Rack Mounted 51.2V100AH LiFePO4 Battery User Manual

Support Inverter list as below:

ADDR Dial setting:

| Choose CAN for inverter:					Select by dialing **5 & 6** in the hose mode	
ADDR						Support inverter brands
#1	#2	#3	#4	**#5**	**#6**	
OFF	OFF	OFF	OFF	**OFF**	ON	DEYE & Pylontech inverters brand
OFF	OFF	OFF	OFF	**ON**	ON	**Growatt inverter**
OFF	OFF	OFF	OFF	**ON**	**OFF**	**Victron inverter**

1 Overview

The 51.2V lithium iron phosphate battery pack (hereinafter referred to as the battery pack) has the characteristics of small size, light weight, long service life, flexible installation method, strong environmental adaptability, maintenance-free, green environmental protection, low comprehensive cost, etc. It is very suitable as a network terminal Backup power supply for equipment. The corresponding lithium battery products can be selected and configured according to the size and quantity of the actual load.

The battery pack is designed with a combination of new high-performance cells and an advanced BMS battery management system. It has protection functions such as over voltage, low voltage, over current, high temperature, low temperature and short circuit, as well as recovery functions, providing strong security for the battery pack. It also has functions such as accurate measurement of SOC remaining power, SOH health status assessment, and balanced charging. It can also perform human-computer interaction through the host computer software, query the battery's operating status, real-time data and historical data, and configure the battery's voltage, current, temperature and other alarm protection parameters.

2 Technical Specifications

|		
Electrical Characteristics	Nominal voltage	51.2V
	Nominal capacity	100Ah
	Energy	5.12KWh
	Cycle Life	6000 cycle @80% DoD (25 C)
	Months Self Discharge	≤3.5% per month at 25℃
Standard charege	Charge Voltage	DC58.4V
	Standard Charging Method(CC/CV)	0.2C (constant currrent)charge to 58V, then CV(constant voltage 58V) charge till charge current decline to ≤0.05C.
	Standard Charge Current	0.2C (20A)
	Max.Charge Current	0.5C (50A)
Standard discharge	Max.Continuous discharge Current	100A
	Peak discharge current	200A (<3s)
	Discharge Cut-off Voltage	40V
Temperature	Charge Temperature	0℃ to 45℃(32℉ to 113℉) @60±25% Relative Humidity
	Discharge Temperature	-20℃ to 60℃(-4℉ to 140℉) @60±25% Relative Humidity
	Storage temperature	-10°C ~ + 45°C（every month needs to do charge and discharge for one time if storage and no put in use)
Initial Impedance		<50mΩ
Battery Weight		Approx. kg 49.95KG
Battery Dimension		442*176*463mm
Housing		Metal
Communication protocol		RS485 232 CAN
LCD		optional
Protection		Over voltage protection (Cell & System) Low voltage protection (Cell & System) High temperature protection Low temperature protection Short cuicuit protection Over current protection

3 Electrical layout
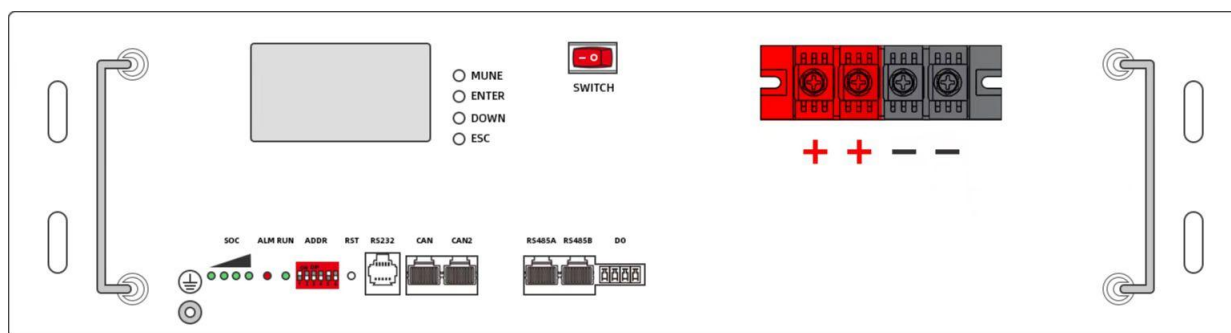
The above picture shows the electrical layout of the battery pack. For other types of base station communication battery packs, only the position of the components has been slightly adjusted. The names and functions of the components are the same. The components are introduced as follows:

Note: The picture is for reference only, please refer to the actual product.

1. **LED display:** It can display battery voltage, current, temperature, BMS status and other information, can set parameters and system settings, and is equipped with four buttons.

2. **SWITCH :** power on / power off

3. **output positive + / output negative -:** Battery positive/battery negative output connector, the 2-position terminal block on the output connector with the same symbol has the same purpose and performance.

4. **SOC:** Marquee, battery SOC remaining power indicator.

5. **ALMRM:** The ALARM fault indicator.

6. **RUN:** The RUN running indicator lights up to indicate that the battery is running.

7. **ADDR:** ADDR code switch, set the ID address of the battery pack in the parallel network.

8. **RESET:** Battery switch key reset key.

9. **RS232:** RS232 communication interface, connected with equipment, used to transmit battery information data.

10. **CAN:** CAN communication interface, connected with equipment, used to transmit battery information data.

11. **RS485:** RS485 communication interface, connected with equipment, used to transmit battery information data. The two RS485 communication interfaces have the same function and purpose.

12. **DRY CONTSCT :** Dry contact. The 4 contacts are divided into 2 groups, and there is no polarity between each group of contacts, which can be interchanged.

4 Instructions

4.1 LED lights: 4 green capacity indicators, one red alarm indicator, and one green running indicator.
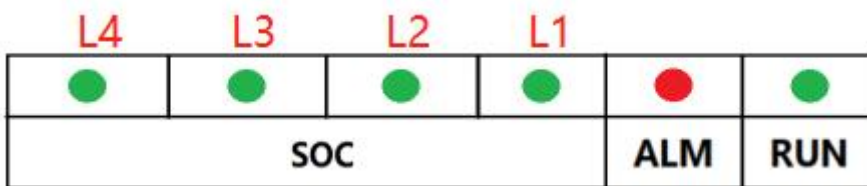
Status	Charging				Discharging			
Capacity indicator	L1●	L2●	L3●	L4●	L1●	L2●	L3●	L4●
0～25%	OFF	OFF	OFF	Flash2	OFF	OFF	OFF	ON
25～50%	OFF	OFF	Flash2	ON	OFF	OFF	ON	ON
50～75%	OFF	Flash2	ON	ON	OFF	ON	ON	ON
75～100%	Flash2	ON	ON	ON	ON	ON	ON	ON
Running lights	Flash2				Flash2			

4.2 Flash

Light ON	Light OFF	Flash mode
0.25 S	3.75 S	This is slow flashing. This mode we called "Flash 1"
0.5 S	0.5 S	This is quick flashing. This mode we called "Flash 2"
0.5 S	1.5 S	This flashing mode "light on 0.5S,off 1.5S", we called "Flash 3"

4.3 Status indication

SYS status	Abnormal event	RUN	ALM	Capacity LED			
		●	●	●	●	●	●
Shutdown		OFF	OFF	ALL OFF			
Standby	Normal	Flash1	OFF	According to the highest capacity indicator			
	Warning	Flash1	Flash2	According to the highest capacity indicator			
	Protection	OFF	ON	OFF			
Charge	Normal	ON	OFF	According to the highest capacity indicator LED flashes 2			
	Over Voltage warning	ON	OFF	According to the highest capacity indicator LED flashes 2			
	Over current/temperature warning	ON	Flash2	According to the highest capacity indicator LED flashes 2			
	Over Voltage Protection	Flash1	OFF	ON			
	Over current Protection	ON	OFF	According to the highest capacity indicator LED flashes 2			
Discharge	Normal	Flash3	OFF	According to capacity indicator			
	Warning	Flash3	Flash2	According to the highest capacity indicator LED flashes 3			
	Low Voltage Protection	Flash1	Flash2	According to capacity indicator			
	Over current Short circuit Temperature Reverse connection Protection	OFF	ON	ALL OFF			

5 Working mode

5.1 Basic mode

5.1.1 charging mode

When the BMS detects that there is an external charging voltage ≥48V, and the cell voltage and temperature are both within the chargeable range, it will turn on the charging MOSFET for charging. When the charging current reaches the

effective charging current, it enters the charging mode. Both the charge and discharge MOSFETs are turned on in the charge mode.

5.1.2 discharge mode

The BMS enters the discharge mode when it detects the load connection and the cell voltage and temperature are within the dis-chargeable range, and the discharge current reaches the effective discharge current.

5.1.3 standby mode

When the above two modes are not satisfied, enter the standby mode.

5.1.4 sleep mode

After the specified time of normal standby, the battery triggers low voltage protection, executes a button shutdown or the host computer executes a shutdown command, the BMS enters the sleep (shutdown) mode.

Wake-up conditions for sleep mode:

1. Charge activation;

2. 2. Press the **RESET** key to turn on;

3. 3. RS232 communication.

5.2 Buzzer

The buzzer function can be enabled or disabled by the host computer, and the factory default is disabled.

5.3 Reset button key description

When the BMS is in the dormant state, press the button for 1 second and then release it, the protection board is activated, and the LED indicator lights start from "L4" for 0.5 seconds.

When the BMS is in the active state, press the button for 3 seconds and then release it, the protection board is dormant, and the LED indicator lights turn on for 0.5 seconds from "RUN".

5.4 Sleep and wake up

5.4.1 Sleep

When any one of the following conditions is met, the system enters a low power consumption mode:

① The monomer low voltage protection or the overall low voltage protection has not been released within 60 minutes.

② Release the **RESET** button after pressing the button for 3 seconds.

③ The lowest cell voltage is lower than the sleep setting voltage (default value 3300mV), and the duration reaches the sleep delay time (default value 1440 minutes) (at the same time, no communication and no charge and discharge current are met).

④ Force shutdown through the host computer software.

Before entering sleep, make sure that the P- terminal is not connected to an external voltage, otherwise it will not be able to enter the low power consumption mode.

5.4.2 Wake-up

When the system is in low-power mode and meets any of the following conditions, the system will exit the low-power mode and enter the normal operation mode:

1.   When the charger is connected, the output voltage of the charger must be greater than or equal to 48V.

2.   Press the **RESET** button for 1S, after releasing the button.

6   Communication

RS485 interface for communication with computer;With CAN interface, CAN carry out multi-machine parallel communication.(RS485 baud rate 19200,CAN baud rate 500K)

Communication protocol selection of inverter:

Dial setting

Dial switch position				reserve	host	Remarks
#1	#2	#3	#4	#5	#6	
OFF	OFF	OFF	OFF	OFF	ON	CAN （Support **DEYE inverter** CAN） & Pylontech protocol
OFF	OFF	OFF	OFF	ON	ON	CAN (Support **Growatt inverter** CAN）
OFF	OFF	OFF	OFF	ON	OFF	CAN **(support Victron inverter)**

6.1   RS232

RJ11

654321
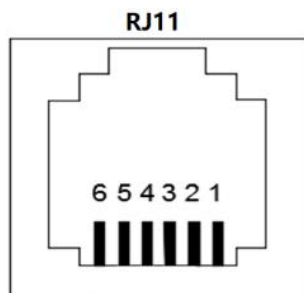
6P6C Vertical RJ11 socket	
Pin	definition
3	BMS TX
4	BMS RX
5	GND

8P8C Vertical RJ485 socket

RS485 & CAN

EMS/CAN1   CAN2

16 15 14 13 12 11 10 9   8 7 6 5 4 3 2 1
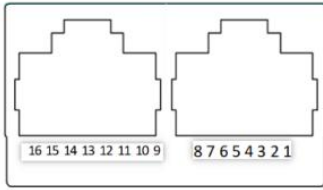
Pin	definition
1、3、7、8	NC
3、6、11、14	GNDC
4	CANH1
5	CANL1
9、16	RS485A_B
10、15	RS485A_A
12	NC
13	NC

Parallel interface：

RS485-A   RS485-B

16 15 14 13 12 11 10 9   8 7 6 5 4 3 2 1
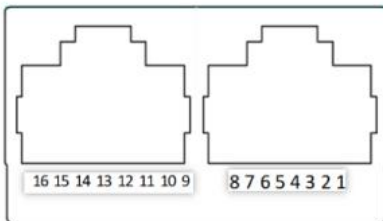
8P8C vertical RJ485 socket	
pin	definition
1、8、9、16	RS485B_B
2、7、10、15	RS485B_A
3、6、11、14	GNDC
4、12	NC
5、13	NC

6.2 Parallel

When the battery is turned off, connect the output of each group of batteries to the bus bar or main line for bus flow. It is strictly prohibited to connect the output terminal of the battery to the device, and finally connect the bus bar to the device. Refer to the following figure for the parallel connection of three groups of batteries.
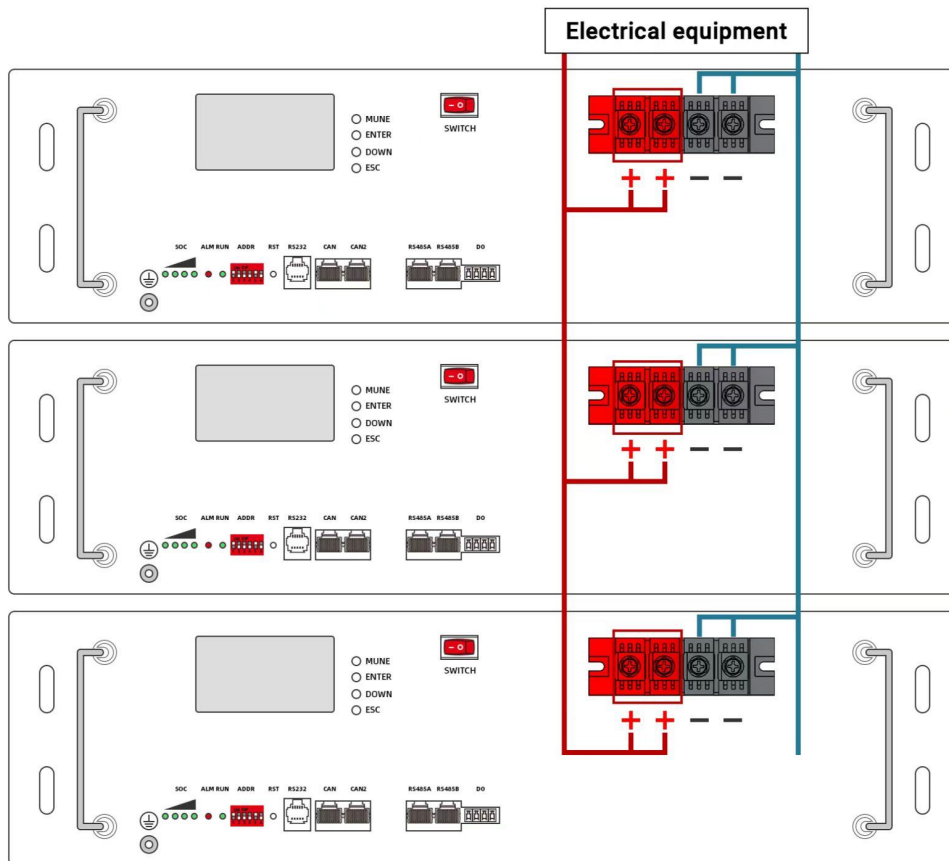
6.3 Host setting and PC communication

Host setting: when the dial switch 6 is set to on, it is the host (only one host can be set). The can line is only connected to the host BMS and can communicate with the inverter end through can.

Schematic diagram of communication between host and terminal:

RS485 interface for communication with computer; With CAN interface, CAN carry out multi-machine parallel communication.(RS485 baud rate 19200,CAN baud rate 500K)

6.4 Dip switch

6.4.1 Switch setting

In the multi-machine parallel communication operation, you need to configure the DIP address of each PACK first. The DIP code adopts the BCD code format, the address of 0 is defined as (black dot is OFF state, blank is ON state, the same below), address 1 , address 2 , and so on. Slave setting: set according to the equipment sequence. The slave address ranges from 1 to 15, and 15 parallel machines

Choose CAN for inverter:						Select by dialing **5 & 6** in the hose mode

ADDR						Support inverter brands
#1	#2	#3	#4	**#5**	**#6**	
OFF	OFF	OFF	OFF	**OFF**	**ON**	DEYE & Pylontech inverters brand
OFF	OFF	OFF	OFF	**ON**	**ON**	**Growatt inverter**
OFF	OFF	OFF	OFF	**ON**	**OFF**	**Victron inverter**

For Parallel:

Host battery as "Pack 0".

Dial setting (not dial in host battery "Pack 0", but dial in slave battery from pack 1 to pack 15)

Add	Dial switch position						Remarks
	#1	#2	#3	#4	#5	#6	
1	ON	OFF	OFF	OFF	OFF	OFF	Pack1
2	OFF	ON	OFF	OFF	OFF	OFF	Pack2
3	ON	ON	OFF	OFF	OFF	OFF	Pack3
4	OFF	OFF	ON	OFF	OFF	OFF	Pack4
5	ON	OFF	ON	OFF	OFF	OFF	Pack5
6	OFF	ON	ON	OFF	OFF	OFF	Pack6
7	ON	ON	ON	OFF	OFF	OFF	Pack7
8	OFF	OFF	OFF	ON	OFF	OFF	Pack8
9	ON	OFF	OFF	ON	OFF	OFF	Pack9
10	OFF	ON	OFF	ON	OFF	OFF	Pack10
11	ON	ON	OFF	ON	OFF	OFF	Pack11
12	OFF	OFF	ON	ON	OFF	OFF	Pack12
13	ON	OFF	ON	ON	OFF	OFF	Pack13
14	OFF	ON	ON	ON	OFF	OFF	Pack14
15	ON	ON	ON	ON	OFF	OFF	Pack15

6.4.2 Application address code setting

Communication Input the current master or slave code system to be communicated in the system parameters of the host computer, and the communication can be detected and communicated.

The BMS is configured in stand-alone working mode, and the DIP address can be any address; the BMS is configured in cascading working mode, and the DIP address is selected from 0 to 15 for different addresses.

7 Charging Instructions

7.1 The charging current and charging voltage of the battery pack shall not exceed the maximum values specified in the technical specifications of this user manual.

7.2 The charging temperature shall not exceed the charging temperature range specified in the technical specifications of this user manual.

7.3 It is forbidden to charge the battery for a long time, and it is forbidden to charge the battery in reverse.

7.4 The charging parameter settings of the charger should meet the requirements of the technical specifications of this product.

7.5 The use of current, voltage and temperature ranges beyond the product technical specifications will affect the life of the battery pack or cause damage to the battery pack, and may cause safety performance problems in severe cases.

8 Maintenance

The battery is one of the core components with backup function. At the same time, the use environment and method of the battery can affect the life of the battery. Reasonable battery maintenance can effectively improve the service life of the battery:

8.1 If it is stored or left unused for a long time, this product must be placed in a dry, clean and specified temperature range environment. It must be recharged once more than three months, and the recommended storage voltage is 51.2V ~ 54.4V.

8.2 According to the on-site environment, try not to use the battery in an environment where the temperature is too high or too low, and the ambient temperature should not exceed the specified operating temperature range of the battery (charging: 0℃～+45℃, discharging: -20℃～+55℃). The battery is working in an environment with a normal temperature of about 25 degrees, which can effectively prolong the life of the battery.

8.3 During each inspection, the appearance of the battery should be checked and its voltage should be measured. When the battery is fully charged, the battery voltage should be in the range of around 53-54V.

8.4 When the battery pack is not in use, the battery pack should be turned off or put into sleep mode to avoid over-discharge of the battery pack.

8.5 In order to ensure the service life of the battery, the battery should be properly inspected and maintained. The following maintenance methods are recommended:

(1) Seasonal maintenance

Complete the following inspections each month:

Detect and record battery room temperature;

Check the cleanliness, appearance and temperature of the chassis one by one;

Measure and record the total voltage of the battery system.

(2) Annual maintenance

Repeat all maintenance and inspections quarterly.

Check for loose connections every year.

The battery pack shall be subjected to a check discharge test with actual load once a year. If the actual discharge capacity of the battery pack is lower than 80% of the rated capacity, the life of the battery pack is considered to be terminated.

(3) Precautions for use and maintenance

During installation and maintenance, insulated tools must be used;

Do not use any organic solvent to clean the module;

Do not smoke or use open flames near the battery pack;

After the battery is discharged, it should be fully charged within 24 hours. so as not to affect the capacitance;

The performance of the battery will degrade during storage, and the battery should be recharged after 3 months of storage;

All maintenance work must be carried out by professionals.

9 transportation

In the process of transporting the battery, it should be handled with care, and it should not be severely impacted. During transportation, it should be placed in strict accordance with the direction marked on the packing box, and violent vibration should be prevented. Impact or squeeze, prevent the sun and rain, so as not to damage the product.

10 Safety Precautions

This manual covers the relevant installation and use information of the 51.2V lithium iron phosphate battery pack. This manual must be read carefully before installation, use and maintenance.

Please read the following safety precautions carefully before use to ensure correct installation, use and maintenance. The company shall not be held responsible for any problems arising from violation of the following matters.

⚠️ ⚡
⚠️ It is forbidden to reverse the positive and negative poles of the battery output;
⚠️ It is forbidden to short-circuit the positive and negative outputs of the battery, and it is forbidden to transport or store the battery together with necklaces, hairpins or other metal objects;

⚠ The rated output voltage of the battery is 48Vdc, which has exceeded the safe voltage that the human body can withstand. Personal contact may cause electric shock.

⚠ The battery discharge temperature range is -20°C to 55°C, and the charging temperature range is 0°C to 45°C. When using the battery, do not exceed the temperature range that the battery can withstand.

⚠ The parameters of the charger should meet the technical requirements of the battery pack

➢ non-technical personnel or authorized technicians, please do not open the battery without authorization, otherwise there will be the danger of electric shock.

➢ This product must be installed and debugged by non-technical personnel or authorized technicians, otherwise it may cause product failure or endanger personal safety.

➢ Before installing and using this product, be sure to read this manual and safety precautions in detail, otherwise it may cause product failure or endanger personal safety.

The company is not responsible for defects or malfunctions caused by:

➢ Exceed the scope of use and working environment specified by the product

➢ Unauthorized modification or repair, wrong installation, improper operation

➢ Encounter force majeure

➢ Other items that violate the provisions of this product manual