

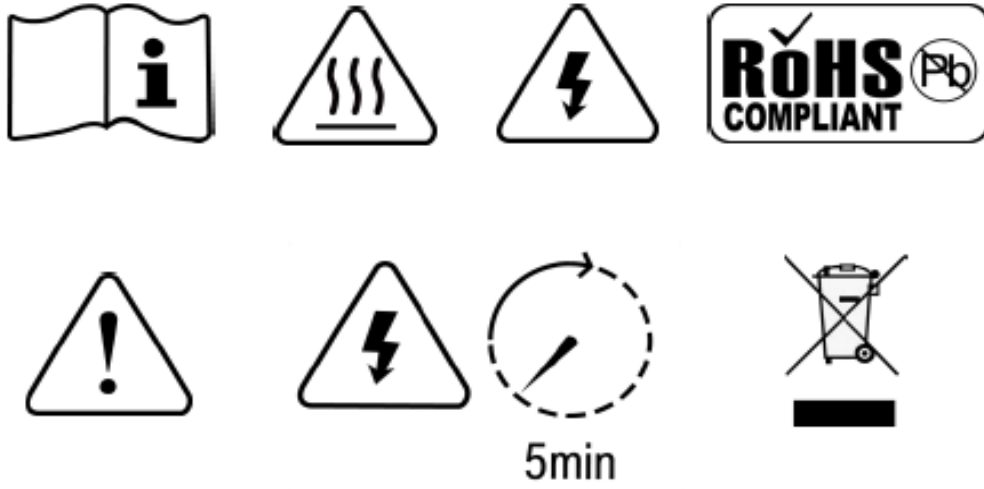


LITHIUM BATTERY MODULE

USER MANUAL

PS5&PS10





WARNING: HIGH VOLTAGE IN SIDE

CAUTION: THE DC FUSE MUST HAVE BEEN TURNED OFF BEFORE SERVICING

MADE IN CHINA

Statement of Law

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Safety Precautions



Warning

- Please refrain from submerging the battery in water or exposing it to fire, in case of explosion or any other situation that might endanger your life.
- Please connect wires properly while installing the battery, do not reversely connect them. To avoid short circuit, please do not connect positive and negative poles with conductor (wires for instance).
- Please avoid puncturing, striking, stepping on, or subjecting the battery to any form of impact.
- During daily usage, it is imperative to fully power down the device before disconnecting it or reattaching wires, or it may result in the risk of electric shock.
- Please use dry powder extinguisher to put out the flame when encountering a fire hazard, liquid extinguisher could result in the risk of secondary disaster.
- For your safety, please do not arbitrarily dismantle any component in any circumstances unless there is a specialist or an authorized one from our company. Device breakdown due to improper operation will not be covered under warranty.



Caution

- While we maintain rigorous quality inspections prior to shipping our products, we encourage you to promptly get in touch with us in the event of any anomalies such as bulging or other irregular occurrences.
- For your safety, device shall be ground connected properly before normal use.
- To ensure correct usage, please verify that the parameters of the relevant devices are compatible with one another.
- Please refrain from mixing batteries from diverse manufacturers, various types, models, as well as those that differ in age.
- The operational lifespan and reliability of the product can be influenced by the ambient environment and storage methods. It is crucial to thoroughly consider the operating environment to ensure the device functions optimally.
- For long-term storage, the battery should be recharged once every 6 months, and the amount of electric charge shall exceed 80% of the rated capacity.
- Please charge the battery in 18 hours after it discharges fully and starts over-discharging protection. Formula of theoretical standby time: $T=C/I$ (T is standby time, C is battery capacity, I is total current of all loads).

Preface

Manual declaration

The Power Stack 5&10 lithium iron phosphate battery can be widely applied to energy storage systems including backup power, solar off grid, solar energy storage, solar hybrid, PV power generation, etc.

This user manual details its basic structure, parameters, basic procedures and ways of installation and operation and maintenance of the equipment.

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1. Introduction

1.1 Brief Introduction

Power Stack 5&10 is 48V lithium battery pack. it is a perfect solution for residential and small commercial applications. Besides floor-mounted installation, Power Stack 5&10 also supports wall-mounted installation to save your valuable space. Thanks to the modular design, its capacity can be flexibly expanded through parallel connection, meeting the demand of various scenarios. With IP65 protection, it is suitable for both indoor and outdoor operation. The battery real-time status can be locally monitored via E4 LCD Monitor and remotely monitored via NOVA APP & Web.

1.2 Product Properties

The anode materials used in the Power Stack 5&10 energy storage products are composed of lithium iron phosphate. Battery cells are managed effectively by BMS with better performance. The system's features are shown below:

- Suitable for applications with a rated voltage of 48V
- Built-in battery management system for better performance, possessing protection functions like over-discharge protection, over-charge protection, over-current protection, and abnormal temperature protection.
- Modular design: Power Stack 5 supports up to 32 units in parallel and Power Stack 10 supports up to 16 units
- Automatically assign the communication address of the slave modules, easy to install.
- Compact and wall-mounted design, saving installation space.
- Support parameter configuration and data monitoring via TBLink software.
- Support CAN communicate with mainstream inverters, like TBB inverter/Victron inverter.
- Integrated with RS485 communication port, supports communication with TBB inverters via RS485 communication protocol.
- Self-ventilation with lower system noise
- Less battery self-discharge, during storage, its power can be self-discharged for 6 months at max until it is recharged
- No memory effect so that battery can be charged and discharged shallowly.
- Wide range of temperature for working environment, $-20^{\circ}\text{C} \sim +55^{\circ}\text{C}$. Circulation span and discharging performance are well under high temperature.
- IP65 protection for both indoor and outdoor use.

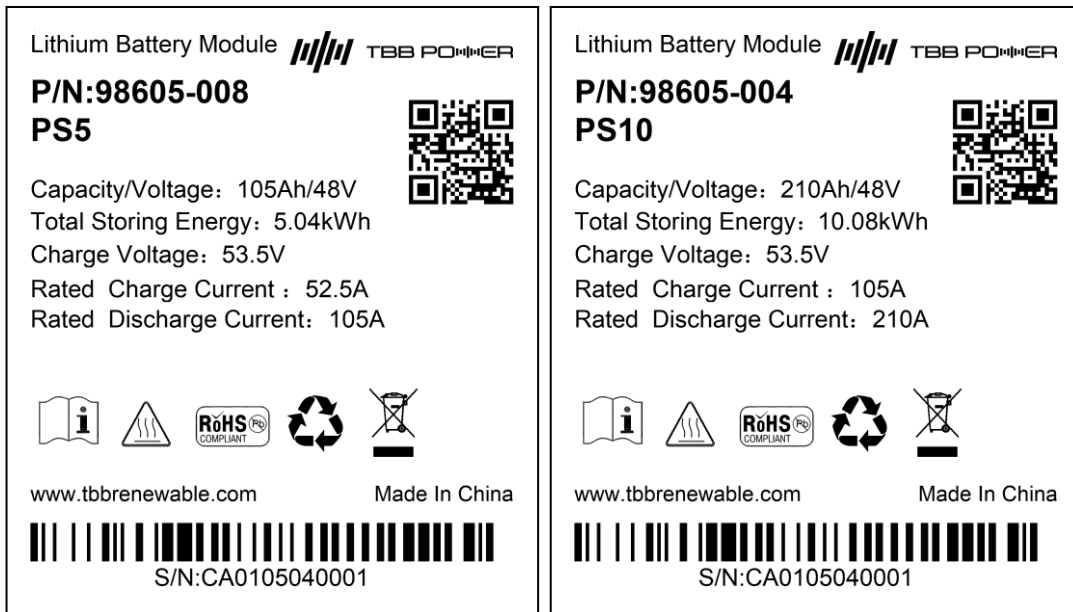



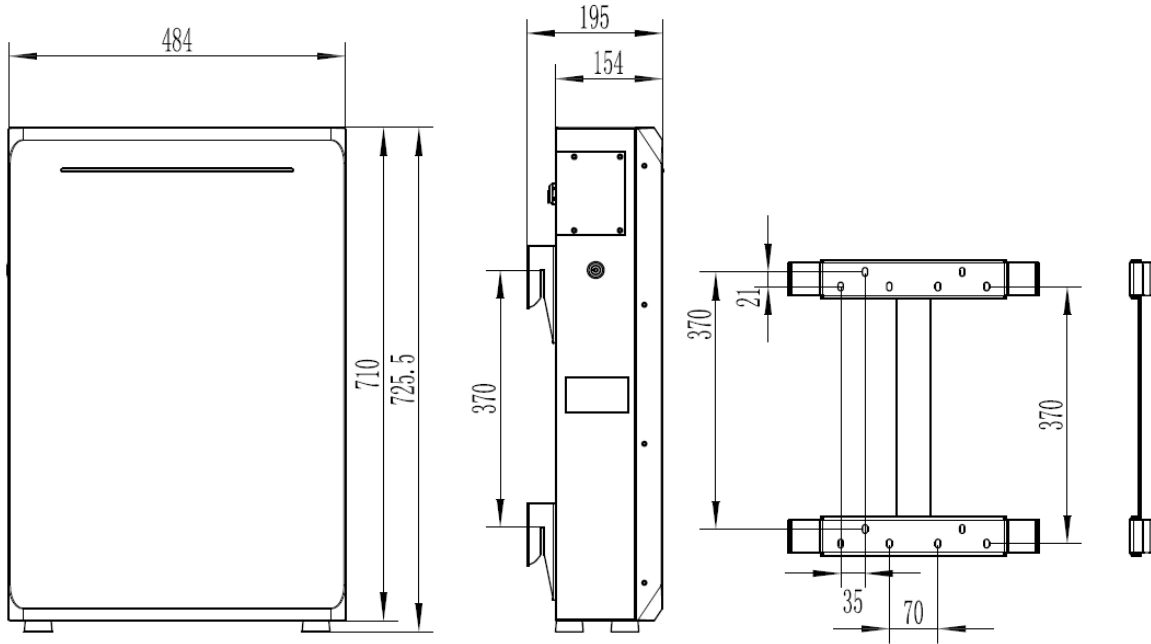
1.3 Product identity definition


Figure 1-1 Battery Energy Storage System nameplate

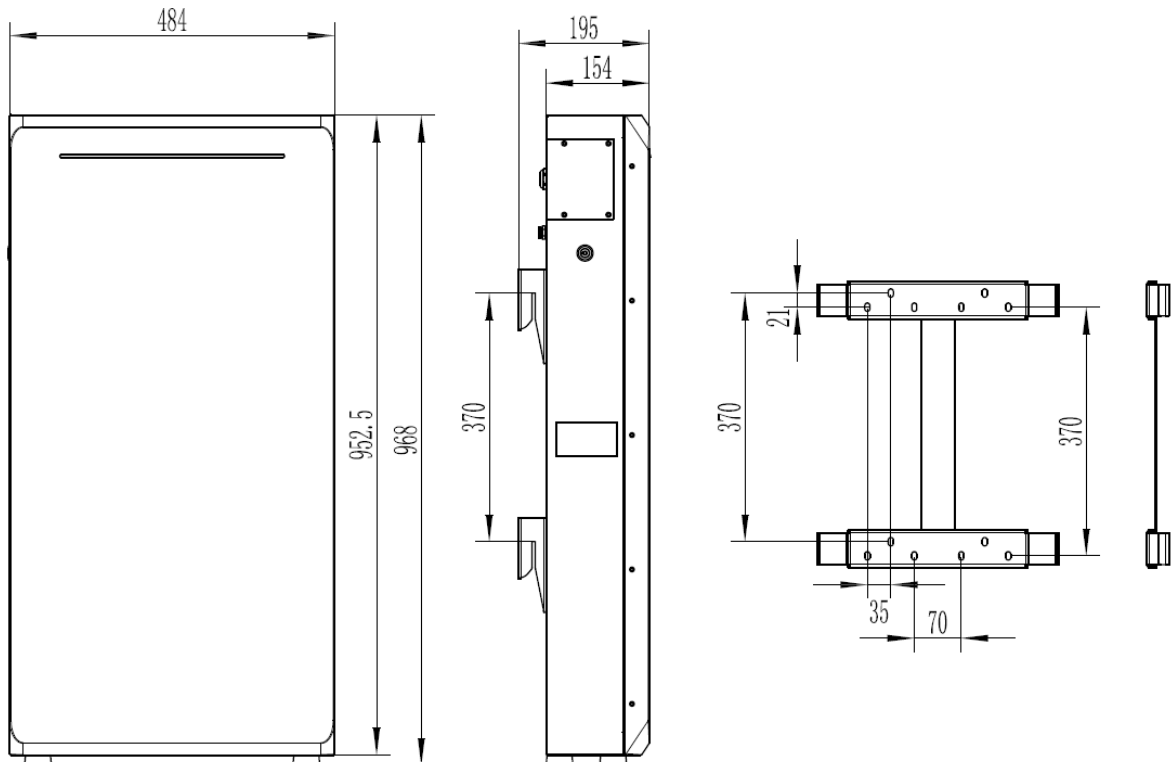
	Battery voltage is higher than safe voltage, direct contact with electric shock hazard.
	Be careful with your actions and be aware of the dangers.
	Read the user manual before using.
	The scrapped battery cannot be put into the garbage can and must be professionally recycled.
	After the battery life is terminated, the battery can continue to be used after it recycled by the professional recycling organization and do not discard it at will.
	This battery product meets European directive requirements.
<div style="background-color: red; color: white; text-align: center; padding: 5px; font-weight: bold;">DANGER</div> <div style="text-align: center; font-size: small; color: red;">HIGH VOLTAGE INSIDE</div> <div style="display: flex; justify-content: space-between; align-items: flex-start; padding-top: 10px;"> <div style="width: 30%;">         </div> <div style="width: 65%;"> <ul style="list-style-type: none"> Do not disconnect, disassemble or repair by yourself. Do not drop, deform, impact, cut or spearing with a sharp object. Do not place near open flame or incinerate. Do not sit or put heavy things on battery. Keep away from moisture or liquid. Keep out of reach of children, animals or insects. Contact the supplier with 24 hours if anything wrong. <p>Emergency Situations</p> <ul style="list-style-type: none"> If leaking, fire, wet or damaged, switch off the breaker and go away from the battery. Do not touch the leaking liquid. Do not use water, sand or dry powder extinguisher is usable. </div> </div>	<p>Dangerous goods warning label on the right of the battery module.</p>

2. Product Specification

2.1 Size and Weight



Power Stack 5

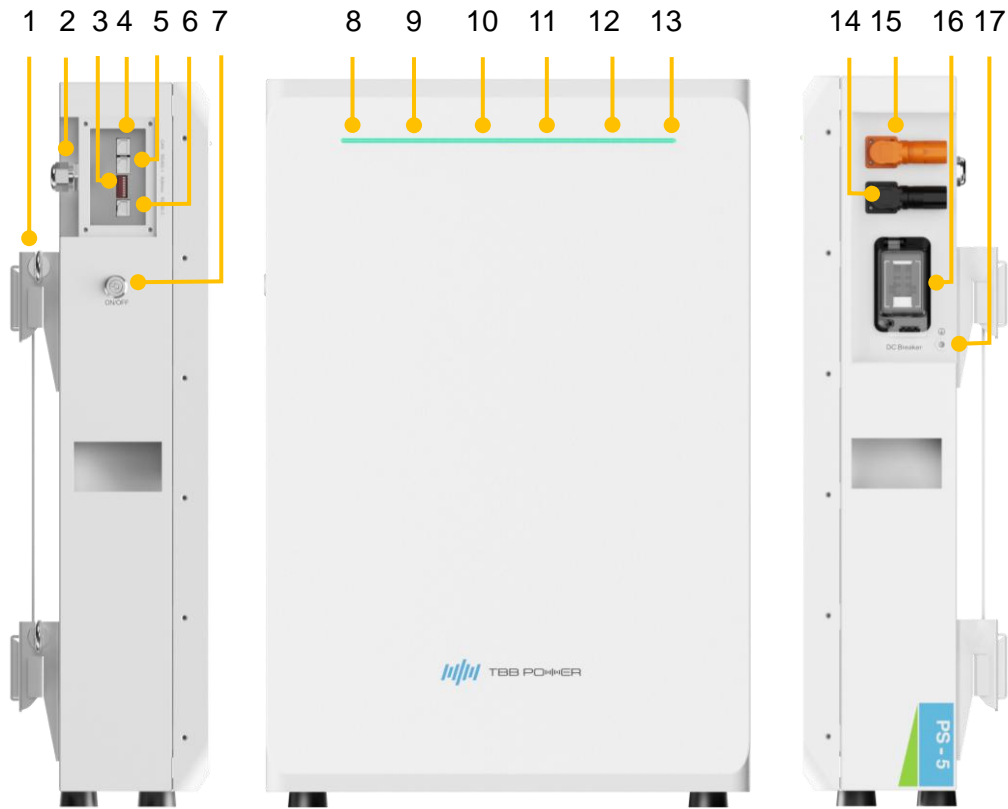


Power Stack 10

Product	Nominal Voltage	Nominal Capacity	Dimension	Weight
PS5	DC48V	105Ah	484x195x725.5mm	54kg
PS10	DC48V	210Ah	484x195x968mm	94kg

2.2 Performance Parameter

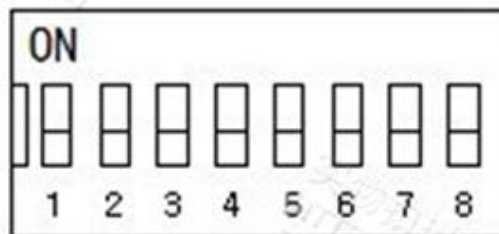
Item	PS5	PS10
Configuration	15S1P	15S2P
Nominal Voltage (V)	48	48
Nominal Capacity (Ah)	105	210
Nominal Energy (kWh)	5.04	10.08
Standard charge current (A)	52.5	52.5
Maximum charge current (A)	105	210
End of charging current (A)	5.25	10.5
Standard charge voltage(V)	53.5	53.5
Max. charge voltage(V)	54.75	54.75
Standard discharge current (A)	52.5	105
Maximum discharge current (A)	105	210
Final discharge voltage(V)	42	42
Cycle Life	90% DoD, 6000 cycles life	
Charging temperature range	0°C~+55°C	
Discharging temperature range	-20°C~+55°C	
Storage temperature	-20°C~+45°C 1month; 0°C~+35°C 3months	

2.2.1 Front Panel Interface Definition


Item	Name	Definition
1	Mounting bracket	Mounting bracket for securing the module in place
2	Communication port	Communication cable outlet
3	Address	DIP switch
4	CAN/RS485	Communication port, support CAN and RS485 communication
5	Parallel Ports In	Parallel communication port, the Parallel Ports Out port should be connected to the Parallel Ports In port of the next slave module
6	Parallel Ports Out	
7	Power switch	OFF/ON button, must be on the "ON" state when in use
8	Run	Green light flashes during standby and charging mode. Green light is always on when the battery is under discharging.
9~12	SoC	The number of green lights on shows the remaining battery power.

Item	Name	Definition
13	ALM	Red light flashes when an alarm occurs. Red light is always on during protection status. When the battery is no longer under protection, it will be automatically off.
14	Negative socket	Connect to battery negative output cable
15	Positive socket	Connect to battery positive output cable
16	Output circuit breaker	Control the positive and negative outputs of the module
17	Ground connection point	Shell ground connection

2.2.2 Address



DIP switch bit 1 to bit 8 definition: bit 1 to bit 5 are used to set the slave address or the number of slaves in parallel according to the master and slave status; bit 8 is used to set the master-slave flag; bit 6 and bit 7 are reserved bits.

Slave setting: Turn bit 1~ bit 8 to “OFF” side

Host setting: bit 1 to bit 5 are used to set the number of slaves in parallel. Bit 8 is fixed to ON. Please refer to the Master Setting table for detailed DIP switch settings.

Note:

Only the first module can be set as the master. DIP switch bit 1 to bit 5 on the master module should be set in accordance with the actual number of slave modules, and then turn bit 8 to “ON” side to start the automatic identification of addresses.

When the automatic identification starts, the 4 battery SoC indicators on both the master and slave modules will flash. Approximately 4 seconds later, the address identification will stop.

If the automatic identification is successfully executed, the four SoC indicators and the Run indicator on the slave modules will indicate the specific address assigned to a slave module for 3 seconds. The address is expressed in binary using these five indicators, namely 1, 2, 4, 8 and 16 from the left indicator to the right indicator. After the process, the slave modules will return to normal working status.

If the automatic identification fails, the Alarm indicator of the slave modules will keep flashing on and off every 0.25 seconds.

Table 2-5 PS5 Master setting

Slave Quantity	DIP switch						Description
	#1	#2	#3	#4	#5	#8	
1	ON	OFF	OFF	OFF	OFF	ON	2 pcs in parallel
2	OFF	ON	OFF	OFF	OFF	ON	3 pcs in parallel
3	ON	ON	OFF	OFF	OFF	ON	4 pcs in parallel
4	OFF	OFF	ON	OFF	OFF	ON	5 pcs in parallel
...
28	OFF	OFF	ON	ON	ON	ON	29 pcs in parallel
29	ON	OFF	ON	ON	ON	ON	30 pcs in parallel
30	OFF	ON	ON	ON	ON	ON	31 pcs in parallel
31	ON	ON	ON	ON	ON	ON	32 pcs in parallel

Table 2-6 PS10 Master setting

Slave Quantity	DIP switch						Description
	#1	#2	#3	#4	#5	#8	
0	ON	OFF	OFF	OFF	OFF	ON	/
1	ON	ON	OFF	OFF	OFF	ON	2 pcs in parallel
2	ON	OFF	ON	OFF	OFF	ON	3 pcs in parallel
3	ON	ON	ON	OFF	OFF	ON	4 pcs in parallel
4	ON	OFF	OFF	ON	OFF	ON	5 pcs in parallel
5	ON	ON	OFF	ON	OFF	ON	6 pcs in parallel
6	ON	OFF	ON	ON	OFF	ON	7 pcs in parallel
7	ON	ON	ON	ON	OFF	ON	8 pcs in parallel
8	ON	OFF	OFF	OFF	ON	ON	9 pcs in parallel
9	ON	ON	OFF	OFF	ON	ON	10 pcs in parallel
10	ON	OFF	ON	OFF	ON	ON	11 pcs in parallel
11	ON	ON	ON	OFF	ON	ON	12 pcs in parallel
12	ON	OFF	OFF	ON	ON	ON	13 pcs in parallel
13	ON	ON	OFF	ON	ON	ON	14 pcs in parallel
14	ON	OFF	ON	ON	ON	ON	15 pcs in parallel
15	ON	ON	ON	ON	ON	ON	16 pcs in parallel

2.2.3 Communication Port Definition

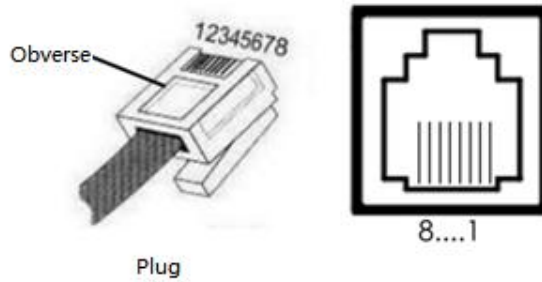


Table 2-7 defines the pins of each interface.

Power Stack 5&10 is designed with 3 RJ45 ports. The CAN port is used for CAN or RS485 communication with the inverter, and the Parallel Ports In and Parallel Ports Out are used for parallel communication with the battery bank. Table 2-7 defines the pins of each port.

Note: The Parallel Ports In is used as the input port, and the Parallel Ports Out is used as the output port during the signal distribution. To ensure the continuity of the signal distribution, it is necessary to connect the Parallel Ports Out port of the master module to the Parallel Ports In port of the first slave module, and connect the Parallel Ports Out port of the first slave module to the Parallel Ports In port of the next slave module.

Table 2-7

Port	Description	Note
CAN/RS485	PIN4: CANH	For communication with inverters
	PIN5: CANL	
	PIN3: 485-1A	For communication with inverters or an upper computer
	PIN6: 485-1B	
	PIN1、 2、 7、 8:NC	
Parallel Ports In	PIN4: 485-2A	For parallel communication
	PIN5: 485-2B	
	PIN3: DI+	Automatically assign the parallel communication address
	PIN6: DI-	
	PIN1、 2、 7、 8:NC	
Parallel Ports Out	PIN4: 485-2A	For parallel communication
	PIN5: 485-2B	
	PIN3: DO+	Automatically assign parallel communication address
	PIN6: DO-	
	PIN1、 2、 7、 8:NC	

2.2.4 LED Explanations

System Status		RUN	ALM	Battery SoC LED
Shutdown	Hibernate	OFF	OFF	All OFF
Standby	Normal	Flash 1	OFF	Indicate based on the battery SoC
	Alarm	Flash 3	Flash 3	
	Slave module address assignment failed	Flash 1	Flash 4	OFF
Charge	Normal	ON	OFF	Indicate based on the battery SoC (The LED to indicate the highest battery power will flash 2)
	Overvoltage alarm	ON	OFF	
	Overcurrent alarm	ON	Flash 3	
	Overvoltage protection	ON	OFF	ON
	Overcurrent protection	OFF	ON	OFF
Discharge	Normal	Flash 3	OFF	Indicate based on the battery SoC
	Alarm	Flash 3	Flash 3	
	Protection against overcurrent, short circuit, reverse polarity, etc.	OFF	ON	OFF
Temperature	Charge alarm	ON	Flash 3	Indicate based on the battery SoC (The LED to indicate the highest battery power will flash 2)
	Discharge alarm	Flash 3	Flash 3	Indicate based on the battery SoC
	Protection	OFF	ON	OFF

LED States Explanations

LED States	ON	OFF
Flash 1	0.25S	3.75S
Flash 2	0.5S	0.5S
Flash 3	0.5S	1.5S
Flash 4	0.25S	0.25S

Table 2-8 SoC light display and corresponding battery capacity

Status	Charging				Discharging			
Capacity indicator	L1	L2	L3	L4	L1	L2	L3	L4
0~25%	Flashing	OFF	OFF	OFF	ON	OFF	OFF	OFF
25~50%	ON	Flashing	OFF	OFF	ON	ON	OFF	OFF
50~75%	ON	ON	Flashing	OFF	ON	ON	ON	OFF
75~100%	ON	ON	ON	Flashing	ON	ON	ON	ON
Running indicator	ON				Flashing			

2.3 Battery Management System (BMS)

2.3.1 Voltage Protection

Low Voltage Protection during Discharging Process:

When the voltage of a battery cell or the total voltage is lower than the protection value, the battery will start over-discharging protection during the discharging process and the battery ALM indicator will be always on. Then the battery system will stop supplying power to the loads. The protection will end when the voltage is restored to the rated return range.

Over Voltage Protection during Charging Process:

When the total voltage or a battery cell voltage reaches the protection value during the charging process, the battery ALM indicator will be always on, and the battery will stop charging. The protection will end when either the total voltage or the voltage of any battery cell is restored to the rated return voltage range.

2.3.2 Current Protection

Over Current Protection during Charging Process:

When the battery pack is not equipped with a charging current limiting module or the charging current limiting function is disabled, the BMS should have a charging over-current protection function. Try the protection and recovery every 5 minutes. If the charging is still over-current, it will be protected again. If the charging is not over-current, it should be automatically protected and recovered.

Over Current Protection during Discharging Process:

When the discharge current is greater than the protection value, the system will stop supplying power to the loads, and disable the output. The BMS detects whether there's discharging over-current every 1 minute. If there is no discharging over-current, it will be restored to the standby state. If there is discharging over-current, it will continue the protection. Also, it can resume normal operation by charging.

2.3.3 Temperature Protection

Less/Over Temperature Protection during Charging Process:

If the battery's temperature exceeds the specified range of 0°C to +55°C during the charging process, the temperature protection mechanism will activate, causing the device to halt the charging procedure.

Less/Over Temperature Protection during Discharging Process:

When the battery's temperature surpasses the prescribed range of -20°C to +55°C during discharging, the temperature protection protocol will initiate, causing the battery to cease its output.

2.3.4 Other Protection

Short Circuit Protection:

In the event of activating the battery while it's in the off state, the short-circuit protection mechanism will be activated. The system will periodically examine for external short-circuits every 5 seconds and initiate pre-charging. If no short-circuit is detected, the battery will return to its standby mode. However, if a short-circuit persists, the protective action will persist as well.

After detecting five consecutive short-circuits, the system will cease its monitoring and the automatic restart of the normal output function will be deactivated. Reestablishing normal operation will necessitate manual intervention or resuming charging after resolving the fault.

Sleep mode:

When the battery does not supply power to the load or connect to any power source, and there is no external communication for more than 48 hours, the battery will automatically enter the standby sleep mode.

When the battery voltage or total voltage is lower than the protection value, the battery automatically enters the standby sleep mode 5 minutes later.

3. Installation and Configuration

3.1 Ready for installation

Safety Requirement

This system can only be installed by personnel who have been trained on the power supply system and have sufficient knowledge of the power system.

The safety regulations and local safety regulations listed below should always be followed during the installation.

- All circuits connected to this power system with an external voltage of less than 48V must meet the SELV requirements defined in the IEC60950 standard.
- If operating within the power system cabinet, make sure the power system is not energized. Additionally, ensure that battery devices are turned off.
- Distribution cable wiring should be reasonable and has the protective measures to avoid touching these cables while operating power equipment.
- The following protective equipment must be worn when installing the battery system:



Protective gloves



Safety goggles



Protective shoes

Figure 3-1

3.1.1 Environmental requirements

- Working temperature: - 20°C~55°C
- Charging temperature range is 0°C~55°C
- Discharging temperature range is -20°C~55°C
- Storage temperature:0°C~35°C
- Relative humidity:15%~90%
- Elevation:86 kPa-106 kPa

Operating environment: It needs to be installed indoors. The installation location needs to be protected from sunlight, no wind, no conductive dust and no corrosive gas.

And the following conditions should be met:

- Installation location should be away from the sea to avoid brine and high humidity environment.
- The ground is flat and horizontal.
- There are no flammable explosive articles near to the installation places.
- The optimal ambient temperature is 15°C ~ 30°C.
- Keep away from dust and messy zones.

3.1.2 Tools and data

Hardware tool

Tools and meters that may be used are shown in table 3-1.

Table 3-1 Tool instrument

Name	
Screwdriver (word, cross)	AVO meter
Wrench	Clamp meter
Inclined pliers	Insulating tape
Needle nose pliers	The thermometer
Clip forceps	Wrist strap
Wire stripper	Tape
Electric drill	

3.1.3 Technical preparation

Electrical interface check

Devices that can be connected directly to the battery can be user's equipment, power supplies, or other power sources.

- Confirm whether the user's PV power generation equipment, power supply or other power supply equipment has a DC output interface, and measure whether the DC power output voltage meets the voltage range requirements in Table 2-2.
- Confirm that the maximum discharge current capability of the DC power interface of the user's PV power generation equipment, power supply or other power supply equipment is greater than the maximum charging current of the products used in Table 2-2.

If the maximum discharge capacity of the DC power interface of the user's PV power generation equipment is less than the maximum charging current of the products used in Table 2-2, it is imperative that the DC power interface of the user's PV power generation equipment incorporates a current limiting function. This is crucial to ensure the unhindered and proper functioning of the user's equipment.

- Verify that the maximum operating current of the battery-powered user equipment (inverter DC input) is less than the maximum discharge current of the products used in Table 2-2.

The security check


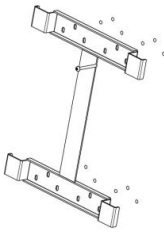

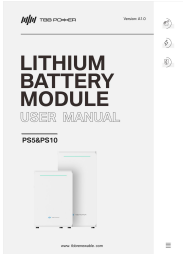
- Firefighting equipment should be provided near the equipment, such as portable dry powder fire extinguisher.
- Automatic fire fighting system shall be provided for the case where necessary.
- No flammable, explosive and other dangerous articles are placed beside the battery.



3.1.4 Unpacking inspection

- When the equipment arrives at the installation site, loading and unloading should be carried out according to the rules and regulations, to prevent it from being exposed to sun and rain.
- Prior to unpacking, it is advised to cross-reference the total number of packages with the shipping list affixed to each package. Additionally, carefully inspect the packaging for signs of damage or deterioration. In the process of unpacking, handle it carefully and protect the surface coating of the object.
- Upon opening the package, installation personnel should thoroughly review the technical documents, cross-check with the provided list, and refer to the configuration table and packing list to confirm the completeness and condition of the items. If the internal packing is damaged, it should be examined and recorded in detail.

The packing list is as follows:

Table 3-2

Item	Specification	Quantity	Figure
Battery	PS5 or PS10	1	
Mounting bracket		1	
Communication cable-to inverter	Black /L2000mm /Double RJ45 plug	1	
User Manual	User manual	1	

Screw	Crown Screws M6*40	6	
Expansion bolts	M8*40	6	

3.1.5 Engineering coordination

Attention should be paid to the following items before construction:

➤ Power cable specification.

The power cable specification shall meet the requirements of maximum discharge current for each product.

➤ Mounting space and bearing capacity.

Make sure that the battery has enough room to install, and the battery rack and bracket have enough load capacity.

➤ Wiring

Make sure the power cables and ground wires are installed reasonably, to prevent them from being short-circuited, flooded, or corroded.

3.2 Equipment installation

Table 3-3 Installation steps

Step1	Installation preparation	Ensure that the ON/OFF switch on the front panel of the battery is set to the "OFF" position to prevent any live operation.
Step 2	Mechanical installation	1. Cabinet placement position determination
		2. Pre-install the top cable harness
		3. Battery module installation
Step3	Electrical installation	1. Ground cable installation
		2. Battery module parallel cables installation
		3. Battery module all positive cables installation
		4. Battery module all negative cable installation
		5. Internal CAN communication interface connection
Step4	Battery system self-test	1. Press the ON/OFF switch to the "ON" state
		2. BMS system power-on activation
		3. Check the system output voltage
		4. Shut down the system
Step5	Connecting inverter	1. Connect all positive & all negative cables of the battery system to the inverter
		2. Connect the external CAN communication cable to the inverter

3.2.1 Installation preparation

1. Prepare equipment and tools for installation.
2. Check the battery and confirm that the ON/OFF switch is in the "OFF" state to prevent any live operation.

3.2.2 Mechanical installation

1. Wall Mounting

1) Plan the layout in advance and insert the expansion screw into the wall at the chosen location, as shown in Figure 3-2.

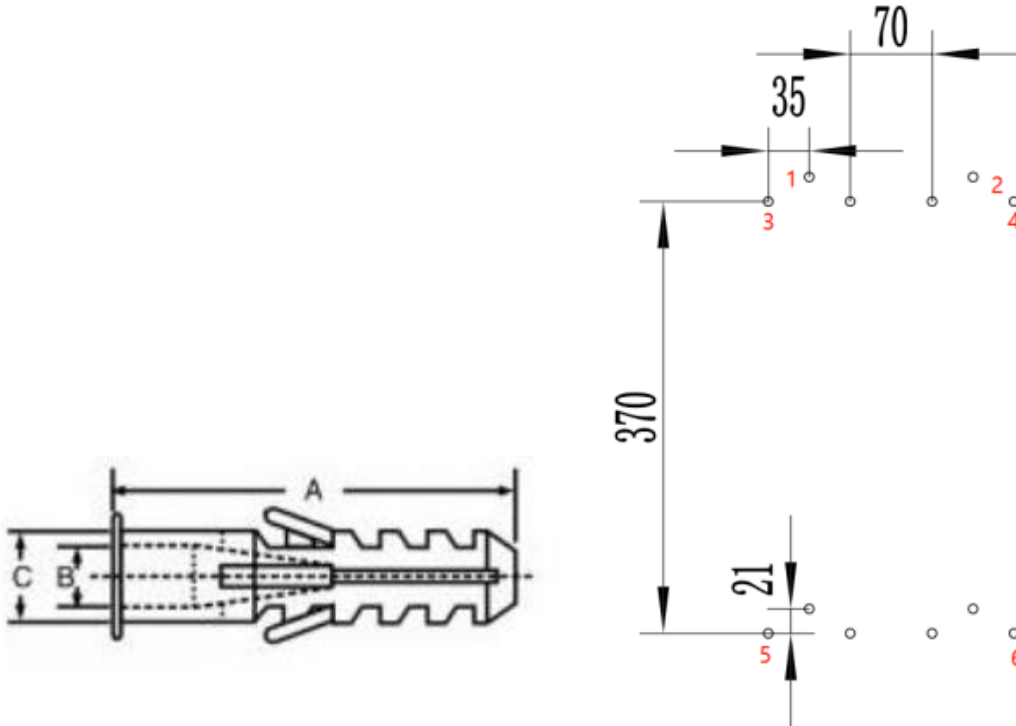


Figure 3-2

Model	A	B	C	Note
069A	39.4mm	6mm	8mm	8*40

Notes:

1) Choose an appropriate wall that can support the total weight of the battery system (PS10: 100kg/PS5: 60kg) and is thick enough to securely anchor the expansion bolts. The wall should have one of the following characteristics:

- Regularly spaced wooden studs
- Adequately thick plywood
- Sturdy concrete or brick material
- Sufficiently sized metal studs

2) Secure the mounting bracket onto the wall. Ensure the mounting bracket is level, and a level tool may be required.

Expansion bolt positions:

A total of 12 holes, as shown in Figure 3-3. For concrete, brick, or metal stud walls, select 6 (hole 1 to 6) holes for fastening. For wooden studs and plywood, use all 12 holes.

Torque: 12N.m

Tools: PH2 screwdriver, socket tool

Fasteners: 6 to 12 pieces, M6*40

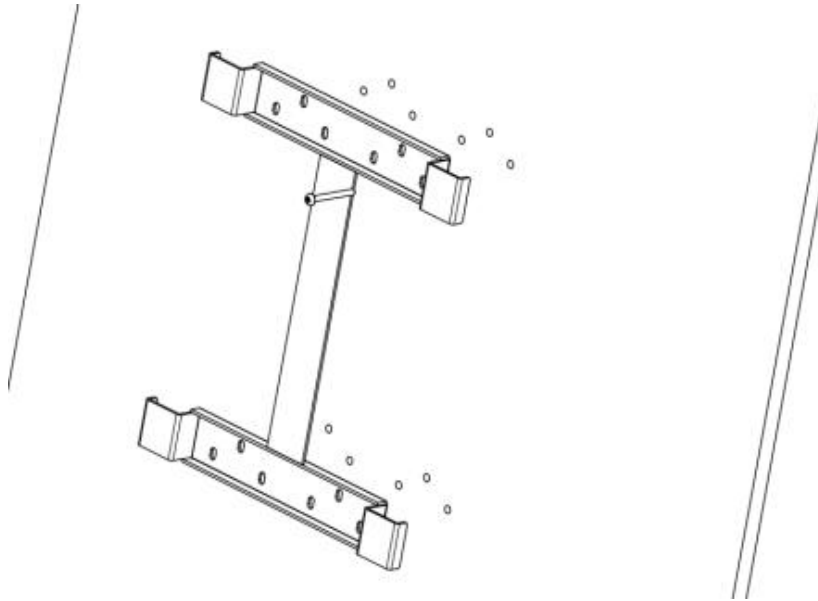


Figure 3-3

3) Secure the battery pack onto the mounting bracket, as shown in Figure 3-4.

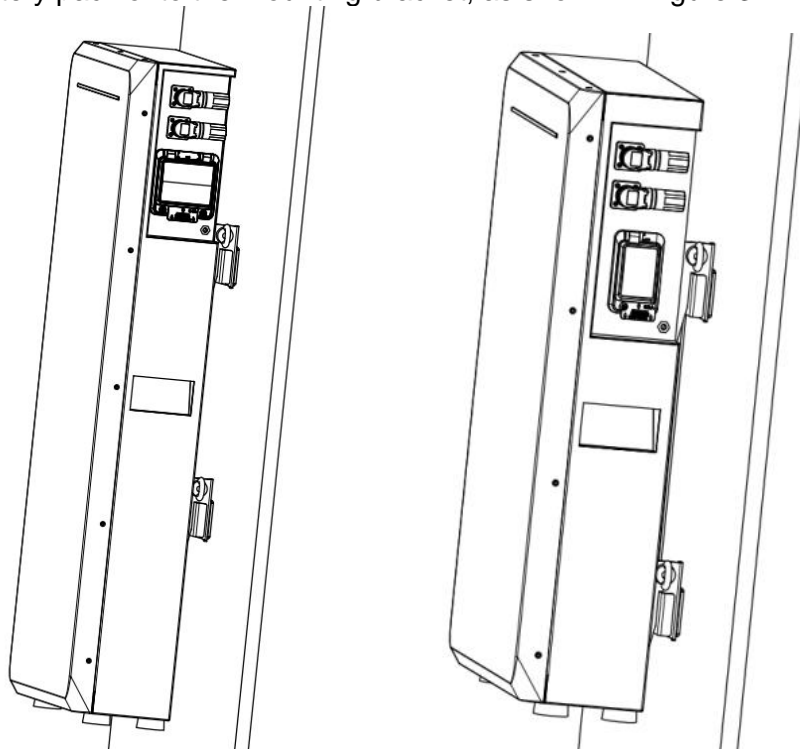


Figure 3-4

2. Floor Mounting

Plan the location in advance and select a flat surface and suitable wall. Ensure that the area is isolated from potential hazards that could damage the battery system, such as heat sources, flammable materials, or floods. Please take into account the spacing requirements of the battery system.

Notes:

1) Choose an appropriate floor area and wall. When installing on the floor, use 4 (hole 3 to 6) holes to fix it.

Choose a floor and wall that can support the total weight of the battery system (PS10: 100kg/PS5: 60kg) and can securely anchor the expansion bolts.

2) The operational steps are the same as wall-mounting installation.

Please note the installation height of the mounting bracket: For PS10, the height from the ground to hole 1 should be between 680mm and 690mm. For PS5, the height from the ground to hole 1 should be between 495mm and 505mm."

3.2.3 Electrical installation

Before connecting the power cables, use multi-meter to measure cable continuity, short circuit, confirm the anode and cathode, and accurately mark the cable labels.

Measuring methods:

- Cable availability: select the buzzer and use the probe to measure the ends of the same color cable. If the buzzer calls, it means the cable is available.
- Short circuit judgment: employ a multi-meter in the resistor mode. Place the probes on the same terminals of the positive and negative poles. If the resistor reading displays infinity, it indicates the cable is intact and operational.
- After visually checking the power cable is in good condition, connect its positive and negative poles respectively to the positive and negative poles of the battery.

It is better to add a circuit breaker between the inverter and the battery system. The selection of the circuit breaker requires:

$$\text{Voltage: } U > 60\text{V}$$
$$\text{Current: } I = \frac{\text{Inverter power}}{45\text{V}}$$

4. Usage, maintenance and troubleshooting

4.1 Battery system usage and operation instructions

After completing the electrical connection, please follow these steps to start the battery system.

1. Refer to 2.3.2 for the definition of the DIP switch and prepare for the DIP before turning on the system, and then turn the switch ON/OFF to ON.

After the battery indicator completes self-test, the RUN indicator flashes, and the SoC indicator displays according to the current state.

Warning: In case there is no response from the battery indicator or if the ALM indicator remains illuminated following the aforementioned procedures, please consult section 4.2 "Alarm Description and Handling" for further guidance.

2. Use a voltmeter to measure whether the battery terminal voltage of the circuit breaker is more than 37V, and check whether the voltage polarity is the same as that of the inverter input. If the measured input has a voltage output of more than 37V, it means that the battery has started working normally.
3. After confirming the voltage and polarity of the battery, close the circuit breaker and turn on the inverter.
4. Inspect the inverter indicator and battery indicator (including the communication and status indicators) for normal operation. If they are functioning correctly, proceed to establish the connection between the battery and the inverter. However, if the indicator lights display abnormalities, please refer to the inverter instruction manual or get in touch with the dealer for guidance.

Table 4-1 Battery and Inverter Power Matching Table

Hybrid Inverter	Off-grid Inverter	Power Stack 5		Power Stack 10	
		Min. parallel number	System Energy (kWh)	Min. parallel number	System Energy (kWh)
EPS (backup port) AC Output power	AC Output Power				
≤2.5 kW		1	5.04	1	10.08
≤5.0 kW		2	10.08	1	10.08
≤7.5 kW		3	15.12	2	20.16
≤10.0 kW		4	20.16	2	20.16
≤12.5 kW		5	25.2	3	30.24
≤15.0 kW		6	30.24	3	30.24
≤30.0 kW		12	60.48	6	60.48
≤40.0 kW		16	80.64	8	80.64
≤80.0 kW		32	161.28	16	161.28

Table4-2

Equipment Use	Charging	a) The battery's long-term continuous charging current should be $\leq 0.5C$ b) If the battery capacity is empty, please charge it within 48 hours after the battery is empty.
	Discharging	c) The long-term continuous discharge current of the battery should be $\leq 1C$ d) The recommended maximum depth of discharge (DoD) of Battery PACK is no more than 90%.

4.2 Alarm description and handling

In the event of a protection action or system fault, the working status indicator on the battery's front panel will display an alarm signal. The network management system can then retrieve the specific alarm categories for further investigation.

If the fault such as single cell over-voltage, charging over-current, under-voltage protection, high-temp protection or other abnormalities affects the output, please address the situation in accordance with the instructions provided in Table 4-3.

Table 4-3 Main alarm and Protection

Statue	Alarm category	Alarm indication	handling
Charging state	Cell over-voltage	RED	Stop charging and find out the cause of the trouble
	Over-current	RED	Stop charging and find out the cause of the trouble
	High temp	RED	Stop charging
Discharge state	Over-current	RED	Stop discharging and find out the cause of the trouble
	High temp	RED	Stop discharging
	Total voltage Under voltage	RED	Start charging
	Cell voltage under voltage	RED	Start charging

4.3 Analysis and treatment of common faults

Analysis and remedies for common faults are outlined in Table 4-4:

Table 4-4 Analysis and treatment of common faults

No.	Fault phenomenon	Reason analysis	Solution
1	The indicator does not respond after it is powered on	Power switch is broken	Check the power switch
2	The DC power supply time is too short	Battery capacity has become smaller	Storage battery replacement
3	Battery can not be fully charged	Charging voltage is too low	Adjust the charging voltage to 53.5V
4	The power cable sparks once it is powered on and the ALM light turns to RED	Power connection short-circuit	Turn off the battery, check the cause of the short circuit
5	The ALM indicator on the slave module flashes every 0.25s	Slave module address assignment failed	1.Check whether the parallel cable is connected. 2.Check whether the OUT port of the parallel cable is connected to the IN port of the next module. 3.Make sure only the first module connected in parallel can be set as the master. 4.The DIP switch Settings for the number of slaves on the master module must be consistent with the actual number of slaves installed. 5.Make sure the modules connected in parallel are of the same model


Should you require technical assistance or have any inquiries, please promptly reach out to the seller.

4.4 Recycle and disposal

When it becomes necessary to dispose of or recycle a battery, whether in normal condition or damaged, it is essential to adhere to local recycling regulations, such as Regulation (EC) No 1013/2006 within the European Union. The process should involve employing the best available techniques to attain the appropriate recycling efficiency.

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