1、Physical interface and communication mode

1.1 physical interface

The physical interface shall adopt the serial communication port and the standard RS232 mode. The information transmission mode shall be asynchronous, with the start bit of 1, data bit of 8, stop bit of 1 and no check bit. The data transmission rate is 9600bps.

1.2 communication mode

The communication mode adopts master-slave response mode, PC software or monitoring equipment as the host to send communication command, and BMS as the slave to return response information. The host sends the communication command. If the response information of the slave is not received within 500ms or the response information received is wrong, the communication process is considered as failure.

2、 Basic format of communication protocol

2.1 Basic format of communication protocol

Table A.1 Frame structure description

NO.	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Name	SOI	VER	ADR	CID1	CID2	LENGTH	INFO	CHKSUM	EOI

2.2 Name comment

Table A.2

NO.	Name	Comment	Description
1	SOI	START OF INFORMATION	(7EH)
2	VER	Protocol version (Ex.V2.5)	(25H)
3	ADR	Address Number (0—15)	
4	CID1	Device descriptor	
5	CID2	Command information: Control identification code Response information: Return identifier RTN	
6	LENGTH	INFO Byte length (Include LENID and LCHKSUM)	
7	INFO	Command Information: Control identification code COMMAND_INFO Response information: Answer data information DATA_INFO	
8	CHKSUM	Check character	
9	EOI	End character (END OF INFORMATION)	CR (0DH)

Remarks: VER-Indicates the communication protocol version, fixed use v2.5, i.e. 25h。

ADR- Indicates the battery pack address. The BMS uses the four digit dial switch to set the address. The address range is 0-15。

2.3 Data Format

2.3.1 Basic Data Format:

SOI and EOI are interpreted and transmitted in hexadecimal, Other items are interpreted in hexadecimal, and transmitted in hexadecimal ASCII mode. Each byte is represented by two ASCII codes. For example, when cid2 = 4bh, 34h (ASCII code of '4') and 42h (ASCII code of 'B') are transmitted during transmission.

2.3.2 LENGTH

Table A.3 LENGTH

High byte				Low byte											
LCHKSUM				LENID											
D15	D14	D13	D12	D11	D10	D9	D8	D7	D6	D5	D4	D3	D2	D1	D0

2.3.3 LED

Lenid indicates the number of ASCII bytes of info item. When lenid = 0, info is empty, that is, there is no such item. Since lenid has only 12bit, the maximum packet size is required to be no more than 4095 bytes.

2.3.4 LCHKSUM

Calculation of check code LCHKSUM: D11D10D9D8+D7D6D5D4+D3D2D1D0

After summing, the

remainder of module 16 is

inversely increased by

Example:

The number of ASCII bytes in info is 18, LENID=0000 0001 0010B。

D11D10D9D8+D7D6D5D4+D3D2D1D0=0000B+0001B+0010B=0011B, MOD 16 The remainder is 0011B, 0011B Add 1 in reverse1101B, LCHKSUM = 1101B。

LENGTH = 1101 0000 0001 0010B = D012H。

2.4 CHKSUM

Except SOI, EOI and chksum, chksum is calculated by summing up other characters with ASCII code value, The remainder of the value module 65536 is inversely increased by 1.

Example:

The received or sent string is: "~1203400356ABCEFEFC72\R"

("~" = SOI, "CR" = EOI),

Then the last 5 characters "FC72\R" Where FC72

is chksum, the calculation method is:

'1' + '2' + '0' + …+ 'F' + 'E' =31H+32H+30H+…+46H+45H=038EH

The remainder of 038eh module 65536 is 038eh, and the reverse addition of

038eh is fc72h.

2.5 DATA_INFO

The transmission of analog data adopts two forms: fixed-point number and floating-

point number, one of which can be selected. This protocol adopts fixed-point data transmission.1) Integer format (INTEGER, 2 bytes)

signed integer: −32768−+32767

unsigned integer:0−+65535

The transmission sequence is from high byte to low byte.

2) Unsigned character type (CHAR, 1 byte, 0−255)

Table A.4

NO.	content	Data Type	Unit
1	Cells Voltage	Unsigned int	mV

2	temperature	Unsinged int	0.1K The temperature is calculated as follows: example: 25.5℃ = 25.5 * 10 + 2730 = 2985 (0.1K) -12.4℃ = -12.4 * 10 + 2730 = 2606 (0.1K)
3	Total voltage	Unsigned int	mV
4	Total Current	Singed int	10mA
5	Battery pack capacity	Unsigned int	10mAH (Including residual capacity, full capacity and design capacity)

2.6 date and time

Table A.5 The "Data" and "Time" formats are shown in the table below:

Name	Ranger	DataType	Description
Year	(0—99)	CHAR	Decimal
month	(1—12)	CHAR	Decimal
Date	(1—31)	CHAR	Decimal
Hour	(0—23)	CHAR	Decimal
Minute	(0—59)	CHAR	Decimal
Second	(0—59)	CHAR	Decimal

Year=Year+2000

3、 Code allocation

Table A.6

NO.	content	CID1	Description
1	Lithium iron battery	46H	(Applicable to ternary lithium)

3.1 command information

code allocation table

Table A.7

NO.	content	CID2	Description
1	get the number of packs	90H	
2	Get pack analog quantity	42H	

3	Get pack alarm	44H	
4	control command	99H	
5	Get software version information	C1H	custom
6	Get product information	C2H	custom
7	Charge MOSFET Control	9AH	custom
8	Discharge MOSFET Control	9BH	custom
9	Get BMS time date	B1H	custom
10	Set BMS time date	B2H	custom
11	Get pack capacity information	A6H	custom

Table A.8

NO.	content	RTN	Description
1	Normal	00H	
2	Reserve	01H	
3	CHKSUM Error	02H	
4	LCHKSUM Error	03H	
5	CID2 invalid	04H	
6	Reserve	05H	
7	Reserve	06H	
8	Operation or write error	09H	custom

4、Command description

4.1 get the number of packs

Table A.9 Command information

NO.	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	90H	LENGTH		CHKSUM	EOI

Notes：LENID = 00H。

If the BMS address setting is not equal to 1, the response to the number of packs is fixed to 1. If the BMS address is set to 1, combined with RS485 master-slave mode, the number of packs depends on the actual number of battery packs

Table A.10 Response information

NO.	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	RTN	LENGTH	DATAINFO	CHKSUM	EOI

Note: LENID = 02H, DATAINFO = PACK Number。

4.2 Get pack analog quantity

Table A.11 Command information

NO.	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	42H	LENGTH		CHKSUM	EOI

Notes: LENID = 02H。

INFO 1Byte , COMMAND: COMMAND =

FFH, Get pack analog quantity。

COMMAND = 01H, Get pack1 analog

quantity。

……

COMMAND = 0FH, Get pack15 analog

quantity。

Notes: For RS232 interface with BMS address set as 1, multiple pack data can be obtained by adopting master-slave structure in combination with RS485; if BMS address is not equal to 1 or RS485 is non master-slave structure, only analog quantity of this pack can be obtained, and command can be set as 01h or FFH.

Table A.12 Response information

NO.	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	RTN	LENGTH	DATAINFO	CHKSUM	EOI

Notes: DATAINFO consists of INFOFLAG and DATAI, DATAI See table A.13 for details

INFOFLAG =00H Or 01H。

Table A.13

NO.	content	DATAI Bytes	Description
1	* PACK Number M / COMMAND Value	1	
2	PACK 1		A.14
3	……	……	
M + 1	PACK M		A.14

* When the command in the command is FFH, the response information is the number of packs; if it is other values, the response information is the number of commands。

Table A.14

NO.	content	DATAI Bytes	Description
1	Total Cells M	1	
2	Cells 1 Voltage	2	
3	Cells 2 Voltage	2	
4	……	……	

M + 1	Cells M Voltage	2	
M + 2	Number of temperature N	1	
M + 3	temperature 1	2	
M + 4	temperature 2	2	
M + 5	……	……	
M + N + 2	temperature N	2	
M + N + 3	PACK Current	2	Charge is positive, discharge is negative, unit: 10mA, complement means
M + N + 4	PACK Total Voltage	2	
M + N + 5	PACK Remaining capacity	2	Unit: 10mAH
M + N + 6	User defined number P = 3	1	
M + N + 7	PACK Full capacity	2	Unit: 10mAH
M + N + 8	Number of charge discharge cycles	2	
M + N + 9	PACK Design capacity	2	Unit: 10mAH

4.3 Get the volume of pack alarms

Table A.15 Command information

NO.	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	44H	LENGTH		CHKSUM	EOI

Notes: LENID = 02H。

INFO 1Byte = COMMAND: COMMAND =

FFH, Get all pack alarms。COMMAND =

01H, Get all pack1 alarms。

……

COMMAND = 0FH, Get all pack15 alarms。

Notes:For RS232 interface with BMS address set as 1, multiple pack data can be obtained by adopting master-slave structure in combination with RS485; if BMS address is not equal to 1 or RS485 is not master-slave structure, only alarm amount of this pack can be obtained, and command can be set as 01h or FFH

Table A.16 Response information

NO.	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	RTN	LENGTH	DATAINFO	CHKSUM	EOI

Note: Datainfo consists of infoflag and warnstate. See tableA.17 for details of warnstate。

INFOFLAG =00H Or 01H。

Table A.17

NO.	Content	DATAI Bytes	Description
1	* PACK Nunber M / COMMAND Value	1	
2	PACK 1 Alarm nformation		A.18
3	……	……	
M + 1	PACK M Alarm nformation		A.18

* When the command in the command is FFH, the response information is the number of packs; if it is other values, the response information is the value of command.

Table A.18

NO.	Content	DATAI Bytes	Description
1	Number of cell M	1	
2	Battery cells 1 告警	1	
3	Battery cells 2 告警	1	
4	……	……	
M + 1	Battery cells voltage M 告警	1	
M + 2	Number of monitoring temperature N	1	
M + 3	Temperature 1 Alarm	1	
M + 4	Temperature 2 Alarm	1	
M + 5	……	……	
M + N + 2	Temperature N Alarm	1	
M + N + 3	PACK Charging current alarm	1	
M + N + 4	PACK Total voltage alarm	1	
M + N + 5	PACK Discharge current alarm	1	
M + N + 6	Protection status 1	1	A.19
M + N + 7	Protection status 2	1	A.20
M + N + 8	Indication status	1	A.21
M + N + 9	Control status	1	A.22
M + N + 10	Fault status	1	A.23
M + N + 11	Equilibrium state 1	1	Battery Cells :1-8
M + N + 12	Equilibrium state 2	1	Battery Cells :9-16
M + N + 13	Alarm state 1	1	A.24
M + N + 14	Alarm state 2	1	A.25

Alarm Byte：

—— 00H：Normal；

—— 01H：Below lower limit；

—— 02H: Above upper limit;

—— 80H～EFH: User defined;

—— F0H: Other faults。

Table A.19

BIT	Content	Description
7	Reserve	
6	short circuit	1: Protection 0: Normal
5	Discharge overcurrent protection	1: Protection 0: Normal
4	Charging overcurrent protection	1: Protection 0: Normal
3	Total undervoltage protection	1: Protection 0: Normal
2	Total pressure over-voltage protection	1: Protection 0: Normal
1	Battery undervoltage protection	1: Protection 0: Normal
0	Battery over-voltage protection	1: Protection 0: Normal

Table A.20

BIT	Content	Description
7	Fully	1: Protection 0: Normal
6	Environmental low temperature protection	1: Protection 0: Normal
5	Environmental high temperature protection	1: Protection 0: Normal
4	MOS high temperature protection	1: Protection 0: Normal
3	Low temperature protection of battery discharge	1: Protection 0: Normal
2	Low temperature protection for battery charging	1: Protection 0: Normal
1	Battery discharge high temperature protection	1: Protection 0: Normal
0	Battery charging high temperature protection	1: Protection 0: Normal

Table A.21

BIT	Content	Description
7	Heating film	1: ON 0: OFF
6	Reserve	
5	ACin	1: Effective 0: Normal
4	Reverse connection of charger	1: Reverse connection 0: Normal
3	Use pack power indication	1: Pack 0: Reserve

2	DFET	1：ON	0：OFF
1	* CFET	1：ON	0：OFF

0	Current limiting	1: ON 0: OFF

* Either the charging MOS or the current limiting circuit is in the open state, which is displayed as on; both are in the closed state, which is displayed as off.

Table A.22

BIT	Content	Description
7	Reserve	
6	Reserve	
5	LED alarm function	1: Enable 0: Disenable
4	Charging current limiting function	1: Enable 0: Disenable
3	Current limiting gear	1: Low gear 0: Hight gear
2	Reserve	
1	Reserve	
0	Buzzer alarm function	1: Enable 0: Disenable

Table A.23

BIT	Content	Description
7	Reserve	
6	Reserve	
5	Sampling failure	1: Failure 0: Normal
4	Battery Cells failure	1: Failure 0: Normal
3	Reserve	
2	Temperature sensor failure	1: Failure 0: Normal
1	Discharge MOS failure	1: Failure 0: Normal
0	Charge MOS failure	1: Failure 0: Normal

Table A.24

BIT	Content	Description
7	Reserve	
6	Reserve	
5	Discharge overcurrent alarm	1: Alarm 0: Normal
4	Charge overcurrent alarm	1: Alarm 0: Normal
3	Total voltage under voltage alarm	1: Alarm 0: Normal
2	Total voltage overvoltage alarm	1: Alarm 0: Normal
1	Battery voltage under voltage alarm	1: Alarm 0: Normal

0	Battery voltage overvoltage alarm	1: Alarm 0: Normal

Table A.25

BIT	Content	Description
7	Low power alarm	1: Alarm 0: Normal
6	MOS high temperature alarm	1: Alarm 0: Normal
5	Ambient low temperature alarm	1: Alarm 0: Normal
4	Ambient high temperature alarm	1: Alarm 0: Normal
3	Battery discharge low temperature alarm	1: Alarm 0: Normal
2	Battery charging low temperature alarm	1: Alarm 0: Normal
1	Battery discharge high temperature alarm	1: Alarm 0: Normal
0	Battery charging high temperature alarm	1: Alarm 0: Normal

4.4 Control command

TableA.26

NO.	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	99H	LENGTH		CHKSUM	EOI

Notes: LENID = 02H。

INFO =1 Byte , COMMAND:
COMMAND = 06H, LED alarm function.
COMMAND = 07H, Disabled alarm function.
COMMAND = 08H, Select the current limiting high gear.
COMMAND = 09H, Select the current limiting low gear.
COMMAND = 0AH, Enable current limiting function.
COMMAND = 0BH, Disabled Current limiting function.
COMMAND = 0CH, Disabled Buzzer alarm function
COMMAND = 0DH, Enabled Buzzer alarm function
When there is no function, the operation prompt fails.

Table A.27 response information

NO.	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	RTN	LENGTH	DATAINFO	CHKSUM	EOI

Note: LENID = 04H。

DATAINFO = COMMAND See table for control status A.22。

4.4 Get software version information

Table A.28

NO.	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	C1H	LENGTH		CHKSUM	EOI

Notes: LENID = 00H。

Table A.29 response information

NO.	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	RTN	LENGTH	DATAINFO	CHKSUM	EOI

Note: LENID = 28H。

DATAINFO Is the software version information, 20 bytes, Space complement of less than 20 characters。

4.5 Get product information

Table A.30

NO.	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	C2H	LENGTH		CHKSUM	EOI

Notes: LENID = 00H。

Table A.31 response information

NO.	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	RTN	LENGTH	DATAINFO	CHKSUM	EOI

Note: LENID = 50H Or 28H。

DATAINFO Product information, including BMS production information (20 characters) and pack production information (20 characters). If lenid = 28h, there is no pack production information.

4.6 Charging MOSFET control

Table A.32

NO.	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	9AH	LENGTH		CHKSUM	EOI

Note: LENID = 02H。

INFO 1byte , COMMAND:

COMMAND = 00H, Turn on the charging MOSFET.

COMMAND = 01H, Turn off the charging MOSFET.

Notes: If the discharging MOSFET is in forced off state or discharging state, the charging MOSFET cannot be switched off.

Table A.33 response information

NO.	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	RTN	LENGTH	DATAINFO	CHKSUM	EOI

Note: LENID = 02H。

DATAINFO 1byte, See table for indication status A.21。

When the RTN response is 00h, it means the operation is successful; other means the operation is failed.

4.7 Discharge MOSFET control

Table A.34

NO.	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	9BH	LENGTH		CHKSUM	EOI

Note: LENID = 02H。
INFO 1Byte, COMMAND:
COMMAND = 00H, Turn on Discharge MOSFET。COMMAND = 01H, Turn off Discharge MOSFET。
Notes: If the charging MOSFET is forced off or charging, the switching off and discharging MOSFET cannot be operated。

Table A.35 response information

NO.	1	2	3	4	5	6	7	8	9
Byte	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	RTN	LENGTH	DATAINFO	CHKSUM	EOI

Notes: LENID = 02H。

DATAINFO 1Byte, See table for indication status A.21。

Note: when the RTN response is 00h, it means the operation is successful; other means the operation is failed.

4.8 Get BMS time date

Table A.36

NO.	1	2	3	4	5	6	7	8	9
Byte	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	B1H	LENGTH		CHKSUM	EOI

Note: LENID = 00H。

Table A.37

NO.	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	RTN	LENGTH	DATAINFO	CHKSUM	EOI

Note：LENID = 0CH。

DATAINFO 6 Bytes，See table for details of time and date A.38。

Table A.38 response information

NO.	Content	DATAI Bytes	Description
1	Year	1	Year=Year + 2000
2	Month	1	
3	Date	1	
4	Hour	1	
5	Minute	1	
6	Second	1	

4.1 Set BMS time date

Table A.39

NO.	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	B2H	LENGTH		CHKSUM	EOI

Note：LENID = 0CH，

INFO 6Bytes，See table for details of time and date A.40。

Table A.40

NO.	Content	DATAI Bytes	Description
1	Year	1	Year = Year - 2000
2	Month	1	
3	Date	1	
4	Hour	1	
5	Minute	1	
6	Second	1	

Table A.41 response information

NO.	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	RTN	LENGTH	DATAINFO	CHKSUM	EOI

Note：LENID = 00H。

4.2 Get pack capacity information

Table A.42

NO.	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	A6H	LENGTH		CHKSUM	EOI

Note：LENID = 00H。

Table A.43 response information

NO.	1	2	3	4	5	6	7	8	9
Bytes	1	1	1	1	1	2	LENID/2	2	1
Format	SOI	VER	ADR	46H	RTN	LENGTH	DATAINFO	CHKSUM	EOI

Note：LENID = 0CH。

DATAINFO 6Bytes，See table for details of ACK capacity information A.44。

Table A.44

NO.	Content	DATAI Bytes	Description
1	PACK Remaining capacity	2	Unit：10mAH
2	PACK Full capacity	2	Unit：10mAH
3	PACK Design capacity	2	Unit：10mAH

5、Example description

RS232 communication is a one-to-one communication mode. BMS will not strictly restrict the ADR field in actual application. The ADR field in BMS response information will be uploaded with the actual address of BMS. Except that the cid2 codes are 42h and 44h, other cid2 codes are only valid for this pack, that is, the pack to which the RS232 communication cable is connected. The communication example command is as follows:

Get pack analog quantity:

7E 32 35 30 30 34 36 34 32 45 30 30 32 30 31 46 44 33 31 0D （COMMAND = 01H)

7E 32 35 30 30 34 36 34 32 45 30 30 32 46 46 46 44 30 36 0D （COMMAND = FFH)

Get the volume of pack alarms：

7E 32 35 30 30 34 36 34 34 45 30 30 32 30 31 46 44 32 46 0D （COMMAND = 01H)

7E 32 35 30 30 34 36 34 34 45 30 30 32 46 46 46 44 30 34 0D （COMMAND = FFH)

Detailed analysis：

Command information：7E 32 35 30 30 34 36 34 32 45 30 30 32 46 46 46 44 30 36 0D

Response information：

7E 32 35 30 30 34 36 30 30 46 30 37 41 30 30 30 31 31 30 30 44 34 32 30 44 31 34 30 44 31 33 30 44 31 33 30 44 31 33 30 44 31 33 30 44 31 33 30 44 31 33 30 44 31 31 30 44 31 32 30 44 31 33 30 44 31 31 30 44 31 31 30 44 31 32 30 44 31 30 30 44 31 33 30 36 30 42 42 37 30 42 42 37 30 42 42 38 30 42 42 36 30 42 42 33 30 42 42 44 30 30 30 30 44 31 35 35 31 32 38 45 30 33 31 33 38 38 30 30 30 30 31 33 38 38 45

33 41 43 0D
Detailed analysis of response information:
7E (SOI)
32 35 (VER, Version No. 25H, V2.5)
30 30 (ADR, Battery PACK Address 0)
34 36 (CID1, 46H)
30 30 (RTN, 00H)
46 30 37 41 (LENGTH, F07A, LENID = 07AH, DATAINFO Length=122Bytes, LCHKSUM = FH)
30 30 (DATAINFO consists of INFOFLAG and DATAI , INFOFLAG=00H。The following information is DATAI)
30 31 (PACK NO., 01H)
31 30 (Number of cell M, 10H, 16 Battery Cells)
30 44 34 32 (Battery Cells 1: 0D42H, = 3394mV)
30 44 31 34 (Battery Cells 2: 0D14H, = 3348mV)
30 44 31 33 (Battery Cells 3: 0D13H, = 3347mV)
30 44 31 33 (Battery Cells 4: 0D13H, = 3347mV)
30 44 31 33 (Battery Cells 5: 0D13H, = 3347mV)
30 44 31 33 (Battery Cells 6: 0D13H, = 3347mV)
30 44 31 33 (Battery Cells 7: 0D13H, = 3347mV)
30 44 31 33 (Battery Cells 8: 0D13H, = 3347mV)
30 44 31 31 (Battery Cells 9: 0D11H, = 3345mV)
30 44 31 32 (Battery Cells 10: 0D12H, = 3346mV)
30 44 31 33 (Battery Cells 11: 0D13H, = 3347mV)
30 44 31 31 (Battery Cells 12: 0D11H, = 3345mV)
30 44 31 31 (Battery Cells 13: 0D11H, = 3345mV)
30 44 31 32 (Battery Cells 14: 0D12H, = 3346mV)
30 44 31 30 (Battery Cells 15: 0D10H, = 3344mV)
30 44 31 33 (Battery Cells 16: 0D13H, = 3347mV)
30 36 (Number of temperature N, 06H, 6 temperatures)
30 42 42 37 (temperature 1: 0BB7H, = 2999, 26.9℃)
30 42 42 37 (temperature 2: 0BB7H, = 2999, 26.9℃)
30 42 42 38 (temperature 3: 0BB8H, = 3000, 27.0℃)
30 42 42 36 (temperature 4: 0BB6H, = 2998, 26.8℃)
30 42 42 33 (temperature 5 (MOS): 0BB3H, = 2995, 26.5℃)
30 42 42 44 (temperature 6 (Environmental): 0BBDH, = 2994, 27.5℃)
30 30 30 30 (PACK Current, 0000H, Unit 10mA, Complementary code, indicating the current range: -327.68A-+327.67A)
44 31 35 35 (PACK Total Voltage, D155H = 53.589V)
31 32 38 45 (PACK Remaining capacity, 128EH = 47.50AH)
30 33 (User defined number P, 03H)
31 33 38 38 (PACK Full capacity, 1388H = 50.00AH)
30 30 30 30 (Number of charge discharge cycles, 0000H)
31 33 38 38 (PACK Design capacity, 1388H = 50.00AH)
45 33 41 43 (CHKSUM, E3ACH)
0D (EOI)

Note

When debugging the communication between the monitoring equipment and the RS232 interface of BMS, the following conditions shall be noted:

1、 o ensure whether the BMS is in working state, it can be judged by observing the LED indicator state (run flashing, or ALM flashing or normally on). If all lights are off, the BMS can be activated by pressing the key (3-6s). If there is a weak current switch, make sure it is on。

2、 Confirm whether the communication baud rate of the monitoring equipment is consistent with the product specification。

3、 When analyzing data, please distinguish whether it is signed data or not, and do not omit to analyze INFOFLAG in obtaining the response information of PACK analog quantity and alarm quantity.