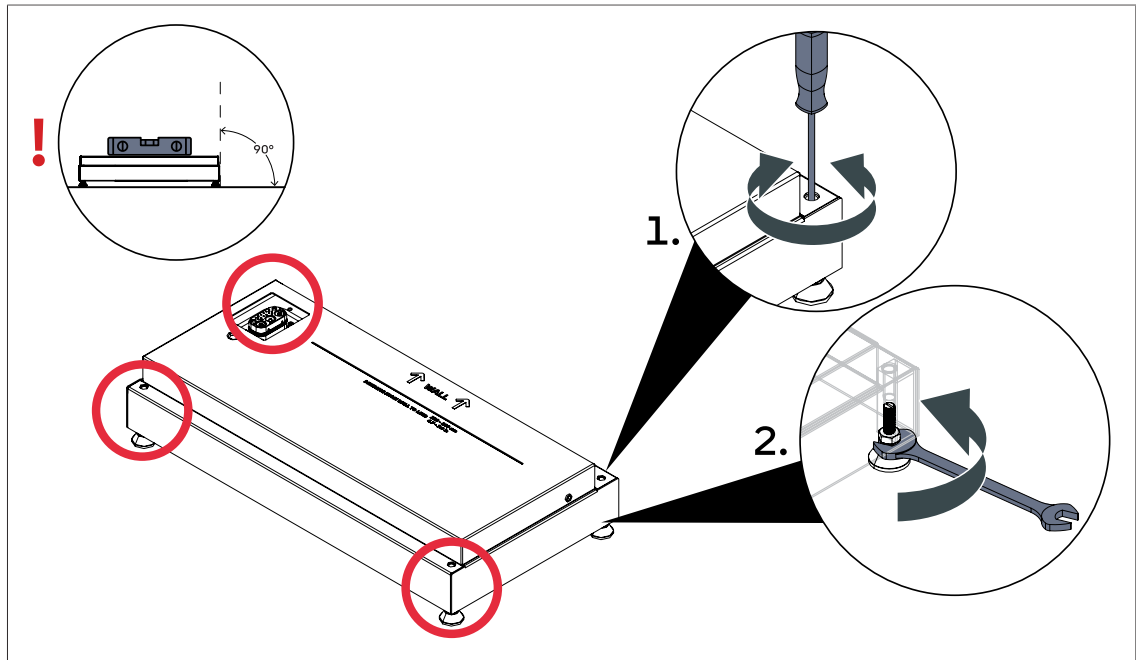


Illustration 11: Placing and aligning the base

→ Determine the distance from and alignment with the wall using the markings on the top of the base.

NOTICE! The wall-side cable entries on the connection box may not be usable if the base is installed too close to the wall. If you intend to use one of the wall-side cable entries, you must ensure that the distance from the wall is greater than the minimum required.

→ Place the base at the chosen location.

→ Use a level and the four feet to level the base. The feet can be adjusted from above using a flat-head screwdriver through the opening directly above each foot (1).

→ Finally, tighten the locknut from the outside using a wrench (2).

Mounting the battery module(s)

NOTICE

Protective caps or covers not removed, damaged connectors, or damage to the enclosure

Damage to the battery module or installation errors!

- Before installation, inspect the upper and lower connectors of the battery module and remove any protective caps and covers.
- To inspect the lower connector, place the battery module on a soft protective surface and carefully tilt it.
- Before installation, ensure that both connectors are exposed and undamaged.

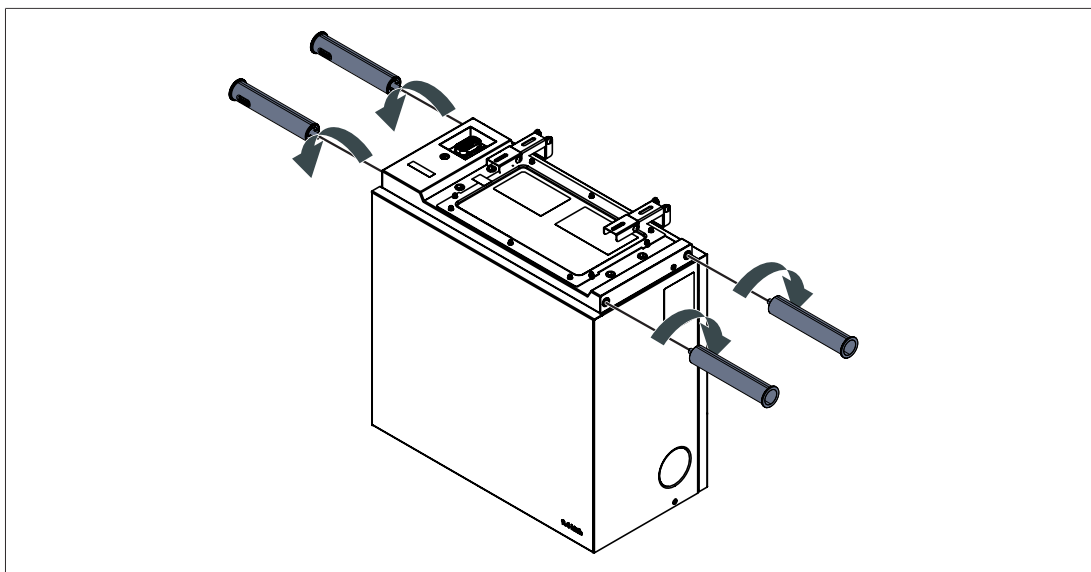


Illustration 12: Mounting handles on the battery module

→ Screw four handles onto the battery module.

DANGER! At least two people are required to lift and carry the battery module.

→ Lift the battery module together and place it on the base/battery module. Then remove the handles.

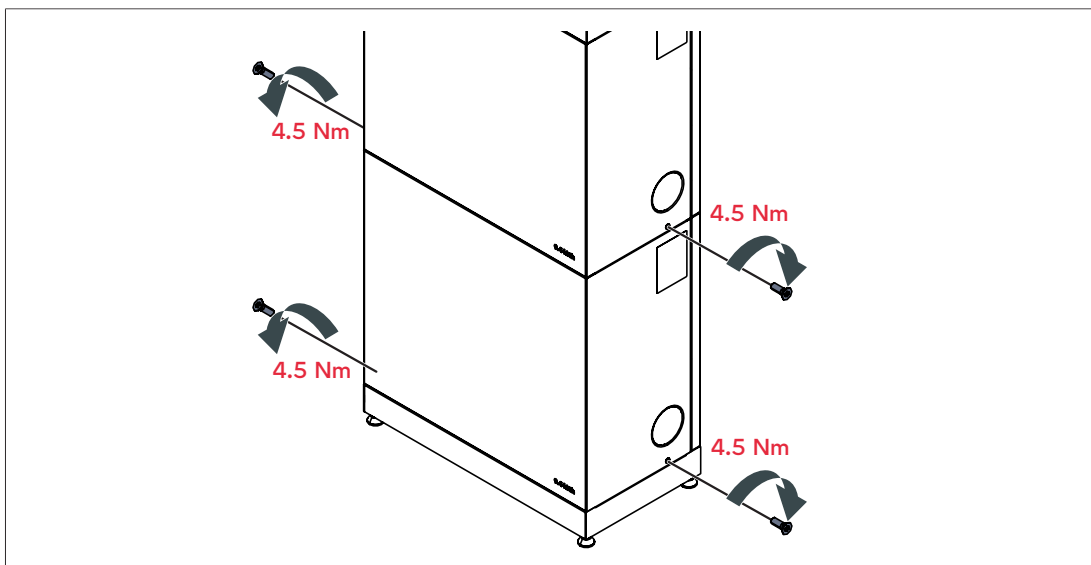
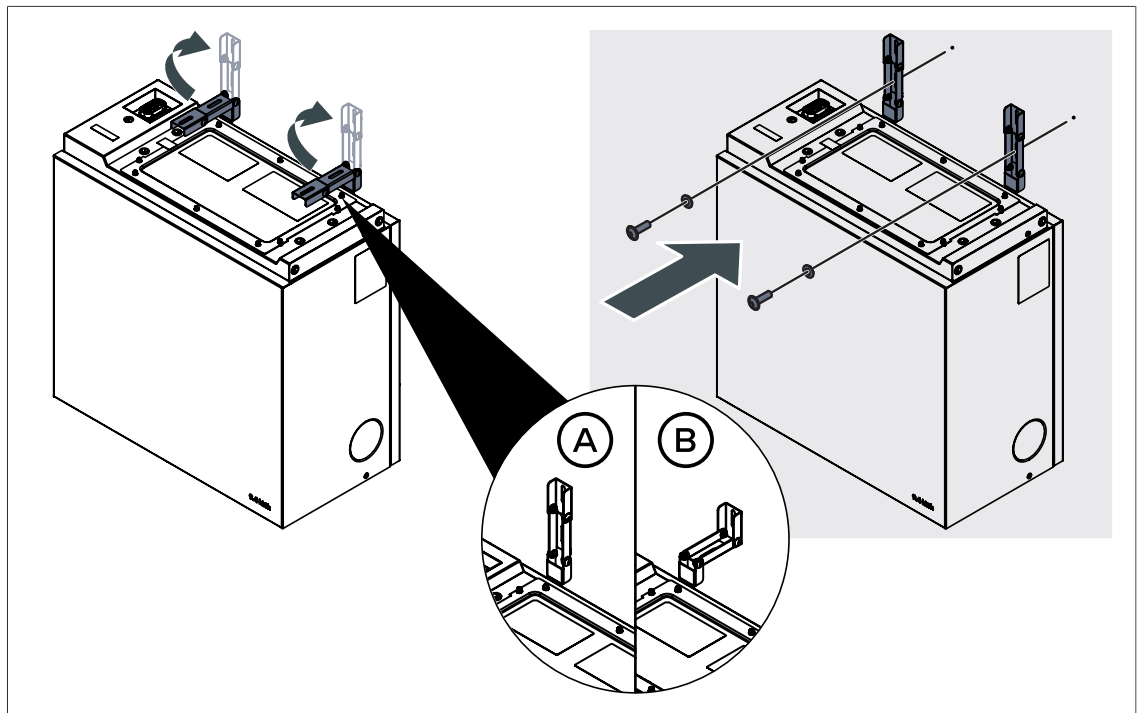


Illustration 13: Attaching the battery module to the base or to the lower battery module

→ Secure the battery module to the base/battery module using two screws.

→ Tighten the screws with a torque of **4.5 Nm**.

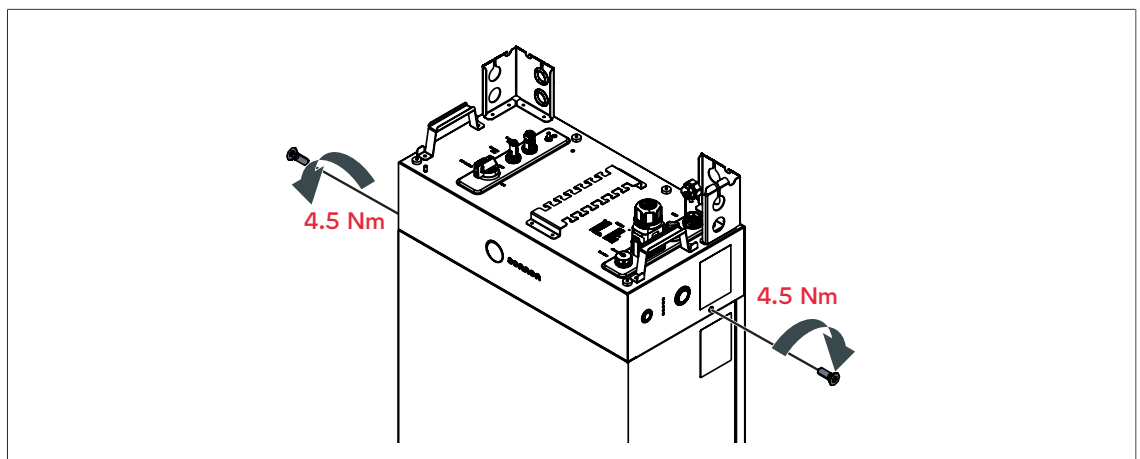


- Fold out the wall mounting brackets on the battery module (Option A or B, depending on the distance from the wall) and mark the desired mounting points on the wall.
- Drill holes for the selected fastening material (see Selecting the mounting materials [P. 31]).

NOTICE! Protect the battery module's connection area from drill dust!

- Secure each battery module to the wall using two screws and washers.

Mounting the connection box



- Place the connection box on the last battery module.
- Attach the connection box to the battery module using the two screws from the accessory kit.
- Tighten the screws with a torque of **4.5 Nm**.

Installing the cover on the connection box

- Place the cover on the connection box.

6.2 Mounting the inverter

WARNING

Risk of injury due to heavy weight of the inverter (~ 16.5 kg)

Crushing or straining due to incorrect lifting or dropping of the inverter!

- Wear appropriate PPE when transporting and installing.
- Use a manual or electric sack truck for the installation.
- Ensure a secure footing.

NOTICE

Damage to the inverter due to improper installation

- Only mount the inverter on load-bearing, vertical, flat walls made of fireproof and non-combustible material.

If the inverter is mounted above the battery stack:

- Place the cover on the connection box to establish the desired distance between the battery stack and the inverter.

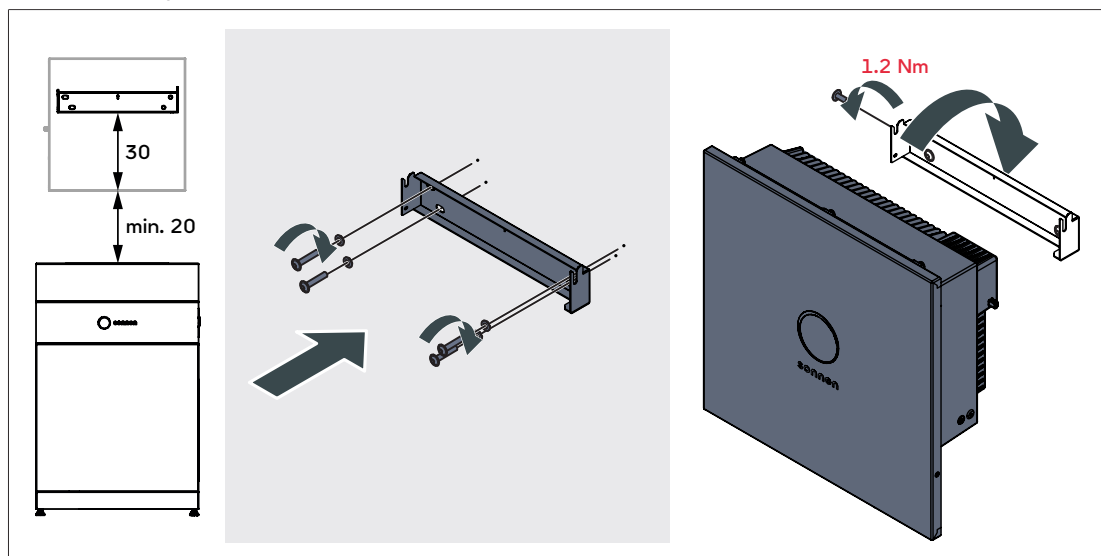


Illustration 14: Mounting the inverter using the wall bracket

- Use the wall bracket and a level to mark the mounting points on the wall.
- Drill holes for the selected fastening material (see Selecting the mounting materials [P. 31]).
- Attach the wall bracket horizontally to the wall using screws and washers.
- Hook the inverter into the wall bracket and check that the inverter is securely seated.
- Use one of the screws included in the inverter's scope of delivery to secure the inverter to the wall bracket. Tighten the screw with a torque of **1.2 Nm**.

6.3 Subsequent extension of storage capacity

NOTICE! Check all equipment for stability and proper functioning before use.

- The battery modules to be installed must have an SOC of approx. 30 %. Observe the information in section Storing the battery modules [P. 14] concerning this.
- Use the commissioning assistant to set the Battery-Module-Extension (30%) operation mode. **NOTICE! This must take place at least 24 hours before extension, as this is the only way the voltage of the installed battery modules can sufficiently adjust to the voltage of the new battery modules to be installed.**
- Switch the storage system off to electrically isolate it. [P. 83]
- Install the additional battery modules.
- Mark the new storage capacity on the connection box's type plate. The previous marking must be clearly invalidated.
- Switch the storage system on [P. 76].
- In the commissioning assistant, set the operating mode to the desired operating mode.

7 Connecting the storage system

DANGER

Electrical work on the storage system and distribution board

Danger to life due to electrocution!

- Ensure that the DC disconnect switches for the connection box (DC Switch) and the inverter (PV Switch) are turned off (switch position: OFF).
- 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 authorised electricians are permitted to carry out electrical work.

WARNING

Hot housing parts during operation of the inverter

Risk of burns!

- Do not touch hot surfaces.
- Wait until the inverter has cooled down before touching it.

NOTICE

Failure to achieve IP protection class due to unsealed connections

Damage to the storage system!

- Always cover unused connections to the inverter and connection box with protective caps or the pre-installed connectors.
- Operate the storage system only when it is fully installed; do not disconnect any cables or connectors.

INFO

The storage system's inverter is equipped with a built-in Type B residual current monitoring unit (RCU). If local regulations require an external residual current device (RCD), you must verify which type is required. Use a Type A RCD with a rated current of at least 100 mA. The use of a Type B RCD is also permitted.

7.1 Electrical connection overview

INFO

All of the circuit diagram overviews are for illustrative purposes only. Specific DNO requirements concerning the connection must be taken into account and observed. As a result, the connection to be actually implemented may differ from the following circuit diagram overviews.

- **Measurement concept:** The installation of the power meter must be carried out using grid connection measurement. This is also shown in the following illustration.
- **Easy Backup:** If the storage system is to be installed with backup power function, the components must be installed as described in the section Easy Backup backup power function [P. 68].
- **Additional external PV inverter:** An additional PV inverter can be integrated into the house grid after the power meter (but upstream of the easy backup backup function components). The PV inverter can be single-phase or three-phase, independent of the house grid, and must be protected in accordance with the manufacturer's specifications. An additional power meter must be installed to measure the power generated.

Electrical connection of the storage system in a single-phase building mains system (without Easy Backup)

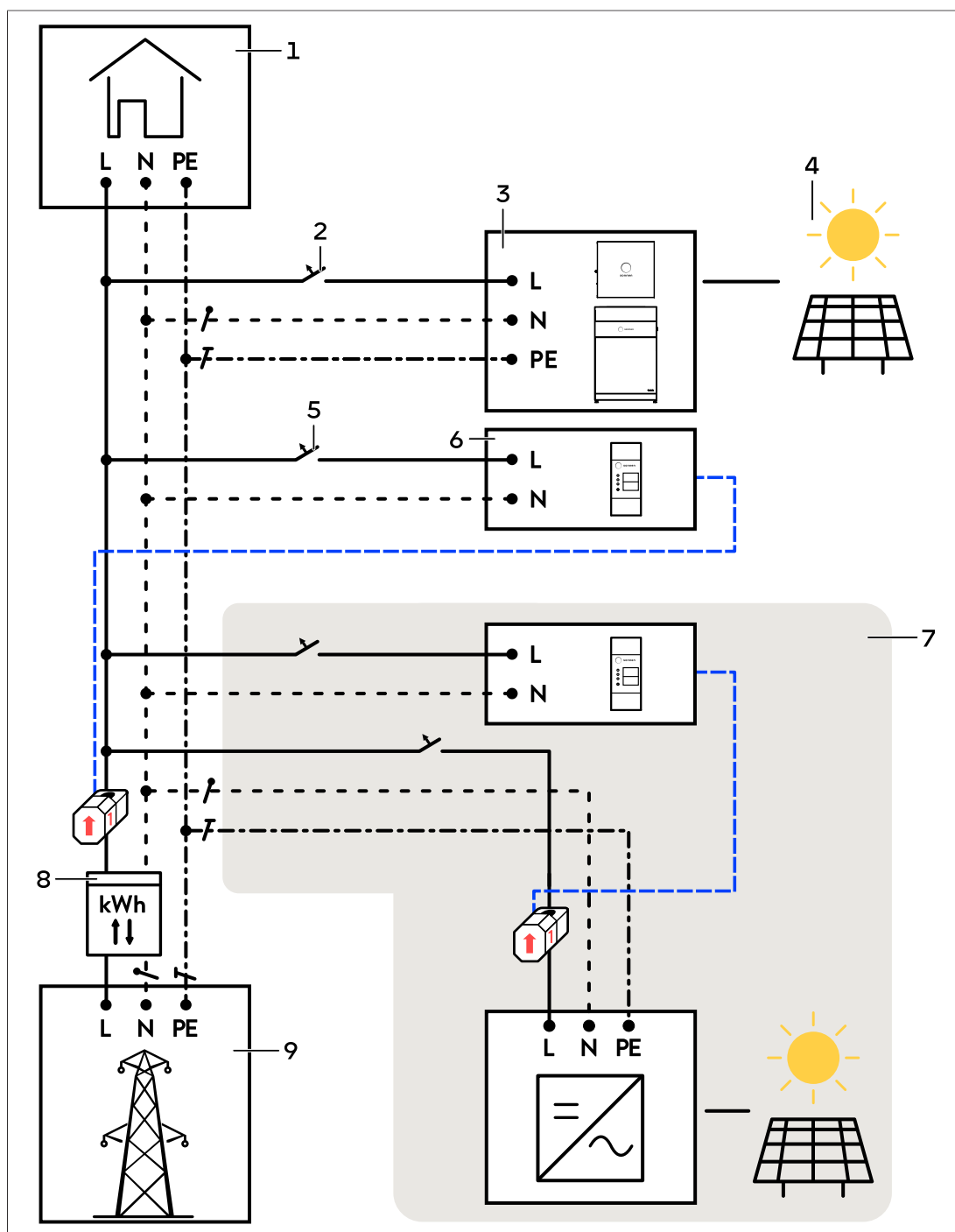


Illustration 15: Circuit diagram overview - sonnenBatterie 12 for single-phase building mains

- | | |
|-------------------------|---|
| 1 Consumers in building | 6 SU103-63 power meter |
| 2 MCB ³ | 7 Optional: Additional external PV inverter with power meter |
| 3 Storage system | 8 Bidirectional counter |
| 4 PV system | 9 Electricity grid |
| 5 MCB B25 | |

³ Protection of the line needs to be ensured.

Electrical connection of the storage system in a three-phase building mains system (without Easy Backup)

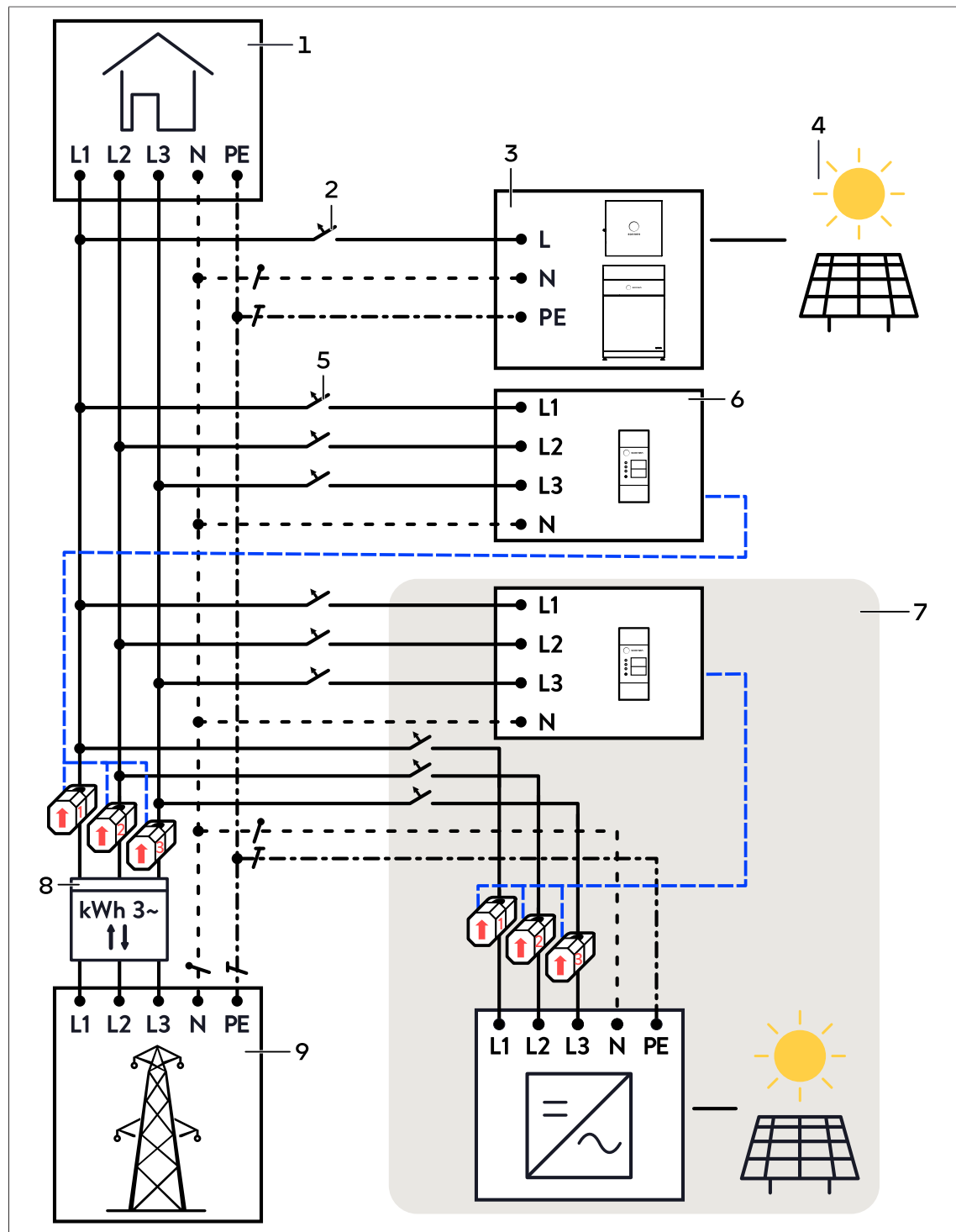


Illustration 16: Circuit diagram overview - sonnenBatterie 12 for three-phase building mains

- | | |
|-------------------------|---|
| 1 Consumers in building | 6 SU103-63 power meter |
| 2 MCB ⁴ | 7 Optional: Additional external PV inverter with power meter |
| 3 Storage system | 8 Bidirectional counter |
| 4 PV system | 9 Electricity grid |
| 5 MCB B25 | |

⁴ Protection of the line needs to be ensured.

Electrical connection of the storage system in a single-phase building mains system (with Easy Backup - connection option 1)

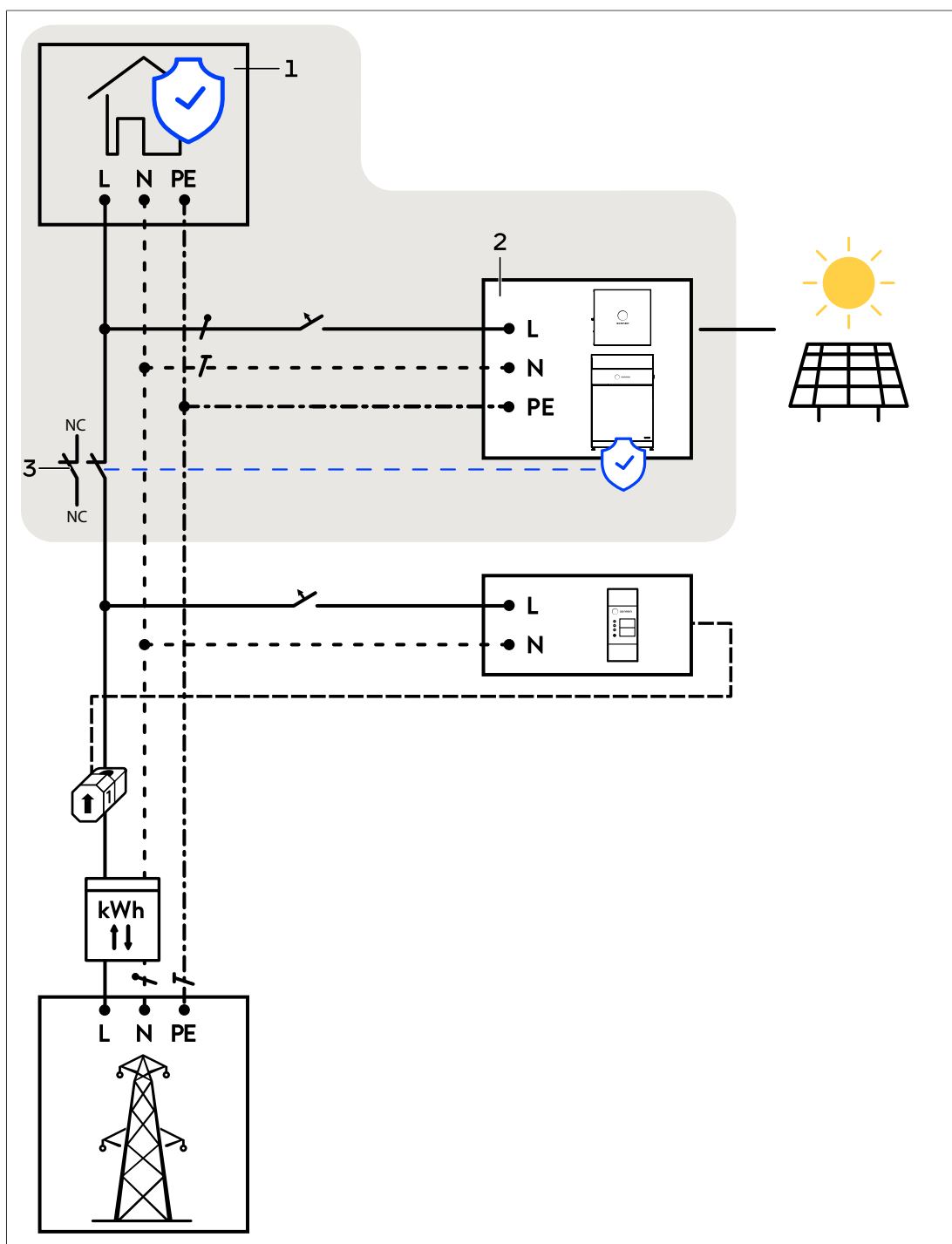


Illustration 17: Circuit diagram overview - sonnenBatterie 12 with backup power function - connection option 1

- 1 Consumers in building
- 2 Storage system with connected backup power function
- 3 Backup power components in the distribution board

Electrical connection of the storage system in a three-phase building mains system
(with Easy Backup - connection option 2)

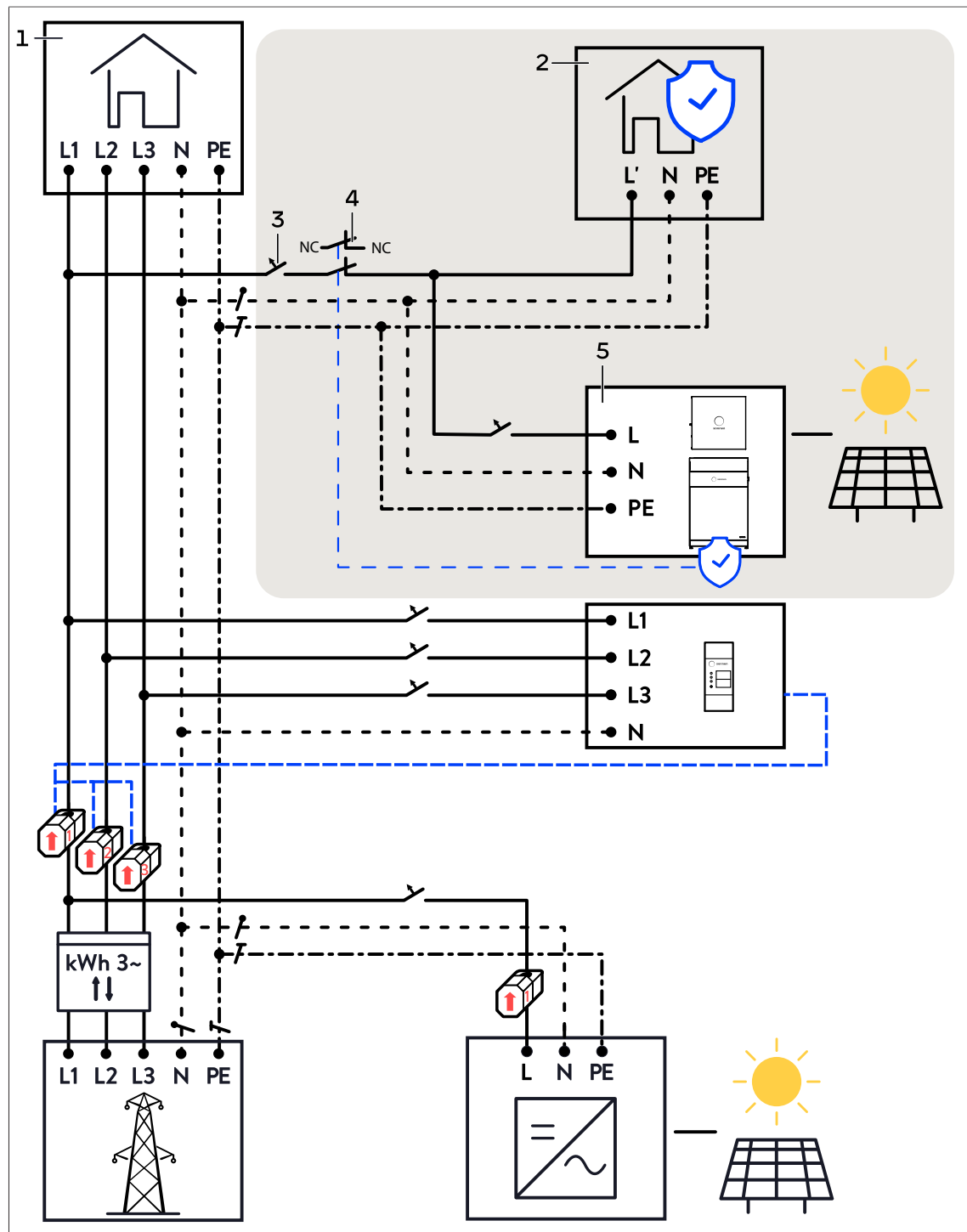
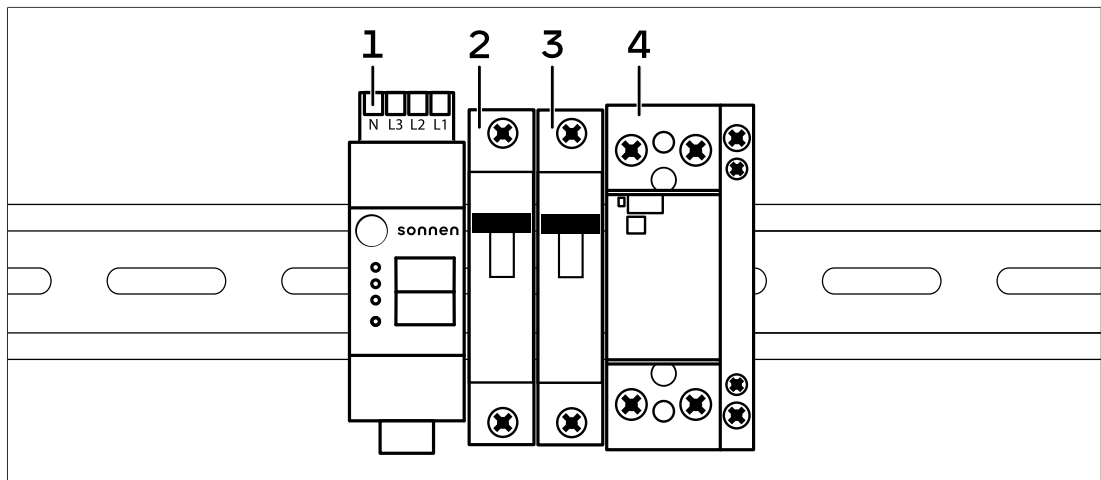


Illustration 18: Circuit diagram overview - sonnenBatterie 12 with backup power function - connection option 2

- 1 Consumers in building
- 2 Consumers in the backup power circuit
- 3 MCB, max. 63 A
- 4 Backup power components in the distribution board
- 5 Storage system with connected backup power function

7.2 Placing components in the distribution board

→ Mount the following components necessary for electrical connection of the storage system in the distribution board.



- 1 SU103 Power Meter (TCP Modbus address: 1, RTU Modbus address: see label)
- 2 MCB B16, 1- or 3-phase (depending on building connection; not included in scope of delivery)
- 3 Circuit breaker, max. 32 A⁵ (not included in scope of delivery)
- 4 **Optional:** Backup power components

Explanation for the components:

- The power meter (1) is used to measure energy consumption in the home. The PV system's energy generation is measured in the storage system.
- The circuit breaker (2) protects the power supply to the power meter.
- The circuit breaker (3) protects the power supply line to the storage system.
- If the storage system is installed with a backup power function, the backup power components (4) provide the connection to the electricity grid and the link to the storage system; see the Easy Backup backup power function (optional) [P. 68].

⁵ Select based on the rated power chosen during commissioning.

7.3 Overview of Connections to the Connection Box and Inverter

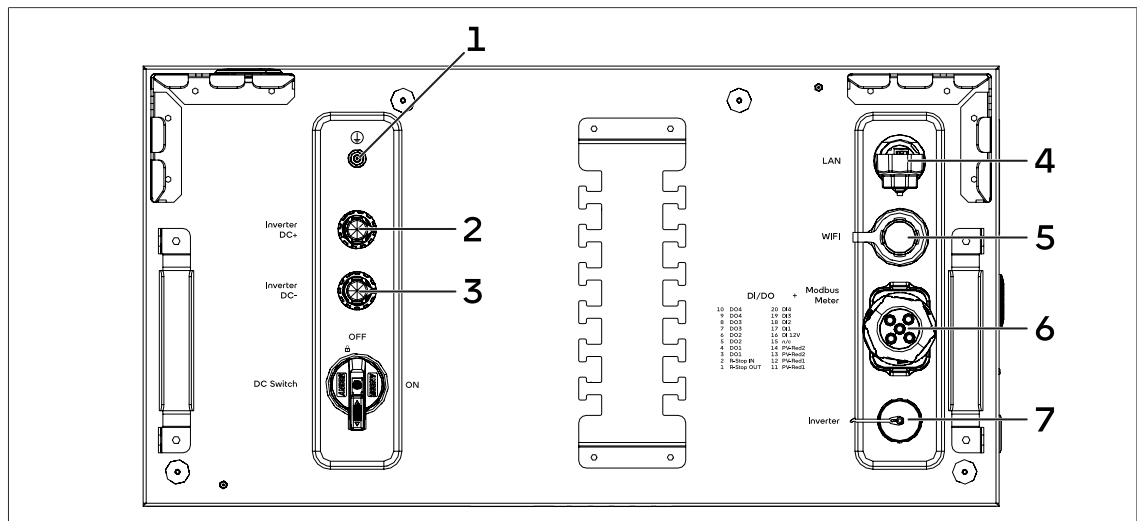


Illustration 19: Labeling of the connections on the connection box

- | | | |
|---|-------------------------|--|
| 1 | Earthing connector | see Connecting earthing / equipotential bonding [P. 63] |
| 2 | Inverter DC+ | see Connecting DC lines [P. 64] |
| 3 | Inverter DC- | see Connecting DC lines [P. 64] |
| 4 | LAN | see Establishing internet connection [P. 47] |
| 5 | WIFI | see Establishing internet connection [P. 47] |
| 6 | DI/DO +
Modbus Meter | see Connecting DI/DO lines (optional) [P. 56]
see Connecting RTU Modbus communication lines [P. 52] |
| 7 | Inverter | see Connecting communication line (COM) [P. 62] |

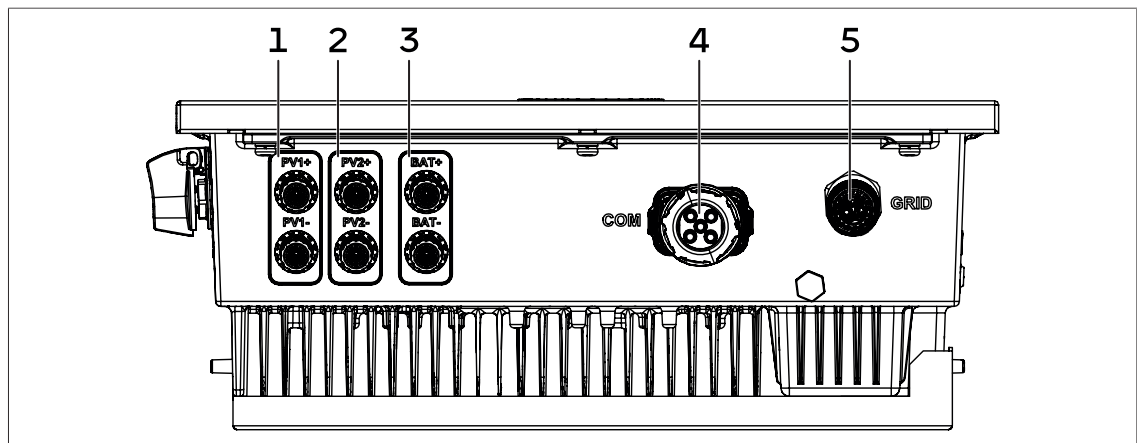


Illustration 20: Labeling of the connections on the inverter

- | | | |
|---|-------------|--|
| 1 | PV1+ / PV1- | see Connecting PV modules (PV system) [P. 65] |
| 2 | PV2+ / PV2- | see Connecting PV modules (PV system) [P. 65] |
| 3 | BAT+ / BAT- | see Connecting DC lines [P. 64] |
| 4 | COM | see Connecting communication line (COM) [P. 62]
see Connection Easy Backup backup power function (optional) [P. 70]
see Implement Remote Shutdown (DRM0) [P. 67] |
| 5 | GRID | see Connecting mains line [P. 66] |

7.4 Cable entry and strain relief

All cables connected to the connection box must be routed through one of the cable glands. In addition, all cables should be secured to the bracket on the connection box using cable ties (included in the accessory kit):

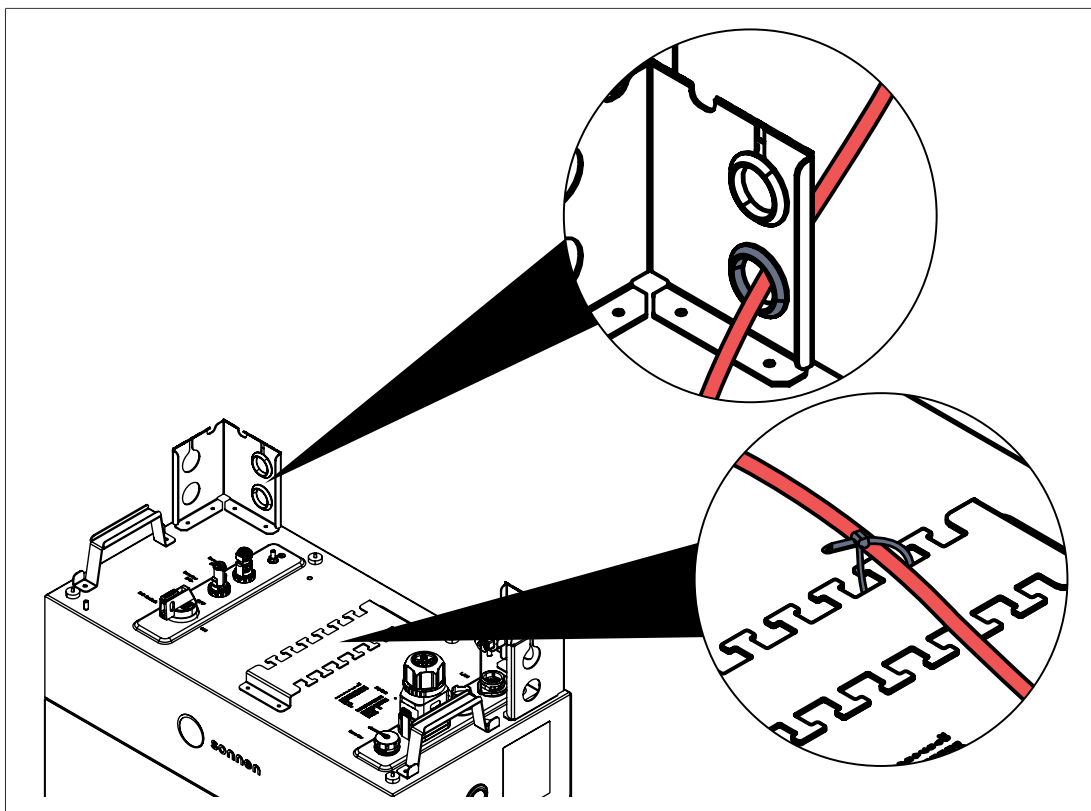


Illustration 21: Cable entry and strain relief on the connection box

- Ensure that the unused cable entries are sealed with the cover plates pre-installed on the connection box cover.
- Ensure that the cables are not kinked or pinched under the cover of the junction box.

7.5 Establishing internet connection

- The storage system must be connected to the home network router via a LAN connection (Ethernet line) **or** the Wifi module (optionally available from sonnen).

Connecting the Ethernet line

- Select the line according to the specifications:
 - RJ-45 connector, Cat 6, shielded.
 - Length adjusted to fit the installation situation, max. 100 m.

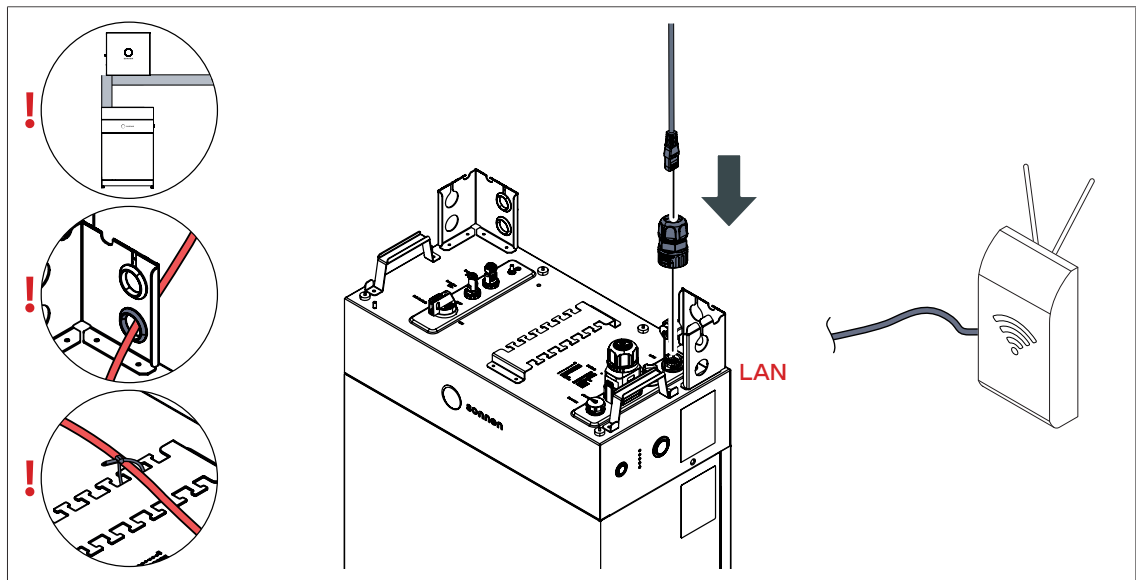


Illustration 22: Connecting the Ethernet line

- Insert the RJ-45 plug of the Ethernet cable into the RJ-45 cable gland included in the scope of delivery and place the cable into the seal.
- Connect the RJ-45 plug with the cable gland to the connection box (**LAN**). Use the cable entry and strain relief on the connection box.
- Connect the other end of the Ethernet line to your home network router.

Connecting the Wifi module (optional)

i INFO

During the commissioning assistant, the system checks whether the Wifi module has sufficient signal strength.

- Depending on the signal strength at the installation site, choose one of the following installation options for the Wifi module.

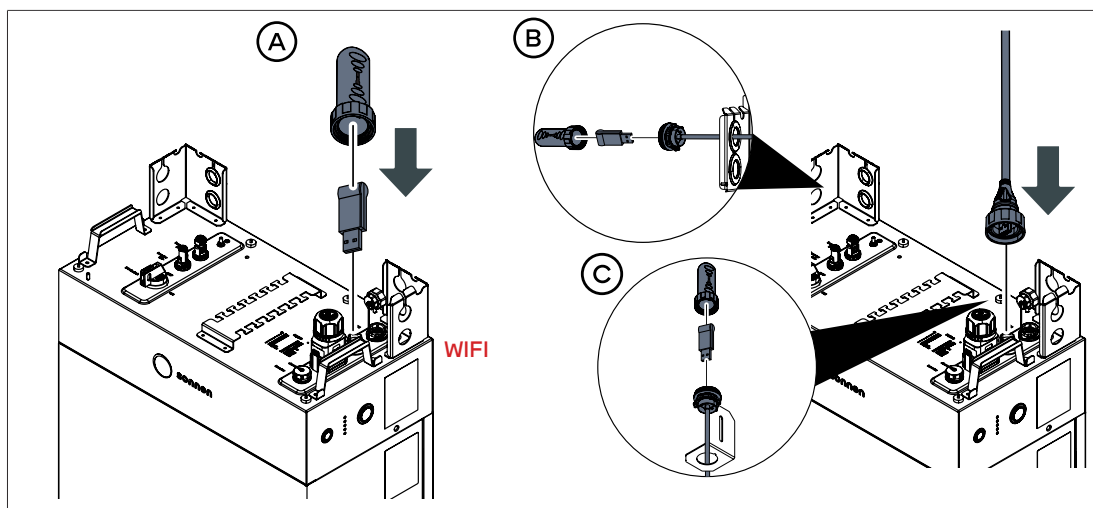


Illustration 23: Connecting the Wifi module

- **Option A:** Connect the Wifi module to the pre-mounted socket on the connection box (**WIFI**).
- **Option B:** Use the USB extension cable included in the scope of delivery to attach the Wifi module to the outside of the connection box in one of the upper cable grommets. Connect the extension cable's plug to the connection box (**WIFI**).
- **Option C:** Use the USB extension cable included in the scope of delivery to mount the Wifi module with the wall bracket outside of the connection box. Connect the extension cable's plug to the connection box (**WIFI**). Use the cable entry and strain relief on the connection box.
- Attach the protective cap to the Wifi module (required for all options!).

7.6 Installing the power measurement

i INFO

Further information on power measurement and the power meter can be found in the power meter instructions⁶. These instructions explain, among other things, the different measurement concepts and how to use multiple power meters.

7.6.1 Overview of the SU103 power meter

i INFO

Refer to the installation instructions included in the sonnenMeter SU103 packaging for safety instructions and further information.

- The SU103 power meter is a transformer meter.
- The power meter can be connected via Modbus TCP (LAN) or Modbus RTU (RS485).
- One power meter represents one measurement point.

Overview of the power meter

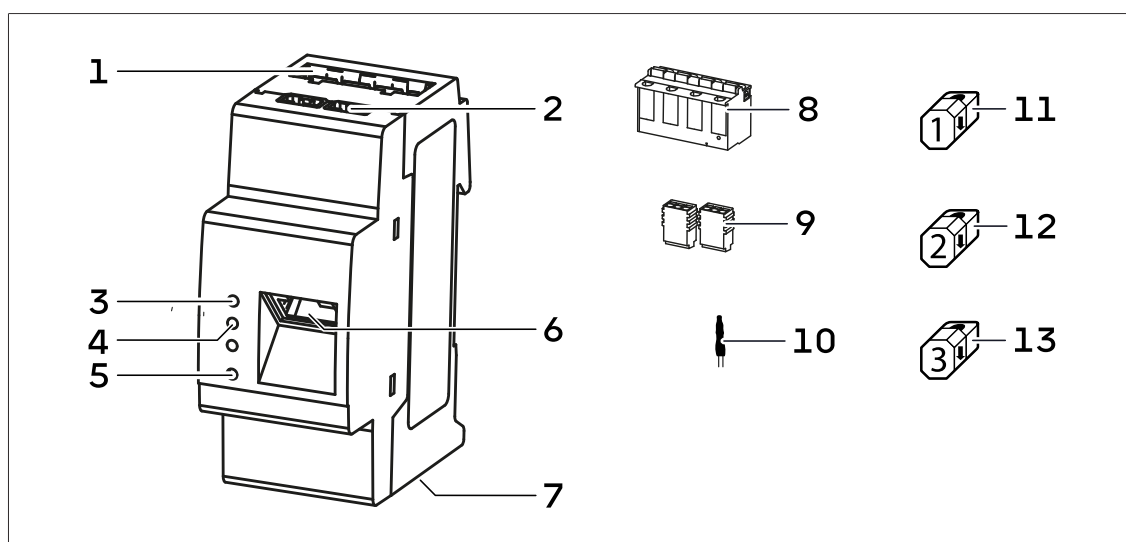


Illustration 24: Components of the SU103 power meter

- | | |
|---|--|
| 1 Voltage inputs | 8 Power supply connector |
| 2 Modbus RTU connection area | 9 RS-485 connector for RTU Modbus connection |
| 3 Status LED | 10 Terminating resistor for RS-485 connector |
| 4 Network LED | |
| 5 Button | 11 CT - L1 |
| 6 Modbus TCP connection area | 12 CT - L2 |
| 7 Clamp-on current transformer (CT) connection terminal | 13 CT - L3 |

Default Modbus RTU address

If two or more power meters are used with an RTU, each SU103 power meter has a preset RTU address between 1 and 230. This address is indicated on the nameplate and on the label on the power meter's packaging ("RTU").

When using two or more power meters with an RTU:

→ Before installation, make sure that the power meters have different Modbus addresses.

If the power meters available happen to have the same Modbus address:

⁶ Link: <https://documents.sonnen.de/s/manual-power-meter-en>

→ Contact the sonnen service team.

Default Modbus TCP address

Every power meter is preset with TCP Modbus ID 1.

7.6.2 Connecting the SU103 power meter

Electrical connection with one measurement point

→ Connect the power meter - single-phase or three-phase (depending on the house connection):

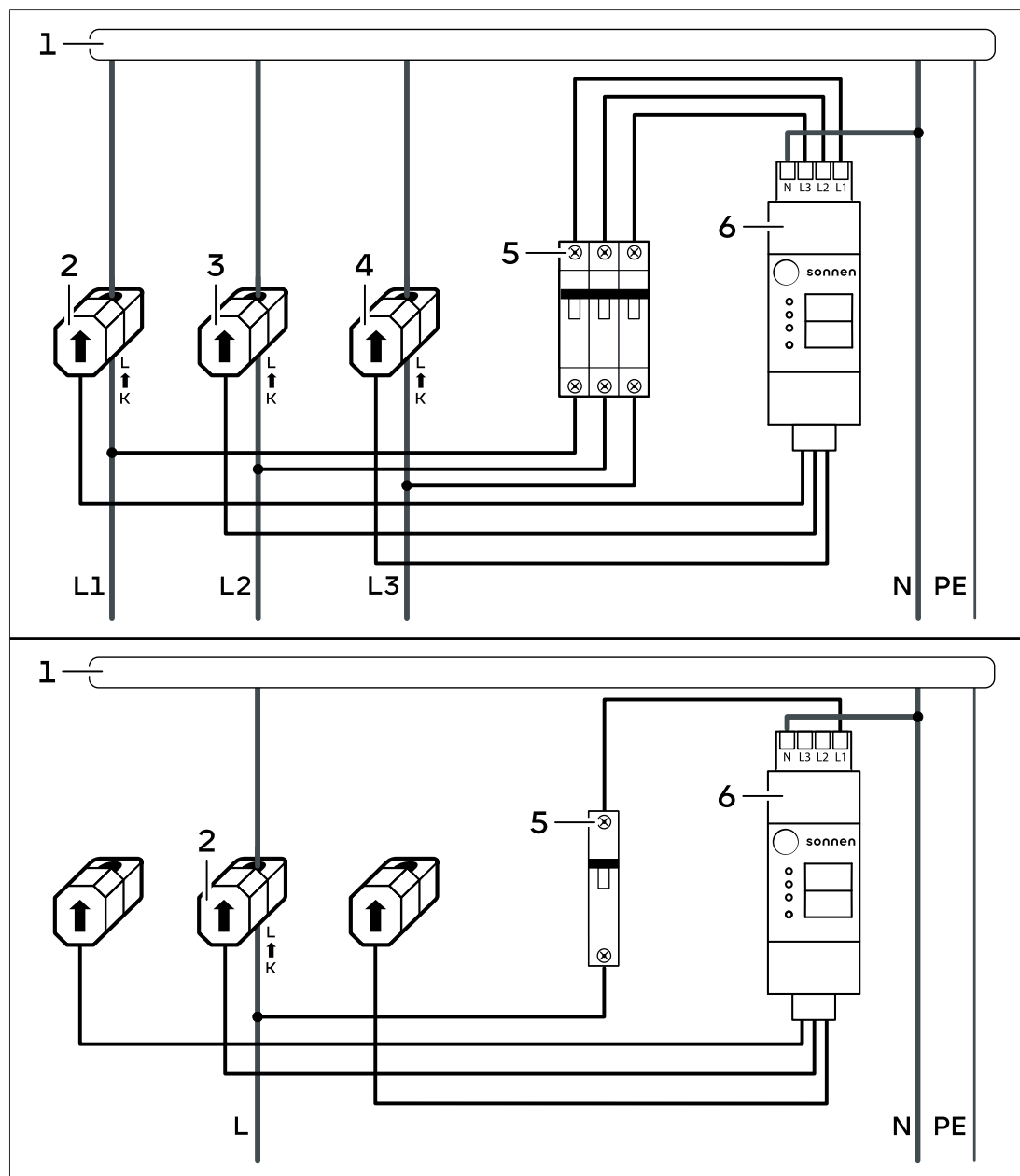


Illustration 25: Three-phase (top) and single-phase (bottom) connection for measuring one measurement point with the SU103 power meter

- | | |
|-------------------------------------|-------------------------------------|
| 1 Consumer | 4 Clamp-on current transformer - L3 |
| 2 Clamp-on current transformer - L1 | 5 B16 miniature circuit breaker |
| 3 Clamp-on current transformer - L2 | 6 SU103 power meter |

Connecting the clamp-on current transformer

i INFO

Always use the supplied clamp-on current transformers, as these have been calibrated together with the respective power meter. Replacing the clamp-on current transformers can lead to measurement deviations.

- First connect the CT to the power meter and then to the line.
- Open the current transformer for L1, place it around the cable, and close it again until it audibly clicks into place. Note the direction of the arrow on the CT!
- Repeat this step for all necessary phases.

Connecting lines to voltage inputs

- The lines connected to the power meter's voltage inputs must be protected by appropriate circuit breakers. Additional circuit breakers are not required if the lines are already protected in accordance with the applicable regulations and standard
- Connect lines L1, N / L1, L2, L3, N to the power meter (permissible cable cross-sections: 0.20 ... 2.50 mm²).
- **NOTICE! Ensure that the phases are correctly assigned.**
- Ensure that the power meter can be switched off by means of a freely accessible meter fuse or an additional switch.
- Ensure that the voltage inputs are fused with 16 A type B.

Connecting communication line

- To connect power meters via TCP Modbus or RTU Modbus, see the following sections.

7.6.3 Connecting TCP Modbus communication lines

To connect multiple power meters via TCP Modbus, each must be connected to a switch/router that is located in the same network as the storage system.

- Select the line according to the specifications:
 - RJ-45 connector, Cat 6, shielded.
 - Length adjusted to fit the installation situation, max. 30 m.

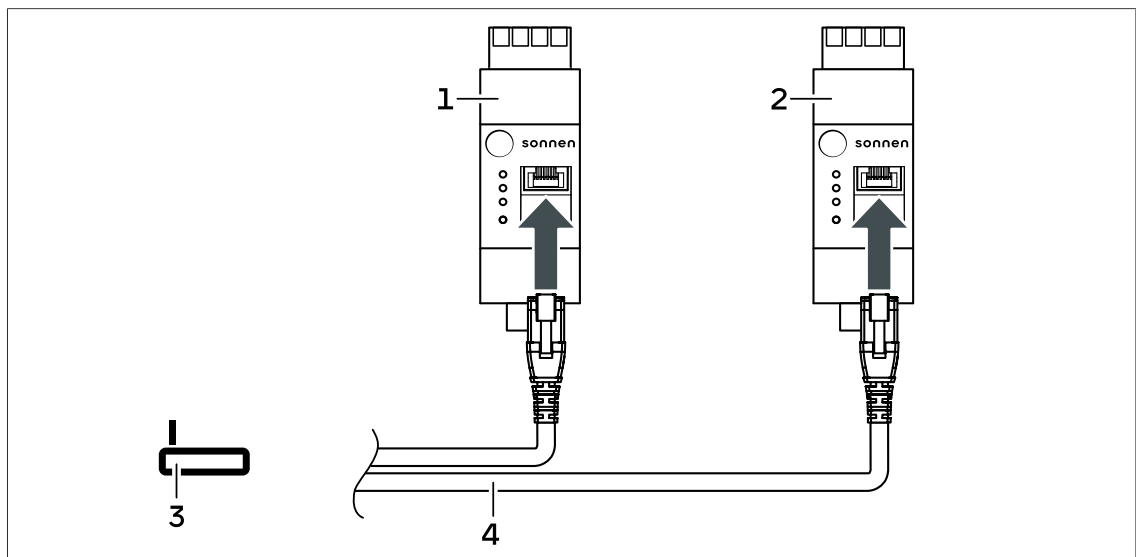


Illustration 26: Connecting the communication line for TCP Modbus

- | | |
|-----------------|-----------------|
| 1 Power meter 1 | 3 Switch/Router |
| 2 Power meter 2 | 4 Patch cable |

7.6.4 Connecting RTU Modbus communication lines

i INFO

The Multicom CB connector is also used to connect the digital inputs/outputs [P. 56]!

- Select the line according to the specifications:
 - RJ-45 connector, Cat 6, shielded.
 - Length adjusted to fit the installation situation, max. 150 m.

Connecting Modbus line to Power Meters

- To connect multiple power meters via Modbus RTU, they must be connected as shown in the figure:

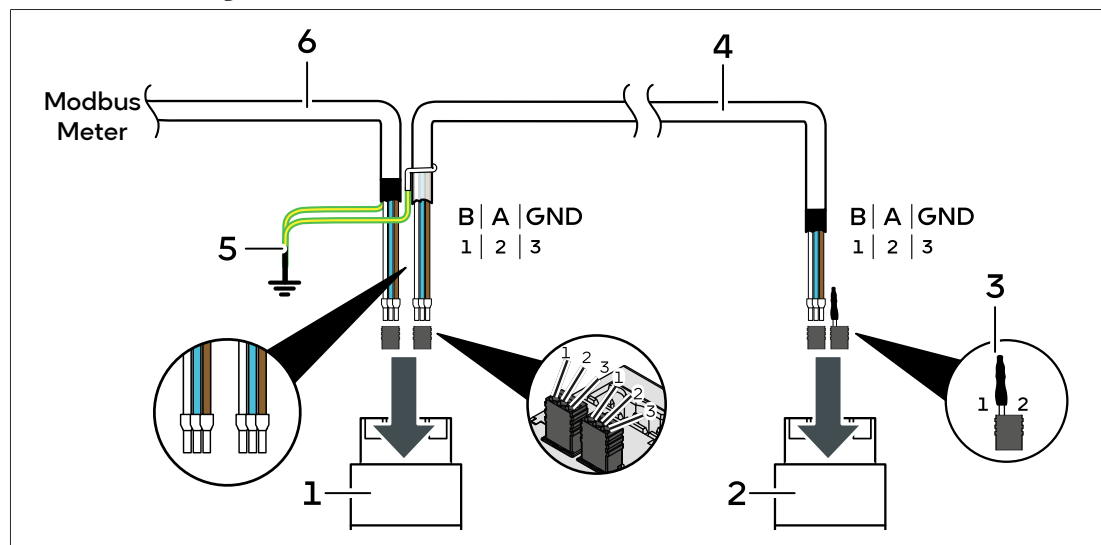


Illustration 27: Connection of RTU communication line for RTU Modbus

- | | |
|---|--|
| 1 Power meter 1 (ID = „RTU“) | 4 Communication line |
| 2 Power meter2 (ID = „RTU“) | 5 Screen connection to earthing system |
| 3 Terminating resistor for Modbus termination | 6 Modbus line |

- On the last power meter, connect the terminating resistor supplied between pins 1 and 2.
- Ensure that the screen of the existing communication line is not connected to the screen of the additional communication line. The screen of the existing communication line is grounded separately instead.

Connecting Modbus line to connection box

Connect the other end of the Modbus cable to the connection box as follows:

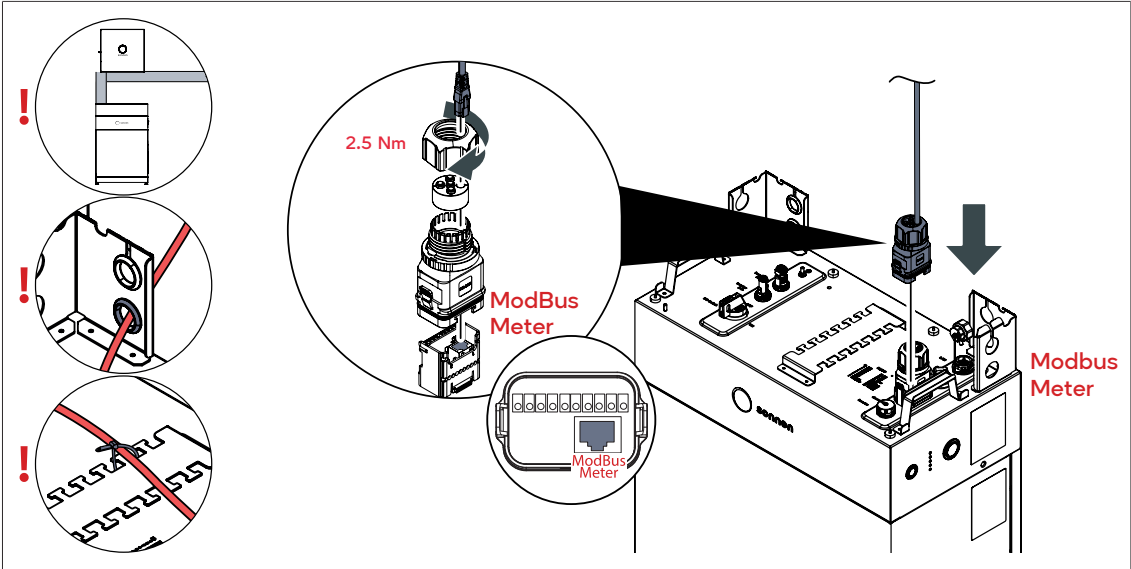


Illustration 28: Connection of the Modbus line

- Disconnect the pre-assembled connector (Multicom CB) from the connection box.
- Open the connector and insert the Modbus line. **NOTICE! First, route the cable through the desired cable entry on the connection box!**
- Plug the RJ-45 connector of the Modbus cable into the socket (**ModBus Meter**).
- Insert the cable into the rubber gasket and slide it into the connector's main housing.
- Insert the connector into the connector housing (until you hear a “click”) and seal the unused openings in the rubber gasket with the sealing plugs.
- Tighten the screw sleeve to a torque of **2.5 Nm**.
- Connect the prepared connector to the connection box (**DI/DO + Modbus Meter**). Use the strain relief on the connection box.

7.6.5 Configuration of the power measurement

The measurement points can be configured in the commissioning assistant (Configuration page).

If the power meters are connected via **Modbus RTU**:

Power Meter Details RTU					
Meter	Direction	Modbus ID	Channel	Measurement value	Edit
SU103	G - Grid	1	1	-	Add

Illustration 29: Adding RTU power meters

Designation	Function
Meter	→ Select 'SU103'.
Direction	• Selection of the type of measurement point. The measurement points available for selection depend on the selected measurement concept. → Select the applicable type of measurement point.
Modbus ID	• Default RTU address of the power meter (see “RTU” on the name-plate and the label on the packaging).
Channel	• Is always '1'.
Measurement value	• Displays the value currently measured by the power meter in watts.
Trash can symbol	• Deletes the selected measurement point.

If the power meters are connected via **Modbus TCP**:

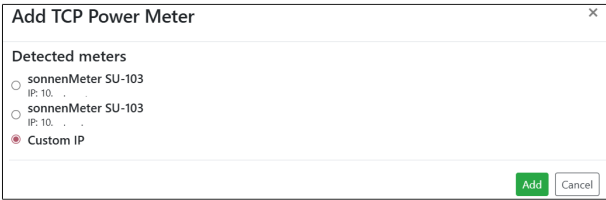


Illustration 30: Adding TCP power meters

The power meters found in the network are displayed here.
If the power meter is not displayed:
→ Select **Custom IP** to add the power meter using the IP address.

Power Meter Details TCP							
Meter	Direction	IP	Port	Modbus ID	Channel	Measurement value	Edit
SU103	P -	10.32.156.186	502	1		0 W	 
Select new meter							

Illustration 31: Configuring a TCP measurement point

Designation	Function
Meter	→ Select 'SU103'.
Direction	• Selection of the type of measurement point. The measurement points available for selection depend on the selected measurement concept. → Select the applicable type of measurement point.
IP	• The IP address is displayed here.
Port	• The port must always be set to '502'.
Modbus ID	• The TCP Modbus ID of the SU103 power meter is always '1'.
Channel	• No display when using SU103 power meter.
Measurement value	• Displays the value currently measured by the power meter in watts.
Light bulb symbol	• Helps with identification if several SU103s are connected via TCP. → Click the icon to make all LEDs on the respective power meter flash. The LEDs will flash until the icon is clicked again.
Trash can symbol	• Deletes the selected measurement point.

7.7 Using digital inputs/outputs (optional)

NOTICE

Connection lines too long

→ Ensure that the signal lines are dimensioned so that the selected conductor cross-section is sufficient for the required line length. sonnen recommends a maximum line length of 30 m for the mains and signal lines.

NOTICE

Overvoltage when switching off electromagnetic relays

Damage to components!

→ Only use electromagnetic relays with a protective circuit (e. g. with a free-wheeling diode) or semiconductor relays.

i INFO

The wiring configurations described in the following are examples only; they do not apply universally and serve only as a guide for the electrician performing the installation. The electrician performing the installation is responsible for connecting the system correctly. In some cases, the permission of the distribution network operator (DNO) or power supply company may be required.

i INFO

External components (power supplies, contactors, relays, etc.) needed to wire up the digital inputs/outputs are not supplied.

7.7.1 Overview digital inputs and outputs

- The signal lines for using the digital inputs and outputs is connected to the connection box. This ensures flexible use of the special functions, as only the necessary connections are used and the cable lengths can be individually adapted to the on-site conditions.
- The connections in the connector and on the connection box are labeled with the numbers 1–20. The following table shows which number corresponds to which digital input or output.

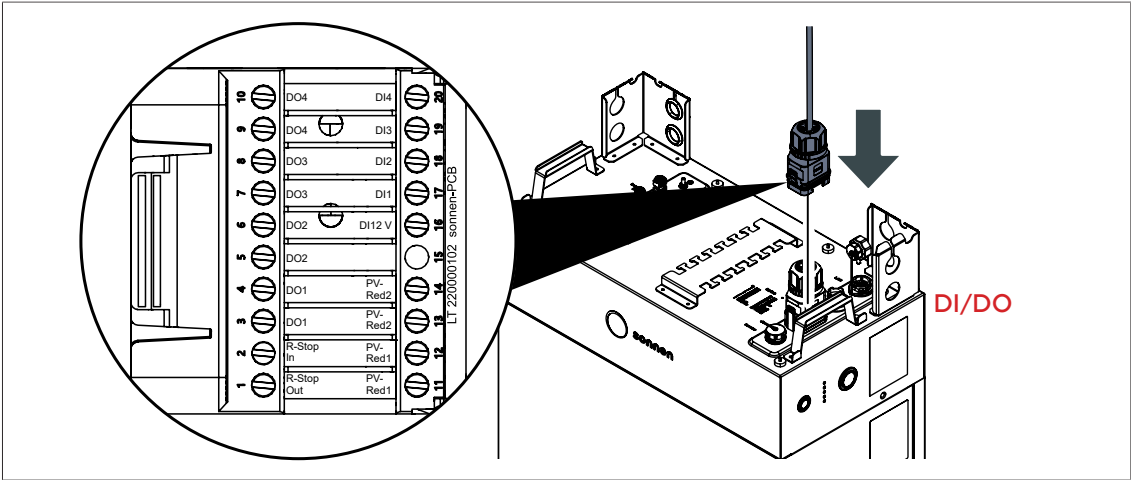


Illustration 32: Overview of the digital inputs and outputs

Label	Function	Voltage [VDC]	Max. amperage [mA]
1 R-Stop OUT	Remote Stop	-	-

Label	Function	Voltage [VDC]	Max. amperage [mA]
2 R-Stop IN	Remote Stop	-	-
3 / 4 DO1	Reserve	-	-
5 / 6 DO2	Reserve	-	-
7 / 8 DO3	Digital output CHP	5-60 (SELV)	300
9 / 10 DO4	Digital output for self-consumption switch	5-60 (SELV)	300
11 / 12 PV-Red 1	PV Reduction 1	5-60 (SELV)	300
13 / 14 PV-Red 2	PV Reduction 2	5-60 (SELV)	300
15 n/c	-	-	-
16 DI 12 V	Supply voltage for digital inputs	12	5
17 DI1	Digital input Regulative	12	1
18 DI2	Digital input Regulative	12	1
19 DI3	Digital input Regulative	12	1
20 DI4	Digital input CHP/Regulative	12	1

Table 3: Technical data for digital inputs (DI) and outputs (DO)

7.7.2 Connecting DI/DO lines (optional)

i INFO

The Multicom CB connector is also used for power measurement via Modbus RTU [P. 52]!

- Select the line according to the specifications:
 - Cable type: Multi-conductor, fine-stranded cable (e.g., LiYY)
 - Conductor cross-section per wire: max. 1.5 mm²
 - Outer diameter: 4.5 – 6.5 mm
 - The number of wires and the selection of other components (e.g., terminals, contactors, relays) depend on the functions actually connected and the specific installation situation.

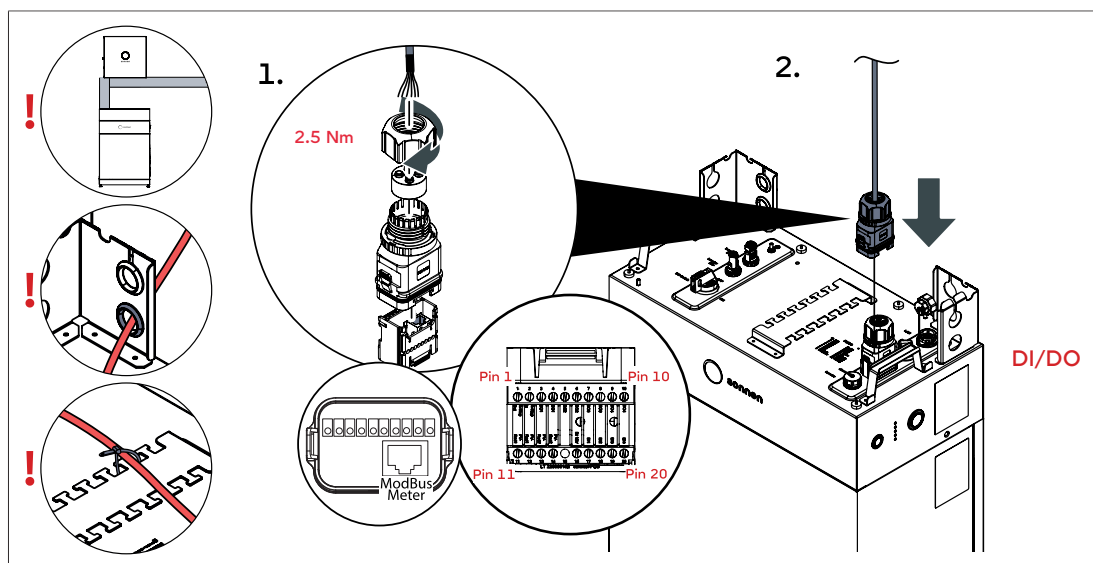


Illustration 33: Connecting signal line to connection box

1. Assembling the connector

- Disconnect the pre-assembled COM connector (Multicom CB) from the connection box.

- Open the connector and insert the signal line. **NOTICE! First, route the cable through the desired cable entry on the connection box!**
- Insert the individual wires of the cable into the corresponding connectors. Tighten the wires with a torque of **0.5 Nm**.
- Arrange the wires neatly without overlapping or crossing them.
- Insert the cable into the rubber gasket and slide it into the connector's main housing.
- Insert the connector into the connector housing (until you hear a "click") and seal the unused openings in the rubber gasket with the sealing plugs.
- Tighten the screw sleeve with a torque of **2.5 Nm**.

2. Connecting the line to the connection box

- Connect the DI/DO line with the prepared connector to the connection box (**DI/DO + Modbus Meter**). Use the strain relief on the connection box.

7.7.3 Using digital inputs/outputs

7.7.3.1 Using electrical consumers for self-consumption optimisation

When **digital output (DO) Self-consumption switch** is used, the controls of the storage system activate an external electrical consumer in certain circumstances, which holds the existing surplus of electricity.

Function

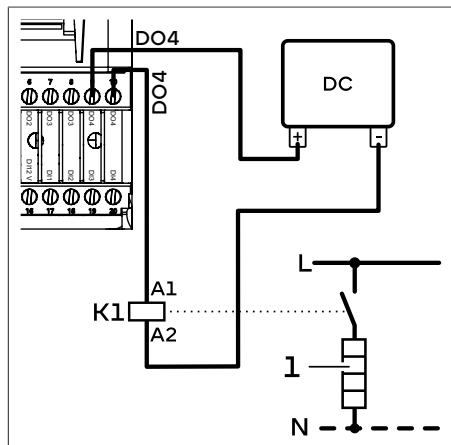
Digital output 'Self-consumption switch' is activated as soon as a defined production surplus (= production - consumption - charging of storage system) has been reached. The production surplus is defined by the Threshold to start (in watts). If the surplus electricity exceeds this limit, the digital output remains activated for the duration of the defined Minimal on time (in seconds).

Configuring settings

The switching behaviour of the self-consumption switch is controlled using the commissioning assistant.

- Adapt the Threshold to start and Minimal on time for the connected electrical consumer.

Application example



- 1 Heating element
- K1 Auxiliary relay for switching loads
- D DC power supply (5 – 60 V)
- C compatible with auxiliary contactor K1

Activating and deactivating a heating element

The heating element (1) is connected to digital output 'Self-consumption switch' via an external contactor and can be activated or deactivated as needed. The nominal power of the heating element (1) was set as Threshold to start.

NOTICE! The heating medium must be prevented from excessive heating using suitable safety measures.

7.7.3.2 Recording constant power of an electrical generator

i INFO

The use of digital inputs/outputs described here is **only permitted for electrical generators with a constant power output**. Generators with fluctuating power output, such as modulating combined heat and power stations, must **not** be connected in this way.

If **digital input (DI) CHP** is used, the controls of the storage system include the power of the connected electrical generator (e.g. a combined heat and power station) in calculations for controlling flows of energy.

Function

When digital input CHP is activated, the storage system adds the power output of the electrical generator to current production calculations. The power output of the electrical generator must be constant for this, as the digital input only detects the statuses of activated or deactivated.

Configuring settings

The power generated by the electrical generator is specified in the commissioning assistant.

→ Activate the combined heat and power station on page Features.

→ Specify the constant power of the combined heat and power station (Power).

Application example

The type of connection for digital input CHP depends on whether the CHP unit has a potential-free operating contact or not.

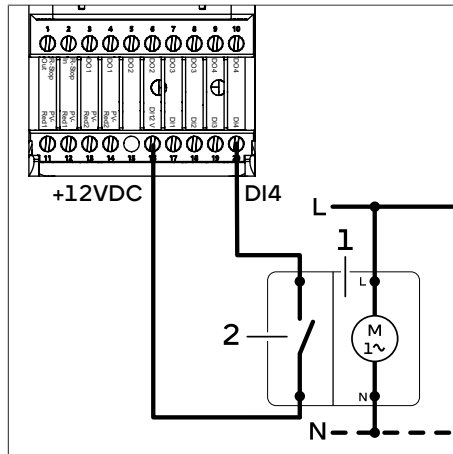


Illustration 34: Example: CHP unit with operating contact

- 1 Combined heat and power station
- 2 Potential-free operating contacts of the CHP unit (open if the station is not operating, closed if it is)

Combined heat and power station with operating contact

If the combined heat and power station (1) has a potential-free operating contact (2), it can be connected as shown in the figure. As soon as the operating contact (2) closes, digital input CHP will be activated.

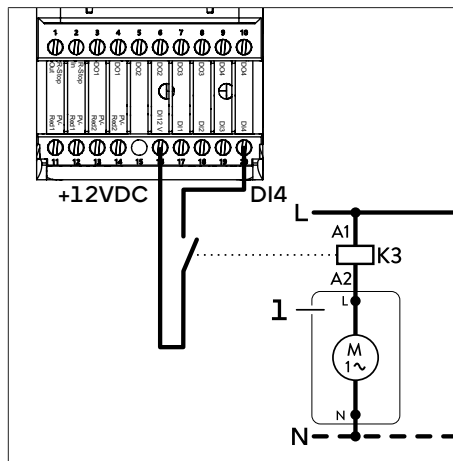


Illustration 35: Example: CHP unit without operating contact

- 1 Combined heat and power station
- K3 Relay

Combined heat and power station without operating contact

If the combined heat and power station (1) does not have a potential-free operating contact, it can be connected as shown in the figure. In this set-up, a relay is used to detect whether the generator is active. This information is forwarded to the storage system via a potential-free make contact in the relay.

7.7.3.3 Recording fluctuating power of an electrical generator

- The power of an electrical generator that does not produce constant output cannot be recorded via digital input CHP (see Recording constant power [P. 58]).
- Instead, the electrical generator has to be integrated in the power measurement via a separate measurement point. This may require an additional power meter and the corresponding setting of the additional measurement point in the commissioning assistant.

i INFO

Further information on power measurement and the power meter can be found in the power meter instructions⁷. These instructions explain, among other things, the different measurement concepts and how to use multiple power meters.

7.7.3.4 Using additional external electrical generators

If **digital output (DO) CHP** is used, the controls of the storage system activate an external electrical generator, e.g. a combined heat and power station, as soon as defined charging state conditions are met.

Function

As soon as the state of charge (SOC) of the storage system drops below a defined value (Charge state to start CHP), the digital output is activated. The digital output and thus the electrical generator remain activated until the state of charge (SOC) of the storage system reaches a defined maximum charging state (Charge state to stop CHP). Surpluses of electricity from the electrical generator are used to charge the storage system. In order for this to be included in calculations correctly when controlling the flows of energy in the building, the power output of the electrical generator must be recorded (see Recording constant power of an electrical generator [P. 58]).

Using a combined heat and power station as an electrical generator

If a combined heat and power station is used as an electrical generator, it must be ensured that it mostly functions as a heat provider, i.e. the highest priority for production is the hot water supply, while production of electricity generally takes second priority. This means that when digital output CHP of the storage system is activated, the combined heat and power station may not start producing electricity immediately.

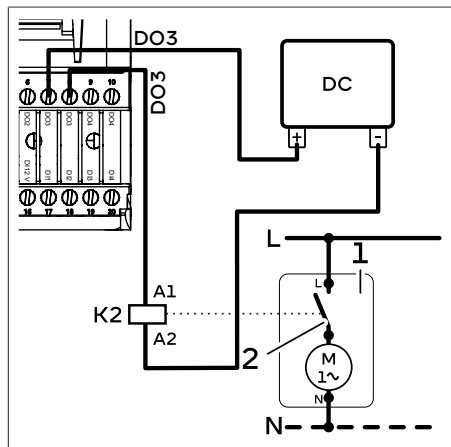
Configuring settings

The switching behaviour of the digital output is controlled using the commissioning assistant.

- Set the lower limit of the charging state at which the digital output and therefore the electrical generator are activated ((Charge state to start CHP).
- Set the upper limit of the charging state at which the digital output and therefore the electrical generator are deactivated (Charge state to stop CHP).

⁷ Link: <https://documents.sonnen.de/s/manual-power-meter-en>

Application example



Activating and deactivating a CHP unit

The combined heat and power station (1) is activated or deactivated using digital output CHP. The prerequisite for this is that the CHP unit must be available via a suitable interface (2) for activation/deactivation.

- 1 CHP
- 2 Contact for activating CHP unit
- K2 Auxiliary relay to activate the CHP unit
- DC DC power supply (5 - 60 V) compatible with auxiliary relay K2

7.7.3.5 Using Remote Stop (R-Stop)

The R-Stop connections ("Remote Stop"/"Remote Emergency Stop") serve as an external shutdown interface. The storage system can be shut down via a connected device with a normally closed contact.

NOTICE

The external R-Stop or power switch neither interrupts the AC voltage at the inverter's AC connection nor disconnects the storage system's internal power paths

If the AC voltage needs to be shut off, an additional disconnect device is required.

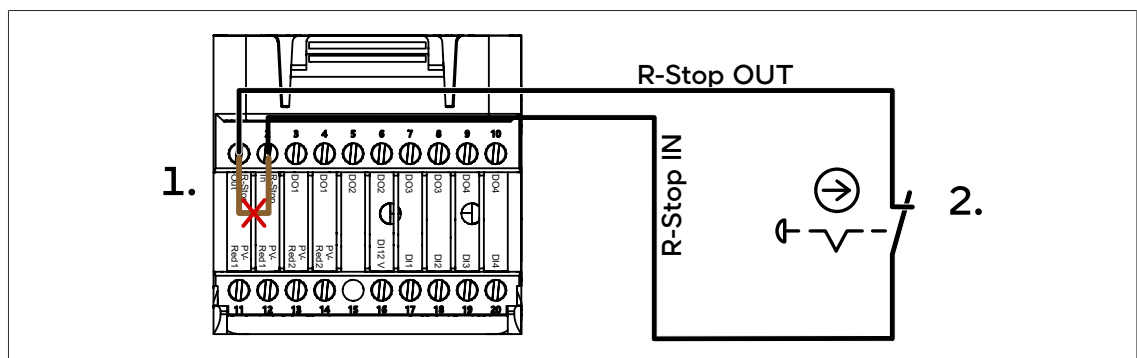


Illustration 36: Connecting the R-Stop connectors

- Remove the pre-installed wire jumper between the R-Stop IN and R-Stop OUT pins.
- Connect the desired component with a two-pole normally closed (NC, 24 V) contact to the R-Stop IN and R-Stop OUT pins.
- After commissioning the storage system, and provided that an external on/off switch is installed, check the wiring and the function of the external switch via the normally closed contact.

7.8 Connecting communication line (COM)

i INFO

The Multicom INV connector is also used for the Easy Backup backup power function [P. 71]!

- Use the communication line included in the accessory kit.
- Use the COM connector (Multicom INV) included with the inverter.

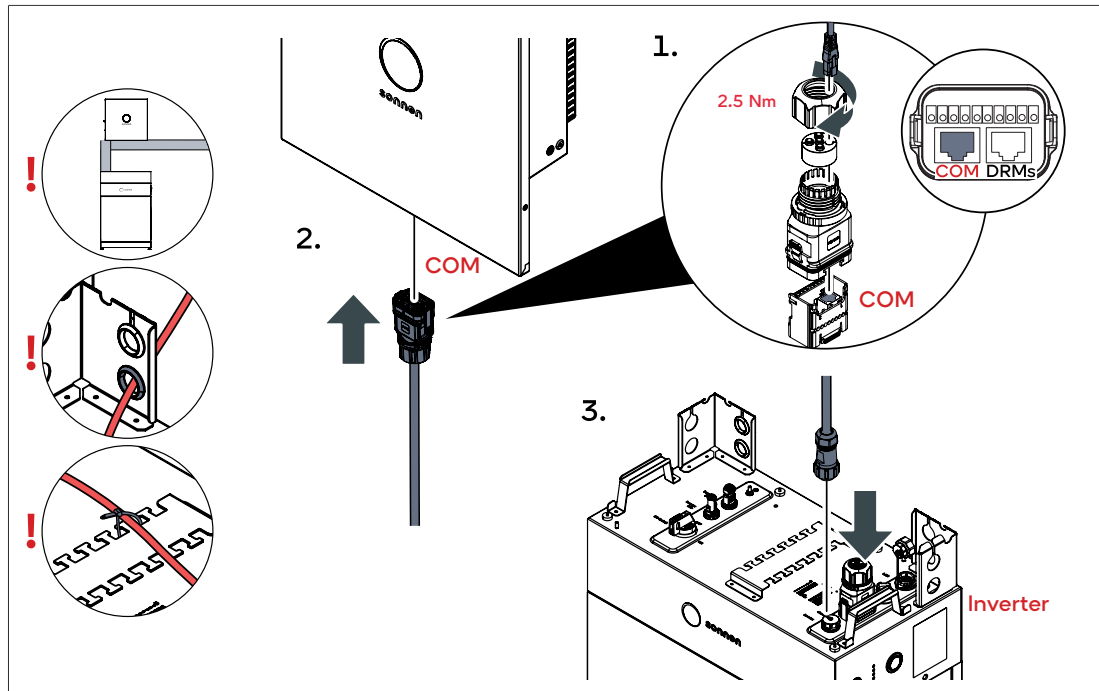


Illustration 37: Connection of the communication line (COM)

1. Preparing the connector

- Open the COM connector and insert the communication line. **NOTICE! First, route the cable through the desired cable entry on the connection box!**
- Plug the cable's connector into the **COM** socket.
- Insert the cable into the rubber gasket and slide it into the connector's main housing.
- Insert the connector into the connector housing (until you hear a "click") and seal the unused openings in the rubber gasket with the sealing plugs.
- Tighten the screw sleeve to a torque of **2.5 Nm**.

2. Connecting the line to the inverter

- Connect the prepared connector to the inverter (**COM**).

3. Connecting the line to the connection box

- Connect the other end of the communication line, with the pre-assembled COM connector, to the connection box (**Inverter**). Use the strain relief on the connection box.

7.9 Connecting earthing / equipotential bonding

- Protective conductors must be fitted between the inverter, connection box and main earthing terminal.
 - The accessory kit includes an earthing line (10 mm²), which is intended for connection between the connection box and inverter.
- Select additional lines according to the specifications:
- Wire cross-section: 10 mm²
 - Select the appropriate type based on on-site conditions.
 - Length adjusted to fit the installation situation.

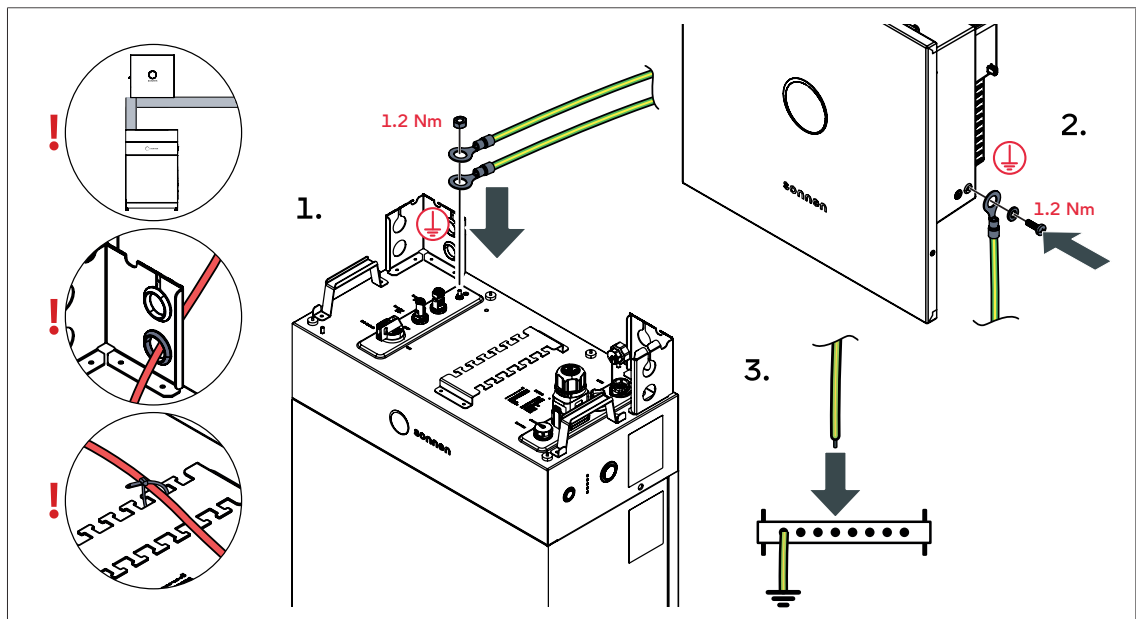


Illustration 38: Connecting the earthing line

1. Connecting earthing line to the connection box

- Connect the earthing line included in the scope of delivery and an additional grounding line to the grounding bolt on the connection box (PE). Use the cable gland and strain relief on the connection box.
- Tighten the nut with a torque of **1.2 Nm**.

2. Connecting earthing line to the inverter

- Connect the other end of the earthing line (included in the scope of delivery) to the grounding terminal on the inverter. To do this, use the safety screw (included in the scope of delivery) provided with the inverter.
- Tighten the screw with a torque of **1.2 Nm**.

3. Connecting earthing line to the main grounding point

- Connect the other end of the additional grounding conductor to the building's main grounding busbar and tighten it to the specified torque.

7.10 Connecting DC lines

- Use the plus and minus DC line from the accessory kit.
- Ensure that the DC disconnect switch (**PV Switch**) on the inverter is turned off (switch position: **OFF**).
- Ensure that the DC disconnect switch (**DC Switch**) on the connection box is turned off (switch position: **OFF**). To lock the switch, turn it until it clicks into place at the lock symbol.
- Check that the wires are free of voltage by measuring them before connecting them.

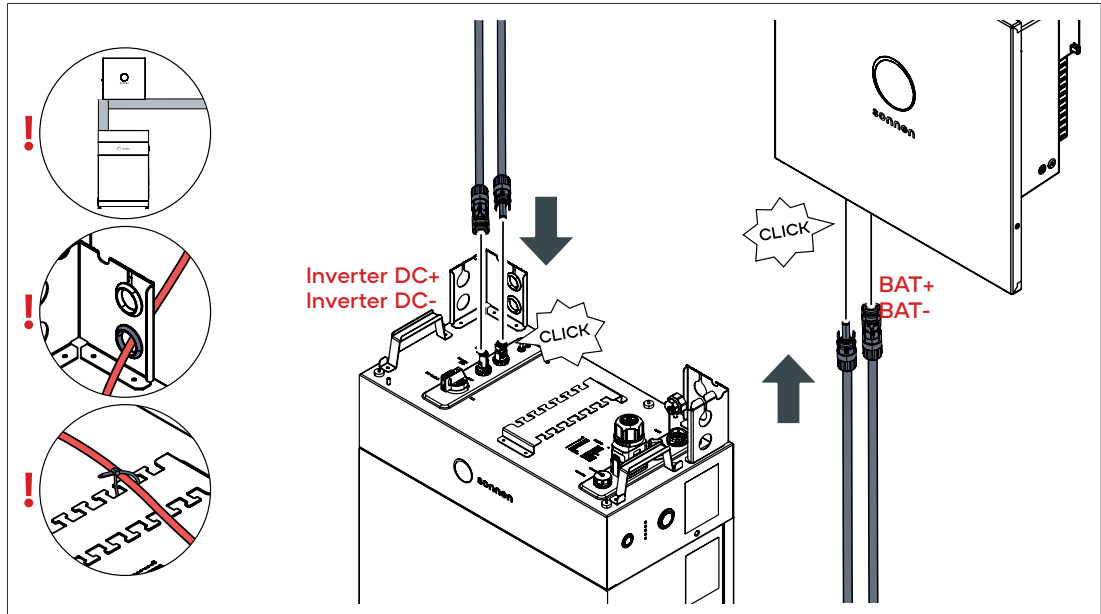


Illustration 39: Connecting DC lines to inverter and connection box

- Connect the DC lines to the inverter and the connection box (**Inverter DC+/- / BAT+/BAT-**). Use the cable entry and strain relief on the connection box.

7.11 Connecting PV modules (PV system)

- Ensure that the DC disconnect switch (**PV Switch**) on the inverter is turned off (switch position: **OFF**).
- Ensure that the DC disconnect switch (**DC Switch**) on the connection box is turned off (switch position: **OFF**). To lock the switch, turn it until it clicks into place at the lock symbol.
- Use the PV connectors included with the inverter.
- Select the line according to the specifications:
 - Cable cross-section: 4 - 6 mm² (6 mm² recommended)
 - Cable diameter: 5 - 8 mm
 - During installation, the polarity and insulation of the PV cables must be checked in accordance with the applicable national standards and regulations (e.g., in accordance with IEC/EN 62446-1 or corresponding national standards such as VDE 0126-23 (Germany), CEI 82-25 (Italy), or AS/NZS 5033 (Australia)).

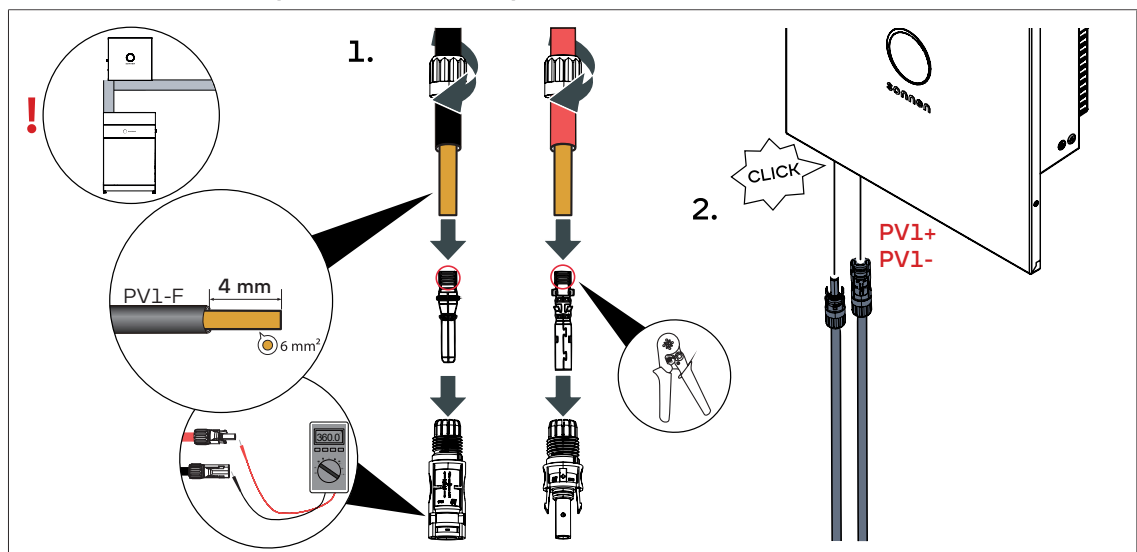


Illustration 40: Preparing PV line and connecting to inverter

1. Attaching connector to PV lines

- Strip approximately 4 mm of insulation from the end of the cable.
- Remove the screw sleeve from the connector and open the connector.
- Insert the stripped end of the cable into the connector.
- Crimp the cable properly.
- Attach the screw sleeve to the connector and tighten it using the installation wrench included with the inverter.

2. Connecting PV lines to inverter

- Connect the PV lines with the pre-installed connectors to the inverter (**PV1+ / PV1-**)
- NOTICE! Observe the permissible bending radii. Avoid tension on the cable.**
- Make sure the plugs click audibly into place!
- Cover any unused DC ports with connectors that do not have wires attached.

7.12 Connecting mains line

→ Use the mains connection connector included with the inverter.

→ Select the line according to the specifications:

- Cable type / diameter: $3 \times 6 \text{ mm}^2$ / 11.5 – 13.5 mm.
- Select the type based on on-site conditions.
- Length adjusted to suit the installation situation.

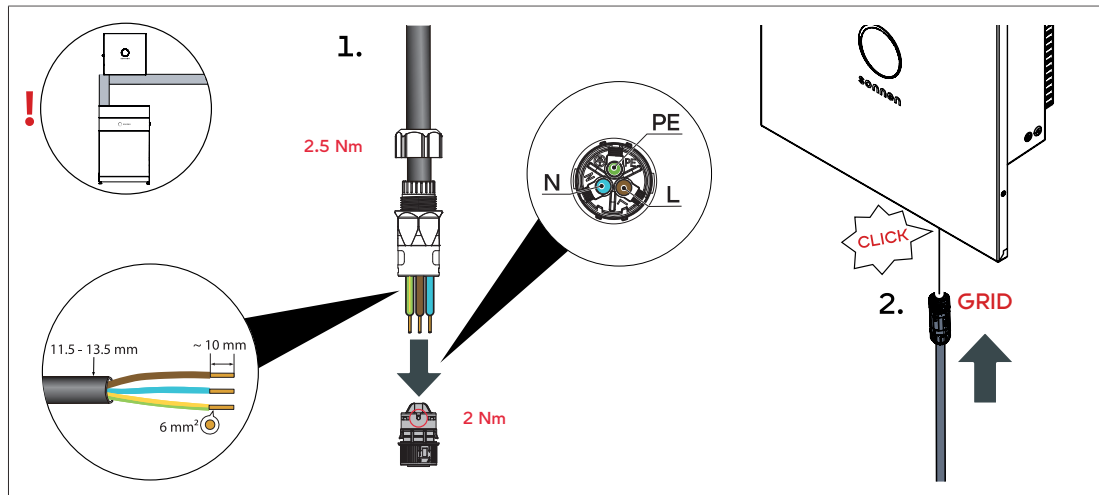


Illustration 41: Preparing mains line and connecting to inverter

1. Attaching connector to mains line

- Strip approximately 3 cm of insulation from the end of the cable.
- Strip the insulation approximately 10 mm from the end of the individual wires (or use wire end ferrules for flexible cables).
- Open the connector and insert the 3 individual wires into the plug.
- If necessary, remove the orange and blue seals from the threaded sleeve if the cable does not fit through.
- Tighten the 3 wires with an Allen wrench to a torque of **2 Nm**. The screws must not protrude.
- Close the connector and tighten the screw sleeve to a torque of **2.5 Nm**.

2. Connecting mains line to inverter

→ Connect the mains line to the inverter using the connector (**GRID**).

NOTICE! Observe the permissible bending radii. Avoid tension on the cable.

→ Make sure the plug clicks audibly into place!

7.13 Implement Remote Shutdown (DRM0)

Standard AS/NZS 4777.2 calls for the provision of a suitable interface for connecting a demand response enabling device (DRED). With demand response mode 0 (DRM0), the storage system can be forced to disconnect from the mains by connecting pins 5 and 6. A possible cable break in the DRED circuit also causes the storage system to disconnect from the mains.

- A socket in the inverter's COM connector (Multicom INV) of the inverter is provided for connecting to the DRED.

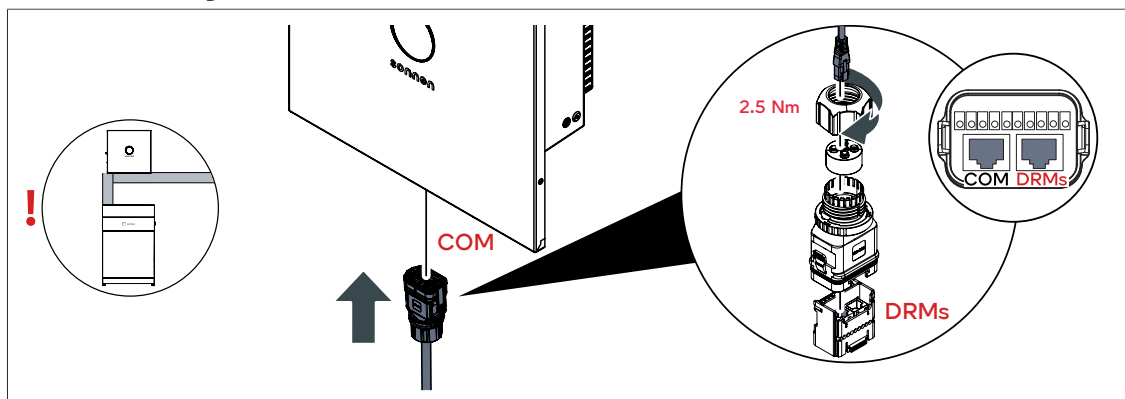


Illustration 42: Socket for DRM0 connection in the COM connector

Pin Assignment for the DRM Jack

Pin	Function Description	Pin	Function Description
1	DRMS1/5	5	REF GEN/0
2	DRMS2/6	6	/
3	DRMS3/7	7	/
4	DRMS4/8	8	/

i INFO

Activating DRM0 in the commissioning assistant

The DRM0 function must also be activated in the CA once the DRED is connected. If the function is activated without a DRED being connected, this may cause the storage system to malfunction due to the integrated cable break check.

8 Easy Backup backup power function (optional)

- Both when the sonnenBatterie 12 is first being installed and after the fact, the backup power function can be added to the system. The components required for this are included as standard (accessory kit).
- If the system is installed retroactively (after the storage system has already been in operation without a backup power function), changes may need to be made to the power metering and the electrical wiring in the home.

Connection options for the storage system with backup power function

The backup power function of the storage system is designed as standard to provide backup power for a single-phase household in the event of a grid outage (**connection option 1**). This is possible for household connections with a maximum fuse rating of 63 A per phase.

For a three-phase household connection or a higher connecting power, **separate backup power circuits** are required (**connection option 2**). Only the connected single-phase loads are supplied by the storage system via these backup power circuits.

→ Note that the following descriptions indicate which connection option they are valid for.

INFO

Adding the backup power function to the storage system allows the system, once installed, to be able to operate both with backup power and in an isolated network. These are functionalities that must be specified when a storage system is re-registered with a DNO.

- Check whether the storage system data needs to be changed with the DNO or whether the system needs to be re-registered.

8.1 Overload detection during backup operation

- If the sonnen Eclipse pulses orange and the LEDs on the connection box light up orange, this means that the electrical loads connected to the backup power function are causing excessive power consumption.
- Backup power operation is stopped when an overload is detected until there is no more overload and the backup power button has been pressed for approx. 2 seconds.

When sonnen Eclipse and LEDs light up orange:

- Switch off electrical consumers or do not connect any electrical consumers if their power consumption exceeds the nominal power or (when switching on) the maximum power of the backup power operation.
- Press and hold the backup power button (LEDs blink green) until backup power operation starts (LEDs light up green).
- ⇒ Backup power operation has started successfully when the sonnen Eclipse pulses green and the LEDs of the connection box light up green.

INFO

In certain situations, it may take up to three minutes for backup power operation to start after the backup power button is pressed.

8.2 Connecting the backup power function

DANGER

Electrical work on the storage system and distribution board

Danger to life due to electrocution!

- Ensure that the DC disconnect switches for the connection box (DC Switch) and the inverter (PV Switch) are turned off (switch position: OFF).
- 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 authorised electricians are permitted to carry out electrical work.

WARNING

Required earthing for backup power function

If the house connection is not separately earthed, a deep earth electrode must be installed.

INFO

The storage system's inverter is equipped with a built-in Type B residual current monitoring unit (RCU). If local regulations require an external residual current device (RCD), you must verify which type is required. Use a Type A RCD with a rated current of at least 100 mA. The use of a Type B RCD is also permitted.

Recommended order for the electrical installation

- Carry out the steps in the following order to ensure a smooth electrical installation. Note that there are different procedures depending on the connection option used.
- 1. **For connection option 1:** Note section consumers in backup power operation [P. 69] before starting the installation.
- 2. **For connection option 2:** If required, separate consumer loads into essential and non-essential circuits to ensure sufficient power supply in backup operation.
- 3. Carry out the necessary modifications to the building's electrical distribution system. Ensure that all electrical wiring complies with local and national wiring standards and is adequately protected.
- 4. If the backup circuit or circuits are installed accordingly, the backup power function can be connected to the storage system (see the following sections).

8.2.1 Electrical consumers in backup power operation

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

- Backup power operation does not provide the same output as grid operation.
- Electrical consumers can sometimes not be operated in backup operation (e.g. due to high switch-on currents).
- **How much capacity of the storage system should be reserved as 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 into account (see Setting the backup buffer [P. 73]).

- If connection option 2 is used, not all electrical consumers are supplied with power in backup operation.

8.2.2 Implementing the backup power circuit(s)

i INFO

This section refers to the installation of backup circuits for **connection option 2**.

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 labelled 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 distribution board 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?
2. Can the distribution board 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 distribution board?

8.2.3 Wiring the backup power function

→ Install the backup power components (contactor with auxiliary contact) included in the accessory kit in the distribution board.

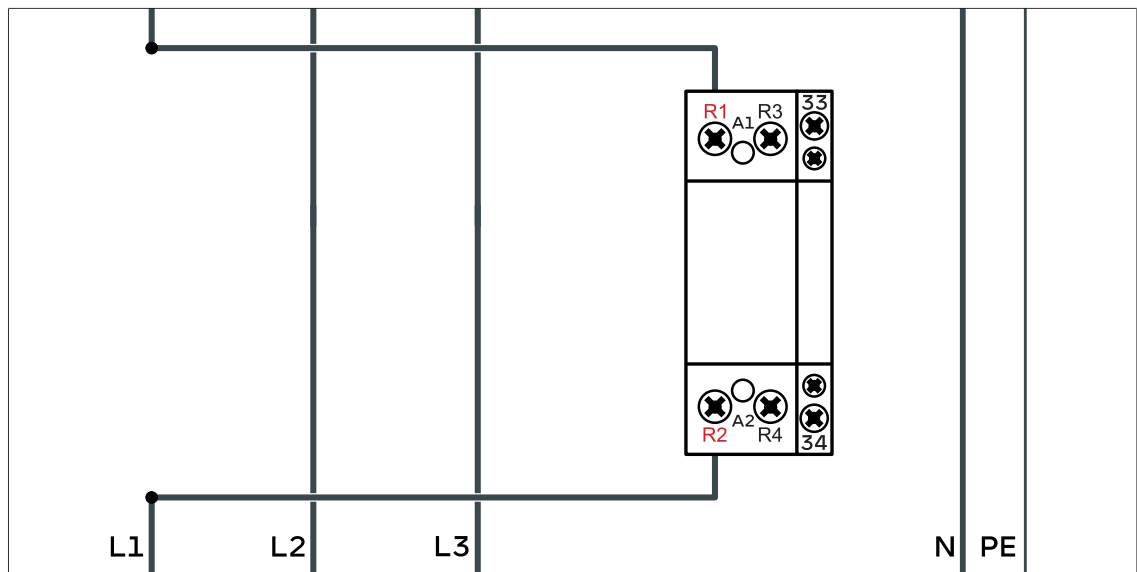


Illustration 43: Electrical Connection of the backup power contactor

→ Connect the contactor to the home's electrical distribution system according to the connection method shown in the overview schematics in the Electrical connection overview [P. 39] chapter.

NOTICE! The neutral conductor must not be disconnected in Australia.

- The schematic diagrams show the installation of the storage system with a backup power function and in a **single-phase house network**.
- The gray areas indicate the backup power function (installation).

8.2.4 Connecting the control line of the backup power function

The control line from the backup power components is connected to the storage system via the Multicom INV connector on the inverter.

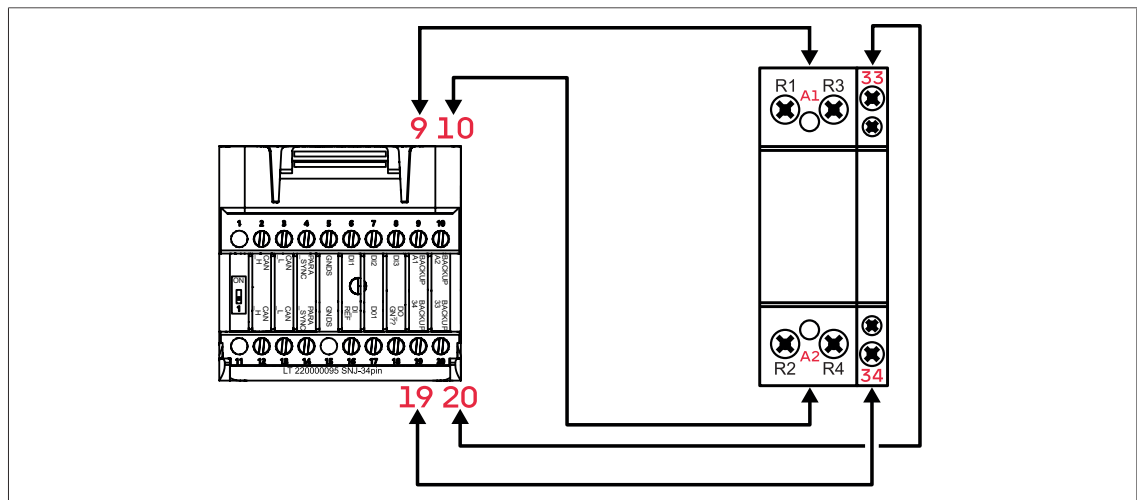


Illustration 44: Connection between backup power components and the COM connector

→ Select the line according to the specifications:

- Cable type: Multi-strand (min. 4), fine-strand cable
- Conductor cross-sectional area per strand: max. 1.5 mm²
- Outer diameter: 4.5 - 6.5 mm
- Length: max. 30 m

→ Connect a suitable line to the backup power components (contactor and auxiliary contact) in the distribution board.

→ Open the COM connector and insert the other end of the line.

→ Insert the individual wires of the cable into the corresponding connectors (pins 9, 19, and 10, 20). Tighten the wires with a torque of **0.5 Nm**.

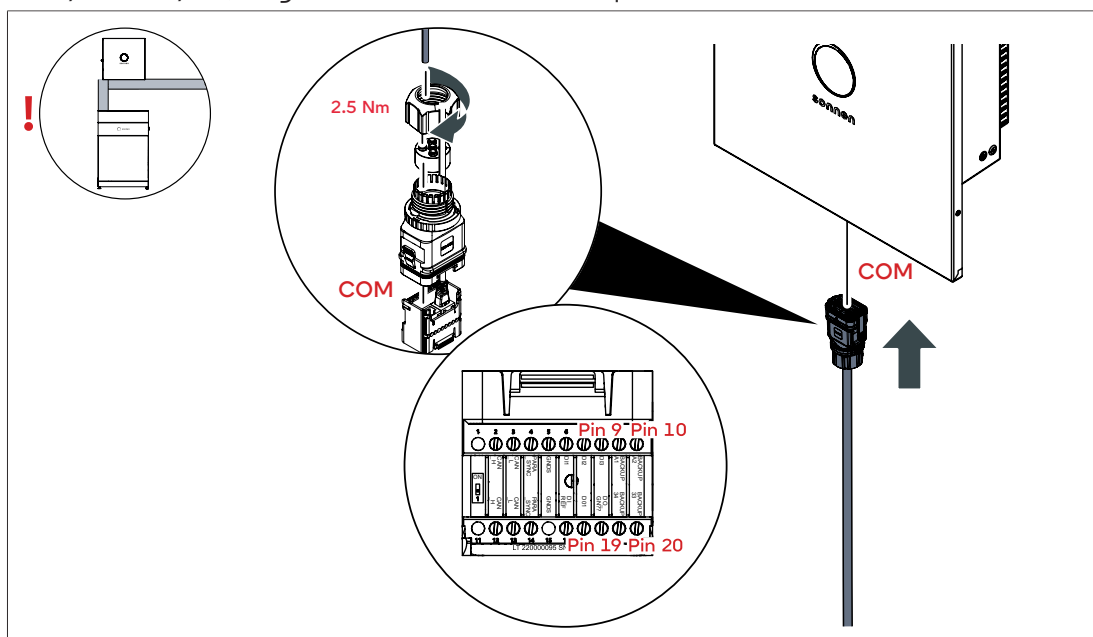


Illustration 45: Connecting the control line for the backup power function

- Arrange the wires neatly without overlapping or crossing them.
- Insert the cable into the rubber gasket and slide it into the connector's main housing.
- Insert the connector into the connector housing (until you hear a "click") and seal the unused openings in the rubber gasket with the sealing plugs
- Tighten the screw sleeve to a torque of **2.5 Nm**.
- Connect the prepared connector to the inverter (**COM**).

i INFO

The Multicom INV connector is also used for the communication line [P. 62]!

8.3 Commissioning the storage system with backup power function

- The backup power function is activated as soon as the storage system has been properly commissioned (see First-time commissioning [P. 77]) and switched on (see Switching on [P. 81]).

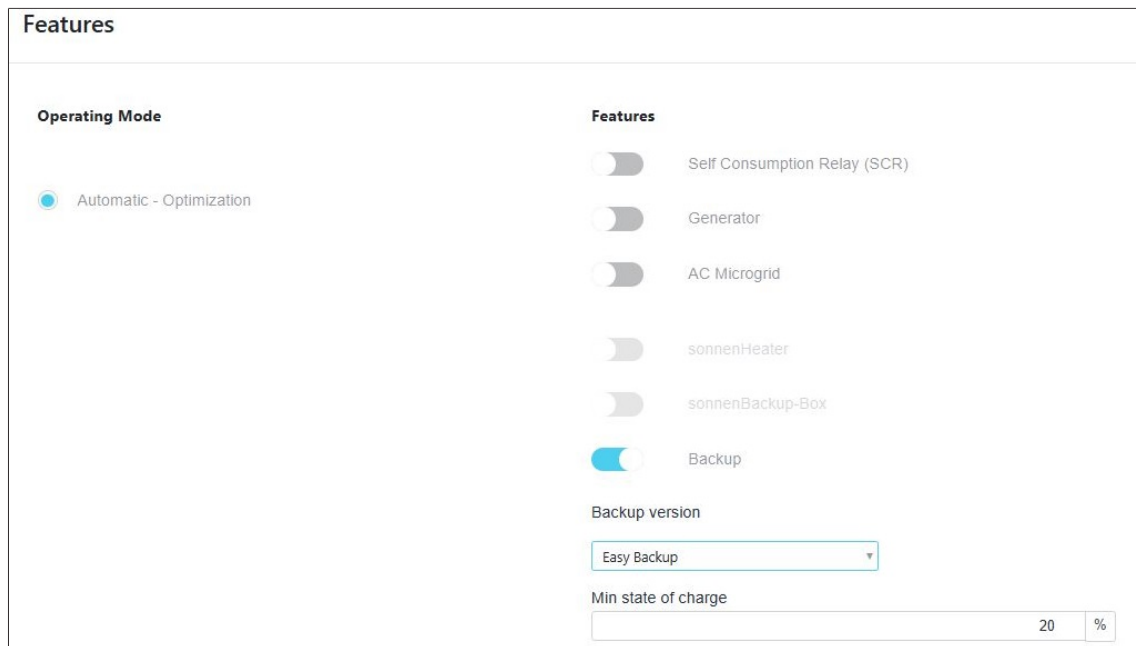


Illustration 46: Activating the Easy Backup feature

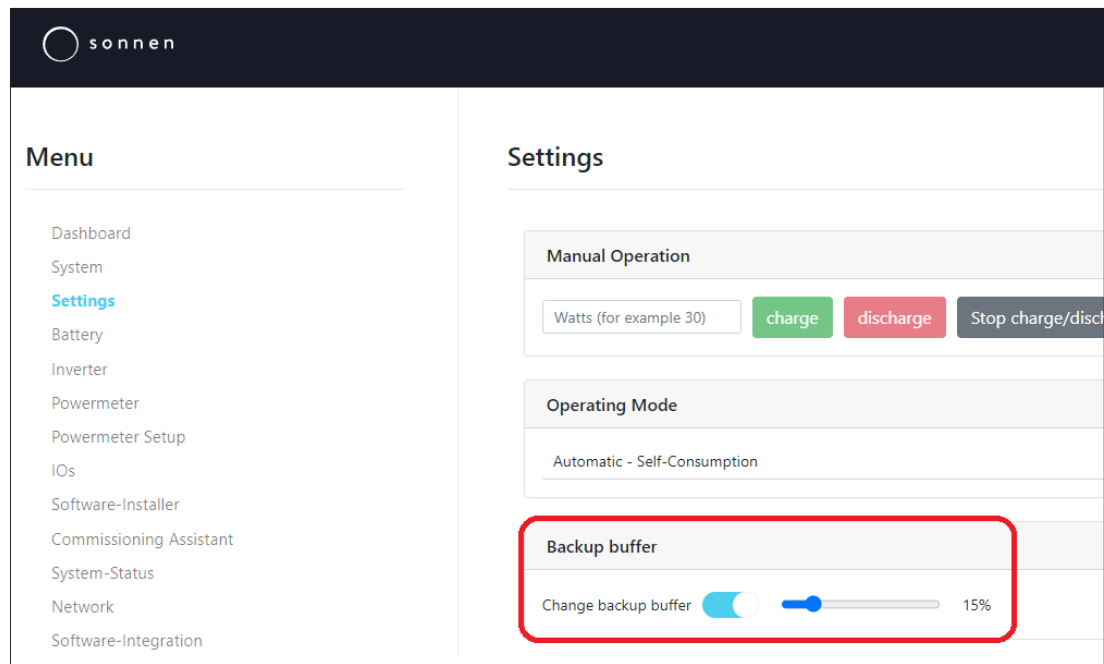
- Enable the Easy Backup backup power function at the respective point during the CA [P. 77]. The backup buffer can also be set there.

8.3.1 Setting the backup buffer

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

The backup buffer can also be adjusted in the sonnen App and the partner portal.

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



8.3.2 Testing backup/standalone operation

i INFO

Backup operation cannot be tested if the storage system performs a full charge after initial commissioning. The full charge can be stopped to perform the test and postponed to a later time (on the Dashboard page of the storage system web interface).

1. Simulate a grid outage

→ Switch the main fuses in the building off, so that the storage system is no longer connected to the electricity grid. Once turned off, the storage system switches to backup power operation.

2. Activate a consumer

→ Activate an electrical consumer connected to the phase in the house (for connection option 1) or to the backup power circuit (for connection option 2).

4. Test the backup power supply

Backup power/standalone operation is working properly when the activated consumers are supplied with electrical power.

If the backup power operation does not work:

1. Check the electrical wiring (see Connecting the backup power function [P. 69]).
2. Check if there is a malfunction which is mentioned in the Troubleshooting [P. 88] section and follow the suggestions for rectification.
3. Contact the sonnen service team if the problem cannot be resolved.

8.4 Decommissioning the storage system with backup power function

The backup power function is switched off together with the storage system (see Switching the storage system off to electrically isolate it [P. 83]).

8.5 Standalone grid/standalone operation

In the event of a grid failure, the **storage system with backup power function** forms a so-called standalone power system together with the PV system.

In standalone operation, electrical energy can be generated off-grid by the sonnenInverter, stored in the battery modules of the storage system and made available to the building. Charging and discharging takes place according to the demand of the connected electrical consumers.

When the maximum charge level of the batteries is reached or consumption is low, the generation of the PV modules is reduced accordingly.

Automatic stop and start of standalone operation

The storage system continues to provide electrical power to the consumers until a minimum battery charging status is reached and there is no (or no sufficient) PV generation. From this point on, no further discharging is possible, backup power operation stops fully and the storage system switches off completely.

When there is sufficient PV generation again (the next day, when the sun is shining), the storage system starts automatically and charges the batteries to a state of charge of 1%. Backup power operation then restarts automatically (so-called black start). To enable island operation to be resumed as early as possible, the electrical consumption in the house should be as low as possible. Therefore:

→ Do not switch on any electrical consumers with high power consumption (e.g. heating, lighting, pumps, compressors).

Manual start/stop of standalone operation ('Black start from battery')

Manual control of standalone operation is not normally necessary or recommended. However, if the storage system is switched off due to incorrect operation or a malfunction, standalone operation can be started manually using the backup power button.

The same principle can be used to switch off the storage system and thus the standalone operation via the backup power button during backup power operation. Only in rare cases does it make sense to save battery capacity for a later time.

→ Press the ON/OFF button on the operating panel of the storage system to switch the storage system on.

→ Press and hold the backup power button (sonnen Eclipse blinks green) until the backup power operation starts (sonnen Eclipse pulses green).

If standalone operation cannot be started using the backup power button, the minimum battery charging status of the batteries has been reached and the storage system cannot start again until sufficient PV generation is available.

9 Completing Installation and Commissioning

i INFO

The storage system is intended exclusively for use within the local customer network. It must not be made accessible from the public Internet under any circumstances. Improper configuration or exposure to the internet may result in significant security risks, including unauthorized access, data loss, or system compromise.

9.1 Attaching labels

- Attach the two “Shutdown Procedure” labels from the accessory kit. Place one near the storage system and one in the distribution board.
- Attach the “SONNEN METER” label from the accessory kit to the power meter.

9.2 Switching the storage system on (initial start-up)

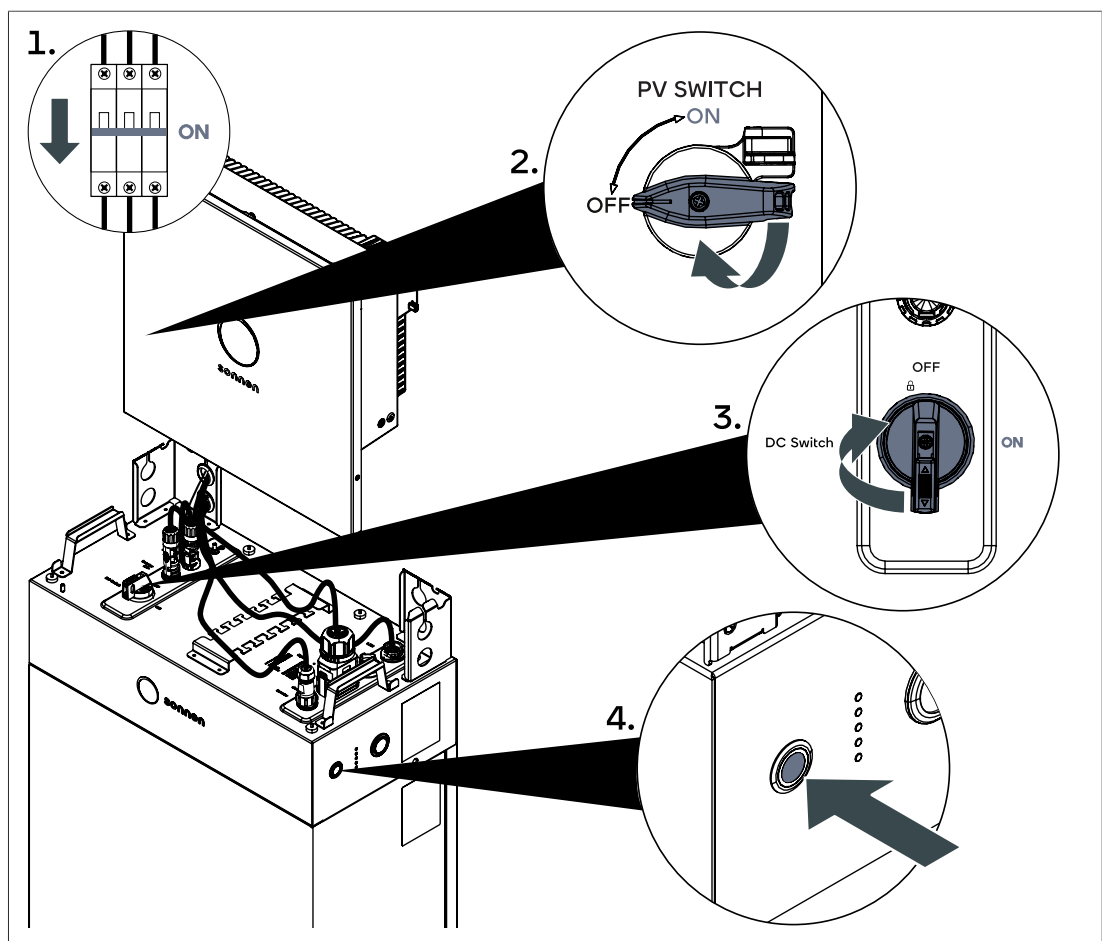


Illustration 47: Steps to switch on the storage system

1. Switch on the grid voltage using the miniature circuit breaker for the mains line.
2. Turn on the DC disconnection switch on the inverter (switch position: **ON**).
3. Turn on the DC disconnector switch (**DC Switch**) on the connection box (switch position: **ON**). To unlock it, slide the lever on the switch downward.
4. Press the ON/OFF button on the connection box. The button clicks into place and lights up.

9.3 Carrying out first-time commissioning

First-time commissioning must be carried out when the storage system has been installed, set up and connected for the first time.

9.3.1 Commissioning assistant

i INFO

The storage system is only ready for operation if the commissioning assistant is fully completed.

The storage system is set up using the commissioning assistant. During this process, the following data is collected and settings are configured:

- Check the installed software version and update if necessary.
- Record the operator's customer information.
- Configure the notifications.
- Select the country code for the inverter.
- Provide details on the PV system.
- Select the power measurement concept and configure power measurement.
- Select and configure Features (use of digital inputs and outputs, activation of backup power function, etc.).
- Perform a system test.
- Confirmation of the information by the installing electrician and the operator. Subsequent sending of a confirmation to the operator by e-mail.

Connect to the storage system

Conditions:

- ✓ The storage system has been fully installed.
 - ✓ The storage system is switched on.
- Connect your laptop to the home network router that is also connected to the storage system.

Run the Commissioning Assistant

→ Go to the website: <https://find-my.sonnen-batterie.com>

The following window appears:



Illustration 48: find-my.sonnen-batterie.com starting page

→ Select the storage system you want to put into operation and click the Configure Assistant button. (If the storage system is not displayed, see Troubleshooting [P. 88].)

- Log in as an installer. To do this, use the initial password found on the connection box's type plate when logging in for the first time.
- Then assign a unique password for the storage system and make a note of it.

i INFO

You can change the password yourself: On the web interface, click “User Account” in the top-right corner and select “Change Password.”

To reset your password, please contact the sonnen service team.

- Launch the commissioning assistant and run it all the way through.

9.4 Filling in the type plates

i INFO

Only industrial markers that are resistant to abrasion, solvents (e.g., alcohol), and UV light, and that are suitable for permanent marking on type plates, may be used for labeling (e.g., Markal PRO-LINE HP, Edding 780, or equivalent).



sonnen GmbH
Am Riedbach 1
87499 WILDPOLDSRIED





9514-0627-0FS000
Item number:4004239
Item revision:00

sonnenBatterie 12
Serial number: #####
Item number / batch: #####
Initial password: #####
Ambient temperature: -20 ... 55 °C
Degree of protection: IP65
Protection class: I
DC ratings - battery
Max. continuous current: 60 A
Cell technology: rechargeable lithium ion
Rated capacity: 100 Ah

Model name	sB12_1	sB12_2	sB12_3	sB12_4	sB12_5
max. power (kW)	6.3	12.6	18.9	25.2	31.5
usable energy (kWh)	9.4	18.8	28.2	37.6	47.0
battery designation	*1S	*2S	*3S	*4S	*5S
max. nominal voltage (V)	108	216	324	432	540
nominal voltage (V)	96	192	288	384	480

Notice
Please also refer to sonnenInverter and sonnenModule nameplates.
Max. capacity possible based on connected inverter

Welcome to sonnen



Power configuration (When no model is selected, the default is 3.0 kW)

Model name	 sl 6-1-2 3.0 kW	 sl 6-1-2 3.6 kW	 sl 6-1-2 4.6 kW	 sl 6-1-2 5.0 kW	 sl 6-1-2 6.0 kW
AC Output Max. Current:(A)	15.0	18.0	21.0	25.0	28.7
AC Output Rated Power:(kW)	3.0	3.6	4.6	5.0	6.0
AC Output Rated Current:(A)	13.0	15.7	20.0	21.7	26.1
AC Output Rated Apparent Power:(kVA)	3.0	3.6	4.6	5.0	6.0
AC Output Max. Apparent Power:(kVA)	3.3	3.96	4.6	5.5	6.6
AC Input Max. Current:(A)	13.6	16.4	20.9	22.7	27.3
Off Grid Rated Output Power:(kW)	3.0	3.6	4.6	5.0	6.0





Illustration 49: Fields to be checked on the type plates of the connection box (left) and the inverter (right)

The storage capacity and the full product name depend on the number of battery modules installed: sB12_1, sB12_2, sB12_3, etc.

- Check the installed product variant (“Model name”) on the connection box's type plate.

 sonnen

78 / 97

960 | EN | 00

The power rating is selected during the commissioning assistant.

→ Check the power rating (“Power configuration”) option on the inverter’s type plate.

9.5 Closing the connection box

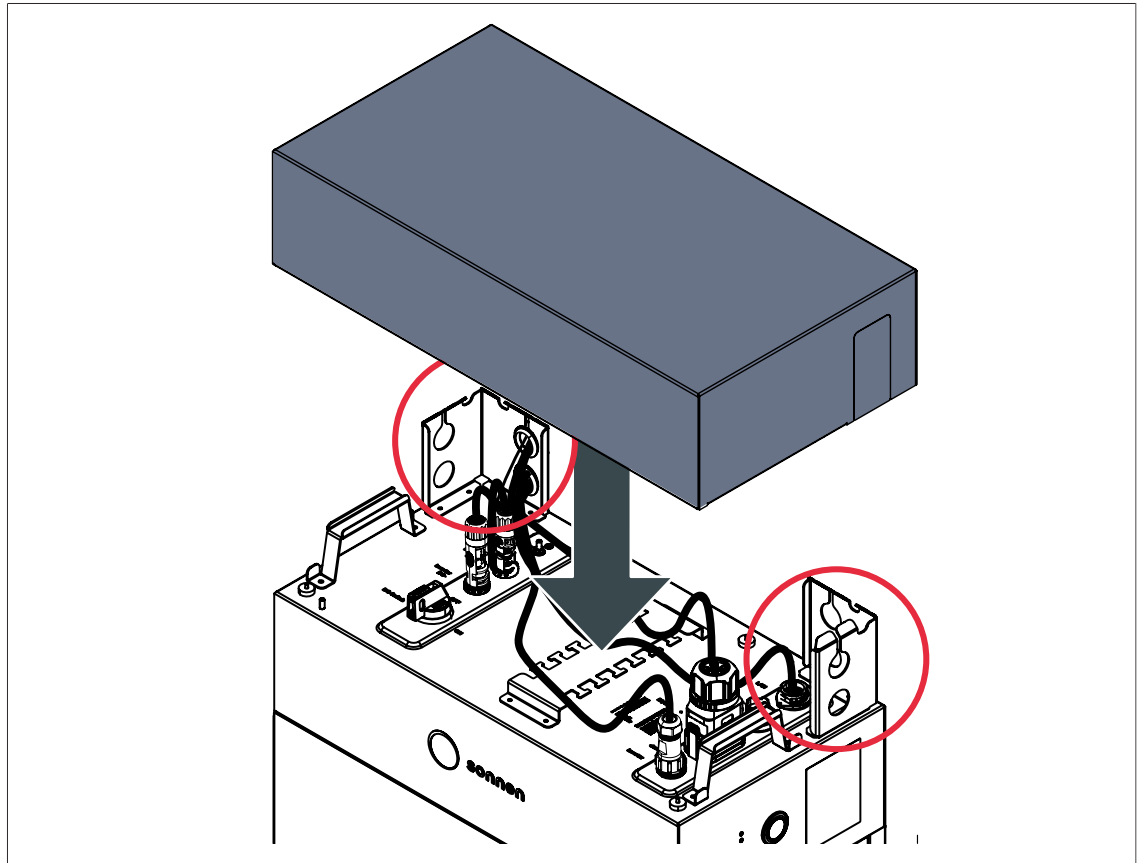


Illustration 50: Possible cable entries on the connection box

→ Cover the unused cable entries on the connection box with the cover plates pre-mounted on the cover.

→ The battery module handles and the PV mounting wrench can be placed on the connection box under the cover for future installation or service work. No objects or tools unrelated to the installation may remain on the connection box.

→ Place the cover on the connection box.

9.6 Checking the installation

→ Use the following list to verify that the installation has been performed and completed correctly.

Earthing

- All earthing lines (inverter, connection box) are properly installed and connected.

Routing of the lines

- All cables routed into the connection box are fed through cable glands.
- All unused connections on the connection box are sealed with the appropriate plug.
- All connections on the inverter are properly connected.

Electrical connections

- The mains line is properly connected, and the necessary safety devices are installed.
- The battery lines and communication lines for the battery modules are correctly connected.

- The connection to the power meter and the internet connection are properly established.

Type plates

- The required information is marked with a check mark on the type plates.

Connection box

- No objects or tools unrelated to the installation should be left under the cover of the connection box. The battery module handles and the PV installation wrench can be stored on the connection box.

Backup power function (if installed)

- All lines are fully and properly connected.
- A circuit breaker (max. 63 A) is installed in the mains line.
- The electrical wiring meets the requirements of all local and national guidelines for wiring sizing.
- The additional ground connection between the storage system and the main grounding busbar has a cross-sectional area of 10 mm² (copper cross-section or equivalent).
- Backup power operation was successfully tested [P. 74].

Table 4: Installation Checklist

10 Switching on the storage system

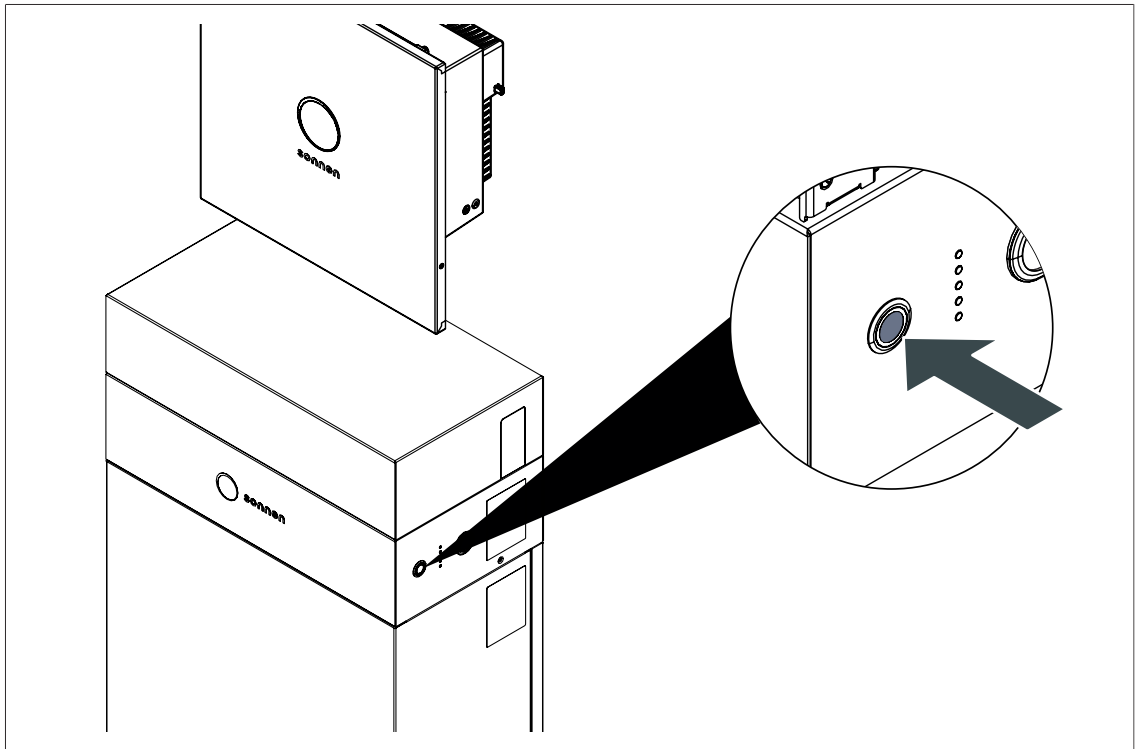


Illustration 51: Switching on the storage system

1. Press the ON/OFF button on the connection box. The button clicks into place and lights up.

The storage system then starts and runs a self-test. Once the self-test is successful, the storage system is ready to operate.

When the storage system is in normal operation, the sonnen Eclipse pulses blue, and the LEDs on the connection box light up blue to indicate the current charge level. All operating states and indicators are described in the section Function of the sonnen Eclipse and Status LEDs [P. 20].

11 Decommissioning

11.1 Switching the storage system off

NOTICE

Deep-discharge of the battery modules

Destruction of the battery modules!

- Do not disconnect the storage system from the electricity grid for long periods of time (see Storing the battery modules [P. 14]).
- Never continue to operate battery modules which have been deep-discharged.

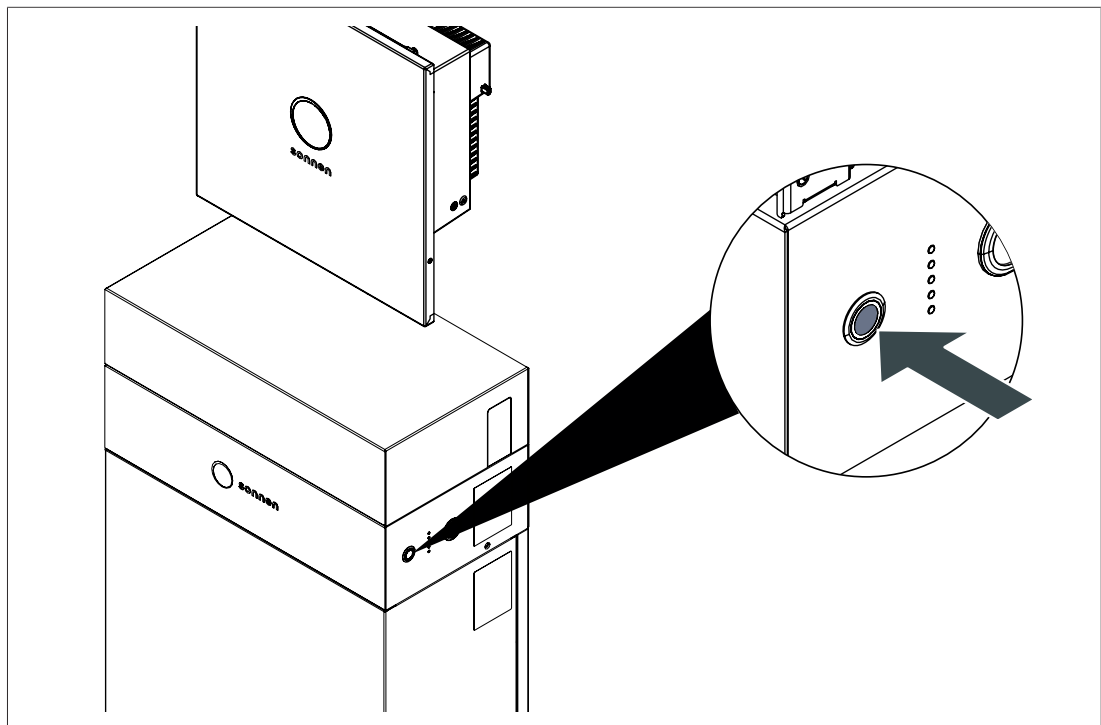


Illustration 52: Switching off the storage system

1. Press the ON/OFF button on the connection box. The sonnen Eclipse, the LEDs on the connection box, and the LED on the ON/OFF button will turn off.

DANGER! There is still live voltage inside the storage system. The storage system must be completely switched off to be electrically isolated before performing any work!

11.2 Switching the storage system off to electrically isolate it

⚠ DANGER

DC voltage after switching off

Danger to life due to electric shock!

The DC connection is still live up to 5 minutes after the DC disconnect switch has been switched off.

→ Wait 5 minutes after switching off the DC disconnect switch and the storage system.

NOTICE

Deep-discharge of the battery modules

Destruction of the battery modules!

→ Do not disconnect the storage system from the electricity grid for long periods of time (see Storing the battery modules [P. 14]).

→ Never continue to operate battery modules which have been deep-discharged.

Before performing **any work on the storage system**, it must be completely switched off to be electrically isolated:

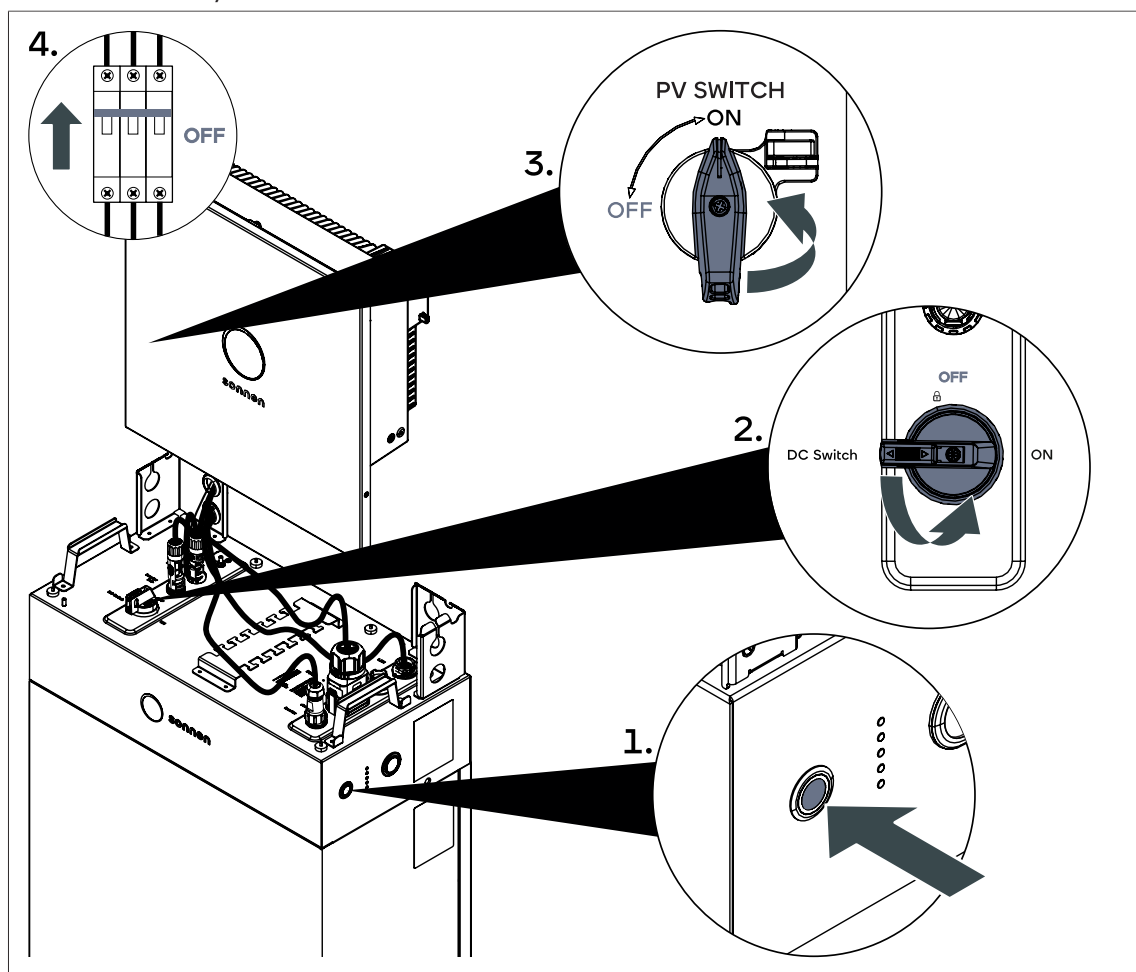


Illustration 53: Steps to switch off the storage system

1. Press the ON/OFF button on the connection box. The sonnen Eclipse, the LEDs on the connection box, and the LED on the ON/OFF button will turn off.

2. Turn off the DC disconnect switch (**DC Switch**) on the connection box (switch position: **OFF**). To lock it, turn the switch past the OFF position and use the slide on the switch to lock it in place at the lock symbol.
 3. Turn off the DC disconnect switch on the inverter (switch position: **OFF**).
 4. Switch off the miniature circuit breaker for the mains line. The grid voltage is disconnected.
- Secure the switching elements in the distribution board to prevent them from being switched back on.
- Wait at least 5 minutes until the internal energy storage devices in the inverter have discharged and the DC connection is de-energised.

DANGER! The PV generators and lines, as well as the DC cables connected to the inverter, may still be live when exposed to sunlight.

12 Uninstallation and Disposal

12.1 Uninstallation

⚠ DANGER

Improper uninstallation

Danger to life due to electrocution!

→ The storage system (battery stack and sonnenInverter) must only be uninstalled by authorised electricians.

Uninstalling the inverter

⚠ DANGER

DC voltage after switching off

Danger to life due to electric shock!

The DC connection is still live up to 5 minutes after the DC disconnect switch has been switched off.

→ Wait 5 minutes after switching off the DC disconnect switch and the storage system.

⚠ DANGER

Dangerous DC voltage in the inverter and at the DC connections when the DC disconnect switch is not turned off and immediately after it is turned off

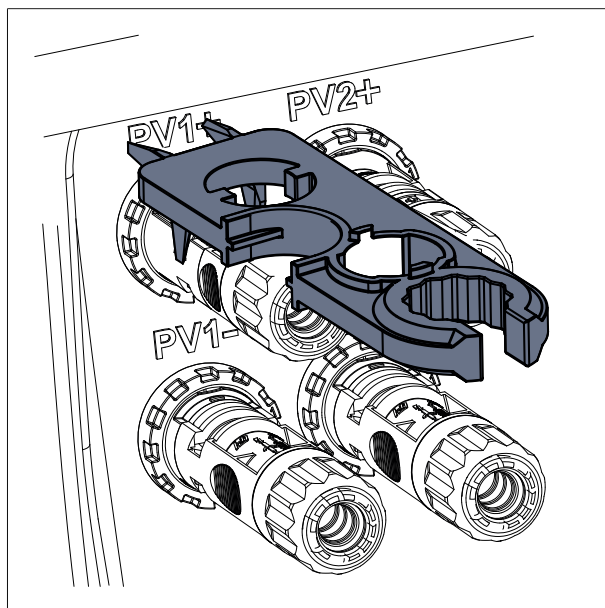
Risk of death from electric shock!

→ Ensure that the DC disconnect switch on the inverter is in the OFF position before removing DC connectors.

→ Wait at least 5 minutes after switching off the DC disconnect switch and the storage system.

Follow these steps to remove the inverter:

→ Disconnect all cables connected to the inverter.



→ Use the installation wrench included with the inverter to disconnect the PV connectors.

- To do this, insert the wrench into the latch in the position shown in the diagram and pull the connector out.
- Remove the inverter from the wall bracket.
- Remove the wall bracket.

12.2 Disposal

⚠ CAUTION

Improper transport of battery modules

Fire outbreak at battery modules or emission of toxic substances!

- Only transport battery modules in packaging that meets applicable regulations.
- Only transport damaged battery modules in accordance with the applicable regulations.

⚠ CAUTION

Improper disposal of battery modules

Explosion or fire outbreak at battery modules or emission of toxic substances!

- Do not dispose of batteries in fire.

The storage system, the batteries it contains and the inverter **must not** be disposed of as domestic waste!

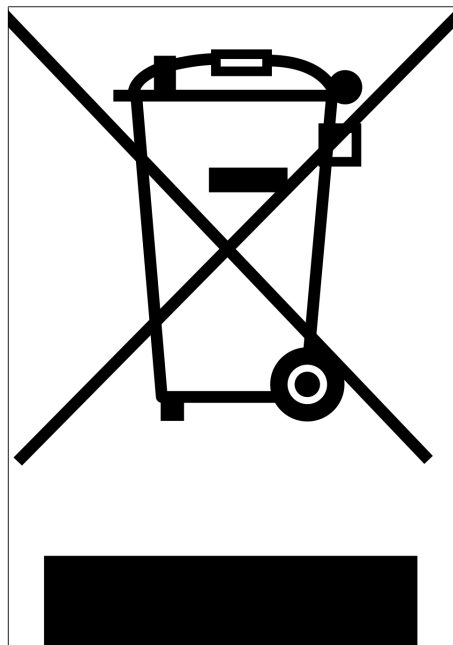


Illustration 54: WEEE symbol

→ Dispose of the storage system, the batteries it contains and the inverter in accordance with the disposal regulations for electrical waste applicable at the installation site.

→ Contact sonnen GmbH to dispose of old batteries.

13 Troubleshooting

13.1 sonnenBatterie 12 (without backup power function)

Fault	Possible cause(s)	Solution
sonnen Eclipse pulses blue. Status LEDs light up blue.	The storage system is in normal operation.	No troubleshooting necessary.
sonnen Eclipse lights up blue/orange.	Software or component firmware is being updated.	No troubleshooting necessary.
sonnen Eclipse rotates blue and orange.	A full charge or maintenance charge is performed.	No troubleshooting necessary.
sonnen Eclipse pulses continuously green or pulses green and turns off after about 5 minutes.	The storage system is not connected to the electricity grid.	→ Check that the circuit breaker in the supply line of the storage system is switched on. If so: The electricity grid does not provide any electrical energy (grid outage). → Wait until the electricity grid resumes supplying power. The storage system will then resume normal operation.
sonnen Eclipse pulses orange. Status LEDs light up orange.	The internet connection to the storage system has been interrupted.	→ Check whether the home network router is able to establish an internet connection. If so: → Ensure that the network line for the storage system is connected to the home network router.
sonnen Eclipse pulses red. Status LEDs light up red.	The storage system has detected a problem with the connected power meter.	→ Check the connection and settings of the power meter.
sonnen Eclipse lights up red. Status LEDs light up red.	The storage system has detected a problem that is preventing normal operation or may cause damage to the storage system.	→ Check the connection of the storage system and the battery modules in line with the installation instructions. → Check that the ambient conditions at the installation site are met. If none of the specified errors apply: → Contact the sonnen service team to get help resolving the problem.
No online connection to the storage system.	No connection between the storage system and the server.	→ Make sure that the Ethernet line between the storage system and the router of the home network is correctly connected. → Make sure that the TCP or UDP ports of the following services are enabled for outgoing connections in the router:

TCP ports: 443 (https)
UDP ports: 123 (NTP); 1194,
 1196 (VPN); 5353 (zeroconf)

13.2 sonnenBatterie 12 with backup power function (Easy Backup)

Fault	Possible cause(s)	Solution
Grid operation (no grid outage)		
The electrical consumers are not supplied with energy in grid operation.	The lines have not been correctly connected.	→ Check the electrical wiring.
	The MCB in the supply line to the storage system is switched off.	→ Switch on the MCB.
	Another circuit breaker is switched off.	→ Switch on all circuit breakers.
	A circuit breaker has tripped.	→ Check the electrical wiring and the connected electrical consumers for faults. → Switch on the affected circuit breaker once any faults are corrected.
	Problem in the storage system.	→ Contact the sonnen service team to get help resolving the problem.
Backup power operation (grid outage) – backup power operation does not start		
Backup power operation does not start. sonnen Eclipse pulses green and switches off after several minutes.	No backup buffer is set. 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.	When the grid outage is over and the electricity grid once again begins supplying electrical energy, the storage system automatically switches to grid operation.
	At the same time the PV system produces no or insufficient electrical energy to start the backup operation.	→ If the PV system produces sufficient electrical energy at one of the defined reenabling times and the grid outage continues, the backup operation starts again.
	The storage system is switched off.	→ Switch on the storage system.
Backup power operation does not start. sonnen Eclipse pulses green .	A circuit breaker is switched off.	→ Switch on all circuit breakers.
	A circuit breaker has tripped.	→ Check the electrical wiring and the connected electrical consumers for faults. → Switch on the affected circuit breaker once any faults are corrected.
Backup power operation does not start. sonnen Eclipse pulses orange .	Electrical consumers with too high of a power consumption are connected to the circuit.	→ Switch off electrical consumers or reduce their power consumption.
		→ Press the backup power button until all Status LEDs light up green. Backup power operation restarts.

Fault	Possible cause(s)	Solution
		→ Only connect electrical consumers to the backup power circuit when they have a power consumption that does not exceed the maximum power (see Technical Data [P. 92]).
Backup power operation does not start. sonnen Eclipse does not light up .	Problem in the inverter or control unit of the storage system.	→ Contact the sonnen service team to get help resolving the problem.
Backup power operation (grid outage) - backup power operation stops		
Backup power operation stops. The miniature circuit breaker (MCB) in the supply line and the circuit breakers in the circuit have not tripped. sonnen Eclipse pulses green and switches off after several minutes.	The backup buffer of the storage system batteries is depleted. The batteries have discharged so much that further discharging would lead to a deep discharge state and therefore damage the batteries At the same time the PV production of the PV system has stopped or has decreased to such an extent that there is not enough electrical energy available for backup power operation.	When the grid outage is over and the electricity grid once again begins supplying electrical energy, the storage system automatically switches to grid operation. → If the PV system produces sufficient electrical energy at one of the defined reenabling times and the grid outage continues, the backup operation starts again.
Backup power operation stops. sonnen Eclipse pulses green . Status LEDs light up green .	The circuit breaker in the mains line or a circuit breaker in the circuit has tripped.	→ Check the electrical wiring and the connected electrical consumers for faults. → Switch on the circuit breaker once any faults are corrected.
Backup power operation stops. The miniature circuit breaker (MCB) in the supply line and the circuit breakers in the backup power circuit have not tripped. sonnen Eclipse pulses orange . Status LEDs light up orange .	Electrical consumers with too high power consumption are connected to the backup power circuit.	→ Switch off electrical consumers in the backup power circuit or reduce their power consumption. → Press the backup power button until all Status LEDs light up green. Backup power operation restarts. → Only connect electrical consumers to the backup power circuit when they have a power consumption that does not exceed the maximum power (see Technical Data [P. 92]).

14 Maintenance

Regular functional checks and cleaning of the storage system are essential for trouble-free operation, operational safety, reliability, and longevity.

- No maintenance of the storage system or the inverter is required, except for cleaning the exterior.
- No maintenance of the battery modules is required

14.1 Checking function

Maintenance interval	Action to be taken
Every 2 weeks	→ Check whether there is a fault with the storage system.
Every 6 months	→ Check for changes to the charging status. If functioning properly, the storage system should be charged to 100 % on a sunny day and the charging status should drop significantly overnight.
Following severe weather events (earthquakes, heavy rain, hail, storms, heavy snowfall, drought, dusty areas, etc.)	→ Check the storage system for external damage. → Check whether the storage system is malfunctioning. → Contact the sonnen service team if there is damage or a malfunction, or if it is unclear whether the storage system is damaged.

Table 5: Checking function

14.2 Cleaning

NOTICE

Damage due to improper cleaning

Material damage because of scratched surfaces and/or damage caused by penetration of water!

- Do not use scouring cloths or sponges.
- Do not use harsh or abrasive cleaning agents.
- Do not clean wet, only damp.
- Do not use water jets.

→ If necessary, clean the outside of the storage system and the inverter with a soft, damp cloth. For stubborn dirt, a small amount of commercially available dishwashing detergent can be applied to the damp cloth.

→ If necessary, use a vacuum cleaner to remove dust in the cooling fins of the inverter.

15 sonnenBatterie 12 technical data

Battery stack	sB12_1	sB12_2	sB12_3
Cell technology	lithium iron phosphate (LiFePO4)		
Number of battery modules	1	2	3
Nominal voltage	96 V	192 V	288 V
Nominal capacity	9.6 kWh	19.2 kWh	28.8 kWh
Usable capacity	9.4 kWh	18.8 kWh	28.2 kWh
Maximum charge/discharge current	60 A	60 A	60 A
Current (Max. continuous)		100 A	
Short-circuit current (I _{sc})		4 kA	
Max. battery efficiency		95 %	
Thermal Management	Natural convection		
Installation Method	Floor-standing with wall support		
Protection			
Protection class	I / PE conductor		
Degree of Protection	IP65		
Overvoltage category	II		
Rated short-withstand current	200 A for < 10 s		
Compliance with Regulations and Standards	EMC 2014/30/EU, LVD 2014/35/EU, RoHS 2011/65/EU, REACH 1907/2006/EC, WEEE 2012/19/EU, BATR 2023/1542/EU, EN IEC 62477-1, IEC 62040-1, IEC 62619, IEC 60730-1, EN IEC 61000-6-1, EN IEC 61000-6-3, AS 62040.1, AS 62477.1, SA TS 5398, UN 38.3, UN 3480		
Origin	Designed and engineered in Germany		
Country of Manufacture	China		
Dimensions (H/W/D) and Weight			
Dimensions of battery stack	88/56/29 cm	139/56/29 cm	190/56/29 cm
Weight of battery module	~ 87 kg		
Weight of connection box	~ 15 kg		
Weight of base	~ 5.5 kg		
Environment			
Environment	Outdoor/Indoor		
Operating temperature range	-20 °C ... 55 °C ⁸		
Storage temperature range	-25 °C ... 60 °C		
Transport temperature range	-25 °C ... 60 °C		
Max. rel. humidity	95 %, non-condensing		
Permissible installation altitude	3,000 m above sea level		
Pollution degree	3		
Noise emission	< 15 dB (A)		

⁸ Temperature-dependent power reduction is possible. Optimal temperature range: 15-30 °C

sonnenInverter 6-1-2**DC Input (PV)**

Maximum recommended PV power	12,000 Wp
Max. input voltage	550 V
Initial input voltage	90 V
MPP voltage range	70 V ... 540 V
Number of MPPTs / Input per MPPT	2 / 1
Max. input current per MPPT	16 A
Short-circuit current (I_{sc}) per MPPT	20 A
Backfeed current to array	20 A

DC Output (Battery)

Battery voltage range	80 - 480 V
Maximum charge/discharge current	45 A

AC Output (Grid)⁹

	3.0 kW	3.6 kW	4.6 kW	5.0 kW	6.0 kW
Nominal power ¹⁰	3,000 W	3,600 W	4,600 W	5,000 W	6,000 W
Apparent power	3,000 VA	3,600 VA	4,600 VA	5,000 VA	6,000 VA
Nominal current	13 A	15.7 A	20 A	21.7 A	26.1 A
Max. continuous current	15 A	18 A	21 A	25 A	28.7 A
Mains connection	single-phase (L/N/PE) 230 V 50 Hz				
Max. output fault current	300 mA				
Inrush current	< Nominal current				
Max. ext. overcurrent protection	32 A				
Grid forms	TN / TT				
Mains connection fuse	Miniature circuit breaker (MCB) Type B max. 32 A ¹¹				
Power factor	> 0.99 @ Rated power (Adjustable from 0.8 LD to 0.8 LG)				
Max. THDi	< 3 % (Nominal power)				

AC Output (Backup)

	3.0 kW	3.6 kW	4.6 kW	5.0 kW	6.0 kW
Nominal power ¹²	3,000 W	3,600 W	4,600 W*	5,000 W*	6,000 W*
Overload (1 min)	3,600 VA	4,320 VA*	5,520 VA*	6,000 VA*	7,200 VA*
Overload (15 s)	4,350 VA*	5,220 VA*	6,670 VA*	7,250 VA*	8,700 VA**

* 3,950 W/VA with 1 battery module.

* 3,950 VA with 1 battery module, 7,900 with 2 battery modules.

Power factor	> 0.99 @ Rated power (Adjustable from 0.8 LD to 0.8 LG)
Max. THDi	< 5 % (Rated power)
Inverter Method of active Anti-Islanding	Active Frequency Drift (AFD)
Switchover time	< 100 ms
Switchback time	< 100 ms ¹³

AC Output (Backup)**In General**

Thermal Management	Natural convection
Installation Method	Wall mount

⁹ During commissioning, the AC output power is set to one of the listed power levels.¹⁰ at power factor of $\cos \phi = 1$ ¹¹ Selection depends on the rated power selected during commissioning.¹² at power factor of $\cos \phi = 1$ ¹³ After the network is restored, the wait time until reconnection can be up to 5.5 minutes due to country-specific regulations.

Maximum Efficiency (PV2AC)	97.8 %
European Efficiency (PV2AC)	97.0 %
Origin	Designed and engineered in Germany
Country of Manufacture	China
Protection	
Protection class	I / PE conductor
Degree of Protection	IP66
Required fault current monitoring	Integrated residual current monitoring unit ¹⁴
Overvoltage category	II (DC); III (AC)
Rated short-withstand current	45 A
Separation principle	no galvanic isolation, transformer-less
Compliance with Regulations and Standards	EMC 2014/30/EU, LVD 2014/35/EU, RoHS 2011/65/EU, REACH 1907/2006/EC, WEEE 2012/19/EU, EN IEC 62109-1, EN IEC 62109-2, EN IEC 61000-3-2, EN IEC 61000-3-3, EN IEC 61000-3-11, EN IEC 61000-3-12, EN IEC 61000-6-1, EN IEC 61000-6-2, EN IEC 61000-6-3, EN IEC 61000-6-4, EN IEC 62920, IEC 62477-1 (Annex P), AS/NZS 4777.2, CEI 0-21
Dimensions (H/W/D) and Weight	
Dimensions (including wall mount)	497/470/195 mm
Weight	~ 16.5 kg
Environment	
Environment	Outdoor/Indoor
Operating temperature range	-25 °C ... 60°C ¹⁵
Storage temperature range	-25 °C ... 60 °C
Transport temperature range	-25 °C ... 60 °C
Max. rel. humidity	100 %, non-condensing
Permissible installation altitude	3,000 m above sea level ¹⁶
Pollution degree	3
Noise emission	< 35 dB(A)
Power measurement with SU103 power meter	
Voltage measurement inputs	Nominal voltage (AC): 230 V (L-N), 400 V (L-L) connectible conductor cross-section: 0.2 ... 2.5 mm ²
Measurable current	Max. 63 A
Communication protocols	Modbus TCP (LAN), Modbus RTU (RS485)

Requirements for the installation site

- It is recommended to avoid direct sunlight and direct exposure to the elements (rain, snow).
- No danger due to flooding.
- No corrosive and explosive gases. The maximum permissible ammonia content is 20 ppm.
- No dust, especially flour dust or sawdust.
- No vibrations.
- No seismically active regions.
- Installation room should be ventilated.
- Easy access.

¹⁴ Local regulations regarding an additional residual current circuit breaker must be observed.

¹⁵ Temperature-dependent power reduction is possible. Optimal temperature range: 15–30 °C

¹⁶ Power reduction is possible at altitudes above 2,000 m.

- Mounting surfaces (walls) must be load-bearing, vertical, level, and made of non-combustible material.
- Floor is suitable for heavy loads.
- Observe applicable local building codes.
- Observe all fire safety guidelines and regulations.

Glossary

CA

Commissioning assistant

CHP

Combined heat and power station

DI

Digital input

DNO

Distribution network operator

DO

Digital output

DRED

Demand response enabling device

MCB

Miniature circuit breaker. Overcurrent safety device that protects the lines from damage caused by overheating as a result of excessive current.

PPE

Personal Protective Equipment

SOC

State of charge



<https://documents.sonnen.de/s/manual-sB12-AU-en>

