

Specification For Approval

Customer Name Code	
Model	ASC-HESS-100
Description	2*160S1P-2*512V100Ah
Issue Date	2023 年 11 月 16 日

Made By	Checked By	Approved By
黄广源	贺星凯	姜国刚

Customer Confirmation	Company Name:
	Signature:
	Company Stamp:

Guangdong Asgoft New Energy Co., LTD

Address: 806 Huiyi Building, No.9 Zhongxin Road, Taoyuan Community, Dalang Street, Longhua District, Shenzhen, Guangdong, China

Asgoft New Energy GmbH

Address: Wandsbeker Allee77,22041 Hamburg, Germany

Mobile Phone:+86-18902448080

TEL: +86-755-29366186

Email: czp@pairbest.com

Website: www.asgoft.de

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1.Scope

This document describes the Product Specification of the Lithium rechargeable battery cell supplied by ASGOFT

2.The Specification Amendment

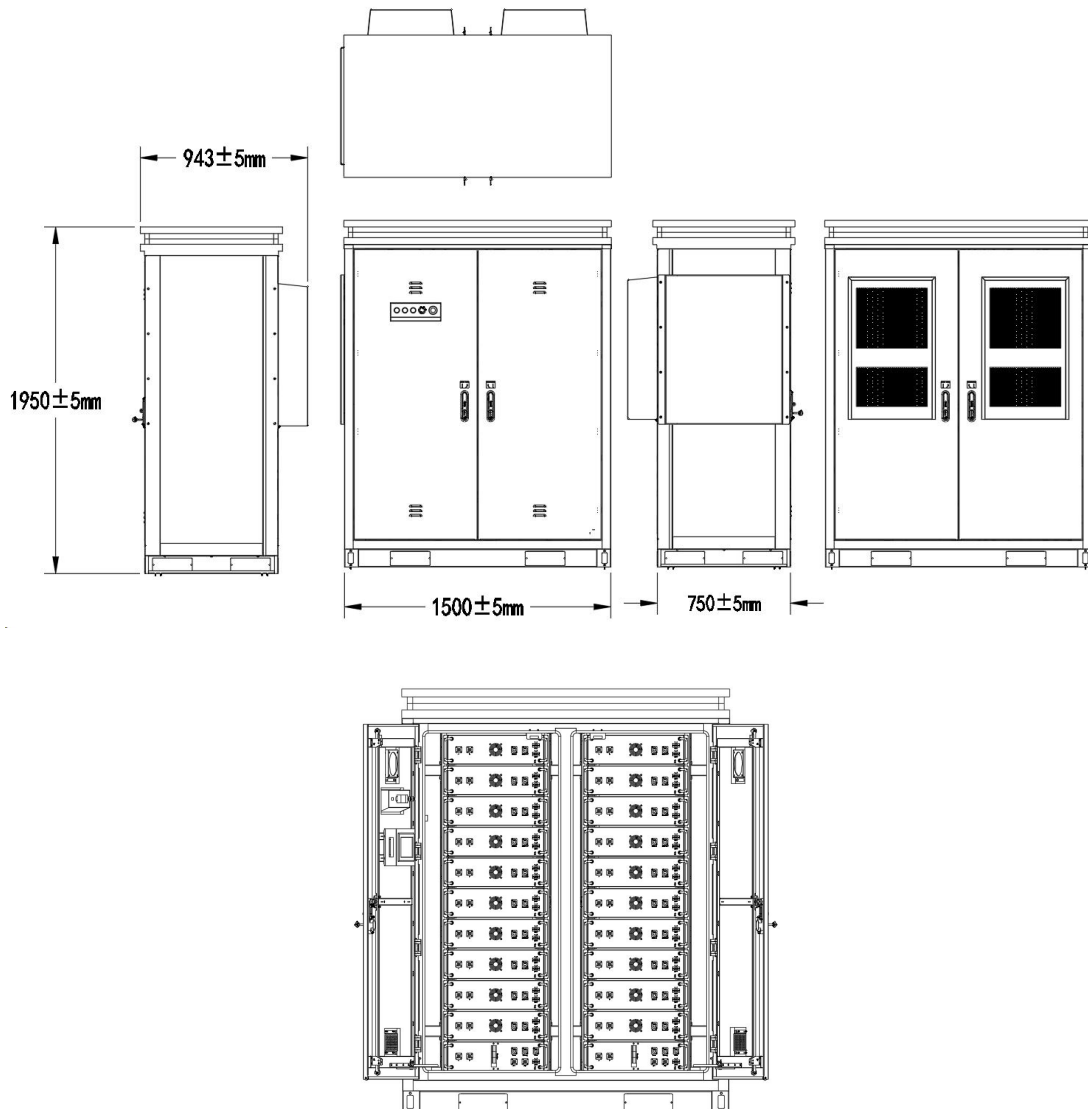
If the raw materials, production processing, production system or battery usage environments & other conditions need to be changed, the amendment side needs provide the written advice to the other side, only the both sides come to agreement, the amendment will be effective.

3.Product or Cell testing conditions

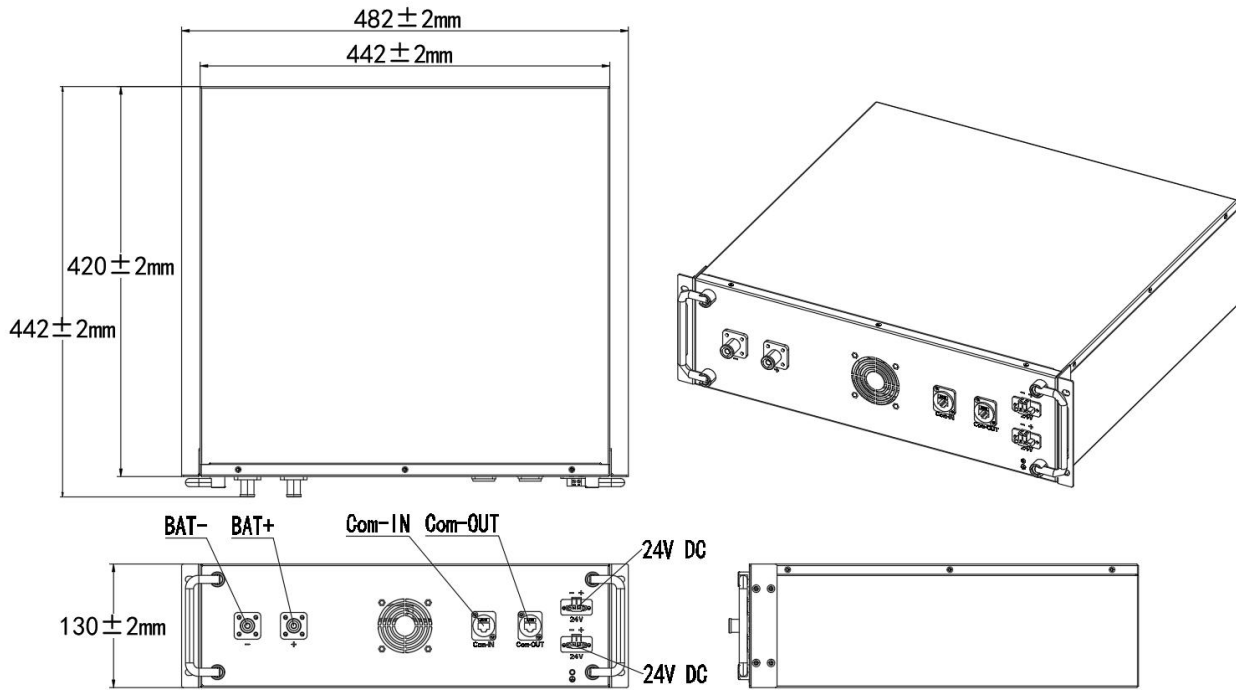
It is recommended to use newly produced battery packs and new cells for related tests. Unless specified, testing and measurement shall be done under temperature of $20\pm 5^{\circ}\text{C}$ and relative humidity of 45~75%.

4.Drawing

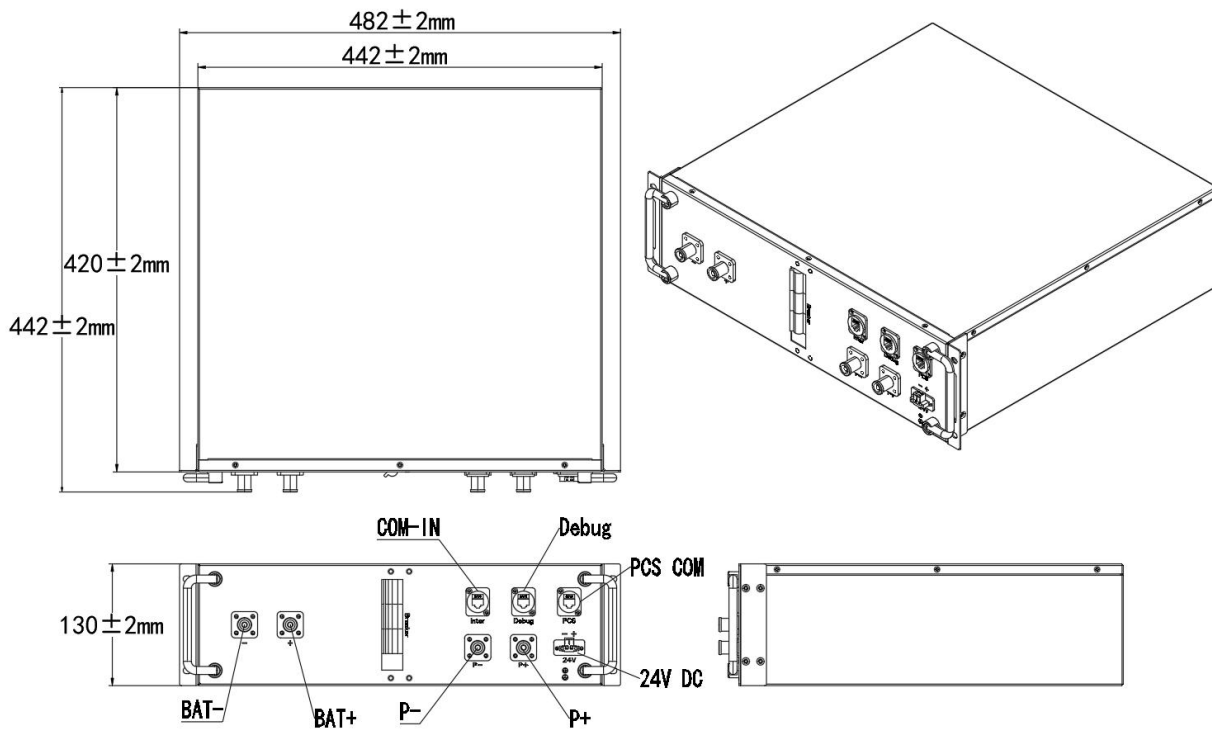
4.1 Cabinet Structure Dimensions Diagram



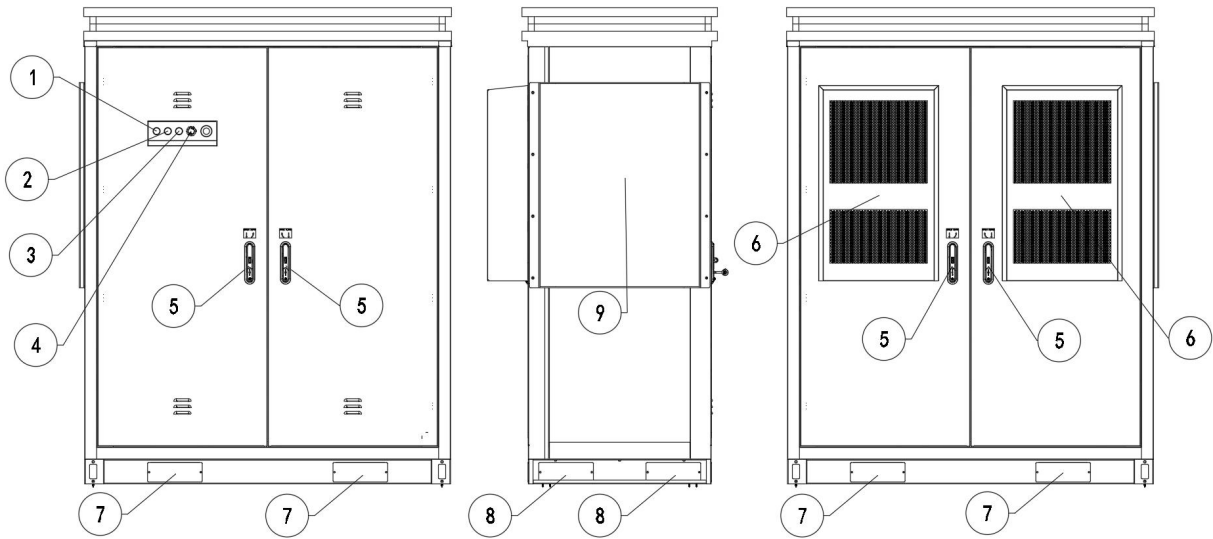
4.2 Battery Module Structure Dimension Diagram



4.3 High Voltage Box Structural Dimension Diagram



5.Cabinet Panel Structure Definition



NO.	Explanation	Silkscreen Print	Note
1	Battery Charging Indicator Light	/	Green
2	Battery Discharge Indicator Light	/	Yellow
3	Fault Indicator Light	/	Red
4	Emergency Stop Switch	/	
5	Cabinet Lock	/	
6	1500W Air Conditioner	/	
7	Forklift Hole	/	
8	Position Of Advancing	/	
9	Inverter Fixed Backplate	/	Adaptation of DEYE 30-50KW inverter.

6.Main Technical Parameters

6.1 Cell Parameters

Items	Specification	Note
Cell Types	LFP	EVE
Nominal Voltage	3.2V	
Nominal Capacity	100Ah	0.5C,25±2°C,2.5-3.65V

Rated Energy	320Wh	0.5C,25±2°C,2.5-3.65V
Internal Resistance	≤0.5mΩ	AC,1kHz,25%SOC
Charging Cut-off Voltage	3.65V	
Discharge Cut-off Voltage	2.5V T >0°C 2.0V T ≤0°C	
Standard Charging Current	20A	0.2C
Standard Discharging Current	20A	0.2C
Max. Continuous Charge Current	100A	1C
Max. Continuous Discharge Current	100A	1C
25°C Standard Cycle	6000	25°C 2°C 0.5P/0.5P, 2.5~3.65V, Capacity Retention≥80%
Size	H:118.5±0.5mm	
	L:160±0.8mm	
	T:50.1±0.5mm	
Weight	1985g±100g	
Operating Temperature	Charge:0~65°C	Charge
	Discharge: -30~65°C	Discharge

6.2 Battery Module Parameters

Items	Specification	Note
Rated Energy	5120Wh	0.5C,25±2°C,2.5-3.65V
Connection	16S1P	
Nominal Capacity	100Ah	0.5C,25±2°C,2.5-3.65V
Nominal Voltage	51.2V	
Standard Charging Current	20A	0.2C
Standard Discharging Current	20A	0.2C
Max. Continuous Charge Current	100A	1C

Max. Continuous Discharge Current	100A	1C
Charging Cut-off Voltage	58.4V	
Discharge Cut-off Voltage	40V	
Internal Resistance	≤40mΩ	AC,1kHz,25%SOC
Size	482±2*442±2*130±2	L*W*H(mm)
Weight	41.6kg±5%	No packaging
Operating Temperature	Charge:0~55°C	Charge
	Discharge: -20~55°C	Discharge

6.3 Battery Cluster Parameters

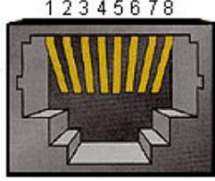
Items	Specification	Note
Rated Energy	51.2kWh	0.5C,25±2°C,2.5-3.65V
Connection	160S1P	10 modules in series
Nominal Capacity	100Ah	0.5C,25±2°C,2.5-3.65V
Nominal Voltage	512V	
Standard Charging Current	20A	0.2C
Standard Discharging Current	20A	0.2C
Max. Continuous Charge Current	100A	1C
Max. Continuous Discharge Current	100A	1C
Charging Cut-off Voltage	584V	
Discharge Cut-off Voltage	400V	
Internal Resistance	≤100mΩ	AC,1kHz,25%SOC
Operating Temperature	Charge:0~55°C	Charge
	Discharge: -20~55°C	Discharge

6.4 System Parameters

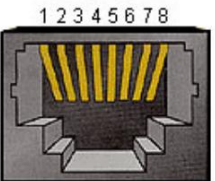
Items	Specification	Note
Rated Energy	102.4kWh	0.5C,25±2°C,2.5-3.65V
Connection	160S1P*2	
Number Of Battery Packs	2	The two clusters of batteries are not connected in parallel.
Nominal Voltage	512V	
Charging Cut-off Voltage	584V	
Discharge Cut-off Voltage	400V	
Operating Temperature	Charge:0~55°C	Charge
	Discharge: -20~55°C	Discharge
Size	1525*948*1955	L*W*H(max)
Weight.	1250kg±5%	No packaging
Air Conditioner Power.	1500W*2	220V AC

7.Port Definitions

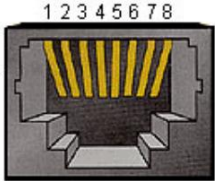
7.1 Master-PC(CAN)

CAN(master-PCS)		
RJ45 Pin	Definition	
4	CAN-H	
5	CAN-L	

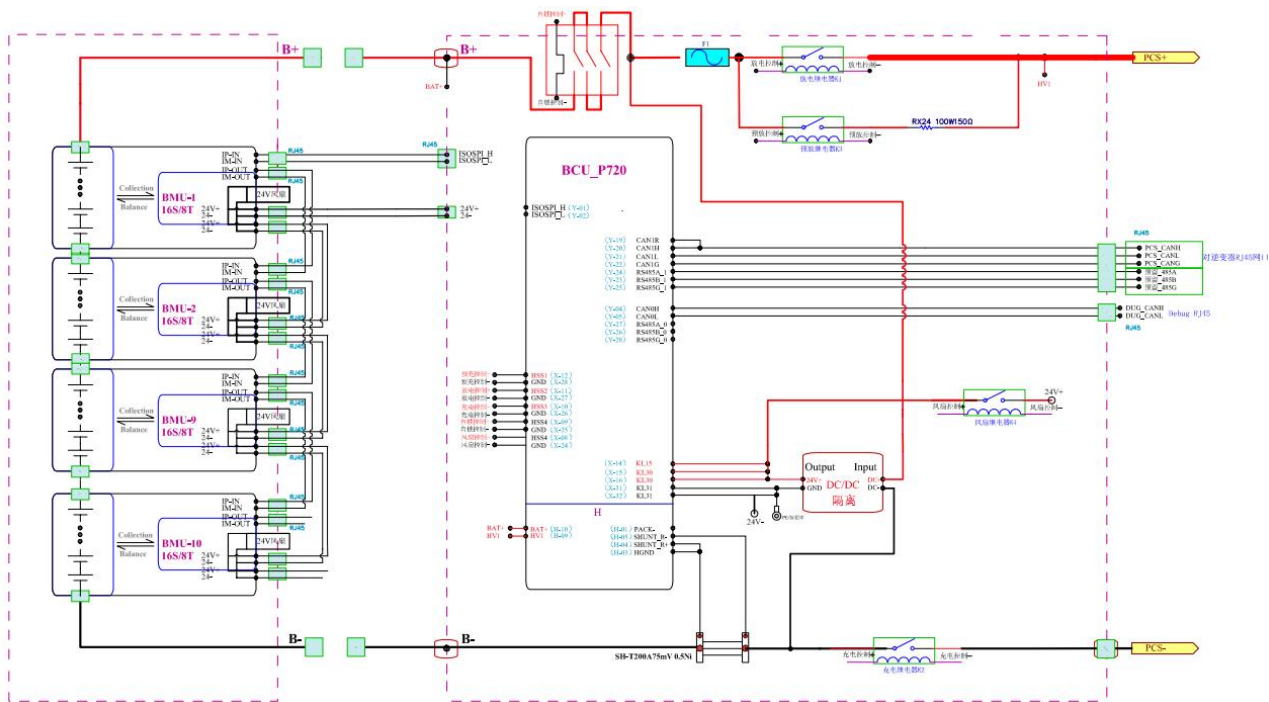
7.2 Master-PC(CAN)

CAN(master-PC)		
RJ45 Pin	Definition	
7	CAN-L	
8	CAN-H	

7.3 Master-Slave (ISOSPI)

ISOSPI(master-slave)		
RJ45 Pin	Definition	
7	ISOSPI_L	
8	ISOSPI_H	

8.Schematic Diagram



9.List of Important Components

NO.	Material	Model	Dosage/unit
1	BCU	P720	2pcs
2	BMU	P722	20pcs
3	DC/DC	SUK60-200S24	2pcs
4	Shunt	FL-2C-200A-75mV	2pcs
5	Relay	HFE82V-200B-750-24-HC5	6pcs
6	Relay	HFE80V-20C/450-24-HTQ2J	2pcs
7	FUSE	RS308-HB-2H 200A 750VDC	2pcs

10.Parameters BMS

10.1 Discharge Fault Threshold and Response Mode

NO.	Fault Name	level	Y/N	Unit	Fault threshold	Delay	Release value	Delay	Response mode
1	Discharge Pack undervoltage Protection	L1	Yes	V	$3.0*N$	2S	$3.05*N$	2S	1.Alarm; 2.The required Discharge power is 50%;
		L2	Yes	V	$2.9*N$	2S	$3.05*N$	2S	1.Alarm; 2.The required Discharge power is 0%; 3. Discharge disable
		L3	Yes	V	$2.8*N$ N: the number of battery strings	2S	$>3.05*N$ $\geq 3.05*N$ and $SOC \geq 30\%$	2S	1.Alarm; 2.Discharge disable 3.Forcible charging is enabled; 4.Disconnect discharge relay after 5min;
		L4	Yes	V	$2.55*N$	2S	$>3.05*N$ or $\geq 3.0*N$ and $SOC \geq 30\%$	2S	1.Alarm; 2. Discharge disable 3.Disconnect positive relay; (Restart recoverable) 4. Forcible charging is enabled;
2	Discharge Cell Undervoltage Protection	L1	Yes	V	3	2S	3.05	2S	1.Alarm;
		L2	Yes	V	2.9	2S	3.05	2S	1.Alarm; 2.The required discharge power is 0%; 3. Discharge disable
		L3	Yes	V	2.8	2S	>3.05 or ≥ 3.0 and $SOC \geq 30\%$	2S	1.Alarm; 2. Discharge disable 3.Forcible charging is enabled; 5.Disconnect all relay after 5min;
		L4	Yes	V	2.55	2S	≥ 3.05 or ≥ 3.0 and $SOC \geq 30\%$	2S	1.Alarm; 2.Discharge disable 3. Forcible charging is enabled; 4.Disconnect positive relay; (Restart recoverable)
3	Discharge PACK	L1	Yes	V	$3.6*N$	2S	$3.55*N$ and	2S	1.Alarm; 2. The required charge

	Overvoltage protection					SOC < 98%		power is 0%;	
		L2	Yes	V	3.63*N	2S	3.55*N and SOC < 98%	2S 1.Alarm; 2.Charge disenable 3.Disconnect positive relay;	
		L3	Yes	V	3.65*N	2S	3.55*N and SOC < 98%	2S 1.Alarm; 2.Charge disenable 3.Disconnect positive relay;	
		L4	NO	V	/	/	/	/	/
4	Regenerative Cell overvoltage Protection	L1	Yes	V	3.6	2S	3.55 and SOC < 98%	2S 1.Alarm; 2. The required charge power is 0%;	
		L2	Yes	V	3.63	2S	3.55 and SOC < 98%	2S 1.Alarm; 2.Charge disenable 3.Disconnect positive relay;	
		L3	Yes	V	3.65	2S	3.55 and SOC < 98%	3S 1.Alarm; 2.Charge disenable 3.Disconnect positive relay;	
		L4	NO	V	/	/	/	/	/
5	Discharge cell voltage difference	L1	Yes	mV	300	2S	250	2S	1.Alarm; 2.The required discharge power is 50%;
		L2	Yes	mV	400	2S	250	2S	
		L3	Yes	mV	500	2S	250	2S	
		L4	NO	mV	/	/	/	/	/
6	Discharge overtemperature protection	L1	Yes	°C	50	2S	45	2S	1.Alarm; 2.The required discharge power is 50%;
		L2	Yes	°C	55	2S	50	2S	1.Alarm; 2.The required discharge power is 0%; 3. Discharge disenable
		L3	Yes	°C	60	2S	55	2S	1.Alarm; 2. Discharge disenable 3.Disconnect positive relay;
		L4	NO	°C	/	/	/	/	/
7	Discharge Low temperature protection	L1	Yes	°C	-10	2S	-8	2S	1.Alarm; 2.The required discharge power is 50%;
		L2	Yes	°C	-15	2S	-10	2S	1.Alarm; 2.The required discharge power is 0%; 3. Discharge disenable
		L3	Yes	°C	-20	2S	-15	2S	1.Alarm;

									2. Discharge disenable 3.Disconnect positive relay;
		L4	NO	°C	/	/	/	/	/
8	Discharge cell temperature difference	L1	Yes	°C	10	2S	8	2S	1.Alarm;
		L2	Yes	°C	12	5S	10	3S	1.Alarm; 2.The required discharge power is 50%;
		L3	Yes	°C	15	5S	12	3S	1.Alarm; 2.The required discharge power is 0%; 3.Disconnect discharge relay;
		L4	NO	°C	/	/	/	/	/
		L1	NO	A	/	/	/	/	/
9	Transient discharge overcurrent	L2	NO	A	/	/	/	/	
		L3	NO	A	/	/	/	/	
		L4	NO	A	/	/	/	/	
		L1	Yes	A	105	10S	100	30S	1.Alarm; 2.The required discharge power is 50%;
10	Continuous discharge overcurrent	L2	Yes	A	110	10S	100	30S	1.Alarm; 2.The required discharge power is 0%; 3.Discharge disenable
		L3	Yes	A	115	S	5	600S	1.Alarm; 2. Discharge disenable 3.Disconnect positive relay;
		L4	NO	A	/	/	/	/	/

10.2 Charging Fault Threshold and Response Mode

No.	Fault Name	level	Y/N	Unit	Fault threshold	Delay	Release value	Delay	Response Mode
1	Charge Pack Overvoltage Protection	L1	NO	V	/	/	/	/	/
		L2	Yes	V	3.63*N	1S	3.4*N	2S	1.The requested charging power is 0; 2.charge disenable
		L3	Yes	V	3.65*N	1S	3.4*N	2S	1.Alarm; 2.The requested charging power is 0; 3. Charge disenable 4.Disconnect discharge relay;
		L4	Yes	V	3.7*N	1S	3.4*N	2S	1.Alarm; 2.The requested charging

									power is 0; 3. Charge disable 4.Disconnect discharge relay;
2	Charge Cell Overvoltage Protection	L1	NO	V	/	/	/	/	
		L2	Yes	V	3.63	1S	3.4 or SOC \leq 95%	2S	1.Alarm; 2.The requested charging power is 0; 3.Charge disable
		L3	Yes	V	3.65	1S	3.4 or SOC \leq 95%	2S	1.Alarm; 2.The requested charging power is 0; 3.Charge disable 4.Disconnect positive relay;
		L4	Yes	V	3.70	1S	3.4 or SOC \leq 95%	2S	/
3	Charge Pack Undervoltage Protection	L1	Yes	V	2.4*N	2S	$>3.1*N$ or $\geq 3.0*N$ and SOC \geq 30%	2S	1.Alarm; 2. The requested charging power is 50%; 3.Forcible charging is enabled;
		L2	Yes	V	2.2*N	2S	$>3.1*N$ or $\geq 3.0*N$ and SOC \geq 30%	2S	1.Alarm; 2. The requested charging power is 50%; 3.Forcible charging is enabled;
		L3	Yes	V	2.0*N	2S	$>3.1*N$ or $\geq 3.0*N$ and SOC \geq 30%	2S	1.Alarm; 2. Charge disable 3.Forcible charging is enabled($<5A$);
		L4	NO	V	/	/	/	/	/
4	Charge Cell Undervoltage Protection	L1	Yes	V	2.4	2S	$>3.1*$ or $\geq 3.0*$ and SOC \geq 30%	2S	1.Alarm; 2. The requested charging power is 50%; 3.Discharge disable 4.Forcible charging is enabled;
		L2	Yes	V	2.2	2S	$>3.1*$ or $\geq 3.0*$ and SOC \geq 30%	3S	1.Alarm; 2. The requested charging power is 50%; 3.Discharge disable 4.Forcible charging is enabled;
		L3	Yes	V	2.0	2S	$>3.1*$ or $\geq 3.0*$ and SOC \geq 30%	3S	1.Alarm; 2. Discharge disable 3. Forcible charging is

									enabled(<5A);
		L4	NO	V	/	/	/	/	/
5	Charge cell voltage difference	L1	Yes	mV	300	2S	250	2S	1.Alarm;
		L2	Yes	mV	400	2S	250	2S	2. The requested charging power is 50%;
		L3	Yes	mV	500	2S	250	2S	
		L4	NO	mV	/	/	/	/	/
6	charge overtemperature protection	L1	Yes	°C	50	2S	48	1S	1.Alarm;
		L2	Yes	°C	55	2S	50	1S	1.Alarm; 2. The requested charging power is 0%; 3.Charge disenable
		L3	Yes	°C	60	2S	55	1S	1.Alarm; 2.The requested charging power is 0%; 3.Disconnect positive relay;
		L4	NO	°C	/	/	/	/	/
7	Charge low-temperature protection	L1	Yes	°C	2	2S	5	2S	1.Alarm;
		L2	Yes	°C	0	2S	3	2S	1.Alarm; 2.The requested charging power is 0%; 3.Charge disenable
		L3	Yes	°C	-1	2S	1	2S	1.Alarm; 2.The requested charging power is 0%; 3.Charge disenable; 4. Disconnect positive relay
		L4	NO	°C	/	/	/	/	/
8	Charge cell temperature difference	L1	Yes	°C	20	2S	15	2S	1.Alarm;
		L2	Yes	°C	23	2S	15	2S	2..The requested charging power is 50%;
		L3	Yes	°C	25	2S	15	2S	
		L4	NO	°C	/	/	/	/	/
9	Charge overcurrent	L1	Yes	A	105	10S	100	30S	1.Alarm; 2. The requested charging power is 50%;
		L2	Yes	A	110	10S	100	300S	1.Alarm; 2. The requested charging power is 0%; 3.Charge disenable
		L3	Yes	A	115	5S	5	600S	1.Alarm; 2. Charge disenable 3.Disconnect charge relay;
		L4	NO	A	/	/	/	/	/

10.3 Other Fault

No.	Fault Name	level	Y/ N	Unit	Fault threshol	Delay	Release value	Delay	Response mode
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						d			
1	Relay adhesion failure	L1	NO	/	/	/	/	/	/
		L2	NO	/	/	/	/	/	/
		L3	Yes	/	Fault	/	/	/	1.Alarm; 2.Discharge, Charging power down to 0%; 3.Charge disenable; discharge Disenable; 4.Disconnect the positive/negative relay;
		L4	NO	/	/	/	/	/	/
2	Insulation leakage fault	L1	Yes	Ω/V	1000	0.1S	Not release	3S	1.Alarm; 2.Discharge, Charging power down to 50%;
		L2	Yes	Ω/V	500	0.1S	Not release	3S	1.Alarm; 2.Discharge, Charging power down to 0%;
		L3	Yes	Ω/V	100	0.1S	Not release	/	1.Alarm; 2.Discharge, Charging power down to 0%; 3.Charge disenable; discharge Disenable; 4. Disconnect the positive/negative relay;
		L4	NO	Ω/V	/	/	/	/	/
3	Low SOC	L3	YES	%	5	5S	30	2S	1.Discharge disenable; 2. Forcible charging is enabled;

12. Battery Power on/off Procedure

12.1 Power On And Power Off

Power On: DC Circuit Breaker (Flip to the right)

Power Off: DC Circuit Breaker (Flip to the left)

12.2 Sleep and Wakeup

Undervoltage Sleep: Lowest single cell $\leq 2.8V$ and duration ≥ 5 minutes

Wake up: Power on by restarting the switch.

13. Cautions

- 1) Do not use or leave the pack at very high temperature (for example, at strong direct sunlight or a vehicle in extremely hot conditions). Otherwise, it can overheat or fire or its performance will be degenerate and its service life will be decreased.
- 2) Do not use it in a location where static electricity is great, otherwise, the safety devices in the pack may be damaged, which will cause hidden trouble of safety.

- 3) If the pack leaks and the electrolyte get into the eyes, do not rub eyes, instead, rinse the eyes, with clean running water, and immediately seek medical attention. Otherwise, eye injury can result.
- 4) If the pack takes off an odor, generates heat, becomes discolored or deformed, or in any way appear abnormal during use, recharging or storage, immediately remove it from the device or battery charge and stop using it.
- 5) In case the pack terminals are dirt, clean the terminals with a dry cloth before use. Otherwise power failure or charge failure may occur due to the poor connection with the instrument.
- 6) Be aware discharged battery may cause fire or smoke, tape the terminals to insulate them.
- 7) The pack should be stored at room temperature, charged to about 40% to 60% of capacity. In case of over-discharge, pack should be charged for one time every 3 months while storing and batteries should be discharge and charge after being stored more than a year in order to activate it and restore energy.

14. Warnings

- 1) Load circuit may cause voltage and current, and the voltage or current may add to pack, the voltage or current must be controlled as lower than RWV and RWI, larger voltage or current may damage the PCM of pack.
- 2) To prevent the possibility of the pack from leaking, heating, fire. Please observe the following precautions:
- 3) The soft aluminum packing foil is very easily damaged by sharp edge parts such as Ni-tabs, pins and needles. Do not strike at pack with any sharp edge parts.
- 4) Do not immerse the pack in water and seawater
- 5) Do not use and leave the pack near a heat source as fire or heater
- 6) When recharging, use the battery charger specifically for that purpose
- 7) Do not reverse the positive and negative terminals
- 8) Do not connect the pack to an electrical outlet
- 9) Do not discard the pack in fire or heat it
- 10) Do not short-circuit the pack by directly connecting the positive and negative terminal with metal object such as wire
- 11) Do not transport and store the battery together with metal objects such as necklaces, hairpins etc.
- 12) Do not strike or throw the pack.
- 13) Do not directly solder the pack or battery and pierce the battery with a nail or other sharp object.

15. Others

The customer is requested to contact ASGOFT in advance, if and when the customer needs other applications or operating conditions than those described in this document. Additional experimentation may be required to verify performance and safety under such conditions.

ASGOFT will take no responsibility for any accident when the battery is used under other conditions than those described in this Document.

ASGOFT will inform, in a written form, the customer of improvement(s) regarding proper use and handing of the battery, if it is deemed necessary.

Any matters that this specification does not cover should be conferred between the customer and ASGOFT.