

SETUP

Installation

Power Storage DC 4.0 / 6.0

EN

This setup manual contains a short instruction required for installing, wiring, commissioning and operating the inverters. For further instructions on installing or operating, please refer to the detailed user manual, which you can access via www.rct-power.com. RCT Power GmbH reserves the right to make changes to specifications or documents without prior notice. RCT Power GmbH shall not be responsible for any damages resulting from use of this document. This document does not replace any applicable laws, regulations, standards or codes. Warranty conditions come enclosed with the device. No warranties can be derived from this document.

Symbols Explanation	Level of risk		
	high	medium	low
Immediate danger of death or serious injury	 DANGER	 WARNING	
Immediate danger of minor or moderate injury			 CAUTION
Danger of equipment or property damage		 NOTICE	

Intended Product Usage



To prevent personal injury or property damage, the inverter must only be installed, wired, connected, commissioned, maintained and serviced by qualified personnel:

- Trained in installing electrical devices.
- Familiar with all applicable laws, regulations, standards and codes for electrical devices.
- Familiar with safety requirements and safety-related guidelines for electrical devices.
- Familiar with work protection laws and regulations.
- Using the appropriate personal protective equipment.

Power Storage DC 4.0, 5.0 and 6.0 are stationary 3-phase string inverters with integrated battery charger. They convert direct current (DC) supplied by the PV array and the battery into alternating current (AC), which can be fed into the electricity grid.

They are not designed for any other application or connection to other devices.

Any use that differs from or goes beyond the intended usage is considered misuse. RCT Power GmbH shall not be liable for any damage resulting from misuse.

Any misuse will terminate warranty, guarantee and general liability of the manufacturer.



Assembly and mounting.
(Section 2, p.3).



Electrical connection of the devices.
(PV, grid, battery section 3, p.4-5 /
Communication section 4&5, p.7-8 and section 7, p-11 /
Power Switch, Power Sensor section 6, p.9-10).



Switch on Inverter (switch on fuses).
(Section 8.1, p.12).



Access to the inverter via APP.
(Steps 1 to 7 under section 8.2, p.13).



Configure the Power Switch, if available.
(See Manual, Power Switch).



Configure the inverter, select the land and norm.
(Steps 8 to 11 in the setup section 8.3, p14).



Configure the battery and Power Sensor classification.
(Steps 12 to 16 in the setup section 8.3, p.14-15).

The configuration of the battery is now complete.
After the inverter has checked the specifications, it starts charging the battery.

[1] Scope of Delivery

Item	Description
A	Setup manual
B	PV input- and battery connectors (Weidmüller PV-Stick)
C	Wall bracket
D	Inverter
a	LCD display for information on inverter operation
b	DC switch
c	DC PV plugs
d	Cable entries for communication ports
e	Cable entry for AC cable
f	Screw hole for additional protective grounding
g	Name plate with technical data, serial number, symbols
h	DC battery plugs
i	Cable entries for RJ45 connectors: Battery, Power Sensors and Power Switch

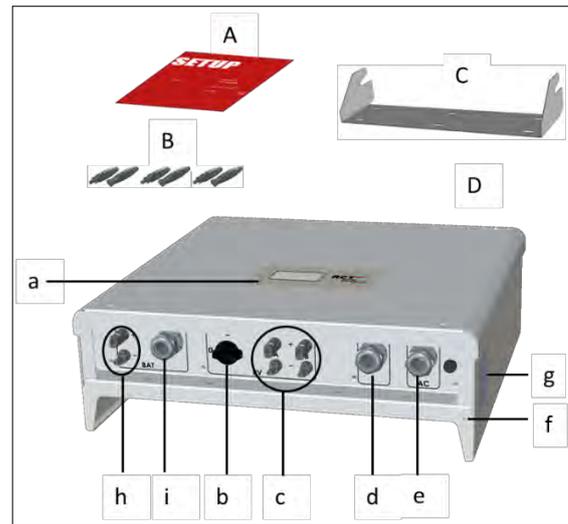
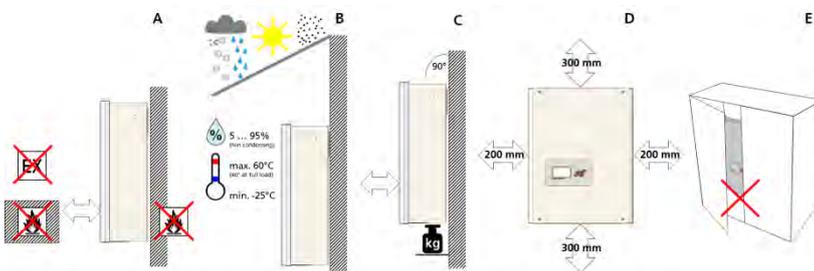


Fig.1

	Look over user manual.		Wait 10 minutes after disconnection before touching inner parts.
	Hot surface		Electrical device: grounding necessary

[2] Inverter Mounting



Item	Description
A	Select non-flammable, firm wall. Room may not contain highly flammable goods, liquids or gas.
B	Protect from snow, rain, direct sunlight and dust. Observe allowed ambient temperature (-25 ... 60°C). Maximum degree of pollution PD2.
C	Mount in upright position. Ensure enough space for easy access. Make sure wall supports inverter weight.
D	Minimum clearance: half of inverter width at both sides and half of height at top and bottom.
E	Do not place inverter in closed cabinet.



Step	Description
1	Attach wall bracket firmly to wall with 3 to 6 screws (\varnothing 6 to 8 mm), matching wall plugs and washers (outer \varnothing min. 18 mm). <i>Material not included in delivery.</i>
2	Take out locking screw of inverter at the top left and right sides. Hook inverter onto wall bracket and fix locking screw back.

[3] Electrical Connection



Risk of death or injury due to electric shock!
While the inverter is connected to grid (AC voltage source), to PV array which is exposed to sunlight (DC voltage source) or to the battery (DC voltage source), high voltage is present in cables and inner parts of inverter.

- **Important: All voltage sources (DC / PV-generator, DC / battery and AC / utility grid) must be disabled before any electrical work.**

To disable PV-generator DC voltage connection turn DC switch to 0-position and wait 10 minutes before continuing.

To disable AC voltage connection turn off AC switch, main breaker or fuse. Make sure, other persons don't switch back.

Do not enable voltage connections until work is finished.

- To disable DC battery voltage connection **both voltage sources (DC / PV-generator and AC / utility grid) must be disabled.**
- During AC connection: Do not exchange L, N and PE wires!
- Make sure other persons keep away during electrical work.



Risk of death or injury due to electric arc!

Disconnecting DC plugs under load can cause electric arcs.



Risk of damage due to improper installation and operation or misuse.

- Contact local utility company or grid operator before connecting inverter to grid.
- Provide for an AC disconnection device (typical miniature circuit breaker 3 pole 6kA, B-characteristic 16A).
- If required in country or installation, install a residual-current device (RCD), or residual-current circuit breaker (RCCB).
- Inverter contains no owner serviceable parts. Contact local authorized personnel for service.
- Do not remove name plate.
- Only RCT Power certified batteries complying with the demands of the certain region are allowed to be used.

[3.1] Overview Connection Parts

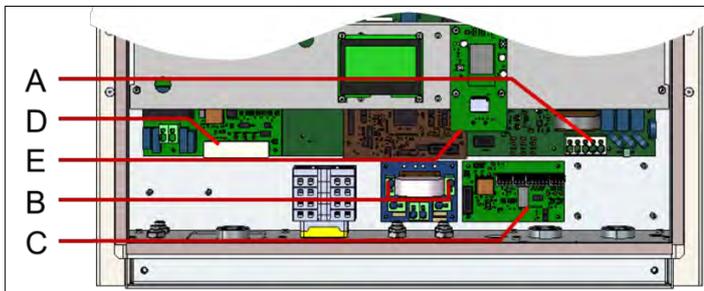
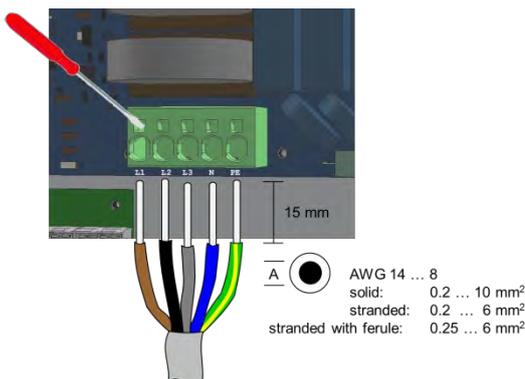


Fig. 2

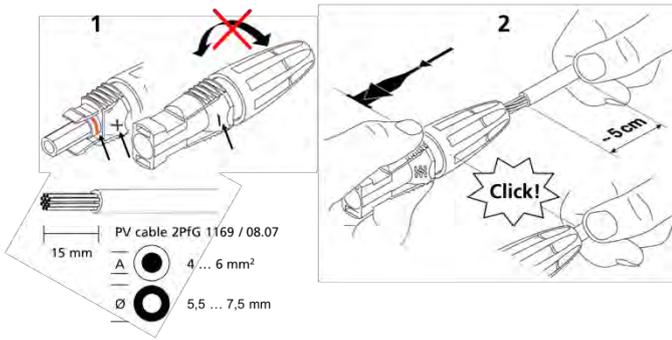
Item	Description
A	AC terminal block for L1, L2, L3, N and PE phases.
B	Clamps for parallel DC mode.
C	Communication board.
D	RJ45 Connectors for Battery, Power Sensor and Power Switch.
E	RJ45 socket for connection of the Ethernet interface.

[3.2] AC Connection



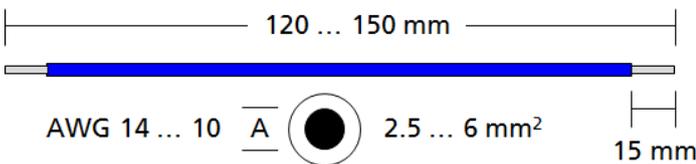
Step	Description
1	Remove cover of inverter. Locate AC terminal block (Fig. 2, A).
2	Feed cable through AC entry (Fig. 1, e). Push down clamps to insert L1, L2, L3, N and PE.
3	Tighten swivel nut of cable entry.

[3.3] DC Connection

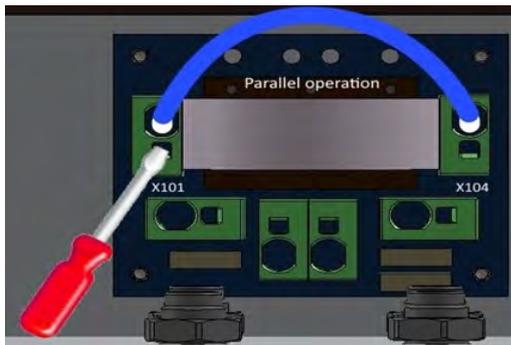


Step	Description
1	Do not turn plug parts before inserting the cable. Select correct plugs for polarity of PV and battery strings.
2	Push cable into plugs straight until the spring clamp locks.
3	Turn lower part of plug shut. Make sure DC switch is "0".
4	Plug corresponding plus and minus poles into adjacent PV plugs of inverter (Fig. 1, c).

[3.4] DC Parallel Mode



Material not included in delivery.



This section applies only, if several Strings with an equal amount of modules are to be connected in parallel and the maximum input current per input therefore exceeds 12A.



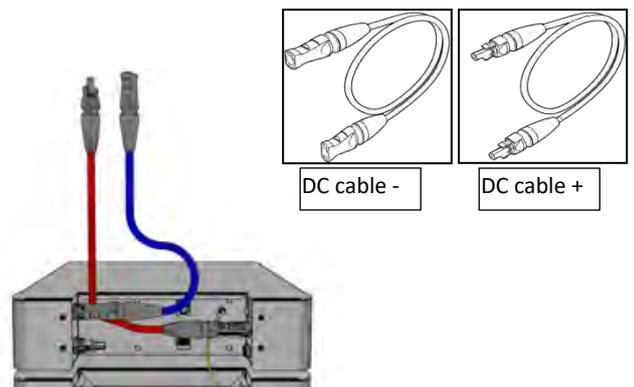
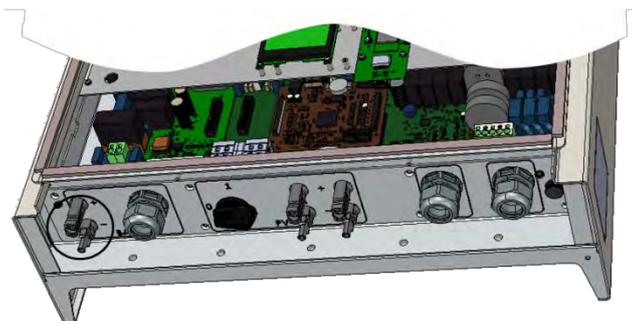
To prevent personal injury or property damage, make sure that there is no PV-DC connector plugged and DC-switch is "0" in during this installation.

Step	Description
1	Remove cover of inverter.
2	Connect clamps X101 and X104. (Show Fig. 2, B).

[3.5] DC Battery Connection

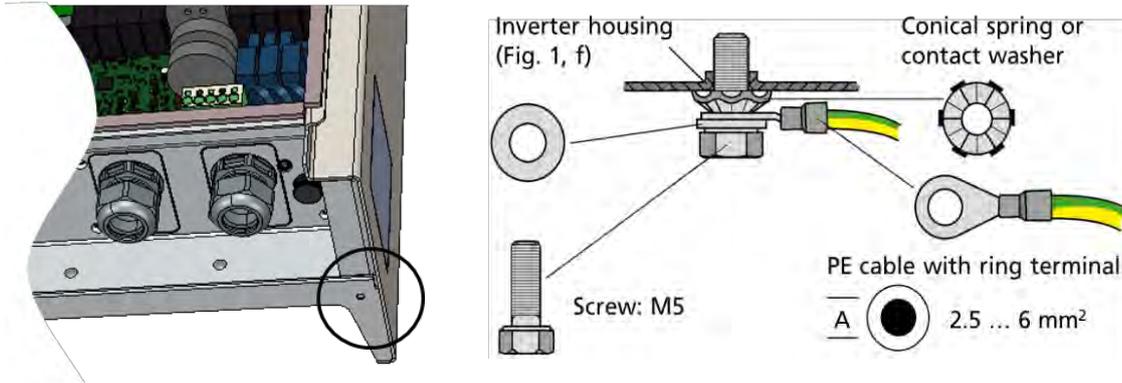
Make sure the DC switch of the inverter is set to "0", the battery ON/OFF switch set to "0" and AC through the main breaker or fuse is disconnected.

Plug the battery connectors to the inverter.



(The connection cables from the inverter to the battery is not included).

[3.6] Second Protective Inverter Grounding



Material not included in delivery.

If required in the country of installation, attach a second protective earth connection to the housing.

[4] I/O-Board Communication Connection

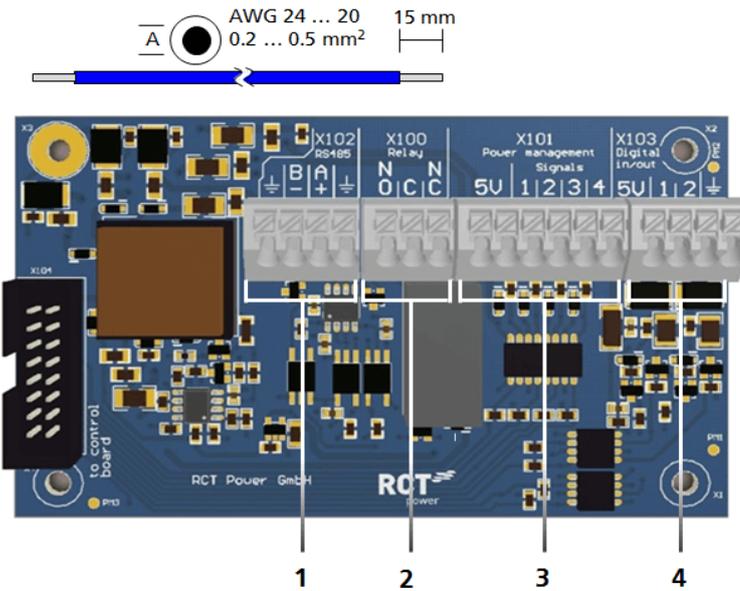


Fig.3

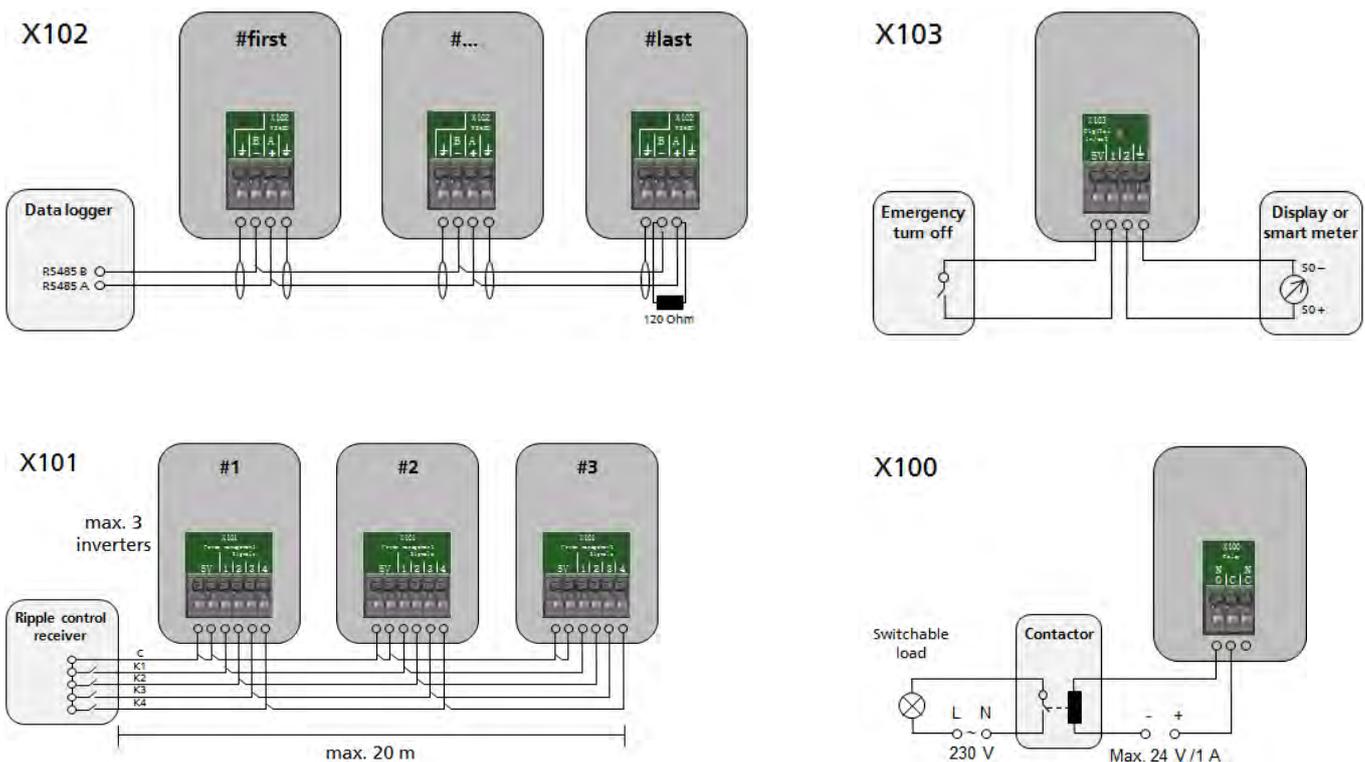
Communication Ports

Item	Description
1	X102: serial RS485 interface.
2	X100: Multifunctional Relay, max. 24 V,1A.
3	X101, Power management: 4 digital inputs for potential free relay contacts.
4	X103: Digital in/out (S0-signals), max. Input 24 V, max. output 5 V 10 mA

[4.1] Connection of Communication Ports

Step	Description
1	Use the feed cables for the corresponding cable entry (Fig. 1, d).
2	Select correct port (see next section), press down spring clamp, insert cables and release.

[4.2] Wiring of Communication Ports



[5] RJ45 Connectors for Power Battery, Power Sensor and Power Switch communication

The inverter communicates with the battery via the CAN-Bus.

If the inverter is delivered with an optional Power Sensor or Power Switch please refer to user manual of these items for further detailed commissioning information.

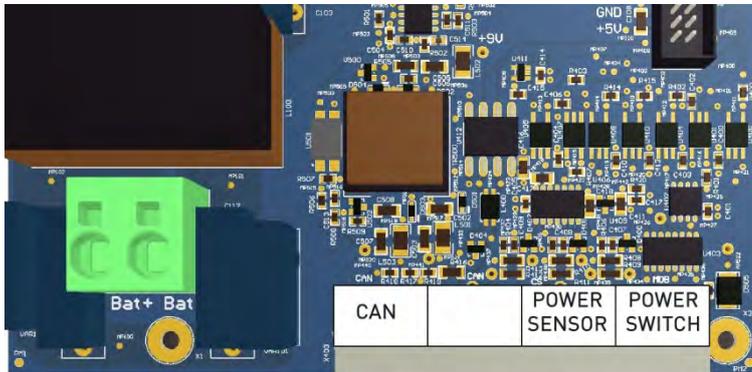


Fig. 4

RJ45 – Communication Ports

Description

CAN:

Battery communication connector.

Power Sensor:

Current sensor communication connector.

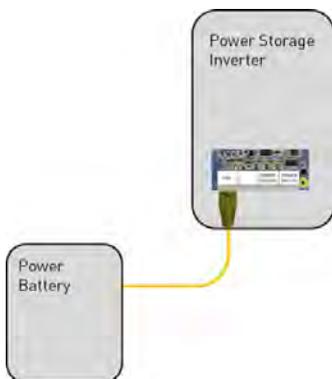
Power Switch:

Power Switch communication connector.

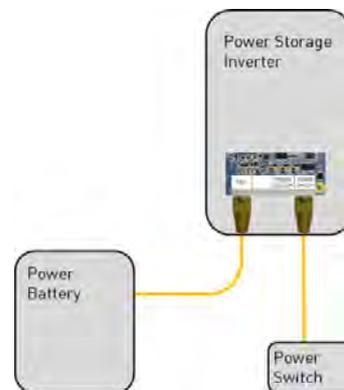
[5.1] Connection of RJ45 – Communication Ports

Step	Description
1	Open cable entry (Fig. 1, i) and feed cables.
2	Select correct port (see Fig. 4 and next section), insert cables in RJ45 connectors.

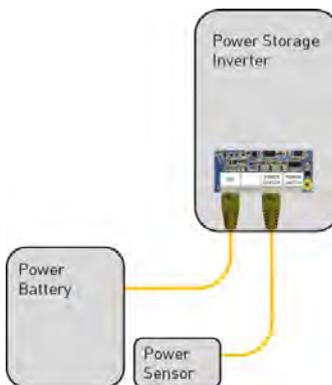
[5.2] Wiring of RJ45 – Communication Ports



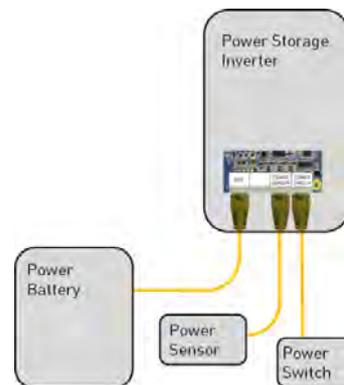
Standard communication with Power Battery



Additional Power Switch communication



Additional Power Sensor communication



Additional Power Switch and Power Sensor communication

[6] Connection - Power Switch

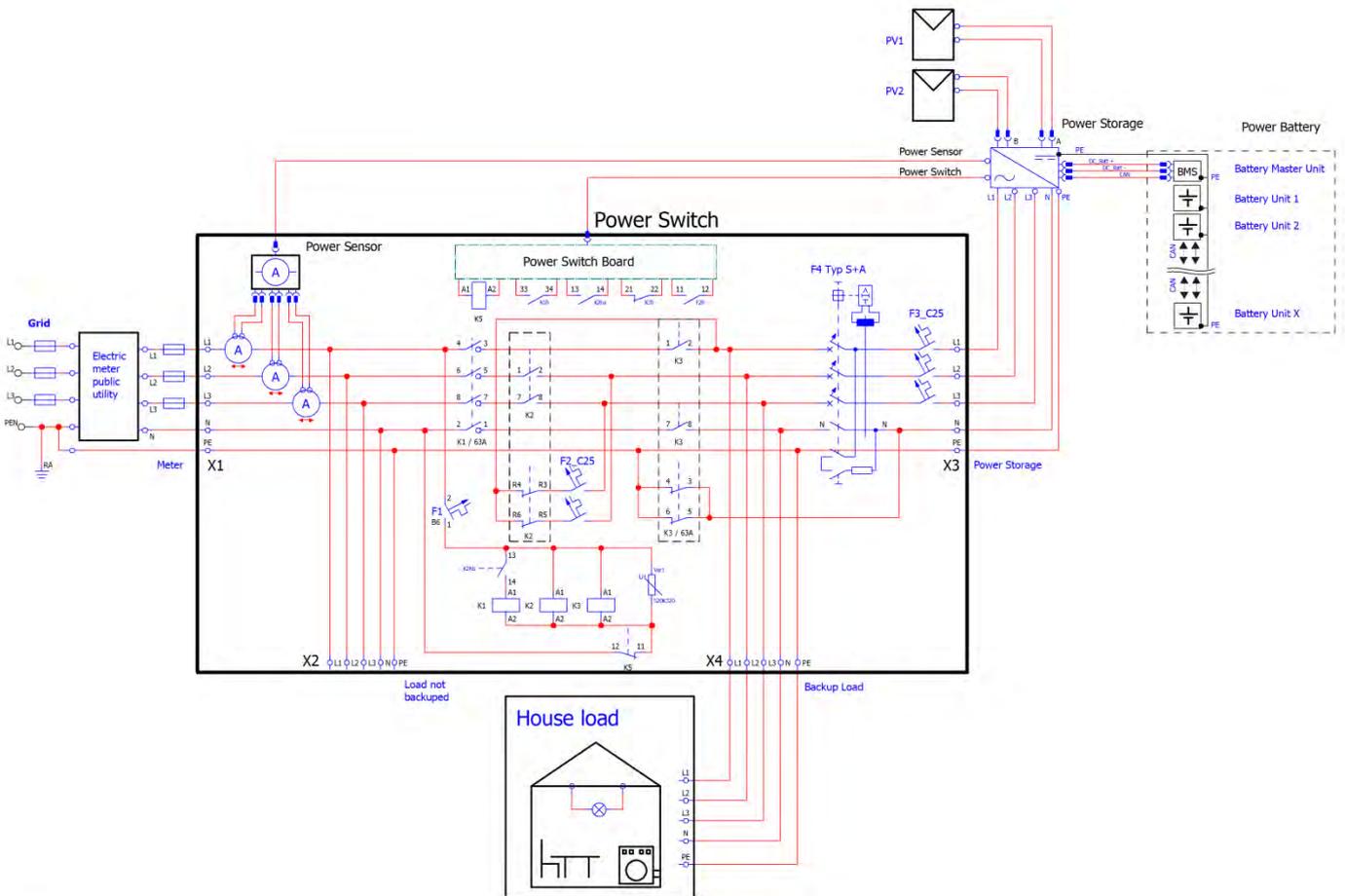


This Section applies only in use with a RCT Power Switch and battery system.



Please note for a correct function of the Power Switch is only possible if the entire installation is as TN-C-S- or TN-S system!

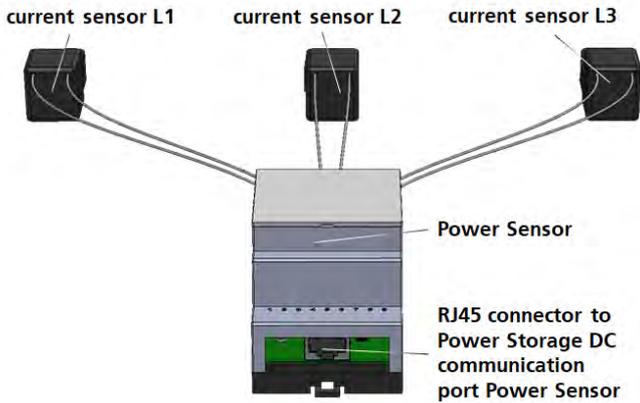
Step	Description
1	Switch off the system (show section 9).
2	Install the Power Switch in the service connection box or in the near.
3	Connect the Power Sensor and Power Switch via patch cable with the Power Storage DC at the RJ45 connector X403.
4	For further configurations please refer to user manual.



[6.1] Connection - Power Sensor

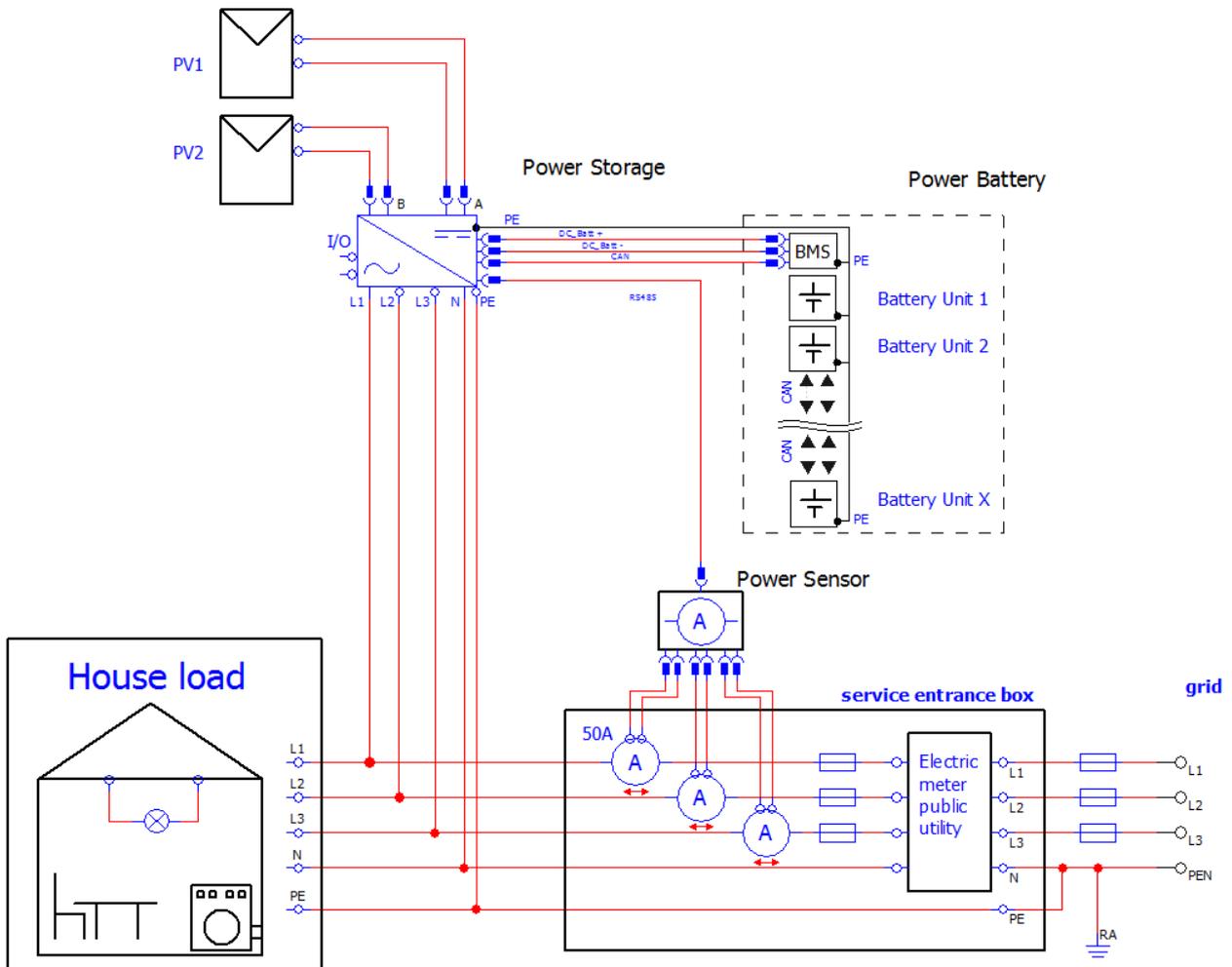


The Power Storage DC system functionality depends on energy consumption measurement.
This section applies only in use with a Power Sensor.



Step Description

- 1 Place the Power Sensor in the service entrance box.
- 2 Click the three current sensors around the phases L1, L2 and L3 wires in the service entrance box.
(The order and direction of installation is not important).
- 3 Connect the Power Sensor via Patch cable to the Power Storage DC at the RJ45 connector X403 "Power Sensor"
(see fig. 4).
- 4 For further configurations please refer to user manual.

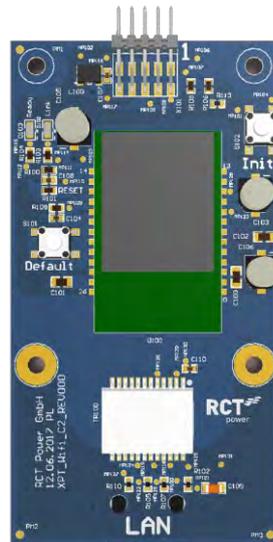


[7] Connection – Ethernet-Interface

In addition to Wi-Fi-communication, the Power Storage DC offers the option to communicate via an Ethernet interface after initial start-up.

For this, a corresponding network cable (at least Cat5e) must be connected to the Power Storage DC and the corresponding terminal (preferably a router).

The configuration of this connection is made via the menu item “network settings” in the RCT Power App and is explained in the manual.



RJ45 connector

Step	Description
1	Open cable entry (Fig. 1, d) and feed the cable.
2	Select correct port, insert cable in RJ45 connector.

[8] Commissioning

Ensure proper mechanical and electrical installation before commissioning the solar inverter.

Check the cables to ensure, that they are in sound condition.



Always disconnect the mains connection first by switching off the corresponding mains fuse and before disconnecting the solar generator side by opening the DC load break switch.

The DC-connectors on the solar generator side must not be disconnected under load. First turn the DC load break switch to position “0” and always switch off battery first!

To ensure proper function of the DC system a RCT Power Sensor is required which transmits the grid feed-in power to the inverter.

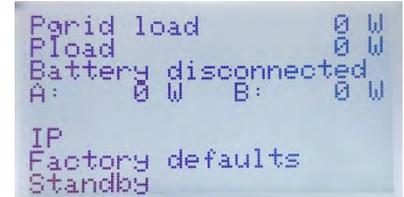
If a storage system already exists this information can also be transmitted by networking via LAN / WLAN and thus dispenses with the RCT Power Sensor.

Further configuration inter alia for the networking of RCT Power devices via LAN / WLAN can be found in the manual on our website www.rct-power.com.

[8.1] Switch on Inverter

Step	Description
------	-------------

- | | |
|---|---|
| 1 | Establish grid connection via the external circuit breaker. |
| 2 | Switch on the solar generator voltage by closing the DC load break switch (position 1).
The solar inverter starts operating, when the input voltage level and power is adequate. |



```
Pgrid load 0 W
Pload 0 W
Battery disconnected
A: 0 W B: 0 W
IP
Factory defaults
Standby
```



NOTICE

Please note that the inverter is powered by PV modules.

Accordingly a start of the power supply and thus commissioning only with sufficient irradiation is possible.

[8.2] Access to the inverter



NOTICE

The Solar Inverter is equipped with an internal Wi-Fi unit. To set up Solar inverter you need to access via Wi-Fi due to the suitable Android APP.

The Android APP is the central user interface for commissioning. It ensures easy data collection and troubleshooting.

Obtaining Android App: Go to Google Play Store, search for "RCT Power App", and install.

Step	Description
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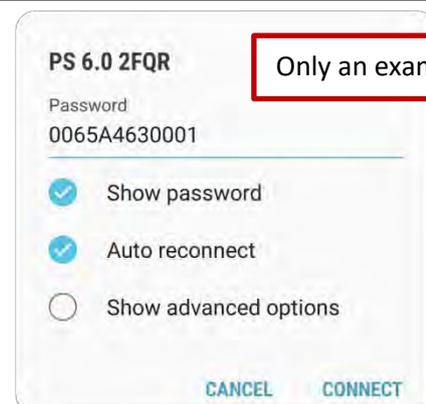
- | | |
|---|---|
| 1 | Activate Wi-Fi on your smartphone (or tablet computer). |
| 2 | Connect with SSID identical with the name of the Power Storage on inverter display via Wi-Fi. (e.g. PS 6.0 2FQR). |



If the Inverter is already in a network via Wi-Fi, connect to the network.



- | | |
|---|---|
| 3 | If you connect the first time with a device to the inverter you need a password.
The password corresponds to the serial number of your device (see display or name plate). |
|---|---|

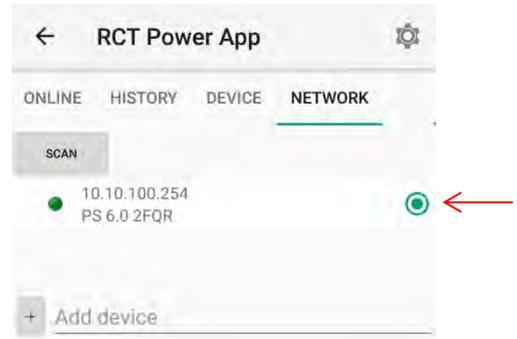


4 Start "RCT Power APP".



5 Switch to tab "Network" and press "Scan".

6 Activate "10.10.100.254" (or if you have renamed the device choose this) by choosing radio button.



7 If the connection is made with an inverter, the name is displayed on the head and the icon is edged.

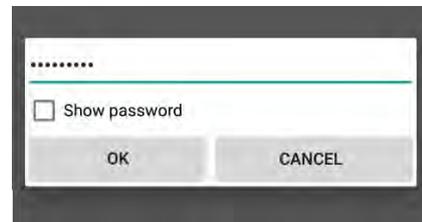


[8.3] Configure inverter

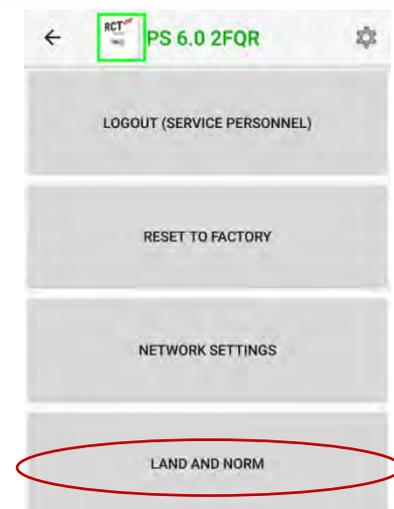
8 Press "⚙️".



9 Enter setup procedure by "Login" with suitable password for installer-level

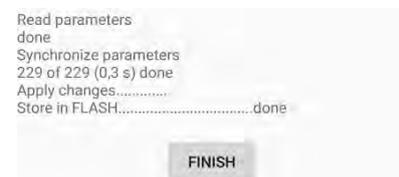


10 Choose "Land and Norm", select appropriate norm and "apply".



11 Wait during parameters are synchronizing and stored. When finished press "Finish".

Return to the main menu.



[8.4] Configure plant peak power and power reduction

In order to obtain the maximum yield from the solar system, it is possible to configure a dynamic power reduction. There is no additional equipment required for this configuration apart from the Power Sensor. The feed-in power is measured at the mains connection point and is only capped if the excess power exceeds the set value.

- 1 Switch to „Device“ and tap on „Settings“ and in following on „Device settings“.
- 2 Enter your system peak power and the required limiting factor in the following screen.
Please note that after entering the value you confirm it on the keyboard (depending on the device "Enter" or "Ok").

External power reduction based on solar plant peak power: e.g. 70% ($\cong 0,70$)

Solar plant peak power [Wp]

Resulting max. allowed grid feed-in power [W]



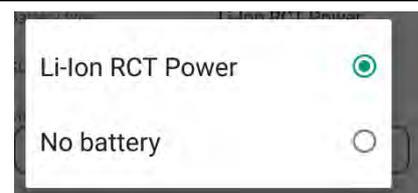
The corresponding field then briefly turns red and white again.

Please note: If your system contains **several devices** you must the enter **peak power** of the **combined system**..

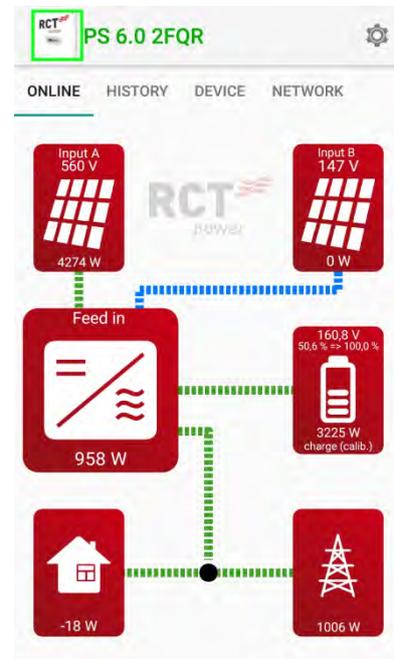
Changes to settings are only saved permanently if they are flashed to the inverter's memory!
It is therefore essential to press "FLASH" to confirm your settings changes. They will otherwise be lost when the inverter is switched off.

[8.5] Configure battery

- 1 Go to "Device" and click on "Settings", then click "Battery".
- 2 Click on "Battery type" and select "Li-Ion RCT Power" or your corresponding battery type.
- 3 Turn on the battery by setting the battery ON / OFF switch to "1".



- 15 The inverter now connects to the battery .
 After the inverter checked the specifications and connected to the battery, it starts to arrange the current sensor.
 Once this is done, the inverter resets and flashes the settings.
 After that he starts to calibrate the battery.
 The battery will be charged to 100%, this may take several hours.
 (When calibrating, power may be used out from the grid to speed up the process if the power is insufficient.)
 When calibration is complete, the system automatically switches to compensation mode.



- 16 Check if the Power Sensor has been arranged.

Go to the homepage “online” and press the



“home” symbol and check the display.

➔ Current sensors are tuned = 1

The screenshot shows the RCT PS 6.0 2FQR control interface with a table of system parameters. The table has two columns: the parameter name and its value. The row "Current sensors are tuned" is circled in red.

Parameter	Value
Load household [W]	-51
Digital I/O 1 usage	I/O not used
Digital I/O 2 usage	I/O not used
Current sensors detected	1
Current sensors are tuned	1
Max. compensation power [W]	6100

Note: For further information on installation and operation, please refer to the detailed user manual, which can be obtained from our website www.rct-power.com .

[9] How to switch off the system

Step Description

- 1 Locate DC switch (Fig. 1, b) and turn to “0” position and switch off the battery with the ON/OFF switch to “0”.
- 2 Switch off circuit breaker, main breaker or fuse for disconnecting inverter from utility grid.
- 3 Wait min. 10 minutes until capacitors have discharged.
- 4 Remove the battery- and DC connectors(Fig. 1, c & h).
 Press latches of male plug together to unlock and pull off DC plugs.

[10] Technical Data

Power Storage DC 4.0 6.0

Order Number	110-0001	110-0002
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DC-INPUT

Max. recommended DC power (South / East-West)*	5,4 kW / 6 kW	8,1kW / 9 kW
MPPT	2 (paralleling possible)	
Input per MPPT	1	
Maximum DC current per MPPT	12 A (24 A in parallel mode)	
Rated DC voltage	700 V	
DC start up voltage / power	150 V / 40 W	
DC voltage range	140 V ... 1000 V	
MPP voltage range	265 V ... 800 V	265 V ... 800 V
Maximum voltage DC	1000 V	
Connector type	Weidmüller PV-Stick (MC4 compatible)	

* Depending on orientation, inclination and place of installation.

BATTERY-INPUT

DC voltage range	120 V ... 600 V	
Maximum charge / discharge current	20 A / 20 A	
Maximum charge / discharge power	9220 W / 4000 W	9220 W / 6000 W
Connector type	Weidmüller PV-Stick (MC4 compatible)	

AC-OUTPUT

Rated AC output power	4000 W	6000 W
Maximum active power	4000 W	6000 W
Maximum apparent power	6300 VA	6300 VA
Nominal AC current per phase	5,8 A	8,7 A
Maximum AC current per phase	9,1 A	9.1 A
Rated frequency	50 Hz / 60 Hz	
Frequency range	45 Hz ... 65 Hz	
Max. switch-on current	9,1 A, 0,1ms	
Max. fault current (RMS)	285 mA	
Rated AC voltage	230V / 400 V (L1, L2, L3, N, PE)	
AC voltage range	180V ... 290V	
Total harmonic distortion (THD)	< 2% at rated power	
Reactive power factor (cos phi)	1 (adjustable range 0,8 cap...0,8 ind)	
Anti-islanding operation	Yes	
Earth fault protection	RCD	
DC-current injection	< 0,5% In	
Required phases, grid connections	3 (L1, L2, L3, N, PE)	
Number of feed-in phases	3	
Grid voltage monitoring	3-phase	
Type of AC connection	Spring clamps	

PERFORMANCE

Stand-by consumption	< 4.0 W	
Maximum efficiency (PV – Grid)	98,16%	
European efficiency (PV – Grid)	97,6%	97,9%
Maximum efficiency (PV – Battery – Grid)	95,9%	
Topology	Transformerless	

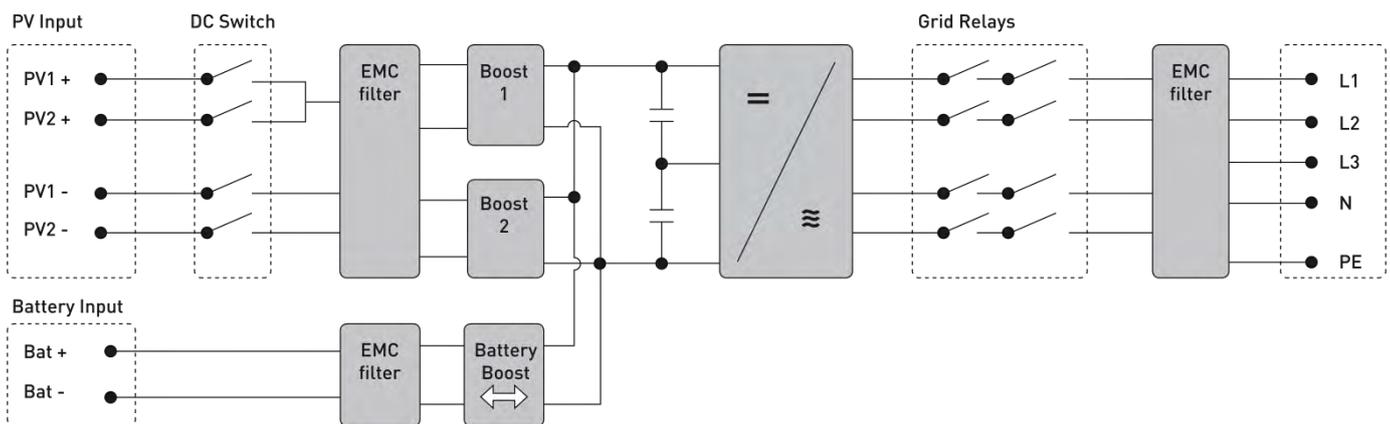
OTHER

PV – DC-switch	Integrated
DC overvoltage category	II
AC overvoltage category	III
Data interface	WIFI, LAN, RS485, Multifunctional dry contact, 4 x digital in, 2 x digital in/out
Display	LCD dot matrix 128 x 64 with backlight
Cooling	Convection
IP degree of protection	IP 42
Max. operating altitude	2000 m
Max. relative humidity	5 - 85% (non condensing)
Typical noise	< 35 dB
Operating temperature range	-25°C ... 60°C (40° at full load)
Type of installation	Wall mounting
Dimensions (height x width x depth)	570 x 585 x 200 mm
Weight	30 kg

SAFETY / STANDARDS

Protection class	1
Overload behavior	Working point adjustment
Certificates	CE, VDE-AR-N 4105:2018-11, EN 50549 Further certificates: www.rct-power.com
EMC	EN61000-6-2, EN61000-6-3, EN61000-3-2, EN61000-3-3
Safety	EN/IEC62109-1, EN/IEC62109-2

BLOCK DIAGRAM



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