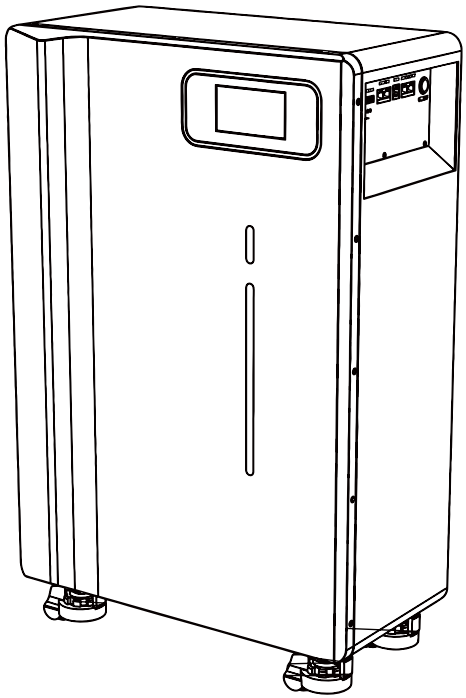
User Manual

ATHENA Power Storage System-B SERIES



PRODUCT PRESENTATION

Energy storage battery is a battery system used to store electrical energy. They are able to convert electrical energy into chemical energy, store the charge in the battery, and then release it when needed. Energy storage batteries are typically designed for long periods of energy storage and charging and discharging. This product uses brand new LiFePO4 battery, high capacity, long cycle life, safety performance. Equipped with the brand intelligent battery management system, with over discharge, overload, over current, short circuit, over-voltage and other multiple protection, compatible with the global mainstream inverter communication.Normally this product is installed in combination with inverter and PV system to provide green electricity to household users, reduce energy consumption, and reduce negative impacts on the environment,it's widely used in remote areas or areas with unstable power supply, to provide reliable, stable, and cost-effective energy supply.

SAFETY RULES

It is very important and necessary to read the user guider carefully before installing or using the battery. Failure to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, death, or may damage the battery and the whole system.

- Keep the battery away fire and water.
- Do not use in high temperature (above 55°C), humid (humidity greater than 90%), or places with danger of gas or dust explosion.
- Do not short shirt positive and negative with wire or metal objects.
- If the battery is stored for a prolonged time, it is requirement that they are charged every three to six
- months, and the SOC should be no less than 60%.
- The battery needs to be recharged within 12 hours, after fully discharging.
- Do not expose cable outside.
- All battery terminals must be disconnected before maintenance.
- Do not use cleaning solvents to clean the battery.
- Do not expose the battery to flammable or harsh chemicals or vapors.
- Do not paint any part of the battery, include any internal or external components.
- Do not connect battery with PV solar wiring directly.
- Any foreign object is prohibited to be inserted into any part of the battery.
- Any warranty claims are excluded for direct or indirect damage due to item above.

Before Connecting

After unpacking, please check the battery and packing list first. if the battery is damaged or spare parts are missing, Please contact the dealer.

- Before installation, be sure to cut off the grid power and make sure the battery is in the turned-off mode. Wiring must be correct, do not mix-connect the positive and negative cables, and ensure no short circuit with the external device.

- It is prohibited to connect the battery with AC power directly.
- The embedded BMS in the battery is designed for 48VDC, please Do not connect battery in series.
- It is prohibited to connect the battery with different type of battery.
- Please ensure the electrical parameters of battery system are compatible to inverter.

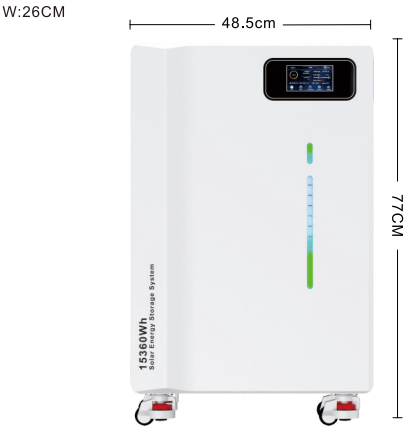
During Operation

If the battery system needs to be moved or repaired, the power must be cut off first and the battery is completely shut down.

- It is prohibited to connect the battery with different type of battery
- It is prohibited to put the batteries working with faulty or incompatible inverter
- In case of fire, only dry powder fire extinguisher can be used, liquid fire extinguishers are prohibited
- Please do not open, repair or disassemble the battery.

We do not undertake any consequences or related responsibility due to violation of safety operation or violating of design, production and equipment safety standards.

PRODUCT DIMENSION



PRODUCT PARAMETER

Battery

Model	SCAE-B-51.2-300	SCAE-B-51.2-314	SCAE-B-51.2-335
Rated Capacity	15360Wh(300Ah)	16076Wh(314Ah)	17152Wh(335Ah)
Nominal Voltage	51.2V		
Discharge Voltage Range	43.2V-58.4V		
Standard Charing Current	100A		
Max Charging Current	200A		
Max Discharging Current	200A		
Depth of Discharge	95%		
Communication Interface	CAN/RS485		
Cycle Life	≥8000, 25±2℃, 0.5C, EOL80%		
Working Temperature Range	Charge: 0℃-50℃; Discharge: -20℃-60℃		
Storage Temperature	-20℃-60℃		
Dimension	48.5*26*77cm		

PACKING LIST

Storage Battery*1

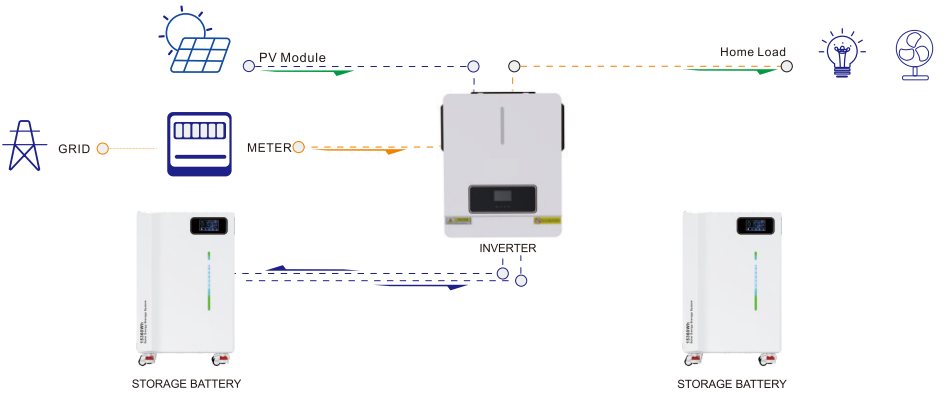
Screw Pack*4

2AWG Silicon Bronze Cable*2

1m Communication Cable

Name	Item No	Components	CNT	Carton Size	N.W (kg)	G.W (kg)	Unit CBM (m^3)
ATHENA SERIES 15KWH	SCAE-B-51.2-300	Battery,Fuma Wheel;Screw Pack;DC Cable;Communication Cable	1	82.6*55.5*42CM	113.5	129.8	0.193
ATHENA SERIES 16KWH	SCAE-B-51.2-314		1	82.6*55.5*42CM	117.5	133.8	0.193
ATHENA SERIES 17KWH	SCAE-B-51.2-335		1	82.6*55.5*42CM	117.5	133.8	0.193

SYSTEM DIAGRAM



INSTALLATION STEPS

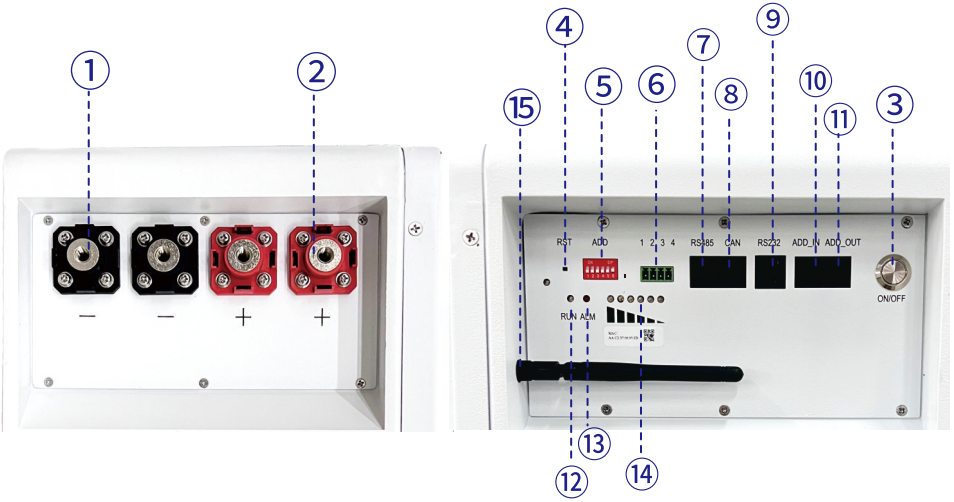
■ Step1: Prepare tools and Security Equipment

Use insulated tools to prevent accidental electric shock or short circuit. Ifthere is no insulation tool, use insulation tape to cover all exposed metal surfaces of the tool for insulation treatment. When handling the battery pack, it is recommended to wear the safety equipment.

■ Step2:Connecting Inverter and Multi-Units Connection

- Terminal Instruction

Battery Interface



No.	Instruction
①	Negative
②	Positive
③	ON/OFF
④	Reset Button
⑤	Dip Switch
⑥	Dry Contacts
⑦	RS485A Communication Port
⑧	CAN Communication Port
⑨	RS232 Communication Port
⑩	Communication Port-ADD IN
⑪	Communication Port-ADD OUT
⑫	Operation Indicator
⑬	Alarm Indicator
⑭	Charging Indicator
⑮	WiFi Antenna Connector

- Battery in parallel

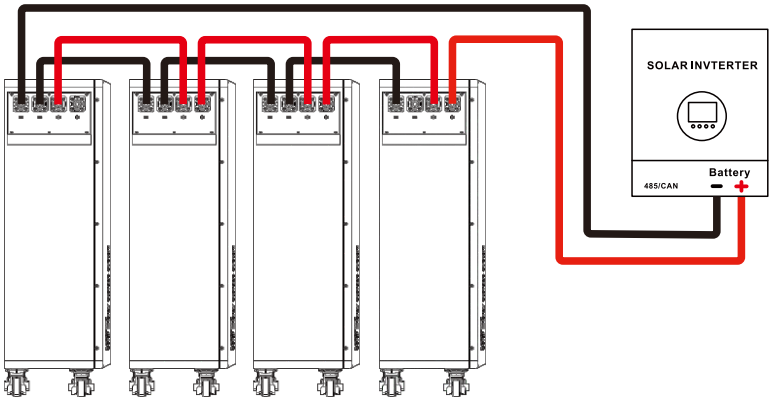
The LiFePO4 battery is a smart battery to match all off-grid and hybrid solar inverter (48Vdc/51.2Vdc)types.

When the battery needs to be used in parallel, the maximum connection is 15 units. And we recommend 2-8 units according to application.

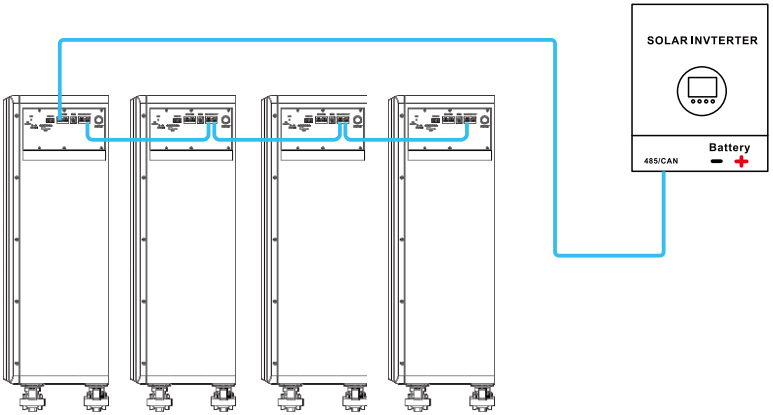
NOTE: Parallel power cable standard is 2 meters. This is not standard cable in battery package. For parallel cable quantity needed, please consult with sales manager for proper use and related quantity.

The battery is equipped with communication functions, allowing it to connect to the inverter via an RS485 or CAN port using a network cable, ensuring the inverter operates properly.If the inverter does not have communication functions, you can set it to LIB (Lithium Battery) mode and configure the inverter correctly. The lithium battery can be used directly and does not require a network cable connection.

① Battery parallel connection



② Communication cable connection



■Step3:Dip switch

- Our product has the automatic addressing function, when packs are connected in parallel. Please put DIP 6 to OFF.

■Step4: Press the ON/OFF Button.

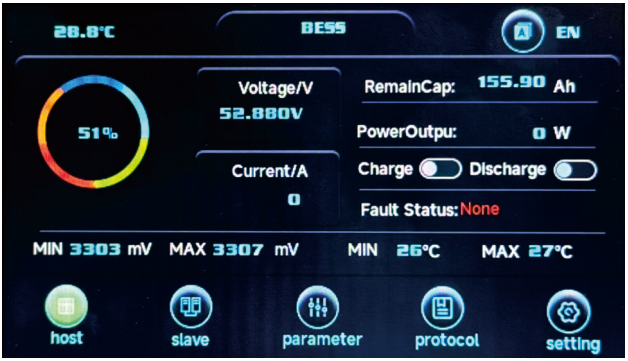
LCD INTRODUCTION

The picture below is as per 51.2V300AH product diagram(for 51.2V)

Display Layout Function

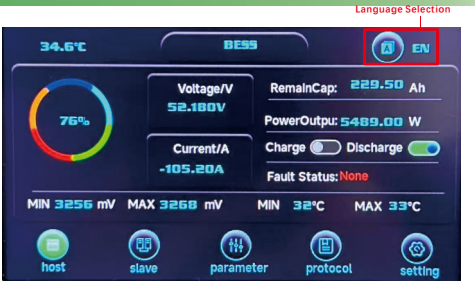
Starting screen: The screen is touch-sensitive, allowing touch-based control and settings adjustment.

The system supports switching between Chinese and English and Arabic. The switch button is in the upper right cornerof the main page.



First Interface: host Interface

This page is the main page, which also serves as the startup/host page and displays fault/alarm information, SOC, total voltage, current status, remaining battery capacity, output power, maximum and minimum voltages of individual battery cells, maximum and minimum temperatures, and language settings.



Second Interface: slave Interface

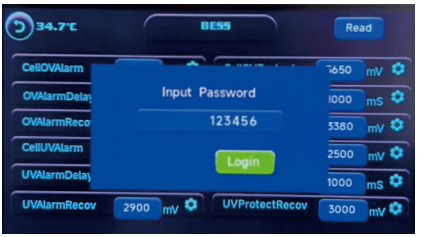
Displays the battery pack's SOC and operating current, along with the voltage, operating temperature, and fault status of each individual cell.
Data for parallel-connected battery packs can be queried by clicking 2-15.

Third Interface: parameter Interface

Professional adjustments to battery pack parameters are available. These configuration parameters are recommended to be set only by qualified personnel; otherwise, the factory default settings shall be used. Improper and incorrect settings may cause damage to the battery pack.

On the parameter setting page, you may configure the following parameters: cell overvoltage and undervoltage thresholds, total battery pack overvoltage and undervoltage thresholds, charge/discharge overcurrent values, charge/discharge high and low temperature limits, MOS high-temperature threshold, ambient high and low temperature limits, SOC alarm parameters, and excessive voltage difference parameters.

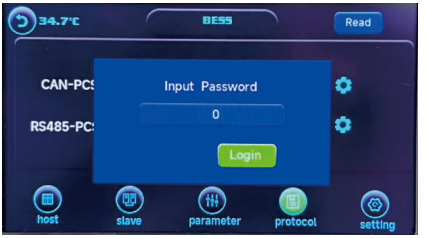
To modify parameters: Enter the correct target values and click the Set button. The password for access is "123456". After completing modifications, click the Read button in the upper right corner to review and verify whether the changes have taken effect successfully.

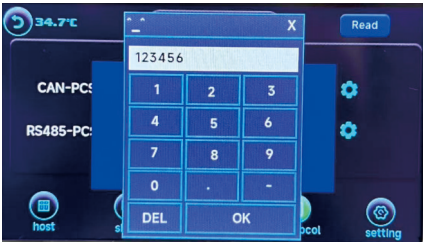


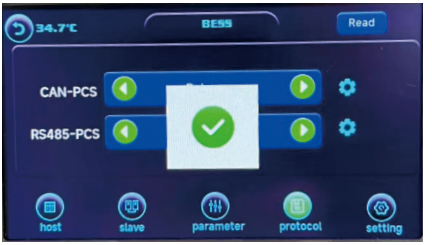
Forth Interface: protocol Interface

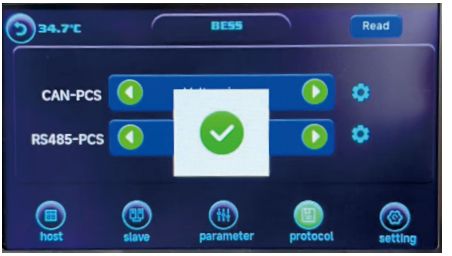
This page is used for protocol configuration. You may select the matching protocol according to different inverters to ensure stable communication and normal operation between the battery pack and the inverter.

A password is required before configuration: the password is "123456". After entering the correct password, click the left and right arrow icons to switch protocols. Once the desired protocol is selected, tap the Set button; a tick mark will appear on the screen to indicate successful configuration. To double-check the result, click the "Read" button in the upper right corner to verify that the settings have been applied properly.









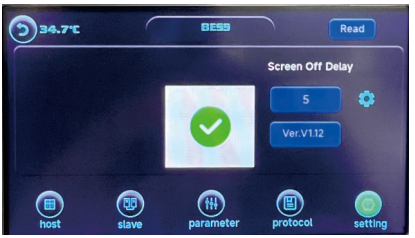
Fifth Interface: setting Interface

This page allows you to adjust the screen sleep timeout. The screen will automatically turn off after the set period of inactivity.

After entering your desired timeout value, click the Set button and input the password "123456". A tick icon will pop up on the screen to notify you of successful configuration.

To fully confirm the modification, you may click the "Read" button at the top right corner for verification.

This page also displays the current firmware version of the screen.



Protection times setting

•Overvoltage protection for single cell (OVP);

•Undervoltage protection for single cell (UVP);

•Overvoltage protection for the whole pack (POVP);

•Undervoltage protection for the whole pack (PUVP);

•High-temperature protection during charging (COTP);

•Low-temperature protection during charging (CUTP);

•High-temperature protection during discharging (DOTP);

•Low-temperature protection during discharging (DUDP);

•Overcurrent protection during charging (COCP);

•Overcurrent protection during discharging (DOCP);

•Short-circuit protection (SCP).

LIGHT STRIP FEATURES

Distribution of light strips

Run-Led	Alarm-Led	Led-10	Led-09	Led-08	Led-07	Led-06	Led-05	Led-04	Led-03	Led-02	Led-01
Run-Led	Alarm-Led	Indicator-Led									
		100%	90%	80%	70%	60%	50%	40%	30%	20%	10%

Classification of light applications

The light board features 12 R-G-LED lights, each capable of displaying multiple colors includin g red, blue, and green. These lights are categorized into three primary types based on their fu nctions:

Status-LED Indication Table

Status	Led1	Led2	Led3	Led4	Led5	Led6	Led7	Led8	Led9	Led10	ALM	RUN
Power on self-test	LED colors light up in sequence. After all lights are on, they turn off and switch to the next color. The direction is from left to right.											
False	Display SOC normally										Always ON	OFF
Protection	Display SOC normally										Flashing 1S	OFF
											OFF when overvoltage	Always ON
	All lights remain off during undervoltage protection										OFF	OFF
Alarm	Display SOC normally										Flashing 1S	
											OFF when overvoltage	
Charging	Display SOC, with the maximum SOC LED to the full charge SOC LED flowing										-	Flashing 1S
Discharging	Display SOC, with the maximum SOC light flashing every 2 seconds										-	Flashing 1S
Idle	Display SOC										—	Flashing 1S
Off	Flowing from left to right, until complete turn off											

Note: Flash ① (frequency: 1 Hz); Flash ② (frequency: 0.5 Hz)

Indicator Led Indication Table

Table 1: Charging Status

SOC	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	ALM	RUN
0<S≤10%	Blue Marquee Light											BLUE FLASH ①
10% < S	BLUE	Blue Marquee Light										BLUE FLASH ①

≤ 20%												
20% < S≤ 30%	BLUE	BLUE	Blue Marquee Light								---	BLUE FLASH ①
30% <S≤ 40%	BLUE	BLUE	BLUE	Blue Marquee Light							---	BLUE FLASH ①
40% < S≤ 50%	BLUE	BLUE	BLUE	BLUE	Blue Marquee Light						---	BLUE FLASH ①
50% < S≤60%	BLUE	BLUE	BLUE	BLUE	BLUE	Blue Marquee Light					---	BLUE FLASH ①
60% ≤ S≤ 70%	BLUE	BLUE	BLUE	BLUE	BLUE	BLUE	Blue Marquee Light				---	BLUE FLASH ①
70% < S≤ 80%	BLUE	BLUE	BLUE	BLUE	BLUE	BLUE	BLUE	Blue Marquee Light			---	BLUE FLASH ①
80% < S≤ 90%	BLUE	BLUE	BLUE	BLUE	BLUE	BLUE	BLUE	BLUE	Blue Marquee Light		---	BLUE FLASH ①
90% <S≤ 100%	BLUE	BLUE	BLUE	BLUE	BLUE	BLUE	BLUE	BLUE	BLUE	Blue Marquee Light	---	BLUE FLASH ①

Note: Flash ① (frequency: 1 Hz); Flash ② (frequency: 0.5 Hz)

Table 2: Discharge Status

SOC	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	ALM	RUN
0 < S≤10%	Green Flash ②	---	---	---	---	---	-	---	---	---	-	GREEN FLASH ①
10% < S≤ 20%	GREEN	GREEN FLASH ②	---	---	---	---	-	---	---	---	-	GREEN FLASH ①
20% < S≤ 30%	GREEN	GREEN	GREEN FLASH ②	---	---	---	---	---	----	---	---	GREEN FLASH ①
30% < S≤ 40%	GREEN	GREEN	GREEN	GREEN FLASH ②	===	----	---		----	---	-	GREEN FLASH ①
40% < S≤ 50%	GREEN	GREEN	GREEN	GREEN	GREEN FLASH ②	---	---	---	---	---	-	GREEN FLASH ①
50% < S≤ 60%	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN FLASH②	-	----	----	----	---	GREEN FLASH ①
60% < S≤ 70%	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN FLASH ②	---	---	---	---	GREEN FLASH ①
70% < S≤ 80%	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN FLASH ②	---	---	-	GREEN FLASH ①
80% < S≤ 90%	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN FLASH ②	---	---	GREEN FLASH ①
90% < S≤ 100%	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN FLASH ②	---	GREEN FLASH ①

Note: Flash ① (frequency: 1 Hz); Flash ② (frequency: 0.5 Hz)

Table 3: Stationary Status without charging or discharging

SOC	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	ALM	RUN
0< S≤ 10%	RED	---	---	---	---	-	---	---	---	---	-	GREEN
10% <S≤ 20%	ORANGE	ORANGE	-	---	---	---	---	---	---	---	-	GREEN
20% < S≤ 30%	GREEN	GREEN	GREEN	---	---	---	---	---	---	---	---	GREEN
30% <S≤ 40%	GREEN	GREEN	GREEN	GREEN	---	---	---	---	---	---	---	GREEN
40% < S ≤ 50%	GREEN	GREEN	GREEN	GREEN	GREEN	---	-	---	---	---	---	GREEN
50% < S≤ 60%	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	---	---	---	---	---	GREEN
60% <S≤70%	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	---	---	---	---	GREEN
70% <S≤ 80%	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	---	---	---	GREEN
80% <S≤ 90%	GREEN	OREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	---	---	GREEN
90% < S ≤100%	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	---	GREEN

Note: Flash ① (frequency: 1 Hz); Flash ② (frequency: 0.5 Hz)

Table 4: Sleep Status

SOC	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	ALM	RUN
0 < S ≤ 100%	----	---	---	---	---	---	---	---	---	---	---	---

Power On Self Test

Self-test all LED lights in a flowing light manner (red, blue, green). All LEDs will perform a self-test display when powered on, as follows:

- Red flow light: The red indicator starts with LED-01, incrementing sequentially until all lights up, then all turn off to enter the next round.
- Blue flow light: The blue indicator starts with LED-01, incrementing sequentially until all lights up, then all turn off to enter the next round.
- Green flow light: The green indicator starts with LED-01, incrementing sequentially until all lights up, then enter the working mode.

LED INDICATOR

Display function

Table 4-11-1LED display description

State of system	Event	ON/OFF (LED9)	Run (LED 8)	Alarm (LED 7)	SOC(LED 6~1)						Instruction
					LED6	LED 5	LED4	LED3	LED2	LED 1	
		●	●	●	●	●	●	●	●	●	
Poweroff	Sleep	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	All LEDS turn off
static state	Normal	ON	Flash1	OFF	Refer to table(4-11-2)						/
	Alarm	ON	Flash1	Flash3							/
Charging	Normal	ON	ON	OFF							/
	Alarm	ON	ON	Flash3							The over-voltage alarm does not flash
	OV protect	ON	ON	OFF	ON	ON	ON	ON	ON	ON	/
	Temperature, Over-current, fail-safe	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	/
Discharging	Normal	ON	Flash 3	OFF	Refer to table(4-11-2)						
	Alarm	ON	Flash 3	Flash 3							
	UV protect	OFF	Flash2	OFF	OFF	OFF	OFF	OFF	OFF	OFF	/
	Over-current, short circuit, temperature, fail-safe	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF	/

Table 4-11-2SOC display description

State			Charging						Discharging					
LED		LED6 ●	LED5 ●	LED4 ●	LED3 ●	LED2 ●	LED1 ●		LED6 ●	LED5 ●	LED4 ●	LED3 ●	LED2 ●	LED1 ●
SOC %	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
RUN LED ●		ON							Flash 3					

Table 4-11-3LED flash description

Flash Mode	ON	OFF
Flash1	0.25S	3.75S
Flash 2	0.5S	0.5S
Flash3	0.5S	1.5S

Reset key switch description

When the BMS is in hibernation state, press the key (1S) and release it, the protection board is activated, and the LED indicator lights up successively from "LED1" for 0.5 seconds.

When the BMS is active, press the button (3 to 6S), and the LED indicator will turn on for 0.5 seconds from the lowest power indicator. When released, the system will go to sleep.

When the BMS is in the active state, press the button (6-10s) and release it, the protection board is reset, and the LED indicator is displayed according to the current power.

Description of the self-locking switch

When the BMS is in hibernation state, after closing the self-lock, the protection board is powered on, and the LED indicator lights up successively from "LED1" for 0.5 seconds.

When the BMS is active, turn off the self-locking switch and wait for 1S~3S before the system enters the power-off state.

FUNCTIONAL OPTIONAL SELECTION

Step①

Scan the QR code with your phone to download the “JBD BMS” app, then connect the device via Bluetooth or Wi-Fi.

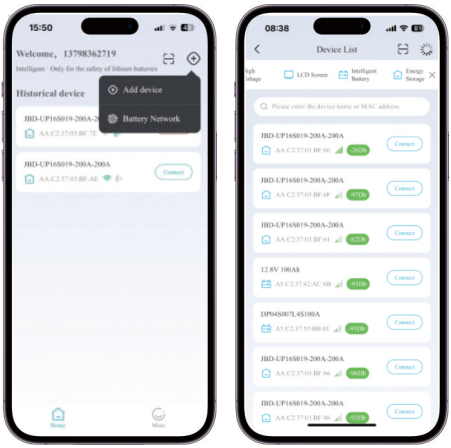
JBD BMS APP

Step②

Registration and Login.

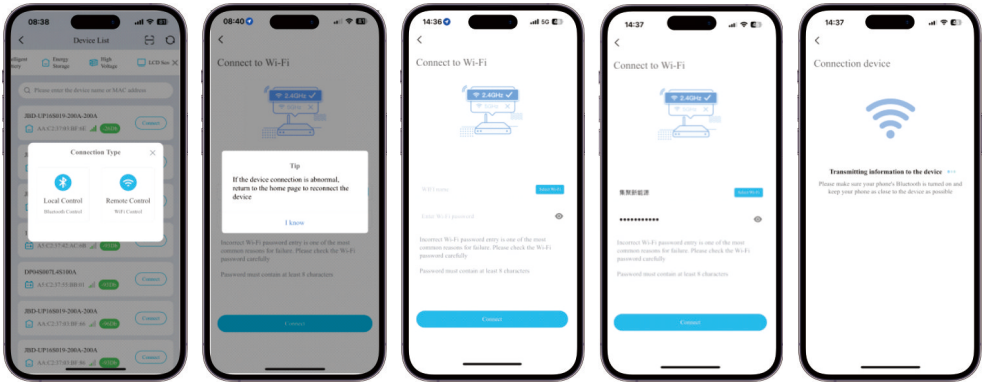
Step③

Keep the device turned on and add the device.



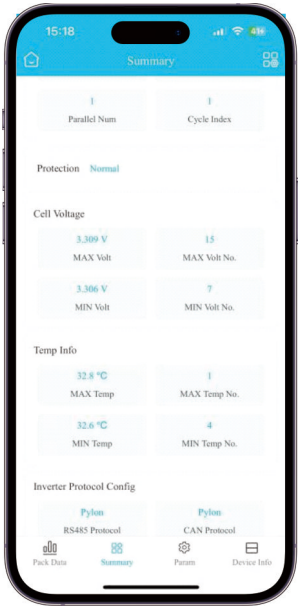
Step④

You may choose either Bluetooth or Wi-Fi connection. For Wi-Fi connection, please use the 2.4 GHz band. After correctly configuring the network, add the device.



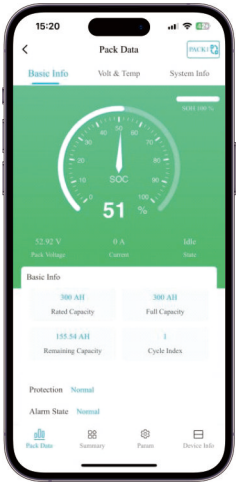
Step⑤

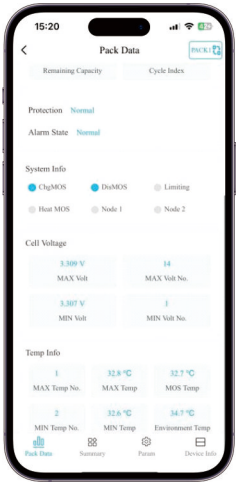
5. After successful connection, the integrated interface will display basic information including SOC value, total voltage, total current, operating temperature, and current protocol.



Step⑥

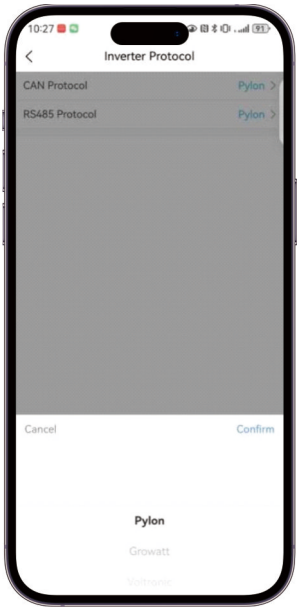
6. PACK Data: This interface displays specifications such as capacity, cycle count, status information, cell temperature, and cell voltage.





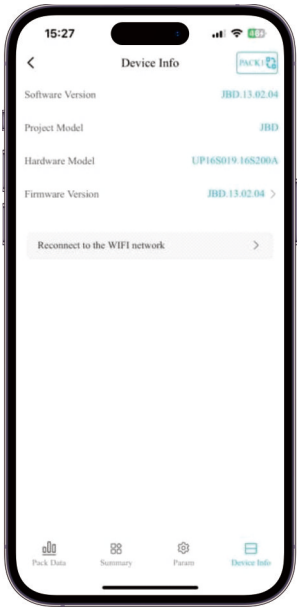
Step⑦

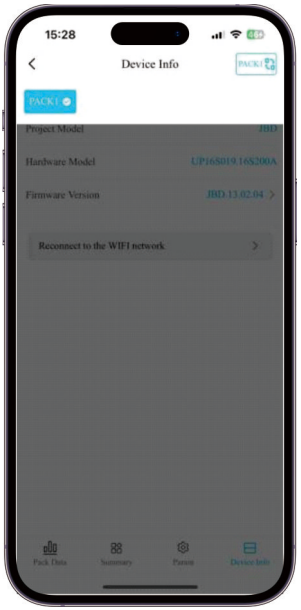
Parameter Settings: Configure the inverter protocol as required.



Step⑧

Device Information. Here you can view the software and hardware version information.





EMERGENCY RESPONSE PROCEDURE

When the ESS operates abnormally, the inverter, battery, and all load switches must be turned off first.

If the battery system leaks electrolyte, avoid contact with the leaking liquid or gas. If exposed to the leaking material, take the following measures immediately:

- Inhalation: Evacuate contaminated area and seek medical attention.
- Eye Contact: Flush eyes with running water for 5 minutes, then seek medical attention.
- Skin Contact: Wash affected area thoroughly with soap and water and seek medical attention.
- Ingestion: Induce vomiting and seek medical attention.

In the event of a fire, please do the following:

- Equipment combustion: If the fire is controllable and personnel are safe, please use Novec 1230, FM-200 or dioxin fire extinguisher to put out the fire. If the fire is uncontrollable, do not try to put it out. When the battery is heated to more than 150°C, it may explode. Evacuate personnel immediately to ensure life safety.
- Fire near the equipment: If it is safe, firstly disconnect the battery system circuit breaker to shut down the power charging. Then immediately extinguish the fire and evacuate personnel.

DAILY MAINTENANCE

- Cable Inspection: Check whether the wire connection is loose, aged, damaged, or falling off; check whether the cable terminals are loose or overheated; and the ground connection is good or not.
- Equipment Inspection: Check the battery system equipment for failure or damage every 6 months. When the system is running, check whether there is any abnormal noise in any part of the system. Check the battery voltage, temperature and other parameters. Check whether the equipment parameters are normal when the system is running.
- Equipment Cleaning: After using the equipment for half a year, the filter cotton on the left side of the ventilation needs to be removed, cleaned, dried and reinstalled, and the warning and guidance signs must be clear and intact, and the on-site environment must be clean and tidy.

QUALITY ASSURANCE

If the product failure during warranty, please contact a professional person to repair.

The product nameplate cannot be torn off; otherwise, warranty service will be void.

The following 7 points are not included in the warranty scope. If the customer requires repairment, should pay for the maintenance service.

- The equipment is damaged during transportation which is not arranged by our company
- The equipment has been improperly installed, reinstalled or used.
- The equipment operated in harsh environments.
- The malfunction or damage was caused by installation, repair, modification or disassembly.
- Repaired by non-professionals
- By using of non-standard accessories
- Damage caused by unexpected natural factors