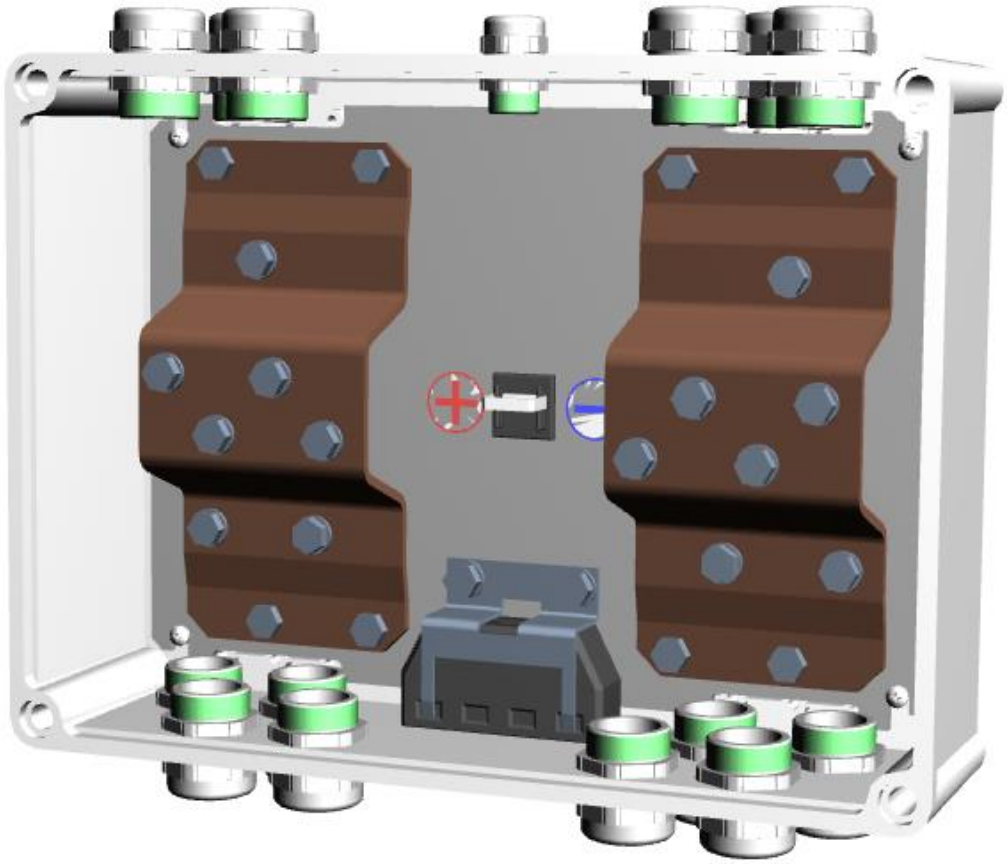
Operating Manual

Parallel Switching Kit for

sun | powerpack premium



Foreword

Dear Customer,

Thank you for choosing one of our brand name products.

Please read the associated documentation carefully before working on the Parallel Switching Kit or its components.

Amendments to this documentation are subject to change without prior notice. Our products undergo continuous advanced development. As a result, there may be deviations between the illustrations given in this documentation and the purchased product. This installation manual is not covered by any change service.

Keep this documentation in such a manner that it is available immediately to all those who need to carry out work in connection with the battery system or its components.

Service Hotline Germany:
0800 246 77 32

International service hotline:
+49 (0) 180 5 22 9999

Internet: www.HOPPECKE.com
E-mail: info@hoppecke.com

Table of contents

1. Target Group

This Operating Manual is meant for dealers, qualified electricians and end users. It describes how to install the Parallel Switching Kit for the sun | powerpack premium battery system. The installation of the Parallel Switching Kit must only be carried out by a qualified electrician.

Observe and follow the safety instructions given in the associated operating manual when handling the sun | powerpack premium battery system and its components.

2. Means of Representation

The following icons and signal words have been used in this operating and maintenance manual:

DANGER!

Denotes an immediate hazard with a high level of risk that could lead to death or severe physical injury if it is not prevented.

WARNING!

Denotes a potential hazard with a medium level of risk that could lead to death or severe physical injury if it is not prevented.

CAUTION!

Denotes a hazard with a low level of risk that could lead to minor or medium degree of physical injury if it is not prevented.

ATTENTION!

Denotes a hazard in which the product, other objects or the environment may get damaged if it is not prevented.

Note:

Denotes instructions that are important for optimum utilisation of the product.

3. Safety Instructions

3.1. General Safety Instructions

DANGER!

Metallic parts of the batteries are always live. Do not short-circuit the batteries! Very high values of current may flow and cause burn injuries in case of a short-circuit. Touching electrically conducting parts may cause cardiac arrhythmia and shock.

- Please take extreme care when carrying out any work on the battery system in order to prevent severe injuries caused by electrical shocks or burns.
- Never place tools or other metallic objects on a battery.
- Be sure to remove watches and jewellery before doing any work on the batteries.
- Do not touch any exposed battery parts, jumpers, terminals or poles!

Just as with other batteries, lithium-ion batteries may represent a source of hazard through high short-circuit currents, even in an apparently discharged condition.

Note:

Observe this operating manual and store the document close to the battery system.

3.2. Intended Use

The Parallel Switching Kit may only be used for the parallel connection of two, up to a maximum of four HOPPECKE sun | powerpack premium battery systems. Installation and electrical connection is carried out on site.

DANGER!

Not intended use of the Parallel Switching Kit may result in personal injury or damage to property.

In case of unintended use, HOPPECKE Batterien GmbH & Co. KG shall not assume any liability for personal injuries or damage to property that result directly or indirectly from handling the batteries.

The operator shall be solely responsible for the risks arising from unintended use.

3.3. Obligations of the Operator

Please keep the documentation in such a manner that it is available immediately to all persons who need to carry out work in connection with the Parallel Switching Kit or the battery system sun | powerpack premium.

WARNING!

The requirements for safe operation of the battery installation must be complied with for subsequent modifications at the installation site. Otherwise, any claims for warranty become null and void.

3.4. Occupational Safety

This section contains important information that needs to be observed and followed while working on the sun | powerpack premium and its components.

- ⇨ Prohibit all work methods that endanger the safety of human beings and impair the working of the batteries in any manner.
- ⇨ Keep strictly to the work sequence described in the documentation.
- ⇨ Pay attention to the polarity of the battery connecting leads
- ⇨ Ensure that the battery connecting leads are fitted tightly. Use only the battery connecting leads supplied to connect the sun | powerpack premium battery systems to the parallel switching box.
- ⇨ Observe the operating manual of the battery inverter/charger manufacturer.

3.4.1. Personnel and Qualification

Work on the battery system, especially its installation, maintenance and disassembly should be done only by electricians.

The personnel must

- be well-versed with handling the batteries,
- be aware of the precautionary measures that are necessary,
- be trained in accordance with DIN VDE 1000-10 and DGUV regulation 3 (formerly BGV A3).

Please read the documentation carefully before you carry out any work on the parallel switching box.

Please make sure to contact your local authorised dealer if:

- you have any queries on this documentation.
- there are local regulations or provisions that are not covered by this documentation or are contrary to its contents.

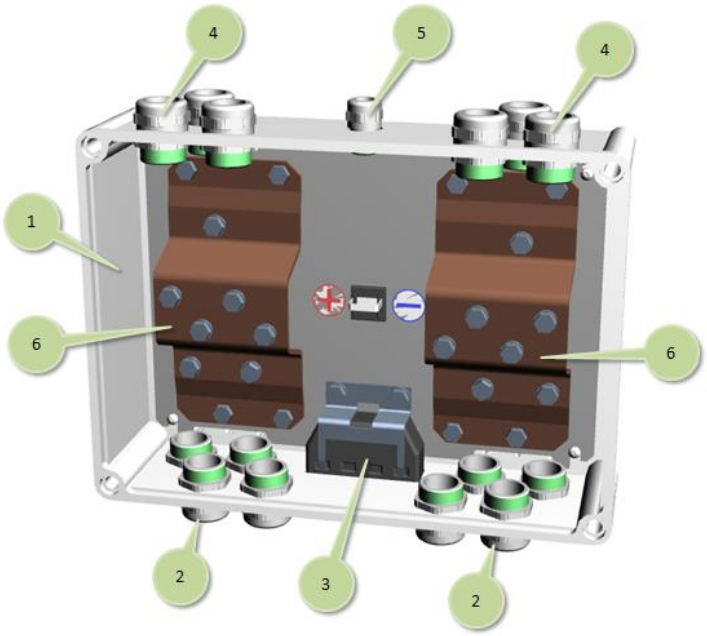
3.4.2. Personal Protective Equipment

While working on the Parallel Switching Kit or its components, always wear the following protective equipment in order to prevent injuries or at least to mitigate them:

- Safety gloves
- Safety boots

4. Parallel Switching Kit for sun | powerpack premium

The Parallel Switching Kit is required for the parallel connection of two, up to a maximum of four sun | powerpack premium battery systems. The major components of the system are illustrated in Figure 2.



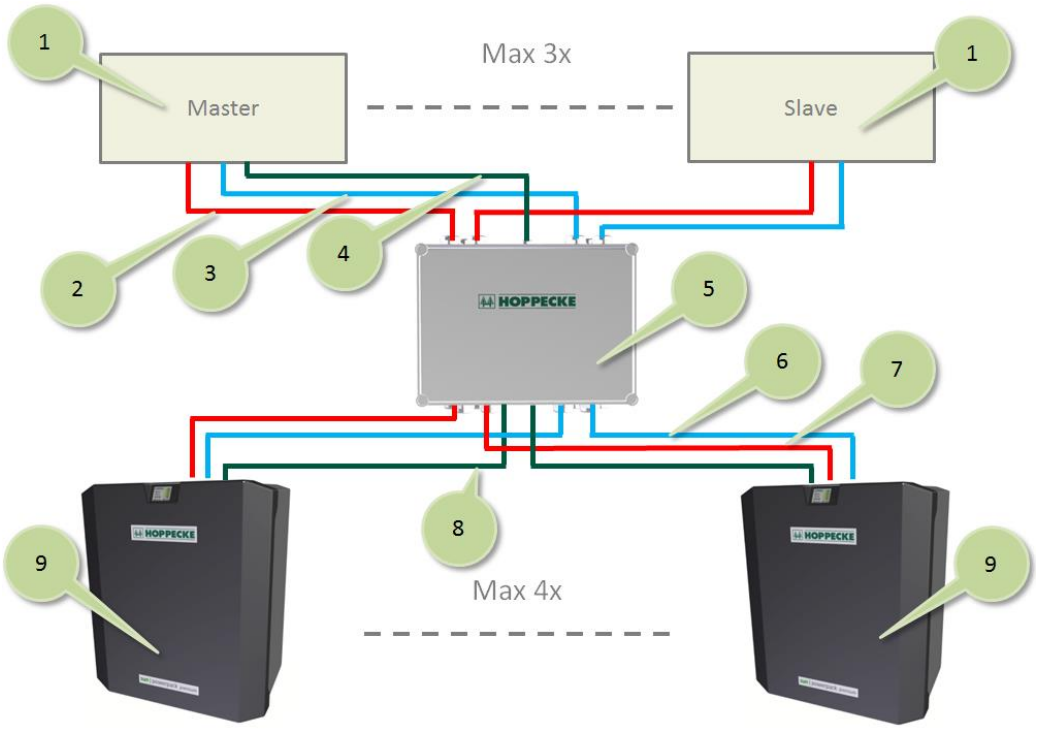
No.	Description
1	Enclosure
2	Cable glands for connecting cables of the sun | powerpack premium storage system
3	Junction box for communication lines
4	Cable glands for connecting cables to the battery inverter(s)
5	Cable gland for communication line to battery inverter
6	Busbar for fixing the battery or battery inverter connecting cables

Figure 1: Parallel switching kit (without cover)

The Parallel Switching Kit consists of the following components:

- 1 x housing with cover
- 1 x communication line (3m) for connecting to battery inverter (pre-assembled)
- 6 x DC-connection cables for connection of max. three battery inverters (2m, 70mm^2)
- 8 x blind plug for unused cable glands

For the basic installation of a parallel circuit refer to the figure below (see Figure 2).



No.	Description
1	Battery inverter (1 x master and up to 2 x slave)
2	DC connecting cable + to battery inverter
3	DC connecting cable - to battery inverter
4	Communication line to "master" battery inverter
5	Parallel switching kit
6	DC connecting cable - to battery storage
7	DC connecting cable + to battery storage
8	Communication line to battery storage
9	Sun | powerpack premium battery storage

Figure 2: Basic circuit diagram

Note:

The battery system should be operated only with approved battery inverters / battery chargers. The nominal battery voltage is 51.2 V, and communication between the battery inverter / battery charger and the battery system takes place via a data interface (CANOpen).

Note:

The individual storage systems need to be configured for parallel operation of two to four sun | powerpack premium systems. Here each storage system is assigned a unique identification number. So that this configuration can be carried out, the software in the battery management system (BMS) must be >= V33020000. The software version number can be called up on the display unit of the storage system.

Note:

Only battery systems of identical nominal capacity can be connected in parallel. The age difference (from the date of commissioning) between the individual systems to be connected in parallel must not exceed 24 months.

4.1. Connection to SMA Sunny Island inverter

When connecting to the SMA Sunny Island battery inverter, observe the instructions listed in the table below (see Table 1).

Variant Energy	1 x 5kWh 5kWh	1 x 7,5kWh 7,5kWh	2 x 5kWh 10kWh	2 x 7,5kWh 15kWh	4 x 5kWh 20kWh	3 x 7,5kWh 22,5kWh	4 x 7,5kWh 30kWh
1 x SMA SI 3.0M	x	x	x	x	x	x	x
1 x SMA SI 4.4M	x	x	x	x	x	x	x
1 x SMA SI 6.0H	x	x	x	x	x	x	x
1 x SMA SI 8.0H	x[1)]	x	x	x	x	x	x
3 x SMA SI 3.0M	---	---	x	x	x	x	x
3 x SMA SI 4.4M	---	---	x	x	x	x	x
3 x SMA SI 6.0H	---	---	x[1)]	x[1)]	x	x	x
3 x SMA SI 8.0H	---	---	x[1)]	x[1)]	x	x	x

[1)] Not recommended for off-grid applications.

Table 1: Potential combinations for battery systems and battery inverter

5. Preparing for Installation

⇨ Before you begin with installation, check whether the installation site meets the requirements (see chapter 5.1).

⇨ Keep all necessary tools ready at hand (see chapter 5.2).

5.1. Installation Site

The Parallel Switching Kit must be installed in a dry internal room (e.g. a utility room or cellar). The installation site must be vibration-free.

Note:

The mounting location for the Parallel Switching Kit must be chosen so that the length of cables from the battery storage to the Parallel Switching Kit, and from there to the inverter(s) are as short as possible. In all events, the total maximum permissible cable length for the battery inverter used must be adhered to.

5.2. Tools and Equipment

The following tools are required for installation:

- Insulated torque wrench 13mm to fix the cable lugs to the bus bars in the Parallel Switching Kit.
- Drilling machine (with drill bits for appropriate subsurface of the mounting wall)
- Mounting materials (screws and fixings depending on the structure of the mounting wall)
- Spirit level
- Interface adapter from USB to CAN bus (accessories for installers and service)
- HOPPECKE sun | powerpack premium Service Software (PC-based configuration software, accessories for installers and service).

6. Installation

The following sections of this chapter describe the installation of the Parallel Switching Kit.

6.1. Installing the Housing

Fix the housing of Parallel Switching Kit in the chosen mounting location (see hole spacings for wall mounting in Figure 3, dimensions in mm).

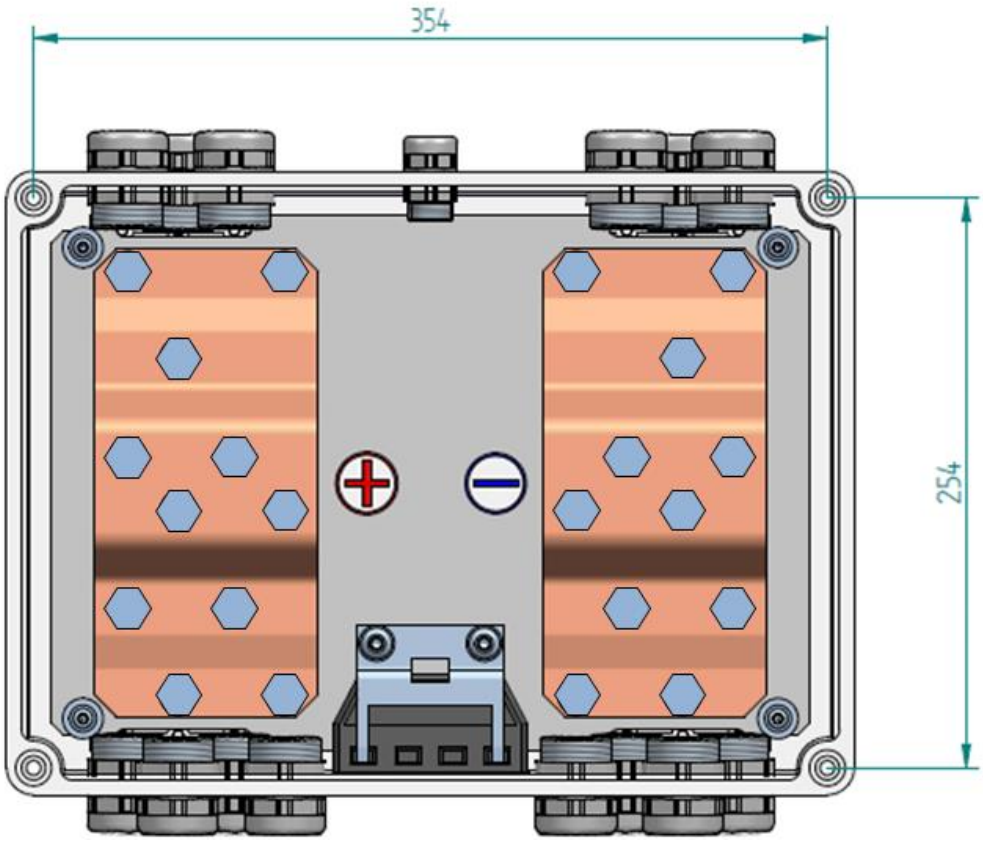


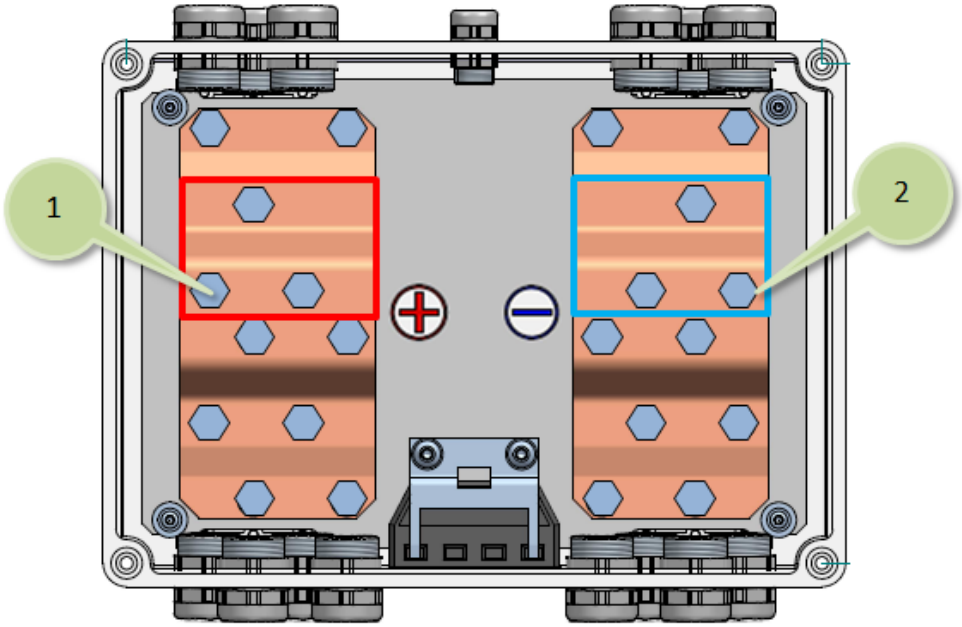
Figure 3: Hole spacings for wall mounting

6.2. Mounting Connecting Cable for Battery Inverter

WARNING!

To avoid short circuits, the DC connecting cables must not be connected to the battery system or the battery inverter, during attachment to the busbars of the Parallel Switching Kit. Before expansion of existing systems, the DC connection cables must first be disconnected from the battery storage (connector plug on the top). Then disconnect the DC connecting cable from the battery inverter according to the specifications of the manufacturer.

1. Attach the DC connection cables for connection to the battery inverter(s) to the associated busbars. The screw fittings must be tightened to a torque of 15 Nm (see Figure 4).



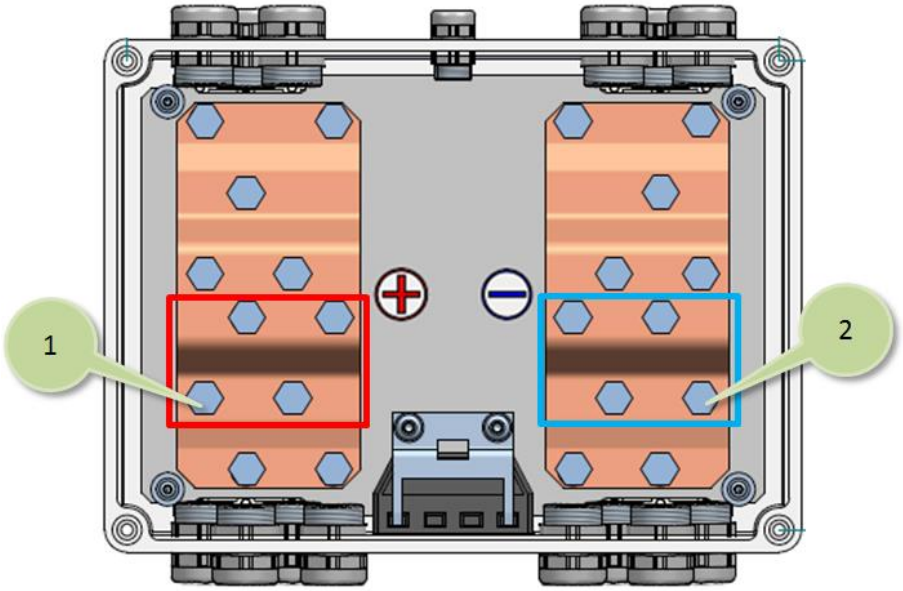
No.	Description
1	Positive battery inverter terminal screws
2	Negative battery inverter terminal screws

Figure 4: Mounting connecting cables for battery inverter

2. Insert the sealing plugs supplied in the unused cable glands.

6.3. Mounting Connecting Cable for Battery Storage

1. Attach the DC connection cables for connection to the battery storage(s) to the associated busbars. The screw fittings must be tightened to a torque of 15 Nm (see Figure 5).



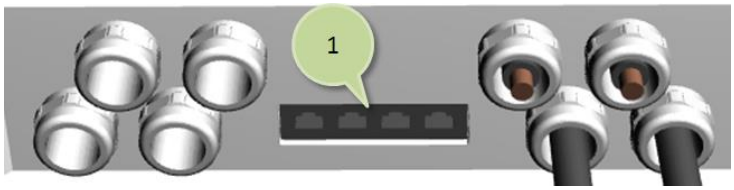
No.	Description
1	Positive battery storage terminal screws
2	Negative battery storage terminal screws

Figure 5: Mounting connecting cables for battery

2. Insert the blind stops supplied in the unused cable glands.
3. Fix the cover of the Parallel Switching Kit

6.4. Connecting the Communication Lines

1. Connect the communication lines of the battery storage systems to the appropriate connecting sockets of the Parallel Switching Kit (see Figure 6).



No.	Description
1	Connecting sockets for communication lines to battery system(s)

Figure 6: Connection of communication lines to the battery system(s)

2. Run the communication cable to the battery inverter (master) and connect the cable there in accordance with the manufacturer's instructions.

No.	Description
1	Communication line to the inverter

Figure 7: Connection of communication line to the battery inverter (master)

6.5. Mounting Connecting Cable to Battery Inverter

Mount the connection cables to the battery inverter according to the manufacturer's instructions.

6.6. Configuration and Connection of the Storage Battery

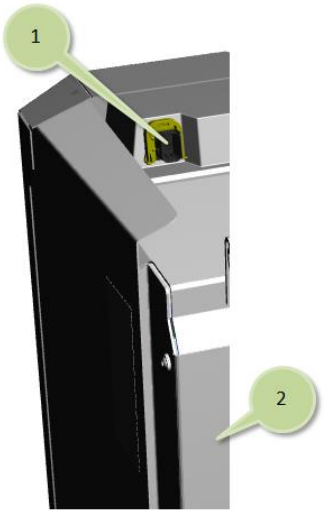
WARNING!

As soon as a battery connection cable is connected to one of the battery systems every battery connection cables connected to the Parallel Switching Kit carry battery voltage. Hence the contacts in the plugs of the battery connection cables must not be short-circuited.
Very high values of current may flow and cause burn injuries in case of a short-circuit.

Note:

The operation of two up to a maximum of four parallel battery systems is only possible if the battery management systems (BMS) of each individual battery storage has been previously configured correctly. Here each individual battery system is assigned a unique identification number (ID).

An interface adapter from USB to CAN bus, and a PC based configuration software, (HOPPECKE accessories available for installers and service), are required for configuration. After installation and start of the sun powerpack premium Service Software the interface adapter needs to be connected to a USB port at the PC / Laptop and with the service interface at the battery system (refer to Figure 8). Detailed information are documented in the HOPPECKE sun | powerpack premium user manual. The user manual is part of the delivery of the interface adapter.



No.	Description
1	Service interface
2	Rear side of battery system

Figure 8: Location of the service interface on the battery system

6.7. Commissioning

Note:

Disconnect the interface adapter from the service interface before commissioning of the battery inverter(s)

Turn on the battery inverter(s) (refer to manufacturer's instructions for this). After successful installation, the current actual percentage charge level, and the current charge or discharge rate are shown in the display units of the battery systems (see Figure 9). In charging mode, the arrow points in the direction of the battery icon. In the discharging mode, the arrow points away from the battery icon. The installation has now been successfully completed.

Note:

Configure the battery inverter(s) according to the manufacturer's specifications.
Typically the battery capacity needs to be configured in the battery inverter. This value corresponds to the amount of parallel switched battery systems. Example: A system of three parallel switched single systems sun | powerpack premium 5.0/48 with 5kWh resp. 100Ah each corresponds to a total battery capacity of 15kWh resp. 300Ah.

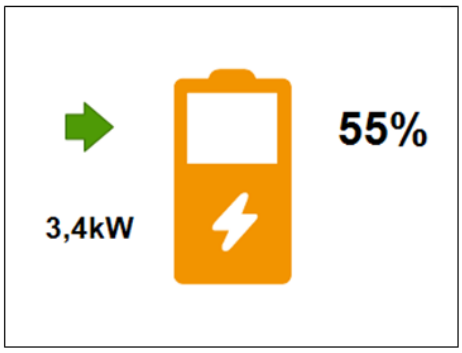


Figure 9: Display unit (Example of standard display)

7. Maintenance, Care and Cleaning

Wipe the Parallel Switching Kit occasionally with a cloth slightly moistened with water.
Beyond this no further maintenance or care is required.

WARNING!

As soon as a battery connection cable is disconnected from one battery system the contacts of that battery connection cable carry the battery voltage. Hence the contacts in the plug of the battery connection cable must not be short-circuited.
Very high values of current may flow and cause burn injuries in case of a short-circuit.

8. Technical Data

8.1. System

Dimensions:	378 x 312 x 180mm (LxWxH)
Total weight:	8kg

9. Abbreviations

BMS	Battery Management System
CAN	Controller Area Network
DC	Direct Current
Li-Ion	Lithium-Ion