ASH-51280 Stacked Battery

User Manual

Model:ASH-51280

Safety Instructions

Please retain this manual for future reference.

This manual contains all safety, installation, and operating instructions for the ASH-51280 stacked battery.

Please read all instructions and precautions in the manual carefully before installation and use:

- There is an non-safe voltage inside the battery, in order to avoid personal injury, the user should not disassemble, such as the need for maintenance should contact the company's professional maintenance personnel. Private disassembly without permission is without warranty, no warranty!
- There is a non-safe voltage inside the battery, please do not let children touch the battery freely.
- Do not install the battery in a harsh environment such as humid, greasy, flammable and explosive, or where a lot of dust collects.
- Battery input and output are non-safe voltages, do not touch the connectors and wiring harness during battery operation.
- When working under high voltage and AC batteries, specialized tools must be used and separate tools should not be used freely.
- It is recommended to install the battery in a place protected from direct sunlight.
- Always switch off the battery output and battery input before installing and adjusting the battery wiring.
- Check that all wiring connections are tight after installation to avoid dangerous heat build-up due to false connections.
- After unplugging the battery output and battery input harnesses, please cover the terminal protection cover in time to avoid the risk of electric shock caused by touching the metal conductors of the terminals.
- The charging temperature range for batteries is 0° C to 45° C. Charging at temperatures outside this range may cause the battery to become hot or damaged. Charging outside this temperature range may also impair the performance or reduce the life expectancy of the battery.

- The battery discharge temperature range is -20° C to 60° C. Use of batteries outside of this temperature range may damage the performance or reduce the life expectancy of the battery.
- Battery support the same type of battery in parallel, prohibited and other different types of batteries in parallel, to avoid battery damage.
- Prohibit the use of series connection between battery packs to avoid battery damage and safety risks.

Catalog

1. Basic information

1.1 Product Overview and Features

ASH-51280 stacked series battery is a LiFePo4 battery with smaller size, lighter weight and longer life span, adopting high energy density LFePo4 cells with higher safety and longer cycle life, through advanced BMS to real-time monitoring of battery voltage, current, temperature, BMS system fault information. It provides a complete and reliable control and protection mechanism for customers, and the system provides intelligent charging equalization, power estimation, RS485 communication, CAN communication, LED power display, on/off switch button, data storage, system parallelism, etc. The product adopts LED LCD display design. The product adopts LED liquid crystal screen display design, real-time display of the system's operating status. Comprehensive electronic protection function ensures the whole system is safer and more stable.

Features：

1. Adopting new LiFePo4 cell, safer and longer cycle life.。

2. Advanced battery management system, real-time management, efficient management of the battery system, fast response time.

3.Three communication methods are available: CAN, RS485 and RS232.

4. LED power and operation indicator, dynamic display of battery power and operation status.

5.Stacked construction for simple and easy installation.

6.With power-saving mode function, it automatically enters into sleep mode with no load.

7.Adoption of high-current stacked connectors, easy installation and operation, high over-current capacity.

8.The module comes with 100mA charge equalization

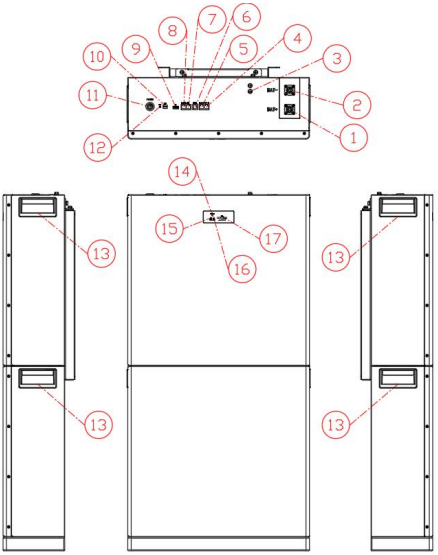
9.Output trunk nodes are available for use with inverters.

10.Short-circuit protection, over-voltage protection, under-voltage protection, SOC estimation, SOH estimation, overload protection, charge equalization, etc.

1.2 Battery System Parameters

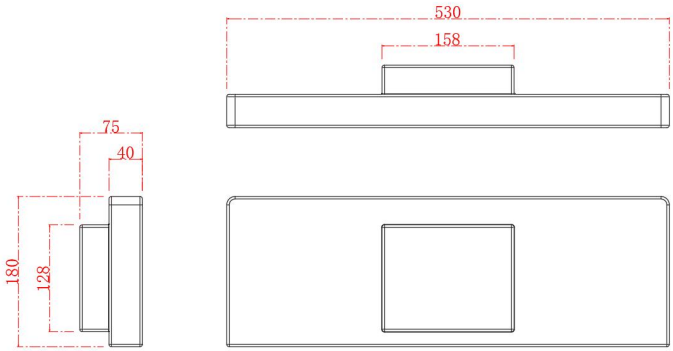
Item	Standard	Remark
Energy	14336Wh	0.5C 25±2℃ 2.5-3.65V
Combination	16S1P	
Nominal Capacity	280Ah	0.5C 25±2℃ 2.5-3.65V
Nominal Voltage	51.2V	
Recommended Charging Current	140A	0.5C
Recommended Discharging Current	140A	0.5C
Max. Charging Current	200A	
Max. Discharging Current	200A	
Limited Charging Voltage	58.4V	
Cut-off Voltage	43.2V	
Internal Resistance	≤100mΩ	Measured using an AC internal resistance tester with a frequency of (1kHz) after being fully charged at an ambient temperature of 20±5℃.
Overall Dimension	530±2*180±2*1040±2	L*W*H（mm)
Battery Weight	83kg±5%	Package excluded
Operating Temperature Range	Charge:0~55℃	Charge
	Discharge: -20~55℃	Discharge

1.3 Product Features

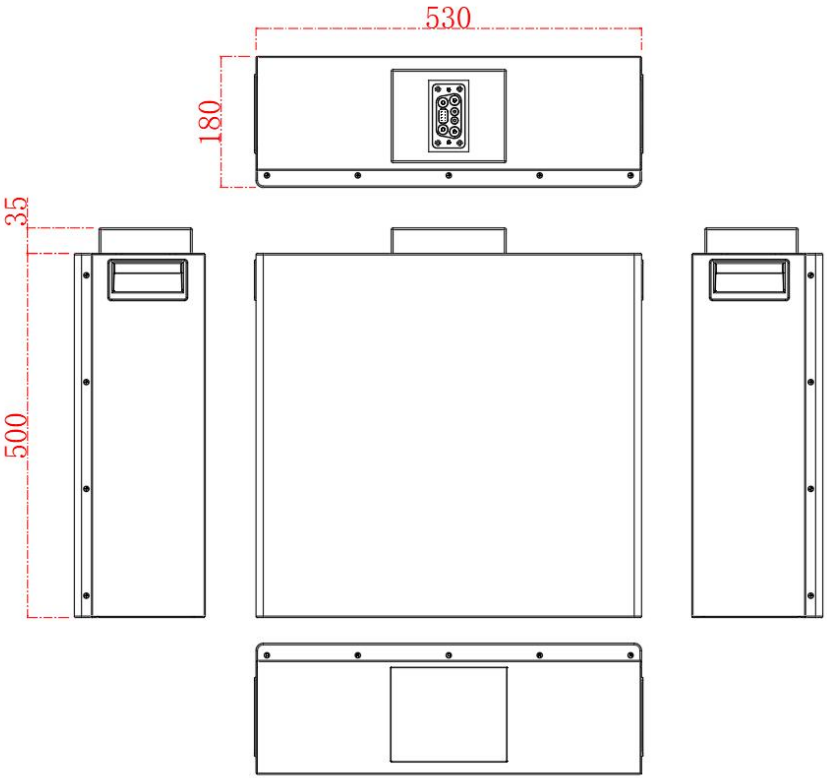


No.	Introductions	silkscreen	Remark
1	Battery Positive	BAT+	200A snap-in terminals/orange
2	Battery Negative	BAT-	200A snap-in terminals/Black
3	Reset Switch	RST	
4	DIP Switch	DIP	
5	Dry contact	DO	
6	RS485, connect PCS	RS485A	Connecting the inverter
7	CAN, connect PCS	CAN	Connecting the inverter
8	RS232 host computer communication	RS232	Connecting to the host computer
9	RS485 Parallel communication	RS485B	Battery Parallel Communication
10	RS485 Parallel communication	RS485B	Battery Parallel Communication
11	Enclosure grounding	⏚	Recommended for 6-10mm² cables
12	Power Switch	POWER	M22 Round Self-Locking Switch
13	Handle	/	
14	Operation Indicator	RUN	Green LED*1
15	Malfunction indicator	ALM	Red LED*1
16	Switch On/Off Indicator	ON/OFF	Green LED*1
17	Power indicator	SOC	Green LED*6

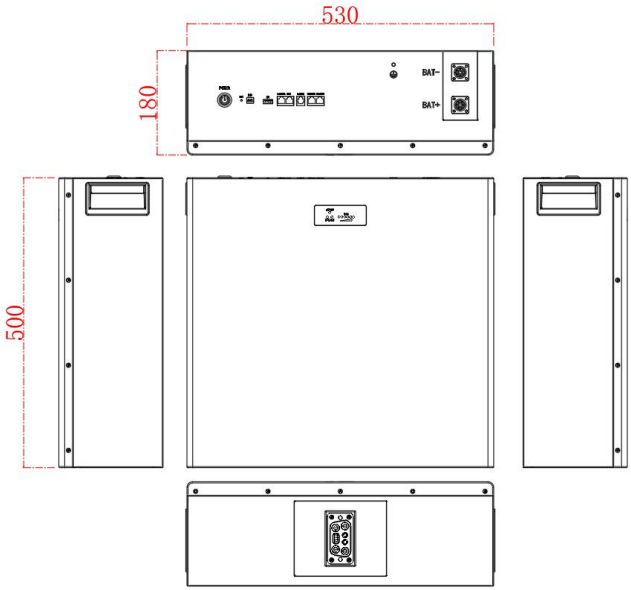
1.4 Dimension drawing of base plate



1.5 Lower Battery Module Dimension Drawing

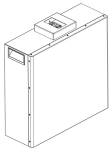
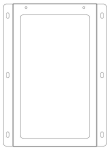


1.6 Upper Battery Module Dimension Drawing



2.Package list

The ASH-51280 Stacked Battery is shipped with the same internal components as the following packing list when unpacked.

				
Upper battery module *1	Lower battery module*1	Base plate*1	Bracket1*1	Bracket2*1
				
2m positive wire	2m negative wire	2.0m cable*1	M6*14 combination screw*7	M6*50 exploding screw*4

3.Installation Instructions

3.1 Installation Precautions

Before installation, please read the precautions carefully and familiarize yourself with the installation procedure.

1、Before installation, open the box to check the number of parts and the appearance of the battery, found that the shell deformation, leakage corrosion, etc., please stop to continue the installation and contact the after-sales personnel in a timely manner.

2、Outdoor open-air use of batteries is strictly prohibited.

3、Avoid placing metal objects near the battery to prevent short-circuiting.

4、When installing the battery, be sure to leave enough space around the battery for heat dissipation; do not install the battery and the load in the same cabinet to avoid the heat generated by the load affecting the battery.

5、Power can only be supplied to work with loads that match the operating voltage and current of the battery.

6、False connections and corroded wires may cause great heat melting the wire insulation, burning the surrounding materials, and even cause a fire, so make sure that the connectors are tightened, and the wires are best secured with tie wraps to avoid loose connectors caused by the wires shaking when moving the application.

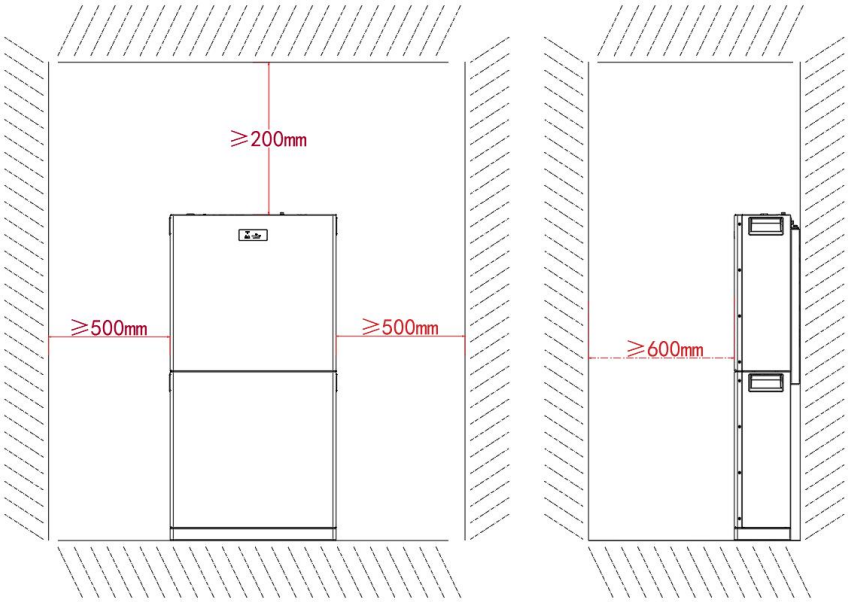
7、Do not install the battery in a harsh environment such as humid, greasy, flammable and explosive, or where a lot of dust collects.

8、The polarity of the battery input and output terminals of this product should not be reversed, otherwise the battery will be easily damaged or unpredictable danger will occur.

9、Ensure that the wall is suitable for expansion screws before installation.

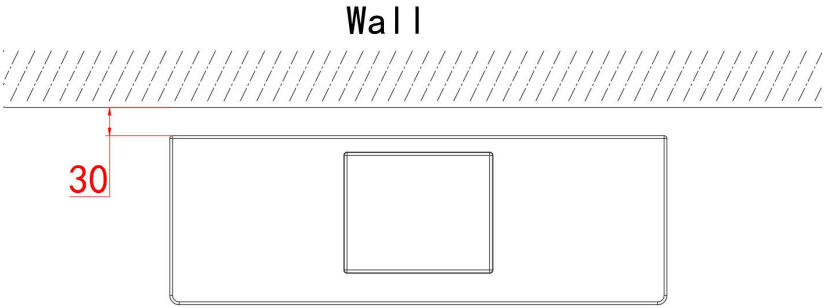
3.2 Stacked Series Battery Installation Space Requirements

When installing the battery, make sure the floor is level due to the weight of the battery. In order to ensure proper operation and easy handling of the system, there are certain requirements for the space available for the system, such as maintaining sufficient clearance. Please refer to the installation schematic below.

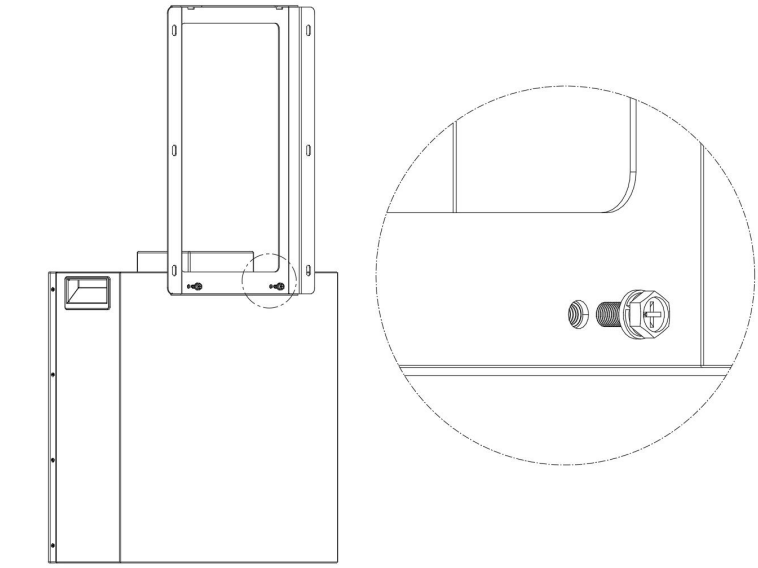


3.3 Stacked Series Battery Stacking Installation Procedure

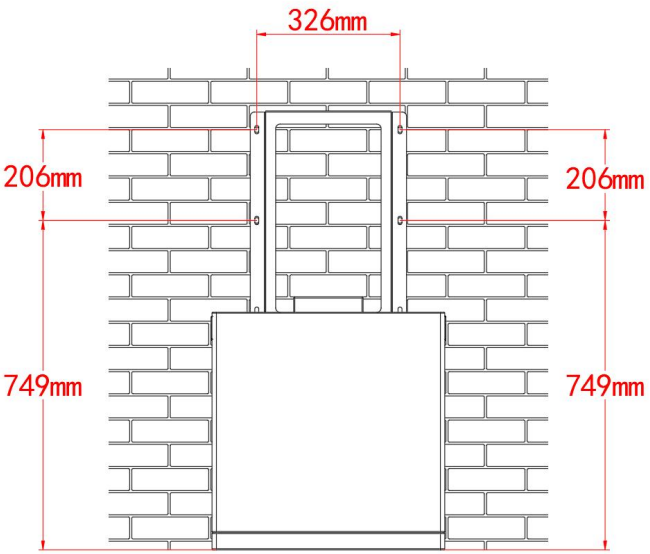
Determine the location of the stacked batteries, clean the ground and place the base plate horizontally on a flat base plate, the base plate is 30mm away from the wall, as shown in the figure below：



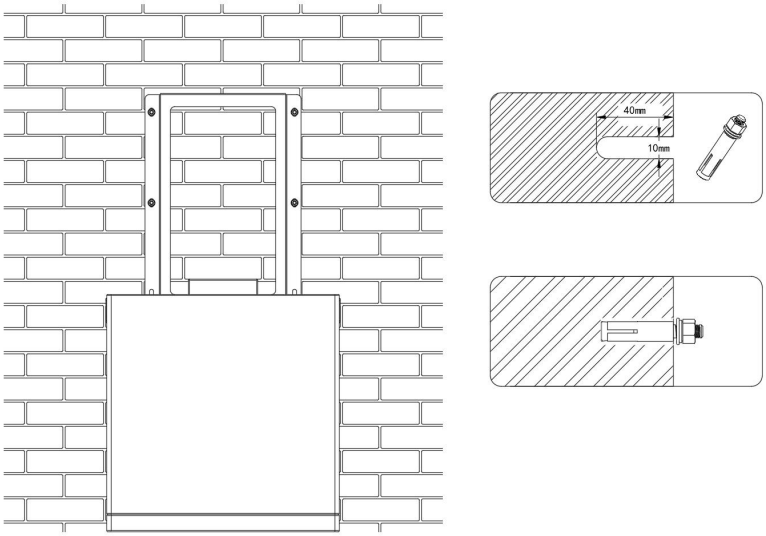
Install the lower battery module bracket 2, tighten it with M6*14 combination screws, recommended torque 4-5 N.m, as shown below：



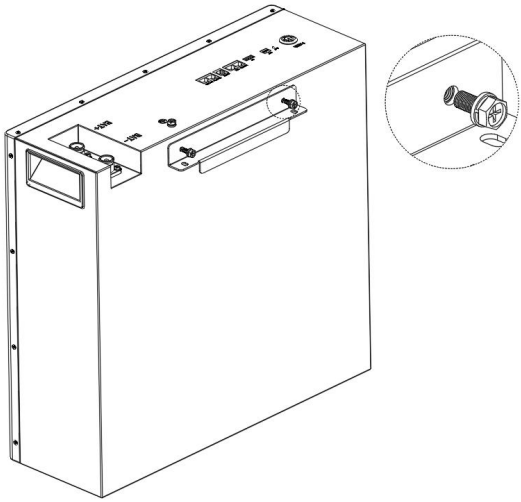
Place the lower battery module on the base plate and draw the drilling position on the wall according to the dimensions of the figure below, as follows：



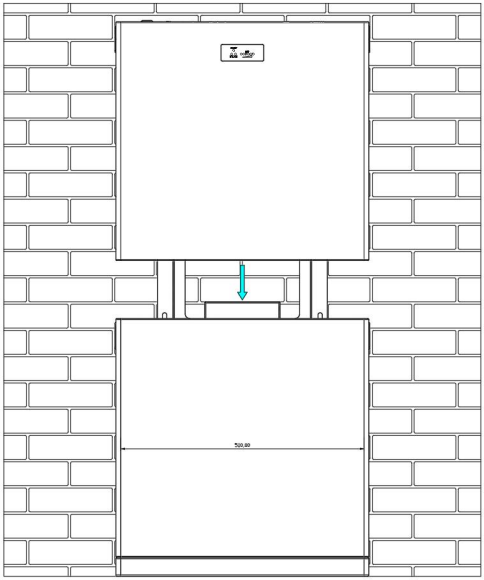
Drill the corresponding mounting holes on the wall according to the drilling dimensions and drilling depth in the figure below, use the expansion screws supplied with the box to fix the lower module together with the fixing bracket on the wall, recommended torque 4-5 N.m.



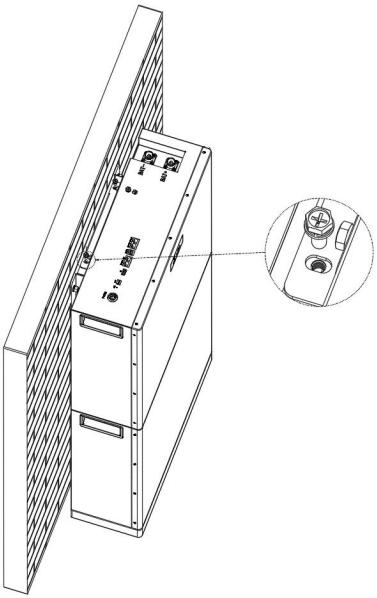
Install the upper battery module bracket 1, tighten it with M6*14 combination screws, recommended torque 4-5 N.m, as follows：



Place the upper battery module vertically from top to bottom on top of the lower battery module as follows：

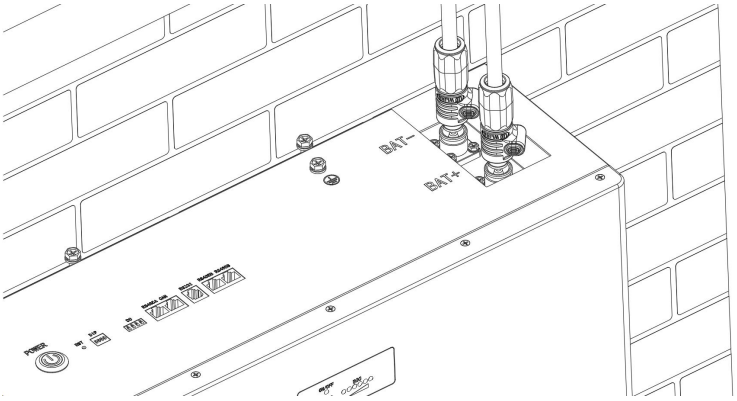


Fix the upper battery module to the fixing bracket 2 with M6*14 combination screws as shown in the figure below, recommended torque 4-5 N.m.

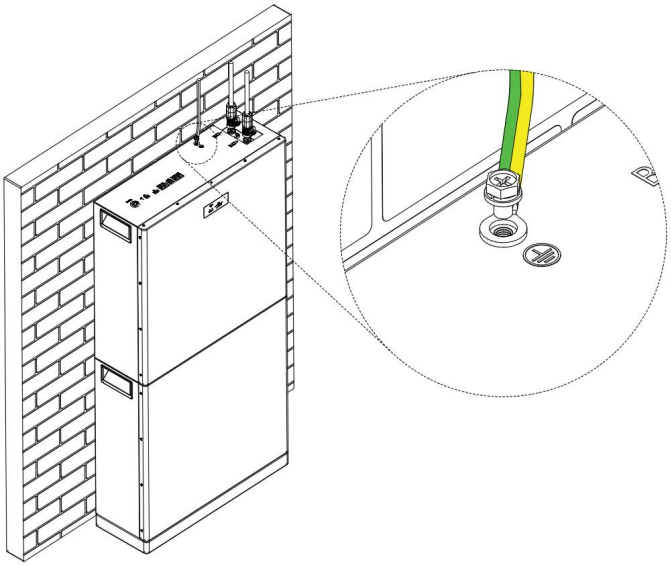


3.4 Stacked Battery Wiring Method

The upper battery module is marked with BAT+ and BAT- snap-in terminals, BAT+ is positive battery terminal, BAT- is negative battery terminal; Before wiring, please turn off the switch on the upper battery module; Please use the wiring harness that comes with the box. Fix the other end of the positive and negative output harness on the inverter first, then insert the red and black plugs into the corresponding colour sockets, and when you hear the sound of "ta" when the harness is plugged in, it will be plugged in successfully; if you need to communicate with the inverter, choose RS485A or CAN according to the communication type, and the communication interfaces are all adopted as standard. RJ45 cable interface;

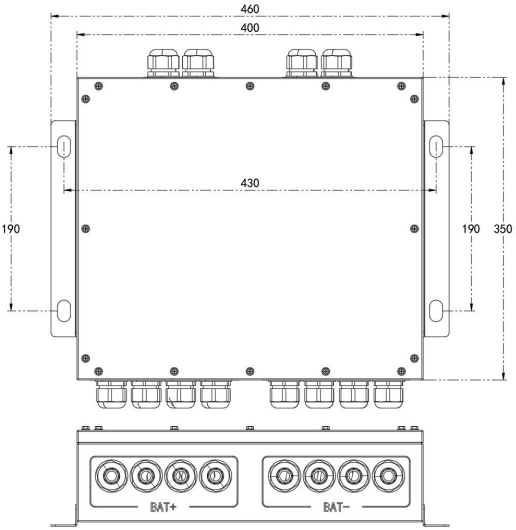


To ensure the safety of electricity, ground the battery reliably as shown in the diagram below, recommended terminals are OT16-6 cold pressed terminals, recommended cable: 6-10mm² (10-8AWG).

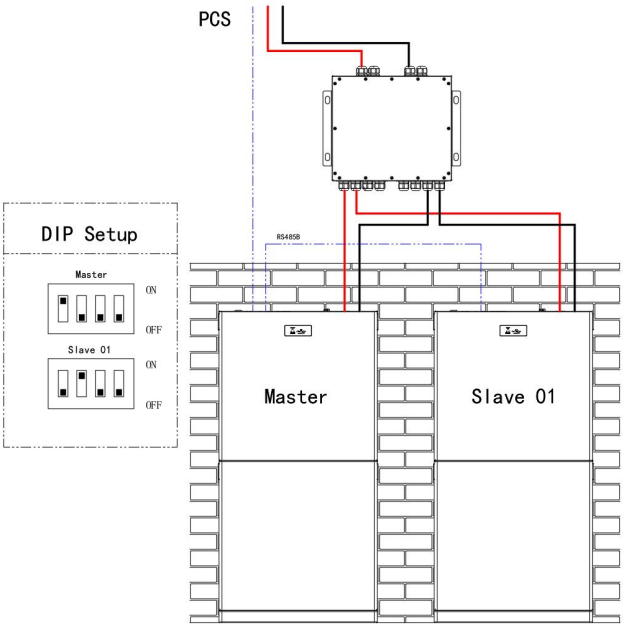


3.5 Multi-battery parallel wiring method

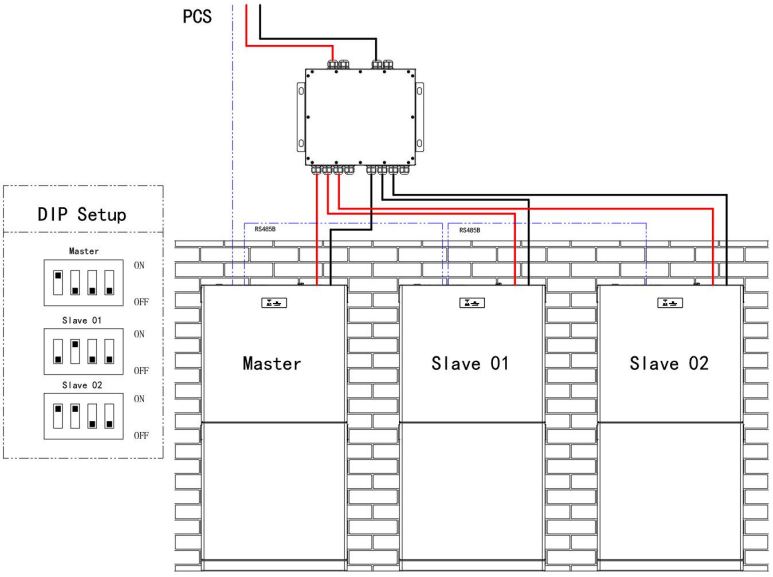
ASH-51280 stacked series batteries support 2-4 parallel use. To parallel use, please use our special DC combiner box, parallel wiring before turning off the battery switch, to ensure that the battery has no output and then wiring, AC combiner box mounting structure is shown in the following figure,



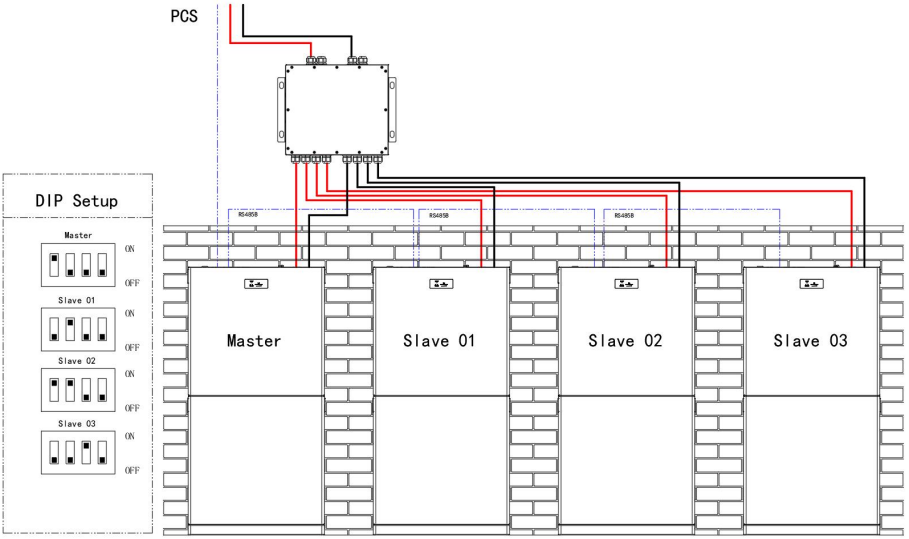
Wiring method for two batteries in parallel:



Wiring method for three batteries in parallel：



Wiring method for four batteries in parallel：



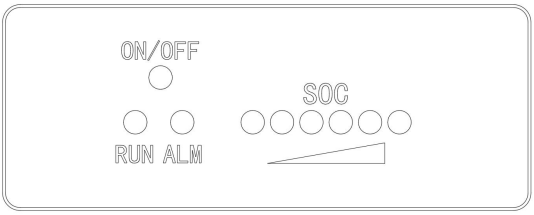
4. LED Indicator description

4.1 LED flash mode description

Flash mode	On	Off
Flash 1	0.25S	3.75S
Flash 2	0.5S	0.5S
Flash 3	0.5S	1.5S

4.2 Battery Power On LED Indicator Description

Press the "POWER" button on the top of the battery, the battery LED indicator will flash once from left to right, after the BMS self-test is completed, the battery has no fault information, the "ON/OFF" green indicator is always on, the "RUN" green indicator will flash according to the flashing mode in the LED flashing mode description table. The "ALM" red indicator is off, and the remaining power "SOC" green indicator works according to the remaining power indicator.



4.3 LED working status indication

Status	Normal/ Warning/P rotection	ON/O FF	RUN	ALM	Power Indicator LED						Instruction
		●	●	●	●	●	●	●	●	●	
Power off	Sleep	off	off	off	off	off	off	off	off	off	off
Standby	Normal	on	Flash 1	off	Based on power indicator						Stand by
	Warning	on	Flash 1	Flash 3							Module Low voltage
Charge	Normal	on	on	off	Based on power indicator (Maximum power indication Flash 2)						Max. Power LED (flash 2), ALM does not blink during overcharge alarm
	Warning	on	on	Flash 3							

	Over-charge protection	on	on	off	on	on	on	on	on	on	If there is no mains, the indicator turns to standby mode
	Temperature, over-current and failure protection	on	off	on	off	off	off	off	off	off	Stop charging
Dis-charge	Normal	on	flash 3	on	Based on power indicator						
	Warning	on	flash3	flash3							
	Under voltage protection	on	off	off	off	off	off	off	off	off	Stop discharging
	Temperature, over-current, short circuit, reverse connection, failure protection	on	off	on	off	off	off	off	off	off	Stop discharging
Failure		off	off	on	off	off	off	off	off	off	Stop charging & discharging

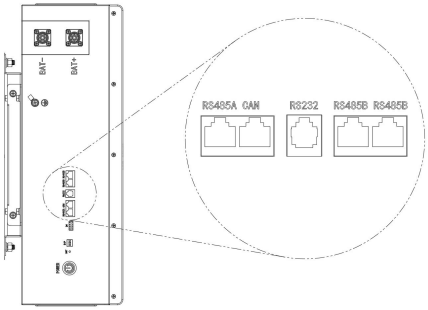
4.4 LED Power Indicator Description

Status		Charge						Discharge					
Capacity indicator		L6 ●	L5 ●	L4●	L3●	L2●	L1●	L6 ●	L5 ●	L4 ●	L3 ●	L2 ●	L1 ●
Power（%）	0～16.6%	off	off	off	off	off	flash 2	off	off	off	off	off	on
	16.6～33.2%	off	off	off	off	flash 2	on	off	off	off	off	on	on
	33.2～49.8%	off	off	off	flash 2	on	on	off	off	off	on	on	on
	49.8～66.4%	off	off	flash 2	on	on	on	off	off	on	on	on	on

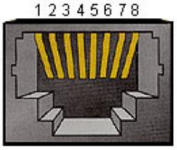
	66.4～83.0%	off	flash 2	on	on	on	on	off	on	on	on	on	on
	83.0～100%	flash 2	on	on	on	on	on	on	on	on	on	on	on
Running indicator●		on						Flashing (flash3)					

5. Communication Interface Definition

As shown in the figure below, "RS485A" and "CAN" are the communication ports with the inverter, including CAN and RS485 communication, "RS485B" is used for parallel communication between batteries, and "RS232" is used for debugging on the PC.



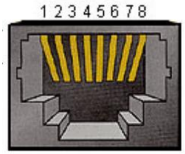
5.1 Inverter communication（RS485A/CAN)



RS485A-using 8P8C vertical RJ45 port		CAN-using 8P8C vertical RJ45 port	
RJ45 Pin	Instruction	RJ45 Pin	Instruction
1、8	RS485-B1	1、2、6、7、8	NC
2、7	RS485-A1	4	CANH
3、6	GND	5	CANL
4、5	NC	2	GND
Default baud rate is 9600bps to communicate with the inverter		Baud rate 500K, communication with inverter	

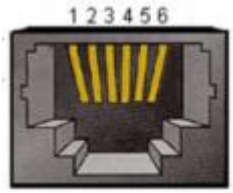
5.2 Parallel communication（RS485B/RS485B)

RS48B-using 8P8C vertical RJ45 port	RS485B-using 8P8C vertical RJ45 port



RJ45 Pin	Instruction	RJ45 Pin	Instruction
1、8	RS485-B	1、8	RS485-B
2、7	RS485-A	2、7	RS485-A
3、6	GND	3、6	GND
4、5	NC	4、5	NC
With dual RS485 interfaces for parallel communication between batteries and batteries, must be used with a dip switch to set the communication address, the address setting range is 1~15.			

5.3 PC host computer communication（RS232)



RS232 - using 6P6C vertical RJ11 port	
RJ11 Pin	Instruction
2	NC
3	TX（Single board）
4	RX（Single board）
5	GND
Communicate with the host computer through RS232 interface, so as to monitor various information of the battery through the host computer, including battery voltage, current, temperature, status and battery production information, etc. The default baud rate is 9600bps.	

6、Sleep and Wake

6.1 Sleep

The battery enters low power mode when any of the following conditions are met：

1）Battery cell or total over-discharge protection not discharged within 30 seconds.

2）Press the button (3~6S), after releasing the button.

3）Minimum battery cell voltage below the hibernation voltage and duration up to the hibernation delay time (while satisfying no communication, no protection, no equalization, no current).

4）Standby time in excess of 24 hours (no communication, no charging or discharging, no mains power).

5）Forced shutdown via the host computer software.

Ps：Before entering hibernation, you need to make sure that no external voltage is connected to the inputs, otherwise you will not be able to enter the low-power mode.

6.2 Wake

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

1）Connected to the charger, the output voltage of the charger should be more than 48V.

2）Press the button (3~6S), after releasing the button.

3）with RS232 activation

Ps：After the single battery cell or overall over-discharge protection, it enters the low-power mode and wakes up once every 4 hours regularly to turn on the charging and discharging MOS. If it can be charged, it will exit the dormant state and enter the normal charging; If it can not be charged by 10 times consecutive automatic wake-ups, it will no longer be automatically woken up. When the system is defined as the end of charging, standby for 2 days/48h (standby time setting value) and still not reached the recovery voltage, forced to resume charging until the end of charging again.

7.Storage and Maintenance

7.1 Storage

Please charge the battery for at least 3 hours before storing. Stand the battery upright and store it in a cool and dry place. The recommended temperature for long-term storage is 15°C-25°C. During storage, please charge the battery according to the following table：

Storage Temperature	Charging frequency	Charging time
0°C-40°C	Every 3 months	2-3 hours

7.2 Maintenance

A. Internal faults in the battery outlets, repairs should only be carried out by qualified service personnel.

B. Even if the battery is switched off, the battery assembly is still connected to the inverter, which is potentially hazardous.

C. Only technicians who are sufficiently familiar with the battery should service/maintain it, and unauthorized personnel are not allowed to operate it.

D. Batteries may cause electric shock and high short circuit current. Remove all wristwatches, rings, and metal personal items before servicing/maintenance.

E. Do not disassemble the battery without permission.

8. Product Liability and Consultancy

A. We are not responsible for accidents that occur as a result of operating in violation of this specification and the user manual.

B. Due to product quality improvement or technology upgrade, specifications subject to change without notice; if you want to know the latest information of this product, please contact us.

C. The warranty period of this product is within 60 months after delivery, within the warranty period of the product, if any product quality problems occur within the specified scope of use, we will repair it free of charge; if the repair fails, we will replace the new relevant parts to achieve the purpose of continuous use without reducing the performance; our after-sales personnel will propose specific maintenance and troubleshooting methods.

D. If you have any questions, please contact us.