

Axxiva Sodium-ion Start-Stop Product Introduction

2025.4
1

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安瓦公司简介

安瓦公司简介



公司名称	安徽安瓦新能源科技有限公司
注册资本	9826.5236万元人民币
成立日期	2020年6月8日
注册地址	芜湖市经济技术开发区赤铸山东路28号

公司成立，落子芜湖

6月，安瓦新能源科技有限公司正式成立，落子芜湖经济技术开发区，产业化进程正式开启



项目落地，稳步建设

9月，动力电池产业园建设正式开始，规划总产能**5GWh**，总投资**18亿元**



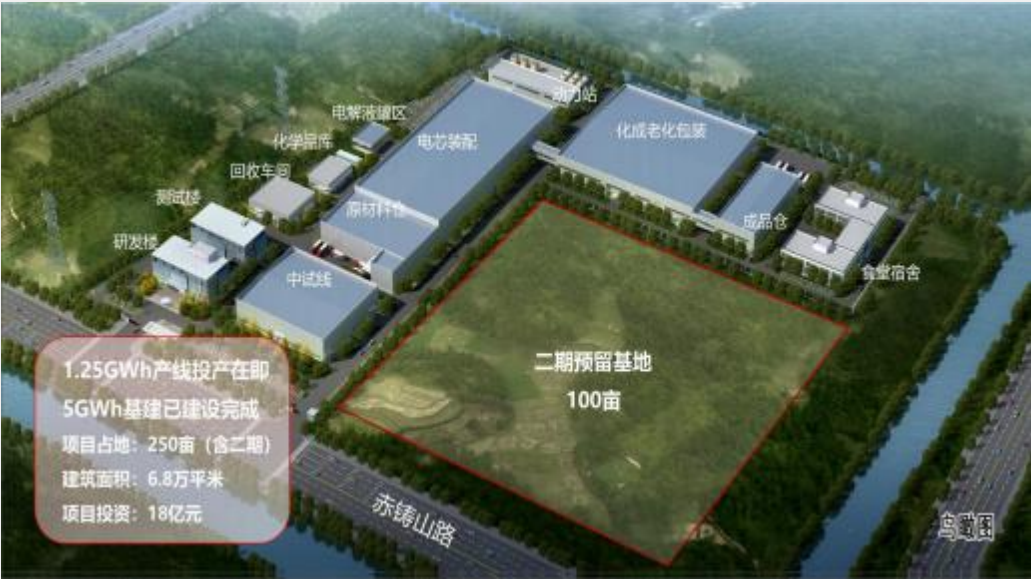
B样测试，加速推进

完成270 + Wh/kg电芯B3样开发，材料体系冻结



基建完成，量产在即

5Gwh厂房等基建已完成，1.25Gwh产线设备进场



2大应用方向

3系列产品

> 500Wh/Kg

百GWh产能

公司以固态电池解决方案为目标，通过对电池的革命性创新及持续迭代，产品可实现更环保、更高的性价比、更好的安全性。

2020年

2021年

2022年

2023年
Confidential

未来



国轩高科股份有限公司



奇瑞新能源汽车股份有限公司



GPSC Singapore Pte. Ltd.



美国24m技术公司



日本阿泽巴公司

Sodium-ion Battery Product Overview

Product Introduction - Product Models



Current Product Portfolio

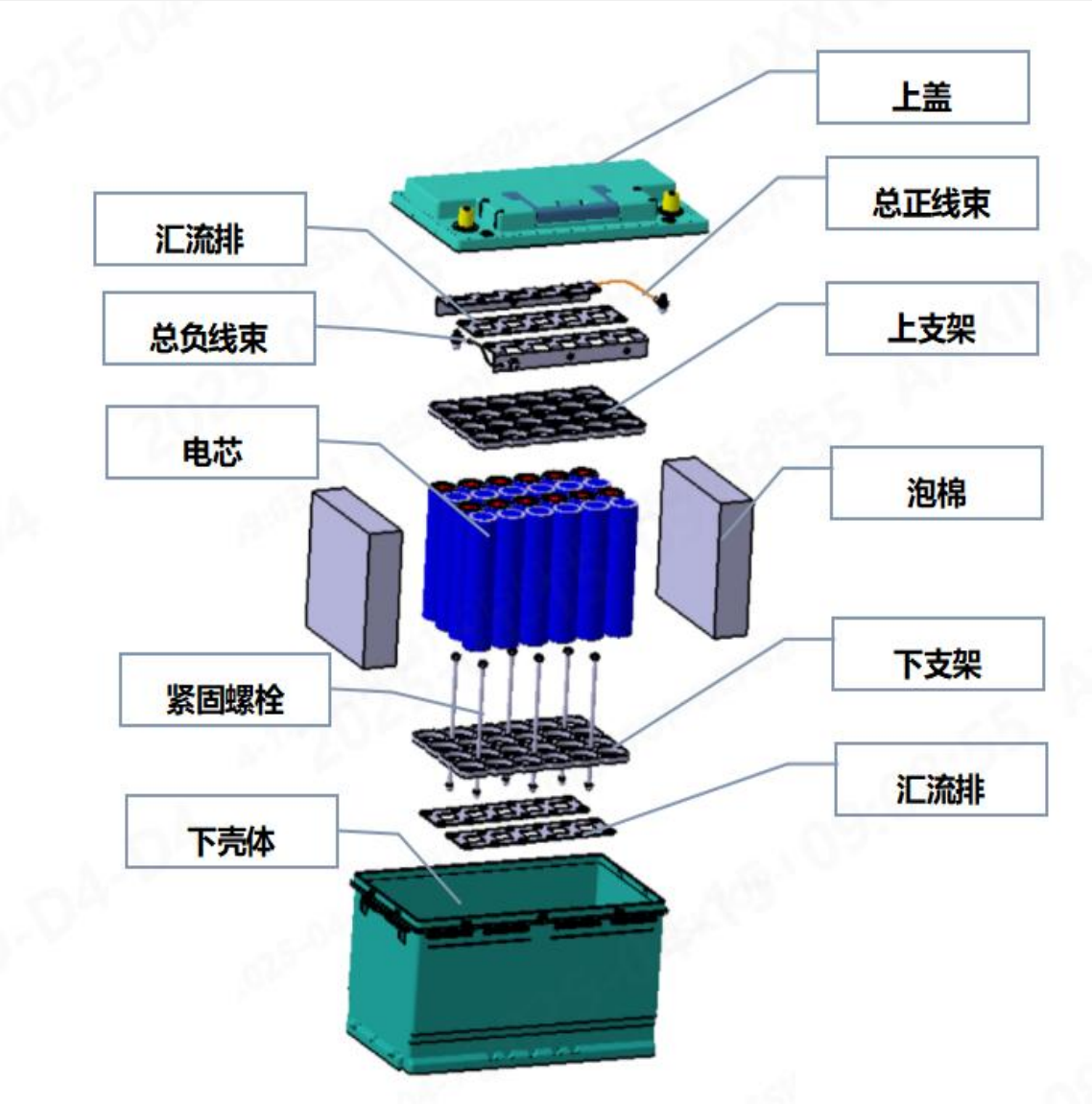
Categories: Starting, Start-Stop

Classifications: Japanese, European, American

Capacity: 20Ah–100Ah

Axxiva Start-Stop Battery Series Model Configuration Overview				
Configuration Model	No Configuration	BMS + Heating	BMS + Shunt (External Communication)	BMS + Heating + Shunt (External Communication)
H4	H4-20-A	H4-20-B	H4-20-C	H4-20-D
	H4-30-A	/	/	/
H5			H5-20-C	
	/	H5-30-B	H5-30-C	H5-30-D
	/	H5-40-B	H5-40-C	H5-40-D
	H5-50-A	H5-50-B	H5-50-C	H5-50-D
	H5-60-A	/	/	/
H6	/	H6-50-B	H6-50-C	H6-50-D
	H6-60-A	H6-60-B	H6-60-C	H6-60-D
	H6-70-A	/	/	/
H7	H7-70-A	/	/	/
	H7-80-A	/	/	/
	H7-90-A			
H8	H8-80-A	/	/	/
	H8-90-A	/	/	/
H9	H9-100-A	/	/	/

Product Introduction - Product Series



H4-30-A



H7-80-A



H5-60-A



H8-90-A

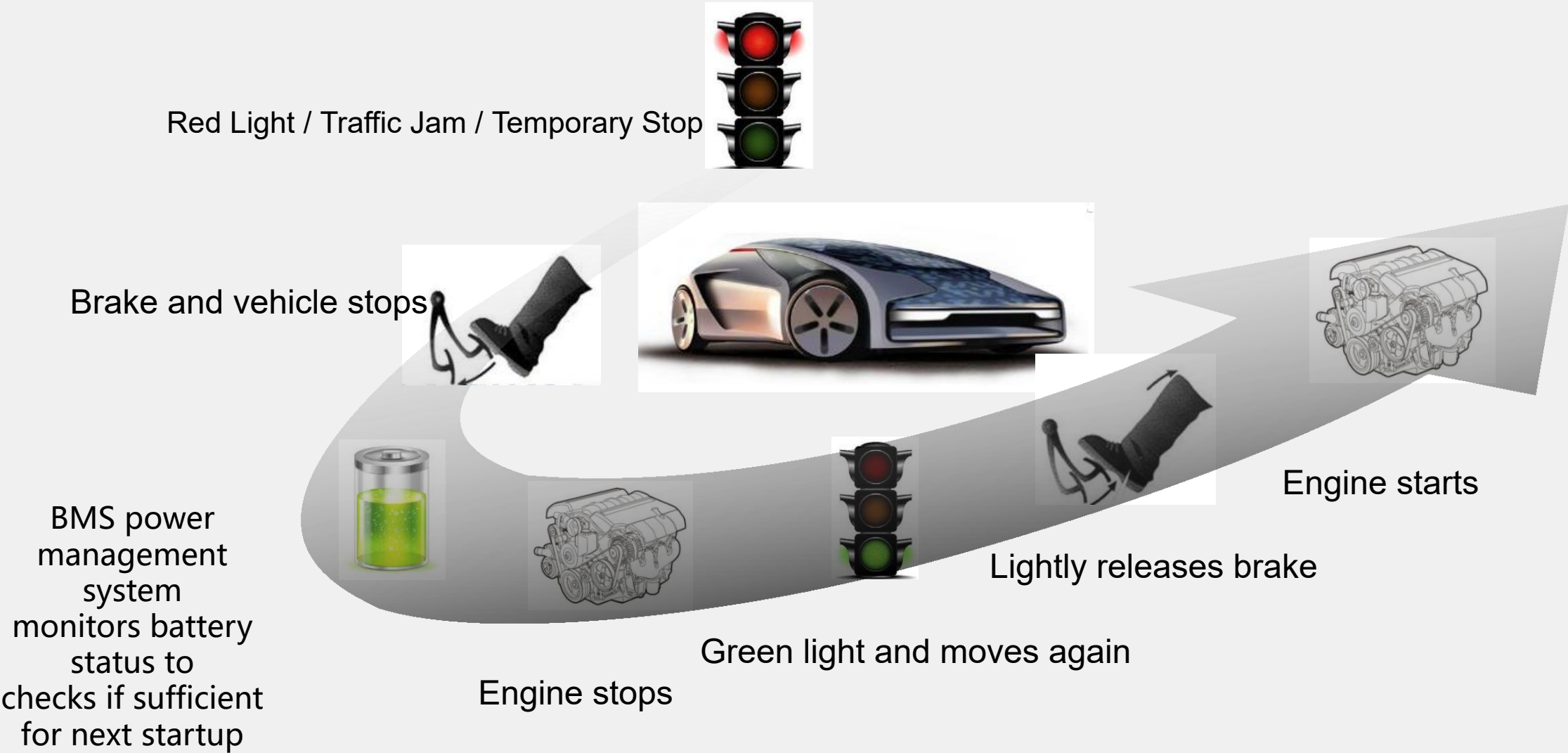


H6-70-A



H9-100-A

Product Introduction — Product Features



Na+ Start-Stop Battery



AGM Lead-Acid Battery



Axxiva Sodium-Ion Battery



寿命

2-5 years
60,000 start-stop cycles

10+ years
600,000 start-stop cycles



体验

Irreversible damage when over-discharged
6 months storage time

95%+ capacity recovery after 0V over-discharge
Over 1 year storage when fully charged



重量

Heavy weight
VARTA H7 70Ah ~22kg

50% lighter than comparable products
Axxiva H7 70Ah ~11kg



环保

Lead pollution

Lead-free, environmentally friendly



Cold start difficulty below -20° C

Normal cold start at -40° C



Lifetime Price High

Lifetime price lower
than AGM (with same CCA)

Product Parameter Comparison



Category	Lead-Acid Battery	Li-ion Battery (LFP)	Li-Ion Battery (LiMn2O4)	Sodium-ion Start-Stop Battery
Energy Density (Wh/kg)	30-50	120-180	120-180	100-160
Cost (RMB/Wh)	0.3-0.5	0.5-0.8	0.6-1.0	0.6-0.8
Room Temp Cycles	300-500cyc@80%	>2000cyc@80%	>1000cyc@80%	>3000cyc@85%
High Temp Cycles	300-500cyc@80%	>1000cyc@80%	>400cyc@80%	>2000cyc@85%@45°C
Safety	Good	Fair	Fair	Excellent
Eco-Friendliness	Poor	Good	Good	Excellent
-20°C Capacity	<60%	>60%	>70%	>90%
Key Advantages	◆ Low cost ◆ No memory effect ◆ Excellent safety and stability ◆ Fully recyclable	◆ High energy density ◆ Long cycle life ◆ Capable of high-rate charging ◆ High safety performance	◆ High Energy Density ◆ Long Cycle Life ◆ High-Rate Charging Capability ◆ Superior Safety Performance	◆ Cost-Effective ◆ High Safety ◆ High-Rate Discharge Capability ◆ Superior Thermal Stability ◆ Low-Temperature Performance ◆ Over-Discharge Resilience
	◆ Low Energy Density &	◆ High Cost	◆ High Cost	◆ Lower Energy Densi

Types of Standard	Standard #
Li-Ion Battery	GB/T 31484—2015
	IEC 62133-2-2017
	UL1642
	UN38.3
Sodium-Ion Battery	UN3551
	GB/T 44265—2024
Lead-Acid Start-Stop Battery	GB_T 5008.1-2023
	GB_T 5008.2-2023
	GB_T 5008.3-2023
	GB_T 43346-2023
	JBT 12666-2016

Typical Vehicle Test Conditions

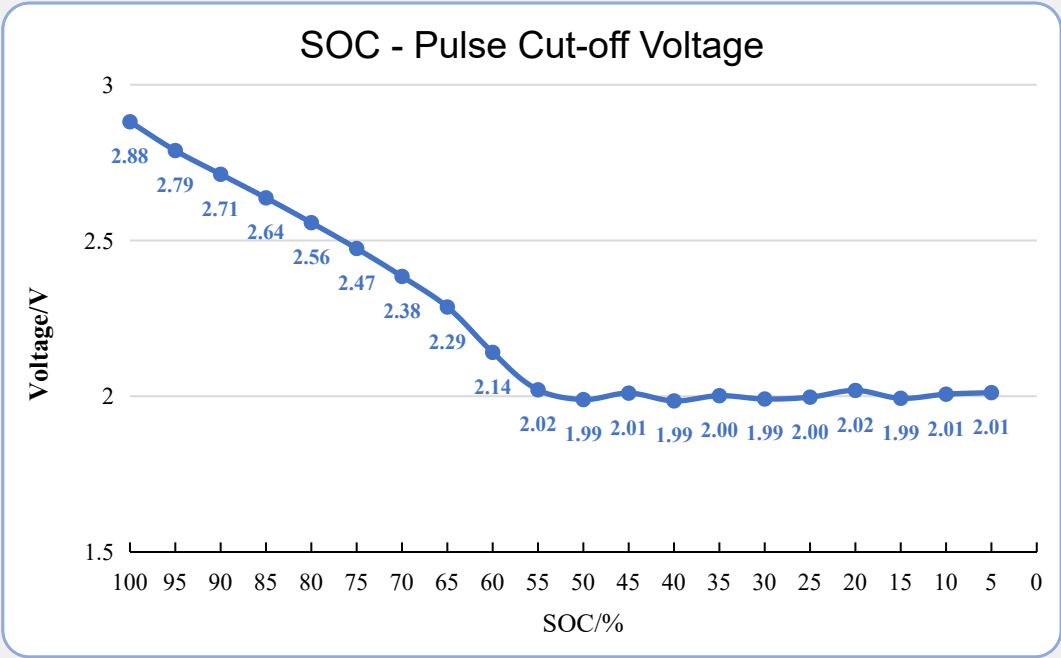
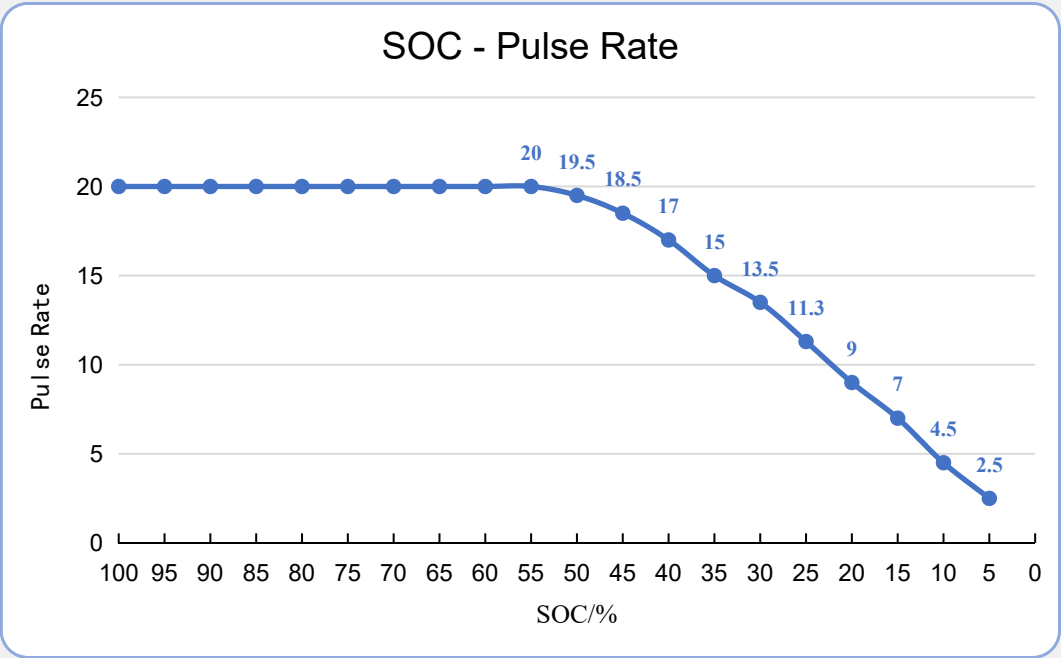


Test Item	Requirements
Charge/Discharge	Different SOC's (90%, 70%, 50%) at varying temps (-29°C, -18°C, -10°C, 0°C, 25°C, 45°C)
Low-Temp Charge / Room-Temp Discharge	0.1C charge for 1h @-29°C and 50mA discharge for 23h @25°C
Low-Temp Charge Efficiency	0.1C charge @low temp + 1C discharge @25°C for reporting efficiency data
Low-Temp Discharge	2C continuous discharge @-29°C; target duration ≥2 minutes
6V Constant-Voltage Charge	Low-voltage battery charged at 25°C/-18°C/-29°C for recording performance data
Multi-Temp SOC Discharge	Measuring voltage while 5C discharge at different temps/SOC and drop within 1 s
Cold-Start Test	Evaluate minimum starting capability @-30°C (SOC & rate limit boundaries)

25°C 20C Pulse Discharge

➤ Test Method: Perform constant-current pulse discharge at 20C for 10s with 5% SOC intervals.

Results:

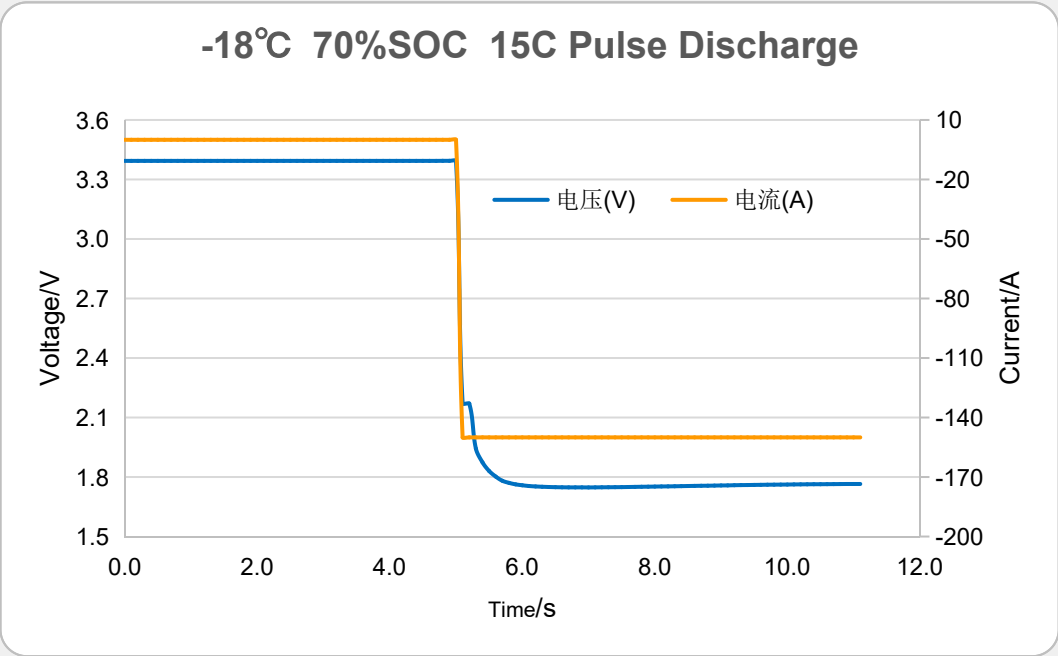
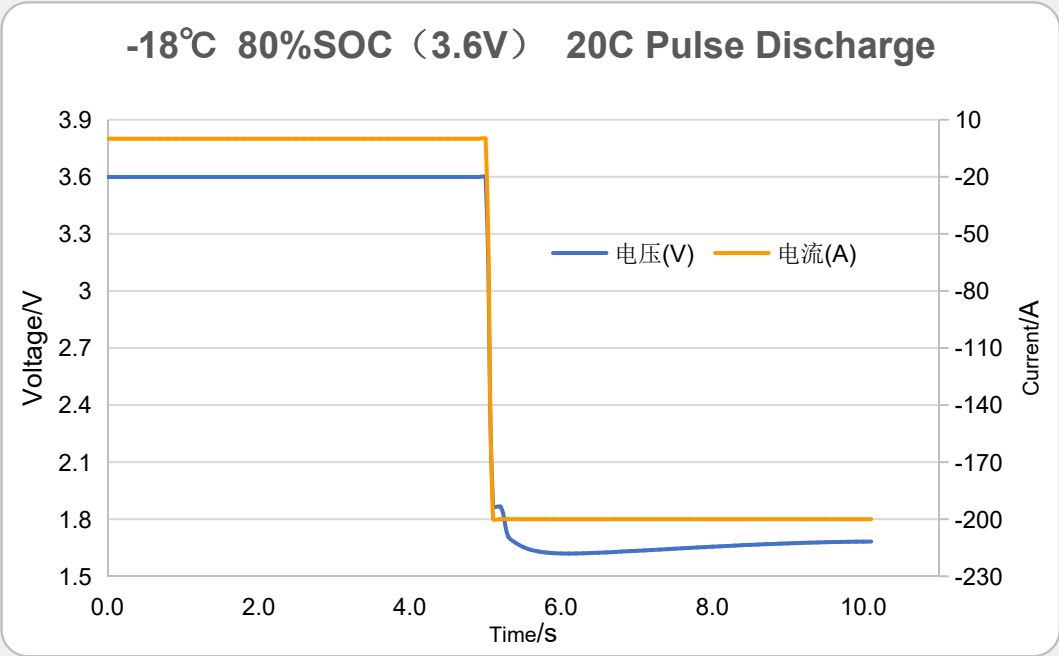


✓ Above 55% SOC, supports discharge rates of 20C and higher. Above 25% SOC, supports discharge rates of 10C and higher

-18°C Pulse Test

✓ Test Conditions: Charge at 0.5C constant current/constant voltage to different SOC levels at 25°C, then soak at -18°C for 16 hours before performing discharge tests at various rates for specified durations.

SOC \ Rate	100%	80% (3.6V)	70%	50%
	Discharge time			
10C	✓	✓	✓	5s
15C	✓	✓	5s	×
20C	5s	5s	×	×



Charge Acceptance Test

Temp	SOC	14.8V Constant Voltage Charging (200A max) – Maximum Acceptance	Low-Temp Efficiency
-29°C	90%SOC	×	80%
	70%SOC	0.5C	
	50%SOC	0.75C	
	0% (6V)	7C	
-18°C	90%SOC	×	98%
	70%SOC	1.25C	
	50%SOC	1.75C	
	0% (6V)	8C	
-10°C	90%SOC	0.5C	97%
	70%SOC	2C	
	50%SOC	3.5C	
0°C	90%SOC	0.5C	–
	70%SOC	3.75C	
	50%SOC	4.5C	

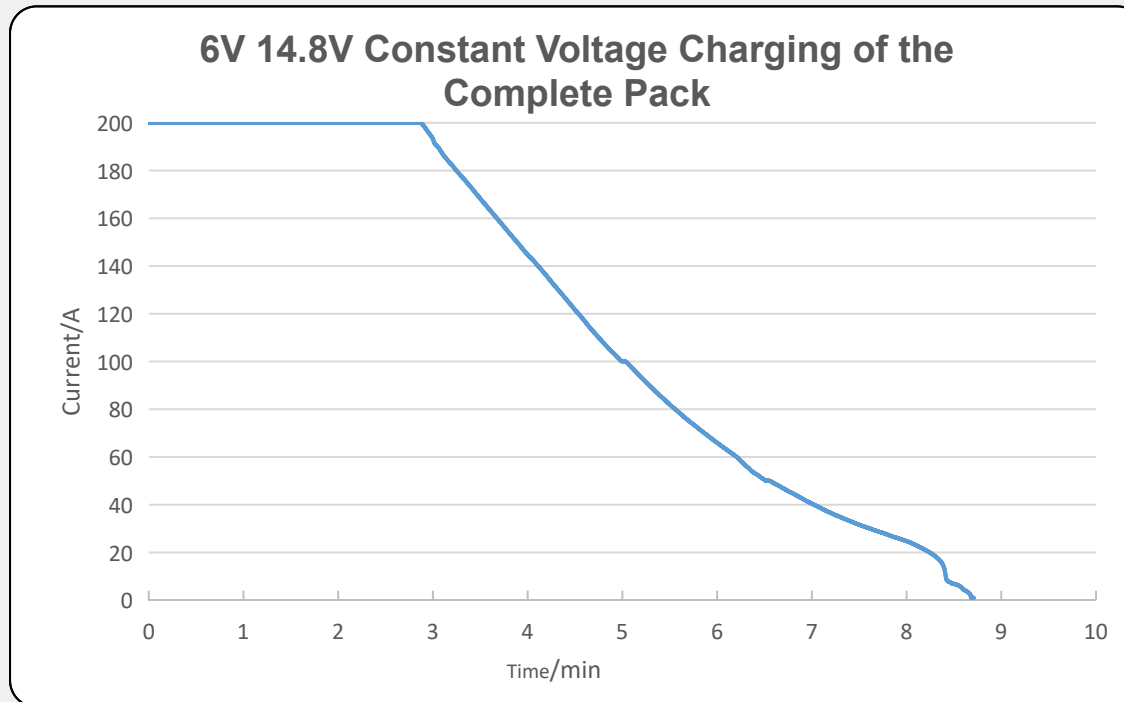
1) Test subject: 4-series 2-parallel pack 2) 3.7V per cell defined as 100% SOC

3) 14.8V 21W constant voltage charging current (200A 4) Lowest constant voltage charging efficiency (0.4C) at lowest

25°C Complete 6V Charge Acceptance Capability Test

Test Method:

- Discharge: At 25°C, discharge at a constant current of 0.5C to 6V, then rest for 30min;
- Charge: At 25°C, charge at a constant voltage of 14.8V until reaching 14.8V, then rest for 30min.



Test Result: At 25°C, the charge acceptance capability reaches 10C when the complete pack is at 6V.

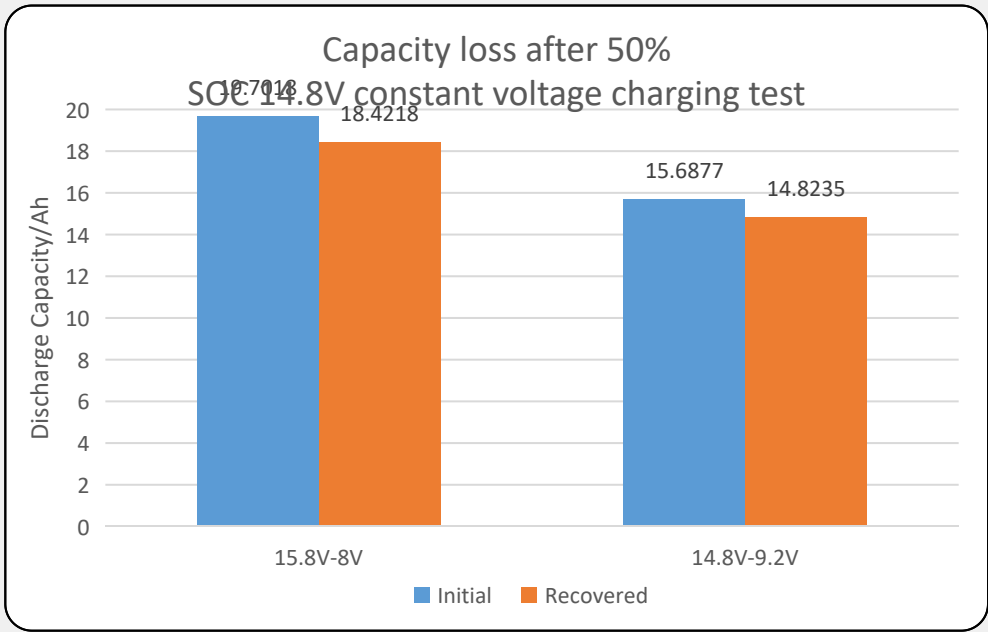
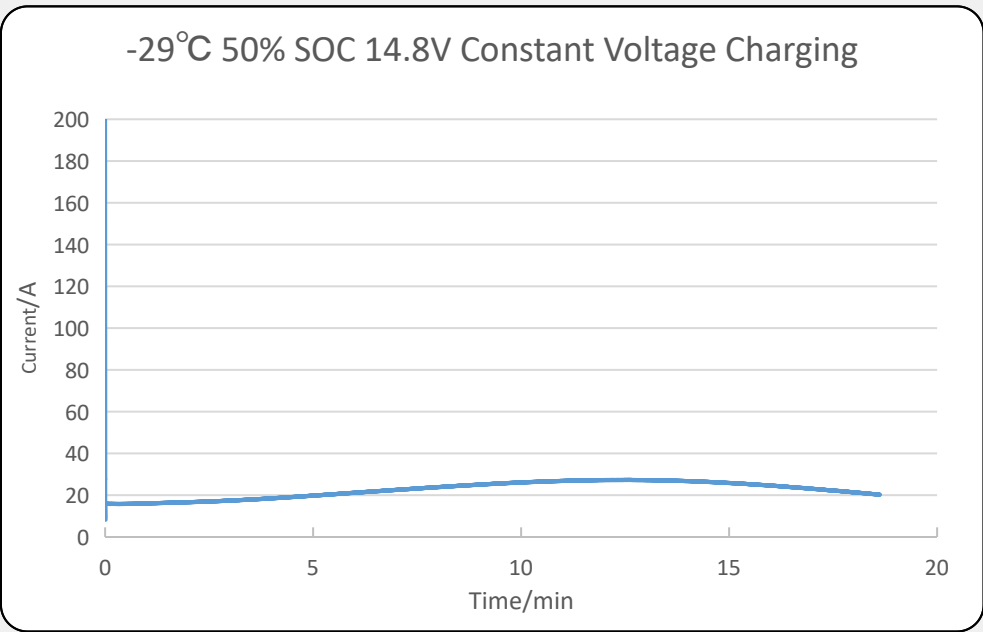
-29°C Charge Acceptance Capability Test (50% SOC)

Test Method:

Discharge: At 25°C, discharge at a constant current of 0.5C to 11.73V (2.93V per cell), then rest for 30min;

Charge: At -29°C, charge at a constant voltage of 14.8V until reaching 14.8V, then rest for 30min.

Note: 2.93V per cell corresponds to 50% SOC at room temperature (3.7V represents 100%).



Test Result:

Under -29°C conditions, the charge acceptance capability at 50% SOC is 0.75C.

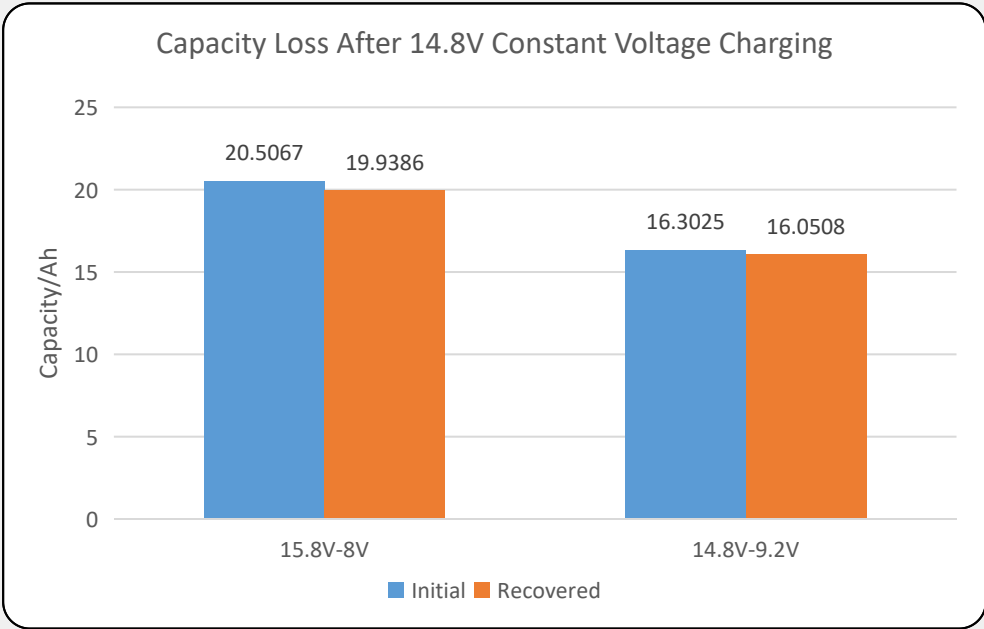
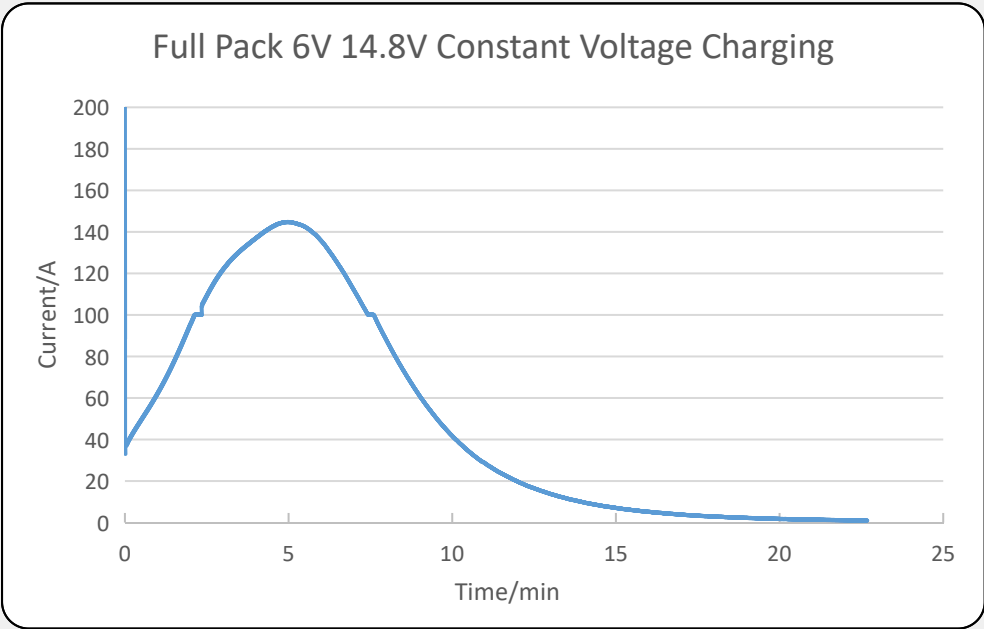
After the 14.8V constant voltage charging test, the recovered capacity exceeds 95% of the initial capacity.

-29°C Full Pack 6V (SOC 0%) Charge Acceptance Test

Test Method:

Discharge: At 25°C, discharge at 0.5C constant current to 6V, then rest for 30min.

Charge: At -29°C, charge at 14.8V constant voltage until reaching 14.8V, then rest for 30min.



Test Results:

Under -29°C conditions, the charge acceptance capability reaches 7C when the full pack is at 6V.

After the 14.8V constant voltage charging test, the recovered capacity exceeds 97% of the initial capacity.

-29°C Charging Efficiency Test

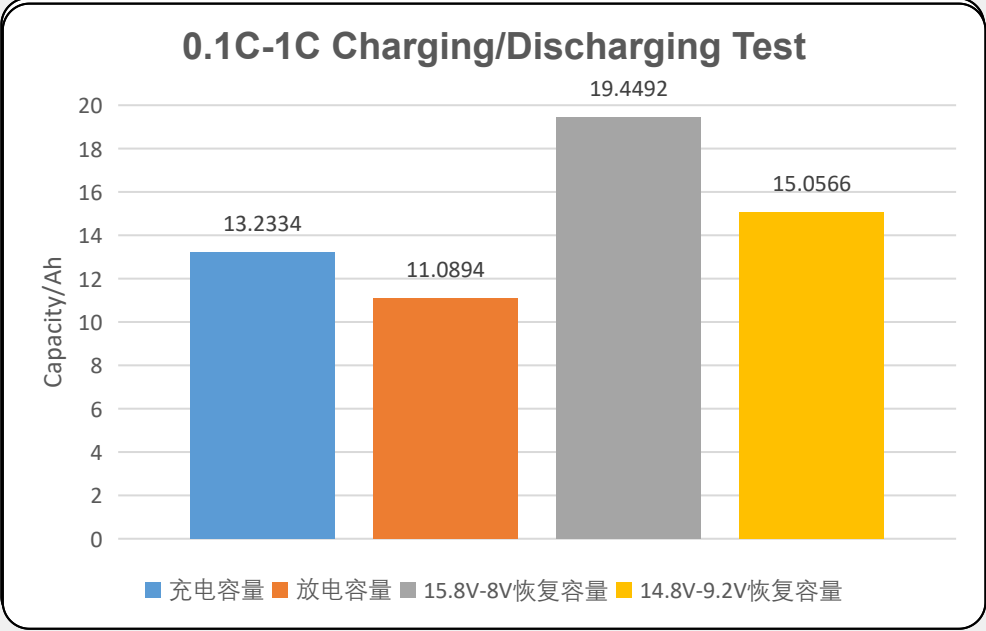
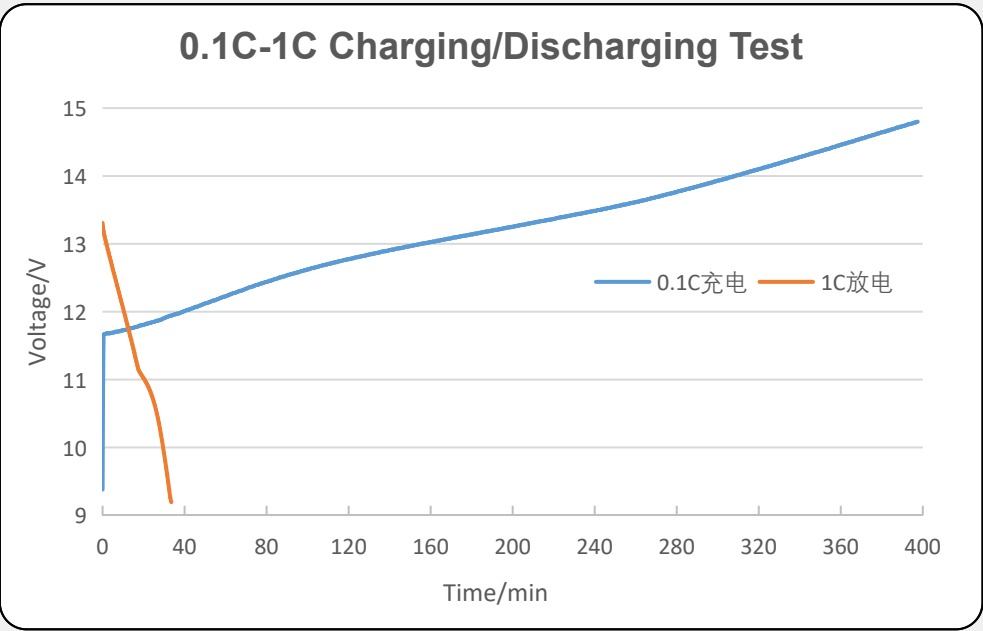
Test Objective: Test charging efficiency and capacity loss at -29°C.

Test Method:

Charge: At -29°C, charge at 0.1C constant current to 14.8V, then rest for 30min.

Discharge: At 25°C, discharge at 1C constant current to 9.2V, then rest for 30min.

Notes: Initial capacity (15.8V–8V): 19.6864Ah & Initial capacity (14.8V–9.2V): 15.6877Ah



Test Results:

Charged capacity at -29°C (0.1C): 13.23Ah

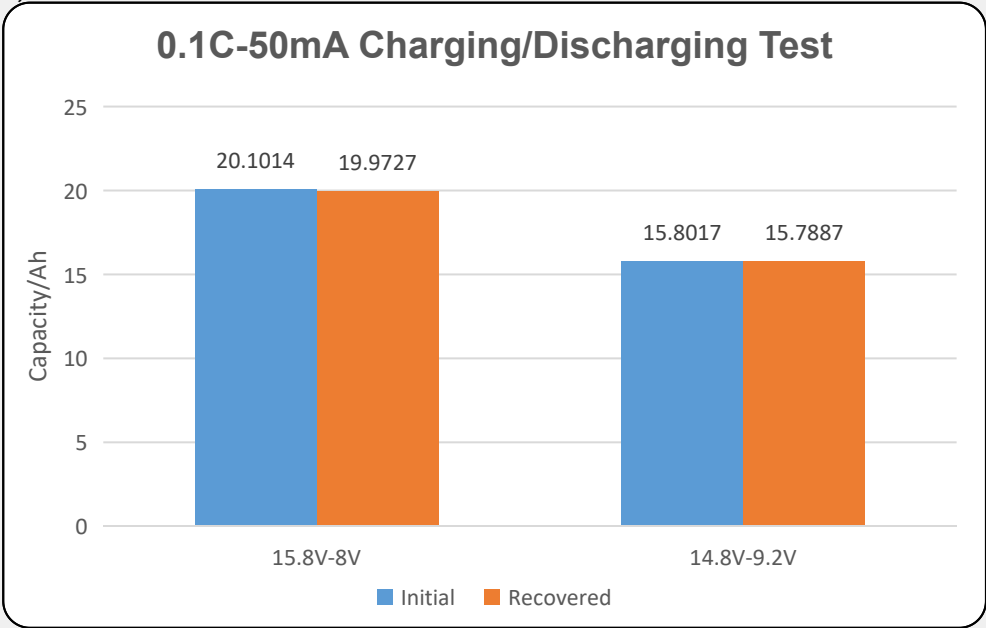
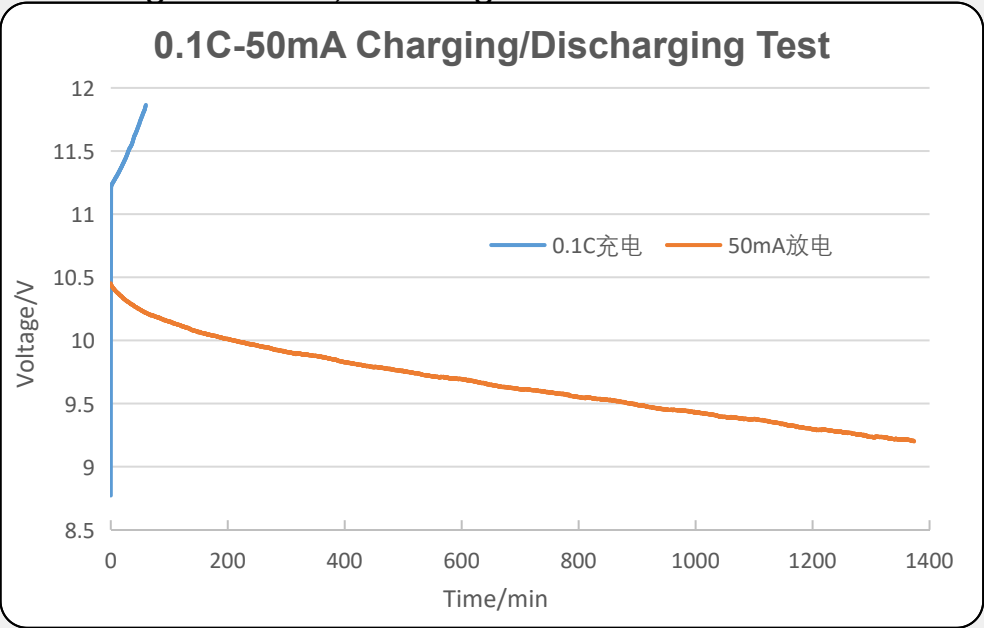
Discharged capacity at 25°C (1C): 11.08Ah, Charging efficiency: >80%, Recovered capacity: >95% of initial capacity

-29°C Charging Efficiency Test (Simulating Real-World Conditions)

Test Objective: Test low-temperature charging efficiency by simulating vehicle with short driving period (1h) charging and long parking period (23h) discharging, in order to verify whether the battery gradually loses capacity under repeated cycles.

Test Method:

Charge: At -29°C, charge at 0.1C constant current for 1h, then rest for 30min;
Discharge: At 25°C, discharge at 50mA constant current for 23h, then rest for 30min.



Test Results:

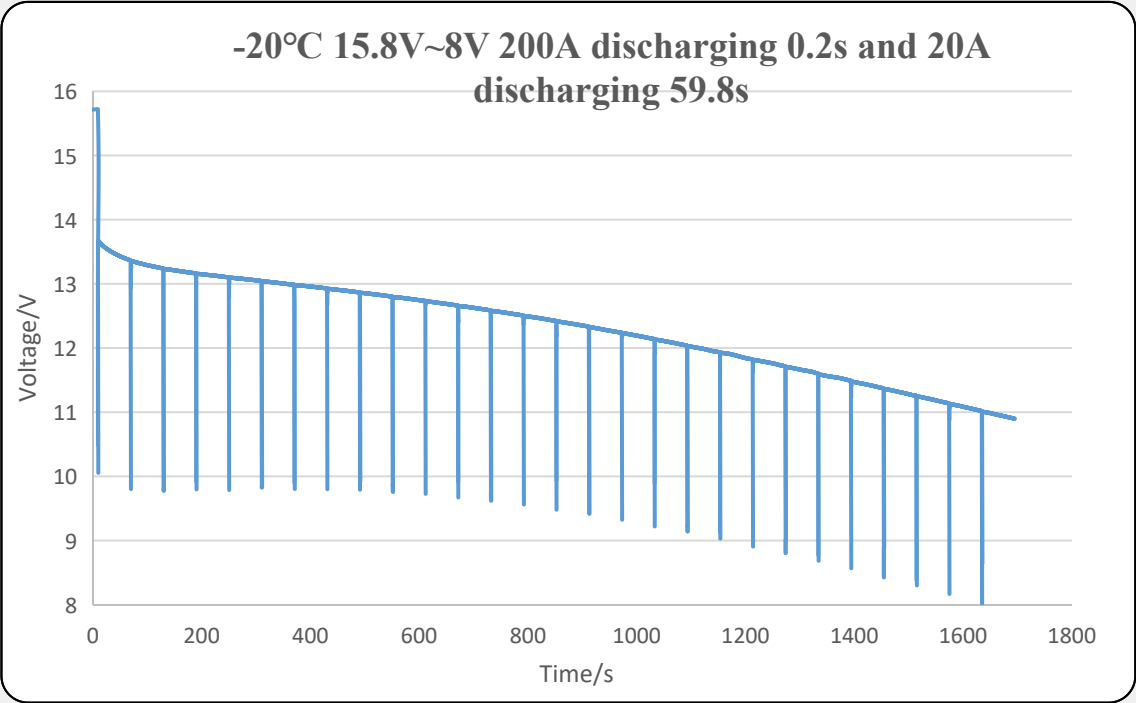
Charged capacity (-29°C, 0.1C, 1h): 2.0Ah and Discharged capacity (25°C, 50mA, 23h): 1.1Ah

-20°C Continuous Cranking Test (10C)

Test Method: Sample: 12V 20Ah Battery Pack

Charge: At 25°C, charge with 0.5C CC-CV up to 15.8V (3.95V/cell), then rest for 30min.

Discharge: At -20°C, 10C (200A) constant current discharging for 0.2s and 1C (20A) constant current discharging for 59.8s, then rest for 30min.



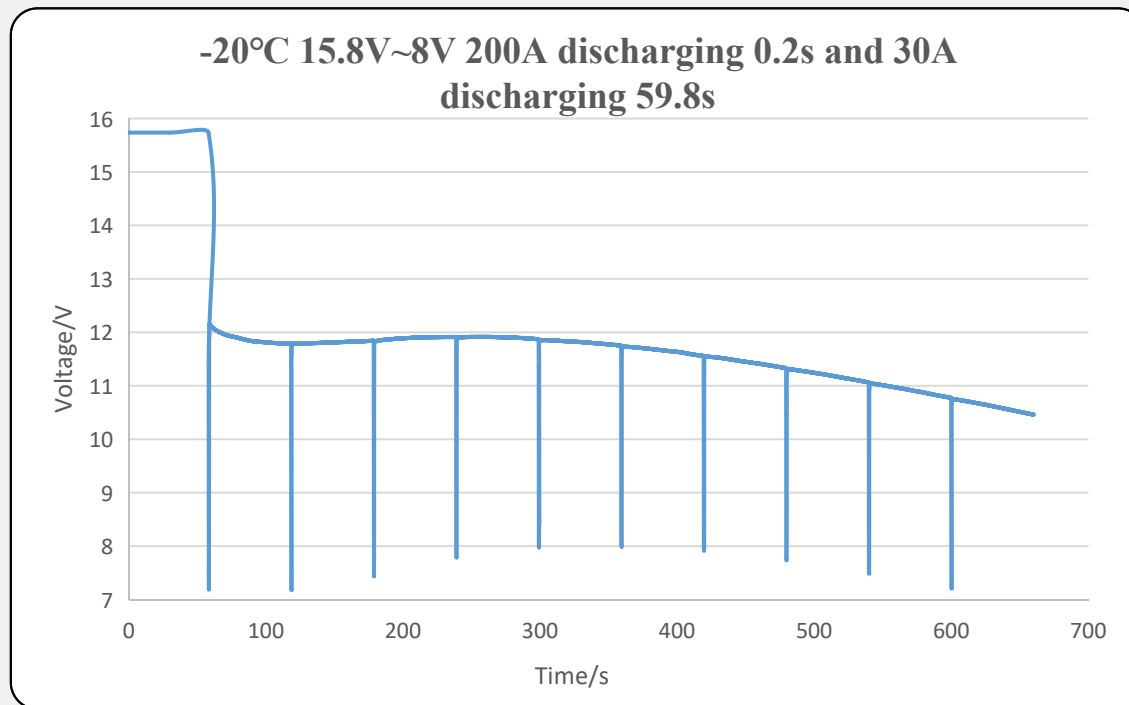
Test Results: At -20°C, cycling discharge of 200A constant current discharge for 0.2s and 20A constant current discharge for 59.8s until 8V, it is capable of 28 discharge cycles.

-20°C Continuous Cranking Test (20C)

Test Method: Sample: 12V 20Ah Battery Pack

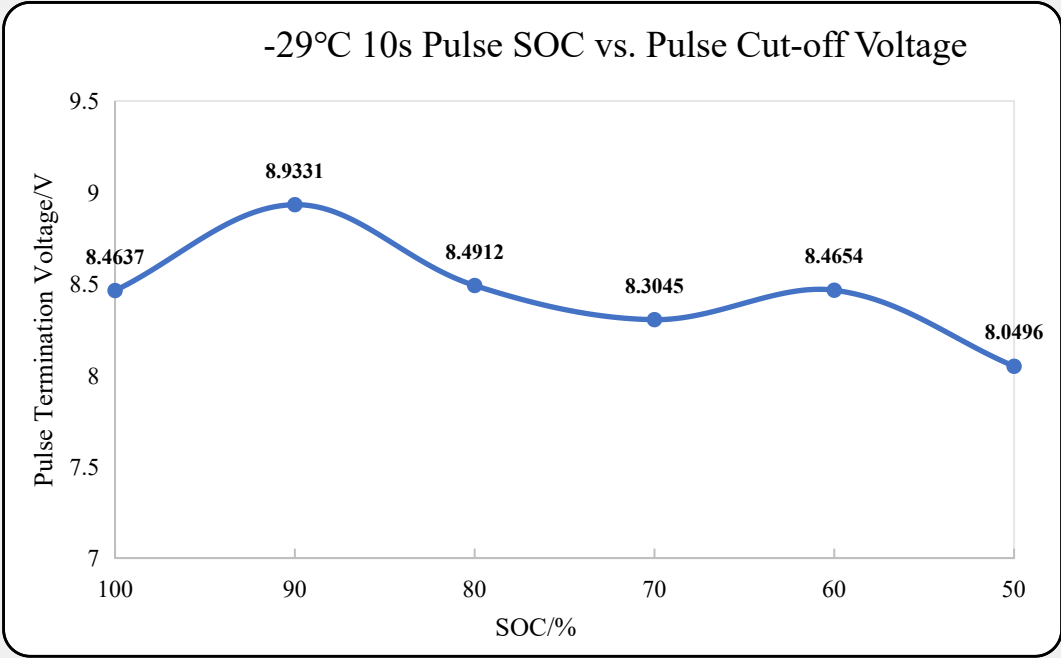
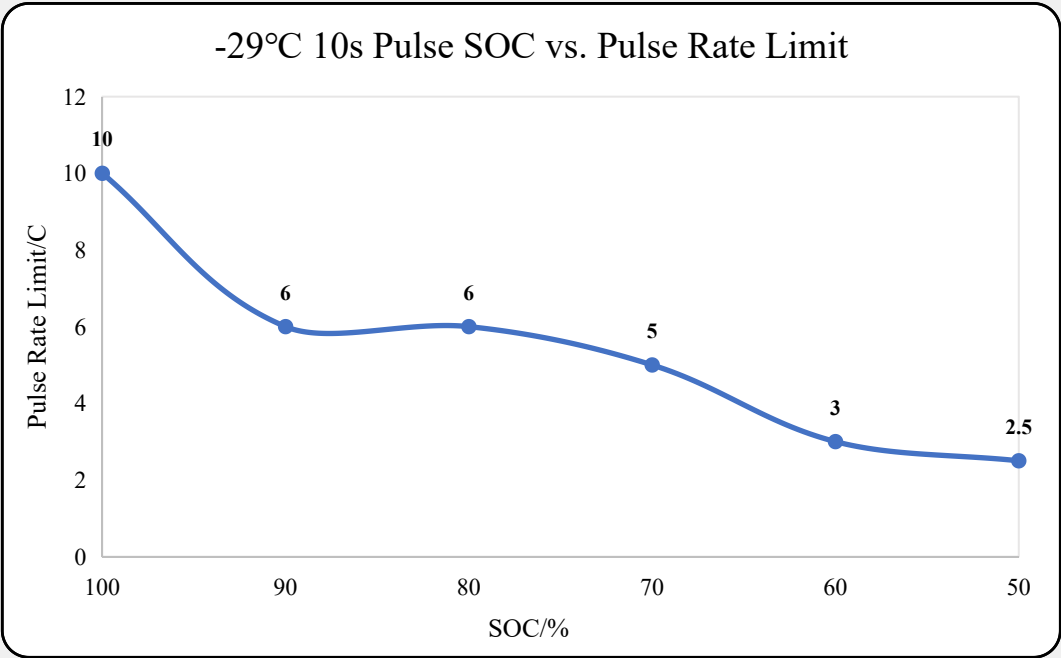
Charge: At 25°C, charge with 0.5C CC-CV up to 15.8V (3.95V/cell), then rest for 30min.

Discharge: At -20°C, 10C (200A) constant current discharging for 0.2s and 1C (20A) constant current discharging for 59.8s, then rest for 30min.



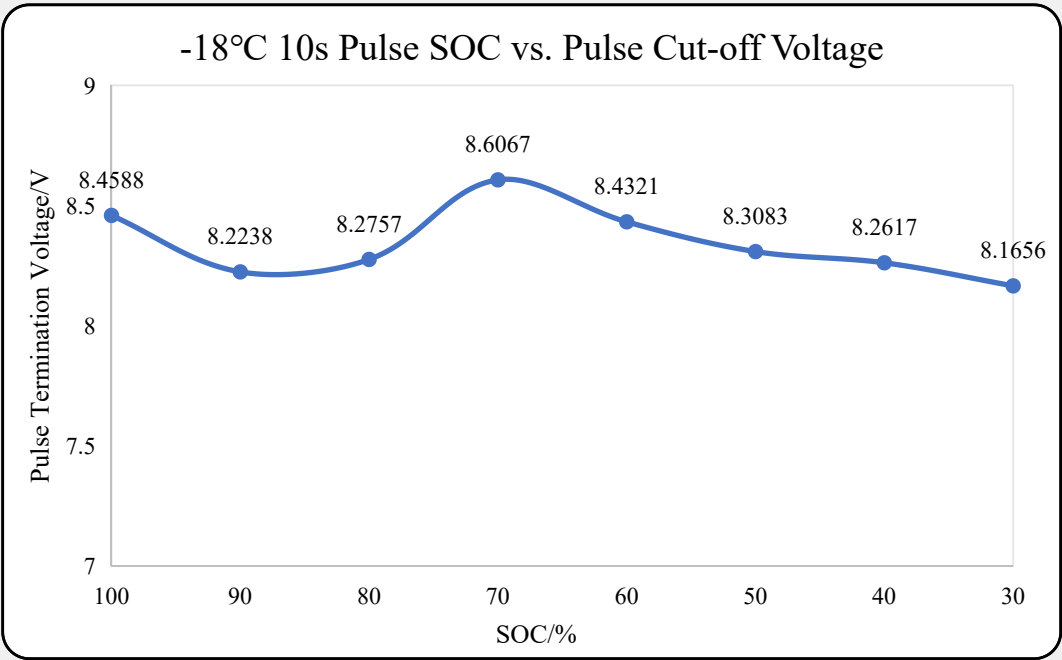
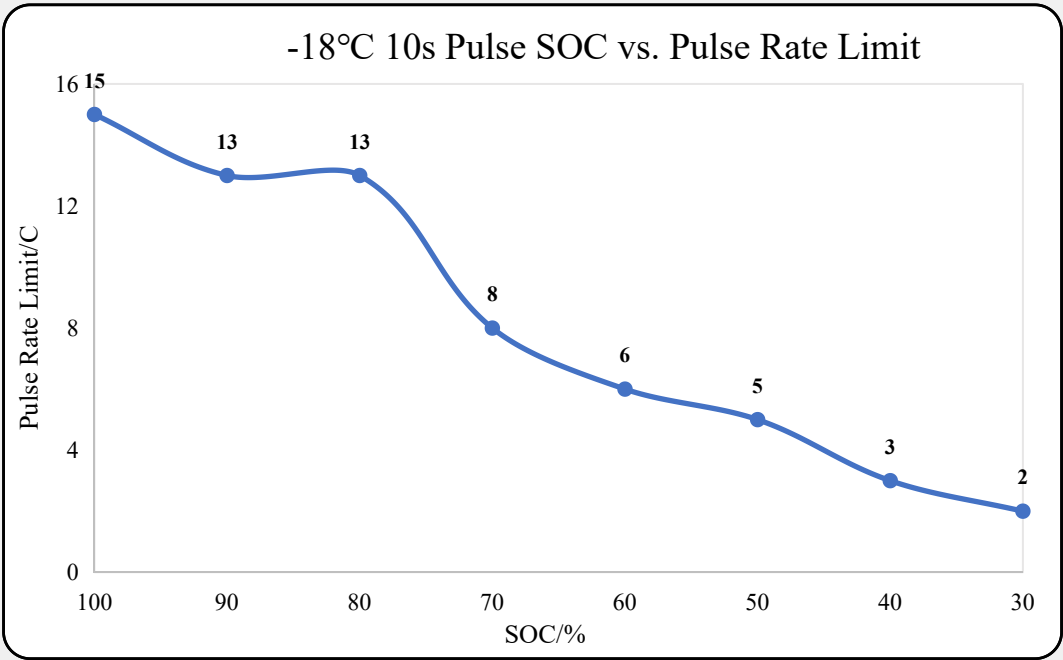
Test Results: At -20°C, cycling discharge of 200A constant current discharge for 0.2s and 30A constant current discharge for 59.8s until 8V, it is capable of 10 discharge cycles.

-29°C Low-Temperature Cranking Capability



Test Results: At -29°C, the maximum cranking capability is 10C.

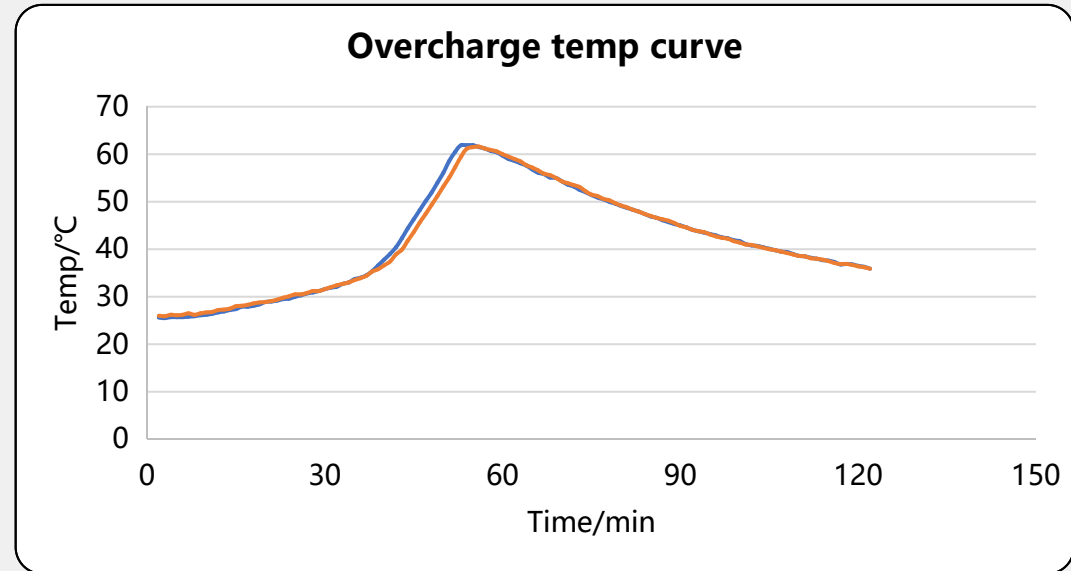
-18°C Low-Temperature Cranking Capability



Test Results: At -18°C, the maximum cranking capability is 15C.

➤ Safety Test - Overcharge

✓ **Test Conditions:** Fully charged battery was charged at 1C constant current to 6.0V under $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ambient temperature.

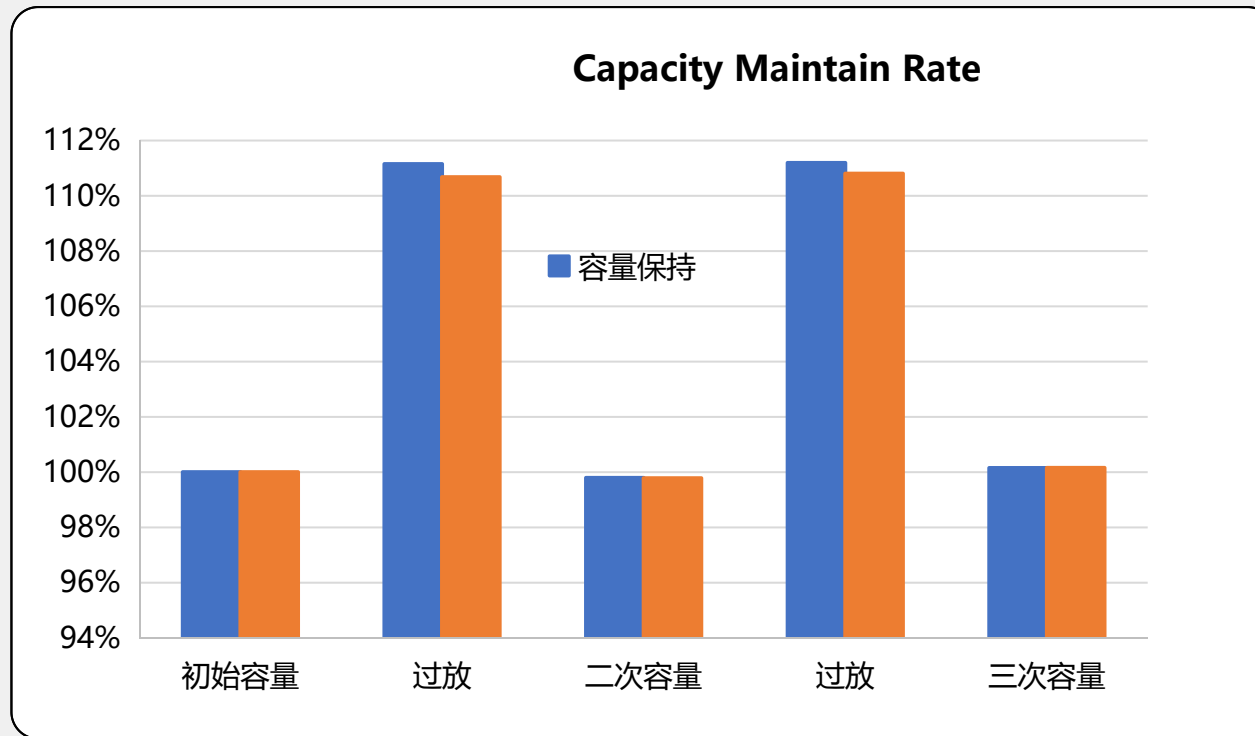


✓ **Summary: Test passed.**

➤ Safety Test - Overdischarge

✓ Test Conditions:

At $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$, discharge to 0V at 1C constant current and recharge to full, repeat discharge to 0V and recharge to full again, and perform 1 capacity check cycle

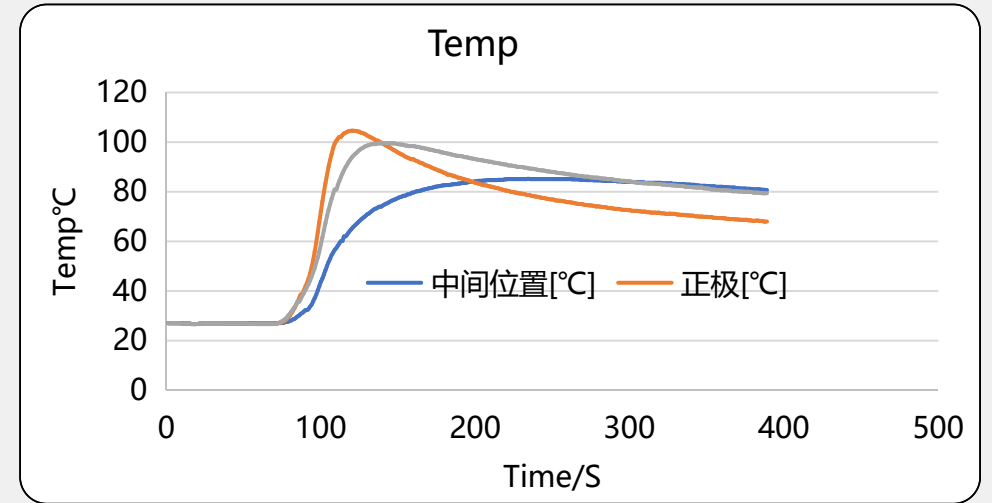


✓ **Summary: Test passed.**

➤ Safety Test - External Short Circuit

✓Test Conditions:

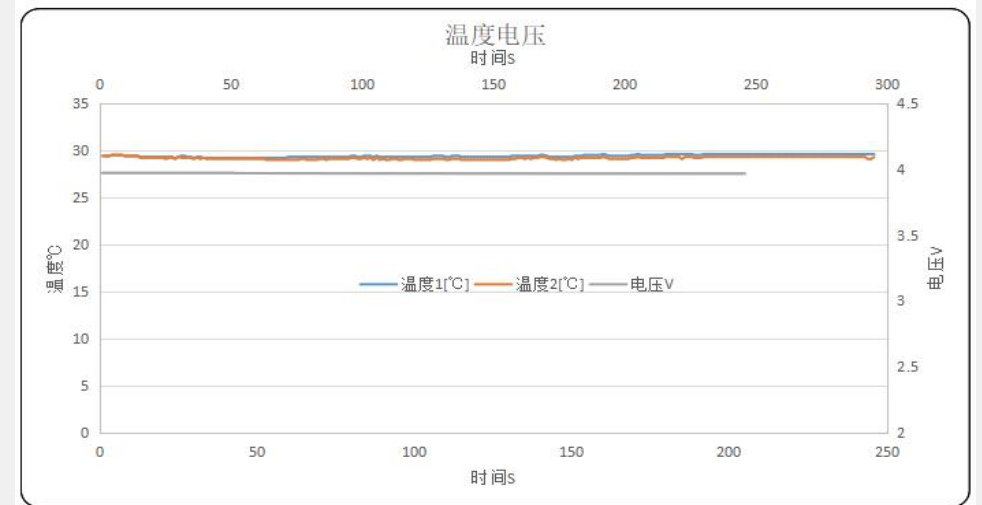
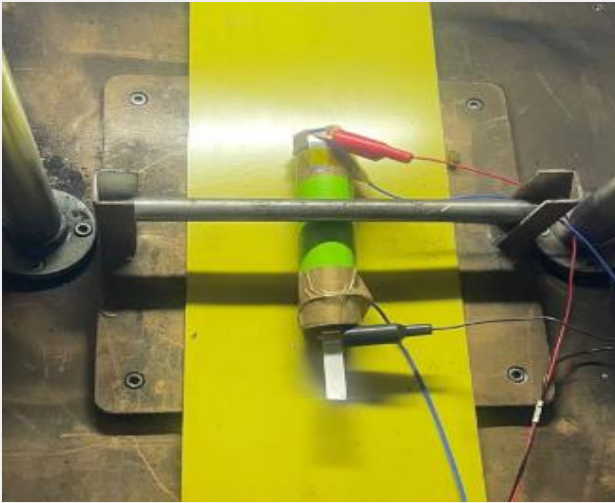
Charge battery at 0.5C constant current/constant voltage to 3.95V under $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ambient temperature and short circuit with external line resistance $< 5\text{m}\Omega$ for 10 minutes



✓Summary: Test passed and no fire or explosion observed on the battery.

➤ Safety Test - Impact (Crush)

✓ **Test Conditions:** Battery charged at 0.5C CC-CV to 3.95V under $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ with 610mm Drop height, 9.1kg Hammer mass and 15.8mm diameter steel cylinder.



✓ **Summary:** Test passed and no fire, explosion or electrolyte leakage observed on the battery.

➤ Safety Test - Low Pressure

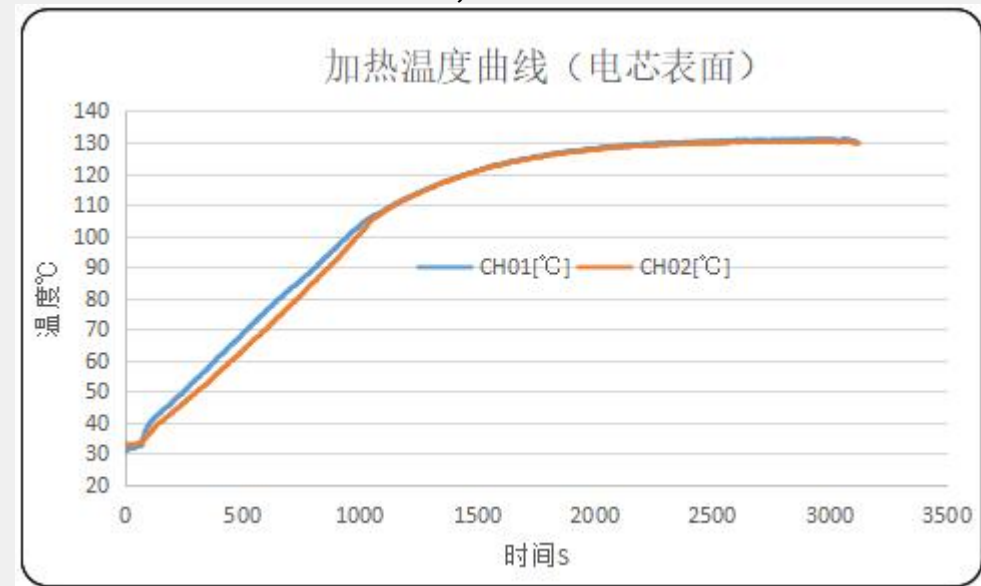
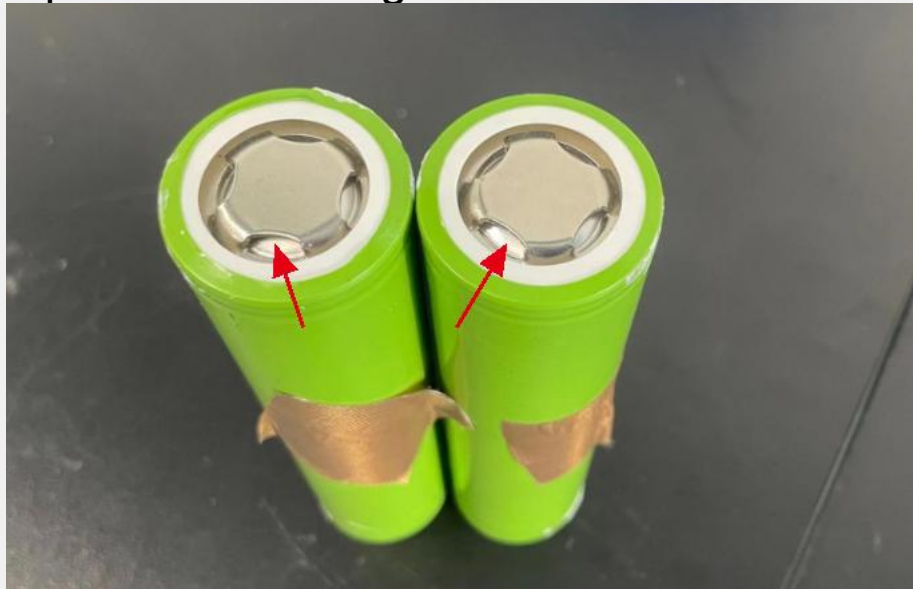
✓**Test Conditions:** Battery charged at 0.5C CC-CV to 3.95V under $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ambient temperature, was placed under 11.6kPa absolute pressure at standard room temperature for 6 hours.



✓**Summary:** Test passed and no fire, explosion or electrolyte leakage observed on the battery.

➤ Safety Test - Thermal Exposure

- ✓ **Test Conditions:** Battery charged at 0.5C CC-CV to 3.95V under $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ambient temperature, cell is fully charged and placed in heating test chamber and heated to 130°C at $5^{\circ}\text{C}/\text{min}$ rate, then maintained for 30min.



- ✓ **Summary:** Test passed and no fire or explosion observed on the battery.

Testing Center Introduction



Power Battery PACK and Pack Test System:

- Electrical Performance Testing:
 - Capacity Test: Measure the actual battery capacity through constant current charge/discharge to test its endurance performance.
 - Internal Resistance Test: Detect DC resistance to analyze battery polarization degree and aging state.
 - Charge/Discharge Curve Test: Record voltage changes under different conditions to assess dynamic performance.
 - Rate Charge/Discharge Test: Conduct charge/discharge tests at different rates to evaluate battery rate capability.



Cell Charge/Discharge Test System:

- Electrical Performance Testing:
 - Capacity Test: Measure the actual battery capacity through constant current charge/discharge to test its endurance performance.
 - Internal Resistance Test: Detect DC resistance to analyze battery polarization degree and aging state.
 - Charge/Discharge Curve Test: Record voltage changes under different conditions to assess dynamic performance.
 - Rate Charge/Discharge Test: Conduct charge/discharge tests at different rates to evaluate battery rate capability.



Temperature Test Chamber:

- High Temperature Test: Verify the heat resistance of cells under high temperature conditions.
- Low Temperature Test: Test cold resistance of cells under low temperature conditions (e.g., -20°C, -55°C, -70°C), detecting issues like reduced endurance and material embrittlement.
- Low Temperature Startup Test: Evaluate cold cranking performance of cells in extreme low temperatures.
- High Temperature Aging Test: Simulate long-term high temperature exposure.



Tensile Testing Machine:

- Standard Test Items
- Tensile Stress & Strength Test: Measures parameters including tensile strength and breaking strength to evaluate material's tensile resistance.
- Elongation Test: Determines material deformation capacity during stretching, including elongation at break and elongation at specified stress.
- Tear & Peel Test: Assesses material's tear resistance and adhesion strength through tear strength and shear force measurements.
- Bend & Puncture Test: Simulates mechanical performance under bending/puncture conditions to validate applicability.



EOL Test System (Voltage & Internal Resistance Tester + Withstanding Voltage & Insulation Tester)

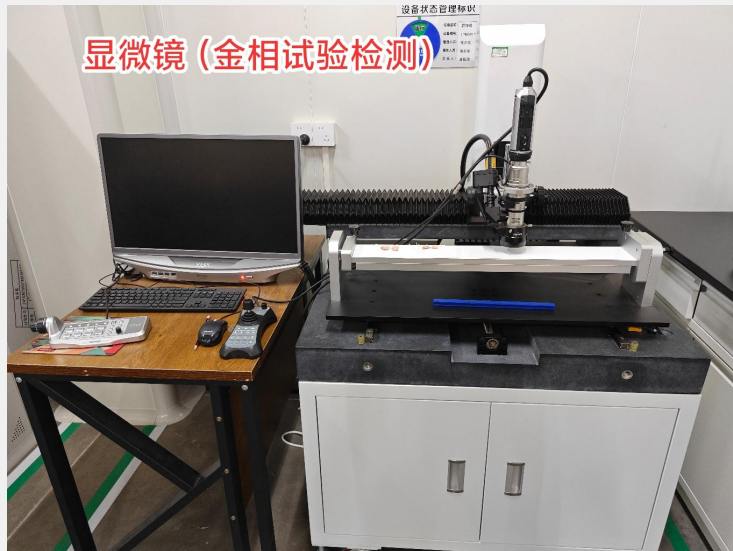
- Voltage & Internal Resistance Tester Test Items
Voltage Accuracy Calibration verifies the indication error of the tester at different voltage ranges to ensure output stability.
- Withstanding Voltage & Insulation Tester Test Items
 - Insulation Resistance Test
Apply DC voltage to measure the resistance value of insulation materials and determine compliance with standards.
 - AC/DC Withstanding Voltage Test
AC Withstanding Voltage applies power frequency high voltage to verify the breakdown resistance of

高精度电池芯内阻测试仪



High-Precision Battery Internal Resistance Tester

- Battery Internal Resistance Measurement
- Voltage Measurement

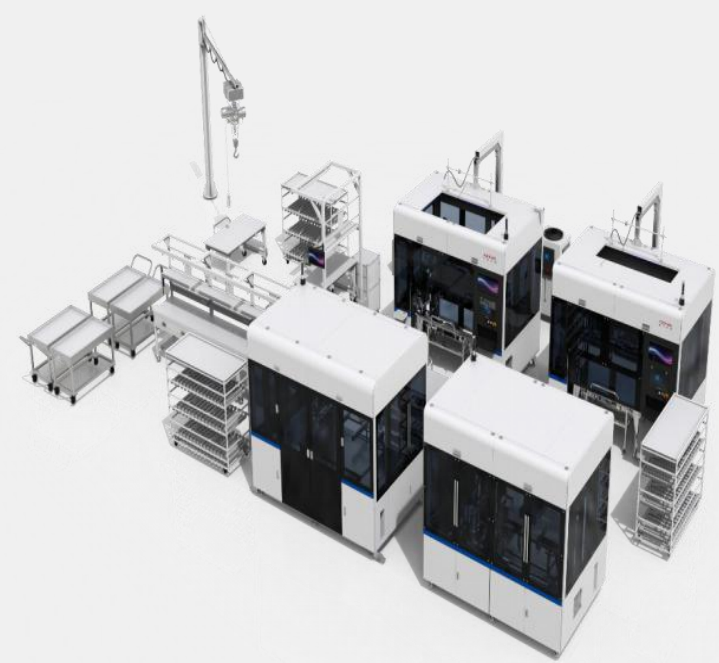


Metallographic Sample Cutting Machine + Grinding/Polishing Machine + Microscope

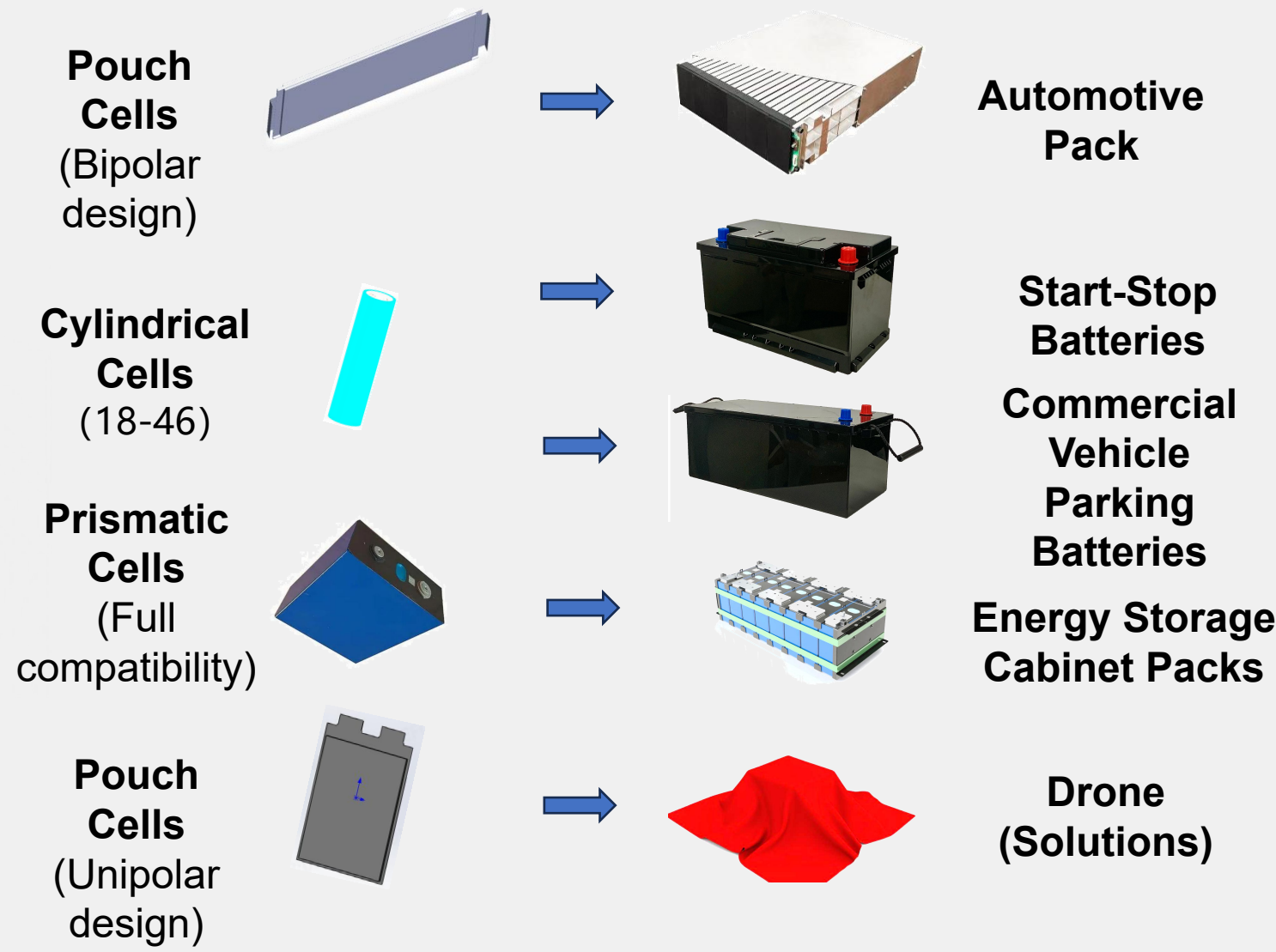
- Sample cutting: Cut specimens along the busbar welding direction to obtain typical areas containing weld center and fusion line.
- Grinding/Polishing: Step-by-step grinding using SiC sandpaper (200#→2000#), mechanically polish to mirror finish, then clean.
- Microscope inspection: Examine weld morphology, including penetration depth, fusion width, and weld thoroughness, to verify geometric parameters meet design requirements.

Production Equip Overview

Production Equipment Overview



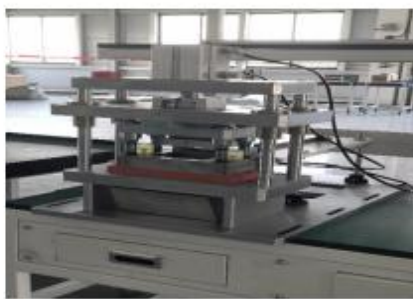
➤ **Pack Production Line:**
Compatible with pouch, prismatic, and cylindrical cell pack welding



Production Equipment Overview—Pack Production Equipment



人工上料、OCV测试组装线



极耳整平/裁切



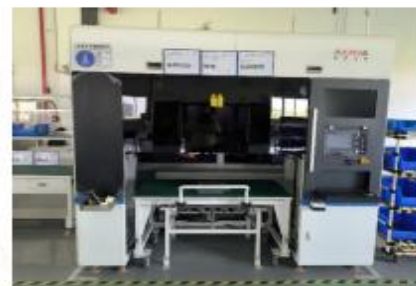
极耳折弯



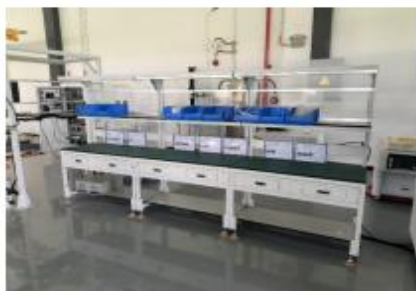
模组挤压设备



极耳焊接



汇流排焊接设备



辅材安装线



悬臂吊

Pack equipment is used for the assembly of semi-solid, pouch, cylindrical and prismatic battery packs. The production line adopts semi-automatic design, using transport carts to transfer cells and packs. The tooling plates on the carts can be changed to meet the production requirements of semi-solid, pouch, cylindrical and prismatic battery packs. Their main functions include: scanning/OCV testing (pouch, semi-solid, cylindrical, prismatic), tab flattening/cutting (pouch, semi-solid), manual stacking of small packs (pouch, semi-solid)/cell taping, end plate taping (prismatic), pack stacking/strapping and busbar installation (pouch, semi-solid, prismatic), tab bending and flattening (pouch, semi-solid), tab welding/busbar welding (pouch, se

Production Equipment Overview—Cell Production Equipment



热复合



涂布、微电芯制作



焊接、封装



自动物流线



化成柜



终装配



高温库



OCV测试



外观检测



分选机



Thanks!