



Test Report issued under the responsibility of:



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

Report Number..... : TSZ24EA046A01-01
Date of issue : 2024-10-22
Total number of pages : 26 Pages

Name of Testing Laboratory preparing the Report : Shenzhen Tiansu Calibration and Testing Co., Ltd.

Applicant’s name : Huizhou FORYOU Optoelectronics Technology Co Ltd
Address : Building 5, District B, NO.1 North Shangxia Road, Dongjiang Hi-tech Industry Park, HUIZHOU GUANGDONG 516005, CHINA

Test specification:
Standard : IEC 62619:2022
Test procedure : CB Scheme
Non-standard test method..... : N/A

TRF template used : IECEE OD-2020-F1:2022, Ed.1.5
Test Report Form No...... : IEC62619B
Test Report Form(s) Originator.... : UL Solutions (Demko)
Master TRF : Dated 2023-02-24

Copyright © 2023 IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components (IECEE System). All rights reserved.
This publication may be reproduced in whole or in part for non-commercial purposes as long as the IECEE is acknowledged as copyright owner and source of the material. IECEE takes no responsibility for and will not assume liability for damages resulting from the reader’s interpretation of the reproduced material due to its placement and context.
If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.
This report is not valid as a CB Test Report unless signed by an approved IECEE Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:
The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing NCB. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description :	Rechargeable Li-ion Battery Pack	
Trademark(s)	ADAYO	
Manufacturer	Same as applicant	
Model/Type reference	BA05G	
Ratings	51.2V, 100Ah, 5120Wh	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
<input checked="" type="checkbox"/>	CB Testing Laboratory:	Shenzhen Tiansu Calibration and Testing Co., Ltd.
Testing location/ address :	Building 4, No.2, Jinlong Road, Longgang District, Shenzhen, Guangdong, China.	
Tested by (name, function, signature)	Leon Gong /Project Handler	<i>Leon Gong</i>
Approved by (name, function, signature) ...	Davis Ding /Reviewer	<i>Davis Ding</i>
<input type="checkbox"/>	Testing procedure: CTF Stage 1:	
Testing location/ address :		
Tested by (name, function, signature)		
Approved by (name, function, signature) ...		
<input type="checkbox"/>	Testing procedure: CTF Stage 2:	
Testing location/ address :		
Tested by (name + signature)		
Witnessed by (name, function, signature) .:		
Approved by (name, function, signature) ...		
<input type="checkbox"/>	Testing procedure: CTF Stage 3:	
<input type="checkbox"/>	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): Enclosures (8 pages)	
Summary of testing:	
Tests performed (name of test, test clause and date test performed): Testing for battery pack: 7.2.3 Drop test Test period: 2024-09-12 8.2.2 Overcharge control of voltage Test period: 2024-09-10 8.2.3 Overcharge control of current Test period: 2024-09-02 8.2.4 Overheating control Test period: 2024-09-11 Cell (Model: LF100LA) has been evaluated according to IEC 62619: 2022, Certificate No.: SG PSB-BT-03455, Report No.: 085-282260325-000.	Testing location: (CBTL, SPTL, CTF, Subcontractor) CBTL Shenzhen Tiansu Calibration and Testing Co., Ltd. Building 4, No.2, Jinlong Road, Longgang District, Shenzhen, Guangdong, China.
Summary of compliance with National Differences (List of countries addressed): EU group *, United Kingdom (Per customer's request shown separately) *=No National or Group Differences declared. <input checked="" type="checkbox"/> The product fulfils the requirements of EN IEC 62619: 2022 <input checked="" type="checkbox"/> The product fulfils the requirements of BS EN IEC 62619: 2022	

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.

Name: Rechargeable Li-ion Battery Pack		ADAYO
Model: BA05G		YYMMDD
Battery Cell	IFpP/51/161/120/[16S]M/-10+60/90	
Cell Technology	Li-ion(LFP)	
Capacity (Ah)	100	
Battery Parameters		
Nominal Voltage (Vdc)	51.2	
Rated Capacity (Ah)	100	
Rated Energy (kwh)	5.12	
Max Voltage (Vdc)	58.4	
Max Charge Voltage (Vdc)	58.4	
Discharge Cut-off Voltage (Vdc)	40	
Standard Charge Current (A)	50	
Max Charge Current (A)	95	
Standard Discharge Current (A)	50	
Max Discharge Current (A)	100	
Others (Standard charging mode:50A CC to 58.4V, 58.4V CV to 5.1A)		
IP inclosure	IP21	
Dimension (mm)	620±1*470±1*165±1	
Communication	RS485/CAN	
Operative Ambient Temperatures	Charge:0°C--55°C Discharge:-20°C--55°C	
Storage Temperature (°C)	-20~60	
Humidity	<45%	
Altitude (m)	<2	
		
<p>Warnings</p> <ul style="list-style-type: none"> -Do not use and leave the battery near a heat source as fire or heater. -Do not reverse the position and negative terminals. -Do not directly solder the battery and pierce the battery with a nail or other sharp object. <p>Disposal method</p> <ul style="list-style-type: none"> -Comply with local regulations. 		

Polarity:



Remark:

- 1: The date code "YYMMDD"
 - 1.1: YYYY stands for year.
 - 1.2: MM stands for month.
 - 1.3: DD stands for date.
- 2: Polarity is reflected on the surface of the Battery.
- 3: Trademark: " **ADAYO** "

Test item particulars: --	
Classification of installation and use: To be defined in final product	
Supply Connection: DC Connector	
Possible test case verdicts: - test case does not apply to the test object.....: N/A - test object does meet the requirement.....: P (Pass) - test object does not meet the requirement.....: F (Fail)	
Testing:	
Date of receipt of test item: 2024-07-18	
Date (s) of performance of tests: 2024-09-02 to 2024-09-12	
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 <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC60335-1:	
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:	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies): Same as applicant	

General product information and other remarks:

The battery pack consists of sixteen cells in 16S1P which fixed by metal frame, protective circuit, metal enclosure.

- Rechargeable Li-ion Battery Pack (Model: BA05G) has been evaluated to comply with ST/SG/AC.10/11/Rev.8/Subsection 38.3, test report No.: TSZ24EA046A03-01 issued on 2024-08-28, issued by Shenzhen Tiansu Calibration and Testing Co., Ltd.

- Type reference IFpP/51/161/120/[16S]M/-10+60/90 is IEC 62620:2014 designation which is identical Model BA05G except for model designation.

- Detailed information of the cell, as following:

Product name:	Rechargeable Li-ion Cell	Cell model:	LF100LA
Nominal Voltage	3.2V	Normal Charge Current	50A
Rated Capacity	102Ah	Maximum Charge Current	100A
Energy	326.4Wh	Normal Discharge Current	50A
Maximum Charge Voltage	3.9V	Maximum Discharge Current	250A
Discharge Cut-Off Voltage	2.0V	End of charging current	5.1A
Charging Temperature Range	0°C to 65°C	Discharging Temperature Range	-30°C to 65°C

- Detailed information of the battery pack, as following:

Product name:	Rechargeable Li-ion Battery Pack	Cell model:	BA05G
Nominal Voltage	51.2V	Normal Charge Current	50A
Rated Capacity	100Ah	Maximum Charge Current	95A
Energy	5120Wh	Normal Discharge Current	50A
Maximum Charge Voltage	58.4V	Maximum Discharge Current	100A
Discharge Cut-Off Voltage	40V	End of charging current	5.1A
Charging Temperature Range	0°C to 55°C	Discharging Temperature Range	-20°C to 55°C

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
4	PARAMETER MEASUREMENT TOLERANCES		P
	Parameter measurement tolerances		P
5	GENERAL SAFETY CONSIDERATIONS		P
5.1	General		P
	Cells and batteries are safe under conditions of both intended use and reasonably foreseeable misuse... :	Clause 6, Clause 7, 8.1, and 8.2. See also table 5.1 for Critical components information.	P
	Reduce the risk of injuries from moving parts		P
5.2	Insulation and wiring		P
	Voltage, current, altitude, and humidity requirements	See table 5.1 for Critical components information.	P
	Adequate clearances and creepage distances between connectors and live parts at different voltages or between live parts and non-current-carrying accessible parts		N/A
	Protect from hazardous live parts, including during installation		N/A
	The mechanical integrity of internal connections		P
5.3	Venting		P
	Pressure relief function		P
	Encapsulation used to support cells within an outer casing		P
5.4	Temperature/voltage/current management		P
	The design prevents abnormal temperature-rise		P
	Voltage, current, and temperature limits of the cells		P
	Specifications and charging instructions for equipment manufacturers	Charging instructions included in the product specification.	P
5.5	Terminal contacts of the battery pack and/or battery system		P
	Polarity marking(s)	See battery front panel.	P
	Polarity marking not provided for keyed external connector		N/A
	Capability to carry the maximum anticipated current	Connector complied with the requirements. See table 5.1 for Critical components information.	P
	External terminal contact surfaces		P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	Terminal contacts are arranged to minimize the risk of short circuits		P
5.6	Assembly of cells, modules, or battery packs into battery systems		P
5.6.1	General		P
	Independent control and protection method(s)		P
	Recommendations of cell operating limits, 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..... :	Refers to page 7.	P
	Designation of battery system to comply with the cell operating region	Refers to page 7.	P
5.8	System lock (or system lock function)		P
	Non-resettable function to stop battery operation	Provided in the BMS software security mechanism.	P
	Manual with procedure for resetting of battery operation		P
	Emergency battery final discharge		N/A
5.9	Quality plan		P
	Manufacturing quality plan (for example: ISO9001, etc.) prepared and implemented..... :	The manufacturer supplies a self-declaration document, Quality Control plan provided.	P
	The process capabilities and the process controls		P

6	TYPE TEST CONDITIONS		P
6.1	General		P
6.2	Test items		P
	Cells or batteries that are not more than six months old (See Table 1 of IEC 62619)		P
	Capacity confirmation of the cells or batteries		P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

	Default ambient temperature of test, 25 °C ± 5 °C		P
--	---	--	---

7	SPECIFIC REQUIREMENTS AND TESTS		P
7.1	Charging procedure for test purposes		P
	The battery discharged to a specified final voltage prior to charging	40V	P
	The cells or batteries charged using the method specified by the manufacturer	See page 7.	P
7.2	Reasonably foreseeable misuse		P
7.2.1	External short-circuit test (cell or cell block)	CB approval cell.	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)		N/A
	Cylindrical cell, longitudinal axis impact		N/A
	Prismatic cell, longitudinal axis and lateral axis impact		N/A
	Results: no fire, no explosion.		N/A
7.2.3	Drop test (cell or cell block, and battery system)		P
7.2.3.1	General		N/A
7.2.3.2	Whole drop test (cell or cell block, and battery system)		N/A
	Description of the Test Unit.....		—
	Mass of the test unit (kg).....		—
	Height of drop (m).....		—
	Results: no fire, no explosion		N/A
7.2.3.3	Edge and corner drop test (cell or cell block, and battery system)		P
	Description of the Test Unit.....	Battery Pack	—
	Mass of the test unit (kg).....	52.159	—
	Height of drop (m).....	0.05	—
	Results: no fire, no explosion		P
7.2.4	Thermal abuse test (cell or cell block)	CB approval cell.	N/A
	Results: no fire, no explosion		N/A
7.2.5	Overcharge test (cell or cell block)	CB approval cell.	N/A

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	For those battery systems that are provided with only a single protection for the charging voltage control		—
	Results: no fire, no explosion		N/A
7.2.6	Forced discharge test (cell or cell block)	CB approval cell.	N/A
	Cells connected in series in the battery system		N/A
	Redundant or single protection for discharge voltage control provided in battery system		N/A
	Target Voltage		N/A
	Maximum discharge current of the cell, I_m		N/A
	Discharge current for forced discharge, $1.0 I_t$		N/A
	Discharging time, $t = (1 I_t / I_m) \times 90$ (min.)		N/A
	Results: no fire, no explosion		N/A
7.3	Considerations for internal short-circuit – Design evaluation		N/A
7.3.1	General		N/A
7.3.2	Internal short-circuit test (cell)	CB approval cell.	N/A
	Samples preparation procedure: In accordance with Clause A.5 and A.6 of IEC 62133-2:2017		N/A
	Tested per 7.3.2 b) in an ambient temperature of $25\text{ °C} \pm 5\text{ °C}$.		N/A
	The appearance of the short-circuit location recorded by photograph or other means		—
	The pressing was stopped - When a voltage drop of 50 mV was detected; or		N/A
	- The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) was reached		N/A
	Results: no fire		N/A
7.3.3	Propagation test (battery system)		N/A
	Method to create a thermal runaway in one cell ...		N/A
	Results: No external fire from the battery system, no battery case rupture		N/A
8	BATTERY SYSTEM SAFETY (CONSIDERING FUNCTIONAL SAFETY)		P
8.1	General requirements		P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	Functional safety analysis for critical controls	Analysis for functional safety according to Annex H of IEC 60730-1 :2020.	P
	Conduct of a process hazard analysis for both the cell manufacturing process and the battery system manufacturing process	Hazard analysis	P
	Conduct of risk assessment and mitigation of the battery system	FEMA provided	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	Annex H of IEC 60730-1 :2020, Class B.	P
	The charge control evaluated by tests in clauses 8.2.2 to 8.2.4		P
8.2.2	Overcharge control of voltage (battery system)		P
	The exceeded charging voltage applied to the whole battery system		P
	The exceeded charging voltage applied to only a part of the battery system, such as the cell(s)..... :		N/A
	Results: no fire, no explosion..... :	See Table 8.2.2.	P
	The BMS terminated the charging before exceeding the upper limit charging voltage		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..... :	60°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

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

9	EMC		N/A
	Battery system fulfil EMC requirements of the end-device application	Intended for to be tested in the end use application.	N/A

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

11	MARKING AND DESIGNATION (REFER TO CLAUSE 5 OF IEC 62620)		P
	The marking items shown in Table 1 in IEC 62620 indicated on the cell, battery system or instruction manual.	See Page 5, Copy of marking plate for more information.	P
	Cell or battery system has clear and durable markings		P
	Cell designation		N/A
	Battery designation	IFpP/51/161/120/[16S]M/-10+60/90	P
	Battery structure formulation		P

12	PACKAGING AND TRANSPORT		P
	Refer to Annex D		P

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

IEC 62619			
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		P
	The materials and pack design chosen in a way as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of environmental contaminants		P
	Regulations concerning international transport of secondary lithium batteries		P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

5.1	TABLE: Critical components information					P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity ¹⁾	
Cell	EVE Power Co., Ltd	LF100LA	3.2V, 102Ah, 326.4Wh	IEC 62619:2022	TUV SUD certificate No.: SG PSB-BT-03455, Report No.: 085-282260325-000	
Key components for Battery module						
Power wire (P- to B-)	DONGGUAN CITY MINGHE ELECTRONIC CO LTD	3512	200°C, 600Vac, 6AWG	UL 758	UL E473509	
Power wire (P- to B-) (Alternative)	Interchangeable	Interchangeable	200°C, 600Vac, 6AWG	UL 758	UL	
Power wire (Cell to B+)	DONGGUAN CITY MINGHE ELECTRONIC CO LTD	3512	200°C, 600Vac, 4AWG	UL 758	UL E473509	
Power wire (Cell+ to B+) (Alternative)	Interchangeable	Interchangeable	200°C, 600Vac, 4AWG	UL 758	UL	
Connector (+, -) (Orange, Black)	Dongguan Vaconn Electronics Technology Co Ltd	VP-ES-SSBAB01	120A, 1500Vdc, -40°C to 125°C	UL 4128	UL E534400	
Connector (+, -) (Orange, Black) (Alternative)	Dongguan Vaconn Electronics Technology Co Ltd	VP-ES-SSBAB02	120A, 1500Vdc, -40°C to 125°C	UL 4128	UL E534400	
Metal enclosure	Huizhou Runde Precision Technology Co., Ltd	BA03-08	Material: SPCC, Dimension: 470mm*620mm*165mm, Thickness: 1.2mm	--	Tested with appliance	
Internal Wire	DONGGUAN CITY MINGHE ELECTRONIC CO LTD	1007	22AWG, 80°C, 300Vac	UL 758	UL E473509	

IEC 62619					
Clause	Requirement + Test			Result - Remark	Verdict
Internal Wire (Alternative)	Interchangeable	Interchangeable	22AWG, 80°C, 300V	UL 758	UL
Tubes	SHENZHEN WOER HEAT-SHRINKABLE MATERIAL CO LTD	RSFR	600V, 125°C,	UL 224	UL E203950
Epoxy resin board	HANGZHOU BLUESUN ELECTRONIC MATERIALS CO LTD	EPGC-FR4	V-0, 90°C, Minimum thickness: 1mm	UL 94 UL 1694	UL E517160
Handle	Huizhou Runde Precision Technology Co., Ltd	BA03-08	Material: SPCC, Thickness: 1.2mm, Dimension: 140mm*40mm*40mm	--	Tested with appliance
Moulded Case Circuit Breaker	SHANGHAI LIANGXIN ELECTRICAL CO LTD	NDB1-125	125A, 60Vdc, 1P	UL 1077	UL E300669
Shunt trip release	SHANGHAI LIANGXIN ELECTRICAL CO LTD	MX-OF	48Vdc	UL 1077	UL E300669
Switch	Dongguan Xiangxing Electronics Co., LTD	PX16B-P22Z(F)/E	36Vdc, 220Vac, 2A	--	Tested with appliance
Key components for BMS					
IC (U6)	Nations Technologies Inc.	N32G455VEL7	V _{DD} : 1.8V to 3.6V, V _{SSA} , V _{DDA} : 1.8V to 3.6V, T _J : -40°C to 125°C	--	Test with appliance
AFE (U1)	Peng Shen Technology Co., Ltd.	PB7170-P48	V _{PVDD} -V _{PGND} : 12V to 88V, T _{OPR} : -40°C to 125°C	--	Test with appliance
MOSFET for Charge and Discharge (Q4, Q6, Q8, Q17, Q18, Q34, Q36, Q38, Q40, Q69, Q72, Q74, Q76, Q78)	GUANGDONG INMARK ELECTRONICS CO. LTD.	MOT1113T	I _d : 399 A, V _{ds} : 100 V, Operating temperature range: -55°C to 175°C	--	Test with appliance

IEC 62619					
Clause	Requirement + Test		Result - Remark		Verdict
PCB	Meizhou Yidasheng Electronic Co Ltd	YDS-M	V-0, 130°C,	UL 796	UL E507628
PCB (Alternative)	Interchangeable	Interchangeable	V-0, 130°C,	UL 796	UL
NTC (NTC1 to NTC4)	Guangdong Xinshiheng Technology Co., Ltd.	MF52C103F343 5	Resistance at 25°C: 10KΩ±5%, T _{moa} : 105°C	UL 1434	UL E526963
Sampling Resistance (433, 456, 498, 501, 508, 518, 524, 549, 555)	SUP	2512	Power rating: 1W, Max Operating Voltage: 250V, Operating Temp Range: -55°C to 155°C	--	Test with appliance
Lead wires (charge & discharge)	DONGGUAN YONGJINXIANG ELECTRIC WIRE & CABLE INDUSTRY CO LTD	3512	5AWG, T _{max} : 200°C, V _{max} : 600V	UL 758	UL E322614
Plastic enclosure	CHI MEI CORPORATION	PA-765A	Material: ABS, Fire rating: V-0, 5VB, T _{max} : 85°C, Min thickness: 2.1mm	UL 94 UL 1694	UL E56070
Fuse (F1)	DONGGUAN PROTECTOM ELECTROM CO LTD	ES1T 1206	12A, 64Vdc	UL 248-1	UL E529172
Supplementary information: ¹) Provided evidence ensures the agreed level of compliance. See OD-2039. ²) The CBTL has verified the component information. ³) License available upon request.					

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

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

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

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

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

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

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

Supplementary information:
Results:
A – No fire or Explosion
B – Fire
C – Explosion
D – Other (Please explain): ____

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

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

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

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

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

7.3.3	TABLE: Propagation test (battery system)					N/A
Sample No.	OCV of Battery System Before Test, (V dc)	OCV of Target Cell Before Test, (V dc)	Maximum Cell Case Temperature, (°C)	Maximum DUT Enclosure Temperature, (°C)	Results	
--	--	--	--	--	--	
--	--	--	--	--	--	
--	--	--	--	--	--	
Method of cell failure ¹⁾		Location of target cell		Area for fire protection (m ²)		
--		--		--		
--		--		--		
--		--		--		
Supplementary information:						
<p>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</p> <p>2) If the battery system has no outer covering, the manufacturer is required to specify the area for fire protection.</p>						
<p>Results:</p> <p>A – No fire external to DUT enclosure or area for fire protection or no battery case rupture</p> <p>B – Fire external to DUT enclosure or area for fire protection</p> <p>C – Explosion</p> <p>D – Battery case rupture</p> <p>E – Other (Please explain): __</p>						

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

8.2.2	TABLE: Overcharge control of voltage (battery system)				P
Sample No.	OCV at start of test for Cell/Cell Blocks, (V dc)	Maximum Charging Current, (A)	Max. Charging Voltage, (V dc)	Max. Voltage of Cell/Cell Blocks, (V dc)	Results
B01#	Min: 2.750	95	58.514	3.680	A, D, F
			Charge Voltage Applied Battery System: 1)		
			Whole	Part	
			68.64V	--	
Supplementary information:					
1) The exceeded voltage can be applied to only a part of the system such as the cell(s) in the battery system per Figure 6 of IEC 62619, if it is difficult to do it in using the whole battery system.					
Results:					
A – No Fire or Explosion					
B – Fire					
C – Explosion					
D – The voltage of the measured cells or cell blocks did not exceed the upper limit charging voltage					
E – The voltage of the measured cells or cell blocks did exceed the upper limit charging voltage					
F – All function of battery system did operate as intended during the test.					
G – All function of battery system did not operate as intended during the test.					
H – Other (Please explain): ____					

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
B01#	46.167	114	52.010	A, D, F
Supplementary information:				
Results: A – No fire or Explosion B – Fire C – Explosion D – Overcurrent sensing function of BMU did operate and then charging stopped E – Overcurrent sensing function of BMU did not operate and then charging stopped F – All function of battery system did operate as intended during the test. G – All function of battery system did not operate as intended during the test.H – Other (Please explain):				

8.2.4	TABLE: Overheating control (battery system)			P
Model No.	OCV at start(SOC 50%) of test, V dc	Maximum Charging Current, A	Measured Maximum Charging Voltage, V dc	
B01#	52.871	50	54.111	
Maximum Specified Temperature of Battery System, °C		Maximum Measured Cell Case Temperature, °C	Results	
55		57.4	A, D, F	
Supplementary information:				
Results: A – No fire or Explosion B – Fire C – Explosion D – Temperature sensing function of BMU did operate and then charging stopped E – Temperature sensing function of BMU did not operate and then charging stopped F – All function of battery system did operate as intended during the test. G – All function of battery system did not operate as intended during the test. H – Other (Please explain): _____				

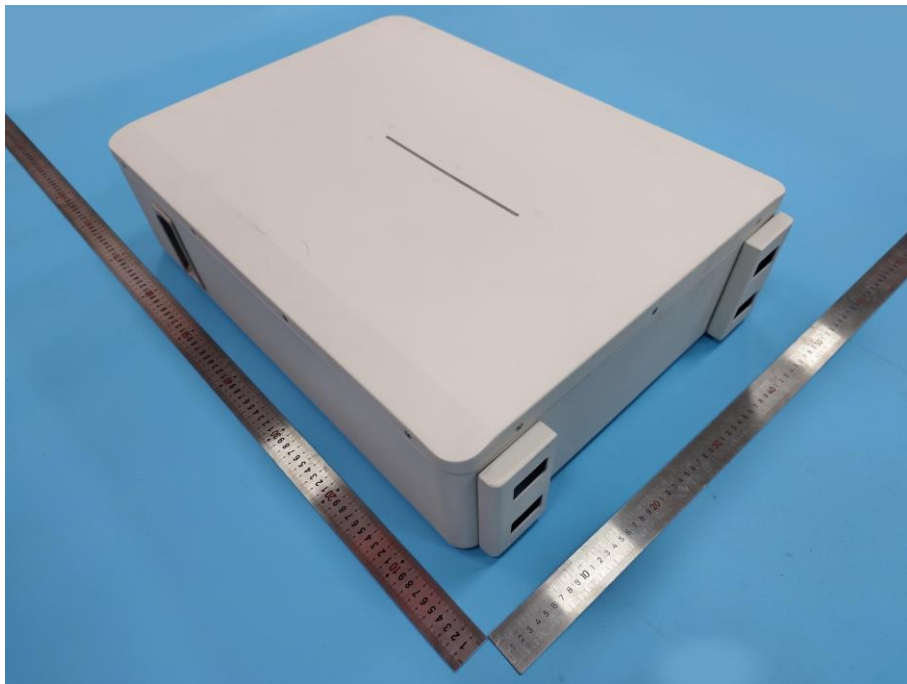
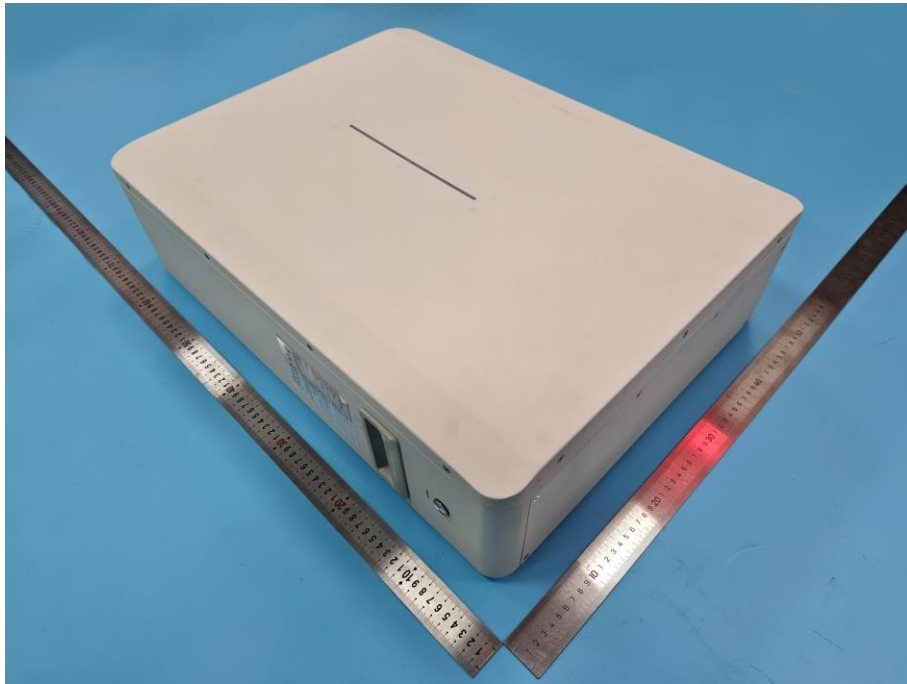
IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

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

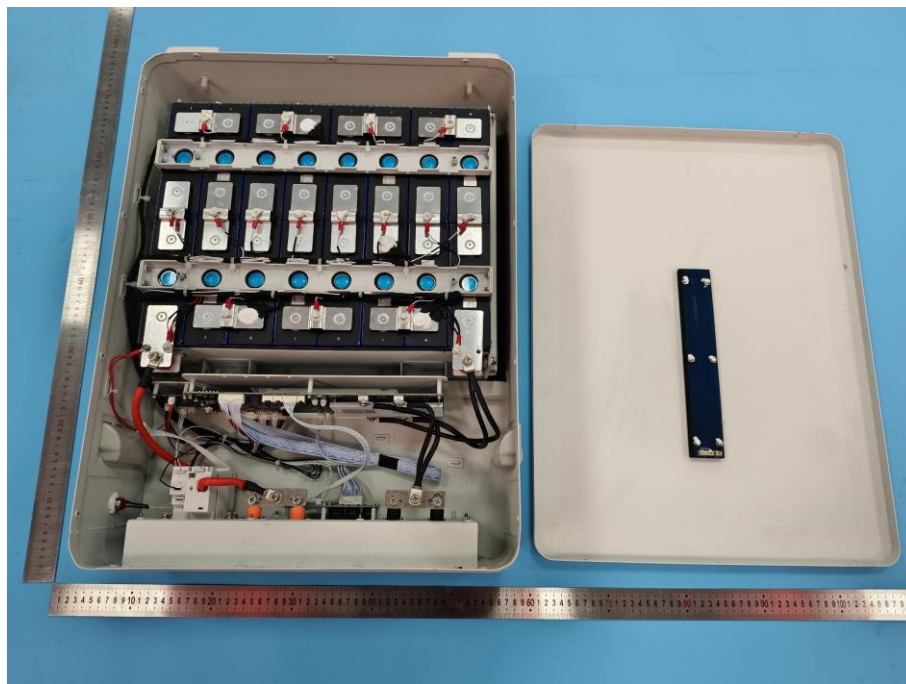
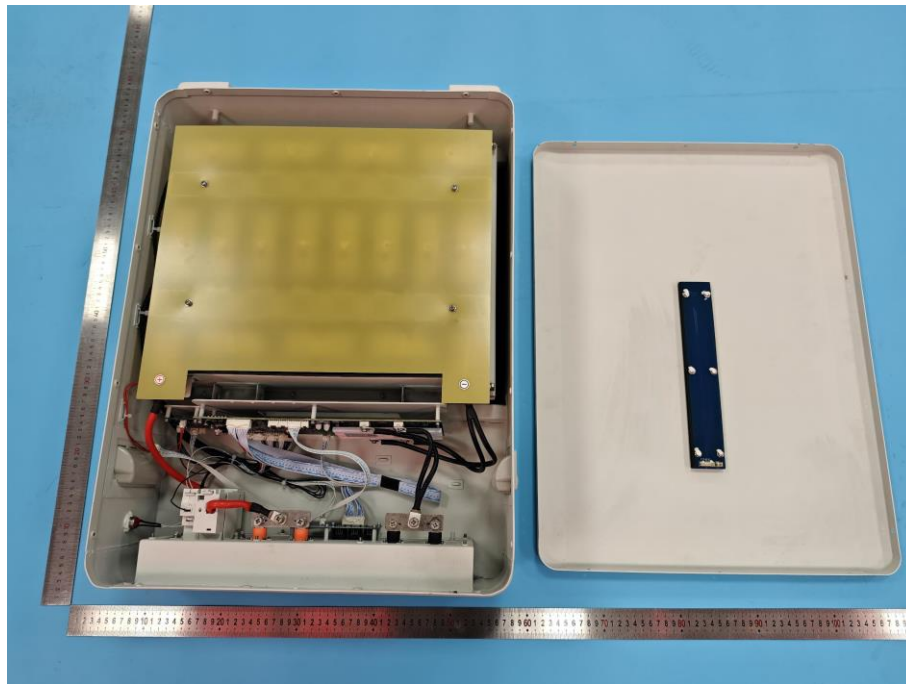
ENCLOSURES

Supplement ID	Description
01	Overall view of Rechargeable Li-ion Battery Pack, Model: BA05G
02	Internal view of Rechargeable Li-ion Battery Pack, Model: BA05G
03-01, 03-02	Overall view of Rechargeable Li-ion Battery Pack BMS, Model: BA05G
04	Overall view of Rechargeable Li-ion Cell, Model: LF100LA
05	Assembly Drawing for Rechargeable Li-ion Battery Pack, Model: BA05G
06	Safety information and instruction for Rechargeable Li-ion Battery Pack, model: BA05G

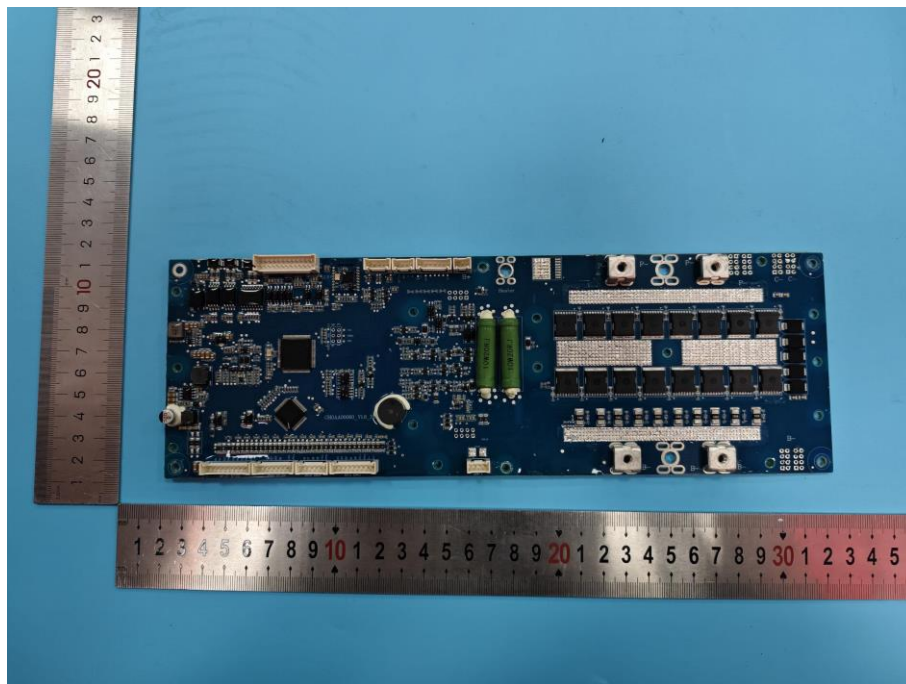
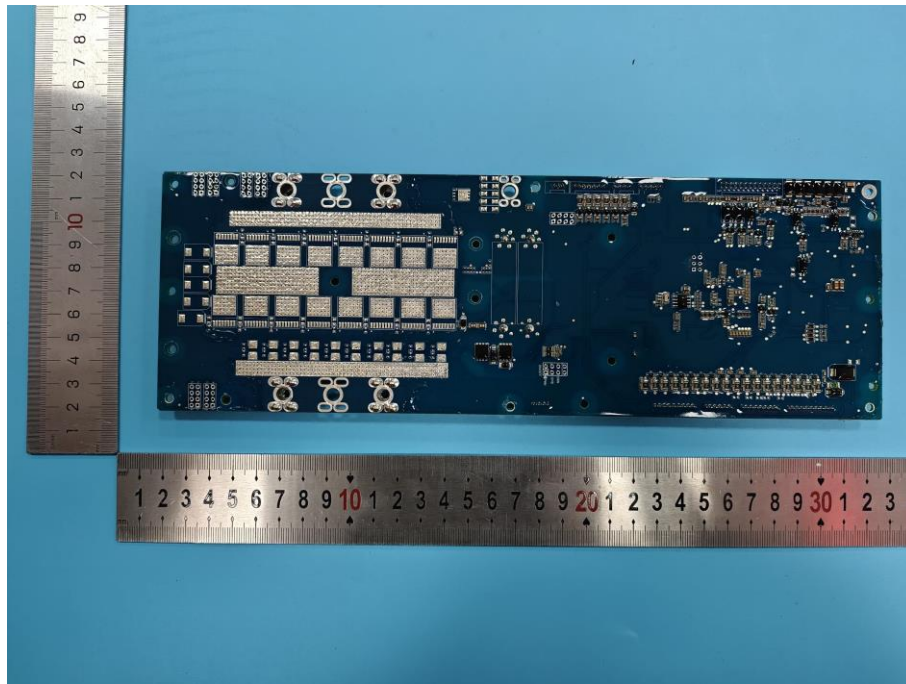
ID 01



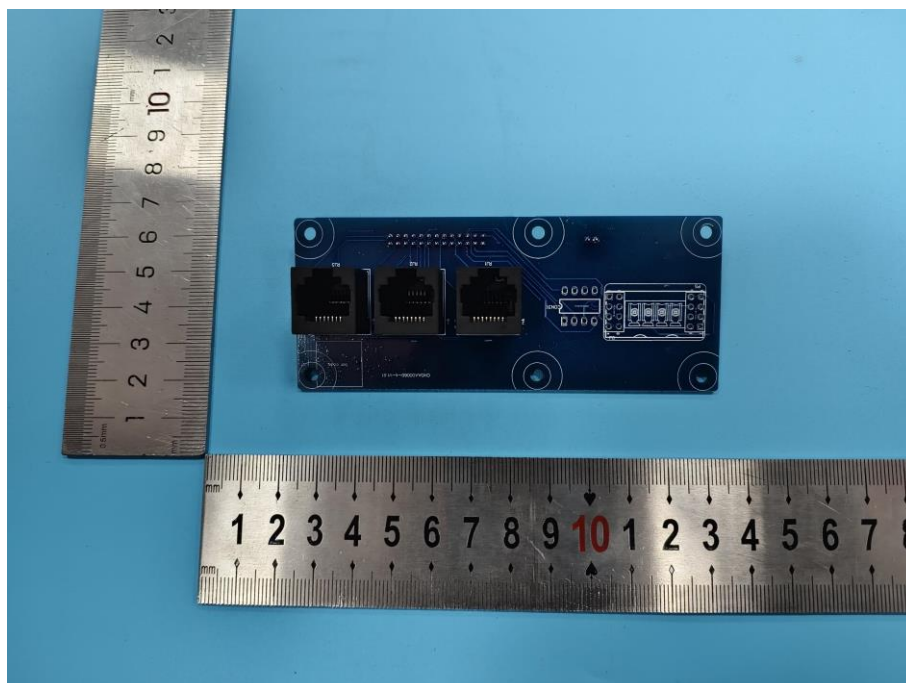
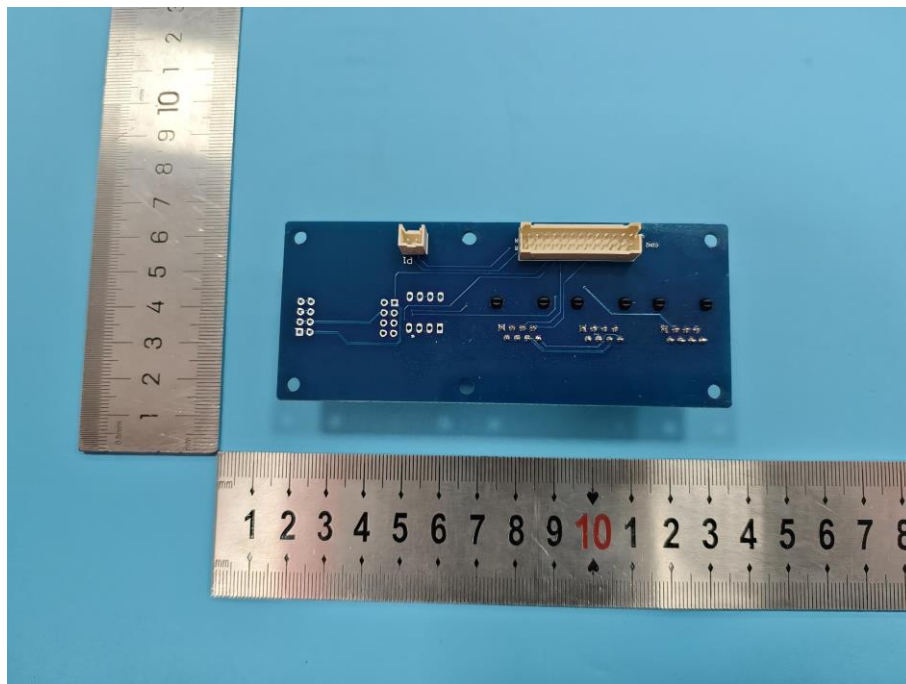
ID 02



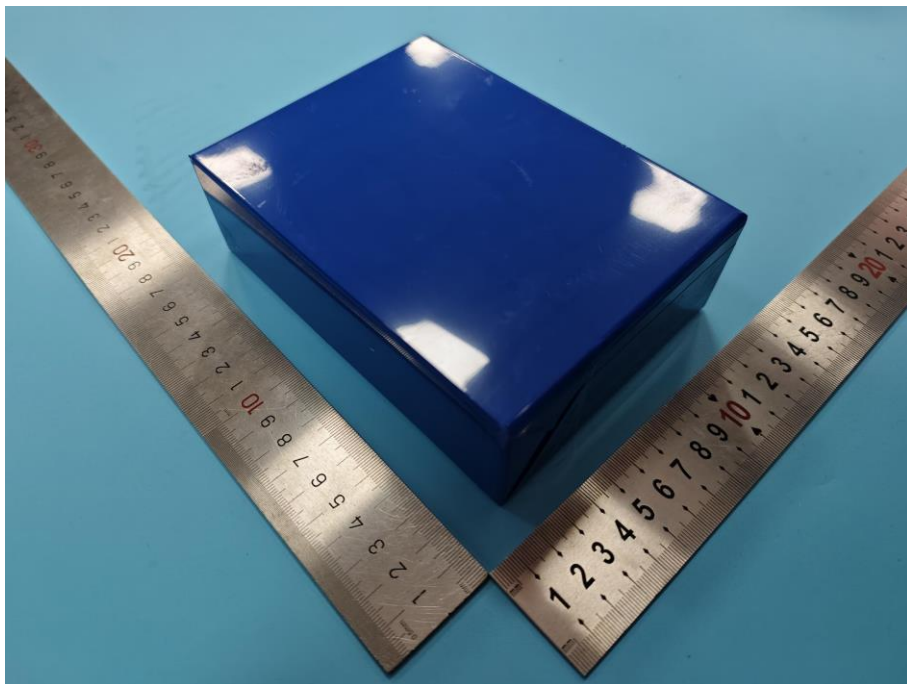
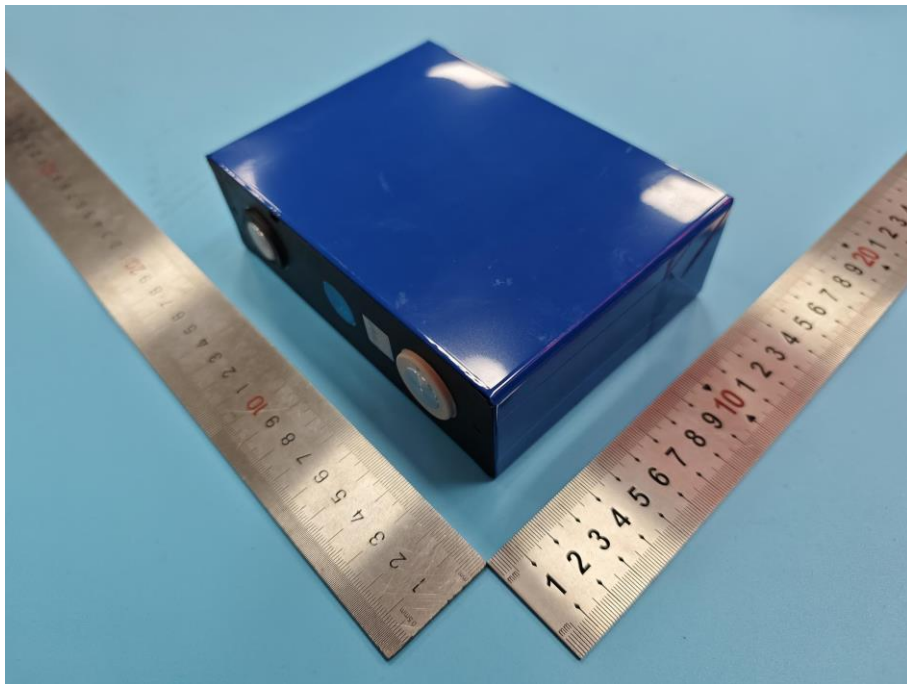
ID 03-01



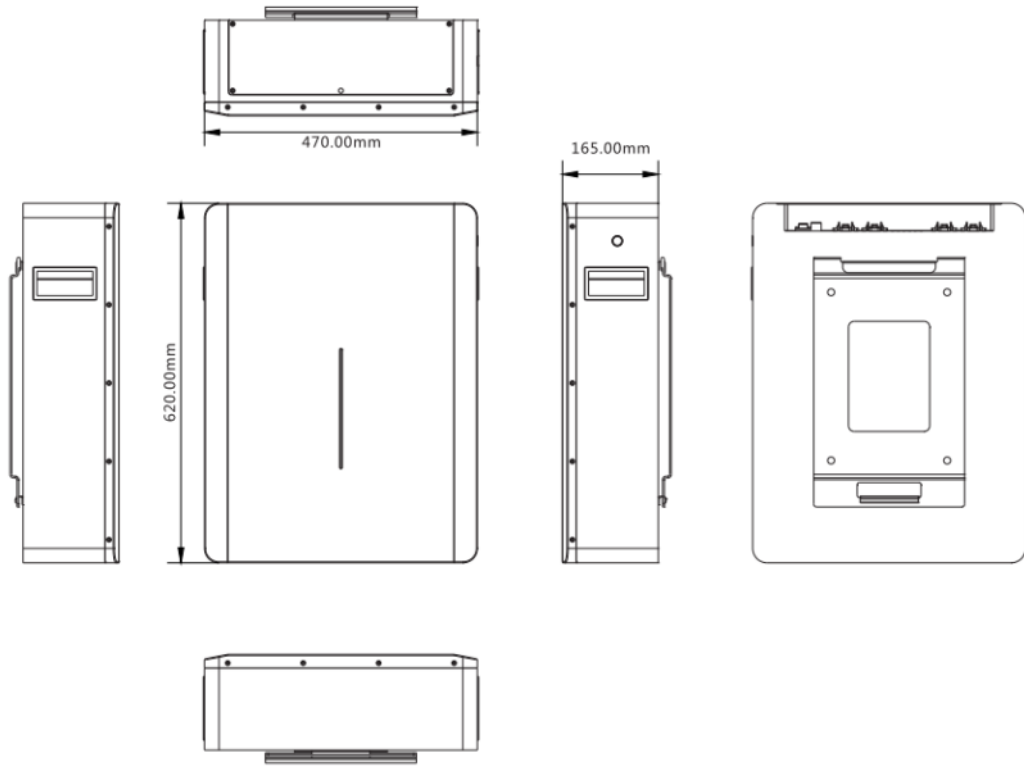
ID 03-02



ID 04



ID 05



Unit: mm

ID 06

10. 警告 Warnings

10.1 为防止电池可能发生的泄漏,发热,起火,请注意以下预防措施:

To prevent the possibility of the battery from leaking, heating, fire, Please READ this specification carefully before usage and observe the following precautions:

- ⦿ 严禁将电池系统裸露放置于室外雨淋。
- ⦿ 禁止将电池在热/高温源旁,如火,加热器等使用设备。
- ⦿ 禁止颠倒正负极使用电池。
- ⦿ 禁止将电池直接接入电源插座。
- ⦿ 禁止将电池丢入火或加热器中。
- ⦿ 禁止用金属直接将电池的正负极进行短路连接。
- ⦿ 禁止敲击或抛掷,踩踏电池等。
- ⦿ 禁止直接焊接电池和用钉子或其它利器刺穿电池。
- ⦿ 搬运、装配、试验过程中应避免电池箱倒置。
- ⦿ 充放电时, 严禁用其他物品覆盖在电池箱上, 否则热量积累, 会导致电池出现性能下降、漏液等问题。
- ⦿ 用户未经允许, 不得随意打开电池箱, 严禁拆卸电池, 以免损伤绝缘部件, 导致短路、影响使用。
- ⦿ 严禁擅自改装电池系统。在电池组中, 为防止发生危险, 装有保护系统, 若保护系统遭到损坏, 可能导致充电无法控制, 或者充放电电流超过设定边界值, 从而造成电池漏液、发热、破裂。
- ⦿ Prohibit to let battery pack bareness on outdoor for rain.
- ⦿ Do not use and leave the battery near a heat source as fire or heater.
- ⦿ Do not reverse the position and negative terminals.
- ⦿ Do not connect the battery to an electrical outlet.
- ⦿ Do not discard the battery in fire or heat it.

- ⦿ Do not transport and store the battery together with metal objects such as necklaces, hairpins etc.
- ⦿ Do not directly solder the battery and pierce the battery with a nail or other sharp object.
- ⦿ To avoid battery in version when carriage, assemble, test.
- ⦿ Do not allow others objects on battery cabinet when charge and discharge, or it will cause hot accumulation, leading to battery performance decline or leakage issue and so on.
- ⦿ Users cannot open the battery cabinet without permit, prohibit to break down battery pack, to avoid break insulation to short circuit and effect on usage.
- ⦿ Prohibit to refit battery pack. The manufacturer install protection system for it in order to prevent danger, if protect system broken, it leads that charge cannot control properly, or charge and discharge current is beyond than the set value, to its leakage, heat and fracture.