

Smart Active Balancing BMS specification

Model No.	EJBMS2A16S100LP EJBMS2A16S200LP	
Item Spec.	16S working current 100A-200A over current 400-800A/ common port	
Communication interface	<input type="checkbox"/> Hardware	<input checked="" type="checkbox"/> Software <input checked="" type="checkbox"/> LCD <input checked="" type="checkbox"/> BT <input checked="" type="checkbox"/> CAN <input checked="" type="checkbox"/> RS485 <input checked="" type="checkbox"/> RS232
Prepared by	Checked by	Approve by
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Client confirmation:

Signature:	
Date:	
Note:	

Release change history:

Issue date	Change content	Version Information	Change person
2023/09/03	first issue	01	

1) Outline

The EJBMS series protection board uses high-quality lithium battery protection IC to provide complete and reliable protection performance: extremely high overcharge/over-discharge voltage detection accuracy; secondary discharge overcurrent protection detection and delay (overcurrent 1/short circuit); extremely low Quiescent current consumption

2) Application

The protection board is suitable for NMC/LTO/LIFEPO4 power battery protection applications for 48V/200A and below equipment.

3) Protection Function

- Overcharge protection: If the voltage of any cell reaches the overcharge protection voltage, the charging circuit will be shut down immediately and continued charging is prohibited.
- Over-discharge protection: If the voltage of any cell is lower than the over-discharge protection voltage, the discharge circuit will be shut down immediately and continued discharge is prohibited.
- Discharge overcurrent protection: When the discharge current exceeds the discharge overcurrent protection current, the discharge circuit will be shut down immediately and continued discharging is prohibited.

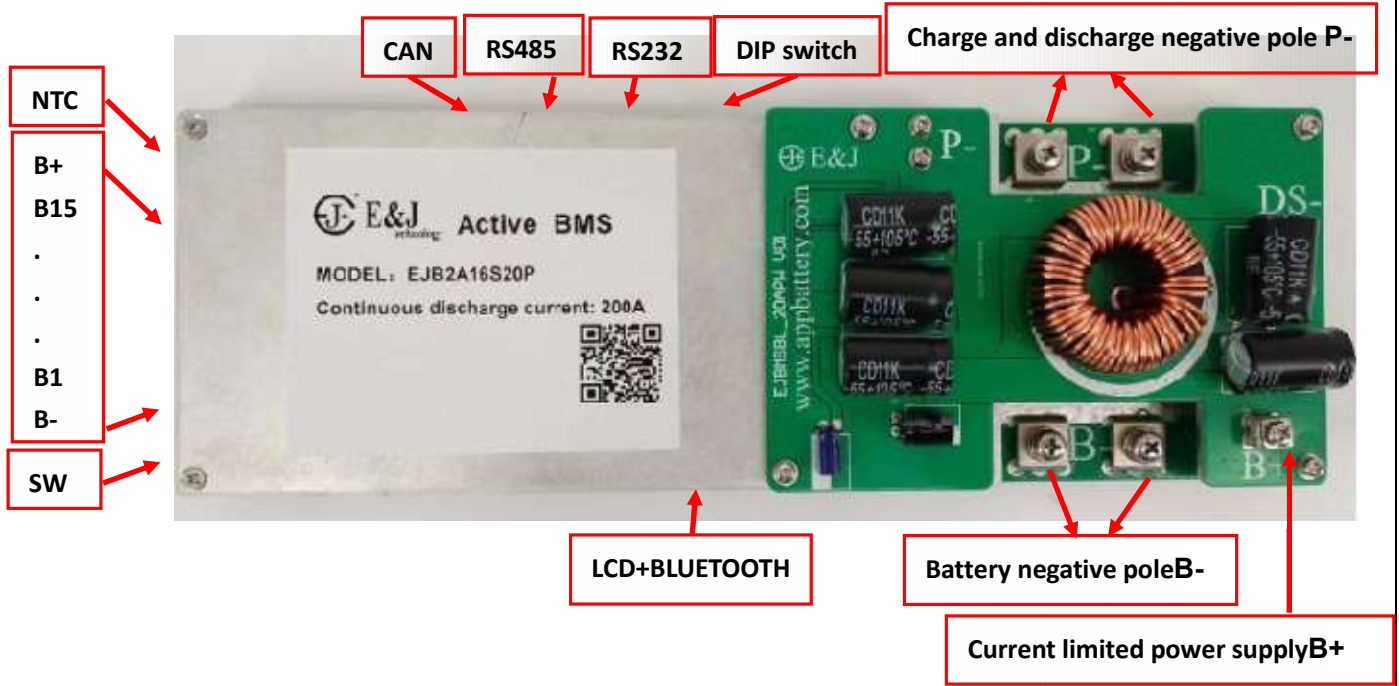
4) Configuration

Function	Configuration
Number of strings supported	4~16S
Continuous current	100-200A
Number of NTCs	1 built-in, 4external
Balance Function	Active balance
UART (non-isolated)	Standard option
485-communication (isolated)	Standard option
Module of Bluetooth	Standard option
CAN communication	Standard option
232 Communication	Standard option
Charging current limit	Standard option
LCD display	Optional
Switch function	Yes
Battery packs in parallel	Yes
Heating function	Optional
History storage	Not supported
Pre-discharge function	Not supported
Buzzer)	Not supported
UART interface (isolated)	/
Battery packs in series	/
LED indicator interface	/
GPS interface	/

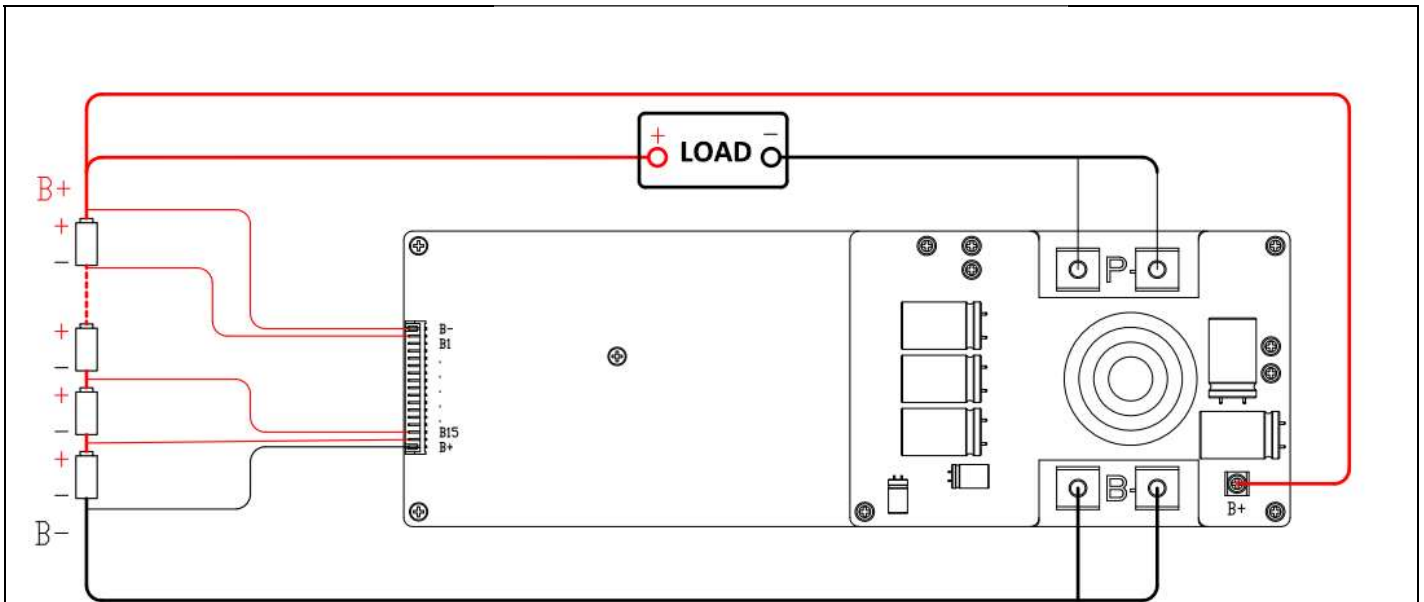
5) 电气特性 Protect the parameters

Item	Symbol	Content	Criterion
Over charge Protection	VCU1	Over chargedetection voltage	3.75V (Software programmable)
	tCU1	Over charge 1 st detection delay time	1±S (Software programmable)
	VCL1	Over charge 1 st release voltage	3.60V (Software programmable)
Over dischargeprotection	VDL	Over discharge detection voltage	2.50V (Software programmable)
	tDL	Over discharge detection delay time	1S (Software programmable)
	VDU	Over discharge release voltage	3V (Software programmable)
Continue Current	ICHG	Continue charge current	100A (Software programmable)
	IDIS	Continue discharge current	200A (Software programmable)
Over current protection	OCIOV1	Charge overcurrentdetection current 1	160A (Software programmable)
	ODIOV1	Discharge overcurrent detection current 1	250A (Software programmable)
	tDIOV1	C&D Overcurrent detection delay time 1	3S (Software programmable)
Short current protection	ISHORT	Short circuit detection current	yes
	tSHORT	Short circuit delay time	500US
Over Shortcurrentrelease	/	Over current & short current release	Load disconnection
Balance function	VBAL	Balance detection voltage	3.4V (Software programmable)
		Balancereleasecurrent	2 A
Temperature protection	NTC	NTC discharge temperature protection	-20~75 (Software programmable)
Internal resistance	RCHG	Resistance in charge	<50mohm
	RDIS	Resistance in discharge	<50mohm
Current consumption	ISTB	Current consume in normal operation	<650uA

Physical diagram of connection and assembly:



Wiring diagram:



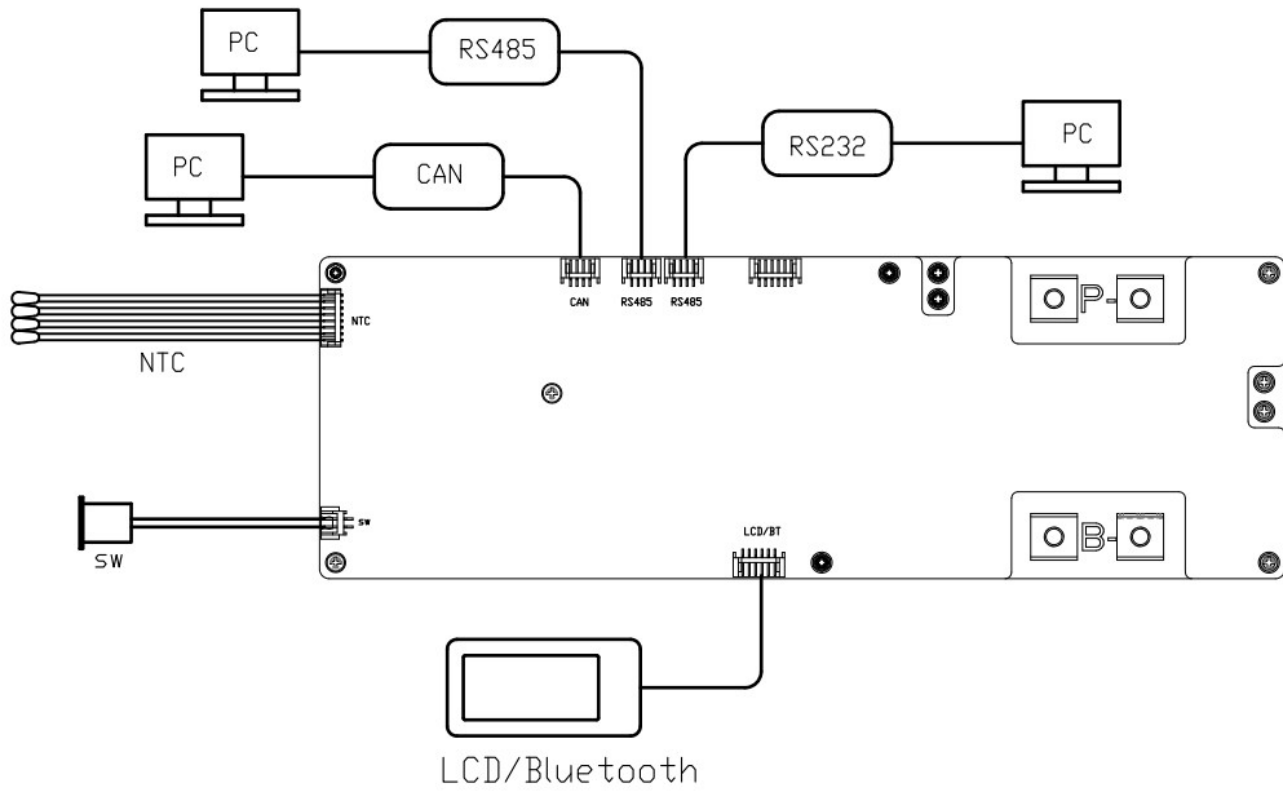
Wiring:

For example: for a 36V battery with 10 strings, the cables B16~B10 should be short-circuited together, and other string numbers should be short-circuited together according to the table.

<div style="border: 1px solid black; padding: 2px;"> cable strings </div>	B16	B15	B14	B13	B12	B11	B10	B9	B8	B7	B6	B5	B4	B3	B2	B1	B0
16	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
15			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
14				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
13					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
12						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
11							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
10								✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
9									✓	✓	✓	✓	✓	✓	✓	✓	✓
8										✓	✓	✓	✓	✓	✓	✓	✓
7											✓	✓	✓	✓	✓	✓	✓
6												✓	✓	✓	✓	✓	✓
5													✓	✓	✓	✓	✓
4														✓	✓	✓	✓
3																	

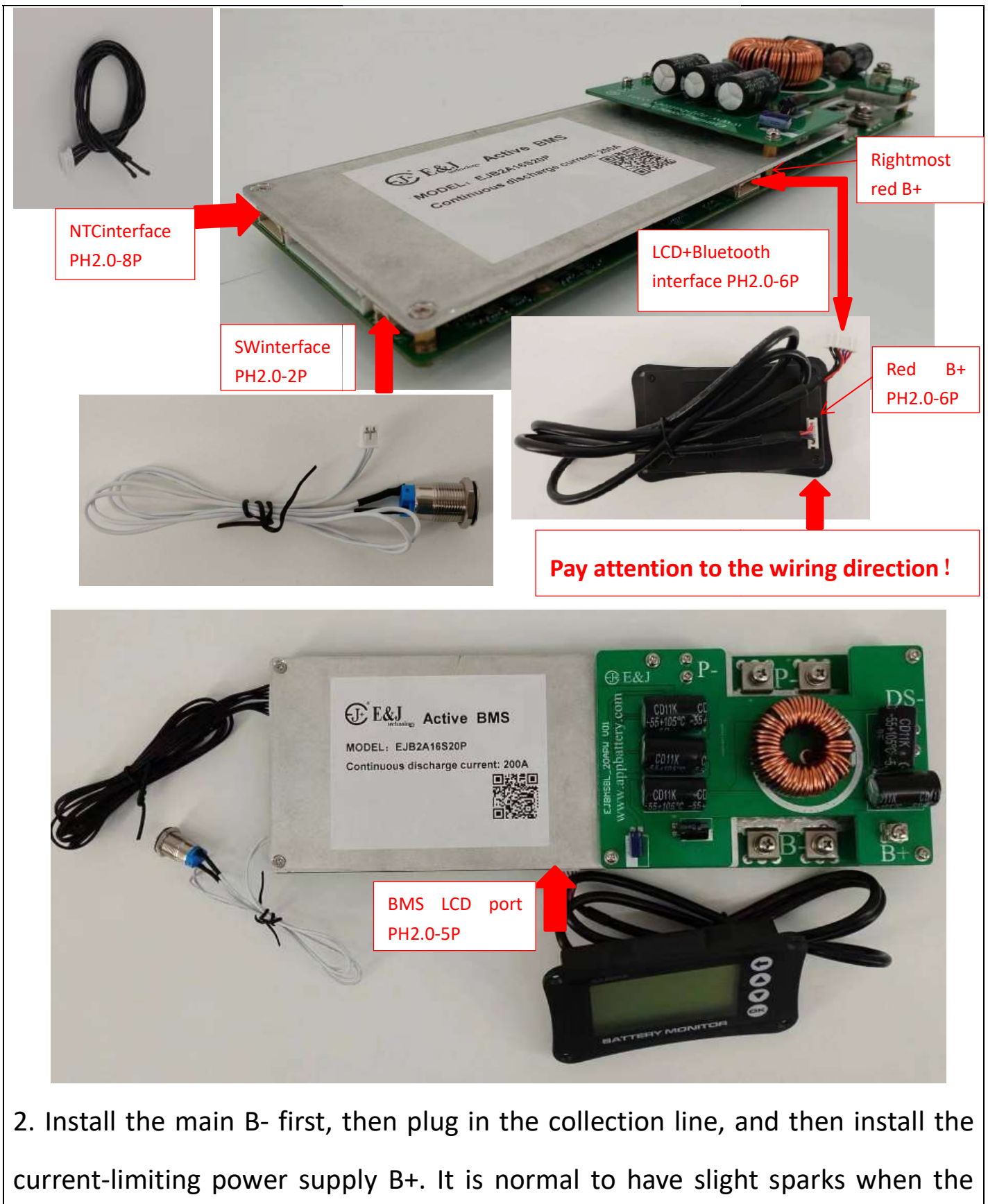
2																			
1																			

CAN/LCD/BLUETOOTH/NTCInterface diagram



BMS-CAN Operating Instructions

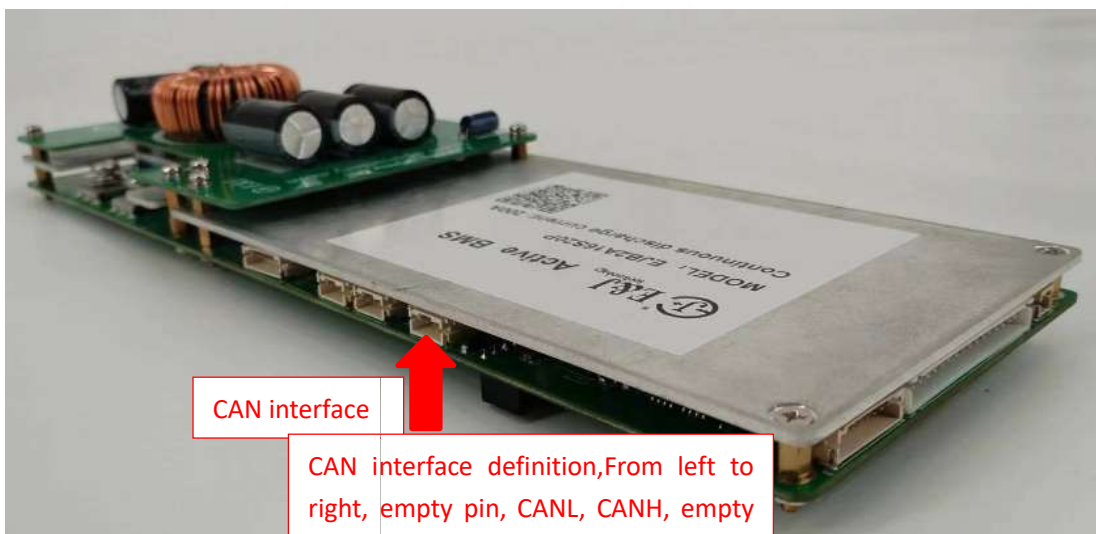
1. Plug in the NTC、 ON/ OFF Switch、 LCD + Bluetooth



current-limiting plate capacitor is charged at the moment of power-on.



3.Open the host computer and connect to CAN



CAN communication tool



CAN-Tool_V7.5-20230607.rar

CAN communication driver



iTEK USBCAN驱动.rar



CAN_Tool_V7.6 - 20230607_51K&91K 东莞市奔瑞技术有限公司

断开CAN盒 CAN已连接! 读取成功!!! Successful!!! 正常读取 快速读取 通信地址 0 中文 English

No	电压/mV	均衡	温度/℃
1	3540	T_1	30.8
2	3546	T_2	30.5
3	3543	T_3	31.1
4	3546	T_4	30.4
5	3546	HDT	-50
6	3543	FET	30.6
7	3546		
8	3543		
9	3546		
10	3543		
11	3546		
12	3549		
13	3546		
14	3546		
15	3546		
16	3540	21	0
17	0	22	0
18	0	23	0
19	0	24	0
20	0	25	0

总电压 56.71 V 最高电压 3549 12
 总电流 0 A 最低电压 3540 1
 平均电压 3544 mV 最大压差 9 mV
 剩余容量 50000 mAh 软件版本 12
 满容量 50000 mAh 循环次数 0
 APP密码 YiRui
 当前SN码 ABC
 设备型号 EJ0008888

充电MOS 开 放电MOS 开
 SOC 100 %

电容电压 2171 mV 当前通信地址 0
 均衡电流 0.15 A 设置通信地址 0

预加热开关 打开温度 °C
 电流 0 A 结束温度 °C

出厂日期 2023 - 1 - 30

保护状态	警告状态	mos管状态	保护次数
单节过充 充电过流	单节过充 soc低	CH 充电 <input checked="" type="checkbox"/> ON	短路次数 3 整组过放 0
单节过放 放电过流	单节过放 FET高温	DS 放电 <input checked="" type="checkbox"/> ON	充电过流 0 整组过充 0
整组过充 短路保护	整组过充 压差大	预充电 <input type="checkbox"/> OFF	放电过流 0 FET过温 0
整组过放 SCP	整组过放	继电器 <input type="checkbox"/> OFF	单体过充 24 充电高温 0
充电高温 APP错误	充电高温	预加热 <input type="checkbox"/> OFF	单体过放 2 充电低温 0
充电低温 断线保护	充电低温	开关状态	放电高温 0 放电低温 0
放电高温 压差大	放电高温	状态: <input type="checkbox"/> OFF	放电空气过温 0 预放电过流 0
放电低温 FET过温	放电低温		放电空气低温 0 断线保护 0
充电空气高温 充电充满	充电空气过温		充电空气过温 0 进入SHIP 0
充电空气低温 充电过流2	充电空气低温		充电空气低温 0 进入复位 1
放电空气高温 SHIP	放电空气过温		
放电空气低温 电流读取	放电空气低温		

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CAN_Tool_V7.6 - 20230607_51K&91K 东莞市奔瑞技术有限公司

断开CAN盒 CAN已连接! 读取成功!!! Successful!!! 正常读取 快速读取 通信地址 0 中文 English

单体过充	3750 mV	释放	3600 mV	延时	1 S
单体过放	2500 mV	释放	3000 mV	延时	1 S
整体过充	60000 mV	释放	57600 mV	延时	3 S
整体过放	40000 mV	释放	48000 mV	延时	3 S
充电高温	55 °C	释放	50 °C	延时	3 S
充电低温	-10 °C	释放	1 °C	延时	1 S
放电高温	60 °C	释放	55 °C	延时	3 S
放电低温	-20 °C	释放	-10 °C	延时	1 S
充电过流	55000 mA	释放	15 S	延时	3 S
放电过流	120000 mA	释放	60 S	延时	5 S
充电过流2	80 A	释放	30 S	延时	250 mS

100%

充电均衡 静态均衡 均衡使能 断线检测
 LED功能 过流负载 履历记录 短路负载
 NTC1 NTC2 NTC3 NTC4 开壳唤醒

均衡开启电压 3400 mV 均衡开启压差 30 mV
 ship单节电压 2500 mV 单节预充电电压 2700 mV
 压差大保护 1000 mV 压差大恢复 500 mV

进入睡眠延时 60 S

放电FET高温 85 °C 释放 75 °C 延时 5 S
 放电AIR高温 80 °C 释放 60 °C 延时 5 S
 充电AIR高温 75 °C 释放 65 °C 延时 5 S

硬件保护设置
 放电过流_2 30 mV 过流延时 10 mS
 短路保护值 100 mV 短路延时 62 uS
 硬件单体过充 4300 mV 过充延时 800 mS
 硬件单体过放 2500 mV 过放延时 200 mS
 短路释放延时 60 S

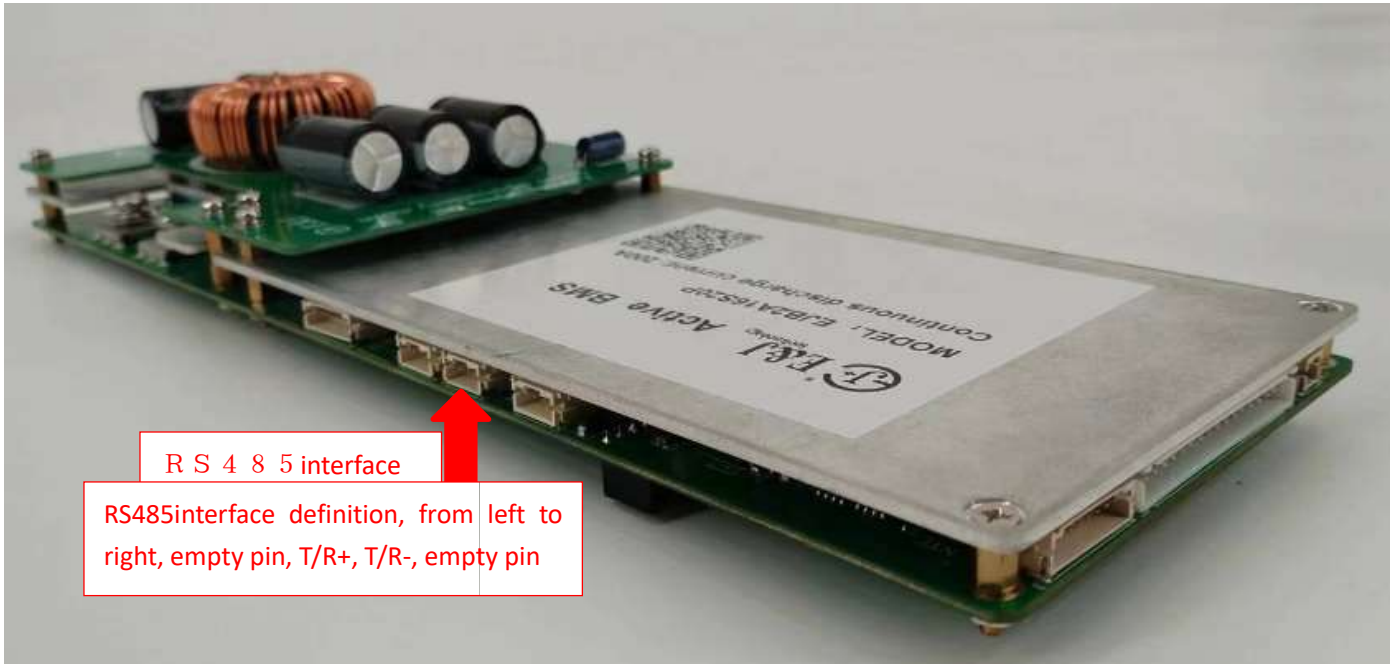
其他参数设置
 检流阻值 20 uR 电池串数 16
 循环次数 0 序列号 1
 APP密码 YiRui
 设备型号 123
 SN码 ABC
 出厂日期 2023 - 1 - 30

EDV电压
 90% 3520 80% 3410
 70% 3350 60% 3287
 50% 3240 40% 3190
 30% 3120 20% 3050
 10% 2800 EDV0 2500

当前EEPROM版本 0

东莞市奔瑞技术有限公司 地址: 东莞市黄江镇田心村广龙路19号湾区智谷1栋803 www.ejbattery.com
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4 .Open the host computer and connect to RS485



R S 4 8 5



串口上位机V5.2-20230707(1).rar

CAN Communication driver tool



ch341ser.rar



东莞市奔瑞技术有限公司-UART-Tool 91K_V5.2-20230707

UART模式 COM14 9600 关闭串口 读取中..... 2023-07-21 19:53:08 电流放大 停止

No	电压/mV	均衡	温度/℃
1	3364	1	30.9
2	3364	2	30.9
3	3361	3	31.5
4	3361	4	30.8
5	3361	5	0
6	3364	6	0
7	3364	7	0
8	3364	8	0
9	3364	AIR	0
10	3361	FET	30.8
11	3364	Ti_Vo1	
12	3364	1	2231
13	3364	2	3039
14	3364	3	0
15	3364	4	0
16	3361		
17	0		
18	0		
19	0		
20	0		

总电压 53.8 V 最高电压 3364 1 mV
 总电流 0 A 最低电压 3361 3 mV
 平均电压 3363 mV 最大压差 3 mV
 剩余容量 50000 mAh SOH 0 %
 满充容量 50000 mAh 循环次数 0
 超级电容 0 mV 充电器 100 mV
 均衡电流 0 A 加热电流 0 A
 充电间隔 0 Min 软件版本 1.2

充电MOS 开 放电MOS 开
 SOC 100 %
 当前SN码 ABC
 出厂日期 2023 - 1 - 30

保护状态	警告状态	保护次数
单节过充	单节过充	短路次数 3
单节过放	单节过放	整组过放 0
整组过充	整组过充	充电过流 0
整组过放	整组过放	整组过充 0
充电高温	充电高温	放电过流 0
充电低温	充电低温	FET过温 0
放电高温	放电高温	单体过充 0
放电低温	放电低温	充电高温 2
充电空气高温	充电空气高温	单体过放 25
充电空气低温	充电空气低温	充电低温 0
放电空气高温	放电空气高温	放电高温 0
放电空气低温	放电空气低温	放电低温 0
		放电空气过温 0
		预放电过流 0
		放电空气低温 0
		断线保护 0
		充电空气过温 0
		进入SHIF 0
		充电空气低温 0
		进入复位 0

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东莞市奔瑞技术有限公司-UART-Tool 91K_V5.2-20230707

UART模式 COM14 9600 关闭串口 读取成功!! 2023-07-21 19:53:57 电流放大 停止

保护参数设置	校准	升级	当前数据记录	履历信息	自动测试
单体过充 3750 mV 释放 3600 mV 延时 1 S					<input checked="" type="checkbox"/> 充电均衡
单体过放 2500 mV 释放 3000 mV 延时 1 S					<input checked="" type="checkbox"/> LED功能
整体过充 60000 mV 释放 57600 mV 延时 3 S					<input checked="" type="checkbox"/> 静态均衡
整体过放 40000 mV 释放 48000 mV 延时 3 S					<input checked="" type="checkbox"/> 均衡使能
充电高温 55 ℃ 释放 50 ℃ 延时 3 S					<input checked="" type="checkbox"/> 断线检测
充电低温 -10 ℃ 释放 1 ℃ 延时 1 S					<input checked="" type="checkbox"/> 过流使能
放电高温 60 ℃ 释放 55 ℃ 延时 3 S					<input checked="" type="checkbox"/> 加热使能
放电低温 -20 ℃ 释放 -10 ℃ 延时 1 S					<input checked="" type="checkbox"/> 断线负载
充电过流 55000 mA 释放 15 S 延时 3 S					<input checked="" type="checkbox"/> NTC1
放电过流 120000 mA 释放 60 S 延时 5 S					<input checked="" type="checkbox"/> NTC2
					<input checked="" type="checkbox"/> NTC3
					<input checked="" type="checkbox"/> NTC4

设计电压 52800 mV
 设计容量 50000 mAh
 满充容量 50000 mAh
 循环容量 50000 mAh
 自放电率 0.1 %
 满充电压 3550 mV
 满充截止电流 1000 mA
 整组恒压电压 52800 mV
 满充电流延时 3 S
 电池SOC低 3 %
 FET工作时间 30 分钟

硬件保护设置
 过流和短路保护值翻倍
 放电过流₂ 11 mV 过流延时 160 mS
 短路保护值 22 mV 短路延时 200 μS
 硬件单体过充 4300 mV 过充延时 1 S
 硬件单体过放 2500 mV 过放延时 1 S
 短路释放延时 60 S

其他参数设置
 检流阻值 2 mR 电池串数 16
 循环次数 0 序列号 1
 APP密码 (10位) YiRui
 设备型号 EJ00008888
 SN码 ABC
 出厂日期 2023 - 1 - 30

EDV电压
 90% 3520 80% 3410
 70% 3350 60% 3287
 50% 3240 40% 3190
 30% 3120 20% 3050
 10% 2800 EDVO 2500
 当前EEPROM版本 0

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5 . Open the host computer and connect RS232

RS232 communicationtools



串口上位机V5.2-
20230707(1).rar

RS232 communication driver



PL-2303 Driver
Installer.exe

USB转RS-232

支持XP/win7/win10
兼容32位/64位系统



RS232 interface

RS232 interface definition, from left
to right GND TXD RXD NC

东莞市奔瑞技术有限公司-UART-Tool 91K_V5.2-20230707

UART模式 COM4 9600 关闭串口 读取成功!! 2023-09-03 18:59:38 电流放大 停止

No	电压/mV	均衡	温度/℃
1	3418	1	29.5
2	3455	2	29.9
3	3455	3	29.7
4	3455	4	29.8
5	3448	5	0
6	3445	6	0
7	3411	7	0
8	3451	8	0
9	3442	AIR	26.9
10	3455	FET	30.7
11	3455	Ti_Vo1	
12	3439	1	0
13	3408	2	0
14	3424	3	0
15	3418	4	0
16	3439		
17	0		
18	0		
19	0		
20	0		

总电压 55 V 最高电压 3455 2 mV
 总电流 0 A 最低电压 3408 13 mV
 平均电压 3438 mV 最大压差 47 mV
 剩余容量 49990 mAh SOH 100 %
 满充容量 50000 mAh 循环次数 0
 超级电容 1834 mV 充电器 0 mV
 均衡电流 0 A 加热电流 0 A
 充电间隔 0 Min 软件版本 1.2

充电MOS 开 放电MOS 开
 SOC 100 %
 当前SN码 ABC
 出厂日期 2023 - 8 - 1

保护状态	告警状态	保护次数
单节过充	充电过流	短路次数 0
单节过放	放电过流	整组过放 0
整组过充	短路保护	充电过流 0
整组过放	预放电过流	整组过充 0
充电高温	AFE错误	放电过流 0
充电低温	断线保护	FET过温 0
放电高温	压差大	单体过充 0
放电低温	FET过温	充电高温 0
充电空气高温	充电满充	单体过放 37
充电空气低温		充电低温 0
放电空气高温		放电高温 0
放电空气低温		放电空气过温 0
		预放电过流 0
		放电空气低温 0
		断线保护 0
		充电空气过温 0
		进入SHIP 0
		充电空气低温 0
		进入复位 0

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东莞市奔瑞技术有限公司-UART-Tool 91K_V5.2-20230707

UART模式 COM4 9600 关闭串口 读取成功!! 2023-09-03 19:00:17 电流放大 停止

单体过充	释放	延时	单位
3750 mV	3600 mV	1 S	S
2500 mV	3000 mV	1 S	S
60000 mV	57600 mV	3 S	S
40000 mV	48000 mV	3 S	S
55 °C	50 °C	3 S	S
-10 °C	1 °C	1 S	S
60 °C	55 °C	3 S	S
-20 °C	-10 °C	1 S	S
55000 mA	15 S	3 S	S
120000 mA	60 S	5 S	S

读取参数 写入参数 导出参数 导入参数 读取100%

硬件保护设置	其他参数设置	EDV电压
<input type="checkbox"/> 过流和短路保护值翻倍	检测阻值 20 mR	90% 3980
放电过流_2 11 mV	电池串数 16	80% 3900
过流延时 160 mS	循环次数 0	70% 3850
短路保护值 22 mV	序列号 1	60% 3700
短路延时 200 uS	APP密码 (10位) YiRui	50% 3650
硬件单体过充 4300 mV	设备型号 123	40% 3600
过充延时 1 S	SN码 ABC	30% 3450
硬件单体过放 2500 mV	出厂日期 2023 - 8 - 1	20% 3350
过放延时 1 S	当前EEPROM版本 0	10% 3200
短路释放延时 60 S		EDV0 3520

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 Dongguan YiRui Technology Co., Ltd Address: Huangjiang Town, Dongguan City, Guangdong, China www.ejbattery.com

Note: Before changing the protection parameters of all host computers, please perform the following operations:

1. Click to read parameters;
2. Click Export Parameters for backup;
3. Change parameters;
4. Click Write Parameters.

6 . LCDscreen display

6.1 LCD screen displays the main interface



6.2 press ▼ ▲ button to adjust the LCD screen display brightness, press and hold ← button to turn the LCD screen light on and off



6.3 Press and hold the OK button on the LCD screen to display the single cell voltage of the battery pack, press ▼ ▲ to page up and down to view

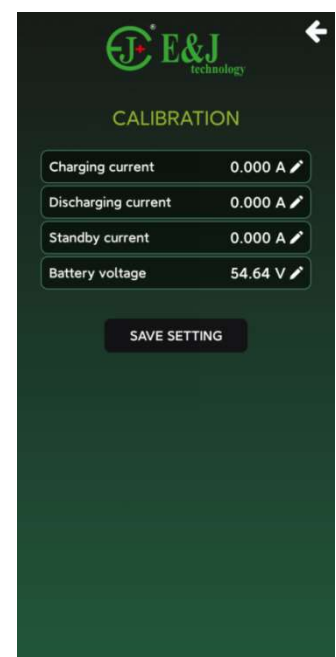
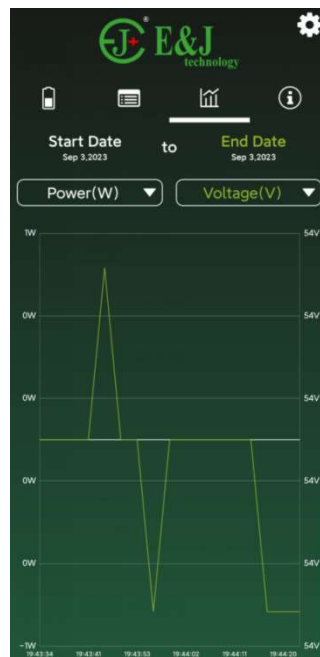
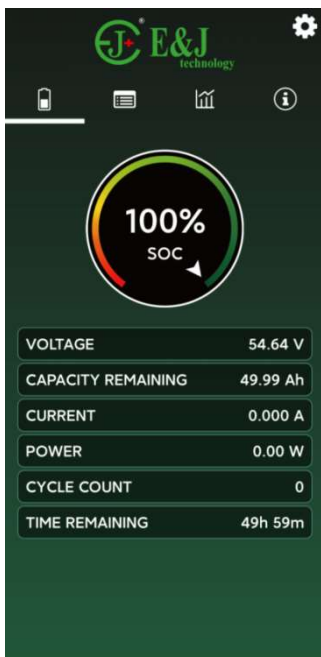




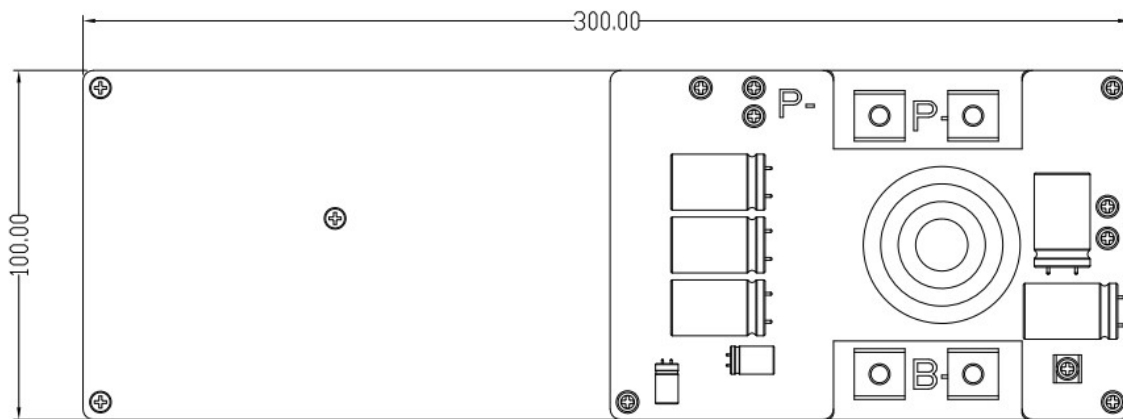
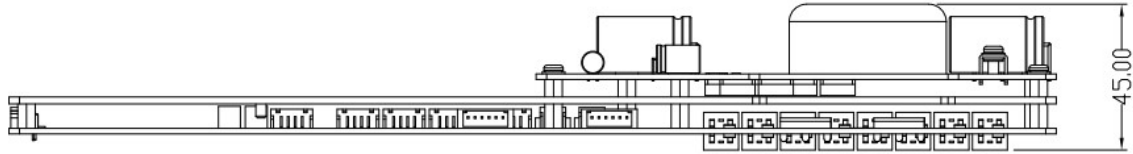
7 . Bluetooth APP display



Smart Battery Monitor.apk



PCB Structure diagram(thickness=<45mm)



Weight:0.620 kg

EJBMS2A16SR is relay version for single use and picture like below:

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电话Tel: 0755-23762949 Web: www.enjpower.com

Packaging and transportation guidelines

1. Package

Place the finished PCBA flatly into a clean bubble bag and seal it.

2. Transportation

Use express delivery or send someone to deliver the goods. During transportation, care should be taken to prevent moisture and moisture, and avoid extrusion, collision, etc. to avoid deformation of the protective plate.

Note: Please store in a cool and dry environment