

GREENROCK Webinar

Installation GREENROCK

Presenter at this webinar

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Content

- ✓ Installation location, Requirements floor, Load capacity
- ✓ Delivery, Transport and transportation aid
- ✓ Set-Up Version
- ✓ Mounting and Set-up steps
- ✓ Tilt Protection
- ✓ Integration

Location, Floor requirement, Load capacity

- ✓ Location
 - ✓ Installation always next to a wall on the floor
 - ✓ Temperature Range -5°C to +50°C
 - ✓ Humidity max. 95% (non condensing)
 - ✓ Natural air exchange with 0,5m³/h per kWh
- ✓ Floor....
 - ✓ Needs to comply to load capacity, please see data sheet for specification
 - ✓ Level, flat and dry

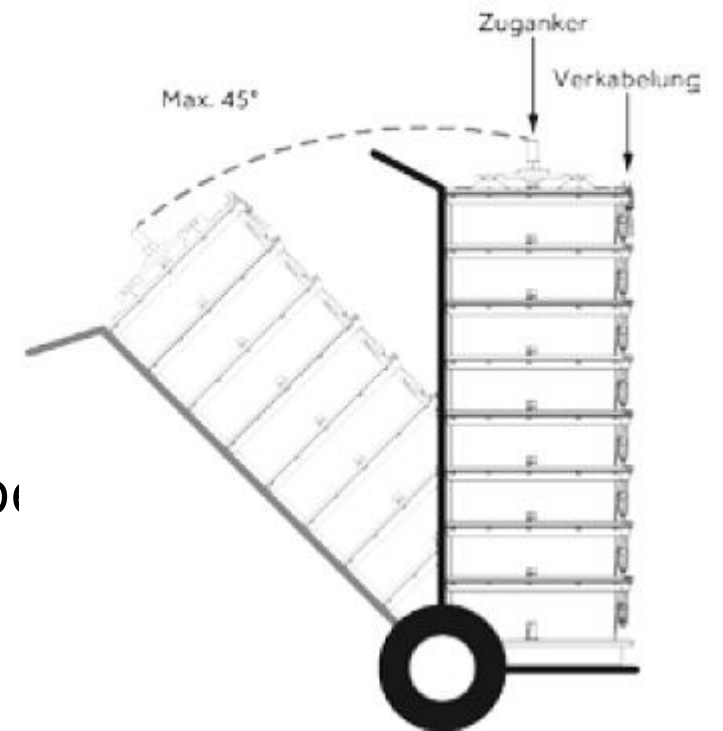
Delivery, Transport and Transportation aid

- ✓ Delivery via Euro-Palette
 - ✓ Exchange palette
- ✓ Check on shipping damages
 - ✓ Document damages (pictures, delivery note)
- ✓ Storage until installation
 - ✓ In House protected from sun and water
 - ✓ between -5°C and $+50^{\circ}\text{C}$

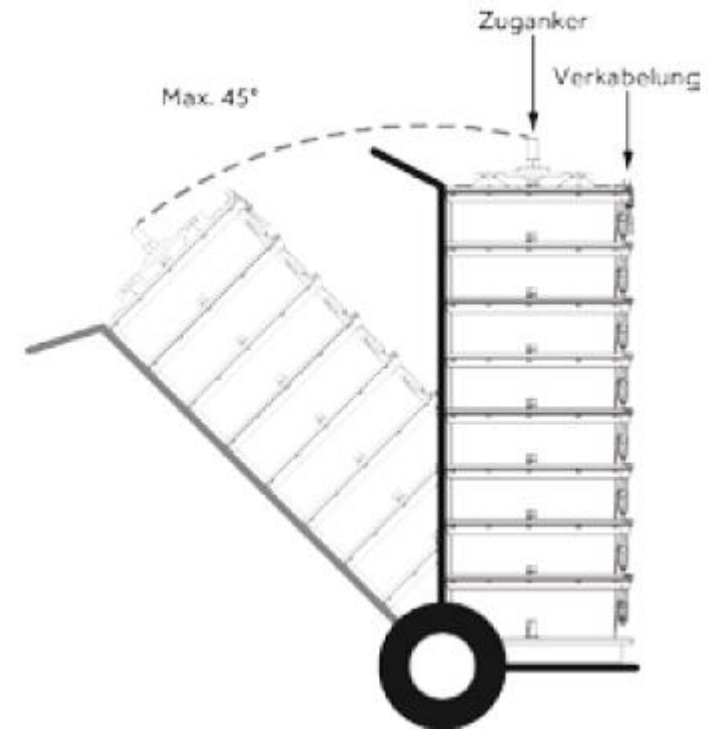


Delivery, Transport and Transportation aid

- ✓ Transport using a (stair) climbing hand truck
 - ✓ Weight, 140kg per stack
 - ✓ Max. degree of tilt 45° for one hour
 - ✓ Transportation flat on the ground not allowed
- ✓ Damage protection
 - ✓ Stack wiring should be in front, wires should not be jammed
 - ✓ Stairs – may be a 2nd person for help advisable
- ✓ Injury protection
 - ✓ Use protection gloves



Delivery, Transport and Transportation aid



Set-Up Versions

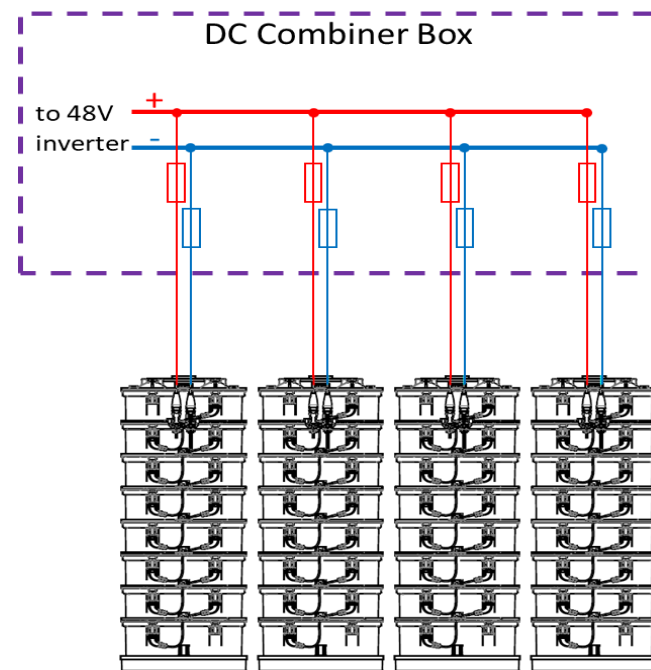
- ✓ Set-Up is modular
 - ✓ Battery stacks need to be placed on the floor
 - ✓ Electronics – wall mounted, please consider distance for cabling between stacks and electronics (inverter etc.)

Installation Steps (1) Battery Inverters

- ✓ Select the place for your battery inverters and install them accordingly

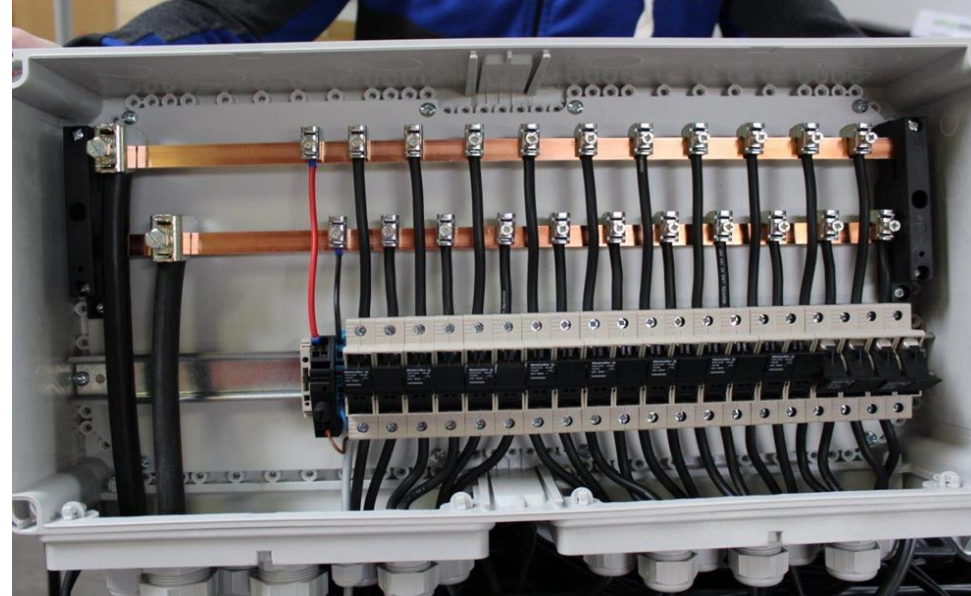
Installation Steps (2) DC Combiner Box

✓ Connecting Batteries with Inverters



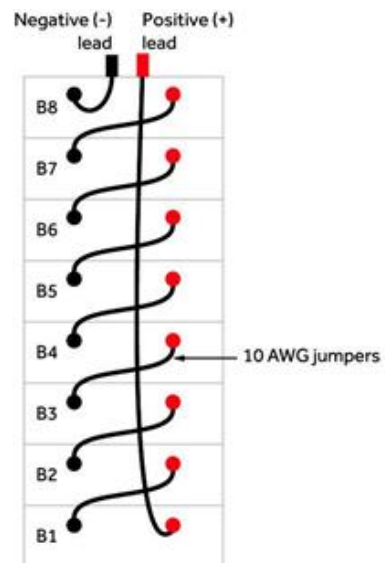
Installation Steps (2) DC Combiner Box

- ✓ Combiner Box includes:
 - ✓ Plastic housing with bus bar
 - ✓ DC fuse and disconnection for Battery + and –
 - ✓ Cabling to batteries
 - ✓ Cabling to inverters



Installation Steps (3) Stacks

- ✓ Select your target place for the system
- ✓ Place the stacks on the dedicated floorspace
- ✓ Ensure wiring cables of stacks are always accessible



Installation Steps (4) Stacks initial charging

- ✓ GREENROCK saltwater battery stacks are shipped with low state of charge and voltage
- ✓ However SOC should be sufficient to start operation of batteries, when hooked up with the designated system

Inverter Settings

Battery Model	Max. Recommended Charge or Discharge Current	Voltage Range (operation after initial charge)	Ambient Temperature (24-hour average)
GREENROCK BA-S1-48	20 A	36 – 60 V	-5°C to +50°C
GREENROCK BA-S1-24	40 A	17,5 – 30 V	-5°C to +50°C
GREENROCK BA-S1-12	20 A	8,8 – 15 V	-5°C to +50°C

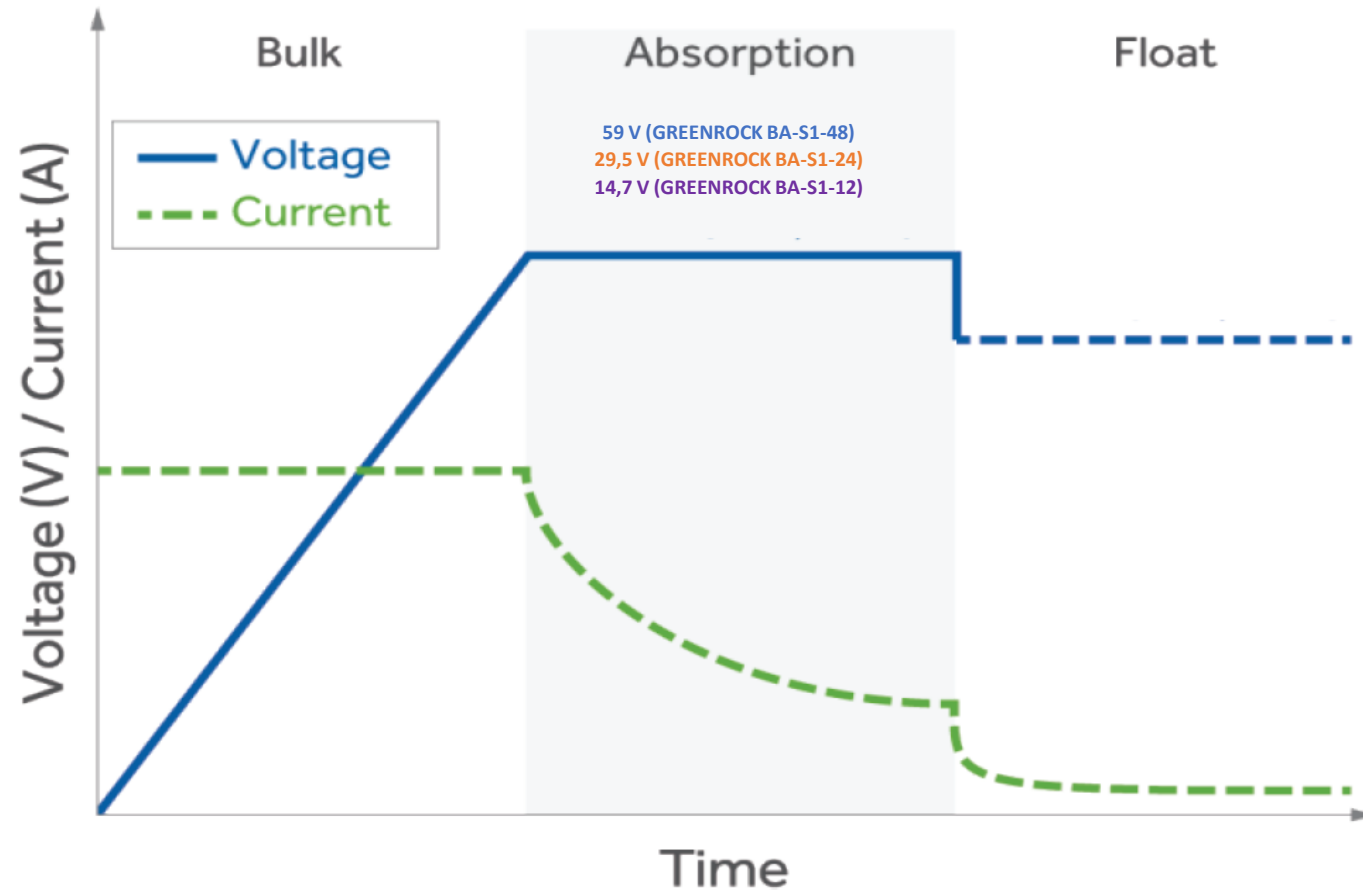
Inverter Settings

For clarity, the charge profiles include the lead acid charge terminology of bulk, absorption, and float, though they are not strictly correct for the GREENROCK chemistry. Please find the charge profile below for clarity.

Recommended Charge Profile

Battery Model	Max. Current	Recommended Bulk Current	Max. Bulk Voltage	Absorption Cut-Off	Float
GREENROCK BA-S1-48	20 A	< 10 A	59 V @ 25°C average temp	Time < 1 hour	54,2 V
GREENROCK BA-S1-24	40 A	< 20 A	29,5 V @ 25°C average temp	Time < 1 hour	27,1 V
GREENROCK BA-S1-12	20 A	< 10 A	14,7 V @ 25°C average temp	Time < 1 hour	13,5 V

Inverter Settings



Inverter Settings

See BlueSky Energy approved battery inverters and documentation
For inverter specific setting

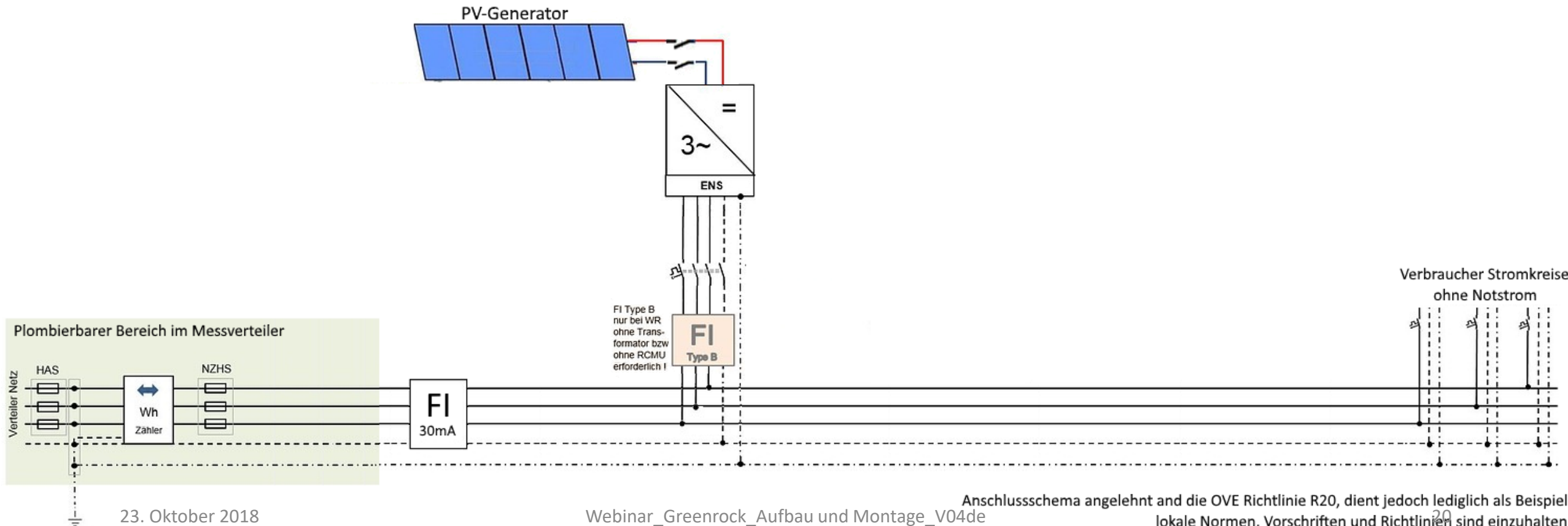
State of Charge - SOC

- Coulomb Counting – Ampere (current method)
- Temperature, Round Trip Efficiency, Open Circuit Voltage
State of health (elaborate method)
- GREENROCK SOC Board available in Q1 2019

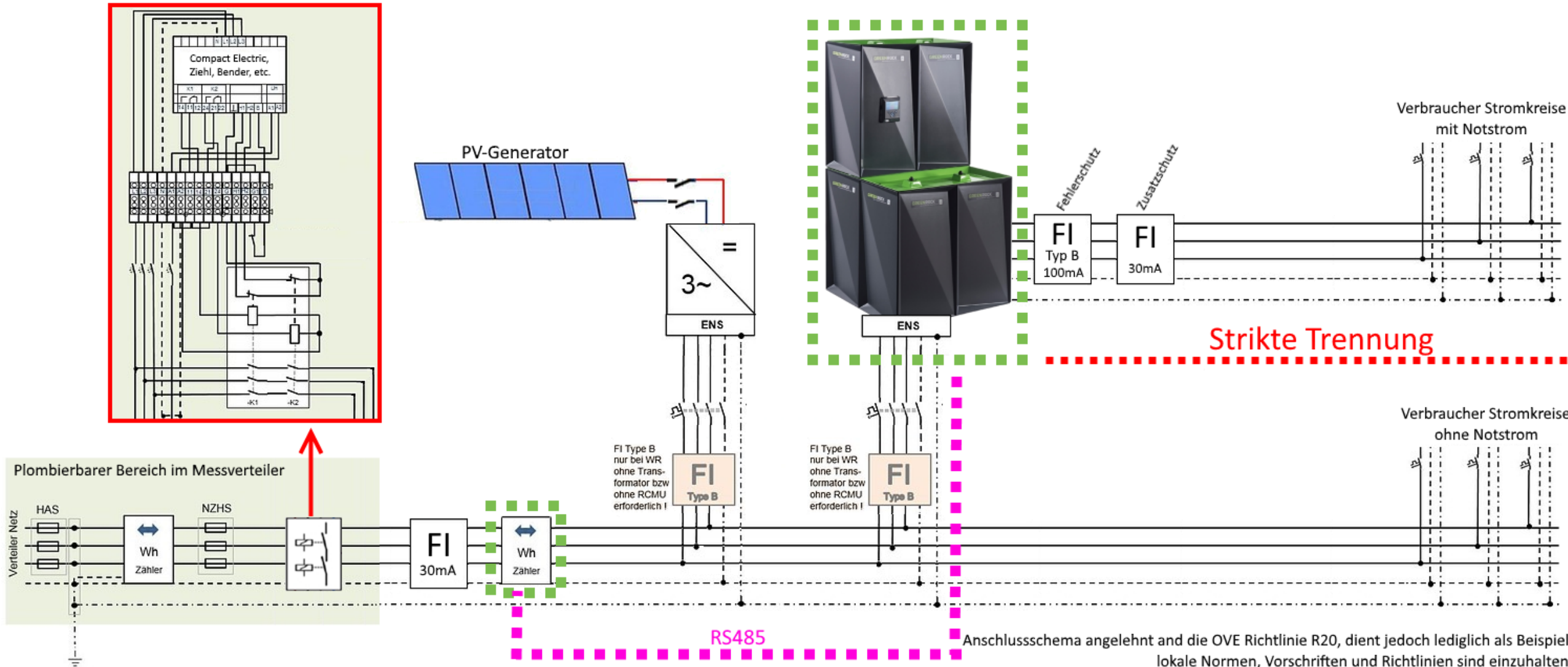
Grid/PV Integration

- DC Coupling with PV Charger
- AC Coupling with PV inverter and battery inverter
- AC Coupling with Hybrid inverter
- Emergency Back-Up
- Islanding Mode

Example – Terra Neutral TN



Example TN with emergency backup



Anschlusschema angelehnt an die OVE Richtlinie R20, dient jedoch lediglich als Beispiel lokale Normen, Vorschriften und Richtlinien sind einzuhalten

Questions?

GREENROCK Webinare

content

- ✓ **Product presentation (done)**
- ✓ **Battery Dimensioning (Deep Dive) (done)**
- ✓ **Installation (this presentation)**
- ✓ **Calculating the costs of energy storage**



23. Oktober 2018

GREENROCK

DER SALZWASSER STROMSPEICHER

Vielen Dank