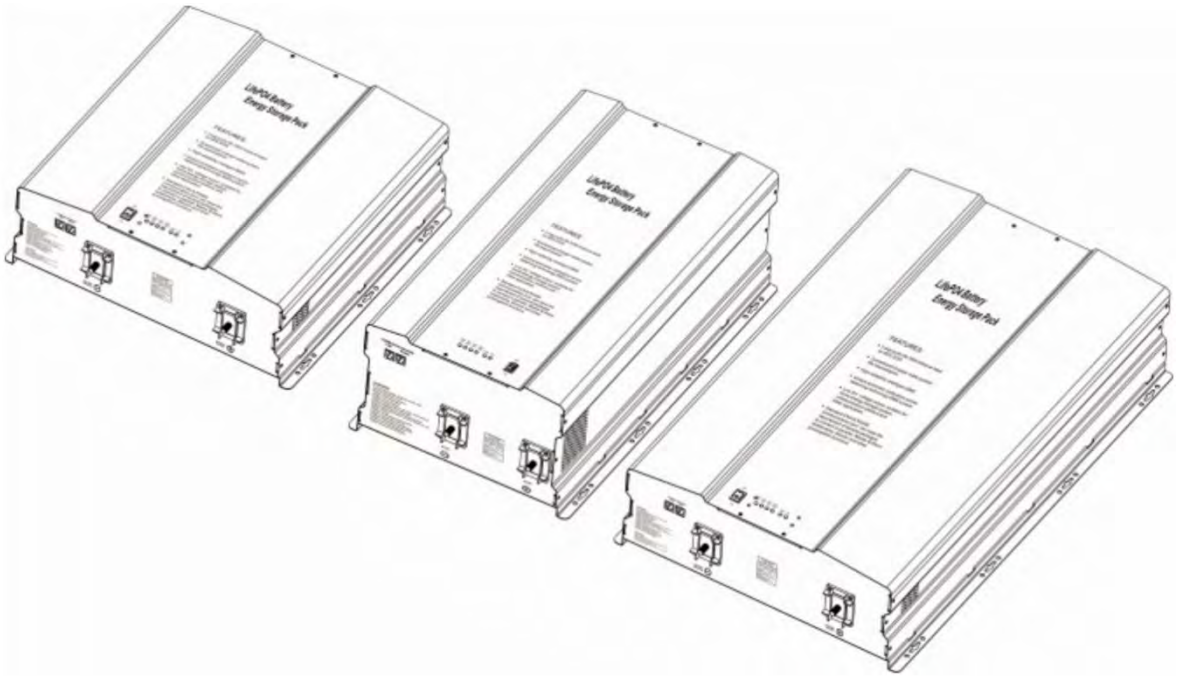
LiFePO4 Battery Pack

Version 1.0



Read the instruction manual before installation and operation.

The information include in this manual is accurate at the time of publication. However, this manual is subject to change without prior notice. In addition, the illustrations in this manual are meant only to help explain system configuration concepts and installation instructions.
Please note the image shown is for illustration purposes only.

Warning: Read this entire document before installing or using this product. Failure to do so or to follow any of the instructions or warning in this document can result in electrical shock, serious injury, or death, or can damage this product, potentially rendering it inoperable.

After installation, the installer must explain the manual to the end-user and keep this manual nearby the product for future reference.

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1 Safety Information

1.1 Symbols

Caution, risk of electric shock

Do not place or install near flammable or explosive materials

Install the product out of reach of children.

Read the instruction manual before starting installation and operation.

Heavy weight may cause serious injury to the back.

Do not dispose of the product with household wastes.

Recyclable

Disconnect the equipment before carrying out maintenance or repair.

Observe precautions for handling electrostatic discharge sensitive devices.

1.2 Safety Instructions

For safety reasons, installers are responsible for familiarizing themselves with the contents of this document and all warnings before performing installation.

1.2.1 General Safety Precautions

Over-voltages or wrong wiring can damage the battery pack and cause deflagration, which can be extremely dangerous.
All types of breakdown of the product may lead to a leakage of electrolyte or flammable gas.
Avoid installing the battery pack where flammable materials are stored. Do not install in places where explosive gas or chemicals are present.
The utility grid, solar input, and battery voltage must be disconnected from the Battery Pack wiring. Wiring must be carried out by a qualified person.
Battery Pack is not user serviceable.

1.2.2 Battery Handling guide

Do not expose battery to open flame.
Do not place the product nearby flammables. It may lead to fire or explosion in case of accident.
Do not expose or place near water sources like downspouts or sprinklers.
Do not store this product in a place exposed to direct sunlight.
A ventilated area is strongly recommended for handling the product.
Store at cool and dry place. (Do not store in greenhouses and storage areas for hay, straw, chaff, animal feed, fertilizers, vegetables or fruit products.)
Store the product on a flat surface.
Store the product out of reach of children and animals.
Store the product where it should be minimal dust and dirt in the area.
Do not disconnect, disassemble or repair by unqualified personnel. Service must be made by qualified personnel only.
Do not damage the unit in such ways as dropping, deforming, impacting, cutting or penetrating with a sharp object. It may cause a leakage of electrolyte or fire.
Do not touch if liquid is spilled on the product. There is a risk of electric shock. Handle the battery wearing the insulated gloves.
Do not step on the product or the product package. The product may be damaged.
Do not place any foreign objects on the top of the Battery Pack.
Do not put the battery pack upside down on the ground.
Do not connect anode and cathode terminal block opposite direction.
Do not charge or discharge damaged battery.
If the battery pack is installed in the garage then ensure the product is above the height of the vehicle bumper.
The battery pack only be installed indoors. If installed outdoors, do not allow the battery pack to be exposed to direct sunlight and water source as it may cause:
-Power limitation phenomena in the battery
(with a resulting decreased energy production by the system)
-Premature wear of the electrical/electromechanical components and mechanical components.
-Reduction in performance, service life and possible damage of the battery
Only use the product with supplier recommend inverter and MPPT solar charge controller.
Do not connect any AC conductors or Photo-voltaic conductors directly to the battery pack and should be only connected to the Inverter

1.2.3 Response to Emergency Situations

The battery comprises multiple batteries and Sophisticated BMS that are designed to prevent hazards resulting from failures. However, we cannot guarantee their absolute safety if battery is mishandled.
If a user happens to be exposed to internal materials of the battery cell due to damage on the outer casing, the following actions are recommended.
Inhalation: Leave the contaminated area immediately and seek medical attention.
Eye contact: Rinse eyes with running water for 15 minutes and seek medical attention.
Contact with skin: Wash the contacted area with soap thoroughly and seek medical attention
Ingestion: Induce vomiting and seek medical attention.
If a fire breaks out in the place where the battery pack is installed, perform the following countermeasures:
Fire extinguishing media
Respirator is not required during normal operations.
Use FM-200 or CO2 extinguisher for battery fire.
Use an ABC fire extinguisher, if the fire is not from battery and not spread to it yet.
Firefighting instructions
If fire occurs when charging batteries, if it is safe to do so, power off the switch.
If the battery pack is not on fire yet, extinguish the fire before the battery pack catches fire.
If the battery pack is on fire, do not try to extinguish but evacuate people immediately
Effective ways to deal with accidents
On land: Place damaged battery into a segregated place and call local fire department or service engineer.
In water: Stay out of the water and do not touch anything if any part of the battery, inverter, or wiring is submerged.
Do not use submerged battery again and contact the service engineer.

1.3 Qualified Personnel

This guide and the tasks and procedures described herein are intended for use by skilled workers only. A skilled worker is defined as a trained and qualified electrician or installer who has all of the following skills and experience:
Knowledge of the functional principles and operation of on-grid and off-grid (backup) systems.
Knowledge of the dangers and risks associated with installing and using electrical devices and acceptable mitigation methods.
Knowledge of the installation of electrical devices
Knowledge of and adherence to this guide and all safety precautions and best practice

Make sure all power is off and wires are disconnected when maintaining/servicing the battery

2 Product Introduction

2.1 General Information

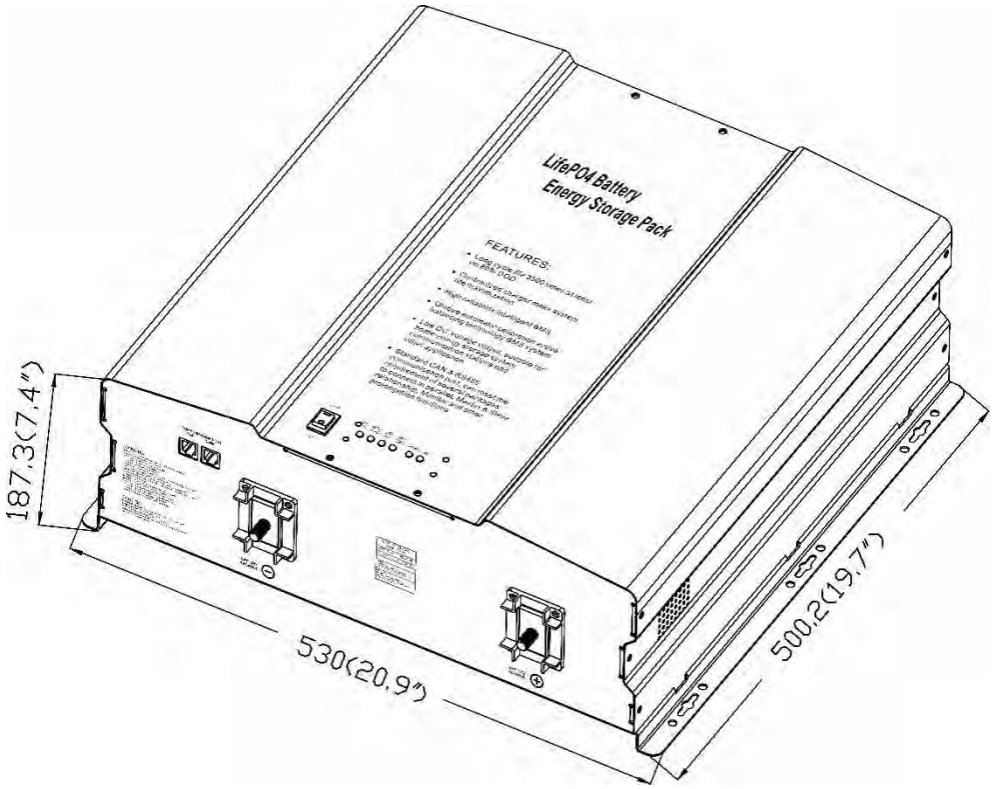
This Battery system is a high-tech product researched and developed product. With its integration, miniaturization, light-weight, intelligent centralized monitoring, battery maintenance and management, unattended, energy conservation and environmental protection, are widely applied in remote access network equipment, remote switch unit, mobile communication, transmission equipment, home storage and other areas as a backup power supply.

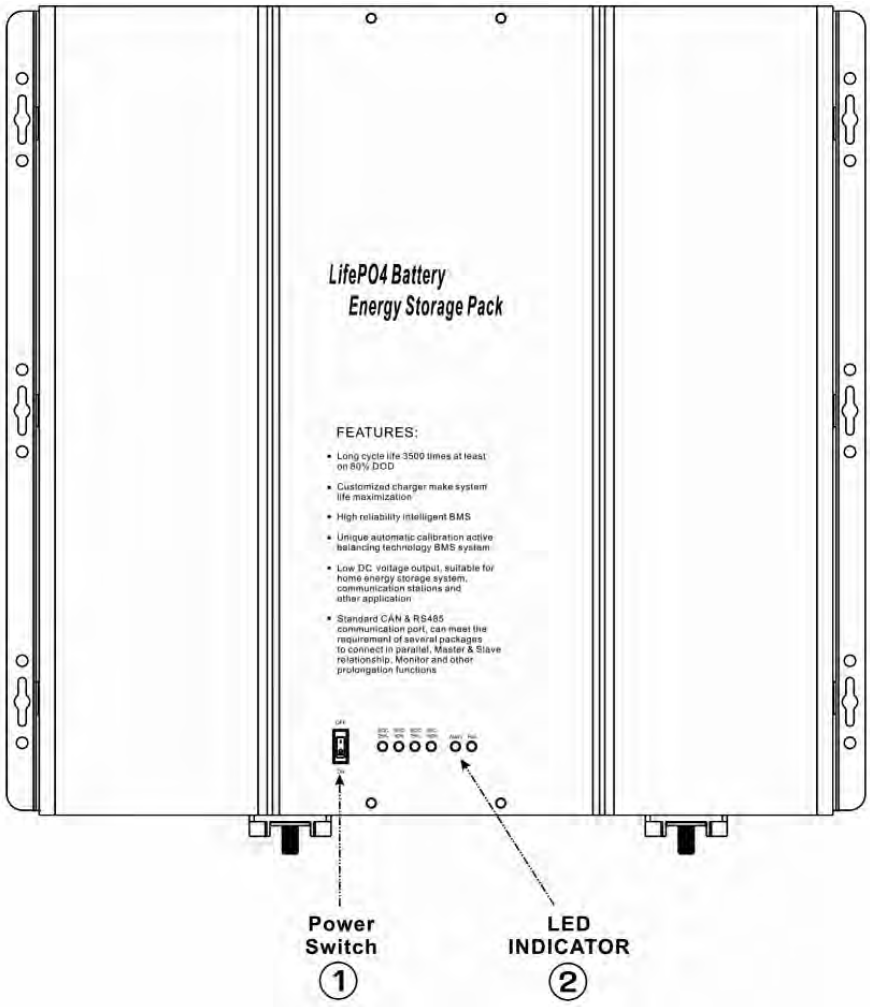
2.2 Product Features

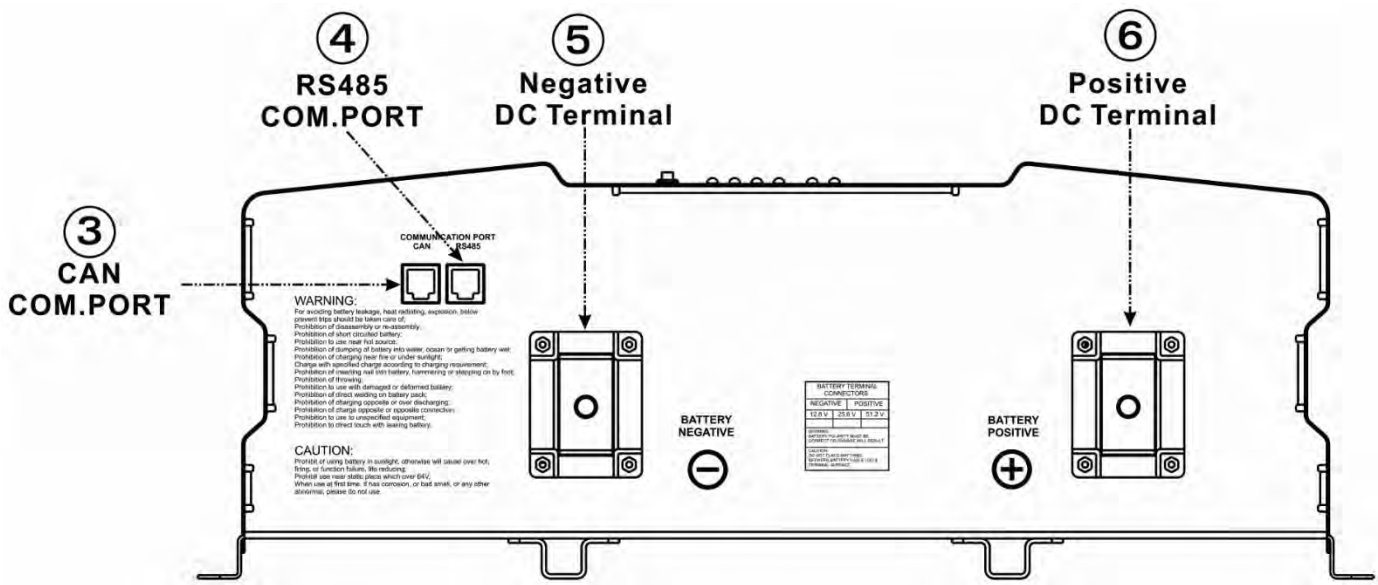
- Battery adopts LiFePO4 as cathode material; LiFePO4 cell life cycle could reach 3500 times RT 80% DOD, 6000 times RT 60%DOD
- The system adopts high performance of BMS battery management module. The BMS has the protection function in current, voltage and temperature, it also makes a good communication between battery system and the host equipment;
- Monitoring unit will automatically measure the battery charge and discharge current, charge and discharge voltage, single cell surface temperature;
- Power cut off function. It will have the alarm information if the battery voltage is lower than the alarm value, when the voltage is too low, it will protect the batteries by automatic power cut off;
- The system has a good electromagnetic compatibility;
- All intelligent design, equipped with centralized monitoring module, it realizes the computer management which can communicate with the remote central control center;
- Effective combinations of Power control technology with computer which realize real-time monitoring and control all kinds of parameters and state;
- Flexible installation: Indoor
- Max connection: 10 batteries in parallel

2.3 Mechanical Drawing

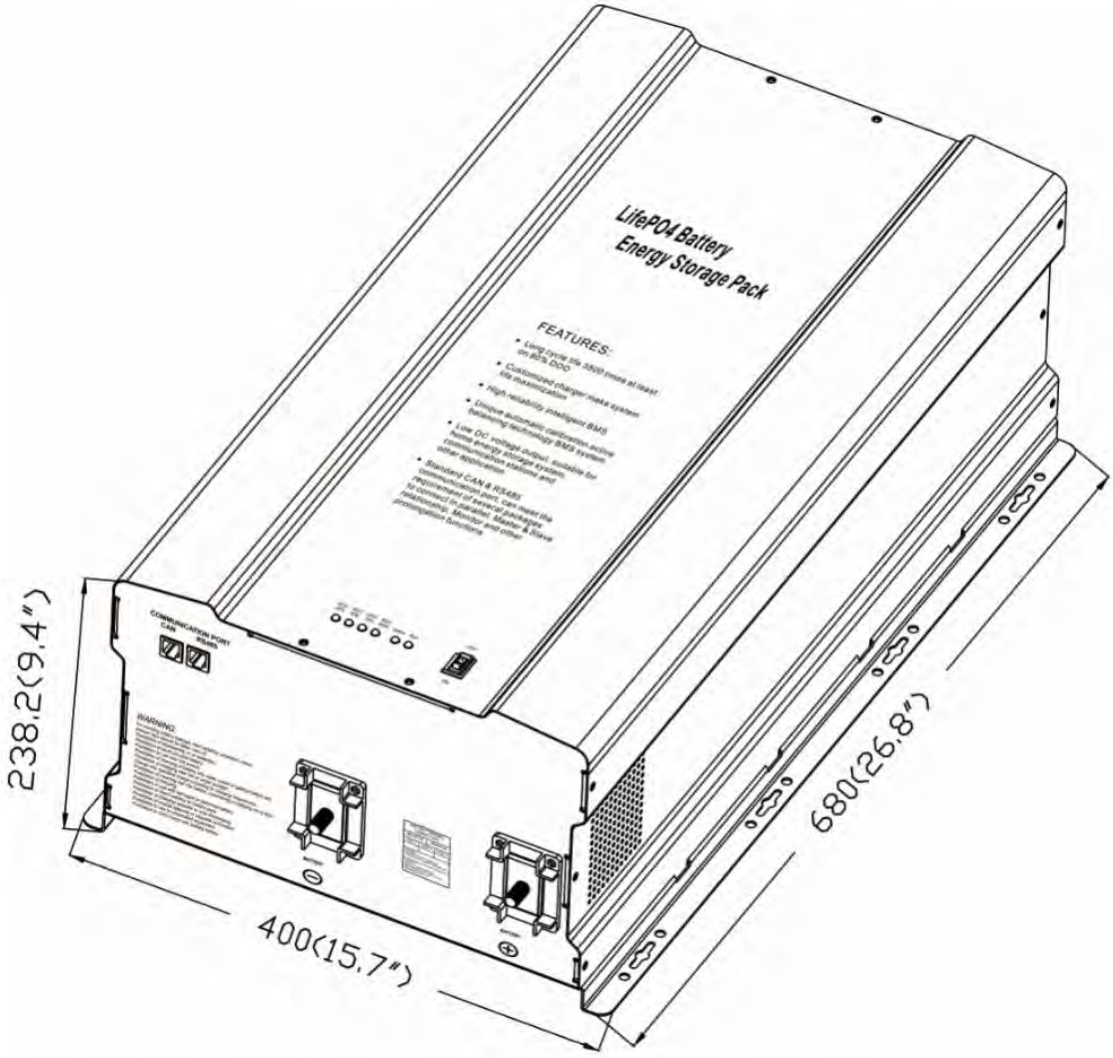
3.84KWH&4.61KWH

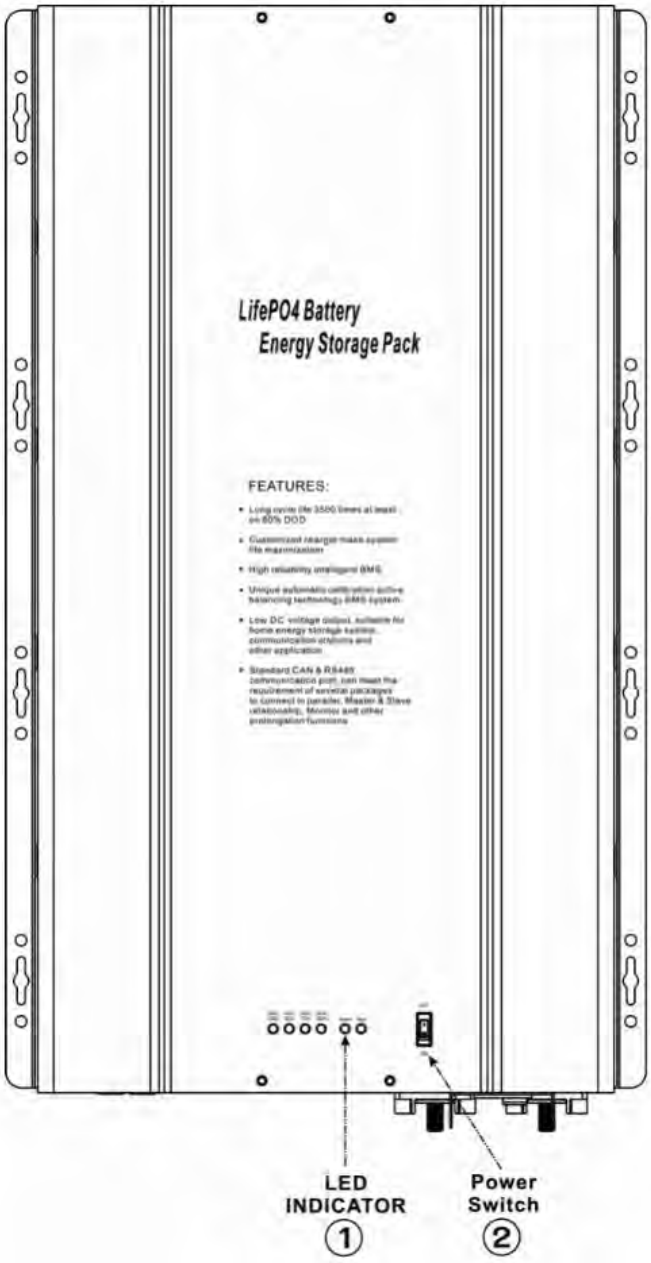


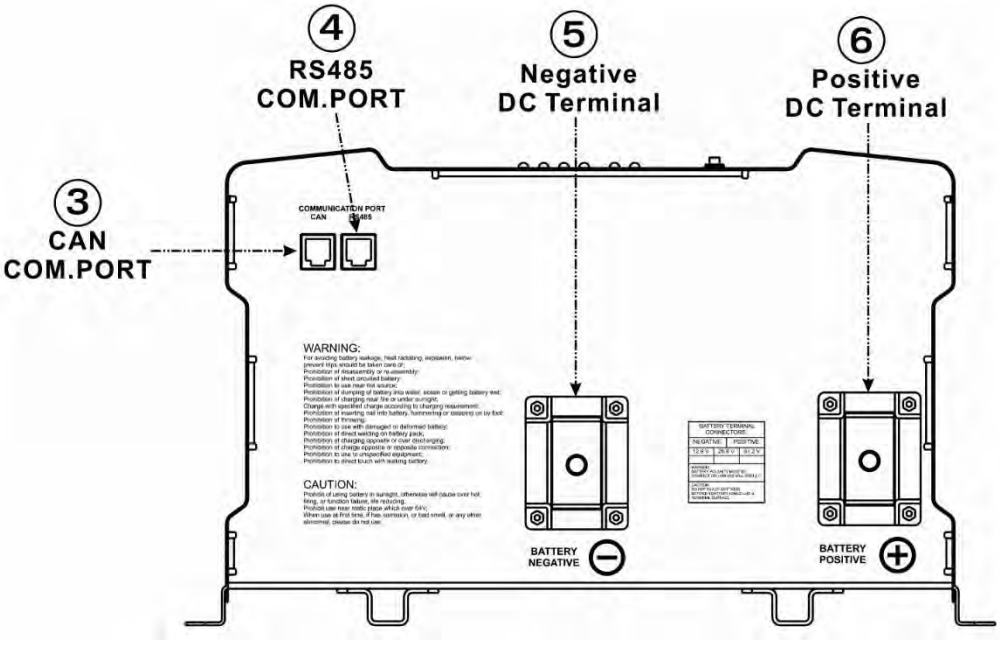



4
RS485
COM.PORT
5
Negative
DC Terminal
6
Positive
DC Terminal
3
CAN
COM.PORT
COMMUNICATION PORT
CAN
RS485
WARNING:
CAUTION:
BATTERY
NEGATIVE
BATTERY
POSITIVE

5.12KWH


LifePO4 Battery
Energy Storage Pack
FEATURES:
238.2(9.4")
400(15.7")
680(26.8")


LifePO4 Battery
Energy Storage Pack
FEATURES:
LED
INDICATOR
①
Power
Switch
②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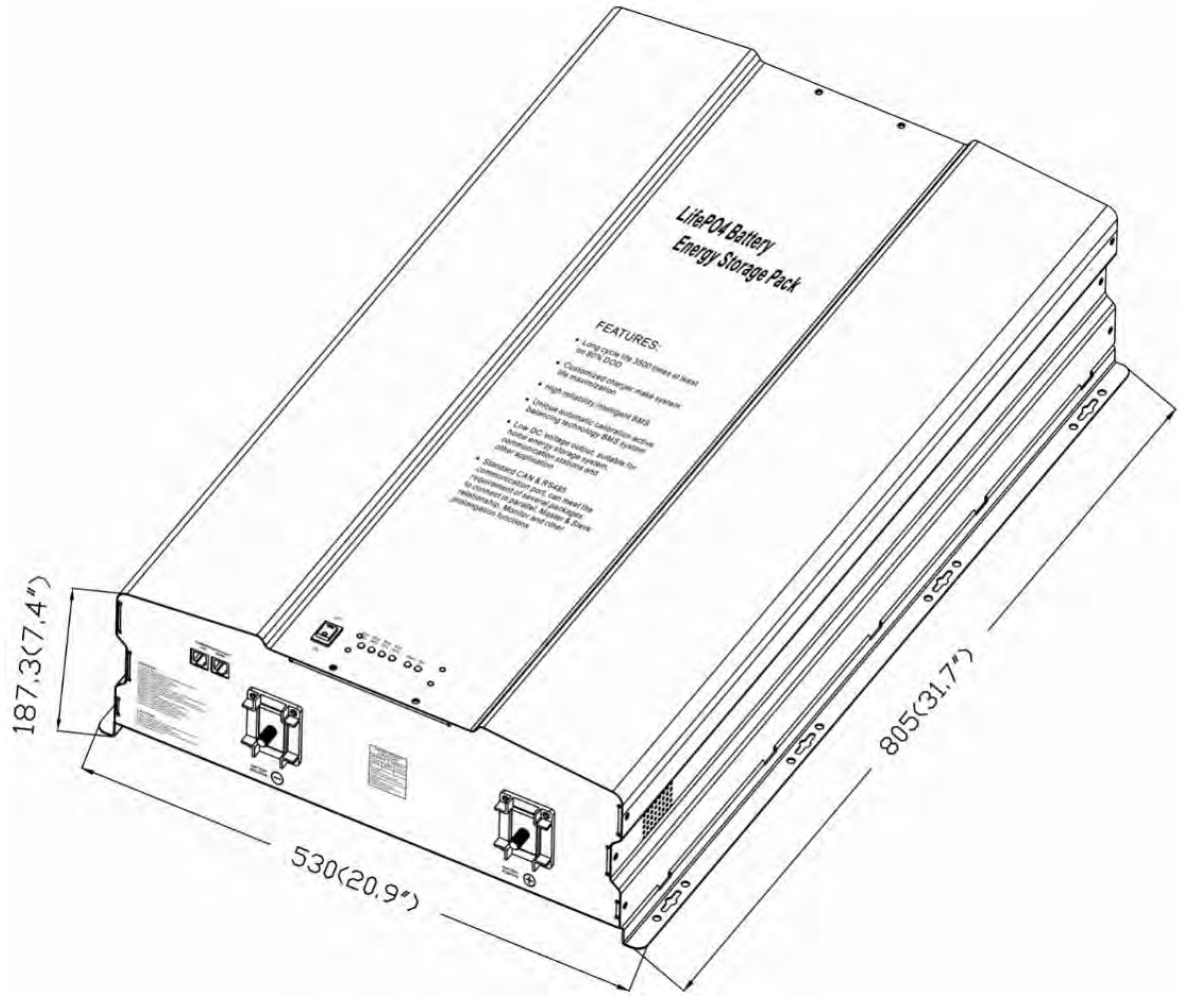
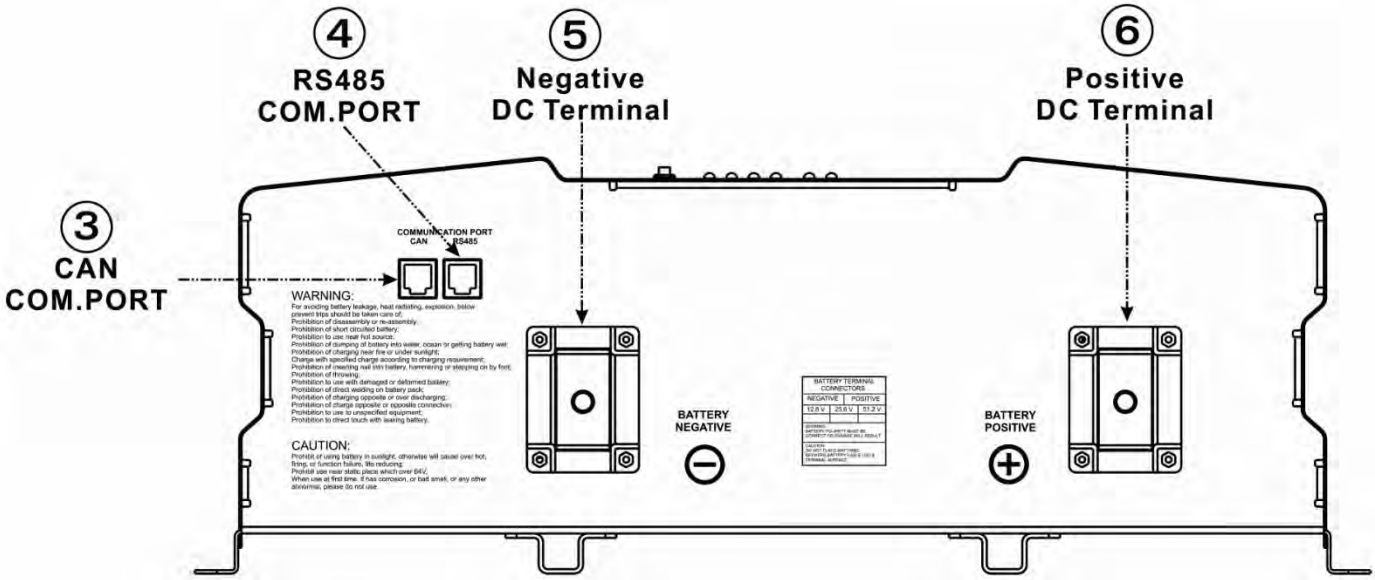
7.68KWH&9.22KWH

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COMMUNICATION PORT
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RS485
WARNING:
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BATTERY
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BATTERY
POSITIVE

2.4 Electrical Performance

2.4.1 Battery Pack

Battery Technology Specification											
NO	**Model**	**12300**	**12360**	**24150**	**24180**	**24200**	**24300**	**24360**	**48100**	**48150**	**48180**
1	Battery Rated Voltage	12.8Vdc		25.6Vdc					51.2Vdc		
2	Battery Rated Capacity	300Ah	360Ah	150Ah	180Ah	200Ah	300Ah	360Ah	100Ah	150Ah	180Ah
3	Battery Rated Energy	3.84KWH	4.61KWH	3.84KWH	4.61KWH	5.12KWH	7.68KWH	9.22KWH	5.12KWH	7.68KWH	9.22KWH
4	Battery Cell Type	Long Cycle Life Square LiFePO4									
5	Battery Cell Quantity	3.2V75AH 16PCS	3.2V90AH 16PCS	3.2V75AH 16PCS	3.2V90AH 16PCS	3.2V50AH 32PCS	3.2V75AH 32PCS	3.2V90AH 32PCS	3.2V50AH 32PCS	3.2V75AH 32PCS	3.2V90AH 32PCS
5	Battery Cell Configuration	4S4P		8S2P		8S4P			16S2P		
6	Rated Charge Voltage	14.0Vdc		28.0Vdc					56.0Vdc		
7	Max Charge Voltage	14.2Vdc		28.4Vdc					56.8Vdc		
8	Overcharge Protection	14.6Vdc		29.2Vdc					58.4Vdc		
9	Rated Charge Current @RT	150A	180A	75A	90A	100A	150A	180A	50A	75A	90A
10	Max Charge Current @RT	180A	220A	90A	110A	120A	180A	220A	60A	90A	110A
11	Over Charge Protection Release	Restart									
12	Charge Temp	0~45℃, （RT=25℃)									

	Range										
13	Output Voltage Range	11~14Vdc		20~28Vdc					40~56Vdc		
14	Rated Discharge Current @RT	300A	360A	150A	180A	200A	300A	360A	100A	150A	180A
15	Max Discharge Current @RT	360A	440A	180A	215A	240A	360A	440A	120A	180A	220A
16	Over Discharge Protection Release	Charging or Cut off loads and Restart									
17	Discharge Temp Range	-20~60℃，（RT=25℃)									
18	Communication	RS485 for LCD / CAN for PC monitor									

2.4.2 BMS

The batteries are supplied with a LiFePO4 Battery Management System (BMS)that can monitor and optimized each single prismatic cell during charge & discharge, to protect the battery pack overcharge, over discharge, short circuit. Overall, the BMS helps to ensure safe and accurate running.

Items	Content (for each cell)	Criterion	Alarm LED(red)
Over charge	Over-charge warning	3600mv	once/3s flash, keep output
	Over-charge protection	3650mv	once/1s flash, relay cut off
	Over-charge warning release	3400mv	
	Over-charge protection release	3350mv	
	Over-charge release method	Restart and Discharge	
Over discharge	Over-discharge warning	2700mv	once/3s flash, keep output
	Over-discharge protection	2500mv	once/1s flash, relay cut off
	Over-discharge warning release	2900mv	
	Over-discharge protection release	2800mv	
	Over-discharge release method	Charging	
Over current (CHG&DISCHG)	Over current warning	110% rated	once/1s flash, delay 1min
	Over current protection(PEAK)	120% rated	Lightning, delay 5s
	Over current release method(CHG)	Restart	
	Over current release method(DISCHG)	Cut off loads and Restart	
Over & Lower Temp (Discharging)	Over temperature	Warning @55℃	once/3s flash, keep output
		Protection @60℃	once/1s flash, relay cut off
		WarningRelease @50℃	
		Protection Release@55℃	
	Lower temperature	Warning @-20℃	once/3s flash, keep output
		Protection @-25℃	once/1s flash, relay cut off
		WarningRelease @-15℃	
		Protection Release@-20℃	
Over & Lower Temp (Charging)	Over temperature	Warning @45℃	once/3s flash, keep output
		Protection @50℃	once/1s flash, relay cut off
		WarningRelease @40℃	
		Protection Release@45℃	
	Lower temperature	Warning @0℃	once/3s flash, keep output
		Protection @-5℃	once/1s flash, relay cut off
		WarningRelease @5℃	
		Protection Release@0℃	

Battery Management System. The built in BMS is a central hub inside the battery that maintains constant voltage, current and temperature. The BMS allows for maximum charging capacity for faster charging and efficient discharging. It also communicates with the desktop monitoring software via the RS485 or CAN port.

2.5 Packaging

Battery is with full packing which ensures that the products are not subject to any harmful gas, chemical contamination, electrostatic, wet and mechanical damage in handling, transportation and storage. The packing box has been marked with the name of the product, the type and size of the product, the date of production, the quantity and the batch number.

NO	Model	12300	12360	24150	24180	24200	48100	24300	24360	48150	48180
1	Dimension(unit) L*W*H(mm)	500*530*180mm				680*400*238mm		800*530*180mm			
2	Shipping L*W*H(mm)	625*610*300mm				815*425*430mm		950*650*400mm			
3	Weight(N.W.)	45kg	50kg	45kg	50kg	65kg	65kg	85kg	95kg	85kg	95kg
4	Weight(G.W.)	50kg	55kg	50kg	55kg	75kg	75kg	100kg	110kg	100kg	110kg

2.6 Transportation and Storage

2.6.1 Transportation

Based on the character of cell, proper environment for transportation of LiFePO4 battery pack need to be created to protect the battery. Battery should be stayed in the ware house -20℃～35℃ where it's dry, clean, shade, and well-ventilated. The battery should be stored in 45~55% SOC during transportation.
Product is adapted to the truck, boat, transport. When in transport, it should be covered to avoid the sunlight, and with civilized loading and unloading. With product packaging box allows using any kinds of transport, battery in loading and unloading process should be light moving gently to prevent throwing, rolling, pressing. Direct rain and mechanical impact of rain and snow should be avoided in transportation.

2.6.2 Storage

Product storage should be kept in dry warehouse, not sun and rain. The harmful gases are not allowed in the warehouse, as well as flammable and explosive products and corrosive chemicals. To avoid mechanical impact, stress and strong magnetic field effect, avoid direct sunlight and away from heat source not be less than 2m, the packing box should pad off the ground at least 20 cm high, away from the wall, window, or the air inlet at least 50cm. Under the provisions of the conditions of storage period of more than 3 months of products should charge once, storage period of more than 6 months products must check and test the capacity, store for more than 1 years of products must be re-examined, only can be used when is qualified.

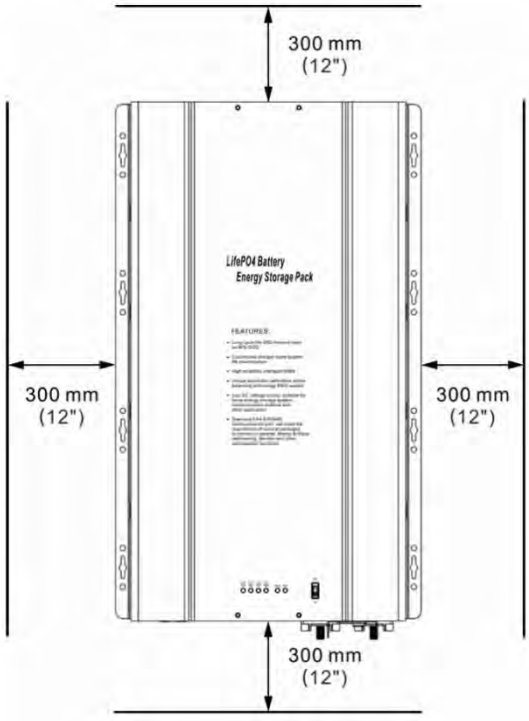
1	Storage Temperature	Less than 1 month	-20~35℃
		Less than 6 months	-10~30℃
2	Storage humidity	45~75%RH	

3 Installation

3.1 Locations

Required:
There must be no flammable or explosive materials nearby.
The recommended ambient temperature should be within the range of -10 ~ 45°C.
Battery pack must be installed on walls that are upright and can support battery weight.
Product shall be installed indoor
Recommended:
The building should be designed to withstand earthquakes.
Waterproof and properly ventilated area.
Install the product on a flat wall, surface or heavy-duty cabinet. Use proper supports, brackets and/or straps to handle the weight of the battery.
Install this product out of reach of children and animals.
CAUTION!
If the ambient temperature is outside of the operating range, the battery pack may stop operating to protect the internal components. The optimal temperature range for the battery pack to operate is from 10°C to 30°C . Frequent exposure to harsh temperatures may deteriorate the performance and overall life of the battery and will void the warranty.

3.2 Clearance



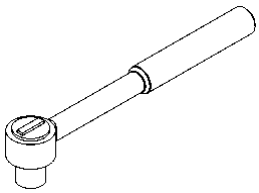
Recommended clearances(>12”) for the left、right、Top and bottom of the product is shown in the figure. For the proper ventilation and installer convenience

3.3 Tools、 Safety Gears Required

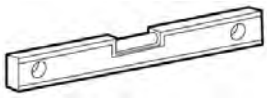
Tools

The following tools are required to install the battery pack:

Precision screwdriver



M8 & M10 Torque wrench



Inclinometer

Drill

Pencil or Marker

Safety gears for personal protection

It is recommended to wear the following safety gears when handling the battery pack.

Insulated gloves

Safety goggles

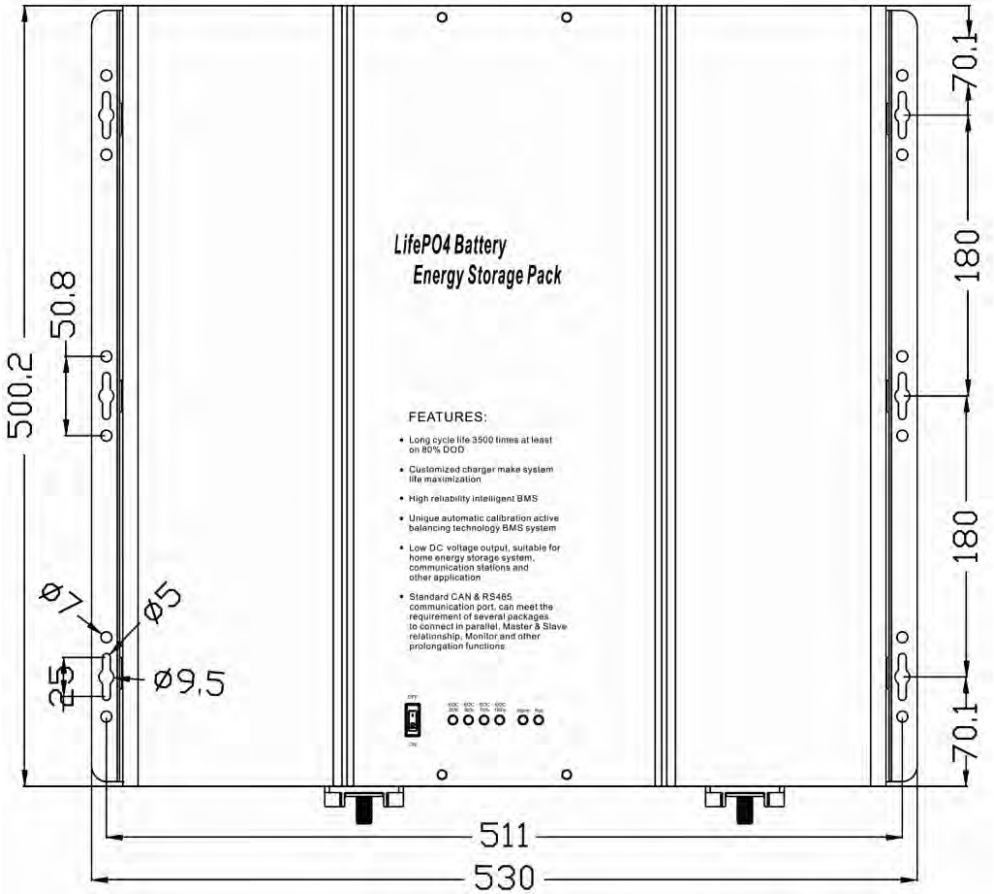
Safety shoes

NOTE

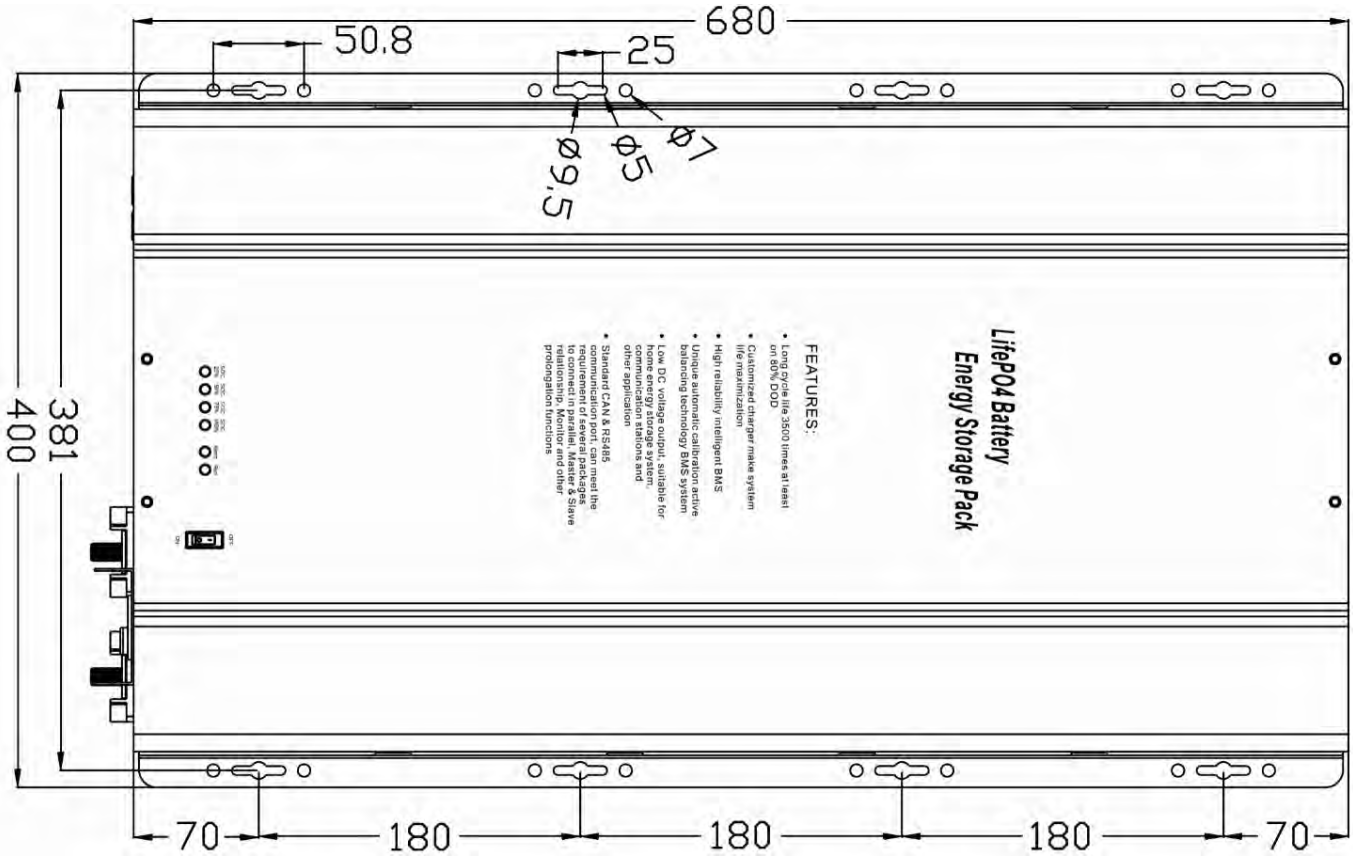
This product is heavy and challenging to lift. Lift handles are recommended.

3.4 Mounting Flange

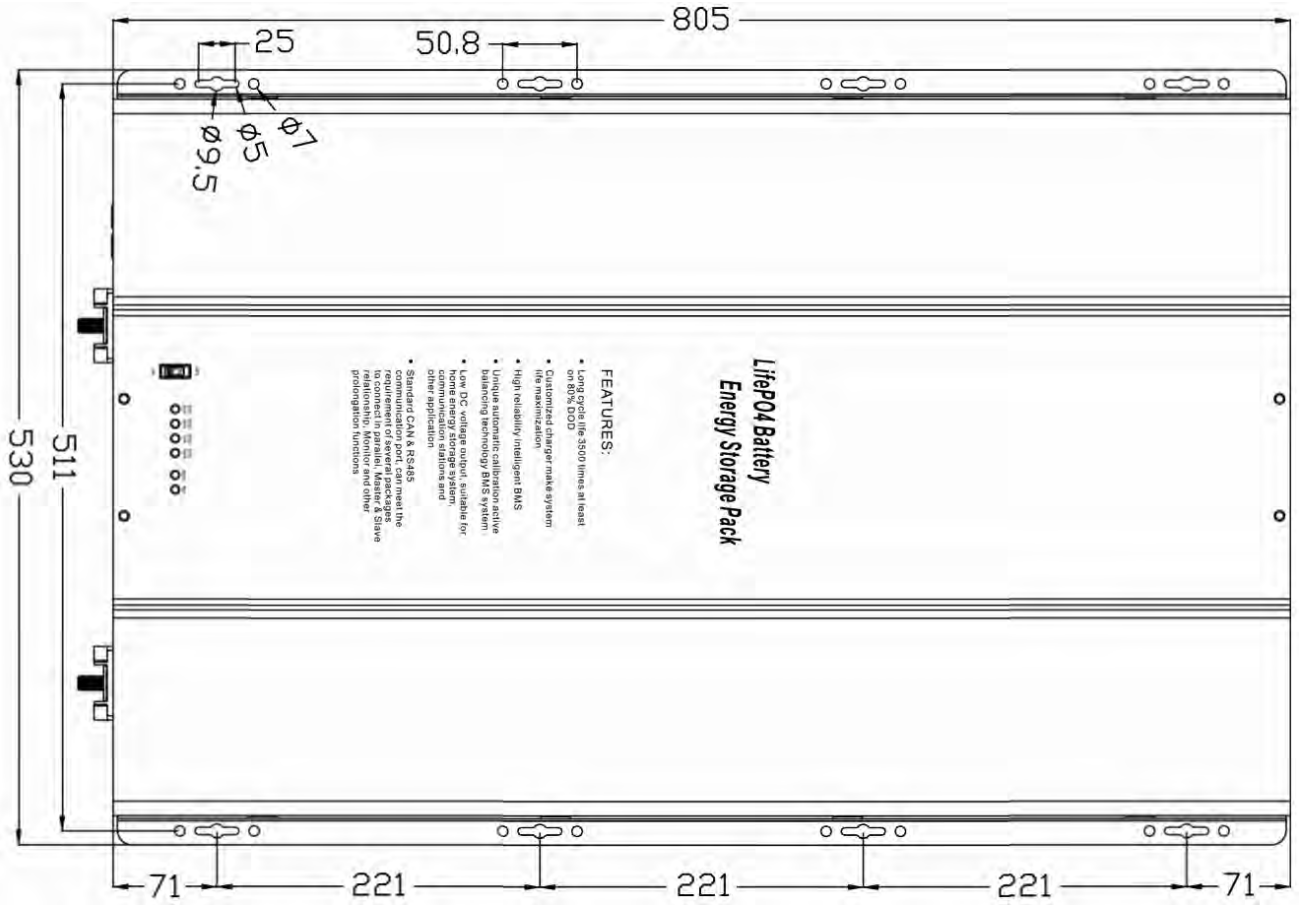
3.84KWH&4.61KWH



5.12KWH



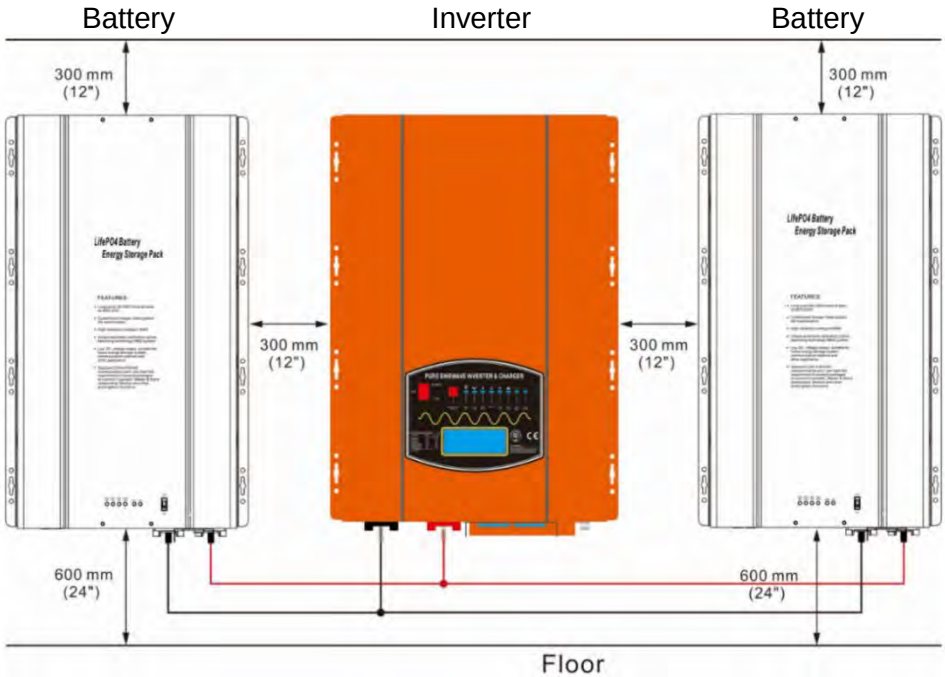
7.68KWH&9.22KWH



CAUTION!
Do not use if battery damaged!!

3.5 System Clearance

Battery requires adequate clearance for installation, cabling and airflow. Minimum clearance in the system configuration is as follows:



3.6 Battery Pack Installation

CAUTION!
Make sure that the inverter AC and DC disconnects are turned off before connecting the power cable to the battery pack.
Make sure that the power switch on inverter and battery pack are turned off before connecting the power cable to the battery pack.

NOTE!
USE PROPER BRACKETS, SUPPORTS, AND/OR STRAPS TO HANDLE THE WEIGHT OF THE BATTERY. WELL VENTILATED, HEAVY DUTY BATTERY CABINET IS RECOMMENDED.

3.6.1 DC Wiring

It is suggested the battery pack be kept as close as possible to the inverter or DC load. The following is a suggested wiring option for 1meter DC cable.
Please find the following minimum wire size, in case of DC cable longer than 1m, please increase the cross section of cable to reduce the loss.

NO	Model	DC Output voltage	Wire Gage
1	12300	12.8Vdc	AWG 2/0#
2	12360	12.8Vdc	AWG 2/0#
3	24150	25.6Vdc	AWG 2#
4	24180	25.6Vdc	AWG 2#
5	24200	25.6Vdc	AWG 1#
6	24300	25.6Vdc	AWG 2/0#
7	24360	25.6Vdc	AWG 2/0#
8	48100	51.2Vdc	AWG 3#
9	48150	51.2Vdc	AWG 2#
10	48180	51.2Vdc	AWG 2#

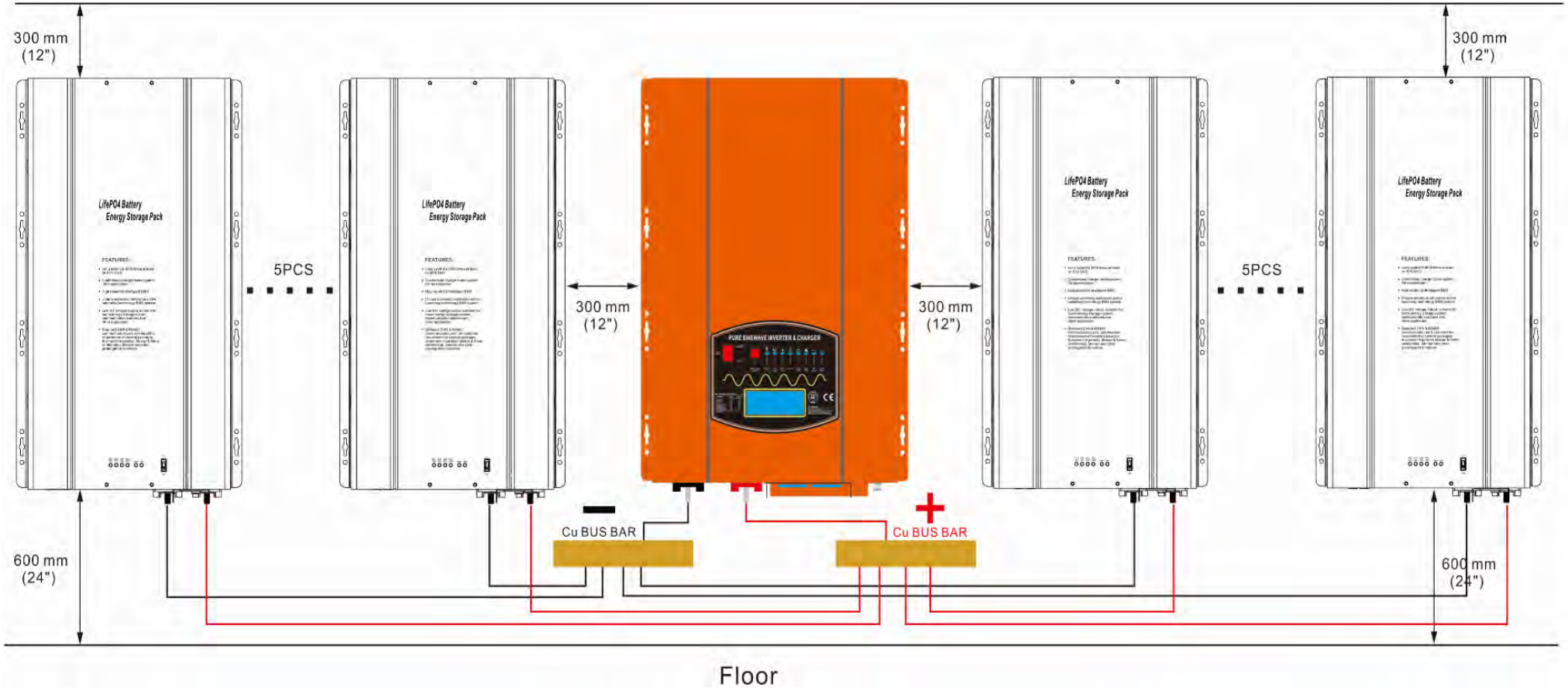
Performance of any product can be improved by thicker cable and shorter runs, so if in doubt, round up and keep the length as short as possible.
For more wiring configurations for your specific system, please contact your distributor for more information.

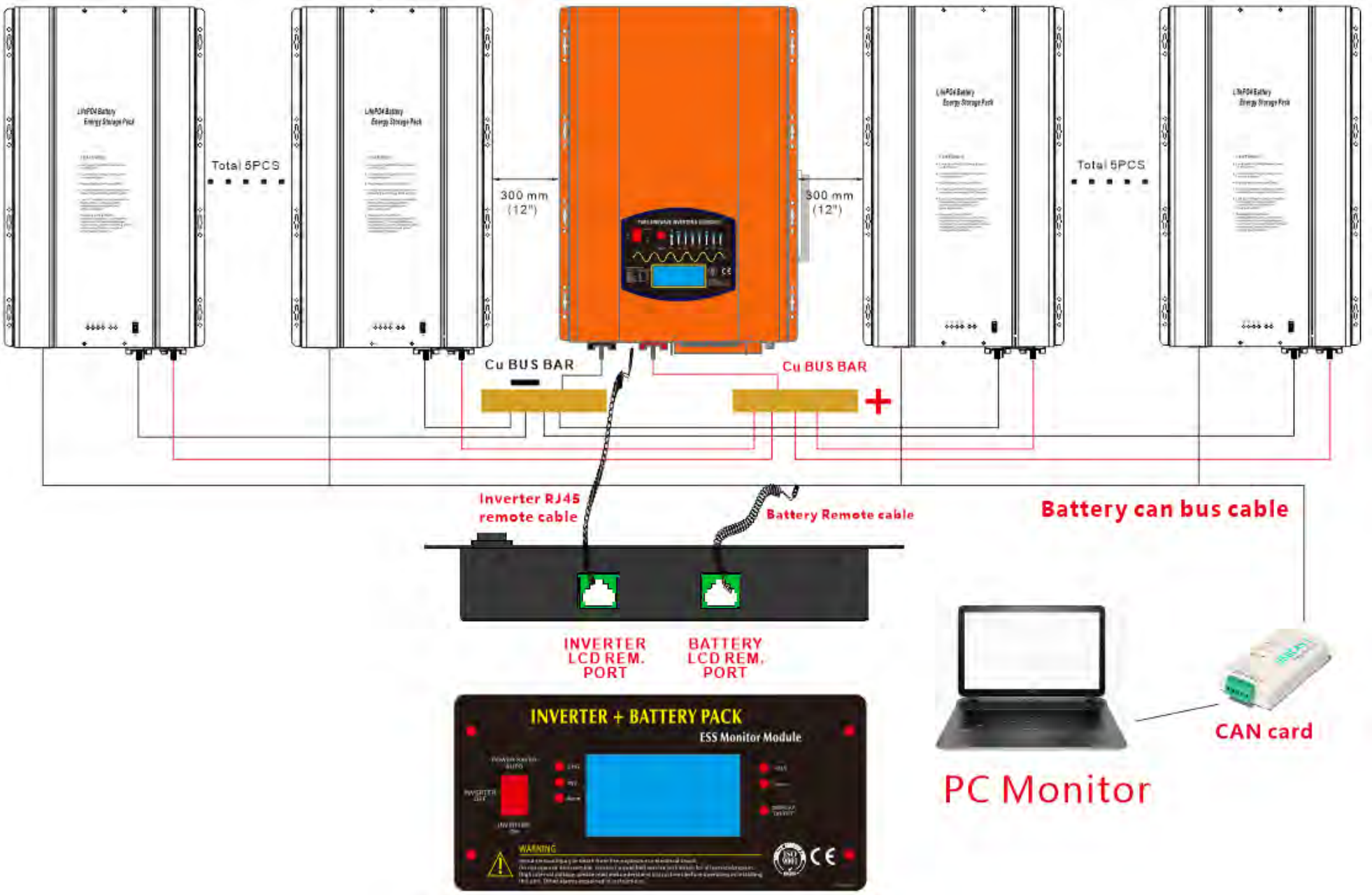
WARNING
The torque rating range for DC terminal is 19.8NM-24.6NM, and the suggested torque rating is 22.5NM. Over torqueing may cause the bolt to break.

3.6.2 Battery Pack Parallel

WARNING
Max batteries connected in parallel is up to 10 batteries. Only use identical batteries. All cables must be the same length and size.
DO NOT WIRE IN SERIES!

If more than 2PCS batteries be used in system, must make sure every battery's DC cable length from batteries to inverter same, this will be make the battery's performance best. Recommend way for more batteries parallel connect to inverter thru a bus bar, for more wiring configurations for your specific system, please contact your distributor for more information.




Total 5PCS
300 mm
(12")
300 mm
(12")
Total 5PCS
Cu BUS BAR
Cu BUS BAR
+
Inverter RJ45
remote cable
Battery Remote cable
Battery can bus cable
INVERTER
LCD REM.
PORT
BATTERY
LCD REM.
PORT
INVERTER + BATTERY PACK
ESS Monitor Module
WARNING
CAN card
PC Monitor

4 Operating

4.1 Operating Conditions

Installation Location	Indoor (Wall-Mounted or Flat-Mounted)
Operating Temperature	14 to 113°F (-10 to 45°C)
Operating Temperature (Recommended)	59 to 86°F (15 to 30°C)
Humidity	5% to 95%
Altitude	Max. 6,562ft (2,000m)
Cooling Strategy	Natural Convection

4.2 Powering Battery Pack

Put the battery pack in operation by taking the following steps:

1. Turn on the power switch after installation battery pack. For parallel batteries, turn on power switch one by one.
2. Seconds the internal main relay will pick up, all LEDs will light up.
3. If the battery pack is successfully initialized. The RUN LED indicator on the front should turn on in green. SOC LEDs indicator will showing the current capacity.
4. Turn on the inverter.

CAUTION

If it stays off, indicates FAULT or fails to operate, do not use the battery pack.

4.3 LED Indicators

The LED indicators on the front of the battery pack show its operational state as follows:

RUN LED(green)	Lighting: System working normal
Alarm LED(red)	once/3S Flash: system warning
	once/1S Flash: system protection
	Lighting: system fault

SOC LEDs (4 green)	**In Charging Mode** SOC<25%, LED1, LED2, LED3, LED4 flash in turn 25%<SOC <50%, LED1 lighting, LED2, LED3, LED4 flash in turn 50%<SOC<75%, LED1, LED2 lighting, LED3, LED4 flash in turn 75%<SOC<95%, LED1, LED2, LED3 lighting, LED4 flash SOC>95%, LED1, LED2, LED3, LED4 lighting **In Discharging Mode** SOC< 10%, LED1, LED2, LED3, LED4 off 10%<SOC<25%, LED1 flash, LED2, LED3, LED4 off 25% <SOC<50%, LED1 lighting, LED2 flash, LED3, LED4 off 50% <SOC <75%, LED1, LED2 lighting, LED3 flash, LED4 off SOC>75%, LED1, LED2, LED3 lighting, LED4 flash

4.4 Turning off the Battery Pack

To shut down the battery pack, follow these steps:
1. Turn off the inverter.
2. Turn off the battery pack. For parallel batteries, turn off the power switch one by one.
3. Within a few seconds, the internal main relay will cut off, all LEDs off.

CAUTION
If not using the battery pack for a long time or if there is any fault on the pack, turn off the power switch.

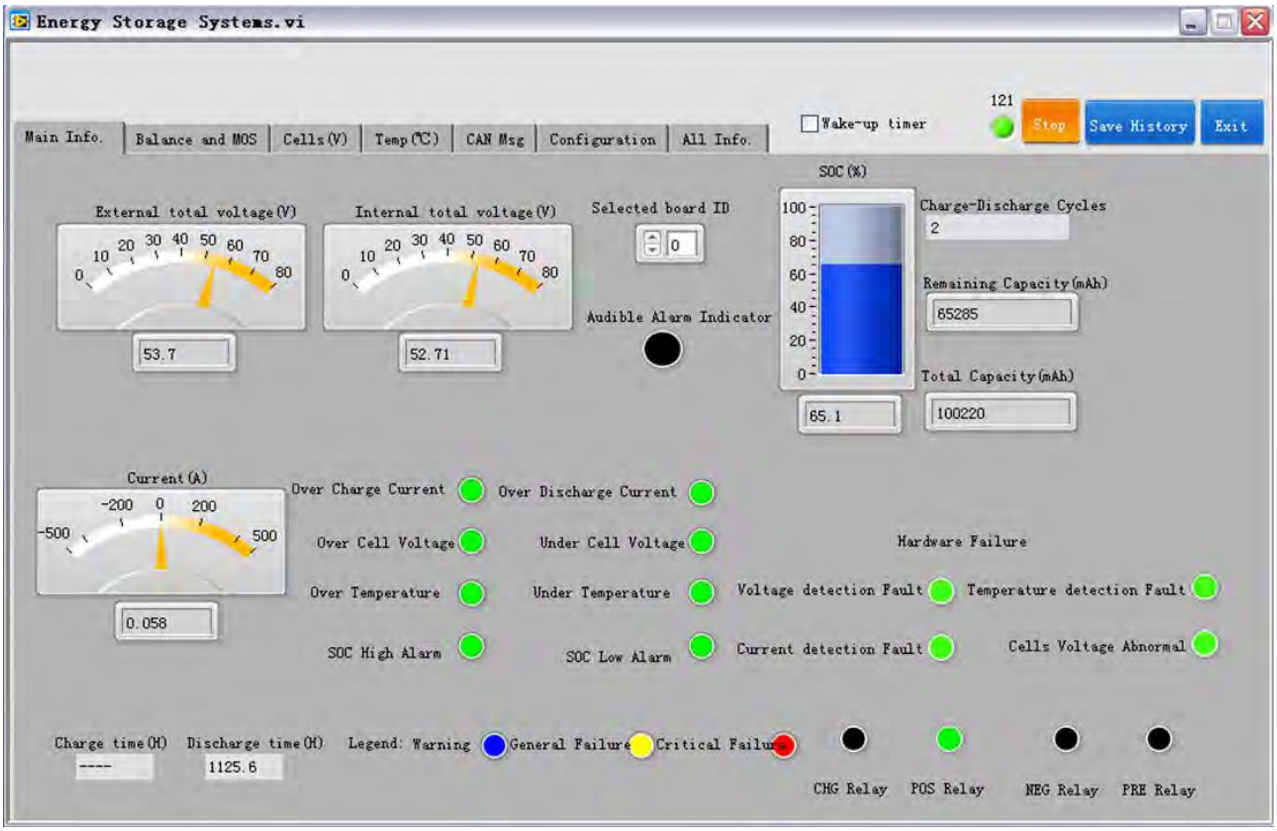
4.5 Communication with PC(optional)

Connect the CAN communication card from the battery pack to the computer, after installing the ESS monitor, the information displays on 7 different tabs:
1. Main Info tab: SOC%, voltage, current, cycles, capacity and running status
2. Balance & MOS tab: cell balancing
3. Cells tab: cell voltage
4. Temp tab: internal cell temperature
5. CAN Transmission Message
6. Configuration tab:
   Bus
   Diagnostics - displays voltage, temp and current
   Data storage
7. All Info tab: summary of all info per battery if more than one battery is being used (max 10 batteries in parallel)

NOTE: The CAN communication card need to buy independent


USBCAN-I
Professional CAN-bus Tools
CAN
ERR
PWR

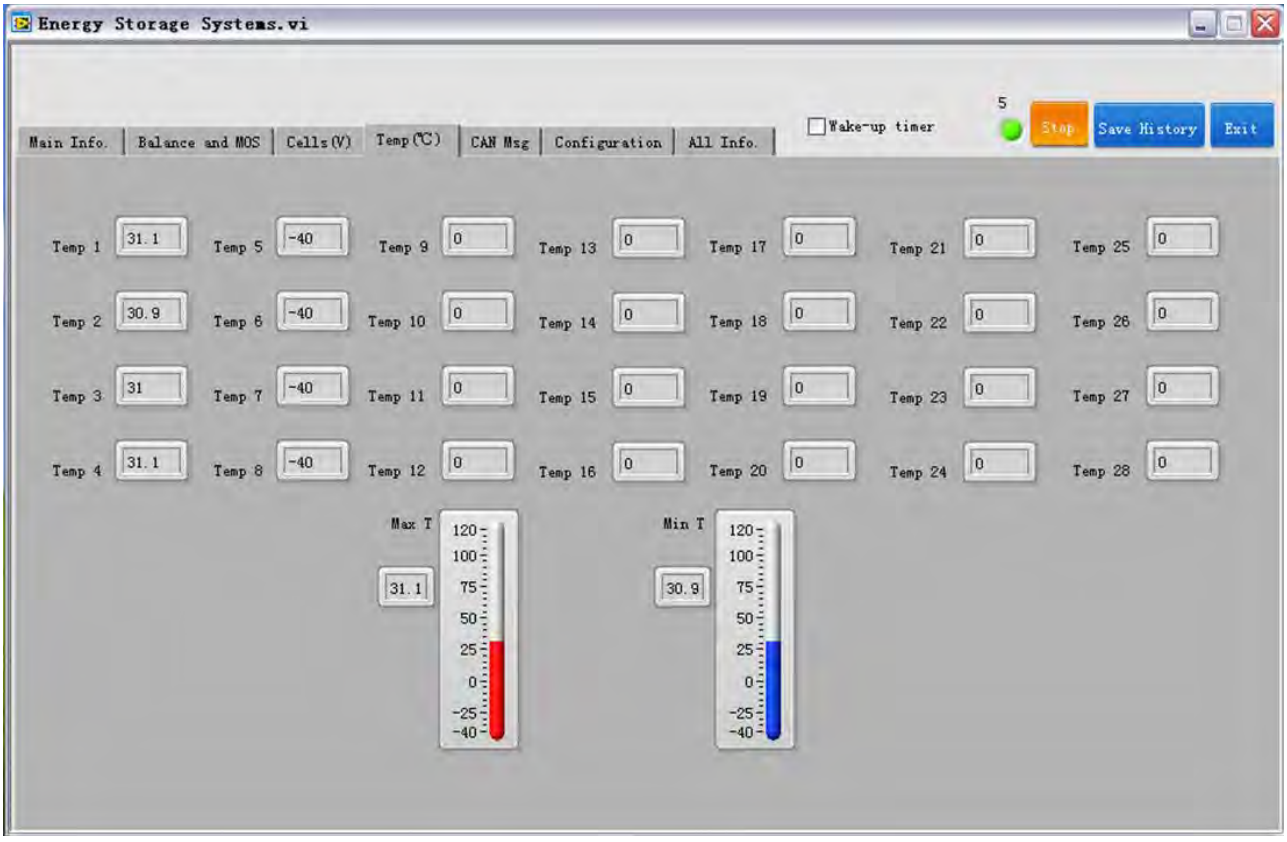

DELL
USBCAN-I



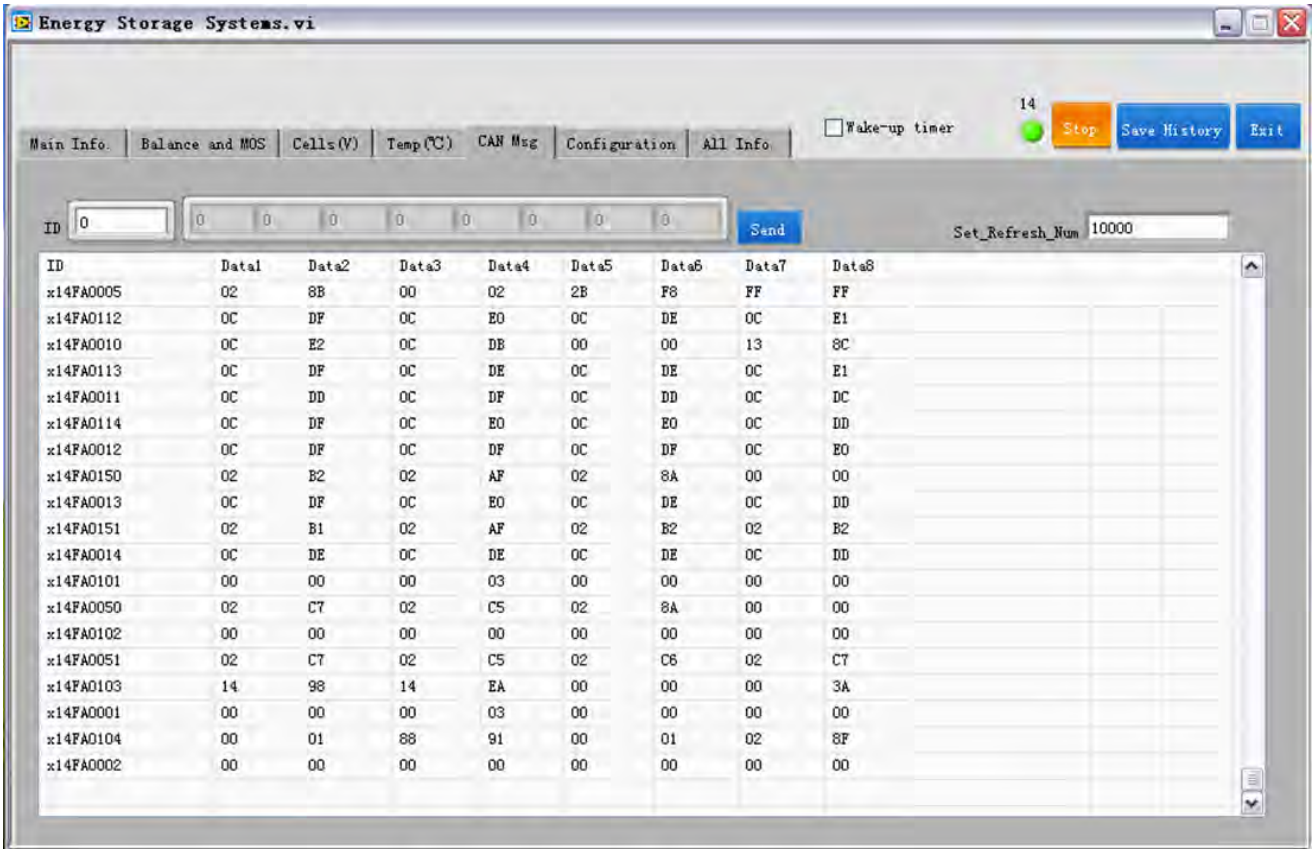
1、Main Info tab: SOC%, voltage, current, cycles, capacity and running status

2、Balance & MOS tab: cell balancing

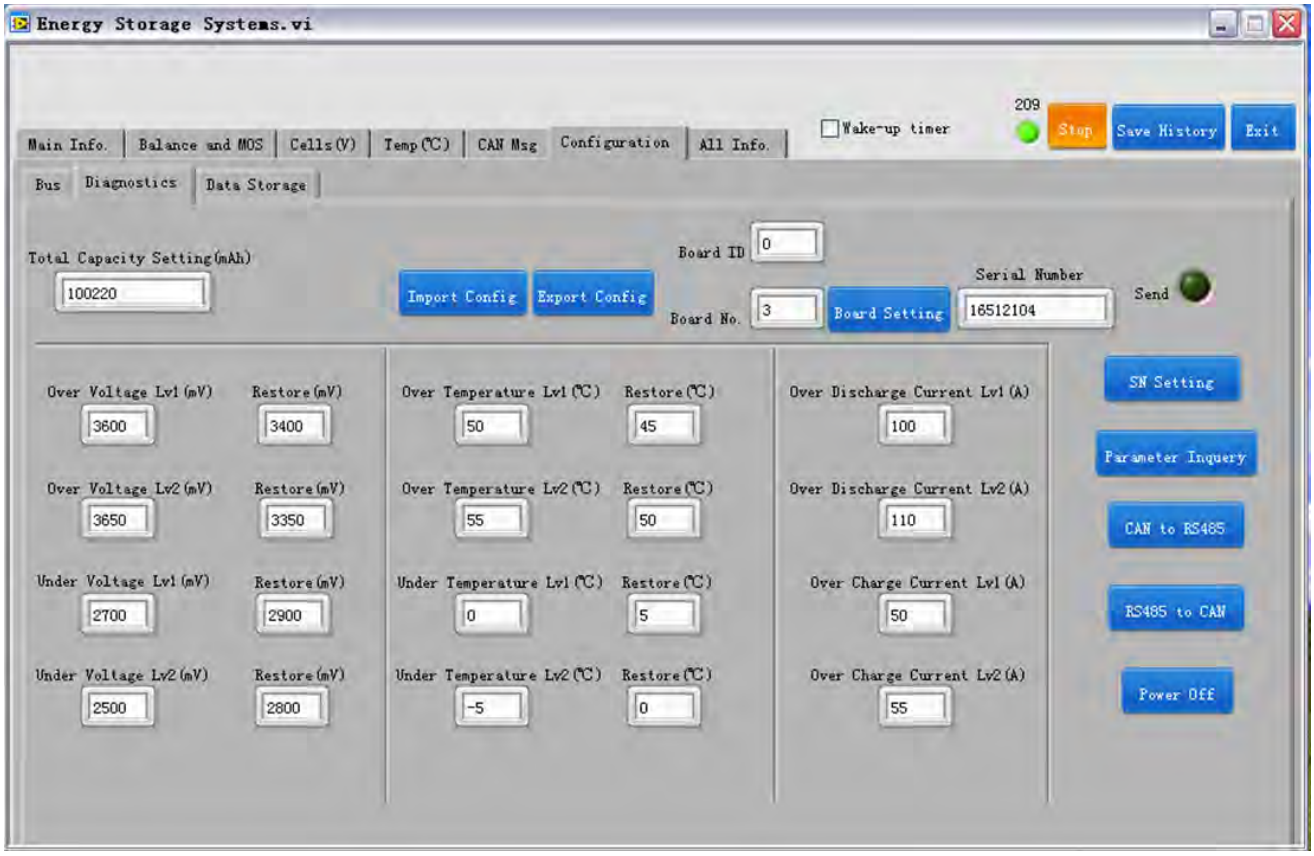
3、Cells tab: cell voltage



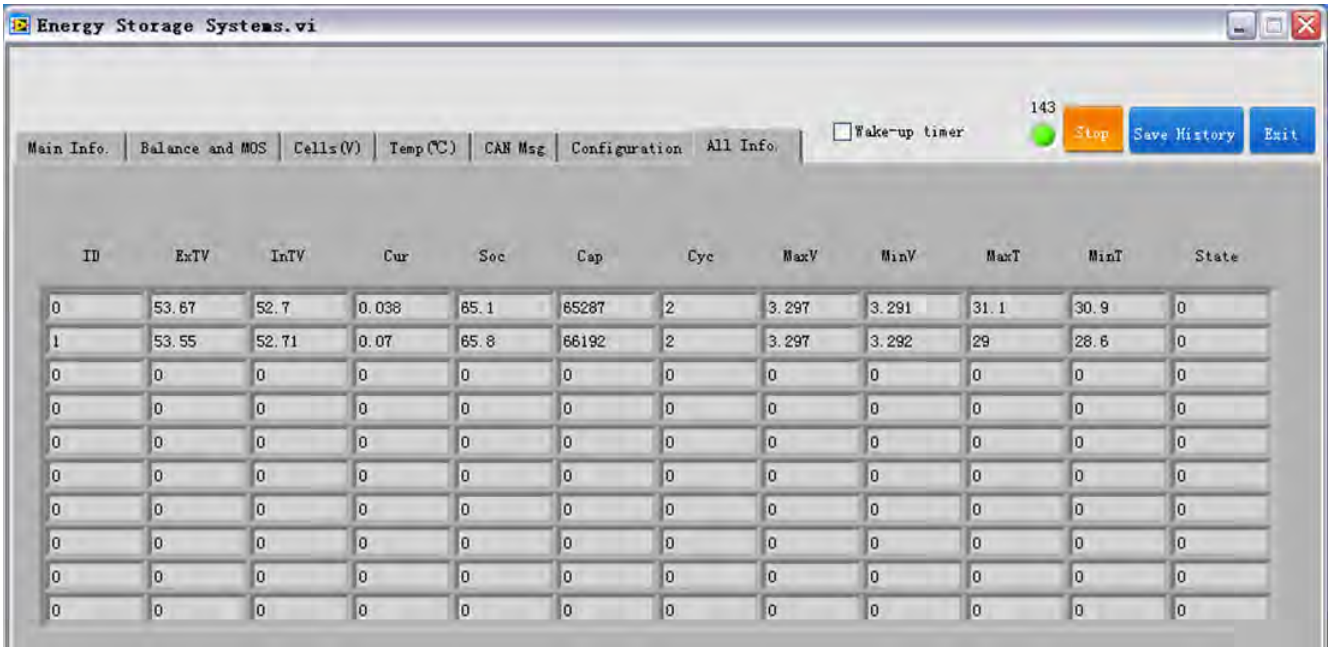
4、Temp tab: internal cell temperature



5、CAN Transmission Message



6、Configuration tab:Bus Diagnostics - displays voltage, temp and currentData storage



7、All Info tab: summary of all info per battery if more than one battery is being used (max 10 batteries in parallel)

4.6 Remote Control LCD Module(optional)

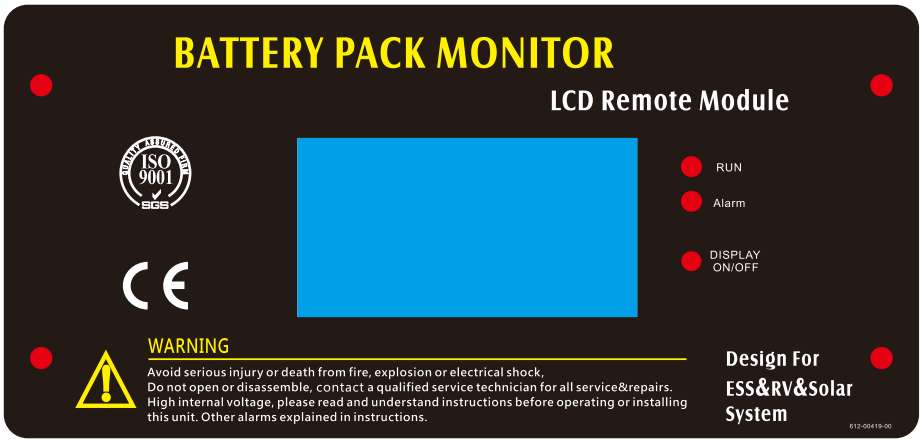
Mode A: Connect INVERTER remote LCD port and BATTERY pack RS485 port, LCD will display inverter and battery working information

Note: 1. The connector of Inverter port is RJ45 type, connector of Battery is RJ11 type, never insert the wrong position or damage will happen and invalid warranty.

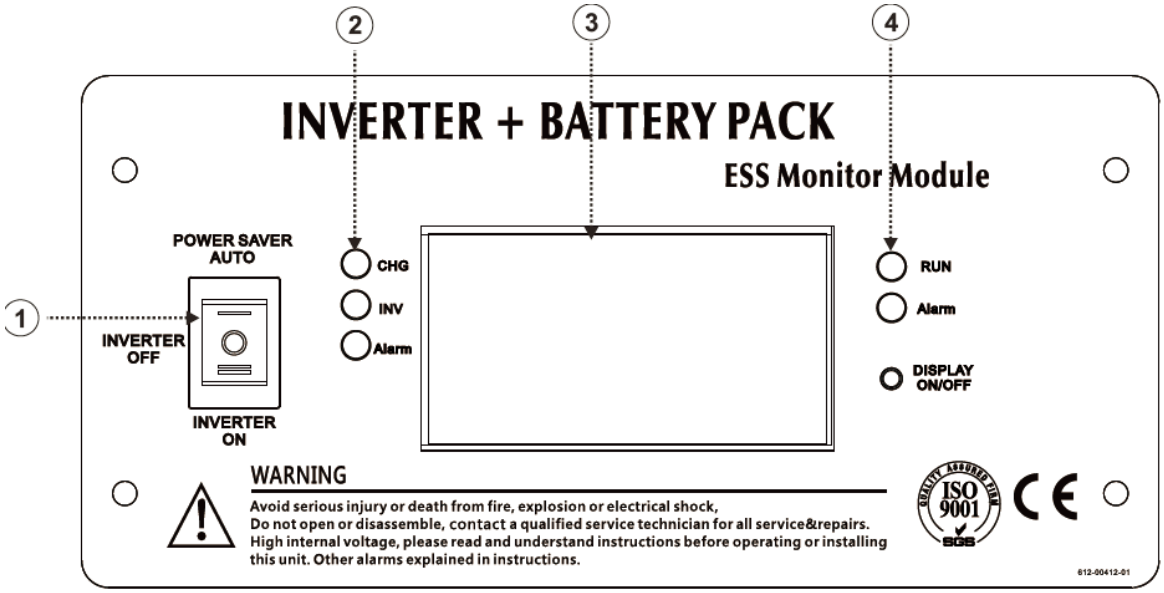
2.DISPLAY ON/OFF: touch the button lighting the LCD, keep press the button, the current screen will hold for checking information

3.LCD module can display 1PCS inverter and maximum 10PCS battery working information through battery pack identity number.

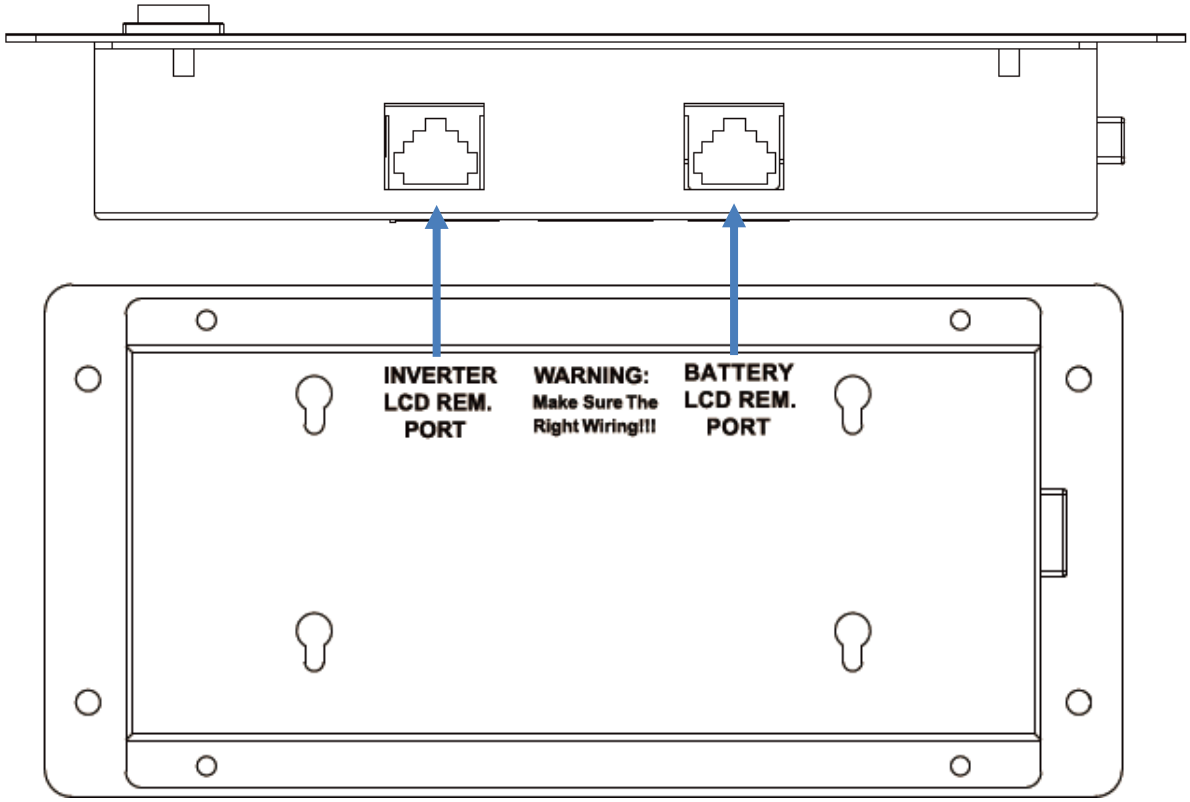
Mode B: Connect BATTERY pack RS485 port, LCD will display battery working information



4.6.1 Function description

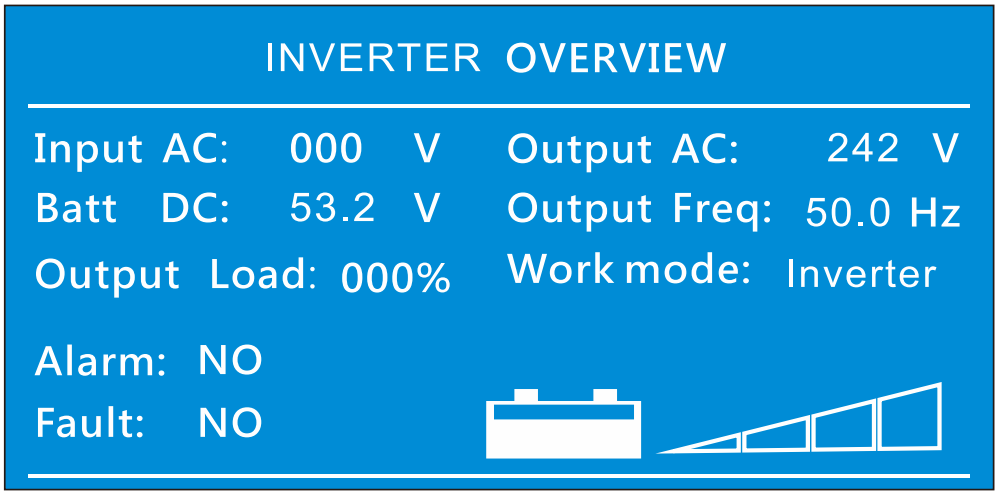


Item	Name	Description
1	switch	Power saver auto: inverter work in saver mode
		Inverter OFF: inverter power off
		Inverter ON: inverter work in normal mode
2	Inverter indicator LED	CHG: inverter working in battery charge mode
		INV: inverter working in battery discharge mode
		Alarm: inverter warning or fault
3	LCD Screen	Display inverter and battery working information
4	Battery indicator LED	RUN: battery working normal
		Alarm: battery warning or fault
		Display ON/OFF



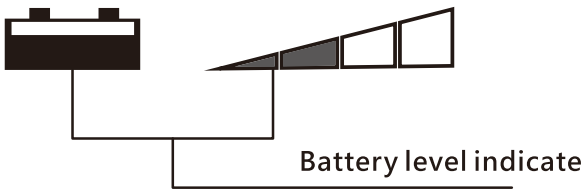
4.6.2 Display introduction

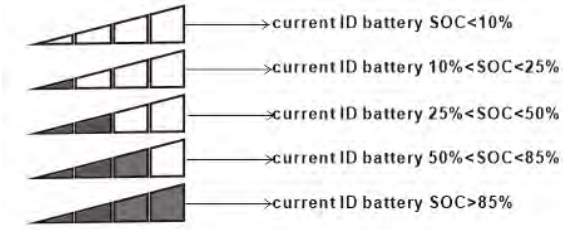
INVERTER display



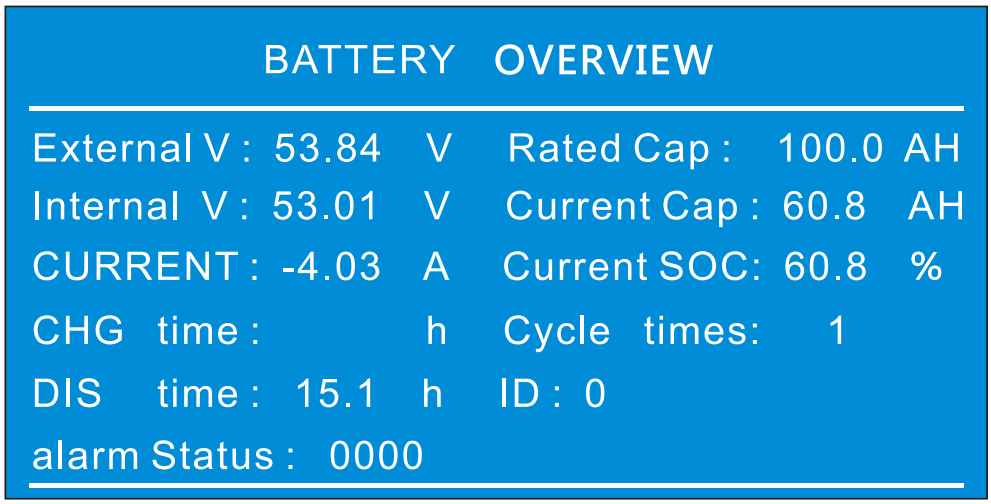
Input AC:	Current utility or generator AC voltage
Output AC:	Inverter output AC voltage
Batt DC:	Current battery voltage
Output Freq:	Inverter output AC frequency
Output Load:	Current AC loads percentage inverter take
Work mode:	Charging or Inverter

Alarm:	Ref inverter module object 3.3.9
Fault:	Ref inverter manual object 3.3.9





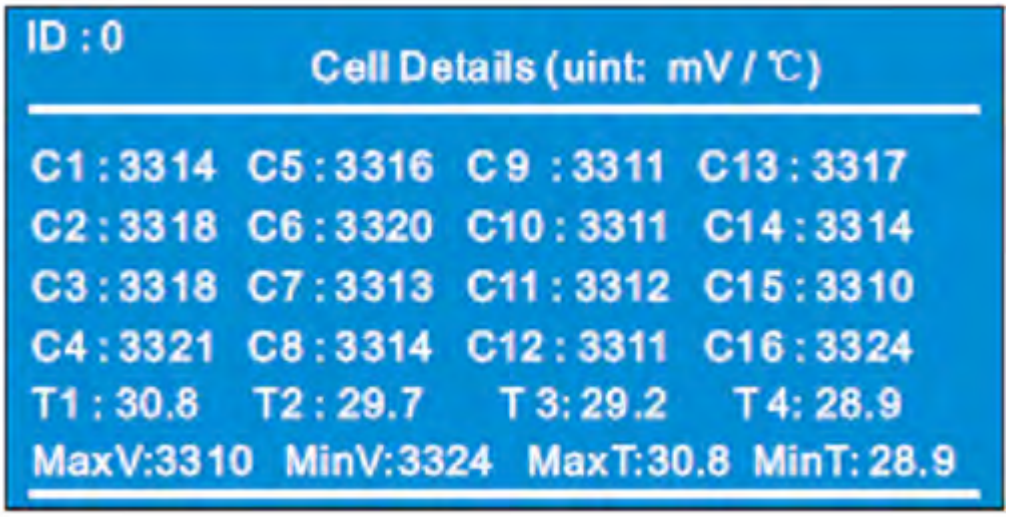
BATTERY PACK display



the first battery info window

External V:	Current ID battery voltage
Internal V:	Total cells voltage sum of current ID
Rated Cap:	Battery rated capacity of current ID
Current Cap:	Current ID battery capacity
Current SOC:	Current ID battery SOC
CURRENT:	Blank means charge, Negative means discharge
CHG time:	Estimated charging time to full
DIS time:	Estimated discharge time to empty
Cycle times:	Battery cycle times of current ID
ID:	Current battery identity number
Alarm status:	Ref the battery pack alarm code table

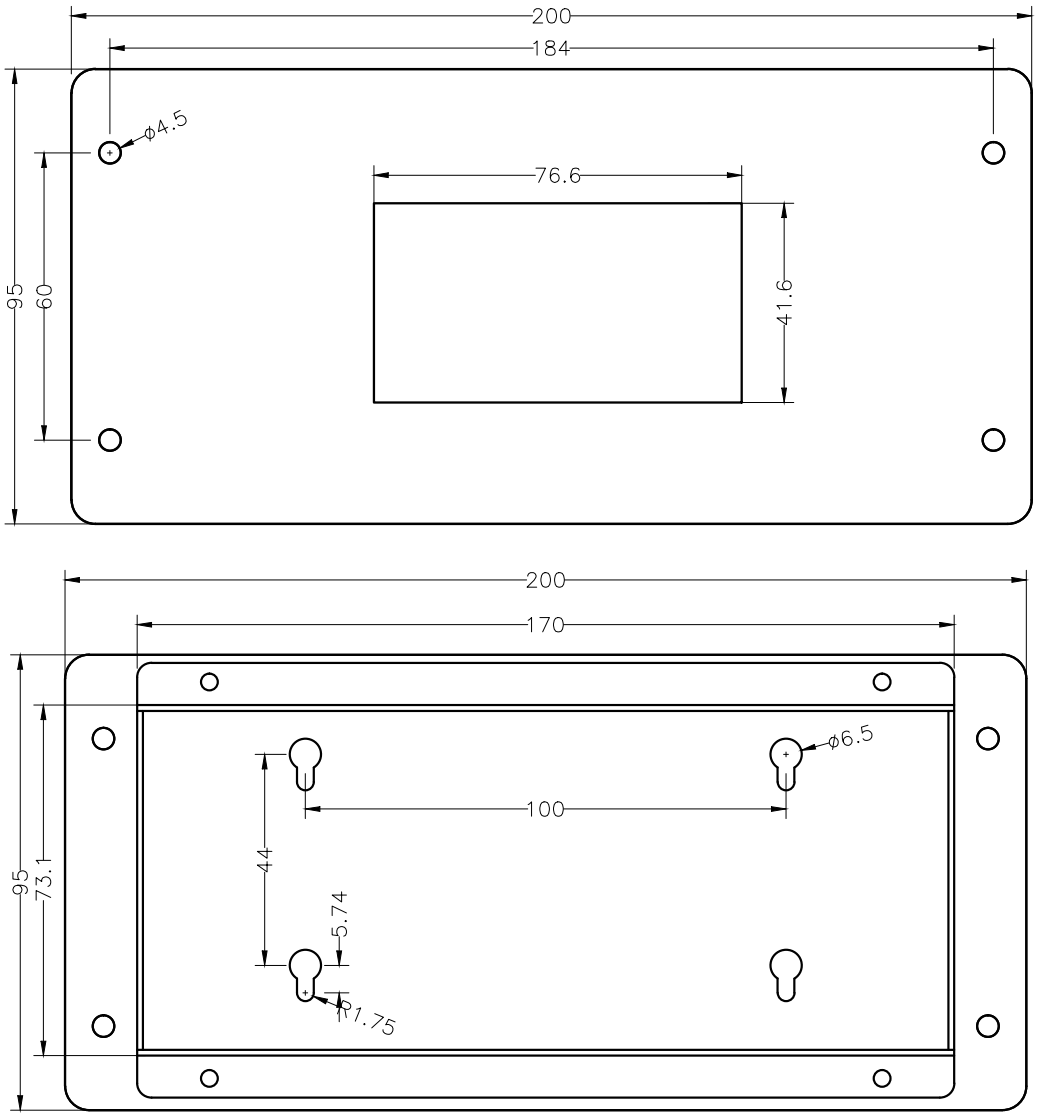
Battery pack alarm code table	
0000	normal
0100	Cell Over-voltage Warning
0200	Cell Over-voltage Protection
0400	Cell Low-voltage Warning
0800	Cell Low-voltage Protection
0010	Cell Over-temp Warning
0020	Cell Over-temp Protection
0040	Cell Low-temp Warning
0080	Cell Low-temp Protection
0001	Discharge Over-current Warning
0002	Discharge Over-current Protection
0004	Charge Over-current Warning
0008	Charge Over-current Protection



the second battery info window

ID	Current battery identity number
C1——C16	Internal cells voltage
T1——T4	Internal temperature detecting value
Max V	Maximum cell voltage
Min V	Minimum cell voltage
Max T	Maximum internal temperature detecting value
Min T	Minimum internal temperature detecting value

4.6.3 The Mechanical Drawing & Install dimension



5 Troubleshooting

Check the indicators on the front of the battery to determine the status of the battery pack. A warning state is triggered when a condition, such as voltage or temperature, is outside battery's rating. When the battery pack status falls outside of set limits, it enters a warning state. When a warning is reported, turn off the DC source immediately.
Use the monitoring software to identify the cause of the warning.

Warning Alarms
Battery Over Voltage
Battery Under Voltage
Battery Over Temperature
Battery Under Temperature
Battery Discharge Over Current
Battery Charge Over Current

The fault state is cleared when the battery pack recovers to normal operation. If battery pack is not working correctly and the issue persists, contact a qualified technician or your distributor.
If the battery pack or the inverter indicates FAULT or fails to operate, contact your distributor immediately.

6 Liability Limitation

Any product damage or property loss caused by the following conditions does not assume any direct or indirect liability.
Product modified, design changed or parts replaced without authorization;
Changes, or attempted repairs and erasing of series number or seals by non technician;
System design and installation are not in compliance with standards and regulations;
Failure to comply with the local safety regulations;
Transport damage (including painting scratch caused by rubbing inside packaging during shipping). A claim should be made directly to shipping or insurance company in this case as soon as the container/packaging is unloaded and such damage is identified;
Failure to follow any/all of the user manual, the installation guide and the maintenance regulations;
Improper use or misuse of the device;
Insufficient ventilation of the device;
The maintenance procedures relating to the product have not been followed to an acceptable standard;
Force majeure (violent or stormy weather, lightning, overvoltage, fire etc);
Damages caused by any external factors.