

Specification for Approval

Customer name				
Product model	KS48100-Ho20 (16S 100A 100AH 16-channel system) -Split-panel unit with 5-inch display, active equalization, WiFi, and LED strip			
Customer model				
Customer part number				
Edition	A1			
Date	2025/11/05			
Parts List	Order number	Name	Model	Quantity
	1	BMS motherboard	KS-48100-Ho20-V2 Split version: No heating, 10A current limiting function, 2-channel 48S, 1-channel CAN, no dry contact (no soldering pads), with soldered terminals 17+8 and 7+6+7+6	1 block
	2	Single voltage sampling line	XHB-17P buckle; UL1430:22#; OT4 terminal; red and black L=900mm ± 10mm	1 twig
	3	NTC sampling line	PHS-8P; 24#; NTC; 10K, B value 3950, standard: L=900mm ± 10mm	1 twig
	4	B+ line	UL1015; 16#; Red; 3.5 Banana Mother Head OT6, Adhesive; ROHS L=200mm ± 10mm	1 twig
	5	Self-locking switch with wiring harness	PHS-4P; UL1430; 24#; ROHS M16 L=900mm ± 10mm	1 twig
	6	Screw	Three-piece screw M5*15	4 particle
	7	5 TTL touch screen (optional)	KS-LCD3-V3-Supports protocol selection (Berson Custom UI) optional	1 block
	8	Touch screen harness	PHS-2.0; UL1430; 24#; black and white; adhesive; ROHS (3 power lines, control lines, and communication lines) connects to Bluetooth port L=600mm ± 10mm	1 cover
	9	18-pin jumper harness	Terminal wire 2.54mm 18P (FC18P crimping tool, double-ended reverse UL2651 26AWG red edge gray strip) butterfly clip L=650mm ± 10mm	1 twig
	10	16-pin jumper harness	Terminal wire 2.54mm 16P (FC16P crimping tool, double-ended reverse UL2651 26AWG red edge gray strip) butterfly clip L=650mm ± 10mm	1 twig
	11	Keysets	KS-PB3-V1 (dry contact terminals without welding)	1 block
	12	Wifi module	(WiFi to blue screen interface)	1 block
	13	WiFi module power cable	Bluetooth cable-PHS-7P; UL1430; 24#; white; adhesive; ROHS (wifi with blue screen interface) L=500mm ± 10mm	1 twig
	14	Light strips & harnesses-optional	LED8-V2 - 32 LEDs (connects to 4G module port) optional L=600mm ± 10mm	1 cover
	15	Active Balance Module-Optional	KS-16S-AE_V3 (16S) optional	1 block
16	Active balancing control line	Control line: PHS-2P; 24#; adhesive; ROHS: Sampling line: 7+6+7+6 to 17P L=600mm ± 10mm	1 cover	
BMS		Customer confirmation		
Lay down :	Lee wave		Back-sign:	
Approval :	Guo Jing 1 / 20			

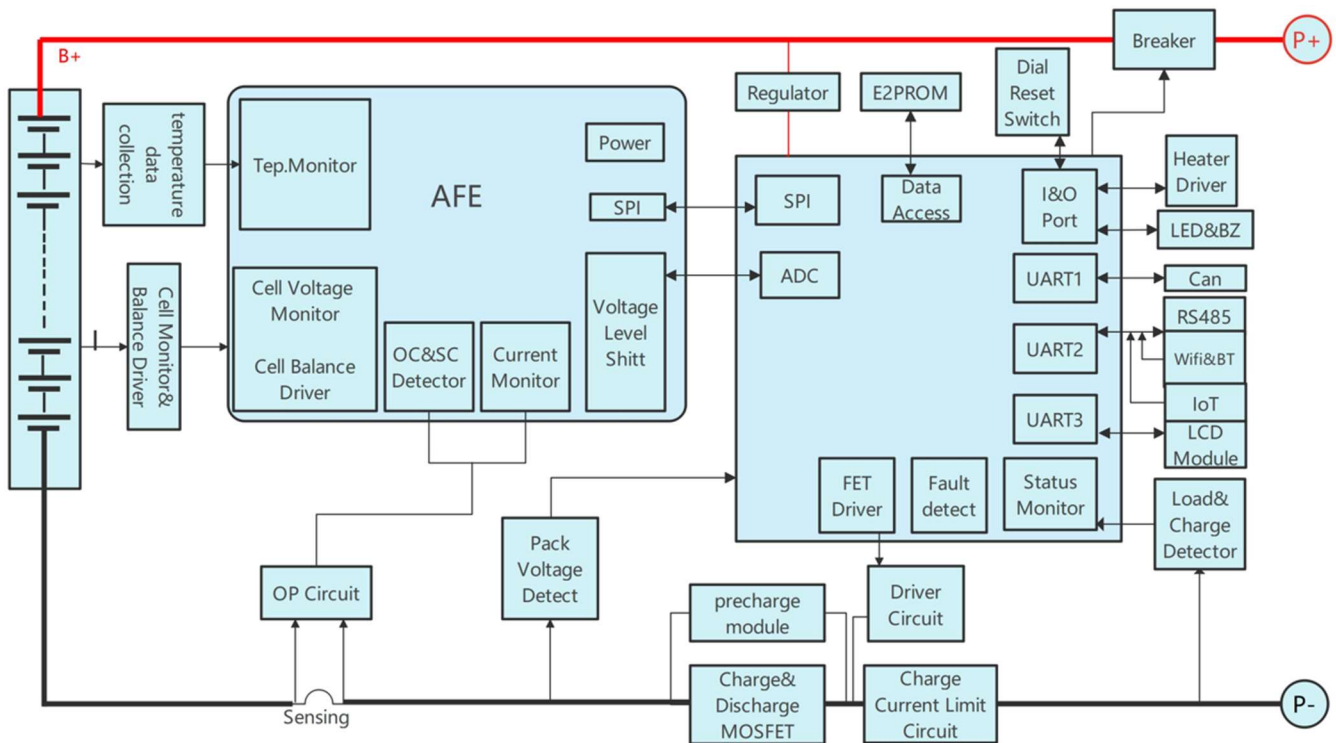
This product complies with environmental protection standards: ☒ ROHS ☐ REACH ☐ Halogen-free address:

Configuration Table		
Function	Serial number	☒ 16 strings ☐ 15 strings ☐ 14 strings ☐ 12 strings ☐ 8 strings
	Charge current limiting	☐ No ☒ 10A ☐ 20A ☐ A ☒ Passive current limiting ☐ active rate limiting
	Reverse connection protection	☒ not have ☐ have
	Low voltage switch	☐ No ☒ Yes
	Buzzer	☐ No ☒ Yes
	Memory	☐ No ☒ 500 items ☐ 1000 items
	Heating film interface	☒ not have ☐ have
	Secondary protection interface	☐ No ☒ Yes
	Pre-load function	☐ not have ☒ The precharge circuit supports a maximum capacitive load of 30,000μF, with the exact value determined by system testing.
	Dry contact	☒ not have ☐ Yes (2 channels) ☐ function
	Display screen	☐ not have ☐ English Intelligence ☐ White button cap ☐ key membrane ☒ 5-inch touchscreen
	Dial switch	☐ not have ☐ 4 people ☒ 6 bits
	LED lamp	☐ No ☒ RUN ☒ ALARM ☒ SOC 4 lights ☒
	Collection socket	☒ vertical ☐ Horizontal ☒ 17+8 ☒ 6+7+6+7
	WIFI	☐ No ☒ Yes
	PDA	☐ No ☒ Yes
Communication	CI	☐ RS232 ☒ RS485 ☒ Parallel Dual RS485 ☒ CAN
	Upgrade method	☒ RS485
	Matched inverter	CAN: Paine, Deyou, Goodway, Gurewatt, Jinlang, Pengcheng, Victron, Shouhang, SMA, etc. RS485: Riyueyuan, Painei, Shuori, etc.
	Protocol	Pylon-CAN-V1.2-180408-lowVoltage Growatt BMS CAN-Bus-protocol-low-voltage-V1.05 Victron-V1.00-220910 Voltronic-485-V1.0.3-200325 WOW-protocol-Shuo Ri-V1.3 KoSheng-BMS_Protocol_V1_0_0

File Change Summary

Date	Version number	Revision note	Formulator	Authorizer
2025-11-05	A1	Drafting Supports Bluetooth protocol switching Supports concurrent use with TBD. KS can respond as a slave.	Lee wave	Guo Jing
2025-11-07	A2	Update the configuration sheet and wiring harness requirements	Lee wave	Guo Jing

1. Product Topology Diagram:



2. Scope of Application

This product is designed for 8-16-cell lithium battery management systems, providing comprehensive protection and recovery functions against overvoltage, undervoltage, overcurrent, high/low temperatures, and short circuits. It enables precise SOC measurement and SOH health status monitoring during charging and discharging processes, while ensuring voltage balance during charging. The system features human-machine interaction through PC software, allowing real-time display and configuration of voltage, current, temperature, and other alarm parameters. It stores and displays both real-time and historical battery operation data, with multiple sleep/wake modes. Parallel communication is supported via RS485, and data exchange with PC terminals is achieved through RS485 and CAN interfaces. Parameter configuration and data monitoring are performed via PC software. This product is widely applicable in household energy storage inverters, indoor/outdoor base stations, and similar applications.

3. Functional Description

3.1. Cell and Battery Voltage Detection

The voltage of the series cell is monitored in real time to realize the overvoltage and undervoltage alarm and protection.

The values of the transduction were $\pm 10\text{mV}$ at $0\sim 45^{\circ}\text{C}$ and $\pm 20\text{mV}$ at $-20\sim 70^{\circ}\text{C}$.

The alarm and protection parameters can be changed by the host computer.

3.2. Detection of Charge and Discharge Current of Battery

The system provides overcurrent alarm and protection for the battery pack charging and discharging current, and short circuit protection detection for the battery pack output. It performs real-time monitoring of the battery pack charging and discharging current. The continuous charging and discharging current is 100A, with a temperature rise of less than 50°C and an accuracy better than $\pm 1\%$.

The alarm and protection parameters can be changed by the host computer.

3.3. Cell, Environment and Power Temperature Detection

4 The system features 1-channel cell temperature detection, 1-channel ambient temperature detection, and 1-channel MOS temperature detection, enabling high/low-temperature alarms and protection. The temperature detection accuracy is $\pm 2^{\circ}\text{C}$. The cell temperature sensor uses 10K resistance with a B-value of 3950.

3.4. Battery Capacity Calculation and Cycle Count Function

The system calculates real-time battery capacity, completes learning of total charge-discharge capacity in one session, and achieves SOC estimation accuracy better than $\pm 5\%$.

The system calculates the battery cycle count. When the battery pack's cumulative discharge reaches 80% of its rated capacity, the cycle count increments by one.

Ansys Integration enables precise battery SOC calculation. It supports open-circuit voltage static calibration and charge/discharge dynamic calibration for SOC correction.

3.5. Charge and Discharge MOSFET Switching Function

Low internal resistance and high current, optimized for backup power applications with large-capacity loads, featuring zero-switching operation and high charging voltage tolerance.

3.6. Battery Charging Equalization Function

The charging equalization strategy allows flexible configuration (including voltage activation and equalization settings), effectively extending battery usage time and cycle life.

3.7. LED Status Indicator

It features 6 LED indicators, 4 battery level indicators, 1 operational status indicator, and 1 alarm protection status indicator.

3.8. Button Key Function

Self-locking switch: Featuring an intelligent one-touch design, it allows manual system startup when powered off, and enables manual shutdown in any operational state.
Sleep mode and reset function: Press and hold the button for 3-6 seconds in no standby power mode to enter sleep, or press and hold for 1-3 seconds in idle mode to wake up.

3.9. RS485 and CAN Communication Functions

Using RS485, PC or EMS can perform battery data monitoring, control and parameter setting through commands such as telemetry, remote signaling, remote adjustment and remote control.

Monitor BMS and Pack status in real time.

The inverter or terminal can obtain the battery state data and adjust the output through CAN or RS485 communication.

3.10. Host Computer Control Function

The system supports configuration of various battery management parameters, including individual cell over/under-voltage, total cell over/under-voltage, overcurrent during charging/discharging, cell/ambient temperature extremes, balancing strategy, cell string count, and capacity. It also enables control of discharge/MOS switches, charge/MOS switches, current limiting function, buzzer alarm, forced sleep mode, and online system software upgrades.

3.11. Hardware Voltage Detection Function

The BMS is designed with a unique hardware protection circuit for fault detection, ensuring safe and reliable long-term operation under abnormal conditions.

3.12. Historical Data Storage

It has a historical record storage function with a capacity of no less than 500 records, facilitating system monitoring, analysis, and maintenance.

3.13.3 And Connectivity

The RS485 interface enables parallel communication, with the dial switch used to configure the address during parallel communication.

3.14. Charge Current Limiting

It has a 10A current limiting function with passive and active modes, with passive mode as the default. Current limiting is activated when charging current exceeds 115A.

3.15. Dry Contact Function (optional)

Dry contact definition: (default normally open)

① When protection is activated, the dry contact 1 closes.

② When a fault occurs (NTC fault, MOS fault, or cell sampling fault), dry contact 2 activates.

3.16. Heating (optional)

The battery features low-temperature heating functionality. When the cell temperature drops below 0°C during charging, the low-temperature protection is triggered, and heating is activated. If the cell temperature exceeds 15°C, heating is deactivated.

3.17. Secondary Protection (optional)

The BMS can trigger the trip unit to disconnect the external output circuit when a charge/discharge MOS fault occurs or when the voltage of a single cell is excessively high or low, thereby achieving secondary protection. Control strategy: Execute upon meeting any condition.

- When a MOS fault is triggered, and the MOS temperature exceeds 100°C or the MOS NTC fault alarm persists for 6 seconds, the fuse will trigger a 'secondary protection' alarm.
- The maximum individual voltage exceeds the overvoltage protection threshold by 300mV, and the system remains in charging mode for 6 seconds, triggering the fuse to report 'secondary protection'.
- The minimum single-cell voltage drops below the undervoltage protection threshold (-300mV) while the system remains in discharge mode for 6 seconds, triggering the fuse to report 'secondary protection'.

Appendix: Reliability Parameters

Order number	Project	Specifications/Conditions
1	Detection accuracy	Current accuracy: $\pm 2\%$ Voltage accuracy: $\pm 20\text{mV}$ Temperature accuracy: $\pm 3^\circ\text{C}$ SOC average accuracy: $\leq \pm 5\%$
2	Current threshold	Charging current: 0.5A Discharging current: 0.5A
3	Failure type	1、 1. The charge-discharge MOS transistor fails; 2. The current detection fails; 3、 Temperature detection failure 4. Voltage detection failure (charging is prohibited when voltage is below 1.0V)
4	Information exists	Store at least 500 historical data entries, including current total voltage, current, temperature, SOC, SOH, cycle count, and operating status.
5	CI	1、 The inverter supports CAN or RS485 communication. 2、 Supports RS485 communication (program upgrade via communication port) 3、 Supports RS485 and serial communication
6	Starting up	In shutdown mode, turn on the low-voltage switch to power on the device, and the corresponding LED lights will illuminate sequentially.
7	Shut down	In startup mode, disconnect the low-voltage switch 3~6S until all 6 LEDs turn off sequentially.
8	Short	The internal resistance of the battery pack and short-circuit loop shall not be less than $40\text{m}\Omega$, and the short-circuit current shall not exceed 1000A. The air switch shall withstand 50 short-circuit attempts.

4. Electrical Character

4.1. Electrical Property

Project	Minimum	Maximum	Convention	Unit
Working voltage	35	60	51.2	V
Charging voltage	42	60	56.8	V
Operating temperature range	-40	60	25	$^\circ\text{C}$
Working humidity range	10	85	/	%
Continuous charge and discharge current		100		A
Discharge output internal resistance	<10			$\text{m}\Omega$
Normal operating power consumption	≤ 30 (without display)			mA
	≤ 50 (with display)			mA
Dormant power consumption		200	100	μA

4.2. Basic Parameter Settings

Alarm value					
Function name	Feature Settings	Enable	Indicators	Factory default value	Remarks
Single voltage alarm	Open	Settable	Overvoltage alarm	3600mV	$\pm 20\text{mV}$
		Settable	Over rolling delay	3000mS	1000-5000mS
		Settable	Overvoltage recovery	3400mV	$\pm 20\text{mV}$

		Settable	Undervoltage alarm	2700mV	±20mV
		Settable	Undervoltage delay	3000mS	1000-5000mS
		Settable	Undervoltage recovery	3000mV	±20mV
General voltage alarm	Open	Settable	Overvoltage alarm	57.6V	±50mV
		Settable	Over rolling delay	3000mS	1000-5000mS
		Settable	Overvoltage recovery	54.4V	±50mV
		Settable	Undervoltage alarm	44.0V	±50mV
		Settable	Undervoltage delay	3000mS	1000-5000mS
		Settable	Undervoltage recovery	48.0V	±50mV
Cell temperature charging prohibition alarm	Open	Settable	High temperature alarm	55℃	±2℃
		Settable	High temperature delay	5000ms	1000-5000mS
		Settable	Heat recovery	50℃	±2℃
		Settable	Cryogenic alarm	3℃	±2℃
		Settable	Low temperature delay	5000ms	1000-5000mS
		Settable	Recovery from low temperature	5℃	±3℃
Cell temperature alarm	Open	Settable	High temperature alarm	60℃	±3℃
		Settable	High temperature delay	5000ms	1000-5000mS
		Settable	Heat recovery	55℃	±3℃
		Settable	Cryogenic alarm	-15℃	±3℃
		Settable	Low temperature delay	5000ms	1000-5000mS
		Settable	Recovery from low temperature	-5℃	±3℃

Ambient temperature alarm	Open	Settable	High ambient temperature alarm	55℃	± 3℃
		Settable	Ambient temperature delay	3000ms	1000-5000mS
		Settable	Environmental temperature recovery	50℃	± 3℃
		Settable	Ambient low temperature alarm	-15℃	± 3℃
		Settable	Ambient temperature delay	3000ms	1000-5000mS
		Settable	Environmental low temperature recovery	-10℃	± 3℃
Overcurrent alarm	Open	Settable	Overcurrent alarm	100A	± 2A
		Settable	Overcharge delay	5000ms	1000-4000mS
		Settable	Overcurrent recovery	95A	± 2A
Overcurrent alarm	Open	Settable	Discharge alarm current	100A	± 2A
		Settable	Overcurrent delay	5000ms	1000-4000mS
		Settable	Recovery current	95A	± 2A
MOS high temperature alarm	Open	Settable	MOS high temperature alarm	90℃	± 3℃
		Settable	MOS high temperature delay	3000ms	1000-5000mS
		Settable	MOS High Temperature Recovery Alarm	80℃	± 3℃
Differential pressure alarm	Open	Settable	Overpressure alarm	500mV	± 50mV
		Settable	Pressure differential alarm restored	300mV	± 50mV
SOC report an emergency	Open	Settable	SOC low alarm	10%	
		Settable	SOC low alarm recovery	15%	

Protective value					
Function name	Feature Settings	Enable	Indicators	Factory default value	Remarks
Monomer protection	Open	Settable	Single unit overvoltage protection	3650mV	± 20mV
		Settable	Over rolling delay	2000ms	± 2000mS
		Settable	Monomer overvoltage recovery	3400mV	± 20mV
		Settable	Single unit under-voltage protection	2500mV	± 20mV
		Settable	Single monomer under-voltage delay	3000ms	± 2000mS
		Settable	Monomer under-voltage recovery	3000mV	± 20mV
Overall protection	Open	Settable	Overall overvoltage protection	58.4V	± 50mV
		Settable	Overall overvoltage delay	2S	± 2000mS
		Settable	Overall overvoltage recovery	54.4V	± 50mV
		Settable	Overall undervoltage protection	40V	± 50mV
		Settable	Overall under-voltage delay	3S	± 2000mS
		Settable	Overall undervoltage recovery	48.0V	± 50mV
Do not charge when the cell temperature is high	Open	Settable	High temperature protection during charging	60℃	± 3℃
		Settable	Charging high temperature delay	3000mS	± 1000mS
		Settable	High temperature recovery	55 ℃	± 3℃
		Settable	Cold protection during charging	0℃	± 3℃
		Settable	Cold charging delay	3000mS	± 1000mS
		Settable	Recovery from low temperature charging	5℃	± 3℃
Cell temperature prohibition	Open	Settable	High temperature protection of discharge	65℃	± 3℃

		Settable	Discharge high temperature delay	3000mS	± 1000mS
		Settable	High temperature recovery of discharge	60℃	± 3℃
		Settable	Discharge low temperature protection	-20℃	± 3℃
		Settable	Discharge low temperature delay	3000mS	± 1000mS
		Settable	Low temperature recovery of discharge	-15℃	± 3℃
Environmental temperature protection	Open	Settable	Environmental low temperature protection	-25℃	± 3℃
		Settable	Environmental temperature release	-15℃	± 3℃
		Settable	Environmental high temperature protection	65℃	± 3℃
		Settable	Environmental heat relief	55℃	± 3℃
MOS transistor high temperature protection	Open	Settable	MOS high temperature protection	110℃	± 3℃
		Settable	MOS high temperature delay	3000mS	± 1000mS
		Settable	MOS high temperature recovery	80℃	± 3℃
Pressure differential protection	Open	Settable	Overpressure protection	800mV	± 50mV
		Settable	Overpressure recovery	500mV	± 50mV
Overcurrent protection	Open	Settable	Overcurrent protection 1	115A	± 2A
		Settable	Overcharge delay 1	3000mS	1000-5000mS
		Settable	Overcurrent protection 2	150A	± 2.0A
		Settable	Overcharge delay 2	500mS	100-2000mS
		Not available	Automatic overcurrent recovery	10min	Automatically attempts recovery in 10 minutes. Locks up to 3 times. You can restore manually or through discharge.
Overcurrent protection	Open	Settable	Overcurrent protection 1	115A	± 2A
		Settable	Overcurrent discharge 1 delay	3000mS	1000-5000mS

		Settable	Overcurrent protection 2	150A	± 5.0A
		Settable	Discharge Overcurrent 2 Delay	500mS	100-2000mS
		Not available	Automatic recovery of overcurrent	1min	1 minute automatic recovery attempt. Locks after 3 consecutive attempts. You can restore manually or by charging.
Short-circuit protection	Open	Not available	Short circuit protection current	300A ± 100A	Upgrade the program to change
		Not available	Short circuit protection delay	450uS ± 100uS	Upgrade the program to change
		Short circuit protection Protective Release	1、 Valid charging current detected 2、 Recheck every 1 minute and lock after 3 consecutive attempts		
Basic parameter settings					
Function name	Feature Settings	Enable	Indicators	Factory default value	Remarks
Cell balancing function	Open	Settable	Cell charge balancing	Static or charging (does not trigger the high-temperature alarm)	
		Settable	Equalization turn-on voltage	3450mV	± 20mV
		Settable	Balanced differential pressure opening	30mV	± 10mV
		Not available	Equalizing current	68mA	50-100mA
Battery capacity settings	Open	Settable	Rated capacity of battery	100AH	
		Settable	Battery remaining capacity	100AH	
BMS power management	Open	Settable	Hibernation voltage	3.35V	± 50mV
		Settable	Dormancy delay	1 440min ± 30min	No charge/discharge current, no communication, no external charging voltage (<48V)
Full charge settings	Open	Settable	Constant pressure value	56.8 ± 0.5V	When the total voltage exceeds the constant voltage threshold and the current falls below the constant current threshold, the Battery Management System (BMS) determines the battery is fully charged, triggering the self-learning condition.
		Settable	Constant current value	1.0A ± 0.5A	
		Not available	Delayed	10S ± 2S	

4.3 LED Indicator Definition

LED lights: 4 green capacity indicators, 1 red alarm indicator, and 1 green operation indicator

SOC4	SOC3	SOC2	SOC1		
					
 SOC				ALM	RUN

4.3.1 Capacity Indicator

State		Charge				Discharge			
Capacity indicator light		SOC4 	SOC3 	SOC2 	SOC1 	SOC4 	SOC3 	SOC2 	SOC1 
	0~25%	Flash 2	Go out	Go out	Go out	Always on	Go out	Go out	Go out
	25~50%	Always on	Flash 2	Go out	Go out	Always on	Always on	Go out	Go out
	50~75%	Always on	Always on	Flash 2	Go out	Always on	Always on	Always on	Go out
	75~100%	Always on	Always on	Always on	Flash 2	Always on	Always on	Always on	Always on
Run indicator		Always on				Flash 3			

4.3.2 Status Indication

System mode	Anomalous event	Quantity of electricity LED				ALM	RUN	Remarks
								
Shut down	Shut down/sleep						Total elimination	
Await the opportune moment	Normal	Electricity indicator				Go out	Flash 1	During standby mode, only normal and alarm statuses are displayed, with protection and fault reports generated based on charge/discharge states. Alarm categories include: significant voltage differential, low capacity, high/low cell voltage, high/low total voltage, and all temperature alarms (cell temperature, ambient temperature, MOS temperature). The ALM indicator remains off during overvoltage alarms for either individual cells or total voltage.
	Report an emergency					Flash 2	Flash 1	
Charge	Normal	Electricity indicator (LED for the highest indicator flashes 2)				Go out	Always on	
	Report an emergency					Flash 2	Always on	The alarms include: pressure differential alarm, low capacity alarm, high/low individual cell voltage, high/low total voltage, all temperature alarms (high/low cell temperature, high/low ambient temperature, high MOS temperature), and overcurrent alarm (ALM does not flash when individual or total voltage is overvoltage).
	Monolithic/Integrated Overvoltage Protection/Full Charge Protection	Electricity indicator				Go out	Flash 2	
	Overcurrent protection (Enter rate-limiting charge)	Electricity indicator (Flash 2 when charging current is present)				Go out	Always on	When overcurrent protection is activated, the system enters current-limited charging mode with normal charging current displayed. If no charging current is detected after overcurrent protection, it indicates a fault, causing the ALM to remain illuminated while all other indicators turn off.
	Temperature protection	Go out				Always on	Go out	Cell, MOS, environment.
Discharge	Normal	Electricity indicator				Go out	Flash 3	
	Report an emergency					Flash 2	Flash 3	The system provides the following alarm categories: differential pressure alarm, low capacity alarm, individual cell voltage alarm, overall voltage alarm, all temperature alarms (cell temperature, ambient temperature, MOS temperature), and overcurrent alarm.
	Single/multi unit under-voltage protection					Flash 2	Go out	
	Overcurrent and short-circuit protection	Go out				Always on	Go out	
	Temperature protection	Go out				Always on	Go out	Cell, MOS, Environment
Hitch	NTC fault, MOS fault, reverse connection, differential pressure protection, ultra-low voltage protection	Go out				Always on	Go out	

4.3.3 Flash

Flash mode	Bright	Go out
Flash 1	0.25 S	3.75 S
Flash 2	0.5 S	0.5 S
Flash 3	0.5 S	1.5 S

5. Work Pattern

5.1 Fundamental Mode

5.1.1 Charging Mode

When the battery management system (BMS) detects an external charging voltage and the cell voltage and temperature are within the rechargeable range, it activates the charging MOSFET to initiate charging. Once the charging current reaches the effective threshold, the system enters charging mode. During this mode, both the charging and discharging MOSFETs remain active.

5.1.2 Discharge Mode

When the battery management system (BMS) detects a load connection and the cell voltage and temperature are within the discharge range, it enters discharge mode once the discharge current reaches the effective discharge current. During discharge mode, both charging and discharging MOSFETs are active.

5.1.3 Sleep and Wake Modes

The system enters sleep mode when the following conditions are met:

- ① If the single-phase or overall low-voltage protection remains active for 30 minutes, it will not be released.
- ② Press and hold the button for 3 seconds;
- ③ The minimum cell voltage drops below the sleep threshold (default 3350mV) and remains below it for the preset duration (default 1440 minutes), with no communication or charge/discharge current.
- ④ The computer is forced to shut down by the software.

Before entering sleep mode, ensure the P-terminal is not connected to external voltage, otherwise the low-power mode cannot be activated.

If the minimum cell voltage drops below the undervoltage protection threshold of 500mV, the system will enter deep sleep mode after a 10-minute delay.

Conditions for waking from sleep mode:

- 1) Connect to the Charger, Which Must Have an Input Voltage Exceeding 48V.
- 2) Wake up by Holding the Button for 1 Second.

5.2 Shut-Down Mode

When the low-voltage switch is disconnected, the BMS enters shutdown mode and can only be powered on by closing the switch.

5.3 Key Instructions

When the BMS is in sleep mode, press and hold the button for 1 second to activate it. The LED will then light up sequentially from 'RUN' for 0.5 seconds.

When the BMS is operational, press and hold button 3S-6S to put it into sleep mode. The LED will then light up sequentially for 0.5 seconds, starting from the lowest power level.

When the BMS is operational, pressing and holding the button for ≥ 10 seconds will reset the BMS via hardware, with the LED indicator displaying the current battery level.

6. Communication

6.1 RS485 Communication

The BMS can communicate with the host computer via the RS485 communication interface.

It features an RS485 parallel port supporting up to 16 battery banks, with a default baud rate of 9600bps.

The inverter has an RS485 communication interface with a default baud rate of 9600bps.

6.2 CAN Communication

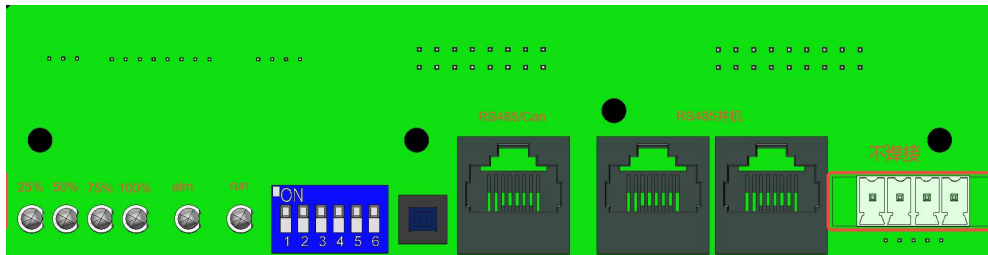
The Battery Management System (BMS) communicates with the inverter via CAN interface, transmitting battery parameters including voltage, current, temperature, State of Charge (SOC), State of Health (SOH), and operational status. The default baud rate is 500Kbps.

Selecting communication protocol for CAN interface inverter:

The BMS operates in host mode CAN to communicate with the inverter, with protocol switching implemented via DIP5 and DIP6.

6.3 Communication Interface Definition:

6.3.1 Interface Diagram:

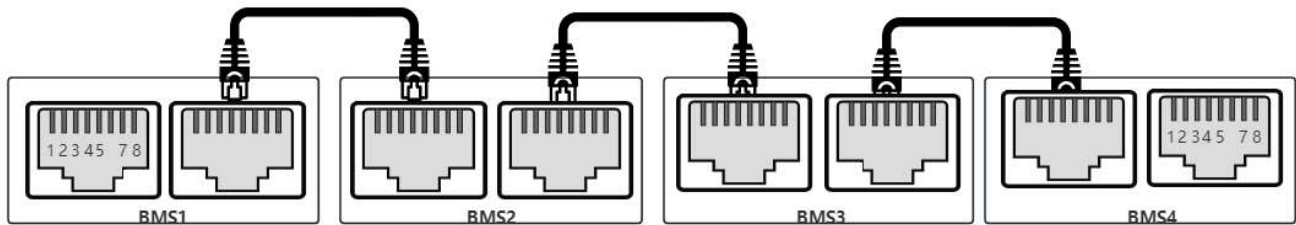


6.3.2 Communication Interface Definition

EMS communication port	
RS232—uses vertical RJ145 connectors	
RJ45 pin	Defined declaration
1	RS485A-B
2	RS485A-A
4	Can-H
5	Can-L
6	GND

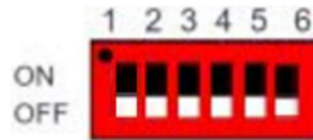
Parallel communication port (for parallel operation only)			
RS485-2—uses vertical RJ45 connectors		RS485-2—uses 8P8C vertical RJ45 connector	
RJ45 pin	Defined declaration	RJ45 pin	Defined declaration
1	RS485B-B	1	RS485B-B
2	RS485B-A	2	RS485B-A
6	GND	6	GND
7	RS485B-A	7	RS485B-A
8	RS485B-B	8	RS485B-B

6.2.3 BMS Board Parallel Connection Method



6.3 DIP Switch Settings (supports Parallel Operation and Protocol Selection)

When using multiple PACKs in parallel, hardware dialing addresses are used to distinguish each PACK. Each PACK in the battery pack has a unique address. The hardware addresses are configured via dialing switches, as shown in the reference table below.



Address	DIP switch position						Explain
	#1	#2	#3	#4	#5	#6	
0	OFF	OFF	OFF	OFF	OFF	OFF	(main engine)
1	ON	OFF	OFF	OFF	OFF	OFF	Slave Pack1
2	OFF	ON	OFF	OFF	OFF	OFF	Slave Pack2
3	ON	ON	OFF	OFF	OFF	OFF	Slave Pack3
4	OFF	OFF	ON	OFF	OFF	OFF	Slave Pack4
5	ON	OFF	ON	OFF	OFF	OFF	Slave Pack5
6	OFF	ON	ON	OFF	OFF	OFF	Slave Pack6
7	ON	ON	ON	OFF	OFF	OFF	Slave Pack7
8	OFF	OFF	OFF	ON	OFF	OFF	Slave Pack8
9	ON	OFF	OFF	ON	OFF	OFF	Slave Pack9
10	OFF	ON	OFF	ON	OFF	OFF	Slave Pack10
11	ON	ON	OFF	ON	OFF	OFF	Slave Pack11
12	OFF	OFF	ON	ON	OFF	OFF	Slave Pack12
13	ON	OFF	ON	ON	OFF	OFF	Slave Pack13
14	OFF	ON	ON	ON	OFF	OFF	Slave Pack14
15	ON	ON	ON	ON	OFF	OFF	Slave Pack15