SEPLOS PUSUNG 2nd Generation 51.2V 100Ah

LIFEPO4 BATTERY PACK USER MANUAL

Please read this manual carefully before operating

and retain it for future reference.

This manual introduces PUSUNG designed by SEPLOS Technology. Please read this manual before installation of the battery module and follow the instruction carefully during the assembly. Any confusion, please contact SEPLOS Technology immediately for advice and clarification.

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1. Safety Precautions

This section describes the safety information that must be observed when working with battery packs. To prevent any damages, or personal injury, and to ensure the performance of the battery packs, please read this section carefully and observe the safety precautions at all times.

1.1 Precautions

- It is very important and necessary to read the user manual carefully before installing or using the product. Failure to do so or to follow any of the instructions or warnings in this document can result in electrical shock, serious injury or death, and could damage the battery, or potentially rendering it inoperable.
- If the battery pack is stored for long time, it is required to charge them every six months, and the SOC should be no less than 90%.
- Please recharged the battery pack within 12 hours, after fully discharged.
- All the battery pack terminals must be disconnected before any maintenance.
- Do not use cleaning solvents to clean battery pack.
- Do not expose battery pack to flammable or harsh chemicals, or corrosive gases or liquids.
- Do not paint any part of battery pack, include any internal or external components.
- Do not expose the battery pack to direct sunlight for extended periods of time.
- Do not connect battery pack with PV solar wiring directly.
- Do not insert any foreign object into any part of the battery pack.

1.2 Warning

- Do not touch the battery pack with wet hands.
- Do not crush, drop or puncture the battery pack.

- Always dispose of the battery pack according to local safety regulations.
- Store and recharge the battery pack in a manner in accordance with this user manual.
- Ensure reliable grounding.
- Do not reverse the polarity when installing.
- Do not short circuit the terminals, remove all jewelry items that could cause a short circuit before installation and handling.
- Disconnect battery from power or loads, and then power off battery before installation and maintenance.
- The battery packs should be not stacked more than specified numbers.
- Continued operation of a damaged battery pack can result in dangerous situation.

2. Introduction

PUSUNG lithium iron phosphate battery pack is a household renewable energy storage solution developed and produced by SEPLOS Technology. After fully installation, it is a low-voltage DC battery system with an operating voltage of 48V, and works with a low voltage inverter to realize the goal of energy storage for home application.

PUSUNG battery pack supports parallel connection to expand capacity, which can meet various capacity requirements. It has built-in battery management system(BMS), which can manage and monitor the pack and cells information including voltage, current and temperature. What's more, BMS can balance cells charging and discharging to extend cycle life.

2.1 Features

- Battery cell is 3.2V 100Ah aluminum case prismatic cell.
- Battery cell is made from lithium iron phosphate (LiFePO4) with safety performance and longer cycle life.
- Special designed plastic cell holder, holding 8 cells in series composes a battery module, and two modules in series, then connected with BMS, composes a battery pack.

- BMS has over-discharge, over-charge, over-current, high and low temperature warning and protection functions.
- BMS monitors charge and discharge state, and balance current and voltage of each cell.
- BMS comes with upper computer system for real-time cell and pack voltage, current, temperature, and battery status monitoring and recording.
- Flexible configuration, max. 15 packs can be connected in parallel for expanding capacity and power with 8 DIP switches.
- Working temperature range is from -20℃~50℃ (Charging 0℃~50℃; discharging -20℃~50℃) with excellent discharge performance and cycle life.

2.2 Specifications

Basic Parameters	**PUSUNG**
Nominal Voltage (V)	51.2V
Nominal Capacity (Ah)	100Ah
Nominal Power (Wh)	5.12KWh
Dimension (mm)	565*440*170mm
Weight (Kg)	56.2KG
Discharge Cut-off Voltage (V)	41.6V
Charge Voltage (V)	54.5V
Max. Charge/Discharge Current (A)	100A
Communication Interface	CAN,RS485
Configuration	16S1P
Working Temperature	0～50℃(Charge)
	-20～50℃(Discharge)
	-20～55℃(Storage)
Cell chemistry	Lithium iron phosphate (LiFePO4)
Cycle life	≥80% capacity state after 4800 cycles at 0.5C, 25℃, 100% DOD
IP level	IP 20

2.3 Interfaces

RESET

Reset button: to start the battery pack, hold the button for 2s to turn on battery pack.

RS485

RS485 communication interface: RJ45 port, follow RS485 protocol. For transmitting battery pack information between paralleled packs.

CAN

RS485 communication interface: follow CAN BUS protocol, for output pack information to inverter.

ADS

ADS Switch: To setup battery address, and to communicate between battery and BMS.

NOTE: There are 8 bit DIP switches, keep the switch on down side means ‘OFF’, turn up the switch to top side means ‘ON’.

RS485 communication DIP address should setup as the following table.

RS485 Communication Single pack address setting: #1, #2, #3, #4, #5, #6, #7, #8 all set OFF								
	8	7	6	5	4	3	2	1
1st PACK	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON
2nd PACK	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF
3rd PACK	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON
4th PACK	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF
5th PACK	OFF	OFF	OFF	OFF	OFF	ON	OFF	ON
6th PACK	OFF	OFF	OFF	OFF	OFF	ON	ON	OFF
7th PACK	OFF	OFF	OFF	OFF	OFF	ON	ON	ON
8th PACK	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
9th PACK	OFF	OFF	OFF	OFF	ON	OFF	OFF	ON
10th PACK	OFF	OFF	OFF	OFF	ON	OFF	ON	OFF
11th PACK	OFF	OFF	OFF	OFF	ON	OFF	ON	ON
12th PACK	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF
13th PACK	OFF	OFF	OFF	OFF	ON	ON	OFF	ON
14th PACK	OFF	OFF	OFF	OFF	ON	ON	ON	OFF
15th PACK	OFF	OFF	OFF	OFF	ON	ON	ON	ON

CAN communication DIP address should setup as the following table.

CAN Communication									
Master Packs (#1, #2, #3, #4 set OFF) #5, #6, #7, #8 set as follows					Slave Packs (#5, #6, #7, #8 set OFF) #1, #2, #3, #4 set as follows				
	8	7	6	5		4	3	2	1
One pack	OFF	OFF	OFF	OFF					
2 packs in parallel	OFF	OFF	OFF	ON	1st slave pack	OFF	OFF	OFF	ON
3 packs in parallel	OFF	OFF	ON	OFF	2nd slave pack	OFF	OFF	ON	OFF
4 packs in parallel	OFF	OFF	ON	ON	3rd slave pack	OFF	OFF	ON	ON
5 packs in parallel	OFF	ON	OFF	OFF	4th slave pack	OFF	ON	OFF	OFF
6 packs in parallel	OFF	ON	OFF	ON	5th slave pack	OFF	ON	OFF	ON
7 packs in parallel	OFF	ON	ON	OFF	6th slave pack	OFF	ON	ON	OFF
8 packs in parallel	OFF	ON	ON	ON	7th slave pack	OFF	ON	ON	ON
9 packs in parallel	ON	OFF	OFF	OFF	8th slave pack	ON	OFF	OFF	OFF
10 packs in parallel	ON	OFF	OFF	ON	9th slave pack	ON	OFF	OFF	ON
11 packs in parallel	ON	OFF	ON	OFF	10th slave pack	ON	OFF	ON	OFF
12 packs in parallel	ON	OFF	ON	ON	11th slave pack	ON	OFF	ON	ON
13 packs in parallel	ON	ON	OFF	OFF	12th slave pack	ON	ON	OFF	OFF
14 packs in parallel	ON	ON	OFF	ON	13th slave pack	ON	ON	OFF	ON
15 packs in parallel	ON	ON	ON	OFF	14th slave pack	ON	ON	ON	OFF
16 packs in parallel	ON	ON	ON	ON	15th slave pack	ON	ON	ON	ON

ALARM

ALARM light: red LED flash to show the battery alarm status. And red light to show the battery in protection status of abnormal temperature, over-current, or short-circuit.

RUN

Working light: green LED to show the battery working status.

Details as follows,

Battery status	Operating Mode	RUN	ALM	LED Light				Remark
		●	●	●	●	●	●	
Power off	Standby	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Standby	Normal	Solid Green	OFF	According to battery SOC status				Standby mode
Charge Mode	Normal	Solid Green	OFF	According to battery SOC status				
	Over current warnings	Solid Green	Blink type 2					
	Over voltage protection	Blink type1	OFF	OFF	OFF	OFF	OFF	
	Temperature, over current protection	Blink type1	OFF	OFF	OFF	OFF	OFF	
Discharge Mode	Normal	Blink type 3	OFF	According to battery SOC status				
	Warning	Blink type 3	Blink type 3					
	Over current, temperature, short-circuit protection	OFF	Solid Red	OFF	OFF	OFF	OFF	Termination of discharge
	Under voltage protection	OFF	OFF	OFF	OFF	OFF	OFF	Termination of discharge

CAPACITY

SOC light: 4 green LED lights to show the capacity status of battery pack. Each LED represents 25% the capacity.

Status	Charge				Discharge			
Capacity indicator	●L4	●L3	●L2	●L1	●L4	●L3	●L2	●L1
0-25%	OFF	OFF	OFF	Blink	OFF	OFF	OFF	Solid Green
25%-50%	OFF	OFF	Blink	Solid Green	OFF	OFF	Solid Green	Solid Green
50%-75%	OFF	Blink	Solid Green	Solid Green	OFF	Solid Green	Solid Green	Solid Green
>75%	Blink	Solid Green	Solid Green	Solid Green	Solid Green	Solid Green	Solid Green	Solid Green
Operating indicator	Solid Green				Blink			

P+/P-

Power terminals: two pairs of power terminals with the same function, one connect to equipment, and the other one parallel to other battery pack for capacity expanding. For a single pack, both terminals can achieve charging and discharging functions.

Power cable uses 6.0mm power plug with lock button. And can be full rotation.



2.4 Cell Features

2.4.1 Specifications

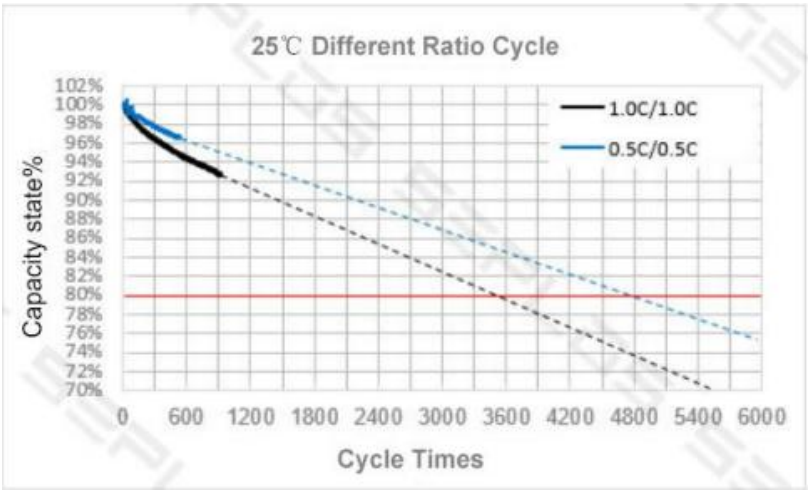
SEPLOS 3.2V 100Ah lithium iron phosphate (LiFePO4) aluminum case prismatic rechargeable battery cell.

	Nominal Voltage	3.2V
	Nominal Capacity	100Ah
	Weight	≤2.25Kg
	Self-discharge Rate	≤3.5% per month
	Initial Internal Resistance（1KHz）	≤0.35mΩ

Refer to the cell specification for more detailed information.

SEPLOS Technology applies high quality Grade A cells inside the battery box. And did the following designs to prolong the battery pack cycle life.

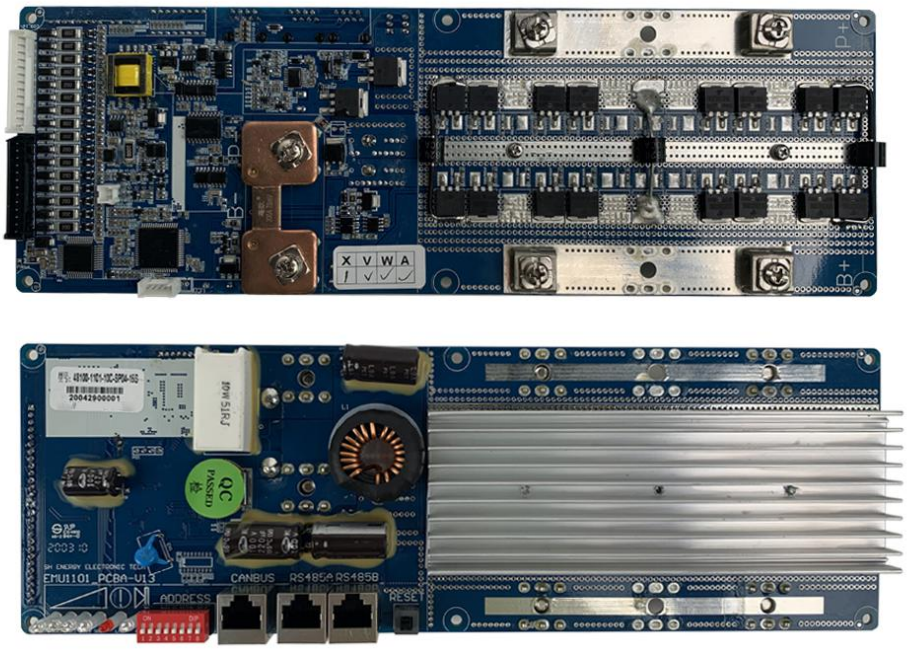
- Judging by the current testing report below, if the battery pack charging and discharging at 0.2C, the battery pack could reach a cycle life of 6000 times or more at the remaining capacity of 80% capacity state at 25℃ room temperature, 100%DOD.



- The real capacity of each single cell is 105Ah.
- The module inside comes with 16 cells in parallel. And the default setting of BMS pack discharge end voltage is for 15 cells in parallel.

2.5 Advanced Battery Management System (BMS)

The BMS is applied to monitor current, voltage, temperature, protection against over-charge, over-discharge, over-current, over-temperature, under-temperature and short circuit. The BMS provides cell balancing and current limitation during charging process to ensure a reliable safety and performance.



2.5.1 BMS Functions

- Over charge protection
- Over discharge protection
- Over current protection
- Cell balancing
- Temperature protection

- CAN and RS485 communication

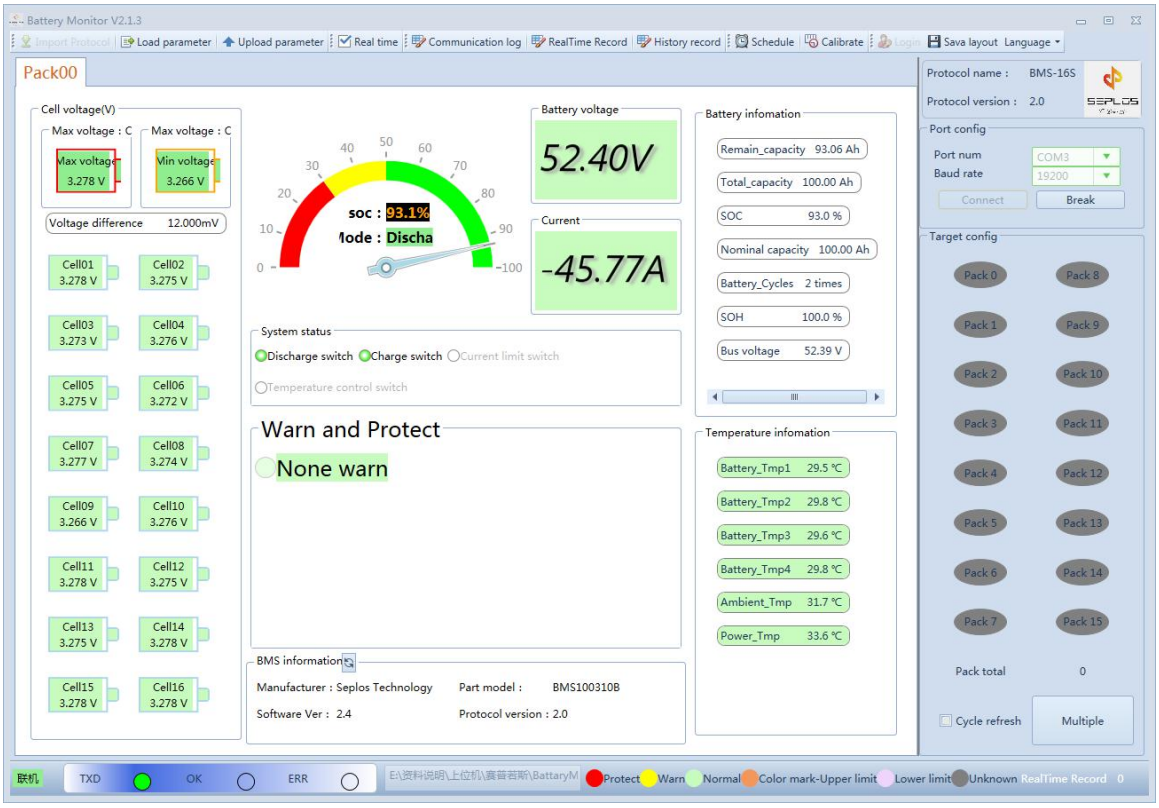
Refer to the BMS specification for the detailed information

2.5.2 BMS Upper Computer System

Battery pack can be remotely monitored with SEPLOS BATTERYMONITOR software. With this software, battery voltage, cell voltage of single cell and pack, SOC status, cell temperature, voltage differences can be monitoring in real time. Through history record, battery status can be checked afterwards.

Note: Download the software installation file at Google drive with this link:

https://drive.google.com/drive/folders/10pxgNLHovcDZRVGrCZsSkfecBrRw-AdW?usp=sharing



2.5.3 Compatible Inverters

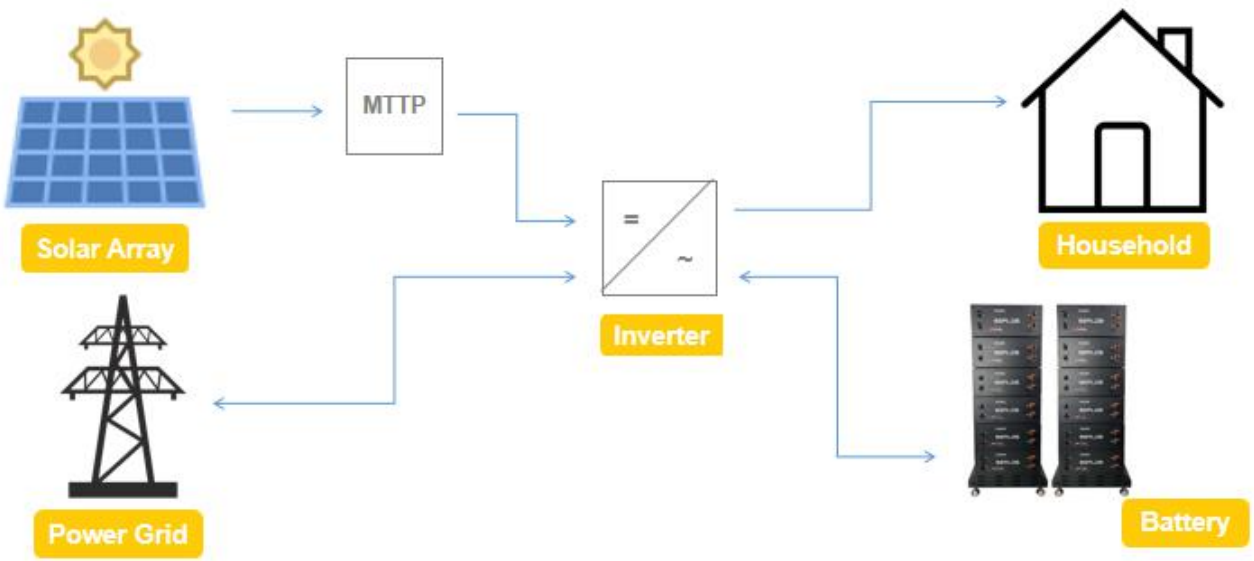
To make sure that the battery module works perfectly, it would be better to use the compatible inverters listed below. Pusung battery module compatible with CANBUS protocol, which was also applied by Pylontech and BYD.

Compatible inverters list:

GOODWE	Growatt powering tomorrow	victron energy BLUE POWER
SMA	PYLONTECH	LUXPOWER TEK
SOFAR SOLAR	Deye 德業	Sermatec
FOX ESS	Voltronic Power Advancing Power	RENAC

3. Installation

3.1 Application



3.2 Tools

Screwdriver

Electric Screwdriver

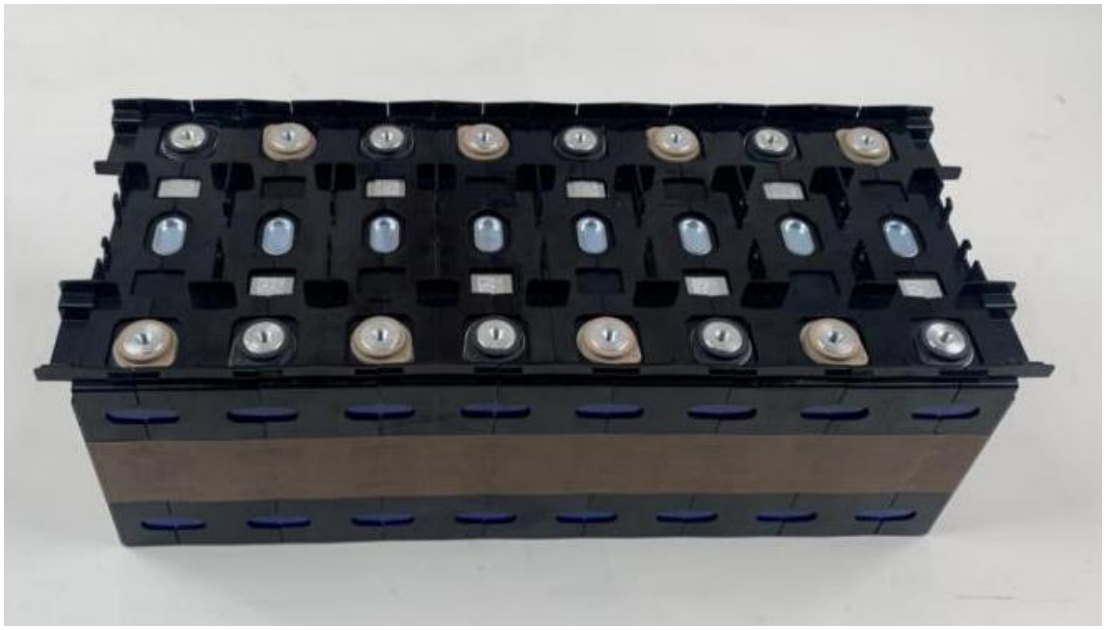
Preset Adjustable Torque Wrench

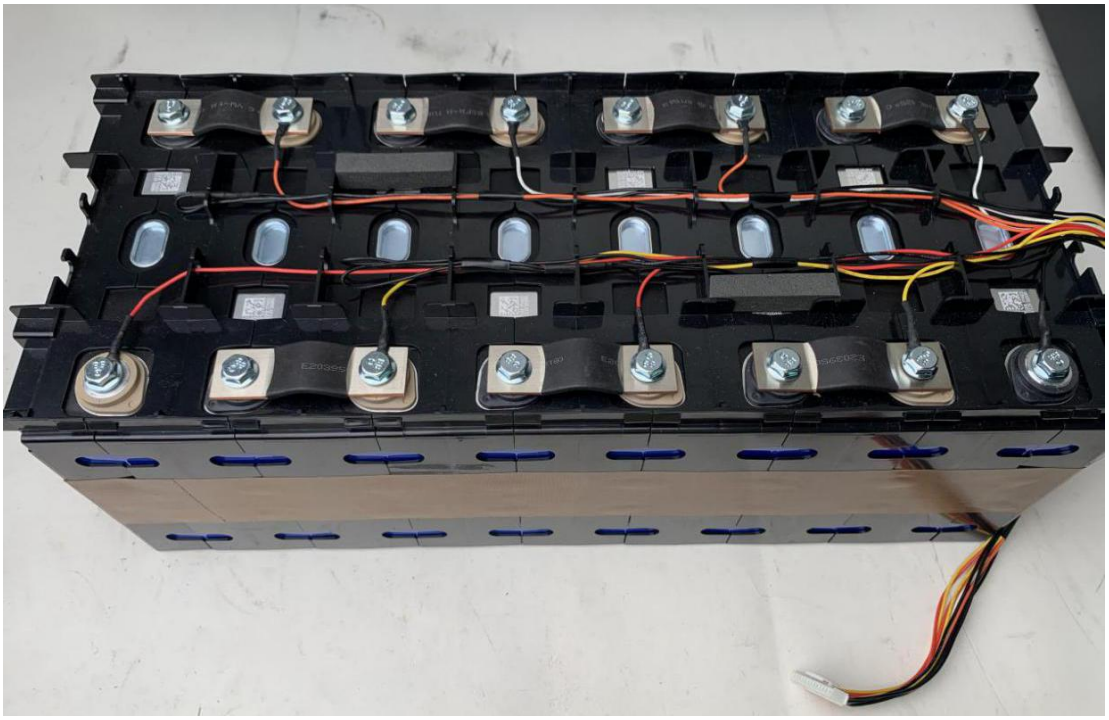
Hex Wrench

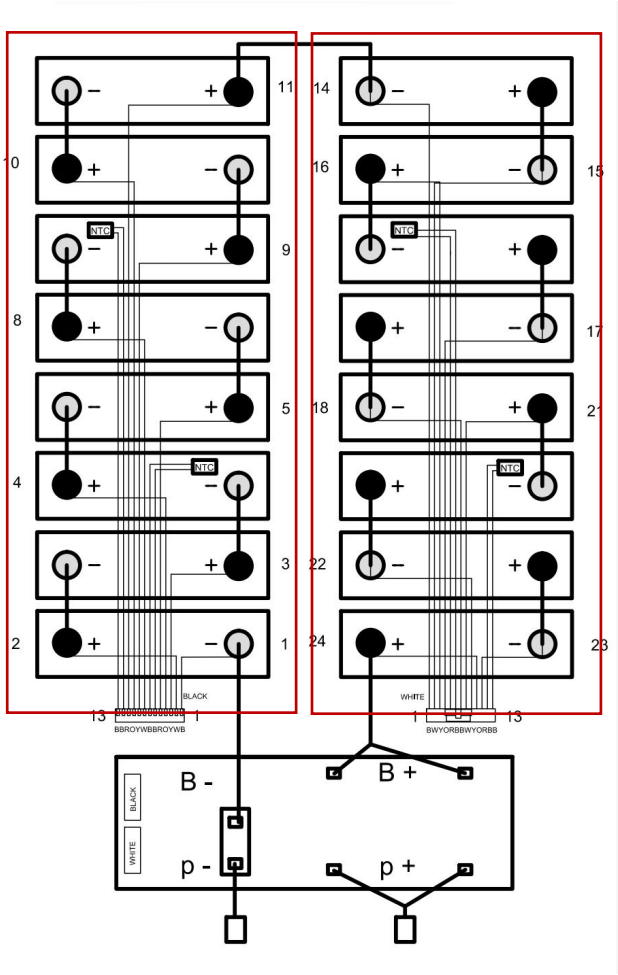
3.3 Installation Process

3.3.1 Battery module assembly (cell to cell)

- Put battery cell into plastic holders.
- Connect the cells in parallel with busbar and BMS data collective wire harness. (Refer to the wiring diagram.)





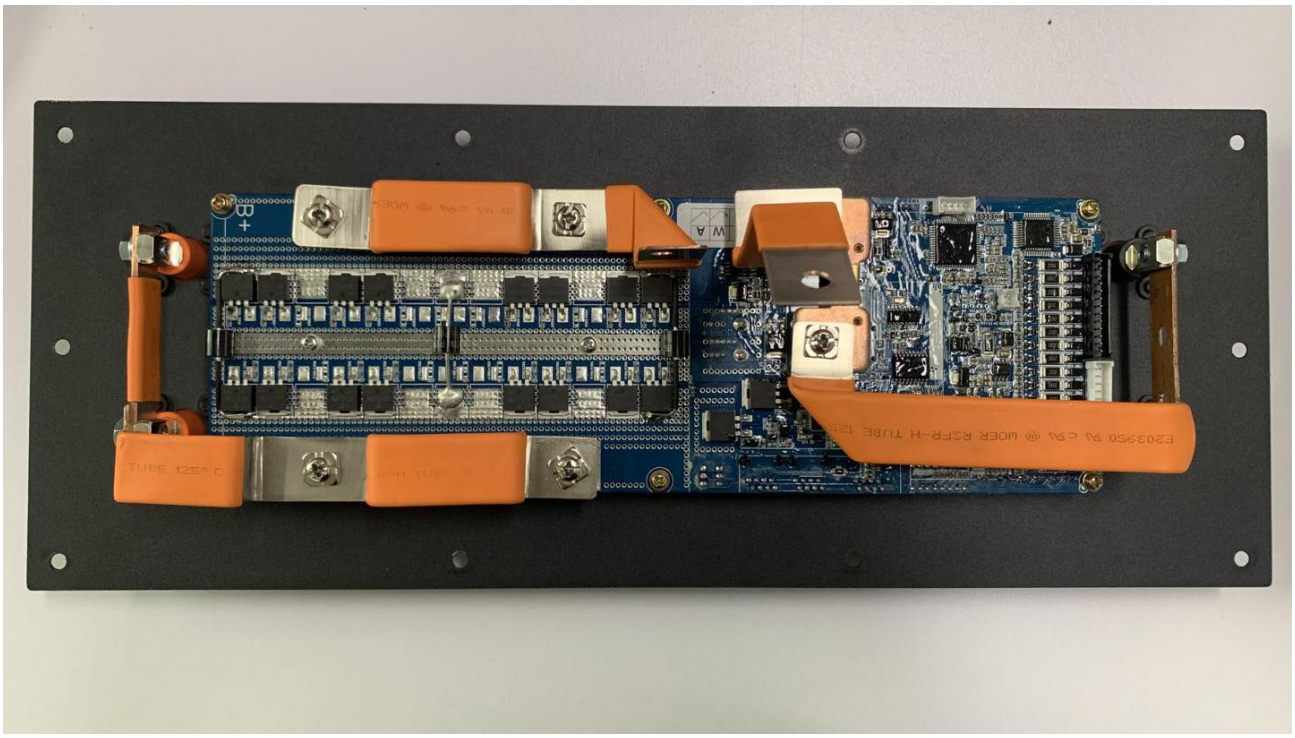


Wiring Diagram

B stands for Black wire
R stands for Red wire
O stands for Orange wire
Y stands for Yellow wire
W stands for White wire
NTC stands for negative temperature coefficient thermistor

3.3.2 Battery module wiring (module to module/BMS)

- Put the battery modules into metal box.
- Connect the two battery modules in parallel with flexible copper busbar.
- Connect pack main negative with BMS negative.
- Connect wire harness to the BMS.
- Connect pack main positive with BMS positive.

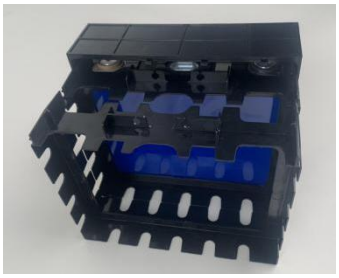
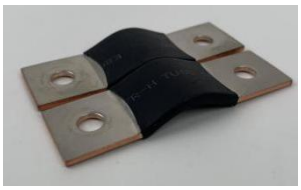
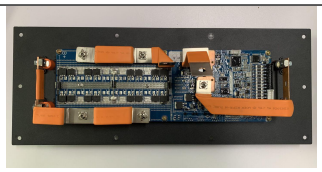


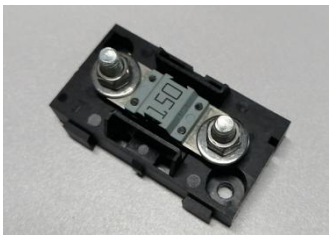
3.3.3 Battery pack wiring (Pack to pack)

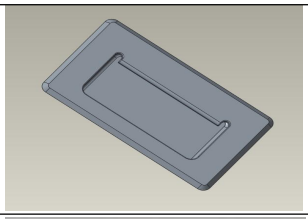
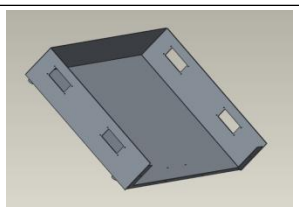
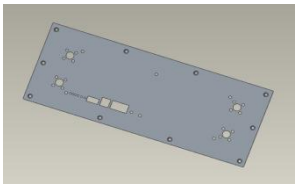
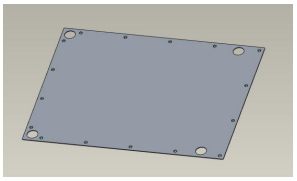
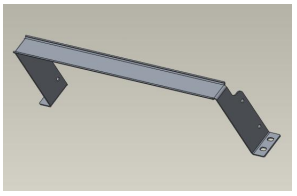
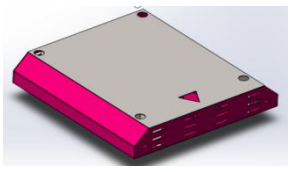
- Stack the battery packs onto the base. (Maximum 6 packs can be stacked.)
- Connect cables between packs.
- Connect cable with inverter.

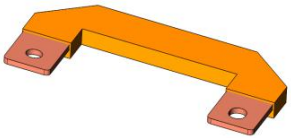
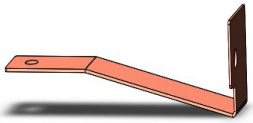
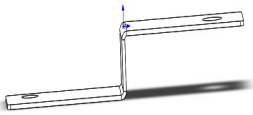
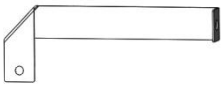
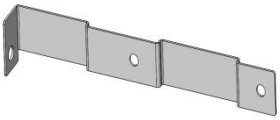
4. List

4.1 Packing list

Item	Name	Description	Quantity	Picture
1	Cell	3.2V 100Ah LiFePO4 battery cell	16 PCS	
2	Cell holder	Plastic cell holder, black	14 PCS	
		Plastic cell holder side cover with screws, black	4 PCS	
		Plastic cell holder top cover,black	16 PCS	
3	Connector	70*21*2mm, flexible copper bus bar	14 PCS	
4	BMS	48v 100A Battery management system	1 PCS	
5	Wire harness	Data collection wire	2 PCS	
6	Teflon tape	45*0.18mm, high temperature tape	1 PCS	

7	Fuse	150A, fuse	1 PCS	
8	Screws	M6*8mm, Grade 8.8 carbon steel, flange screw	32 PCS	
		M3*8mm, carbon steel, Phillips oval screw	6 PCS	
		M4*8mm, carbon steel, Phillips truss screw	18 PCS	
		M5*8mm, carbon steel, flat head screw	26 PCS	
		M6*10mm, Grade 8.8 carbon steel, hex flange screw	4 PCS	
		M6*10mm, carbon steel, Phillips hex screw	16 PCS	
		M5*8mm, hex flange screw	16 PCS	

9	Handle	98*48mm, 304 stainless steel	4 PCS	
10	Nuts	M4 nuts	16 PCS	
11	Foot	M16, diameter 60mm, height 100mm	4 PCS	
12	Outer box	Bottom box, Q345 steel, black	1 PCS	
		Front panel, Q345 steel, black	1 PCS	
		Top cover, Q345 steel, black	1 PCS	
		Fuse holder, Q345 steel, black	1 PCS	
		Metal plate, Q345 steel, black	1 PCS	
		Base, Q345 steel, black	1 PCS	

13	Bus bar	Module to module	1 PCS	
		PACK negative to BMS negative	1 PCS	
		PACK positive to fuse	1 PCS	
		Fuse to BMS positive	1 PCS	
		BMS negative to power terminal negative	1 PCS	
		BMS positive to power terminal positive	1 PCS	
		P+ to P+/P- to P-	2 PCS	
14	Foot	M16, diameter 60mm, height 100mm	4 PCS	

4.2 Optional tools and accessories list

1	Adapter	RS485 to USB adapter	optional	
2	Power terminals	120A positive power terminals, red	optional	
		120A negative power terminals, black	optional	

3	Power cable	Pack to pack positive power cable, red, 24cm	optional	
		Pack to pack negative power cable, black, 24cm	optional	
		Pack to inverter power cable, 150cm, other length cables optional	optional	
4	Communication cable	Communication cable 30cm	optional	
		Communication cable 150cm, other length cables optional	optional	

This document is subject to change without notice.

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