LiFePO4 Battery

51.2V 71kWh RACK48280

USER MANUAL

2023.12

GLOBAL ACE SOLAR

Solar,Alternative Free Energy, Keeping Our Planet Green

Contents

01 Safety instructions

1.1 Warning

a. The input voltage and output voltage of this equipment are above 20V DC, if not operated properly, it may cause a short circuit or damage to electrical equipment, etc. Please read this manual carefully before installation and operation, pay attention to the various labels on the equipment, and do not let children touch alone to prevent accidents. Non-professional maintenance personnel, please do not remove the battery equipment casing

b. During installation, operation and maintenance of the equipment, the relevant safety codes and related operating procedures must be observed, otherwise personal safety and equipment damage may be jeopardized. The safety precautions mentioned in the manual are only intended to supplement local safety codes.

c. The Company shall not be liable for any liability resulting from violation of the general safety operation requirements or from violation of the safety standards for the design, production and use of the equipment.

Precautions for Battery Usage

This battery system is composed of battery pack and protection plate, non-professional and improper operation and use may cause sparking, short circuits and other serious consequences. The installation and maintenance of the system must be operated by professional technicians, and the use of the system must strictly comply with the relevant safety regulations. Non-professionals are strictly prohibited from installing and maintaining the lithium-ion battery pack and abusing it beyond its scope.

1. Please read and keep this manual carefully.
2. Please pay attention to all warning labels on the battery, do not tear or damage the warning labels.
3. It is strictly prohibited to immerse the battery in seawater or water, and when not in use, it should be placed in a cool and dry environment.
4. Prohibit the battery in the heat of high-temperature sources, such as fire, heaters, etc. Use and stay, do not expose the lithium battery to fire, the lithium battery may explode.
5. When charging, please use a special charger for lithium-ion batteries, it is strictly prohibited to plug the battery directly into the power outlet.
6. Prohibit the use of metal directly connected to the battery's positive and negative short circuits.
7. Prohibit knocking or throwing, stepping on the battery or directly welding the battery and piercing the battery with nails or other sharp objects.

Notice

1. It is prohibited to use or place the battery under high temperatures, otherwise, it may cause the battery to overheat, fire, or function failure, life-shortening.
2. It is prohibited to use the battery in the place of strong static electricity and a strong magnetic field, otherwise, it is easy to destroy the battery safety protection device and bring unsafe hidden danger.
3. If the battery leaks and the electrolyte gets into your eyes, please do not rub it, flush your eyes with water and send it to the doctor immediately, otherwise it will hurt your eyes.
4. If the battery emits a strange odour, becomes hot, discoloured, or deformed, or if any abnormality occurs during use, storage, or charging, immediately remove the battery from the device or charger and deactivate it.

5. If the electrodes are dirty, wipe them with a dry cloth before use, otherwise it may lead to poor contact and malfunction.
6. Discarded batteries should be wrapped in insulating paper to prevent short-circuiting and fire.

 **Keep equipment well ventilated**

02 Battery introduction

2.1 Product features

1. Lithium iron phosphate battery, safe and environmentally-friendly.
2. Battery built-in BMS to prevent over-charge, over-discharge, safe and reliable.
3. The battery section consists of 5 standard 14kwh battery modules stacked in parallel, which can be increased or decreased according to customer's demand, and a maximum of 15 battery modules can be connected in parallel.
4. The internal structure of the battery module is designed according to automotive grade, completely fixed at the top, bottom, left, right, front and back.
5. Battery module is 51.2V lithium iron phosphate battery, low DC voltage, safe and reliable, battery cycle life of more than 2500 times. There are RS485 and CAN dual communication, real-time transmission of battery status data.

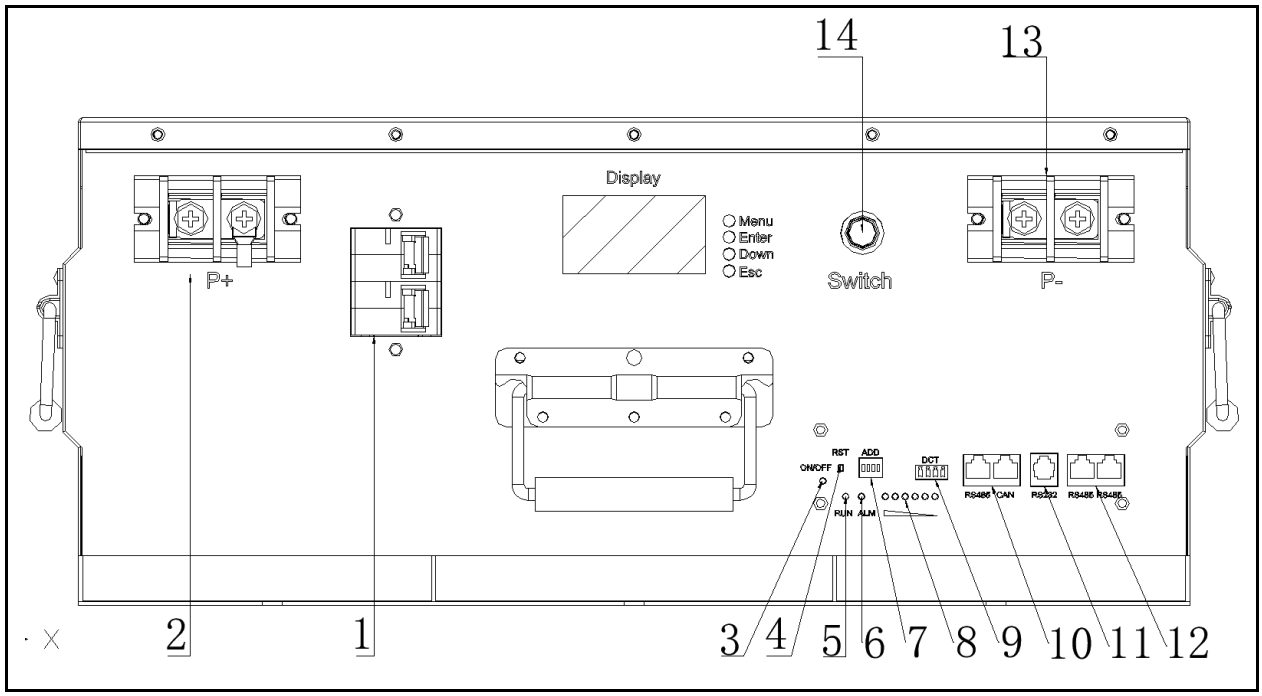
2.2 Normal performance

NO.	Item	General Parameter	
1	Rated capacity	280Ah	
2	Standard voltage	51.2V (16S)	
3	Standard Charge voltage	58.4V	
4	Charging method	CC-CV	
5	Charge current	Normal	75A
		Max	150A
6	Cut-off voltage	40V	
7	Continuous discharge current	150A	
8	Peak discharge current	160A / 1s	
9	Total weight	About 750kg / 1653.47lbs	
10	Impedance at 1000Hz.	≤ 50mΩ	

11	Operation Temperature	Charge: 32 - 140°F ***Heating: -40 ~ 32°F (only working with charging)***	
		Discharge: -4 - 140°F	
12	Storage environment	Temperature	50 - 113°F
		Humidity	≤ 75%RH
13	Cycle life	1C@DOD100%	≥2500 cycles
		0.2C@DOD100%	≥4000 cycles
14	Self-discharge rate	≤3%/Month	
15	Battery dimension	L= 770mm(30.3”)	
		W=860mm(33.86”)	
		H=1450mm(57.09”)	

BMS Parameter			
No.	**Item**		**General Parameter**
1	Single Cell over-charge protection	Single Cell over-charge protection voltage	3650mV
		Single Cell over-charge protection delay	1.0S
		Single Cell over-charge protection release voltage	3380mV
2	Single Cell over-discharge protection	Single Cell over-discharge protection voltage	2700mV
		Single Cell over-discharge protection delay	1.0S
		Single Cell over-discharge protection release voltage	2950mV
3	Charge/discharge over-current protection	Discharge over-current level 1 protection current	160A
		Discharge over-current level 1 protection delay	1.0S
		Discharge over-current level 2 protection current	≥200A
		Discharge over-current level 2 protection delay	100mS
		Discharge over-current release condition	Recover after a delay of about 60S
		Charge over-current protection current	160A
		Charge over-current protection delay	1.0S
		Charge over-current release condition	Recover after a delay of about 60S

2.3 Interface Introduction



No.	Name	No.	Name
1	Output breaker	8	State of Charge (SOC) indicator
2	Battery Positive (P+)	9	Dry contact
3	ON/OFF indicator	10	CAN/RS485 COM Output port
4	BMS reset button	11	RS232 COM for upper-computer
5	Operation indicator	12	RS485 COM for parallel
6	Alarm indicator	13	Battery Negative (P-)
7	Dial switch (ADD), set battery address	14	ON/OFF Battery Power button

2.4 Installation instructions

1. Please read this manual carefully before installation, if the installation is not carried out in accordance with the instructions in this manual, or ignoring the warnings in the manual and there is damage to the equipment, the company has the right not to carry out quality assurance.
2. For all operations and wiring, please ask a professional electrical or mechanical engineer to operate.
3. When installing, please don't move other parts inside the box except the terminals and the parts that must be removed.
4. All electrical installations must comply with local electrical safety standards.
5. If maintenance is required, please contact the local designated system installation and maintenance personnel.
6. the machine in the process of operation, may be local temperature is relatively high, please be careful to touch, in order to prevent burns.

2.5 Transportation of battery packs

Battery packs are strictly inspected and tested before leaving the factory, in order to avoid bad battery packs during transportation, please use soft materials such as pearl cotton for packaging and use customized wooden boxes for transportation, when using non-containerized vehicles for transportation, the battery packs should be fixed as much as possible to ensure the safety of transportation.

2.6 Storage of battery packs

1. Battery packs are best placed in packed packages and placed in a ventilated and dry place;
2. the recommended storage temperature range is: 41- 113°F, humidity is 65 ± 10%;
3. if there is a large number of battery packs that need to be stored, the warehouse needs to do the following:
a. the warehouse can control temperature and humidity, such as air conditioning or dehumidification equipment, to avoid battery packs for a long time in a high-humidity environment;
b. the warehouse should be equipped with automatic fire extinguishing system, emergency sprinkler system, dry powder fire extinguishers and firefighting sand (construction sand can be);
c. cannot be mixed with flammable materials (such as packaging materials cartons, cardboard boxes, etc.), it is recommended to use an independent warehouse to store battery packs;
d. secondary fire door;
e. in accordance with the lithium battery packaging instructions on the labelling and stacking requirements placed, it is strictly prohibited to stack more than a certain height;
4. battery packs rest for a long time, and should be charged and discharged on time within 3 months to prevent over-discharge of the battery; prohibit the battery packs from being placed for a long time after discharge.

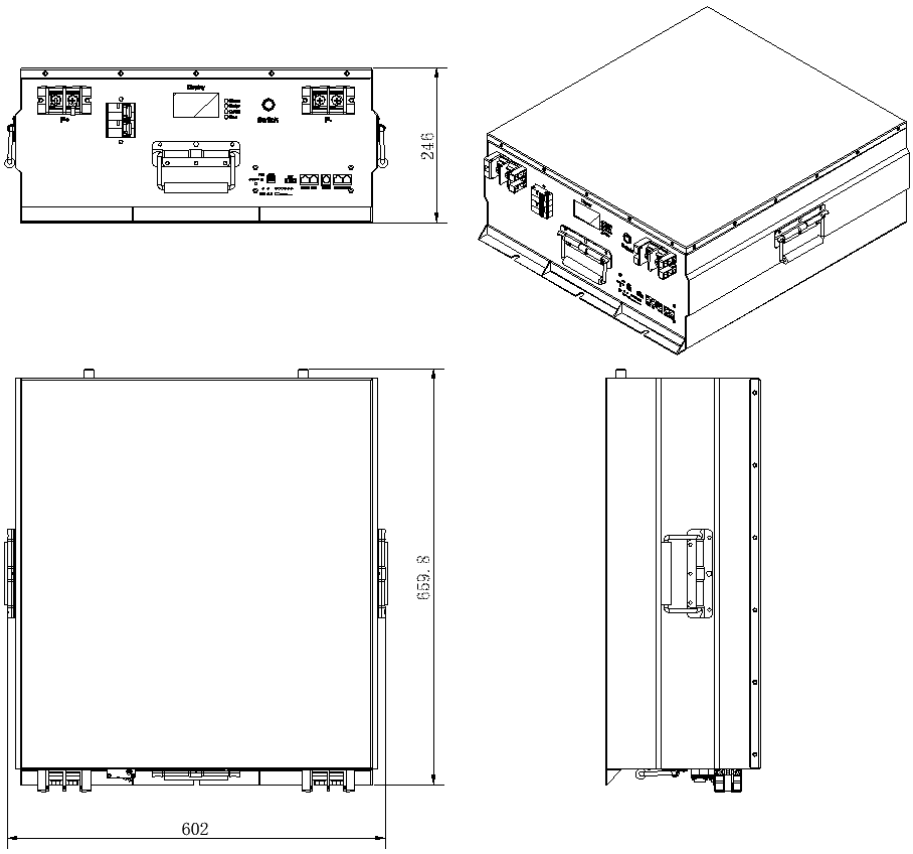
03 Installation

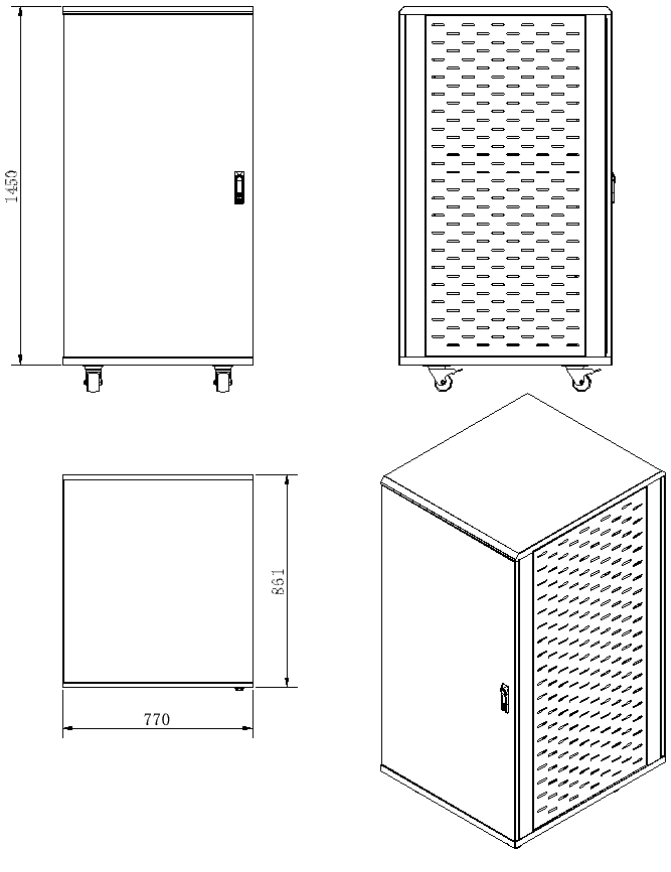
3.1 Installation requirements

This part of the guidance is provided to the installer to choose the appropriate installation location to avoid damage to the machine or the relevant operator.

A. The product is placed in a fixed position to ensure that it can withstand the weight of the battery for a long time; when it is dropped to the ground, due to the product's tallness, its installation is as follows.
The installation position must be in accordance with the size of the battery pack, please refer to Figure 3-5 for installation dimensions.
B. It is prohibited to install the battery pack on the surface of the building built with flammable or non-heat-resistant materials.
C. Do not install the battery pack in a place with poor air circulation to affect the natural heat dissipation of the battery pack.
D. It is recommended for indoor use, and it is recommended not to expose the battery pack to direct sunlight.
E. The ambient temperature around the battery pack should be: -4 ~ 140°F.
F. Please take care to provide sufficient clearance for the battery pack.
G. Do not install the battery pack in a place where children can reach it.

3.2 Schematic diagram of battery appearance

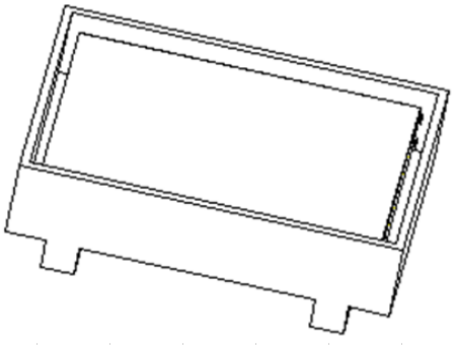




3.3 Carry and install the battery pack

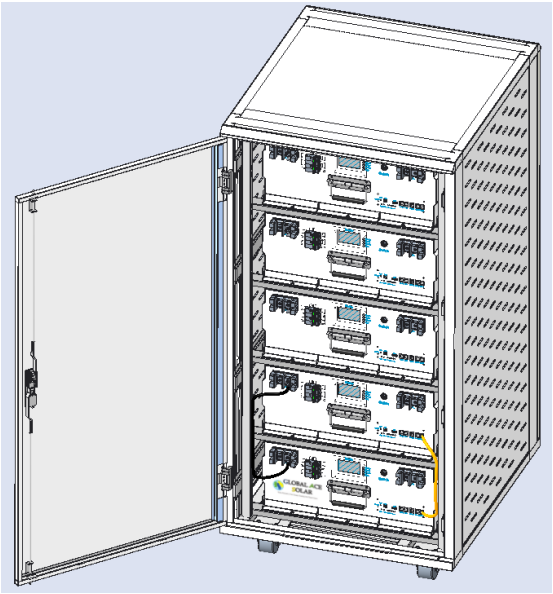
DANGER: The battery pack is heavy and should be handled with care to maintain balance so that it does not fall and injure the operator.

1. Lift the battery out of the battery box and transport it to the designated installation location

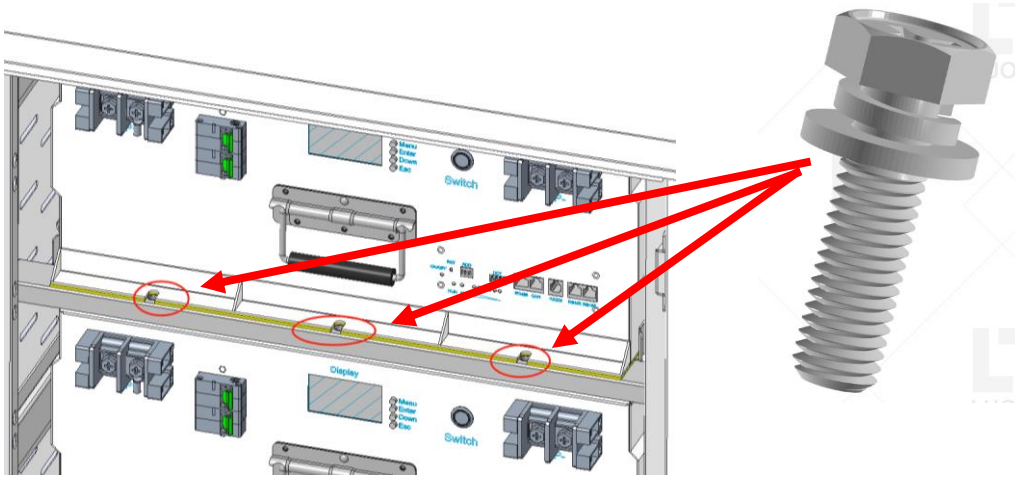


2. battery box bracket installation

a. Place the 5 battery modules into the compartment in order.

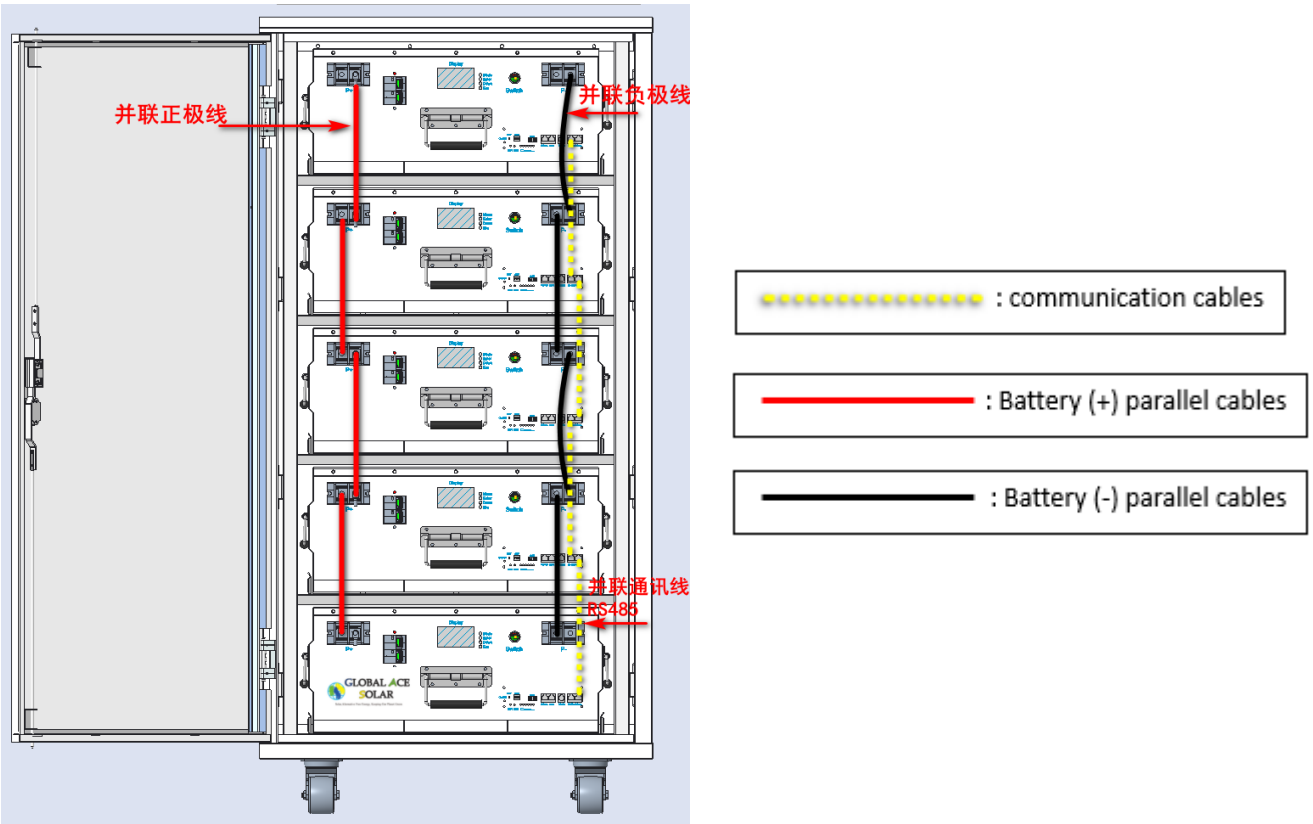


b. Put it on as shown below and push it into place and align the front bottom screw holes and secure the box with M8 combination screws.



3.4 Wiring Instructions

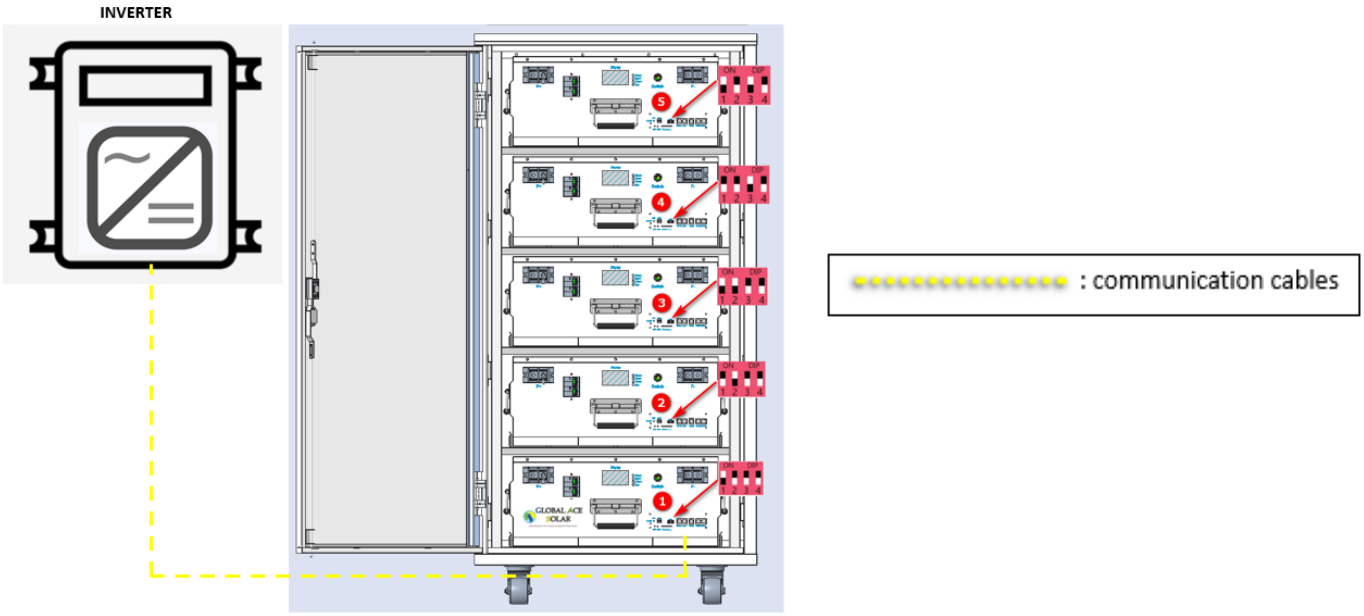
Parallel connection of cables after stacking battery boxes



3.5 Dialing Code and Protocol Replacement Instructions

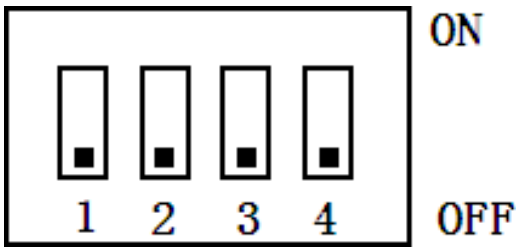
1. Dialing code setting

The dialing code of the battery box communicating with the inverter is always set to 1, and the following battery boxes connected in parallel with it are set to 2,3,4 in turn ... The following figure shows that



2. DIP switch setting

When multiple battery modular are connected in parallel, they need to communicated in cascades. Please set the hardware addresses for both the primary and secondary battery pack by DIP switches on the board. Please refer to the following table for the definition of switches:



Address	DIP Switch Position				Instruction
	#1	#2	#3	#4	
0	OFF	OFF	OFF	OFF	Single use
1	**ON**	OFF	OFF	OFF	Set as main Pack
2	OFF	**ON**	OFF	OFF	Set as secondary pack 1
3	**ON**	**ON**	OFF	OFF	Set as secondary pack 2
4	OFF	OFF	**ON**	OFF	Set as secondary pack 3
5	**ON**	OFF	**ON**	OFF	Set as secondary pack 4
6	OFF	**ON**	**ON**	OFF	Set as secondary pack 5
7	**ON**	**ON**	**ON**	OFF	Set as secondary pack 6
8	OFF	OFF	OFF	**ON**	Set as secondary pack 7
9	**ON**	OFF	OFF	**ON**	Set as secondary pack 8
10	OFF	**ON**	OFF	**ON**	Set as secondary pack 9
11	**ON**	**ON**	OFF	**ON**	Set as secondary pack 10
12	OFF	OFF	**ON**	**ON**	Set as secondary pack 11
13	**ON**	OFF	**ON**	**ON**	Set as secondary pack 12
14	OFF	**ON**	**ON**	**ON**	Set as secondary pack 13
15	**ON**	**ON**	**ON**	**ON**	Set as secondary pack 14

3. Battery Pack LED indicator guides

Chart 1 - LED Working Status Indicator

State	Normal / Warning / Protection	RUN	ALM	SOC				Description
		●	●	●	●	●	●	
Shut down	Sleep	OFF	OFF	OFF	OFF	OFF	OFF	ALL OFF
Standby	Normal	Flash1	OFF	Based on capacity				Standby
	Alarm	Flash1	Flash3					Low voltage

Charge	Normal	ON	OFF	Based on capacity (High LED Flash2)				High LED flash2
	Warning	ON	Flash3					
	Over Charge Protection	ON	OFF	ON	ON	ON	ON	Switch to standby when there is no charging
	Over temperature / Over current / Fail protection	OFF	ON	OFF	OFF	OFF	OFF	Stop charging
Discharge	Normal	Flash3	OFF	Based on capacity				
	Warning	Flash3	Flash3					
	Over Discharge Protection	OFF	OFF	OFF	OFF	OFF	OFF	Stop discharging
	Over temperature / Over current/ Short circuit / Fail protection	OFF	ON	OFF	OFF	OFF	OFF	Stop discharging
Fault		OFF	ON	OFF	OFF	OFF	OFF	Stop charging or discharging

Chart 2 - SOC Indicator

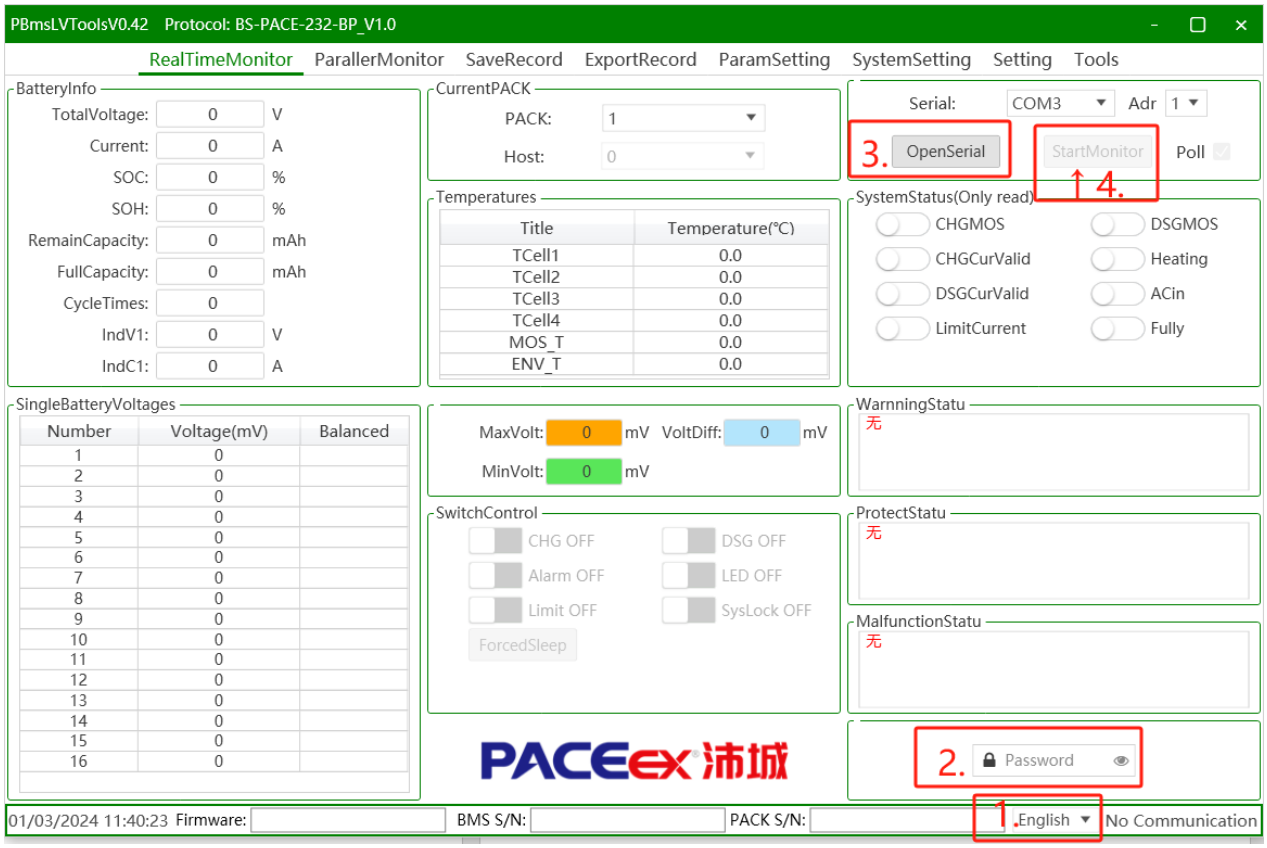
Status		Charge				Discharge			
SOC indicator		● L4	● L3	● L2	● L1	● L4	● L3	● L2	● L1
SOC (%)	0-25%	OFF	OFF	Flash2	ON	OFF	OFF	OFF	ON
	25-50%	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON
	50-75%	OFF	OFF	OFF	ON	OFF	OFF	OFF	ON
	75-100%	OFF	OFF	Flash2	ON	OFF	OFF	ON	ON
RUN indicator		ON				Flash3			

Chart 3 - LED Flashing Mode

Mode	Light on (S = Second)	Light out (S = Second)
Flash1	0.25S	3.75S
Flash2	0.5S	0.5S
Flash3	0.5S	1.5S

04 Manual modification of protocol description

1. Plug the USB to RS232 cable into the laptop and the RS232 port on the battery box. Open the host computer software, PBmsLVTools_V0.42_20231109. Then, click on the lower right corner of the Chinese to switch to English. Enter the password 123456. Open the serial port, and click the "StartMonitor" to start.



2. Click on ”SystemSettings“, read the current protocols, select the needed CAN and 485 protocols and click on "Write".

Global Ace Solar reserves the right to change the contents of this manual without notice.


775-391-0778


www.globalacesolar.com


sales.support@globalacesolar.com