ENERGY TECHNOLOGIES
BUILD LIFE BETTER

RESIDENTIAL
BATTERY

RT 5.1-1S1

Product Description

Contact Details

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EN V1.0 202512

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CONTENTS

01 TECHNICAL DATA

NOTE

Operating current derating according to the cell voltage and battery temperature.

- Full automatic manufacturing products
- 100% tested for safety, readability and capacity
- Top-notch LFP Class A cell / Strict capacity grading
- Precise voltage / temperature / SOC detection
- One button start / stop and parallel connection
- Intelligent aerosol fire extinguishing

DATASHEET

Model	RT 5.1-1S1
Performance	
Cell technology	LFP ($LiFePO_4$)
Battery usable energy [1]	5324.8 Wh
Nominal voltage	51.2 V
Operating voltage	44.8 ~ 56.16 V
Max. charge and discharge current [2]	100 A
Communication	
Display	SOC status indicator, LED indicator
Communication	CAN / RS485 / RS232
General Specification	
Dimension (W×D×H)	440×135×550 mm
	17.3×5.3×21.7 inch
Weight	46 kg (101.4 lbs)
Installation	Rack / Cabinet-Mounted
Operating temperature [3]	Charge: 0 to 50°C (32 to 122°F) Discharge: -15 to 50°C (5 to 122°F)
Environmental humidity	≤ 95%RH (No condensation)
Ingress protection rating	IP20
Scalability	Max. 15 batteries in parallel
Application	ON Grid / ON Grid + Backup / OFF grid
Compatible inverters	Refer to compatible inverter list (Compatible with major PCS brands)
Standard Compliance	
Compliance	UN38.3 / IEC62619 / IEC61000 (More available upon request)
Ordering and Delivery Parts	
Parts	RT 5.1-1S1 Battery
	RT 5.1-1S1 Parallel cable (optional)
	RT 5.1-1S1 to PCS cable (optional)

[1] Test conditions: 100% depth of discharge (DOD), 0.2C rate charge & discharge at 25°C.
[2] There is 0.5C or 1C configurations optional in factory default.
[3] Charge/discharge derating occurs when the temperature is below 0°C or above 45°C.

02 PRODUCT OVERVIEW

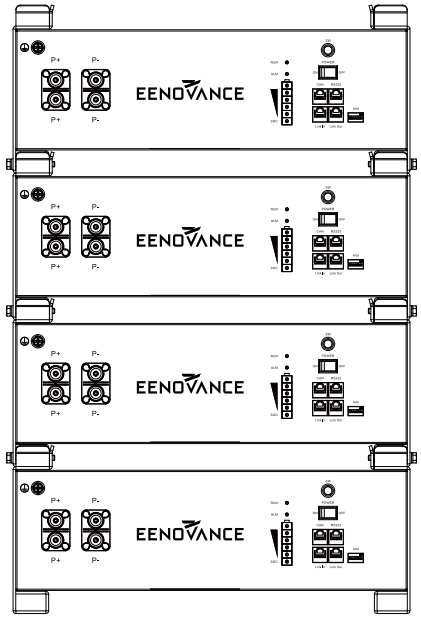
RT 5.1-1S1 is a lithium battery with an operating voltage range between 44.8~56.16V. It is designed for residential energy storage applications and works together with a 48V battery hybrid inverter. RT 5.1-1S1 is not suitable for supporting life-sustaining medical devices.

RT 5.1-1S1 has built-in BMS (Battery Management System), which can manage and monitor cells information including voltage, current and temperature. Besides that, BMS can balance cells charging to extend cycle life. BMS has protection functions including over-discharge, over-charge, over-current and high / low temperature; the system can automatically manage the charge state, discharge state, and balance state.

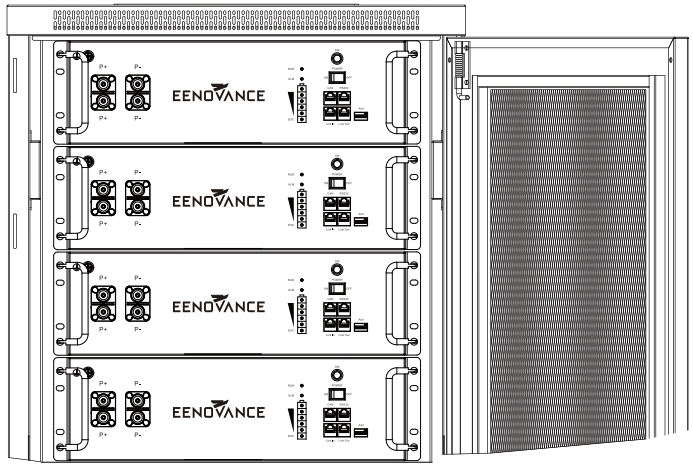
Multiple RT 5.1-1S1 can be connected in parallel to expand capacity and power, and 15 units RT 5.1-1S1 can be connected in parallel at most.

2.1 Appearance

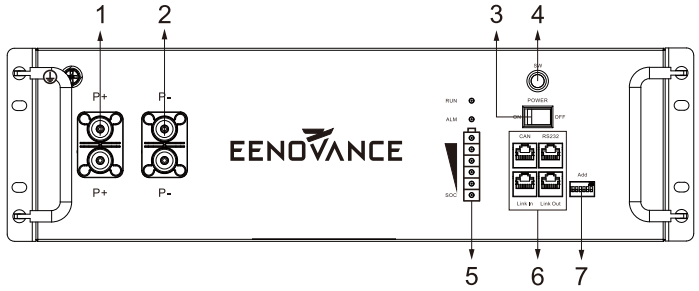
2.1.1 Rack Mounted RT 5.1-1S1



2.1.2 Cabinet Mounted RT 5.1-1S1



2.2 Interface Introduction



Operation interface description:

Serial Number	Name	Description
1	Positive terminal	Total positive terminal
2	Negative terminal	Total negative terminal
3	Rocker switch	BMS switch
4	ON / OFF button	Reset switch
5	Status Indicator	Operation, alarm, and SOC status
6	Communication port	Communication interface
7	Dip switch	Select inverter communication protocol

2.2.1 LED Indicator Definition

Note:
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

		RUN	ALM	Battery Level Indicator						
Status		L8	L7	L6	L5	L4	L3	L2	L1	Descriptions
Shut down		OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	All OFF
Standby		Flash 1	OFF	According to the battery level						Indicates Standby
Charging	Normal	Light	OFF	According to the battery level						The highest capacity indicator LED flashes(flash 2), others lighting
	Full Charged	Light	OFF	Light	Light	Light	Light	Light	Light	Turn to standby status when charger off
	Protection	OFF	Light	OFF	OFF	OFF	OFF	OFF	OFF	Stop charging
Discharge	Normal	Flash 3	OFF	According to the battery level						
	UVP	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Stop charging
	Protection	OFF	Light	OFF	OFF	OFF	OFF	OFF	OFF	Stop discharge
Fault		OFF	Light	OFF	OFF	OFF	OFF	OFF	OFF	Stop charging and discharge

Charging Battery Level Indicators Instructions

Status		Charging							
Battery Level Indicator		L8	L7	L6	L5	L4	L3	L2	L1
Battery Level (%)	0~17%	Light	OFF	OFF	OFF	OFF	OFF	OFF	Flash 2
	18~33%			OFF	OFF	OFF	OFF	Flash 2	Light
	34~50%			OFF	OFF	OFF	Flash 2	Light	Light
	51~66%			OFF	OFF	Flash 2	Light	Light	Light
	67~83%			OFF	Flash 2	Light	Light	Light	Light
	84~100%			Flash 2	Light	Light	Light	Light	Light
	Full Charged			Light	Light	Light	Light	Light	Light

Discharging Battery Level Indicators Instructions

Status		Discharge							
Battery Level Indicator		L8	L7	L6	L5	L4	L3	L2	L1
Battery Level (%)	0~17%	Flash 3	OFF	OFF	OFF	OFF	OFF	OFF	Light
	18~33%			OFF	OFF	OFF	OFF	Light	Light
	34~50%			OFF	OFF	OFF	Light	Light	Light
	51~66%			OFF	OFF	Light	Light	Light	Light
	67~83%			OFF	Light	Light	Light	Light	Light
	84~100%			Light	Light	Light	Light	Light	Light

Protection Fault Indicators Instructions

Status	Protection Fault							
Status Battery Level Indicator	L8	L7	L6	L5	L4	L3	L2	L1
Battery Level(%)			84~100%	67~83%	51~66%	34~50%	18 ~33%	0~17%
Cell failure	OFF / Light	Light	OFF	OFF	OFF	OFF	OFF	OFF
NTC failure			Light	OFF	OFF	OFF	OFF	OFF
Precharge failure			OFF	Light	OFF	OFF	OFF	OFF
Short circuit fault			Light	Light	OFF	OFF	OFF	OFF
Charging MOS failure			OFF	OFF	Light	OFF	OFF	OFF
Discharge MOS fault			Light	OFF	Light	OFF	OFF	OFF
Precharge failure			OFF	Light	Light	OFF	OFF	OFF
Total negative contact failure			Light	Light	Light	OFF	OFF	OFF
Overvoltage protection of charging cells			OFF	OFF	OFF	Light	OFF	OFF
Overall charging overvoltage protection			Light	OFF	OFF	Light	OFF	OFF
Charging overcurrent protection			OFF	Light	OFF	Light	OFF	OFF
Discharge cell undervoltage protection			Light	Light	OFF	Light	OFF	OFF
Discharge overall undervoltage protection			OFF	OFF	Light	Light	OFF	OFF
Discharge overcurrent protection			Light	OFF	Light	Light	OFF	OFF
Charging high-temperature protection			OFF	Light	Light	Light	OFF	OFF
Charging low-temperature protection			Light	Light	Light	Light	OFF	OFF
High-temperature protection for discharge			OFF	OFF	OFF	OFF	Light	OFF
Discharge low-temperature protection			Light	OFF	OFF	OFF	Light	OFF
MOS tube high-temperature protection			OFF	Light	OFF	OFF	Light	OFF
Environmental low-temperature protection			Light	Light	OFF	OFF	Light	OFF
Ambient high-temperature protection			OFF	OFF	Light	OFF	Light	OFF

Notes:
1. The fault lamp ALM is not on in a normal state, at this time the SOC lamp is used as a power indication, the fault lamp ALM is always on when the fault occurs, and the SOC lamp is on according to the fault sequence number (priority sequence number from low light), if a variety of protection faults exist. the RUN lamp also needs to be on constantly.

2.2.2 CAN / RS485 Port

CAN / RS485 (RJ45) to Inverter

CAN / RS485 Communication Terminal (RJ45 port), connect to inverter, follow CAN / RS485 protocol.

PIN	Definition
Pin 1, Pin 8	RS485-B (to Inverter, reserved)
Pin 2, Pin 7	RS485-A (to Inverter, reserved)
Pin 3	NC
Pin 4	CANH (to Inverter)
Pin 5	CANL (to Inverter)
Pin 6	GND

2.2.3 RS232 Port

RS232 Communication Terminal (RJ45 port) follow RS232 protocol, for manufacturer or professional engineer to debug or service.

PIN	Definition
Pin 1, Pin 8	GND
Pin 2, Pin 7	RS232_TX
Pin 3, Pin 6	RS232_RX
Pin 4, Pin 5	NC

2.2.4 Link in/LinK out

Lin In/Link Out Terminal (RJ45 port), for battey parallel communication.

	Link in
Pin1	NC
Pin2	RS485-A (Parallel communicatio)
Pin3, Pin6	RS485-B (Parallel communicatio)
Pin4, Pin7	UP IN+ (Parallel address)
Pin5	UP IN-UP IN+(Parallel address)
Pin8	GND

	Link out
Pin1	NC
Pin2	RS485-A (Parallel communicatio)
Pin3, Pin6	RS485-B (Parallel communicatio)
Pin4, Pin7	DN OP+ (Parallel address)
Pin5	DN OP- (Parallel address)
Pin8	GND

2.2.5 Select Inverter Communication Protocol

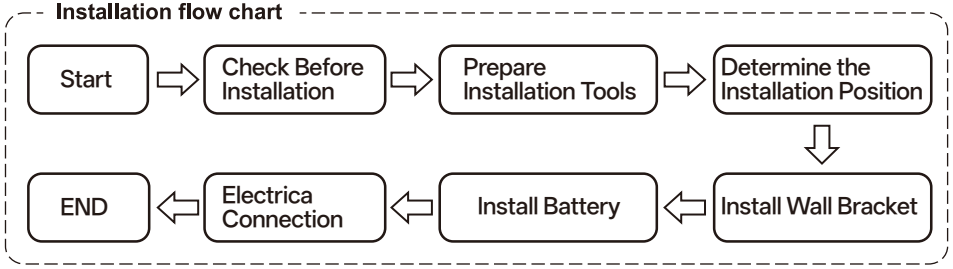
The communication protocol encoding definitions are as shown in the table below.

Communication protocol encoding definitions

Inverter brand	Internal code	Communication options	485/CAN Switching	Code				Note
		K6	K5	K4	K3	K2	K1	Default EENOVANCE protocol
		1	1	1	1	1	1	K6=0,Set Communication protocol from PC tool or LCD
		0	0	0	0	0	0	K6=1,Set Communication protocol from dip switch
		1	0	0	0	0	0	K6K5=10, For CAN communication identification
PYLON	1	1	0	0	0	0	1	
GROWATT	2	1	0	0	0	1	0	
VICTRON	3	1	0	0	0	1	1	
SCHNEIDER	4	1	0	0	1	0	0	
LUXPOWER	5	1	0	0	1	0	1	
SRD	6	1	0	0	1	1	0	
SMA	7	1	0	0	1	1	1	
GOODWE	8	1	0	1	0	0	0	
STUDER	9	1	0	1	0	0	1	
SOFAR	10	1	0	1	0	1	0	
PV	11	1	0	1	0	1	1	
JINLANG	12	1	0	1	1	0	0	
SENERGYINV	14	1	0	1	1	0	1	
TBB LITHIUM	15	1	0	1	1	1	0	
Megarevo	16	1	0	1	1	1	1	
PYLON	1	1	1	0	0	0	0	K6K5=11, For RS485 communication identification
GROWATT	2	1	1	0	0	0	1	
VOLTRONIC	3	1	1	0	0	1	0	
SE	4	1	1	0	0	1	1	
	5	1	1	0	1	0	0	
	6	1	1	0	1	0	1	
	7	1	1	0	1	1	0	
	8	1	1	0	1	1	1	
	9	1	1	1	0	0	0	
	10	1	1	1	0	0	1	
	11	1	1	1	0	1	0	
LUXPOWER V03	12	1	1	1	0	1	1	
WOW	13	1	1	1	1	0	0	
		1	1	1	1	0	1	
Voltronic_v15	26	1	1	1	1	1	0	

03 INSTALLATION GUIDE

Installation flow chart



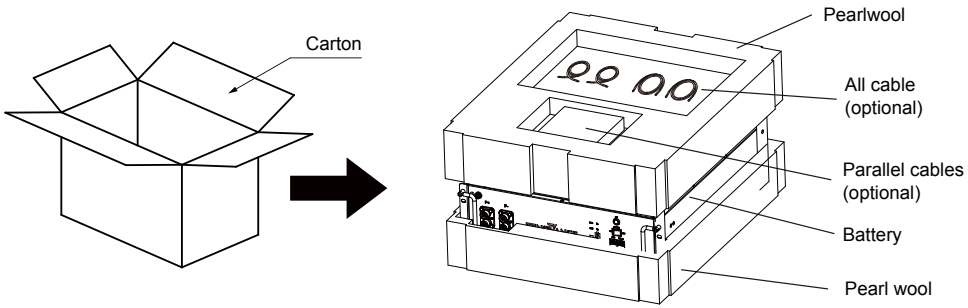
3.1 Checking Before Installation

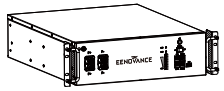
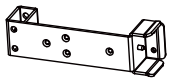
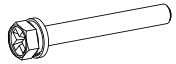
3.1.1 Checking Outer Packing Materials

Packing materials and components may be damaged during transportation. Therefore, check the outer packing materials before installing the battery. Checking the surface of packing materials for damage, such as holes and cracks. If any damage is found, do not unpack the battery and contact the dealer as soon as possible. You are advised to remove the packing materials within 24 hours before installing the battery.

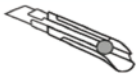
3.1.2 Checking Deliverables

After unpacking the battery, check whether deliverables are intact and complete. If any damage is found or any component is missed, contact the dealer.
The below table shows the components and mechanical parts that should be delivered.



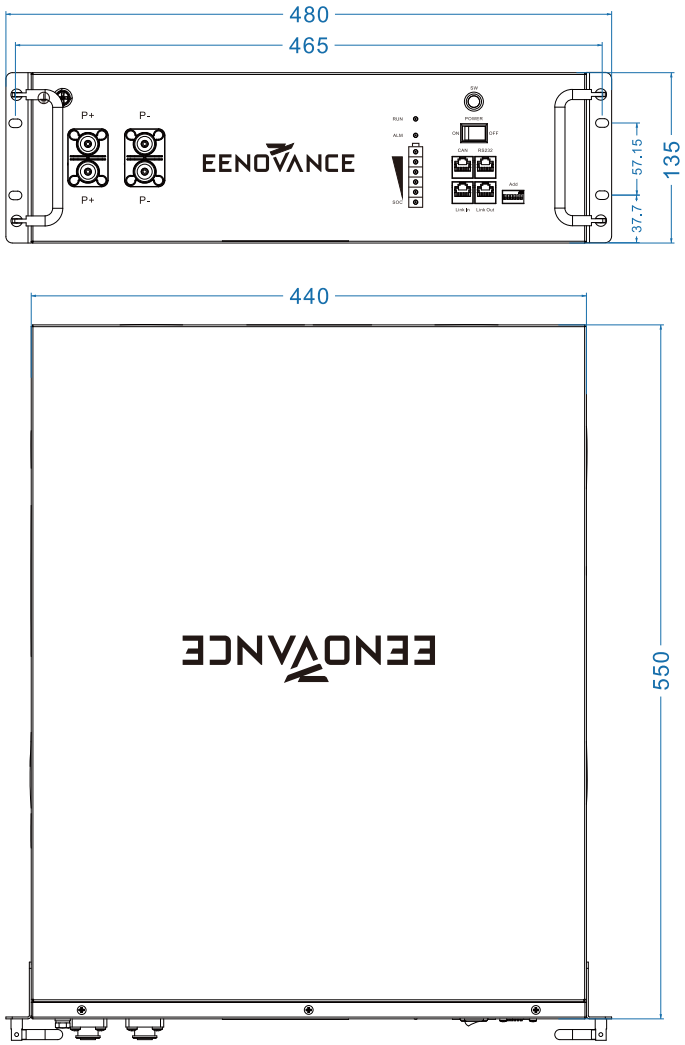
NO.	Pictures	Quantity	Description
1		1 PCS	Battery
2		1 PCS	Positive power cable (optiohal)
3		1 PCS	Negative power cable (optional)
4		1 PCS	PE cable (optional)
5		1 PCS	Communication cable (optional)
6		1 PCS	Parallel cables (optional)
7		4 PCS	Support frame (optional)
8		12 PCS	M4*8 (optional)
9		8 PCS	M6*50 (optional)
10		1 PCS	Test report
11		1 PCS	QA certificate

3.2 Tools

Model	Tools		
Installation	Knife 	Measuring tape 	Socket wrench (10 / 16mm) 
	Rubber mallet 	Cross screwdriver 	Hammer drill (68mm) 
Protection	ESD gloves 	Safety goggles 	Anti-dust respirator 
	Safety shoes 		

3.3 Installation Instructions

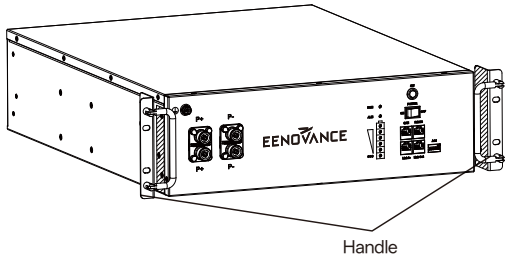
3.3.1 Dimensions



3.3.2 Installation Steps (Rack Mounted)

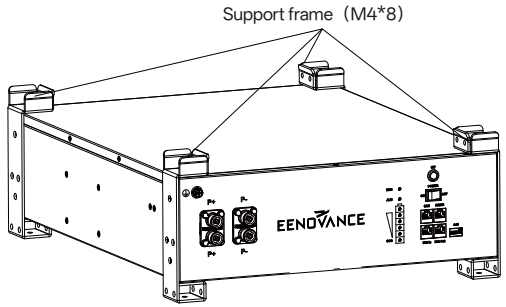
Step 1

Remove the handle from the battery.



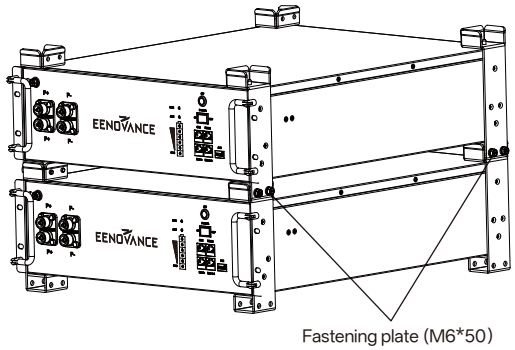
Step 2

Install support frames at the four corners of the battery.



Step 3

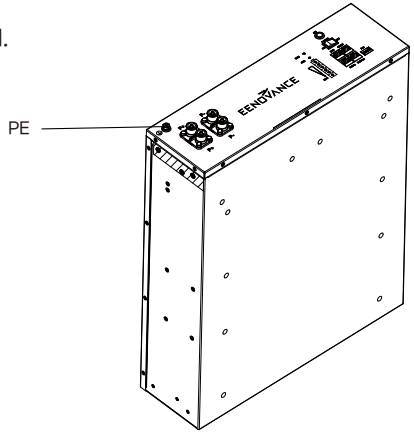
The battery with the support frame is stacked up and down.



3.3.3 Wiring Steps

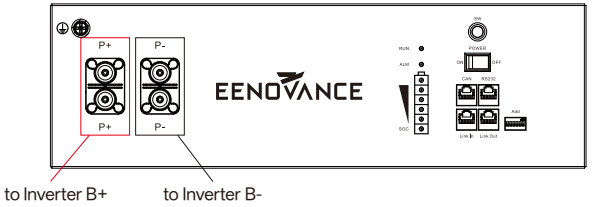
Step 1

Connected to the ground.



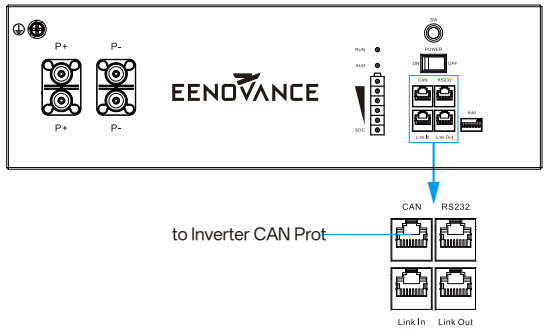
Step 2

Connect the power line.



Step 3

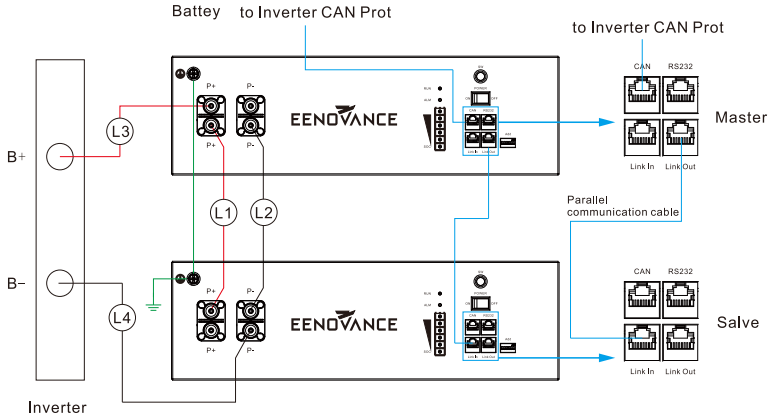
Connect the communication lines.



Step 4

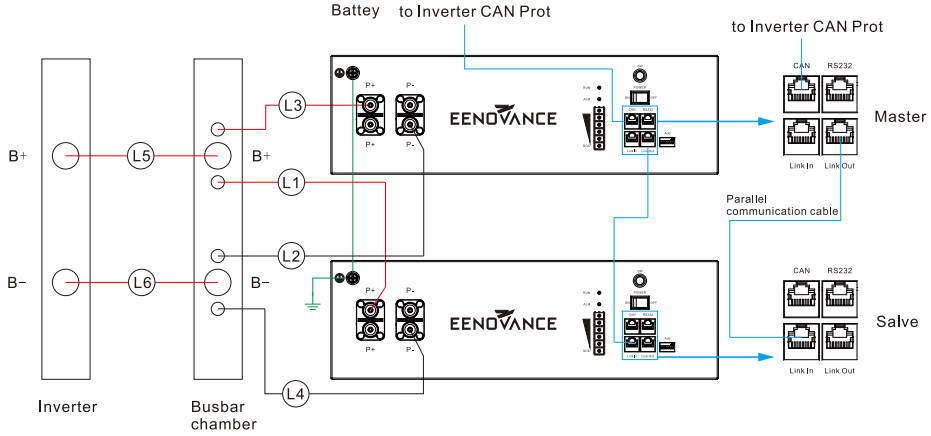
When mutiple batteries are connected in parallel, follow the following wiring mode.
Scheme One (Inverter Power ≤ 5KW)

Inverter Power≤5KW



L1=L2; 25mm² EV cable
L3=L4; 25mm² EV cable

Inverter Power≥5KW



L1=L2=L3=L4; 25mm² EV cable
L5=L6; 50mm² EV cable

3.3.4 Power ON / OFF

1. Power ON

For a single RT 5.1-1S1, switch on the rocker switch, then long press (more than 3 seconds) ON / OFF button, LED will flash, then the battery will operate normally. L1 to L6 shows battery SOC, and L7/L8 shows battery status.

For multiple RT 5.1-1S1 in parallel, switch on the rocker switch of all batteries, long press (more than 3 seconds) ON / OFF button of the master battery, LED will flash, the battery system will automatically encode and assign ID to each slave battery, then the battery system will operate normally.

2. Power OFF

Press the ON / OFF button of the master battery more than 3s and then release the button, the master battery will shut down after all slave batteries shut down (sleep mode).

For a single RT 5.1-1S1, switch off the rocker switch.

For multiple RT 5.1-1S1 in parallel, switch off the rocker switch of all slave batteries first. Then switch off the rocker switch of the master battery.

04 MAINTENANCE

4.1 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 the follow table with 0.5C (50A) current till 40% SOC after a long storage time.

Recharge Conditions When in Storage

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

4.2 Recharge Requirements When Over Discharged

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

Recharge Conditions When Battery is Over Discharged

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

05 DISPOSAL OF THE BATTERY SYSTEM

Disposal of the battery must comply with the local applicable disposal regulations for electronic waste and used batteries.

- Do not dispose of the battery system with your household waste.
- Avoid exposing the batteries to high temperatures or direct sunlight.
- Avoid exposing the batteries to high humidity or corrosive atmospheres.