

Lithium-Iron Phosphate Battery

User Operation Manual

Product Name: PS5120E-V2

Cell Configuration: 16S1P

Information Version: 3.0

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1 Application Scope

This MES-branded lithium iron phosphate battery pack incorporates a battery management system (BMS) and consists of 16 cells. The 51.2 V, 100 Ah model supports a maximum continuous charging current of 80 A and a maximum continuous discharge current of 100 A. It provides CAN bus and RS485 communication interfaces. Refer to Section 2.2 for protection settings.

The battery is intended for household energy storage and emergency backup applications. It can be used with compatible inverters to support the connected loads. For example, when connected to a compatible residential photovoltaic storage inverter, it can provide backup power for household loads. Consult the supplier to confirm compatibility before using the battery with other equipment or in other applications.

This document describes the battery specifications, electrical characteristics, environmental requirements, interfaces, wiring, operating instructions, safety precautions, packaging, storage and transportation information.

Illustrations may differ slightly from the supplied product. Contact the supplier if clarification is required.

2 Electrical Characteristics

2.1 Features

1. Uses 3.2 V, 100 Ah lithium iron phosphate cells.
2. Provides overcharge, overdischarge, overcurrent and short-circuit protection.
3. Monitors cell, ambient and power MOS temperatures. Six NTC channels are provided: four for cell temperatures, one for ambient temperature and one for power MOS temperature.
4. Provides temperature-related alarms and protection during charging and discharging.
5. Displays state of charge (SOC) and fault status using indicators.
6. Provides RS485 and CAN communication interfaces.
7. Supports configurable charging balance thresholds, including the activation voltage and cell voltage difference.
8. Supports communication between parallel battery packs through RS485. A host computer can poll battery pack data.

2.2 Parameters(Ta=23℃)

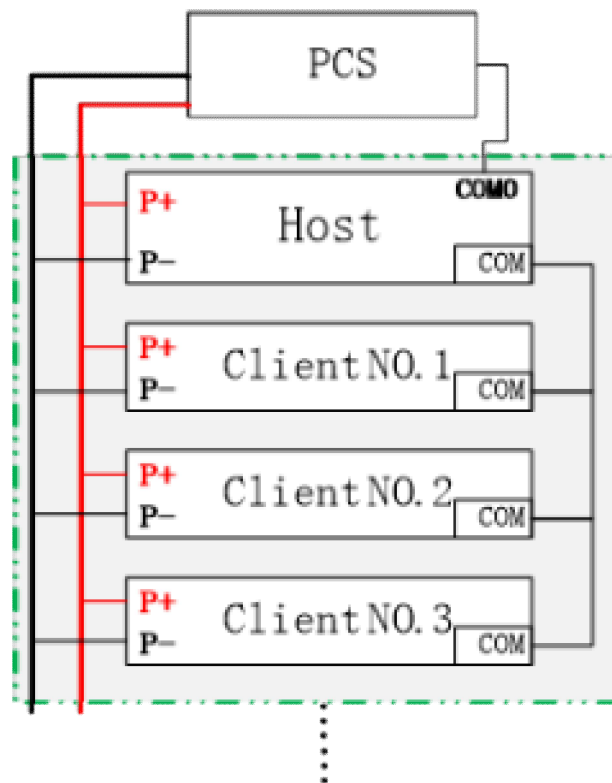
Battery pack parameters		
Item	Specification	Remark
Cell configuration	16S1P	
Capacity	Nominal capacity 100Ah Minimum capacity 100Ah	Cell dimensions: $50 \pm 1.0 \times 160 \pm 0.5 \times 118.4 \pm 0.5$ mm
Operating voltage range	44.8V- 58.4V	Cell@2.8~3.65V
Nominal voltage	51.2V	Cell @3.2V, 16S1P
Charging voltage	57.6V	Cell @3.6V
Standard charging current	50A	Typical value: 0.5C
Standard discharge current	50A	Typical value: 0.5C
Maximum continuous charging current	80A	0.8C
Maximum continuous discharge current	100A	1C
Charge overvoltage protection	58.4V	Cell@3.65V
Charge overvoltage protection delay	1S	
Charging overvoltage protection alarm	57.6V	Cell@3.6V
Discharge undervoltage protection	T > 10℃: 40 V T ≤ 10℃: 44.8 V	Cell: 2.5-2.8 V Changeover: 20 ms
Discharge under voltage protection delay	1S	
Discharge undervoltage alarm	46.4V	Cell @2.9V
Charge overcurrent protection	90A	Delay 1000ms
Discharge overcurrent protection 1	110A	Delay 30000ms
Discharge overcurrent protection 2	150A	Delay 10000ms

Charging High Temp Protection	53℃	Delay 4000ms
Charging Low Temp Protection	0℃	
Discharging High Temp Protection	55℃	
Discharging Low Temp Protection	-20℃	
ENV High Temp Protection	70℃	
ENV Low Temp Protection	-25℃	
MOS High Temp Protection	110℃	
AC Internal Impedance	$\leq 50\text{m}\Omega$	
Quiescent current	$\leq 40\text{mA}$	
Resting current	$\leq 100\mu\text{A}$	
Voltage difference protection	$\geq 1000\text{mV}$	Delay 5000ms
Short circuit protection	500A	Delay 200-500 μs
Cell balancing current	68mA(45-85mA)	Turn-on Voltage:3450mV Turn-on Voltage difference:30mV
Low battery alarm	SOC<10%	
Charging current limit	$20\pm 2\text{A}$	Activation: $90\pm 3\text{A}$. Default: parallel operation. Standalone: software setting.
Battery Dimensions	459.3*440*133.5 mm	
Battery weight	$\approx 44\text{kg}$	
Cycle life	5000 cyc	25℃ 80% DOD
Ingress protection rating	IP20	

2.3 Environmental Characteristics

Item		Specification	Remark
Operating Temperature	Charge	0°C ~ 50°C	
	Discharge	-20°C ~ 55°C	
	Recommend	23°C ± 2°C	
Storage Temperature	1 month	-10°C ~ 45°C	High temperature storage is not recommended
	3 months	0°C ~ 35°C	
	12 months	10°C ~ 25°C	
	Recommend	21°C ~ 25°C	
Relative humidity		65 ± 20% Relative Humidity	

2.4 System schematic diagram

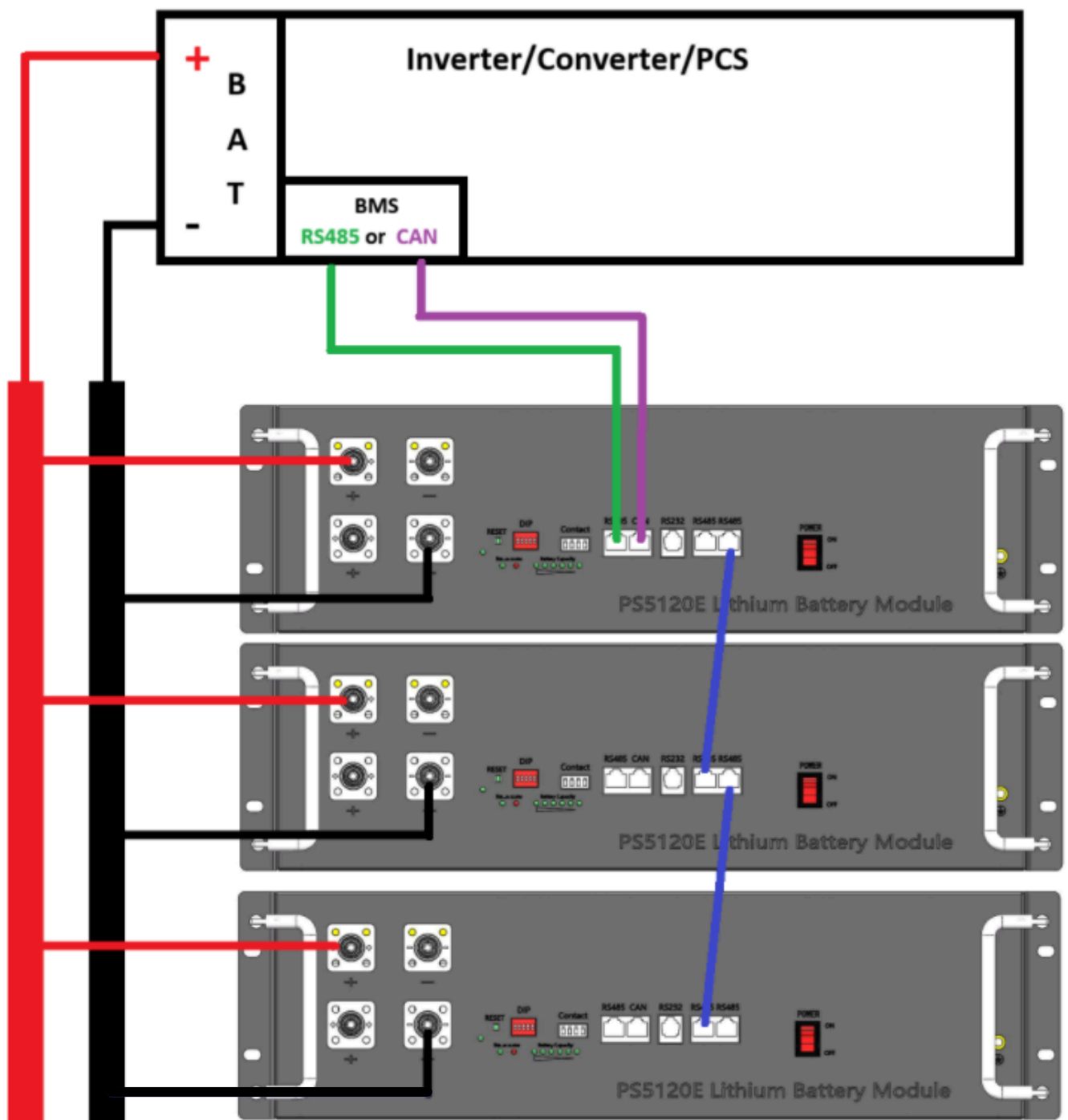


Note on battery pack parallel connection:

1. Use equal-length battery branch cables where practicable. Select cables for the required current and installation conditions; see Section 3.4.
2. Recommended sizing: $Q \text{ [kWh]} \geq 2 \times P \text{ [kW]}$, where P is the inverter rated power and Q is the usable battery bank energy. Ideal runtime $[h] = \text{usable energy [kWh]} / \text{load [kW]}$. For example, 10 kWh of usable energy supplies 5 kW for 2 hours ideally. Actual runtime depends on usable energy and system losses.

3. Before paralleling battery packs, ensure that their voltage difference is no more than 0.5 V and their SOC difference is no more than 5 percentage points. Balance newly added batteries before connection. Follow the battery compatibility and address requirements in Section 3.1.2.

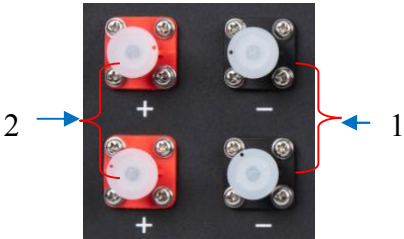
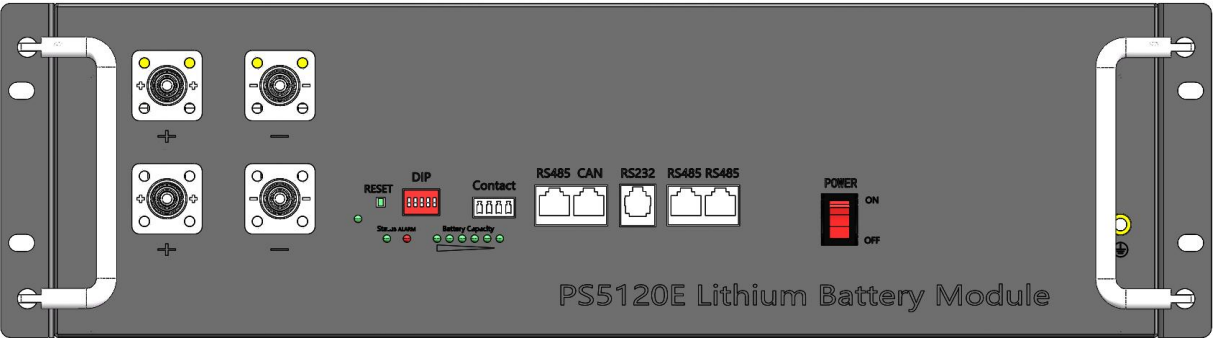
2.5 Application wiring diagram



Use either RS485 or CAN for inverter communication, according to the equipment protocol. Blue lines between the battery packs indicate RS485 communication.

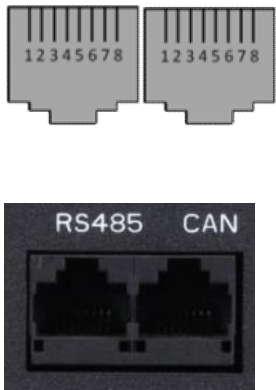
3 Internal and External Characteristics

3.1 Port Definitions

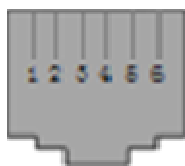


No	Definition	Remarks
1	P-	Output negative pole
2	P+	Output positive

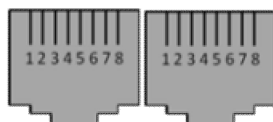
3.1.1 Communication port definition



RS485 / CAN ports (PCS connection)					
RS485			CAN		
PIN	Definition	Remark	PIN	Definition	Remark
1	RS-485B1		1	NC	
2	RS-485A1		2	CAN-GND	
3	GND		3	NC	
4	NC		4	CAN-H	
5	NC		5	CAN-L	
6	GND		6	NC	
7	RS-485A1		7	NC	
8	RS-485B1		8	NC	



RS232 port (battery monitoring)		
PIN	Definition	Remark
1	NC	
2	NC	
3	TXD	
4	RXD	
5	GND	
6	NC	

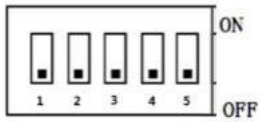


RS485 ports (battery parallel communication)					
RS485			RS485		
PIN	Definition	Remark	PIN	Definition	Remark
1	RS-485B2		1	RS-485B2	
2	RS-485A2		2	RS-485A2	
3	GND		3	GND	
4	NC		4	NC	
5	NC		5	NC	
6	GND		6	GND	
7	RS-485A2		7	RS-485A2	
8	RS-485B2		8	RS-485B2	

3.1.2 Parallel Battery Address Settings

Up to 31 battery packs may be connected in parallel. Use address 0 for a standalone battery. For parallel operation, use unique addresses from 1 to 31; address 1 is the host. DIP address changes take effect without restarting. The settings are shown on the following page.

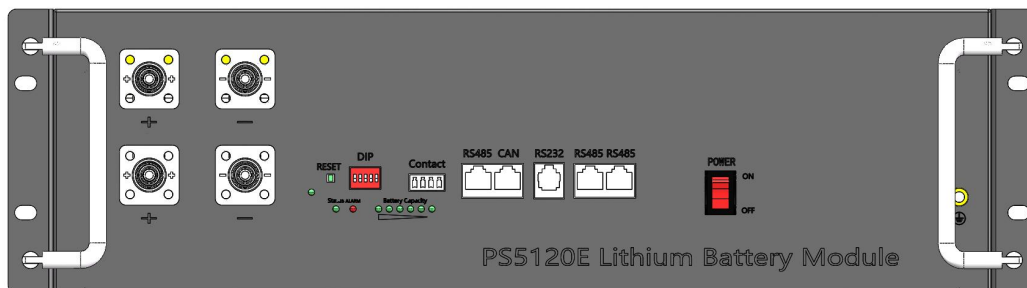
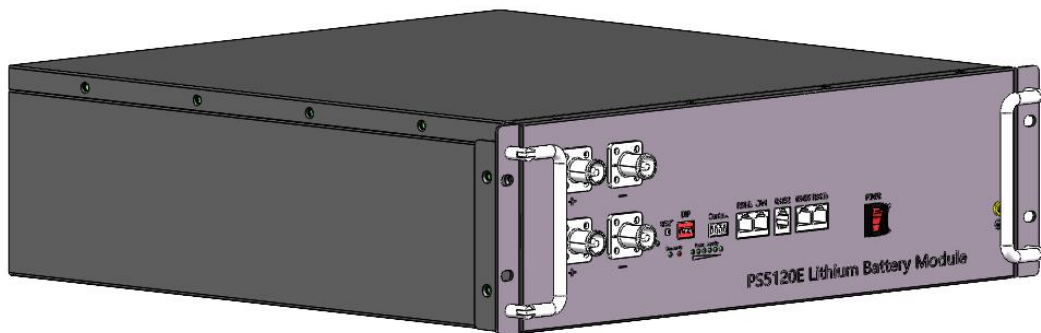
Mixing batteries from different production batches is not recommended. New and used batteries may be combined only if their condition and consistency are suitable and their voltages have been equalized. Do not combine batteries with different BMS firmware versions. Before connection, balance newly added batteries and ensure voltage differences ≤ 0.5 V and SOC differences ≤ 5 percentage points.



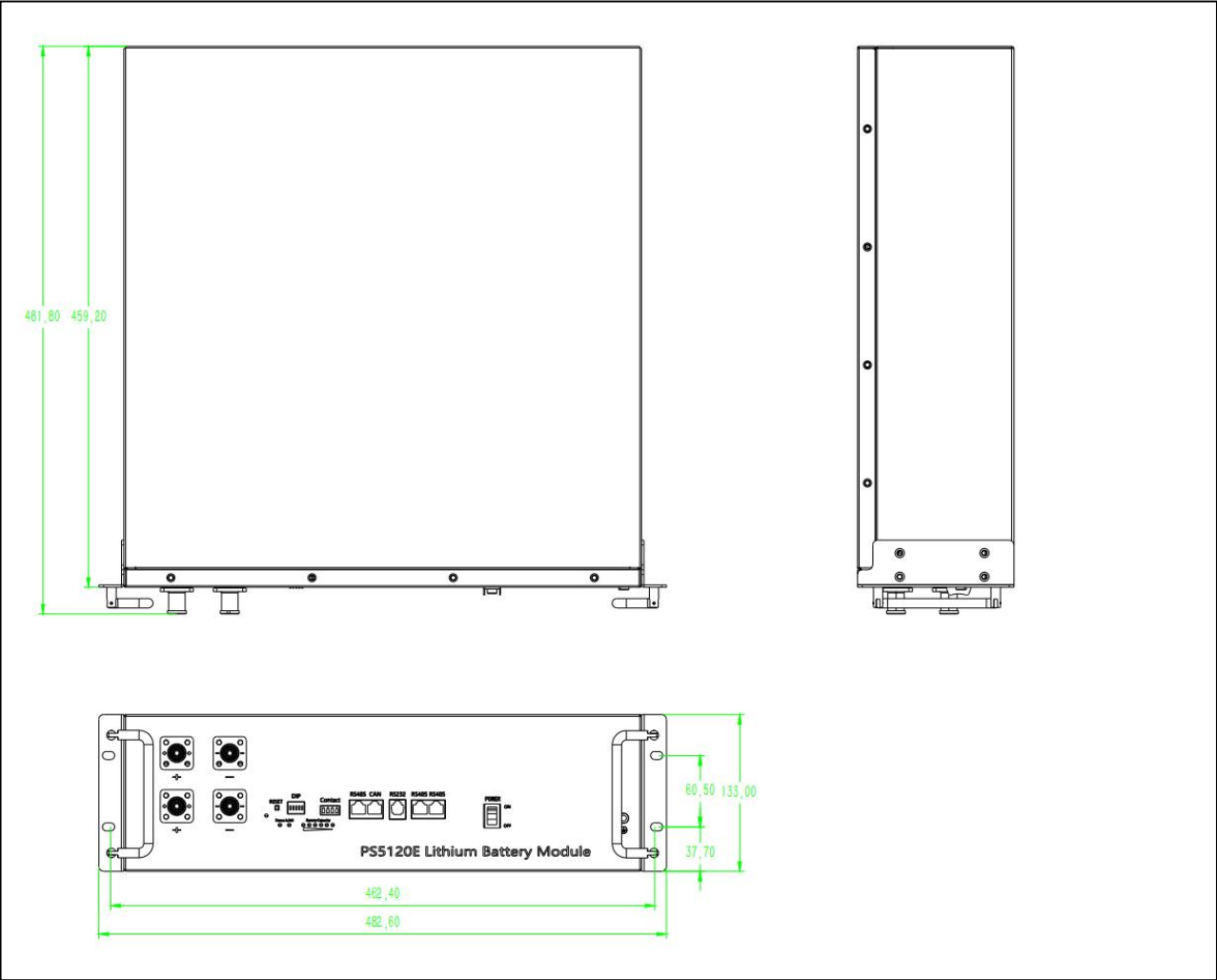
Address	DIP Switch Position				
	#1	#2	#3	#4	#5
0	OFF	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF
5	ON	OFF	ON	OFF	OFF
6	OFF	ON	ON	OFF	OFF
7	ON	ON	ON	OFF	OFF
8	OFF	OFF	OFF	ON	OFF
9	ON	OFF	OFF	ON	OFF
10	OFF	ON	OFF	ON	OFF
11	ON	ON	OFF	ON	OFF

12	OFF	OFF	ON	ON	OFF
13	ON	OFF	ON	ON	OFF
14	OFF	ON	ON	ON	OFF
15	ON	ON	ON	ON	OFF
16	OFF	OFF	OFF	OFF	ON
17	ON	OFF	OFF	OFF	ON
18	OFF	ON	OFF	OFF	ON
19	ON	ON	OFF	OFF	ON
20	OFF	OFF	ON	OFF	ON
21	ON	OFF	ON	OFF	ON
22	OFF	ON	ON	OFF	ON
23	ON	ON	ON	OFF	ON
24	OFF	OFF	OFF	ON	ON
25	ON	OFF	OFF	ON	ON
26	OFF	ON	OFF	ON	ON
27	ON	ON	OFF	ON	ON
28	OFF	OFF	ON	ON	ON
29	ON	OFF	ON	ON	ON
30	OFF	ON	ON	ON	ON
31	ON	ON	ON	ON	ON

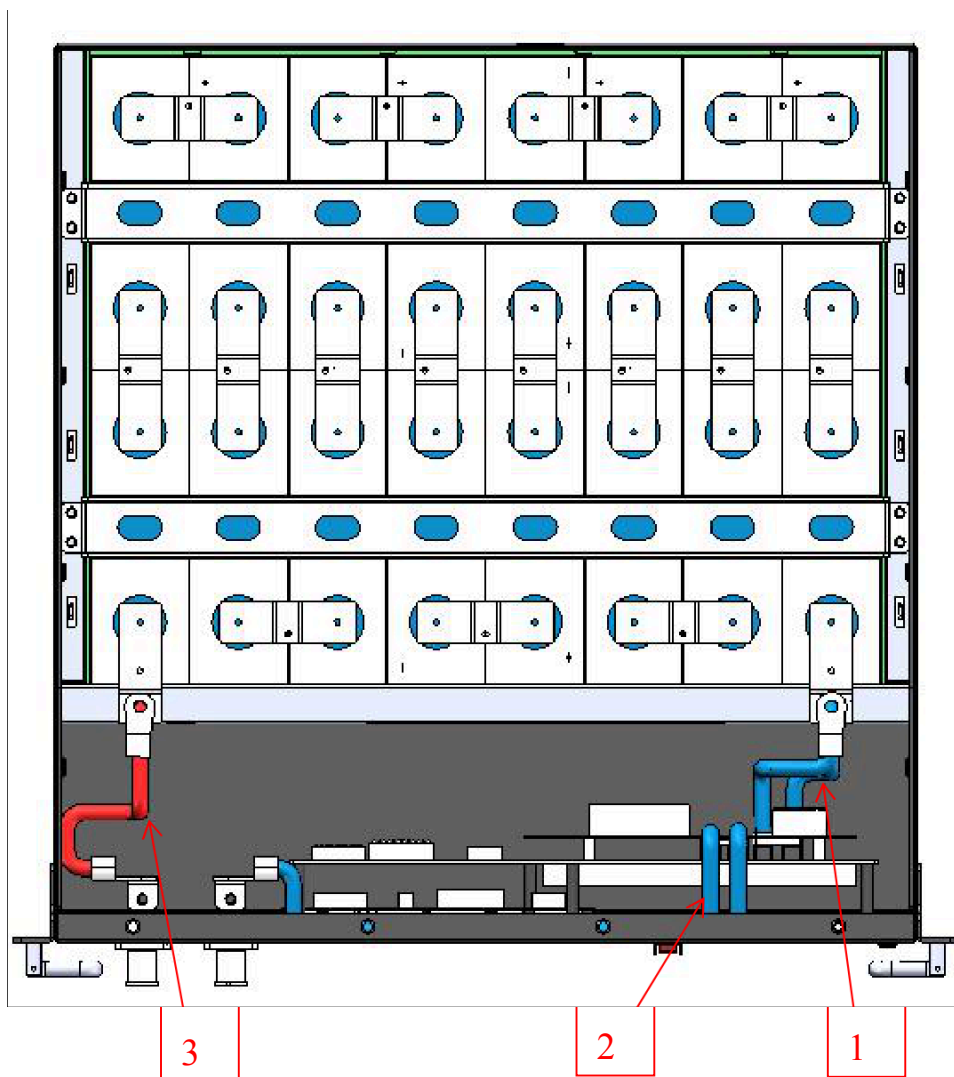
3.2 Battery Dimensions and Appearance



3.2 Battery Dimensions and Appearance (continued)



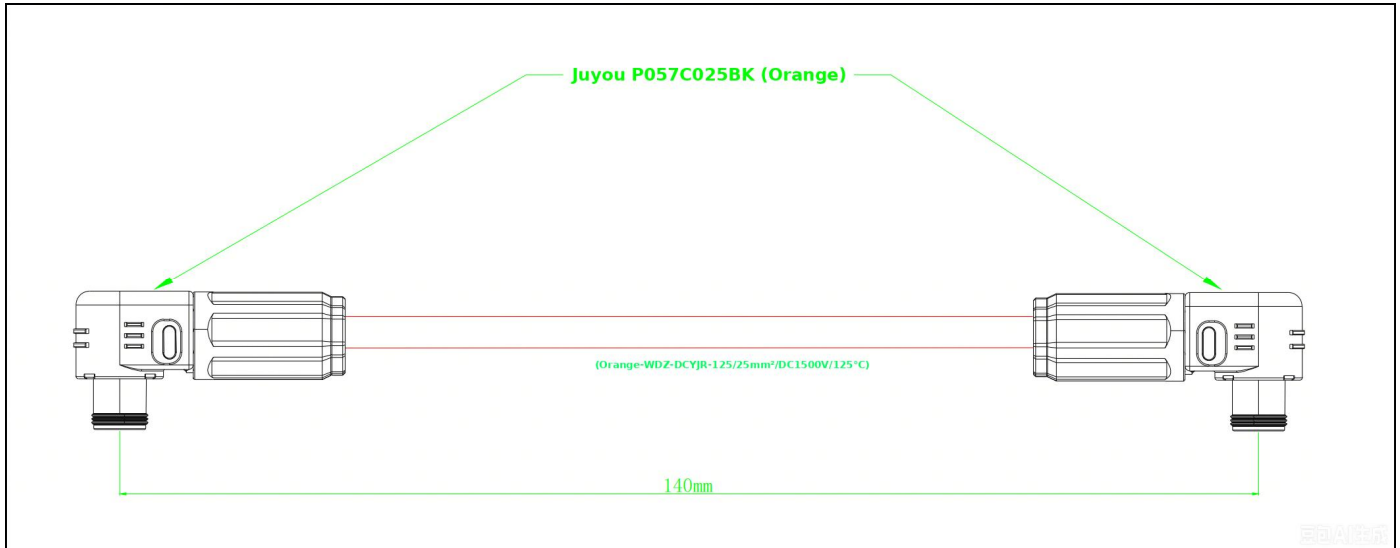
3.3 Internal Battery Layout



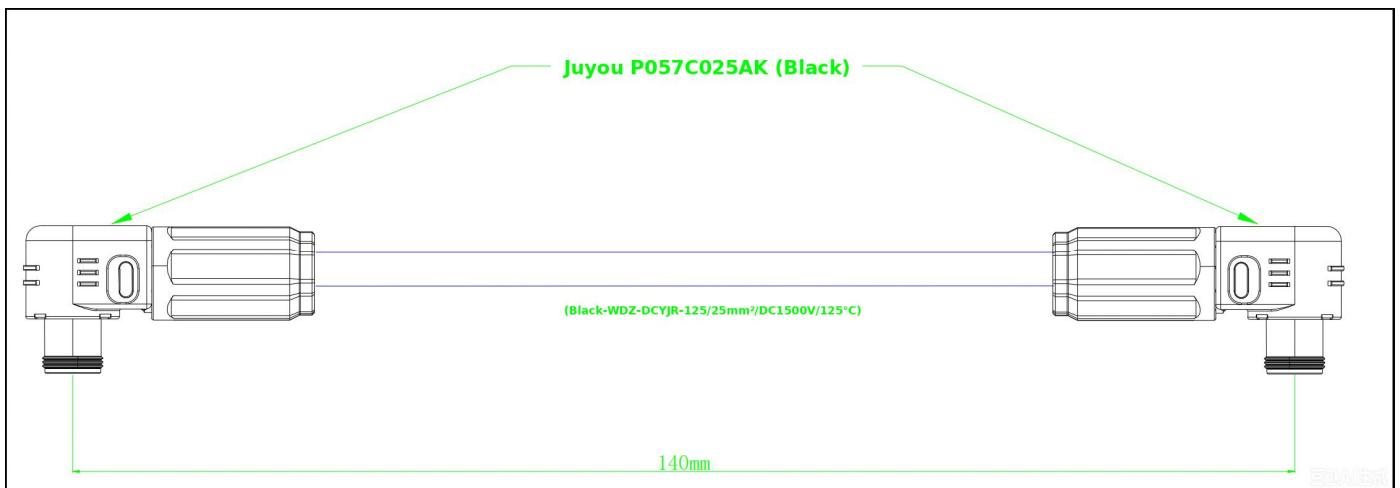
Internal Wiring Harness Description			
NO.	Cable Specification Description	Unit	Q'ty
1	UL3512 / 6 AWG / 16 mm ² ; stranding: 3200 strands × 0.08 mm (TS); rated 600 V / 200 ° C; two-wire construction; one end: wires paralleled (joined) and crimped with one SC35-6 terminal; other end: crimped with two T16-5-90D terminals; wire color: black; wire length: 160 mm.	PCS	1
2	UL3512 / 6 AWG / 16 mm ² ; stranding: 3200 strands × 0.08 mm (TS); rated 600 V / 200 ° C; two-wire construction; one end: wires paralleled (joined) and crimped with one SC35-6 terminal; other end: crimped with two T16-5-90D terminals; wire color: black; wire length: 310 mm.	PCS	1
3	UL3512 / 6 AWG / 16 mm ² ; stranding: 3200 strands × 0.08 mm (TS); rated 600 V / 200 ° C; two-wire construction; both ends: wires paralleled (joined) and crimped with SC35-6 terminals; wire color: red; wire length: 160 mm.	PCS	1

3.4 External Parallel Cable Harnesses

Positive busbar (pole) parallel wire harness: both ends terminated with Juyou P057C025BK (orange) connectors; cable: WDZ-DCYJR-125 / 25 mm² / DC 1500 V / 125 ° C; color: orange; length: L = 140 mm; dedicated for P/N 709005; positive parallel wire.

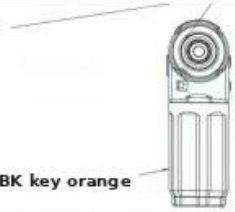


Negative busbar (pole) parallel wire harness: both ends terminated with Juyou P057C025AK (black) connectors; cable: WDZ-DCYJR-125 / 25 mm² / DC 1500 V / 125 ° C; color: black; length: L = 140 mm; dedicated for P/N 709005; negative parallel wire.



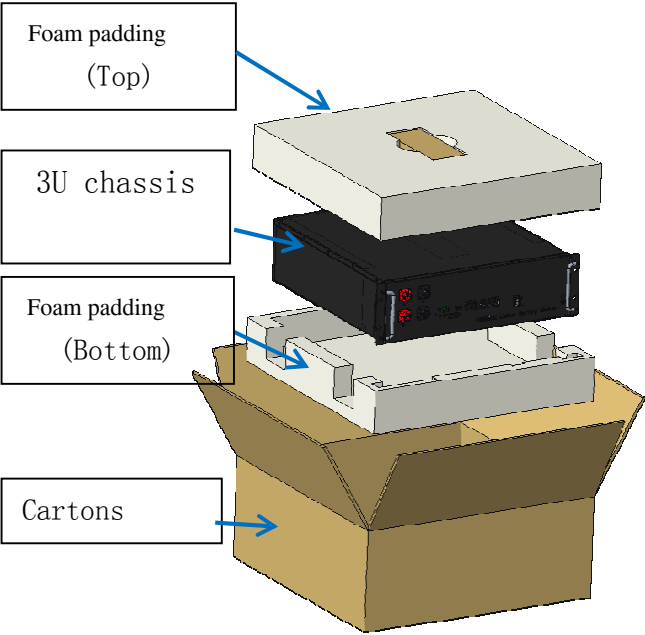
Install a DC circuit breaker between the DC busbar and the inverter. The manufacturer recommends 25 mm² cable for currents of approximately 100 A. Select cables for the installation conditions and component ratings. The connectors in Section 3.5 are rated at 125 A. The inverter-to-battery energy ratio does not determine the allowable current of a cable, connector or shared bus section; verify the complete DC circuit ratings for the installation.

3.5 Connector Selection Table

5.7mm Right-Angle Connector — No Mounting Key / No Mating Key Part Number Selection Table				
Customer P/N	Juyou P/N	Description	Structure Diagram	Photo
	R057MM05BK-01	5.7-01 BK Orange Receptacle, 1500V 125A, M5 threaded hole, no mounting key, no mating key	 BK-01 key, orange CK-0	
	R057MM05AK-01	5.7-01 AK Black Receptacle, 1500V 125A, M5 threaded hole, no mounting key, no mating key	 AK-01 key, black BK-C	
	P057C025AK	5.7 AK Black Plug, 1500V 125A, 25mm ² , no mating key	 AK-AK key black	
	P057C025BK	5.7 BK Orange Plug, 1500V 125A, 25mm ² , no mating key	 BK-BK key orange	

3.6 Packaging Information

1. 3U Chassis Module Packaging



Carton Size:540*540*220mm



Packing Size: 1.1*1.1*1.0m
Gross weight:795kg

2. Loading Quantity for a 20-Foot Container

Loading Quantity for a 20-Foot Container		
Item	Number	Remark
3U chassis	20 pallets with a total of 320 pcs	The two pallets are stacked together to put 2 rows and 5 columns, a total of 20 pallets.

4 Operating Instructions and Safety Precautions

4.1 Operating Instructions

1. Read this manual before use. Confirm equipment compatibility, charging method, current requirements and protective functions with the supplier.
2. Charge at 0°C to 50°C and discharge at -20°C to 55°C; relative humidity: 65% ± 20%. Maximum continuous current: 80 A charging and 100 A discharging.
3. After storage exceeding six months, recharge to above 50% SOC. For long-term storage, keep the battery approximately half charged in a cool, dry place with insulated terminals. Prolonged depleted storage may damage the battery.
4. Keep away from heat, high-voltage equipment and children. Avoid severe impacts, damp conditions, short circuits and disassembly. Dispose of used batteries appropriately; never put them in fire or water.
5. Below 46.4 V, the BMS warning indicator flashes. This undervoltage alarm does not itself stop discharge; the separate undervoltage protection remains active.
6. The red indicator flashes when the pack or any cell reaches its overvoltage alarm threshold, whichever occurs first (57.6 V per pack; 3.6 V per cell). An alarm may therefore occur during normal full charging at 57.6 V.
7. Undervoltage protection is 40 V above 10°C and 44.8 V at 10°C or below. The specified changeover time is 20 ms. Refer to Section 2.2 for the protection parameters.
8. During standalone charging, charge overcurrent protection activates at 90 A with a 1000 ms delay. This is a protection threshold, not a continuous current rating. Default parallel charging current limiting activates at 90 ± 3 A and limits current to 20 ± 2 A. For a standalone battery, enable limiting through the host-computer software.
9. After charge overcurrent protection, stop charging and wait 2 minutes. Resume below 90 A while observing the 80 A maximum continuous charging rating. Discharge overcurrent also requires manual intervention; obtain the applicable reset procedure from the supplier.
10. Automatic recovery occurs once the applicable recovery conditions are met for cell/pack overcharge and overdischarge, charging/discharging high and low temperatures, MOS high temperature, and ambient high and low temperatures.

Capacity LED Indicators

Six capacity indicators, L1 to L6, are arranged from left to right.

SOC	Charging						Discharging					
	L1	L2	L3	L4	L5	L6	L1	L2	L3	L4	L5	L6
0-17%	Flash	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
17-33%	ON	Flash	OFF	OFF	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF
33-50%	ON	ON	Flash	OFF	OFF	OFF	ON	ON	ON	OFF	OFF	OFF
50-66%	ON	ON	ON	Flash	OFF	OFF	ON	ON	ON	ON	OFF	OFF
66-83%	ON	ON	ON	ON	Flash	OFF	ON	ON	ON	ON	ON	OFF
83-100%	ON	ON	ON	ON	ON	Flash	ON	ON	ON	ON	ON	ON

ON = steady light; OFF = unlit; Flash = blinking.

4.2 Cautions

Charging outside 0°C to 50°C may reduce performance and service life. Keep the supplier's contact details available for assistance. Before connecting other equipment, confirm compatibility with the supplier. The manufacturer does not provide free replacement for damage caused by misuse rather than a product quality defect, even during the warranty period.

4.3 Safety Warnings

Do not disassemble the battery

The battery contains protective mechanisms and circuits. Improper disassembly may disable these protections and cause overheating, smoke, deformation or fire.

Prevent short circuits

Do not connect the positive and negative terminals with metal objects. Do not store or transport the battery with loose metal items that could contact the terminals. A short circuit can produce a high current and cause overheating, smoke, deformation or fire. Excessive heat may damage the separator and protective functions.

Keep away from heat sources

Do not use the battery near flames or furnaces, or expose it to ambient temperatures above 80°C. Excessive heat may cause internal short circuits, smoke, deformation or fire. Follow the specified operating temperature limits during normal use.

Keep the battery dry

Do not wet or immerse the battery. Water may damage the protective circuits and cause abnormal chemical reactions, overheating, smoke, deformation or fire.

Do not charge near flames or in direct sunlight

Exposure to excessive heat during charging may damage the protective functions and cause abnormal chemical reactions, overheating, smoke, deformation or fire.

Prevent physical damage

Do not pierce, hammer, strike or otherwise damage the battery. Physical damage may cause overheating, smoke, deformation or fire.

Do not weld on the battery

Heat from welding may damage the separator and protective functions, causing overheating, smoke, deformation or fire.

Use only with compatible equipment

Confirm equipment compatibility with the supplier before use. Improper use may reduce performance or service life and may cause overheating, smoke, deformation or fire.

Avoid contact with leaking electrolyte

Leaking electrolyte may injure the skin. If electrolyte enters the eyes, rinse immediately with clean water. Do not rub the eyes. Seek medical attention immediately.

4.4 Potential Hazards

Battery handling and operation involve the following potential hazards:

1. Electrical hazards, including electric shock and arcing. The battery voltage can exceed 50 V DC. Take appropriate precautions to avoid contact with live parts and accidental short circuits.
2. Chemical hazards from leaking electrolyte.
3. Fire, explosion and thermal runaway. Consider these hazards when planning work and selecting personal protective equipment.