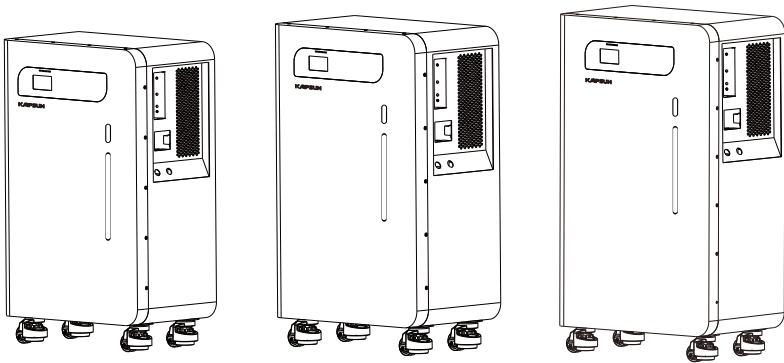


USER MANUAL

ARES Series (Integrated Inverter & Battery)



PRODUCT PRESENTATION

Home ESS refers to the storage of electricity locally by household energy storage equipment for later use. ESS consists of energy storage batteries, inverters and other components. We use brand new grade A LiFePO4 battery, equipped with an intelligent battery management system for charging and discharging cycles. The inverter converts DC energy to AC energy to meet the requirements for household electricity. Normally this product is installed in combination with 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

Important Warning Signs



Indicates that the equipment is in a dangerous state and the switch should be turned off immediately to prevent injury.



Indicates that the system must be turned off or disconnected for 5 minutes before being touched or put into use to prevent electric shock.



Indicates that the contact surface is at risk of high temperature



Please refer to the operating instructions.

INSTALLATION ENVIRONMENT

- Do not operate the device in high-temperature environments (over 55°C), highly humid environments (relative humidity above 90%), or areas with gas/dust explosion risks.
- Do not place heavy objects on top of the device. Ensure all ventilation openings remain unobstructed.
- Do not install the unit in living rooms or entry and exit passageways.
- Do not install the unit in locations exposed to direct sunlight or areas with extreme ambient temperature fluctuations.

Installation

- Make sure the DC and AC input cable have fuses and appropriate circuit breakers.
- Before connecting AC power to the device, please make sure that the AC power is disconnected.
- The equipment must be installed by a professional and must be tested with a properly calibrated voltage tester.
- Make sure using the correct cable specifications while installing
- Do not short-circuit the positive and negative poles or install them in reverse.
- Do not touch DC conductors.
- Do not wipe the system with a wet cloth.
- Do not open the inverter and battery.
- Do not touch uninsulated cable ends.
- If the battery pack is damaged or malfunctions, stop using it immediately
- Do not touch the battery socket (even if the inverter is disconnected from the DC or AC side)

TRANSPORTATION

- If the product is exposed to fire or mechanical shock, the battery casing will be extremely damaged and dangerous substances may be released, causing harm.
- During transport, a certified fire extinguisher with a minimum capacity of 2 kg must be carried with you. Smoking is strictly prohibited in and near the vehicle during loading and unloading.
- During transportation or installation, please ensure that more than 2 people work together to move it to avoid injury, as the product is very heavy.

PRODUCT PARAMETER

Inverter

Model	SCAS-5KW-5KWH	SCAS-5KW-7.2KWH	SCAS-5.5KW-10KWH
Rated Power	5KW	5KW	5.5KW
AC Rated Voltage	230VAC	230VAC	230VAC
Rated Frequency	50/60Hz	50/60Hz	50/60Hz
Efficiency	> 98%	> 98%	> 98%
Transfer Time	10ms	10ms	10ms
Waveform	Pure sinusoidal wave		
Battery Overvoltage	29.2V	29.2V	58.4V
Battery Undervoltage Alarm	22.5V	22.5V	45V
Constant Voltage Charge	29.2V	29.2V	58.4V
Protection voltage	21.6V	21.6V	43.2V
Float Voltage	28V	28V	56V
Max Charging Current	200A	200A	100A
Communication Interface	RS232 (Inverter)/RS485 (BMS)		

AC Input

Nominal Voltage	230VAC	230VAC	230VAC
Voltage Range	90-280VAC	90-280VAC	90-280VAC
Rated Frequency	50Hz	50Hz	50Hz
Frequency Range	40-70Hz	40-70Hz	40-70Hz
Rated Current	60A	60A	60A
Max AC Current	160A	160A	120A

PV Input

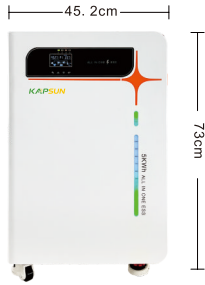
Max Voltage	500V	500V	500V
Optimum Voltage	300-400V	300-400V	300-400V
Voltage Range	60-500VDC	60-500VDC	80-500VDC
Max Power	27A/9000W	27A/9000W	27A/9000W

Battery

Rated Capacity	5120Wh(200Ah)	7168Wh(280Ah)	10240Wh(200Ah)
Nominal Voltage	25.6V	25.6V	51.2V
Discharge Voltage Range	21.6V-29.2V	21.6V-29.2V	43.2V-58.4V
Standard Charging Current	100A	100A	50A
Max Charging Current	200A	200A	100A
Max Discharging Current	200A	200A	100A
Depth of Discharge	95%	95%	95%
Communication Interface	CAN/RS485	CAN/RS485	CAN/RS485
Cycle Life	> 6000, 25±2°C, 0.5C, EOL80%		
Working Temperature Range	Charge:0°C-50°C; Discharge: -20°C-60°C		
Storage Temperature	-20°C -60°C		
Dimension	45.2*73*27cm	45*77*29cm	48*84*30cm

PRODUCT DIMENSION

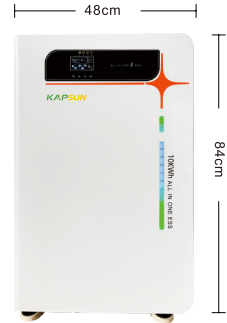
W:27CM



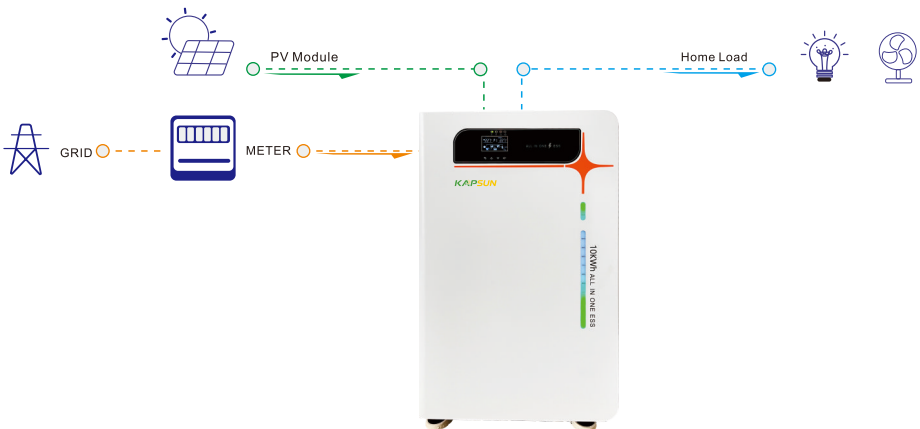
W:29CM



W:30CM



SYSTEM DIAGRAM



ENERGY STORAGE SYSTEM

SYSTEM DIAGRAM(5KWH/10KWH)

Note:

It is recommended to use an AC circuit breaker rated at 40A. Ensure all switches are off during installation to avoid the risk of electric shock.

• Step1:

Open the box, lift out the whole machine, put it upright, then fix wheels to prevent the unit from moving.

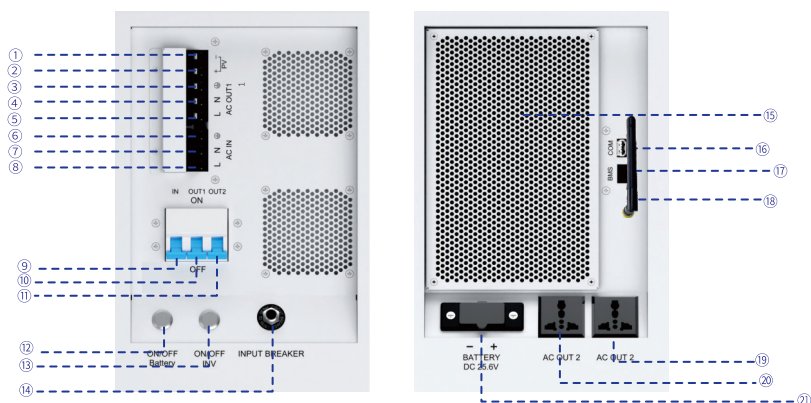
• Step2:

Connect the AC input, AC output and PV input.

• Step3:

Check all the connections are correctly wired. Turn on the battery switch and inverter switch, then turn on Circuit Breaker, to start running the all-in-one machine .

Remark: Inverter Terminal Instruction



NO. Interface Instruction

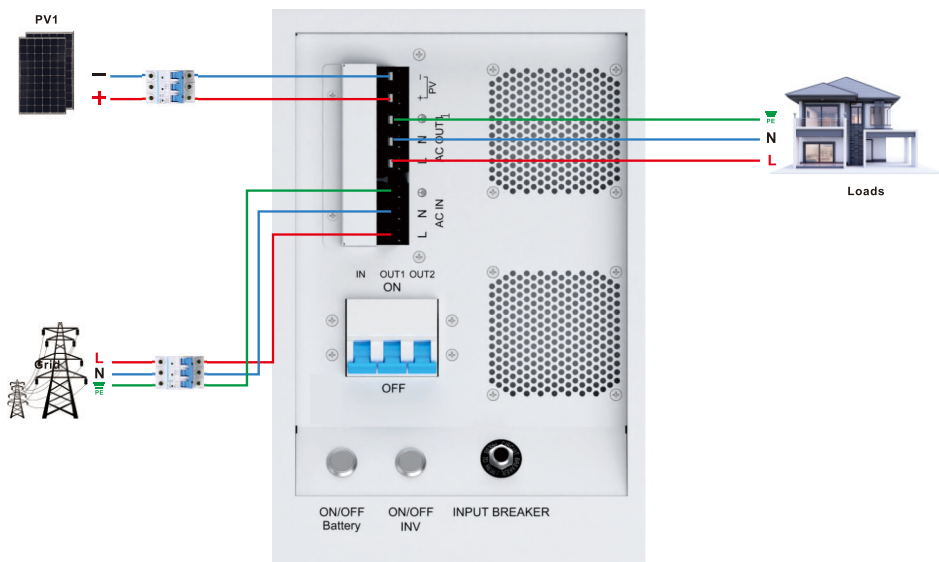
①	PV-
②	PV+
③	AC OUT PE
④	AC OUT N
⑤	AC OUT L
⑥	AC IN PE
⑦	AC IN N
⑧	AC IN L
⑨	AC In Circuit Breaker
⑩	AC Out 1 Circuit Breaker
⑪	AC Out 2 Circuit Breaker

NO. Interface Instruction

⑫	Battery switch
⑬	Inverter Switch
⑭	Input Thermal Overload Reset Switch
⑮	Air intake
⑯	USB port: Wi-Fi dongle port
⑰	BMS RS-485 Communication Port
⑱	WiFi Antenna
⑲	AC Out 2
⑳	AC Out 2
㉑	External DC battery connector

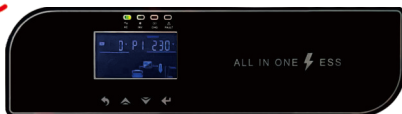
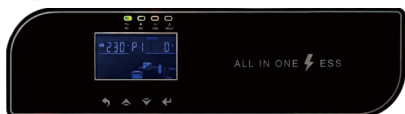
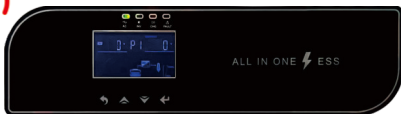
- **Step 4:**

Connect AC input cable according to the terminal on the inverter, firstly "GND", then "N", last "L"



- **Step 5:**

Turn on the power. Firstly turn on all the battery system, then press the inverter switch button. The LCD screen shows a complete link diagram, indicating that the system is in order(see below pictures).



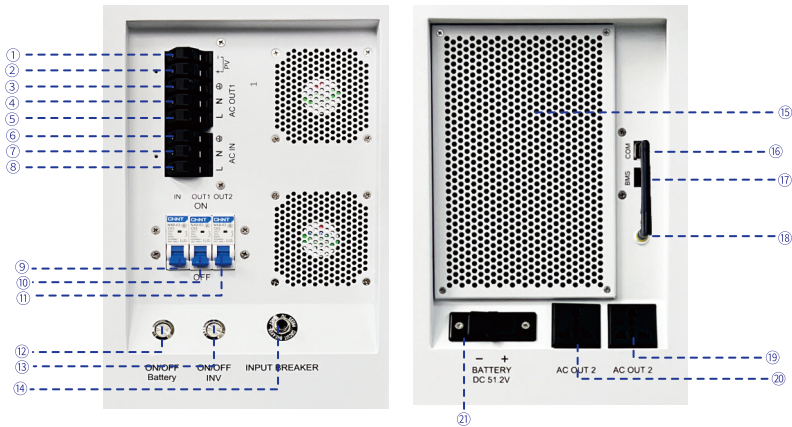
SYSTEM DIAGRAM (7.2KWH)

Note:

It is recommended to use an AC circuit breaker rated at 40A. Ensure all switches are off during installation to avoid the risk of electric shock.

- **Step1:**
Open the box, lift out the whole machine, put it upright, then fix wheels to prevent the unit from moving.
- **Step2:**
Connect the AC input, AC output and PV input.
- **Step3:**
Check all the connections are correctly wired. Turn on the battery switch and inverter switch, then turn on Circuit Breaker, to start running the all-in-one machine .

Remark: Inverter Terminal Instruction



NO. Interface Instruction

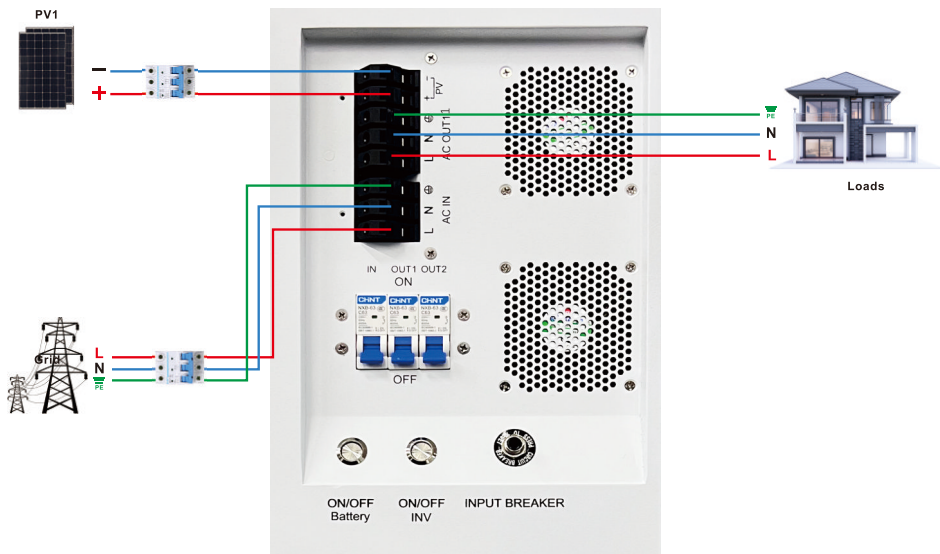
①	PV-
②	PV+
③	AC OUT PE
④	AC OUT N
⑤	AC OUT L
⑥	AC IN PE
⑦	AC IN N
⑧	AC IN L
⑨	AC In Circuit Breaker
⑩	AC Out 1 Circuit Breaker
⑪	AC Out 2 Circuit Breaker

NO. Interface Instruction

⑫	Battery switch
⑬	Inverter Switch
⑭	Input Thermal Overload Reset Switch
⑮	Air intake
⑯	USB port: Wi-Fi dongle port
⑰	BMS RS-485 Communication Port
⑱	WiFi Antenna
⑲	AC Out 2
⑳	AC Out 2
㉑	External DC battery connector

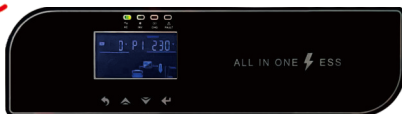
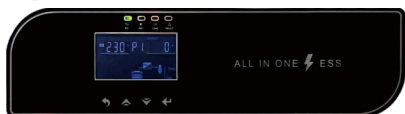
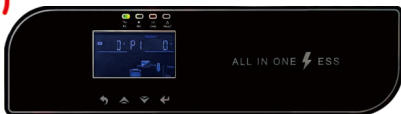
- **Step 4:**

Connect AC input cable according to the terminal on the inverter, firstly "GND", then "N", last "L"



- **Step 5:**

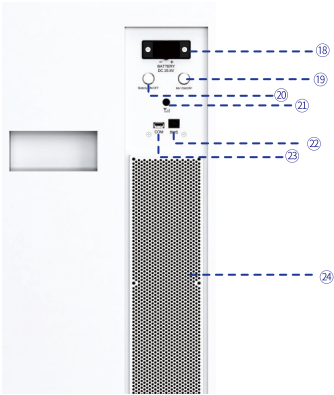
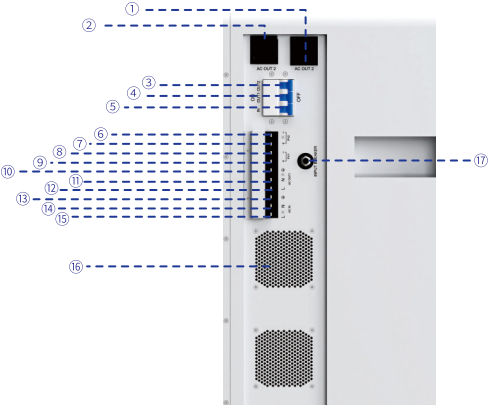
Turn on the power. Firstly turn on all the battery system, then press the inverter switch button. The LCD screen shows a complete link diagram, indicating that the system is in order(see below pictures).



SYSTEM DIAGRAM (15KWH)

- Note:**
It is recommended to use an AC circuit breaker rated at 63A. Ensure all switches are off during installation to avoid the risk of electric shock.
- **Step1:**
Open the box, lift out the whole machine, put it upright, then fix wheels to prevent the unit from moving.
 - **Step2:**
Connect the AC input, AC output and PV input.
 - **Step3:**
Check all the connections are correctly wired. Turn on the battery switch and inverter switch, then turn on Circuit Breaker , to start running the all-in-one machine .

Remark: Inverter Terminal Instruction

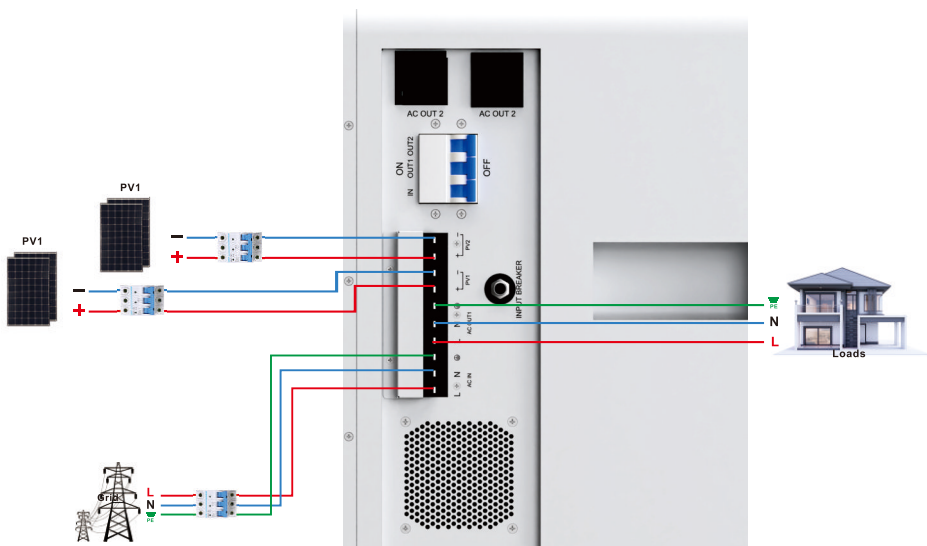


NO. Interface Instruction	
①	AC OUT 2
②	AC OUT 2
③	AC Out 2 Circuit Breaker
④	AC Out 1 Circuit Breaker
⑤	AC In Circuit Breaker
⑥	PV2-
⑦	PV2+
⑧	PV1-
⑨	Pv1+
⑩	AC OUT PE
⑪	AC OUT1 N
⑫	AC OUT1 L
⑬	AC IN PE
⑭	AC IN N

NO. Interface Instruction	
⑮	AC IN L
⑯	Cooling vents
⑰	Input Thermal Overload Reset Switch
⑱	External DC battery connector
⑲	Inverter Switch
⑳	Battery switch
㉑	WiFi Antenna
㉒	BMS RS-485 Communication Port
㉓	USB port: Wi-Fi dongle port
㉔	Dust cover

- **Step 4:**

Connect AC input cable according to the terminal on the inverter, firstly "GND", then "N", last "L"



- **Step 5:**

Turn on the power. Firstly turn on all the battery system, then press the inverter switch button. The LCD screen shows a complete link diagram, indicating that the system is in order(see below pictures).



OPERATION FUNCTION

Battery Indicator Light



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 LED lights, each capable of displaying multiple colors including red, blue, and green. These lights are categorized into three primary types based on their functions:

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	
	All lights remain off during undervoltage protection										OFF when overvoltage	Always ON
Alarm	Display SOC normally										Flashing 1S	OFF
											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
$0 < S \leq 10\%$	Blue Marquee Light											BLUE FLASH ①
$10\% < S$	BLUE	Blue Marquee Light										BLUE FLASH ①

$\leq 20\%$											
$20\% < S \leq 30\%$	BLUE	BLUE	Blue Marquee Light							---	BLUE FLASH ①
$30\% < S \leq 40\%$	BLUE	BLUE	BLUE	Blue Marquee Light						---	BLUE FLASH ①
$40\% < S \leq 50\%$	BLUE	BLUE	BLUE	BLUE	Blue Marquee Light					---	BLUE FLASH ①
$50\% < S \leq 60\%$	BLUE	BLUE	BLUE	BLUE	BLUE	Blue Marquee Light				---	BLUE FLASH ①
$60\% \leq S \leq 70\%$	BLUE	BLUE	BLUE	BLUE	BLUE	BLUE	Blue Marquee Light			---	BLUE FLASH ①
$70\% < S \leq 80\%$	BLUE	BLUE	BLUE	BLUE	BLUE	BLUE	BLUE	Blue Marquee Light		---	BLUE FLASH ①
$80\% < S \leq 90\%$	BLUE	BLUE	BLUE	BLUE	BLUE	BLUE	BLUE	BLUE	Blue Marquee Light	---	BLUE FLASH ①
$90\% < S \leq 100\%$	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)

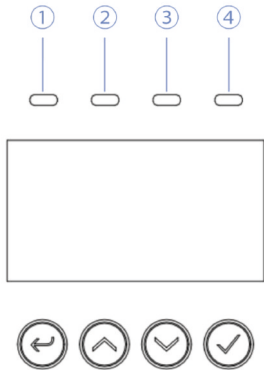
Table 2: Discharge Status

SOC	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	ALM	RUN
$0 < S \leq 10\%$	Green Flash ②	---	---	---	---	---	-	---	---	---	-	GREEN FLAS H①
$10\% < S \leq 20\%$	GREEN	GREEN FLASH ②	---	---	---	---	-	---	---	---	-	GREEN FLAS H①
$20\% < S \leq 30\%$	GREEN	GREEN	GREEN FLASH ②	---	---	---	---	---	---	---	---	GREEN FLAS H①
$30\% < S \leq 40\%$	GREEN	GREEN	GREEN	GREEN FLASH ②	---	---	---	---	---	---	-	Green Flash①
$40\% < S \leq 50\%$	GREEN	GREEN	GREEN	GREEN	GREEN FLASH ②	---	---	---	---	---	-	GREEN FLAS H①
$50\% < S \leq 60\%$	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN FLASH ②	-	---	---	---	---	GREEN FLAS H①
$60\% < S \leq 70\%$	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN FLASH ②	---	---	---	---	GREEN FLAS H①
$70\% < S \leq 80\%$	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN FLASH ②	---	---	-	GREEN FLAS H①
$80\% < S \leq 90\%$	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN FLASH ②	---	---	GREEN FLAS H①
$90\% < S \leq 100\%$	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN FLASH ②	---	GREEN FLAS H①

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

Inverter LCD Screen

The operation and display panel, shown in below chart, is on the front panel of the inverter. It includes four indicators, four function keys and a LCD display, indicating the operating status and input/output power information.



LED Indicator			Messages
① AC	Status indicator (Green)	Solid On	The mains power is normal and enters the mains power operation.
		Flashing	The mains power is normal, but it has not entered mains power operation.
		Off	The mains power is abnormal.
② Inverter	Invert indicator (Yellow)	Solid On	Output is powered by battery or PV in battery mode.
		Off	Other states.
③ Charging	Charging indicator (Yellow)	Solid On	The battery is in float charging.
		Flashing	The battery is in constant voltage charging.
		Off	Other states.
④ Fault	Fault indicator (Red)	Solid On	Fault occurs in the inverter.
		Flashing	Warning condition occurs in the inverter.
		Off	The inverter is working properly.



ESC



UP



DOWN



ENTER

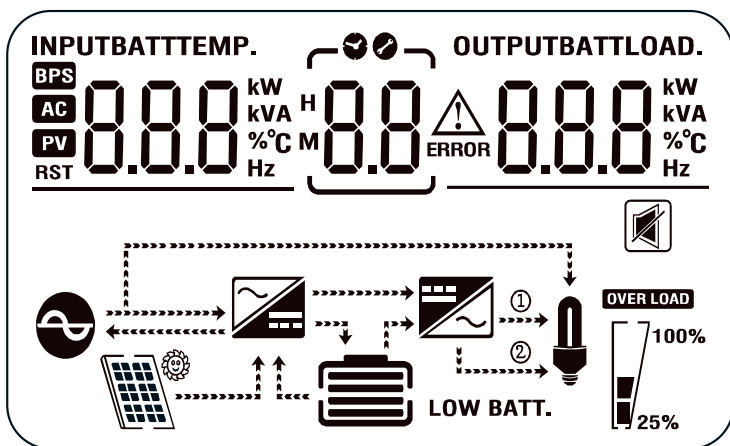
Function Buttons

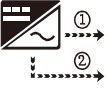
Button	Description
ESC	To exit setting mode
UP	To go to previous selection
DOWN	To go to next selection
ENTER	To confirm the selection in setting mode or enter setting mode

Inverter LCD Display Function

Operation & Display Panel

LCD Display Icons



Icon	Description
AC Input Information	
	AC input icon.
	Indicate AC input power, AC input voltage, AC input frequency, AC input current.
PV Input Information	
	PV input icon.
	Indicate PV power, PV voltage, PV current, etc.
Output Information	
	Inverter icon.
	Indicate output voltage, output current, output frequency, inverter temperature.
	Dual output (output1 and output2)
Load Information	
	Load icon.
	Indicate power of load, power percentage of load.
	Indicate overload happened.
Battery Information	
	Indicate battery level by 0-24%, 25-49%, 50-74% and 75-100% in battery mode and charging status in line mode.
	Indicate battery voltage, battery percentage, battery current.
Other Information	
	Indicate alarm code or fault code.
	Indicate a fault is happening.
	Indicate the alarm is disabled.

Display Setting

After pressing and holding ENTER button for 2 seconds, the unit will enter setting mode. Press 'UP' or 'DOWN' button to select setting programs. Then press 'ENTER' button to confirm the selection or ESC button to exit

Notes: Standby mode: Inverter is not allowed to power the load. (Turn output switch to 'OFF' or inverter is abnormal)

Battery mode: Inverter is allowed to power the load with PV/ PV+Battery / Battery, and operates without the grid.

Grid mode: Inverter is allowed to power the load with PV/ PV+Grid / Grid, and operates with the grid.

Program	Description	Setting Option	
01	Output voltage	0PU 01 230^v	
		230V (default) Adjustable/settable value: 220V, 230V, 240V	
02	Output frequency	0PF 02 50^{Hz}	
		50Hz(default) Adjustable/settable frequency: 50Hz, 60Hz. It can be set in standby mode or grid mode, and take effect immediately.	
03	Output source priority	Grid first (default)	0PP 03 0Pb
		Grid provides power to the loads as first priority. Solar power will charge the battery. If solar is not sufficient to charge battery, grid will charge the battery at the same time. If grid is absent and solar is sufficient, solar will power the loads. If grid is absent and solar is not sufficient, solar and battery will power the loads. If grid is absent, solar and battery are not sufficient to power loads at the same time, inverter will go to standby and charge battery.	
		Solar first	0PP 03 PGb
		Solar energy provides power to the loads as first priority. If solar energy is sufficient, battery will be charged with solar energy. If solar energy is not sufficient to power all connected loads, Grid will supply power to the loads at the same time. If grid is absent and solar is not sufficient, solar and battery will power the loads. If grid is absent, solar and battery are not sufficient to power loads at the same time, inverter will go to standby and charge battery.	

03	Output source priority	PBG priority	OPP 03 PBG
		Solar energy provides power to the loads as first priority. If solar energy is sufficient, solar will charge the battery. If solar energy is not sufficient, battery will also supply power. If solar and battery energy are not sufficient, grid will supply power to the loads and solar charges the battery. If battery is charged to be sufficient, solar and battery will power the loads instead of grid. If grid is absent, solar and battery are not sufficient to power loads at the same time, inverter will go to standby and charge battery.	
		MKS	OPP 03 nts
		Generator provides power to loads as first priority. When generator, PV, battery all exist, the work mode is as PBG. When generator exists with PV or battery, the work mode is as GPB.	
04	Input mode	APP: Appliance (default)	n0d 04 APP
		Applied to household appliances Typical switching time is 10ms.	
		UPS	n0d 04 UPS
		Applied to computer and other devices. Typical switching time is 10ms.	
		GEN	n0d 04 GEN
		Applied to connect generator from AC IN port. Typically switching time is 20ms.	
05	Charger source priority	PNG: PV and Grid (default)	CHP 05 PNG
		PV and Grid are charged at the same time.	
		OPV: Only PV	CHP 05 OPV
		Only PV charge.	
		PVF: PV first	CHP 05 PVF
		If both grid and PV are available, PV charge. If only PV is available, PV charge. If only grid is available, grid charge.	

06	Grid charging current	24V 7 06 80 A 48V 7 06 60 A	Set charging current for grid chargers. The default setting is 60A. Available options: 2/10/20/30/40/50/60/70/80/90/100/110/120/130/140/150/160A
07	Maximum charging current	24V 7 07 120 A 48V 7 07 100 A	Set total charging current for solar and grid chargers. The default setting is 100A. Available options: 10/20/30/40/50/60/70/80/90/100/110/120/130/140/150/160A If the BMS is connected, the total charging current will follow the data from BMS.
08	Menu Default	7 08 00	During setting: Set to ON. If the current page is not on the first page and no operation with 1 minute, the system will return to display the first page. Set to OFF. If the current page is not on the first page and no operation with 1 minute, the system will stay on the current page.
09	Auto restart when overload occurs	ON(default)	7 09 00
10	Auto restart when over temperature occurs	ON(default)	7 10 00
11	Main input cut warning	7 11 00	Enable/Disable Grid or PV loss alarm. The default setting is ON. If the grid input detected lost, the buzzer will sound for 5 seconds. when set to OFF, after the grid input is lost, the buzzer will not sound.
12	Energy-saving mode	7 12 OFF	The default setting is OFF. When set to ON, in battery mode, if the load is lower than 25W and 100VA, the system will stop output for a period then resume. If the load is still lower than 25W, the system will do the loop stop then resume. If the load is higher than 35W or 120VA, the system will resume continuous normal output.

13	Overload transfer to bypass		
		The default setting is OFF. When set to ON, in the case of PBG (PV priority) or MKS (generator priority) mode, if there is an overload, the system will immediately transfer to bypass mode (grid power output, also known as bypass mode).	
14	Silent mode setting		
		Enable/disable buzzer sound. The default setting is OFF. When set to ON, in any situation such as alarms or faults, the buzzer will not sound. This setting can be applied to all modes. Button sound is not effected.	
15	Battery return to grid voltage point		
		When the battery is set to the AGM (Lead Acid Battery Type) or FLD (Flooded Battery Type) mode. The default setting is 23V/46V, and it can be adjusted within a range of [22, 26V/44, 52V].	
		When the battery is set to LIB (Ternary lithium battery). The default setting is 23.8V/47.6V. It can be adjusted within a range of [20, 25V/40, 50V]. When the battery is set to FEL (Lithium iron battery), the default setting is 24.8V/49.6V. It can be adjusted within a range of [20, 25V/40, 50V].	
		When the battery is set to the CUS (Customer Setting Type) mode. The default setting is 23.8V/47.6V, and it can be adjusted within a range of [20, 25V/40,50V].	
16	Switching back to battery mode voltage points		
		After the battery shuts down due to low voltage, it needs to reach a certain voltage level to restart in battery mode. The value can be set to FUL or battery voltage. If set to FUL, the battery will only recharge to full capacity before it can restart in battery mode.	
		When the battery is set to AGM (Absorbent Glass Mat) or FLD (Flooded) mode, the default setting is 26V/52V. It can be adjusted within a range of [24, 29V/48, 58V].	
		When the battery is set to LIB (Ternary lithium battery). The default setting is 27.2V/54.4V. It can be adjusted within a range of [23, 29V/46, 58V]. When the battery is set to FEL (Lithium iron battery), the default setting is 26.6V/53.2V. It can be adjusted within a range of [23, 29V/46, 58V].	
		When the battery is set to CUS (Customer Set Type) mode, The default setting is 27.2V/54.4V, The voltage range is [23.29V/46, 58V].	

17	Battery type	AGM(default)	bAt 17 AGn	
		Flooded	bAt 17 FLd	
		Lithium (Ternary Lithium Battery)	bAt 17 LiB	
		FEL (Lithium iron)	bAt 17 FEL	
		User-Defined	bAt 17 CUS	
18	Battery low voltage point	24V bAt 18 22.0 V		48V bAt 18 44.0 V
		Battery low voltage alarm setting. If BMS is connected and the minimum discharge voltage uploaded by BMS is lower than the current set low voltage point, the low voltage point will be changed to the data from BMS.		
		If BMS is not connected, according to the following settings: When the battery type is set to LIB, the default setting is 23.8V/47.6V. The adjustable range for the voltage is [20.6V, 25V/41.2, 50V]. When the battery type is set to FEL, the default setting is 24V/48V. The adjustable range for the voltage is [20.6V, 25V/41.2, 50V]. When the battery type is set to CUS, the default setting is 47.6V. The adjustable range for the voltage is [42, 54V].		
		It is not possible to set the battery definition mode to AGM or FLD mode. The default setting is 22V/44V.		
19	Battery shutdown voltage point	24V bAt 19 21.0 V		48V bAt 19 42.0 V
		The battery low voltage shutdown point setting function cannot be adjusted when the battery is defined as AGM or FLD mode. The default setting is 21V/42V.		
		If BMS is connected, the battery low voltage shutdown point will be changed to the data from BMS.		
		If BMS is not connected, according to the following settings: When the battery type is set to LIB, the default setting is 23V/46V, and the adjustable range is [20, 24V/40, 48V]. Initial settings for CUS are the same as for LIB. When the battery type is set to FEL, the default setting is 21V/42V, and the adjustable range is [20, 24V/40, 48V].		

20	Constant voltage mode voltage point setting	24V 6C^u 20 28.2^v	48V 6C^u 20 56.4^v
		When the battery is defined in AGM or FLD mode, the voltage set point cannot be configured. The default setting for AGM mode is 28.2V/56.4V, for FLD mode is 29V/58V.	
		If BMS is connected, the constant voltage set point voltage will be changed to the data from BMS. If BMS is not connected, according to the following settings: When the battery type is set to LIB/CUS, the default setting is 28.2V/56.4V, and it can be adjusted within the range of [24,30V/48, 60V]. When the battery type is set to FEL, the default setting is 27.6V/55.2V, and it can be adjusted within the range of [24,30V/48, 60V].	
		It is important to ensure that the constant voltage set point voltage is higher than the float charge set point voltage.	
21	Floating charge mode voltage point setting	24V 6FL 21 27.0^v	48V 6FL 21 54.0^v
		If battery type is AGM or FLD mode, the voltage set point cannot be configured. The default setting is 27V/54V.	
		If BMS is connected, the constant voltage set point voltage will be changed to the data from BMS. If BMS is not connected, according to the following settings: When the battery type is CUS, the default setting is 27.6V/55.2V. The setting range is [24, 30V/48, 60V]. When the battery type is LIB, the default setting is 27.6V/55.2V. The setting range is [25, 29V/50, 58V]. When the battery type is FEL, the default setting is 27.6V/54.4V. The setting range is [25, 29V/50, 58V].	
		It is important to note that the constant voltage point voltage should always be set higher than the floating charge point voltage.	
22	Grid low voltage point setting	LL^u 22 154^v	
		If input mode is APP/GEN, Grid low voltage point can be set within a range of 90V to 154V. The default setting is 154V. If input mode is UPS, Grid low voltage point can be set within a range of 170V to 200V. The default setting is 185V.	

23	Grid high voltage point setting	
		The default setting is 264V. If input mode is APP/GEN, Grid high voltage point can be set within a range of 264V to 280V. If input mode is UPS, Grid high voltage point can not be changed.
24	Automatic turn off backlight	
		The default setting is ON. If ON, the backlight will turn off after 1minutes of no button operation.
25	Inverter soft start setting	
		The default setting is OFF. If ON, the inverter output gradually increases from 0 to the target voltage value. If OFF, the inverter output directly increases from 0 to the target voltage value. Setting Condition: It can be set in single-machine operation mode.
26	Reset factory setting	
		Restore all settings to factory default values. Before the setting, this interface is displayed as OFF. When set to ON, the system will restore to default settings. After the setting is completed, this interface will display OFF again. The setting can be applied immediately in mains and standby modes, but cannot be set in battery mode.
29	Battery Disconnection Alarm	
		Enable/Disable battery disconnection alarm. OFF(default). When set to OFF, there will be no battery disconnection alarm when the battery is disconnected.

31	Equalization Voltage Point Setting	24V E94 31 29.2^v	48V E94 31 58.4^v
		The default setting for FEL battery type is 28V, setting range is [24, 30V]. The default setting for AGM/FLD/LIB/CUS battery type is 29.2V/58.4V, with a configurable range of [24, 30V/48, 60V].	
32	Equalization Charging Time Setting	E96 32 OFF	
		The function can be set as 'OFF' or active. During the equalization stage, the controller will charge the battery as much as possible until the battery voltage rises to the battery equalization voltage. Then, it will adopt constant voltage regulation to maintain the battery voltage. The battery will remain in the equalization stage until the set battery equalization time is reached. The setting range is [5, 900] with 5 minutes for every step. The default setting is OFF.	
33	Equalization Delay Time Setting	E90 33 120	
		The function can be set as 'OFF' or active. During the equalization stage, if the battery equalization time expires and the battery voltage has not risen to the battery equalization voltage point, the charging controller will extend the battery equalization time until the battery voltage reaches the battery equalization voltage. When the battery equalization delay setting is completed and the battery voltage is still below the battery equalization voltage, the charging controller will stop equalization and return to the floating stage. The default setting is 120 minutes, with a configurable range of [5, 900], and an increment of 5 minutes for each setting.	
34	Equalization Interval Time Setting	E91 34 30	
		When the battery connection is detected during the float phase with the equalization mode turned on, the controller will start to enter the equalization phase when the set equalization interval (cell equalization period) is reached. The default setting is 30 days, the settable range is [1, 90], and the increment of each setting is 1 day.	

35	Enable Equalization Immediately		
		The default setting is OFF, and the function is not turned on. If it is set to ON, in the float charging stage when the equalization mode is turned on and the battery connection is detected. The equalization charging is activated immediately, and the controller will start to enter the equalization stage.	
36	Grid-tie inverter function		
		The default setting is OFF, and the range is OFF / INT / MET. When it is set to INT, inverter feeds grid with internal sampling. When it is set to MET, inverter feeds grid with meter sampling.	
		If the value is INT / MET, the inverter can feed excess energy into grid according to different output source priority. In PGB mode when battery level is sufficient, as long as grid is connected, PV can feed energy to grid as much as possible and surplus energy of PV charges the battery. In PGB mode when battery level is NOT sufficient, PV charges battery as much as possible and surplus energy of PV feeds grid. In GPB or PBG mode, as long as grid is connected, PV charges battery as much as possible and surplus energy of PV feeds grid. In MKS mode, inverter does not feed grid.	
		If the value is INT / MET, it is prohibited for the grid to charge battery when PV is available, while allow grid to charge battery when PV is unavailable.	
37	Max Grid Tie Power		
		Setting the output power value to grid. The default setting is 5.0kW/12.0kW. The setting range is [0, 5.0/0, 12.0]kW. Every setting step is 0.5kW. When the setting item GTI is 'MET', the feed data uploaded by the electricity meter will be used as the reference.	
38	Battery dual output low voltage shutdown point		
		When enabled, the secondary output of the inverter is enabled by default. In battery mode, when the battery voltage drops below the set point, the secondary output is turned off. When the battery voltage rises above the set value +1V/2V per battery cell, the secondary output is turned on. The default setting is 24V/48V, with a configurable range of [22, 30/44, 60]V.	

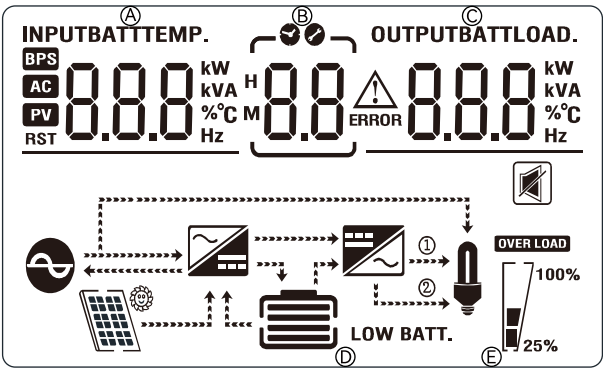
39	Battery dual output duration	dbt 39 OFF
		When enabled, the secondary output of the inverter is enabled by default. In battery mode, when the battery discharge time reaches the set point, the secondary output is turned off. Default setting is OFF, the function is not enabled. The configurable range is [5,900] in minutes. When set to FUL, the secondary output has unlimited output time.
40	Dual output battery mode cut-off SOC	db5 40 20%
		When enabled, the secondary output of the inverter is enabled by default. In battery mode, when the battery SOC is lower than the set value, the secondary output is turned off. After the battery SOC is 5% higher than set value, the secondary output will turn on. The default setting is 20. The setting range is [5, 90] and OFF.
44	BMS Communication Function	bns 44 OFF
		The default setting is OFF, and the function is not enabled. When set to a specific BMS protocol, the inverter communicates with the lithium battery BMS through the centralized control board and obtains battery information. If the communication is abnormal after the function is enabled, alarm 56 is generated, and the inverter does not determine the running logic based on the BMS information. CVT: CVTE protocol (485) PYL: PYLON protocol (485 and CAN) GRO: GROWATT protocol (485 and CAN) VOL: VOLTRONIC protocol (485) IRO: China Tower protocol (485) PAC: PACE RTU protocol (485)
45	BMS ID	bni 45 AtO
		Setting BMS ID number to communication with. The setting value is AtO or numerical value [0, 15]. Among them, A-F represents 10-15 respectively. The default value is auto (AtO). When set to auto (AtO), system will automatically poll the BMS ID from small to large. When system poll for the first ID with a correct response, it locks the ID and only asks the BMS with that ID.

46	Low SOC Shutdown	Set the inverter to shut down when the State of Charge (SOC) of the battery is low. The default setting is 20, with a configurable range of [5, 50]. When the lithium battery SOC reaches the set value in battery mode, the inverter shuts down and generates alarm 68. The alarm 68 is cleared when the SOC returns to the set value + 5%. In standby mode, the inverter can switch to battery mode only when the SOC reaches the set value + 10%. If it does not reach this threshold, alarm 69 is generated. Once the function is enabled, alarm 69 is triggered when the lithium battery SOC reaches the set value + 5%, and it is cleared when it returns to the set value + 10%. It can be set to OFF, in which case the inverter no longer performs shutdown, startup, or alarm operations based on the SOC condition. Once the function is enabled, if a communication abnormality occurs, the inverter no longer operates based on the SOC information and clears the related alarms.
47	High SOC to Battery	Set the SOC value for the inverter to switch to battery mode. The default setting is 90, with a configurable range of [10, 100]. In PBG priority mode, when the lithium battery SOC reaches the set value in normal grid mode, the inverter switches to battery mode. Once enabled, the inverter will only switch to battery mode when the SOC is above the set point and the battery voltage is higher than the voltage point to switch back to battery mode. It can be set to OFF, in which case the inverter no longer switches between grid mode and battery mode based on the SOC condition, and the setting Low SOC to Grid will take effect as 'OFF'. Once the function is enabled, if a communication abnormality occurs, the inverter no longer operates based on the SOC information and clears the related alarms.

48	Low SOC to Grid	Set the SOC value for the inverter to switch to grid mode. The default setting is 50, with a configurable range of [10, 90]. In PBG priority mode, when the lithium battery SOC reaches the set value in battery mode, the inverter switches to grid mode. Once enabled, the inverter will switch to grid mode when the SOC is below the set point or the battery voltage is lower than the voltage point to switch back to grid mode. It can be set to OFF, in which case the inverter no longer switches between battery mode and grid mode based on the SOC condition, the setting High SOC to Battery will take effect as 'OFF'. Once the function is enabled, if a communication abnormality occurs, the inverter no longer operates based on the SOC information and clears the related alarms. When this setting is higher than the STB point, STB and STG will no longer take effect after the next activation.
61	Battery Max. Discharge Current	The default setting is 220A. When set to a numerical value, it indicates the limitation current value. The setting range is [10,190A/220A] with a setting step of 5A. If the discharging current is over the limitation for more than 3 seconds, alarm 60 will occur. If the continuous over-current time reaches 5 seconds, fault 14 will occur and inverter goes into fault mode. When set to OFF, if the current is higher than 230A and the over-current time reaches 3 seconds, alarm 60 will occur. If the continuous over-current time reaches 5 seconds, fault 14 will occur and inverter goes into fault mode. If BMS is connected, the value will be changed as BMS reported max discharge current.
62	PV Parallel Mode	The default setting is OFF. When the value is 'OFF', PV1/2 are connected to different PV string. When the value is 'ON', PV1/2 are connected to same PV string.

Display Information

The LCD display information will be switched in turns by pressing 'UP' or 'DOWN' key. The selectable information is switched as below order: voltage, frequency, current, power, firmware version.

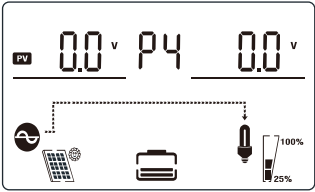
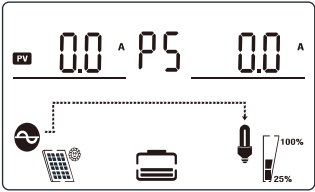
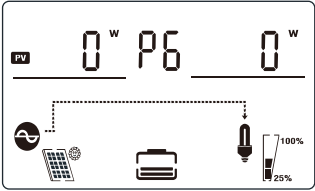
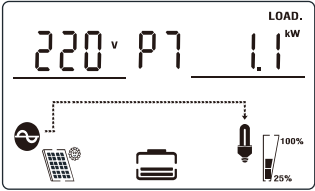
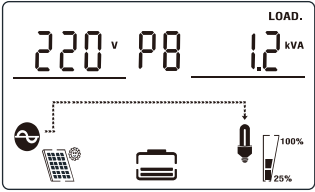


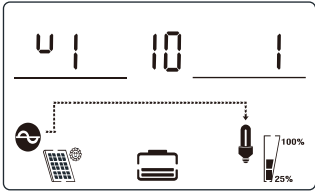
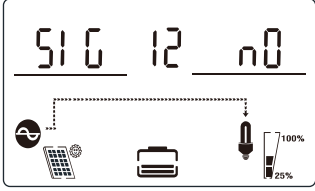
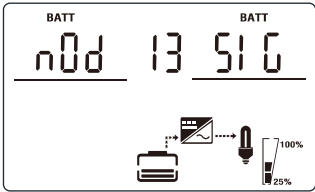
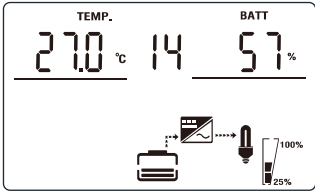
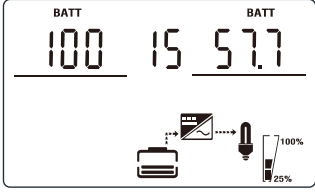
- Ⓐ See table
- Ⓑ Page number
- Ⓒ See table
- Ⓓ Battery capacity
- Ⓔ Load percentage

After enabling BMS, Page 13/14/15/16/17 will be available.

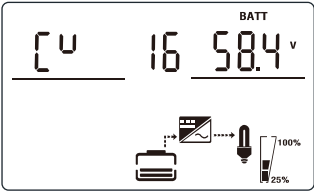
The selectable information is switched as below.

LCD display	Information
Ⓐ AC Input voltage Ⓑ Display page number Ⓒ AC Output voltage Ⓓ Battery capacity Ⓔ Load percentage	The display shows 'AC 219 V' on the left and 'P1 219 V' on the right. Below the display is a schematic diagram with icons for AC source, inverter, battery, and load, along with a battery level gauge.
Ⓐ AC Input frequency Ⓑ Display page number Ⓒ AC Output frequency Ⓓ Battery capacity Ⓔ Load percentage	The display shows 'AC 50.0 Hz' on the left and 'P2 50.0 Hz' on the right. Below the display is a schematic diagram with icons for AC source, inverter, battery, and load, along with a battery level gauge.
Ⓐ Battery voltage Ⓑ Display page number Ⓒ Battery charge or discharge current Ⓓ Battery capacity Ⓔ Load percentage	The display shows 'BATT 48.0 V' on the left and 'P3 28.0 A' on the right. Below the display is a schematic diagram with icons for AC source, inverter, battery, and load, along with a battery level gauge.

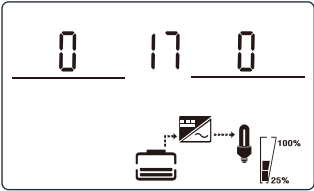
(A) PV1 voltage (B) Display page number (C) PV2 voltage (D) Battery capacity (E) Load percentage	
(A) PV1 current (B) Display page number (C) PV2 current (D) Battery capacity (E) Load percentage	
(A) PV1 power (B) Display page number (C) PV2 power (D) Battery capacity (E) Load percentage	
(A) AC output voltage (B) Display page number (C) AC output active power (D) Battery capacity (E) Load percentage	
(A) AC output voltage (B) Display page number (C) AC output apparent power (D) Battery capacity (E) Load percentage	
(A) AC output voltage (B) Display page number (C) Load percentage (D) Battery capacity (E) Load percentage	

Display inverter software version	
Ⓐ Total power generation of PV Ⓑ Display page number Ⓒ Daily power generation of PV Ⓓ Battery capacity Ⓔ Load percentage	
Parallel operation status	
Network status of lithium battery. When the upper right display shows SIG constant, the battery pack is operating as a single group; When it shows PAR constant, the battery pack is operating in multiple groups in series and parallel; When it flashes PAR, the battery pack is establishing a state of multiple groups in series and parallel.	
Lithium battery temperature and SOC; The upper left displays BMS temperature information; The upper right displays BMS SOC information. When BMS communication fails, both the upper left and upper right displays will flash ERR.	
Lithium battery capacity; The upper left displays rated capacity; The upper right displays current capacity. When BMS communication fails, both the upper left and upper right displays will flash ERR.	

Lithium battery constant voltage point; The upper left displays the fixed letter CV; The upper right displays the BMS constant voltage charging point. When BMS communication fails, the upper right display will flash ERR.



Lithium battery fault/alarm information; The upper left displays BMS alarm information; The upper right displays BMS fault information. When BMS communication fails, both the upper left and upper right displays will flash ERR.



Fault Reference Code

Fault display:



Function description: If an alarm occurs, the indicator flashes and the buzzer sounds once every second for 1 minute before stopping. If a fault occurs, the fault indicator stays on, the buzzer sounds for 10 seconds and then stops, and the system will attempt an automatic restart. If the device still fails to work normally after accumulating 6 restarts within 15 minutes, the device and LCD screen will remain in a fault state. You need to completely power off the device (turn off the screen) or wait for 15 minutes before restarting it.

The LCD display interface in the fault state is shown in the figure above. In fault mode, the fault icon stays on; in alarm state, the alarm icon flashes. Please contact the manufacturer to troubleshoot the abnormal condition based on the fault information.

Fault: The inverter enters fault mode, with a constant red LED light and LCD displaying a fault code.

Fault code sheet

Fault code	Meaning	Relevant action	Trigger conditions	Resume conditions
1	Grid soft start fail	Turn fault mode	Grid soft start process starts but bus voltage does not reach set value	Restore after reaching the set voltage for 15 seconds
2	Bus over voltage	Turn fault mode	Bus voltage is higher than set value	Restore after reaching the set voltage for 15 seconds

Fault code	Meaning	Relevant action	Trigger conditions	Resume conditions
3	Bus below voltage	Turn fault mode	Bus voltage is lower than set value	Restore after 15 seconds
4	Battery over current	Turn fault mode	Battery current is higher than set value	Cannot restore
5	System over temperature	Turn fault mode	Temperature is higher than set value or fan is not connected	Restore after temperature lower than set value and fan connected for 15 minutes
6	Battery over voltage	Turn fault mode	Battery voltage is higher than set value	Restore after reaching the set voltage for 15 seconds
7	Bus soft start failed	Turn fault mode	Battery soft start process starts but the bus voltage has not reached set value	Restore after reaching the set voltage for 15 seconds
8	Bus short circuit	Turn fault mode	Bus voltage is lower than set value	Cannot restore
9	Inverter soft start failed	Turn fault mode	Inverter soft start process starts but the inverter voltage has not reached set value	Restore after reaching the set voltage for 15 seconds
11	Inverter under voltage	Turn fault mode	The inverter voltage is lower than the set value in battery mode	Restore after reaching the set voltage for 15 seconds
12	Inverter short circuit	Turn fault mode	Inverter voltage is less than the set value and current is higher than the set value	Restore after reaching the set value for 15 seconds
13	Inverter negative power	Turn fault mode	The inverter power is negative and exceeds the set value for a period of time	Restore after reaching the set value for 15 seconds
14	Over load	Turn fault mode	The load current, load power, battery current, or grid current exceeds the set value.	Restore after reaching the set value for 15 seconds
17	Program updating	Turn fault mode	Inverter updating or OTA	Restore after updating
18	PV reverse connection	Turn fault mode	PV reverse connection	Restore after connecting correctly for 5 seconds

Fault code	Meaning	Relevant action	Trigger conditions	Resume conditions
26	BMS fault	Turn fault mode	Error code in BMS message.	Restore after BMS fault resolved
29	Inverter load abnormal	Turn fault mode	Abnormal inverter load leads to abnormal voltage	Restore after voltage returning normal for 15 seconds

Alarm Reference Code

Alarm: the inverter does not enter the fault mode, LED red light flashing, LCD displays the Alarm code.



Alarm code sheet

Alarm code	Meaning	Relevant action	Trigger conditions	Resume conditions
50	Battery open	Alarm	Battery disconnected for no more than 10 minutes	Restore after battery connected for 2 minutes
51	Battery under voltage	Alarm, battery low voltage shutdown or cannot power on	Battery voltage is lower than BAU set value	When the battery voltage is higher than 52V, or higher than BAU + 2V, and the grid power is connected, or the on/off switch is turned off, or a remote shutdown command is received.
52	Battery low voltage	Alarm	Battery voltage is lower than BAL set value	Restore after the battery voltage exceeding the BAL set value by 2V
53	Battery charge short circuit	Alarm, battery does not charge	Battery voltage is less than 24V and the charging current exists.	Restore after the short circuit is eliminated.
56	BMS loss	Alarm	Communication failure after BMS communication function is enabled	Restore after communication function disabled or communication success
58	Fan error	Alarm, fan operation in full speed	No fan speed signal detected	Restore after fan speed signal detected
59	EEPROM error	Alarm	EEPROM read/write exception	Can not restore

Alarm code	Meaning	Relevant action	Trigger conditions	Resume conditions
60	Overload	Alarm	The mains current/ battery discharge current/ load power is higher than the rated value.	Restore after the mains current/battery discharge current/load power is less than the rated value.
62	PV energy weak	Alarm, Turn off the PV output to the load, but keep the PV charging the battery	When the battery is not connected, the bus voltage is lower than the set value	Restore after battery connected or grid connected, or 10 minutes later.
68	Battery under SOC shutdown	Alarm, turn to standby mode	BMS reports SOC lower than BSU set value	Restore after meeting one of the following three conditions: 1. Disable low SOC shutdown function 2. Disable BMS communication function 3. SOC is higher than the set value by 5%
69	Battery below SOC warning	Alarm, if it is in standby mode, it will remain in standby mode.	Lithium battery SOC is lower than set value+5% (grid mode or battery mode), lower than set value+10% (standby mode)	Restore after meeting one of the following three conditions: 1. Disable low SOC shutdown function 2. Disable BMS communication function 3. SOC is higher than the set value by 10%
72	Battery can not startup	Alarm	During standby, battery voltage is lower than the allowed startup voltage	Restore after the battery voltage is higher than the allowed startup voltage
77	Grid power is unstable	Alarm	Lost of grid power three times within 5 minutes	Restore after 5 mins
78	Meter Loss	Alarm	When the grid power is connected and the grid connected inverter function is set to Meter, the meter communication is disconnected	Restore after grid is disconnected, or detection device is not set to Meter, or meter communication restore

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

FUNCTIONAL OPTIONAL SELECTION

Step①

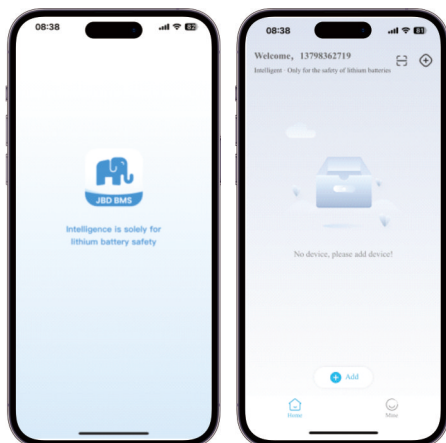
Scan the QR code with your phone to download the "JBD BMS" app, then connect the device via Bluetooth or Wi-Fi.



JBD BMS APP

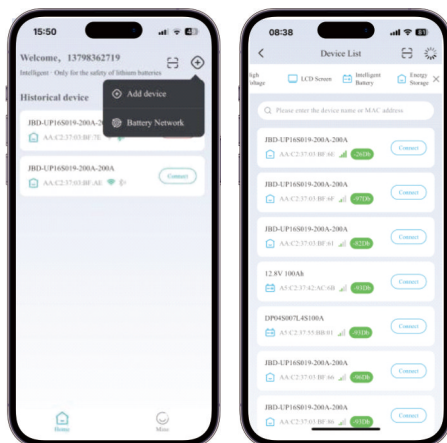
Step②

Registration and Login.



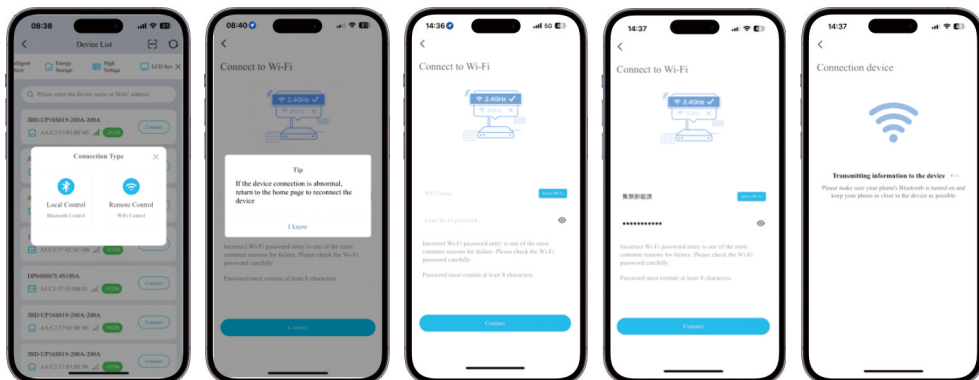
Step③

Keep the device turned on and add the device.



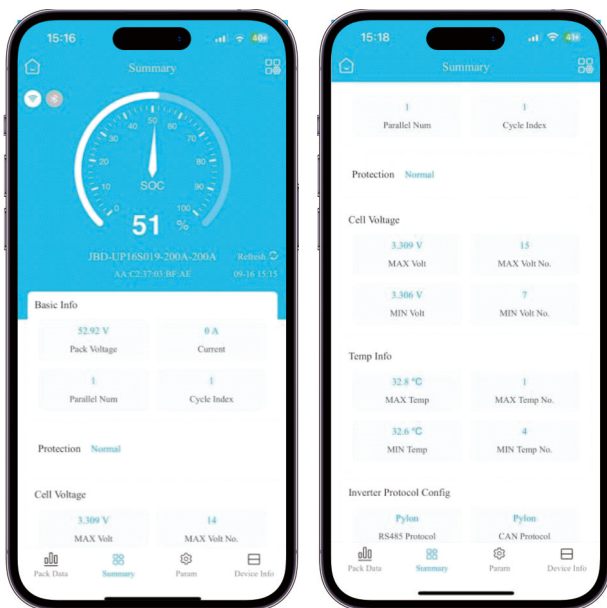
Step④

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.



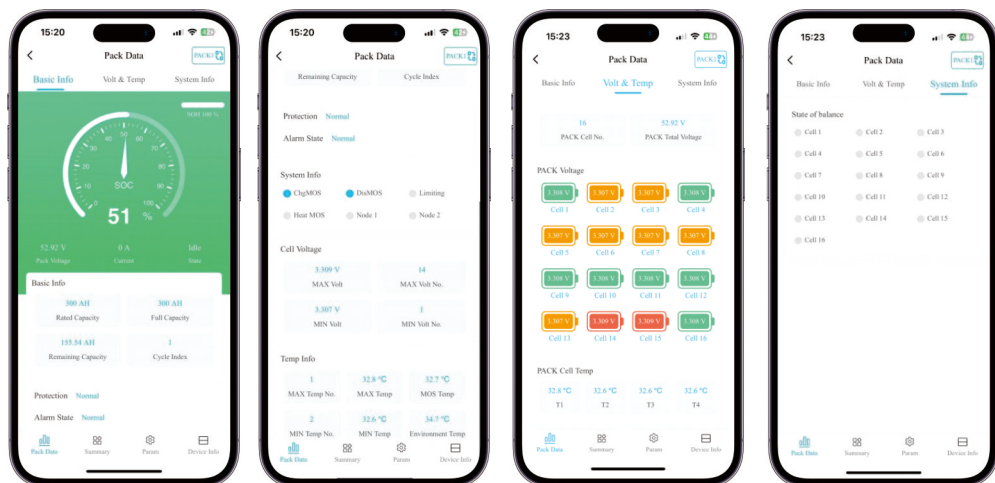
Step⑤

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



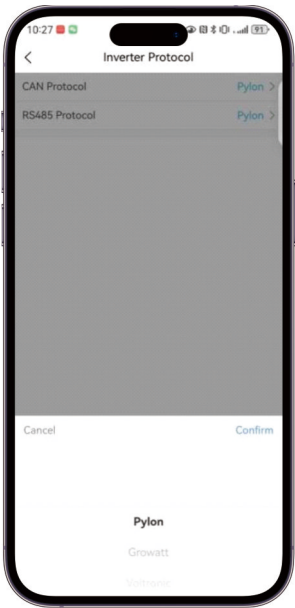
Step⑥

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.

