

PRODUCT SPECIFICATION

Product Name: ECO-314L-(ST)

51.2V314AH Lithium-Ion Battery System



Item Name	Configuration
External Switch Function	Yes
Current Limit Function	Yes
Display Screen	Yes
Storage Function	Yes
Pre-charge Function	Yes
Communication Function	CAN、RS485
Secondary Protection	Yes
Bluetooth	Yes

REVISION HISTORY

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CONTENTS

1.Introduction	2
2.Features	2
3.Product Details	3
3.1Outline Dimensions & Interface Diagram	3
3.2 Electrical Schematic	4
3.3 Battery Performance Parameters	5
3.4 Battery Protection Parameters	6
4.Communication Description	15
4.1、Communication	15
4.1.1、Matching Inverter Communication	15
4.1.2、Internal Communication	15
4.2、Parallel Communication	16
4.2.1No DIP Switch Setting Required	16
5.Basic Operating Modes	17
5.1 Charge Mode	17
5.2 Discharge Mode	17
5.3 Standby Mode	17
5.4 Shutdown Mode	17
6. LED Indicator Description	17
6.1 LED Sequence	17
6.2 Capacity Indication	17
6.3、Flashing Description	18
6.4、Status Indication	18
7. Installation & Commissioning	19
7.1Packing List and Handling	19
7.1.1 Packing List	19
7.1.2 Packing List	20
7.2 Installation Instructions	21
7.2.1 Check Battery Status Before Installation	21
7.2.2 Select Suitable Installation Location	21
7.2.3 Harness Connection	22
8.Packaging	22
9.Precautions	23

1.Introduction

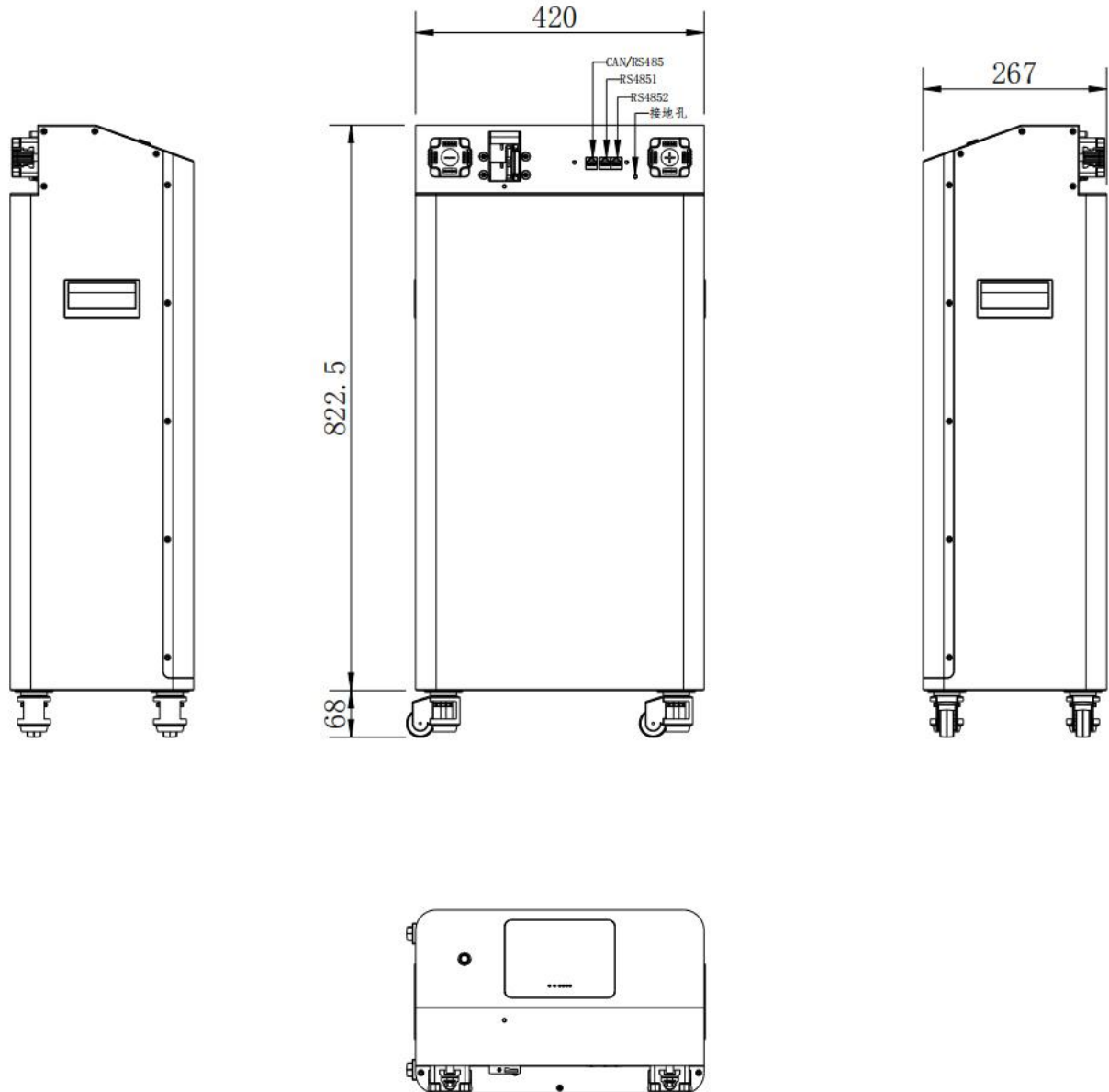
This battery system is suitable for home energy storage and small to medium commercial energy storage battery systems. It adopts 3.2V 314Ah lithium cells to form a 1-parallel 16-series battery module and an intelligent BMS to form a 51.2V 314Ah lithium battery system. The system supports a maximum of 16 battery units in parallel. This system is prohibited from being used in series and mixed with batteries of other brands or models.

2.Features

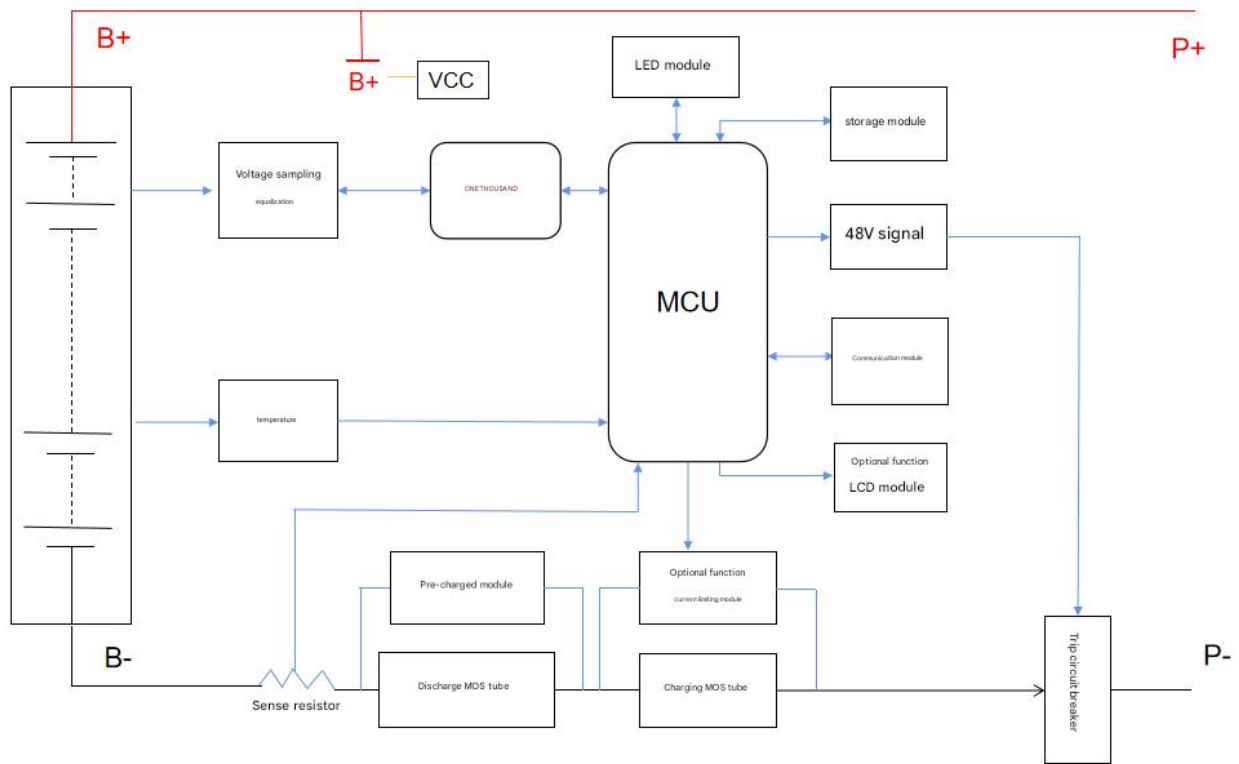
- Battery Voltage Calculation: 16-cell voltage sampling test, deviation $\pm 20\text{mV}$.
- Battery & Ambient Temperature Detection: 4 battery temperature sensors, 1 ambient temperature sensor, 1 MOS temperature sensor, deviation $\pm 2^{\circ}\text{C}$.
- Battery Capacity & Cycle Count: Completes a full charge/discharge cycle to set the actual capacity. Monitors the battery's State of Charge (SOC) with a capacity estimation accuracy within 5% deviation. Furthermore, charge and discharge cycle times, as well as full charge and discharge cycle times, can be configured.
- Intelligent Cell Balancing: Charging and static balancing strategies can be flexibly set, effectively extending service life.
- Communication Interface: A PC or smart front-end can monitor battery pack data, control operation, and set parameters via commands for telemetry, remote signaling, remote adjustment, and remote control. The communication protocol complies with YD/T 1363.3 requirements and also implements cascade communication.
- Historical Data Recording, Saving, Reading: When the battery is abnormal, it records and saves real-time battery status and alarm information. Currently, it can store up to 500 historical fault data records.
- Battery Management System Parameter Settings: BMS parameters, including cell overvoltage/undervoltage, total battery voltage overvoltage/undervoltage, charge/discharge overcurrent, battery high/low temperature, battery capacity, operating mode, charge/discharge current limit, etc., can be set in the battery monitoring system.
- Operating Modes: Operating modes such as charge/discharge current limiting, constant voltage output, and direct output can be set in the monitoring system.
- Multiple Protection Functions: Hardware protection, battery protection, high/low temperature protection, output short circuit protection, etc.

3.Product Details

3.1Outline Dimensions & Interface Diagram



3.2 Electrical Schematic



3.3 Battery Performance Parameters

No.	Item	Specification
1	Battery Configuration	1P16S
2	Nominal Voltage	51.2V
3	Operating Voltage Range	43.2V~58.4V
4	Nominal Capacity	314Ah
5	Nominal Energy	16.0768KWh
6	Standard Charge/Discharge Current	100A@25±2℃
7	Maximum Charge Current	200A@25±2℃
8	Maximum Discharge Current	200A @25±2℃
9	Operating Ambient Temperature	0~40℃ (Charge)
		-20~40℃ (Discharge)
10	Storage Temperature, Humidity	-10℃ to 35℃ (within one month of storage) 25 ± 2℃ (within three months of storage) 65% ± 10% RH Condensation free
11	Dimensions (L x W x H)	890.5×420×267mm
12	Weight	120Kg±3kg
13	Cycle Life	8000 cycles @25℃, 100A charge/discharge current, 7 0% DOD
14	IP Rating	IP 20
15	Communication Method	CAN&RS485
16	Altitude	0-3000m
17	Humidity Range	5~75%

3.4 Battery Protection Parameters

Function Name	Function Setting	Item List	Set Value	Setting Range
Cell Voltage Warning	Enabled	Cell High Voltage Warning	3500mV	Cell High Voltage Recovery ~ Cell Overvoltage Protection
		Cell High Voltage Recovery	3400mV	3370mV ~ Cell High Voltage Warning
	Enabled	Cell Low Voltage Warning	2900mV	Cell Undervoltage Protection ~ Cell Low Voltage Recovery
		Cell Low Voltage Recovery	3100mV	Cell Low Voltage Warning ~ 3100mV
Cell Overvoltage Protection	Enabled	Cell Overvoltage Protection	3650mV	Cell High Voltage Warning ~ 3850mV
		Cell Overvoltage Recovery	3400mV	Cell High Voltage Recovery ~ Cell Overvoltage Protection
		Overvoltage Recovery Condition	1. Cell voltage drops to the overvoltage recovery point. 2. Remaining capacity is below intermittent charging capacity 96%. Both conditions must be met to recover.	
			Detect battery discharge current > 1A.	
Cell Undervoltage Protection	Enabled	Undervoltage Protection Voltage	2700mV	2500mV ~ Cell Low Voltage Warning
		Undervoltage Recovery Voltage	3100mV	Cell Undervoltage Protection ~ Cell Low Voltage Recovery
		Cell Undervoltage Shutdown	Shuts down after undervoltage protection and maintains communication for 1 minute.	

		Undervoltage Recovery Condition	Detected charging current (> 1A)	
Total Voltage Warning	Enabled	Total High Voltage Warning	56.0V	Total High Voltage Recovery ~ Total Overvoltage Protection
		Total High Voltage Recovery	54.0V	51.0V ~ Total High Voltage Warning
	Enabled	Total Low Voltage Warning	46.4V	Total Undervoltage Protection ~ Total Low Voltage Recovery
		Total Low Voltage Recovery	48.0V	Total Low Voltage Warning ~ 49.0V
Total Overvoltage Protection	Enabled	Total Overvoltage Protection	57.6V	Total High Voltage Warning ~ 58.0V
		Total Overvoltage Recovery	54.0V	Total High Voltage Recovery ~ Total Overvoltage Protection
		Overvoltage Recovery Condition	1. Cell voltage drops to the overvoltage recovery point. 2. Remaining capacity is below intermittent charging capacity 96%. Both conditions must be met to recover.	
			Detect battery discharge current > 1A.	
Total Undervoltage Protection	Enabled	Total Undervoltage Protection	43.2V	40.0V ~ Total Low Voltage Warning
		Total Undervoltage Recovery	48.0V	Total Undervoltage Protection ~ Total Low Voltage Recovery
		Total Undervoltage Shutdown	Total Undervoltage Protection ~ Total Low Voltage Recovery	

		Undervoltage Recovery Condition	Detected charging current (>1A)	
Cell Temp. Charge Prohibit	Enabled	Charge High Temp. Warning	50°C	Charge High Temp. Recovery ~ Charge Overtemp. Protection
		Charge High Temp. Recovery	47°C	40°C ~ Charge High Temp. Warning
		Charge Overtemp. Protection	55°C	Charge High Temp. Warning ~ 65°C
		Charge Overtemp. Recovery	50°C	Charge High Temp. Recovery ~ Charge Overtemp. Protection
		Charge Low Temp. Warning	2°C	Charge Undertemp. Protection ~ Charge Low Temp. Recovery
		Charge Low Temp. Recovery	5°C	Charge Low Temp. Warning ~ 10°C
		Charge Undertemp. Protection	-10°C	-15°C ~ Charge Low Temp. Warning
		Charge Undertemp. Recovery	0°C	Charge Undertemp. Protection ~ Charge Low Temp. Recovery
Cell Temp. Discharge Prohibit	Enabled	Discharge High Temp. Warning	55°C	Discharge High Temp. Recovery ~ Discharge Overtemp. Protection
		Discharge High Temp. Recovery	50°C	45°C ~ Discharge High Temp. Warning
		Discharge Overtemp. Protection	60°C	Discharge Overtemp. Recovery ~ 65°C

		Discharge Overtemp. Recovery	55℃	Discharge High Temp. Recovery ~ Discharge Overtemp. Protection
		Discharge Low Temp. Warning	-10℃	Discharge Undertemp. Protection ~ Discharge Low Temp. Recovery
		Discharge Low Temp. Recovery	3℃	Discharge Low Temp. Warning ~ 10℃
		Discharge Undertemp. Protection	-15℃	-15℃ ~ Discharge Low Temp. Warning
		Discharge Undertemp. Recovery	0℃	Discharge Undertemp. Protection ~ Discharge Low Temp. Recovery
Ambient Temp. Protection	Enabled	Ambient High Temp. Warning	50℃	Ambient High Temp. Recovery ~ Ambient Overtemp. Protection
		Ambient High Temp. Recovery	47℃	45℃ ~ Ambient High Temp. Warning
		Ambient Overtemp. Protection	60℃	Ambient High Temp. Warning ~ 65℃
		Ambient Overtemp. Recovery	55℃	Ambient High Temp. Recovery ~ Ambient Overtemp. Protection
		Ambient Low Temp. Warning	0℃	Ambient Undertemp. Protection ~ Ambient Low Temp. Recovery
		Ambient Low Temp. Recovery	3℃	Ambient Low Temp. Warning ~ 10℃

		Ambient Undertemp. Protection	-10℃	-15℃ ~ Ambient Low Temp. Warning
		Ambient Undertemp. Recovery	0℃	Ambient Undertemp. Protection ~ Ambient Low Temp. Recovery
Power Temp. Protection	Enabled	Power High Temp. Warning	95℃	Power High Temp. Recovery ~ Power Overtemp. Protection
		Power High Temp. Recovery	85℃	45℃ ~ Power High Temp. Warning
		Power Overtemp. Protection	110℃	Power High Temp. Warning ~ 110℃
		Power Overtemp. Recovery	85℃	Power High Temp. Recovery ~ Power Overtemp. Protection
Charge Current Limit	Disabled	Active Current Limit	10A	Enable limit when charger current > 10A
	Enabled	Passive Current Limit	205A	Enable limit when charger current > Charge Overcurrent Warning (value settable)
		Charge Current Limit Delay	5 minutes	After limit is enabled, re-check whether to enable limit after 5 minutes.
Charge Overcurrent Warning	Enabled	Charge Overcurrent Warning	205A	Charge Overcurrent Recovery ~ Charge Overcurrent Protection

		Charge Overcurrent Recovery	203A	0A ~ Charge Overcurrent Warning
Charge Overcurrent Protection	Enabled	Charge Overcurrent Protection	210A	0A~150A
		Charge Overcurrent Delay	10S	Settable
		Overcurrent Recovery Condition	Discharge recovers immediately, or aCharge Exit Current automatically recovers after 60S.	
		Charge Secondary Overcurrent Protection	300A	Discharge recovers immediately; or automatically recovers 60S after overcurrent protection.
		Charge Secondary Overcurrent Delay	300mS	
Valid Charge Current	Charge Entry Current		500mA	
	Charge Exit Current		400mA	
Discharge Overcurrent Warning	Enabled	Discharge Overcurrent Warning	-205A	Discharge Overcurrent Protection ~ Discharge Overcurrent Recovery
		Discharge Overcurrent Recovery	-203A	Discharge Overcurrent Warning ~ 0A
Discharge Overcurrent Protection	Enabled	Discharge Overcurrent Protection	-210A	Transient Overcurrent Protection ~ 0A
		Discharge Overcurrent Delay	10S	Settable
		Overcurrent Recovery Condition	Charge recovers immediately, or automatically recovers after 60S.	

		Discharge Secondary Overcurrent Protection	300A	Charge recovers immediately; or automatically recovers 60S after overcurrent protection.
		Discharge Secondary Overcurrent Delay	300mS	
Output Short Circuit Protection	Enabled (Currently does not support disabling settings)	Short Circuit Protection Current & Delay	Written into program (Not settable)	
		Short Circuit Protection Recovery	Charge recovers immediately, or automatically recovers after 60S.	
	Enabled	Short Circuit Protection Lock	Continuous output short circuit, exceeds overcurrent lock count.	
		Short Circuit Lock Count	5 times	
		Short Circuit Lock Release	Connect charger	
Valid Discharge Current	Discharge Entry Current		-500mA	
	Discharge Exit Current		-400mA	
Cell Balancing Function	Enabled	Standby Balancing	Enable balancing in no charge/discharge state.	
		Standby Balancing Time	10 hours	Settable
	Enabled	Charge Balancing	Enable balancing during charge state and float charge state.	
	Enabled Voltage Condition	Balancing Start Voltage	3400mV	Settable
		Balancing Start Voltage Diff.	50mV	
		Balancing End Voltage Diff.	30mV	
	Enabled	Balancing Temp. Limit	Balancing shutdown temperature range determined by (ambient warning temperature).	
		Balancing High Temp. Disable	50℃	Settable

		Balancing Low Temp. Disable	0℃	
Cell Failure Warning	Enabled	Cell Failure Voltage Diff.	150mV	Settable
		Cell Recovery Voltage Diff.	100mV	
Battery Capacity Settings	Battery Rated Capacity		314Ah	5Ah to 314Ah
	Battery Remaining Capacity		Estimated based on cell voltage	Settable
	Cycle Accumulated Capacity		20%	Cycle count (Not settable)
	Enabled	Remaining Capacity Warning	10%	
	Enabled	Remaining Capacity Protection	2%	Disable output
Reset Button	Power On / Activate		When BMS is in sleep state, press the reset button for 1S to activate the BMS. The LED indicators light up in sequence, then transition to normal working state.	
	Power Off / Sleep		When BMS is in standby or working state (except charging), press the reset button for 3S to put the BMS to sleep. The LED indicators light up in sequence, then transition to sleep state.	
Pre-charge Function	3000ms	0~5000ms settable	BMS starts pre-charge function instantly upon power-on.	
BMS Power Consumption Management	Enabled	Max Standby Time	48h (Charger not present and no valid discharge current)	
Cell Low Temp. Heating	Disabled	Cell Low Temp. Heating	0℃	Settable
		Cell Heating Recovery	10℃	
		Heating Start Logic	Heater turns on when charger is online and cell temperature meets start condition. Does not heat in standby or discharge state.	
External Switch	Enabled	BMS in standby state, external switch can be operated to turn BMS off and on.		

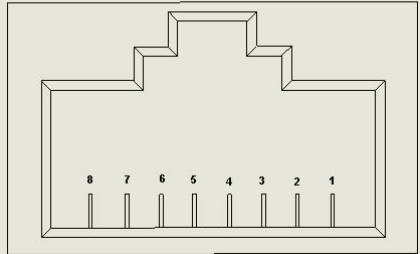
LCD Screen	Disabled	Simplified monitoring software, can view data such as cells, temperature, current, etc.		
Manual Charge Activation	Disabled	60S	After undervoltage protection BMS shuts down, manually press button to activate, clear undervoltage protection, and force output.	Settable
Compensation Impedance	Connection Fault Impedance	10m Ω	Default between 8 and 9	Battery connection wire impedance compensation
	Compensation Point 1	0m Ω	9	Settable
	Compensation Point 2	0m Ω	13	

4.Communication Description

4.1、Communication

4.1.1、Matching Inverter Communication

Correspond the communication interface definition of each inverter to the BMS communication interface; For special inverters whose communication port definition is inconsistent with the BMS communication port definition, you need to make your own network cable. Using a conventional network cable may cause phenomena such as the BMS automatically turning on or being unable to shut down; Generally, using a conventional network cable is sufficient for communication.

CAN/RS485	
	Pin
	Definition description
	1、 8 RS485-B
	2、 7 RS485-A
	4 CAN-H
	5 CAN-L
	3、 6 GND

4.1.2、Internal Communication

Select the corresponding port for BMS internal communication, baud rate select 19200.

RS485A

A 3D perspective diagram of a rectangular connector housing. Inside the housing, there are eight vertical pins. The pins are numbered 1 through 8 from right to left. The housing has a raised, stepped top edge.

RS485B

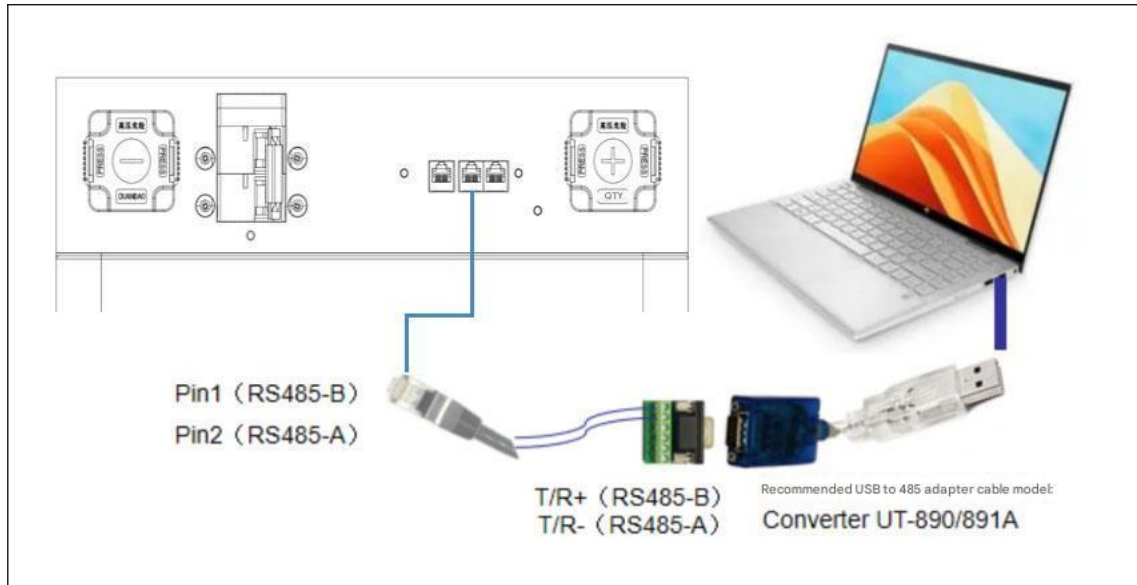
A 3D perspective diagram of a rectangular connector housing, identical in shape to the RS485A one. It contains eight vertical pins numbered 1 through 8 from right to left.

RS485A

Pin	Definition description
1、 8	RS485-B
2、 7	RS485-A
3	Master flag enable
4	Autocode address 2
5	GND
6	GND

RS485B

Pin	Definition description
1、 8	RS485-B
2、 7	RS485-A
3	GND
4	Autocode address 1
5	GND
6	Salve flag enable

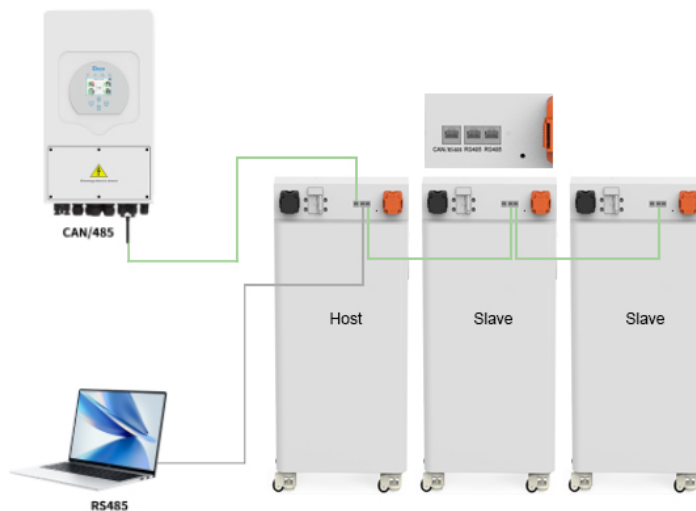


4.2、Parallel Communication

4.2.1 No DIP Switch Setting Required

The BMS has an automatic address assignment function (The DIP switch reserved on the BMS is just for show, to be compatible with the original battery chassis port design. The DIP address is optional and does not affect the BMS automatic address assignment);

Use conventional network cables for parallel connection. Connect the RS485B of any first unit to the RS485A of the second unit (The first unit is the host, the host CAN/485 connects to the inverter communication). Connect the RS485B of the second unit to the RS485A of the third unit, and so on. All subsequent units are slaves. Example below:



5. Basic Operating Modes

5.1 Charge Mode

When the BMS detects that a charger is connected and the external charging voltage is more than 0.5V higher than the internal battery voltage, it turns on the charge MOSFET to start charging. When the charging current reaches the valid charge current, it enters charge mode. In charge mode, both charge and discharge MOSFETs are closed.

5.2 Discharge Mode

When the BMS detects that a load is connected and the discharge current reaches the valid discharge current, it enters discharge mode.

5.3 Standby Mode

If neither of the above two modes is met, it enters standby mode.

5.4 Shutdown Mode

The BMS enters shutdown mode under the following conditions: normal standby for 48 hours, battery triggers undervoltage protection, executing button shutdown, or external switch shutdown. Shutdown mode wake-up conditions: 1. Charge activation; 2. 48V voltage activation; 3. Button power-on.

6. LED Indicator Description

6.1 LED Sequence

1 Run Light, 1 Alarm Light, 4 Capacity Indicator Lights

					
L1	L2	L3	L4		
SOC				ALARM	RUN

6.2 容量指示

State		Charging				Discharging			
Capacity LED		L4 	L3 	L2 	L1 	L4 	L3 	L2 	L1 
	0~25%	Off	Off	Off	Flash	Off	Off	Off	On
	25~50%	Off	Off	Flash	On	Off	Off	On	On
	50~75%	Off	Flash	On	On	Off	On	On	On
	≥75%	Flash	On	On	On	On	On	On	On
Run Indicator 		On				Flash			

6.3、Flashing Description

Flash Mode	On	Off
Flash 1	0.25s	3.75s
Flash 2	0.5s	0.5s
Flash 3	0.5s	1.5s

6.4、Status Indication

System State	Operating State	RUN	ALM	SOC				Description
								
Shutdown	Sleep	Off	Off	Off	Off	Off	Off	All off
Standby	Normal	Flash	Off	Off	Off	Off	Off	Standby state
Charge	Normal	On	Off	According to capacity indication				Highest LED Flash 2
	Overcurrent Warning	On	Flash 2	According to capacity indication				Highest LED Flash 2
	Overvoltage Protection	Flash 1	Off	Off	Off	Off	Off	
	Temperature, Overcurrent Protection	Flash 1	Off	Off	Off	Off	Off	
Discharge	Normal	Flash 3	Off	According to capacity steady indication				According to capacity steady indication
	Warning	Flash 3	Flash 3					
	Temp., Overcurrent, Short Circuit, etc. Protection	Off	On	Off	Off	Off	Off	Stop discharge, force sleep after 48h if no action when grid-off
	Undervoltage Protection	Off	Off	Off	Off	Off	Off	Stop discharge

7.Installation & Commissioning

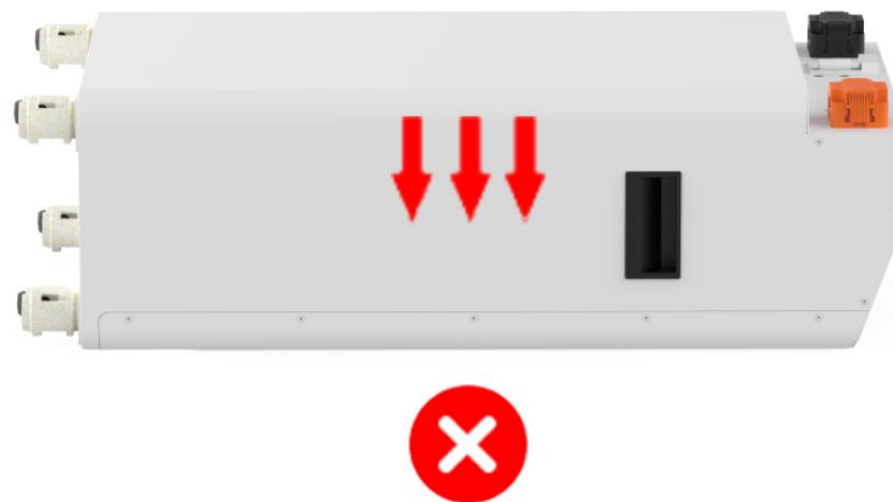
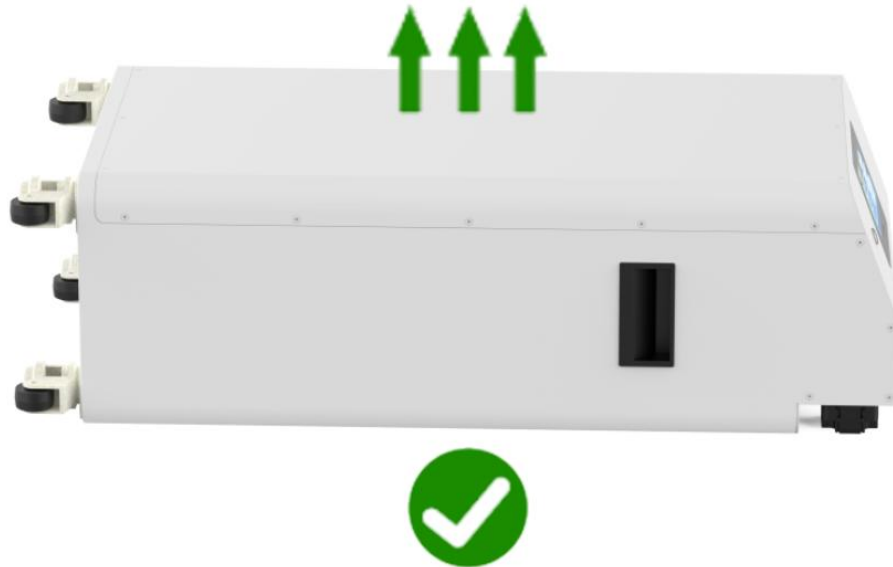
7.1Packing List and Handling

7.1.1 Packing List

No.	Name	Qty	Picture
1	Battery Pack	1PCS	
2	1.5m Power Harness	2PCS	
3	1.8m PC Communication Cable	1PCS	
4	1.5m Communication Cable	1PCS	
5	Specification	1PCS	

7.1.2 Handling

When handling the packaged product or when it is lying flat, ensure the side with the cover and display screen faces upwards; otherwise, consequences are your own responsibility; as shown below:



7.2 Installation Instructions

7.2.1 Check Battery Status Before Installation



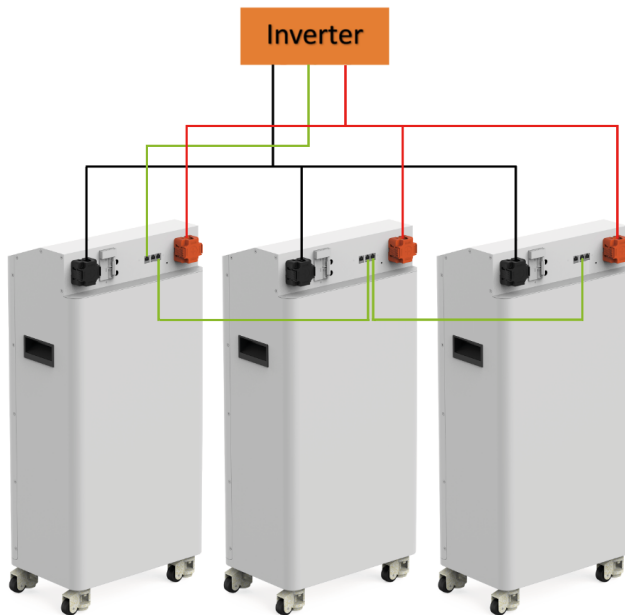
7.2.2 Select Suitable Installation Location

- Do not place the battery on flammable building materials.
- Temperature should be between 10° C and 30° C for optimal operation.
- It is recommended to place the battery on a level ground surface.
- There should be some free space around the battery for heat dissipation (as shown below). Suitable for placement on concrete surfaces or other non-flammable surfaces.
- For special environments, the heat dissipation space (battery spacing) can be appropriately adjusted.



7.2.3 Harness Connection

Before connection, the battery should be in the shutdown state.



8. Packaging

Packed in packaging box with shockproof, dustproof, and moisture-proof properties.

Product packaged with plastic film/EPE, packed in wooden case.

Inner dimensions of wooden case: L950W480H330mm Packing quantity: 1 unit Weight: 128.5kg



9.Precautions

- If the battery suffers significant impact or deformation, do not use it.
- Do not install batteries stacked in multiple layers.
- Pay attention to the polarity of the power supply and connection terminals.
- Ensure equipment insulation, use tools and instruments correctly.
- The battery installation site should be away from fire sources and flammable objects. The installation site should be ventilated and dry.
- Absolutely forbid plugging/unplugging connectors while the product is running.
- It is strictly prohibited for non-professional technicians of our company to open various functional modules. Consequences are your own responsibility.
- Before using a new battery or a battery that has been stored for a long time, please fully charge the battery using a dedicated charger.
- Do not disassemble, open, crush, bend, deform, puncture, or shred the product.
- Do not modify the battery or insert any external objects. Do not immerse or expose the product to water or fresh water, seawater, beverages (coffee, juice, etc.), or other liquids. Keep away from fire sources, explosive substances, or other hazards.
- Do not short-circuit the battery. Do not let metal or other conductors contact the battery terminals.
- Do not drop the battery. If it does occur (especially on a hard surface), please contact the service center.
- If electrolyte leaks, do not let the battery contact skin or eyes. If it does occur, wash the contact area with plenty of water or seek medical help.
- Do not disassemble the battery cells under any circumstances. This may cause internal short circuits, or even fire or other problems.
- Under no circumstances should you burn the battery or throw it into a fire. Otherwise, it may cause the battery to burn.
- **Please operate and use according to the above content. If the product is damaged due to personal reasons, we are not responsible.**