TEST REPORT
EN IEC 62619
Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for secondary lithium cells and batteries, for use in industrial applications

Report Number ..... :	KS2502S0610B
Date of issue ..... :	2025.03.14
Total number of pages ..... :	19 pages
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Applicant's name ..... :	SRNE Solar Co., Ltd
Address..... :	4-5F, Building13A, Taihua Wutong Industrial Park, Gushu Development Zone, Hangcheng Street, Baoan, Shenzhen 518126 Guangdong, P.R. China
Test specification:	
Standard ..... :	EN IEC 62619:2022
Test procedure..... :	Safety Test Report
Non-standard test method..... :	N/A

General disclaimer:

The test results presented in this report relate only to the object tested.

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Test item description ..... :	Lithium Battery Energy Storage
Trade Mark ..... :	SRNE
Manufacturer ..... :	SRNE SOLAR CO., LTD Dongguan Branch Room 301, Building 5th, Fuxing Rd No.36, Chang'an Town, Dongguan City, Guangdong, P.R. China
Model/Type reference ..... :	SR-SE10B
Ratings ..... :	51.2V, 205Ah, 10.49kWh

List of Attachments (including a total number of pages in each attachment):

Attachment 1: Photo documentation (4 pages).

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
7.2.3 Drop test (cell or cell block, and battery system) 8.2.2 Overcharge control of voltage (battery system) 8.2.3 Overcharge control of current (battery system) 8.2.4 Overheating control (battery system) The component cell (NP54173207-205) was evaluated according to IEC 62619: 2022, Ref. Certif. No. DE 7-0957 Tests are made with the number of batteries specified in EN IEC 62619: 2022.	KSIGN(Guangdong) Testing Co., Ltd. West Side of 1/F., Building C, Zone A, Fuyuan New Factory, Jiujiu Industrial Park, Minzhu, Shatou, Shajing, Bao'an District, Shenzhen, Guangdong, China

Summary of compliance with National Differences (List of countries addressed):

N/A

☒ **The product fulfils the requirements of IEC 62619:2022**

Copy of marking plate:

The artwork below may be only a draft.



Polarity:



Remark:



The manufacture date is in the 3th to 8th digits of the bar code (SR-241112LC001-301803-S000110), the bar code rule shows below:

1. The 3th-4th digits represent the year, eg “24” is 2024 year;
2. The 5th-6th digits represent the month, eg “11” is November;
3. The 7th-8th digits represent the day, eg ”12” is 12 day.

Test item particulars.....:	
Classification of installation and use.....:	To be defined in final product
Supply Connection.....:	Terminals
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item .....:	February 20, 2025
Date (s) of performance of tests.....:	February 20, 2025 to March 05, 2025
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. **Throughout this report a ☐ comma / ☒ point is used as the decimal separator.**	
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies).....:	Same as Manufacturer

General product information and other remarks:

The SR-SE10B is a Li-on battery with a nominal voltage of 51,2V and a Rated capacity of 205Ah which is used in energy storage applications.

The battery system consists of 16 Lithium Iron Phosphate cells connected in 16S1P; cell model no. is NP54173207-205.

The main features of the battery are shown as below:

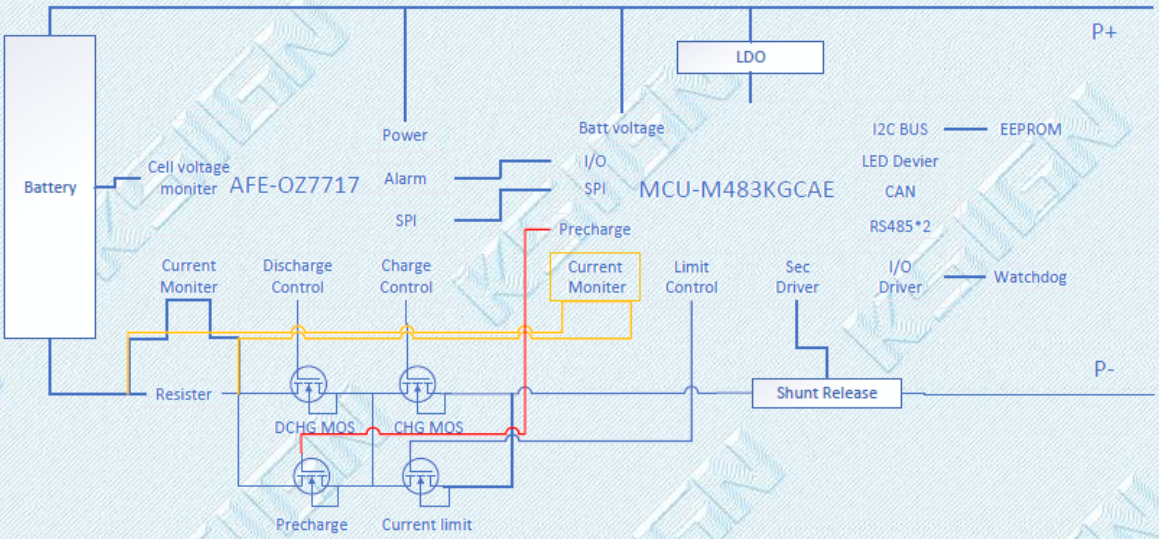
Cell and battery	Cell	Battery System
Model Name	NP54173207-205	SR-SE10B
Rated capacity (Ah)	205	205
Nominal voltage (V)	3,2	51,2
Standard Charge Current (A)	102,5	100
Standard Discharge Current (A)	102,5	100
Maximum continuous charge current (A)	205	200
Maximum continuous discharge current (A)	205	200
Charge temperature Range (°C)	0~60	0~45
Discharge temperature Range (°C)	-20~60	-10~45
Standard Charge Voltage (V)	3,65	57,6
Upper limit Charging Voltage (V)	3,65	57,6
End-of-discharge Voltage (V)	2,5	44.8
Weight (kg)	4±0,2	88
Recommend charging method declared by the manufacturer	Charging the cell with 102,5A constant current until to 3,65V, then constant voltage 3,65V until charging current reduces to 10,25A	Charge the battery at constant current 100A until voltage reaches 57,6V, then charge at constant voltage 57,6V till charge current is 10,25A

Construction:



L*H*T=690mm*433mm*256mm
Battery

Circuit diagram:



4	**PARAMETER MEASUREMENT TOLERANCES**		P
	Parameter measurement tolerances		P

5	**GENERAL SAFETY CONSIDERATIONS**		P
5.1	**General**		P
	Cells and batteries are safe under conditions of both intended use and reasonably foreseeable misuse.. :	See also table 5.1 for Critical components information	P
	Reduce the risk of injuries from moving parts		N/A
5.2	**Insulation and wiring**		P
	Voltage, current, altitude, and humidity requirements		P
	Adequate clearances and creepage distances between connectors and live parts at different voltages or between live parts and non-current-carrying accessible parts		P
	Protect from hazardous live parts, including during installation		N/A
	The mechanical integrity of internal connections		P
5.3	**Venting**		P
	Pressure relief function		P
	Encapsulation used to support cells within an outer casing		P
5.4	**Temperature/voltage/current management**		P
	The design prevents abnormal temperature-rise		P
	Voltage, current, and temperature limits of the cells		P
	Specifications and charging instructions for equipment manufacturers		P
5.5	**Terminal contacts of the battery pack and/or battery system**		P
	Polarity marking(s)		P
	Polarity marking not provided for keyed external connector		N/A
	Capability to carry the maximum anticipated current		P
	External terminal contact surfaces		P
	Terminal contacts are arranged to minimize the risk of short circuits		P
5.6	**Assembly of cells, modules, or battery packs into battery systems**		P
5.6.1	General		P
	Independent control and protection method(s)		P
	Recommendations of cell operating limits by the cell manufacturer		P
	Batteries designed for the selective discharge of a portion of their series connected cells		N/A

	Protective circuit component(s) and consideration to the end-device application		N/A
5.6.2	Battery system design		P
	The voltage control function		P
	Maximum charging/discharging current of the cell are not exceeded		P
5.7	**Operating region of lithium cells and battery systems for safe use**		P
	The cell operating region..... :	Listed in the specification of cell.	P
	Designation of battery system to comply with the cell operating region		P
5.8	**System lock (or system lock function)**		P
	Non-resettable function to stop battery operation		P
	Manual with procedure for resetting of battery operation		N/A
	Emergency battery final discharge		N/A
5.8	**Quality plan**		P
	Manufacturing quality plan (for example: ISO9001, etc.) prepared and implemented..... :	ISO 9001 certificate provided.	P
	The process capabilities and the process controls		P

6	**TYPE TEST CONDITIONS**		P
6.1	**General**		P
6.2	**Test items**		P
	Cells or batteries that are not more than six months old (See Table 1 of IEC62619)		P
	Capacity confirmation of the cells or batteries		P
	Default ambient temperature of test, 25 °C ± 5 °C		P

7	**SPECIFIC REQUIREMENTS AND TESTS**		P
7.1	**Charging procedure for test purposes**		P
	The battery discharged to a specified final voltage prior to charging		P
	The cells or batteries charged using the method specified by the manufacturer..... :	Information mentioned in Manufacturer's specifications	P
7.2	**Reasonably foreseeable misuse**		P
7.2.1	External short-circuit test (cell or cell block)	CB approved cell used.	N/A
	Short circuit with total resistance of 30 mΩ ± 10 mΩ at 25 °C ± 5 °C		N/A
	Results: no fire, no explosion		N/A
7.2.2	Impact test (cell or cell block)	CB approved cell used.	N/A
	Cylindrical cell, longitudinal axis impact		N/A

	Prismatic cell, longitudinal axis and lateral axis impact		N/A
	Results: no fire, no explosion.		N/A
7.2.3	Drop test (cell or cell block, and battery system)		P
7.2.3.1	General		P
7.2.3.2	Whole drop test (cell or cell block, and battery system)		N/A
	Description of the Test Unit ..... :		—
	Mass of the test unit (kg) ..... :		—
	Height of drop (m) ..... :		—
	Results: no fire, no explosion		N/A
7.2.3.3	Edge and corner drop test (cell or cell block, and battery system)		P
	Description of the Test Unit ..... :	Battery	—
	Mass of the test unit (kg) ..... :	89,00kg	—
	Height of drop (m) ..... :	0.05	—
	Results: no fire, no explosion		P
7.2.4	Thermal abuse test (cell or cell block)	CB approved cell used.	N/A
	Results: no fire, no explosion		N/A
7.2.5	Overcharge test (cell or cell block)	CB approved cell used.	N/A
	For those battery systems that are provided with only a single protection for the charging voltage control		—
	Results: no fire, no explosion ..... :		N/A
7.2.6	Forced discharge test (cell or cell block)	CB approved cell used.	N/A
	Upper limit charge voltage of the cell ..... :		N/A
	Cells connected in series in the battery system ..... :		N/A
	Redundant or single protection for discharge voltage control provided in battery system ..... :		N/A
	Target Voltage ..... :		N/A
	Maximum discharge current of the cell, I_m ..... :		N/A
	Discharge current for forced discharge, 1.0 It ..... :		N/A
	Discharging time, t = (1 It / I_m) x 90 (min.) ..... :		N/A
	Results: no fire, no explosion ..... :		N/A
7.3	**Considerations for internal short-circuit – Design evaluation**		N/A
7.3.1	General		N/A
7.3.2	Internal short-circuit test (cell)	CB approved cell used.	N/A

	Samples preparation procedure: a), in accordance with 8.3.9 of IEC62133:2012; or b), the nickel particle inserted before charging, or c), the nickel particle was inserted before electrolyte filling ..... :		N/A
	Tested according to Cl. 8.3.9 of IEC 62133:2012 test method, except all tests were carried out in an ambient temperature of 25 °C ± 5 °C.		N/A
	The appearance of the short-circuit location recorded by photograph or other means ..... :		—
	The pressing was stopped - When a voltage drop of 50 mV was detected; or		N/A
	- The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) was reached		N/A
	Results: no fire, no explosion ..... :		N/A
7.3.3	**Propagation test (battery system)**	CB approved cell used.	N/A
	Method to create a thermal runaway in one cell ... :		N/A
	Results: No external fire from the battery system or no battery case rupture ..... :		N/A

8	**BATTERY SYSTEM SAFETY (CONSIDERING FUNCTIONAL SAFETY)**		P
8.1	**General requirements**		**P**
	Functional safety analysis for critical controls	Relevant documents provided by the client which indicate analysis for function safety meet the requirement of the IEC 60730-1 Annex H.	P
	Conduct of a process hazard analysis for both the cell manufacturing process and the battery system manufacturing process		P
	Conduct of a process hazard, risk assessment and mitigation of the battery system		P
8.2	**Battery management system (or battery management unit)**		P
8.2.1	Requirements for the BMS		P
	The safety integrity level (SIL) target of the BMS		P
	The charge control evaluated by tests in clauses 8.2.2 to 8.2.4		N/A
8.2.2	Overcharge control of voltage (battery system)	Tested complied.	P
	The exceeded charging voltage applied to the whole battery system		P
	The exceeded charging voltage applied to only a part of the battery system, such as the cell(s) ..... :		N/A
	Results: no fire, no explosion ..... :	(See appended table 8.2.2)	P
	The BMS interrupted the overcharging before reaching 110% of the upper limit charging voltage		P
8.2.3	Overcharge control of current (battery system)	Tested complied.	P

	Results: no fire, no explosion ..... :	(See appended table 8.2.3)	P
	The BMS detected the overcharging current and controlled the charging to a level below the maximum charging current		P
8.2.4	Overheating control (battery system)		P
	The cooling system, if provided, was disconnected		N/A
	Elevated temperature for charging, 5 °C above maximum operating temperature ..... :		P
	Results: no fire, no explosion ..... :	(See appended table 8.2.4)	P
	The BMS detected the overheat temperature and terminated charging	Tested complied.	P
	The battery system operated as designed during test		P

9	**EMC**		P
	Battery system fulfil EMC requirements of the end-device application ..... :	Client provided EMC test report	P

10	**INFORMATION FOR SAFETY**		P
	The cell manufacturer provides information about current, voltage and temperature limits of their products		P
	The battery system manufacturer provides information regarding how to mitigate hazards to equipment manufacturers or end-users.		P

11	**MARKING AND DESIGNATION (REFER TO CLAUSE 5 OF IEC 62620)**		P
	The marking items shown in Table 1 in IEC 62620 indicated on the cell, battery system or instruction manual.		P
	Cell or battery system has clear and durable markings		P
	Cell designation		N/A
	Battery designation	See marking.	P
	Battery structure formulation		P

12	**PACKAGING AND TRANSPORT**		P
	Refer to Annex D		P

ANNEX A	**OPERATING REGION OF CELLS FOR SAFE USE**		N/A
A.1	General		N/A

A.2	Charging conditions for safe use		N/A
A.3	Consideration on charging voltage		N/A
A.4	Consideration on temperature		N/A
A.5	High temperature range		N/A
A.6	Low temperature range		N/A
A.7	Discharging conditions for safe use		N/A
A.8	Example of operating region		N/A

ANNEX B	**PROCEDURE OF 7.3.3 PROPAGATION TEST BY LASER IRRADIATION**		N/A
B.1	**General**		N/A
B.2	**Test conditions**		N/A
B.2.1	Cell test (preliminary test)		N/A
	The cell fully charged according to the manufacturer recommended conditions ..... :		—
	Laser irradiation point on the cell ..... :		—
	Output power of laser irradiation..... :		—
	Tested in an ambient temperature of 25 °C ± 5 °C		N/A
	Repeat of cell test for 3 times		N/A
B.2.2	Battery system test (main test)		N/A
	The battery system fully charged according to the manufacturer recommended conditions ..... :		—
	Target cell to be laser irradiated ..... :		—
	The irradiation point on the target cell same or similar as that on the cell test		
	Output power of laser irradiation..... :		—
	Tested in an ambient temperature of 25 °C ± 5 °C		N/A

ANNEX C	**PROCEDURE OF 7.3.3 PROPAGATION TEST BY METHODS OTHER THAN LASER**		N/A
C.1	General		N/A
C.2	Test conditions:		N/A
	– The battery fully charged according to the manufacturer recommended conditions ..... :		—
	– Target cell forced into thermal runaway ..... :		—
	– A specially prepared sample (e.g. a heater or a hole for nail penetration provided) used for ease of testing..... :		—

C.3	Method used for initiating the thermal runaway. 1) Heater (Heater, Burner, Laser, Inductive heating 2) Overcharge 3) Nail penetration of the cell 4) Combination of above methods 5) Other methods..... :		—

ANNEX D	**PACKAGING AND TRANSPORT**		P
	The materials and pack design chosen in a way as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of environmental contaminants		P
	Regulations concerning international transport of secondary lithium batteries		P

5.1	TABLE: Critical components information				P
Object/part no.	**Manufacturer/ trademark**	**Type/model**	**Technical data**	**Standard**	**Mark(s) of conformity [1)]**
Cell	Guoke Energy(CHUZHOU)Co., Ltd.	NP54173207-205	3.2V, 205Ah	IEC 62619: 2022	Ref. Certif. No. DE 7-0957
Metal Enclosure	Shenzhen Changqin Industrial Co., Ltd	SGCC1.2	Thickness min.: 2m Dimensions: 690*433*256mm	--	Test with
Power Input /Output Connector	Shenzhen Connection Electronic Co., Ltd.	DSTB38-04-TWIN	600V	EN IEC 60947-1:2021	CERTIFICATE No. B 108338 0003
Power wire (Connect B- and BMS)	Dongguan Zelongkang Wire Co., Ltd	1015	3AWG, 600V, 105°C	UL 758	UL E330488
Power wire (Connect B+ and BMS)	Dongguan Yueshun Electronic Technology Co., LTD	3135	16AWG, 600V, 200°C	UL 758	UL E526255
Internal Signal Wire	YONG HAO ELECTRICAL INDUSTRY CO LTD	1007	22AWG, 300V, 80°C	UL 758	UL E240426
Black plastic sheet	Shenzhen Bornsun New Material co.,Ltd	BN-FP	Thickness min.: 0.25mm V-0, 130°C	UL 94	UL E256822
PCB	Xinfeng Huihe Circuits Co Ltd	hh02g4	V-0, 130°C	UL 796	UL E358408
NTC	DONG GUAN SENSICOM ELECTRONICS TECHNOLOGY CO LTD	SNS103	R25 =10kΩ±1%	UL 1434	UL E318986
IC (EU1)	Nuvoton	M483KGCAE	VDD-VSS=3,3V, Max:3.6V, VIN=3.3V, Temperature rang: -40°C ~ 85°C	--	Test with appliance
IC (AU1)	O2Micro	OZ3717	VCC: 8 ~ 80V, Temperature rang: -40°C ~ 85°C	--	Test with appliance
MOSFET (MD1 ~ MD18, MC1 ~ MC18)	Depuw	DP023N10TGN	V_{DS}: 100V, V_{GS}: ±20V, I_D: 300A, Tstg: -55 ~+175°C	--	Test with appliance

Supplementary information:

[1)] Provided evidence ensures the agreed level of compliance. See OD-CB2039.

Remark: Due to the product confidential, the details components was not provided by client.

7.2.1	TABLE: External short-circuit test (cell or cell block)				N/A
Sample No.	**Ambient (at 25°C ± 5°C)**	**OCV at start of test (V dc)**	**Resistance of Circuit (mΩ)**	**Maximum Case Temperature ~~Rise ΔT~~ (°C)**	**Results**
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

Supplementary information:

A - No fire or Explosion
B - Fire
C - Explosion
D - The test was completed after 6 h
E - The test was completed after the cell casing cooled to 20% of the maximum temperature rise
F - Other (Please explain): ___

7.2.5	TABLE: Overcharge test (cell or cell block)					N/A
Sample No.	**OCV at start of test (V dc)**	**OCV at end of test (V dc)**	**Measured Maximum Charging Current (A)**	**Measured Maximum Charging Voltage (V dc)**	**Max. Cell Case Temperature, (°C)**	**Results**
--	--	--	--	--	--	--
--	--	--	--	--	--	--
--	--	--	--	--	--	--

Supplementary information:

Results:
A - No fire or Explosion
B - Fire
C - Explosion
D - Test concluded when temperature reached a steady state condition
E - Test concluded when temperature returned to ambient
F - Other (Please explain): _____

7.2.6	TABLE: Forced discharge test (cell or cell block)				N/A
Sample No.	**OCV before applying reverse charge, (V dc)**	**Target Voltage (V dc)**	**Measured Reverse Charge Current It, (A)**	**Total Time for Reversed Charge Application (min)**	**Results**
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

Supplementary information:

Results:
A - No fire or Explosion
B - Fire
C - Explosion
D - Other (Please explain): ___

7.3.2	TABLE: Internal short-circuit test (cell)			N/A
Sample No.	**OCV at start of test, (V dc)**	**Particle location [1)]**	**Maximum applied pressure, (N)**	**Results**
--	--	--	--	--
--	--	--	--	--
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Supplementary information:

[1)] Identify one of the following**:**
1: Nickel particle inserted between positive and negative (active material) coated area.
2: Nickel particle inserted between positive aluminium foil and negative active material coated area.

Results:

A - No fire or explosion
B – Fire
C - Explosion
D – Test concluded when 50 mV voltage drop occurred prior to reaching force limit
E – Test concluded when 800/400 N pressure was reached and 50 mV voltage drop was not achieved
F – Test was concluded when fire or explosion occurred
G - Other (Please explain): __

7.3.3	TABLE: Propagation test (battery system)				N/A
Sample No.	**OCV of Battery System Before Test, (V dc)**	**OCV of Target Cell Before Test, (V dc)**	**Maximum Cell Case Temperature, (°C)**	**Maximum DUT Enclosure Temperature, (°C)**	**Results**
Method of cell failure [1)]		**Location of target cell**		**Area for fire protection (m^2)**	

Supplementary information:

1) Cell can be failed through applied heat, overcharge, nail penetration or combinations of these failures or other acceptable methods. See supporting documentation for details on cell failure method

2) If the battery system has no outer covering, the manufacturer is required to specify the area for fire protection.

Results:
A – No fire external to DUT enclosure or area for fire protection or no battery case rupture
B – Fire external to DUT enclosure or area for fire protection
C – Explosion
D – Battery case rupture
E - Other (Please explain): __

8.2.2	**TABLE: Overcharge control of voltage (battery system)**				**P**
Sample No.	**OCV at start of test for Cell/Cell Blocks, (V dc)**	**Maximum Charging Current, (A)**	**Max. Charging Voltage, (V dc)**	**Max. Voltage of Cell/Cell Blocks, (V dc)**	**Results**
B02#	3.062~3.088	200	57.44	3.633	A, D, F
			Charge Voltage Applied Battery System: 1)		
			Whole	**Part**	
			64.24 Vdc	--	

Supplementary information:

1. The exceeded voltage can be applied to only a part of the system such as the cell(s) in the battery system per Figure 6 of IEC 62619, if it is difficult to do it in using the whole battery system.

Results:
A - No Fire or Explosion
B – Fire
C - Explosion
D - The voltage of the measured cells or cell blocks did not exceed the upper limit charging voltage
E - The voltage of the measured cells or cell blocks did exceed the upper limit charging voltage
F - All function of battery system did operate as intended during the test.
G - All function of battery system did not operate as intended during the test.
H - Other (Please explain): ___

8.2.3	TABLE: Overcharge control of current (battery system)			P
Sample No.	**OCV at start of test, (V dc)**	**Max. Charging Current, (A)**	**Max. Charging Voltage, (V dc)**	**Results**
B03#	49.16	240	51.28	A, D, F

Supplementary information:

Results:
A – No fire or Explosion
B – Fire
C – Explosion
D - Overcurrent sensing function of BMU did operate and then charging stopped
E - Overcurrent sensing function of BMU did not operate and then charging stopped
F - All function of battery system did operate as intended during the test.
G - All function of battery system did not operate as intended during the test.
H - Other (Please explain):

8.2.4	TABLE: Overheating control (battery system)		P
Model No.	**OCV at start(SOC 50%) of test, V dc**	**Maximum Charging Current, A**	**Maximum Charging Voltage, V dc**
B04#	52.86	200	54.70
Maximum Specified Temperature of Battery System, °C		**Maximum Measured Cell Case Temperature, °C**	**Results**
45		54.7	A, D, F

Supplementary information:

Results:
A – No fire or Explosion
B – Fire
C – Explosion
D - Temperature sensing function of BMU did operate and then charging stopped
E - Temperature sensing function of BMU did not operate and then charging stopped
F - All function of battery system did operate as intended during the test.
G - All function of battery system did not operate as intended during the test.
H - Other (Please explain): ___

Product: Lithium Battery Energy Storage

Type Designation: SR-SE10B



Figure 1 Overview of battery



Figure 2 Overview of battery

Product: Lithium Battery Energy Storage

Type Designation: SR-SE10B

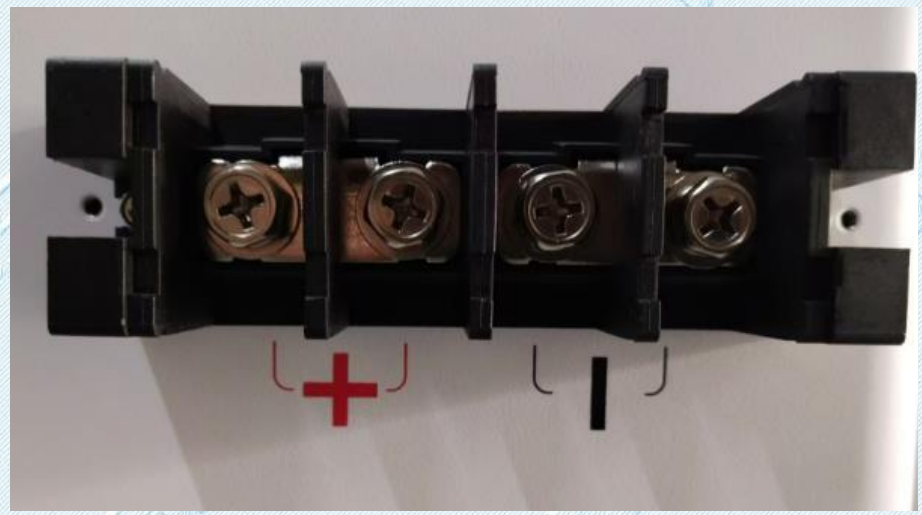


Figure 3 Ports view

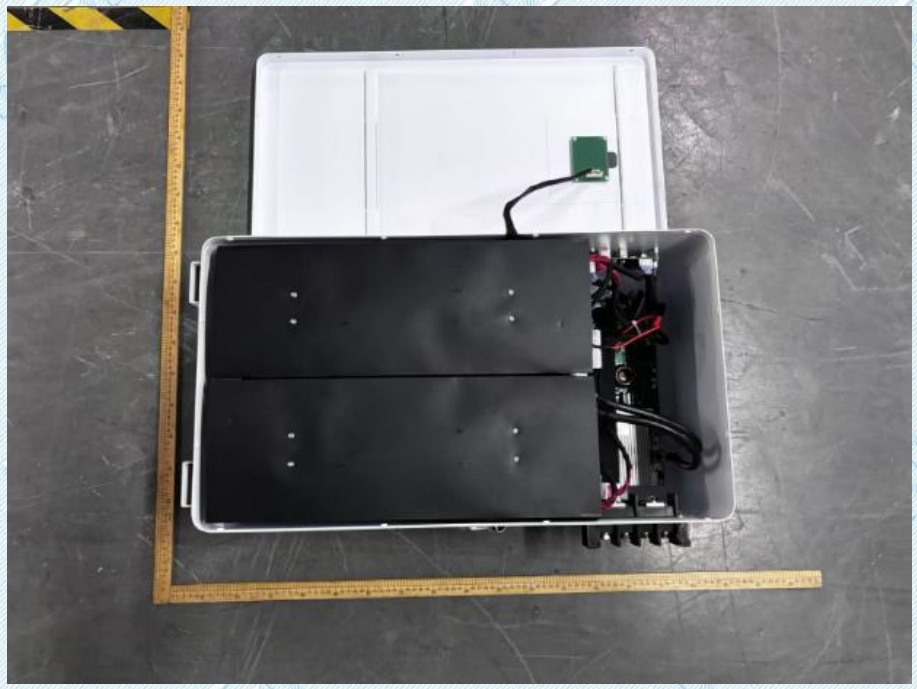


Figure 4 Internal view of battery

Product: Lithium Battery Energy Storage

Type Designation: SR-SE10B



Figure 5 Internal view of battery

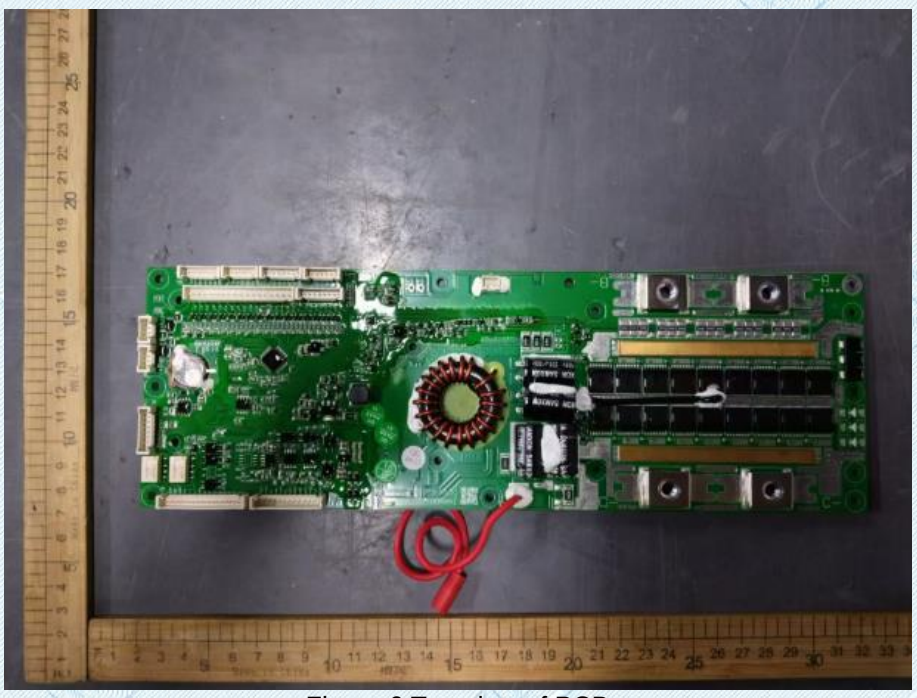


Figure 6 Top view of PCB

Product: Lithium Battery Energy Storage

Type Designation: SR-SE10B

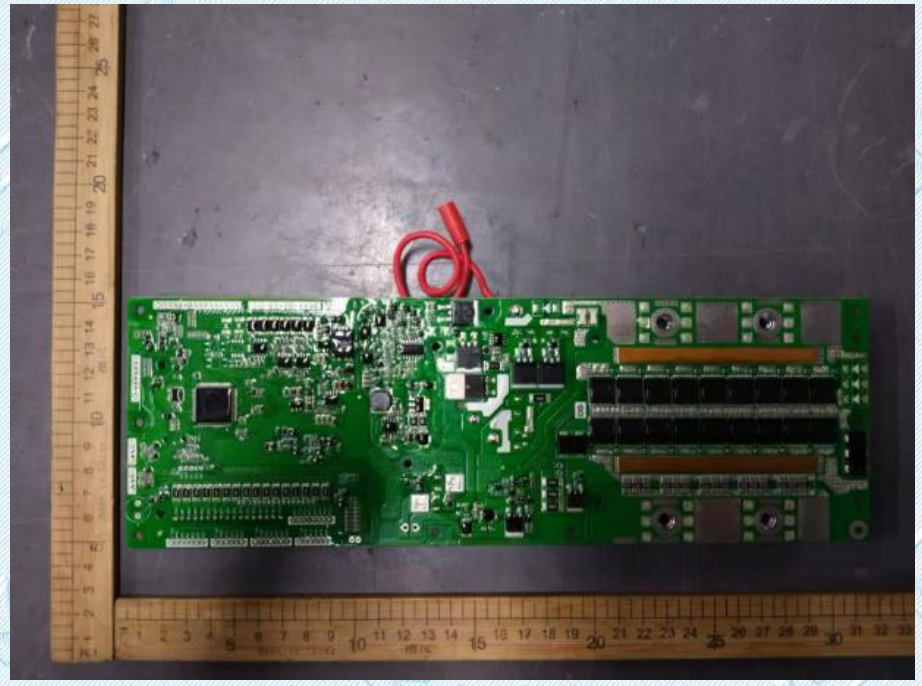


Figure 7 Back view of main PCB

--End of Report--