SOLE 2500H

This SOLE 2500H from FFD POWER.
SOLE 2500H is a High-voltage Lithium-ion Phosphate Battery storage system. Please read this manual before you install the battery and follow the instruction carefully during the installation process. Any confusion, please contact FFD POWER immediately for advice and clarification.

- High-voltage LiFePO4 battery solution, Single module is 51.2V 50Ah 2.56kWh.
- 3 to 10 layers recommended.
- Inverter you need to choose 380V 3phase input and output, common is 8-15KW inverter.
- Cobalt Free Lithium Iron Phosphate (LFP) Battery: Maximum Safety, Life Cycle and Power.
- Applicable on grid or hybrid on and off-Grid solar energy storage system.
- Self-Consumption Optimization for Residential and Commercial Applications.
- Modular Design Simplifies Transport and Installation.

1 Safety Information

1.1 General Safety

Please carefully read the manual safety precautions and observe all the safety instructions on the equipment and in this document.

The "DANGER", "WARNING", and "NOTICE" statements in this document do not cover all the safety instructions. They are only supplements to the safety instructions.

For user safety and utilization efficiency of this manual, a list of symbols is designed to alert people from danger. You must understand and comply with the emphasized information to avoid personal injury and property damage. Relative safety symbols have been listed below.

Danger	DANGER indicates a hazardous situation which, if not avoided will result in serious injury and fire.
Danger	WARNING indicates a hazardous situation which, if not avoided will result in property loss or void warranty.
	NOTICE indicates normal situation which, if not avoided will result in that battery doesn't work.

Notice

Follow local laws and regulations when installing, operating, or maintaining the equipment. The safety instructions in this document are only supplements to local laws and regulations.

1.2 Personal Safety

Personal Requirements

People who plan to install or maintain battery equipment must be trained, understood all necessary safety precautions, and are able to perform all operations correctly.

Only qualified professionals or trained people are allowed to install, operate, and maintain the equipment.

Personal Safety

Danger

- Do not place battery at a children or pet touchable area.
- Do not touch the energized battery, as the enclosure is hot.
- Do not touch the energized battery terminals.
- Do not stand on, lean on, or sit on the battery.

1.3 Electrical Safety

Symbols on Battery

There are some electrical symbols on battery relate to electrical safety. Please make sure you have fully understood them before installation.

	Electrical danger	Voltage exits when the battery is powered on. Only qualified engineers are allowed to operate.
	Earth connector	Earth connection.
+ −	DC positive and negative connectors	Identify positive and negative connectors of DC power source.
CE	CE mark	The product meets CE certification.
	WEEEtag	Can't leave battery as garbage disposal.
	Recycle	Battery can be recycled.

Electrical Safety

Danger

- Before installation, ensure that the equipment is intact. Otherwise, electrics hocks or fire may occur.
- Do not connect or disconnect power cables when battery is power-on. Which may cause electric arcs and sparks more over fire or personal injury. Before connecting a power cable, check the positive or negative connectors are correct.
- Do not parallel connection with different batteries.
- Do not connect battery with AC directly.
- Do not connect battery with PV wiring directly.
- Do not connect batteries in series.
- Do not connect battery to faulty or unqualified inverter or charger.
- Do not create short circuits with the external connection.
- Make sure the grid is cut off and the battery is powered off before maintenance.
- Make sure the earth cable is connected correctly before operation.

Warning

- Recharge battery in every six months.
- Recharge battery within 10 days after battery is fully discharged.
- Make sure battery cable placement is installed correctly.
- When the battery is being installed or repaired, make sure the battery is powered off and using a multi meter to make sure there is no voltage in the positive and negative terminals.

Notice

- Please use dedicated insulated tools for install and maintenance.
- Please make sure all batteries are power-off when multiple parallel connection.
- Please check lights on sequence when battery power-on.
- Please make sure communication connection connect correctly with battery and inverter.
- Please check inverter alarm or SOC reading when there is BMS communicated with inverter.

Environment Safety

Warning

- Ensure that the equipment is installed in a dry and well-ventilated environment.
- The installation position must be away from direct sunlight and rain.
- The installation position must be far away from fire sources.
- The installation position must be far away from water sources such as taps, sewer pipes, and sprinklers to prevent water seepage.
- Do not expose the equipment to flammable or explosive gas or smoke.
- Do not perform any operation on the equipment in such environments.
- The operation and service life of the battery depends on the operating temperature. Operate the battery at a temperature equal to or better than the ambient temperature. The recommended operating temperature range is from 0。C to 30。C.

1.4 Transportation Safety

Warning

- The products passed certification UN38.3.
- The products have MSDS.
- The products belong to class 9 dangerous goods.
- Please protect the packing case from the below situations.
- Being dampened by rains, snows, or falling into water.
- Falling or mechanical impact.
- Being upside-down or tilted.

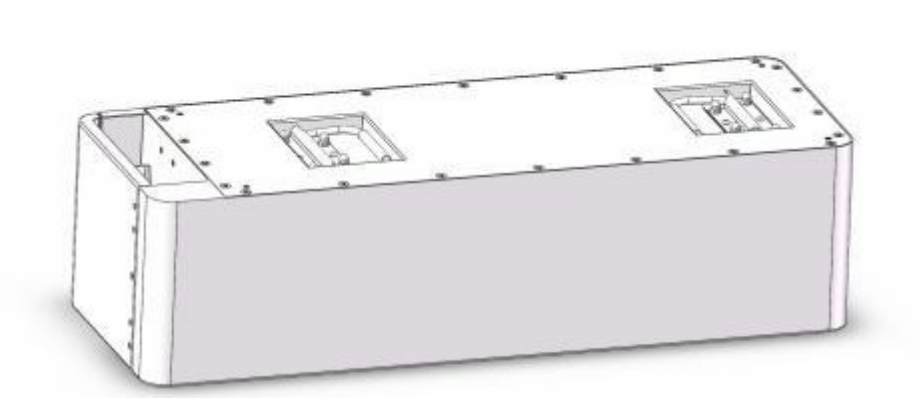
2 System Information

2.1 Product introduce

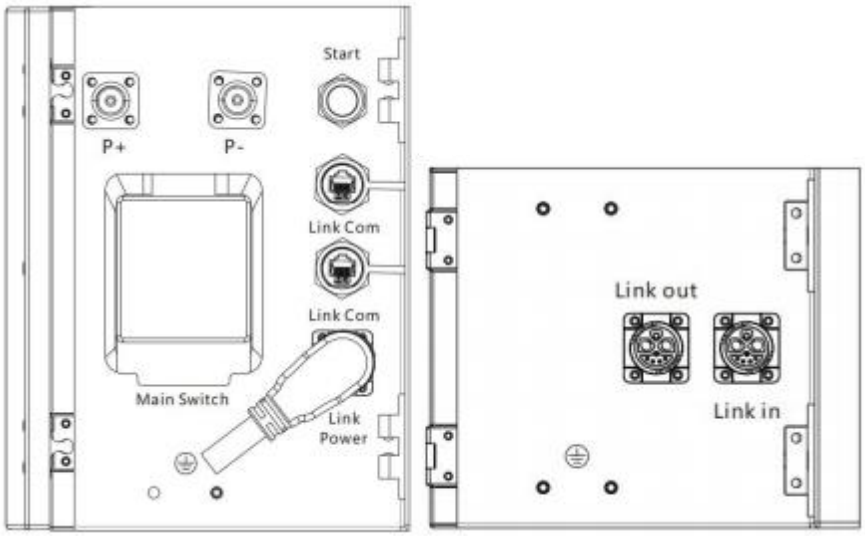
SOLE 2500H is a high-voltage battery storage system based on lithium-iron phosphate battery, which is one of the new energy storage products developed and produced by FFD POWER. It can be used to support relable power for various types of equipment and systems. SOLE 2500H is especially suitable for those application scenes which required high power output, limited installation space, restricted load-bearing and long cycle life.

2.2 Specification

2.2.1 Battery Module



Cable Panel



Start

1. ON

For multiple Battery Modules in series, long press (more than 5 seconds) Start button of High-voltage box (which connect with inverter), normal LED will be lighted in the front panel, L1 to L5 shows battery SOC, L6 shows battery status. Then battery system will automatically encode and assign ID to each slave battery, then battery system will operate normally.

2 OFF

Press Start button of High-voltage box (Which connect with inverter) more than 5s, LED will flash in the front panel and then release the button, the master pack will shut down after all slave packs shut down (Sleep mode).

In the system with inverter, there is an air switch between inverter and battery system, normally the air switch keeps off-state if the system does not work.

Link Com Port

CAN / RS485/RS232 Communication Terminal (RJ45 port),

CAN/RS485 connect to inverter, follow CAN / RS485 protocol.

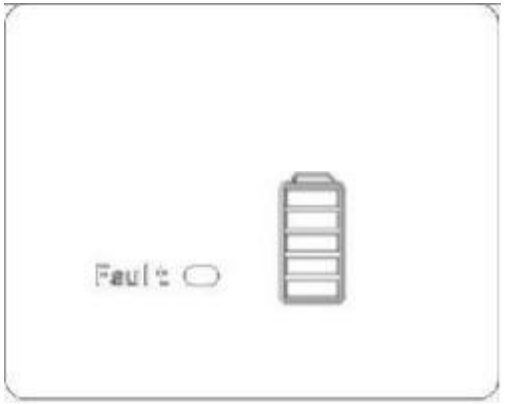
RS232 Communication follow RS232 protocol, for manufacturer or professional engineer to debug or service.

PIN	Definition
Pin 1	RS485-B (to PCS, reserved)
Pin 2	RS485-A (to PCS, reserved)
Pin 3	GND_2
Pin 4	CANH (to PCS)
Pin 5	CANL (to PCS)
Pin 6	RS232_TX
Pin 7	RS232_RX
Pin 8	RS232_GND

Link Power/Link in/Link out

Link Power/Link in/Link out are used for the communication between battery piles. The battery pack close to the inverter as the master, others are the slave pack.

2.2.2 LED Indicator Definition



flash 1 - 0.25s light//3.75s off flash 2 - 0.5s light / 0.5s off flash 3 - 0.5s light / 1.5s off

LED Indicators Instructions

		Fault	Battery Level Indicator					
Status		L6	L5	L4	L3	L2	L1	Descriptions
Shut down		OFF	OFF	OFF	OFF	OFF	OFF	All OFF
Standby		OFF	According to the battery level					Indicates Standby
Charging	Normal	OFF	According to the battery level					The highest capacity indicator LED flashes(flash 2),others lighting
	Full Charged	OFF	Light	Light	Light	Light	Light	Turn to standby status when charger off
	Protection	Light	OFF	OFF	OFF	OFF	OFF	Stop charging
Discharge	Normal	OFF	According to the battery level					
	UVP	OFF	OFF	OFF	OFF	OFF	OFF	Stop charging
	Protection	Light	OFF	OFF	OFF	OFF	OFF	Stop decharge
Fault		Light	OFF	OFF	OFF	OFF	OFF	Stop charging and Discharge

3 Installation

3.1 tools

Tools			
Installation	Rubber mallet 	Cross Screwdriver 	Hammer drill（10 mm） 
	ESD gloves 	Safety goggles 	Anti-dust respirator 
	Safety shoes 		

3.2 Checking deliverables

After unpacking the battery, check whether deliverables are intact and complete, The below table shows the components and mechanical parts that should be delivered.

3.3 Installation requirement

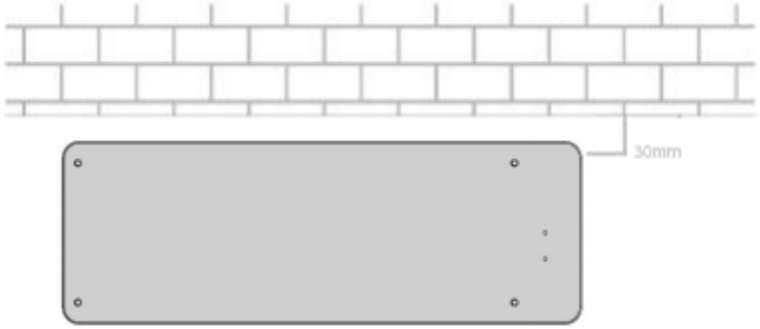
- Install the battery in the in door environment.

- Place battery in secure location away from children and animals.
- Do not place the battery near any heat sources and avoid sparks.
- Do not expose the battery to moisture or liquids.
- Do not expose the battery to direct sunlight.
- Only mount battery on fire resistant building. Do not install batteries on flammable buildings.

3.4 Installation

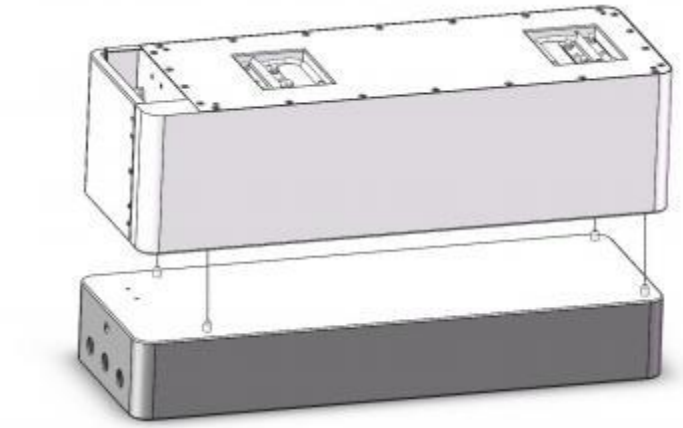
Step 1

Placed the base against the wall, the distance between the base and the wall is 30mm as follows. Use the gradienter to keep the base is aclinic.



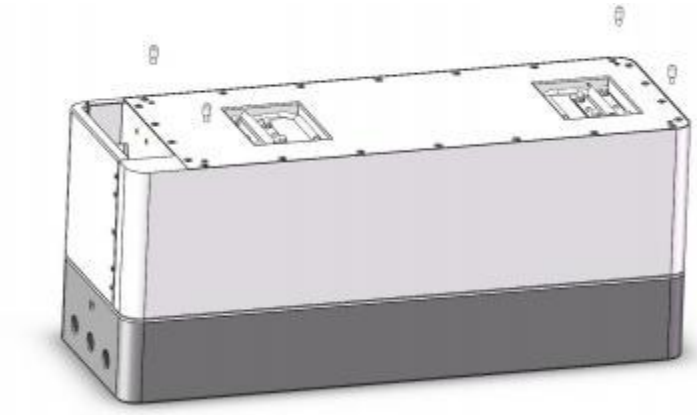
Step 2

Twist the dowel pin into the base and put the first battery pack on the base.



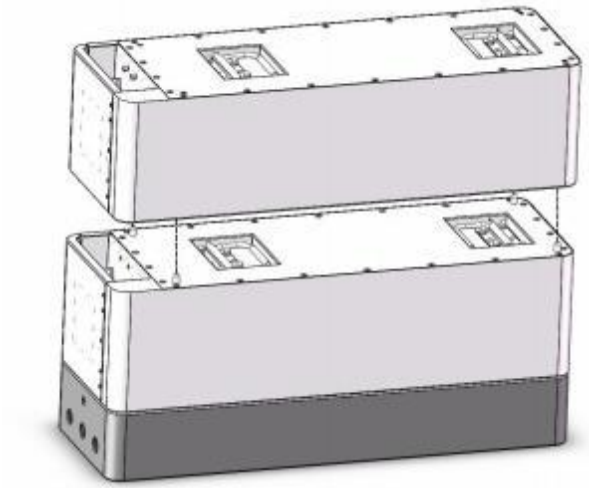
Step 3

Twist the dowel pin into the first battery pack.



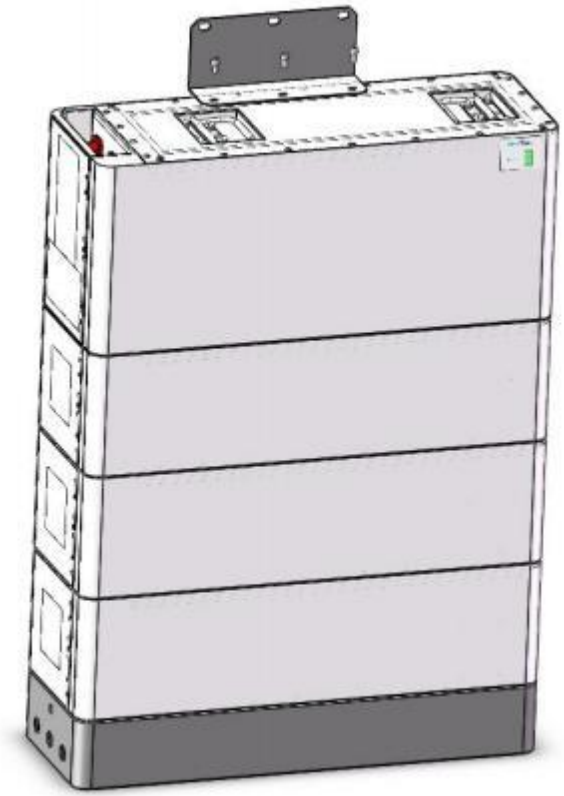
Step 4

Put the second battery pack onto the first pack.



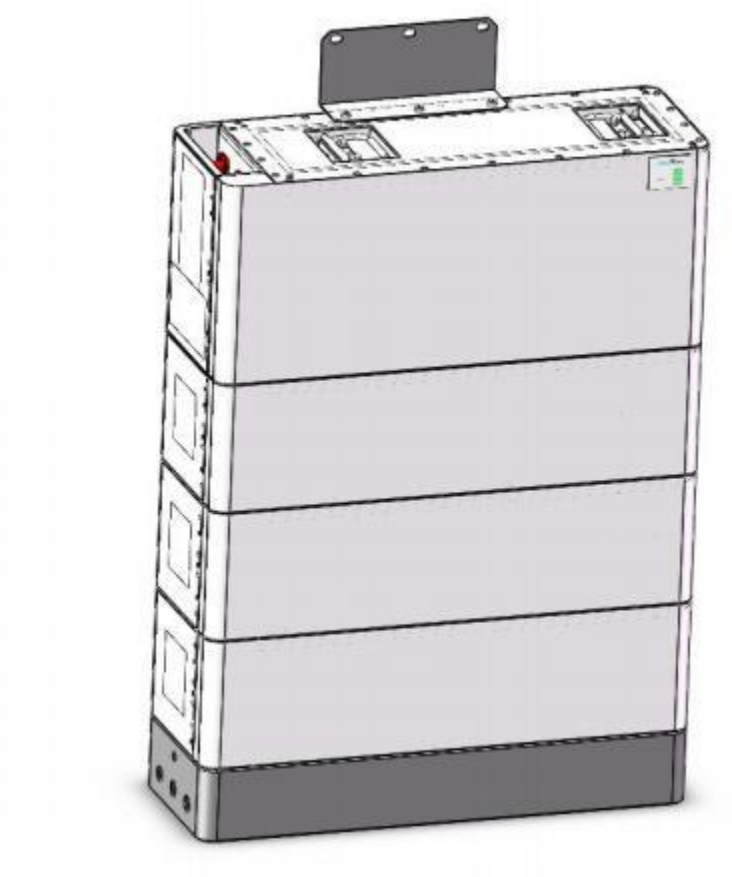
Step 5

As step3 and step4, put the third battery pack and fourth high-voltage box onto the second battery pack.



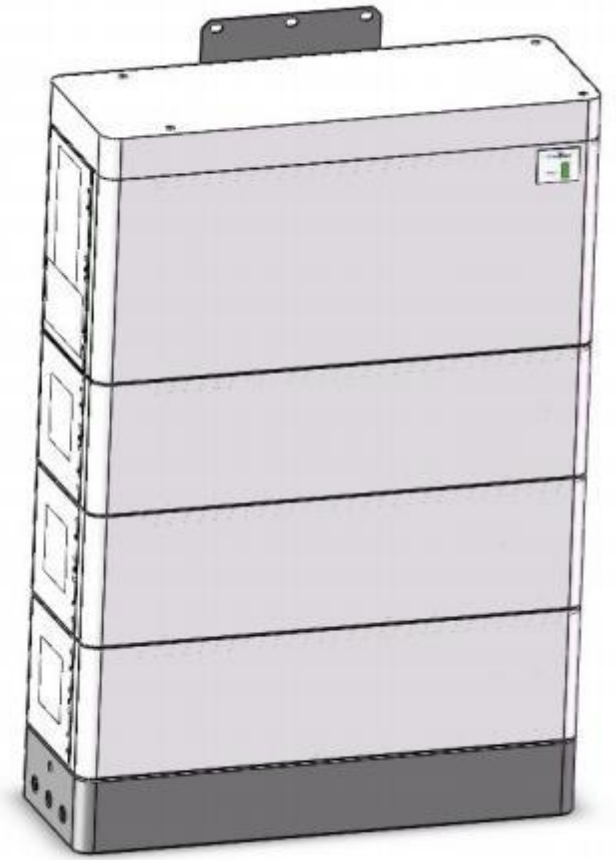
Step 6

Fixed the battery with the wall using a L shape metal parts and expansion bolts.



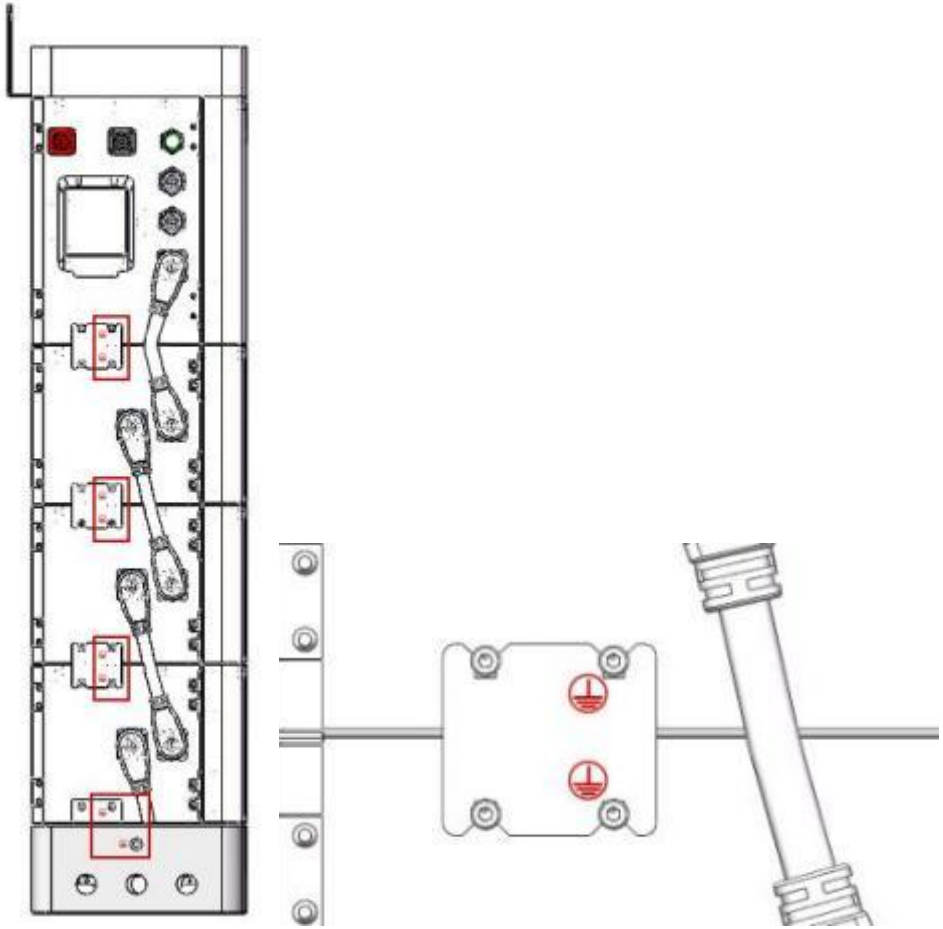
Step 7

Put the cover onto the battery pack and being fixed with battery pack using screw.



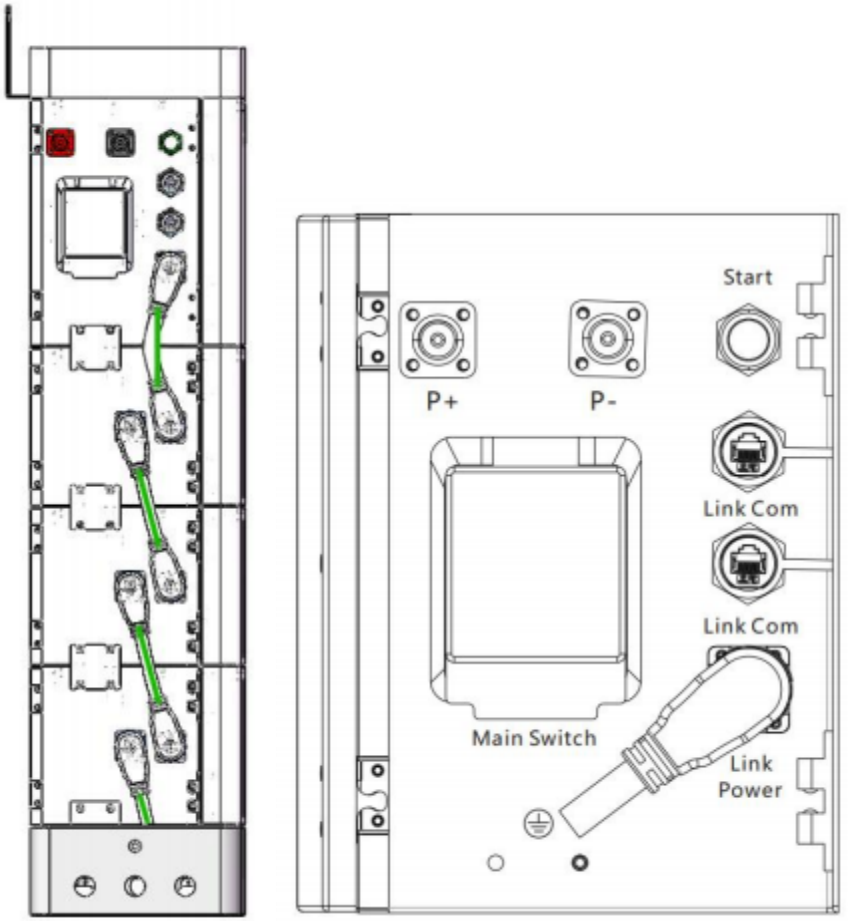
Step 8

Connect to ground with a small metal plate as follows.

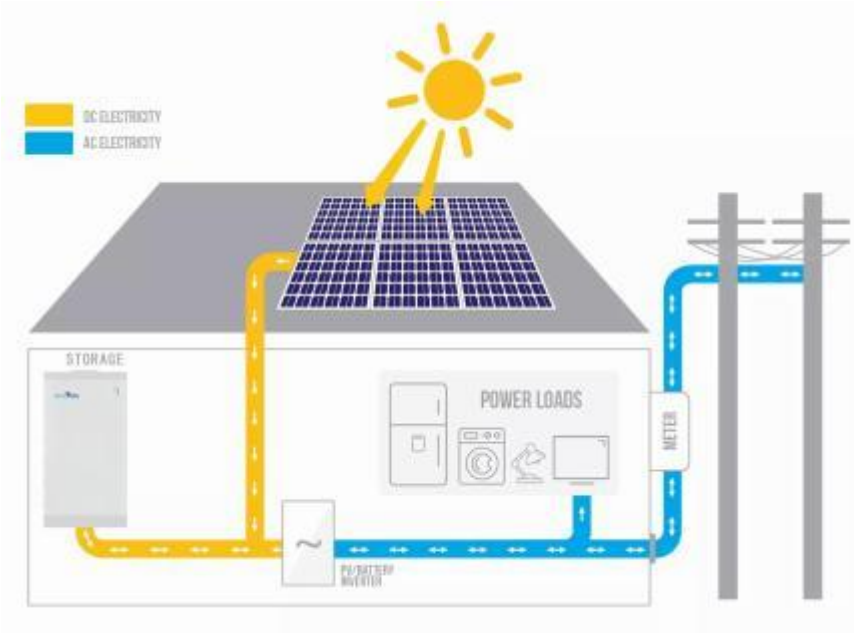


Step 9

Connect to the power and communication cable.



- Connect the power Terminal+(BAT+)and Teminal-(BAT-) to the inverter or the DC switches.
- The green cable is the communication for the batteries in series.
- Connect the first High-voltage box Link Com Terminal to the inverter BMS port for communication beween inverter and battery.



Danger: All the plugs and sockets of the power cables must be not reverse connection.

Danger: Do not short circuit or reserved connection of the battery system's positive and negative port.

Caution: Wrong communication cables connection will cause the battery system failure.

4 Maintenance

- Recharge Requirements During Normal Storage

Battery should be stored in an environment with temperature range between -10。C ~+45。C and maintained regularly according to following table with 0.5C(51A)current till40% SOC after long storagetime.

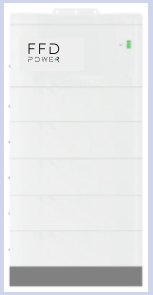
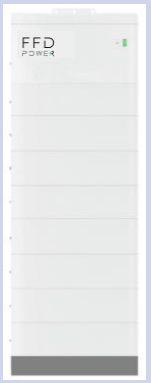
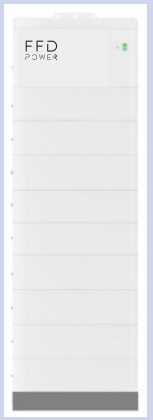
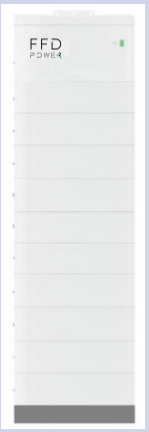
Storage Environment Temperature	Relative Humidity of Storage Environment	Storage Time	SOC
Below -10℃	/	prohibit	/
-10~25℃	5%~70%	≤12 months	30%≤SOC≤60%
25~35℃	5%~70%	≤6 months	30%≤SOC≤60%
35~45℃	5%~70%	≤3 months	30%≤SOC≤60%
Above 45℃	/	prohibit	/

- Recharge Requirements When Over Discharged

Over discharged (90% DOD) battery should be recharged according to following table, otherwise over discharged battery will be damaged.

Storage Environment Temperature	Storage Time	Note
-10~25℃	≤15 days	Battery Pack disconnected from PCS
25~35℃	≤7 days	
-10~45℃	<12 hours	Battery Pack connected to PCS

Technical Specification

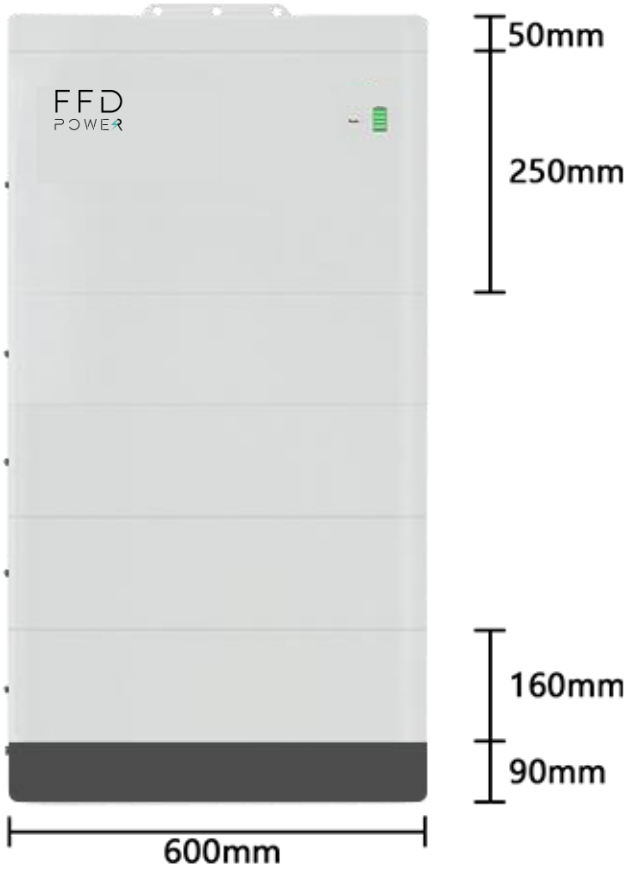
Model	153.6V 50Ah	204.8V 50Ah	256V 50Ah	307.2V 50Ah	358.4V 50Ah	409.6V 50Ah	460.8V 50Ah	512V 50Ah
Number of layers	3 layers	4 layers	5 layers	6 layers	7 layers	8 layers	9layers	10layers
Picture								
Energy	7.68KWh	10.24KWh	12.8KWh	15.36KWh	17.92KWh	20.48KWh	23.04KWh	25.6KWh
Operating Voltage Range	129.6V ~ 168.48V	172.8V ~ 224.64V	216V ~ 280.8V	259.2V ~ 336.96V	302.4V ~ 393.12V	345.6 ~ 449.28V	388.8V ~ 505.44V	432V ~ 561.6V
Dimension (L*W*H)	600*210*820	600*210*980	600*210*1140	600*210*1300	600*210*1460	600*210*1620	600*210*1780	600*210*1940
Net Weight	102.5	129	155.5	182	208.5	235	261.5	288

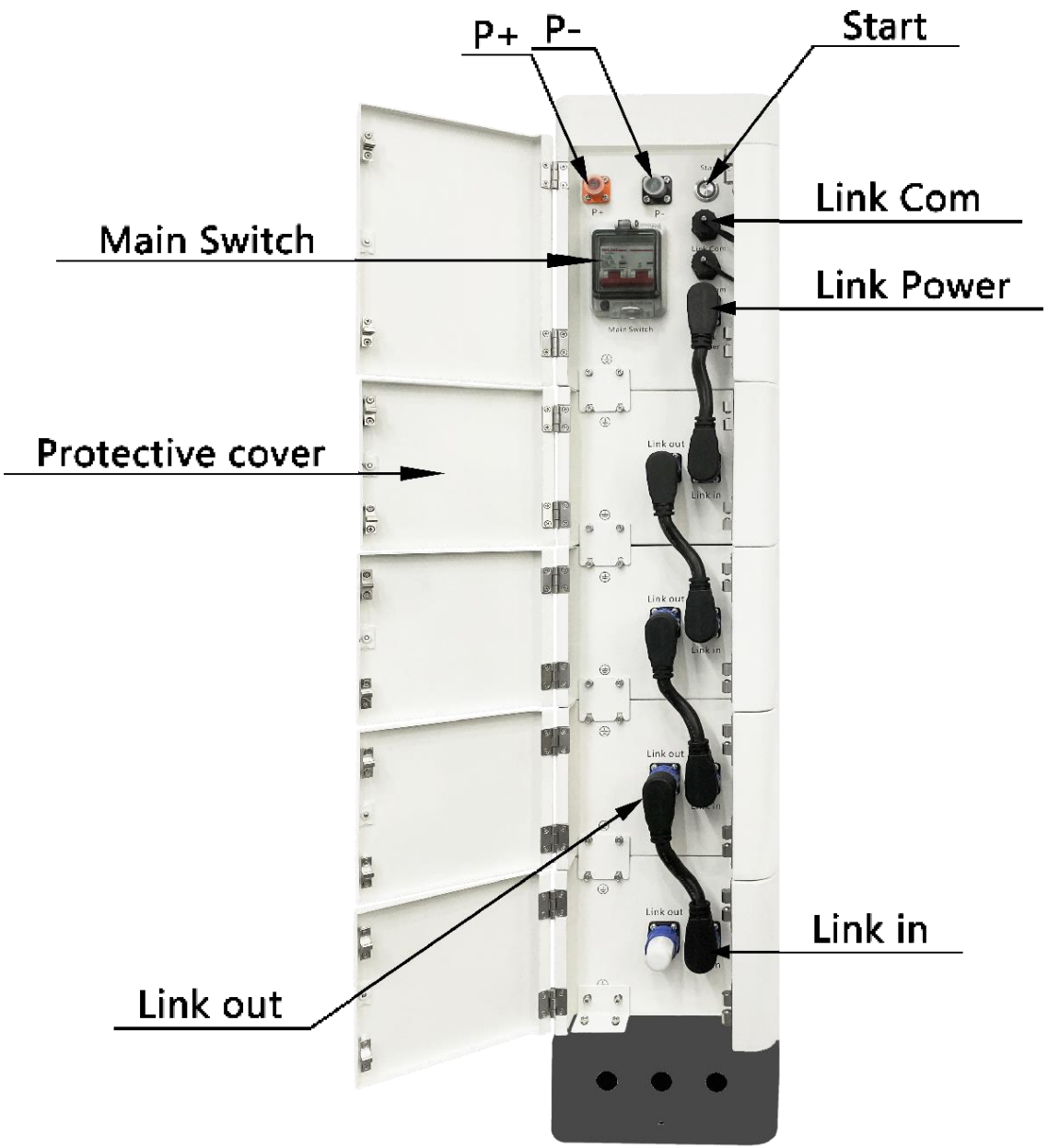
Recommend charge current	10~25A
Max continue charge current	50A
Max continue discharge current	50A
Peak current	100A
Display	The information of Battery, such as SOC, battery voltage and so on
Communication	Support RS485 / CAN
Operating temperature	-20℃ ~ 55℃
Environment	Indoor
Relative humidity	5% ~ 95%
Cooling	Natural convection
Cell technology	Lithium-iron phosphate (LiFePO4)
Life cycle	6000 times @80%DOD

Single module Technical Specification

Dimension (L*W*H)	High Voltage Box:600*210*250 Battery Box:600*210*160
Battery module weight	26.5kg


210mm


FFD
POWER
50mm
250mm
160mm
90mm
600mm


P+
P-
Start
Link Com
Main Switch
Link Power
Protective cover
Link out
Link in
Link out