

Low-Voltage Energy Storage Battery

User Manual

**FENG Rui**

WUXI FENG Rui NEW ENERGY POWER BATTERY CO., LTD.

📍 No. 5 Jingxin Road, Xibei Town, Xishan District, Wuxi City

✉ sales@fengruenergy.com | ☎ 0510-83796889

🌐 www.fengruenergy.com

About the manual

This manual provides essential product information and detailed installation instructions for the FN310 battery pack. Prior to installation or use, carefully read the entire manual and strictly follow all installation procedures. Should you have any questions regarding the requirements, instructions, or safety measures, contact FENGRUI Company immediately. Please note that damage caused by human error or failure to comply with this manual will void the warranty.

NOTE :

This manual is only applicable to the FN310 low-voltage series battery pack (hereinafter referred to as the battery pack)

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1. Safety

1.1 Battery pack label symbol

There are some electrical symbols related to electrical safety on the battery, please make sure you fully understand these symbols before installation.



Before installing or operating the battery pack, please read the user manual first.

-  Voltage may cause shock.
-  Ensure correct polarity.
-  Keep away from open flames/flammables.
-  Avoid physical abuse (drop/impact/cut/spray).
-  Keep away from children.
-  Keep away from ignition sources.
-  Do not dispose with household waste.
-  Battery is recyclable.

1.2 Important safety instructions

For safety reasons, please carefully read the safety precautions and instructions in this manual before installation. FENGRUI Company shall not be liable for any losses caused by violation of the instructions in this manual. In the document, we use the following symbols to highlight important information: When using the battery pack, these warnings and precautions must be followed.



Warning

Indicates a dangerous situation that, if not avoided, may result in injury or death.

- Due to the active chemical properties of batteries, there is a high risk of electric shock, fire, and even explosion when exposed to ventilated air. When lithium metal is exposed to air, it will explode due to a violent oxidation reaction with oxygen. Please follow appropriate preventive measures:

- *Do not squeeze or puncture the battery.
- *Do not throw battery into fire.
- *Do not expose battery to direct sunlight.
- *Keep connectors away from conductive objects (e.g., wires).
- *Do not open/disassemble/modify without prior written approval from FENGRUI.
- *Keep out of reach of children.

- The battery pack is very heavy! Suggest using lifting equipment.
- Do not touch internal components while running. Ensure power switch & breaker are OFF before install/maintenance.
- Read manual before use. Non-standard operation may cause shock, injury, or death.
- Use the battery pack according to the instructions.



Warning

Indicates a dangerous situation that, if not avoided, may result in minor injury or equipment damage.

- Shock hazard. Do not remove cover; contains non-removable parts. Consult staff.
- PV panel outputs DC voltage when exposed to light.
- Do not clean battery pack with solvents or expose to flammable/irritating chemicals/vapors.
- Storage ≤ 1 month. Power OFF, maintain SOC $> 50\%$, recharge within 90 days.

1.3 Personal protective equipment

Wear the following safety equipment correctly for installation work.
Installation personnel must meet relevant standards, such as IEC62619,
or local legal requirements.



护目镜
goggles

耳塞
earplug

绝缘手套
insulating
gloves

安全手套
safety
gloves

安全鞋
safety
shoes

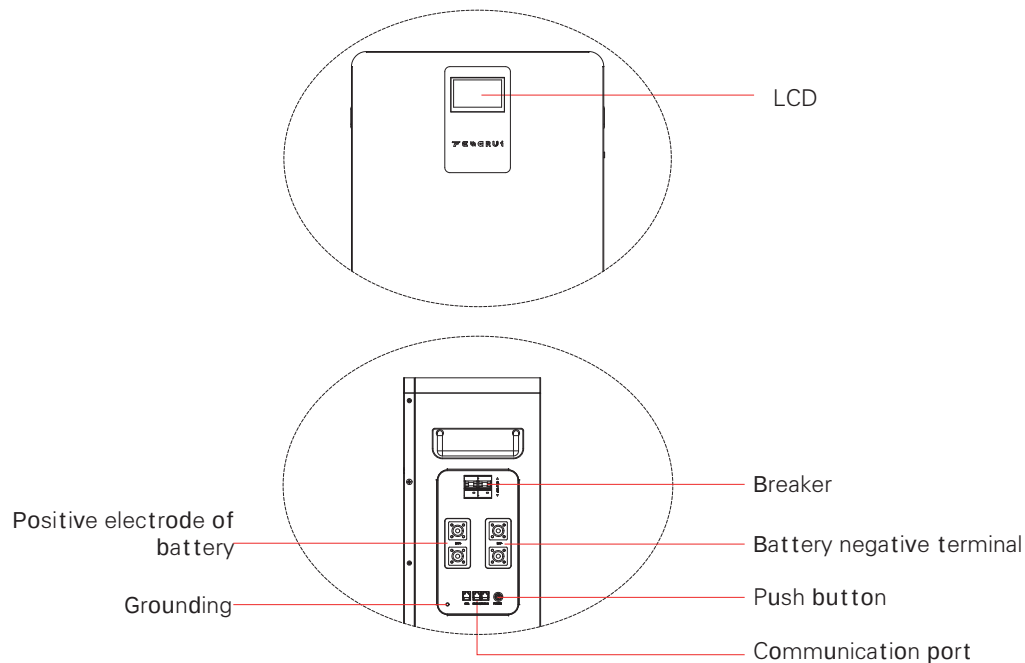
2. Product Introduction

2.1 Overview of battery pack

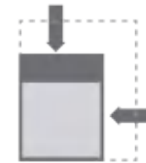
Energy storage battery pack is a device used for storing electrical energy, consisting of multiple individual batteries combined with a battery management system (BMS). It plays a key role in modern energy management, especially in balancing grid supply and demand, increasing the utilization of renewable energy, and improving the response speed of the power system.

NOTE :

The FN310 battery supports parallel connection of multiple machines, but the minimum workload is one battery pack.



Main functions



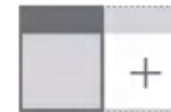
Compact & easy to install.

Lightweight/stackable design for quick indoor install.



Safety

LFP cells for energy storage; built-in BMS for monitoring and over-limit protection.



Scalability

Increase capacity by adding modules.

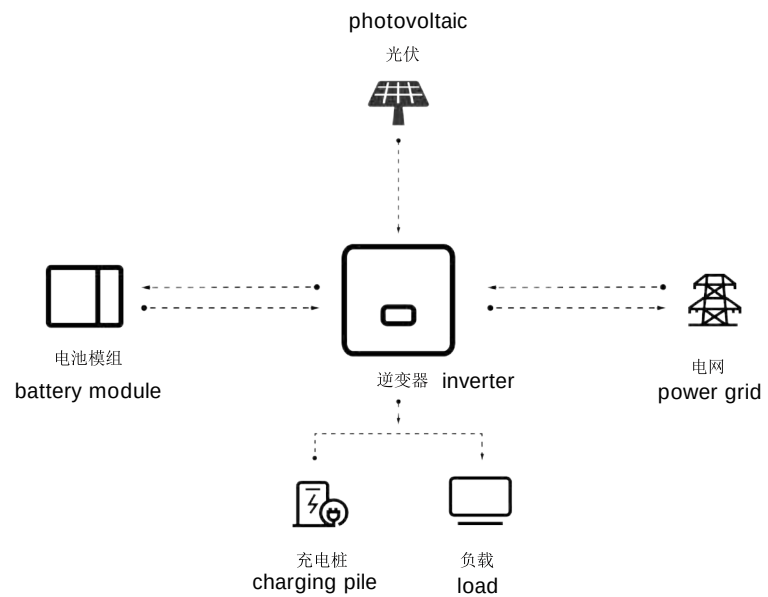


High compatibility

Compatible with multiple inverters.

2.2 Technical data

The FN310 battery pack is designed for charging and discharging to provide maximum energy independence for your home and potentially save on your electricity bills.

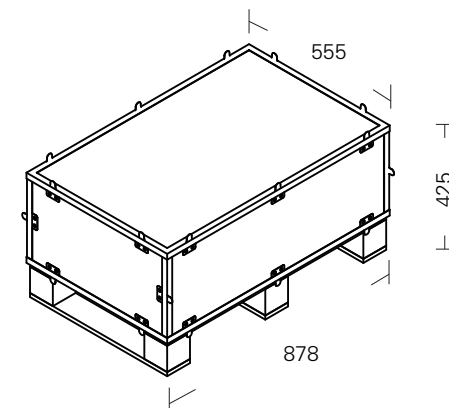


2.2.1 Dimensions and weight

	length (mm)	width (mm)	height (mm)	weight (kg)
battery packsize:	500	270	730	118



outer packaging dimensions:	878	555	425	12
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2.2.2 performance

Specification	Parameter
Model	FN310
Pack Configuration	1P16S
Rated Energy (KWh)	16kWh
Cell Chemistry	LFP/314Ah
Rated voltage(V)	51.2V
Operating Voltage Range (VDC)	44.8~57.6V
Max. Continuous Charge/Discharge Current (A)	100A
Depth of Discharge (%)	90%/ 95% (Adjustable)
Charge/discharge temperature	0~55℃/–10~55℃
Cycle life	≥6000Cycles
BMS Communication	CAN/RS485

2.2.3 Environmental Requirements

FN310	
Working temperature range	0~50° C
Best operating temperature	5~50° C
Storage temperature range	0~35° C
Humidity	5%–95%
Altitude	3000m
Cooling strategy	natural convection

2.2.4 Cable requirements

Negative power line	φ 16mm ²
Positive power cable	φ 16mm ²
Communication cable	φ 3mm ²
Grounding electrode	φ 2.5mm ²



Warning

Unqualified cables may cause problems.

3. Installation

3.1 Prepare

3.1.1 Installation materials and tools

Before starting the installation process, ensure that all necessary tools and materials are in place to avoid any inconvenience on site. These tools are used for installing battery packs.



冲击钻
Impact drill



十字绝缘力矩螺丝刀
Cross insulation torque screwdriver



内六角绝缘力矩螺丝刀
Internal hexagonal insulation torque screwdriver



绝缘力矩套筒扳手
Insulation torque socket wrench



内六角扳手
Hex key



斜口钳
Diagonal cutting pliers



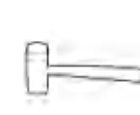
液压钳
Hydraulic pliers



剥线钳
Wire stripper



拆卸扳手
Dismantling wrench



橡胶锤
Rubber mallet



剪线钳
Wire cutter



压线钳
Crimping tool

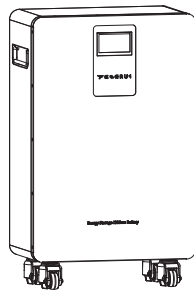
3.1.2 Installation location

Ensure that the installation location meets the following conditions:

- Distance $\geq 1000\text{m}$ from coast (avoid salt/moisture).
- Floor must be flat.
- No flammable/explosive materials nearby.
- Ambient temp: $15\text{-}30^{\circ}\text{C}$.

3.1.3 Packaging inspection

Verify and ensure that the following quantities match the order and that there are no parts damaged or broken during transportation. You can check it in the unpacking inspection guide provided below.



battery pack



grounding cable



parallel positive cable



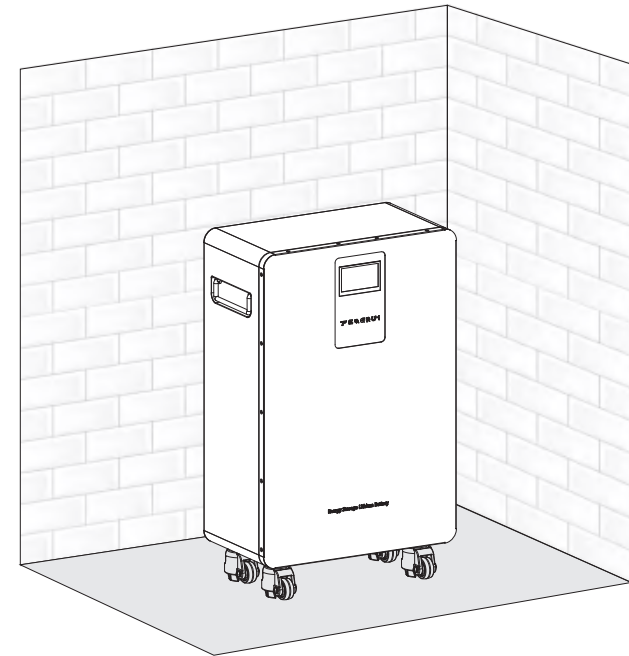
parallel network cable



parallel negative cable

3.2 Start Installation

3.2.1 Installation space



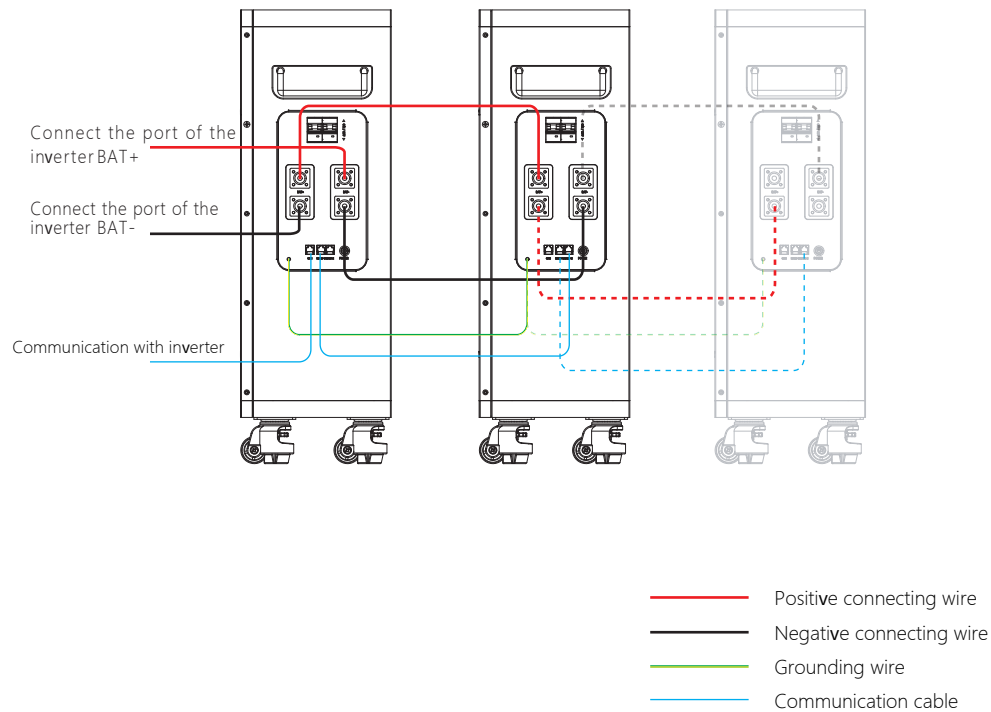
Distance from the wall is greater than 100mm

NOTE :

Ensure that the battery pack is always exposed to ambient air. The battery pack is cooled by natural convection, and if the battery pack is completely or partially covered, it may cause the battery pack to stop working.

3.2.2 Parallel mode

- FN310 parallel connection, prepare power line, communication line, red and black power line, red to positive pole, black to negative pole.
- Ensure that each connecting wire is correctly inserted into the corresponding hole.



4. Debug

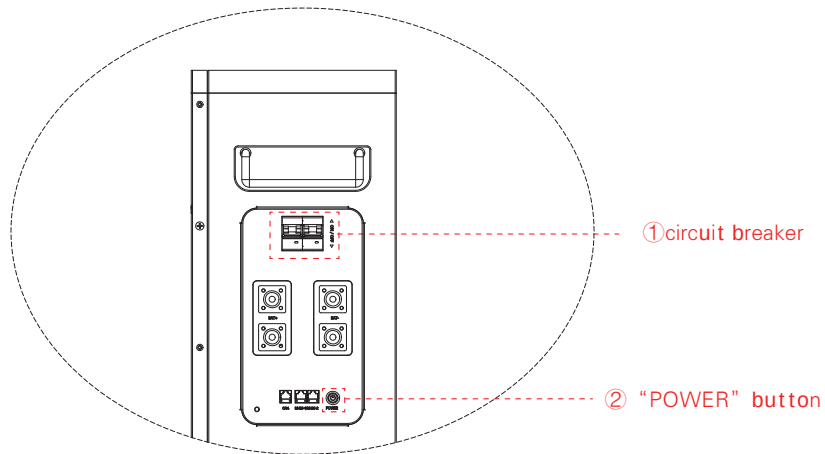


Warning

When connecting a battery pack to another battery pack, make sure the battery is turned off.
If the sequence of power cables and communication cables is in a disordered state, it may cause faults.

4.1 Turn on the battery pack

- 1) Open the empty switch;
- 2) Press the "POWER" button to turn on the battery pack.

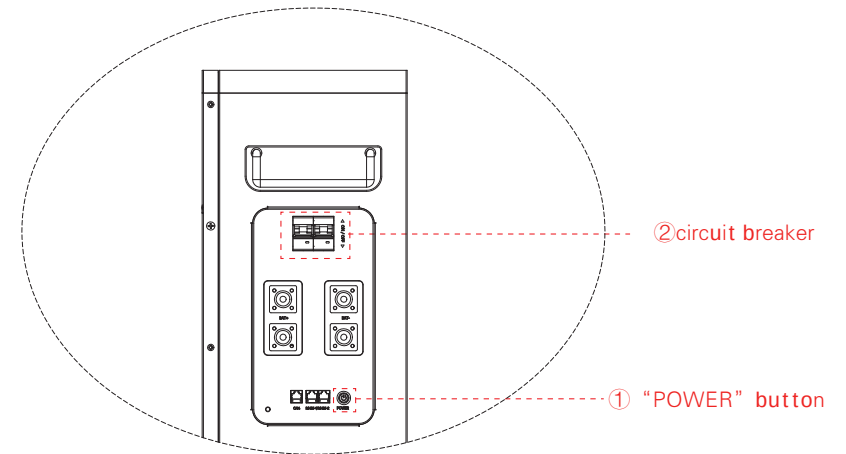


NOTE :

If there is no communication established with the inverter within 3 minutes after the battery pack is turned on, the output power of the battery pack will be turned off.

4.2 Turn off the battery pack

- 1) Press the "POWER" button to turn off the battery pack;
- 2) Close the empty switch.

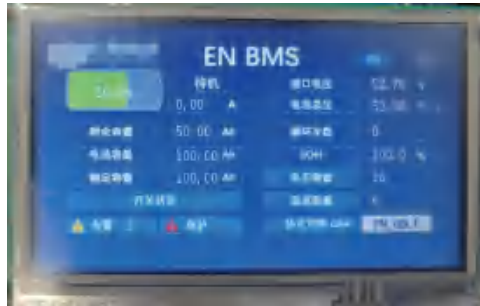


NOTE :

Ensure that all indicator lights on the battery pack are turned off.

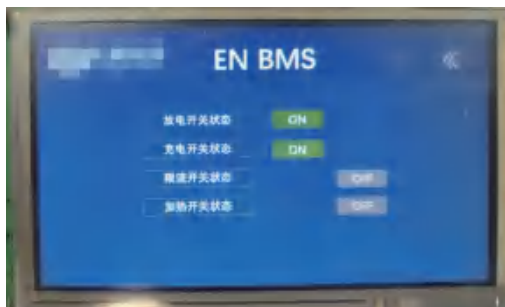
4.3 Screen debugging

1) Main Interface



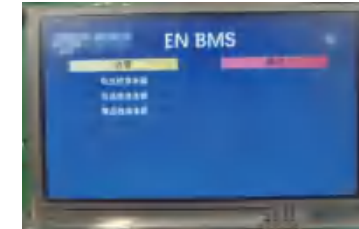
BMS displays "Charge/Discharge/Standby" modes based on status. Shows parameters: Rem Cap, Batt Cap, Rated, Port V, Total V, Cycles, SOH. Blue icons (EN, Switch, Alarm/Protection/Cell/Temp count, Protocol) are clickable for details.

2) Switch status display



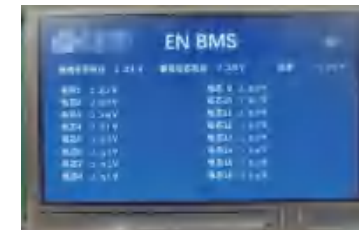
Click on "Switch Status" to view the current status of various switches, including discharge switch status, charging switch status, current limiting switch status, and heating switch status.

3) Alarm and protection status display



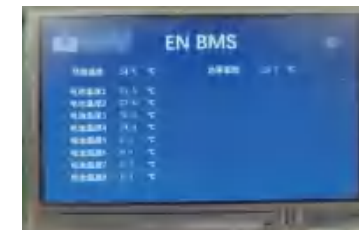
Clicking on the "Alarm" button on the left or "Protection" button on the right (yellow icon for alarm, red icon for protection) will display the specific alarm and protection items currently in use.

4) Details of battery cell quantity



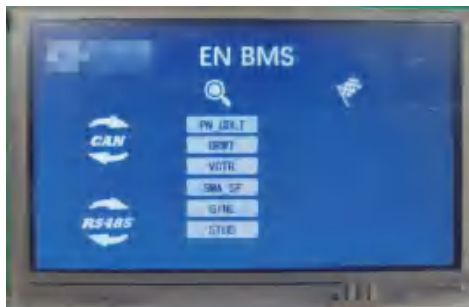
The voltage details of a single battery cell, and in order to help customers have a more intuitive understanding of the cell voltage situation, the highest cell voltage, lowest cell voltage, and voltage difference have also been displayed on the page.

5) Temperature quantity details



Details of each battery temperature, including current ambient temperature and power temperature.

6) Protocol switching



The first image is the page that pops up when clicking the blue label "Protocol Switch", displaying the current protocol used. Clicking "CAN" will redirect to the second image, which shows various protocols that customers can switch according to their needs (the table below lists the currently displayed protocols from top to bottom). Note: "RS485" is temporarily not needed.

5. Troubleshooting

Check the front indicator lights to determine the status of the battery pack. When conditions such as voltage, current, or temperature exceed the design limits, a warning state will be triggered.

Use monitoring software connected to the battery pack to determine the cause of the warning. Possible warning messages are as follows:

Battery charging overvoltage

Insufficient battery voltage

The battery temperature is too high

The battery temperature is too low

Battery overcurrent discharge

Excessive battery charging current

BMS internal communication error, battery cell voltage imbalance

NOTE :

The system can automatically restore minor risks, dangers, and no warnings after a period of time. For serious warnings or alerts, please contact FENGRUI Company or local installation personnel.