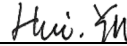




Test Report issued under the responsibility of:

TÜVNORD

TEST REPORT IEC 63056 Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries, for use in electrical energy storage systems	
Report Number..... :	BL-DG2660012-302
Date of issue..... :	2026-07-01
Total number of pages	48
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 63056:2020
Test procedure	CB Scheme
Non-standard test method	N/A
TRF template used.....	IECEE OD-2020-F1:2020, Ed.1.4
Test Report Form No.	IEC63056A
Test Report Form(s) Originator	UL(Demko)
Master TRF	Dated 2020-10-15
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Test item description :	Rechargeable Li-ion Battery system	
Trade Mark(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)	
Approved by (name, function, signature) :	Hui Yin (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):

This report contains 48 pages, incl. Annex 1 (Photos) with 8 pages.

Summary of testing:**Tests performed (name of test and test clause):**

cl. 7.4 Electric insulation check during transport and installation (2026-05-27)
 cl. 7.6 Protection for short circuit during transport and installation (2026-05-28)
 cl. 7.8 Overdischarge control of voltage (battery system) (2026-05-18)
 cl. 7.9 Drop test (2026-06-16)

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 short circuit protection and over discharge-voltage protection, the safety mechanism would not be influenced by number of batteries in the system, therefore battery type E-MATE-16-QC and 1 high-voltage box E-MATE-BCU-N-QC could be chosen as the representative testing unit. The Rechargeable Li-ion Battery system E-MATE 128-A could be chosen as the cl. 7.6 Protection for short circuit during transport and installation testing unit.

Number of samples required for testing: 4 battery systems (B1, B3, B4 for battery module E-MATE-16-QC battery module with one high-voltage box E-MATE-BCU-N-QC, B2 for battery system E-MATE 128-A).

The samples comply with the requirement of IEC 63056: 2020.

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 _____

Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

☐ Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:

Procedure number, issue date and title:

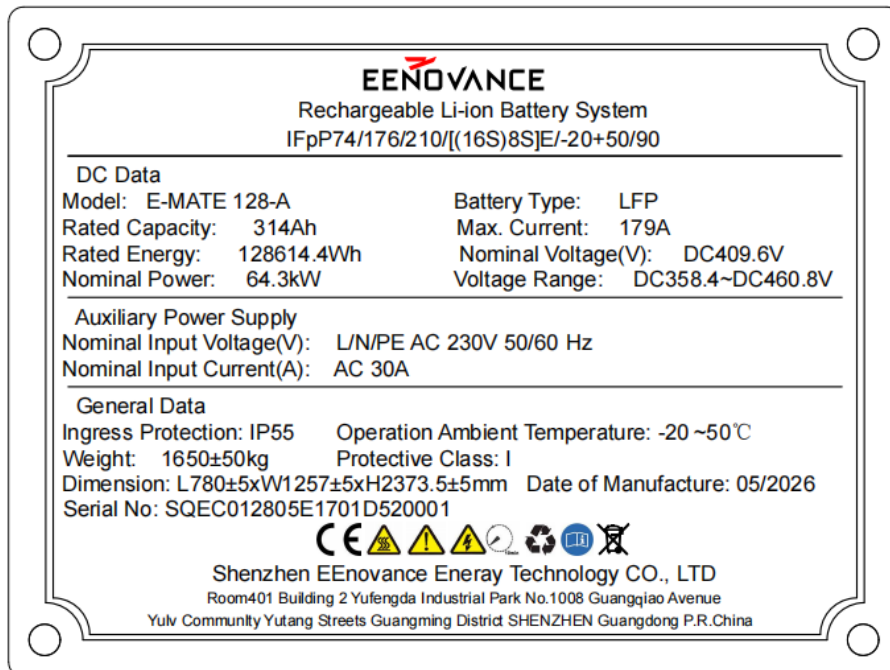
Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

☒ Statement not required by the standard used for type testing

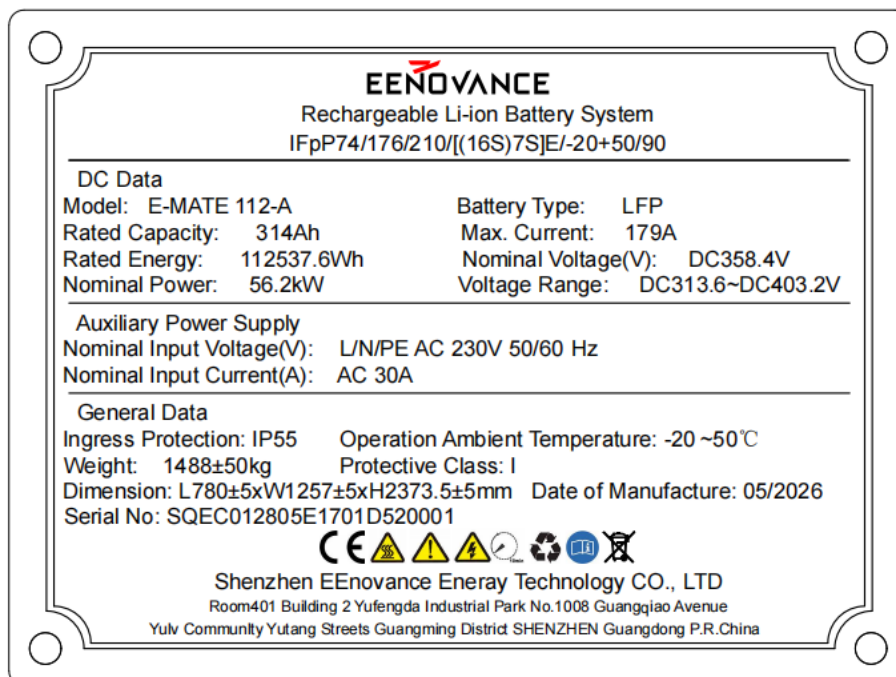
(Note: When IEC or ISO standard requires a statement concerning the uncertainty of the measurement systems used for tests, this should be reported above. The informative text in parenthesis should be delete in both cases after selecting the applicable option)

Copy of marking plate:

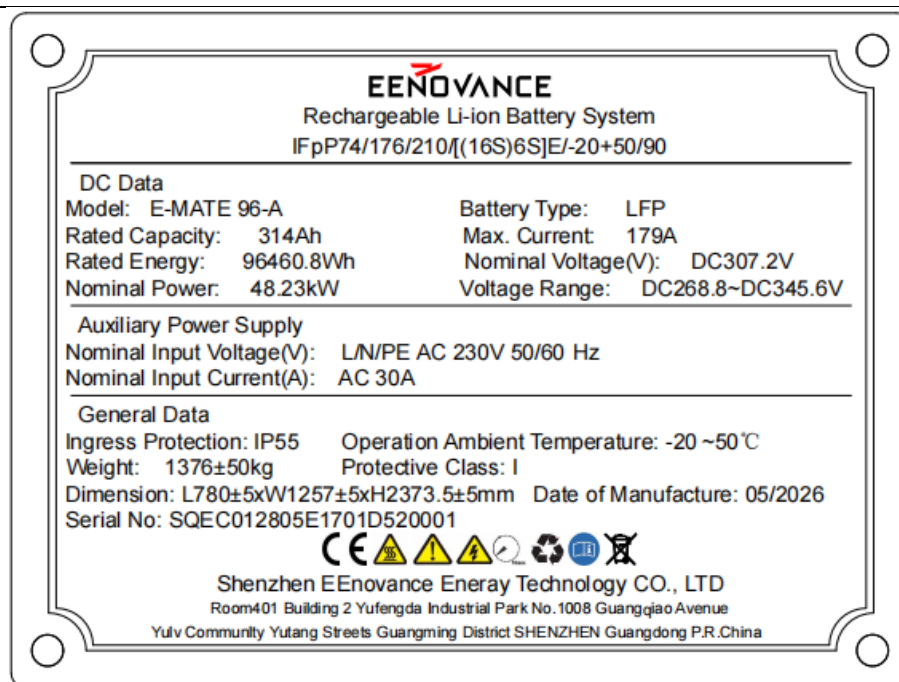
The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.



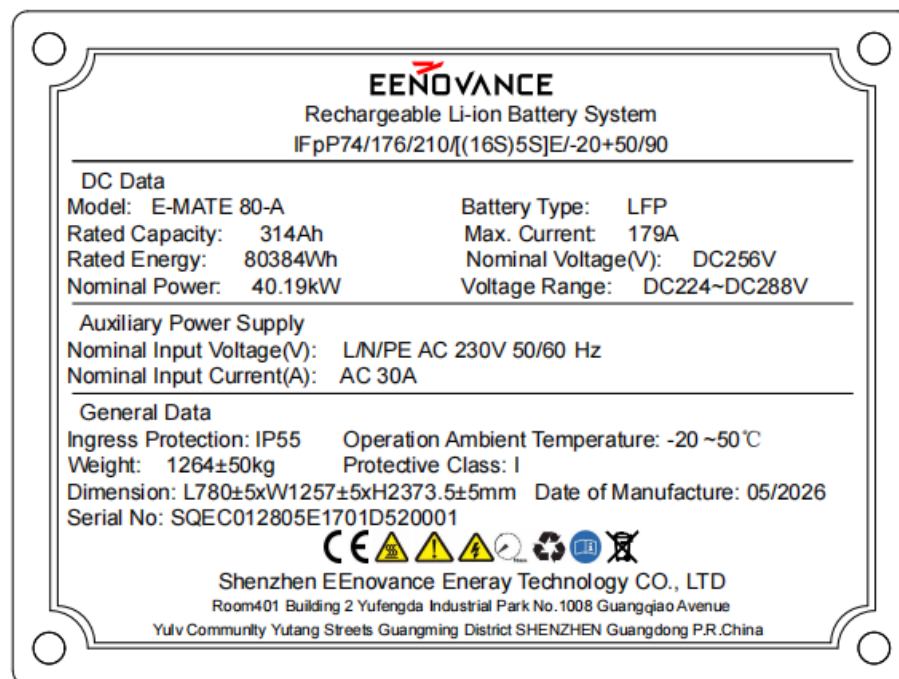
Label of battery system with model E-MATE 128-A



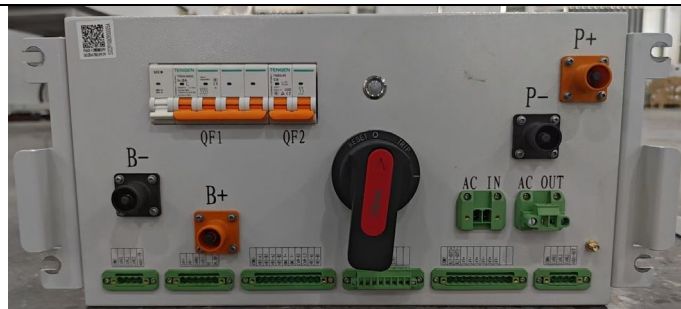
Label of battery system with model E-MATE 112-A



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 2026-05-18 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 60068-2-1:	
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).

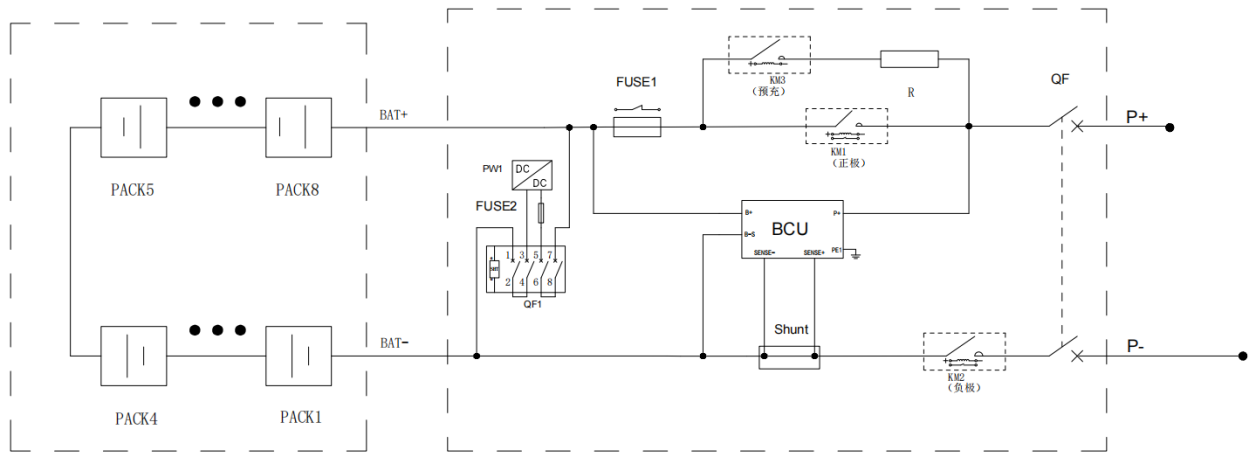
The Rechargeable Li-ion Battery system consists of 1 high voltage box E-MATE-BCU-N-QC and 5 to 8 battery modules E-MATE-16-QC connected in series, which corresponds to 4 models of E-MATE 80-A, E-MATE 96-A, E-MATE 112-A, and E-MATE 128-A. The Rechargeable Li-ion Battery System has the same topology, construction, 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 System 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 declared by the manufacturer	Discharging at constant power 64.3072kW until the voltage	Discharging at constant power 56.2688kW until the voltage

	reaches 358.4V, or any cell reaches 2.8V	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 63056			
Clause	Requirement + Test	Result - Remark	Verdict
4	PARAMETER MEASUREMENT TOLERANCES		P
	Parameter measurement tolerances		P
5	GENERAL SAFETY CONSIDERATIONS		P
5.1	General		P
	Battery systems and the cells they contain comply with the applicable general safety considerations of IEC 62619	Battery systems and cells passed IEC 62619. For battery systems report No. BL-DG2660012-301. Cell PC-0B1-72174L4-BE Certificate No.: SG PSB-BT-04096, Report No.: 085-282360183-000.	P
	Within the standard temperature range, secondary cells are charged at the maximum charge current		P
	Lithium-ion cells are operated within the operating region and the storage conditions		P
	Cells and battery systems are safe under conditions of both intended use and reasonably foreseeable misuse..... :	See also Table 5.1 for Critical Components information	P
	Moving parts apply appropriate design to reduce the risk of injuries		P
5.2	Insulation and Wiring		P
	Sufficient for maximum voltage, current, temperature, altitude, and humidity requirements.. :	See also Table 5.1 for Critical Components information	P
	Adequate clearances and creepage distances between connectors according to IEC 60950-1:2005, 3.1 and 3.2	Meet the requirements.	P
	Hazardous live parts are protected to avoid the risk of electric shock		P
	The mechanical integrity of whole battery system and internal connections follow end use equipment manufacturer's requirements or Annex A :	See also Annex A	P
	Maximum allowed number of series connections of a module or a battery system is provided in the specifications or instruction manual	Provided in the specifications or instruction manual.	P
5.3	The peak voltage of charging		P

IEC 63056			
Clause	Requirement + Test	Result - Remark	Verdict
	Battery system manufacturer ensures the peak voltage of charging current is under the upper limit charging voltage by monitoring the voltage of every single cell or cell block.		P

6	TYPE TEST CONDITIONS		P
6.1	General		P
6.2	Test items		P
	DUT (device under test) is stored under conditions specified by cell manufacturer and is not more than six months old		P
	Capacity confirmation of the DUT	314Ah.	P
	Default ambient temperature of test, 25 °C ± 5 °C		P
	See Table 1 of IEC 63056 for the type tests and the sample quantity for each tests	1 sample per test item.	P

7	SPECIFIC REQUIREMENTS AND TESTS		P
7.1	Basic requirement		P
	Cells and batteries used in battery systems evaluated to this standard comply with the test requirements of IEC62619 and this standard		P
7.2	Resistance of abnormal heat		N/A
	Non-metallic materials, on which parts at hazardous voltage are directly mounted, are resistant to abnormal heat and comply with ball pressure test in IEC 60695-10-2	See also Table 5.1 for Critical Components Information.	N/A
	Results: The dimension <i>d</i> of indentation does not exceed 2 mm		N/A
	Dimension <i>d</i> is the largest distance that can be measured across the indentation from one clearly defined edge of the indentation to another		—
7.3	Casing material of a battery system which can be transported for installation or maintenance		N/A
	The class of thermoplastic casing (V-2 or higher)	Metal case	—
	Where components cannot be protected against overheating under fault conditions, the following additional requirements are met:		—

IEC 63056			
Clause	Requirement + Test	Result - Remark	Verdict
	(1) Mounted on V-1 or higher class material, and		—
	(2) Separated from the V-2 class case material by min. 13 mm of air, or by a solid barrier of V-1 or higher class material.....		—
	Materials are tested at a thickness equal to the smallest thickness used in the application and classified according to IEC 60695-11-10 (mm).....		N/A
7.4	Electric insulation check during transport and installation		P
	The hazardous live parts of battery or cell are covered or insulated from personnel		P
	Unless the end use equipment has specific requirements, the test method is in accordance with the insulation resistance test of IEC 62133:2017, Clause 5.2		P
	The insulation resistance between the positive terminal and externally exposed metal surfaces of the battery is not less than 5 MΩ at 500 Vdc when measured 60 s after applying the voltage		P
	Results: The insulation resistance is equal to or higher than 5 MΩ	See Table 7.4	P
7.5	Charging procedures for test purposes		P
	The battery is discharged at a constant current of 0,2 It A to a specified final voltage prior to charging		P
	Discharge current, 0,2 It A.....	62.8A.	—
	The cells or batteries are charged using the method specified by the manufacturer	See General product information and other remarks page 9 to page 12.	—
7.6	Protection for short circuit during transport and installation		P
	A safeguard is provided to prevent the risk of short circuit for personnel during transport and installation		P
	Safeguards are provided for battery system and for each part when the battery system is divided into parts for transportation		P
	Fully charged DUT is discharged to SOC (state of charge) for installation or maintenance, which is specified by the manufacturer		P

IEC 63056			
Clause	Requirement + Test	Result - Remark	Verdict
	Unless otherwise specified by the manufacturer, tests are carried out without discharging after charging in accordance with 7.2.		P
	DUT is stored in an ambient temperature until its temperature is stabilized at $25\text{ °C} \pm 5\text{ °C}$. Then, DUT is short-circuited by connecting the positive and negative terminals.		P
	The external resistance to short circuits is $(30\text{ m}\Omega \pm 10\text{ m}\Omega) \times \text{module configuration}$ (= number of series connections / number of parallel connections) or less than $5\text{ m}\Omega$, whichever is higher; total external resistance less than $100\text{ m}\Omega$.		P
	Test is continued for 6 hours or the case temperature declined by 80% of maximum temperature rise, whichever is sooner	Test is continued for 6 hours.	P
	Results: No rupture, no fire, no explosion :	See Table 7.6	P
7.7	Protection for reverse connection		N/A
	Battery systems consisting of multiple battery packs or modules - that are not designed to prevent a reverse polarity connection or - that are not connected into the battery system with the BMS at the factory	Battery System has a feature that prevents a reverse connection.	N/A
	Fully charged DUT is discharged to SOC (state of charge) for installation or maintenance, which is specified by the manufacturer		N/A
	One of the DUTs of battery system is connected with opposite polarity		N/A
	The battery system is fully charged or stopped by a safety protection, and then rested for one hour		N/A
	If the battery system can be discharged, - with the maximum discharge current until it stops discharging, and it's rested for one hour.		N/A
	If the battery system cannot be discharged, it is rested for one hour.		N/A
	Results: No rupture, no fire, no explosion :		N/A
7.8	Overdischarge control of voltage test (battery system)		P
	The BMS controls the cell voltage during discharging above the lower limit discharging voltage of the cells		—

IEC 63056			
Clause	Requirement + Test	Result - Remark	Verdict
	The cooling system remains functional during the test and the main contactors are closed with the battery system controlled by the BMS		P
	The battery system is discharged at a constant current of 0,2 It A to 30 % of the rated capacity, and then is discharged at the specified maximum discharging current		P
	The discharge is continued until the BMS terminates the discharging before exceeding the lower limit discharging voltage of the cells		P
	If difficult to overdischarge the whole system, the exceeded voltage applied to the cell(s) in the battery system		N/A
	Data acquisition/monitoring was continued for 1 h after discharging is stopped		P
	Results: No fire, no explosion	See Table 7.8	P
	The BMS interrupts the discharging before exceeding the lower limit discharging voltage of the cells		P
	All functions of the battery system are fully operational as designed during the test		P
7.9	Drop test		P
7.9.1	General		P
	For the simulation of a drop during installation and maintenance		P
	The DUT is (Cell, Module or Battery System).....:	Battery System.	—
7.9.2	Whole drop test	The mass of battery system is more than 50 kg.	N/A
	For DUT's mass less than 50 kg		N/A
	Fully charged DUT is discharged to SOC (state of charge) for installation or maintenance, which is specified by the manufacturer.		N/A
	Where SOC for installation or maintenance is not specified by the manufacturer, tests carried out without discharging after charging per clause 7.2.		N/A
	Description of the DUT		—
	The DUT is dropped one time from a height shown in Table 2 of IEC63056		N/A

IEC 63056			
Clause	Requirement + Test	Result - Remark	Verdict
	For DUT's mass less than 7 kg, it drops so as to obtain impact in random orientation		N/A
	For DUT's mass between 7 kg and 50 kg, it drops in the bottom down direction. The bottom surface of the DUT is specified by the manufacturer		N/A
	After the test, the DUT is put on rest for 1 h, and a visual inspection is performed		N/A
	Results: No fire, no explosion		N/A
7.9.3	Edge and corner drop test		P
	For DUT's mass equal to or more than 50 kg		P
	Fully charged DUT is discharged to SOC (state of charge) for installation or maintenance, which is specified by the manufacturer.		P
	Unless otherwise specified by the manufacturer, tests are carried out without discharging after charging in accordance with 7.2.		P
	Description of the DUT		—
	The DUT is dropped two times from a height shown in Table 2 of IEC63056		P
	Test is arranged for reproducible impact points for the shortest edge drop impact and the corner impacted		P
	The two impacts, per impact type, are on the same corner and on the same shortest edge		P
	After the test, the DUT is put on rest for 1 h, and a visual inspection is performed		P
	Results: No fire, no explosion	See Table 7.9.3	P
8	INFORMATION FOR SAFETY		P
	Information for safety in accordance with IEC 62619 was provided		P
	The cell manufacturer provides information about current, voltage and temperature limits of their products		P
	The battery system manufacturer provides information regarding how to mitigate hazards to equipment manufacturers or end-users	Written in instruction manual.	P

IEC 63056			
Clause	Requirement + Test	Result - Remark	Verdict

9	MARKING AND DESIGNATION		P
	The marking items shown in Table 1 of IEC 62620 indicated on the cell, battery system or instruction manual	The battery system is marked in accordance with IEC 62620, also see page 5 to page 7.	P
	Cell or battery system has clear and durable markings		P
	Cell designation		N/A
	Battery designation		P
	Battery structure formulation		P

ANNEX A	WIRING, CONNETIONS AND SUPPLY		P
Table A.1	Wiring, connections and supply requirement, as addressed in IEC 60950-1:2005		P
Table A.2	Wiring, connections and supply requirement, as addressed in IEC 62368-1		P

IEC 63056			
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. thickness 1.5mm	IEC 63056:2020	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 63056			
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	TUVRh: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	TUVRh: 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 63056			
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 63056			
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	60mm ²	IEC 63056:2020	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 63056			
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, 82.95.51CFM	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 63056			
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. thickness 1.5mm	IEC 63056:2020	Tested with apparatus	
Main Copper Busbar	Dongguan LeXun New Energy Technology Co., Ltd.	T2 Purple Copper	60mm ²	IEC 63056:2020	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 63056			
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 63056			
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 63056			
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)	

IEC 63056			
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 (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)	
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 63056			
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 63056:2020	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 63056:2020	Tested with apparatus	
-AFE (UA4)	ST	STM32G0B1CC T6	Supply voltage: 1.7V-3.6V Topr: -40~85°C	IEC 63056:2020	Tested with apparatus	
-Mos (QG27, QG30, QG19, QG22, QG3, QG4)	UNIKC	P2610BD	Supply voltage: 100V 26.8 mΩ VDS: 100V VGS: ±20V ID: 36A TJ: 150°C	IEC 63056:2020	Tested with apparatus	

IEC 63056			
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 63056:2020	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 63056:2020	Tested with apparatus	
-MOS(QL4)	Jiangsu Jiejie Microelectronics Co., Ltd	JMGK540P	100V 52mΩ VDS: -100V VGS: ±20V ID: -35A TJ:150°C	IEC 63056:2020	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 63056:2020	Tested with apparatus	

IEC 63056					
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 63056:2020	Tested with apparatus	
Inductor (LC1LC2, LC3)	TDK	ACT45B-220-2P-TL003	22uH±30%, -40~150°C	IEC 63056:2020	Tested with apparatus	
Inductor (LL2)	Jin Haode	CMF2K701WIT	2k ±1% -40~125°C	IEC 63056:2020	Tested with apparatus	
IC for SYSTEM POWER(UL2)	EP MPS	MP9457GF	Supply voltage: 4.5-55V OUTPUT: 5V 3A Topr: -40~125°C	IEC 63056:2020	Tested with apparatus	
IC FOR CAN (UC2, UC3, UC6)	SIT	SIT1044T	Supply voltage: 4.75~5.25 Topr: -40~150°C	IEC 63056:2020	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 63056:2020	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 63056:2020	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 63056			
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 63056:2020	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 63056:2020	Tested with apparatus	
-AFE (U1)	Aerosemi	MT9805	Supply voltage: 3V-5.5V Topr: -40-85°C	IEC 63056:2020	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 63056:2020	Tested with apparatus	
-MOS (QG1,QA36, QF2,QF1,QF3)	High Diode	2N7002K	Supply voltage: 60V VDS: 60V VGS: ±2 0 ID: 0.34mA TJ: 159°C	IEC 63056:2020	Tested with apparatus	

IEC 63056			
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,Q A38,QA39,Q A40,QA41,Q A47,QA43)	JESTEK	JST2305A	Supply voltage: 20V VDS: -20V VGS: ± 12 ID: -4.1A TJ: 150°C	IEC 63056:2020	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 $\pm 20\%$ -40°C ~ +125°C	IEC 63056:2020	Tested with apparatus	
Key components for Cell PC-0B1-72174L4-BE						
Rechargeable prismatic Li-ion Cell	Batterio 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*W 1 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 63056			
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 63056			
Clause	Requirement + Test	Result - Remark	Verdict

7.2	TABLE: Resistance of abnormal heat			N/A
Allowed impression diameter (mm) :		--		—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)	
--	--	--	--	
Supplementary information: The test is made in a heating cabinet at a temperature of $(\Delta T + T_{max} + 15\text{ °C}) \pm 2\text{ °C}$. • ΔT means the maximum temperature rise of thermoplastic parts during the most adverse operation specified by the battery system manufacturer at $25\text{ °C} \pm 5\text{ °C}$. • T_{max} means upper limit ambient temperature specified by the battery system manufacturer.				

7.4	TABLE: Electric insulation check during transport and installation		P
Sample No.		Insulation resistance (MΩ)(1)	Results
B1		95800	A

Supplementary information:

1. The insulation resistance is measured between the positive terminal and externally exposed metal surfaces of the battery at 500 Vdc when measured 60 s after applying the voltage

Results:

A – The insulation resistance is equal to or higher than 5 MΩ

B – The insulation resistance is less than 5 MΩ

C – Other (Please explain): ____

IEC 63056			
Clause	Requirement + Test	Result - Remark	Verdict

7.6	TABLE: Protection for short circuit during transport and installation		P
Constant discharging current, 0,2 It (A).....:		62.8A	—
SOC for installation or maintenance (Ah or Wh).....:		314Ah	—
Battery configuration (XS/YP).....:		[(16S)8S]/1P	—
Sample No.	DUT's temperature at start of test (°C)(1)	External resistance (mΩ)(2)	Results
B2	24.7	99.7	A, E

Supplementary information:

1. Prior to test, the DUT is stored in an ambient temperature until its temperature is stabilized at 25 °C ± 5 °C.
2. The external resistance to short circuits is $(30 \text{ m}\Omega \pm 10 \text{ m}\Omega) \times \text{battery configuration}$ (= number of series connections / number of parallel connections) or less than 5 mΩ, whichever is higher. Total external resistance is less than 100 mΩ.

Results:

A – No rupture or fire or explosion
 B – Rupture
 C – Fire
 D – Explosion
 E – The test is completed after 6 h
 F – The test is completed after the casing cooled to 20% of the maximum temperature rise
 G – Other (Please explain): ____

IEC 63056			
Clause	Requirement + Test	Result - Remark	Verdict

7.7	TABLE: Protection for reverse connection			N/A
Constant discharging current, 0,2 It (A)		--	—	
SOC for installation or maintenance (Ah or Wh).....		--	—	
Sample No.	Charging voltage (Vdc)	Charging current (A)	Maximum discharging current (A)	Results
--	--	--	--	--
Supplementary information: Results: A – No fire or explosion B – Fire C – Explosion D – The DUT is fully charged and then is rested for one hour E – The charging is stopped by a safety protection and then is rested for one hour F – The DUT can be discharged with maximum discharge current until stopped by itself and then is rested for one hour G – The DUT can't be discharged and then is rested for one hour H – Other (Please explain): ____				

7.8	TABLE: Overdischarge control of voltage test (battery system)					P
Constant discharging current, 0,2 It (A).....:			62.8A			—
30% of rated capacity (Ah).....:			94.2Ah			—
Sample No.	Maximum discharging current applying to battery (A)(1)		OCV at end of the test (Vdc)		Lower limit discharging voltage of the cell (Vdc)	Results
	Whole system	Cell(s)	Whole system	Cell(s)		
B3	179	/	42.65	/	2.694	A, D

Supplementary information:

1. If it is difficult to overdischarge the whole system, the exceeded voltage can be applied to a part of the system such as the cell(s) in the 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 lower limit discharging voltage

E - The voltage of the measured cells or cell blocks did exceed the lower limit discharging voltage

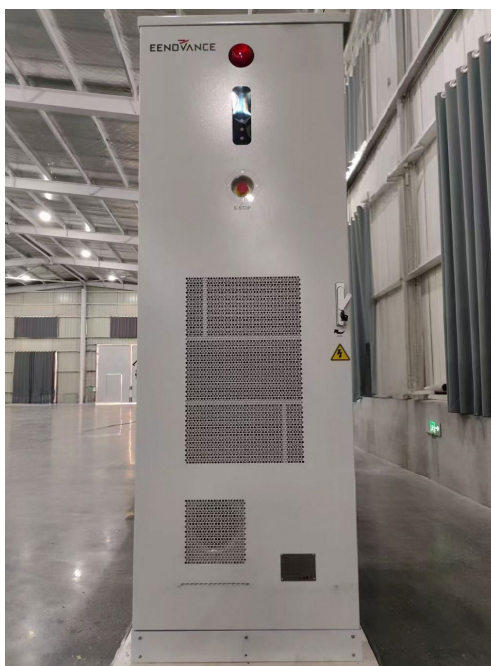
F – Other (Please explain):

IEC 63056					
Clause	Requirement + Test			Result - Remark	Verdict
7.9.2	TABLE: Whole drop test				N/A
Constant discharging current, 0,2 It (A).....:		--			—
SOC for installation or maintenance (Ah or Wh).....:		--			—
Sample No.	Mass of DUT (kg)	Height of drop (m)(1)	OCV at start of the test (Vdc)	Impacted points (2)	Results
--	--	--	--	--	--
Supplementary information:					
Mass of the DUT, m		Test method	Orientation	Height of drop	
$m < 7 \text{ kg}$		Whole	Random	100,0 cm	
$7 \text{ kg} \leq m < 20 \text{ kg}$		Whole	Bottom down direction (Note)	100,0 cm	
$20 \text{ kg} \leq m < 50 \text{ kg}$		Whole	Bottom down direction (Note)	50,0 cm	
$50 \text{ kg} \leq m < 100 \text{ kg}$		Edge and corner	--	5,0 cm	
$m \geq 100 \text{ kg}$		Edge and corner	--	2,5 cm	
Note – The bottom surface of the DUT is specified by the manufacturer					
Results: A – No fire or explosion B – Fire C – Explosion D – Other (Please explain): ____					

IEC 63056					
Clause	Requirement + Test			Result - Remark	Verdict
7.9.3	TABLE: Edge and corner drop test				P
Constant discharging current, 0,2 It (A)..... :				62.8A	—
SOC for installation or maintenance (Ah or Wh)..... :				314Ah	—
Sample No.	Mass of DUT (kg)	Height of drop (m)(1)	OCV at start of the test (Vdc)	Impacted points (2)	Results
B4	144.6	0.025	53.9	Edge and corner	A
Supplementary information:					
Mass of the DUT, m		Test method	Orientation		Height of drop
$m < 7$ kg		Whole	Random		100,0 cm
$7 \text{ kg} \leq m < 20$ kg		Whole	Bottom down direction (Note)		100,0 cm
$20 \text{ kg} \leq m < 50$ kg		Whole	Bottom down direction (Note)		50,0 cm
$50 \text{ kg} \leq m < 100$ kg		Edge and corner	--		5,0 cm
$m \geq 100$ kg		Edge and corner	--		2,5 cm
Note – The bottom surface of the DUT is specified by the manufacturer					
Results: A – No fire or explosion B – Fire C – Explosion D – Other (Please explain): ____					

Annex 1: Photos

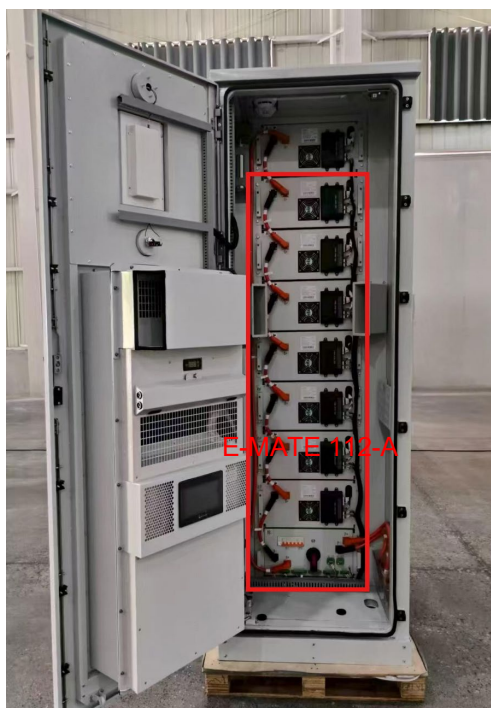
Model type: 1) E-MATE 80-A, 2) E-MATE 96-A, 3) E-MATE 112-A, 4) E-MATE 128-A



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



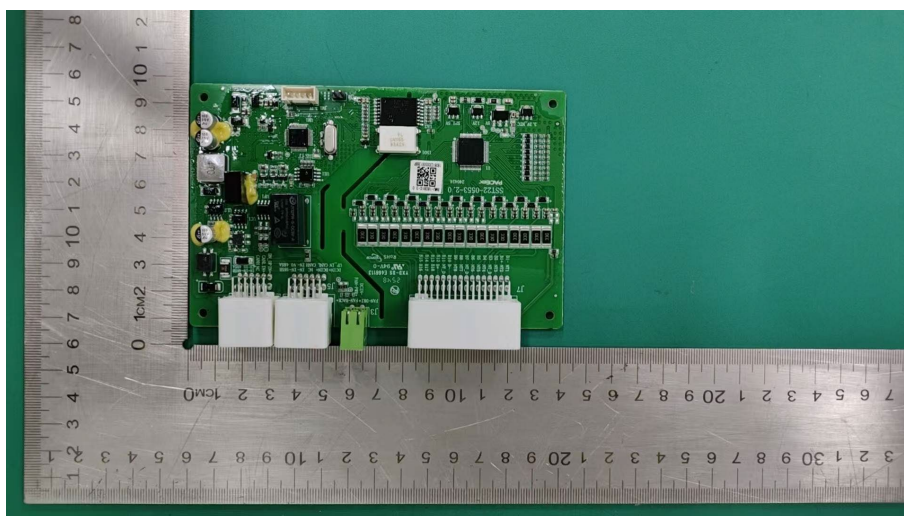
Side view of battery module E-MATE-16-QC



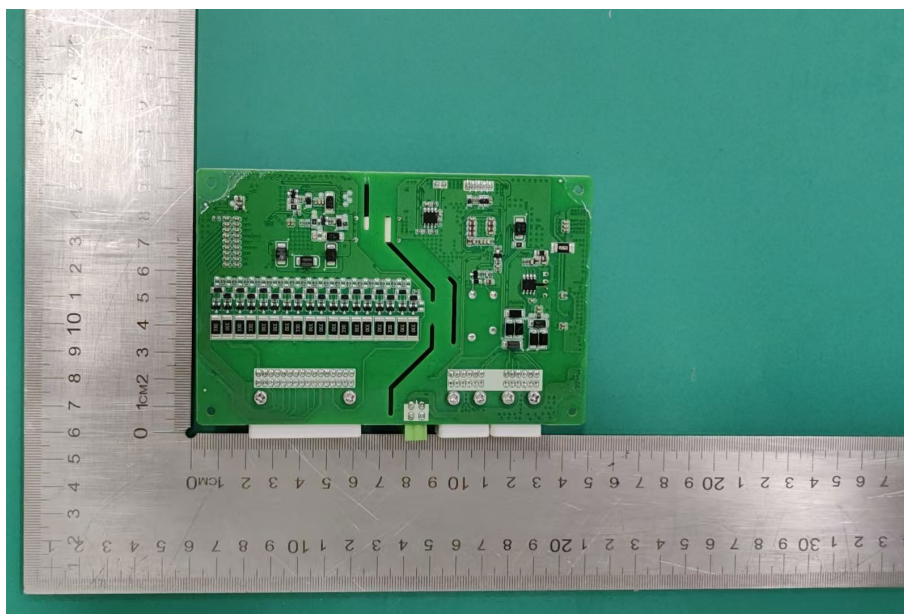
Internal view of battery module



Internal view of battery module



BMU of the battery module



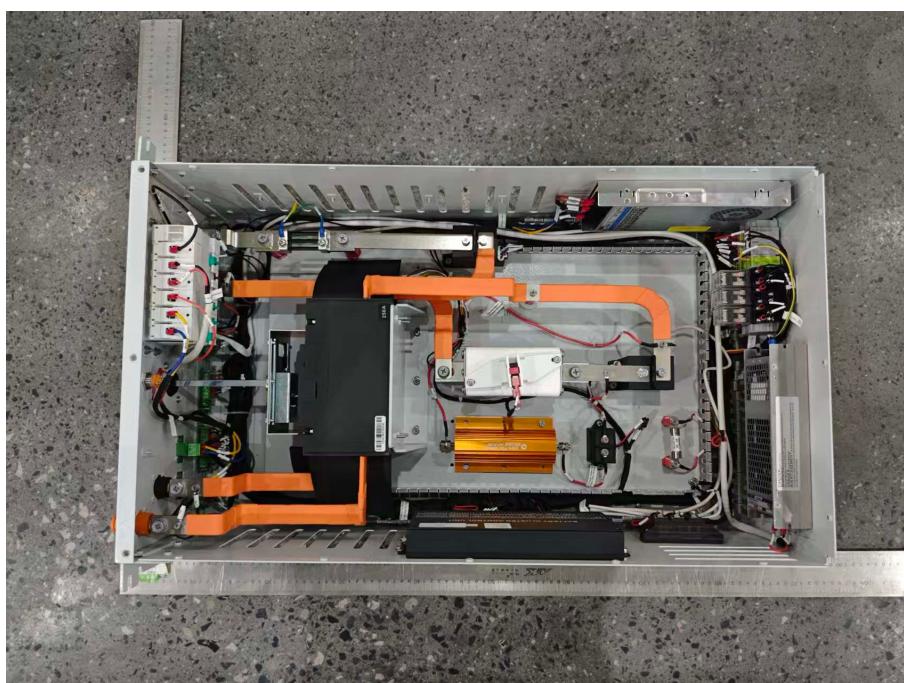
BMU of the battery module



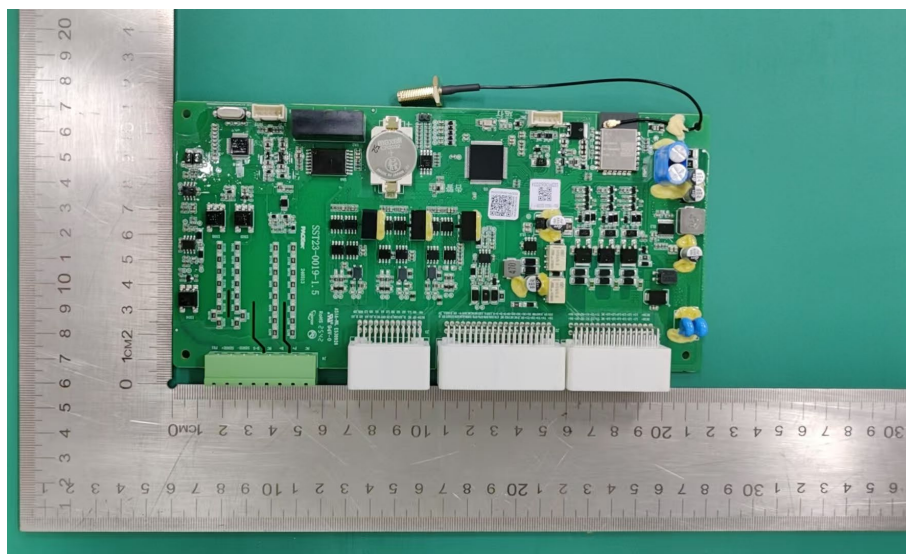
Side view of high-voltage box



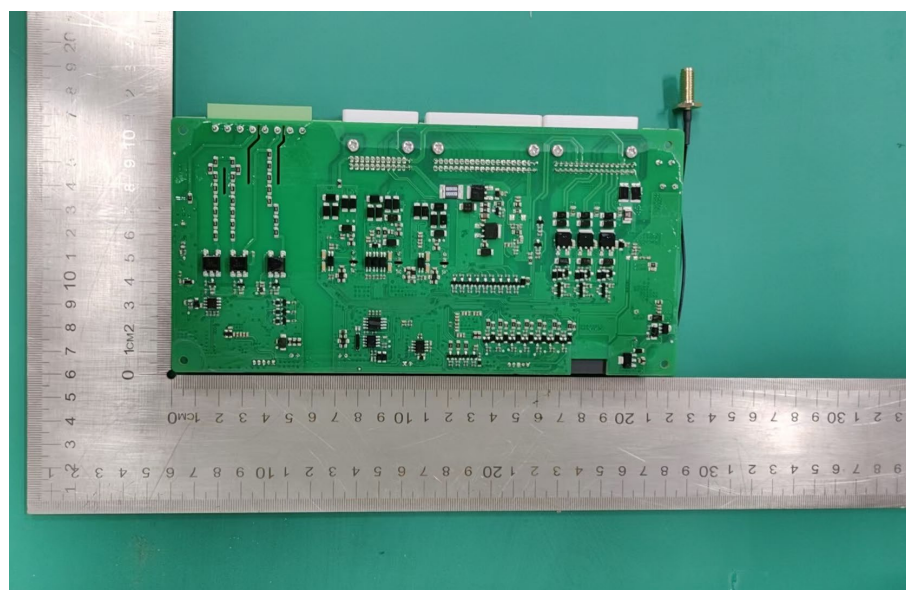
Side view of high-voltage box



Interna view of the high-voltage box



BCU of the high-voltage box



BCU of the high-voltage box

-- End of Report --