Product Specification

Product Name: Li-ion battery pack
Client Name:

Product Type：48V 30Ah
Cell Type：ITR26/70-46E(R5)
Pack ID：
Product Revision：A0

Suzhou Suanics Renewable Energy Co., Ltd.

File Information			
SSRE check	Prepared by	Checked by	Approved by
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Client confirmation			
	Please sign and feedback if client confirmed.		

File history records				
Item	Version	Issue Date	Description	Remarks
1	A0	2025/7/1	Ist issue	

Contents

1. Product Information

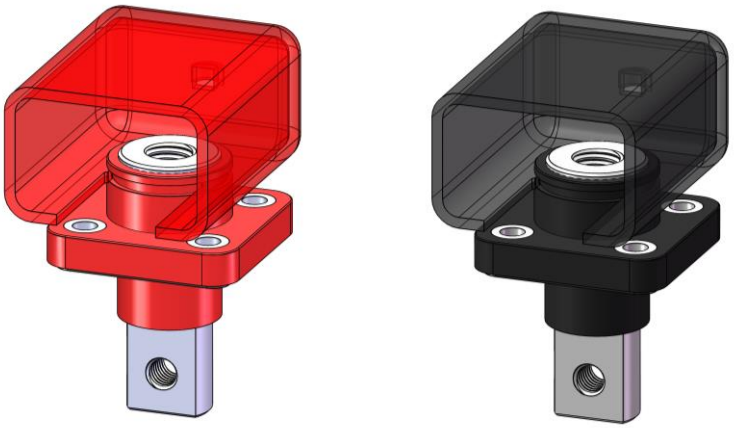
1.1 Dimension

Outline size (W×D×H): 203×230×219 (mm)（Including handle）
Weight: 13.8±0.2 kg
Cell Configuration: 15S7P

1.2 Interface Define

a) Charge & Discharge ports

a) Charging Connector Type：200A



b) Control port

a) Connector Type： GX16-5P

b) Pin sequence：As shown below.

No.	Pin mark	Definition	Remarks
1	1	CAN_H	
2	2	CAN_L	
3	3	switch	
4	4	switch	
5	5	NA	

2. Product Function

2.1 Basic Function

a) Protect function:OV/UV for cell and whole pack.
b) Protect function: OC for charge and discharge.
c) Protect function: OT/UT for charge and discharge.
d) Pack could run in sleep type and wakeup by Trig/Charger, which is helpful for lower power consumption.
e) The port of discharge and charging are similarly.
f) If the secondary overcurrent or short circuit protection is activated and cannot be restored through switch operation, the system will automatically shut down after 1 hour.

2.2 Pack parameter

No.	Type	Description	Unit	Parameters	Notes
1	Cell	Cell Type		ITR26/70-46E(R5)	
		Rating Voltage	V	3.2	
		Rating Capacity	Ah	4.6	
2	Pack	Rating Voltage	V	48	
		Max. Voltage	V	54.75	
		Min. Voltage	V	37.5	
		Rating Capacity	Ah	30	0.33C Discharge
		Nominal Capacity	Ah	32.2	0.33C Discharge
3	Charging	Charging Method		CC-CV	
		Standard Current	A	15	
		Max Current	A	30	
		Voltage	V	54.75	
		Temperature Range	℃	0℃~45℃	>40℃, 0.2C charging
4	Discharge	Shutoff Voltage	V	Pack≤39V Or any cell≤2.5V	
		Max. Continuous DSG current	A	60	
		Pre-Discharge	ms	100	
		Short-Circuit Protection	A	665	<400us
		Temperature Range	℃	-10℃~50℃	>45℃，0.2C Discharge

2.3 PCB Protection

Battery pack setting parameter table						
No.	**Item**	**Unit**	**Min**	**Type**	**Max**	**Notes**
1	Cell over-charge protection voltage	V	3.625	3.65	3.675	
2	Cell over-charge protection delay	S	0.5	1	1.5	

3	Cell over-charge protection release voltage	V	3.325	3.35	3.375	
4	Cell over-charge protection release delay	S	0.5	1	1.5	
5	Cell over-discharge shutdown voltage	V	2.475	2.5	2.525	
6	Cell over-discharge shutdown delay	s	9.8	10	10.2	
7	Pack over-discharge shutdown voltage	V	38.8	39	39.2	
8	Pack over-discharge shutdown delay	s	9.8	10	10.2	
9	Primary discharge over-current protection current	A	60	62	64	
10	Primary discharge over-current protection delay	s	9.5	10	10.5	
11	Primary discharge over-current auto release delay	s	8	10	12	
13	Secondary discharge over-current protection current	A	115	120	125	
14	Secondary discharge over-current protection delay	s	1.5	2.0	2.5	
15	Discharge short-circuit protection current	A	655	665	675	
16	Discharge short-circuit protection delay	us		< 400		
17	Charge over-current protection current	A	37	40	43	
18	Charge over-current protection delay	s	0.5	1	1.5	
19	Charge over-current protection release		Charger disconnected			
20	Discharge low-temperature protection temperature	℃	-17	-15	-13	1s
21	Discharge low-temperature protection release temperature	℃	-12	-10	-8	1s
22	Discharge high-temperature protection temperature	℃	53	55	57	1s
23	Discharge high-temperature protection release temperature	℃	48	50	52	1s
24	Charge low-temperature protection temperature	℃	-4	-2	0	1s
25	Charge low-temperature protection release temperature	℃	0	2	4	1s
26	Charge high-temperature protection temperature	℃	48	50	52	1s
27	Charge high-temperature protection release temperature	℃	43	45	47	1s
29	Power consumption in sleep mode	μA		< 20		
30	Power consumption in operation state	mA		<30		No load
31	Cell balance		Enable： Cell Voltage 3.3V~3.6V, Difference >50mV Disable：Voltage Difference <20mV			

2.4 LED Status

<table>
<tr><th>Status</th><th>LED</th></tr>
<tr><td>Discharge</td><td>
<table>
<tr><td>80% <= SOC <= 100%</td><td>  </td></tr>
<tr><td>60% <= SOC < 80%</td><td>  </td></tr>
<tr><td>40% <= SOC < 60%</td><td>  </td></tr>
<tr><td>20% <= SOC < 40%</td><td>  </td></tr>
<tr><td>5%<= SOC < 20%</td><td>  </td></tr>
<tr><td>0% < SOC < 5%</td><td>  </td></tr>
</table>
</td></tr>
<tr><td>Charging</td><td>Red LED OFF; Green LED flash one by one</td></tr>
<tr><td>Fault</td><td>Discharge:
1 Short circuit: Red light on constantly, all green lights flashing.
 
2 FET NTC short circuit: Red light on constantly, green LED2 flashing.
 
3 FET NTC open circuit: Red light on constantly, green LED4 flashing.
 
4 CELL NTC short circuit: Red light on constantly, green LED3 flashing.
 
5 CELL NTC open circuit: Red light on constantly, green LED5 flashing.
6 First-level overcurrent: Red light on constantly, green LED1, LED2, LED3, LED4 flashing.
7 Second-level overcurrent: Red light on constantly, green LED2, LED3, LED4, LED5 flashing.
8 Overtemperature during discharge: Red light on constantly, green LED1, LED2, LED3 flashing.
9 Low temperature during discharge: Red light on constantly, green LED2, LED3, LED4 flashing.
10 Cell voltage difference: Red light on constantly, green LED1, LED2 flashing.</td></tr>
</table>

	11 FET overtemperature: Red light on constantly, green LED2, LED3 flashing. 12 Large temperature difference between CELL NTCs: Red light on constantly, green LED3, LED4 flashing. 13 UV: Red light on constantly, all green lights off. Charging: 1 Short circuit: Red light flashing, all green lights flashing. 2 FET NTC short circuit: Red light flashing, green LED2 flashing. 3 FET NTC open circuit: Red light flashing, green LED4 flashing. 4 CELL NTC short circuit: Red light flashing, green LED3 flashing. 5 CELL NTC open circuit: Red light flashing, green LED5 flashing. 6 Overcurrent during charging: Red light flashing, green LED1, LED2, LED3, LED4 flashing. 7 Overtemperature during charging: Red light flashing, green LED1, LED2, LED3 flashing. 8 Low temperature during charging: Red light flashing, green LED2, LED3, LED4 flashing. 9 Cell voltage difference: Red light flashing, green LED1, LED2 flashing. 10 FET overtemperature: Red light flashing, green LED2, LED3 flashing. 11 Large temperature difference between CELL NTCs: Red light flashing, green LED3, LED4 flashing. 12 OV2: Red light flashing, green LED4, LED5 flashing.
SOC < 1%	Red LED and the neighbor green LED flash alternately
Shutoff	All LED OFF
Standby	Red LED OFF; Lighted Green LED quantity corresponds to the SOC, each LED indicates about 20% SOC.

2.4 Charger

Charger Parameter

- Charging voltage：54.75V；
- Charging current：Max.30A
- Charging Mode：
  CC-CV, off when current less than1.5A.

Battery pack will switch on CHG after charge voltage detected, and will switch off CHG after 10 seconds without charging current.

2.5 Main IC

Item	Name	Model	Parameters	Notes
1	Main IC	BQ7694003DBT	TI	
2	MCU	STM32F103RCT6	STMicroelectronics	
3	N-MOSFET	KJ011N10T	KJX-semi	
4	FUSE	SCP60A12K	LANSON	

Item	Name	Model	Parameters	Notes
5	NTC	NL103AT3435F	NEWLIFE	

3. Performance Testing

3.1 Testing Condition

Testing Item	Testing Method	Notes
Standard charging	CC 25A to 54.75V, then CV until charging current is less than 1.5A.	
Nominal Capacity	CC 0.33C DSG to UV protection of any cell at 25℃.DSG capacity ≥50Ah.	
DSG Capacity At High Current	CC 30A DSG to UV protection of any cell. Normal room temperature, DSG capacity ≥95%.	
Capacity of LT charging	Quick charging at 0℃, and CC 1C DSG. The DSG capacity is no less than 80% nominal capacity.	
Capacity of HT charging	Quick charging at 40℃, and CC 1C DSG. The DSG capacity is higher than 90% nominal capacity.	
Cycling Life	CC/CV charging at RT, and CC 0.5C DSG. The DSG capacity is higher than 80% nominal capacity after 3500 cycles.	
Initial Resistance	<50mΩ	
SOC remaining	Standard charging and keep 30 days without any load connection. CC 0.33C to UV, The DSG capacity is higher than 90% original capacity	
Certification	The product could meet the requirements of UN38.3 & IEC62169.	
Environment Policy	The product comply with RoHS 2.0.	

3.2 Delivery parameter

No.	Items	Value	Device/Method	Unit	Remarks
1	Appearance	Follow SOP	Visual		100%
2	Function		Auto testing appliance		Auto line, 100%
3	Pack voltage	48.5V≥V≥47.5	Multimeter	V	Auto line, 100%
4	Pack internal impedance	R≤75	Impedance tester	mΩ	Auto line, 100%
5	Pack SOC	≥30%	OCV-SOC, Auto line		OCV-SOC comparison
6	Cell Voltage tolerance	≤25	Auto line	mV	Auto line
7	Cell Impedance tolerance	≤2	Auto line	mΩ	Auto line
8	Short protection	Short protection	According to request	/	Auto line

4. Environment testing

4.1 Vibration

- **Test method**

a) Sinusoidal waveform with a logarithmic sweep between 7 Hz and 200 Hz, 3 hours for each three mutually perpendicular mounting positions.

b) Logarithmic frequency sweep is as follows: from 7 Hz a peak acceleration of 1 gn is maintai ned until 18 Hz is reached. Amplitude is maintained at 0.8 mm (1.6 mm total excursion) and frequency increased until a peak acceleration of 8 gn occurs (approximately 50 Hz). A peak acceleration of 8 gn is n maintained until frequency is increased to 200 Hz.

- **Acceptance criteria**

a) No mass loss, no leakage, no venting, no disassembly, no rupture and no fire after testing.

c) The open circuit voltage is no less than 90% with beginning of testing.

4.2 Mechanical shock

Test purpose

Shocks encountered during handling or transportation shall not cause fire, explosion or leakage.

- **Test requirements**

a) The fully charged cell or battery is secured to the testing machine by means of a rigid mount which will support all mounting surfaces of the cell or battery. The cell or battery is subjected to a total of three shocks of equal magnitude. The shocks are applied in each of three mutually perpendicular directions. At least one of them shall be perpendicular to a flat face.

b) Each battery shall be subjected to a half-sine shock of peak acceleration of 150 gn and pulse duration of 6 milliseconds. Each battery shall be subjected to three shocks in the positive direction followed by three shocks in the negative direction of three mutually perpendicular mounting positions of the cell or battery for a total of 18 shocks.

- **Acceptance criteria**

a) No fire, no explosion, no leakage.

b) The open circuit voltage is no less than 90% with beginning of testing.

4.3 ESD protection

a) The PCB board could meet the testing of ESD 4kV connection directly.

b) The PCB board could meet the testing of ESD 8kV in air.

4.4 Low air pressure

- **Test purpose**

Low pressure (for example, during transportation in an aircraft cargo hold) shall not cause fire or explosion.

- **Test requirements**

Each fully charged cell is placed in a vacuum chamber, in an ambient temperature of 20°C ± 5°C. Once the chamber has been sealed, its internal pressure is gradually reduced to a pressure equal to or less than 11.6 kPa (this simulates an altitude of 15240 m) held at

that value for 6h.

- **Acceptance criteria**

No fire, no explosion, no leakage.

4.5 Temperature Impact

- **Test requirements**

Stock the battery pack in 75±2℃ for 6 hours, then put the pack into the - 40±2℃ within 30 minutes and last for 6 hours, repeat 10 times. Then put the battery pack under ambient temperature (20±5℃) for 24 hours.

- **Acceptance criteria**

a) No fire, no explosion, no leakage.

b) The open circuit voltage is no less than 90% with beginning of testing.

4.6 Short protection

- **Test purpose**

Short-circuiting of the positive and negative terminals shall not cause fire or explosion.

- **Test requirements**

The battery shall be subjected to a short circuit condition with a total external resistance of less than 0.1 Ω at 55±2℃, This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to 55±2℃.

- **Acceptance criteria**

External temperature not exceed 170℃, No fire, no explosion.

5. Storage and Transportation

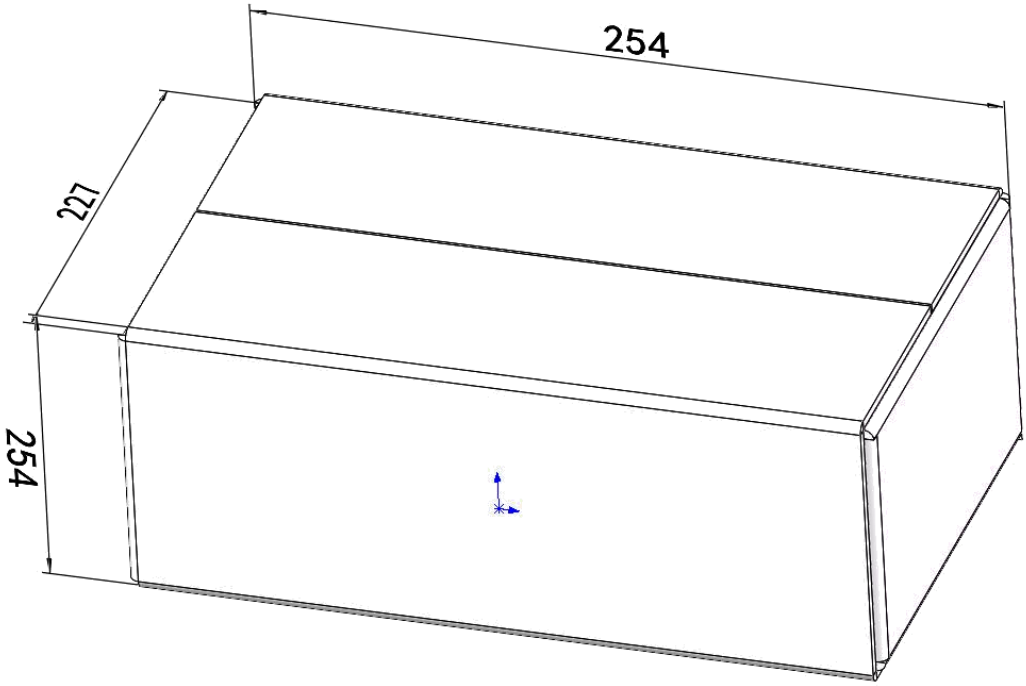
5.1 Pack Label

1) Customer label

- Stick on customer specified area.
- Size: L80×W60 mm，adhesive on back side.

5.2 Packing

Packing size: 254 (L)×254 (W)×227 (H) mm
Weight: 15±0.5 kg



5.3 Storage Environment

1) Storage temperature
   - Less than 1 months：-20℃≤T≤+45℃
   - Less than 1 year：0℃≤T≤+35℃
   - Check voltage every 3 mouths. Charge if necessary.
2) Storage humidity
   - Standard atmospheric pressure，45%～85％RH。
3) Altitude
   - Suitable for altitude from 0~2000 Meters
4) Others
   - Store the battery at no dust and no corrosive gas atmosphere. Factory warranty 3 months

5.4 Transportation

1) Don’t combine with other tip or conductive goods during transport.
2) Avoid the product close to the environment of overheating.
3) Avoid severe mechanical vibration and impact on the product.

4) Don't immerse the battery in water. Avoiding rain when in transportation.
5) Don't leave the battery near the fire or a heated source.

6. Safety of Usage

6.1 Safety warning

In order to avoid damage to equipment and personal injury caused by storage, improper use or improper operation, please read the following safety regulations carefully before using the product:

1) Use stipulated charger.
2) Don't charge the battery reversely.
3) Do not disassemble the cover of this product module by yourself.
4) When the problem status is not clear, it is necessary to disconnect the external connection plug of the product.

6.2 Application limitation

1) The pack shall be integrated with the host machine for application.
2) The battery pack shall be discharged when the total voltage is greater than the starting working voltage.
3) The battery pack can only be charged when the total voltage is less than the starting charge voltage.
4) The battery pack shall operate within the maximum allowable discharge current.