
1: Precautions for use of the product

● Precautions for use

1. The product must be used in accordance with the conditions of use specified in this specification. Failure to do so may damage the protection board and, in turn, the battery pack.
2. When testing, installing, using, or touching the protection board, appropriate anti-static measures must be taken.
3. Please use a charger that complies with the requirements of this specification. If you use a charger with a DC voltage higher than the maximum tolerable DC voltage of the charging port, it is easy to damage the protection board. The charger should preferably have a trickle-off function at the end of the charging current (double insurance). During use, be careful not to let the lead head, electric soldering iron, tin slag, etc. touch the components on the circuit board, otherwise it is easy to damage the protection board.
4. When assembling the protection board and battery pack, do not place the heat dissipation aluminum plate close to the surface of the battery cell, otherwise the heat will be transferred to the battery cell and affect the safety of the battery pack.
5. If any abnormal situation occurs during use, please stop using it immediately, return it to the manufacturer or ask professional maintenance personnel to repair it.
6. **It is forbidden to connect two or more protection boards in series or in parallel.**
7. This protection board has undergone a lot of reliability tests, and its reliability is much higher than the general protection boards on the market. However, in order to reduce the occurrence of accidents as much as possible, please use qualified batteries.

2: Functional Description

- 6-32 strings of power battery pack charging protection;
- Can realize overcharge protection of any battery. BMS is aimed at protecting the voltage of a single battery in the PACK package. Overcharge protection will be realized if any one or more batteries in the PACK package meet the protection conditions.
- Can realize the battery pack's charging overcurrent, short circuit, charging high and low temperature protection, etc.
- With battery temperature detection, MOS temperature detection function;
- BMS has Bluetooth function, and is equipped with corresponding mini-programs and Android or Apple system APPs . It supports online modification of protection parameters and real-time detection of equipment status. Customers can change the corresponding protection parameters in the mini-program or APP according to specific usage ;
- Support APP online upgrade program.

3: Test conditions and parameter description

3.1 Test conditions

The batteries used in the test must be new batteries that are no older than 1 week. Unless otherwise specified, the test must be conducted indoors at a temperature of 23 ± 2 °C and a relative humidity of $65 \pm 20\%$.

3.2 Parameter Description

Function	Test items	parameter	Accuracy	unit	Remark
total capacity	Battery pack rated capacity	5		(A H)	Parameters can be set
Charging voltage	Rated charging voltage	PACK series *4.2		(V)	Parameters can be set
Continuous current	Maximum charging current	8		(A)	suggested value
	Maximum discharge current	/		(A)	suggested value
balanced	Balanced start voltage	4100	± 50	(mV)	Parameters can be set
	Balanced opening pressure difference	20	± 20	(mV)	Parameters can be set
	Balance current	100	± 20	(mA)	
Charging protection	Overcharge protection voltage	4250	± 50	(mV)	Parameters can be set
	Overcharge protection recovery voltage	4150	± 50	(mV)	Parameters can be set
	Overcharge protection delay	1000	± 500	(mS)	Parameters can be set
	Overcharge protection recovery conditions	Each cell voltage is lower than the recovery voltage			
	Charging overcurrent protection	12	± 2	(A)	Parameters can be set
	Charging overcurrent protection delay	3000	± 1000	(m S)	Parameters can be set
Discharge protection	Over discharge protection voltage	/	± 50	(mV)	Parameters can be set
	Over discharge protection recovery voltage	/	± 50	(mV)	Parameters can be set
	Over discharge protection delay	/	± 500	(mS)	Parameters can be set
	Over discharge protection recovery conditions	/			
	Discharge overcurrent 1 protection current	/	± 10	(A)	Parameters can be set
	Discharge overcurrent 1 protection delay	/	± 1000	(m S)	Parameters can be set
	Discharge overcurrent 2 protection current	/	± 10	(A)	Parameters can be set
	Discharge overcurrent 2 protection delay	/	± 50	(m S)	Parameters can be set

	Discharge overcurrent recovery conditions	/			
	Short circuit protection current	/		(A)	Parameters can be set
	Short circuit protection delay	/	100- 1000	(u S)	Parameters can be set
	Short circuit protection recovery conditions	/			
Temperature protection	Charging high temperature protection	60	± 3	(°C)	Parameters can be set
	Charging high temperature protection recovery	50	± 3	(°C)	Parameters can be set
	Charging low temperature protection	-5	± 3	(°C)	Parameters can be set
	Charging low temperature protection recovery	0	± 3	(°C)	Parameters can be set
	Discharge high temperature protection	/	± 3	(°C)	Parameters can be set
	Discharge high temperature protection recovery	/	± 3	(°C)	Parameters can be set
	Discharge low temperature protection	/	± 3	(°C)	Parameters can be set
	Discharge low temperature protection recovery	/	± 3	(°C)	Parameters can be set
MOS temperature rise	1C continuous charging 1H	40	± 5	(°C)	
Self-consumption	Self-consumption during operation	2	≤ 0.5	(m A)	
	Self-power consumption during shutdown	5	<50	(uA)	Cell voltage below 2.7V enters shutdown
Internal resistance	Charging circuit internal resistance	9	< 15	(mΩ)	
size	W*L*H	30 * 120 * 10		(mm)	

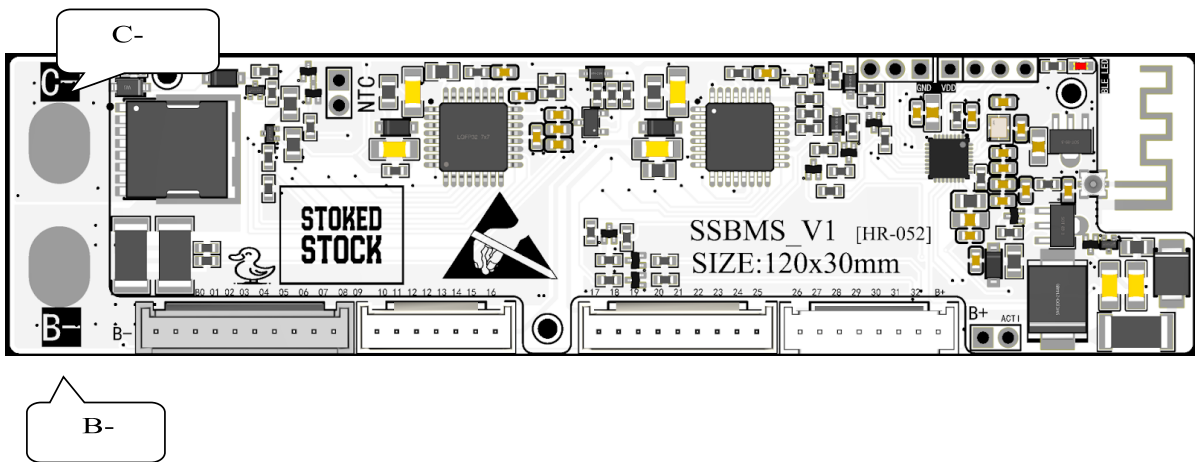
Table II

4. Main materials list

Serial number	Material Name	model	brand	quantity	effect
2	Analog front-end acquisition processing	SH3676016B	SinoWise Electronics	2 (compatible with 6~16- string AFE)	Analog front end for protection , used to collect all cell voltage, current and temperature
3	MCU (Microprocessor)	N32WB031KE Q6-2	National Technology	1	For data and control as well as external communication
4	N-MOS tube	200 V TOLL	/	1	Power MOS, used to control high current charging
5	Alloy resistance	5 mΩ	Wei'an, Dayi	2	

Table 3 Main materials list

4.1 Wiring instructions:



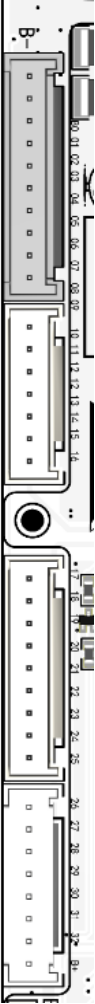
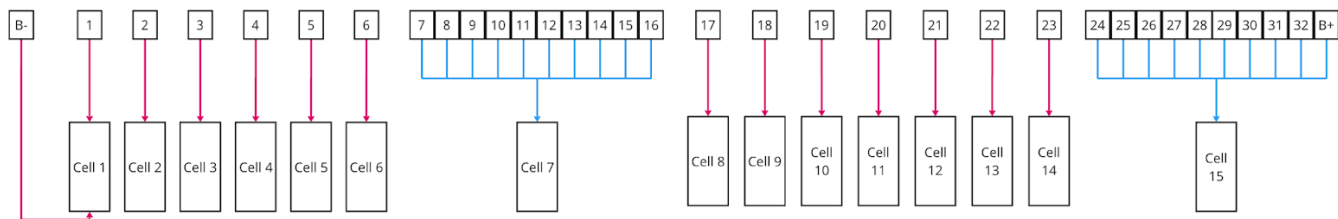
interface	illustrate
B-	Connect to the negative terminal of the battery pack
C-	Connect to the negative pole of the charger
	PIN1: B0 (negative pole of the lowest voltage node of PACK) PIN 33 : B32 (positive pole of the highest voltage node of PACK)

Table 4

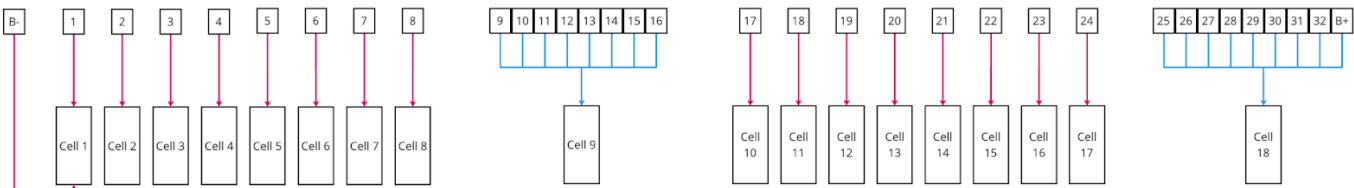
4.2 CellNumber Configuration Description

Wire BattSeriesNum	9	10	11	12	13	14	15	16		25	26	27	28	29	30	31	32	B+	
18s	SHORT TO B9+									SHORT TO B18+								B18+	
19s	SHORT TO B9+									B18+	SHORT TO B19+							B19+	
20s	B9+	SHORT TO B10+								B19+	SHORT TO B20+							B20+	
21s	B9+	SHORT TO B10+								B19+	B20+	SHORT TO B21+						B21+	
22s	B9+	B10+	SHORT TO B11+							B20+	B21+	SHORT TO B22+					B22+		
23s	B9+	B10+	SHORT TO B11+							B20+	B21+	B22+	SHORT TO B23+				B23+		
24s	B9+	B10+	B11+	SHORT TO B12+						B21+	B22+	B23+	SHORT TO B24+				B24+		
25s	B9+	B10+	B11+	SHORT TO B12+						B21+	B22+	B23+	B24+	SHORT TO B25+			B25+		
26s	B9+	B10+	B11+	B12+	SHORT TO B13+					B22+	B23+	B24+	B25+	SHORT TO B26+			B26+		
27s	B9+	B10+	B11+	B12+	SHORT TO B13+					B22+	B23+	B24+	B25+	B26+	SHORT TO B27+		B27+		
28s	B9+	B10+	B11+	B12+	B13+	SHORT TO B14+				B23+	B24+	B25+	B26+	B27+	SHORT TO B28+		B28+		
29s	B9+	B10+	B11+	B12+	B13+	SHORT TO B14+				B23+	B24+	B25+	B26+	B27+	B28+	SHORT TO B29+		B29+	
30s	B9+	B10+	B11+	B12+	B13+	B14+	SHORT TO B15+			B24+	B25+	B26+	B27+	B28+	B29+	SHORT TO B30+		B30+	
31s	B9+	B10+	B11+	B12+	B13+	B14+	SHORT TO B15+			B24+	B25+	B26+	B27+	B28+	B29+	B30+	B31+	B31+	
32s	B9+	B10+	B11+	B12+	B13+	B14+	B15+	B16+	B25+	B26+	B27+	B28+	B29+	B30+	B31+	B32+	B32+		

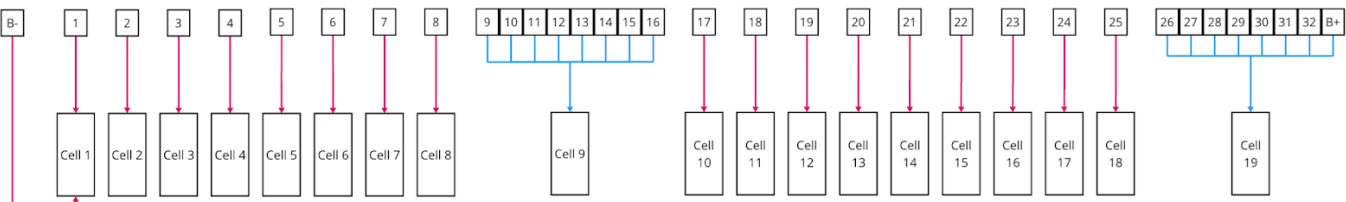
15S



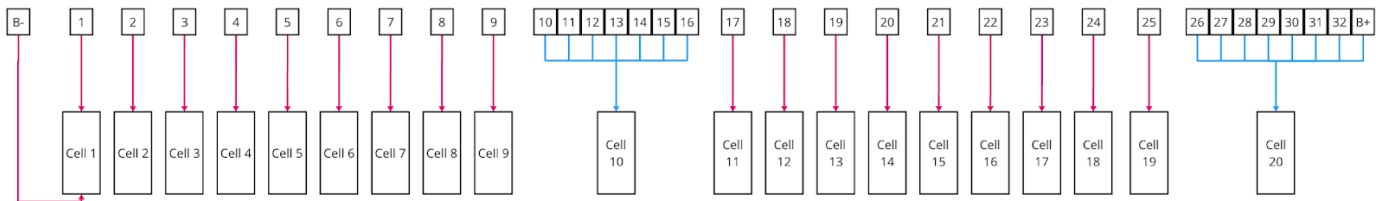
18S



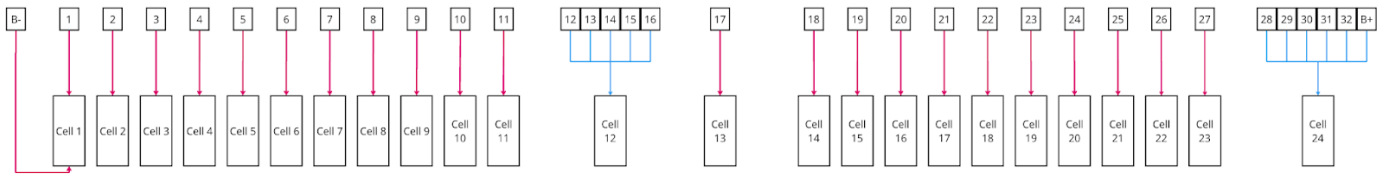
19S



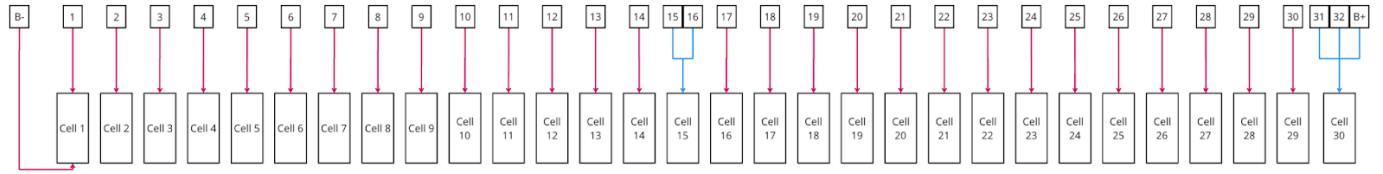
20S



24S



30S



4.3 Power-on sequence description :

When assembling the wiring, first connect the negative pole of the battery pack, i.e. B-, then connect the battery sampling line, and finally connect the B+ line to the positive pole of the battery pack. The charger can only be added after all the connecting wires are installed. The power-off sequence is opposite to the power-on sequence. You must strictly follow the power-on sequence requirements to avoid damage.

!! ATTENTION !!

BMS is shipped in storage mode. Once all wires have been connected correctly - plug in the charger to wake it up. Once awake, bluetooth broadcasting will begin and you will be able to connect to the BMS via the app. The LED on the BMS does not come on when it's awake. It will only come on if it's connected via bluetooth and will turn off once you've disconnected the bluetooth connection.