Test Report issued under the responsibility of:

TÜVRheinland®

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..... :	**CN26E59I 001**
Date of issue ..... :	2026-05-29
Total number of pages ..... :	36
Name of Testing Laboratory preparing the Report ..... :	TÜV Rheinland (Shanghai) Co., Ltd. Kunshan Branch
Applicant's name ..... :	Dunext Technology Xiamen Co., Ltd.
Address ..... :	Building 7, No. 1001 Haiming Road, Xiamen Torch High-tech Industrial Development Zone (Xiang'an), Xiamen 361115 Fujian P.R. China
Test specification:	
Standard ..... :	IEC 62619:2022
Test procedure..... :	CB Scheme
Non-standard test method..... :	N/A
TRF template used ..... :	IECEE OD-2020-F1:2022, Ed.1.5
Test Report Form No. ..... :	IEC62619B
Test Report Form(s) Originator.... :	UL Solutions (Demko)
Master TRF ..... :	Dated 2023-02-24

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Test item description .....:	Integrated energy storage system
Trademark(s).....:	DUNEXT
Manufacturer.....:	Dunext Technology Xiamen Co., Ltd. Building 7, No. 1001 Haiming Road, Xiamen Torch High-tech Industrial Development Zone (Xiang'an), Xiamen 361115 Fujian P.R. China
Model/Type reference.....:	PowerHill-P125-261kWh, PowerHill-P125-261kWh-S2, PowerHill-P125-261kWh-S3, PowerHill-P125-261kWh-S4
Ratings.....:	See copy of marking label and model list

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):

☒	**CB Testing Laboratory:**	TÜV Rheinland (Shanghai) Co., Ltd Kunshan Branch	
Testing location/ address ..... :		No. 38 Jingfan Road, Bacheng, Kunshan, Jiangsu, China	
Tested by (name, function, signature) ..... :		Kevin Peng /Project Engineer	Kevin Peng
Approved by (name, function, signature) .. :		Roger Fang /Authorizer	Roger Fang
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address ..... :			
Tested by (name, function, signature) ..... :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address ..... :			
Tested by (name + signature)..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
☐	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		
Testing location/ address ..... :			
Tested by (name, function, signature) ..... :			
Witnessed by (name, function, signature) . :			
Approved by (name, function, signature) .. :			
Supervised by (name, function, signature) :			

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

Attachment 1: Photo documentation (13 pages).

Summary of testing:

Tests performed (name of test, test clause and date test performed):

Clause(s)	Test(s)	Test date
7.2.3.3	Edge and corner drop test (battery system)	2026-04-15
8.2.2	Overcharge control of voltage (battery system)	2026-03-24
8.2.3	Overcharge control of current (battery system)	2026-03-26
8.2.4	Overheating control (battery system)	2026-03-25

The samples comply with the requirement of IEC 62619: 2022.

Testing location: (CBTL, ~~SPTL, CTF, Subcontractor~~)

TÜV Rheinland (Shanghai) Co., Ltd Kunshan Branch

No. 38 Jingfan Road, Bacheng, Kunshan, Jiangsu, 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”).

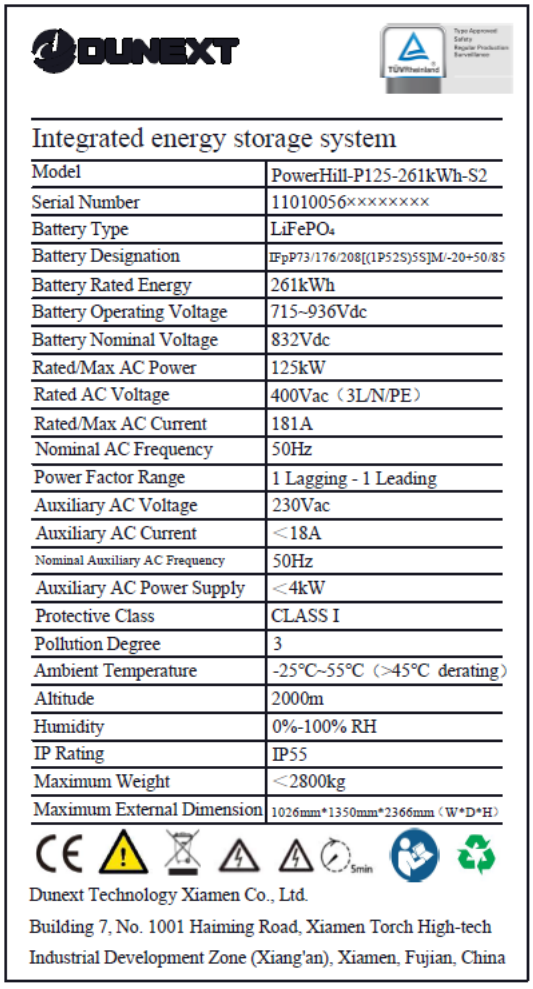
☐ Other: … (to be specified, for example when required by the standard or client, or if national accreditation requirements apply)

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.

For example:



DUNEXT

Integrated energy storage system

Model	PowerHill-P125-261kWh-S2
Serial Number	11010056××××××××
Battery Type	$LiFePO_4$
Battery Designation	IFpP73/176/208[(1P52S)5S]M/-20+50/85
Battery Rated Energy	261kWh
Battery Operating Voltage	715~936Vdc
Battery Nominal Voltage	832Vdc
Rated/Max AC Power	125kW
Rated AC Voltage	400Vac（3L/N/PE）
Rated/Max AC Current	181A
Nominal AC Frequency	50Hz
Power Factor Range	1 Lagging - 1 Leading
Auxiliary AC Voltage	230Vac
Auxiliary AC Current	<18A
Nominal Auxiliary AC Frequency	50Hz
Auxiliary AC Power Supply	<4kW
Protective Class	CLASS I
Pollution Degree	3
Ambient Temperature	-25℃~55℃（>45℃ derating）
Altitude	2000m
Humidity	0%-100% RH
IP Rating	IP55
Maximum Weight	<2800kg
Maximum External Dimension	1026mm*1350mm*2366mm（W*D*H）

5min

Dunext Technology Xiamen Co., Ltd.

Building 7, No. 1001 Haiming Road, Xiamen Torch High-tech Industrial Development Zone (Xiang'an), Xiamen, Fujian, China

Note:

1. The manufacturing date is reflected in the serial number.
2. The parameters on the label of the four models (PowerHill-P125-261kWh, PowerHill-P125-261kWh-S2, PowerHill-P125-261kWh-S3, PowerHill-P125-261kWh-S4) are the same except for the model names.

Test item particulars.....:	
Classification of installation and use.....:	Class I
Supply Connection.....:	Directly connected to mains
.....:	
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item .....:	2026-03-03
Date (s) of performance of tests.....:	2026-03-24 to 2026-04-30

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 IECEE 02:

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).....:	Factory 1: Dunext Technology Xiamen Co., Ltd. Building 7, No. 1001 Haiming Road, Xiamen Torch High-tech Industrial Development Zone (Xiang'an), Xiamen 361115 Fujian P.R. China Factory 2: Wuxi Unite Energy Technology Co., LTD No.24 Yu'an Road, Shuofang Industrial Park, Xinwu District, Wuxi, JiangSu P.R. China

General product information and other remarks:

Product Description:

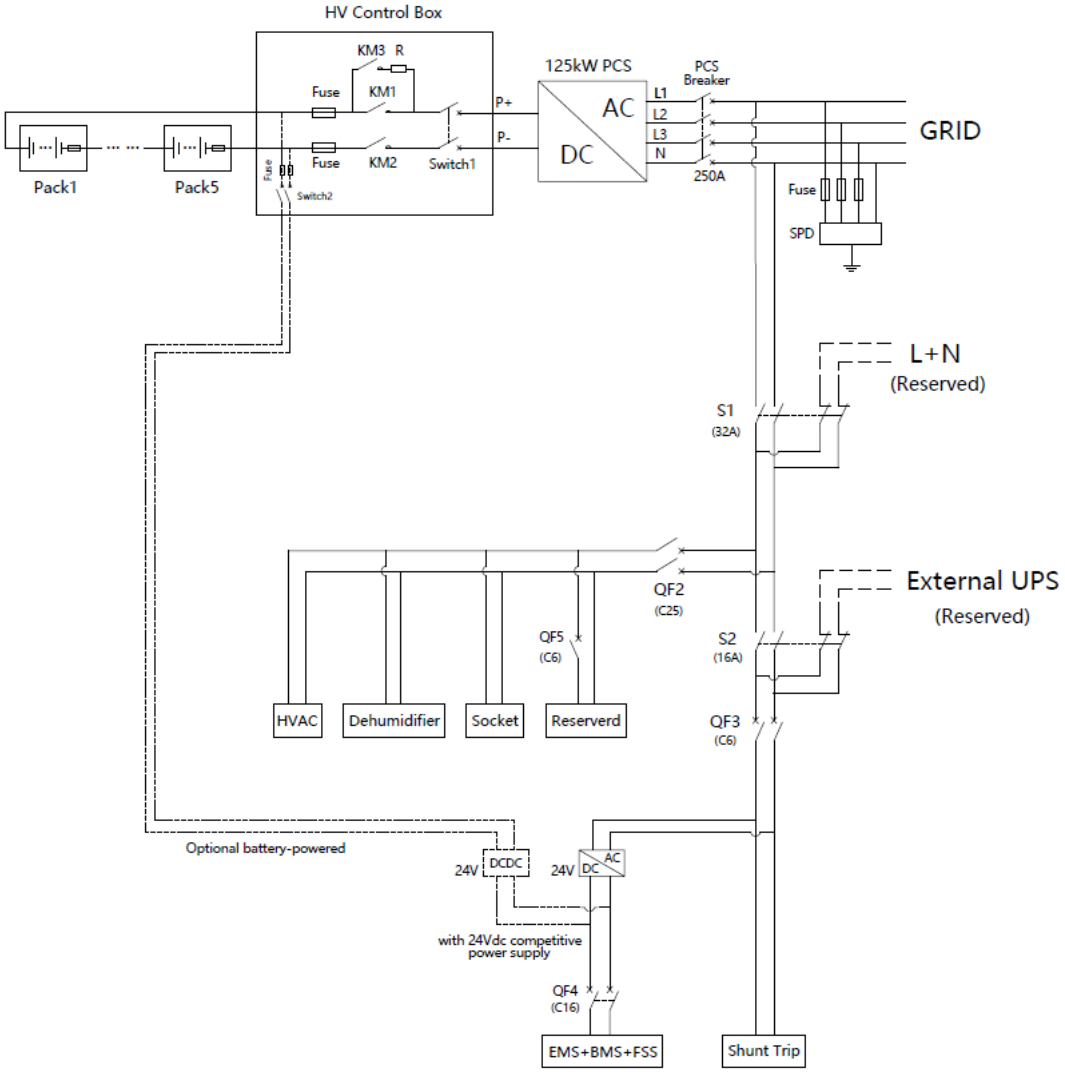
The products PowerHill-P125-261kWh, PowerHill-P125-261kWh-S2, PowerHill-P125-261kWh-S3, PowerHill-P125-261kWh-S4 are Battery Energy Storage System (BESS). The BESS contains one LFP battery rack, one PCS module, one liquid cooling system and one fire protection system.

The LFP battery rack contains one high voltage box and 5 battery packs in series connection. The BCU board is placed in the high voltage box. The battery pack contains 52 cells in structure 1P52S. Each battery pack contains one BMU board for measuring and collecting the cell parameters and uploading the

information of cell voltage and temperature to the BCU board.
The battery rack connects to the PCS. The PCS is a converter which can deliver DC energy to AC energy or draw energy from AC grid. The battery rack can store energy from AC grid and deliver energy to AC grid through the PCS.
The grid port reduced the overvoltage category through the SPDs with status monitoring.

The difference between four product models is that the models PowerHill-P125-261kWh-S3, PowerHill-P125-261kWh-S4 are equipped with a DC/DC module in high voltage box whereas models PowerHill-P125-261kWh, PowerHill-P125-261kWh-S2 are not equipped. The DC/DC module accepts high-voltage DC input and provides regulated 24 VDC output. Two types of EMS(Energy Management System) are adopted across the four product models. Product models PowerHill-P125-261kWh and PowerHill-P125-261kWh-S3 adopt EMS model DN-EMS-300-EU. Product models PowerHill-P125-261kWh-S2 and PowerHill-P125-261kWh-S4 adopt EMS model WL-EMS-1000. Except for the above two differences, the product structure is identical. See Model difference table below for details.
All the tests performed on the full-featured models of PowerHill-P125-261kWh-S3 and PowerHill-P125-261kWh-S4 to represent the others.

Block diagram as below:



(PowerHill-P125-261kWh-S3, PowerHill-P125-261kWh-S4)

The insulation between the DC circuit and the metal enclosure is basic insulation. And the insulation between the DC circuit and communication ports is reinforced insulation or double insulation.

The insulation between the AC circuit and the metal enclosure is basic insulation. And the insulation between the AC circuit and communication ports is reinforced insulation or double insulation.

OVC II considered for the battery rack, it shall be isolated from an OVC III supply source (such as from an OVC III PCS) through an isolated transformer or protected in a manner that prevents transient overvoltage conditions in end use.

The EUT(equipment under test) is outdoor type. The Ingress Protection (IP) rating of the EUT is IP55, and the Pollution Degree (PD) of the product is PD3 (PD2 inside) which specified by the manufacturer.

The PCS is certified individually.

The BMS functional safety was evaluated according to IEC 60730-1 Annex H by TÜV Rheinland.
Note: All tests in this report apply only to the DC part of the product.

Model difference:

Product model	DC/DC module in high voltage box	EMS model
PowerHill-P125-261kWh	Excluded	DN-EMS-300-EU
PowerHill-P125-261kWh-S2	Excluded	WL-EMS-1000
PowerHill-P125-261kWh-S3	Included	DN-EMS-300-EU
PowerHill-P125-261kWh-S4	Included	WL-EMS-1000

1. The main features of battery system are shown as below:

	Cell	Module
Product name	Lithium-ion Cell	Rechargeable Li-ion Battery Pack
Type/model	LFP71173207/314Ah	PowerPack-52.2HV-EU
Rated Capacity[Ah]	314	314
Cell Quantity	1	52
Battery structure	-	1P52S
Nominal voltage[Vd.c.]	3.2	166.4
Nominal energy[Wh]	1004.8	52249.6
Upper limited charging voltage [Vd.c.]	3.85	187.2
Recommend charging voltage [Vd.c.]	3.65	187.2
Recommend charging current[A]	157A	157
Maximum continuous charging current[A]	314A	185
Recommend discharging current [A]	157A	157
Maximum continuous discharge current[A]	314A	185
End of discharge voltage[Vd.c.]	2.5	143

Lower limit discharging voltage [Vd.c.]	1.8	137.8
Temperature range for charging [°C]	0 to 60	0 to 55
Temperature range for discharging[°C]	-30 to 60	-25 to 55
Temperature threshold for protection(cell surface)[°C]	-	56
Overcharge protected voltage supply by battery system[Vd.c.]	-	3.7V/cell
Recommend charging method declared by the manufacturer	At constant current 157A till cell voltage reaches 3.65V, then switch to constant voltage 3.65V till charge current drops to 15.7A	Charging at constant power 26.1248kW until the voltage reaches 187.2V or any one cell reaches 3.6V
Recommend discharging method declared by the manufacturer	Discharging the cell with 157A constant current to discharge cut-off voltage 2.5V	Discharging at constant power 26.1248kW until the voltage reaches 143V or any one cell reaches 2.75V
Dimension[mm]	Thickness: 71.70±0.50 mm Width: 174.70±0.50 mm Height: 207.11±0.50 mm	W790×D1145×H246.3mm
Weight[kg]	5.6±0.2	347±5kg
Ingress Protection (IP)	-	IP67
Protective Class	-	I
Pollution degree	-	2 (Indoor)
Cooling type	-	Liquid cooling
Altitude[m]	-	2000

	Battery system	
Product name	DC Side of Integrated Energy Storage System	
Type/model	PowerHill-P125-261kWh, PowerHill-P125-261kWh-S2	PowerHill-P125-261kWh-S3, PowerHill-P125-261kWh-S4
DC/DC module in high voltage box	-	Input: 300-400VDC, 2A(max) Output: 24V, 11700mA Input: 400-1500VDC, 2A(max) Output: 24V, 14600mA
Designation	IFpP73/176/208[(1P52S)5S]M/-20+50/85	
Rated Capacity[Ah]	314	
Cell Quantity	260	
Battery structure	(1P52S)5S	
Nominal voltage[Vd.c.]	832	

Nominal energy[Wh]	261248
Upper limited charging voltage [Vd.c.]	936
Recommend charging voltage [Vd.c.]	936
Recommend charging current[A]	157
Maximum continuous charging current[A]	185
Recommend discharging current [A]	157
Maximum continuous discharge current[A]	185
End of discharge voltage[Vd.c.]	715
Lower limit discharging voltage [Vd.c.]	689
Temperature range for charging [°C]	0 to 55
Temperature range for discharging[°C]	-25 to 55
Temperature threshold for protection(cell surface)[°C]	56
Overcharge protected voltage supply by battery system[Vd.c.]	3.7V/cell
Recommend charging method declared by the manufacturer	At constant Power 125kW till any one cell voltage reaches 3.6 V
Recommend discharging method declared by the manufacturer	At constant Power 125kW till any one cell voltage reaches 2.75 V
Dimension[mm]	1026±2(W)*1350±2(D)*2366±3(H)
Weight[kg]	<2800
Ingress Protection (IP)	IP67(battery pack)
Protective Class	I
Pollution degree	2 (Indoor)
Cooling type	Liquid cooling
Altitude[m]	2000

2. PCS Cabinet:

MODELS LIST		EPCS125-AM-F
Battery Input	Battery Type	lithium-ion battery Lead-acid battery Lithium titanate battery

	Voltage range [V]	615-950(3W+PE)/650-950(3W+N+PE)
	Full load voltage range [V]	615-950(3W+PE)/680-950(3W+N+PE)
	Max continuous charging current [A]	203
	Max continuous discharging current [A]	203
	Overvoltage Category (OVC)	II
AC Side (On Grid)	Rated Input/Output Voltage [Vac]	230/400, 3W+N+PE/3W+PE
	Rated Input/Output Frequency [Hz]	50/60
	Rated Input/Output Power [kW]	125
	Max. Input/Output Apparent power [kVA]	138.0
	Rated Input/Output Current [A]	181.2
	Max. Input/Output Current [A]	200
	Power Factor cosφ [λ]	1 Leading - 1 Lagging
	Overvoltage Category (OVC)	III
CONSTRUCTION	Firmware version	V100B000D000
	Hardware version	A00
	Type of inverter	Non-isolated
	Type of NS Protection	Integrated
	Protective Class	I
	Enclosure Protection (IP)	IP20
	Acoustic Noise	<70dB
	Operating Temperature Range [ºC]	-30°C ~ 55°C (Derating above 45°C)
	Pollution degree (PD)	2
	Altitude [m]	4000m
	Size W*H*D [mm]	520*232*785
	Weight [kg]	74.5

3. Energy Storage System

MODELS LIST		PowerHill-P125-261kWh, PowerHill-P125-261kWh-S2, PowerHill-P125-261kWh-S3, PowerHill-P125-261kWh-S4
DC side	Cell Type	LiFePO4
	Battery Nominal Voltage [Vd.c.]	832
	Voltage Range [Vd.c.]	715~936
	Rated Energy[Wh]	261248

	Recommend charging / discharging power(kW)	125
	Maximum continuous charging current[A]	185
	Maximum continuous discharge current[A]	185
	Overvoltage Category(OVC)	II
AC side	PCS Cabinet Model	EPCS125-AM-F
	Rated Output Voltage Un [Vac]	230/400, 3L/N/PE
	Rated Output Frequency fn [Hz]	50
	Rated AC Power Pn [kW]	125
	Max AC Power Pn [kW]	125
	Rated AC Current [A]	181
	Max AC Current [A]	181
	Power Factor Range cosφ	1 Lagging - 1 Leading
	Overvoltage Category (OVC)	III
Auxiliary power	Rated Output Voltage Un [Vac]	230, L/N
	Rated Output Frequency fn [Hz]	50
	Max Power Pn [kW]	<4
	Max Current Imax [A]	<18
Battery Energy Storage System	Type of inverter	Non-isolated
	Enclosure Protection (IP)	IP55
	Protective Class	I
	Operating Temperature Range [ºC]	-25 to 55 (>45 derating)
	Humidity Range[%RH]	0-100
	Pollution degree (PD)	External PD3/Internal PD 2
	Cooling method	Liquid cooling
	Acoustic Noise [dB]	<70
	Altitude [m]	2000
	Weight [kg]	<2800
	Size (W x D x H) [mm]	(1026±2)*(1350±2)*(2366±3)

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**		
	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		P
5.3	**Venting**		**P**
	Pressure relief function	Pressure relief function 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		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)		P
	Polarity marking not provided for keyed external connector		P
	Capability to carry the maximum anticipated current		P
	External terminal contact surfaces		P
	Terminal contacts are arranged to minimize the risk of short circuits		P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
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..... :	1.8 to 3.85Vd.c., 0 to 60°C for charging -30 to 60°C for discharging	P
	Designation of battery system to comply with the cell operating region	Information mentioned in manufacturer's specifications.	P
5.8	**System lock (or system lock function)**		**P**
	Non-resettable function to stop battery operation		P
	Manual with procedure for resetting of battery operation		P
	Emergency battery final discharge		P
5.9	**Quality plan**		**P**
	Manufacturing quality plan (for example: ISO9001, etc.) prepared and implemented..... :	ISO 9001 certification provided.	P
	The process capabilities and the process controls		P

6	**TYPE TEST CONDITIONS**	P
6.1	**General**	**P**
6.2	**Test items**	**P**

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	Cells or batteries that are not more than six months old (See Table 1 of IEC 62619)		P
	Capacity confirmation of the cells or batteries		P
	Default ambient temperature of test, 25 °C ± 5 °C	Tests were carried out in an ambient temperature of 25±5°C.	P
7	**SPECIFIC REQUIREMENTS AND TESTS**		P
7.1	**Charging procedure for test purposes**		**P**
	The battery discharged to a specified final voltage prior to charging		P
	The cells or batteries charged using the method specified by the manufacturer..... :	The method mentioned in manufacturer's specifications.	P
7.2	**Reasonably foreseeable misuse**		**P**
7.2.1	External short-circuit test (cell or cell block)	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)	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		P
7.2.3.2	Whole drop test (cell or cell block, and battery system)	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)		P
	Description of the Test Unit..... :	Battery pack	—
	Mass of the test unit (kg)..... :	342kg	—
	Height of drop (m)..... :	2.5cm	—
	Results: no fire, no explosion	No fire, no explosion.	P
7.2.4	Thermal abuse test (cell or cell block)	Approval cell used.	N/A

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	Results: no fire, no explosion		N/A
7.2.5	Overcharge test (cell or cell block)	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)		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, Im..... :		N/A
	Discharge current for forced discharge, 1.0 It ..... :		N/A
	Discharging time, t = (1 It / Im) x 90 (min.) ..... :		N/A
	Results: no fire, no explosion ..... :		N/A
7.3	**Considerations for internal short-circuit – Design evaluation**		N/A
7.3.1	General	Approval cell used.	N/A
7.3.2	Internal short-circuit test (cell)		N/A
	Samples preparation procedure: In accordance with Clause A.5 and A.6 of IEC 62133-2:2017		N/A
	Tested per 7.3.2 b) in an ambient temperature of 25 °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**

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	Functional safety analysis for critical controls	Functional safety evaluated acc. to IEC 60730-1 Annex H. See report CN26XSFB 001 issued by TÜV Rheinland (Shanghai) Co., Ltd.	P
	Conduct of a process hazard analysis for both the cell manufacturing process and the battery system manufacturing process	See above.	P
	Conduct of risk assessment and mitigation of the battery system	Considered	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	Functional safety evaluated Class B acc. to IEC 60730-1 Annex H	P
	The charge control evaluated by tests in clauses 8.2.2 to 8.2.4	See above	P
8.2.2	Overcharge control of voltage (battery system)		P
	The exceeded charging voltage applied to the whole battery system		N/A
	The exceeded charging voltage applied to only a part of the battery system, such as the cell(s) ..... :	One high voltage box and one battery pack	P
	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		N/A
	Elevated temperature for charging, 5 °C above maximum operating temperature ..... :	Protected at 56.2°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

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Clause	Requirement + Test	Result - Remark	Verdict
9	**EMC**		P
	Battery system fulfil EMC requirements of the end-device application ..... :	See Table 9 [ ] ~~See attachment # __ for detail EMC report~~ [ ] ~~Intended for to be tested in the end use application [include specific application]~~	P
10	**INFORMATION FOR SAFETY**		P
	The cell manufacturer provides information about current, voltage and temperature limits of their products	See model list and cell test report	P
	The battery system manufacturer provides information regarding how to mitigate hazards to equipment manufacturers or end-users.	See 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.		P
	Cell or battery system has clear and durable markings		P
	Cell designation		N/A
	Battery designation	See copy of marking plate	P
	Battery structure formulation	See model list	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	See model list and manual	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	55°C	P
A.6	Low temperature range	0°C	P
A.7	Discharging conditions for safe use	-20 to 55°C	P
A.8	Example of operating region		P

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Clause	Requirement + Test	Result - Remark	Verdict

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

ANNEX C	**PROCEDURE OF 7.3.3 PROPAGATION TEST BY METHODS OTHER THAN LASER**		**N/A**
C.1	General		N/A
C.2	Test conditions:		N/A
	– The battery fully charged according to the manufacturer recommended conditions ..... :		—
	– Target cell forced into thermal runaway ..... :		—
	– A specially prepared sample (e.g. a heater or a hole for nail penetration provided) used for ease of testing..... :		—
C.3	Method used for initiating the thermal runaway. 1) Heater (Heater, Burner, Laser, Inductive heating 2) Overcharge 3) Nail penetration of the cell 4) Combination of above methods 5) Other methods..... :		—

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

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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)]**
Battery Pack					
Rechargeable Prismatic Lithium-ion Cell	Xiamen Hithium Energy Storage Technology Co., Ltd.	LFP71173207/314Ah	3.2V, 314Ah	IEC 62619: 2022	TUV RH JPTUV-152897
Fuse in Battery module	Xi'an Sinofuse Electric Co. Ltd.	RSZ307-1-TMZ-450A250V-N	DC250V/450A breaking capacity 50kA/-40°C~+85°C	EN 60269-1: 2007+A1+A2, EN 60269-4: 2009+A1+A2	TUV RH R 50448323
Positive connector (High voltage)	General Connectivity System Co., Ltd	PSR8CBM6L	Rated current:250 A Operating voltage: DC1500V Operating temperature: -40°C~+125°C IP67	EN 61984: 2009	TUV RH AN 50669162 0001
Negative connector (High voltage)	General Connectivity System Co., Ltd	PSR8ABM6L	Rated current:250 A Operating voltage: DC1500V Operating temperature: -40°C~+125°C IP67	EN 61984: 2009	TUV RH AN 50669162 0001
Connector (Low-Voltage)	Shanghai Futronics Electronic Technology Co Ltd	FLP25	Operating voltage: DC300V Operating temperature: -40°C~+125°C IP67	EN 61984: 2009	TUV SUD No. B 123935 0003 Rev. 01
Insulator (between cells and case)	Changzhou Hongjun Material Science & Technology Co Ltd	HJFRPC-770FB	V-0, Min. Thickness: 0,5 mm, 80°C	UL 94 UL 746B	UL E524866

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Clause	Requirement + Test	Result - Remark	Verdict

NTC	THINKING ELECTRONIC INDUSTRIAL CO LTD	NTSA1103	Resistance at 25 °C: R25=10kΩ±1%	UL 1434 UL 60730	UL E138827
Voltage & Temperature Sensor Wiring Harness	Suzhou Xinchengda Wire & Cable Co Ltd	UL4413 24AWG UL10588 22AWG	Rating Temp:150°C Rating Voltage:300V 24AWG Rating Temp:200°C Rating Voltage:300V 22AWG	UL 758	UL E537778
Busbar insulation tube	CHANGYUAN ELECTRONICS GROUP CO LTD	cb-hft	Rating Voltage:300V Max. Operating Temp: 125°C	UL 1581	UL E494006
Power cable	JIANGSU ETERN CO LTD	3640	50mm² Rating voltage: AC1.1kV/DC1.5kV	UL 758	UL E470465-20220828
High-voltage box					
Switching Power Supply	PHOENIX CONTACT GmbH & Co.KG	PHO.1159038	240W Rated input voltage range:100 ~ 240Vac Rated output voltage:24Vdc	IEC 61010-1:2010/AMD1:2016, IEC 61010-2-201:2017	CB Test Certificate SIQ SI-12207
Female positive high voltage connector	General Connectivity System Co., Ltd	PSR8CBM6L	Rated current:250 A Operating voltage: DC1500V Operating temperature: -40°C~+125°C IP67	EN 61984:2009	TUV RH AN 50669162 0001
Female negative high voltage connector	General Connectivity System Co., Ltd	PSR8ABM6L	Rated current:250 A Operating voltage: DC1500V Operating temperature: -40°C~+125°C IP67	EN 61984:2009	TUV RH AN 50669162 0001

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

Main circuit fuse	Xi'an Sinofuse Electric Co., Ltd.	RS306-01-AT5Z-350A1250V	1000Vdc/350A Breaking capacity: 100kA (time constant: 10ms~15ms)	EN 60269-1: 2007+A1+A2, EN 60269-4: 2009+A1+A2,	TUV RH R 50405695 0001
Hall current sensor	SINOMAGS TECHNOLOGY CO., LTD.	STB-CAB500M-52C	Rated Voltage : DC 12V or 24V Rated Current : 26-250mA Measurement category: CAT III, 300V for RI, 600V for BI Nominal Current: 500A Temperature: -40 to 85°C	EN 61010-1: 2010+A1, EN IEC 61010-2-030:2021+A11 EN IEC 62368-1:2020+A11, EN 62477-1: 2012+A11+A1+A12	TUV RH R 50621977 0001
High-voltage box relay	Xiamen Hongfa Electroacoustic Co., Ltd	HFE88P-400/1500-24-HA-C5-6	1500Vdc/400A Contact Arrangement:1 Form A Max Breaking Current:2000A(1 op)	EN IEC 60947-4-1:2019, EN 60947-1: 2007/A2:2014, EN IEC 60947-1:2021	TUV SUD N8A 053286 0060 Rev.00
Pre-charge contactor	Xiamen Hongfa Electroacoustic Co., Ltd	HFE82P-20/1500-24-H-Q2J-1	1500Vdc/20A Contact Arrangement: 1 Form A Max Breaking Current:200 A 1000 Vd.c. (1 op)	EN IEC 60947-4-1:2019	TUV RH AN 50599939 0001
Breaker	Xiamen Hongfa Electrical Safety & Controls Co., Ltd	UEM6H-400H/250-234011-Z3	1500Vdc/250A,2P Shell frame grade:400A Rated operating short-circuit breaking capacity Ics:15kA	IEC 60947-1: 2020, IEC 60947-2: 2016, IEC 60947-2: 2016/AMD1:2019	VDE DE1-65843
Power cable	JIANGSU ETERN CO LTD	3640	50mm² Rating voltage: AC1.1kV/DC1.5kV	UL 758	UL E470465-20220828
Red stand-off insulator	Chengdu Jieyang Electric Components Co., Ltd	JYZ-118AS, KLY30308G	D30*H60-M8, D30*H30-M8 V0	UL 94	UL E536124

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Clause	Requirement + Test	Result - Remark	Verdict

Busbar insulation tube	Nanjing Sunyoung Insulation Material Co., Ltd	CZ1531-2N	>0.7mm V0	UL 94	UL E540086
Pre-charging resistor	Shenzhen Zenithsun Electronics Tech. Co., Ltd.	ASZ6030 200W50R J	50Ω, 200W	IEC 62619:2022	Test with appliance
Switching power supply fuse	COOPER BUSSMANN LLC	PV-5A10F85L	1500Vdc, 5A	UL 248-19	UL E335324
DCDC power	Mornsun Guangzhou Science&Technology Co., Ltd.	PV350-29B24	Input: 300Vdc-1500Vdc Output: 24V/14.6A 350W	IEC 62109-1: 2010	Intertek SE-108481
DCDC power switch	Shanghai Liangxin Electrical Co., Ltd	NDG3V-50/2/1/01/M/1	1500Vdc, 63A	EN IEC 60947-1:2021, EN IEC 60947-3:2021	TUV SUD No. N8A 083574 0315 Rev. 07
Battery cabinet and Electrical cabinet					
Smoke fire detector	Gulf Security Technology co., Ltd	DC-9102E	Supply voltage: 16VDC~28VDC ≤55mA	EN 54-7:2018	LPCB 548d
Heat detector	Gulf Security Technology co., Ltd	DC-9103E	Supply voltage: 16VDC~28VDC ≤55mA	EN 54-5:2017/ A1:2018	LPCB 548c
Detector base	Gulf Security Technology co., Ltd	RB-01	9,5Vdc~28Vdc ≤15mA	EN 54-18: 2005, EN 54-18:2005/ AC:2007	APPLUS 0370-CPR-7231
Low-voltage connector	Shanghai Futronics Electronic Technology Co Ltd	FLP6008W-01W, FLP2508W-01W	DC300V,7A Max Operating temperature: -40°C~+125°C IP67	EN 61984:2009	TUV SUD B 123935 0003 Rev.01
AC back-up fuse	Xi'an Sinofuse Electric Co., Ltd.	SFD2-8EC-20	500Vac/40A Breaking capacity: 50kA	EN 60269-1: 2007+A1+A2, EN 60269-4: 2009+A1+A2	TUV RH R 50554874 0001 TUV RH AN 50557430 0001

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

Back-up fuse base(3P)	Xi'an Sinofuse Electric Co., Ltd.	TSA1451-K3/40	500Vac/40A, 3P	EN IEC 60947-1:2021, EN IEC 60947-3:2021	TUV RH R 50554873 0001 TUV RH AN 50559209 0001
AC SPD	Sichuan Zhongguang Lightning Protection Technologies Co., Ltd.	ZGG40-385(3+1)e	Nominal discharge current 20kA; Maximum discharge current 40kA; Voltage protection level L-N: 1.8kV, N-PE: 1.5kV	IEC 61643-11: 2011, EN 61643-11: 2012	TUV RH AN 50611522 0001
PCS	Shenzhen Enjoy Technology Co., Ltd.	EPCS125-AM-(F)	125KW DC side operating voltage range:650~950Vdc AC side rated voltage:230/400Vac Power factor range: 1 (leading) ~ 1 (lagging)	EN 62477-1: 2012+A11+A1+A12	TUV RH AN 50663492 0001
HVAC (Liquid cooling unit)	Shenzhen Envicool Technology Co., Ltd.	EMW50HFNC1C	220~240VAC; Max operating current: 19.2A Cooling capacity: 5KW Heating capacity: 2KW	EN 60335-1:2012+A11+A13+A1+A14+A2+A15, EN 60335-2-40:2003+A11+A12+A1+A2+A13 EN 62233:2008	TUV RH AM 50703920 0001
Dehumidifier	Zhuzhou Gongchuang Technology Co., ltd.	CSH-8060TS	110-230VAC, 50/60Hz,60W	EN IEC 60335-2-40:2023/A11: 2023, EN 60335-1:2012/A16: 2023, EN 62233:2008	TUV SUD NO. N8A 126711 0001 Rev.00
AC main circuit breaker QF1	Xiamen Hongfa Electrical Safety & Controls Co., Ltd	UEM5-250L/250-434011B	400Vac/250A,4P Shell Frame Rating: 250A Rated operating short-circuit breaking capacity Ics: 25kA	EN 60947-2: 2017+A1	TUV RH AN 50672511 0001
Others					

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Clause	Requirement + Test	Result - Remark	Verdict

E-STOP button	PHOENIX CONTACT GmbH & Co.KG	PHO.1108295	Rated Insulation Voltage (Ui): 600V; Rated Impulse Voltage: 6kV; Ith: 10A; -25 °C to 70 °C	IEC 62619:2022	Test with appliance
EMS (LnXall)	Zhejiang LnXall IoT Technology Co., Ltd.	WL-EMS-1000	DC12V ~ 48V Methods of communication: RS485, Ethernet, CAN	IEC 62619:2022	Test with appliance
EMS (Dunext) -Alternative	UTEK TECHNOLOGY (SHENZHEN)CO., LTD	DN-EMS-300-EU	DC12V ~ 36V Methods of communication: RS485, Ethernet, CAN	IEC 62619:2022	Test with appliance
Positive high voltage connector plug	General Connectivity System Co., Ltd	PSRP8C50L	Rated current:250 A Operating voltage: DC1500V Operating temperature: -40°C~+125°C IP67	EN 61984:2009	TUV RH AN 50669162 0001
Negative high voltage connector plug	General Connectivity System Co., Ltd	PSRP8A50L	Rated current:250 A Operating voltage: DC1500V Operating temperature: -40°C~+125°C IP67	EN 61984:2009	TUV RH AN 50669162 0001
Breaker(25A, 2P)	Shanghai Liangxin Electrical Co., Ltd.	NDB2-63C25/2	400Vac/25A,2P Shell Frame Grade: 25A	IEC 60898-1 IEC 60898-2	TUV RH AN 50606700 0001
Breaker(6A, 2P)	Shanghai Liangxin Electrical Co., Ltd.	NDB2-63C6/2	400Vac/6A,2P Shell Frame Grade: 6A	IEC 60898-1 IEC 60898-2	TUV RH AN 50606700 0001
Breaker(16A, 2P)	Shanghai Liangxin Electrical Co., Ltd.	NDB2-63C16/2	400Vac/16A,2P Shell Frame Grade: 16A	IEC 60898-1 IEC 60898-2	TUV RH AN 50606700 0001

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

Breaker(6A, 1P)	Shanghai Liangxin Electrical Co., Ltd.	NDB2-63C6/1	400Vac/6A,1P Shell Frame Grade: 6A	IEC 60898-1 IEC 60898-2	TUV RH AN 50606700 0001
European standard socket	ABB S.p.A. – ELSB	M1175	250 Vac/16 A Rated Frequency:50/60 Hz	IEC 60884-1: 2002, IEC 60884-1: 2002/AMD1:2006, IEC 60884-1: 2002/AMD2:2013	VDE 40022740
AC power cable	JIANGSU ETERN CO LTD	3512	70mm²	UL 758	UL E470465-20220828
DC power cable	JIANGSU ETERN CO LTD	3640	50mm² Rating voltage: AC1.1kV/DC1.5kV	UL 758	UL E470465-20220828
Gasket	AEROFLEX CO LTD	MSR20	EPDM.V-0	UL 94	UL E228536
Cabinet body	Wuxi Weijia Power Technology Co., Ltd.	UE399-0405-002-A0	Material: SGCC Galvanized Steel Sheet Cabinet Dimensions: Size1390*1350*2380 Coating: Zinc-rich primer + finish coat, RAL9003, fine orange peel texture Film Thickness: 120–280 μm	IEC 62619:2022	Test with appliance
Insulating Column	JIANGSU BI-GOLD TECHNOLOGY NEW MATERIALS CO., LTD.	YD0304E	3mm, V-0, 130°C	UL 94	UL E240680
White Epoxy Board	Anhui Yisuola Composite Materials Co., Ltd	UE312-05001-701-A0	FR4 Thickness: 2mm.V0	UL 94	UL E510612

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Clause	Requirement + Test	Result - Remark	Verdict

Copper busbar	Suzhou Yantai Copper Industry Technology Co., Ltd.	UE312-04003-406-A0	Grade T2 Copper Copper content: 99.988 Tensile strength: 258 Thickness: 3mm	IEC 62619:2022	Test with appliance
BCU board in high voltage box(model no. BCU-B30-201-003-001 V1.1)					
DC/DC power supply Chip (U9)	Joulwatt Electronic (Hangzhou)Co., Ltd.	JW5121	Working voltage: 4.5~ 60V Working temperature: -40~ 125°C	IEC 62619:2022	Test with appliance
Single chip microcomputer (U6)	STMicroelectronics	STM32F407ZGT6	Operating voltage: 1.8-3.6V, Operating temperature: -40 to 85°C, Flash memory : 192+4KB Memory :1MB	IEC 62619:2022	Test with appliance
Communication chip (UN3, UN5)	3PEAK INCORPORATED	TPT1051	Operating temperature: -40 to 125°C Communication rate: 5 Mbit/S	IEC 62619:2022	Test with appliance
-Alternative	Shanghai Chipanalog Microelectronics Co., Ltd.	CA-IF1051	Operating temperature: -55 to 125°C Communication rate: 5 Mbit/S	IEC 62619:2022	Test with appliance
Communication isolation chip (UN2, UN4, UN8, UN11, UN12)	Suzhou Novosense Microelectronics Co., Ltd.	NSi8221N1	Isolation voltage: 3.75kVrms Working voltage: 2.5-5.5V Operating temperature: -40 to 125°C	DIN EN IEC 60747-17 (VDE 0884-17):2021-10, EN IEC 60747-17:2020+AC:2021	VDE 40050121

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

-Alternative	Shanghai Chipanalog Microelectronics Co., Ltd.	CA-IS3722HS	Isolation voltage: 3.75kVrms Working voltage: 2.5-5.5V Operating temperature: -40 to 125°C	DIN EN IEC 60747-17 (VDE 0884-17):2021-10, EN IEC 60747-17:2020+AC:2021	VDE 40052786
High-voltage connector (J3, J4, J5, J6)	ShenZhen ChangJiang Connectors Co., Ltd	C4201WR-2*1P C4201WR-2*2P	Flame rating: V-2 Operating temperature: -40 to 105°C Rated voltage :600V AC/DC Rated current :9A AC/DC	UL 1977	UL E326732
Transformer (TR5)	SHENZHEN SINODRIVE ELECTRIC TECHNOLOGIES CO., LTD.	N12103S	-40°C to 125°C Working Voltage Of 1500VDC Class A	IEC 62619:2022	Test with appliance
- Triple insulation wire	YOUNG CHANGSILICONE COLIMITED	STW-F-xx	155°C, Generic Type of Insulation: Reinforced Insulation, PFA 416HP(#), CTI 0	DIN EN IEC 62368-1 (VDE 0868-1):2025-01, EN IEC 62368-1:2024+A11:2024	VDE 40013359
- Case	WAH HONG INDUSTRIAL CORP	WH-9100(G1)(G2)	Diallyl Phthalate, V-0, 130°C, min. 0.8 mm thickness, CTI 0	UL 94 UL 746B	UL E150608
- Glue	Dow Silicones Corp	1-2577 #@, 12577 Low VOC#@	V-0, 130°C, Min. 1.4mm thickness, FR-4.0	UL 94 UL 746B	UL E81611
Optocoupler (UH1, UH2, UH3)	Xiamen Hualian Semiconductor Technology Co. LTD	HSSR-61A0 D-2	Isolation voltage: 5kVrms Working temperature: -40~ 85°C	UL 1577, DIN EN IEC 60747-5-5 (VDE 0884-5):2021-10, EN IEC 60747-5-5:2020	UL E178703, VDE 40004708

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

AFE chip (U2)	NXP	MC33772	Working voltage:6-30V Operating temperature: -40 to 125°C	IEC 62619:2022	Test with appliance
PCB board	SHANGHAI GLOBAL ELECTRONIC MATERIAL LTD	GF11/T6	CTI: >600 FLAME CLASS: V-0 Min Thk (mm): 0.63-1.4mm R.T.I. (°C): 90	UL 94	UL E224772
BMU board in battery pack(model no. BMU-B30-64-504 V1.4)					
Connector (JV1, JV2, JV3, JV4, JV5)	JIANGSU YXT PRECISION ELECTRON ICS CO., LTD	WTB41-B116HW1-001, WTB41-B140HW1-001, WTB41-B136HW1-001, WTB41-DB140HZ1-001, WTB41-DB136HZ1-001	Flame rating: V-0, Operating temperature: -40 to 125°C, Rated voltage :50V AC/DC, Rated current :3A AC/DC	UL 1977	UL E532919
Transformer (TJ1 TJ2)	Huizhou U&T Electronics Inc	UTA06C02	Working voltage:1500V Operating temperature: -40 to 150°C	IEC 62619:2022	Test with appliance
- Triple insulation wire	E&B Technology Co., Ltd.	E&B-XXXH-3*	180°C, Generic Type of Insulation: Reinforced Insulation, PFA340(e) (#), CTI: 600V	IEC/EN 62368-1	VDE 40043492
- Magnet wire	GUANGDONG SUNTEK WIRE CO., LTD	FIWy F/R	Insulation Type: Reinforced; Temp Class °C: 155; Test Voltage V: 3000 39-26AWG	UL 1446	UL E469976

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

- Case	WAH HONG INDUSTRIAL CORP	WH-9100(G1)(G2)	Diallyl Phthalate, V-0, 130°C, min. 0.8 mm thickness, CTI 0	UL 94 UL 746B	UL E150608
- Glue	MIANYANG WELLS ELECTRONIC MATERIALS CO LTD	WR7155	V-0, min.150ºC, min. 2.5 mm thickness, CTI 0	UL 94 UL 746B	UL E223455
Equalizing resistance (R9, R11, R12, R14, R15, R17, R18, R20, R21, R23, R24, R28, R29, R31, R32)	YAGEO CORPORATION	RC1206FR-0730RL, 1206W4F300JT5E	Operating temperature: -55 to 155°C	IEC 62619:2022	Test with appliance
AFE Chip (U4)	ADI	ADBMS6830MWCCSZRL	Working voltage: 11-80V Operating temperature: -40 to 125°C	IEC 62619:2022	Test with appliance
PCB board	SHANGHAI GLOBAL ELECTRONIC MATERIAL LTD	GF11/T6	CTI: >600, FLAME CLASS: V-0, Min Thk (mm): 0.63-1.4mm, R.T.I. Mech (°C): 90	UL 94 UL 746C	UL E224772
Enclosure	FORMOSA CHEMICALS & FIBER CORPORATION	PC/ABS AC310(+)	CTI:0 FLAME CLASS: V-0 Thickness :2.3mm	UL 94 UL 746C	UL E162823
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): _____

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**

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

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): __

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)

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

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): __

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**
A004216626-001	150.7 (2.823 to 2.916)	185	189.8	3.753	A, D, F
-	-	-	-	-	-
-	-	-	-	-	-

	Charge Voltage Applied Battery System: 1)	
	Whole	**Part**
	N/A	3.85*1.1*52=220.22

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.

2) Tested on a part of the battery system which consisted of one battery pack and one high voltage box.

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): ___

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

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**
A004216626-001	158.0	185*1.2=222	161.7	A, D, F
-	-	-	-	-
-	-	-	-	-

Supplementary information:

Tested on a part of the battery system which consisted of one battery pack and one high voltage box.

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

8.2.4	TABLE: Overheating control (battery system)			P
Model No.	**OCV at start(SOC 50%) of test, V dc**	**Maximum Charging Current, A**	**Measured Maximum Charging Voltage, V dc**	
A004216626-001	172.1	157.0	176.4	
-	-	-	-	
-	-	-	-	
Maximum Specified Temperature of Battery System, °C		**Maximum Measured Cell Case Temperature, °C**	**Results**	
55.0		56.2	A, D, F	
-		-	-	
-		-	-	

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

Supplementary information:

1. Tested on a part of the battery system which consisted of one battery pack and one high voltage box.

2. When charging, temperature threshold for cell temperature protection is 56 °C.

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

9	TABLE: EMC				P
Standard used for EMC test:			-		
Sample No.	**EMC Test Item**	**Battery Condition**	**EMC Test Level/ Parameters**	**Compliance Criteria**	**Results**
-	-	-	-	-	-

Supplementary information:

Evaluated by the EMC report CN26AEG3 001.

Battery Condition During EMC test

1 – In Operation Mode, [ ] Supplied at ____, [ ] Load at____

2 – In non-operation Mode, Battery state of charge (SOC) before test at around____

Compliance Criteria and Test Results:
A – No fire or Explosion
B – Fire
C – Explosion
D – Battery system did operate as intended during the test.
E - All function of battery system did operate as intended after the test.
F - All function of battery system did not operate as intended during the test, (Please explain): ____
G - Other (Please explain): ____

- End of test report -

Picture 1 Front view

Picture 2 Left view

Picture 3 Back view

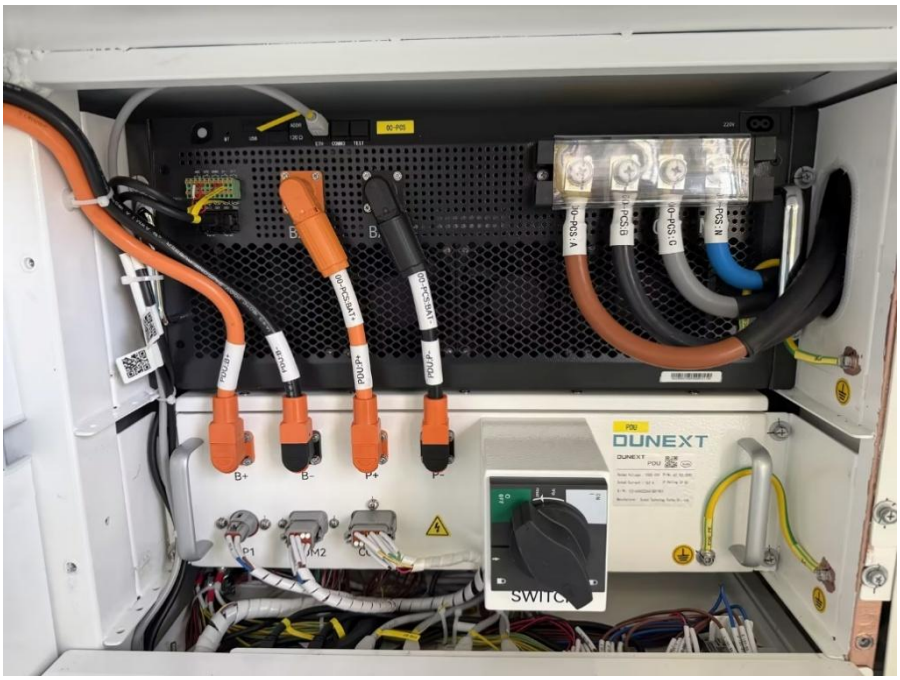
Picture 4 Right view

Picture 5 Open view 1

Picture 6 Open view 2

Picture 7 Battery cabinet

Picture 8 Electrical cabinet

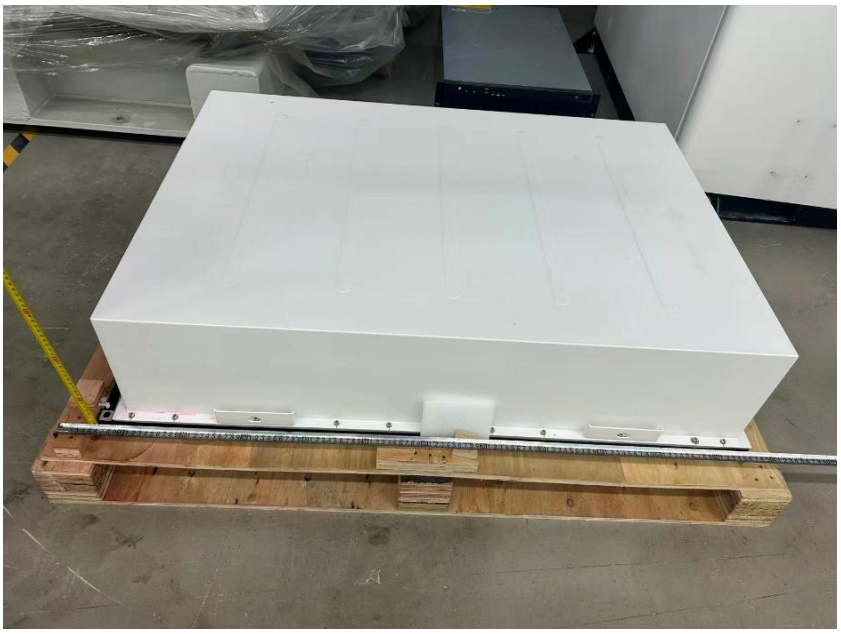


Picture 9 High voltage box/PDU + PCS box

Picture 10 AC main circuit breaker

Picture 11 Earth terminal

Picture 12 Battery pack (Top and front view)



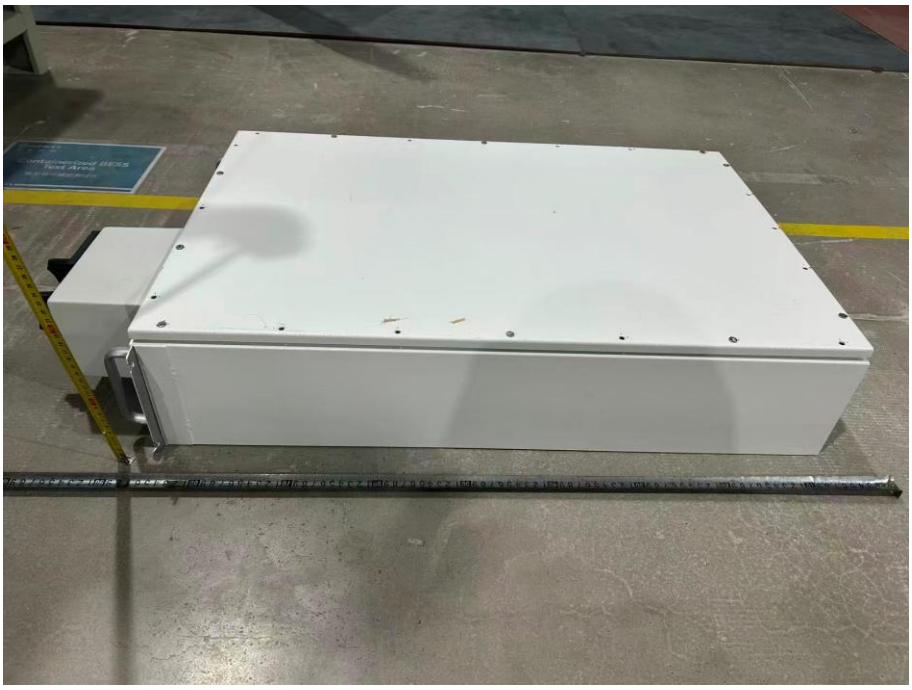
Picture 13 Battery pack (Top and right view)

Picture 14 Battery pack (Top and back view)

Picture 15 Battery pack (Inside view 1)

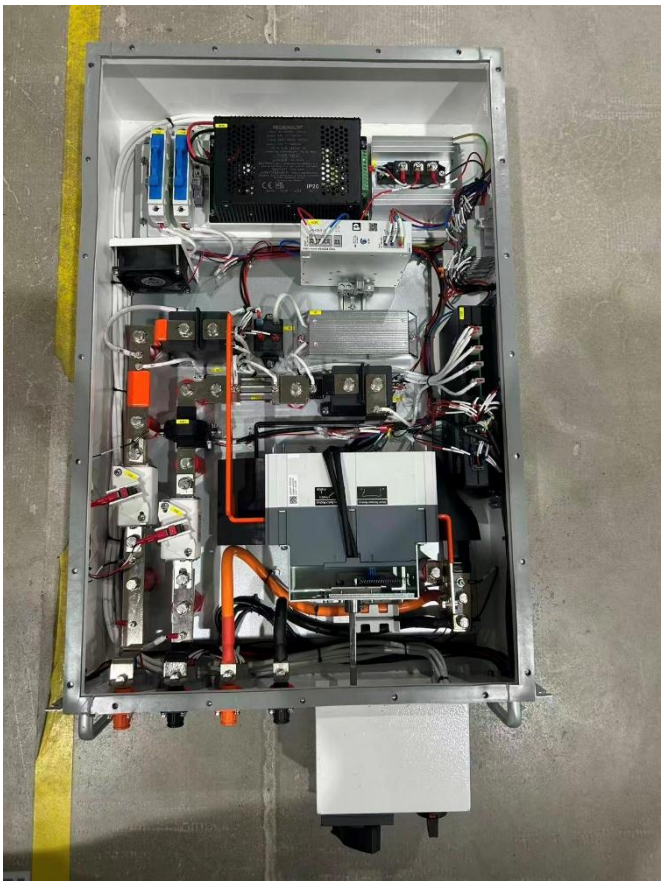
Picture 16 Battery pack (Inside view 2)

Picture 17 High voltage box/PDU with DC/DC module (Front view)



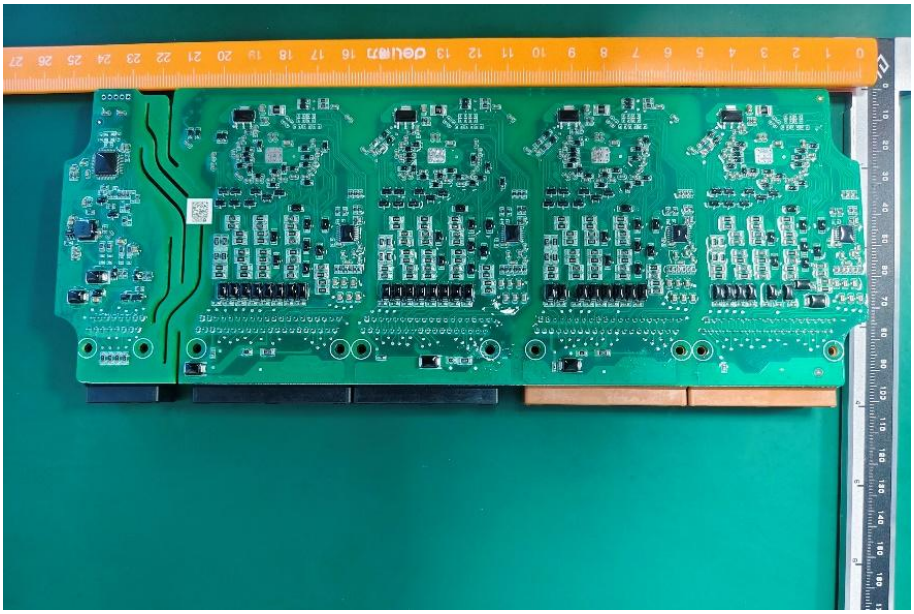
Picture 18 High voltage box/PDU (Top and side view)

Picture 19 High voltage box/PDU (Top and back view)

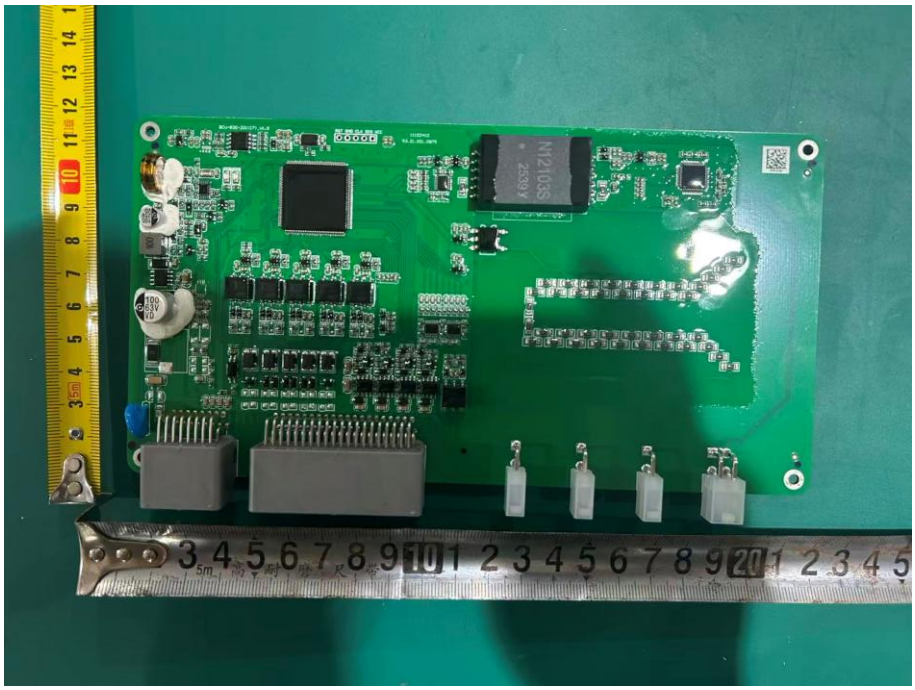


Picture 20 High voltage box/PDU with DC/DC module (Inside view)

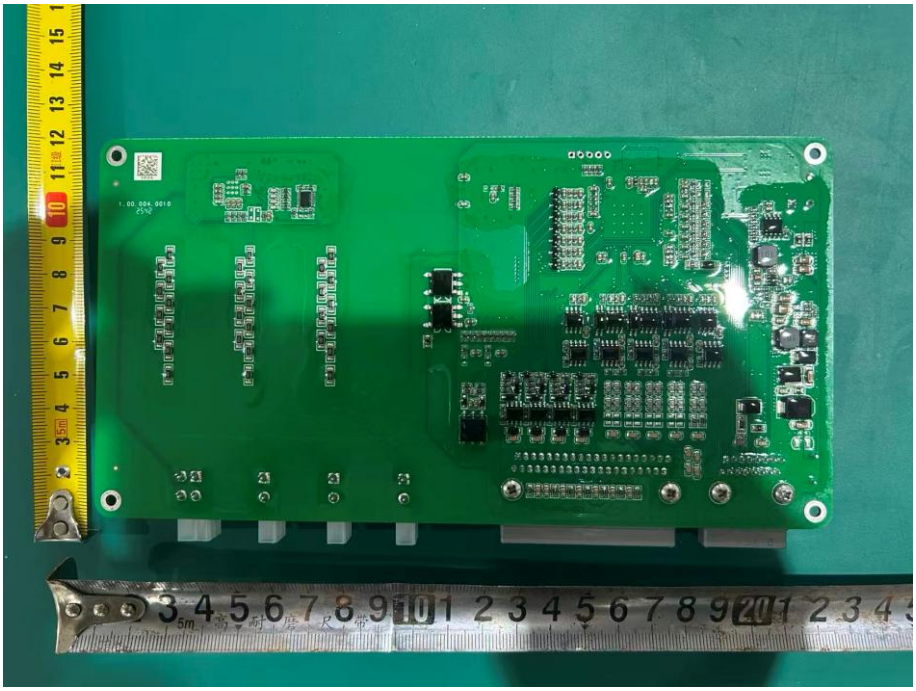
Picture 21 BMU view 1



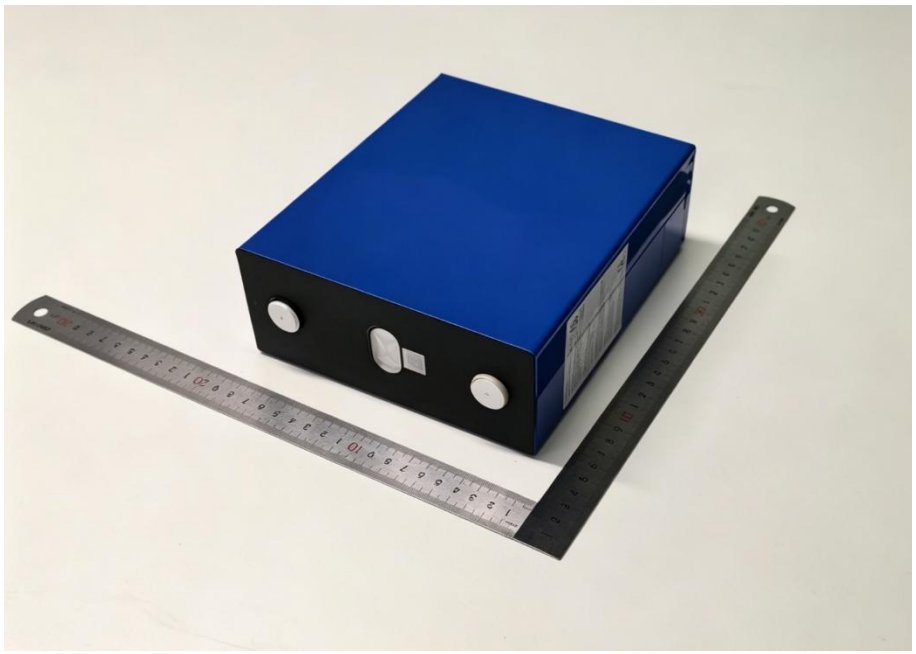
Picture 22 BMU view 2



Picture 23 BCU view 1



Picture 24 BCU view 2



Picture 25 Cell view