SP-5000L Lithium Iron Phosphate Battery

Residential Energy Storage System

Quick Guidance

Version: 1.0

Date: 2023-08-19

Read this Guidance carefully before installation to understand product features and safety precautions.

WARNING

* Operators should be well trained to fully understand grid-connected photovoltaic power system and national/regional standards.
* Installers must use insulating tools and wear safety equipment.
* Device damages caused by noncompliance with storage, transportation, installation and usage requirements specified in Quick Guidance and Manual are not covered by Warranty.

1 Important Safety Information

Risks of electrolyte leakage

* Do not subject battery to strong impact.
* Do not crush or puncture battery.
* Prevent battery from falling. In case of fall, turn off the battery immediately and stop using it.
* Do not open or mutilate batteries. Released electrolyte is harmful to the skin and eyes.

Risks of fire

* Do not expose battery to direct sunlight.
* Avoid contact with conductive objects such as terminals or exposed wires.
* Keep battery away from fire source, inflammable, explosive and chemical materials.
* Do not dispose batteries in a fire as they may explode.

Risks of electric shock

* Do not touch battery with wet hands.
* Keep battery away from children and animals.
* A battery can present a risk of electric shock and burns due to high short-circuited current.
* Battery installation and wire connection must be operated by professionals.

Risks of damage

* Keep battery away from water.
* Do not subject battery to high voltage.
* Place battery on a flat surface. Do not place any foreign object on top of battery nor step on battery.
* Battery-connected PCS should have reinforced insulation.

Table 1-1 Responses to Emergencies

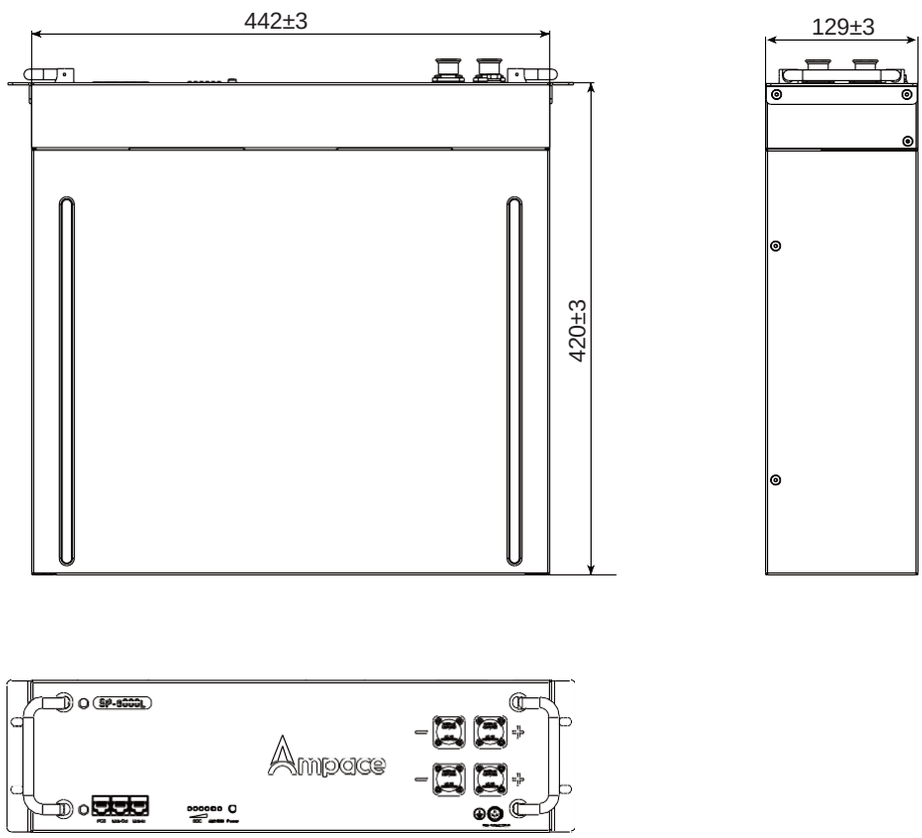
Event	Description and Recommended Actions
Leakage	* Inhalation: leave the contaminated area immediately. * Swallow: induce vomiting. * Contact with eyes: flush eyes with flowing water for 15 minutes. * Contact with skin: wash thoroughly with soap and water. * Immediately seek for medical help after taking emergency measures.
Fire	Battery may catch fire when heated above 150℃. Please implement the following actions: * If battery catches fire during operation, turn off the breaker between battery and PCS when there is no direct risk of safety. * Use an extinguisher before the battery catches fire. An ABC or carbon dioxide extinguisher is recommended. * If battery is on fire, evacuate people first before calling fire fighter for help.
Wet battery	If battery is wet or under water, do not access it. Contact aftersales service or distributor immediately for technical assistance.
Damage	Damaged battery is dangerous and must be handled with utmost care. It can't be used and could pose a safety threat to people or property. If battery is suspected to be damaged, stop any operation and return it to the distributor.

2 Product Appearance

The battery is an energy storage unit composed of cells, mechanical parts, battery management system (BMS) as well as power and signal terminals.

Table 2-1 Mechanical features

Parameter	Value
Dimensions	W442*D420*H129 mm (excluding brackets and terminals)
Weight	≤37 kg
Installation	Rack-mounted installation



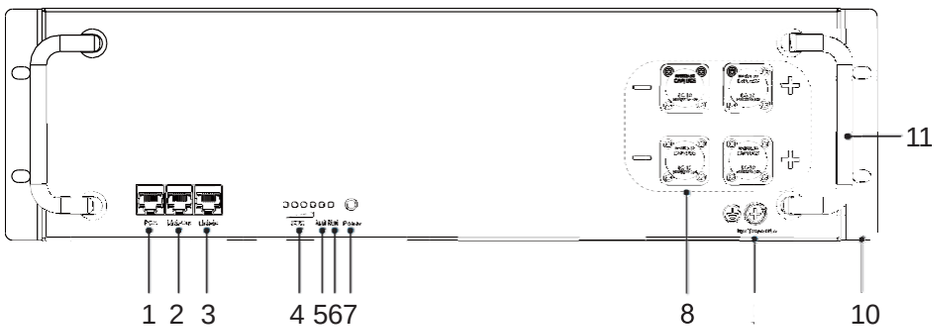
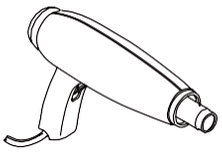


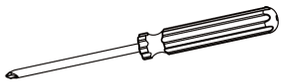
Table 2-2 Ports and terminals

No.	Label	Name
1	PCS	PCS communication port
2	Link-Out	Network port for parallel connection
3	Link-In	Network port for parallel connection
4	SOC	Display the battery capacity, and each indicator represents 25% SOC
5	ALM	Display the alarm status of the battery
6	RUN	Display the running status of the battery
7	Power	Power ON/OFF button
8	+/-	Two-positive two-negative power IO ports
9	⏚	Grounding terminal
10	Rack mount bracket	19-inch rack mount bracket, adjustable
11	Handle	Foldable handle

3 Tools and Protective Equipment

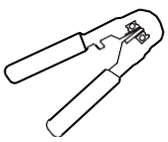


Heat gun



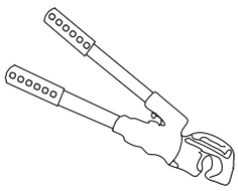
Cross-head screwdriver

Wire cutter



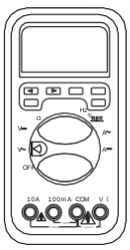
Wire crimper

Wire stripper



Hydraulic plier

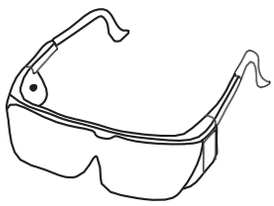
Tape measure



Multi-meter

Mark pencil

Insulated gloves



Safety goggles

Rubber boots

To prevent injury, always wear acid-resistant clothing, PVC gloves, goggles and rubber boots during installation and operation.

4 Installation of Battery

It is recommended to install the battery into a rack and place it indoor. If you install it outdoor, select a rack with a sufficient IP rating. Build sunshade & rain shelter to avoid direct exposure to sunlight and rain for outdoor application.

CAUTION

* Do NOT expose battery into sunshine or rain directly.
* Keep the dirt or dust at a minimal level.
* Do not install battery in a place where flood frequently occurs.
* Do not install battery in highly humid area.
* Ensure direct contact between battery shell and ambient air and do NOT cover or shield battery.
* The battery storage and installation environment must ensure that there is no conductive dust, corrosive gases, and no risk of explosion; And ensure that the indicators of dust, corrosive substances, harmful organisms, fungi, etc. comply with the temperature controlled environment requirements of Class 3.1 of ETSI EN 300 019-1-3 (V2.3.2 or higher version).

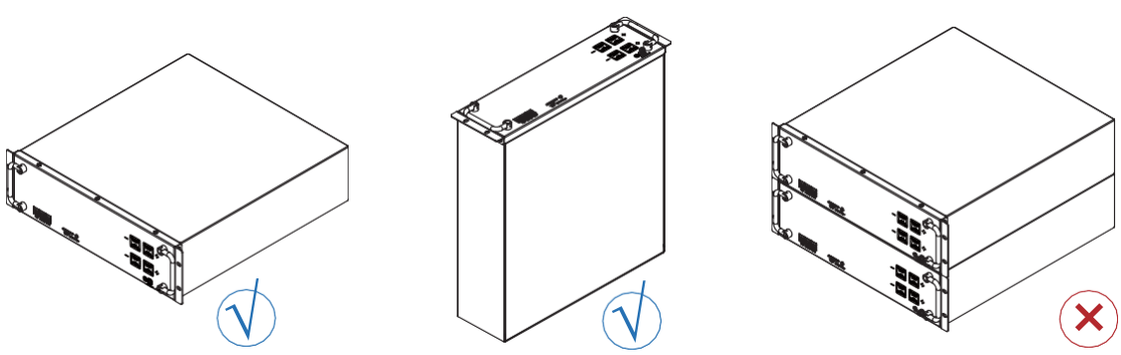
Inspection Before Installation

Before installation, check carefully for any damages on the package and the products and inspect if all accessories in the list are included. If any part is missing or damaged, please contact your distributor.

Battery Package		
Item NO.	**Part Name**	**Quantity**
1	Battery	1pcs
2	Grounding wire	1pcs
3	Communication wire	1pcs
4	Terminator (crystal plug)	2pcs
5	Quick Guidance	1pcs
6	Factory Inspection Report	1pcs

Battery Orientation

The battery can be installed in a rack and connected in parallel. Ensure that you install the battery in correct directions. Please refer to figures below (√ means acceptable and X unacceptable).



CAUTION

* Do not place battery upside down.
* Do not stack two batteries.

Rack-Mounted Installation

CAUTION

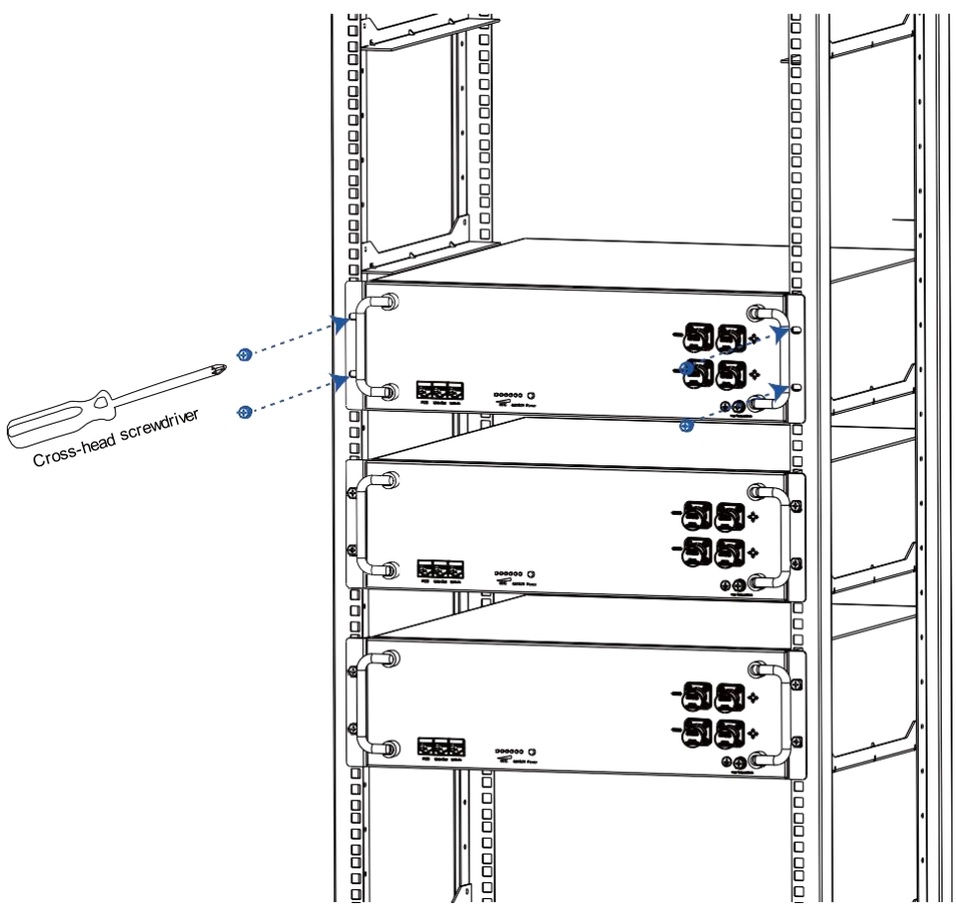
- Ensure that batteries are in off mode and battery breakers are turned off.
- Before installing battery, remove conductive ornaments such as watch, bracelet, and rings and wear protection equipment.
- Confirm the capability of the rack to bear weight before installation.
- Confirm the volume of the rack before installation.
- It is recommended to reserve 4U for the installation of one unit of SP-5000L. To prolong the life of batteries, reserve a gap greater than 20 mm between batteries for cooling.

Check and confirm the battery is powered off and battery breakers are turned off before any process.

Step 1 Take the battery out of its package.

Step 2 Align the battery with the rails of the rack and slide it into the rack.

Step 3 Use four screws to fix the battery in the rack.

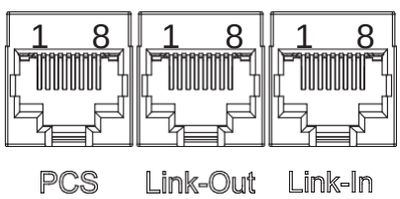


5 Electrical Connection

The battery provides three network ports and four power terminals for electrical connection.

Terminals/Ports	Type	Cable Cross-Section	Current Carrying Capacity
Grounding	M6	16mm²	
+/-	M6	25mm² or 3AWG	100A
PCS/Link-In/Link-Out	RJ45	24AWGX8	

Pin No.	PCS	Link-Out	Link-In
1	RS485_B	CAN_H	CAN_H
2	RS485_A	CAN_L	CAN_L
3	NC	Ecode_OUT	Ecode_IN
4	CAN1_H	ISO_GND	ISO_GND
5	CAN1_L	Slave	Master
6	NC	RS485_B	RS485_B
7	NC	RS485_A	RS485_A
8	NC	Syn_Wake Out	Syn_Wake Out



Prepare Cables

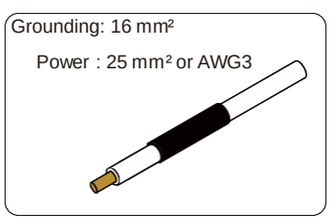
Before connecting the batteries, you need to prepare cables to meet the requirements of your applications.

CAUTION

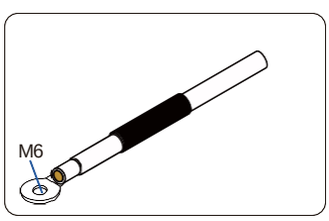
Cables can be made by yourself or purchased from qualified providers.

It is recommended to purchase finished power wire products according to the terminal specifications of the battery. Unqualified power wires might result in damages to the battery and your power system. If you make cables on your own, please ensure that the terminals are crimped properly.

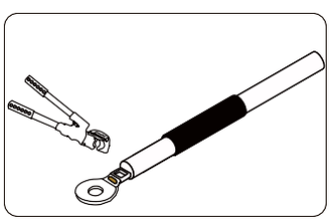
Step1 Make power and grounding wires with OT terminals.



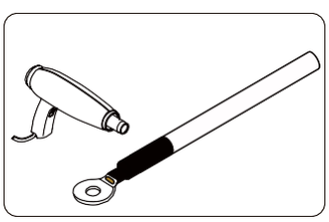
1. Strip cable sheaths and put a piece of heat shrinking tube along the wire.



2. Insert conductive wires into an OT terminal.



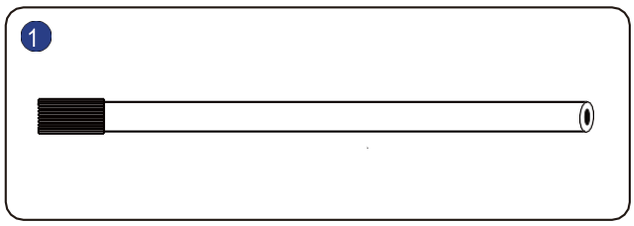
3. Crimp the OT terminal with a hydraulic plier.



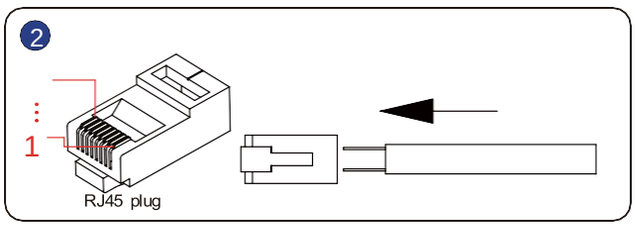
4. Use a heat gun to heat the heat shrinking tube.

Step 2 Make Network Cable A.

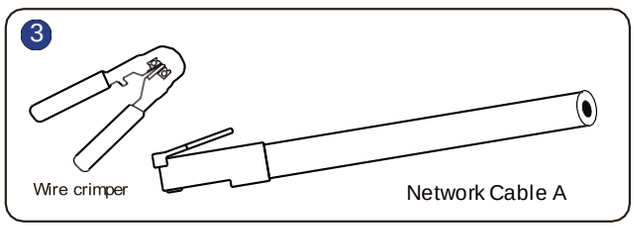
1. Strip cable sheaths for 15±0.5mm first.



2. Insert eight wires into an RJ45 plug at one end of network cable A. Ensure all wires stay well aligned.

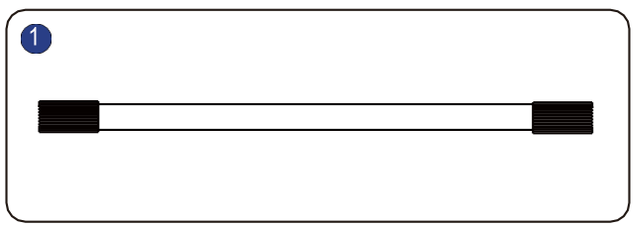


3. Crimp the RJ45 plug with a wire crimper.



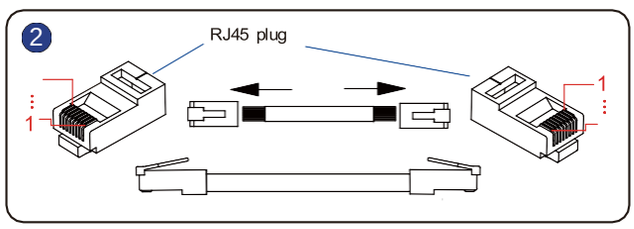
Step3 Make straight through network cable B.

1. Strip cable sheaths for 15±0.5mm first.

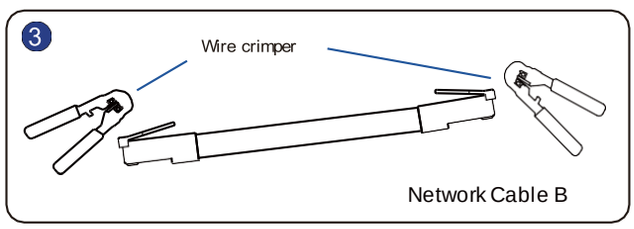


2. Insert eight wires into RJ45 plugs.

   Ensure that the colors of wires stay consistent at both ends of network cable B.



3. Crimp RJ45 plugs with a wire crimper.



Connect One Battery

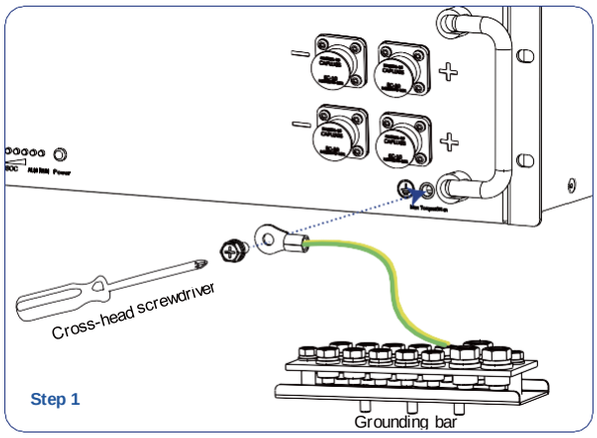
CAUTION

* Ensure that battery is in off mode and battery breaker is turned off.
* Ensure that no cable is twisted after battery is wired.

After making the cables ready and equipping yourself with protective devices, connect cables to the battery in the following way:

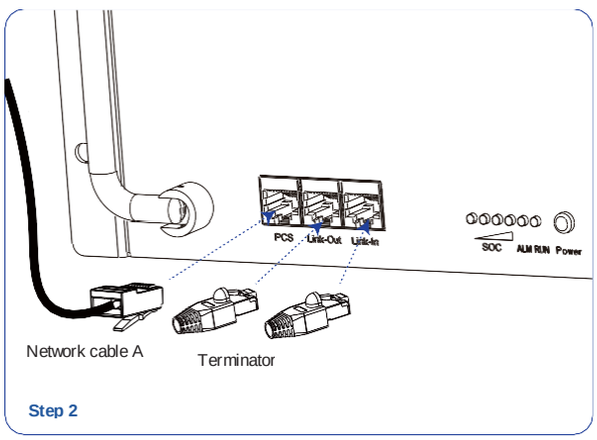
Step 1 Use an M6 screw to fasten the grounding wire to grounding terminal and fix the other end to grounding bar.

Note that the cross-section of grounding wire is 16mm^2.



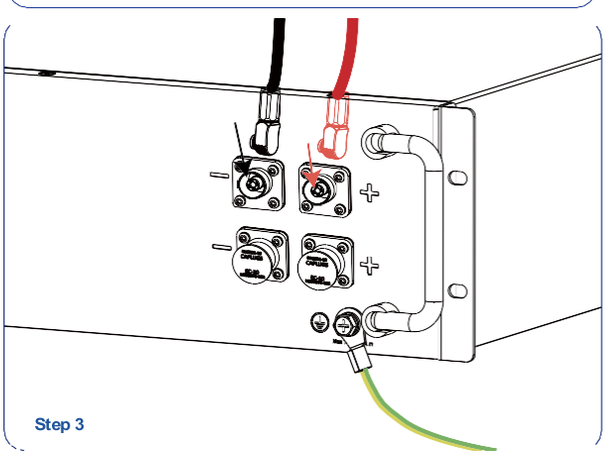
Step 2 Insert a network cable into battery port.

1. Plug one end of network cable A into the **PCS** port of battery, and plug the other end into the network port of the inverter.
2. Insert two terminators (a crystal plug with pin 4 and pin 5 short circuited) into **Link-Out** and **Link-In** respectively.



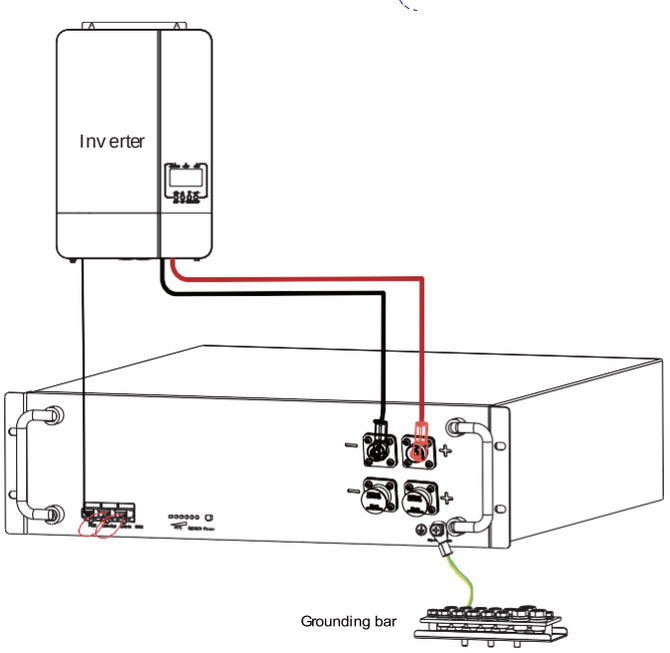
Step 3 Connect power wires.

1. Fix the OT terminals of power wires to one pair of the **+/-** terminals of the battery.
2. Put back the plastic cover.



CAUTION

* When connecting a power wire, ensure that its OT terminal is placed in the correct direction.
* Do NOT stack two OT terminals onto one power interface.



Connect Batteries in Parallel

CAUTION

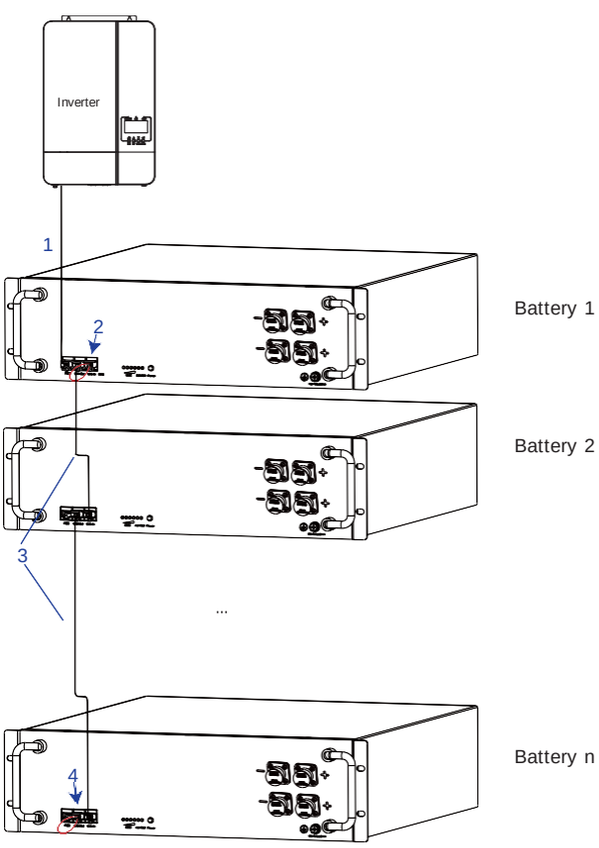
* Ensure that all batteries are in off mode and battery breakers are turned off.
* Ensure that no cable is twisted after batteries are wired.
* The batteries shall be manufactured within one year and have a cycle difference less than 300.

Step 1 Confirm that the voltage difference is not greater than 1V.

1. Power on the batteries without load and use a multi-meter to measure their voltages.
2. If the voltage difference is greater than 1V, charge the battery with lower voltage.
3. Power off the batteries.

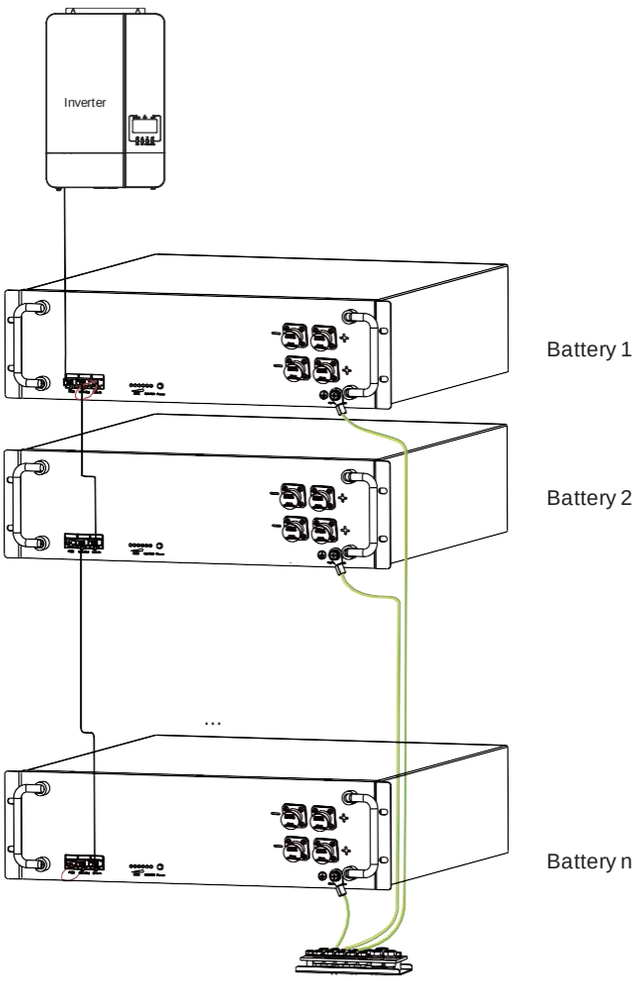
Step 2 Connect network cables.

1. Insert one end of network cable A into the **PCS** port of **Battery 1** and the other end into the network port of the inverter.
2. Insert a terminator (a crystal plug with pin 4 and pin 5 short circuited) into **Link-In** of **Battery 1**.
3. Use network cable B to connect the **Link-Out** port of **Battery 1** and the **Link-In** port of **Battery 2**.
   Connect the rest batteries in a similar way till the last one is connected.
4. Insert a terminator (a crystal plug with pin 4 and pin 5 short circuited) into **Link-Out** of **Battery n** (n≤16) .



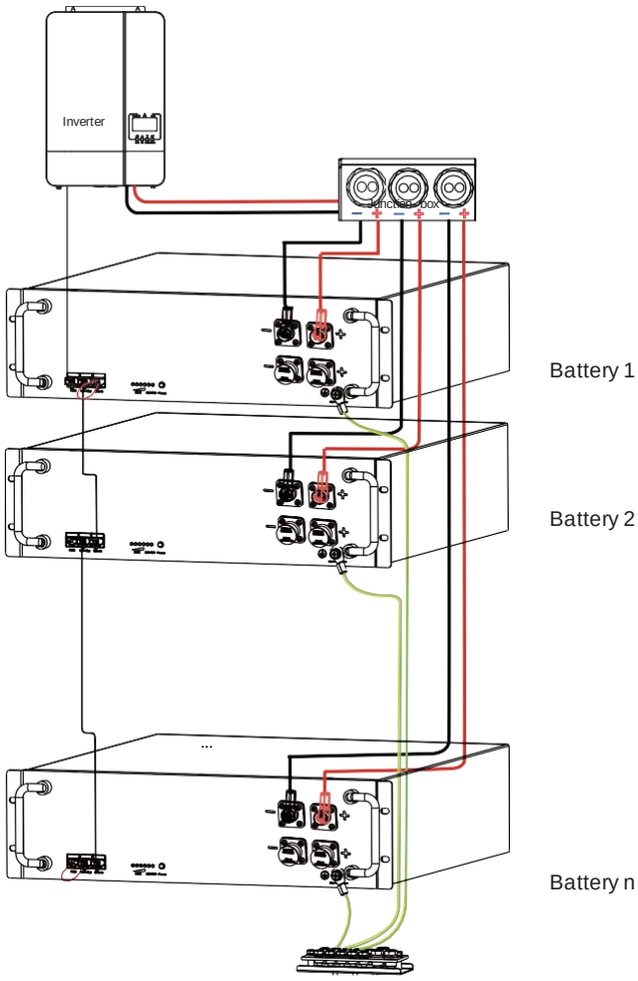
Step 3 Connect grounding wires.

Connect the grounding terminal of each battery to the grounding bar of the rack.



Step 4 Connect power wires.

Connect the **+/–** terminals of each battery to the +/- of the junction box respectively and then connect the junction box to the inverter.



6 Operation and Commissioning

After the battery is installed and wired, operate and commission it to check if the battery works properly.

CAUTION

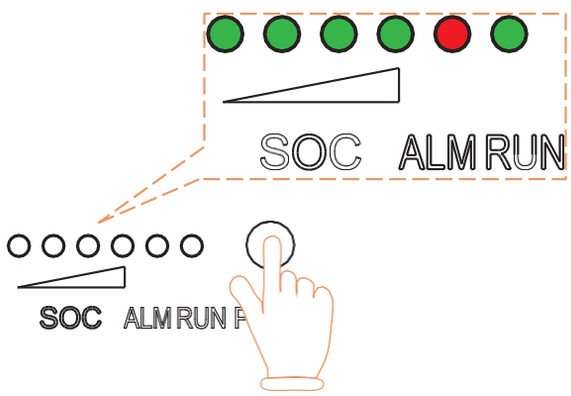
When operating or commissioning the battery, please strictly follow the safety instruction below:

* Technicians must go through technical training and obtain certificates in compliance with local laws and regulations.
* Please stand on dry insulating objects and do not wear metal objects such as watches, rings and necklaces during operation.
* Use insulating tools and wear protective devices.
* Do not contact with two charged positions with a potential difference.
* Hang a prohibition sign that stops people from closing the breakers on the power distribution equipment if needed.
* If any abnormality is detected, immediately power off the battery. Proceed again only after causes are confirmed.

Power on Battery

Power on the battery in either of the following ways:

Keep the inverter on and close battery breaker(s). The battery(s) is activated after detecting a voltage from the inverter.



Alternatively, close battery breaker first, then hold the **Power** button on battery for over one second.

If LED1 to LED6 are lit on one by one and SOC indicators on all batteries indicate SOC correctly, batteries are powered on successfully.

After the battery(s) is powered on, observe it for 15 minutes to confirm that it can charge and discharge properly.

Power off Battery

Hold the **Power** button of the single battery or one battery in parallel connection for over two seconds. LED1 to LED4 and LED6 flicker for 12 times, and the battery(s) turns off.

CAUTION

* If a battery encounters low voltage, it powers off one minute later.
* If a battery encounters a communication abnormality or permenant fault, it powers off 15 minute later.

* When the battery voltage drops below 40V, it may not be possible to charge directly with PCS (PCS voltage does not support it). In this case, a DC charger should be used to first charge the battery to above 48V before charging with PCS.

* Before powering on the battery，please close the breaker between PCS and the battery first. Otherwise, it may cause the battery pre-charging function to faild.

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