



Test Report issued under the responsibility of:



TEST REPORT

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.....: CN24JHYA 001

Date of issue.....: 2024-04-28

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Name of Testing Laboratory
preparing the Report.....: TÜV Rheinland (Shenzhen) Co., Ltd.

Applicant's name: Shenzhen EEnovance Energy Technology CO.,LTD

Address: Room 401, Building 2, Yufengda
Industrial Park, No. 1008 Guangqiao, Avenue, Yulv Community,
Yutang Streets, Guangming District, SHENZHEN, Guangdong,
P.R. China

Test specification:

Standard.....: IEC 62619:2022

Test procedure: CB Scheme

Non-standard test method: N/A

TRF template used: IECEE OD-2020-F1:2022, Ed.1.5

Test Report Form No.: IEC62619B

Test Report Form(s) Originator: UL Solutions (Demko)

Master TRF.....: Dated 2023-02-24

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Test item description	Rechargeable Li-ion battery System	
Trademark(s)		
Manufacturer	Same as applicant	
Model/Type reference	RT 5.12-H4, RT 5.12-H5, RT 5.12-H6, RT 5.12-H7, RT 5.12-H8, RT 5.12-H9, RT 5.12-H10, RT 5.12-H11, RT 5.12-H12	
Ratings	RT 5.12-H4: 204.8Vdc, 100Ah, 20.48kWh RT 5.12-H5: 256.0Vdc, 100Ah, 25.6kWh RT 5.12-H6: 307.2Vdc, 100Ah, 30.72kWh RT 5.12-H7: 358.4Vdc, 100Ah, 35.84kWh RT 5.12-H8: 409.6Vdc, 100Ah, 40.96kWh RT 5.12-H9: 460.8Vdc, 100Ah, 46.08kWh RT 5.12-H10: 512.0Vdc, 100Ah, 51.2kWh RT 5.12-H11: 563.2Vdc, 100Ah, 56.32kWh RT 5.12-H12: 614.4Vdc, 100Ah, 61.44kWh	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒	CB Testing Laboratory	TÜV Rheinland (Shenzhen) Co., Ltd.
Testing location/ address.....		1F East, 3F West - 4F, Cybio Technology Building No.1, No.16 Kejibei 2nd Road, High-Tech Industrial Park North Nanshan District, 518057, Shenzhen, China
Tested by (name, function, signature)		Allen Chen / Project engineer 
Approved by (name, function, signature)...		Alvin Zheng / Reviewer 
☐	Testing procedure: CTF Stage 1:	
Testing location/ address.....		
Tested by (name, function, signature)		
Approved by (name, function, signature)...		
☐	Testing procedure: CTF Stage 2:	
Testing location/ address.....		
Tested by (name + signature)		
Witnessed by (name, function, signature)...		
Approved by (name, function, signature)...		
☐	Testing procedure: CTF Stage 3:	
☐	Testing procedure: CTF Stage 4:	
Testing location/ address.....		
Tested by (name, function, signature)		

Witnessed by (name, function, signature)..:		
Approved by (name, function, signature)...:		
Supervised by (name, function, signature) :		

List of Attachments (including a total number of pages in each attachment): Attachment 1: Photo documentation (11 pages)	
Summary of testing:	
Tests performed (name of test, test clause and date test performed): Edge and corner drop test (battery system), cl.7.2.3.3, 2024-04-02 Overcharge control of voltage (battery system), cl.8.2.2, 2024-04-02 Overcharge control of current (battery system), cl.8.2.3, 2024-04-02 Overheating control (battery system), cl.8.2.4, 2024-04-07 The component cell (CB56) used inside was complied with the requirement of IEC 62619:2022, certified by TÜV SUD, Ref. Certif. No. PSB-BT- 03584M1. The samples comply with the requirement of IEC 62619: 2022	Testing location: TÜV Rheinland (Shenzhen) Co., Ltd. 1F East & 3F West -4F, Cybio Technology Building No.1, No.16 Kejibei 2nd Road, High-Tech Industrial Park North Nanshan District, 518057, Shenzhen, China
Summary of compliance with National Differences (List of countries addressed): No EU Group Differences ☒ The product fulfils the requirements of <u>EN IEC 62619:2022</u>.	
Use of uncertainty of measurement for decisions on conformity (decision rule): ☒ No decision rule is specified by the IEC standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty ("simple acceptance" decision rule, previously known as "accuracy method"). ☐ Other: N/A Information on uncertainty of measurement: The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE. IEC Guide 115 provides guidance on the application of measurement uncertainty principles and applying the decision rule when reporting test results within IECEE scheme, noting that the reporting of the measurement uncertainty for measurements is not necessary unless required by the test standard or customer. Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.	

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

The markings below are indicated on the battery:

		
BCU Box Model: RT 5.12-H-BCU		
Battery System Model:		
☐ ① RT 5.12-H4	☐ ② RT 5.12-H5	☐ ③ RT 5.12-H6
☐ ④ RT 5.12-H7	☐ ⑤ RT 5.12-H8	☐ ⑥ RT 5.12-H9
☐ ⑦ RT 5.12-H10	☐ ⑧ RT 5.12-H11	☐ ⑨ RT 5.12-H12
Usable Energy(kWh):		
① 20.48	② 25.60	③ 30.72
④ 35.84	⑤ 40.96	⑥ 46.08
⑦ 51.20	⑧ 56.32	⑨ 61.44
Operating Voltage(V):		
① 179.2-224.64	② 224.0-280.80	③ 268.8-336.96
④ 313.6-393.12	⑤ 358.4-449.28	⑥ 403.2-505.44
⑦ 448.0-516.60	⑧ 492.8-617.76	⑨ 537.6-673.92
Nominal Current: 50A		
Maximum Continuous Current: 98A		
Operating Temperature: Charge: 0-50°C, Discharge: -15-50°C		
Protective Class: I		
IP Class: IP20		
• Do not disassemble • Do not short-circuit • Do not place in fire or near hot source • Please read user manual carefully		CAUTION!  
Shenzhen EEnovance Energy Technology CO.,LTD Room 401, Building 2, Yufengda Industrial Park, No. 1008 Guangqiao Avenue, Yulu Community, Yutang Streets, Guangming District, SHENZHEN.PRC.		MADE IN CHINA IEC 62619 CB BY TUV Rheinland    

Warning Label nearby terminal:



The others required marking items are indicated in the battery specification.

Rechargeable Li-ion Battery

Model	RT 5.12-H4	RT 5.12-H5	RT 5.12-H6	RT 5.12-H7	RT 5.12-H8	RT 5.12-H9	RT 5.12-H10	RT 5.12-H11	RT 5.12-H12
Performance									
Battery module (Wh/V)	5.12kWh,51.2V,43kg(94.79lbs)								
Number of modules	4	5	6	7	8	9	10	11	12
Cell technology	LFP (LiFePO4)								
Battery usable energy [1]	20.48 kWh	25.6 kWh	30.72 kWh	35.84 kWh	40.96 kWh	46.08 kWh	51.2 kWh	56.32 kWh	61.44 kWh
Nominal voltage	204.8 V	256 V	307.2 V	358.4 V	409.6 V	460.8 V	512 V	563.2 V	614.4 V
Operating voltage	179.2 – 224.64 V	224.0 – 280.80 V	268.8 – 336.96 V	313.6 – 393.12 V	358.4 – 449.28 V	403.2 – 505.44 V	448.0 – 516.60 V	492.8 – 617.76 V	537.6 – 673.92 V
Battery rated capacity	100Ah								
Rated charge and discharge current [2]	50A								
Max. charge and discharge current [3]	98A								
Communication									
Display	SOC status indicator, LED indicator								
Communication	CAN / RS485 / RS232								
Functions	Remote upgrade, EMS, Real-time monitoring of local data								
General Specification									
Dimension (W*D*H)	620×630×2220 mm 24.4×24.8×87.4 inch								
Weight	327.5 kg (722.0 lbs)	370.5 kg (816.8 lbs)	413.5 kg (911.6 lbs)	456.5 kg (1006.4 lbs)	499.5 kg (1101.2 lbs)	542.5 kg (1196.0 lbs)	585.5 kg (1290.8 lbs)	628.5 kg (1385.6lbs)	671.5 kg (1480.4 lbs)
Installation	Floor stand								
Operating temperature [4]	Charge : 0to 50°C (32to122°F) Discharge : -15 to 50 °C (5to122°F)								
Environmental humidity	≤ 95%RH (No condensation)								
Protection rating	IP 20								
Cycle life [5]	6000 Cycles or ten (10) years @ 80% DOD / 25°C / 0.5°C, 60% EOL								
Scalability	Max 12 modules per stack, 4 stacks in parallel								
Application	ON Grid / ON Grid + Backup / OFF grid								
Compatible inverters	Refer to compatible inverter list (Compatible with major PCS brands)								
Battery Designation	FP/53/149/120/[(1P16S)×n]M/-10+50/95 (n=4,5,6,7...12)								

Recommended charging instruction:

[2] Recommended charging the battery system with 50A constant current until $56.16V \times n$ (n=4,5,6,7...12) at ambient 20°C±5°C.

Disposal instructions:

Disposal of the Battery System

Disposal of the battery must comply with the locaapplicable disposal regulations for electronic wasteand used batteries.

- Do not dispose of the battery system with your household waste.
- Avoid exposing the batteries to high temperatures or direct sunlight.
- Avoid exposing the batteries to high humidity or corrosive atmospheres.

Label of S/N number (included manufacturer date):



10100202007-0_Barcode printing rules:

SD: Manufacturer and delivery area(determined according to the actual delivery area)

L06141001: Product Specifications (Fixed)

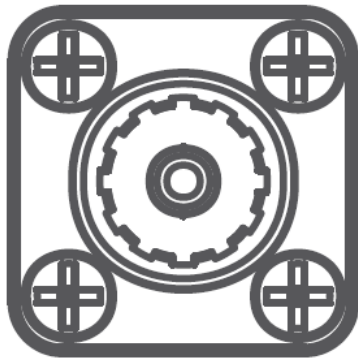
01: Production line body

B429: Date of manufacture, 24/04/29, B represents 2024

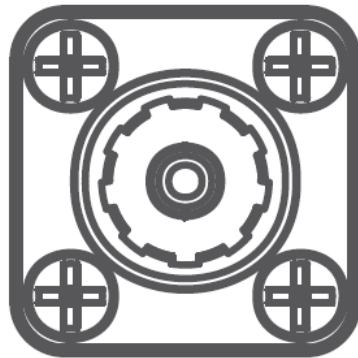
001: Serial number, 001~999 (determined according to the daily production quantity)

Polarity is marked near connector.

P-



P+



Test item particulars :	
Classification of installation and use : To be defined in final system.	
Supply Connection : Not directly connected mains. :	
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 : 2024-03-06	
Date (s) of performance of tests : 2024-03-08 to 2024-03-28	
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.	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC 62368-1:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided	☐ Yes ☒ Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies)..... :	1. Dongguan EEnovance Energy Technology Co.,Ltd. Room 501, Building 1 Songhu Zhigu Science and Technology Industrial Park, No. 11, Liaobu Yanhe Road, Liaobu Town, Dongguan city, Guangdong, P.R. China 2. Shenzhen EEnovance Energy Technology CO.,LTD Room 401, Building 2, Yufengda Industrial Park, No. 1008 Guangqiao, Avenue, Yulu Community, Yutang Streets, Guangming District, SHENZHEN, Guangdong, P.R. China

General product information and other remarks:

Model RT 5.12-H4, RT 5.12-H5, RT 5.12-H6, RT 5.12-H7, RT 5.12-H8, RT 5.12-H9, RT 5.12-H10, RT 5.12-H11, RT 5.12-H12 are battery system series. It consists of 4 to 12 battery module (RT-5.12-QC-A) and 1 BCU box (RT 5.12-H-BCU). The battery modules and BCU box are all installed in a single rack.

The battery module (RT-5.12-QC-A) consist of 16 lithium-ion cells in 16S1P connection, it contains BMU for monitoring and collecting the information of cells temperature, voltage, current.

The BMS consists of BMU and BCU, it can control the charging and discharging of battery, during the charging and discharging process, and collects temperature, voltage, and current information, and communicates with PCS to interact with the charging and discharging requirements. When a fault occurs, the BMS implements a battery protection function.

The battery system can be divided into smaller units, the tests were conducted on 1 BCU box match 4 battery modules as test unit representing the battery system, model RT 5.12-H4 will be used as the test sample.

The final product may add one addition display screen for end use.

The electric, electronic and software controls and systems for critical safety were subjected to analysis for functional safety according to IEC 60730-1 Annex H.

The main features of the battery system are shown as below:

Product name	Rechargeable Li-ion battery
Model	RT 5.12-H*n (n=4, 5 ,6 to 12)
Rated Capacity	100Ah
Nominal voltage	51.2*n VDC (n=4, 5 ,6 to 12)
Energy	5120*n Wh (n=4, 5 ,6 to 12)
Maximum continuous Charging current	98A
Maximum continuous Discharging current	98A
Maximum Charge voltage	56.16*n V (n=4, 5 ,6 to 12)
End of Discharging voltage	44.8*n V (n=4, 5 ,6 to 12)
Upper Charge temperature limit	50°C
Lower Charge temperature limit	0°C
Upper Discharge temperature limit	50°C
Lower Discharge temperature limit	-15°C
Recommend Charging method declared by the Manufacturer	Charge the battery at constant current 50A until voltage reaches 56.16*n V. (n=4, 5 ,6 to 12)
Nominal mass	Approx. 155.5+43*n kg
External dimensions	Approx. 620×630×2220 mm
Battery designation	IFpP/54/150/120/[(1P16S)*nS]M/-10+50/95 (n=4, 5 ,6 to 12)
n responds for number of modules, n= 4, 5, 6 to 12.	

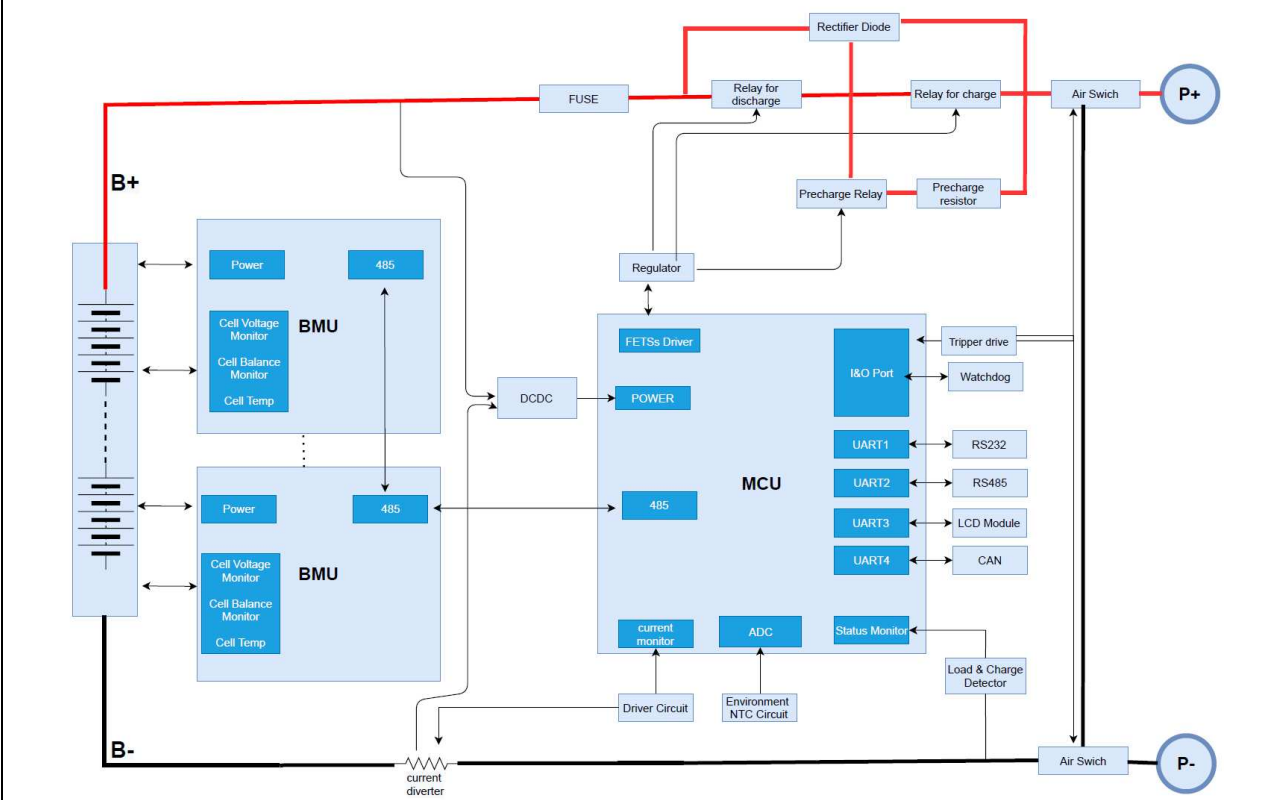
The main features of the battery module are shown as below:

Product name	Rechargeable Li-ion battery module
Model	RT-5.12-QC-A
Rated Capacity	100Ah
Nominal voltage	51.2VDC
Energy	5120Wh
Maximum continuous Charging current	98A
Maximum continuous Discharging current	98A
Maximum Charge voltage	56.16V
End of Discharging voltage	44.8V

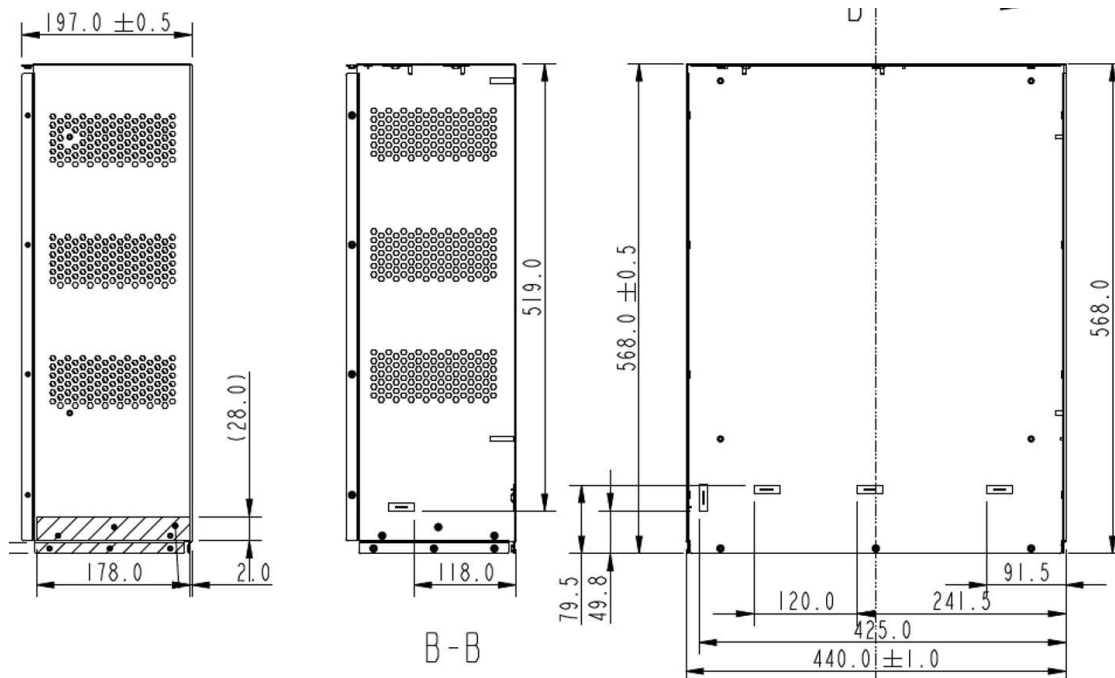
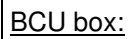
Upper Charge temperature limit	50°C
Lower Charge temperature limit	0°C
Upper Discharge temperature limit	50°C
Lower Discharge temperature limit	-15°C
Recommend Charging method declared by the Manufacturer	Charge the battery at constant current 50A until voltage reaches 56.16V.
Nominal mass.....	Approx. 43kg
External dimensions.....	Approx. 482×570×130 mm
Battery designation	IFpP/54/150/120/[1P16S]M/-10+50/95

Internal cell operating region:

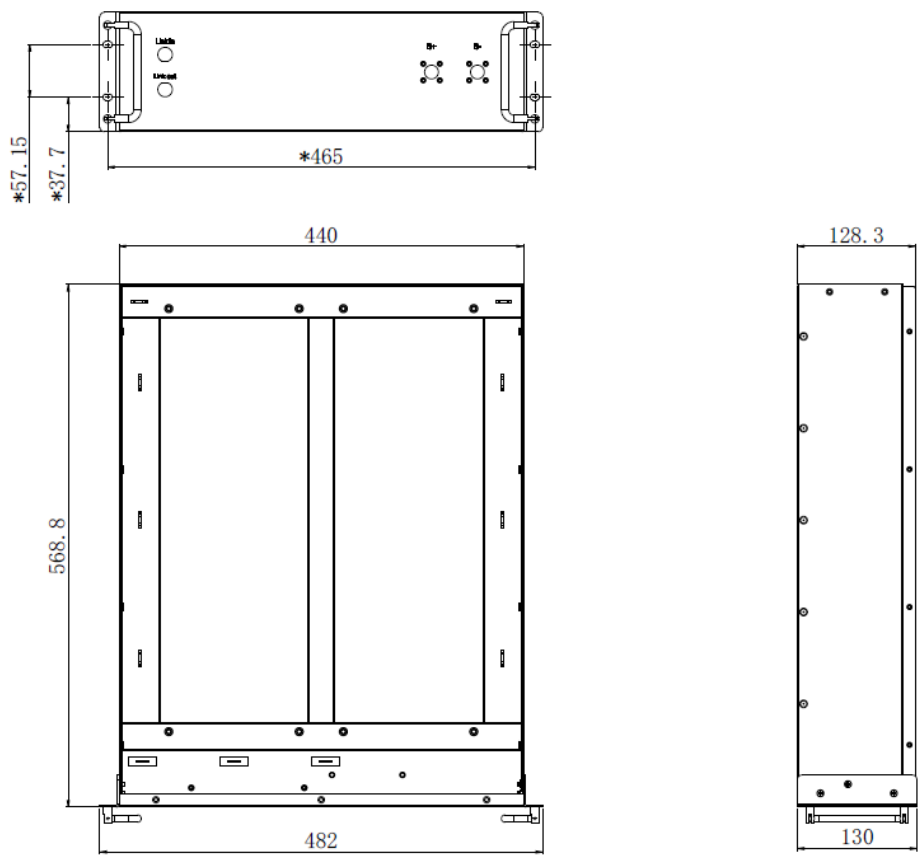
Product name	Rechargeable Prismatic Lithium-ion Cell
Model	CB56
Capacity.....	100Ah
Nominal voltage	3.2V
Maximum continuous charging current	100A
Maximum continuous discharging current	150A
Standard fully Charge Voltage.....	3.65V
Maximum Charge Voltage	3.65V
End of discharging voltage	2.5V
Charge temperature range	-10°C to 60°C
Discharge temperature range	-20°C to 60°C
Cell designation.....	IFpP/54/150/120/M/-20+60/95

Topology Diagram:

Battery system:



Battery module:



IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
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	The battery system is considered as OVC 2, PD2 internal and under 2000m and evaluated with the reference of IEC 60730-1	P
	Protect from hazardous live parts, including during installation	Protection provided. Warning information provided in installation instruction	N/A
	The mechanical integrity of internal connections		P
5.3	Venting		P
	Pressure relief function	Vent design in cell.	P
	Encapsulation used to support cells within an outer casing		P
5.4	Temperature/voltage/current management		P
	The design prevents abnormal temperature-rise	Integrated in BMS.	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)	Marking near the terminal.	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

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	Recommendations of cell operating limits, mounting advice, storage conditions and other design recommendations by the cell manufacturer		P
	Batteries designed for the selective discharge of a portion of their series connected cells	No such design.	N/A
	Protective circuit component(s) and consideration to the end-device application		P
5.6.2	Battery system design		P
	The voltage control function	Integrated in BMS.	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	Information mentioned in manufacturer's specifications	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		P
	Emergency battery final discharge	No such design.	N/A
5.9	Quality plan		P
	Manufacturing quality plan (for example: ISO9001, etc.) prepared and implemented	Reference: ISO 9001 certificate provided for Dongguan EEnovance Energy Technology Co.,Ltd. Quality plan was submitted for Shenzhen EEnovance Energy Technology CO.,LTD	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 IEC 62619)		P
	Capacity confirmation of the cells or batteries		P
	Default ambient temperature of test, 25 °C ± 5 °C	Tests were carried out in an ambient temperature of 25°C ± 5°C	P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

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	The method mentioned in manufacturer's specifications	P
7.2	Reasonably foreseeable misuse		P
7.2.1	External short-circuit test (cell or cell block)	Approved cell used.	N/A
	Short circuit with total resistance of $30\text{ m}\Omega \pm 10\text{ m}\Omega$ at $25\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$		N/A
	Results: no fire, no explosion		N/A
7.2.2	Impact test (cell or cell block)	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.	Approved cell used.	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)	The mass of battery system is more than 20 kg.	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 pack.	—
	Mass of the test unit (kg)	43.2	—
	Height of drop (m)	0.10	—
	Results: no fire, no explosion		P
7.2.4	Thermal abuse test (cell or cell block)	Approved cell used	N/A
	Results: no fire, no explosion		N/A
7.2.5	Overcharge test (cell or cell block)	Approved cell used	N/A
	For those battery systems that are provided with only a single protection for the charging voltage control		N/A
	Results: no fire, no explosion		N/A
7.2.6	Forced discharge test (cell or cell block)	Approved cell used	N/A

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	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 I_t :		N/A
	Discharging time, $t = (1 I_t / I_m) \times 90$ (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	Approved cell used	N/A
7.3.2	Internal short-circuit test (cell)		N/A
	Samples preparation procedure: In accordance with Clause A.5 and A.6 of IEC 62133-2:2017		N/A
	Tested per 7.3.2 b) in an ambient temperature of $25\text{ °C} \pm 5\text{ °C}$.		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 :		N/A
7.3.3	Propagation test (battery system)		N/A
	Method to create a thermal runaway in one cell :		N/A
	Results: No external fire from the battery system, 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	The electric, electronic and software controls and systems for critical safety were subjected to analysis for functional safety according to 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 risk assessment and mitigation of the battery system	FMEA documents were provided.	P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
8.2	Battery management system (or battery management unit)		P
8.2.1	Requirements for the BMS	Class B according to IEC 60730-1 Annex H.	P
	The safety integrity level (SIL) target of the BMS		N/A
	The charge control evaluated by tests in clauses 8.2.2 to 8.2.4		P
8.2.2	Overcharge control of voltage (battery system)		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 Table 8.2.2.	P
	The BMS terminated the charging before exceeding the upper limit charging voltage	Tested complied.	P
8.2.3	Overcharge control of current (battery system)		P
	Results: no fire, no explosion	See 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	No cooling system.	N/A
	Elevated temperature for charging, 5 °C above maximum operating temperature		P
	Results: no fire, no explosion		P
	The BMS detected the overheat temperature and terminated charging	See Table 8.2.4	P
	The battery system operated as designed during test	Complied.	P
9	EMC		N/A
	Battery system fulfil EMC requirements of the end-device application	Intended for to be tested in the end use application	N/A
10	INFORMATION FOR SAFETY		P
	The cell manufacturer provides information about current, voltage and temperature limits of their products	Approved cell used.	N/A
	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

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	The marking items shown in Table 1 in IEC 62620 indicated on the cell, battery system or instruction manual.	Identification of manufacturer shown in label	P
	Cell or battery system has clear and durable markings		P
	Cell designation		N/A
	Battery designation	IFpP/54/150/120/[(1P16S)*nS] M/-10+50/95 (n=4, 5, 6 to 12)	P
	Battery structure formulation		P

12	PACKAGING AND TRANSPORT		N/A
	Refer to Annex D	Informative.	N/A

ANNEX A	OPERATING REGION OF CELLS FOR SAFE USE		P
A.1	General		P
A.2	Charging conditions for safe use		P
A.3	Consideration on charging voltage		P
A.4	Consideration on temperature		P
A.5	High temperature range		P
A.6	Low temperature range		P
A.7	Discharging conditions for safe use		P
A.8	Example of operating region		P

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		—

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	The irradiation point on the target cell same or similar as that on the cell test		N/A
	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		N/A
	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	Informative.	N/A
	Regulations concerning international transport of secondary lithium batteries	Informative.	N/A

IEC 62619					
Clause	Requirement + Test		Result - Remark		Verdict
5	TABLE: Critical components information				P
Object/part no.	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity ¹⁾
Cell					
Cell	REPT BATTERO Energy	CB56	3.2 V, 100 Ah	IEC 62619: 2022	SG PSB-BT-03584; SG PSB-BT-03584M1;
Whole unit					
Integrated rack	Shenzhen EEnovance Energy Technology CO., LTD	RT5.12-H	SGCC 630*620*2220mm	IEC 62619: 2022	Tested with appliance
BCU box					
Metal enclosure	Shenzhen EEnovance Energy Technology CO., LTD	RT-BCU-M-61.44-QC	SGCC 482*200*570mm	IEC 62619: 2022	Tested with appliance
Copper bar	Shenzhen EEnovance Energy Technology CO., LTD	300901010032-1 300901010033-1 300901010037-0	Material: T2 Cu	IEC 62619: 2022	Tested with appliance
DC-DC Converter	MORNSUN	PV75-2YB12R3	Input: 80-1000Vdc, 0.7A Output:12Vdc, 6.25A -40°C to +85°C	EN 62109-1:2010	TUV Rh: AN 50579752 0001
Insulator support	Dongguan Wolf Composite Material Co Ltd	WF88	Min. Thickness 1.5mm, V-0,130°C	UL746C	UL E488513
DC breaker	Projoy Electric Co., Ltd.	PEBS-H-125 PROJOY	Rating:1000V, 125A Breaking capacity: 6KA. T _A : -30°C to 70°C	EN 60947-2:2017+A1	TUV RH R 50600874 0001
Power Input/Output Receptacle (P+/P-/B+/B-Port)	General Connectivity System Co., Ltd.	PSR6XCBS1A, PSR6XABS1A	Rating:1000V,12 0A -40°C to 125°C	2 PfG 2740/04.20	TUV RH R 50584986

IEC 62619					
Clause	Requirement + Test		Result - Remark		Verdict
Power Input/Output Plug (P+/P-/B+/B- Port) (Alternative)	Amphenol Technology (Zhuhai) Co., LTD	C10-730187-210, C10-730187-110	Rating:1000V, 120A -40°C to 120°C	2 PfG 2740/04.20	TUV RH R 50481661
Power Input/Output Receptacle (P+/P-/B+/B- Port) (Alternative)	Shenzhen Tengdaxing technology CO., LTD	RCL01X-120-S6-03, RCL04X-120-S6-01.	Rating:1000V,12 0A -40°C to 125°C	IEC/EN 61984:2019	TUV SUD B 117781 0006 Rev. 00
Power Input/Output Plug (P+/P-/B+/B- Port)	Shenzhen Tengdaxing technology CO., LTD	RCL21X-120-25, RCL21Y-120-25	Rating:1000V,12 0A -40°C to 125°C	IEC/EN 61984:2019	TUV SUD B 117781 0006 Rev. 00
Power Input/Output Plug (P+/P-/B+/B- Port) (Alternative)	General Connectivity System Co., Ltd.	PSRP6XC25A, PSRP6XA25A	Rating:1000V,12 0A -40°C to 125°C	2 PfG 2740/04.20	TUV RH R 50584986
DC Contactor	JOIN ELECTRIC (SHANGHAI) CO.,LTD	EVHB150A-12	Rating:1000V, 150A Max. Contact Voltage/Current: 1500V/2000A Tj: -40°C to 85°C	EN 60947-1:2007/A2:2014E N 60947-5-1:2017 EN IEC 60947-4-1:2019	TUV SUD N8A 109076 0001
DC Contactor	JOIN ELECTRIC (SHANGHAI) CO.,LTD	EVHC50A-12S	Rating:1500V, 50A Tj: -40°C to 85°C	EN 60947-1:2007/A2:2014E N 60947-5-1:2017 EN IEC 60947-4-1:2019	TUV SUD N8A 109076 0001
Fuse	Xi'an Sinofuse Electric Co., Ltd.	RSZ307-000-L2N-160A1000V	Rating:1000V, 160A Breaking capacity: 50Ka Tj: -40°C to 85°C	EN 60269-4:2009+A1+A2 EN 60269-1:2007+A1+A2	TUV RH R 50541400
Heat shrink tubing	SHENZHEN WOER HEAT-SHRINKABLE MATERIAL CO LTD	RSFR-H	125°C, 600V, VW-1	UL 224	UL E203950
Heat shrink tubing (Alternative)	Interchangeable	Interchangeable	min.125°C, 600V, VW-1	UL 224	UL Approval

IEC 62619					
Clause	Requirement + Test			Result - Remark	Verdict
Diverter	Shenzhen EEnovance Energy Technology CO., LTD	SH-F	75mV,150A	IEC 62619: 2022	Tested with appliance
Pre-charge resistance	Shenzhen EEnovance Energy Technology CO., LTD	RXLG-500W-30R-J	500W,30ohm	IEC 62619: 2022	Tested with appliance
Internal Signal Wire	DONGGUAN DANYANG ELECTRONIC WIRE CO LTD	3385	Min.24AWG, min.105°C, 300V	UL758	UL E332522
Internal Signal Wire (Alternative)	SHENZHEN CITY DE XING LONG ELECTRIC CO LTD	3385	Min.24AWG, min.105°C, 300V	UL758	UL E328945
Internal Signal Wire (Alternative)	DONGGUAN ZHENGWEI ELECTRIC WIRE & CABLE INDUSTRY CO LTD	3385	Min.24AWG, min.105°C, 300V	UL758	UL E326510
Internal Signal Wire (Alternative)	DONGGUAN BOLI ELECTRONIC CO LTD	3385	Min.24AWG, min.105°C, 300V	UL758	UL E305164
Internal Signal Wire (Alternative)	DONGGUAN ZHONGZHEN NEW ENERGY TECHNOLOGY CO.,LTD	3385	Min.24AWG, min.105°C, 300V	UL758	UL E355578
Internal Signal Wire (Alternative)	Interchangeable	Interchangeable	Min.24AWG, min.105°C, 300V	UL758	UL Approval
Transfer termina	SABIC JAPAN LLC	945 (GG)	Min.V-2, min.120°C, thickness 0.8mm	UL 94	UL E207780
Internal/External Connecting Power Wires	QIFURUI ELECTRONICS CO	3278	3AWG, 600Vac, 150°C Horizontal flame	UL758	UL E211048
Internal/External	GUANGDONG OMG	3886	3AWG,1500Vac, 125°C	UL758	UL E323711

IEC 62619					
Clause	Requirement + Test		Result - Remark		Verdict
Internal Connecting Power Wires (Alternative)	TRANSMITTING TECHNOLOGY CO LTD				
Internal Connecting Power Wires (Alternative)	SHENZHEN MYSUN INSULATION MATERIALS CO LTD	3886	3AWG, 1500Vac, 125°C	UL758	UL E239689
NTC	SHENZHENSHI KEMIN SENSOR CO LTD	MF5210K	10K ohm at 25°C	UL 1434	UL E356449
NTC (Alternative)	SHENZHENSHI KEMIN SENSOR CO LTD	KM10K	10K ohm at 25°C	UL 1434	UL E356449
NTC (Alternative)	SHENZHENSHI KEMIN SENSOR CO LTD	KM10K3380 3435	10K ohm at 25°C	UL 1434	UL E356449
Battery module					
Metal enclosure	DongGuan DIYER Metal Manufacturing CO., LTD	RT-5.12-QC-A	SPCC, SGCC 482*130*570mm	IEC 62619: 2022	Tested with appliance
Copper bar (connect +/- Port)	Shenzhen EEnovance Energy Technology CO., LTD	30090201028-0 30090201030-0	Material: T2 Cu	IEC 62619: 2022	Tested with appliance
Epoxy resin board	KINGBOARD LAMINATES HOLDINGS LTD	KB-6160A	V-0, 130°C	UL94, UL746C	UL E123995
Epoxy resin board (Alternative)	Interchangeable	Interchangeable	V-0, 130°C	UL94, UL746C	UL approval
Power Input/Output Receptacle (P+/P-/B+/B- Port)	General Connectivity System Co., Ltd.	PSR6XCBS1A, PSR6XABS1A	Rating:1000V, 120A PD2, IP67 -40°C to 125°C	2 PfG 2740/04.20	TUV RH R 50584986
Power Input/Output Plug (P+/P-/B+/B- Port) (Alternative)	Amphenol Technology (Zhuhai) Co., LTD	C10-730187-210, C10-730187-110	Rating:1000V, 120A PD2, IP67 -40°C to 120°C	2 PfG 2740/04.20	TUV RH R 50481661
Insulating	SHENZHEN	TS-FR1365	VTM-0, min.80°C	UL94	UL E329660

IEC 62619					
Clause	Requirement + Test		Result - Remark		Verdict
paper	TEESUN TECHNOLOGY CO LTD				
Insulating paper (Alternative)	Interchangeable	Interchangeable	Min.VTM-0, min.80°C	UL94	UL approval
Internal Signal Wire	DONGGUAN DANYANG ELECTRONIC WIRE CO LTD	3385	Min.24AWG, min.105°C, 300V	UL758	UL E332522
Internal Signal Wire (Alternative)	SHENZHEN CITY DE XING LONG ELECTRIC CO LTD	3385	Min.24AWG, min.105°C, 300V	UL758	UL E328945
Internal Signal Wire (Alternative)	DONGGUAN ZHENGWEI ELECTRIC WIRE & CABLE INDUSTRY CO LTD	3385	Min.24AWG, min.105°C, 300V	UL758	UL E326510
Internal Signal Wire (Alternative)	DONGGUAN BOLI ELECTRONIC CO LTD	3385	Min.24AWG, min.105°C, 300V	UL758	UL E305164
Internal Signal Wire (Alternative)	DONGGUAN ZHONGZHEN NEW ENERGY TECHNOLOGY CO.,LTD	3385	Min.24AWG, min.105°C, 300V	UL758	UL E355578
Internal Connecting Power Wires	QIFURUI ELECTRONICS CO	3278	3AWG,1500Vac, 125°C	UL758	UL E211048
Internal Connecting Power Wires (Alternative)	GUANGDONG OMG TRANSMITTING TECHNOLOGY CO LTD	3886	3AWG,1500Vac, 125°C	UL758	UL E323711
Internal Connecting Power Wires (Alternative)	SHENZHEN MYSUN INSULATION MATERIALS CO LTD	3886	3AWG,1500Vac, 125°C	UL758	UL E239689
Internal Signal Wire (Alternative)	Interchangeable	Interchangeable	Min.24AWG, min.105°C, 300V	UL758	UL Approval

IEC 62619					
Clause	Requirement + Test		Result - Remark		Verdict
Heat shrink tubing	SHENZHEN WOER HEAT-SHRINKABLE MATERIAL CO LTD	RSFR-H	125°C, 600V, VW-1	UL 224	UL E203950
Heat shrink tubing (Alternative)	Interchangeable	Interchangeable	min.125°C, 600V, VW-1	UL 224	UL Approval
NTC	SHENZHENSHI KEMIN SENSOR CO LTD	MF5210K	10K ohm at 25°C	UL 1434	UL E356449
NTC (Alternative)	SHENZHENSHI KEMIN SENSOR CO LTD	KM10K	10K ohm at 25°C	UL 1434	UL E356449
NTC (Alternative)	SHENZHENSHI KEMIN SENSOR CO LTD	KM10K3380 3435	10K ohm at 25°C	UL 1434	UL E356449
Main Board					
MCU (UM2)	Nations	N32G455VEL7	V _{BAT} =1.8~3.6V, T _A =-40~105°C	IEC 62619: 2022	Tested with appliance
Communication Components (UG1, UG6, UG10)	Shanghai Beiling Co., Ltd	BL1585B	VCC=4.5~5V T _A =-40°C to +85°C SOP8	IEC 62619: 2022	Tested with appliance
Relay SR1, SR2	HONGFA	JY23F-S-DC12V-C	Rated Current: 3A Rated Voltage: 6VDC Operation temperature: -40°C ~70°C Rated coil voltage: 12VDC	IEC 62619: 2022	Tested with appliance
NTC (RT2)	SHENZHEN SUNLORD ELECTRONICS CO LTD	SDNT1608X103α 3450βTF	R25 =10KΩ±1%, B25/85=3450K±1% T _{opr} : -40°C to 125°C	UL 1434	UL E352242
Cell (BT1)	Shenzhen MyRock Industrial Co., Ltd	CR1220	3V, 40mAH Φ12.5mm H=2.0mm	IEC 62619: 2022	Tested with appliance
Optocoupler(, UI3,UG3,UI4, UG4,UI5,UG5 ,)	Lite-on Technology Corporation	LTV217	Reverse Voltage: 6V Forward Current: 50mA T _{opr} : -55 ~	IEC 62619: 2022	Tested with appliance

IEC 62619					
Clause	Requirement + Test		Result - Remark		Verdict
			+110°C		
Signal Connector (J1, J2, J3, J4, J5)	Envalior	TE250F6	130°C, V-0	UL94	UL E47960
BMU board					
IC for AFE (UB1)	Maxim Integrated	MAX14921	V _P =6V to 65V T _A = -40°C ~ +85°C I _P =65 A to 150A	IEC 62619: 2022	Tested with appliance
Balanced resistance (RB26,RB27, RB28,RB29,R B30,RB31,RB 32,RB33,RB5 1,RB52,RB53, RB54,RB55,R B56,RB57,RB 58,RB75,RB8 7,RB137,RB1 41,RB142,RB 143,RB144,R B145,RB146, RB147,RB148 ,RB149,RB15 0,RB151,RB1 52,RB153)	UNI-ROYAL	25121WJ0430T4 E	1W, 43Ω±5%, 2512	IEC 62619: 2022	Tested with appliance
Optocoupler (UB2, UB8, UB9)	LITE-ON Technology Corp.	LTV-1008-TP1-G	CTR: MIN. 50% at I _F =5Ma, V _{CE} =5V, T _a =25°C V _{CEO} =70V T _{opr} =-55°C to 110°C	DIN EN IEC 60747-5-5 (VDE 0884-5):2021-10; EN IEC 60747-5-5:2020	VDE No. 138213.
Isolation IC (U8)	Shanghai Chipanalog Microelectronics Co., Ltd.	CA-IS308x	V _{DDA} : 2.5V to 5V I _o : -20mA to 20mA T _{opr} : -40°C to 125°C	IEC 62368-1:2014	TUV Rh: JPTUV-112094
PCB material	Kingboard electronics Co., LTD	KB-6160C	Fire rating: V-0 Max temperature: 130°C Min. thickness: 2mm	UL 796	E123995
Collection board					

IEC 62619					
Clause	Requirement + Test		Result - Remark		Verdict
Isolation IC (U8)	Shanghai Chipanalog Microelectronics Co., Ltd.	CA-IS308x	Supply voltage: 2.5V-5.5V 150Mbps 4 5kV Topr: -40-125°C	IEC 62368-1:2014	TUV Rh: JPTUV-112094
DC-DC (U21)	Mornsun	B0505CS1WR3L	Supply voltage: 4.5~5.5V current: 20~200mA Isolation voltage: 3750VDC Topr: -55-125°C	IEC 62368	VDE No. 138213. UL
JR1, JR3, JR4, JR5	Envalior	TE250F6	130°C, V-0	UL94	UL E47960
U20	ST	STM32G0B1CCT6	Reset and power management Voltage range: 1.7 V to 3.6 V Separate I/O supply pin (1.6 V to 3.6 V) Power-on/Power-down reset (POR/PDR) Programmable Brownout reset (BOR) Programmable voltage detector (PVD) Low-power modes: Sleep, Stop, Standby, Shutdown VBAT supply for RTC and backup registers	IEC 62619: 2022	Tested with appliance
Supplementary information: 1) Provided evidence ensures the agreed level of compliance. See OD-2039. License available upon request.					

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

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: Results: 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): _____						

IEC 62619					
Clause	Requirement + Test			Result - Remark	Verdict
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 I _t , (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	
--	--	--	--	--	
--	--	--	--	--	
--	--	--	--	--	
--	--	--	--	--	
--	--	--	--	--	
--	--	--	--	--	
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): ____					

IEC 62619					
Clause	Requirement + Test			Result - Remark	Verdict
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 (m²)	
--		--		--	
--		--		--	
--		--		--	
Supplementary information:					
1) Cell can be failed through laser exposure, 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): __					

IEC 62619					
Clause	Requirement + Test		Result - Remark		Verdict
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
A003704937-001	3.305~3.296	98.0	224.6	3.517	A, D, F
			Charge Voltage Applied Battery System: 1)		
			Whole		Part
			256.96VDC		N/A
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.					
The upper charge voltage limit of cell is 3.65V.					
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	
A003704937-001	202.0	101	216.4	A, D, F	
A003704937-001	202.1	120	217.2	A, D, F	
A003704937-001	202.4	116	217.9	A, D, F	
Supplementary information: The maximum charging current of cell is 100A. 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):					

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
8.2.4	TABLE: Overheating control (battery system)		P
Sample No.	OCV at start(SOC 50%) of test, V dc	Maximum Charging Current, A	Measured Maximum Charging Voltage, V dc
A003704937-001	212.1	98.0	213.8
Maximum Specified Temperature of Battery System, °C		Maximum Measured Cell Case Temperature, °C	Results
50.0		55.0	A, D, F
Supplementary information: The upper charge temperature limit of cell is 60°C. 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): _____			

9	TABLE: EMC				N/A
Standard used for EMC test:					
Sample No.	EMC Test Item	Battery Condition	EMC Test Level/Parameters	Compliance Criteria	Results
--	--	--	--	--	--
Supplementary information: Battery Condition During EMC test 1 – In Operation Mode, [] Supplied at _____, [] Load at _____ 2 – In non-operation Mode, Battery state of charge (SOC) before test at around _____ Compliance Criteria and Test Results: A – No fire or Explosion B – Fire C – Explosion D – Battery system did operate as intended during the test E - All function of battery system did operate as intended after the test F - All function of battery system did not operate as intended during the test, (Please explain): _____ G - Other (Please explain): _____					

- End of test report -

Product: Rechargeable Li-ion battery System

Type Designation: RT 5.12-H4, RT 5.12-H5, RT 5.12-H6, RT 5.12-H7, RT 5.12-H8, RT 5.12-H9,
RT 5.12-H10, RT 5.12-H11, RT 5.12-H12



Figure 1 Front view of battery system (RT 5.12-H12)



Figure 2 Back view of battery system (RT 5.12-H12)

Product: Rechargeable Li-ion battery System

Type Designation: RT 5.12-H4, RT 5.12-H5, RT 5.12-H6, RT 5.12-H7, RT 5.12-H8, RT 5.12-H9,
RT 5.12-H10, RT 5.12-H11, RT 5.12-H12



Figure 3 Left view of battery system (RT 5.12-H12)



Figure 4 Right view of battery system (RT 5.12-H12)

Product: Rechargeable Li-ion battery System

Type Designation: RT 5.12-H4, RT 5.12-H5, RT 5.12-H6, RT 5.12-H7, RT 5.12-H8, RT 5.12-H9,
RT 5.12-H10, RT 5.12-H11, RT 5.12-H12



Figure 5 Overview view 1 of BCU box

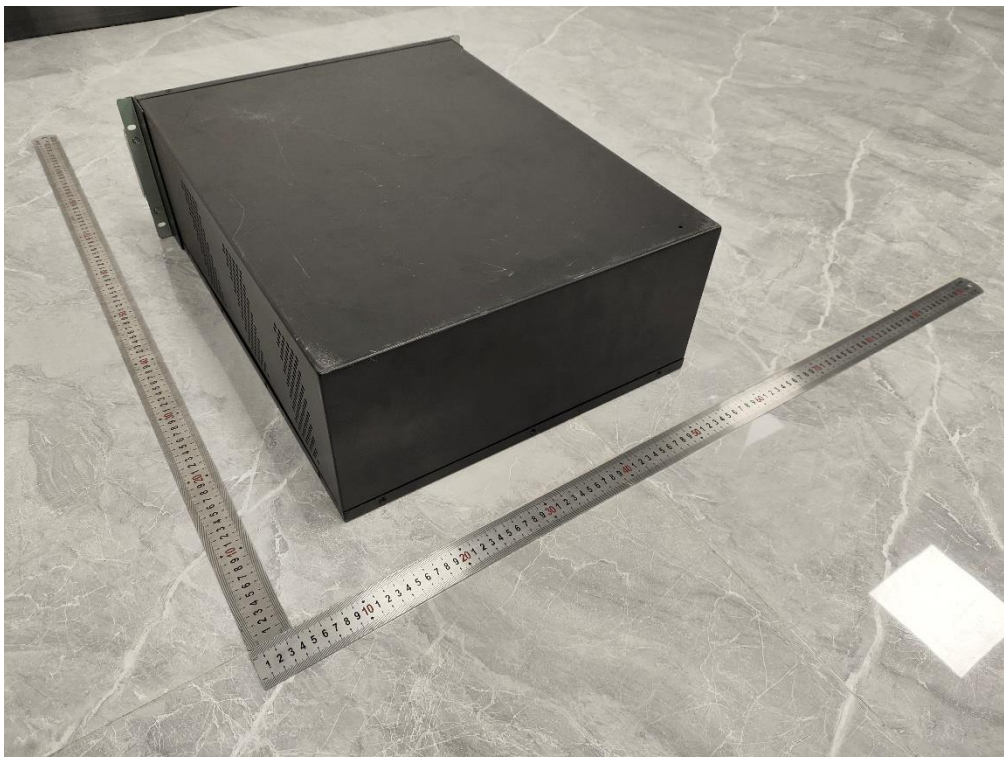


Figure 6 Overview view 2 of BCU box

Product: Rechargeable Li-ion battery System

Type Designation: RT 5.12-H4, RT 5.12-H5, RT 5.12-H6, RT 5.12-H7, RT 5.12-H8, RT 5.12-H9,
RT 5.12-H10, RT 5.12-H11, RT 5.12-H12



Figure 7 Front view of BCU box

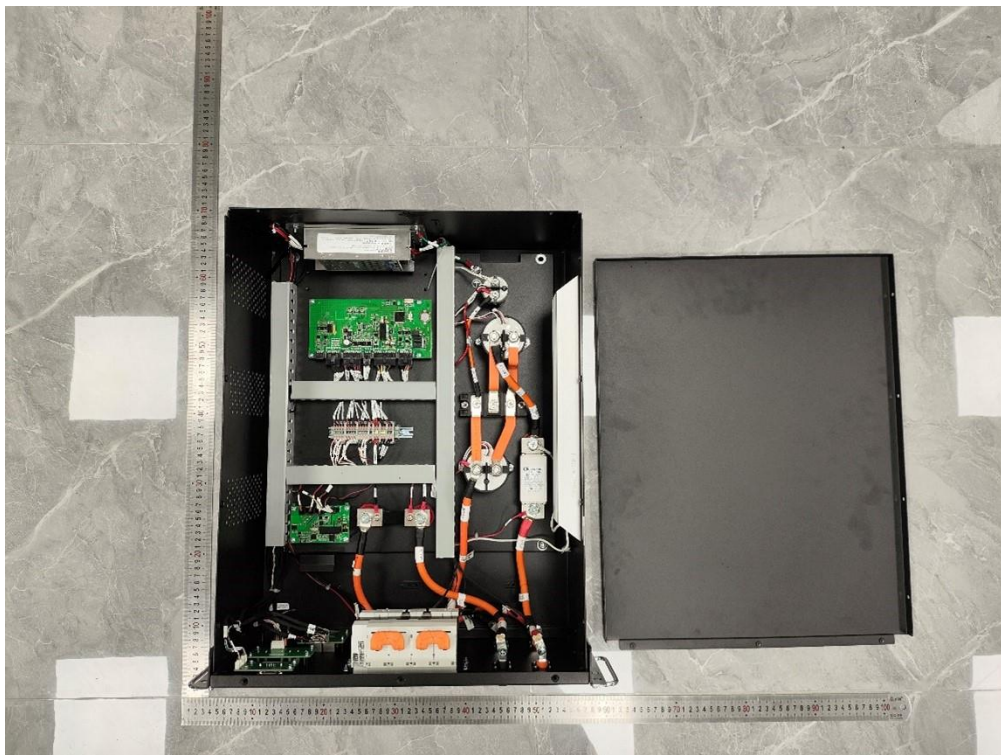


Figure 8 Inside view of BCU box

Product: Rechargeable Li-ion battery System

Type Designation: RT 5.12-H4, RT 5.12-H5, RT 5.12-H6, RT 5.12-H7, RT 5.12-H8, RT 5.12-H9,
RT 5.12-H10, RT 5.12-H11, RT 5.12-H12



Figure 9 Overview of battery module



Figure 10 Overview of battery module

Product: Rechargeable Li-ion battery System

Type Designation: RT 5.12-H4, RT 5.12-H5, RT 5.12-H6, RT 5.12-H7, RT 5.12-H8, RT 5.12-H9,
RT 5.12-H10, RT 5.12-H11, RT 5.12-H12



Figure 11 Internal 1 of battery module



Figure 12 Internal view 2 of battery module

Product: Rechargeable Li-ion battery System

Type Designation: RT 5.12-H4, RT 5.12-H5, RT 5.12-H6, RT 5.12-H7, RT 5.12-H8, RT 5.12-H9,
RT 5.12-H10, RT 5.12-H11, RT 5.12-H12

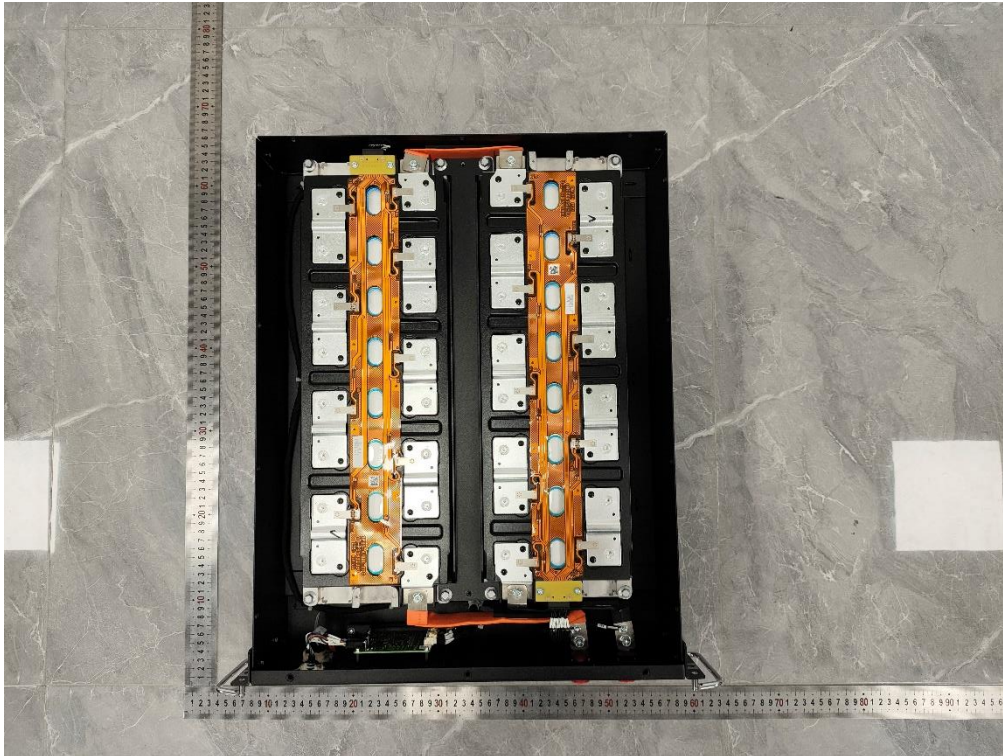


Figure 13 Internal view of battery module

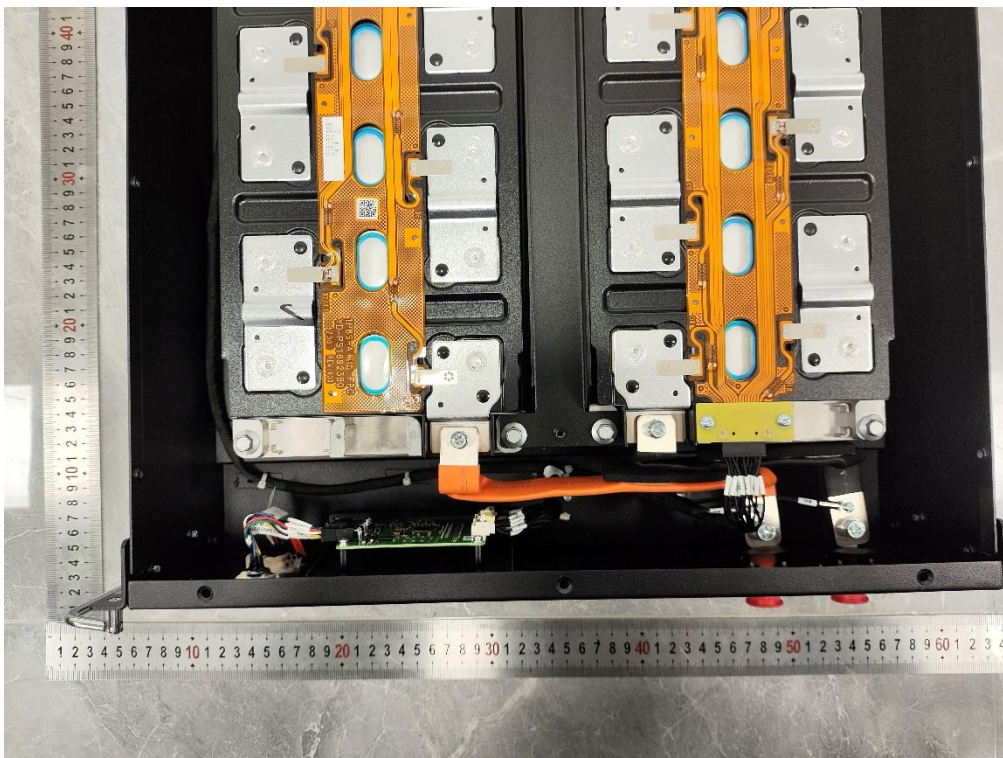


Figure 14 Internal view of battery module

Product: Rechargeable Li-ion battery System

Type Designation: RT 5.12-H4, RT 5.12-H5, RT 5.12-H6, RT 5.12-H7, RT 5.12-H8, RT 5.12-H9,
RT 5.12-H10, RT 5.12-H11, RT 5.12-H12

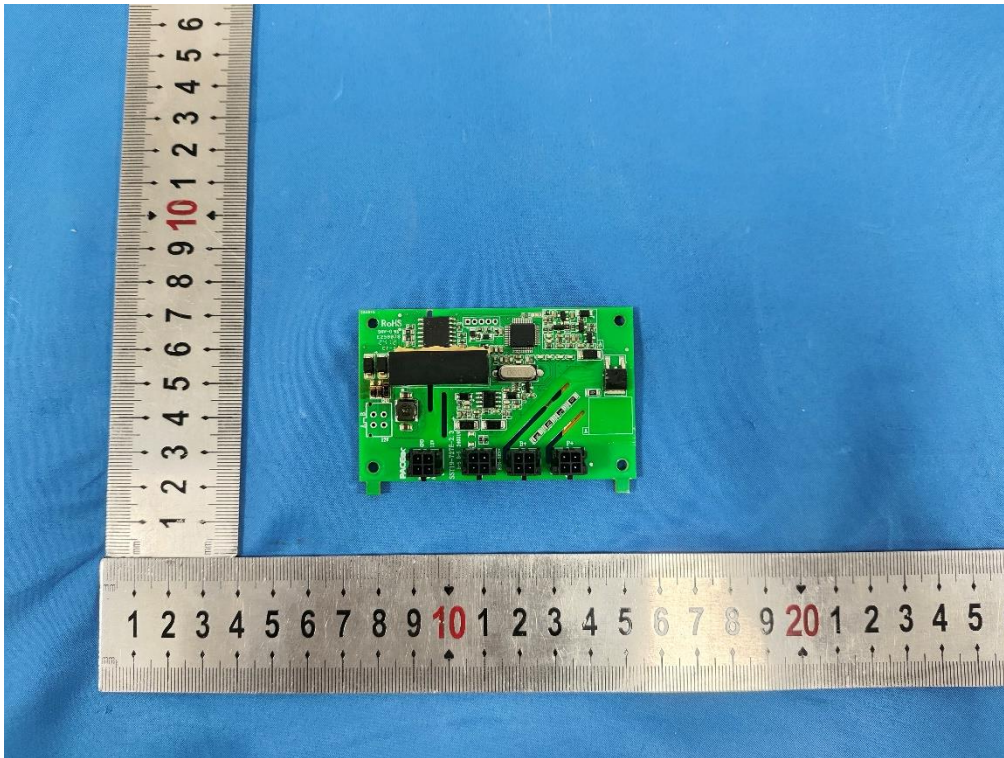


Figure 15 Front of collection board PCB

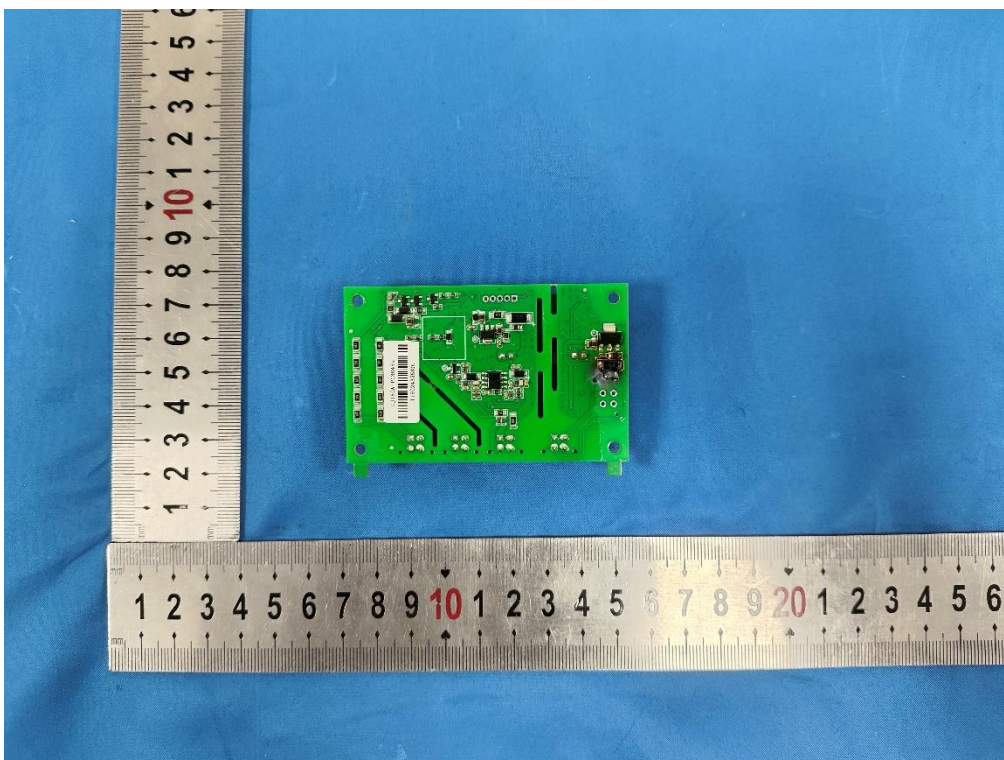


Figure 16 Back of collection board PCB

Product: Rechargeable Li-ion battery System

Type Designation: RT 5.12-H4, RT 5.12-H5, RT 5.12-H6, RT 5.12-H7, RT 5.12-H8, RT 5.12-H9,
RT 5.12-H10, RT 5.12-H11, RT 5.12-H12

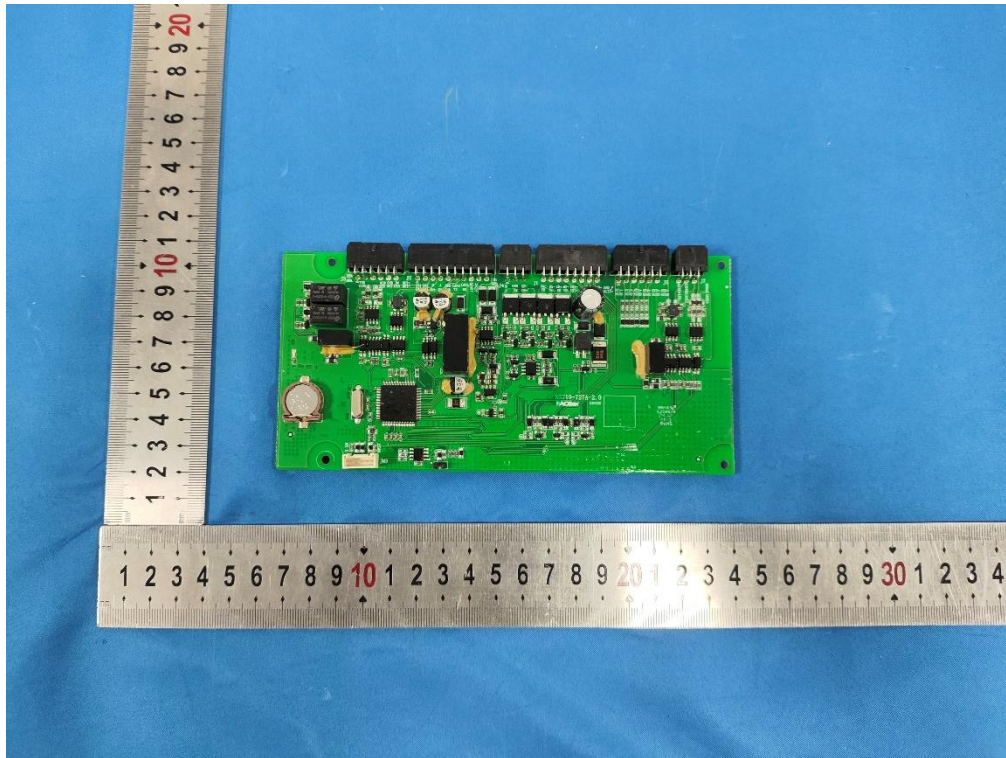


Figure 17 Front of Main control board PCB

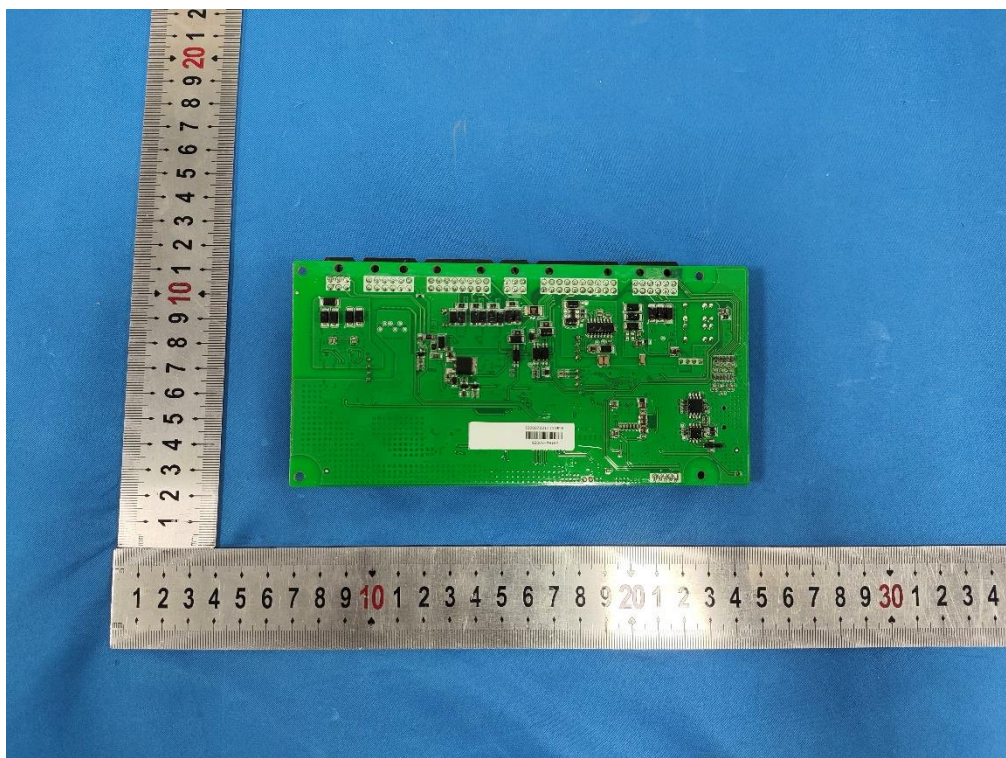


Figure 18 Back of Main control board PCB

Product: Rechargeable Li-ion battery System

Type Designation: RT 5.12-H4, RT 5.12-H5, RT 5.12-H6, RT 5.12-H7, RT 5.12-H8, RT 5.12-H9,
RT 5.12-H10, RT 5.12-H11, RT 5.12-H12

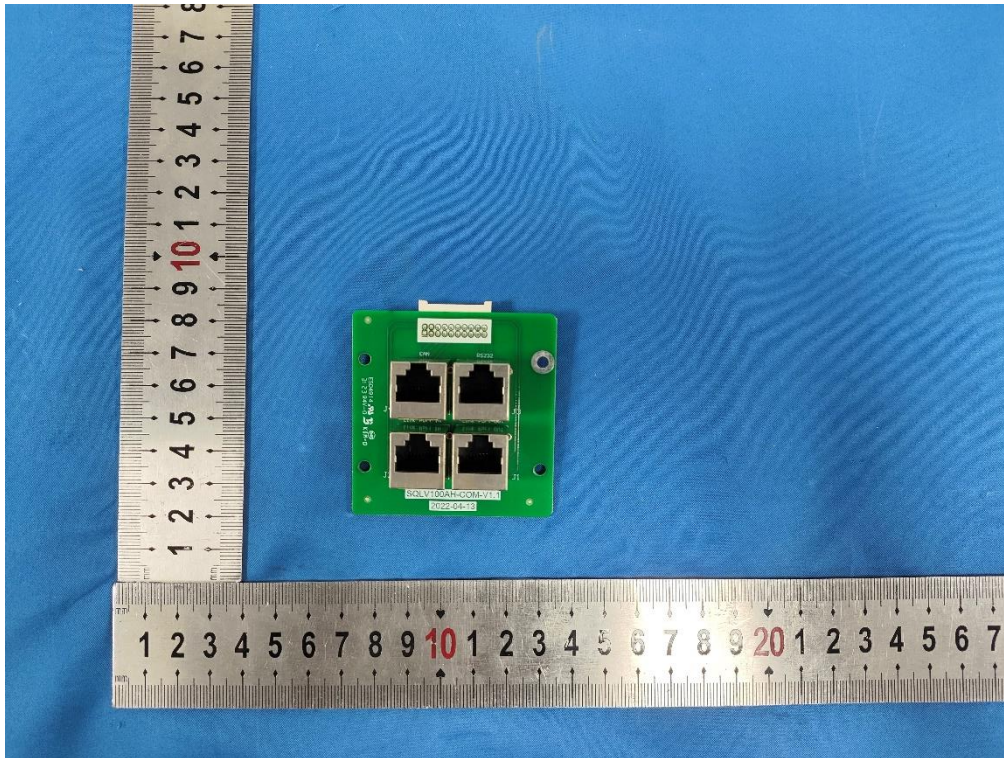


Figure 19 Front of interface board PCB

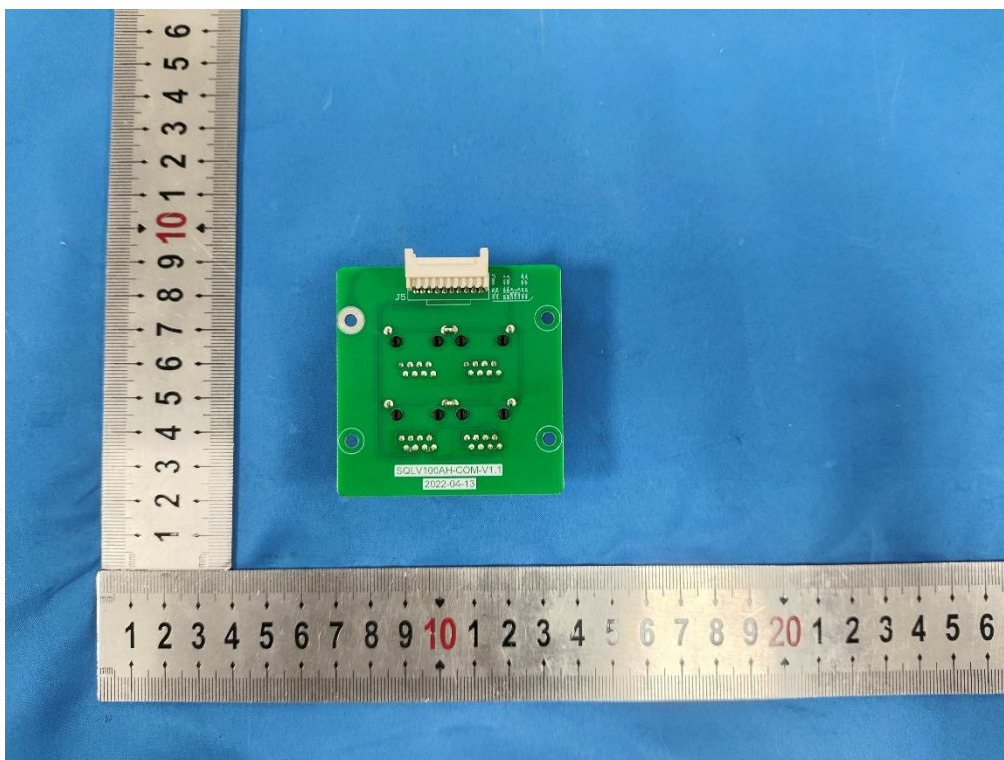


Figure 20 Back of interface board PCB

Product: Rechargeable Li-ion battery System

Type Designation: RT 5.12-H4, RT 5.12-H5, RT 5.12-H6, RT 5.12-H7, RT 5.12-H8, RT 5.12-H9,
RT 5.12-H10, RT 5.12-H11, RT 5.12-H12

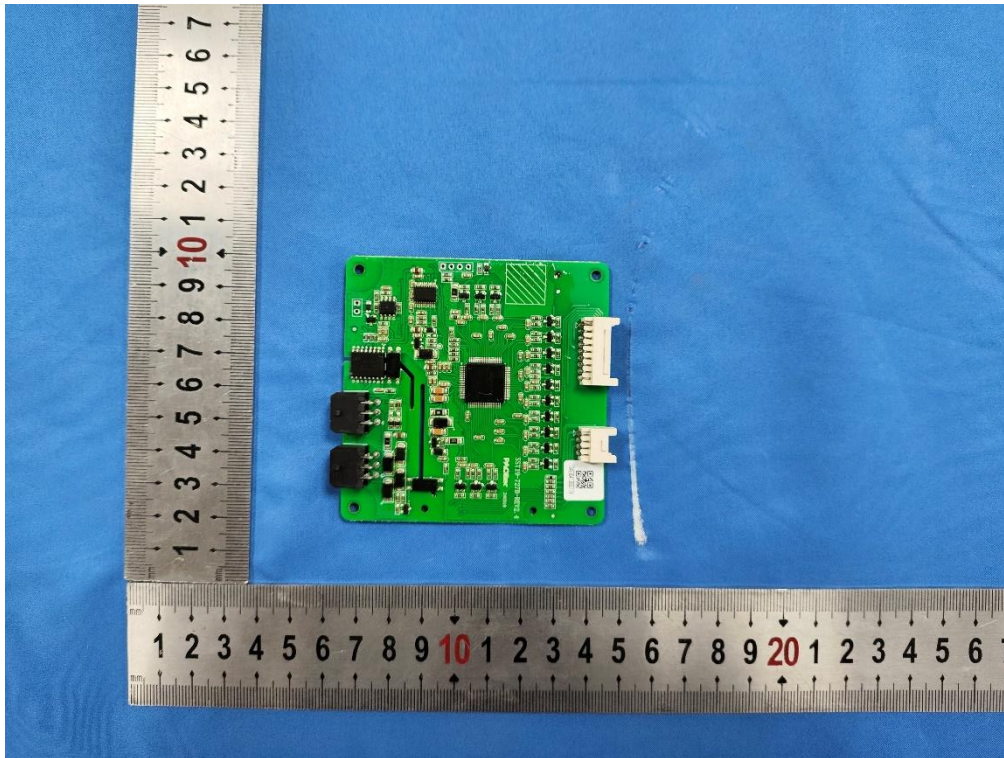


Figure 21 Front of battery control board PCB

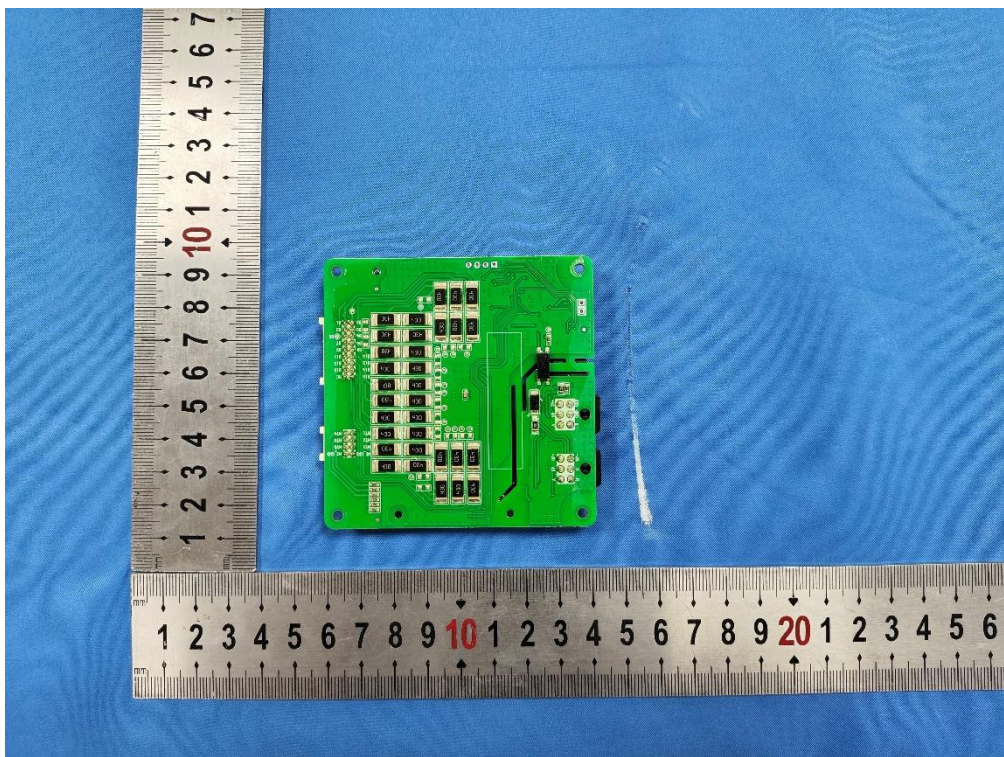


Figure 22 Back of battery control board PCB