



Test Report issued under the responsibility of:

TÜVNORD

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.....	BL-DG2660012-301
Date of issue	2026-07-01
Total number of pages	51
Name of Testing Laboratory preparing the Report	Dongguan BALUN Testing Technology 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, 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
Copyright © 2023 IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components (IECEE System). All rights reserved.	
This publication may be reproduced in whole or in part for non-commercial purposes as long as the IECEE is acknowledged as copyright owner and source of the material. IECEE takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.	
If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.	
This report is not valid as a CB Test Report unless signed by an approved IECEE Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.	
General disclaimer:	
The test results presented in this report relate only to the object tested.	
This report shall not be reproduced, except in full, without the written approval of the Issuing NCB. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.	

Test item description :	Rechargeable Li-ion Battery system	
Trademark(s)		
Manufacturer	Same as applicant.	
Model/Type reference	1) E-MATE 80-A, 2) E-MATE 96-A, 3) E-MATE 112-A, 4) E-MATE 128-A	
Ratings	1) 256V, 314Ah, 80.384kWh 2) 307.2V, 314Ah, 96.4608kWh 3) 358.4V, 314Ah, 112.5376kWh 4) 409.6V, 314Ah, 128.6144kWh	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒ CB Testing Laboratory:	Dongguan BALUN Testing Technology Co., Ltd.	
Testing location/ address :	No. 59, Xianghe Third Road, Dalang Town, Dongguan, Guangdong Province, China	
Tested by (name, function, signature)	Bond Qin (Engineer)	<i>Bond Qin</i>
Approved by (name, function, signature) ...	Hui Yin (Reviewer)	<i>Hui Yin</i>
☐ 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): This report contains 51 pages, incl. ANNEX 1: PHOTOS with 8 pages.	
Summary of testing:	
Tests performed (name of test, test clause and date test performed): cl.7.2.3.3 Edge and corner drop test (battery system) (2026-06-16) cl. 8.2.2 Overcharge control of voltage (battery system) (2026-05-08) cl. 8.2.3 Overcharge control of current (battery system) (2026-05-11) cl. 8.2.4 Overheating control (battery system) (2026-05-13) Cell PC-0B1-72174L4-BE were CB approved according to IEC 62619:2022, Certificate No.: SG PSB-BT-04096, Report No.: 085-282360183-000. The Rechargeable Li-ion Battery system consists of 1 high voltage box E-MATE-BCU-N-QC and 5 to 8 battery modules E-MATE-16-QC connected in series, which corresponds to 4 models of E-MATE 80-A, E-MATE 96-A, E-MATE 112-A, and E-MATE 128-A. The Rechargeable Li-ion Battery System has the same topology, construction, hardware and software except for the difference in cell number, battery configuration, voltage, and weight. For over-voltage protection, over-current protection and over-temperature protection, the safety mechanism would not be influenced by number of batteries in the system, therefore, one battery module E-MATE-16-QC and one high-voltage box E-MATE-BCU-N-QC could be chosen as the representative testing unit. Number of samples required for testing: 2 battery systems (B1 and B2 for one battery module E-MATE-16-QC with one high-voltage box E-MATE-BCU-N-QC). The samples comply with the requirement of IEC 62619: 2022.	Testing location: Dongguan BALUN Testing Technology Co., Ltd. No. 59, Xianghe Third Road, Dalang Town, Dongguan, Guangdong Province, China

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

N/A

☐ The product fulfils the requirements of _____

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: (to be specified, for example when required by the standard or client, or if national accreditation requirements apply)

Information on uncertainty of measurement:

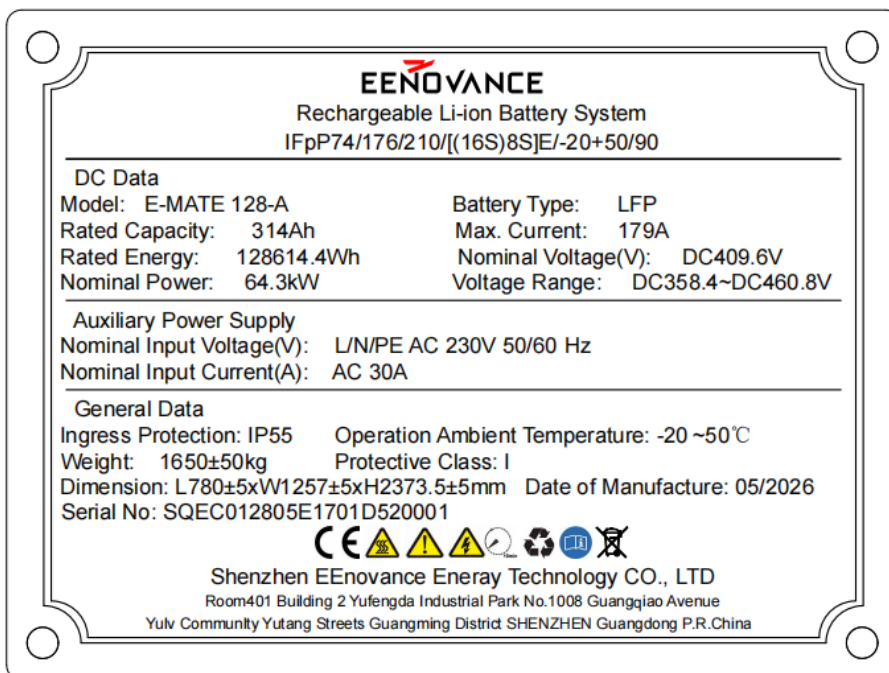
The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE.

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.

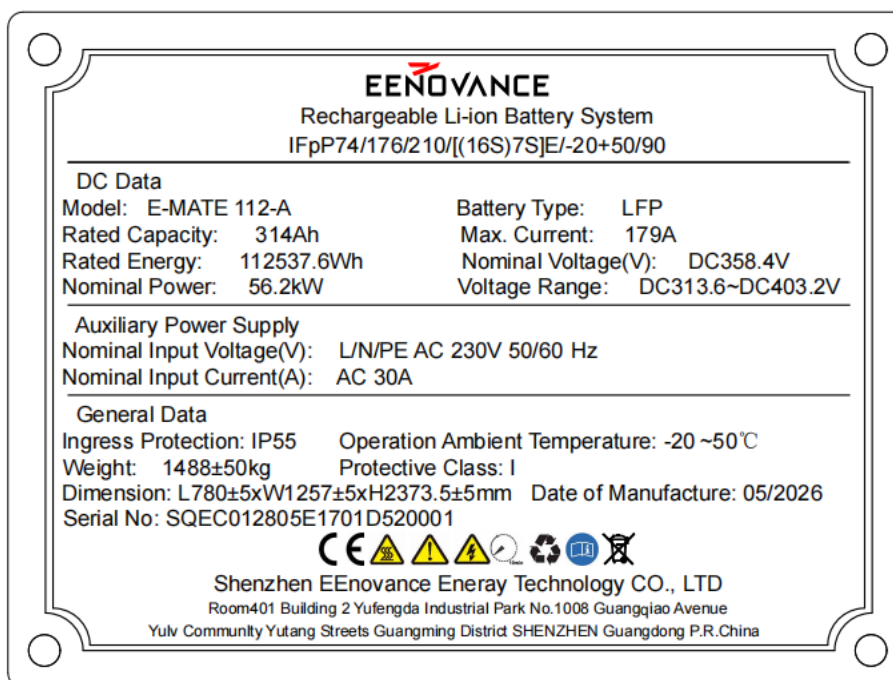
Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

Copy of marking plate:

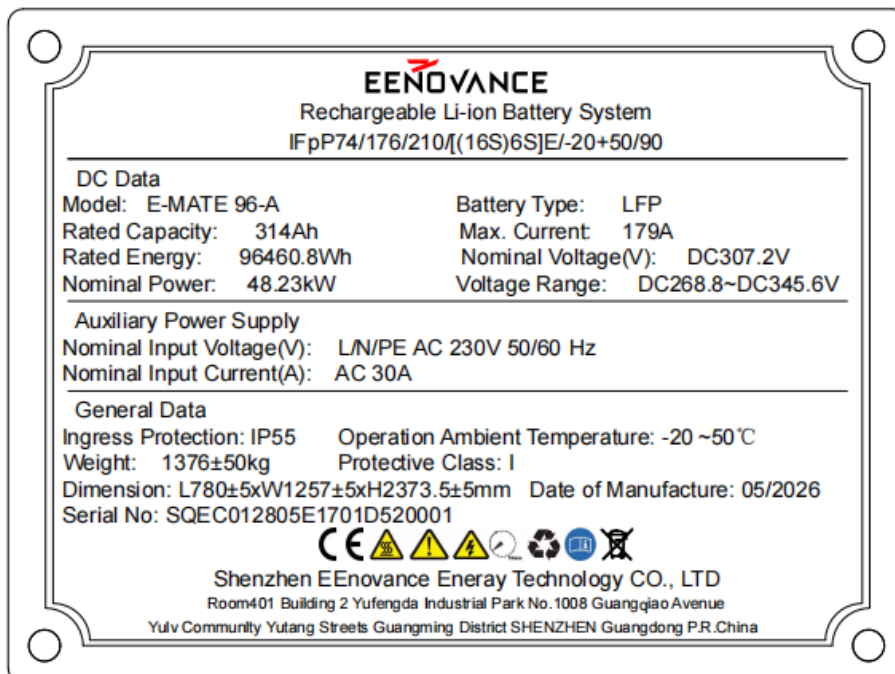
The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.



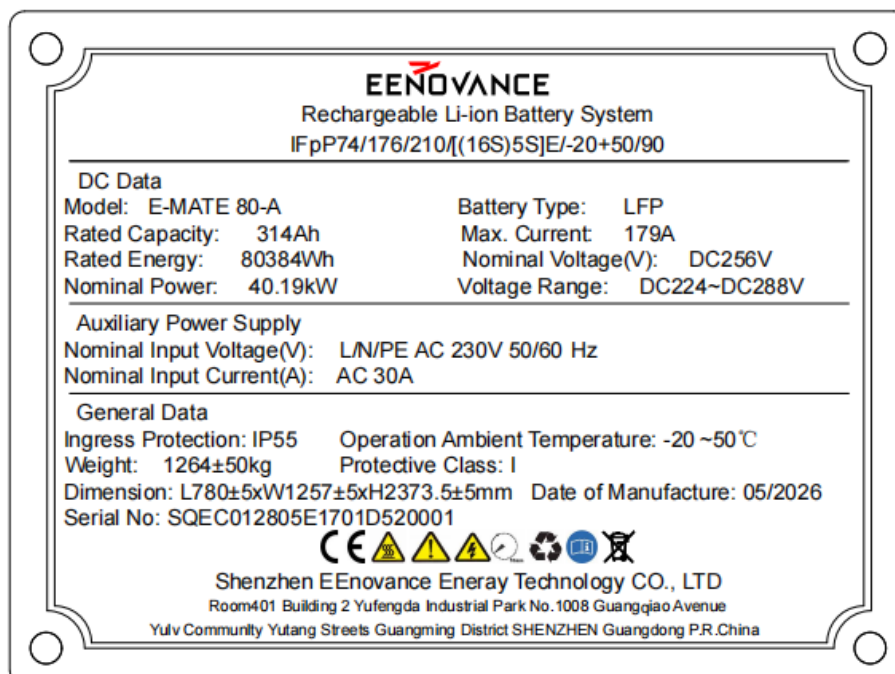
Label of battery system with model E-MATE 128-A



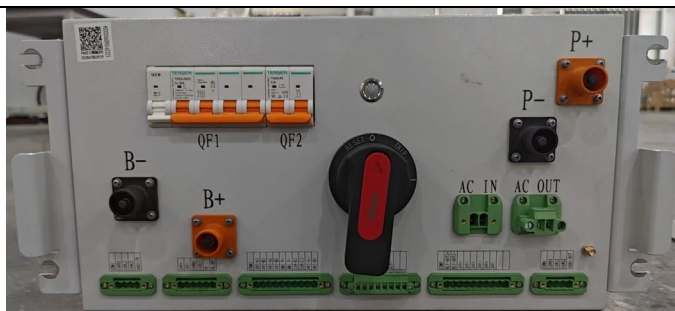
Label of battery system with model E-MATE 112-A



Label of battery system with model E-MATE 96-A



Label of battery system with model E-MATE 80-A



Battery Polarity

Remark:

1. Calculated rated capacity:
 Measured rated capacity of module: 314Ah
 Number of modules connected in parallel: 1
 Calculated rated capacity(Ah) = 314Ah x 1= 314Ah
2. Product serial number code: SQEC012805E1701D520001
 Bit 1~4, Company model identification
 Bit 5~8, System energy
 Bit 9~10, 0.5P discharge rate
 Bit 11~13, Product serial number
 Bit 14~15, Integrated factory code
 Bit 16, Production year, "A" stand for 2023, "B" stand for 2024, ..., "D" stand for 2026, ...
 Bit 17, Production month, "5" stand for May, "6" stand for Jun., ..., "A" stand for Oct., ...
 Bit 18~19, Production date, "20" stand for 20th
 Bit 20~22, Serial number
3. Example of Date of manufacture: 05/2026
 "05" represents the month, such as 01, 02, 03, 04, 05, ..., 12
 "2026" represents the year, such as 2024, 2025, 2026, ...
4. "B+", "B-", "P+", "P-" are marked near the polarity of the Rechargeable Li-ion Battery system, "+" positive electrode; "-" negative electrode.
5. The code "SQEC012805E1701D520001" can trace the manufacture information of the battery system. This is not the actual code and only for example.

Test item particulars:	
Classification of installation and use:	To be defined in final product
Supply Connection	DC connector
.....:	See page 9: General product information and other remarks for details.
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	2026-05-07
Date (s) of performance of tests	2026-05-08 to 2026-06-16
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 60335-1:	
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) : Dongguan EEnovance Energy Technology Co., Ltd. Room 501, Building1, Songhu Zhigu Science and Technology Industrial Park, No.11, LiaobuYanhe Road, Liaobu Town, Dongguan City, Guangdong Province, P.R. China	

General product information and other remarks:

The Rechargeable Li-ion Battery system is used in energy storage applications.

The battery module of model E-MATE-16-QC is composed of 16 lithium-ion cells (16S).

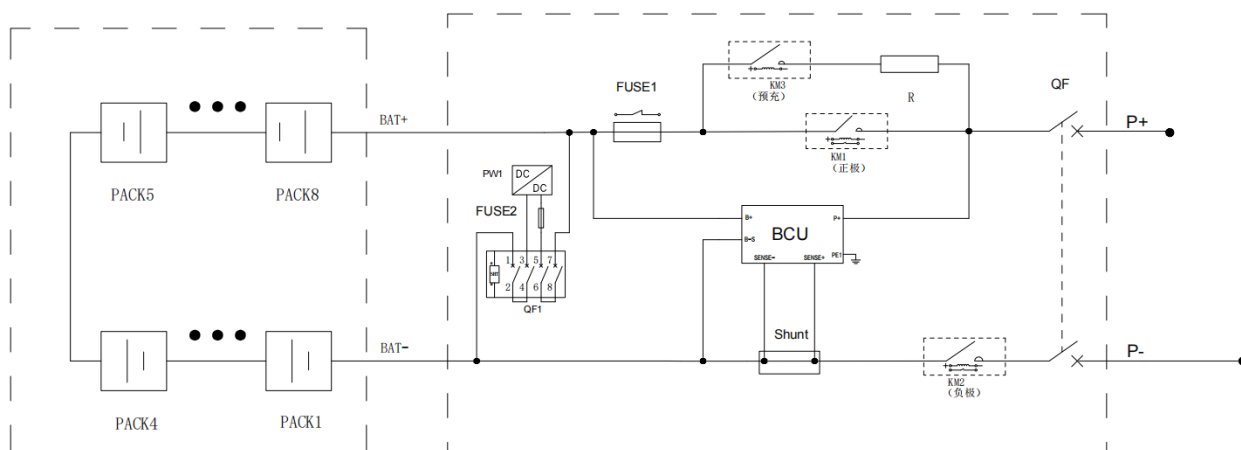
The Rechargeable Li-ion Battery system consists of 1 high voltage box E-MATE-BCU-N-QC and 5 to 8 battery modules E-MATE-16-QC connected in series, which corresponds to 4 models of E-MATE 80-A, E-MATE 96-A, E-MATE 112-A, and E-MATE 128-A. The Rechargeable Li-ion Battery System has the same topology, construction, hardware and software except for the difference in cell number, battery configuration, voltage, and weight.

The battery system has protection functions against overcharging, over-discharge, over current, over temperature, and short circuit.

The Rechargeable Li-ion Battery also equipped subsystem with Battery Management System (BMS), Thermal Management System, Fire Suppression System (FSS), Energy Management System (EMS) and other auxiliary equipment.

List of subsystems

Subsystem	Component Function
Battery module	The battery module with model E-MATE-16-QC is composed of 16 lithium-ion cells (cell model PC-0B1-72174L4-BE).
Battery management system	Adopting a two-level management architecture and three-level software protection, including module level and battery cluster level, to achieve comprehensive control, management and protection of The Rechargeable Li-ion Battery to ensure the safe and stable operation of The Rechargeable Li-ion Battery.
Energy management system	EMS is responsible for collecting the status and data of all devices in the energy storage system, receiving the charge and discharge requests of the energy storage system, and generating control strategies according to the control requirements to control the operation of the system.
Thermal management system	The entire thermal management system adopts air cooling to control the temperature of the Rechargeable lithium-ion Air-cooled Energy Storage System.
Fire suppression system	Includes an aerosol base fire extinguishing system, strobe and horn annunciators, as well as temperature and smoke sensors. The battery pack shall be provided with fire protection partition according to the partition, and the alarm shall be provided outside the cabin.

Block Diagram:

The main features of the battery system E-MATE 128-A and E-MATE 112-A are shown as below:

Product information	Rechargeable Li-ion Battery system	Rechargeable Li-ion Battery system
Model	E-MATE 128-A	E-MATE 112-A
Nominal capacity	314Ah	314Ah
Nominal voltage	409.6V	358.4V
Nominal Charge Current	157A	157A
Maximum Charge Current	179A	179A
Nominal Discharge Current	157A	157A
Maximum Discharge Current	179A	179A
Maximum Charge Voltage	460.8V	403.2V
Upper limit Charging Voltage	467.2 V	408.8V
Cut-off Voltage	358.4V	313.6V
Upper charge temperature	50°C	50°C
Lower charge temperature	0°C	0°C
Upper discharge temperature	50°C	50°C
Lower discharge temperature	-20°C	-20°C
Storage temperature range	-20°C~50°C	-20°C~50°C
Recommend charging method declared by the manufacturer	Charging at constant power 64.3072kW until the voltage reaches 460.8V, or any cell reaches 3.6V	Charging at constant power 56.2688kW until the voltage reaches 403.2V, or any cell reaches 3.6V
Recommend discharging method	Discharging at constant power	Discharging at constant power

declared by the manufacturer	64.3072kW until the voltage reaches 358.4V, or any cell reaches 2.8V	56.2688kW until the voltage reaches 313.6V, or any cell reaches 2.8V
Nominal mass	(1650±50)kg	(1488±50)kg
External dimensions	(780 ±5)mm x(1257±5)mm x (2373.5±5) mm (L×W×H)	(780 ±5)mm x(1257±5)mm x (2373.5±5) mm (L×W×H)
The main features of the battery system E-MATE 96-A and E-MATE 80-A are shown as below:		
Product information	Rechargeable Li-ion Battery system	Rechargeable Li-ion Battery system
Model	E-MATE 96-A	E-MATE 80-A
Nominal capacity	314Ah	314Ah
Nominal voltage	307.2V	256V
Nominal Charge Current	157A	157A
Maximum Charge Current	179A	179A
Nominal Discharge Current	157A	157A
Maximum Discharge Current	179A	179A
Maximum Charge Voltage	345.6V	288V
Upper limit Charging Voltage	350.4V	292V
Cut-off Voltage	268.8V	224V
Upper charge temperature	50°C	50°C
Lower charge temperature	0°C	0°C
Upper discharge temperature	50°C	50°C
Lower discharge temperature	-20°C	-20°C
Storage temperature range	-20°C~50°C	-20°C~50°C
Recommend charging method declared by the manufacturer	Charging at constant power 48.2304kW until the voltage reaches 345.6V, or any cell reaches 3.6V	Charging at constant power 40.192kW until the voltage reaches 288V, or any cell reaches 3.6V
Recommend discharging method declared by the manufacturer	Discharging at constant power 48.2304kW until the voltage reaches 268.8V, or any cell reaches 2.8V	Discharging at constant power 40.192kW until the voltage reaches 224V, or any cell reaches 2.8V
Nominal mass	(1376±50)kg	(1264±50)kg
External dimensions	(780 ±5)mm x (1257±5)mm x (2373.5±5) mm (L×W×H)	(780 ±5)mm x (1257±5)mm x (2373.5±5) mm (L×W×H)

The main parameters of the battery module E-MATE-16-QC, as well as the internal cells PC-0B1-72174L4-BE are shown in the table below:

Product information	Rechargeable Li-ion Battery Module	Cell inside the battery
Model	E-MATE-16-QC	PC-0B1-72174L4-BE
Nominal capacity	314Ah	314Ah
Nominal voltage	51.2V	3.2V
Nominal Charge Current	157A	157A
Maximum Charge Current	179A	250A
Nominal Discharge Current	157A	157A
Maximum Discharge Current	179A	314A
Maximum Charge Voltage	57.6V	3.8V
Upper limit Charging Voltage	58.4V	3.8V
Cut-off Voltage	44.8V	2.0V
Lower limit discharging voltage	/	2.0V
Upper charge temperature	50°C	60°C
Lower charge temperature	0°C	0°C
Upper discharge temperature	50°C	60°C
Lower discharge temperature	-20°C	-30°C
Storage temperature range	-20°C~50°C	-40°C~60°C
Recommend charging method declared by the manufacturer	Charging at constant power 8.0384kW until the voltage reaches 57.6V or any cell reaches 3.6 V	Charging the cell with 157A constant current until to 3.8V, then constant voltage 3.8V until charging current reduces to 15.7A
Recommend discharging method declared by the manufacturer	Discharging at constant power 8.0384kW until the voltage reaches 44.8V or any cell reaches 2.8V	/
Nominal mass	(112±5)kg	(5.5±0.3)kg
External dimensions	(782.5±2)mm x (487±2)mm x (227±2)mm (L×W×H)	TxWxH: (71.72±2.0)mm x (174±2.0)mm x (207.11±2.0)mm

Remark:

The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

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... :	Clause 6, Clause 7, 8.1, and 8.2. See also table 5.1 for Critical components information	P
	Reduce the risk of injuries from moving parts		P
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		P
	The mechanical integrity of internal connections	Wires and cables used are certified.	P
5.3	Venting		P
	Pressure relief function	Explosion-proof safety valve for venting exists.	P
	Encapsulation used to support cells within an outer casing		P
5.4	Temperature/voltage/current management		P
	The design prevents abnormal temperature-rise	Overcharge, over current and overheating proof circuit used in this battery. See tests of clause 8.	P
	Voltage, current, and temperature limits of the cells	See above.	P
	Specifications and charging instructions for equipment manufacturers	The charging limits specified in the user manual.	P
5.5	Terminal contacts of the battery pack and/or battery system		P
	Polarity marking(s)	See page 7.	P
	Polarity marking not provided for keyed external connector		N/A

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	Capability to carry the maximum anticipated current	DC connector complied with the requirements.	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)	Battery system has independent control and protective functions, and BMS is integrated into battery system.	P
	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		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		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..... :	Information mentioned in manufacturer's specifications.	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	Non-resettable protect function provided in the BMS security mechanism.	P
	Manual with procedure for resetting of battery operation	Information mentioned in maintenance manual.	P
	Emergency battery final discharge	Not for such application.	N/A
5.9	Quality plan		P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	Manufacturing quality plan (for example: ISO9001, etc.) prepared and implemented	Complied. ISO 9001: 2015 certificate provided. Certificate No. CN24-13205A, issued by ACM (CHINA) LIMITED, valid until: 2027-06-18.	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	Test complied.	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	B1: voltage: 44.8V	P
	The cells or batteries charged using the method specified by the manufacturer	Discharging and charging are carried out in an ambient temperature of 25°C ± 5°C.	P
7.2	Reasonably foreseeable misuse		P
7.2.1	External short-circuit test (cell or cell block)	CB approval 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 approval 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		N/A

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
7.2.3.2	Whole drop test (cell or cell block, and battery system)	CB approval cell used.	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)	Battery system applied.	P
	Description of the Test Unit..... :	1 HV box and 1 Battery pack	—
	Mass of the test unit (kg)..... :	B2: 144.6kg	—
	Height of drop (m)..... :	0.025m	—
	Results: no fire, no explosion	No fire, no explosion.	P
7.2.4	Thermal abuse test (cell or cell block)	CB approval cell used.	N/A
	Results: no fire, no explosion		N/A
7.2.5	Overcharge test (cell or cell block)	CB approval 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 approval cell used.	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 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		N/A
7.3.2	Internal short-circuit test (cell)	CB approval cell used.	N/A
	Samples preparation procedure: In accordance with Clause A.5 and A.6 of IEC 62133-2:2017		N/A

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	Tested per 7.3.2 b) 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.....		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	Relevant documents provided by the client which indicate analysis for functional safety has been done 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	PFMEA provided	P
	Conduct of risk assessment and mitigation of the battery system	FMEA table has been submitted.	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	Suitable for Class B control according to IEC 60730-1:2022, Annex H.	P
	The charge control evaluated by tests in clauses 8.2.2 to 8.2.4	Relevant tests (8.2.2, 8.2.3 and 8.2.4) have been performed and successfully passed.	P
8.2.2	Overcharge control of voltage (battery system)		P
	The exceeded charging voltage applied to the whole battery system	B1: 64.24V.	P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	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		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		P
	Elevated temperature for charging, 5 °C above maximum operating temperature..... :	55°C	P
	Results: no fire, no explosion..... :	See Table 8.2.4.	P
	The BMS detected the overheat temperature and terminated charging		P
	The battery system operated as designed during test		P

9	EMC		P
	Battery system fulfil EMC requirements of the end-device application.....	The Rechargeable Li-ion Battery system has passed the EMC certification in accordance with EN IEC 61000-6-2: 2019 and EN IEC 61000-6-4: 2019. Certificate No.: NE1105260144, Report No.: TWR2606027 001, issued by TUV NORD Taiwan Co., Ltd.	P

10	INFORMATION FOR SAFETY		P
	The cell manufacturer provides information about current, voltage and temperature limits of their products	Included in datasheet.	P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	The battery system manufacturer provides information regarding how to mitigate hazards to equipment manufacturers or end-users.	Written in instruction manual.	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.	The battery is marked in accordance with IEC 62620, also see pages 5 to 7.	P
	Cell or battery system has clear and durable markings		P
	Cell designation		N/A
	Battery designation		P
	Battery structure formulation		P

12	PACKAGING AND TRANSPORT		N/A
	Refer to Annex D		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 :		—

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	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	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	N/A

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	Regulations concerning international transport of secondary lithium batteries		N/A

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

5.1	TABLE: Critical components information					P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾	
Key Components for Battery System						
Enclosure	Shenzhen Jianji Technology Co., Ltd.;	SGCC	780x1257x2373mm, min. thickness1.5mm	IEC 62619:2022	Tested with apparatus	
MCB(1QF1)	Zhejiang Tengen Electric Co., Ltd.	TGBG-63	AC230/400V, 32A, 2P, -35°C ~+70°C	IEC 60898-1:2015	TUV Rh: HU-003799-M1 0002	
MCB(1QF1) (Alternative)	ProJoy Electric Co., Ltd.	PEM1-63	AC230/400V, 32A, 2P, -35°C ~+70°C	EN 60898-1:2019	TUVRh: R 50492216 0001	
MCB(1QF1) (Alternative)	Zhejiang Chint Electrics Co., Ltd.	NXB-63E	AC230/400V, 32A, 2P, -35°C ~+70°C	EN 60898-1:2019	TUV Rh: AN 50640496 0001	
MCB(2QF1)	Zhejiang Tengen Electric Co., Ltd.	TGBG-63	AC230/400V, 16A, 2P, -35°C ~+70°C	IEC 60898-1:2015	TUV Rh: HU-003799-M1 0002	
MCB(2QF1) (Alternative)	ProJoy Electric Co., Ltd.	PEM1-63	AC230/400V, 16A, 2P, -35°C ~+70°C	EN 60898-1:2019	TUV Rh: R 50492216 0001	
MCB(2QF1) (Alternative)	Zhejiang Chint Electrics Co., Ltd.	NXB-63E	AC230/400V 16A, 2P, -35°C ~+70°C	EN 60898-1:2019	TUV Rh:AN 50640496 0001	
RCCB(2QF2)	Zhejiang Tengen Electric Co., Ltd.	TGBGLE-32	AC230V, 10A, 30mA, 2P, -5°C ~+40°C	EN 61009-1:2012+A1+A2+A11+A12+A13	TUV Rh: R 50580330 0001	
RCCB(2QF2) (Alternative)	ProJoy Electric Co., Ltd.	PEL1-63	AC230V, 10A, 30mA, 2P, -5°C ~+40°C	EN 61008-1:2012+A12:2 017	GTS: CLJS220705 39642R	
RCCB(2QF2) (Alternative)	Zhejiang Chint Electrics Co., Ltd.	NXBLE-63E	AC230V, 10A, 30mA, 2P, -5°C ~+40°C	EN 61009-1:2012+A1+A2+A11+A12+A13	TUV Rh: AN 50639250 0001	

IEC 62619					
Clause	Requirement + Test			Result - Remark	Verdict
5.1	TABLE: Critical components information				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
MCB(2QF3)	Zhejiang Tengen Electric Co., Ltd.	TGBG-63	AC230/400V, 6A, 2P, -35°C ~+70°C	IEC 60898-1:2015+A1	TUV Rh: HU-003799-M1
MCB(2QF3) (Alternative)	ProJoy Electric Co., Ltd.	PEM1-63	AC230/400V, 6A, 2P, -35°C ~+70°C	EN 60898-1:2019	TUV Rh: R 50492216 0001
MCB(2QF3) (Alternative)	Zhejiang Chint Electrics Co., Ltd.	NXB-63E	AC230/400V, 6A, 2P, -35°C ~+70°C	EN 60898-1:2019	TUV Rh: AN 50640496 0001
MCB(3QF1)	Zhejiang Tengen Electric Co., Ltd.	TGBG-63DC	DC500V,6A,2P, -35°C ~+70°C	EN 60947-2:2017/A1:2020 EN 60947-2:2017	CQC: CE23030300 8262
MCB(3QF1) (Alternative)	ProJoy Electric Co., Ltd.	PEBS-H-50	DC500V,6A,2P, -35°C ~+70°C	EN IEC 60947-2:2025	TUV Rh: AN 50693282 0001
MCB(3QF1) (Alternative)	Zhejiang Chint Electrics Co., Ltd.	NB1-63DC	DC500V,6A,2P, -35°C ~+70°C	EN 60947-2:2017+A1	TUV Rh: R 50318826 0004
Switch	Zhejiang Chint Electrics Co.,Ltd.	NP2-BS542	AC220V/5A, -5°C ~+40°C	EN 60947-5-1:2004+A1 EN 60947-1:2007+A1	TUV Rh: AN 50361757 0001
Condensed Aerosol Fire Extinguishing System	Hubei Jiandun Fire Technology Co., Ltd.	JAD300-U01	DC24V, -40°C~+54°C	BS EN 15276-1:2019	BSI: KM781135
Fire Alarm Device	Vimpex Ltd.	958CHL1000	DC24V, -15°C~+40°C	EN 54-3:2001+A1:2002+A2:2006	LPCB: 539c
Smoke detector	Gulf Security Technology Co., Ltd.	DC-9102E	DC24V, -10°C~+50°C	EN 54-7:2018	LPCB: 548d

IEC 62619					
Clause	Requirement + Test			Result - Remark	Verdict
5.1	TABLE: Critical components information				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
Temperature detector	Gulf Security Technology Co., Ltd.	DC-9103E	DC24V, -10°C~+50°C	EN 54-5 :2017+A1:2018	LPCB: 548c
Relay base	Gulf Security Technology Co., Ltd.	RB01	DC24V, -20°C~+65°C	EN 54-18: 2005; EN 54-18:2005/AC:2007	Applus: No. 0370-CPR-7231
Terminal Blocks	NINGBO SUPE Electronic Co., Ltd.	TP2.5-2-GY	800V, 24A, -40°C ~+105°C	EN 60947-7-1:2009	TUV Rh: AN 50600045 0001
Power wire	Dongguan Zelongkang Wire Co., Ltd	11627	105°C, 2000V, 1/0AWG	UL 758	UL E330488 (2025-05-14)
Communication wire (RS485)	Dongguan Zelongkang Wire Co., Ltd	2517	105°C, 300V, 22AWG	UL 758	UL E330488 (2018-04-24)
Communication wire (Dry Contact)	Dongguan Zelongkang Wire Co., Ltd	1569	105°C, 300V, 22AWG/20AWG	UL 758	UL E330488 (2013-02-22)
Communication wire (PE)	Dongguan Zelongkang Wire Co., Ltd	10269	105°C, 1000V, 12AWG/14AWG/16AWG	UL 758	UL E330488 (2014-10-10)

IEC 62619						
Clause	Requirement + Test		Result - Remark		Verdict	
5.1	TABLE: Critical components information					P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾	
Air Conditioner	TCL Air Conditioner (Zhongshan)Co.,Ltd.	TC003MH1AA	AC220V/3kW/10A Heating/cooling capacity: 2/3 kw -40°C ~+55°C	EN 60335-1:2012+AC:2014+A11:2014+A13:2017+ A1:2019+A14:2019+A2:2019+A15:2021+A16:2023, EN 60335-2-40:2003(incl. Corr.:2006 and 2010) +A11:2004+A12:2005+A1:2006+A2:2009+A13:2012/AC:2013, EN 62233:2008	CVC: LVD24-10100	
Battery Pack type E-MATE-16-QC for Battery System						
Main Copper Busbar	Dongguan LeXun New Energy Technology Co., Ltd.	T2 Purple Copper	60mm²	IEC 62619:2022	Tested with apparatus	
insulating trip	Sichuan Libowei Advanced Materials Co.,Ltd	BWFRFO-AF01	V-0, Min. thickness =0.3mm RTI=80°C	UL 94 UL 746	UL E525490 (2025-09-17)	
FAN	Shenzhen Huaxia Hengtai Electronic Co.,Ltd	DA09225B24XH	DC24V, 0.24A, 5.76W, 5000rpm, 84.68CFM	EN62368-1:2014+A11	TUR Rh: R 50490780 0001	
FAN (Alternative)	Linkwell Electric (Shanghai) Co., Ltd	LK9225H24B	DC24V, 0.35A, 8.4W, 5000rpm, 82.96CFM	EN 60335-1:2012/A16:2023 EN 62233:2008	TUV SUD: N5A 130123 0003 Rev. 00	

IEC 62619					
Clause	Requirement + Test		Result - Remark		Verdict
5.1	TABLE: Critical components information				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
FAN(Alternative)	COOLCOX LIMITED	CC9225H24D	DC24V,0.28A, 6.72W, 5000rpm, 95.51CFM	EN IEC62368-1:2020+A11:2020	ALPHA: A2311061-C01-R01
Electrical Connector (B+)	DEGSON TECHNOLOGY CO.,LTD.	ESS-250A-70-B/S-OR-03	DC1500V, 250A IP67 -40°C ~125°C	2 PFG 2740/04.2020	TUV Rh: R 50581738 0004
Electrical Connector (B-)	DEGSON TECHNOLOGY CO.,LTD.	ESS-250A-70-B/S-BK-02	DC1500V, 250A IP67 -40°C ~125°C	2 PFG 2740/04.2020	TUV Rh: R 50581738 0004
Communication wire (Dry contact)	Dongguan Zelongkang Wire Co., Ltd	1569	105°C 300V 20AWG/	UL 758	UL E330488 (2013-02-22)
Communication wire (connect HV box to battery pack)	Dongguan Zelongkang Wire Co., Ltd	2517	105°C, 300V 20AWG	UL 758	UL E330488 (2018-04-24)
Communication wire (Cell voltage sampling)	Dongguan Zelongkang Wire Co., Ltd	1330	200°C, 600V 22AWG	UL 758	UL E330488 (2010-02-12)
Communication wire (Cell temperature sampling)	Dongguan Zelongkang Wire Co., Ltd	4413	150°C, 300V 24AWG	UL 758	UL E330488 (2022-09-21)
Li-ion battery cell	BatteroTech Corporation Limited	PC-0B1-72174L4-BE	3.2V, 314Ah	IEC 62619:2022	TUV SUD: SG PSB-BT-04096
HEAT SHRINKABLE Tubing	SHENZHEN WOER HEAT-SHRINKABLE MATERIAL CO.,	RSFR(CB)	300V,125°C	UL 224	UL E203950 (2025-06-25)
Injection molding materials	SICHUAN COREMER MATERIALS CO.,LTD	FRPC200	V-0, Min. Thickness =0.38mm RTI=80°C	UL94 IEC 60695-11-10 UL 746B UL746A	UL E255235 (2025-11-14)

IEC 62619					
Clause	Requirement + Test			Result - Remark	Verdict
5.1	TABLE: Critical components information				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
HV box type E-MATE-BCU-N-QC for Battery System					
Enclosure	Shenzhen Jianji Technology Co., Ltd.;	SGCC	730.7*420*223.5mm, Min. thickness1.5mm	IEC 62619:2022	Tested with apparatus
Main Copper Busbar	Dongguan LeXun New Energy Technology Co., Ltd.	T2 Purple Copper	60mm ²	IEC 62619:2022	Tested with apparatus
HEAT SHRINKABLE Tubing	SHENZHEN WOER HEAT-SHRINKABLE MATERIAL CO.,	RSFR(CB)	300V,125°C	UL 224	UL E203950 (2025-06-25)
Insulation column	Guangdong Wolf Polymer Material Technology Co., Ltd.	WF88	V-0, 130°C CH30*Φ14/H50*Φ14	UL94 IEC 60695-11-10 UL 746B UL746A	UL E488513 (2025-09-17)
ACDC	MORNSUN GUANGZHOU SCIENCE & TECHNOLOGY CO., LTD.	LM350-10B24	Input: 180-264VAC/ 90-132VAC Output: DC24V, 14.6A -30°C ~70°C	EN 62368-1:2014+A11:2017 EN 55032: 2015 EN 55035: 2017 IEC 62321:2008	EC2019033
ACDC (Alternative)	MEAN WELL ENTERPRISES CO., LTD.	LRS350-24	Input: 180-264VAC/90-132VAC Output: DC24V, 14.6A -30°C ~70°C	IEC 61558-1:2017 IEC 61558-2-16:2009 IEC 61558-2-16:2009/AMD 1:2013	DEKRA: NL-104206

IEC 62619					
Clause	Requirement + Test			Result - Remark	Verdict
5.1	TABLE: Critical components information				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
ACDC (Alternative)	Delta Electronics, Inc.	PMT-24V350W2BR	Input: 180-264VAC /90-132VAC Output: DC24V, 14.6A -30°C ~70°C	EN62368-1:2014+A11	TUV Rh: R 50450375 0004
DCDC	ATAZ Guangzhou Science&Technology Co., Ltd.	HV150-10DB24	Input: 80-1000VDC Output: DC24V, 6.25A -40°C ~85°C	IEC 62109-1:2010 EN 62109-1:2010	TUV Rh: R 50703210 0001
MCCB	ProJoy Electric Co., Ltd.	PEMC-250	DC1500V, 250A 2P, -35°C~+70°C	EN60947-2:2017/A1:2020	TUV SUD: NO.N8A 123375 0006 Rev.00
MCCB (Alternative)	Shanghai Liangxin Electrical Co., Ltd.	NDM3Z-250V	DC1500V, 250A 3P, -35°C ~+70°C	EN60947-2:2017/A1:2020	TUV SUD: No. B 083574 0244 Rev. 02
MCCB (Alternative)	NOARK Electrics (Shanghai) Co., Ltd.	ExMDY2HVE	DC1500V, 250A 2P, -40°C~+70°C	EN 60947-2:2017/A1:2020	TUV SUD: No.N8A 075006 0149 Rev. 02
MCB(QF2)	Zhejiang Tengen Electric Co., Ltd.	TGBG-63	AC230/400V, 6A 2P, -35°C~+70°C	IEC 60898-1:2015+A1	TUV Rh: HU- 003799-M1
MCB(QF2) (Alternative)	ProJoy Electric Co., Ltd.	PEM1-63	AC230/400V, 6A 2P, -35°C~+70°C	EN 60898-1:2019	TUVRh: AN 50492216 0001
MCB(QF2) (Alternative)	Zhejiang Chint Electrics Co., Ltd.	NXB-63E	AC230/400V, 6A 2P -35°C ~+70°C	EN 60898-1:2019	TUV Rh: AN 50640496 0001
MCB(QF1)	Zhejiang Tengen Electric Co., Ltd.	TGB3-63DC	DC1000V, 6A 2P -35°C ~+70°C	EN60947-2:2017/A:2020; EN 60947-2:2017	CQC: CE23030300 8262
MCB(QF1) (Alternative)	ProJoy Electric Co., Ltd.	PEBS-H-50	DC1000V, 6A 4P -35°C ~+70°C	EN IEC 60947-2:2025	TUV Rh: AN 50693282 0001

IEC 62619					
Clause	Requirement + Test			Result - Remark	Verdict
5.1	TABLE: Critical components information				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
MCB(QF1) (Alternative)	Zhejiang Chint Electrics Co., Ltd.	NB1-63DC	DC1000V, 6A 4P -35°C ~+70°C	EN60947- 2:2017+A1	TUVRh:R 50318826 0004
FUSE(FUSE1)	Xi'an Sinofuse Electric Co., Ltd.	RSGE178-350	DC1500V, 350A, - 40°C ~+125°C	IEC 60269- 7:2021 IEC60269- 1:2006+A1+A 2	TUV Rh: R 50578436 0001
FUSE(FUSE1) (Alternative)	Eugard Co., Ltd	ESH5596B	DC1500V, 350A -40°C ~+125°C	EN60269- 1:2007+A1+A 2 EN60269- 4:2009+A1+A 2	TUV Rh: J 50589692 0003
FUSE(FUSE1) (Alternative)	Hollyland Co., Ltd.	NH2XLaBat	DC1500V, 350A -40°C ~+125°C	IEC 60269- 7:2021 IEC 60269- 1:2006+A1+A 2	TUV Rh: R 50564975 0001
FUSE(FUSE2)	Xi'an Sinofuse Electric Co., Ltd.	RS308-PV	DC1000V, 6A -40°C ~+85°C	EN 60269- 6:2011 EN 60269- 1:2007/A1:200 9	TUV SUD: NO. B 150691839 004
FUSE(FUSE2) (Alternative)	GUANGDONG EUGARD CO.,LTD	PV1000.6 AP	DC1000V, 6A, -40°C ~+125°C	EN60269- 1:2007+A1+A 2 EN60269- 4:2011+A1	TUV Rh: J 50642735 0001
FUSE(FUSE2) (Alternative)	Hollyland Co., Ltd.	HC10gPV	DC1000V, 6A -40°C ~+90°C	EN 60269- 1:2007+A1 EN 60269- 6:2011	TUV Rh: AN 50263931 0001
DC Contactor (KM1/KM2)	DongGuan Churod Electronics Co., Ltd.	CHEV-H250F	DC1500V, 250A -40°C ~+85°C	EN IEC 60947-4- 1:2019; EN60947- 51:2017	TUV Rh: R 50568598 0001

IEC 62619					
Clause	Requirement + Test			Result - Remark	Verdict
5.1	TABLE: Critical components information				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
DC Contactor(KM 1/KM2) (Alternative)	CLION ELECTRIC CO., LTD.	NN82A-250/1500-24-HAC5-3	DC1500V, 250A -40°C ~+85°C	EN IEC60947-4-1:2019	TUR Rh: R 50627343 0001
DC Contactor(KM 1/KM2) (Alternative)	Huizhou BYD Battery Company Limited	EVHBCA250CE -A-1	DC1500V, 250A -40°C ~+85°C	EN IEC 60947-4-1:2019	TUV Rh: AN 50551187 0001
DC Contactor (KM1/KM2) (Alternative)	Shenzhen Unitone New Energy Technology Co., Ltd.	UNEC1N-250/1500 BD-D24-CW-A1W-5	DC1500V, 250A -40°C ~+85°C	EN IEC60947-4-1:2019	TUV Rh: R 50639203 0001
DC Contactor (KM3)	DongGuan Churod ElectronicsCo., Ltd.	CHPV-S40/F-24LA1	DC1500V, 40A -40°C ~+85°C	EN IEC 60947-4-1:2019	TUV Rh: R 50566712 0001
DC Contactor (KM3) (Alternative)	Huizhou BYD Battery Company Limited	EVHBB50CI-A	DC1500V, 50A -40°C ~+85°C	EN IEC 60947-4-1:2019	TUV Rh: AN 50551187 0001
Resistor	Bengbu Jindun Electronics Co., Ltd.	RX24-300W-50R J	300W, 50Ω	EN 60204-1:2018; EN ISO12100:2010	UDEM: M.2024.206.C 112040
Terminal	NINGBO SUPU ELECTRONICS CO., LTD.	TP2.5-2-GY	800V, 24A, -40°C ~+105°C	EN 60947-7-1:2009	TUV Rh: AN 50600045 0001
Connector (AC IN/AC OUT)	DEGSON TECHNOLOGY CO.,LTD.	5EDGKRP-7.62-2P-14-00Z(H)	300V, 30A -40°C ~+105°C	UL 1059	UL E228872 (2026-06-11)
Connector (COM1/COM 6 female)	DEGSON TECHNOLOGY CO.,LTD.	2EDGKRP-5.08-04P-14-00Z(H)	300V, 15A -40°C ~+105°C	UL 1059	UL E228872 (2025-05-26)
Connector (COM2 female)	DEGSON TECHNOLOGY CO.,LTD.	2EDGKRP-5.08-06P-14-00Z(H)	300V, 15A -40°C ~+105°C	UL 1059	UL E228872 (2025-05-26)
Connector (COM4 female)	DEGSON TECHNOLOGY CO.,LTD.	2EDGKRP-5.08-08P-14-00Z(H)	300V, 15A -40°C ~+105°C	UL 1059	UL E228872 (2025-05-26)
Connector (COM3/COM 5 female)	DEGSON TECHNOLOGY CO.,LTD.	2EDGKRP-5.08-10P-14-00Z(H)	300V, 15A -40°C ~+105°C	UL 1059	UL E228872 (2025-05-26)

IEC 62619					
Clause	Requirement + Test			Result - Remark	Verdict
5.1	TABLE: Critical components information				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
Connector (COM1/COM 6 male)	DEGSON TECHNOLOGY CO.,LTD.	2EDGKM-5.08-04P-14-1000Z(H)	300V, 15A -40°C ~+105°C	UL 1059	UL E228872 (2026-04-14)
Connector (COM2 male)	DEGSON TECHNOLOGY CO.,LTD.	2EDGKM-5.08-06P-14-1000Z(H)	300V, 15A -40°C ~+105°C	UL1059	UL E228872 (2026-04-14)
Connector (COM4 male)	DEGSON TECHNOLOGY CO.,LTD.	2EDGKM-5.08-08P-14-1000Z(H)	300V, 15A -40°C ~+105°C	UL 1059	UL E228872 (2026-04-14)
Connector (COM3/COM 5 male)	DEGSON TECHNOLOGY CO.,LTD.	2EDGKM-5.08-10P-14-1000Z(H)	300V, 15A -40°C ~+105°C	UL 1059	UL E228872 (2026-04-14)
Communication wire (Dry Contact)	Dongguan Zelongkang Wire Co., Ltd	1569	105°C, 300V 18AWG/20AWG/22A WG	UL 758	UL E330488 (2013-02-22)
Communication wire (RS485)	Dongguan Zelongkang Wire Co., Ltd	2517	105°C, 300V 18AWG/20AWG/22A WG	UL 758	UL E330488 (2018-04-24)
Power wire (AC)	Dongguan Zelongkang Wire Co., Ltd	1015	105°C,600V 14AWG/16AWG	UL 758	UL E330488 (2013-02-22)
Power wire (DC)	Dongguan Zelongkang Wire Co., Ltd	1569	105°C,300V 14AWG/16AWG	UL 758	UL E330488 (2013-02-22)
Power wire (HV)	Dongguan Zelongkang Wire Co., Ltd	3239	200°C,3000V 14AWG/16AWG	UL 758	UL E330488 (2014-08-06)
Key components for high box:contain main board, controller and protect devices (BCU)					

IEC 62619						
Clause	Requirement + Test		Result - Remark		Verdict	
5.1	TABLE: Critical components information					P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾	
BMS	SHENZHEN PACE ELECTRONICS CO., LTD	Model: Hardware version: SST23-0019-1.5 Software version: HVP-1018-53160-1.00Ce-000/BCU: 0x946EA36E	Overcharge detection voltage for each cell: 3.65V Overdischarge detection voltage for each cell: 2.7V Charge overcurrent detection current:186A Discharge overcurrent detection current:186A High temperature protection: 54°C	IEC 62619:2022	Tested with apparatus	
-MCU(U3)	ST	STM32G474VE T6	Supply voltage: 1.71V-3.6V Topr: -40~85°C Data retention failure rate is much less than 1 PPM over 20 years at 85°C	IEC 62619:2022	Tested with apparatus	
-AFE (UA4)	ST	STM32G0B1C CT6	Supply voltage: 1.7V-3.6V Topr: -40~85°C	IEC 62619:2022	Tested with apparatus	
-Mos (QG27, QG30, QG19, QG22, QG3, QG4)	UNIKC	P2610BD	Supply voltage: 100V 26.8mΩ VDS: 100V VGS: ±20V ID: 36A TJ: 150°C	IEC 62619:2022	Tested with apparatus	

IEC 62619						
Clause	Requirement + Test		Result - Remark		Verdict	
5.1	TABLE: Critical components information					P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾	
-MOS (QG6, QG1, QA4, QA10, QA12, QA8, QA5, QA11, QA6, QA7, QA9, QA2, QA1, QA3, QE2, QE1, QF1, QG13, QG31, QG32, QL6)	High Diode	2N7002K	Supply voltage: 60V 5.3Ω VDS: 60V VGS: ± 2 0 ID: 0.34mA TJ: 159°C	IEC 62619:2022	Tested with apparatus	
-MOS (QG2, QG5, QG21, QG18, QG26, QG29)	JESTEK	JST2305A	-20V 45mΩ VDS: -20V VGS: ±12 ID: -4.1A TJ: 150°C	IEC 62619:2022	Tested with apparatus	
-MOS(QL4)	Jiangsu Jiejie Microelectronics Co., Ltd	JMGK540P	100V 52mΩ VDS: -100V VGS: ±20V ID: -35A TJ:150°C	IEC 62619:2022	Tested with apparatus	
IC(UA6)	Shanghai Chipanalog Microelectronics Co., Ltd.	CA-IS3841HWW	Supply voltage: 2.5V~5.5V, Topr: -40°C to 125°C	EN IEC 62368-1:2020+A11 UL 1577	TUV RH: AK 50656801 0001 UL E511334 (2026-06-01)	
DC-DC(UA2)	MORNSUN	H0505CS-1WR3	Supply voltage:4.5~5.5V, OUT PUT: 5V, 20~200mA, Topr: -40°C to 105°C	IEC 62368-1:2018	DK-128420-UL	
-Alternative	ATAZ Guangzhou science&Technology Co.,Ltd.	DCS1-H0505	Supply voltage:4.5~5.5V, OUT PUT: 5V, 20~200mA, Topr: -40°C to 105°C	IEC 62368-1:2018	DK-154570-UL	
Inductor (LL1)main	GLE	GCNR6045-100MC	10uH ±20%, -40°C ~125°C	IEC 62619:2022	Tested with apparatus	

IEC 62619					
Clause	Requirement + Test			Result - Remark	Verdict
5.1	TABLE: Critical components information				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
Inductor (L1, L2, L3)	GUANGDONG FENGHUA ADVANCED TECHNOLOGY (HOLDING) CO.,LTD	CMP321609XD 6R8MT	6.8uH ±20% -40°C ~85°C	IEC 62619:2022	Tested with apparatus
Inductor (LC1LC2, LC3)	TDK	ACT45B-220-2P-TL003	22uH±30%, -40~150°C	IEC 62619:2022	Tested with apparatus
Inductor (LL2)	Jin Haode	CMF2K701WIT	2k ±1% -40~125°C	IEC 62619:2022	Tested with apparatus
IC for SYSTEM POWER(UL2)	EP MPS	MP9457GF	Supply voltage: 4.5-55V OUTPUT: 5V 3A Topr: -40~125°C	IEC 62619:2022	Tested with apparatus
IC FOR CAN (UC2, UC3, UC6)	SIT	SIT1044T	Supply voltage: 4.75~5.25 Topr: -40~150°C	IEC 62619:2022	Tested with apparatus
IC FOR 485(UF2, UF4, UF1)	Suzhou NOVOSENSE Microelectronics Co., Ltd.	BL3085(I47)	Supply voltage: 4.75V~5.25V Topr: -55~125°C	IEC 62619:2022	Tested with apparatus
IC FOR GELI(UF3,UF 5)	Suzhou NOVOSENSE Microelectronics Co., Ltd.	NIRS21N1	Supply voltage: 4.75V~5.25V Topr: -55°C~125°C	IEC 62619:2022	Tested with apparatus
PCB of BMS	KINGBOARD LAMINATES HOLDINGS LTD	KB-6160C	Fire rating: V-0 Max temperature: 130°C Min. thickness: 2mm	UL 796 UL 94	UL E123995 (2024-04-22)
-Alternative	SHENGYI TECHNOLOGY CO LTD	S1600	130°C, V-0 Min thickness: 1.57mm	UL 796 UL 94	UL E109769 (2023-10-31)
Button Cell (BT1)	CHANGZHOU JINTAN CHAOCHUANG BATTERY CO LTD	CR1220	3.5Vdc, 10mA Φ12.5mm H=2.0mm	UL1642	UL MH10136 (2025-10-23)
For Battery Pack: contain main board, controller and protect devices (BMU)					

IEC 62619					
Clause	Requirement + Test		Result - Remark		Verdict
5.1	TABLE: Critical components information				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
BMU	PACE	Model:STM32F072CBT6	Hardware version: SST22-0553-2_0 Software version: BMU-V140-18081C-1.20-002/BMU: 0x564C07D0	IEC 62619:2022	Tested with apparatus
-PCB of BMU	KINGBOARD LAMINATES HOLDINGS LTD	KB-6160C	Fire rating: V-0 Max temperature: 130°C Min. thickness: 2mm	UL 796 UL 94	UL E123995 (2024-04-22)
-MCU (UM1)	ST	STM32F072CBT6	Supply voltage:2.0V-3.6V Topr: -40-85°C	IEC 62619:2022	Tested with apparatus
-AFE (U1)	Aerosemi	MT9805	Supply voltage: 3V-5.5V Topr: -40-85°C	IEC 62619:2022	Tested with apparatus
-Optocoupler (ISO2)	LITE-ON Technology Corporation	LTV-1008-TP1-G	Supply voltage:1.25V 60mA 130°C	UL 1577	UL E113898 (2026-06-05)
-IC for isolation (UA2)	Shanghai Chipanalog Microelectronics Co., Ltd.	CA-IS3841HWW	Supply voltage: 2.5V-5.5V, Topr: -40°C to 125°C	EN 61010-1:2010+A1	TUV RH: AK 50656801 0001
-Optocoupler (ISO1)	ENERLIGHT	CNY65	Supply voltage: 1.25V, IF: 60mA, Viso: 5000Vrms, Topr: -55°C to 110°C	DIN EN IEC 60747-5-5 (VDE 0884-5):2021-10; EN IEC 60747-5-5:2020	VDE: 2415700-4880-0001 / 307931
IC for CAN (UC2)	Chipanalog Incorporated	NSI8221N1-DSPR	Supply voltage: 2.5V~5.5V 150M 2 5KV Topr: -40-125°C	IEC 62619:2022	Tested with apparatus
-MOS (QG1,QA36, QF2,QF1,QF3)	High Diode	2N7002K	Supply voltage: 60V VDS: 60V VGS: ±2 0 ID: 0.34mA T.J: 159°C	IEC 62619:2022	Tested with apparatus

IEC 62619					
Clause	Requirement + Test		Result - Remark		Verdict
5.1	TABLE: Critical components information				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
-MOS (QA1,QA37, QA38,QA39, QA40,QA41, QA47,QA43)	JESTEK	JST2305A	Supply voltage: 20V VDS: -20V VGS: ±12 ID: -4.1A TJ: 150°C	IEC 62619:2022	Tested with apparatus
-Relay (LS1)	XIAMEN HONGFA ELECTROACOUSTIC CO LTD	HFD4/5-SR	Supply voltage: 5V 140mW 30V1A	UL 60335-1	UL E133481 (2025-08-26)
-Inductor (L1)	Jin Haode	SPL1040-47uH	47uH ±20% -40°C ~ +125°C	IEC 62619:2022	Tested with apparatus
Key components for Cell PC-0B1-72174L4-BE					
Rechargeable prismatic Li-ion Cell	Battero Tech Corporation Limited	PC-0B1-72174L4-BE	3.2Vd.c., 314Ah	IEC 62619-2022	TUV SUD: SG PSB-BT-04096
-Electrolyte	Guangzhou Tianci Materials Technology Co., Ltd.	TC-E8087-F9A+TC-E8087-F9B	LiPF ₆ , DMC, EMC, EC	--	--
-Separator	Advanced Electronic Technology Ltd.	7um+3umCCS+2*1umPCS*W1 96.5mm	PE, L×W×T: 30742mm×196.5mm×0.012mm for one cell core, total two cell cores	--	--
-Positive electrode	Batterotech Corporation Limited	SM-CEC-72174L4-BE00	LiFePO ₄ , Conductive Additive, PVDF, Aluminum Foil, L×W×T: 14542mm×189.5mm×0.188mm for one cell core, total two cell cores	--	--

IEC 62619					
Clause	Requirement + Test			Result - Remark	Verdict
5.1	TABLE: Critical components information				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾
-Negative electrode	Batterotech Corporation Limited	SM-AEC-72174L4-BE00	Carbon, Conductive Additive, Copper Foil, L×W×T: 14879mm×190mm×0.130 mm for one cell core, total two cell cores	--	--
-Positive electrode tab	Jiangxi BSL New Energy Technology Co., LTD	872mm*13μm	Aluminum, L×W×T: 13.9mm×17.9mm×0.049mm, 51pcs for one cell core, total two cell cores	--	--
-Negative electrode tab	Jiangxi BSL New Energy Technology Co., LTD	878mm*6μm	Aluminum, L×W×T: 13.9mm×17.9mm×0.048mm, 52pcs for one cell core, total two cell cores	--	--
-Insulation tap	Dongguan Xinmei Electronic Material Co., Ltd	MD-XTB-GY00007-0678	PET, W×T: 25mm×0.03mm	--	--
-Case	Ningbo Zhenyu Technology Co., Ltd	MD-PPA-GY00001-0080	Thickness: 0.6 mm, Aluminium	--	--
-Top Case / Venting	Ningbo Zhenyu Technology Co., Ltd	MD-PTA-GY00001-0080	Thickness: 2.0 mm, Aluminium, (0.6±0.2) MPa	--	--
Supplementary information: ¹⁾ Provided evidence ensures the agreed level of compliance. See OD-CB2039. ²⁾ 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: 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 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	
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 (m ²)		
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	
B1	2.956	179	58.00	3.660	A, D, F	
			Charge Voltage Applied Battery System: 1)			
			Whole	Part		
			64.24V	/		
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	
B1	46.28	214.80	49.23	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): ____					

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

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)	
B1	53.52	157	55.46	
Maximum Specified Temperature of Battery System (°C)		Maximum Measured Cell Case Temperature (°C)	Results	
50.0		54.1	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): _____				

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

9	TABLE: EMC					P
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): ____ Remark: The Energy storage system has passed the CE-EMC certification in accordance with EN IEC 61000-6-2: 2019 and EN IEC 61000-6-4: 2019. Certificate No.: NE1105260144, Report No.: TWR2606027 001, issued by TUV NORD Taiwan Co., Ltd.						

ANNEX 1: PHOTOS

MODEL TYPE: 1) E-MATE 80-A, 2) E-MATE 96-A, 3) E-MATE 112-A, 4) E-MATE 128-A



Front view of battery system for all models



Internal view of battery system for E-MATE 128-A



Internal view of battery system for E-MATE 112-A



Internal view of battery system for E-MATE 96-A



Internal view of battery system for E-MATE 80-A



Side view of battery module E-MATE-16-QC



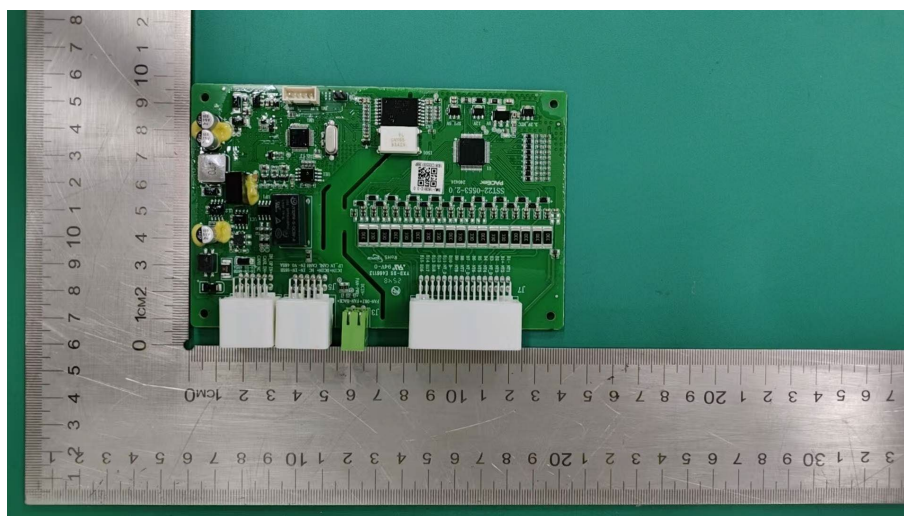
Side view of battery module E-MATE-16-QC



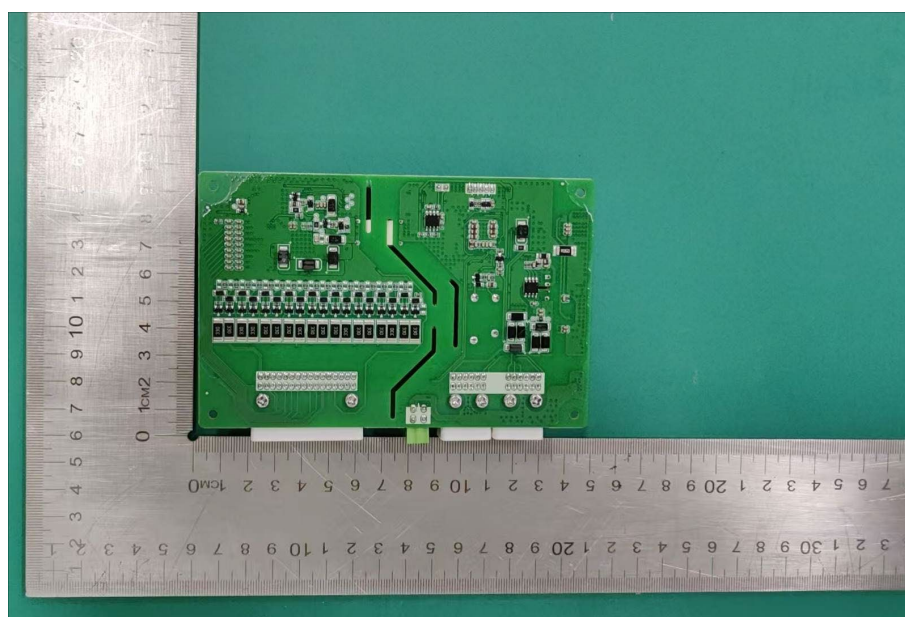
Internal view of the battery module



Internal view of the battery module



BMU of the battery module



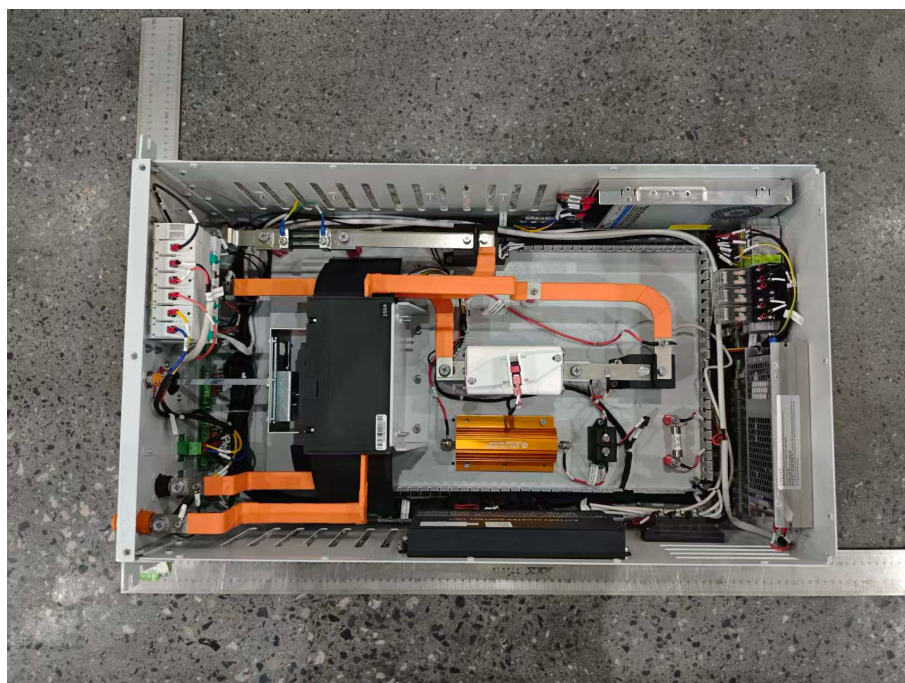
BMU of the battery module



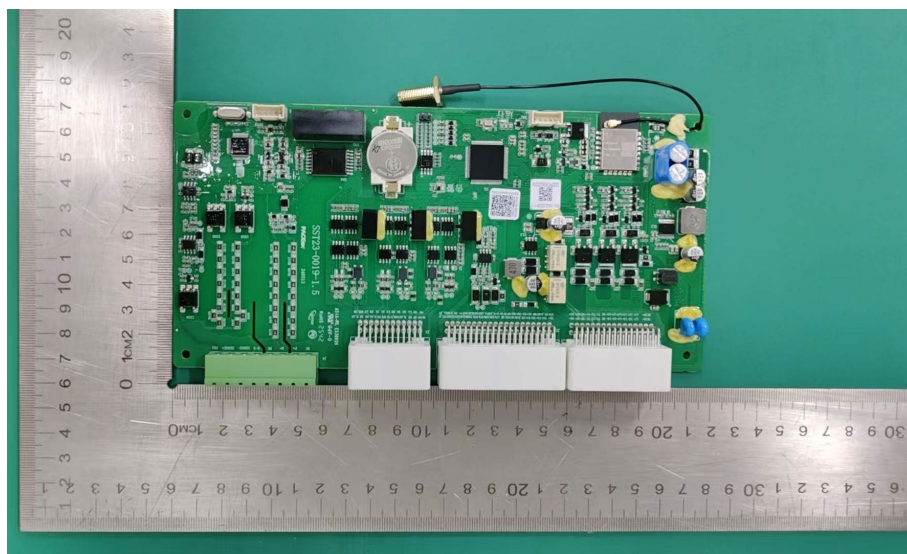
Side view of high-voltage box



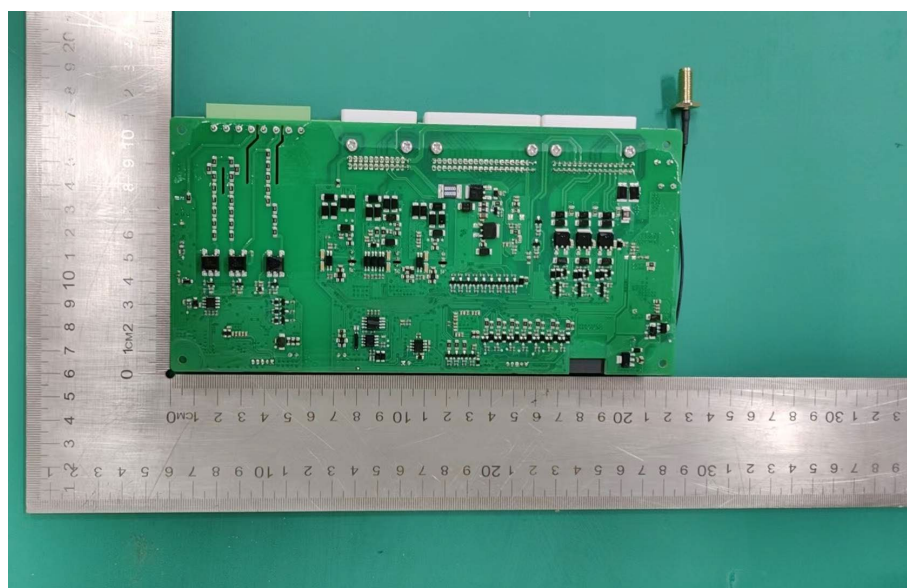
Side view of high-voltage box



Internal view of high-voltage box



BCU of the high-voltage box



BCU of the high-voltage box

-- End of Report --