MANUAL

Power Storage DC 4.0 / 6.0

EN

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The passages in the user manual referring to these products do not represent the product's original documentation.

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Preface

Thank you for choosing the RCT Power Storage DC!

You have purchased an innovative, high-quality product with unique features and consistently high efficiency.

RCT Solar Inverters are transformerless, highly flexible and robust. With this device, you will always achieve the highest possible yield from your PV system.

WARNING

Solar modules, inverters, cables and other components of the photovoltaic system are electrical devices. During installation, wiring, grid connection, operation, maintenance and service they can cause various hazards.

Please read the documents supplied with the product carefully and follow the instructions and device information to avoid material damage and personal injury.

Keep this manual in a safe place for future reference.

Declaration of conformity

RCT Power GmbH confirms that the Power Storage DC inverter described in this document is in compliance with the essential requirements and provisions of the following European Union directives :

- RED Radio Equipment Directive (RED) 2014/53/EU
- Electromagnetic Compatibility Directive (EMC) 2014/30/EU
- Low Voltage Directive (LVD) 2014/35/EU
- Restriction of Hazardous Substances in Electrical and Electronic Equipment Directive (RoHS2)-2011/65/EU

The detailed declaration of conformity can be found under :

www.rct-power.com

1 About this Manual

1.1 Validity, Purpose, Scope of this document and Legal Regulations

This document is applies to the Power Storage DC models 4.0, and 6.0.

Power Storage DC 4.0 and Power Storage DC 6.0 are referred to as "Inverter", "Hybrid Inverter", "Device" or "Product" unless otherwise stated.

This installation manual provides general instructions for installing, wiring, commissioning and operating the inverter and the battery.

The content of this manual is regularly updated and revised as a part of the continuous product development.

The current document version can be found at: www.rct-power.com.

We explicitly reserve the right to make technical changes which improve the device or increase its safety standard. These changes do not require a separate notification. RCT Power GmbH is not liable for damages resulting from the use of this document.

This manual does not supersede existing laws, regulations, rules, standards or conventions.

The warranty conditions are enclosed with the device. No further warranty claims can be derived from this document.

1.2 Explanation of Symbols and References

It is important to follow the references in the manual during the installation, operation and maintenance of the Power Inverter. The table below shows the warning signs and symbols used in the manual.

Symbols and References	Description
 DANGER	This symbol indicates a direct imminent danger. If the safety regulations are not observed, this may result in death, personal injury or serious damage to property.
 WARNING	This symbol indicates a direct imminent danger of medium risk. If the safety regulations are not observed, this may result in death, personal injury or serious damage to property.
 CAUTION	This symbol indicates a direct imminent danger of low risk. If the safety regulations are not observed, it might result in minor or moderate material damage.
 NOTICE	This symbol indicates a potentially hazardous situation which, if not avoided, could result in material damage to equipment or property.
	This symbol indicates important information and hints. They will help you to better understand the functionality of the Power Storage DC.

2 Safety Instructions

2.1 Personnel and Qualifications

WARNING

The inverter and the battery must only be installed, wired, connected, commissioned and serviced by qualified personnel to prevent material damage or personal injury.

Qualified personnel authorised to perform the tasks described in this manual must have the following skills and technical expertise:

- They are trained to install electrical equipment.
- They understand the technical functionality of an inverter
- They are familiar with lithium iron phosphate (LiFeP04) accumulators.
- They have read and understood the documents shipped with the unit.
- They know and use the appropriate tools and equipment to perform the tasks described in the manual.
- They are familiar with all current laws and applicable regulations, standards and directives for electrical equipment.
- They are familiar with the safety requirements and guidelines for electrical equipment.
- They are familiar with occupational health and safety regulations.
- They know and use appropriate personal protective equipment.

2.2 Safety Procedures

The Power Storage DC was developed and tested in strict accordance with international safety regulations.

All safety instructions relating to electrical and electronic equipment must be complied with during installation, operation and maintenance.

DANGER

Danger to life or serious injury due to electric shock!
High voltages are present in cables and inner parts of the inverter if it is connected to the grid (AC / AC voltage source) or the solar generator (DC / DC voltage source) is exposed to sunlight.

- Qualified personnel must perform any work that involves wiring, connecting or opening the inverter case.
- Important: Both voltage sources (DC / solar generator and AC / grid) must be switched off before any electrical work is carried out on the inverter.
- Turn the DC Switch into the 0 position to disconnect the DC voltage.
- Activate the circuit breaker or remove the fuse to disconnect the mains voltage (AC). Do not reconnect until the work has been completed.
- To disconnect the battery voltage, both voltage sources (DC / solar generator and AC / mains) must be switched off and the battery switch on the master must be set to "0".
- Allow a minimum of 10 minutes for the capacitors to fully discharge and then check the voltage with a suitable measurement device.
- Ensure that other persons stay away from cables and internal components.

WARNING

Risk of injury due to electric shock!

Installation, service and maintenance work must only be carried out by a qualified electrician.

- Do not drop the device. Do not expose it to knocks or pressure.
- Only switch on again after all electrical work has been completed.

CAUTION

Risk of burns on hot parts of the inverter housing.

During standard operation of the inverter, some parts of the inverter's housing can become hot.

- Use care when touching the housing while the inverter is operating.
- Do not cover the Power Storage DC (especially not the top).

NOTICE

- All electrical installations must be carried out in accordance with local and national standards and guidelines.
- Contact your local energy supplier or grid operator before connecting the inverter to the grid.
- Ensure that electrically conductive surfaces of the entire PV system are grounded to prevent personal injury.
- A malfunction can impair inverter safety. Do not operate or start the inverter if it shows visible damage or if the displayed error message is unclear.
- The inverter does not contain any parts to be serviced by the owner. Please contact qualified personnel locally for servicing work on the inverter.
- Only use devices and accessories approved by the manufacturer. Do not make any changes to the device. Do not remove the type plate.

3 Product Presentation

3.1 Intended Use

Power Storage DC 4.0 and 6.0 are stationary 3-phase inverters with integrated battery charging unit.
The energy received from the connected solar generator and the battery is converted into grid-compliant AC current and fed into the grid. PV energy can also be charged directly into the battery on the DC side.

Please note:

The Power Storage DC is not designed for other use cases or connections to other devices.
Any deployment of the device that is different from the intended use is considered a misuse.
RCT Power GmbH is not liable for damages resulting from misuse of the device.
Any misuse terminates the warranty, guarantee and general legal liability of the manufacturer.

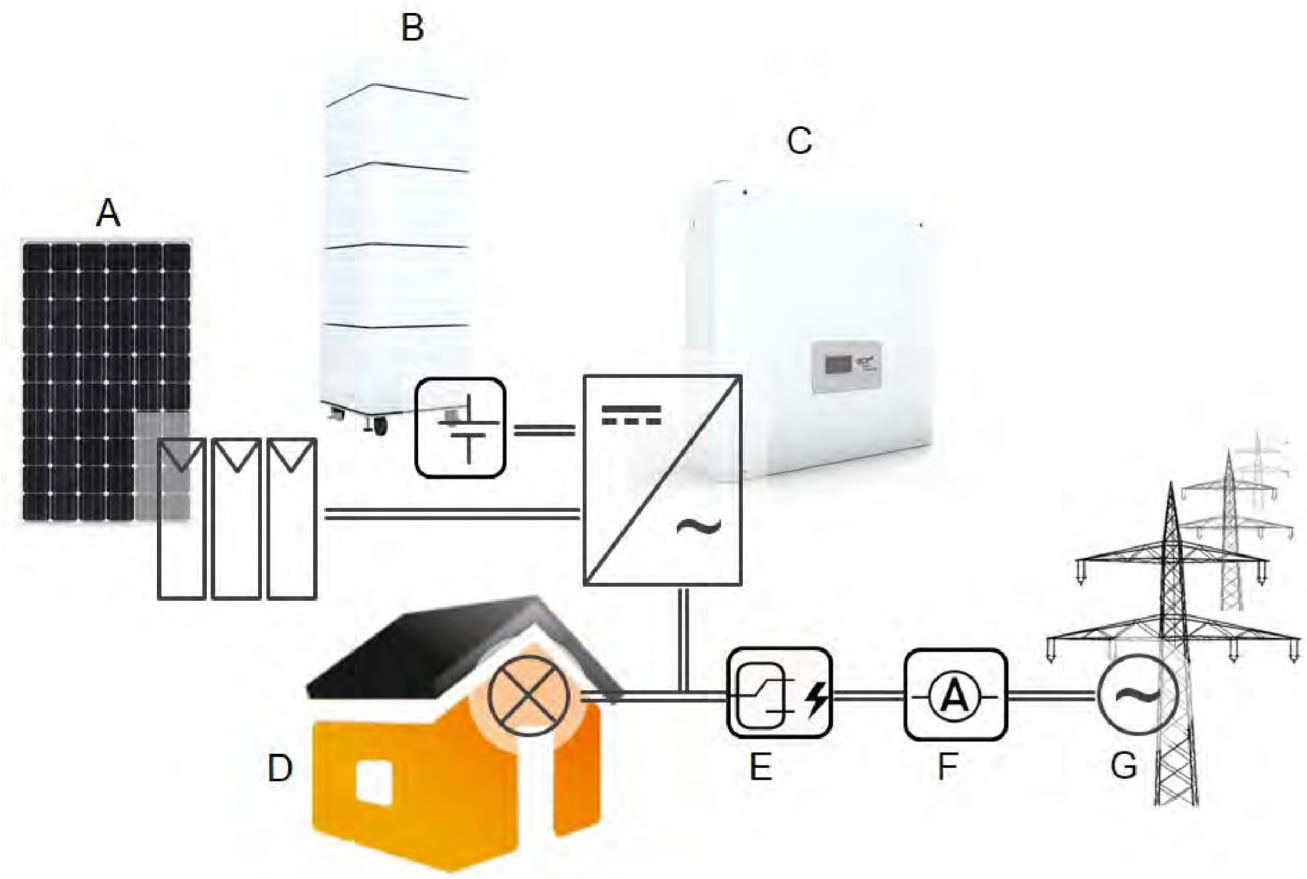


Fig. 3-1 Intended use of the Power Storage DC with the Power Battery in the PV system.

Pos	Description	Comment
A	PV Generator	Monocrystalline silicon; polycrystalline silicon and thin film without grounding and protection class II
B	Battery	Power Battery 3.8, 5.7, 7.6, 9.6, 11.5
C	Inverter	Power Storage DC 4.0, 6.0
D	Dwelling	Domestic electricity consumers
E	Power Switch	Switches to island operation mode in the event of a power failure.
F	Power Sensor	Current sensors for AC power measurements
G	Public grid	TT, TN-C, TN-S, TN-C-S

3.2 Product Specification

3.2.1 Scope of Supply

Our products are inspected for proper condition before shipment.

Despite careful packaging, transport damage can occur. The transport company usually has to take responsibility for this damage.

Please inform the transport company immediately if you notice any damage to the packaging or the Power Storage DC. Your specialist dealer will be happy to assist you if necessary.

Do not install, wire or operate the Power Storage DC if any damage has been detected.

Check the contents of the shipment for completeness in accordance with Fig. 3-2.

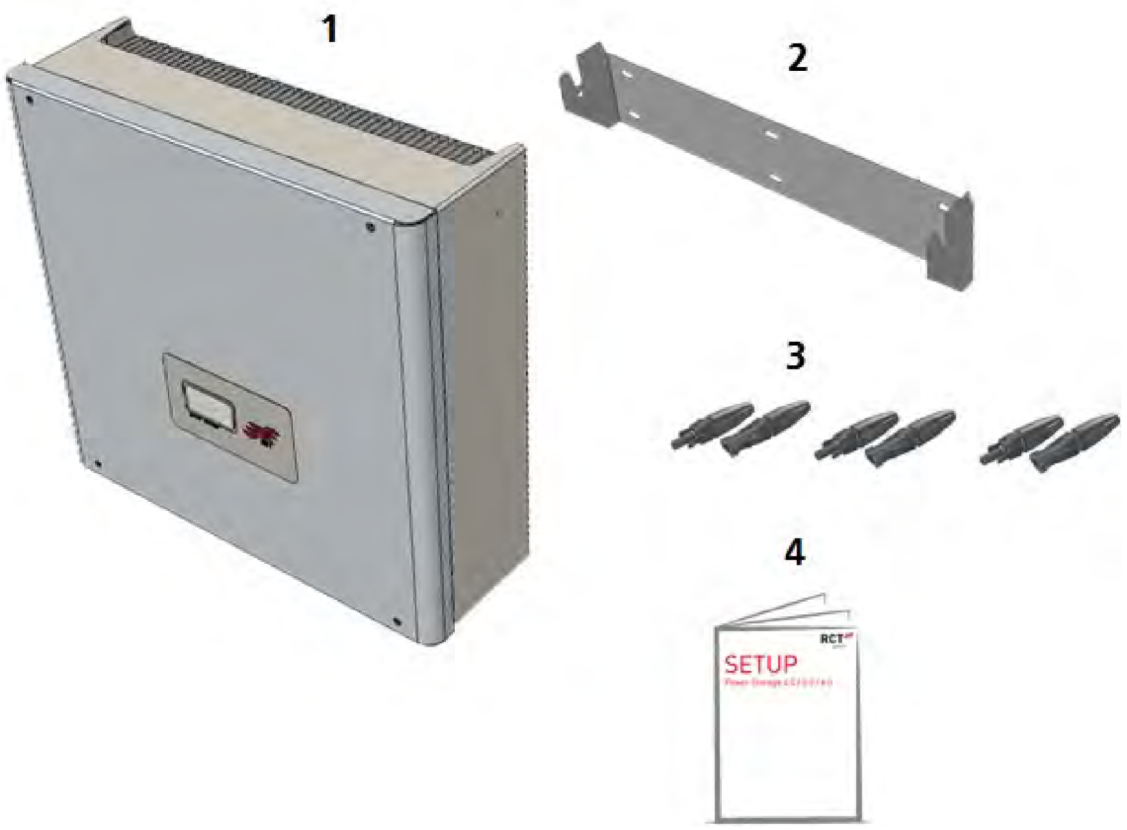


Fig. 3-2 Scope of supply

Pos.	Description
1	1x Power Storage DC
2	1x Inverter wall mounting bracket
3	3x PV Stick + (Weidmüller) 3x PV Stick – (Weidmüller)
4	1x Setup Manual

3.2.2 Component Description

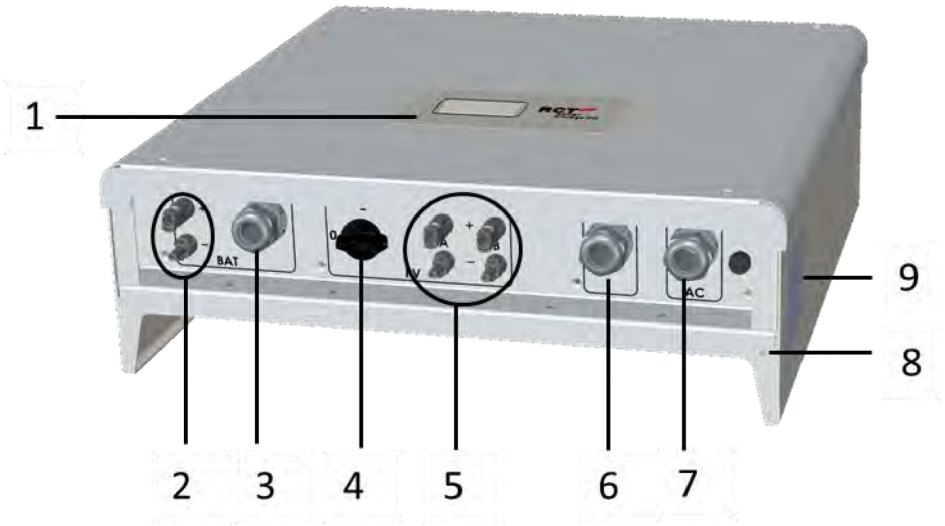


Fig. 3-3 Product specification

Pos	Component	Description
1	LCD Operating Display	Displays important Inverter status and operational information (see section 7.3)
2	Battery connection area	Battery connections (see sections 5.1 to 5.4)
3	RJ45-CAN bus communication connectors	RJ45-sockets for CAN-bus connection with batteries, Power Sensor and Power Switch
4	DC load break switch	Normal operation: Switch is in position "1", Turning switch to position "0" shuts down the inverter.
5	DC connectors	Two separate Solar generator inputs (A & B), Connector Plug Type : Weidmüller WM4
6	Connection area communication	Cable entry for the communication connections (see sections 5.1 to 5.4)
7	AC-connection	AC-connection cable entry
8	Type Plate	Contains technical data, serial number barcode and warning symbols
9	Additional protective conductor connection	Connection for additional protective conductor (see section 5.6)

3.2.3 Type Plate and Warning Signs

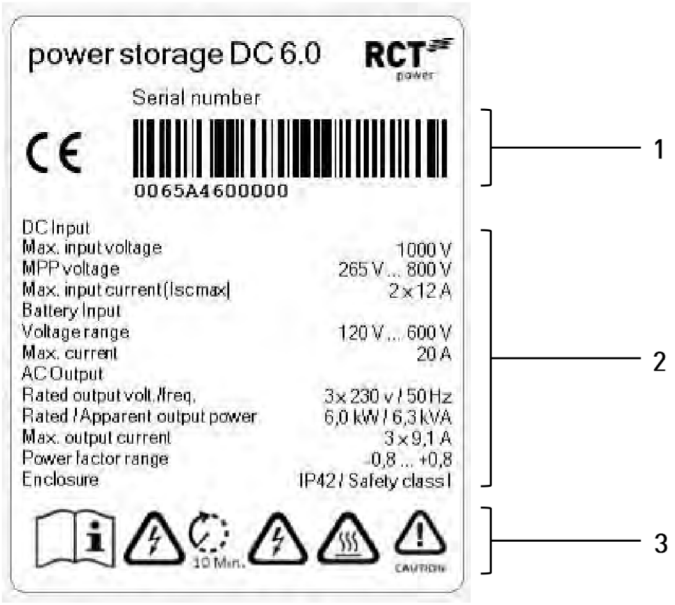


Fig. 3-4 Type plate

Pos.	Description
1	Serial number
2	Technical data
3	Symbols

This symbol indicates that the user manual must be read and understood before the device is put into operation.

After disconnecting the electrical connections, wait a minimum of 10 minutes before opening the unit.

DC and AC voltage is present in the cables and inner parts of the inverter.

Hot surface! The housing can heat up during operation.

Warning! High leakage currents. It is essential to establish an earthing connection before connecting to the power supply circuit (AC mains)!

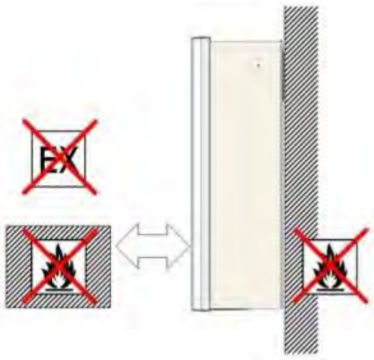
4 Mechanical Installation

4.1 Select mounting location

DANGER

Danger to life or serious injury from fire or explosions!

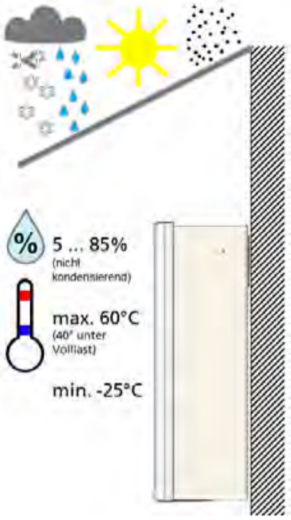
- Do not mount the inverter on a flammable surface.
- No combustible materials must be stored within 3 m of the inverter.
- The inverter must not be installed in areas and rooms subject to explosion hazards.



The mounting surface must be made of flame-retardant material.

Do not install in rooms and area subject to explosion hazards.

Keep away from flammable materials.



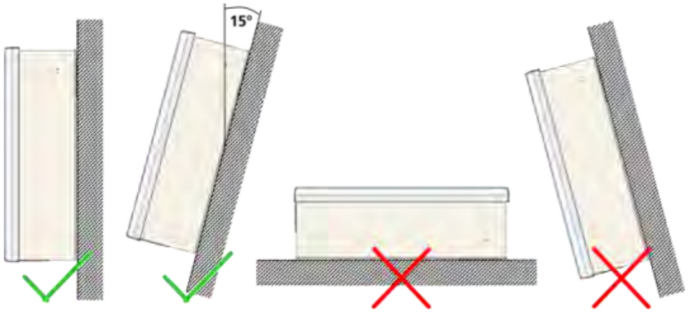
The inverter must be protected from dust, snow, rain and direct thermal radiation (e.g. solar radiation, central heating radiators, etc.).

The following requirements must be met:

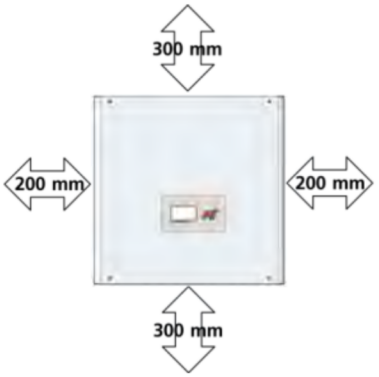
- Relative humidity 5 ... 85 % (non-condensing).
- Ambient temperature -25 ... 60 °C (40°C at full load).
- Maximum degree of contamination PD 2.

The mounting surface must be solid and able to permanently support the weight of the inverter unit.

The selected location must be accessible easily and safely at all times. Ensure no additional aids (e.g. ladder, scaffolding) are required for access.



Mount the inverter in an upright or slightly backward inclined position.



Required minimum distances to allow sufficient free convection of air for cooling the unit.

To prevent mutual heating, inverters must not be mounted on top of each other.

Installation in a closed cabinet is prohibited.

NOTICE

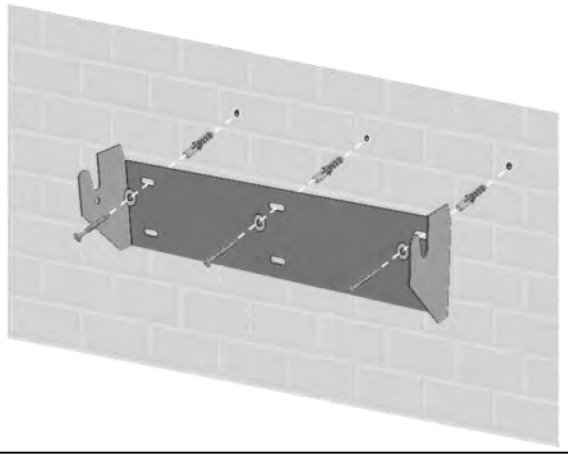
- Ensure sufficient air convection for the inverter. Overheating of the inverter due to poor cooling will result in reduced performance.
- The inverter can produce noise levels of up to 35db during operation. Ensure the inverter is mounted in a way that people cannot be disturbed by the operating noise.

4.2 Mounting

Additional material required (not included in the scope of supply):

- At least 3 to 6 screws with a diameter of 6 to 8 mm.
- Suitable dowels.
- Suitable washers with a minimum outer diameter of 18 mm.

Procedure:



Mount the wall bracket as shown left. Use at least 3 screws (ø 6-8mm), 3 washers (outside ø min. 18mm) and the appropriate dowels.

Loosen the inverter's left and right-sided locking screws at the top.

Hook the Power Storage DC with the retaining bolts on both sides into the recesses of the wall mounting bracket.

Tighten the locking screws again to secure the inverter.

Check that the inverter is securely fastened.

5 Electrical Installation

5.1 Overview of the Connections

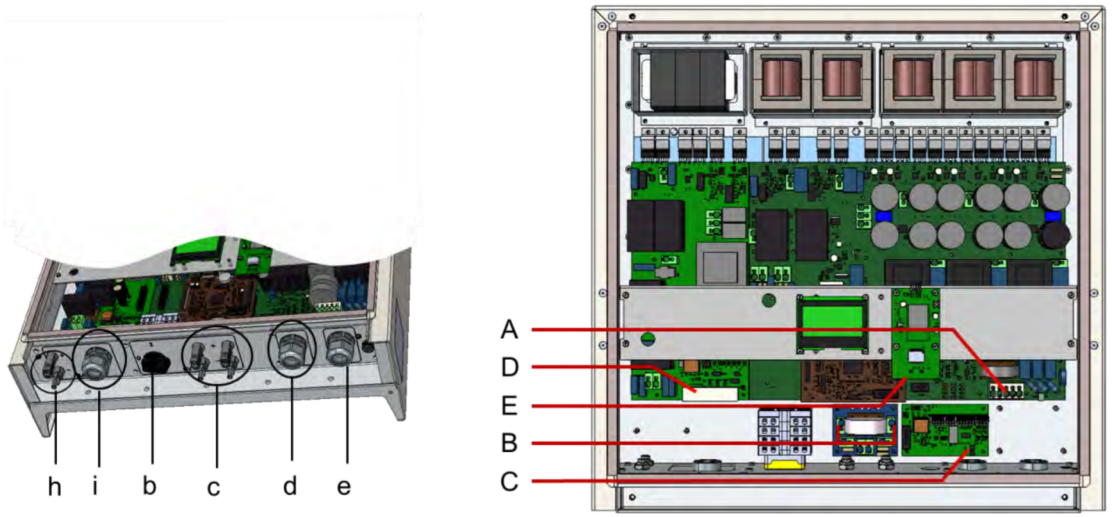


Fig. 5-1 Overview of wiring area and interior connecting components

Pos.	Component	Comment
b	DC load break switch	Normal operation: Switch is in position "1". If the switch is set to position "0", the inverter shuts down when the circuit to the battery is disconnected.
c	DC connectors	Two separate solar generator inputs (A & B), Connector type: Weidmüller WM4.
d	Cable gland communication interfaces	Cable entrie communication interfaces
e	AC cable gland	Cable entry mains power connection (AC)
h	DC Battery connectors	Battery Input, Connector type: Weidmüller WM4.
i	Cable gland for RJ45 connections	Cable entry for RJ45 connectors: battery, power sensor and power switch.
A	AC terminal block	AC terminal block with terminals for connecting phases L1, L2, L3, as well as N and PE.
B	Terminals for DC parallel connection	Terminals for internal DC parallel connection of the PV inputs (see section 5.3).
C	Communication Board	The communication board has a serial RS485 interface, a multifunction relay, 4 digital inputs for ripple control signals and further digital inputs and outputs (S0) to connect current sensors or displays.
D	RJ45 connector for battery communication over CAN, Power Sensor and Power Switch	I/O communication interface connecting Power Sensor, Power Switch and Power Battery.
E	Ethernet port	RJ45 socket for connection to the Ethernet interface

5.2 AC Connection

Procedure.

DANGER

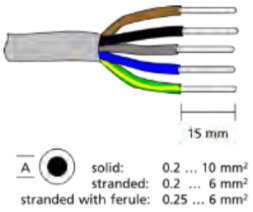
Danger to life or serious injury from electric shock!

- Only qualified personnel must carry out the work described in this section.
- Important: All voltage sources (DC /solar generator, DC /battery and AC /grid) must be disconnected before carrying out any electrical work on the inverter.
- To disconnect the solar generator voltage, turn the DC switch (on the inverter) to the position '0'.
- To disconnect the battery voltage, turn the DC switch (on the Power Battery Master) to the position '0'.
- To disconnect the mains voltage (AC) activate the circuit breaker or remove the fuse . Do not reconnect until the work has been completed.
- Only switch inverter back on after all electrical work has been completed.
- Ensure that other persons stay away from cables and internal components.
- Avoid traction forces on cables and plugs. Avoid sharp edges. Do not exceed the maximum bending radius of the cables.

WARNING

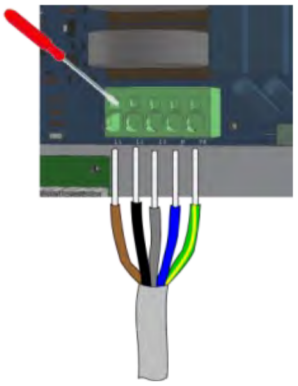
Danger to life or serious injury from electric shock or fire!

- Do not mix up the wires L, N and PE!
- Install an overcurrent protection device (circuit breaker, fuse) of max. 25A.



Required cable:

AWG 24 ... 8



Install an overcurrent protection device of max. 25A.

Remove the inverter cover and identify the AC terminal block (see Figure 5-1).

Loosen the cable gland of the AC cable duct. Carefully remove the cable insulation.

Make sure that no wire strand is damaged. Use the designated cable entry provided for the AC cable.

To open the terminals press them down with an insulated screwdriver. Make sure that the connections of L1, L2, L3, N and PE are correctly inserted.
Tighten the cable gland to ensure strain relief for the connected cable.

NOTICE

- Provide an AC disconnector switch. (LS switch 3-pole 6kA B characteristic 16A).
- Ensure that the disconnect device can be easily accessed at all times.
- Install the residual current device (RCD) required in the country of installation. A residual current circuit breaker (RCCB) type A is required in Germany.

5.3 Configuration of the PV inputs

A) Stand-alone operation Mode

Stand-alone operation mode is preconfigured.

In this mode, each DC input (A & B) has an independent MPP tracker.

This is especially of advantage if the properties of the PV-strings are different such as module type, number of modules, orientation or shading of the panels. Differences in these properties lead to different MPPs of the two PV-strings.

B) Parallel Mode

This mode is only used if several strings with the same number of modules are to be connected in parallel and resulting maximum input current per input exceeds 12 A.

Conditions for parallel mode:

- The total current of all strings connected to the inverter must not exceed 24 A.
- The strings have identical properties (module type, orientation and condition of the modules)

Example:

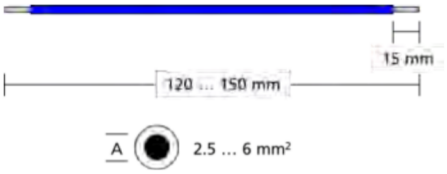
The PV panels are divided into three strings of 8A each. It is nevertheless possible to connect them to the inverter without changing the string configuration. One string is connected to one of the two solar generator inputs. The other two strings are connected in parallel via a Y contact and then connected to the remaining free input.

Procedure for Parallel Connection:

DANGER

Danger to life or serious injury from electric shock!

- Only qualified personnel must carry out the work described in this section.
- Important: All voltage sources (DC /solar generator, DC /battery and AC /grid) must be disconnected before carrying out any electrical work on the inverter.
- To disconnect the solar generator voltage, turn the DC switch (on the inverter) to the position '0'.
- To disconnect the battery voltage, turn the DC switch (on the Power Battery Master) to the position '0'.
- To disconnect the mains voltage (AC) activate the circuit breaker or remove the fuse . Do not reconnect until the work has been completed.
- Only switch inverter back on after all electrical work has been completed.
- Ensure that other persons stay away from cables and internal components.



Required Cable

AWG 24 ... 10

Material not included in scope of supply.

Remove the inverter cover. Identify the terminals for parallel operation.

Connect terminal X101 to X104.