Rimdin-280L 51.2V280Ah

Lithium-ion battery system

Update Record

Version	describe	Date	state
A	First edition released	2024.06.25	controlled

Project name	Configuration
External switch function	Yes
Current limiting function	Yes
Display screen	Yes
Storage function	Yes
Pre-charge function	Yes
Communication function	CAN
Secondary protection	Yes
Bluetooth	Yes

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Basic Introduction

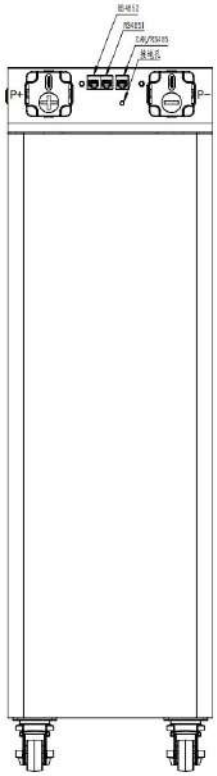
This battery system is suitable for household energy storage and small and medium-sized commercial energy storage. It uses 3.2V 280Ah lithium battery cells to form a 1-parallel 16-series battery module and an intelligent BMS to form a 51.2V280Ah lithium battery system. The system supports up to 16 groups of batteries in parallel. This system is prohibited from being used in series and mixed with other batteries of different brands and models.

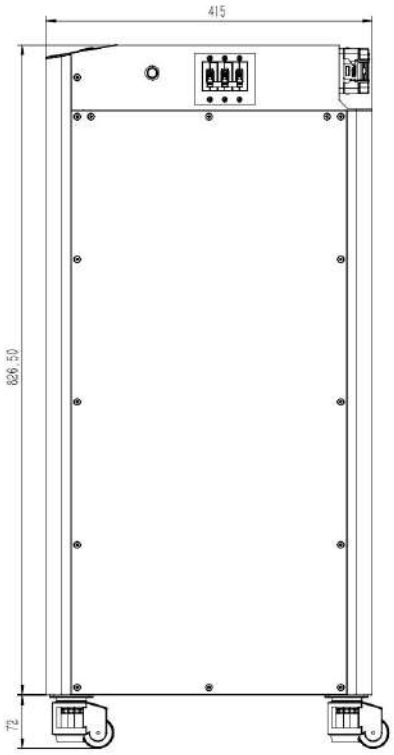
1. Function Introduction

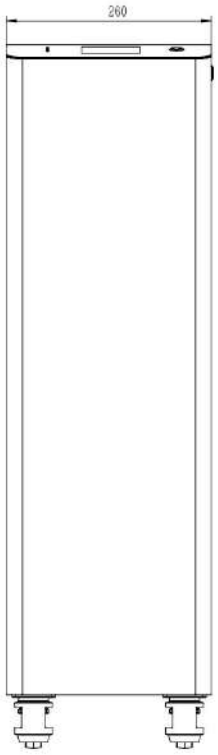
- Battery voltage calculation: 16 battery voltage sampling test, deviation ±20mV.
- Battery and ambient temperature detection: 4 battery temperature sensors, 1 ambient temperature sensor, 1 MOS temperature sensor, deviation ±2°C.
- Battery Capacity and Cycle Count: Complete a full charge/discharge cycle to set the actual capacity. Monitor the remaining capacity of the battery with a capacity estimation accuracy within 5% deviation. In addition, the charge and discharge cycle time and the complete charge and discharge cycle time can be configured.
- Intelligent cell balancing: charging and static balancing strategies can be flexibly set to effectively extend service life.
- Communication interface: PC or intelligent front end can monitor battery pack data, control operation and set parameters through telemetry, telesignaling, teleadjustment and remote control commands. The communication protocol complies with the requirements of YD/T 1363.3 and realizes cascade communication.
- Historical data recording, saving, and reading: When the battery is abnormal, the real-time battery status and alarm information are recorded and saved. Currently, up to 500 historical fault data can be stored.
- Battery management system parameter settings: Battery management system parameters, including cell battery overvoltage/undervoltage, battery total voltage overvoltage/undervoltage, charge and discharge overcurrent, battery high/low temperature, battery capacity, working mode, charge and discharge limit current, etc., can be set in the battery monitoring system
- Working mode: The monitoring system can be set to charge and discharge current limiting, constant voltage output, direct output and other working modes.
- Multiple protection functions: hardware protection, battery protection, high and low temperature protection, output short circuit protection, etc..

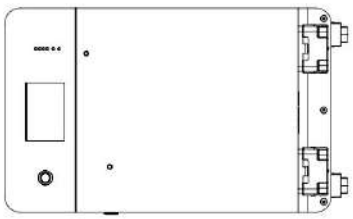
2. Product details

3.1 Dimensions and interface diagram

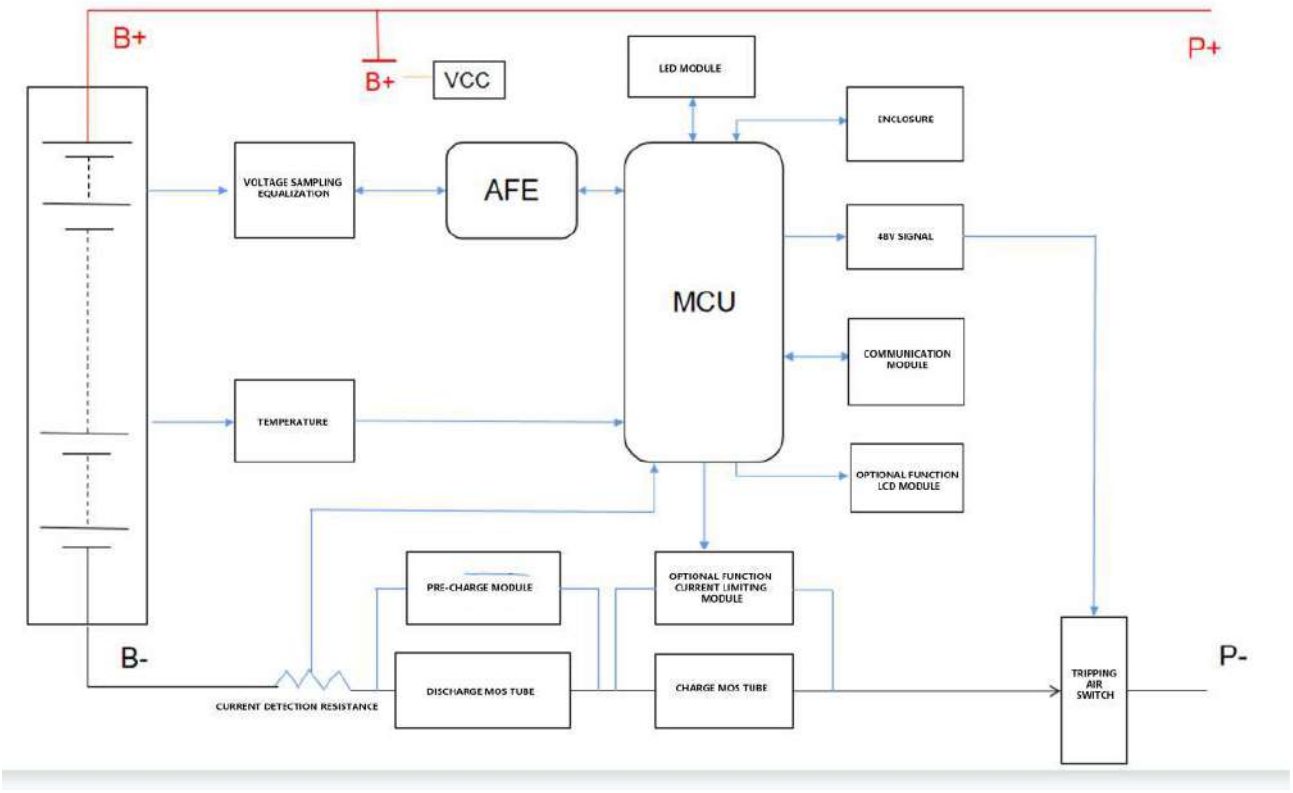








3.2 Electrical Schematics



3.3 Battery performance parameters

Serial number	project	Regulation
1	Battery configuration	1P16S
2	Rated voltage	51.2V
3	Operating voltage range	43.2V~58.4V
4	Rated capacity	280Ah
5	Rated	14.34KWh
6	Standard charge/discharge current	100A/200A @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 and humidity	-10℃~35℃（Storage within 1 month） 25±2℃（Storage within 3 months） 65%±20%RH
11	Size（L x W x H）	(898.5＋10)×(415)×(260)mm
12	Weight	119.5Kg±3kg
13	Cycle life	8000 cycles @25℃ 50A charge and discharge current 80% DOD
18	IP rating	IP 20
19	Communication method	CAN&RS485
20	Altitude	0-3000m
21	Humidity range	5~95%

3.4 Battery protection parameters

Function Name	Function settings	Project List	Setting Value	Setting Range
Single cell voltage alarm	Open	Single cell high pressure alarm	3500mV	Single cell high voltage recovery~Single cell overvoltage protection
		Single cell high pressure recovery	3400mV	3000mV~Single cell high voltage voltage
	Open	Single cell low pressure alarm	2900mV	Single cell undervoltage protection~Single cell low voltage recovery
		Single cell low pressure recovery	3000mV	Single cell low voltage alarm~3300mV
Single overvoltage protection	Open	Single cell overvoltage protection	3650mV	Single high voltage alarm ~ 4500mV
		Single cell overvoltage recovery	3400mV	Single high voltage recovery ~ Single overvoltage voltage
		Overvoltage recovery conditions	1. The cell voltage drops to the overvoltage recovery point 2. The remaining capacity is lower than 96% of the intermittent charging capacity Two conditions must be met for recovery	
			The battery discharge current is detected to be >1A	
Single cell undervoltage protection	Open	Undervoltage protection voltage	2700mV	1500mV~ Single cell undervoltage recovery
		Undervoltage recovery voltage	2900mV	Single cell undervoltage protection~ Single cell low voltage alarm

		Monomer undervoltage shutdown	After undervoltage protection, the device shuts down and maintains communication for 1 minute. Charging current is detected (>1A).	
		Undervoltage recovery conditions	After undervoltage protection, the device shuts down and maintains communication for 1 minute. Charging current is detected (>1A).	
Battery total pressure alarm	Open	Total pressure high pressure alarm	52.5V	Total voltage high voltage recovery ~ total voltage overvoltage protection
		Total pressure high pressure recovery	50.6V	49.7V ~ total voltage high voltage
	Open	Total pressure low pressure alarm	43.5V	Total voltage undervoltage protection ~ total voltage low voltage recovery
		Total pressure low pressure recovery	45.0V	Total voltage low voltage alarm ~ 51.6V
Total pressure overvoltage protection	Open	Total pressure overvoltage protection	54.0V	Total voltage high voltage alarm ~ 56.2V
		Total pressure overvoltage recovery	47.4V	Total voltage high voltage recovery ~ Total voltage overvoltage
		Overvoltage recovery conditions	1. The cell voltage drops to the overvoltage recovery point 2. The remaining capacity is lower than 96% of the intermittent charging capacity Two conditions must be met for recovery	
			The battery discharge current is detected to be >1A	
Total voltage undervoltage protection	Open	Total voltage undervoltage protection	39.0.V	36.0V~Total voltage undervoltage recovery

		Total voltage undervoltage recovery	43.1V	Total voltage undervoltage protection~Total voltage low voltage alarm
		Total voltage undervoltage shutdown	After undervoltage protection, shut down and maintain communication for 1 minute	
		Undervoltage recovery conditions	Charging current (>1A) is detected	
Battery cell temperature prohibits charging	Open	Charging high temperature alarm	50℃	Charging high temperature recovery~charging over-temperature protection
		Charging high temperature recovery	47℃	35℃~charging high temperature warning
		Charging overtemperature protection	55℃	Charging over-temperature recovery~80℃
		Charging overtemperature recovery	50℃	Charging high temperature recovery~charging over-temperature protection
		Charging low temperature alarm	2℃	Charging under-temperature protection~charging low temperature recovery
		Charging low temperature recovery	5℃	Charging low temperature warning~10℃
		Charging undertemperature protection	-10℃	-20℃~charging under-temperature recovery
		Charging undertemperature recovery	0℃	Charging under-temperature protection~charging low temperature recovery

Battery core temperature is prohibited	Open	Discharge high temperature alarm	52℃	Discharge high temperature recovery ~ discharge over temperature protection
		Discharge high temperature recovery	47℃	35℃ ~ discharge high temperature alarm
		Discharge overtemperature protection	55℃	Discharge over temperature recovery ~ 80℃
		Discharge overtemperature recovery	50℃	Discharge high temperature recovery ~ discharge over temperature protection
		Discharge low temperature alarm	-10℃	Discharge under temperature protection ~ discharge low temperature recovery
		Discharge low temperature recovery	3℃	Discharge low temperature alarm ~ 10℃
		Discharge undertemperature protection	-15℃	-30℃ ~ discharge under temperature recovery
		Discharge undertemperature recovery	0℃	Discharge under temperature protection ~ discharge low temperature recovery
Ambient temperature protection	Open	High ambient temperature alarm	50℃	Ambient high temperature recovery~Ambient over-temperature protection
		High ambient temperature recovery	47℃	-20℃~Ambient high temperature alarm
		Over-temperature protection	60℃	Ambient over-temperature recovery~80℃
		Over-temperature recovery	55℃	Ambient high temperature recovery~

		Low ambient temperature alarm	0℃	Environmental under-temperature protection~
		Low ambient temperature recovery	3℃	Environmental low temperature recovery
		Ambient under-temperature protection	-10℃	Environmental low temperature alarm~60℃
		Ambient under-temperature recovery	0℃	-30℃~
Power temperature protection	Open	Power high temperature alarm	90℃	Power high temperature recovery ~ Power over-temperature protection
		Power high temperature recovery	85℃	60℃ ~ Power high temperature alarm
		Power over temperature protection	100℃	Power high temperature alarm ~ 120℃
		Power over temperature recovery	85℃	Power high temperature recovery ~ Power over-temperature protection
Charging current limit	closure	Active current limiting	10A	When the charger current is greater than 10A, turn on current limiting
	Open	Passive current limiting		Charger current is greater than the charging overcurrent alarm （Value can be set），Enable current limiting

		Charging current limiting delay	5 minutes	After the current limit is turned on, recheck whether the current limit is turned on after 5 minutes
Charging overcurrent alarm	Open	Charging overcurrent alarm Charging overcurrent recovery	200A	Charge overcurrent recovery~Charge overcurrent protection
		Charging overcurrent alarm Charging overcurrent recovery	195A	0A~Charge overcurrent alarm
Charging overcurrent protection	Open	Charging overcurrent protection	210A	0A~150A
		Charging overcurrent delay	10S	Can be set
		Overcurrent recovery conditions	Discharge is restored immediately, or automatically after 60 seconds	
Effective charging current	Charge entry current Charge exit current		1000mA	
	Charge entry current Charge exit current		700mA	
Discharge overcurrent alarm	Open	Discharge overcurrent alarm	-205A	Discharge overcurrent protection~discharge to overcurrent recovery
		Discharge to overcurrent recovery	-203A	Discharge overcurrent alarm~0A
Discharge overcurrent protection	Open	Discharge overcurrent protection	-210A	Transient overcurrent protection ~0A

		Discharge overcurrent delay	10S	Can be set
		Overcurrent recovery conditions	Charging resumes immediately or automatically after 60 seconds	
Transient overcurrent protection	Open	Transient overcurrent protection	-300A	Discharge overcurrent protection value To 300A
		Transient overcurrent delay	30mS	Can be set
		Transient overcurrent recovery	Charging resumes immediately, or automatically resumes after 60 seconds	
	closure	Transient overcurrent lock	Continuous secondary overcurrent, exceeds overcurrent lock times	
		Overcurrent lock times	5 times	
		Transient lock release	Connect charger	
Output short circuit protection	Open (Currently does not support turning off settings)	Short circuit protection current and delay	Writing Program（Not configurable）	
		Short circuit protection recovery	Charging resumes immediately, or automatically resumes after 60 seconds	
	Open	Short circuit protection lock	Continuous output short circuit, exceeds overcurrent lock times	
		Short circuit lock times	5 times	
		Short circuit lock release	Connect charger	
Effective discharge current	Discharge entry current		-1000mA	
	Discharge exit current		-700mA	
Cell balancing function	Open	Standby balance	No charge and discharge state, start balancing	

		Standby balance time	10 hours	Can be set
	Open	Charge balance	Enable balancing in charging and floating charging states	
	Turn on voltage condition	Balanced start voltage	3350mV	Can be set
		Balanced start voltage difference	30mV	
		Balanced end voltage difference	20mV	
	Open	Balanced temperature limit	Balanced shutdown temperature range according to (ambient alarm temperature determination)	
		Balanced high temperature prohibited	50℃	Can be set
		Balanced low temperature prohibited	0℃	
Battery failure alarm	Open	Battery cell failure pressure difference	500mV	Can be set
		Battery cell recovery pressure difference	300mV	
Battery capacity setting	Battery rated capacity		280Ah	5Ah to 280Ah
	Battery remaining capacity		Estimated based on cell voltage	Can be set
	Cycle cumulative capacity		20%	Cycle times（Can be set）
	Open	Remaining capacity warning	10%	
	closure	Remaining capacity protection	2%	Turning off output

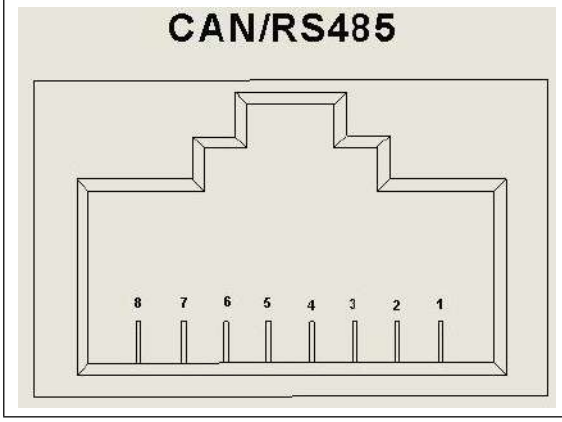
<table>
<tr><td rowspan="2">Reset button</td><td colspan="2">Power on/activate</td><td colspan="3">When the BMS is in sleep mode, press the reset button for 1S, the BMS is activated, the LED indicators light up in sequence, and then it enters normal working mode;</td></tr>
<tr><td colspan="2">Power off/sleep</td><td colspan="3">When the BMS is in standby or working mode (except charging), press the reset button for 3S, the BMS is in sleep mode, the LED indicators light up in sequence, and then it enters sleep mode;</td></tr>
<tr><td colspan="6"></td></tr>
<tr><td>Pre-charge function</td><td>2000ms</td><td>0~5000ms can be set</td><td colspan="3">BMS starts pre-charging function instantly</td></tr>
<tr><td>BMS power consumption management</td><td>Open</td><td>Maximum standby time</td><td colspan="3">48h (charger is not present and there is no effective discharge current)</td></tr>
<tr><td rowspan="3">Low temperature heating of battery cells</td><td rowspan="3">closure</td><td>Battery cell low temperature heating</td><td>0℃</td><td rowspan="2">Can be set</td></tr>
<tr><td>Battery cell heating recovery</td><td>10℃</td></tr>
<tr><td>Heating start logic</td><td colspan="2">When the charger is online and the battery cell temperature reaches the start-up condition, heating is turned on. No heating is performed in standby and discharge states.</td></tr>
<tr><td>External switch</td><td>closure</td><td colspan="4">When the BMS is in standby mode, the external switch can be operated to turn the BMS off and on</td></tr>
<tr><td>LCD screen</td><td>Open</td><td colspan="4">Simplified monitoring software to view data such as battery cells, temperature, current, etc.</td></tr>
<tr><td>Manual charging activation</td><td>Open</td><td>1 point</td><td>After undervoltage protection, the BMS shuts down. Press the button manually to activate and clear the undervoltage protection to force output.</td><td>Can be set</td></tr>
<tr><td rowspan="3">Impedance compensation</td><td>Connect fault impedance</td><td>10mΩ</td><td>Default is between 8 and 9</td><td>Battery connection line impedance compensation</td></tr>
<tr><td>Compensation point 1</td><td>0mΩ</td><td>9</td><td rowspan="2">Can be set</td></tr>
<tr><td>Compensation point 2</td><td>0mΩ</td><td>13</td></tr>
</table>

4. Communication Instructions

4.1、communication

4.1.1、Matching inverter communication

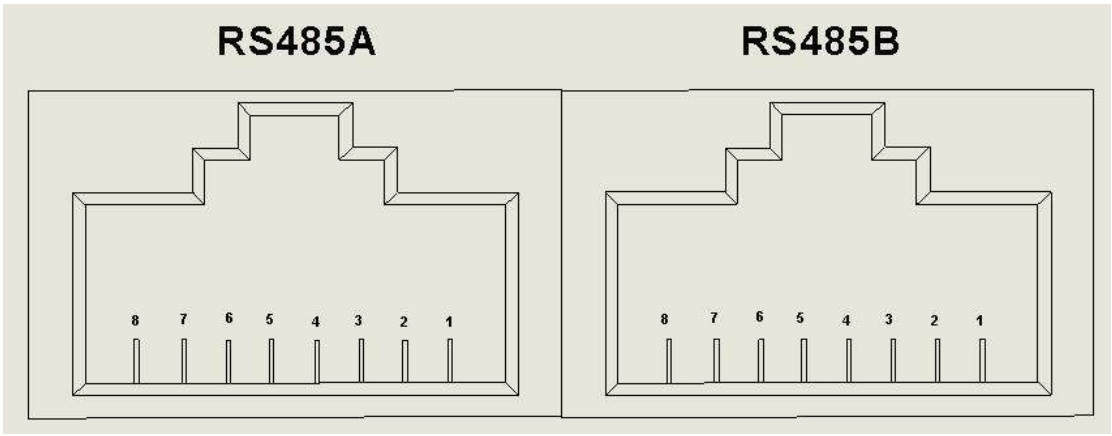
The BMS communication interface is defined according to each inverter communication interface. The definition of the special inverter communication port is inconsistent with the BMS communication port definition, so you need to make your own network cable. If you use a regular network cable, the BMS may automatically start or fail to shut down. Generally, you can use a regular network cable 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 Communications

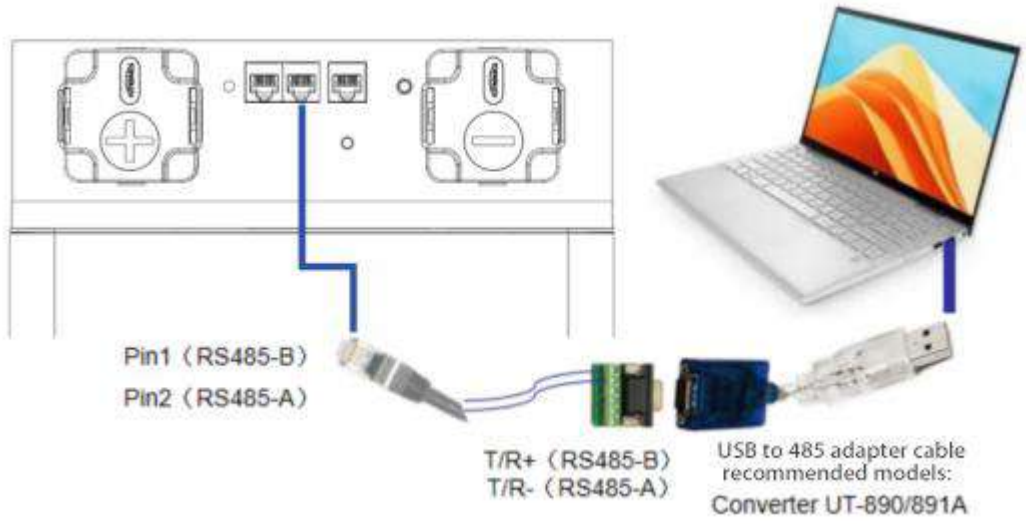
Select the corresponding port for BMS internal communication and 19200 baud rate



RS485A	
Pin	**Definition description**
1、8	RS485-B
2、7	RS485-A
3	Master flag enable
4	Autocode address 2

RS485B	
Pin	**Definition description**
1、8	RS485-B
2、7	RS485-A
3	GND
4	Autocode address 1

5	GND		5	GND
6	GND		6	Salve flag enable



4.2、Parallel communication

4.2.1 No dial required

BMS has the function of automatically assigning addresses (the reserved DIP switch on the BMS is just for decoration, in order to be compatible with the original battery chassis port design, the DIP address is optional and does not affect the automatic address assignment of BMS);

When paralleling, just use a regular network cable. Any first RS485B is connected to the second RS485A (the first one is the host, the host CAN/485 is connected to the inverter communication), the second RS485B is connected to the third RS485A, and the next ones are all slaves. The following figure shows an example:

5 Basic working mode

5.1 Charging Mode

When the BMS detects that the charger is connected and the external charging voltage is greater than the internal battery voltage by more than 0.5V, it turns on the charging MOSFET for charging. When the charging current reaches the effective charging current, it enters the charging mode. In the charging mode, both the charging and discharging MOSFETs are closed.

5.2 Discharge mode

The BMS enters the discharge mode when it detects that the load is connected and the discharge current reaches the effective discharge current.

5.3 Standby mode

When neither of the above two modes is satisfied, it enters the standby mode.

5.4 Shutdown Mode

After 48 hours of normal standby, battery triggers undervoltage protection, key shutdown or external switch shutdown, the BMS enters shutdown mode.
Wake-up conditions for shutdown mode: 1. Charging activation; 2. 48V voltage activation; 3. Key startup.

6.1 LED light indication

6.2.1LLED light sequence

1 running light, 1 warning light, 4 capacity indicator lights

● ● ● ●	●	●
SOC	ALARM	RUN

6.1.2 Capacity indicator

Status		Charge				Discharge			
Capacity indicator		L4●	L3●	L2●	L1●	L4●	L3●	L2●	L1●
	0～25%	OFF	OFF	OFF	Blink	OFF	OFF	OFF	Green
	25～50%	OFF	OFF	Blink	Green	OFF	OFF	Green	Green
	50～75%	OFF	Blink	Green	Green	OFF	Green	Green	Green
	≥75%	Blink	Green	Green	Green	Green	Green	Green	Green
Running indicator light●		Green				Flash			

6.1.3、Flashing Description

Flashing mode	Bright	Destroy
Flash 1	0.25s	3.75s
Flash 2	0.5s	0.5s
Flash 3	0.5s	1.5s

6.2、Status Indicator

System status	**Running status**	**RUN**	**ALM**	**SOC**				**Illustrate**
		●	●	●	●	●	●	
Power off	Sleep	Off	Off	Off	Off	Off	Off	All off
Standby	Normal	Flashing	Off	Off	Off	Off	Off	Standby mode
Charging	Normal	Solid on	Off	According to the power indicator				Maximum LED flash 2
	Overcurrent alarm	Solid on	Flash 2	According to the power indicator				Maximum LED flash 2
	Overvoltage protection	Flash 1	Off	Off	Off	Off	Off	
	Temperature, overcurrent protection	Flash 1	Off	Off	Off	Off	Off	
Discharging	Normal	Flash 3	Off	According to the power indicator				According to the constant light indicator
	Alarm	Flash 3	Flash 3					
	Temperature, overcurrent, short circuit, etc. protection	Off	Still on	Off	Off	Off	Off	Stop discharging, when the mains is offline, it will be forced to sleep after 48 hours without any action
	Undervoltage protection	Off	Off	Off	Off	Off	Off	Stop discharge

7 Installation and commissioning

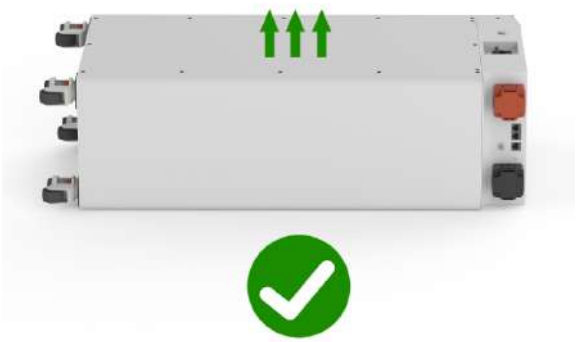
7.1 Product List and Transportation

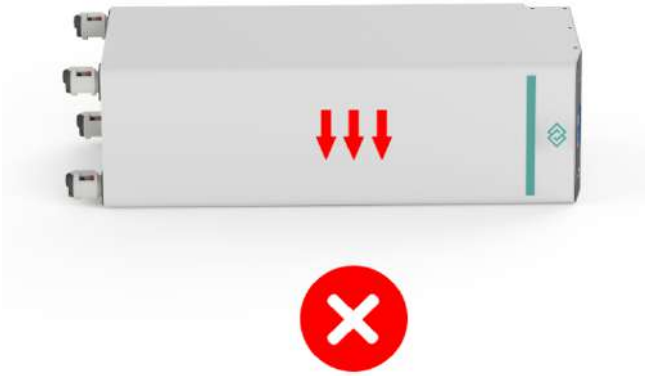
7.1.1 Goods List

number Serial	Name	Quantity	Picture
1.	Battery Pack	1 PCS	
2	1.5m power harness	2PCS	
3	1.8m host computer harness	1PCS	
4	1.5m communication cable	1PCS	
5	Specifications	1PCS	

7.1.2 Transportation

When the product is packaged and transported or laid flat, make sure the side with the cover, switch and circuit breaker is facing upwards; otherwise, you will be at your own risk; as shown below:





7.2Installation Instructions

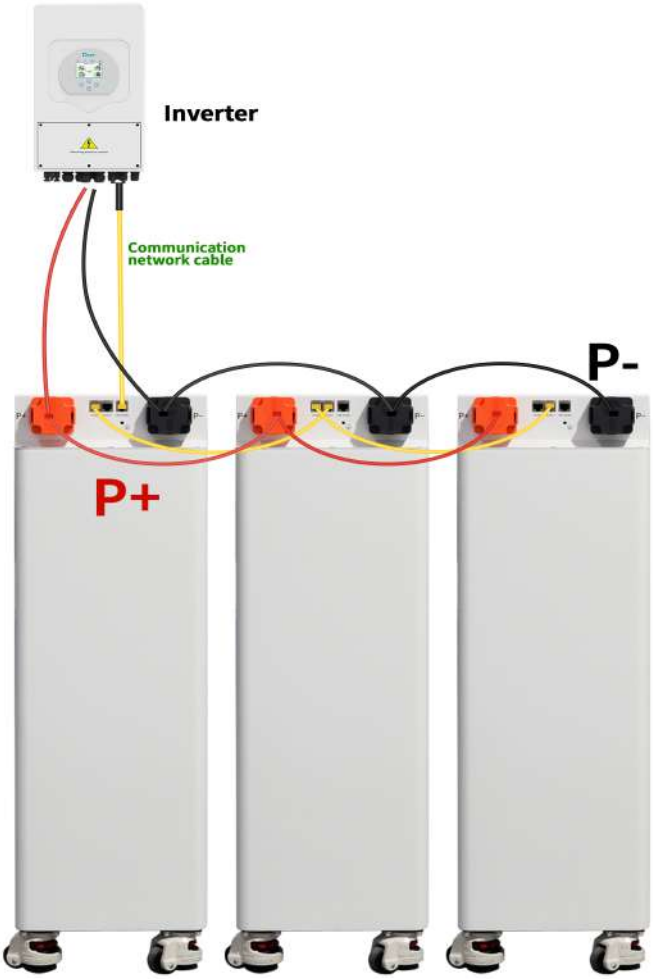
7.2.1Check battery status before installation

7.2.2 Choose a suitable installation location

- Do not place the battery on flammable building materials
- The temperature should be between 10℃ and 30℃ to maintain optimal operation。
- It is recommended to place the battery on a level surface.
- There should be some free space around the battery to dissipate heat (as shown below) Suitable for placement on concrete or other non-flammable surfaces

7.2.3Wiring connection

The battery should be powered off before connecting.



8.Package

Packaged in a dry, dust and moisture proof packaging box. Package the product with plastic film/EPE and package it in a wooden box.
Specifications: L 97cm*W48.5cm*H 43.5cm Package quantity 1 unit Weight:
128kg

9.Precautions

- Do not use the battery if it is obviously impacted and deformed
- Do not install the battery in multiple layers
- Pay attention to the polarity of the power supply and access terminal.
- Insulate the equipment well and use tools and instruments correctly.
- The battery installation site should be away from fire and flammable objects, and the installation site should be kept ventilated and dry
- It is absolutely forbidden to plug and unplug the plug when the product is running.
- Non-professional technicians of our company are strictly prohibited from opening each functional module, and the consequences are at your own risk.
- Before using a new battery or using the battery for a long time, please fully charge the battery with a dedicated charger.
- Do not disassemble, open, squeeze, bend, deform, puncture or crush the product.
- Do not modify or insert the battery into any external objects. Do not immerse or expose the product to water or other liquids such as fresh water, sea water or beverages (coffee, juice, etc.). And stay away from fire, explosive substances or other dangers.
- Do not short-circuit the battery and do not let metal or other conductors touch the battery contact terminals.
- Do not drop the battery. If it does happen (especially on a hard surface), please contact the service center.
- If there is electrolyte leakage, do not allow the battery to come into contact with your skin or eyes. If it does happen, wash the contact area with plenty of water or seek medical help.
- Do not disassemble the battery under any circumstances. This may cause an internal short circuit and even lead to fire or other problems.
- Do not burn the battery or throw it into fire under any circumstances. Otherwise, it may cause the battery to burn
- Please strictly follow the operating instructions in the specification. If the product is damaged due to failure to follow the operating instructions in the specification, our company will not be responsible.