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MAKING CONTROL SMARTER

HBCU200 BMS MASTER CONTROL MODULE USER MANUAL



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Table - 1 Software Version

Date	Version	Note
2023-03-26	1.0	Original release.
2023-06-20	1.1	Modify the wrong model of P4 Terminal in Table 3.

Table 2 Notation Clarification

Sign	Instruction
 NOTE	Highlights an essential element of a procedure to ensure correctness.
 CAUTION!	Indicates a procedure or practice, which, if not strictly observed, could result in damage or destruction of equipment.
 WARNING!	Indicates a procedure or practice, which could result in injury to personnel or loss of life if not followed correctly.

Glossary and List of Abbreviations

PCS: Power Conversion System

BMS: Battery Management System

BCU: Battery Control Unit

BMU: Battery Management Unit

SOC: State of Charge

SOH: State of Health

SOP: State of Power

SOE: State of Energy



1 OVERVIEW

HBCU200 Master Control Module is a significant part of the energy storage battery management system (BMS), which can manage the battery system safely, reliably and efficiently. HBCU200 collects the voltage and temperature of the single cell of the battery module uploaded by BMU slave control module (supporting lithium iron phosphate and ternary lithium) to calculate SOC, SOH, the max. single cell voltage/temperature, the min. single cell voltage/temperature, insulation resistance and other data. It realizes the protections of over/under voltage, high/low temperature, charge/discharge overcurrent of the cell by the tertiary fault protection system and the control of external main circuit relay. HBCU200 is compatible with protocol by PCS of different manufacturers to realize charge/discharge management of battery cluster.

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2 PERFORMANCE AND CHARACTERISTICS

- Rated operating voltage is 12/24VDC;
- LED lamps indicate the running status and alarm status of the module;
- It can collect total voltage and current of battery cluster and calculate the SOC and SOH data;
- It can collect the insulation resistance to the ground for the positive and negative of the battery cluster;
- Collect the current of battery cluster by Hall current sensor or diverter;
- Receive the voltage and temperature of a single cell of BMU module via non-isolated CAN port, and calculate max./min. voltage of battery cell, control passive balance on BMU module. This port can also be used to upgrade BCU firmware program.
- Tertiary fault alarm protection function, which can alarm for over/under voltage, high/low temperature, charging/discharging overcurrent, low insulation resistance, abnormal communication, high voltage collecting fault, current collecting fault, cell voltage collecting fault, temperature collecting fault. The alarm protection actions can be set as level-1 current drop (drop to 50%), level-2 current drop (drop to 80%), level-3 current drop (drop to 100%) and high voltage power-off;
- 2 isolated RS485 communication ports using Modbus protocol, which can communicate with HMU8-BMS display module and PCS;
- 1 ETHERNET port to monitor BCU data;
- Bluetooth function can monitor BCU data by mobile APP;
- 7 relay output ports, of which 5 are active output ports (the default function is master positive relay output, pre-charge output, module power control, alarm indicator output, operation output), the other 2 are passive output ports;
- 4 input ports, of which 3 are aux. input ports, 1 is fixed as adhesion detection input of master positive relay;
- With 1 temperature sensor, NTC 10K-3950 type can be connected;
- With event-log, which can circularly record 200 items of historical records (contents and detailed data of tertiary fault alarm);
- Daily, total charging/discharging energy (kWh) and battery capacity (Ah) data can be counted;
- Modular design, screw-mounting, flame retardant ABS/PC shell with compact structure and easy installation.
- The built-in SD card storage function can support up to 32GB data (depends on customer's needs).

3 SPECIFICATION

Table 1- Specification Parameters

Items	Contents
Operating Voltage Range	DC8V ~ DC35V, DC reverse connection protection
Overall Consumption	<4W (Standby mode: ≤2.5W)
Total Voltage Collection	Range: 20V~1000V Resolution: 0.1V Accuracy: 0.5%FSR (full range) or ±1.5V
Hall Current Sampling	Range: -100A~100A (Please specify the range when ordering) Resolution: 0.1A Accuracy: 0.5%FSR (full range)
Diverter Sampling	75mV diverter is supported. Resolution: 0.1A Accuracy: 0.5%FSR (full range) Accuracy error is also related to the diverter type selection.
Insulation Sampling	Range: 0~20MΩ Accuracy: ±5%(>100kΩ); ±10kΩ(0~100kΩ)
Temperature Sampling Input	Range: -40°C~+200°C Resolution:1°C Accuracy: ±1°C Temp sensor type: NTC 10K-3950
Aux. Output 1~5	1A DC30V DC power supply active output
Aux. Output 6~7	1A DC30V Volts free output
Digital Input 1~4	Low threshold voltage is 1.2V, max. input voltage is 60V
RS485-1	Fixed parameter: 115200 baud rate, 1 stop bit, no parity. Can be used to connect with HMU8-BMS display module.
RS485-2	Isolated, half-duplex, 9600 baud rate, maximum communication distance 1000m. Default: 9600 baud rate, 1 stop bit, no parity.
Ethernet Port	Self-adapting 10/100Mbit
CAN 1	250kbps, non-isolated, maximum communication distance is 250m, using Belden 9841cale or equivalent. Built-in 120Ω terminal impedance matching resistance.
CAN 2	Isolation, maximum communication distance is 250m, using Belden 9841cale or equivalent. 120Ω terminal impedance matching resistance is optional to connect with.
EMC	GB/T 34131-2017
Vibration	5Hz~8Hz: ±7.5mm 8Hz~500Hz: ±2g IEC 60068-2-6
Shock	50g, 11ms, half-sine, three consecutive shocks are applied in each of the three mutually perpendicular directions, i.e. a total of 18 times. IEC 60068-2-27

Items	Contents
Bump Test	20g, 16ms, half-sine IEC 60255-21-2
Overall Dimensions	253mmx54mmx106mm
Working Temperature	(-40~+70) °C;
Working Humidity	(20~93)%RH
Storage Temperature	(-40~+80) °C;
Protection Level	IP20
Insulation Strength	Apply AC2.4kV voltage between high voltage terminal and low voltage terminal and the leakage current is not more than 3mA within 1min.
Weight	0.5kg

4 MODULE PANEL

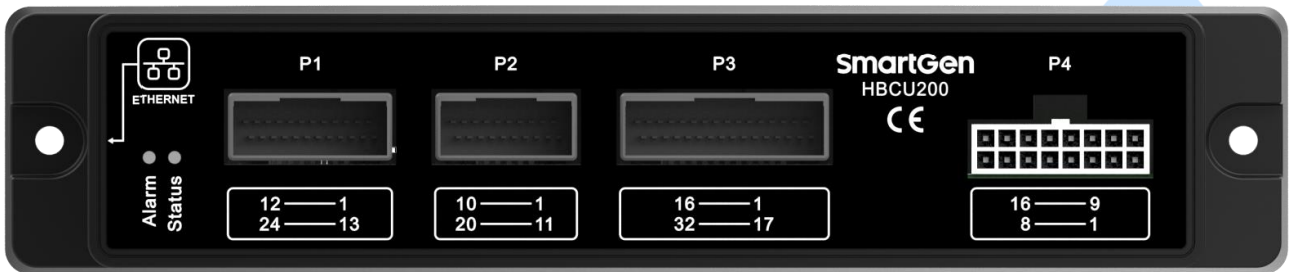


Fig.1 – HBCU200 Panel Drawing

Table 2 - Indicator Description

Indicator	Function
Status Indicator	The indicator slow flashes (once per second) when module is power on.
Alarm Indicator	The indicator slow flashes (once per second) when the level-1 fault alarm occurs.
	The indicator slow flashes (5 times per second) when the level-2 fault alarm occurs.
	The indicator is always illuminated when the level-3 fault alarm occurs.

Table 3 - Terminal Definition

Terminal No.	Definition	Terminal No.	Definition
P1 Terminal (24PIN)	JAE MX34024NF1		
	JAE MX34024SF1		
	JAE M34S75C4F2		
1	RS485_1A	13	RS485_1B
2	NC	14	TR1
3	NC	15	NC
4	NC	16	NC
5	NC	17	NC
6	RS485_2A	18	RS485_2B
7	NC	19	TR3
8	NC	20	NC
9	NC	21	NC
10	NC	22	NC
11	CAN2_H	23	CAN2_L
12	NC	24	TR4
P2 Terminal (20PIN)	JAE MX34020NF1		
	JAE MX34020SF1		
	JAE M34S75C4F2		
1	TEMP_1	11	TEMP_2
2	NC	12	NC
3	+5V	13	I_SENSOR1
4	GND	14	I_SENSOR2
5	NC	15	NC
6	NC	16	NC
7	NC	17	NC
8	NC	18	NC
9	NC	19	NC
10	NC	20	NC
P3 Terminal (32PIN)	JAE MX34032NF2		
	JAE MX34032SF1		
	JAE M34S75C4F2		
1	DC_VIN+	17	DC_VIN-
2	DC_VIN+	18	DC_VIN-
3	CAN1_H_IN	19	CAN1_L_IN
4	CAN1_H_OUT	20	CAN1_L_OUT
5	RELAY1	21	NC
6	RELAY2	22	NC
7	RELAY3	23	NC
8	RELAY4	24	NC
9	RELAY5	25	NC

Terminal No.	Definition	Terminal No.	Definition
10	RELAY6_2	26	RELAY6_1
11	RELAY7_2	27	RELAY7_1
12	NC	28	NC
13	NC	29	NC
14	INPUT2	30	INPUT1
15	INPUT3	31	INPUT_COM
16	INPUT4	32	INPUT_COM
P4 Terminal (10PIN)			
YATXF 10-0501-16			
H4201-2x8NP			
YT4202-01			
1	PE	9	PE
2	NC	10	NC
3	NC	11	NC
4	B+	12	CHG
5	NC	13	NC
6	NC	14	NC
7	NC	15	IBAT-
8	B-	16	IBAT-

Table 4 - Terminal Function Description

Terminal No.	Definition	Function
P1 Terminal		
1	RS485_1A	Isolated RS485 port for communication between PCS and EMS.
13	RS485_1B	
14	TR1	According to the onsite connections, it is short connected with Terminal 1 for using to connect to 120Ω terminal impedance matching resistance of RS485-2.
6	RS485_2A	Isolated RS485 port for communication with HMU8-EMS, PCS and EMS.
18	RS485_2B	
19	TR2	According to the onsite connections, it is short connected with Terminal 6 for using to connect to 120Ω terminal impedance matching resistance of RS485-2.
11	CAN2_H	Isolated CAN for communication with PCS.
23	CAN2_L	
24	TR4	According to the onsite connections, it is short connected with Terminal 11 for using to connect to 120Ω terminal impedance matching resistance of CAN2.
Other Terminals	NC	Must be hang up in the air.
P2 Terminal		
1	TEMP_1	Temperature sensor connected.
11	TEMP_2	An NTC 10K-3950 type sensor is required.
3	5V	Hall current sensor sampling input.

Terminal No.	Definition	Function
4	GND	
13	I_SENSOR1	
14	I_SENSOR2	
Other Terminals	NC	Must be hang up in the air.
P3 Terminal		
1	DC_VIN+	Module power input.
2		
17	DC_VIN-	
18		
3	CAN1_H	Non-isolated CAN port is used for internal communication between BCU and BMU module.
4		
19	CAN1_L	
20		
5	RELAY1	AUX. Output 1. Active output (Terminal 1 provides power supply), capacity 1A DC30V. Default "Master Positive Relay Output".
6	RELAY2	AUX. Output 2. Active output (Terminal 1 provides power supply), capacity 1A DC30V. Default "Pre-charge Output".
7	RELAY3	AUX. Output 3. Active output (Terminal 1 provides power supply), capacity 1A DC30V. Default "Module Power Control".
8	RELAY4	AUX. Output 4. Active output (Terminal 1 provides power supply), capacity 1A DC30V. Default "Alarm Indicator Output".
9	RELAY5	AUX. Output 5. Active output (Terminal 1 provides power supply), capacity 1A DC30V. Default "Running Output".
10	RELAY6_2	AUX. Output 6. Volts free output (Terminal 1 provides power supply), capacity 1A DC30V. Default "Not Used".
26	RELAY6_1	
11	RELAY7_2	AUX. Output 7. Volts free output (Terminal 1 provides power supply), capacity 1A DC30V. Default "Not Used".
27	RELAY7_1	
14	INPUT2	Digital Input 2.
15	INPUT3	Bonding test input of the master positive relay, used to test whether

Terminal No.	Definition	Function
		the master positive relay is bonded.
16	INPUT4	Digital Input 4.
30	INPUT1	Digital Input 1.
31	INPUT_COM	Common port of digital input.
32	INPUT_COM	
Other Terminals	NC	Must be hang up in the air.
P4 Terminal		
1	PE	Metal shell or earth of energy storage system.
9		
12	CHG	High voltage sampling input on charging side of energy storage battery.
4	B+	High voltage sampling input of total positive of storage battery.
8	B-	High voltage sampling input of total negative of storage battery.
15	IBAT-	Diverter connects to negative.
16	IBAT+	Diverter connects to positive.
Other Terminals	NC	Must be hang up in the air.

Cable specification requirements:

0.5mm² cable is used for Terminal P1, P2 and P3;

0.5mm² impedance 120Ω shielding wire is used for communication line of RS485 and CAN and it is grounded at a single end;

1.0mm² cable is used for P4 high voltage sampling, the rated voltage is determined according to the voltage of energy storage battery cluster.

5 OPERATION

5.1 WORKING PROCESS

- a) After module is power on, the module power control outputs and the running indicating outputs at the same time, the module enters BMS standby status;
- b) In standby status, the communication of all the BMU modules and insulation monitoring modules is normal, then enters the self-check stage of BMS; otherwise, it will be in the standby status for waiting all the time., when the master-slave communication fails or insulation monitoring module fails to enable the communication, BCU will send an alarm;
- c) In BMS self-check stage, if the status of mater positive relay (no bonding) is normal, it will enter into BMS master negative relay closed stage (if configured); otherwise, it will be in the self-check stage for waiting all the time, when the master positive relay bonding test enables, BCU will send an alarm;
- d) BMS master negative closing relay is closed (if configured);
- e) In pre-charge stage of BMS, the pre-charge outputs. When the voltage on side is greater than or equal to the preset pre-charge voltage or 5-second delay ends, it will enter high voltage power-on stage of BMS (In the case of pre-charge protection enabled, the failure of pre-charge will alarm and BMS will enter the shutdown stage);
- f) In the high voltage power-on stage of BMS, after the master positive relay is closed for 200ms, the pre-charge output is disconnected, it will enter the normal running stage of BMS;
- g) From the pre-charge stage of BMS to the normal running stage, if the fault alarm triggers the high voltage power-off action, BMS will enter the high voltage power-off stage;
- h) When BMS is in the high voltage power-off stage, the master positive relay is disconnected, BMS will enter the master negative relay disconnected stage;
- i) After BMS master negative relay is disconnected, it will enter into stop stage.

Note 1: The insulation monitoring module will perform a detection every 2 minutes in the normal running stage of BMS;

Note 2: When lock fault alarms or triggers high voltage power-off action of BMS, it is necessary to disconnect the power supply of the module to reset the alarm.

5.2 INTERACTION LOGIC WITH PCS

BCU module communicates with PCS by RS485 port or CAN port, PCS can communicate to request the max. limit current for charging/discharging and the max. cut-off voltage for charging to adjust the output current of PCS.

The max. limit charging current/discharging current are related to the specifications of the storage battery cluster cell and the current fault alarm action of BCU (current drop or high voltage power-off).

6 FAULT ALARM PROTECTION

BCU has a tertiary fault alarm protection function, which is level-1 fault alarm, level-2 fault alarm and level-3 fault alarm.

The alarm types can be set to disable, lock, self-reset. When set the alarm type as lock, BCU module needs to be powered off and reset alarm; when set alarm type as self-reset, and alarms reach to return threshold, the alarm will reset.

The alarm action can be set as level-1 current drop (drop to 50%), level-2 current drop (drop to 50%), level-3 current drop (drop to 100%) and High voltage power-off.

Table 5 - Description of Fault Alarm Level

No.	Fault Alarm Level	Description
1	Level 1 Fault Alarm	The alarm indicator flashes slowly when module detects the signal of level-1 fault alarm.
2	Level 2 Fault Alarm	The alarm indicator flashes rapidly when module detects the signal of level-2 fault alarm.
3	Level 3 Fault Alarm	The alarm indicator will be always illuminated when module detects the signal of level-3 fault alarm.

Table 6 - Level 1/Level 2/Level 3 Fault Alarm List

No.	Alarm	Fault Alarm Levels		
		Level 1	Level 2	Level 3
1	Total Volt. High	●	●	●
2	Total Volt. Low	●	●	●
3	Single Volt. High	●	●	●
4	Single Volt. Low	●	●	●
5	Single Volt. Difference Large	●	●	●
6	Charging Over Temp	●	●	●
7	Charging Under Temp	●	●	●
8	Large Temp Difference	●	●	●
9	Temp Rise Fast	●	●	●
10	SOC Low	●	●	●
11	Charge Overcurrent	●	●	●
12	Discharge Overcurrent	●	●	●
13	Insulation Low	●	●	●
14	Volt. Sampling Line Abnormal	●	●	●
15	Temp Sampling Line Abnormal	●	●	●
16	Current Sampling Line Abnormal	●	●	●
17	High Volt. Sampling Fault	●	●	●
18	Master Positive Relay Bond	/	/	●
19	Master-Slave Comm. Failure Alarm	●	●	●
20	Max. Charging Current Over Limit	●	●	●
21	Max. Discharging Current Over Limit	●	●	●
22	Environment Temp. High	●	●	●

No.	Alarm	Fault Alarm Levels		
		Level 1	Level 2	Level 3
23	Pre-charge Failure	/	/	
24	Connector Temp. High	●	●	●
25	Connector Temp. Sensor Open	●	●	●
26	Discharging Temp. High	●	●	●
27	Discharging Temp. Low	●	●	●

Table 7 - Fault Alarm Details

No.	Type	Description
1	Total Volt. High	When the total voltage of the battery cluster is greater than or equal to the pre-set single threshold of the total voltage high multiplied by the total number of cells, after a continuous set delay time, it will send the alarm signal of total voltage high.
2	Total Volt. Low	When the total voltage of the battery cluster is not 0 and less than or equal to the pre-set single threshold of the total voltage low multiplied by the total number of cells, after a continuous set delay time, it will send the alarm signal of total voltage low.
3	Single Volt. High	When the max. single voltage online is greater than or equal to the pre-set threshold of single max. voltage, after a continuous set delay time, it will send the alarm signal of single voltage high.
4	Single Volt. Low	When the min. single voltage is less than or equal to the pre-set threshold of single min. voltage, after a continuous set delay time, it will send the alarm signal of single voltage low.
5	Single Volt. Difference Large	When the voltage difference between max. single voltage and min. single voltage online is greater than or equal to the pre-set threshold of single voltage difference, after a continuous set delay time, it will send the alarm signal of single voltage difference large.
6	Charging Over Temp.	When the max. temperature online is greater than or equal to the pre-set threshold of over temperature, after a continuous set delay time, it will send the alarm signal of over temperature.
7	Charging Under Temp.	When the min. temperature online is less than or equal to the pre-set threshold of under temperature, and the set delay time continues after a continuous set delay time, it will send the alarm signal of under temperature.
8	Large Temp Difference	When the difference value between the max. temperature and min. temperature online is greater than or equal to the pre-set threshold of temperature difference, after a continuous set delay time, it will send the alarm signal of large temperature difference.
9	Temp Rise Fast	When the change rate per second of the average temperature online is greater than or equal to the pre-set threshold of temperature rising, after a continuous set delay time, it will send the alarm signal of temperature rise fast.
10	SOC Low	When the SOC of battery cluster is less than or equal to the pre-set threshold of SOC, after a continuous set delay time, it will send the alarm signal of SOC low.

No.	Type	Description
11	Charge Overcurrent	When the battery cluster is charging, the current is greater than or equal to the pre-set threshold of charging overcurrent, after a continuous set delay time, it will send the alarm signal of charging overcurrent.
12	Discharge Overcurrent	When the battery cluster is discharging, the current is greater than or equal to the pre-set threshold of discharging overcurrent, after a continuous set delay time, it will send the alarm signal of discharging overcurrent.
13	Insulation Low	When the insulation resistance value of the insulation monitoring module is read and the total voltage of battery cluster is greater than 100V, the insulation rate (the ratio of the min. value (total positive insulation resistance to ground and total negative insulation resistance to ground) to the current total voltage) is less than or equal to the pre-set threshold , after a continuous set delay time, it will send the alarm signal of insulation low.
14	Volt. Sampling Line Abnormal	When voltage sampling line disconnects and after a continuous set delay time, it will send the alarm signal of voltage sampling line abnormal.
15	Temp Sampling Line Abnormal	When temperature sampling line disconnects and after a continuous set delay time, it will send the alarm signal of temperature sampling line abnormal.
16	Current Sampling Line Abnormal	When the Hall current sensor fails or the connection with module fails, after a continuous set delay time, it will send the alarm signal of current sampling line abnormal.
17	High Volt. Sampling Fault	When the total voltage of battery cluster is 0, after a continuous set delay time, it will send the alarm signal of high voltage sampling fault.
18	Master Positive Relay Bond	When the contact output of the master positive relay is disconnected, if the auxiliary contact of the master positive relay is still closed, after a continuous set delay time, it will send the alarm signal of master positive relay bond.
19	Master-slave Comm. Failure Alarm	When BCU module cannot receive data frames sent by BMU module, after a continuous set delay time, it will send the alarm signal of master-slave communication failure.
20	Max. Charging Current Over Limit	When the battery cluster is in charging status and the charging current is greater than 1A, the charging current exceeds the set allowed max. charging current, after a continuous set delay time, it will send the alarm signal of max. charging current over limit.
21	Max. Discharging Current Over Limit	When the battery cluster is in discharging status and the discharging current is greater than 1A, the discharging current exceeds the set allowed max. discharging current, after a continuous set delay time, it will send the alarm signal of max. discharging current over limit.
22	Environment Temp High	When the environment temperature of BCU module is over the pre-set threshold of max. environment temperature, after a continuous set delay time, it will send the alarm signal of environment temperature high.

No.	Type	Description
23	Pre-charge Failure	When BMS is in the pre-charge stage and the protection enables, if the charging side voltage is still less than the pre-set pre-charge voltage at the end of 5s delay, it will send the alarm signal of pre-charge failure and the BMS will enter the shutdown stage.
24	Connector Temp. High	When the sampling temperature on BMU connector (only for HBMU200) exceeds the preset max. temperature threshold, and lasts for the set delay, it will send a signal of alarm.
25	Connector Temp. Sensor Open Circuit	When the sampling temperature on BMU connector (only for HBMU200) is disconnected, and lasts for the set delay, it will send a signal of alarm.
26	Discharging Temp. High	When the highest temperature of the online cell is greater than or equal to the preset threshold, and lasts for the set delay, it will send a signal of alarm.
27	Discharging Temp. Low	When the lowest temperature of the online cell is less than or equal to the preset threshold, and lasts for the set delay, it will send a signal of alarm.

7 SCOPES AND DEFINITIONS OF PROGRAMMABLE PARAMETERS

7.1 CONTENTS AND SCOPES OF PARAMETER SETTING

Table 8 - Contents and Scopes of Parameter Setting

No.	Items	Ranges	Defaults	Description
Module Setting				
1	Module Address	(1-254)	1	The address of controller during remote monitoring.
2	Password	(0-65534)	1234	The password to be entered when writing parameter configurations via PC.
3	Data-storage Period	(2-600) s	30	The period of real-time data storage.
4	Number of BMU	(1-15)	13	The number of battery module of storage system.
5	Battery No. of Slave Unit	(1-32)	16	The single cell number of single BMU.
6	Temp Sensor No. of Slave Unit	(1-16)	8	The temperature sensor number of single BMU.
7	Temp. Detection of High Volt. Connector	(0-1)	0	0: Disable; 1: Enable
8	Hall Current Sensor Reverse	(0-1)	0	0: Disable; 1: Enable
9	Current Sensor Range	(10-1000) A	100	

No.	Items	Ranges	Defaults	Description
10	Current Sensor Type	(0-3)	0	0: Single Range Hall 1: Diverter; 2: Reserved; 3: Reserved; 4: Reserved
11	Storage Energy Converter Model	(0-50)	1	0: Not Used; 1: INVT
12	Insulation Monitoring Set	(0-1)	1	0: Disable; 1: Self-adaption (According to rated voltage, above 120V)
13	Hall Sensor Model	(0-30)	0	0: HAS2020 1:CHF-100FS
14	Insulation Detection Interval	(1-2000)min	5	The insulation detection time after BMS normal running.
15	MAC	(0-255)	/	The MAC address, which can only be read.
16		(0-255)	/	
17		(0-255)	/	
18		(0-255)	/	
19		(0-255)	/	
20		(0-255)	/	
21	ip	(0-255)	192	IP address.
22		(0-255)	168	
23		(0-255)	0	
24		(0-255)	2	
25	Subnet Mask	(0-255)	255	
26		(0-255)	255	
27		(0-255)	255	
28		(0-255)	0	
29	Gateway Address	(0-255)	192	
30		(0-255)	168	
31		(0-255)	0	
32		(0-255)	1	
Battery Cluster Setting				
1	Rated Voltage	(50.0-1500.0)V	665.6V	The rated voltage of current system.
2	Percentage of Pre-charge Voltage	(50-100)%	95%	In the pre-charge stage of BMS, the pre-charge output will be disconnected only when the pre-charge voltage reaches this value.
3	Nominal Capacity	(1-1000.0) Ah	50.0AH	The standard design capacity of the storage system.
4	Total Capacity	(1-1000.0) Ah	50.0AH	Reserved.
5	Pre-charge Protection Enable	(0-1)	1	0: Disable 1: Enable
Aux. Input Setting				

No.	Items	Ranges	Defaults	Description
Input Port 1				
1	Content	(0-10)	0	Not used. See Table 10.
2	Active Type	(0-1)	0	0: closed; 1:Open.
Input Port 2				
1	Content	(0-10)	1	Isolating switch closing status input. See Table 10.
2	Active Type	(0-1)	0	0: closed; 1:Open.
Input Port 4				
1	Content	(0-10)	0	Not used. See Table 10.
2	Active Type	(0-1)	0	0: closed; 1:Open.
Aux. Output Setting				
Output Port 1				
1	Content	(0-20)	1	The master positive relay output. See Table 9.
2	Output Type	(0-1)	0	0: NO; 1:NC
Output Port 2				
1	Output Port	(0-20)	2	Pre-charge output. See Table 9.
2	Output Type	(0-1)	0	0: NO; 1:NC
Output Port 3				
1	Content	(0-20)	3	The module power control. See Table 9
2	Output Type	(0-1)	0	0: NO; 1:NC
Output Port 4				
1	Content	(0-20)	4	The alarm indicator output. See Table 9.
2	Output Type	(0-1)	0	0: NO; 1:NC
Output Port 5				
1	Content	(0-20)	8	Running output. See Table 9.
2	Output Type	(0-1)	0	0: NO; 1:NC
Output Port 6				
1	Content	(0-20)	0	Not used. See Table 9.
2	Output Type	(0-1)	0	0: NO; 1:NC
Output Port 7				
1	Content	(0-20)	0	Not used. See Table 9.
2	Output Type	(0-1)	0	0: NO; 1:NC
Charging and SOC Setting				
1	Balanced Open Volt.	(0-5000) mV	3450	The battery passively balance to open the voltage.

No.	Items	Ranges	Defaults	Description	
2	Charging Volt. Upper Limit	(40.0-2000.0) V	743.0	The upper limit of charging voltage sent to PCS.	
3	Full Charging Single Cell Volt.	(2000-5000) mV	3600		
4	Discharging Volt. Lower Limit	(40.0-2000.0) V	520.0	The lower limit of discharging voltage sent to PCS.	
5	Over Charging SOC Request	(0-80.0) %	10.0	Used for protocol of INVT converter.	
6	Over Charging Single Volt. Request	(0-5000) mV	2800		
7	Stop Over Charging SOC	(0-80.0) %	30.0		
Protection Parameter Setting					
Total Voltage High					
1	Level-1 Fault Alarm	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
2		Action	(0-4)	1	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
3		Set Value	(0-5000)mV	3600	The threshold value of alarm action.
4		Return Value	(0-5000)mV	3350	The reset threshold value of alarm when alarm type is "self-reset".
5		Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.
6		Return Delay Value	(0-3000.0)s	6.0	The reset delay value of alarm when the type is "self-reset".
7	Level-2 Fault Alarm	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
8		Action	(0-4)	2	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
9		Set Value	(0-5000)mV	3650	The threshold value of alarm action.
10		Return Value	(0-5000)mV	3450	The reset threshold value of alarm when alarm type is "self-reset".
11		Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.

No.	Items	Ranges	Defaults	Description
12	Return Delay Value	(0-3000.0)s	6.0	The reset delay value of alarm when the type is "self-reset".
13	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
14	Action	(0-4)	3	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
15	Level-3 Fault Alarm Set Value	(0-5000)mV	3700	The threshold value of alarm action.
16	Return Value	(0-5000)mV	3550	The reset threshold value of alarm when alarm type is "self-reset".
17	Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.
18	Return Delay Value	(0-3000.0)s	6.0	The reset delay value of alarm when the type is "self-reset".
Total Voltage Low				
1	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
2	Action	(0-4)	1	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
3	Level-1 Fault Alarm Set Value	(0-5000)mV	2600	The threshold value of alarm action.
4	Return Value	(0-5000)mV	2900	The reset threshold of alarm when alarm type is "self-reset".
5	Action Delay Value	(0-3000.0) s	10.0	Alarm action delay.
6	Return Delay Value	(0-3000.0) s	10.0	The reset delay value of alarm when the type is "self-reset".
7	Level-2 Fault Alarm Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset

No.	Items	Ranges	Defaults	Description	
8	Action	(0-4)	2	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off	
9	Set Value	(0-5000)mV	2600	The threshold of alarm action.	
10	Return Value	(0-5000)mV	2800	The reset threshold value of alarm when alarm type is "self-reset".	
11	Action Delay Value	(0-3000.0)s	10.0	Alarm action delay.	
12	Return Delay Value	(0-3000.0)s	10.0	The reset delay value of alarm when the type is "self-reset".	
13	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset	
14	Action	(0-4)	3	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off	
15	Level-3 Fault Alarm	Set Value	(0-5000)mV	2500	The threshold value of alarm action.
16		Return Value	(0-5000)mV	2600	The reset threshold value of alarm when alarm type is "self-reset".
17		Action Delay Value	(0-3000.0)s	10.0	Alarm action delay.
18		Return Delay Value	(0-3000.0)s	6.0	The reset delay value of alarm when the type is "self-reset".
Battery Cell Voltage Difference Large					
1	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset	
2	Level-1 Fault Alarm	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
3		Set Value	(0-5000) mV	500	The threshold value of alarm action.
4		Return Value	(0-5000) mV	300	The reset threshold value of alarm when alarm type is "self-reset".

No.	Items	Ranges	Defaults	Description
5	Action Delay Value	(0-3000.0)s	30.0	Alarm action delay.
6	Return Delay Value	(0-3000.0)s	30.0	The reset delay value of alarm when the type is "self-reset".
7	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
8	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
9	Set Value	(0-5000)mV	1000	The threshold value of alarm action.
10	Return Value	(0-5000)mV	800	The reset threshold value of alarm when alarm type is "self-reset".
11	Action Delay Value	(0-3000.0)s	30.0	Alarm action delay.
12	Return Delay Value	(0-3000.0)s	30.0	The reset delay value of alarm when the type is "self-reset".
13	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
14	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
15	Set Value	(0-5000)mV	2000	The threshold value of alarm action.
16	Return Value	(0-5000)mV	700	The reset threshold value of alarm when alarm type is "self-reset".
17	Action Delay Value	(0-3000.0)s	30.0	Alarm action delay.
18	Return Delay Value	(0-3000.0)s	6.0	The reset delay value of alarm when the type is "self-reset".
Battery Cell Over Voltage				

No.	Items	Ranges	Defaults	Description	
1	Level-1 Fault Alarm	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
2		Action	(0-4)	1	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
3		Set Value	(0-5000)mV	3700	The threshold value of alarm action.
4		Return Value	(0-5000)mV	3550	The reset threshold value of alarm when alarm type is "self-reset".
5		Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.
6		Return Delay Value	(0-3000.0)s	6.0	The reset delay value of alarm when the type is "self-reset".
7	Level-2 Fault Alarm	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
8		Action	(0-4)	2	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
9		Set Value	(0-5000)mV	3720	The threshold value of alarm action.
10		Return Value	(0-5000)mV	3600	The reset threshold value of alarm when alarm type is "self-reset".
11		Action Delay Value	(0-3000.0)s	3.0	Alarm action delay.
12		Return Delay Value	(0-3000.0)s	4.0	The reset delay value of alarm when the type is "self-reset".
13	Level-3 Fault Alarm	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
14		Action	(0-4)	3	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
15		Set Value	(0-5000)mV	3750	The threshold of alarm action.
16		Return Value	(0-5000)mV	3650	The reset threshold value of alarm when alarm type is "self-reset".

No.	Items	Ranges	Defaults	Description	
17	Action Delay Value	(0-3000.0)s	3.0	Alarm action delay.	
18	Return Delay Value	(0-3000.0)s	4.0	The reset delay value of alarm when the type is "self-reset".	
Battery Cell Under Voltage					
1	Level-1 Fault Alarm	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
2		Action	(0-4)	1	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
3		Set Value	(0-5000)mV	2700	The threshold value of alarm action.
4		Return Value	(0-5000)mV	3000	The reset threshold value of alarm when alarm type is "self-reset".
5		Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.
6		Return Delay Value	(0-3000.0)s	6.0	The reset delay value of alarm when the type is "self-reset".
7	Level-2 Fault Alarm	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
8		Action	(0-4)	2	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
9		Set Value	(0-5000)mV	2500	The threshold value of alarm action.
10		Return Value	(0-5000)mV	2700	The reset threshold value of alarm when alarm type is "self-reset".
11		Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.
12	Return Delay Value	(0-3000.0)s	6.0	The reset delay value of alarm when the type is "self-reset".	
13	Level-3 Fault Alarm	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset

No.	Items	Ranges	Defaults	Description
14	Action	(0-4)	3	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
15	Set Value	(0-5000)mV	2000	The threshold value of alarm action.
16	Return Value	(0-5000)mV	2500	The reset threshold value of alarm when alarm type is "self-reset".
17	Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.
18	Return Delay Value	(0-3000.0)s	6.0	The reset delay value of alarm when the type is "self-reset".
Charging Temperature High				
1	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
2	Action	(0-4)	1	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
3	Set Value	(-40-200)°C	55	The threshold value of alarm action.
4	Return Value	(-40-200)°C	50	The reset threshold value of alarm when alarm type is "self-reset".
5	Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.
6	Return Delay Value	(0-3000.0)s	6.0	The reset delay value of alarm when the type is "self-reset".
7	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
8	Action	(0-4)	2	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
9	Set Value	(-40-200)°C	60	The threshold value of alarm action.
10	Return Value	(-40-200)°C	55	The reset threshold value of alarm when alarm type is "self-reset".

No.	Items	Ranges	Defaults	Description
11	Action Delay Value	(0-3000.0)s	3.0	Alarm action delay.
12	Return Delay Value	(0-3000.0)s	4.0	The reset delay value of alarm when the type is "self-reset".
13	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
14	Action	(0-4)	3	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
15	Level-3 Fault Alarm Set Value	(-40-200)°C	65	The threshold value of alarm action.
16	Level-3 Fault Alarm Return Value	(-40-200)°C	60	The reset threshold value of alarm when alarm type is "self-reset".
17	Level-3 Fault Alarm Action Delay Value	(0-3000.0)s	3.0	Alarm action delay.
18	Level-3 Fault Alarm Return Delay Value	(0-3000.0)s	2.0	The reset delay value of alarm when the type is "self-reset".
Discharging Temperature High				
1	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
2	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
3	Level-1 Fault Alarm Set Value	(-40-200)°C	65	The threshold value of alarm action.
4	Level-1 Fault Alarm Return Value	(-40-200)°C	45	The reset threshold value of alarm when alarm type is "self-reset".
5	Level-1 Fault Alarm Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.
6	Level-1 Fault Alarm Return Delay Value	(0-3000.0)s	5.0	The reset delay value of alarm when the type is "self-reset".
7	Level-2 Fault Alarm Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset

No.	Items	Ranges	Defaults	Description	
8	Action	(0-4)	2	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off	
9	Set Value	(-40-200)°C	70	The threshold value of alarm action.	
10	Return Value	(-40-200)°C	50	The reset threshold value of alarm when alarm type is "self-reset".	
11	Action Delay Value	(0-3000.0)s	3.0	Alarm action delay.	
12	Return Delay Value	(0-3000.0)s	4.0	The reset delay value of alarm when the type is "self-reset".	
13	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset	
14	Action	(0-4)	3	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off	
15	Level-3 Fault Alarm	Set Value	(-40-200)°C	75	The threshold value of alarm action.
16		Return Value	(-40-200)°C	50	The reset threshold value of alarm when alarm type is "self-reset".
17		Action Delay Value	(-40-200)°C	5.0	Alarm action delay.
18		Return Delay Value	(0-3000.0)s	10.0	The reset delay value of alarm when the type is "self-reset".
Charging Temperature Low					
1	Level-1 Fault Alarm	Type	(0-2)	0	0: Disable 1: Lock 2: Self-reset
2		Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
3		Set Value	(-40-200)°C	5	The threshold value of alarm action.
4		Return Value	(-40-200)°C	10	The reset threshold value of alarm when alarm type is "self-reset".

No.	Items	Ranges	Defaults	Description	
5	Action Delay Value	(0-3000.0)s	6.0	Alarm action delay.	
6	Return Delay Value	(0-3000.0)s	6.0	The reset delay value of alarm when the type is "self-reset".	
7	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset	
8	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off	
9	Level-2 Fault Alarm Set Value	(-40-200)°C	5	The threshold value of alarm action.	
10	Return Value	(-40-200)°C	10	The reset threshold value of alarm when alarm type is "self-reset".	
11	Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.	
12	Return Delay Value	(0-3000.0)s	6.0	The reset delay value of alarm when the type is "self-reset".	
13	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset	
14	Action	(0-4)	3	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off	
15	Level-3 Fault Alarm Set Value	(-40-200)°C	0	The threshold value of alarm action.	
16	Return Value	(-40-200)°C	5	The reset threshold value of alarm when alarm type is "self-reset".	
17	Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.	
18	Return Delay Value	(0-3000.0)s	6.0	The reset delay value of alarm when the type is "self-reset".	
Discharging Temperature Low					
1	Level-1 Fault Alarm	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset

No.	Items	Ranges	Defaults	Description	
2	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off	
3	Set Value	(-40-200)°C	-5	The threshold value of alarm action.	
4	Return Value	(-40-200)°C	5	The reset threshold value of alarm when alarm type is "self-reset".	
5	Action Delay Value	(0-3000.0)s	5	Alarm action delay.	
6	Return Delay Value	(0-3000.0)s	5	The reset delay value of alarm when the type is "self-reset".	
7	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset	
8	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off	
9	Level-2 Fault Alarm	Set Value	(-40-200)°C	-15	The threshold value of alarm action.
10		Return Value	(-40-200)°C	-10	The reset threshold value of alarm when alarm type is "self-reset".
11		Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.
12		Return Delay Value	(0-3000.0)s	6.0	The reset delay value of alarm when the type is "self-reset".
13		Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
14	Level-3 Fault Alarm	Action	(0-4)	3	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
15		Set Value	(-40-200)°C	-25	The threshold value of alarm action.
16		Return Value	(-40-200)°C	-20	The reset threshold value of alarm when alarm type is "self-reset".
17		Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.

No.	Items	Ranges	Defaults	Description	
18	Return Delay Value	(0-3000.0)s	6.0	The reset delay value of alarm when the type is "self-reset".	
Temperature Difference Large					
1	Level-1 Fault Alarm	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
2		Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
3		Set Value	(0-200)°C	10	The threshold value of alarm action.
4		Return Value	(0-200)°C	5	The reset threshold value of alarm when alarm type is "self-reset".
5		Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.
6		Return Delay Value	(0-3000.0)s	6.0	The reset delay value of alarm when the type is "self-reset".
7	Level-2 Fault Alarm	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
8		Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
9		Set Value	(0-200)°C	10	The threshold value of alarm action.
10		Return Value	(0-200)°C	5	The reset threshold value of alarm when alarm type is "self-reset".
11		Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.
12	Return Delay Value	(0-3000.0)s	6.0	The reset delay value of alarm when the type is "self-reset".	
13	Level-3 Fault Alarm	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset

No.	Items	Ranges	Defaults	Description
14	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
15	Set Value	(0-200)°C	15	The threshold value of alarm action.
16	Return Value	(0-200)°C	10	The reset threshold value of alarm when alarm type is "self-reset".
17	Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.
18	Return Delay Value	(0-3000.0)s	6.0	The reset delay value of alarm when the type is "self-reset".
Temperature Rise Fast				
1	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
2	Action	(0-4)	1	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
3	Set Value	(0-200)°C /s	4	The threshold value of alarm action.
4	Return Value	(0-200)°C /s	1	The reset threshold value of alarm when alarm type is "self-reset".
5	Action Delay Value	(0-3000.0)s	10.0	Alarm action delay.
6	Return Delay Value	(0-3000.0)s	5.0	The reset delay value of alarm when the type is "self-reset".
7	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
8	Action	(0-4)	2	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
9	Set Value	(0-200)°C /s	6	The threshold value of alarm action.
10	Return Value	(0-200)°C /s	1	The reset threshold value of alarm when alarm type is "self-reset".

No.	Items	Ranges	Defaults	Description
11	Action Delay Value	(0-3000.0)s	10.0	Alarm action delay.
12	Return Delay Value	(0-3000.0)s	5.0	The reset delay value of alarm when the type is "self-reset".
13	Type	(0-2)	1	0: Disable 1: Lock 2: Self-reset
14	Action	(0-4)	3	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
15	Level-3 Fault Alarm Set Value	(0-200)°C /s	8	The threshold value of alarm action.
16	Return Value	(0-200)°C /s	1	The reset threshold value of alarm when alarm type is "self-reset".
17	Action Delay Value	(0-3000.0)s	10.0	Alarm action delay.
18	Return Delay Value	(0-3000.0)s	10.0	The reset delay value of alarm when the type is "self-reset".
Charge Overcurrent				
1	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
2	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
3	Level-1 Fault Alarm Set Value	(0-500.0)A	60.0	The threshold value of alarm action.
4	Return Value	(0-500.0)A	50.0	The reset threshold value of alarm when alarm type is "self-reset".
5	Action Delay Value	(0-3000.0)s	10.0	Alarm action delay.
6	Return Delay Value	(0-3000.0)s	6.0	The reset delay value of alarm when the type is "self-reset".
7	Level-2 Fault Alarm Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset

No.	Items	Ranges	Defaults	Description	
8	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off	
9	Set Value	(0-500.0)A	100.0	The threshold value of alarm action.	
10	Return Value	(0-500.0)A	60.0	The reset threshold value of alarm when alarm type is "self-reset".	
11	Action Delay Value	(0-3000.0)s	10.0	Alarm action delay.	
12	Return Delay Value	(0-3000.0)s	10.0	The reset delay value of alarm when the type is "self-reset".	
13	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset	
14	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off	
15	Level-3 Fault Alarm	Set Value	(0-500.0)A	120.0	The threshold value of alarm action.
16		Return Value	(0-500.0)A	80.0	The reset threshold value of alarm when alarm type is "self-reset".
17		Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.
18		Return Delay Value	(0-3000.0)s	10.0	The reset delay value of alarm when the type is "self-reset".
Discharge Overcurrent					
1	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset	
2	Level-1 Fault Alarm	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
3		Set Value	(0.0-500.0) A	120.0	The threshold value of alarm action.
4		Return Value	(0.0-500.0) A	50.0	The reset threshold value of alarm when alarm type is "self-reset".

No.	Items		Ranges	Defaults	Description
5		Action Delay Value	(0-3000.0) s	5.0	Alarm action delay.
6		Return Delay Value	(0-3000.0) s	6.0	The reset delay value of alarm when the type is "self-reset".
7	Level-2 Fault Alarm	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
8		Action	(0-4)	1	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
9		Set Value	(0-500.0)A	150.0	The threshold value of alarm action.
10		Return Value	(0-500.0)A	80.0	The reset threshold value of alarm when alarm type is "self-reset".
11		Action Delay Value	(0-3000.0)s	1.0	Alarm action delay.
12		Return Delay Value	(0-3000.0)s	4.0	The reset delay value of alarm when the type is "self-reset".
13	Level-3 Fault Alarm	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
14		Action	(0-4)	2	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
15		Set Value	(0-500.0)A	180.0	The threshold value of alarm action.
16		Return Value	(0-500.0)A	130.0	The reset threshold value of alarm when alarm type is "self-reset".
17		Action Delay Value	(0-3000.0)s	1.0	Alarm action delay.
18		Return Delay Value	(0-3000.0)s	4.0	The reset delay value of alarm when the type is "self-reset".
SOC Low					
1	Level-1 Fault Alarm	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset

No.	Items	Ranges	Defaults	Description	
2	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off	
3	Set Value	(0-100.0)%	20.0	The threshold value of alarm action.	
4	Return Value	(0-100.0)%	22.0	The reset threshold value of alarm when alarm type is "self-reset".	
5	Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.	
6	Return Delay Value	(0-3000.0)s	6.0	The reset delay value of alarm when the type is "self-reset".	
7	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset	
8	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off	
9	Level-2 Fault Alarm	Set Value	(0-100.0)%	10.0	The threshold value of alarm action.
10		Return Value	(0-100.0)%	12.0	The reset threshold value of alarm when alarm type is "self-reset".
11		Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.
12		Return Delay Value	(0-3000.0)s	6.0	The reset delay value of alarm when the type is "self-reset".
13		Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
14	Level-3 Fault Alarm	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
15		Set Value	(0-100.0)%	0	The threshold value of alarm action.
16		Return Value	(0-100.0)%	10.0	The reset threshold value of alarm when alarm type is "self-reset".
17		Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.

No.	Items	Ranges	Defaults	Description	
18	Return Delay Value	(0-3000.0)s	6.0	The reset delay value of alarm when the type is "self-reset".	
Insulation Resistance Low					
1	Level-1 Fault Alarm	Type	(0-2)	2 0: Disable 1: Lock 2: Self-reset	
2		Action	(0-4)	0 0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off	
3		Set Value	(0-10000)Ω/V	1000	The threshold value of alarm action.
4		Return Value	(0-10000)Ω/V	2000	The reset threshold value of alarm when alarm type is "self-reset".
5		Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.
6		Return Delay Value	(0-3000.0)s	6.0	The reset delay value of alarm when the type is "self-reset".
7	Level-2 Fault Alarm	Type	(0-2)	2 0: Disable 1: Lock 2: Self-reset	
8		Action	(0-4)	0 0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off	
9		Set Value	(0-10000)Ω/V	500	The threshold value of alarm action.
10		Return Value	(0-10000)Ω/V	2000	The reset threshold value of alarm when alarm type is "self-reset".
11		Action Delay Value	(0-3000.0)s	1.0	Alarm action delay.
12		Return Delay Value	(0-3000.0)s	2.0	The reset delay value of alarm when the type is "self-reset".
13	Level-3 Fault Alarm	Type	(0-2)	1 0: Disable 1: Lock 2: Self-reset	

No.	Items	Ranges	Defaults	Description
14	Action	(0-4)	3	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
15	Set Value	(0-10000)Ω/V	200	The threshold value of alarm action.
16	Return Value	(0-10000)Ω/V	500	The reset threshold value of alarm when alarm type is "self-reset".
17	Action Delay Value	(0-3000.0)s	1.0	Alarm action delay.
18	Return Delay Value	(0-3000.0)s	10.0	The reset delay value of alarm when the type is "self-reset".
Cell Sampling Fault				
1	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
2	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
3	Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.
4	Return Delay Value	(0-3000.0)s	5.0	The reset delay value of alarm when the type is "self-reset".
5	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
6	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
7	Action Delay Value	(0-3000.0)s	10.0	Alarm action delay.
8	Return Delay Value	(0-3000.0)s	10.0	The reset delay value of alarm when the type is "self-reset".

No.	Items	Ranges	Defaults	Description	
9	Level-3 Fault Alarm	Type	(0-2)	1	0: Disable 1: Lock 2: Self-reset
10		Action	(0-4)	4	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
11		Action Delay Value	(0-3000.0)s	30.0	Alarm action delay.
12		Return Delay Value	(0-3000.0)s	30.0	The reset delay value of alarm when the type is "self-reset".
Temperature Sampling Fault					
1	Level-1 Fault Alarm	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
2		Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
3		Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.
4		Return Delay Value	(0-3000.0)s	5.0	The reset delay value of alarm when the type is "self-reset".
5	Level-2 Fault Alarm	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
6		Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
7		Action Delay Value	(0-3000.0)s	10.0	Alarm action delay.
8		Return Delay Value	(0-3000.0)s	10.0	The reset delay value of alarm when the type is "self-reset".

No.	Items	Ranges	Defaults	Description	
9	Level-3 Fault Alarm	Type	(0-2)	1	0: Disable 1: Lock 2: Self-reset
10		Action	(0-4)	4	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
11		Action Delay Value	(0-3000.0)s	30.0	Alarm action delay.
12		Return Delay Value	(0-3000.0)s	30.0	The reset delay value of alarm when the type is "self-reset".
Current Sampling Fault					
1	Level-1 Fault Alarm	Type	(0-2)	0	0: Disable 1: Lock 2: Self-reset
2		Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
3		Action Delay Value	(0-3000.0)s	30.0	Alarm action delay.
4		Return Delay Value	(0-3000.0)s	30.0	The reset delay value of alarm when the type is "self-reset".
5	Level-2 Fault Alarm	Type	(0-2)	0	0: Disable 1: Lock 2: Self-reset
6		Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
7		Action Delay Value	(0-3000.0)s	30.0	Alarm action delay.
8		Return Delay Value	(0-3000.0)s	30.0	The reset delay value of alarm when the type is "self-reset".

No.	Items	Ranges	Defaults	Description	
9	Level-3 Fault Alarm	Type	(0-2)	1	0: Disable 1: Lock 2: Self-reset
10		Action	(0-4)	4	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
11		Action Delay Value	(0-3000.0)s	10.0	Alarm action delay.
12		Return Delay Value	(0-3000.0)s	10.0	The reset delay value of alarm when the type is "self-reset".
High Voltage Sampling Fault					
1	Level-1 Fault Alarm	Type	(0-2)	0	0: Disable 1: Lock 2: Self-reset
2		Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
3		Action Delay Value	(0-3000.0)s	30.0	Alarm action delay.
4		Return Delay Value	(0-3000.0)s	30.0	The reset delay value of alarm when the type is "self-reset".
5	Level-2 Fault Alarm	Type	(0-2)	0	0: Disable 1: Lock 2: Self-reset
6		Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
7		Action Delay Value	(0-3000.0)s	30.0	Alarm action delay.
8		Return Delay Value	(0-3000.0)s	30.0	The reset delay value of alarm when the type is "self-reset".

No.	Items	Ranges	Defaults	Description	
9	Level-3 Fault Alarm	Type	(0-2)	1	0: Disable 1: Lock 2: Self-reset
10		Action	(0-4)	4	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
11		Action Delay Value	(0-3000.0)s	10.0	Alarm action delay.
12		Return Delay Value	(0-3000.0)s	10.0	The reset delay value of alarm when the type is "self-reset".
Master-slave Communication Failure					
1	Level-1 Fault Alarm	Type	(0-2)	0	0: Disable 1: Lock 2: Self-reset
2		Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
3		Action Delay Value	(0-3000.0)s	30.0	Alarm action delay.
4		Return Delay Value	(0-3000.0)s	30.0	The reset delay value of alarm when the type is "self-reset".
5	Level-2 Fault Alarm	Type	(0-2)	0	0: Disable 1: Lock 2: Self-reset
6		Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
7		Action Delay Value	(0-3000.0)s	30.0	Alarm action delay.
8		Return Delay Value	(0-3000.0)s	30.0	The reset delay value of alarm when the type is "self-reset".

No.	Items	Ranges	Defaults	Description	
9	Level-3 Fault Alarm	Type	(0-2)	0 1: Lock 2: Self-reset	
10		Action	(0-4)	0 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off	
11		Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.
12		Return Delay Value	(0-3000.0)s	5.0	The reset delay value of alarm when the type is "self-reset".
Master Positive Relay Bonding					
1	Level-3 Fault Alarm	Type	(0-2)	1 0: Disable 1: Lock 2: Self-reset	
2		Action	(0-4)	3 0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off	
3		Action Delay Value	(0-3000.0) s	1.0	Alarm action delay.
4		Return Delay Value	(0-3000.0) s	3000.0	The reset delay value of alarm when the type is "self-reset".
Master Negative Relay Bonding					
1	Level-3 Fault Alarm	Type	(0-2)	0 1: Lock 2: Self-reset	
2		Action	(0-4)	0 0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off	
3		Action Delay Value	(0-3000.0) s	0	Alarm action delay.
4		Return Delay Value	(0-3000.0) s	0	The reset delay value of alarm when the type is "self-reset".
Max. Charging Current Over Limit					

No.	Items	Ranges	Defaults	Description	
1	Level-1 Fault Alarm	Type	(0-2)	0 1: Lock 2: Self-reset	
2		Action	(0-4)	0 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off	
3		Set Value	(50.0-200.0)%	120.0	Threshold value of alarm action.
4		Return Value	(50.0-200.0)%	100.0	The reset threshold value of alarm when the type is "self-reset".
5		Action Delay Value	(0-3000.0) s	5.0	Alarm action delay.
6		Return Delay Value	(0-3000.0) s	6.0	The reset delay value of alarm when the type is "self-reset".
7	Level-2 Fault Alarm	Type	(0-2)	0 1: Lock 2: Self-reset	
8		Action	(0-4)	0 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off	
9		Set Value	(50.0-200.0)%	120.0	Threshold value of alarm action.
10		Return Value	(50.0-200.0)%	100.0	The reset threshold value of alarm when the type is "self-reset".
11		Action Delay Value	(0-3000.0) s	5.0	Alarm action delay.
12		Return Delay Value	(0-3000.0) s	6.0	The reset delay value of alarm when the type is "self-reset".
13	Level-3 Fault Alarm	Type	(0-2)	1 1: Lock 2: Self-reset	
14		Action	(0-4)	4 0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off	
15		Set Value	(50.0-200.0)%	120.0	Threshold value of alarm action.
16		Return Value	(50.0-200.0)%	100.0	The reset threshold value of alarm when the type is "self-reset".

No.	Items	Ranges	Defaults	Description	
17	Action Delay Value	(0-3000.0) s	5.0	Alarm action delay.	
18	Return Delay Value	(0-3000.0) s	6.0	The reset delay value of alarm when the type is "self-reset".	
Max. Discharging Current Over Limit					
1	Level-1 Fault Alarm	Type	(0-2)	0	0: Disable 1: Lock 2: Self-reset
2		Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
3		Set Value	(50.0-200.0)%	120.0	Threshold value of alarm action.
4		Return Value	(50.0-200.0)%	100.0	The reset threshold value of alarm when the type is "self-reset".
5		Action Delay Value	(0-3000.0) s	5.0	Alarm action delay.
6		Return Delay Value	(0-3000.0) s	6.0	The reset delay value of alarm when the type is "self-reset".
7	Level-2 Fault Alarm	Type	(0-2)	0	0: Disable 1: Lock 2: Self-reset
8		Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
9		Set Value	(50.0-200.0)%	120.0	Threshold value of alarm action.
10		Return Value	(50.0-200.0)%	100.0	The reset threshold value of alarm when the type is "self-reset".
11		Action Delay Value	(0-3000.0) s	5.0	Alarm action delay.
12		Return Delay Value	(0-3000.0) s	6.0	The reset delay value of alarm when the type is "self-reset".
13	Level-3 Fault Alarm	Type	(0-2)	1	0: Disable 1: Lock 2: Self-reset

No.	Items	Ranges	Defaults	Description
14	Action	(0-4)	4	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
15	Set Value	(50.0-200.0)%	120.0	Threshold value of alarm action.
16	Return Value	(50.0-200.0)%	100.0	The reset threshold value of alarm when the type is "self-reset".
17	Action Delay Value	(0-3000.0) s	5.0	Alarm action delay.
18	Return Delay Value	(0-3000.0) s	6.0	The reset delay value of alarm when the type is "self-reset".
Environmental Temperature High				
1	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
2	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
3	Set Value	(-40-200)°C	65	Threshold value of alarm action.
4	Return Value	(-40-200)°C	45	The reset threshold value of alarm when the type is "self-reset".
5	Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.
6	Return Delay Value	(0-3000.0)s	5.0	The reset delay value of alarm when the type is "self-reset".
7	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
8	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
9	Set Value	(-40-200)°C	70	Threshold value of alarm action.
10	Return Value	(-40-200)°C	50	The reset threshold value of alarm when the type is "self-reset".

No.	Items	Ranges	Defaults	Description
11	Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.
12	Return Delay Value	(0-3000.0)s	5.0	The reset delay value of alarm when the type is "self-reset".
13	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
14	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
15	Level-3 Fault Alarm Set Value	(-40-200)°C	75	Threshold value of alarm action.
16	Level-3 Fault Alarm Return Value	(-40-200)°C	50	The reset threshold value of alarm when the type is "self-reset".
17	Level-3 Fault Alarm Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.
18	Level-3 Fault Alarm Return Delay Value	(0-3000.0)s	10.0	The reset delay value of alarm when the type is "self-reset".
Connector Temperature High				
1	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
2	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
3	Level-1 Fault Alarm Set Value	(-40-200)°C	65	Threshold value of alarm action.
4	Level-1 Fault Alarm Return Value	(-40-200)°C	45	The reset threshold value of alarm when the type is "self-reset".
5	Level-1 Fault Alarm Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.
6	Level-1 Fault Alarm Return Delay Value	(0-3000.0)s	5.0	The reset delay value of alarm when the type is "self-reset".
7	Level-2 Fault Alarm Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset

No.	Items	Ranges	Defaults	Description	
8	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off	
9	Set Value	(-40-200)°C	70	Alarm action delay.	
10	Return Value	(-40-200)°C	50	The reset delay value of alarm when the type is "self-reset".	
11	Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.	
12	Return Delay Value	(0-3000.0)s	5.0	The reset delay value of alarm when the type is "self-reset".	
13	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset	
14	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off	
15	Level-3 Fault Alarm	Set Value	(-40-200)°C	70	Alarm action delay.
16		Return Value	(-40-200)°C	50	The reset delay value of alarm when the type is "self-reset".
17		Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.
18		Return Delay Value	(0-3000.0)s	10.0	The reset delay value of alarm when the type is "self-reset".
Connector Temperature Sensor Sampling Fault					
1	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset	
2	Level-1 Fault Alarm	Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
3		Action Delay Value	(0-3000.0)s	5.0	Alarm action delay.

No.	Items	Ranges	Defaults	Description
4	Return Delay Value	(0-3000.0)s	5.0	The reset delay value of alarm when the type is "self-reset".
5	Type	(0-2)	2	0: Disable 1: Lock 2: Self-reset
6	Level-2 Fault Alarm Action	(0-4)	0	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
7	Level-2 Fault Alarm Action Delay Value	(0-3000.0)s	10.0	Alarm action delay.
8	Level-2 Fault Alarm Return Delay Value	(0-3000.0)s	10.0	The reset delay value of alarm when the type is "self-reset".
9	Type	(0-2)	1	0: Disable 1: Lock 2: Self-reset
10	Level-3 Fault Alarm Action	(0-4)	4	0: Alarm 1: Level-1 current drop (drop to 50%) 2: Level-2 current drop (drop to 20%) 3: Level-3 current drop (drop to 0%) 4: High voltage power-off
11	Level-3 Fault Alarm Action Delay Value	(0-3000.0)s	30.0	Alarm action delay.
12	Level-3 Fault Alarm Return Delay Value	(0-3000.0)s	30.0	The reset delay value of alarm when the type is "self-reset".

7.2 DEFINABLE CONTENTS OF PROGRAMMABLE OUTPUT PORTS 1~7

Table 9 - Definable Contents of Programmable Output Port 1~7

No.	Items	Function Description
0	Not Used	Not Used.
1	Master Positive Relay Output	BMS outputs between the high voltage power on and power off.
2	Pre-charge Output	BMS outputs in pre-charge stage.
3	Module Power Control	BCU outputs after power on.
4	Alarm Indicator Output	Output when the module alarms, the output logic is consistent with the alarm indicator on the module panel.
5	Reserved	
6	Reserved	
7	Master Negative Output	Master negative relay outputs.
8	Running Output	Output when BCU module is power on.
9	Remote Control Output	When it is configured this function , it can output by PC software or the control output port of HMU8-BMS display module.
10	Charging Indication	
11	Discharging Indication	
12	Level-1 Fault Alarm	
13	Level-2 Fault Alarm	
14	Level-3 Fault Alarm	
15	Reserved	
16	Reserved	
17	Reserved	
18	Reserved	
19	Reserved	
20	Reserved	

7.3 DEFINABLE CONTENTS OF DIGITAL INPUT PORTS 1/2/4

Table 10 - Definable Contents of Digital Input Port 1~2 (Active when all connect to INPUT_COM)

No.	Items	Function Description
0	Not Used	
1	Isolating Switch Closing Status Input	It is used for the isolating switch with closing auxiliary contacts to realize the fast power failure of BCU module. When this input port is active, if the closing auxiliary contact is disconnected, the 24V power control output is disconnected.
2	Master Negative Relay Closing Status Input	When output port is configured as "Master Negative Output", whether the master negative relay is bond could be detected.
3~10	Reserved	

8 PARAMETER SETTING

The configured parameter of module can be configured by PC software or HMU8-BMS. When enter the password and input "01234" to set all the parameter items. When the default password (01234) is changed, setting parameter by PC software need inputting the same password as the controller. When there are more items need to be set (i.e Voltage and Current Calibration), please contact with manufacturer when forgetting the password.

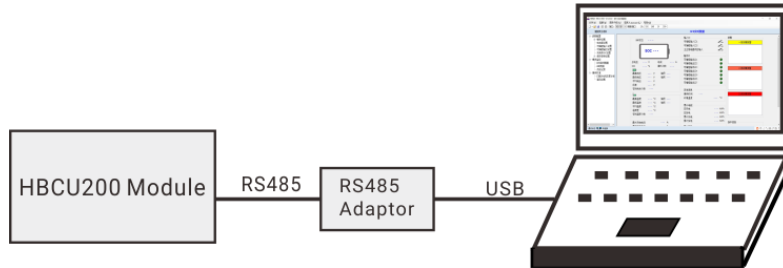


Fig.2 – PC Connection Diagram

Notes:

- a) The high threshold value must be greater than the low threshold value, for example, the overvoltage threshold value must be greater than the under voltage threshold value, otherwise, both overvoltage and under voltage will occur.
- b) When setting the self-reset alarm, please set the return value correctly, otherwise, the normal alarm will not occur. If the threshold value is set too high, the return value should be less than the set value, and if the threshold value is set too low, the return value should be greater than the set value
- c) The Aux. input ports cannot be set as the same item, otherwise the correct function will not occur, while the Aux. output ports can be set as the same items.

9 CASE DIMENSIONS AND PANEL CUTOUT

Unit: mm

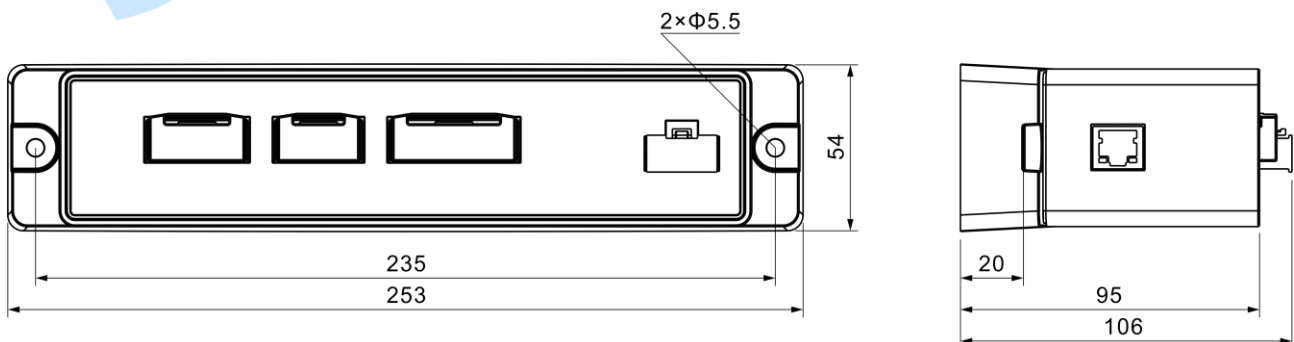


Fig.3 – Overall Dimensions and Panel Cutout

10 ETHERNET INTERFACE

ETHERNET interface is used for monitoring of battery cluster to realized the network client connection.

▲Note: After changing the network parameters (such as IP address and subnet mask), the new parameter will be active only after the controller is power off and power on again.

10.1 NETWORK CLIENT CONNECTION

BCU module acts as the server , and the users monitor the controller by using TCP MODBUS protocol through the network interface.

The steps are as follows:

- Set the IP address and subnet mask of the controller. The IP address should be in the same network segment and different from the IP address used by the monitoring device (such as PC), for instance, the If the IP address of the monitoring device is 192.168.0.16, the IP address of the controller can be set as 192.168.0.18 and the subnet mask is 255.255.255.0;
- Connect the control. The monitoring device can be directly connected with the controller by using the network cable or through the switch;
- The monitoring device uses TCP MODBUS protocol to communicate with controller.

▲ Note: The parameter of controller can be set by this connection mode. The test software provided by our company can be connected in this way, and the communication protocol can be obtained from relevant staff from our company.

10.2 DESCRIPTION OF NETWORK CONNECTION

Table 11-Definition of Controller Network Interface

No.	Definition	Description
1	TX+	Tranceive Data+(Sending Data+)
2	TX-	Tranceive Data- (Sending Data -)
3	RX+	Receive Data+ (Receiving Data+)
4	NC	
5	NC	
6	RX-	Receive Data- (Receiving Data-)
7	NC	
8	NC	

- The controller is directly connected to PC only by using a network cable:

Crossing wire is used for this connection method;

▲Note: For example, the network interface of PC has the automatic flipping function of sending and receiving, parallel wire can also be used.

- The controller is connected to PC by switch (or router):

Parallel wire is used for this connection method;

▲Note: For example, the network interface of switch (or router) has the automatic flipping function of sending and receiving, crossing wire can also be used.

11 SYSTEM TYPICAL APPLICATION DIAGRAM

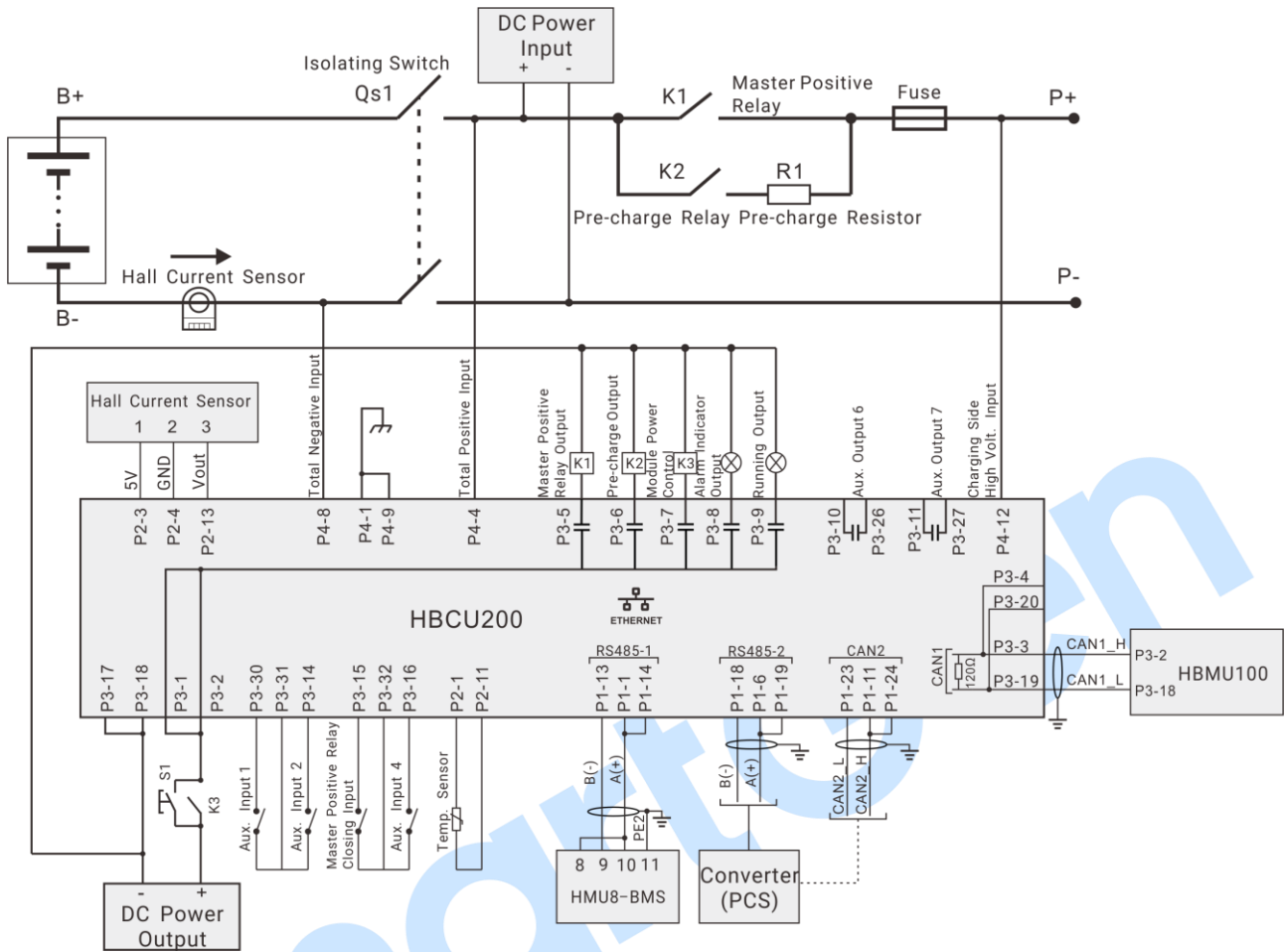


Fig.4 – HBCU200 Application Diagram

12 COMMISSIONING

It is recommended to do the following checks before the system is operating:

- Check all the wirings are correct and the diameters are suitable;
- Test a single battery module to ensure that the voltage and temperature data of the cell are within the normal range;
- After the system is power on, check the insulation resistance value of the total positive and negative of the battery cluster to ground is within the normal range;
- Conduct a full charge/discharge test on the battery cluster to ensure that the battery cluster can stop charging and discharging when it full charged normally;

Please contact our service personnel in time if there is any question.

13 TROUBLESHOOTING

Table 12 - Troubleshooting

Fault Symptom	Possible Measurement
Controller no response when power on	Check controller wirings; Check if there is voltage output of power supply module;
RS485 communication failure	Check the wirings; Check if the settings of COM port are correct; Check the communication port of PC is damaged or not; A 120Ω resistor is recommended to connect between A&B of RS485.
CAN communication failure	Check the wirings; Check whether the wirings between CANH and CANL are reversely connected; A 120Ω resistor is recommended to connect between CANH and CANL.