

MANUAL

Power Storage

EN



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Document number: 03/2017

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Foreword

Thank you for choosing a RCT Power Storage!

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

RCT Solar Inverters are transformerless, highly flexible and robust. These devices will bring highest possible profit from your PV power system.



PV array, inverter, cables and other components of the photovoltaic system are electrical devices which may generate various hazardous risks during installation, wiring, connecting to the grid, operation, maintenance and service. To prevent personal injury or material damage, please read and observe all documents shipped with the product and information on the product carefully.



Keep this manual in a convenient place for future reference.

Declaration of Conformity

The company **RCT Power GmbH** hereby declares, that the described Power Storage in this document is in accordance with the essential requirements and the other relevant provisions of the guidelines below.

- Directive 2014/30/EC
(Electromagnetic Compatibility, EMC)
- Directive 2014/35/EC
(Low Voltage Directive)
- Directive 1999/05/EC
(On Radio Equipment and telecommunications Terminal Equipment, R&TTE)

For a detailed EU declaration of conformity, please visit:

www.rct-power.com

1 About this Document

1.1 Validity, purpose and scope of the document and legal provisions

This document is valid for Power Storage 4.0, 5.0 and 6.0.

Power Storage 4.0, Power Storage 5.0 and Power Storage 6.0 will be referred to as “inverter”, “hybrid inverter”, “device” or “product” hereinafter unless specified otherwise.

This setup manual contains a general instruction required for installing, wiring, commissioning and operating the inverters and batteries.

The contents of the manual will be periodically updated or revised due to product development.

The latest manual version can be accessed 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 further warranties can be derived from this document.

1.2 Symbols- and note explanation

Important instructions contained in this manual should be followed during installation, operation and maintenance of the inverter. They will be highlighted by the following symbols.

Symbol and Note	Description
 DANGER	This symbol indicates an immediate danger with a high level of risk which, if not avoided, will result in death or serious injury.
 WARNING	This symbol indicates an immediate danger with a medium level of risk which, if not avoided, could result in death or serious injury.
 CAUTION	This symbol indicates an immediate danger with a low level of risk which, if not avoided, could result in minor or moderate injury.
 NOTICE	This symbol indicates a situation which, if not avoided, could result in equipment or property damage.
	This symbol indicates important additional information, emphasized contents or tips which contribute to a better understanding of the inverter and help to solve problems and save time.

2 Safety Instructions

2.1 Personnel and qualifications



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

Qualified personnel eligible to perform the tasks described in this document have following skills and knowledge.

- They are trained in installing electrical devices.
- They understand the functions of a solar inverter and know how it operates.
- They are familiar with lithium ion batteries.
- They have read and understood the documents shipped with the device.
- They know and use the appropriate tools and equipment to perform the work.
- They are familiar with all applicable laws, regulations, standards and codes for electrical devices.
- They are familiar with safety requirements and safety-related guidelines for electrical devices.
- They are familiar with national work protection laws and regulations.
- They know and use the appropriate personal protective equipment.

2.2 Safety precautions

The Power Storage has been designed and tested strictly according to the international safety regulations. All safety instructions related to the electrical and electronic device must be complied with during installation, operation and maintenance.



DANGER

Risk of death or serious injury due to electric shock!

When the inverter is connected to the utility grid (AC voltage source) and/or to a PV array which is exposed to sunlight (DC voltage source), high voltage is present within the inverter components and cables which can cause fatal electric shocks.

- Any work which involves wiring, connecting or opening the inverter housing has to be performed by qualified personnel.
- Important: All voltage sources (DC / PV-generator, DC / battery and AC / utility grid) must be disabled before opening the inverter cover.
- To disable DC voltage connection turn DC switch to "0"-position.
- To disable AC voltage connection turn off AC switch, main breaker or fuse. Make sure, other persons don't switch it back during electrical work.
- To disable DC battery voltage connection both voltage sources (DC / PV-generator and AC / utility grid) must be disabled and turn battery switch to "0"-position.
- Wait at least 10 minutes until the capacitors are discharged completely and verify with appropriate testing device that no voltage is present.
- Make sure other persons keep away from cables and inner inverter parts.



WARNING

Risk of death or serious injury due to electric arc!

Installations, service and maintenance work may only be carried out by qualified electrician.

- Do not expose the product to impact or pressure.
- Do not enable voltage connections until electrical work is finished.



CAUTION

Risk of burns due to hot parts of inverter housing.

Some parts of inverter housing may become hot during normal inverter operation.

- Be careful with touching parts while inverter is operating.
- Do not cover inverter (especially upper side or heat sink).



NOTICE

- All electrical installations must be made in accordance with local and national standards and regulations.
- Before connecting the inverter to the electrical grid, contact the local utility company or grid operator.
- In order to prevent personal injury make sure that electrically conductive surfaces of the whole PV system are grounded.
- Malfunction might impair inverter and battery safety. Do not operate or restart inverter, if it shows any visible damage or if error message is unclear.
- Inverter contains no owner serviceable parts. Please contact local authorized personnel if any service work is required.
- Use only accessories and spare parts approved by the inverter manufacturer. Never modify the inverter or components of the inverter.
- Do not remove nameplate of inverter.

3 Product Introduction

3.1 Intended usage

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

Please note:

They are not designed for any other application or connection with 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 cause the termination of the warranty, guarantee and general liability of the manufacturer.

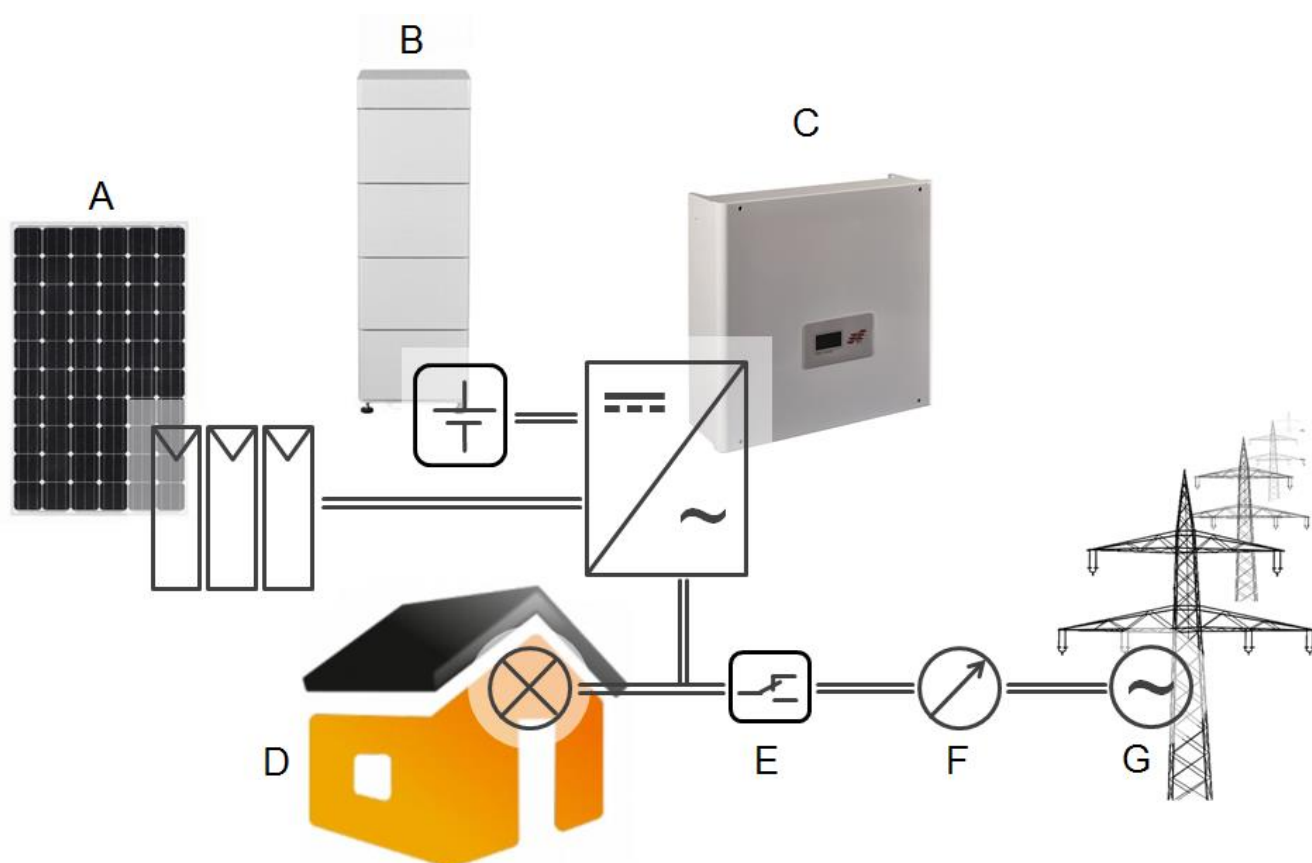


Fig. 3-1 Intended use of the Power Storage and Power Battery in the PV Power System

Item	Description	Note
A	PV strings	Monocrystalline silicon; polycrystalline silicon and thin-film without grounding and protection class II
B	Battery	Power Battery 5.7, 7.6, 9.6, 11.5
C	Inverter	Power Storage 4.0, 5.0, 6.0
D	Household load	Household appliances
E	Power Switch	Switches Household to island mode during utility grid power outage
F	Power Sensor	Current sensors for power measuring
G	Utility grid	TT, TN-C, TN-S, TN-C-S

3.2 Product description

3.2.1 Scope of delivery

Before shipment our products are checked for proper condition.

Despite careful packaging, transport damage can occur, for which the transport company is generally responsible.

If you notice any damage to the packaging or the Power Storage, please inform immediately the transport company. If necessary, your specialist dealer will assist you.

Do not install, connect and operate the inverter, if any damage is detected.

Check the content for completeness according to Fig. 3-2.

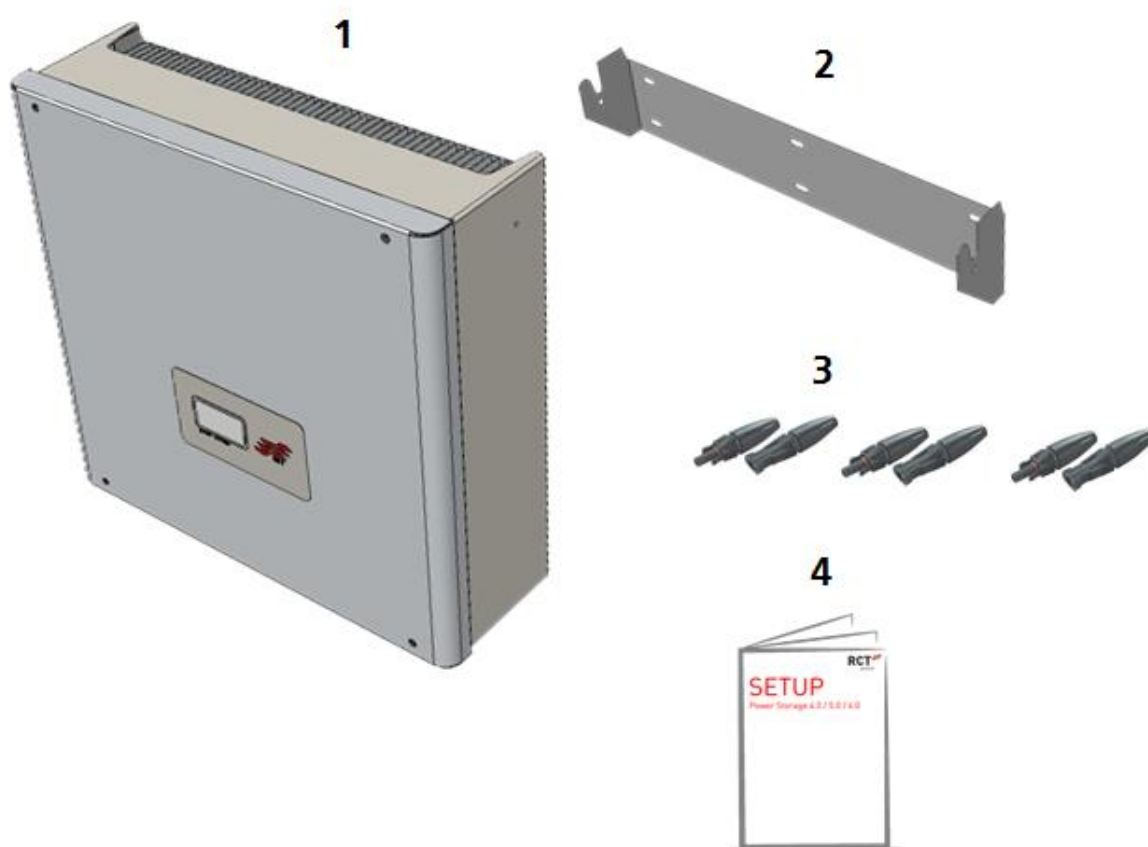


Fig. 3-2 Delivery Contents

Item	Description
1	1x Power Storage
2	1x Wall bracket used to mount inverter onto the wall
3	3x PV Stick + (Weidmüller) 3x PV Stick – (Weidmüller)
4	1x Setup Manual

3.2.2 Product appearance

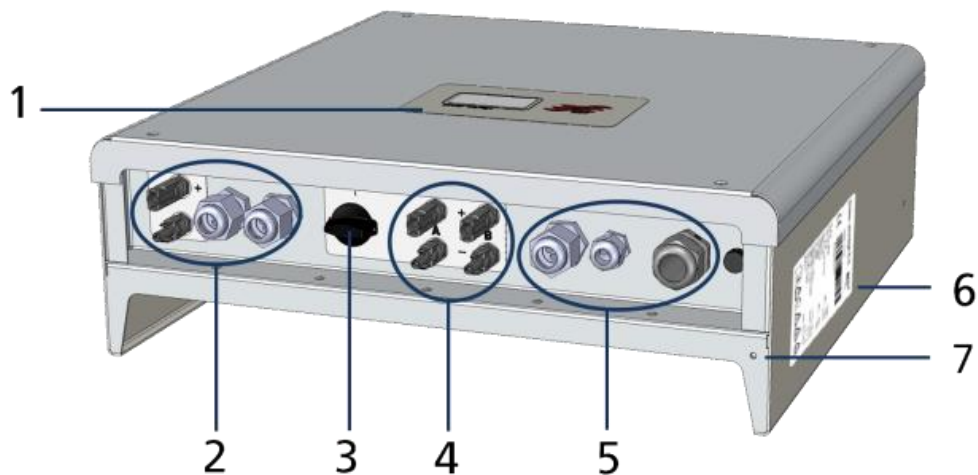


Fig. 3-3 Product description

Item	Name	Description
1	LCD display	Display showing information on inverter operation
2	Battery connection area	Battery connections and cable entries (see section 5.1 to 5.3)
3	PV switch	Normal operation: "1", shuts down inverter when turned to "0" position and no battery connected
4	PV connector	Connection to PV-generator
5	Connection area	Connections and cable entries (see section 5.1 to 5.3)
6	Name plate	Contained technical data, scan code and symbols
7	Screw hole	Screw hole for additional protective grounding of inverter housing (see section 5.5)

3.2.3 Name plate and cautionary note

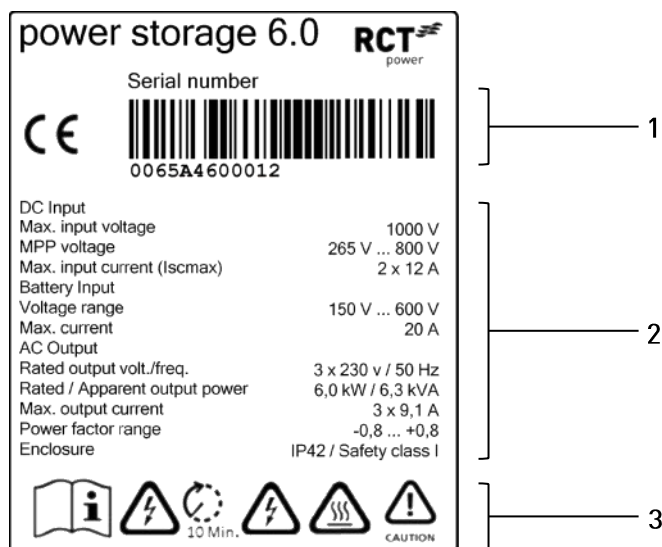


Fig. 3-4 Name plate

Item	Description
1	Serial number
2	Technical data
3	Symbols:



Look over the user manual before any work at the inverter.



Wait at least 10 minutes after disconnecting the inverter from voltage sources (utility grid, PV input and battery) before touching inner live parts.



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



Hot surface! In order to reduce the risk of burns, do not touch the hot surface when the device is running.



High leakage currents. Be sure that grounding connection is established before connecting power supply (see section 5).

4 Mechanical Installation

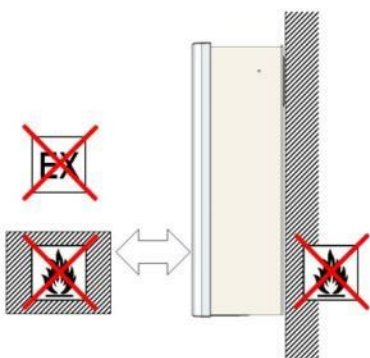
4.1 Place of location



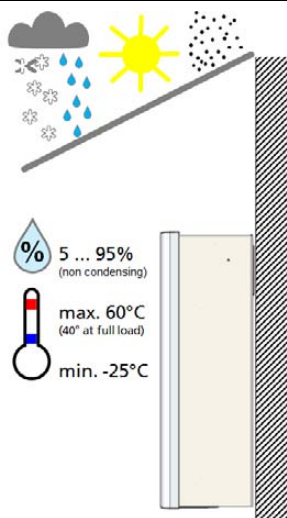
DANGER

Risk of death or serious injury due to fire or explosions!

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



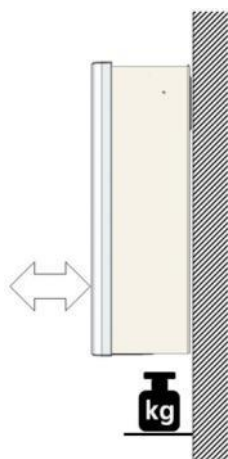
Select non-flammable, firm wall. Room may not contain highly flammable goods, liquid or gas.



Protect the Inverter from snow, rain, direct heat radiation (e.g. sun, heater, etc.) and dust.

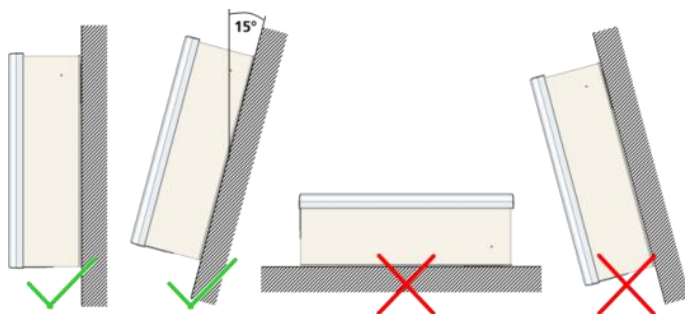
The following requirements must be fulfilled:

- Relative humidity 5 ... 95 % (non condensing).
- Ambient temperature -25 ... 60 °C (40°C at full load).
- Maximum degree of pollution PD 2.

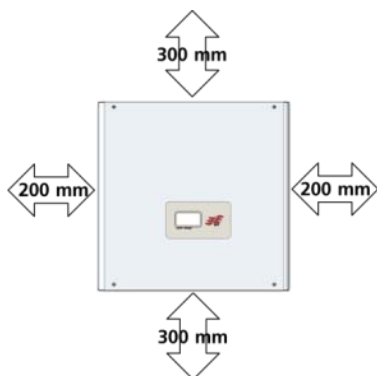


Make sure, the selected location and surface supports the weight of the inverter.

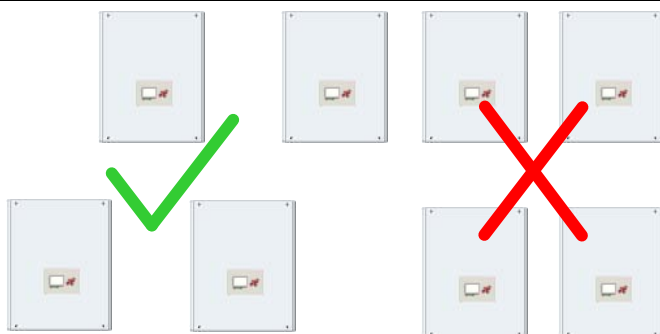
The selected location must be readily and safely accessible at all times without additional aids (ladder, scaffold).



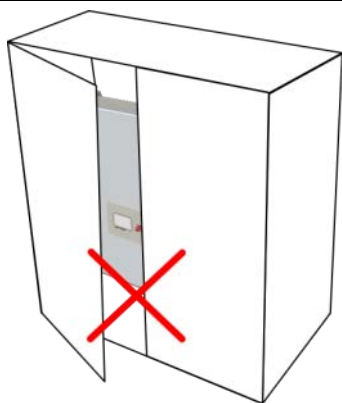
Place the inverter in an upright position or slightly tilted backwards. Do not install it on a horizontal surface or tilted forwards.



Minimum clearance to allow sufficient by cooling air convection.



Several inverters may not be mounted over each other to prevent them from heating each other.



Do not place inverter inside a closed cabinet.



NOTICE

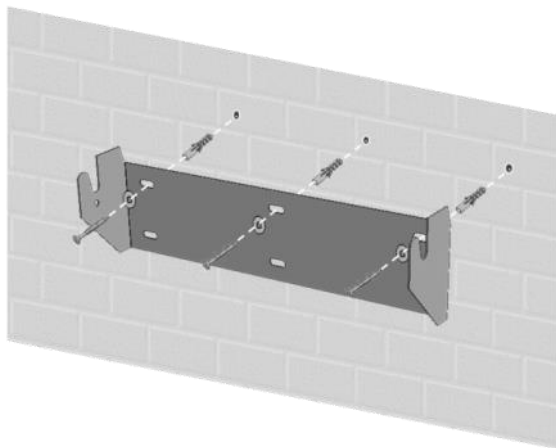
- Make sure, that there is sufficient air convection around the inverter. Overheating of the inverter due to poor cooling will result in decreasing performance.
- The inverter emits noise of maximum 35dB. If installed in places where people might be disturbed by noise, make sure the surface to which the inverter is attached is not amplifying vibration or sound.

4.2 Mounting

Additionally required material (not included in delivery):

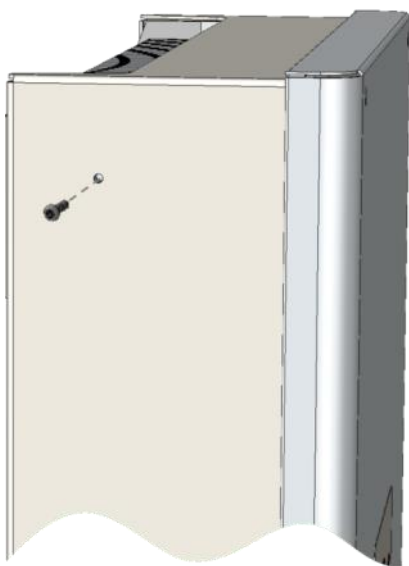
- Minimum 3 to 6 screws with diameter of 6 to 8 mm
- Matching wall plugs
- Matching washers with minimum outer diameter of 18 mm

Mounting Procedure:



Use the wall bracket as template to mark drill holes at the wall. Use at least one hole left, middle and right to fix the bracket to the wall with minimum three screws, washers and wall plugs.

Attach wall bracket firmly to wall.



Unscrew and take out locking screws on the upper left and right side of inverter housing.

Insert the retaining bolts found at the rear (top) of the Power Storage into the openings of the mounting frame.

Secure the inverter by retightening the retaining screws.

Check if inverter is safely fixed.

5 Electrical Connection

5.1 Overview connection parts

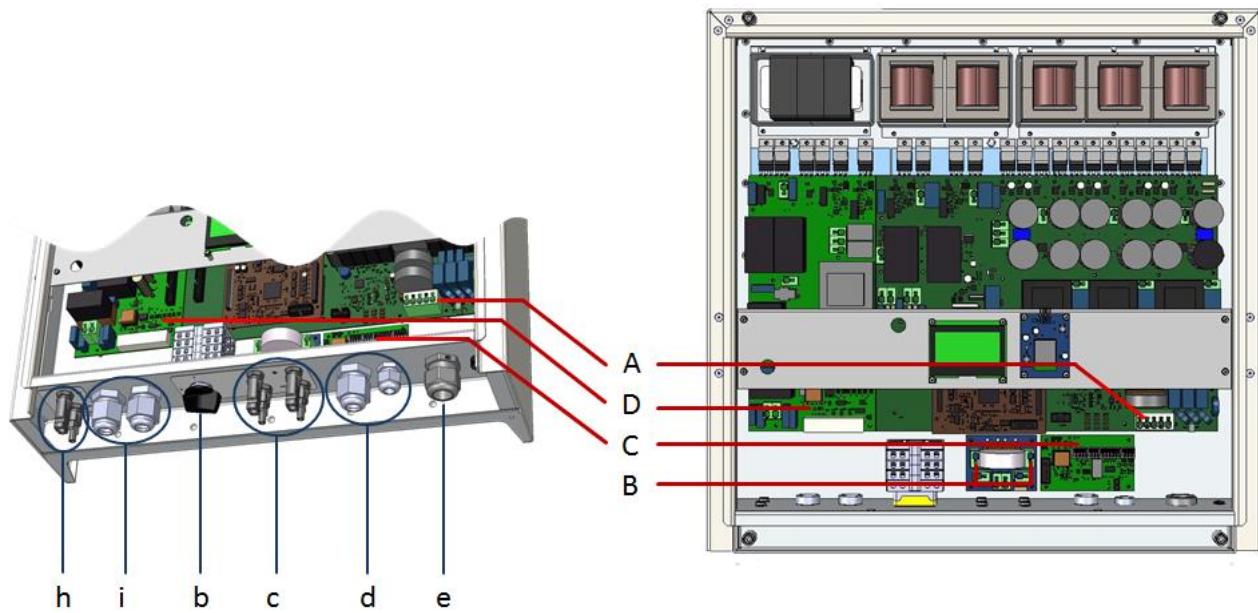


Fig. 5-1 Overview connection area and inner connection parts

Item	Name	Description
b	PV switch	Normal operation: "1" Shuts down inverter when turned to "0" position and no battery connected.
c	PV connectors	Two independent solar inputs (A & B), connector type: Weidmüller WM4.
d	Cable entries of communication module	Cable entry for the communication interfaces.
e	AC cable entry	Entry for cable connecting inverter to utility grid (AC).
h	DC battery plugs	Input for battery, connector type: Weidmüller WM4.
i	Cable entries to the RJ45 connectors	Cable entries for RJ45 connectors, battery, Power Sensor and Power Switch.
A	AC terminal block	Terminal block with clamps for inserting L1, L2, L3, N and PE phases of AC cable.
B	Parallel operation clamps	Clamps for parallel DC mode (see section 5.3).
C	communication board	The communication board has a serial RS485 interface, a multifunction relay, 4 digital inputs for ripple control receiver and other digital inputs and outputs (S0) for connecting current sensors or displays.
D	RJ45 connector for Battery communication via CAN, Power Sensor and Power Switch	I/O communication board for connecting Power Sensor, Power Switch and Battery.

5.2 AC connection

Connection procedure:



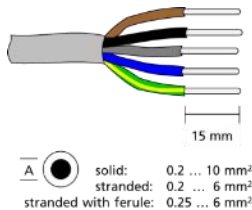
Risk of death or serious injury due to electric shock!

- The tasks described in this section have to be performed by qualified personnel only.
- Important: the voltage connections (DC / PV-generator, DC / battery and AC / utility grid) must be disabled before any electrical work on inverter.
- To disable PV voltage connection turn PV switch to “0”-position (at the Inverter).
- To disable battery voltage connection turn switch to “0”-position (at the Power Battery Master).
- To disable AC voltage connection turn off AC switch, main breaker or fuse. Make sure, other persons don't switch it back during electrical work.
- Do not enable voltage connections until work is finished.
- Make sure other persons keep away from cables and inner inverter parts.
- Avoid tensile force on cables and connectors, avoid sharp edges and take notice to maximum bending radius.



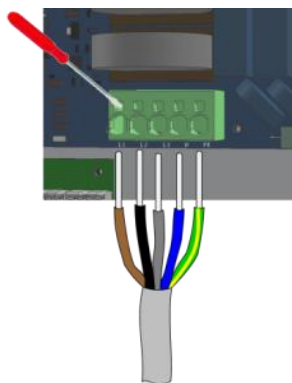
Risk of death or serious injury due to electric shock or fire!

- Do not exchange L, N and PE wires!
- Install AC overcurrent protection device (breaker, fuse) of maximum 25A.
- Do not connect inverter and loads or more than one inverter to the same main breaker or fuse.



Required cable:

AWG 24 ... 8



Install AC overcurrent protection device of maximum 25A.

Unscrew and remove cover of inverter. Locate AC terminal block (see Fig. 5-1).

Unscrew cable gland of AC cable entry.

Strip the cable careful. Take care not to damage stands of the cable. Feed cable through AC entry.

Push down clamp releases of AC connection terminal with insulated screwdriver to unlock clamps. Select correct cables and insert cable endings into clamps L1, L2, L3, N and PE.

Tighten cable gland of AC cable entry to obtain a mechanical strain relief.



- Provide an AC disconnection device (typical miniature circuit breaker 3 pole 6kA, B-characteristic 16A).
- Make sure disconnection device is easily accessible at any time.
- If required in the country of installation, install a residual-current device (RCD), or residual-current circuit breaker (RCCB), in Germany type B is required.

5.3 PV inputs configuration

A) Independent mode

Independent mode is the default mode.

In this mode each DC-input has an independent MPP tracker. This is especially favorable, if the PV strings differ in any property like module type, number of PV panels, pitch, orientation or shading of panels, because differences in these properties result in different MPPs of the two strings.

B) Parallel mode

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.

Prerequisites for parallel mode:

- Total current of all strings connected to the inverter does not exceed 24A.
- All strings have identical properties (module type, pitch, orientation and shading of modules).

Example:

If the PV panels are connected into three strings with 8A each, it is still possible to connect them to the inverter without changing this string configuration. One string is connected to the first of the two DC inputs of the inverter. Two strings are connected to the second DC input via Y-type cable connectors.

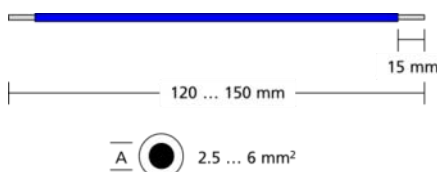
Although total current is within the inverter limit of 24A (3 x 8A), current at the second DC input (where two strings are connected) is 16A which exceeds allowed limit for each input of 12A. Therefore it is necessary to parallel the two inputs in order to distribute the current equally.

Paralleling procedure



Risk of death or serious injury due to electric shock!

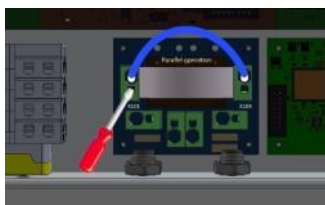
- The tasks described in this section have to be performed by qualified personnel only.
- Important: the voltage connections (DC / PV-generator, DC / battery and AC / utility grid) must be disabled before the tasks are performed.
- To disable PV voltage connection turn PV switch to "0"-position(at the Inverter).
- To disable battery voltage connection turn switch to "0"-position (at the Power Battery Master).
- To disable AC voltage connection turn off AC switch, main breaker or fuse. Make sure, other persons don't switch it back during electrical work.
- Do not enable voltage connections until electrical work is finished.
- Make sure other persons keep away during electrical work.



Required cable:

AWG 24 ... 10

Material not included in delivery.



Unscrew and remove cover of inverter. Locate clamps for parallel DC operation mode (see Fig. 5-1).

Push down clamp release with insulated screwdriver to unlock clamp.

Insert cable endings into clamps X101 and X104.

5.4 DC Connection



DANGER

Risk of death or serious injury due to electric shock!

- While the PV array is exposed to sunlight, high voltage up to 1000 V is present in the DC cables. Make sure nobody touches positive and negative cable ending at the same time!
- Inverters are transformerless.
Therefore PV array must not be grounded!
- Cable routing: prevent tensile force on cables and connectors, avoid sharp edges and take notice to maximum bending radius.



NOTICE

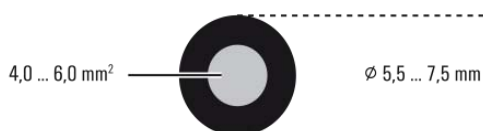
- Check cables for correct polarity.
- Make sure DC switch is turned to "0" position before plugging in connectors.
- Make sure, PV modules are suitable for maximum system voltage according to IEC 61730 class A and system voltage does not exceed maximum input voltage of inverter (see name plate). Overvoltage will result in destruction of the inverter. Review string layout if necessary.



- Any kind of soiling (dust, moisture, etc) has a negative effect on the connector system with regard to function over the intended period of use. Therefore, extreme care must be taken to achieve proper processing during assembly.
- Voltage in the DC cables correlates to intensity of sunlight on the PV array. Voltage is lower in morning and evening hours or if panels are covered.

5.4.1 Assembly of DC connector plugs

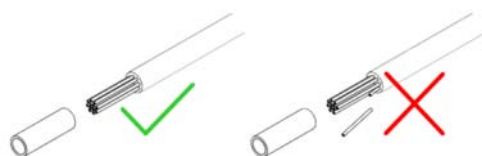
Preparing the cable:



Required cable:

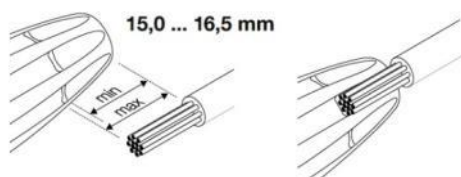
PV cable

2PFG 1169 / 08.07



Strip the cable carefully.

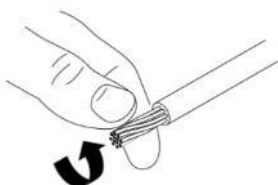
Take care not to damage individual stands of the cable.



Check the length of the exposed wires at the connector.

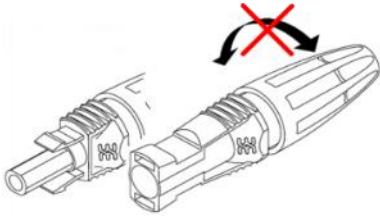
Min. 15mm

Max. 16,5mm

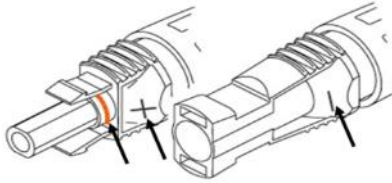


Twist the conductor.

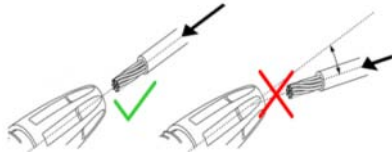
Inserting the cable:



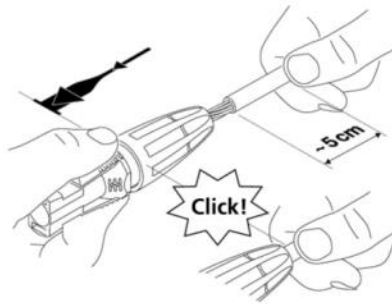
Do not twist before wiring.



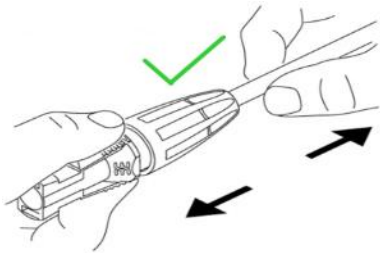
Chose the correct connector type.
Pay attention to the polarity.



Insert the cable straight into the connector.

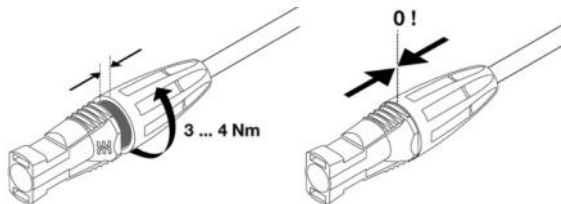


Make sure that the contact locks with a “click”.



Check the correct locking by a slight pull on the cable.

Connecting the cable:



Turn on the plug.



Make sure PV switch is turned to “0” position,
then plug corresponding plus and minus poles
into adjacent DC connectors of inverter.

Do not turn PV switch to “1” position until all
electrical work is finished.

5.4.2 Battery inputs



DANGER

Risk of death or serious injury due to electric shock!

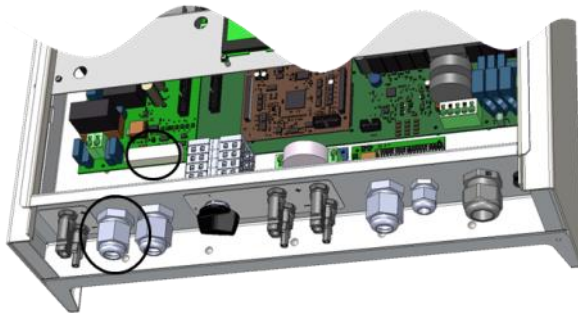
- Only battery systems specified and certificated by RCT Power GmbH are allowed to be connected here! Check cables for correct polarity.
- Cables may only be connected or disconnected in a voltage-free state.



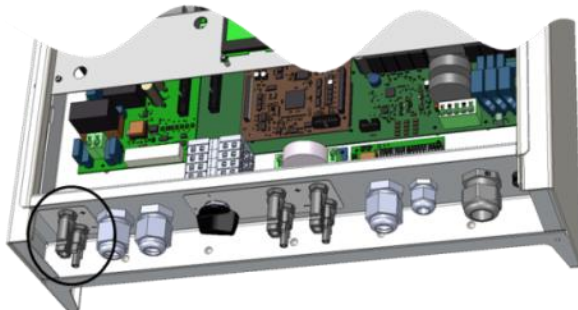
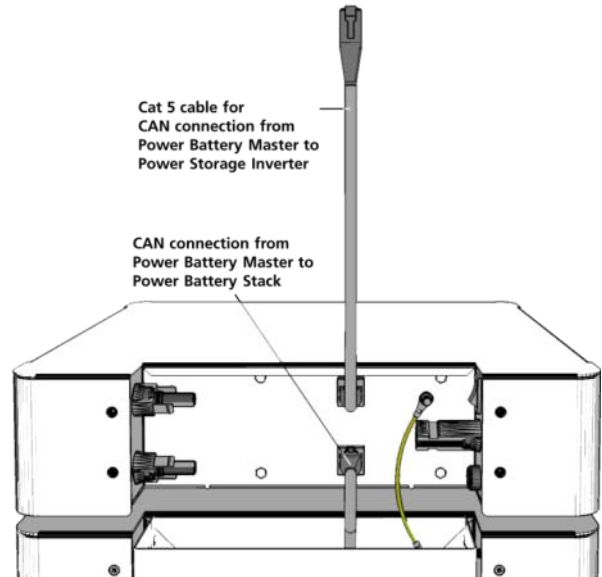
NOTICE

- Check cables for correct polarity.
- Make sure switch on the Battery is turned to "0" position before plugging in connectors.

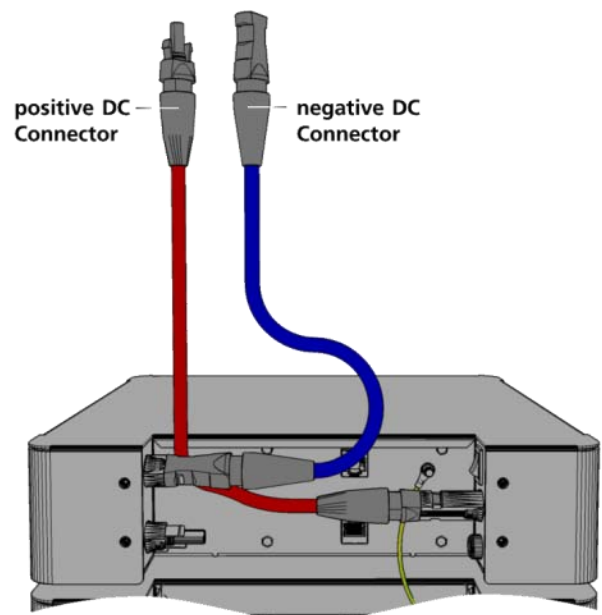
Battery inputs of the Power Storage inverter are connected to the battery output of the Power Battery Master. For a proper function the CAN connection between Power Storage inverter and Power Battery Master is needed.



Feed the cat 5 cable from Power Battery Master through the cable entry and insert cable in RJ45 connectors X403(CAN).



Battery DC input of the Power Battery.



5.5 Disconnection from voltage sources



DANGER

Risk of death or serious injury due to electric shock!

When the inverter is connected to the utility grid (AC voltage source) and/or to a PV array which is exposed to sunlight (DC voltage source), high voltage is present within the inverter components which can cause fatal electric shocks.

- Any work which involves wiring, connecting or opening the inverter or the battery housing has to be performed by qualified personnel.
- Make sure other persons keep away from cables and inner inverter parts.



WARNING

Risk of death or serious injury due to electric arc!

When the inverter is connected to a PV array which is exposed to sunlight (DC voltage source), high voltage is present within the cables and inverter components which can cause electric arcs when DC plugs are disconnected under load.

Electric arcs can cause fatal electric shocks or burns.

Disconnection procedure:

Step	Description
1	Locate PV switch of inverter (see Fig. 5-1) and turn to "0" position.
2	Locate ON/OFF switch of Battery and switch to "0" position.
3	Locate and switch off circuit breaker, main breaker or fuse for disconnecting inverter from utility grid.
4	Wait 10 minutes until capacitors have discharged and check the voltage.
5	Disconnecting DC side (PV and Battery): Locate DC connectors. Press latches of male plug together to unlock plug parts and pull off DC plugs.
6	Disconnecting AC side: Unscrew and remove cover of inverter. Locate AC terminal block (see Fig. 5-1). Push down clamp releases of AC connection terminal with screw driver to unlock clamps. Pull out cable endings from clamps L1, L2, L3, N and PE. Unscrew cable gland of AC cable entry (see Fig. 5-1) and pull out cable through entry carefully.

5.6 Second protective earth connection

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

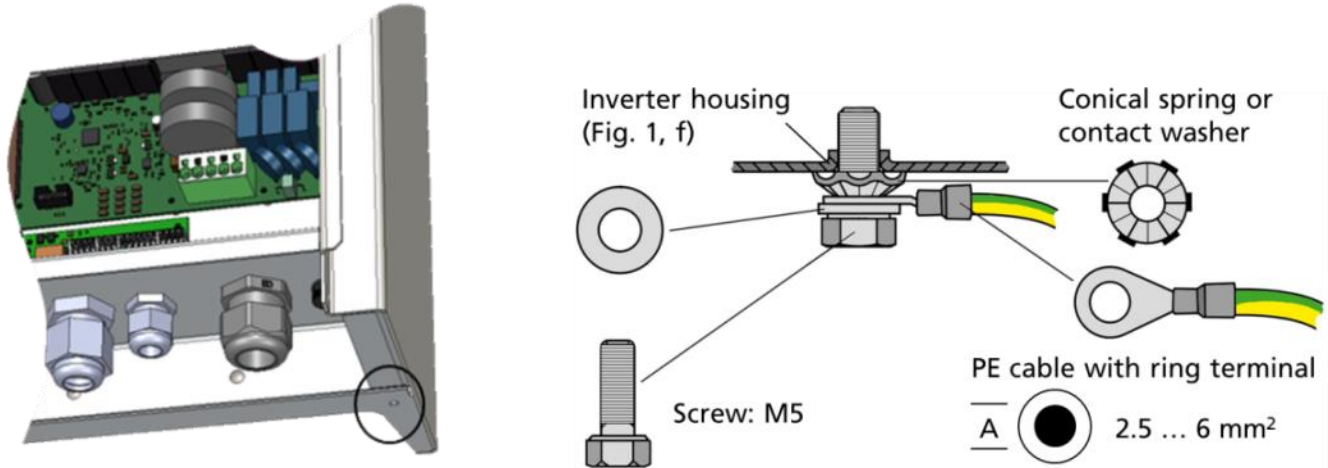


Fig. 5-6

Material not included in delivery.

Connection procedure:

Locate second protective earth terminal at lower right side of inverter housing.

Assemble connection parts as shown in Fig. 5-6.

Attach cable ending to potential equalization.

5.7 Power Switch



This section applies only if Power Switch is existing and in connection with a battery system.

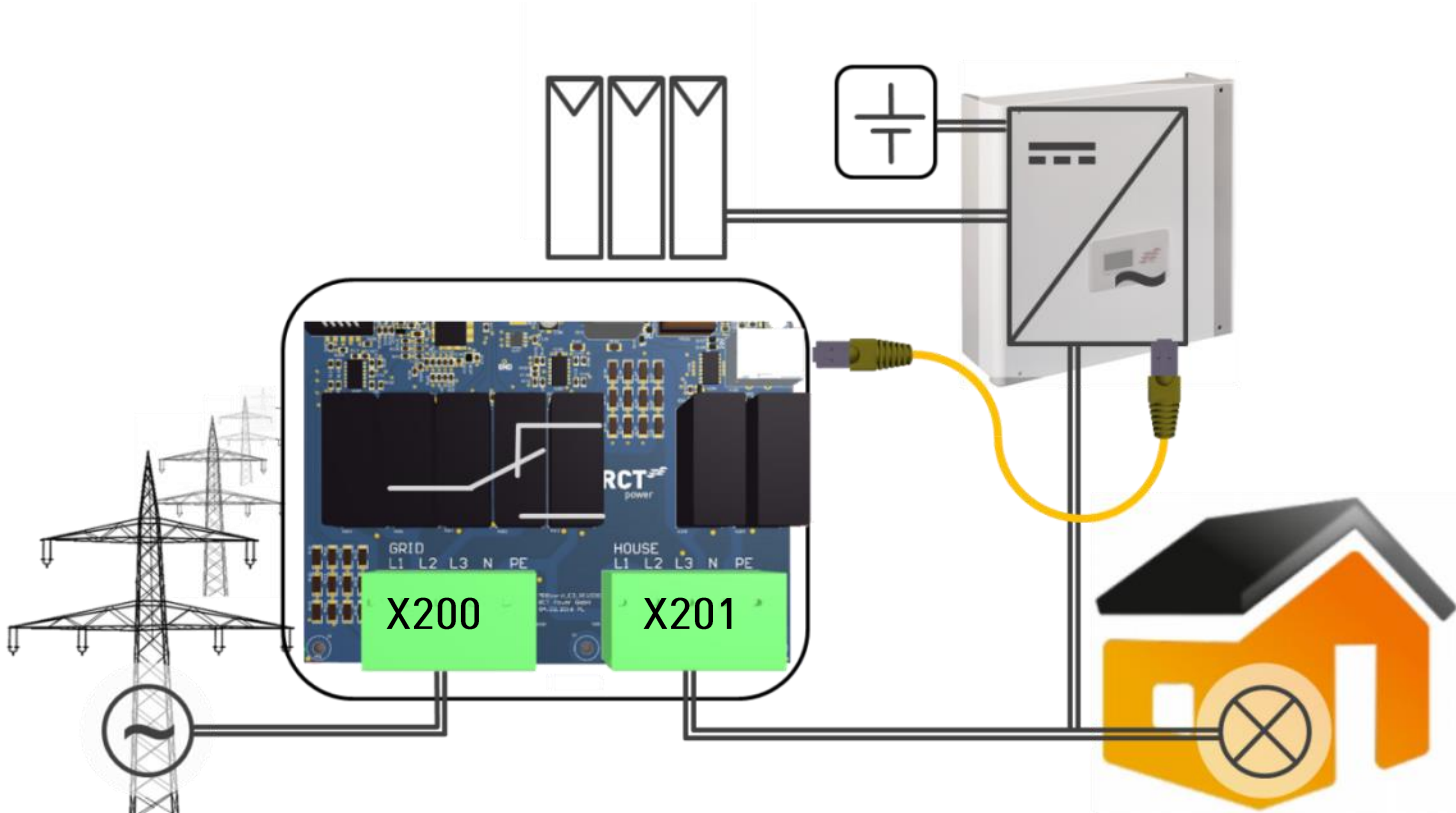
In case of a power failure, the battery system in connection with the Power Switch ensures that your household loads are still supplied.

In case of an grid outage, the household will be disconnected from the grid by the Power Switch and the household is supplied by battery only.

If the grid supply returns, the Power Switch switches back and connects the household to the grid again without an interruption.

Remember: There is still an outage to the household for a very short time!

This is not an uninterruptible power supply! It is no replacement for UPS to protect devices that can not handle power outage e.g. servers, medical devices etc.



Disconnect from voltages sources (see [section 5.5](#)).

Place the Power Switch in or near the service entrance box.

For further details regarding installation of Power Switch refer to Power Switch Manual.

After the commissioning, you can activate the Power Switch in the APP under Device → Settings → Device settings → scroll down and set Power Switch is available.

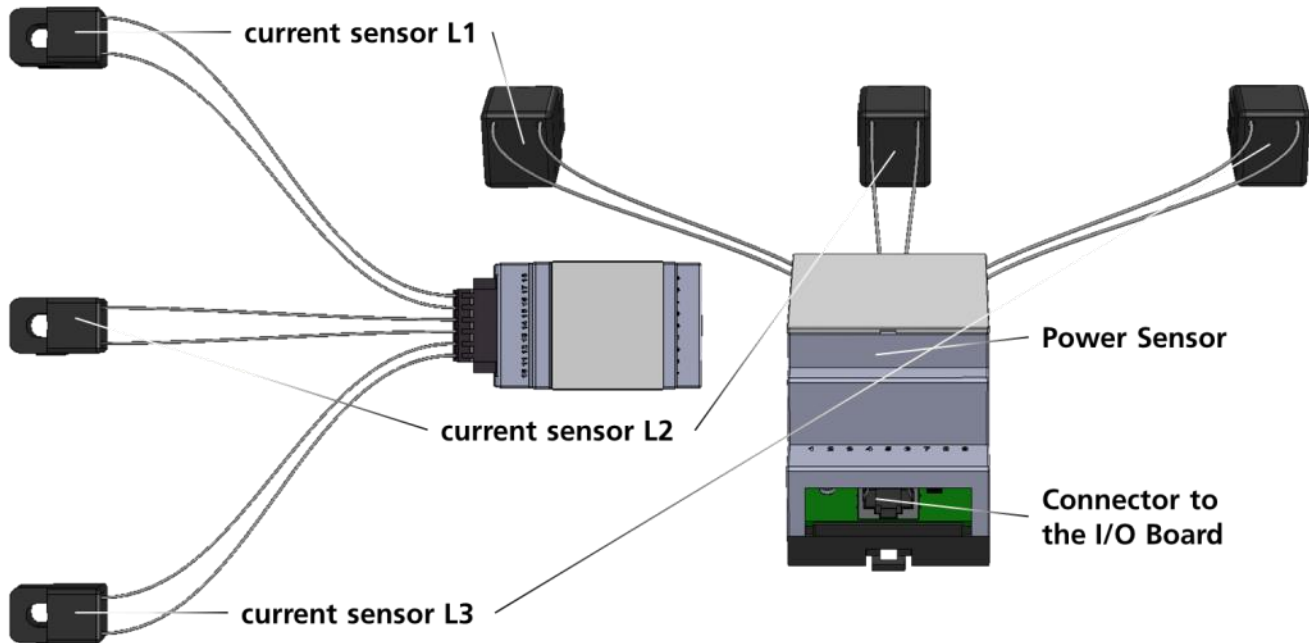
5.8 Power Sensor



The Power Storage functionality depends on energy consumption measurement.

The Power Sensor allows a 3-phase current monitoring with a simple installation without disconnecting the cables.

This section applies only if Power Sensor is existing.



Disconnect from voltages sources (see [section 5.5](#)).

Place the Power Sensor in the service entrance box.

Click the three current sensors around the L1, L2 and L3 wires in the service entrance box (the order and direction of installation is not important).

For further details regarding installation of Power Sensor refer to Power Sensor Manual.

Connect the Power Sensor to the Current Sensor communication Connector X403" C" at the I/O Board of the Power Storage via patch cable, as shown in section 6.2.

6 I/O – Board and RJ45 configuration

6.1 I/O Board

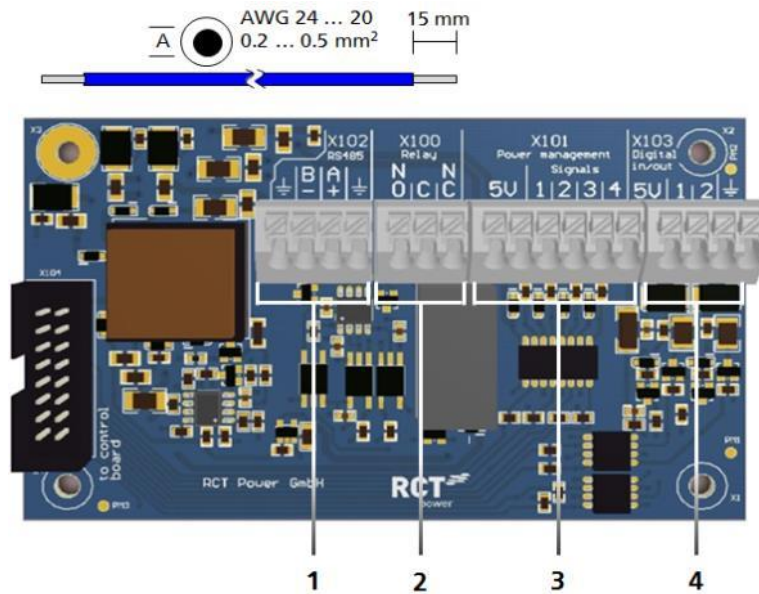


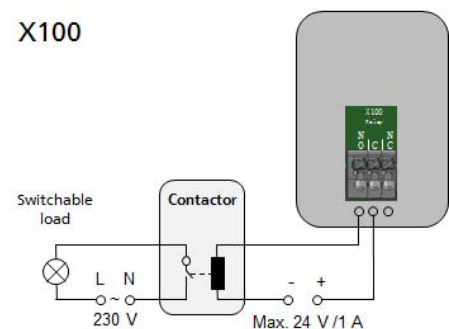
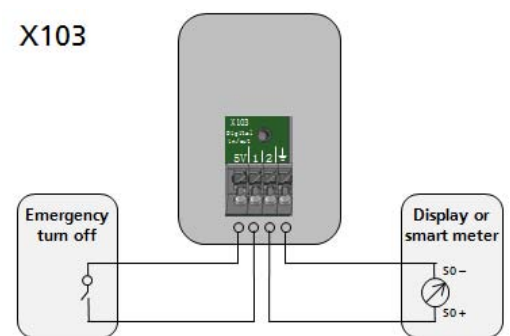
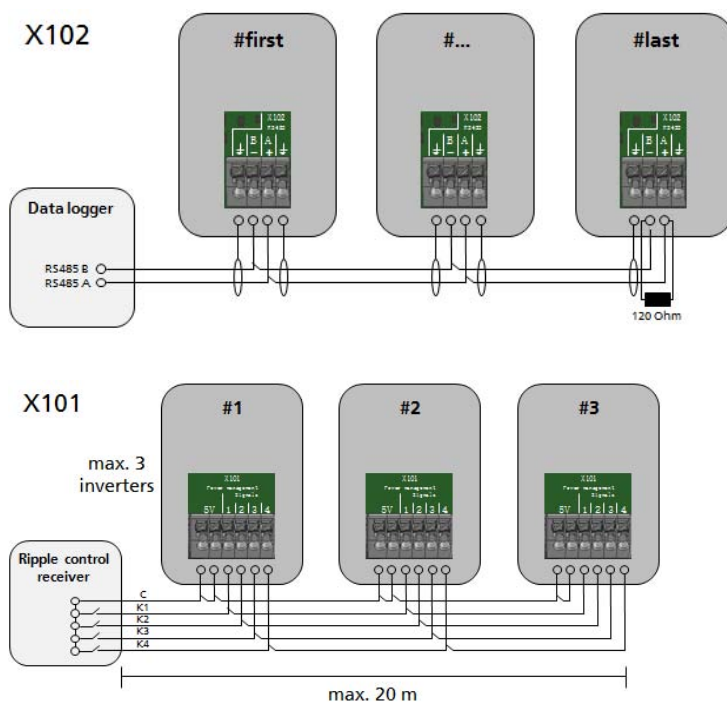
Fig. 6-1 I/O Board

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

Connection of communication ports:

Step	Description
1	Disconnect from voltage sources (see section 5.5).
2	Open cable entry (see Fig. 5-1) and feed cables.
3	Select correct port (see next section), press down spring clamp, insert cables and release.

Wiring of communication ports:



6.1.1 RS485 connector X102

Main Use:

RS485 is a serial interface mainly used for connecting external data loggers, e.g. Meteocontrol WEB 'logs or temperature or irradiation sensors.

Wiring:



Number of inverters which can be connected to a common data logger is limited by specification of data logger. Refer to manual of data logger.

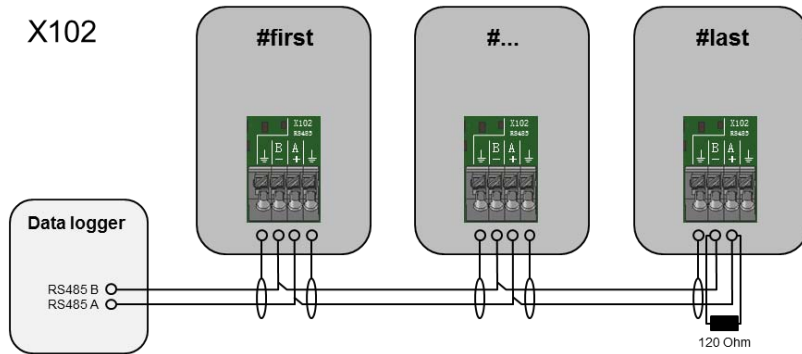


Fig. 6-3 Connection of Data logger

6.1.2 Multifunctional Relay X100

Main Use:

The multifunctional Relay X100 can be configured in two ways.

1. As fault relay for connecting some kind of alarm signal in case of inverter error
2. As control for a contactor (with power supply) to switch household loads.

Wiring:



Several signals can be operated in parallel, as long as the maximum current of 1 A and 24 V is not exceeded.

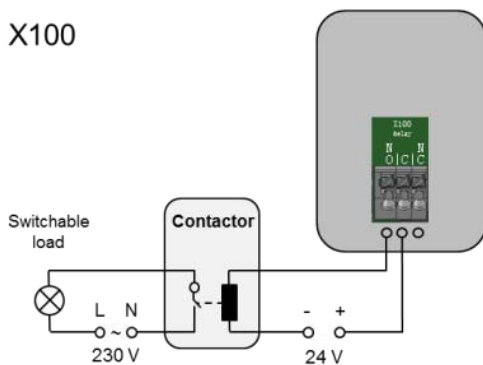


Fig. 6-4 Connection of contactor and switchable load

6.1.3 Power Management X101

Main Use:

X101 are four digital inputs mainly used for potential free relay contacts connecting one or more inverters to a ripple control receiver.

Wiring:



- Maximum 3 inverters may be interconnected via X101 relay.
- Total cable length should not exceed 20 m.

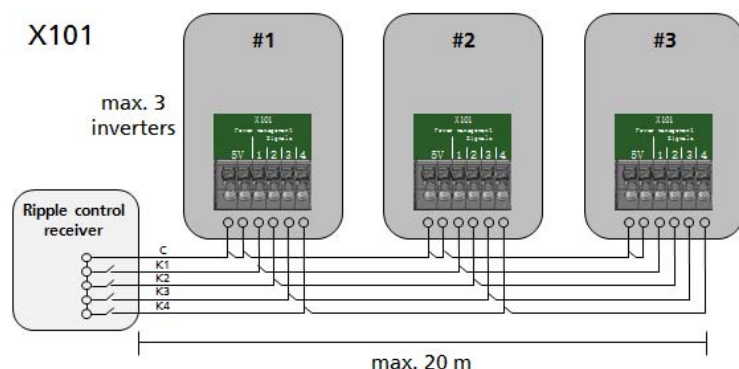


Fig. 6-5 Connection of three inverters to common ripple control receiver

6.1.4 Digital In/Out X103

Main Use:

1. Main use as In-signal is connecting inverter to an energy meter.
2. Main use as Out-signal is for connecting a display panel to permanently show feed-in data.
3. One port can be used for emergency turn off (required in some countries, e.g. Italy)

Wiring:



Each port of digital in/out connector can be configured either as In- or Out-signal.

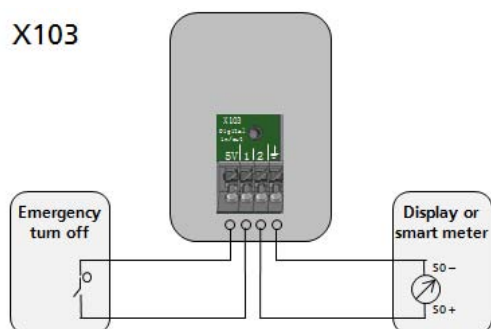


Fig. 6-6 Connection to emergency turn off and smart meter or display panel

6.2 RJ45 connectors for Power Battery, Power Sensor and Power Switch communication

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

If inverter is delivered with optional Power Switch and Power Sensor please refer to section 5.7 and 5.8 of these manual for further detailed information on wiring these items.

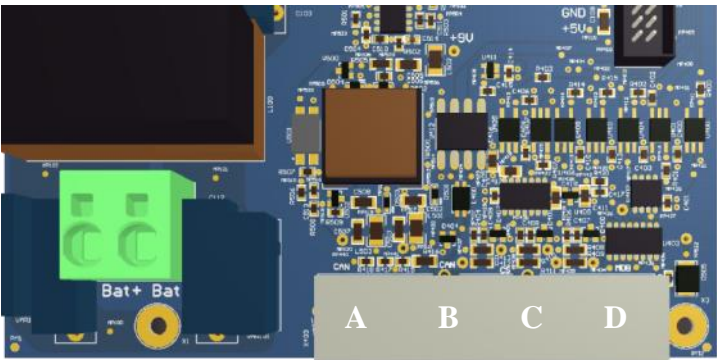


Fig. 6-7 Overview connectors on optional multiple communication board

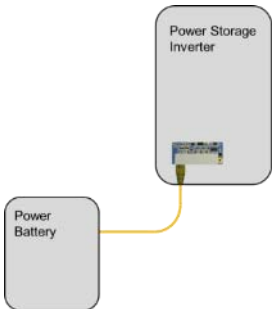
Item	Description
A	X403: Battery communication connector.
B	X403: Battery communication connector.
C	X403: Power Sensor communication connector.
D	X403: Power Switch communication connector.

Connection of communication ports:

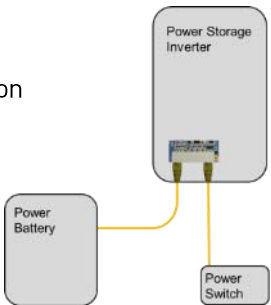
Step	Description
1	Disconnect from voltage sources (see section 5.5).
2	Open cable entry and feed cables trough the holes.
3	Select correct port, insert cables in RJ45 connectors.

6.2.1 Wiring of communication ports

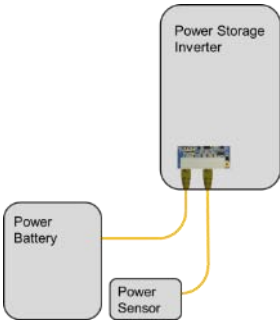
Standard communication with battery



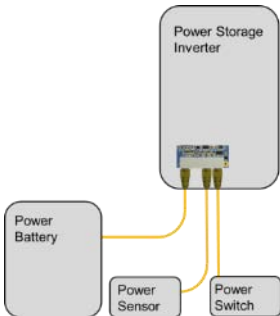
Additional Power Switch communication



Additional Power Sensor communication



Additional Power Switch and Power Sensor communication



7 Setup

7.1 Commissioning

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, basic data logging and troubleshooting.

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



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



Following tasks have to be finished before commissioning and operation.

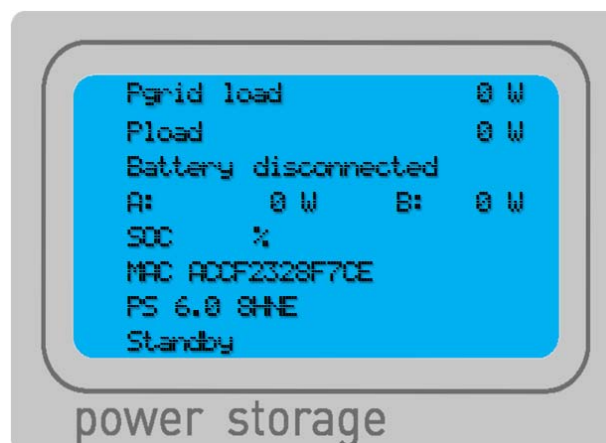
- Mounting (see section 4.2).
- AC cables connected to utility grid (see section 5.2).
- DC cables connected to PV array (see section 5.4).
- DC cables and CAN connected to Power Battery (see section 5.4.2)
- Second protective earth connected if required (see section 5.6)
- If available Power Switch and / or Power Sensor (see section 5.7 and 5.8)
- Inverter cover closed

7.1.1 Inverter switch on

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

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

Display will switch on and show Norm „Factory defaults“.



7.1.2 Access to the inverter



If an inverter is selected or searched via the app, the inverter display flashes for a short time.

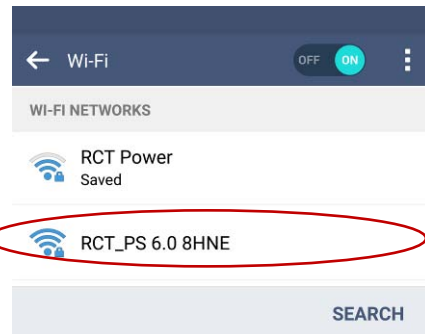
Step	Description
------	-------------

- | | |
|---|--|
| 1 | Activate WLAN on your smartphone (or tablet computer). |
|---|--|

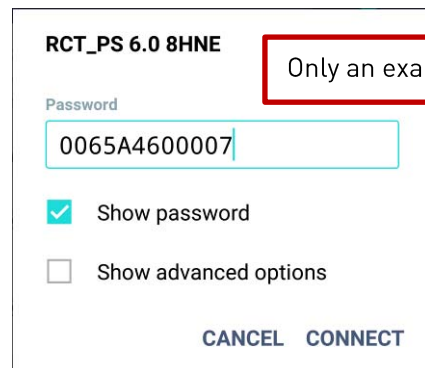
- | | |
|---|---|
| 2 | Connect via Wi-Fi with SSID identical with the name of the Power Storage on inverter display. (e.g. PS 6.0 8HNE). |
|---|---|



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



- | | |
|---|---|
| 3 | If you connect 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). |
|---|---|

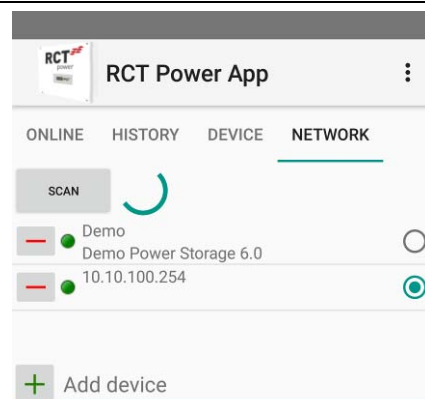


- | | |
|---|------------------------|
| 4 | Start "RCT Power APP". |
|---|------------------------|



- | | |
|---|--|
| 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. |
|---|--|

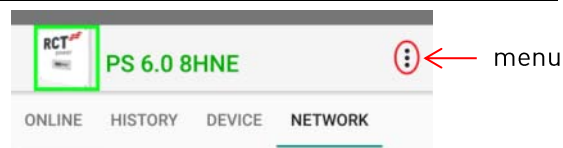


7.1.3 Inverter configure

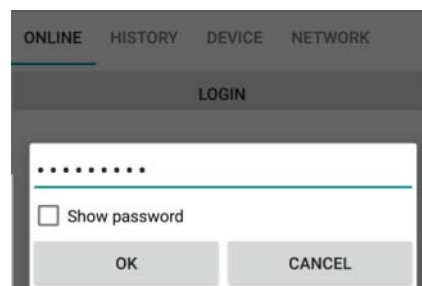
Step	Description
------	-------------

1	Connect to the inverter (see 7.1.2).
---	--------------------------------------

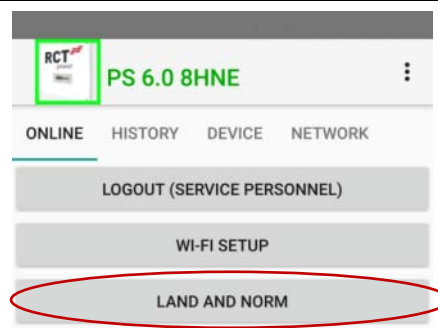
2	Press "menu" and choose "Setup".
---	----------------------------------



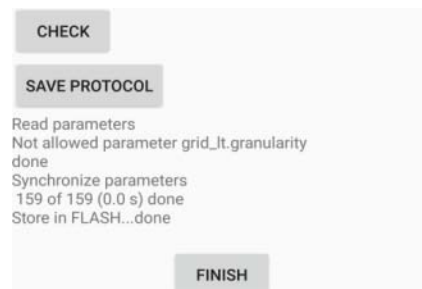
3	Enter setup procedure by "Login" (password: "installer").
---	---



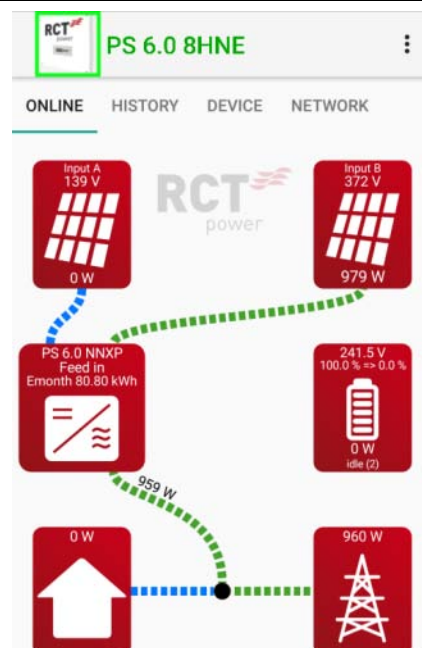
4	Choose "Land and Norm", select appropriate norm and "Apply".
---	--



5	Wait during parameters are synchronizing and stored. When finished type "Finish".
---	---



6	Now setup procedure is completed and inverter starts feeding after checking normative specifications, press "return" to get on start page.
---	--



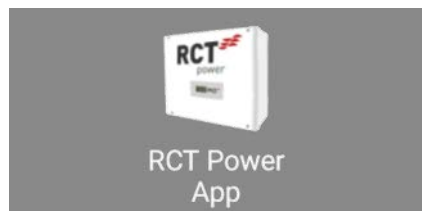
7.1.4 Power Sensor configuration

It is recommended to switch off the Power Battery during the Power Sensor configuration.

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

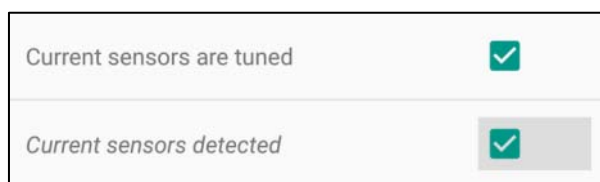
1	Install and wire the Power Sensor
---	-----------------------------------

2	Start "RCT Power APP".
---	------------------------



3	The Power Sensor will be detected and tuned, automatically by an Inverter power of >250W.
---	---

4	Continue with Device → Settings → Device settings (scroll down) → Power Sensor tuning (scroll down) If current sensors are tuned and detected press "FLASH" to store settings permanent, finish!
---	---



5	Power Sensor 50 is now installed.
---	-----------------------------------

7.1.5 Battery configuration



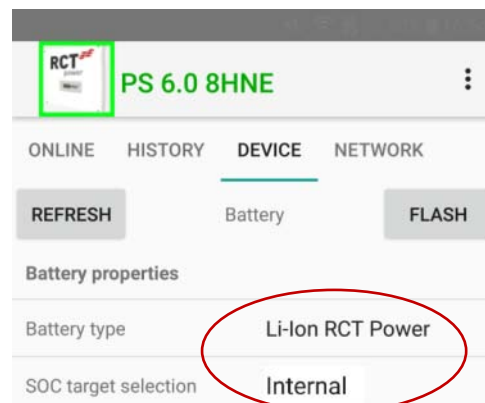
Before switching on the Power Battery, it must be configured.

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

1	Check if ON/OFF switch of the Power Battery is set to off ("0").
---	--

2	Connect to the inverter (see 7.1.2).
---	--------------------------------------

3	<p>Switch to tab "Device" → "Settings" and press "Battery".</p> <p>Press "Battery type" and choose "Li-Ion RCT Power".</p> <p>Press "SOC target selection" and choose "Internal" (recommended) for an intelligent battery control.</p> <p>Current generated power from the solar generator, as well as the expected power in the coming days, will be taken into account. As well as the current consumptions.</p> <p>This allows the system to calculate the best possible use for you and the system, to bring more profit from your PV power system.</p>
---	---



Other possibilities are:

- Constant
The battery system targets the entered force SOC target.
- External
An external device is supplying the target SOC i.e. home automation controller, weather forecast device etc.

4	Expert settings:
---	------------------

- Min SOC target
Minimum SOC value which can be reached (0.00 \pm 0%).
- Max SOC target
Maximum SOC value which can be reached (1.00 \pm 100%).
- Force SOC target
For SOC target selection mode "constant".
- Max. compensation power [W]
The maximum power that can be taken for load compensation out of the battery.
- Max. battery to grid power [W]
The maximum power that can be taken for grid feed-in out of the battery.

Min SOC target	0.00
Max SOC target	1.00
Force SOC target	1.00
Max. compensation power [W]	4500
Max. battery to grid power [W]	1500

Please do not make changes to preconfigured values without consulting RCT Power !

5	To store the settings permanently, press "FLASH".
---	---

6	Switch the battery on by setting the battery ON/OFF switch to "1".
---	--

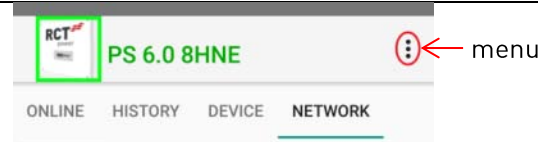
7.1.6 Inverter integration in a network via Wi-Fi

Integration of inverter in a home network (can be done with customer or installer login).


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

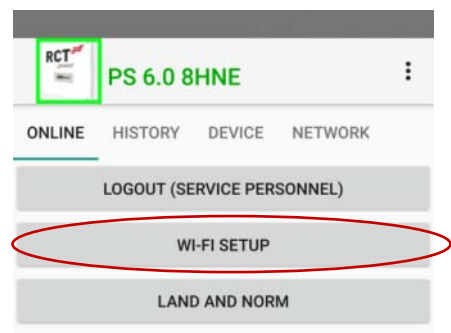
1	Connect to the inverter (see 7.1.2).
---	--------------------------------------

2	Press "menu" and choose "Setup".
---	----------------------------------



3	Enter setup procedure by "Login", (password: "installer" for installer login or "*****" for customer login).
---	--

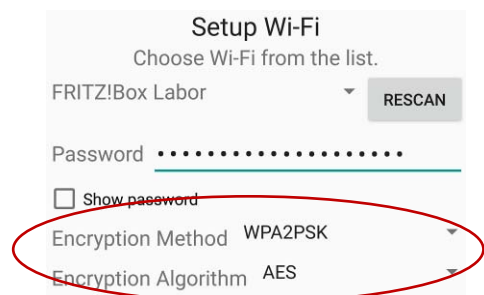
4	<div><p>NOTICE</p><p>In various Android versions, there are difficulties in the search for a Wi-Fi network. This is a problem on Android and appears on the Android versions 6.0 & 6.0.1. It is possible that the error occurs with other versions. If this is the case, please activate the GPS and execute the procedure again. After Wi-Fi integration, the GPS signal can be deactivated.</p></div>
---	---



Choose "Setup Wi-Fi", Wi-Fi networks will be scanned (this may take a moment).

5	Choose the suitable network and type in the corresponding Wi-Fi password.
---	---

6	Choose Encryption Method and Encryption Algorithm (WPA2PSK and AES is standard) and continue with "Next".
---	---



7	Choose "Obtain an IP address automatically" to "ON" and go on with "Finish". The process may take a few minutes. Finally, choose again "Finish". The device is now integrated in your home network. In the future, you can access the inverter via the home network. (It can take up to 5 minutes until the IP address is displayed on the inverter display.) Done!
---	--

7.1.7 Remote access to the inverter from the internet

If you are unsure if you can properly configure your router, please contact your network administrator.

Internet-accessible systems are always a potential security risk.

To allow access to the inverter over the internet, the inverter must be connected to a stable network that has access to the Internet via Wi-Fi.

One of the following is required:

- The router is connected to the Internet via a fixed IP of the Internet service provider and supports port forwarding.

Usually this is the case for Internet connections of companies.

- The router is connected to the Internet via a dynamic IP of the Internet service provider, supports port forwarding and allows the use of a dynamic domain name system entry.

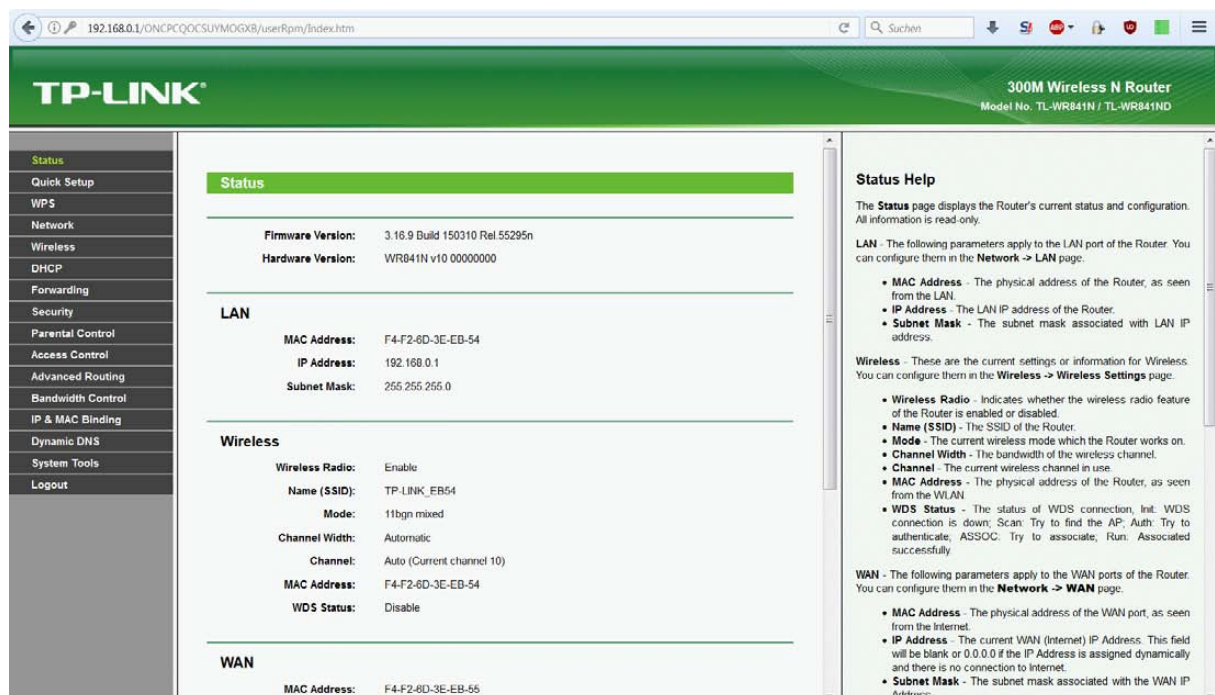
This is the case of most private internet connections.

- The router allows you to set up a virtual private network (VPN) and use the Internet as an extended line from your terminal (e.g. mobile phone) to your home network and thus to the inverter.

The following describes how to set up the remote access via DynDNS of a TP-Link router.

Depending on the supplier or manufacturer, this manual may differ.

- 1.) Call the user interface of your TP-Link router. To do this, enter <http://192.168.0.1> or <http://192.168.1.1> in a browser.



2.) After logging in, switch to the tab “Dynamic DNS”.

TP-LINK® 300M Wireless N Router
Model No. TL-WR841N / TL-WR841ND

DDNS

Service Provider: No-IP (www.noip.com) [Go to register](#)

User Name:

Password:

Domain Name:

☐ Enable DDNS

Connection Status: DDNS not launching!

Login Logout

Save

DDNS Help

The Router offers a Dynamic Domain Name System (DDNS) feature. DDNS lets you assign a fixed host and domain name to a dynamic Internet IP address. It is useful when you are hosting your own website, FTP server, or other server behind the Router. Before using this feature, you need to sign up with DDNS service providers such as [www.noip.com](#). The Dynamic DNS client service provider will give you a password or key.

Follow these instructions to set up DDNS:

If your selected dynamic DNS Service Provider is [www.noip.com](#):

1. Enter the **User Name** for your DDNS account.
2. Enter the **Password** for your DDNS account.
3. Enter the **Domain Name** you received from dynamic DNS service provider.
4. Click the **Login** button to login to the DDNS service.

Connection Status - The status of the DDNS service connection is displayed here.

Click **Logout** to logout of the DDNS service.

Notice: If you want to login again with another account after a successful login, please click the **Logout** button, then input your new username and password and click the **Login** button.

3.) Depending on the provider and manufacturer, different DynDNS providers are available. First, look at the available DynDNS providers on the drop-down list.

TP-LINK® 300M Wireless N Router
Model No. TL-WR841N / TL-WR841ND

DDNS

Service Provider: No-IP (www.noip.com) [Go to register](#)

User Name:

Password:

Domain Name:

☐ Enable DDNS

Connection Status: DDNS not launching!

Login Logout

Save

DDNS Help

The Router offers a Dynamic Domain Name System (DDNS) feature. DDNS lets you assign a fixed host and domain name to a dynamic Internet IP address. It is useful when you are hosting your own website, FTP server, or other server behind the Router. Before using this feature, you need to sign up with DDNS service providers such as [www.noip.com](#). The Dynamic DNS client service provider will give you a password or key.

Follow these instructions to set up DDNS:

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1. Enter the **User Name** for your DDNS account.
2. Enter the **Password** for your DDNS account.
3. Enter the **Domain Name** you received from dynamic DNS service provider.
4. Click the **Login** button to login to the DDNS service.

Connection Status - The status of the DDNS service connection is displayed here.

Click **Logout** to logout of the DDNS service.

Notice: If you want to login again with another account after a successful login, please click the **Logout** button, then input your new username and password and click the **Login** button.

- 4.) In our example we have selected the provider of “No-IP”, since this also offers a free DynDNS service.

TP-LINK® 300M Wireless N Router
Model No. TL-WR841N / TL-WR841ND

DDNS

Service Provider: No-IP (www.noip.com) [Go to register](#)

User Name: User-at-NoIP
Password:
Domain Name: tps://domain4myInverter.noip.com

☒ Enable DDNS

Connection Status: DDNS not launching!

[Login](#) [Logout](#)

[Save](#)

DDNS Help

The Router offers a Dynamic Domain Name System (DDNS) feature. DDNS lets you assign a fixed host and domain name to a dynamic Internet IP address. It is useful when you are hosting your own website, FTP server, or other server behind the Router. Before using this feature, you need to sign up with DDNS service providers such as [www.noip.com](#). The Dynamic DNS client service provider will give you a password or key.

Follow these instructions to set up DDNS:

If your selected dynamic DNS Service Provider is [www.noip.com](#):

1. Enter the **User Name** for your DDNS account.
2. Enter the **Password** for your DDNS account.
3. Enter the **Domain Name** you received from dynamic DNS service provider.
4. Click the **Login** button to login to the DDNS service.

Connection Status - The status of the DDNS service connection is displayed here.

Click **Logout** to logout of the DDNS service.

Notice: If you want to login again with another account after a successful login, please click the **Logout** button, then input your new username and password and click the **Login** button.

- 5.) First a DynDNS access of the selected provider has to be created. To do so, you must set up an account with the respective provider.
After successful registration you can create a “Dynamic DNS”.

- 6.) Enter the registration data of the previously created DDNS provider and enable the check box “Enable DDNS” confirm with “Save” and “Login”.

TP-LINK® 300M Wireless N Router
Model No. TL-WR841N / TL-WR841ND

DDNS

Service Provider: No-IP (www.noip.com) [Go to register](#)

User Name: User-at-NoIP
Password:
Domain Name: tps://domain4myInverter.noip.com

☒ Enable DDNS

Connection Status: DDNS not launching!

[Login](#) [Logout](#)

[Save](#)

DDNS Help

The Router offers a Dynamic Domain Name System (DDNS) feature. DDNS lets you assign a fixed host and domain name to a dynamic Internet IP address. It is useful when you are hosting your own website, FTP server, or other server behind the Router. Before using this feature, you need to sign up with DDNS service providers such as [www.noip.com](#). The Dynamic DNS client service provider will give you a password or key.

Follow these instructions to set up DDNS:

If your selected dynamic DNS Service Provider is [www.noip.com](#):

1. Enter the **User Name** for your DDNS account.
2. Enter the **Password** for your DDNS account.
3. Enter the **Domain Name** you received from dynamic DNS service provider.
4. Click the **Login** button to login to the DDNS service.

Connection Status - The status of the DDNS service connection is displayed here.

Click **Logout** to logout of the DDNS service.

Notice: If you want to login again with another account after a successful login, please click the **Logout** button, then input your new username and password and click the **Login** button.

- 7.) Create a fixed IP address for the inverter, switch to the “DHCP” tab, click on the “DHCP Client List”, search for the inverter name and copy the “MAC Address” and the “Assigned IP”.

The screenshot shows the TP-Link 300M Wireless N Router web interface. The left sidebar contains a menu with options: Status, Quick Setup, WPS, Network, Wireless, DHCP, DHCP Settings, DHCP Client List, Address Reservation, Forwarding, Security, Parental Control, Access Control, Advanced Routing, Bandwidth Control, IP & MAC Binding, Dynamic DNS, System Tools, and Logout. The main content area is titled "DHCP Client List" and displays a table with the following data:

ID	Client Name	MAC Address	Assigned IP	Lease Time
1	Power-Storage	00:24:7b:0c:25:04	192.168.0.10	01:57:58

Below the table is a "Refresh" button. To the right of the table is a "DHCP Client List Help" section with the following text:

DHCP Client List Help

This page shows Client Name, MAC Address, Assigned IP and Lease Time of each DHCP Client connected to this device.

- **Client Name** - The name of the DHCP client.
- **MAC Address** - The MAC address of the DHCP client.
- **Assigned IP** - The IP address this device has allocated to the DHCP client.
- **Lease Time** - The time of the DHCP client leased.

You cannot change any of the values on this page. To update this page and to show the current connected devices, click on the Refresh button.

- 8.) Switch to the “Address Reservation” tab and click “Add New...” .

The screenshot shows the TP-Link 300M Wireless N Router web interface. The left sidebar contains a menu with options: Status, Quick Setup, WPS, Network, Wireless, DHCP, DHCP Settings, DHCP Client List, Address Reservation, Forwarding, Security, Parental Control, Access Control, Advanced Routing, Bandwidth Control, IP & MAC Binding, Dynamic DNS, System Tools, and Logout. The main content area is titled "Address Reservation" and displays a table with the following data:

ID	MAC Address	Reserved IP Address	Status	Modify
----	-------------	---------------------	--------	--------

Below the table are buttons: "Add New...", "Enable All", "Disable All", and "Delete All". Below these buttons are "Previous" and "Next" buttons. To the right of the table is an "Address Reservation Help" section with the following text:

Address Reservation Help

When you specify a reserved IP address for a PC in the LAN, that PC will always receive the same IP address each time when it accesses the DHCP server. Reserved IP addresses could be assigned to servers that require permanent IP settings.

- **MAC Address** - The MAC Address of the PC that you want to reserve an IP address for.
- **Reserved IP Address** - The IP address this device reserved.
- **Status** - It shows whether the entry is enabled or not.
- **Modify** - To modify or delete an existing entry.

To Reserve IP Addresses, you can follow these steps:

1. Enter the MAC Address (The format for the MAC Address is XX:XX:XX:XX:XX:XX) and the IP address in dotted decimal notation of the computer you wish to add.
2. Click the **Save** button.

To modify a Reserved IP Address, you can follow these steps:

1. Select the reserved address entry as you desired, modify it. If you wish to delete the entry, click the **Delete** link of the entry.
2. Click the **Save** button.

Click the **Add New...** button to add a new Address Reservation entry.

Click the **Enable All** button to enable all the entries in the table.

Click the **Disable All** button to disable all the entries in the table.

Click the **Delete All** button to delete all the entries in the table.

Click the **Next** button to go to the next page, or click the **Previous** button return to the previous page.

Note: The changes will not take effect until this device reboots.

9.) Enter the “MAC Address” and the IP Address (Assigned IP) and confirm with “Save”.

The screenshot shows the TP-Link 300M Wireless N Router web interface. The left sidebar contains a menu with options: Status, Quick Setup, WPS, Network, Wireless, DHCP (highlighted), DHCP Settings, DHCP Client List, Address Reservation (highlighted), Forwarding, Security, Parental Control, Access Control, Advanced Routing, Bandwidth Control, IP & MAC Binding, Dynamic DNS, System Tools, and Logout. The main content area is titled 'Add or Modify an Address Reservation Entry'. It contains a form with the following fields: MAC Address (00-24-7E-0E-25-5F), Reserved IP Address (192.168.0.10), and Status (Enabled). There are 'Save' and 'Back' buttons at the bottom of the form. On the right side, there is an 'Address Reservation Help' section with instructions on how to reserve IP addresses and modify existing entries.

10.) The Router needs to reboot to change the Address, click on “click here”, confirm with “Reboot” and click at last on “OK”.

The screenshot shows the 'Address Reservation' page in the TP-Link web interface. It features a table with the following columns: ID, MAC Address, Reserved IP Address, Status, and Modify. The table contains one entry with ID 1, MAC Address 00-24-7E-0E-25-5F, Reserved IP Address 192.168.0.10, and Status Enabled. Below the table are buttons for 'Add New...', 'Enable All', 'Disable All', and 'Delete All'. A red message states: 'The change of Address Reservation will not take effect until this device reboots, please [click here](#) to reboot.' There are 'Previous' and 'Next' buttons at the bottom.

The screenshot shows the 'Reboot' page in the TP-Link web interface. It contains a single button labeled 'Reboot' with the text 'Click this button to reboot this device.' above it.

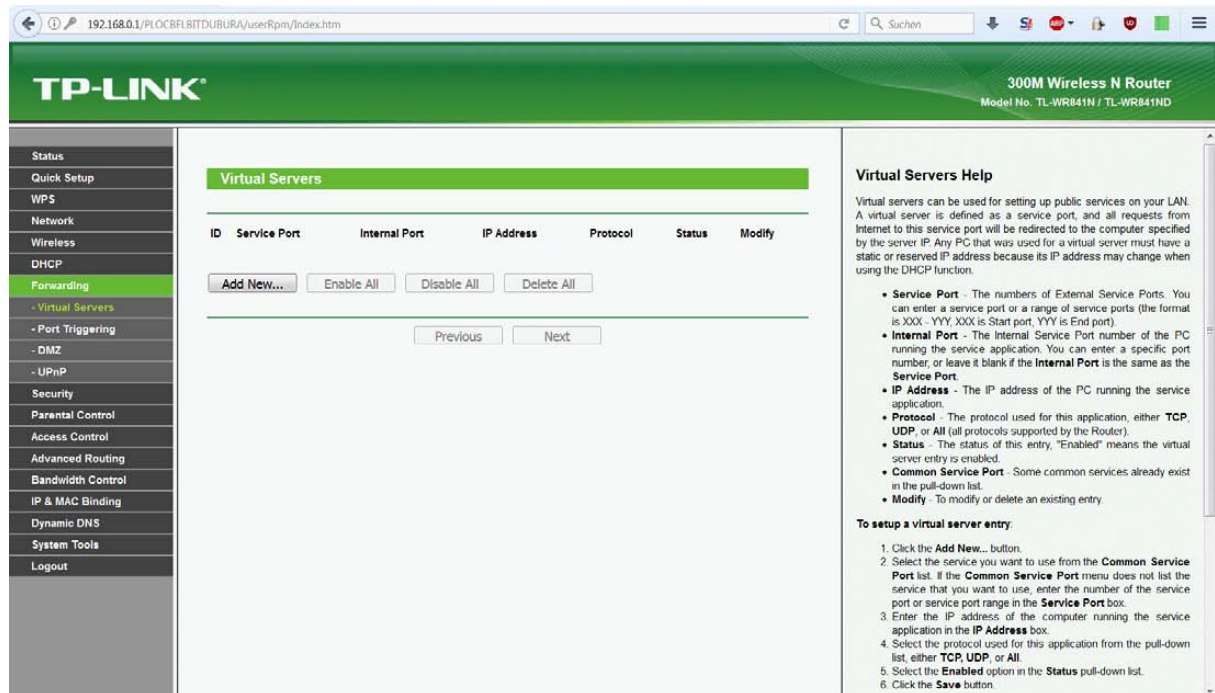
The screenshot shows a confirmation dialog box over the 'Reboot' page. The dialog box has the title 'Are you sure to reboot this device?' and two buttons: 'OK' and 'Abbrechen'.

11.) Finally a port release has to be activated. This is necessary, because the TP-Link Router should carry out a port transfer for the inverter.

The communication of the inverter is operated via port 8899. Coming from the Internet requests to port 8899, the router redirects these requests to the inverter.

The (fixed) IP address of the inverter must therefore be specified as the IP address.

Switch to "Forwarding" tab, click on the sub-item "Virtual Servers".



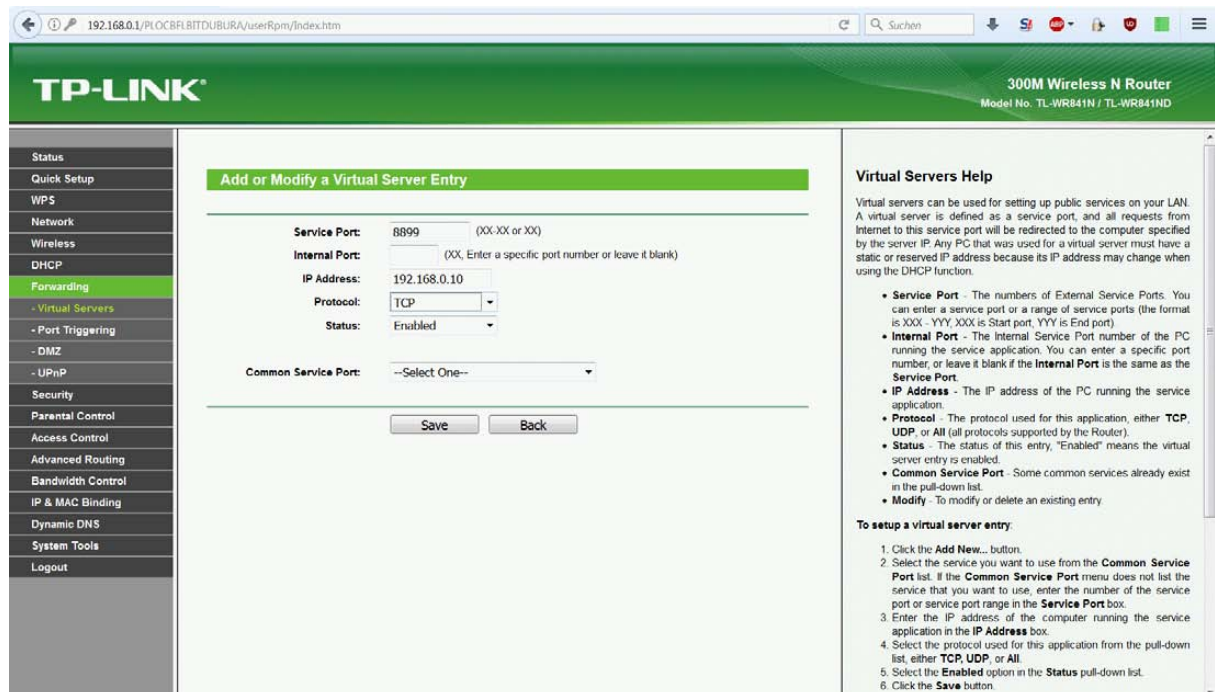
12.) Click on "Add New..."

Service Port: 8899

IP Address: Reserved IP address

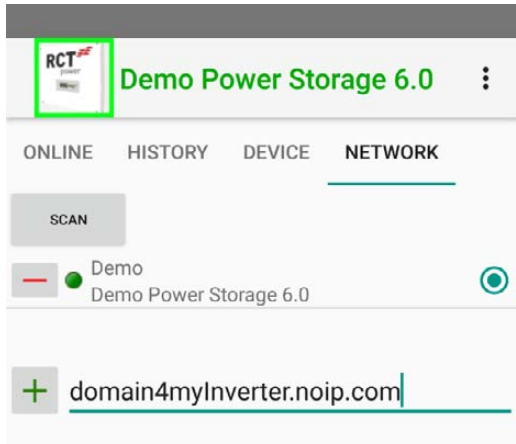
Protocol: TCP

Status: Enabled



Confirm with "Save".

13.) The installation is complete. The inverter can be accessed from remote via the RCT Power App by using the DynDNS URL.



7.2 APP Description

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, basic data logging and troubleshooting.

Obtaining Android App: Go to Google play store, search for “RCT Power APP”, and install.

APP menu is divided in several areas depending of login:

Customer area: Login: *****

Installer area: Login: installer

Please notify, that the area accessible with installer login (marked red in menu overview) has to be performed by qualified personnel only!

7.2.1 Overview of APP menu



7.2.2 Description of menu items

7.2.2.1 Online

An interactive overview of all the devices of the system with their status and values.
By touching a symbol more details will be displayed. Details vary with login level.

7.2.2.2 History

All logged data can be displayed in this menu.

7.2.2.2.1 Charts

Graphical display of all energy data. Resolution can be chosen by user (day, month, year, total).
Displayed variables can be chosen by double clicking on diagram.

7.2.2.2.2 Info of events

Display of occurred info sorted by date.

7.2.2.3 Device

Display and setting possibility of all device specific parameters. Details and setting rights can vary with login level.

7.2.2.3.1 Information

Specific information's about the inverter, like SW-Versions, serial number, and chosen grid code.

7.2.2.3.2 Measured values

Display of all measured values of the system.

7.2.2.3.2.1 AC

Display of all grid specific values.

7.2.2.3.2.2 Battery

Display of all Battery specific values.

7.2.2.3.2.3 PV

Display of all PV specific values.

7.2.2.3.2.4 Device

Display of all device specific values.

7.2.2.3.2.5 Energy

Display of energy values sorted by time period and source (sink).

7.2.2.3.3 Settings

All settings of the device and system can be done here. Details and setting rights can vary with login level.

Please notify that the settings are only stored permanent, if they are flashed! Therefore it's necessary to press "Flash" after terminating all settings. Otherwise settings will be resetted after shutdown of inverter.

7.2.2.3.3.1 *Battery (installer area!)*

The supported battery type and state of charge target can be chosen here.

Also minimum and maximum target SOC and battery voltage value can be configured.

7.2.2.3.3.1.1 *Battery power management (installer area!)*

The serial numbers, software levels and parameters of the Power Battery or rather Power Battery Stack can be called up here.

7.2.2.3.3.2 *Interfaces*

Configuration of the interfaces for peripheral devices.

7.2.2.3.3.2.1 *Multifunctional relay*

The multifunction relay can be configured as a load relay or as an alarm relay.

In operating mode “load”, the relay switches on, if a certain power threshold is reached. Power threshold and on and off time are adjustable.

In operating mode “alarm”, the relay switches on, if an error of the inverter occurs. This allows e.g. control of a warning lamp.

7.2.2.3.3.2.2 *Digital I/O's (installer area!)*

In this area, digital I/O's can be configured. They can be used to control a display or as inputs for impulses of energy meters to control the output power of the inverter. Further they can be configured as emergency stop input or to switch voltage levels (especially for Italy).

7.2.2.3.3.2.3 *External active power reduction (installer area!)*

Inputs to connect ripple control receiver. Preconfigured to standard configuration of German EEG.

7.2.2.3.3.3 *Normative parameter (installer area!)*

Grid relevant parameters regarding chosen grid code can be viewed and edited here.

7.2.2.3.3.3.1 *AC levels (installer area!)*

AC voltage levels and suitable switch-off times can be viewed and edited here. Settings are suitable to chosen grid code and may change only with consultation of the local utility company.

7.2.2.3.3.3.2 *AFI parameters (installer area!)*

AFI current levels and suitable switch-off times can be viewed and edited here.

7.2.2.3.3.3.3 *DC-component (installer area!)*

Configuration of max. Permittable DC-component in feed-in current.

7.2.2.3.3.3.4 *NSM (installer area!)*

Normative relevant grid support functions [cosphi(P), fixed cosphi, P(f), Q(U)] can be configured and viewed here. Settings are suitable to chosen grid code and may change only with consultation of the local utility company.

7.2.2.3.3.3.5 *Switch on conditions (installer area!)*

Normative relevant switch-on conditions (voltage level, frequency level, test period) can be configured and viewed here. Settings are suitable to chosen grid code and may change only with consultation of the local utility company.

7.2.2.3.3.4 *Device settings*

Inverter and power plant relevant settings can be done here, such as:

- Device Name
- Power reduction factor
- Activate /deactivate MPP algorithm for shaded strings
- Brightness and contrast of inverter display

Please refer that language of APP is automatically set by settings of your monitoring device.

7.2.2.3.4.1 Advanced settings (installer area!)

Advanced inverter relevant settings can be done here, such as:

- Inverter start voltage
- Min. allowed insulation resistance

7.2.2.3.5 Update (installer area!)

Software version of your inverter can be updated here. You see newest available software version in first row and your actual inverter software version below. You can easy update device by choosing "Update from APP".



NOTICE

During update inverter is supplied by DC-Power and your Wi-Fi-connection is stable. If update failed, please try it again before you call the service.

Any update of inverter software represents a certain risk. So you should only update, if necessary.

Further you can export / import normative parameters here. This could be necessary, if your local energy provider requires special settings. So you can adjust and export. You can import adjusted file on other devices.

7.2.2.4 Network

This is the central interface to choose your inverter to be monitored. By typing "scan" the Wi-Fi -network will be scanned for available inverters. All found items will be listed.

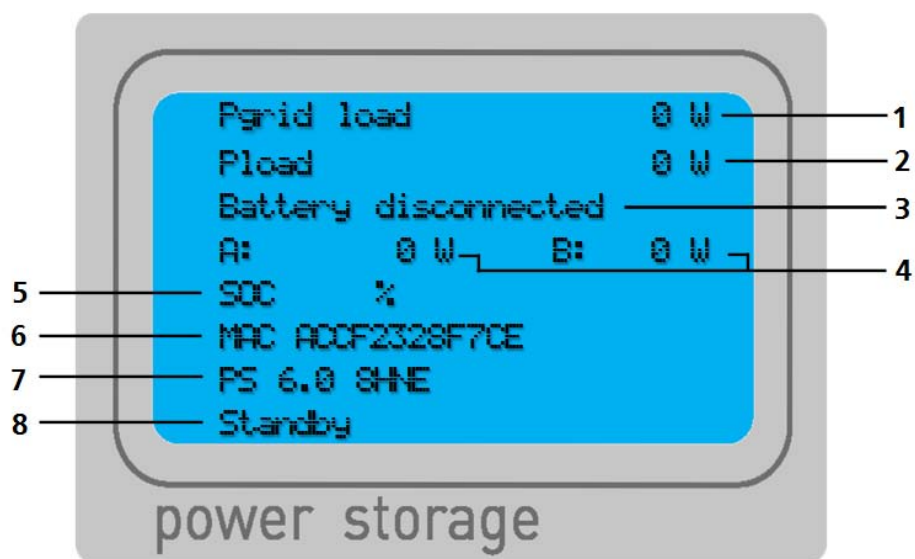
If your inverter is not in the local Wi-Fi-network, you have to type-in web address (i.e.: myinverter@dyndns.com) and add to list once by typing "+".

Now you can choose your device to be monitored by activating button on the right. If Power APP Icon is activated green you are connected.

When you open the App next time, you will be connected automatically with your last chosen device.

To delete some inverters from the list, you have to tap 2 seconds on the relevant item or click on the "-".

7.3 Display



Item	Name	Specification
1	AC Power	<ul style="list-style-type: none"> - Pgrid load: Grid feed into houshold. - Pgrid feed: Inverter feed into the grid.
2	External Source	<ul style="list-style-type: none"> - Pload: The comsumption of the consumer. - Pext. source: Generated energy of the consumer external inverter.
3	Battery Power	<ul style="list-style-type: none"> - Pbat: Battery passive (inverter and batterie are in quit mode). - Pbat charg.: The battery is charging. - Pbat discharg.: The battery is discharging. - Battery disconnected.: The battery does not connect or has no connection.
4	PV Generators	<p>The values of PV generator A and B are displayed alternate by</p> <ul style="list-style-type: none"> - Voltage - Power - State: <ul style="list-style-type: none"> • MPP [Operation in Maximum Power Point] • P_Lim [PV power is limited] • Fix [operation in fixed voltage mode] • OFF [PV generator not used]

5	SOC	State Of Charge of the battery in percent at the moment and the target SOC.
6	Device Information	<p>Information of the device, the values are displayed alternate by</p> <ul style="list-style-type: none"> - IP-adress - MAC-Adress - Serial number
7	Device Information	<p>Information of the device, the values are displayed alternate by</p> <ul style="list-style-type: none"> - Date /time - Norm - Software version - Device name - OSC_ "device name" [restart APP] - Wi-Fi "0 1 2" [Wi-Fi get configured]
8	Device state	<p>Information to current device state</p> <ul style="list-style-type: none"> - Feed IN [Inverter is feeding in] - H/W check [Checking hardware components] - Initialization [Initilization of system] - Insulation check [Checking insulation resistance] - Island check [Checking grid state] - Island [Inverter is not connected to the grid] - Island sync [Inverter change mode from island to normal by checking grid symmetry and connect seamlessly] - Standby [Inverter is in Standby mode] - Bat passive power [Battery keeps the inverter alive and is not connected to the grid] - Grid passive power [Inverter is not connected to a battery and keeps alive from the grid] - Power check [Inverter is checking solar power] - Relays test [Functional test of grid relays] - Start conditions [Checking grid conditions] - Uzk symmetry [Checking symmetry of DC-link voltage] - Software X.X.X [latest software status] - Trap XXX [Error occured]

8 Configurations

8.1 Power reduction

There are 3 possibilities to configure power reduction.

- Fixed power reduction ratio
- Dynamic power reduction with Power Sensor or external energy meter
- Power reduction by ripple control receiver

8.1.1 Fixed power reduction ratio

To configure fixed power reduction there's no need of additional hardware.

App Configuration:

Start "RCT Power App" and continue:

Device → Settings → Device settings

Input for reduction ratio:
E.g. 70%(± 0,70).

Input for Solar plant peak power in Wp.

Resulting power limitation of inverter.

Please notify, that the settings are only stored permanent, if they are flashed! Therefore it's necessary to press "Flash" after terminating all settings. Otherwise settings will be resettled after shutdown of the inverter.

8.1.2 Dynamic power reduction with Power Sensor or external energy meter

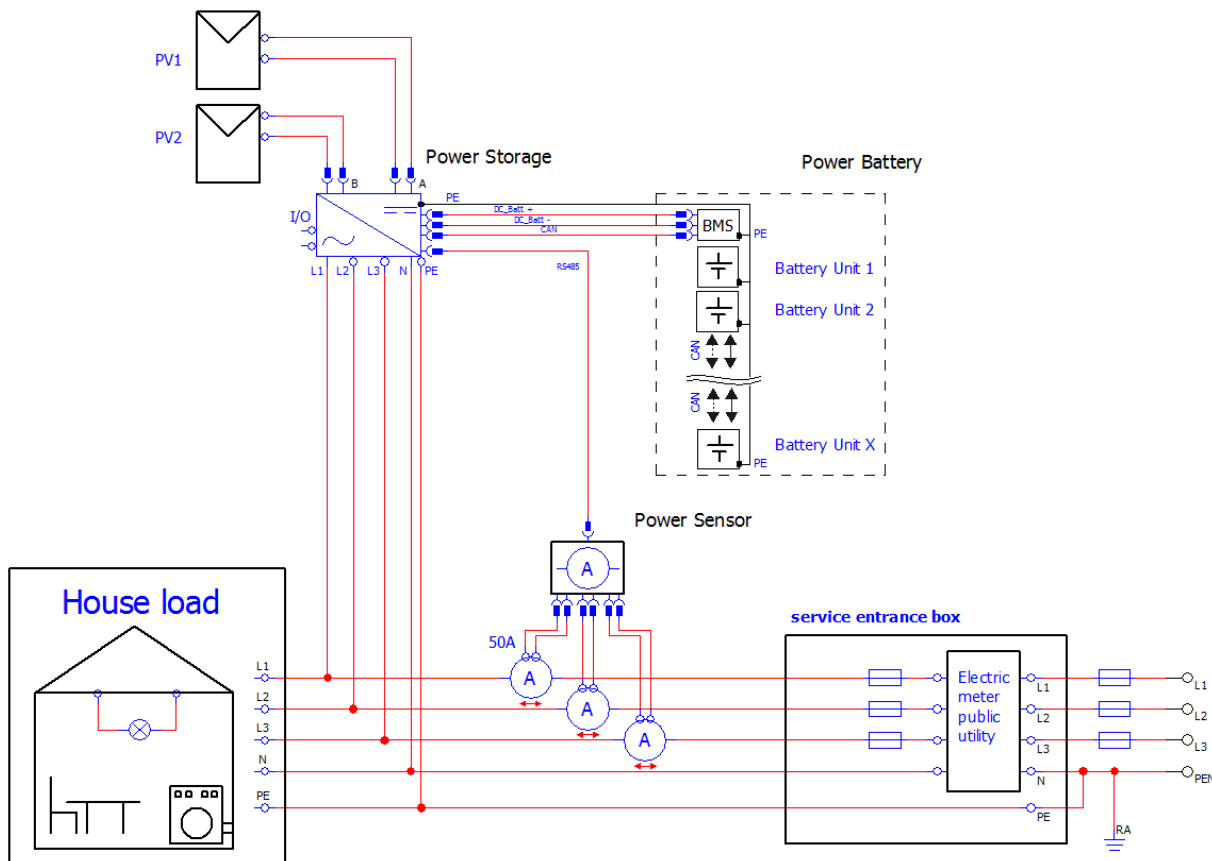
8.1.2.1 Dynamic power reduction with Power Sensor

To obtain maximum yield out of solar plant there's the possibility to configure dynamic power reduction.

You can use solar power that exceeds configured power reduction threshold for self-consumption by measuring real power feed in public grid.

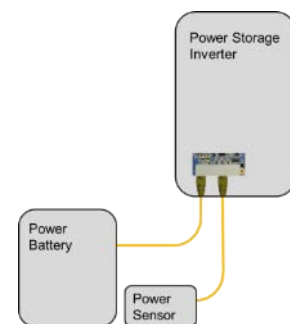
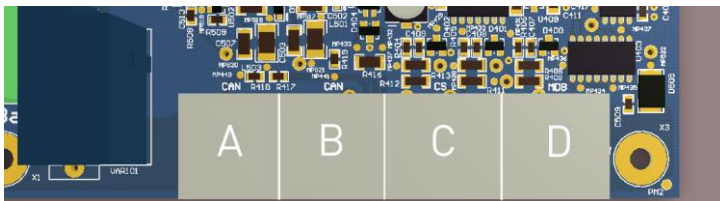
For this a Power Sensor from RCT Power is needed.

Installation Power Sensor:



Commissioning / wiring:

Connect cabling from RS485 of Power Sensor to Interface C (CS) on BPM board.



App Configuration:

- Configure power reduction according to "fixed power reduction ratio" (8.1.1).
- The Power Storage detects automatically the connection of the Power Sensor no additional configurations required.

App configuration:

- Configure power reduction according to “fixed power reduction ratio” (8.1.1)
- Continue with Device → Settings → Interfaces → Digital I/Os and configure

(Example is for use of Digital I/O 1 and Impulse ratio of 2000)

The screenshot shows the 'power storage 6.0' app interface. At the top, there's a header with the RCT logo and the app name. Below the header are tabs: ONLINE, HISTORY, DEVICE (selected), and NETWORK. Under the DEVICE tab, there are buttons for REFRESH, Digital I/O's, and FLASH. The main content area is titled 'Digital I/O's' and shows two sections: 'Digital I/O 1 usage' and 'Digital I/O 2 usage'. The 'Digital I/O 1 usage' section is expanded, showing 'Input S0 household power'. It includes a checkbox for 'Inverted signal on input I/O 1' which is checked, and a text input field for 'Number of impulses per kWh for S0 signal on I/O 1' with the value '2000'. Below this is another text input field for 'Minimum S0 signal duration on I/O 1 [s]' with the value '0.0150'. The 'Digital I/O 2 usage' section shows 'I/O not used' and also has a checked checkbox for 'Inverted signal on input I/O 2' and a partially visible text input field for 'Number of impulses per kWh for S0 signal on I/O 2'.

Use of Digital I/O 1 (X103/1) as Input for household power

Impulse ratio of used energy meter

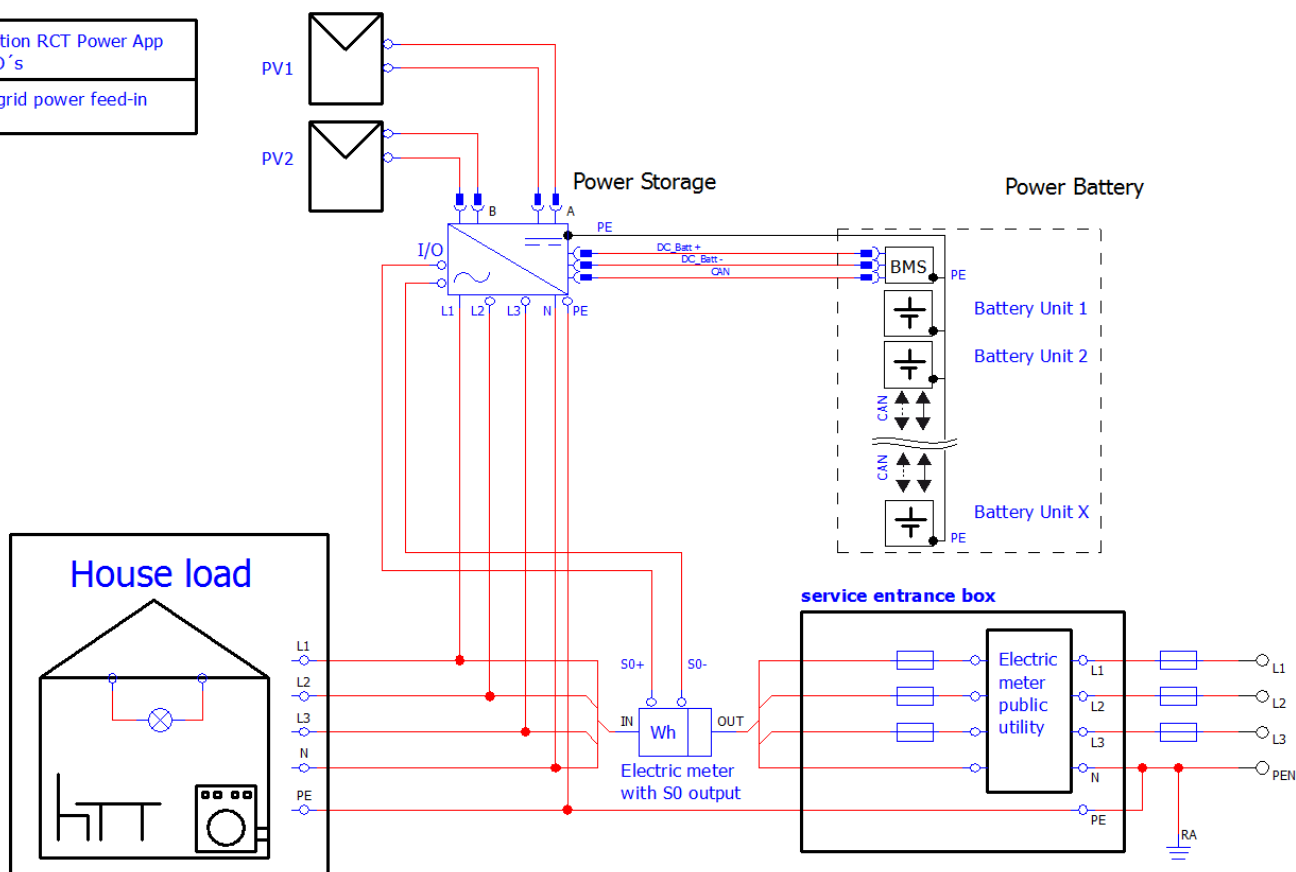
Pulse length should be minimum 15ms. Value should not be modified

Please notify, that the settings are only stored permanent, if they are flashed! Therefore it's necessary to press "Flash" after terminating all settings. Otherwise settings will be resettled after shutdown of the inverter.

Option 2: Energy meter measuring grid feeding (recommended)

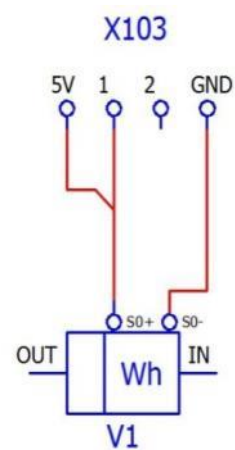
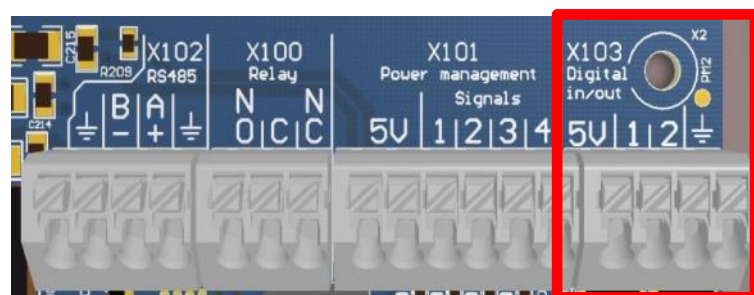
Installation energy meter:

Configuration RCT Power App Digital I/O's
Input S0 grid power feed-in



Commissioning / wiring:

Connect cabling from S0-interface of energy meter to concerning clamps X103 on communication board.



App configuration:

- Configure power reduction according to “fixed power reduction ratio” (8.1.1.)
- Continue with Device → Settings → Interfaces → Digital I/O's and configure

(Example is for use of Digital I/O 1 and Impulse ratio of 2000)

The screenshot shows the 'power storage 6.0' app interface. At the top, there's a header with the RCT logo and the app name. Below the header are tabs: ONLINE, HISTORY, DEVICE (selected), and NETWORK. Under the DEVICE tab, there are buttons for REFRESH, Digital I/O's, and FLASH. The main content area shows settings for Digital I/O 1 and Digital I/O 2. For Digital I/O 1, the usage is 'Input S0 grid power feed-in'. There's a checkbox for 'Inverted signal on input I/O 1' which is checked. A text input field for 'Number of impulses per kWh for S0 signal on I/O 1' contains the value '2000'. Below that, another text input field for 'Minimum S0 signal duration on I/O 1 [s]' contains the value '0.0150'. For Digital I/O 2, the usage is 'I/O not used', and the 'Inverted signal on input I/O 2' checkbox is also checked. The 'Number of impulses per kWh for S0 signal on I/O 2' field is partially visible at the bottom.

Use of Digital I/O 1 (X103/1) as Input grid power feed in

Impulse ratio of used energy meter

Pulse length should be minimum 15ms. Value should not be modified

Please notify, that the settings are only stored permanent, if they are flashed! Therefore it's necessary to press "Flash" after terminating all settings. Otherwise settings will be resettled after shutdown of the inverter.

8.1.3 Power reduction by ripple control receiver

Commissioning / wiring:

Connect cabling from ripple control receiver to concerning clamps X101 on communication board.

Recommended cable type: i.e. YR05x0,8WS, YSLY-OZ05x0,5GR



App configuration:

Start "RCT Power App" and continue:

Device → Settings → Interfaces → External active power reduction

Actual K4..K1 data: Displays current status of relays K4..K1 in decimal code (K1 is 2^0)

Delay for new K4..K1 data[s]: Delay for power reduction changing when relay status changes

Device is preconfigured by factory with following rates:

K4	K3	K2	K1	Allowed Active Power
0	0	0	1	100%
0	0	1	0	60%
0	1	0	0	30%
1	0	0	0	0%

To configure deviating rates, go to →K4..K1: active power reducing table

Please notify, that the settings are only stored permanent, if they are flashed! Therefore it's necessary to press "Flash" after terminating all settings. Otherwise settings will be resettled after shutdown of the inverter.

8.2 Multifunctional relays

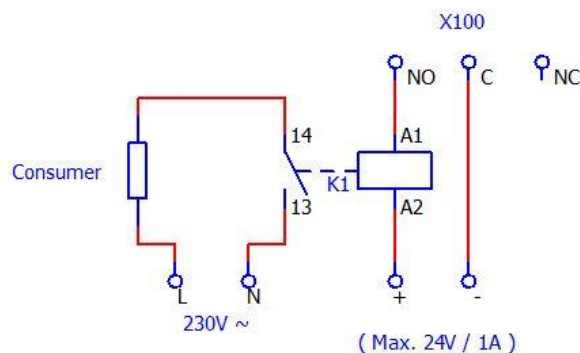
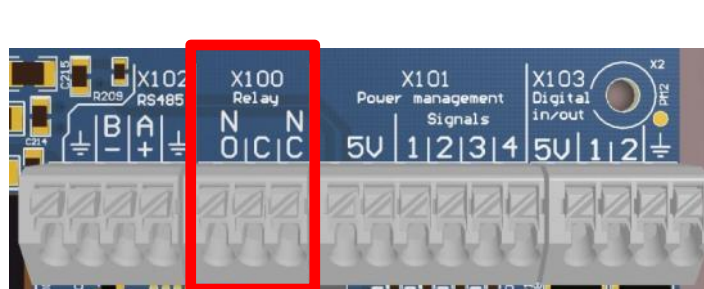
8.2.1 Use of multifunctional relay as “Load Relay”

By configuration as “Load” the Multifunctional Relay will switch, when achieving a preconfigured AC power.

So you can control a power contactor to switch household loads!

Commissioning / wiring:

Connect cabling for power supply (max. 24V/1A) and power contactor to concerning clamps X100 on communication board.



App configuration:

Start “RCT Power App” and continue:

Device → Settings → Interfaces → Multifunctional relay → Multifunctional relay usage: choose “Load” → Configure values:

Power threshold:
Min. inverter power to be reached to switch on relay.

Switch-off delay:
Time which relay stays switched after min. inverter power is not reached anymore.

Power threshold for load relay [W]
2000.0000

Load relay switching on delay [s]
50.0000

Load relay switching off delay [s]
30.0000

Switch-on delay:
Min. time recommended inverter power has to be reached.

Please notify, that the settings are only stored permanent, if they are flashed!
Therefore it's necessary to press “Flash” after terminating all settings. Otherwise settings will be resetted after shutdown of inverter.

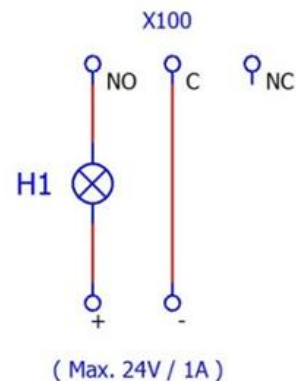
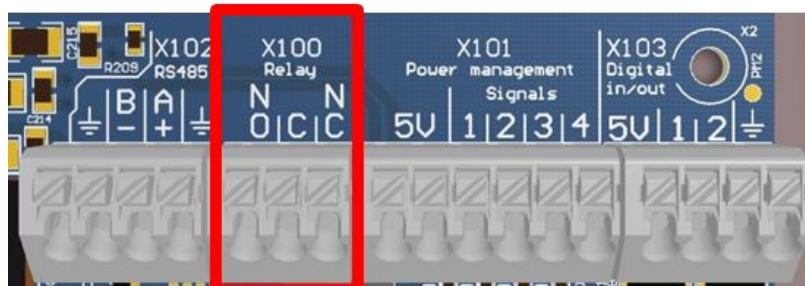
8.2.2 Use of multifunctional relay as “Alarm Relay”

By configuration as “Alarm” the Multifunctional Relay will switch, when inverter is in fault state.

So you can control a signal lamp to visualize fault state.

Commissioning / wiring:

Connect cabling for power supply (max. 24V/1A) and signal lamp to concerning clamps X100 on communication board.



App configuration:

Start “RCT Power App” and continue:

Device → Settings → Interfaces → Multifunctional relay → Multifunctional relay usage: choose “Alarm”

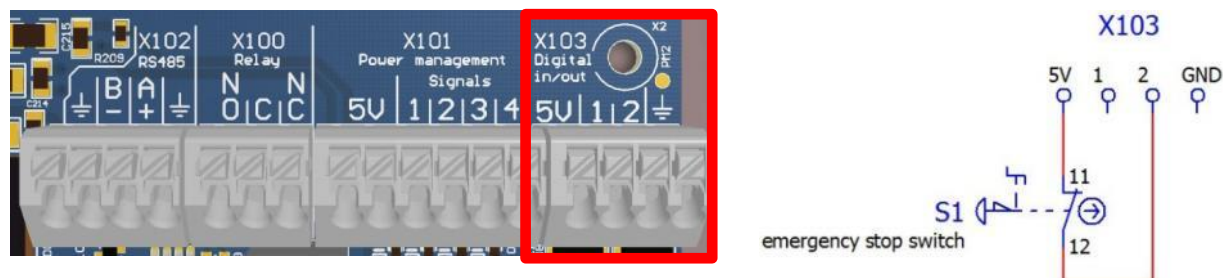
Please notify, that the settings are only stored permanent, if they are flashed! Therefore it's necessary to press “Flash” after terminating all settings. Otherwise settings will be resetted after shutdown of inverter.

8.3 Configuration of emergency stop

Inputs X103 on communication board can be used to stop inverter from remote.

Commissioning / wiring:

Connect cabling of ripple control receiver to concerning clamps X103 on communication board.



App configuration:

Start "RCT Power App" and continue:

Device → Settings → Interfaces → Digital I/O's

Choose required input I/O1 or I/O2 and set to "Input emergency turn off"

Activate "Inverted signal on input I/OX"

(example is for use of Digital I/O 2)

Please notify, that the settings are only stored permanent, if they are flashed! Therefore it's necessary to press "Flash" after terminating all settings. Otherwise settings will be resetted after shutdown of inverter.

8.4 Configuration of external display

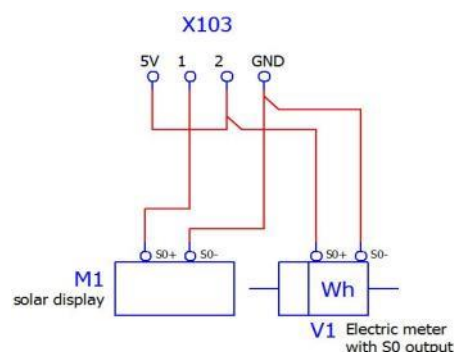
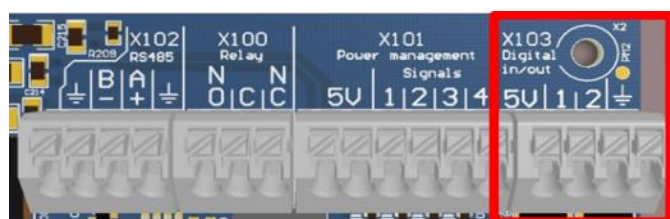
By digital I/O-ports of communication boards it's possible to drive an external display with S0-input.

It can be chosen between following options to be displayed:

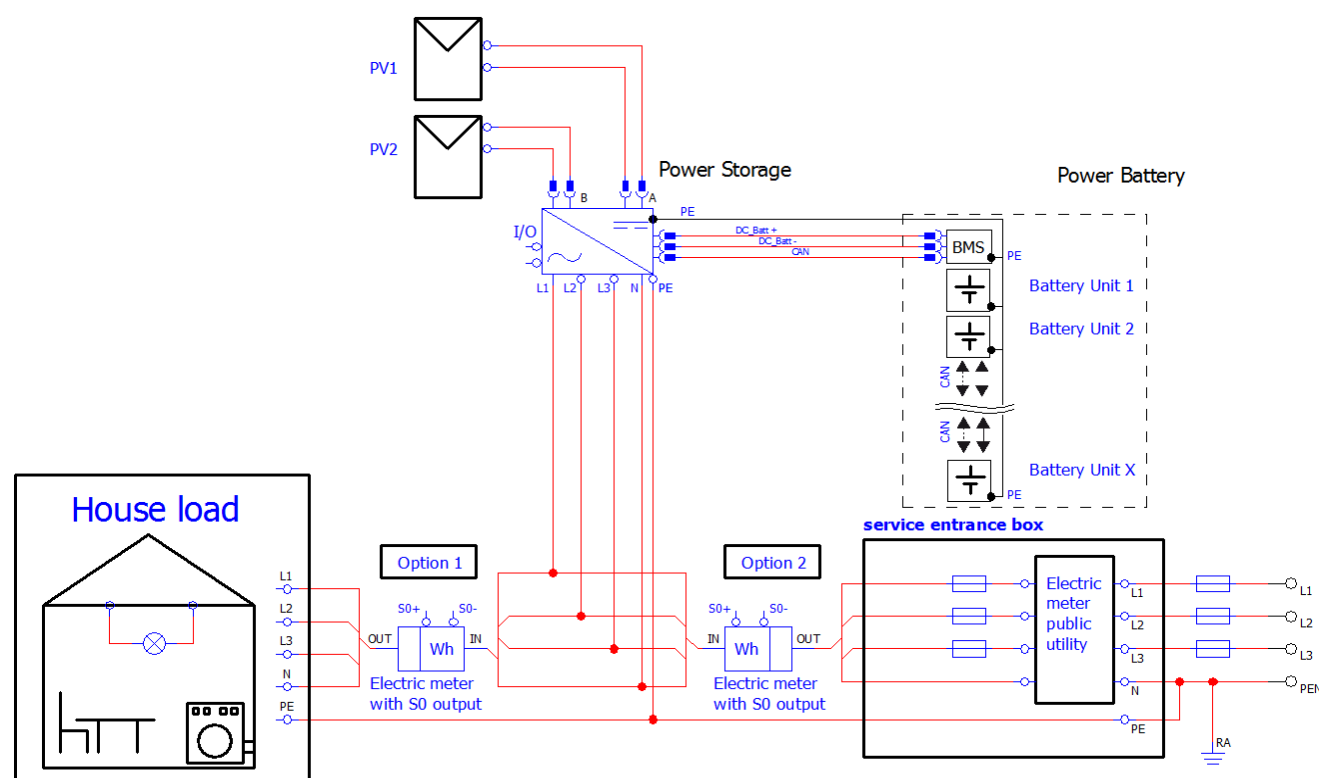
- Option 1: Household load (external energy meter with S0 needed)
- Option 2: Grid power (external energy meter with S0 needed)
- Option 3: Solar power
- Option 4: Inverter power

Commissioning / wiring:

Connect cabling from S0-input of display and energy meter (option 1 and 2) to concerning clamps X103 on communication board.



If choosed option 1 or 2 an energy meter with S0 has to be installed on relevant position:



Please refer that suitable impulse ratio of energy meter and display is configured in APP.

Recommended impulse ratio of energy meter and display is between 1000 and 2000 impulses/kWh.

App configuration:

Start "RCT Power App" and continue:

Device → Settings → Interfaces → Digital I/O's →

Setting solar display

	Output option			
	Generated solar power	Generated inverter power	House hold consumption	Input grid power feed-in
Digital I/O usage:				
Output S0 inverter power		x		
Output S0 household power			x	
Output S0 grid power feed-in				x
Output S0 solar power	x			
Input S0 grid power household feed-in power			x	x

Please notify, that the settings are only stored permanent, if they are flashed! Therefore it's necessary to press "Flash" after terminating all settings. Otherwise settings will be resetted after shutdown of inverter.

9 Error messages and troubleshooting

Solar inverter indicates error malfunctions on LCD display and stores these in the internal error memory.

Error messages stored in memory can be accessed by APP via “History” →



Errors are displayed by type and time of occurrence. By tapping on error, duration and short description will be displayed.

Error message	Description	Cause and possible remedies
TRAP	General error, causing switch-off of inverter. Occurs always with additional single fault.	Please refer to instructions on additional single fault
HW_STOP_UZK	Overvoltage occurred in DC-link. Inverter stops feeding.	DC-link-voltage is out of permissible range. Switch of inverter (DC and AC) for about 15 min. and check PV-voltage. If error still occurs, contact technical hotline
U_ZK_UNDERVOLTAGE	Undervoltage occurred in DC-link. Inverter stops feeding.	DC-link-voltage is out of permissible range. Check PV-voltage and ask grid provider about grid stability. If error still occurs, contact technical hotline
U_SG_A U_SG_B	Your power storage is approved for a max. open-circuit solar generator voltage of 1000 V. All components are sufficiently dimensioned with a safety factor. If the threshold is exceeded, the Power Storage stops feeding.	Max. allowed DC-voltage was exceeded: Check dimensioning of PV-generator. Reduce the number of modules in series and carry out commissioning again.
U_ACC	The battery voltage is outside of the expected range.	Check the parameters and the connection to battery. If error still occurs after reboot, contact technical hotline.
THROTTLE_L1_OVERCURRENT THROTTLE_L2_OVERCURRENT THROTTLE_L3_OVERCURRENT	Overcurrent in throttle of phase L1 / L2 / L3 occurred.	Error could be caused by grid interruption or problems with cabling of PV-generator. Please restart inverter. If problem occurs permanent or very often, please contact service.
BAT_OVERCURRENT	Your power storage continually monitors charge/discharge current. When the maximum permissible limit exceeded, Power Storage stops charge/discharge.	If the error occurs multiple times, check configuration of battery in APP. If error still occurs after reboot, contact technical hotline.

BAT_EMPTY	<p>Your power storage continually monitors battery voltage level.</p> <p>When the minimum permissible limit of battery voltage is dropped below, storage inverter stops discharging.</p>	<p>Battery will be charged, if there is enough power from PV-generator.</p> <p>Check battery connection, if error still occurs, contact technical hotline.</p>
BAT_OVERVOLTAGE	<p>Your power storage continually monitors battery voltage level.</p> <p>When the maximum permissible battery voltage limit is exceeded, Power Storage stops charging.</p>	<p>If error occurs for a long period of time, contact technical hotline.</p>
UL_UNDER_L1_LV1 UL_UNDER_L2_LV1 UL_UNDER_L3_LV1	<p>Your power storage continually monitors voltage level of grid.</p> <p>When the minimum permissible limit of level1 is dropped below, Power Storage stops feeding.</p>	<p>Check grid voltage level and / or ask grid provider about grid stability.</p>
UL_UNDER_L1_LV2 UL_UNDER_L2_LV2 UL_UNDER_L3_LV2	<p>Your power storage continually monitors voltage level of grid.</p> <p>When the minimum permissible limit of level2 is dropped below, Power Storage stops feeding.</p>	<p>Check grid voltage level and / or ask grid provider about grid stability.</p>
UL_OVER_L1_LV1 UL_OVER_L2_LV1 UL_OVER_L3_LV1	<p>Your power storage continually monitors voltage level of grid.</p> <p>When the maximum permissible limit of level1 is exceeded, Power Storage stops feeding.</p>	<p>Check grid voltage level and / or ask grid provider about grid stability.</p>
UL_OVER_L1_LV2 UL_OVER_L2_LV2 UL_OVER_L3_LV2	<p>Your power storage continually monitors voltage level of grid.</p> <p>When the minimum permissible limit of level2 is exceeded, Power Storage stops feeding</p>	<p>Check grid voltage level and / or ask grid provider about grid stability.</p>
GRID_UNDERVOLTAGE_UL1 GRID_UNDERVOLTAGE_UL2 GRID_UNDERVOLTAGE_UL3	<p>Your power storage continually monitors voltage level of grid.</p> <p>In case of spikes on the feeding phase the power storage stop feeding and restarts.</p>	<p>Check grid voltage level and phase wiring between L1, L2, L3 and N.</p> <p>Ask grid provider about grid stability.</p>
LT_OVERVOLTAGE_L1 LT_OVERVOLTAGE_L2 LT_OVERVOLTAGE_L3	<p>Your power storage continually monitors voltage level of grid.</p> <p>When the maximum permissible limit is exceeded for more than 10 minutes, Power Storage stops feeding.</p>	<p>The cable cross section in the AC-supply line could be too small.</p> <p>Your inverter feeds into a spur line, which is insufficiently dimensioned.</p> <p>Check grid voltage level and / or ask grid provider about grid stability.</p>
FL_OVER_LV1 FL_UNDER_LV1	<p>Your power storage continually monitors the grid frequency.</p> <p>If this is outside of the permitted level 1, inverter stops feeding.</p>	<p>Ask grid provider about grid stability.</p>

FL_OVER_LV2 FL_UNDER_LV2	<p>Your power storage continually monitors the grid frequency.</p> <p>If this is outside of the permitted level 2, inverter stops feeding.</p>	Ask grid provider about grid stability.
SW_ON_UMIN_L1 SW_ON_UMIN_L2 SW_ON_UMIN_L3	<p>Your power storage continually monitors voltage level of grid before starting to feed in.</p> <p>When the minimum permissible limit is dropped below, Power Storage doesn't start feeding.</p>	Check grid voltage level and / or ask grid provider about grid stability.
SW_ON_UMAX_L1 SW_ON_UMAX_L2 SW_ON_UMAX_L3	<p>Your power storage continually monitors voltage level of grid before starting to feed in.</p> <p>When the maximum permissible limit is exceeded, Power Storage don't start feeding.</p>	Check grid voltage level and / or ask grid provider about grid stability.
SW_ON_FMIN SW_ON_FMAX	<p>Your power storage continually monitors the grid frequency.</p> <p>If this is outside of the permitted level, inverter doesn't start feeding.</p>	Ask grid provider about grid stability.
PHASE_POS	<p>Your power storage is equipped with a redundant grid monitoring according to VDE-AR-N 4105:2011-08 and constantly monitors the grid.</p> <p>If phase position between the individual conductors changes, Power Storage stops feeding.</p>	<p>Check phase wiring.</p> <p>Ask grid provider about grid stability.</p>
ISO	<p>Before connection to grid, your power storage checks the PV-system for a possible earth fault or insulation fault.</p> <p>If an insulation error is detected, Power Storage don't start feeding.</p>	<p>Check the PV-system for possible insulation faults (e.g. pinched-off DC lines etc.).</p> <p>The measured insulation resistance must be at least 400 kOhms.</p>
AFI_30mA AFI_60mA AFI_150mA AFI_300mA	<p>Your power storage is equipped with a universally sensitive AFI according to VDE-AR-N 4105:2011-08.</p> <p>This monitoring device has detected a fault current.</p> <p>Inverter stops feeding.</p>	Check your PV-system for possible insulation faults.
IDC IDC_SLOW	<p>Your power storage continually monitors the quality of current fed in.</p> <p>If an increased DC-component in AC-current is detected, inverter stops feeding.</p>	<p>Restart the Power Storage.</p> <p>If the error still occurs, please contact service.</p>
CAN_TIMEOUT	CAN communication timeout with battery.	Restart the power storage and reestablish the CAN connection.

RELAYS TEST	Before connection to grid, your power storage checks the operation of mains relays. An error was detected during this check.	Restart the Power Storage If the error still occurs, please contact service.
EXT_OFF	Your power storage has the possibility to be switched off by a configurable "emergency stop". This signal is active and inverter stops feeding.	Check "emergency stop" switch to be unlocked. Check configuration of "emergency stop" function in APP.
RS485_POWER_SW	Error by RS485 communication with the Power Switch.	Check the RS485 connector fitting. Check the RS485 connector wire ring . If the error still occurs, please contact service.
TEMP_SINK1	Your power storage is designed to feed full power up to an ambient temperature of +40°C. If heatsink temperatures exceed a specific threshold inverter reduces power.	Check ambient temperature of installation. Clean the heatsink of inverter. Observe the installation distances specified in manual. Remove possible objects laying on the convection paths of heatsink.
TEMP_HIGH	Your power storage is designed to feed full power up to an ambient temperature of +40°C. If heatsink temperature exceeds a specific threshold inverter stops feeding. After the heatsink temperature drops, inverter restarts feeding.	Check ambient temperature of installation. Clean the heatsink of inverter. Observe the installation distances specified in manual. Remove possible objects laying on the convection paths of heatsink.
TEMP_BAT	Your power storage is designed to feed full power up to an ambient temperature of +40°C. The charge/discharge current will be reduced. If heatsink temperature exceeds the battery will be disconnected.	Check ambient temperature of installation. Clean the heatsink of inverter. Observe the installation distances specified in manual. Remove possible objects laying on the convection paths of heatsink.

10 Maintenance

This topic describes the routine maintenance items and cycles of the Power Storage.

Maintenance item	Method	Period
System cleaning	Check that the heatsink is free of block and dust	Semiannual or annual depending on environment
System running status	Check whether the inverter are damaged or deformed Check that the running sound of inverter is normal	Semiannual
Electrical connections	Check that all the cables are secured Check that all the cables are intact Check that the idle ports are locked by waterproof caps Switch off and on DC-switch	Annual
Grounding reliability	Check that the ground cables are secured	Annual

Please notify that before wiping the heatsink, the DC-switch is OFF and the circuit breaker between the inverter and the power grid is OFF.

11 Exclusion of liability

Although information contained in this manual has been checked with the greatest care for its accuracy and completeness, not liability whatsoever can be accepted for errors or omissions.

RCT Power GmbH reserves the right to change the hardware and software features described here at any time without prior notice.

Guarantee or liability claims for damages of any kind are excluded if they are caused by one or more of the followings:

- Inappropriate use or installation of the product
- Installing or operating the product in an unintended environment
- Ignoring relevant safety regulations in the deployment location when installing or operating the product
- Ignoring safety warnings and instructions contained in all documents relevant to the product
- Installing or operating the product under incorrect safety or protection conditions
- Altering the product or supplied software without authority
- The product malfunctions due to operating attached or neighboring devices beyond allowed limit values
- Damages caused by natural environment

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RCT Power GmbH shall assume no guarantee for damage caused by faulty or lost data, due to incorrect operation or the malfunction of the inverter, the software, additional devices or PCs.

12 Technical Data

Power Storage	4.0	5.0	6.0
Order Number	IHP040N1AE0	IHP050N1AE0	IHP060N1AE0
DC-INPUT			
Max. recommended DC power	5000 W	6250 W	7500 W
Rated DC power	4200 W	5250 W	6300 W
MPPT	2 (paralleling possible)		
Input per MPPT	1		
Maximum DC current per MPPT	2 x 12 A (1 x 24 A in parallel mode)		
Rated DC voltage	700 V		
DC start up voltage / power	150 V / 25 W		
DC voltage range	140 V ... 1000 V		
MPP voltage range	265 V ... 800 V		
Maximum voltage DC	1000 V		
Connector type	Weidmüller PV-Stick (MC4 compatible)		
BATTERY-INPUT			
DC voltage range	150 V ... 600 V		
Maximum charge / discharge current	20 A / 20 A		
Maximum charge / discharge power	6000 W / 4000 W	6000 W / 5000 W	6000 W / 6000 W
Connector type	Weidmüller PV-Stick (MC4 compatible)		
AC-OUTPUT			
Rated AC output power	4000 W	5000 W	6000 W
Maximum active power	4000 W	5000 W	6000 W
Maximum apparent power	6300 VA	6300 VA	6300 VA
Nominal AC current per phase	5,8 A	7.3 A	8.7 A
Maximum AC current per phase	9,1 A	9.1 A	9.1 A
Rated frequency	50 Hz / 60 Hz		
Frequency range	45 Hz ... 65 Hz		
Max. switch-on current	13 A, 0,1ms		
Max. fault current (RMS)	285 mA		
Rated AC voltage	230V / 400V (L1, L2, L3, N, PE)		
AC voltage range	180V ... 270V		
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%	97,7%	97,9%
Maximum efficiency (PV – Battery – Grid)	95,9%		
Topology	Transformerless		

OTHER

PV – DC-switch	Integrated
DC / AC overvoltage protection	Category II / Category III
Data interface	WI-FI, optional: 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 - 95% (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	26 kg

SAFETY / STANDARDS

Protection class	1
Overload behavior	Working point adjustment
Certificates	CE, VDE-AR-N 4105:2011-08, EN 50438
	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

