Rack Mounted 48V / 51.2V Li-ion Battery

User's Guide

End User Documentation

Rev 1.0

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WARNING: Explosion, Electrocution, Or Fire Hazard

A battery can present a risk of electric shock, burns from high short circuit current, fire, or explosion.

Observe proper precautions.

Ensure the cables are properly sized.

Ensure clearance requirements are strictly enforced around the batteries.

Ensure the area around the batteries is well ventilated and clean of debris.

Always use insulated tools. Avoid dropping tools onto batteries or other electrical parts.

If a battery must be removed, always remove the grounded terminal from the battery first. Make sure all devices are disconnected.

All devices must be disconnected when update the BMS software.

IMPORTANT

When installing batteries, leave adequate clearance between batteries.

When replacing batteries, use the same part number of batteries.

Avoid any fall or collision during the installation process.

Do not remove the battery components. The maintenance of the battery should be carried out by a professional engineer.

Do not expose the Li-ion battery to heat in excess of 55°C during operation, 60 °C in storage; Do not incinerate or expose to open flames.

Rack Mounted Li-ion Battery

Ritar rack-mounted telecom li-ion batteries are designed for the telecom market. This series combines safe and reliable LiFePO4 prismatic cells with dedicated BMS to guarantee high reliability, safety, and scalability when used with different telecom systems. The product can be installed in a 19” or 21” standard cabinet or rack.

It provides two types of configuration to adapt to the voltage limits of different power supplies.

This document is intended for use by anyone required to install and operate Ritar rack mounted Li-ion batteries. Be sure to review this manual carefully to identify any potential safety risks before proceeding.

The owner must be familiar with all the features of this product before proceeding.

Failure to install or use this product as instructed can result in damage to the product that may not be covered under the limited warranty.

Product Introduction

The Ritar rack mounted Li-ion batteries are shown in Figure 1.

Figure 1. Rack mounted Li-ion batteries appearance

The front panel of the battery is shown in Figure 2.

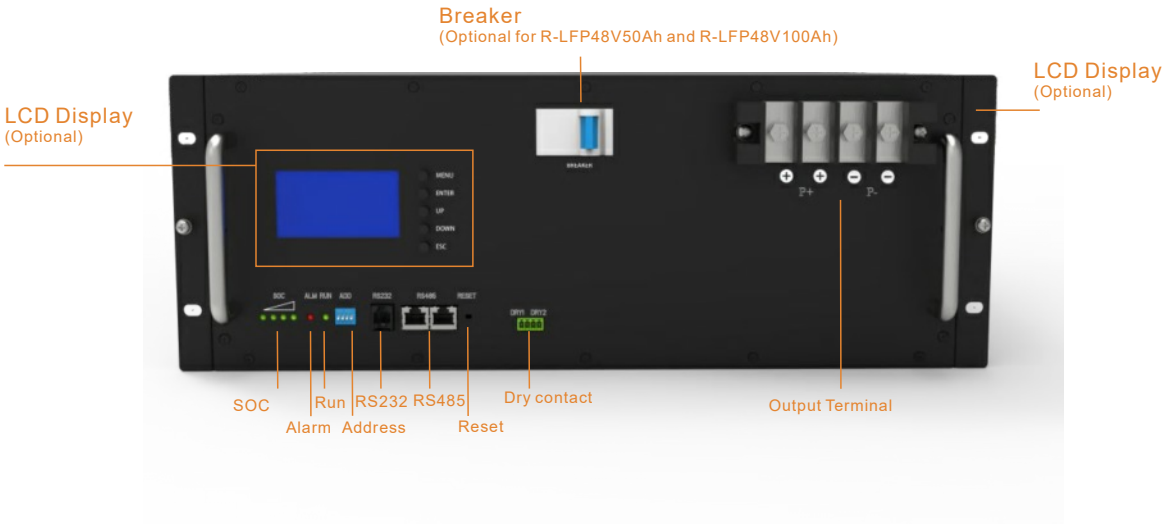
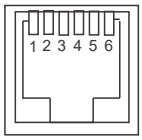


Figure 2. Front panel of rack mounted Li-ion batteries

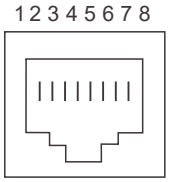
Rj11 (RS232) PIN MAP



RJ11

RJ11 PIN	Description
1, 2,6	NC
3	TX
4	RX
5	GND

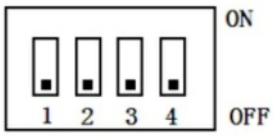
RJ45 (RS485) PIN MAP



RJ45

RJ45 PIN	Description
1, 8	RS485-B
2, 7	RS485-A
3, 6	GND
4, 5	NC

ADD SWITCH



ADD	1#	1#	1#	1#	Remark
0	OFF	OFF	OFF	OFF	Pack 0
1	ON	OFF	OFF	OFF	Pack 1
2	OFF	ON	OFF	OFF	Pack 2
3	ON	ON	OFF	OFF	Pack 3
4	OFF	OFF	ON	OFF	Pack 4
5	ON	OFF	ON	OFF	Pack 5
6	OFF	ON	ON	OFF	Pack 6
7	ON	ON	ON	OFF	Pack 7
8	OFF	OFF	OFF	ON	Pack 8
9	ON	OFF	OFF	ON	Pack 9
10	OFF	ON	OFF	ON	Pack 10
11	ON	ON	OFF	ON	Pack 11
12	OFF	OFF	ON	ON	Pack 12
13	ON	OFF	ON	ON	Pack 13
14	OFF	ON	ON	ON	Pack 14
15	ON	ON	ON	ON	Pack 15

LED Indicator Description

Status	Nominal Warning Protection	RUN	ALM	SOC				Description
Shut down	Dormancy	OFF	OFF	OFF	OFF	OFF	OFF	
Standby	Nominal	Flash 1	OFF	Follow module capacity				Standby
	Warning	Flash 1	Flash 3					Module at low voltage
Charge	Nominal	ON	OFF	Follow module capacity				
	Warning	ON	Flash 3					
	Over-charge Protection	ON	OFF	ON	ON	ON	ON	LED turn to standby if no power supply
	Temperature, over-current, Failure protection	OFF	OFF	OFF	OFF	OFF	OFF	Stop charging
Discharge	Nominal	ON	OFF	Follow module capacity				
	Warning	ON	Flash 3					
	Under voltage Protection	OFF	OFF	OFF	OFF	OFF	OFF	Stop discharging
	Temperature, over-current, short circuit, failure protection	OFF	ON	OFF	OFF	OFF	OFF	Stop discharging
Failure		OFF	ON	OFF	OFF	OFF	OFF	Stop charging and discharging

Note:
Flash 1: light 0.25s/off 3.75s
Flash 2: light 0.5s/ off 0.5s
Flash 3: light 0.5s / off 1.5s

RESET Button

When the battery in dormancy mode, press reset button 3~6s and release, the system will be activated.

When the battery in working mode, press reset button 3~6s and release, the system will turn to dormancy mode.

When the battery in working mode, press reset button 6~10s and release, the BMS will be reset and all LED indicators will be light 1.5s at the same time..

History Record

The BMS can restore 500 logs about historical alarm / protection data, the logs can be read by PC software.

BMS Parameters- 16S -100A

S/N	Parameters		Default Setting	Adjustable or not	Remark
1	Cell Over-voltage protection	Cell OV alarm	3500mV	Adjustable	
		Cell OV protection	3650mV	Adjustable	
		Delay time	1.0S±0.5S	Adjustable	
	Cell OV protection release	Release voltage	3380mV	Adjustable	
		Capacity release	SOC＜96%	Adjustable	
		Discharge release	Discharge current > 1A		
2	Cell Low-voltage protection	Cell LV alarm	2800mV	Adjustable	
		Cell LV protection	2500mV	Adjustable	
		Delay time	1S	Adjustable	
	Cell LV protection release	Release voltage	2900mV	Adjustable	
		Charge release	connect to charger		
3	System Over-voltage protection	System OV alarm	55.2V	Adjustable	
		System OV protection	57.6V	Adjustable	
		Delay time	1.0S	Adjustable	
	System OV protection release	Release voltage	54.0V	Adjustable	
		Capacity release	SOC＜96%	Adjustable	
		Discharge release	Discharge current > 1A		
4	System Low-voltage protection	System LV alarm	43.2V	Adjustable	
		System LV protection	41.6V	Adjustable	
		Delay time	1S	Adjustable	
	System LV protection release	Release voltage	45V	Adjustable	
		Charge release	connect to charger		
5	Charge Over-current protection	OC alarm	120A	Adjustable	
		OC protection	125A	Adjustable	
		Delay time	1.0S	Adjustable	
	Charge OC protection release	Automatic release	1min automatic release		
		Discharge release	discharge current > 1A		

S/N		Parameters	Default Setting	Adjustable or not	Remark
6	Discharge Over-current protection	OC Alarm-1	120A	Adjustable	
		OC protection	125A	Adjustable	
		Delay time	1.0S	Adjustable	
	Discharge Over-current protection release	Automatic release	It will be automatically released after 1min. If it repeat 10 times, the state will be locked.		
		Discharge release			
		Charge release	charge current > 1A		
8	Short circuit protection	Short circuit proteciton	Yes		
		Release voltage	Charge the battery		
			Remove the load		
9	MOS high temperature protection	MOS HT alarm	90℃	Adjustable	
		MOS HT protection	110℃	Adjustable	
		MOS protection release	85℃	Adjustable	
10	Cell temperature	Charge low temperature alarm	0℃	Adjustable	
		Charge low temperature protection	-5℃	Adjustable	
		Charge low temperature protection release	0℃	Adjustable	
		Charge high temperature alarm	60℃	Adjustable	
		Charge high temperature protection	65℃	Adjustable	
		Charge high temperature protection release	60℃	Adjustable	
		Discharge low temperature alarm	-15℃	Adjustable	
		Discharge low temperature protection	-20℃	Adjustable	
		Discharge low temperature protection release	-15℃	Adjustable	
		Discharge high temperature alarm	65℃	Adjustable	
		Discharge high temperature protection	70℃	Adjustable	
		Discharge high temperature protection release	60℃	Adjustable	

S/N		Parameters	Default Setting	Adjustable or not	Remark
11	Ambient temperature	Ambient low temperature alarm	-20℃	Adjustable	
		Ambient low temperature protection	-25℃	Adjustable	
		Ambient low temperature protection release	-20℃	Adjustable	
		Ambient high temperature alarm	65℃	Adjustable	
		Ambient high temperature protection	70℃	Adjustable	
		Ambient high temperature protection release	65℃	Adjustable	

Rack mounted Li-ion battery list

Nominal Voltage (V)	Model	Part Number	Nominal Capacity (Ah)	Max. Continuous Discharge Current (A)	Max. Continuous Charge Current (A)	Charge Voltage (V)	EOD(1) Voltage (V)	Dimension (W*D*H, mm)	Weight (Kg)
48V	R-LFP48V50Ah	8110480005001	50	50	50	51.8~54.7	42	442*400*130.5	26.5
	R-LFP48V100Ah	8110480010001	100	100	100			442*450*175	50
	R-LFP48V100Ah	8110480010002	100	100	100			442*450*133	45
	R-LFP48V125Ah	8110480012501	125	100	100			442*450*175	52
	R-LFP48V150Ah	8110480015001	150	100	100			442*560*177	63
	R-LFP48V150Ah	8110480015002	150	100	100			442*400*260	63
51.2V	R-LFP48V50Ah	8110512005001	50	50	50	55.2~58.4	44.8	442*400*130.5	28
	R-LFP48V100Ah	8110512010001	100	100	100			442*450*175	52
	R-LFP48V100Ah	8110512010002	100	100	100			442*450*133	48
	R-LFP48V125Ah	8110512012501	125	100	100			442*450*175	54
	R-LFP48V150Ah	8110512015001	150	100	100			442*560*177	69
	R-LFP48V150Ah	8110512015002	150	100	100			442*400*260	69

Note:
(1) EOD voltage: End of discharge voltage.

Support Parallel connection, Don't support series connection.

Transportation and storage

Transportation requirement

The product passes the certifications of the UN38.3 (UN38.3: Section 38.3 of the sixth Revised Edition of the Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria) and SN/T 0370.2-2009 (Part 2: Performance Test of the Rules for the Inspection of Packaging for Exporting Dangerous Goods). This product belongs to class 9 dangerous goods.

The SOC is 30%~50% when shipped from factory.

The product can be delivered to the site directly and transported by land and water. The packing case must be secured for transportation, compliant with related national standards,

and printed with marks such as anti-collision and moisture prevention. Dispose of waste ESMs in strict accordance with local laws and regulations.

Protect the packing case with the product from the following situations:

- Being dampened by rains, snows, or falling into water
- Falling or mechanical impact
- Being upside-down or tilted

Storage

The rack mounted Li-ion battery can be stored in an environment with temperatures between -40°C and +60°C and between 10% and 90% relative humidity, non-condensing. For long storage periods at 25°C, charge the battery every 6 months. For temperatures above 40°C, charge the battery every quarter.

- Do not store the Li-ion battery at temperatures above 60°C.
- Keep away from heat sources (such as a heater)

Installation

Ritar rack-mounted telecom li-ion batteries can be installed into standard 19" rack or cabinet.

Before installation, make sure the rack tray can bear the weight of the battery module.

Place the battery module onto the battery tray and fix the battery module onto the rack using the screws through the installation holes of the brackets.

Step 1. Unpacking Inspection

Unpack the battery and visually inspect the appearance. If any shipping damage is found, notify the carrier immediately.

Check the types of the accessories against the delivery list.

Step 2. Mechanical Installation

fix the brackets onto the battery module using the screws through the installation holes.

Place the battery module on the battery tray and fix the battery module onto the rack using the screws through the installation holes of the brackets,

Figure 3. Installation of Li-ion battery

Step 4. Connecting Cables

Connecting the battery output cable, ground cable and RS485 communication cable.

Notes:
For Power cable connection, It needs to make sure the battery terminal and cable's OT terminal is connection is reliable and the cable size needs to meet current-carrying capacity requirements.

Parallel Connection

You can combine batteries together in parallel strings to achieve higher operating energy by connecting like-polarity terminals of adjacent batteries. To combine batteries in parallel strings, connect all like-polarity wires on adjacent batteries to an appropriately sized terminal block for your application.

For parallel application, it only allows the same brand and capacity batteries connect in parallel.

For parallel application, it needs to active the charge limiter to avoid instant large current. the method refer to BMS operation manual.

For 48V / 51.2V Li-ion battery, it allows max. 16 pcs in parallel.

There are two parallel connection methods.

Refer to Figure 4 for an example of Five 48V/51.2 Li-ion batteries connected together.

This connection is simple and suitable for most cabinets. The disadvantage of this connection is that if one of the modules needs to be replaced, the other modules will be affected.

If the cabinet has positive (+) and negative(-) copper bars, it is recommended to use parallel method 2. Refer to Figure 5. It will be easily to replace one of the modules.

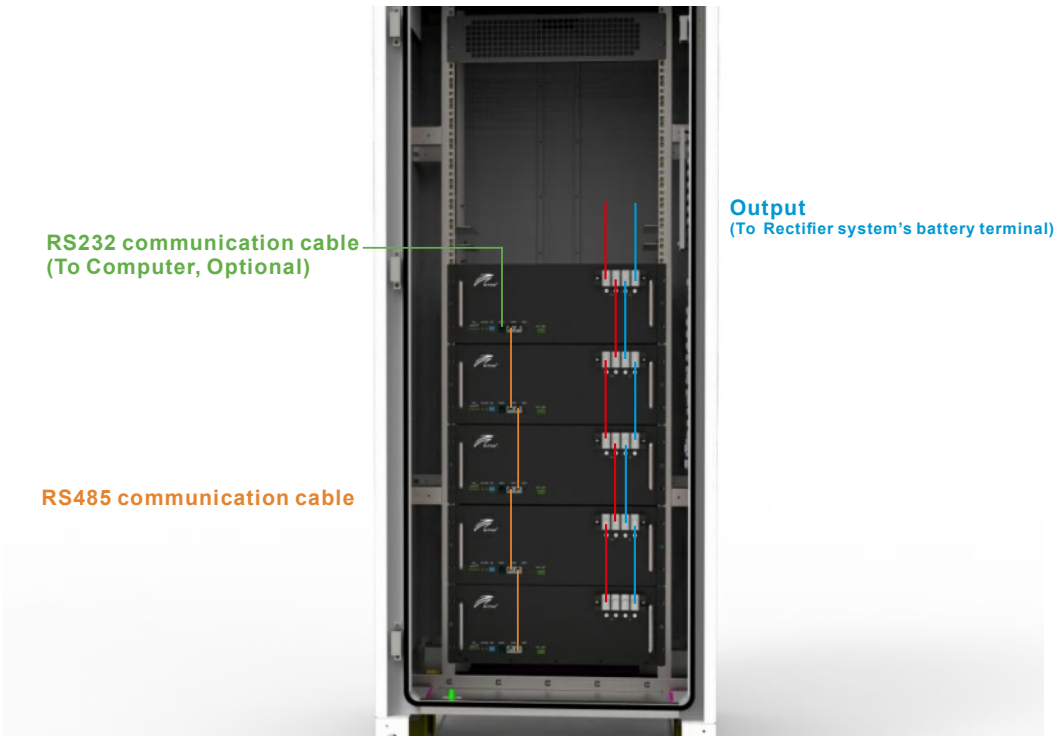


Figure 4. **Parallel connection method 1- parallel through battery output terminal**

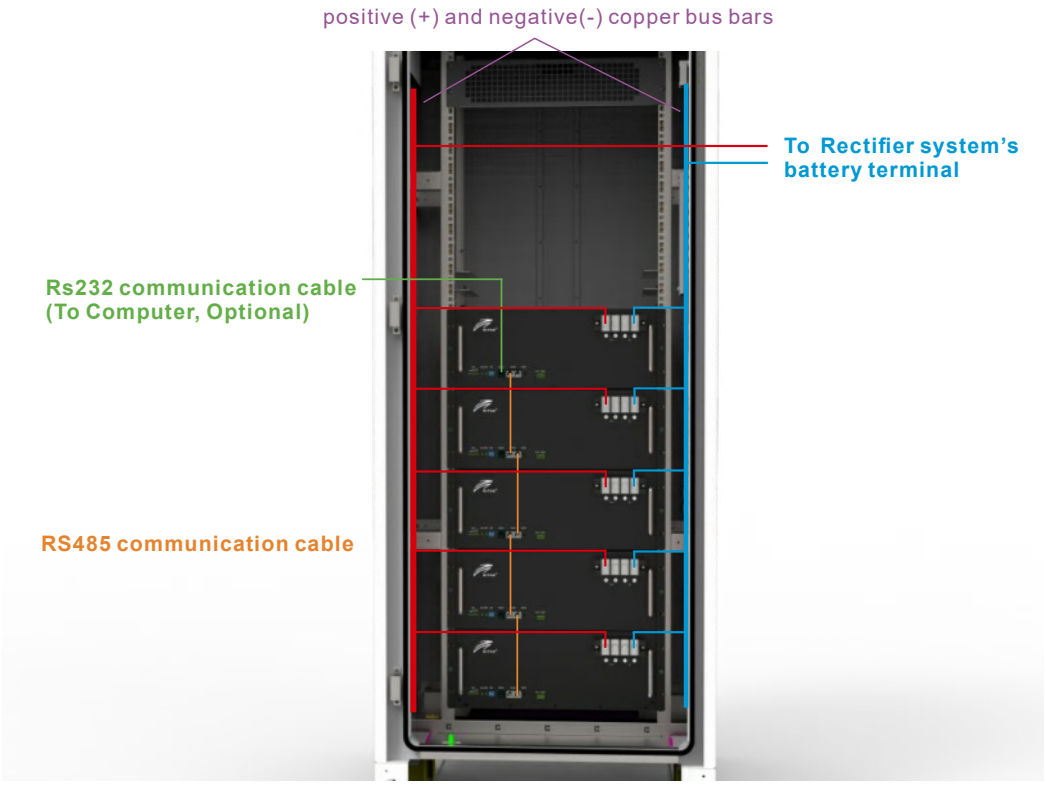


Figure 5. Parallel connection method 2- connect to copper bus bar

CAUTION

It only allows the same brand and capacity batteries connect in parallel.

Do not connect different batches, different types in parallel.

It needs to turn on the charge limiter function to avoid large circulating currents

The parallel application can only extend the working time, and can not double the charging or discharging current.