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..... :	TSZ25HK022A02-01
Date of issue ..... :	2026-06-26
Total number of pages ..... :	24 Pages
Name of Testing Laboratory preparing the Report ..... :	Shenzhen Tiansu Calibration and Testing Co., Ltd.
Applicant's name..... :	Shenzhen Himax Electronics Co., Ltd
Address ..... :	Floor 501, Building B, Nantong Avenue No.5, Tongle Community, Baolong Street, Longgang, SHENZHEN GUANGDONG 518000, 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

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 ..... :	Lithium iron phosphate battery pack		
Trademark(s) ..... :	N/A		
Manufacturer ..... :	Same as applicant		
Model/Type reference ..... :	LAF48100		
Ratings ..... :	51.2V, 100Ah, 5120Wh		
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**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	Leon Gong
Approved by (name, function, signature)...:		Sean Xie /Reviewer	Sean Xie
☐	**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): Enclosures (8 pages)	
Summary of testing:	
Tests performed (name of test, test clause and date test performed): **Testing for Battery Pack (LAF48100)** 7.2.3 Drop test (battery system) Test Period: 2026-04-21 8.2.2 Overcharge control of voltage (battery system) Test period: 2026-04-17 8.2.3 Overcharge control of current (battery system) Test period: 2026-04-20 8.2.4 Overheating control (battery system) Test period: 2026-04-18 Cell (Model: PF160-100A) has been evaluated according to IEC 62619:2022, Certificate No.: JPTUV-147063, Report No.: CN23BLOY 001.	**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. ☒ **The product fulfils the requirements of EN IEC 62619: 2022** ☒ **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.

Product Name: Lithium iron phosphate battery pack
Manufacturer: Shenzhen Himax Electronics Co., Ltd
Model Name: LAF48100
IFpP/51/161/119/[16S]M/-20+50/90
Ratings: 51.2V, 100Ah, 5120Wh
YYYYMMDD0001 Made in China
Recommended Charge: 20A CC charge to 57.6V, then CV (constant voltage 57.6V) charge till charge current decline to 5A
Caution: Risk of Fire and Burns.
Disposal instructions: Comply with local regulations.

Polarity:

Remark:
1: The date code “YYYYMMDD0001”
1.1: YYYY stands for year.
1.2: MM stands for month.
1.3: DD stands for date.
1.4: 0001 represents the flow code.
2: Polarity is reflected on the surface of the Battery.

Test item particulars.....:	--
Classification of installation and use.....:	--
Supply Connection.....:	DC Terminal
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 .....:	2025-08-20
Date (s) of performance of tests.....:	2026-04-17 to 2026-04-21

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) ..... : Same as applicant

General product information and other remarks:

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

- Lithium iron phosphate battery pack (Model: LAF48100) has been evaluated to comply with ST/SG/AC.10/11/Rev.8/Subsection 38.3, test report No.: TSZ25HK022A01-01 issued on 2025-09-04, issued by Shenzhen Tiansu Calibration and Testing Co., Ltd.

- Type reference IFpP/51/161/119/[16S]M/-20+50/90 is IEC 62620:2014 designation which is identical Model LAF48100 except for model designation.

- Detailed information of the cell, as following:

Product name:	Lithium-ion cell	Cell model:	PF160-100A
Nominal Voltage	3.2V	Normal Charge Current	50A
Rated Capacity	100Ah	Maximum Charge Current	100A
Energy	320Wh	Normal Discharge Current	100A
Charging voltage declared by manufacturer	3.65V	Maximum Discharge Current	150A
Upper limit charging voltage	3.75V	Discharge Cut-Off Voltage	2.5V
End of charging current	5A	Charging Temperature Range	0°C to 55°C
Discharging Temperature Range	-30°C to 55°C	/	/

- Detailed information of the battery pack, as following:

Product name:	Lithium iron phosphate battery pack	Battery model:	LAF48100
Nominal Voltage	51.2V	Normal Charge Current	20A
Rated Capacity	100Ah	Maximum Charge Current	95A
Energy	5120Wh	Normal Discharge Current	20A
Charging voltage declared by manufacturer	57.6V	Maximum Discharge Current	150A
Upper limit charging voltage	58.4V	Discharge Cut-Off Voltage	40V
End of charging current	5A	Charging Temperature Range	0°C to 50°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		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		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)		P
	Polarity marking not provided for keyed external connector		N/A
	Capability to carry the maximum anticipated current		P
	External terminal contact surfaces		P
	Terminal contacts are arranged to minimize the risk of short circuits		P
5.6	**Assembly of cells, modules, or battery packs into battery systems**		**P**

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
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..... :	ISO 9001: 2015 certificate 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
	Default ambient temperature of test, 25 °C ± 5 °C		P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
7	**SPECIFIC REQUIREMENTS AND TESTS**		**P**
7.1	**Charging procedure for test purposes**		**P**
	The battery discharged to a specified final voltage prior to charging	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)	CB approval cell.	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)	CB approval cell.	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)..... :	37.506	—
	Height of drop (m)..... :	0.1	—
	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
	For those battery systems that are provided with only a single protection for the charging voltage control		—

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	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, 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		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 °C ± 5 °C.		N/A
	The appearance of the short-circuit location recorded by photograph or other means .....:		N/A
	The pressing was stopped - When a voltage drop of 50 mV was detected; or		N/A
	- The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) was reached		N/A
	Results: no fire ..... :		N/A
7.3.3	Propagation test (battery system)		N/A
	Method to create a thermal runaway in one cell ... :		N/A
	Results: No external fire from the battery system, no battery case rupture ..... :		N/A

8	**BATTERY SYSTEM SAFETY (CONSIDERING FUNCTIONAL SAFETY)**		**P**
8.1	**General requirements**		**P**
	Functional safety analysis for critical controls	Analysis for functional safety according to Annex H of IEC 60730-1 :2020.	P

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

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

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

10	**INFORMATION FOR SAFETY**		**P**
	The cell manufacturer provides information about current, voltage and temperature limits of their products	Refers to cell specification.	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/51/161/119/[16S]M/-20+50/90	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		P
A.6	Low temperature range		P
A.7	Discharging conditions for safe use		P
A.8	Example of operating region		P

ANNEX B	**PROCEDURE OF 7.3.3 PROPAGATION TEST BY LASER IRRADIATION**	**N/A**
B.1	**General**	**N/A**
B.2	**Test conditions**	**N/A**

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
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	WUHAN CORNEX NEW ENERGY CO.,LTD	PF160-100A	3.2Vd.c., 100Ah, 320Wh	IEC 62619:2022	TÜV Rheinland Certificate No.: JPTUV-147063, Report No.: CN23BLOY 001
Key components for Battery Pack					
Enclosure	CHI MEI CORPORATION	PA-765	Material: ABS, Min Thickness: 2.5mm, 5VA, V-0, 80ºC, Dimensions: 494±2*268±2*31±1mm(upper cover), 518±0.5*268±0.5*200±0.5mm(lower cover)	UL 746 UL 94	UL E56070
Power Terminals	Dongguan Meibangnuo New Material Technalogy Co..Ltd	12V250L	Material: Copper, Size: φ20(23)mm*L31.5mm	--	Tested with appliance
Internal power wires	Dongguan Yue Zhen Wire & Cable Co Ltd	3512	6AWG, 600V, 200ºC	UL 758	UL E354338
Internal power wires (Alternative)	Interchangeable	--	6AWG, 600V, 200ºC	UL 758	UL approved
Wire (sampling)	SHENZHEN JIAHUIDA ELECTRONICS CO LTD	1332	22AWG, 300V, 200ºC	UL 758	UL E361915
Wire (sampling) (Alternative)	Interchangeable	--	22AWG, 300V, 200ºC	UL 758	UL approved
Cell Holder	FORMOSA CHEMICALS & FIBRE CORP PLASTICS DIV	AC310(+)	Material: PC/ABS, 90°C, Min Thickness: 1.5mm, V-0	UL 94 UL 1694	UL E162823
Key components for BMS					
PCB	HUIZHOU TAISHENG ELECTRONICS CO LTD	TS-D	130°C, V-0	UL 796	UL E361828

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

B+ wires	Dongguan Honglin Electronics Ltd	1015	16AWG, 105°C, 600Vac	UL 758	UL E529899
Signal wires	Dongguan Honglin Electronics Ltd	1015	22AWG, 105°C, 600 Vac	UL 758	UL E529899
Protect IC(MCU) (U6)	XIAOHUA SEMICONDUCTOR CO.,LTD.	HC32F448KCTI-LQFP64	V_{CC}: 1.8V to 3.6V, T_A: -40°C to 105°C	--	Tested with appliance
Protect IC(AFE) (U20)	Nanjing devechip electronic technology co.,LTD	DVC1117	VTOP-VSS: 8V to 85V, T_{OPR}: -40°C to 85°C	--	Tested with appliance
MOSFET (M1 to M26, M29 to M36)	Jiangsu JieJie Microelectronics Co., Ltd.	JBL101N	V_{DS}: 100V, V_{GS}: ±20V, I_D: 325A(T_C=25°C), T_J: -55°C to 150°C	--	Tested with appliance
Current Sensing Resistor (RS1, RS3, RS4, RS6, RS7, RS8, RS10, RS12, RS13, RS15, RS16, RS18, RS20, RS21, RS22, RS24, RS26, RS27 RS31, RS44)	RALEC	LR2512-22R002F4	2mΩ±1%, 2W, -55°C to 170°C	--	Tested with appliance
NTC (NTC1, NTC2)	Guangzhou Newlife New Material Co Ltd	NL103F3950	R_{25}: 10KΩ, T_{moa}: 150°C	UL 1434	UL E505719
Fuse (F1)	Suzhou Prosemi Electronic Tech Ltd	1206TD-3A	72V, 3A, -55°C to 125°C	UL 248-1 UL 248-14	UL E489684
Fuse (external)	XIAMEN SET ELECTRONICS CO LTD	THU145-R5N-WGZ	80Vdc, 270A, -20°C to 65°C	UL 60691	UL E214712

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 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): Remark: __

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

7.3.3	TABLE: Propagation test (battery system)				N/A
Sample No.	**OCV of Battery System Before Test, (V dc)**	**OCV of Target Cell Before Test, (V dc)**	**Maximum Cell Case Temperature, (°C)**	**Maximum DUT Enclosure Temperature, (°C)**	**Results**
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

Method of cell failure [1)]	**Location of target cell**	**Area for fire protection (m^2)**
--	--	--
--	--	--
--	--	--

Supplementary information:

1) Cell can be failed through laser exposure, applied heat, overcharge, nail penetration or combinations of these failures or other acceptable methods. See supporting documentation for details on cell failure method

2) If the battery system has no outer covering, the manufacturer is required to specify the area for fire protection.

Results:
A – No fire external to DUT enclosure or area for fire protection or no battery case rupture
B – Fire external to DUT enclosure or area for fire protection
C – Explosion
D – Battery case rupture
E – Other (Please explain): __

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

8.2.2	TABLE: Overcharge control of voltage (battery system)				P
Sample No.	**OCV at start of test for Cell/Cell Blocks, (V dc)**	**Maximum Charging Current, (A)**	**Max. Charging Voltage, (V dc)**	**Max. Voltage of Cell/Cell Blocks, (V dc)**	**Results**
B01	Min 2.640	95	58.641	3.682	A, D, F
			Charge Voltage Applied Battery System: 1)		
			Whole	**Part**	
			66V	--	

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	41.816	114	50.539	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	52.854	20	53.491
Maximum Specified Temperature of Battery System, °C		**Maximum Measured Cell Case Temperature, °C**	**Results**
50		51.8	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**
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--
--	--	--	--	--	--

Supplementary information:

Battery Condition During EMC test

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

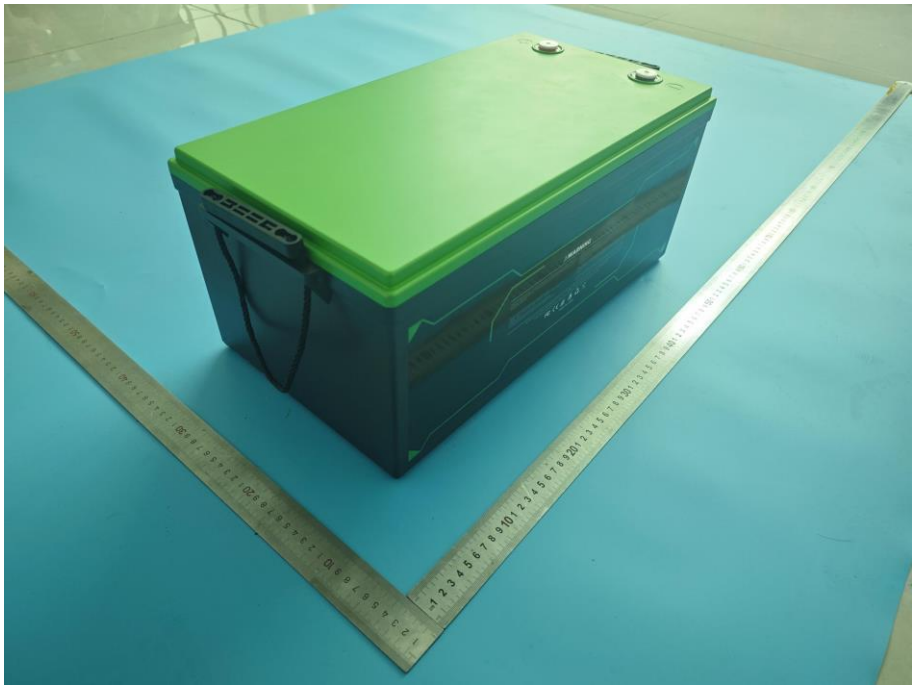
2 – In non-operation Mode, Battery state of charge (SOC) before test at around____

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

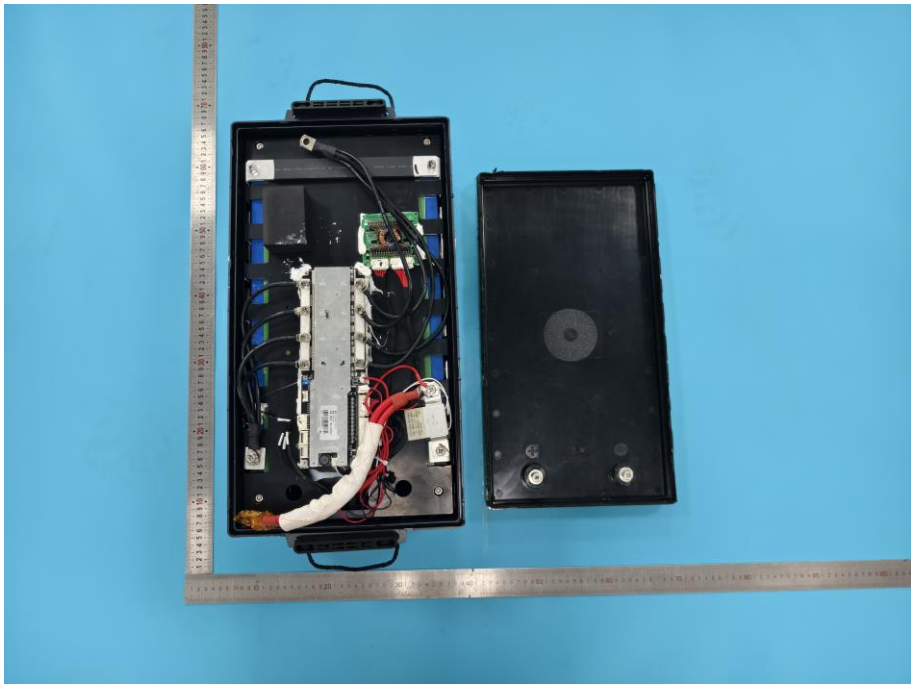
ENCLOSURES

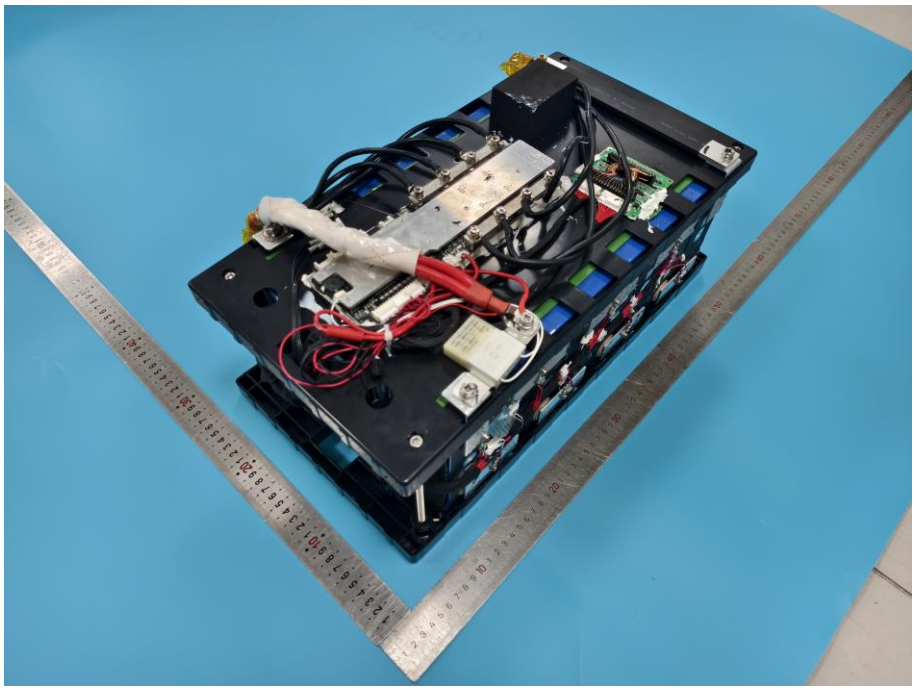
Supplement ID	Description
01	Overall view of Lithium iron phosphate battery pack, Model: LAF48100
02	Internal view of Lithium iron phosphate battery pack, Model: LAF48100
03	Overall view of PCB
04	Overall view of Lithium-ion cell, Model: PF160-100A
05	Dimension drawing of Lithium iron phosphate battery pack, Model: LAF48100
06	Package of Lithium iron phosphate battery pack, Model: LAF48100
07	Cautions in use of Lithium iron phosphate battery pack, Model: LAF48100

ID 01

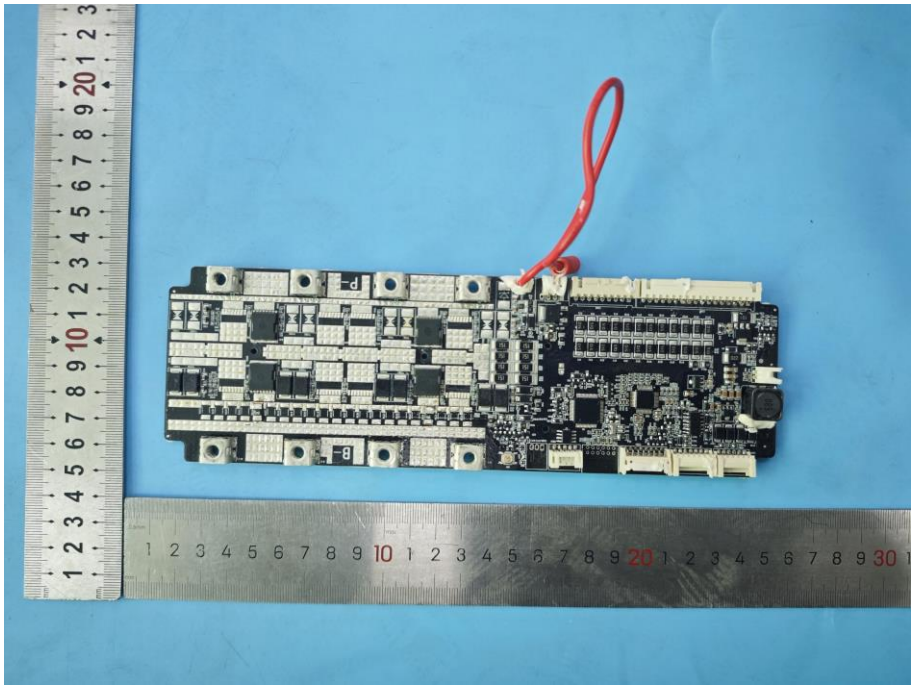


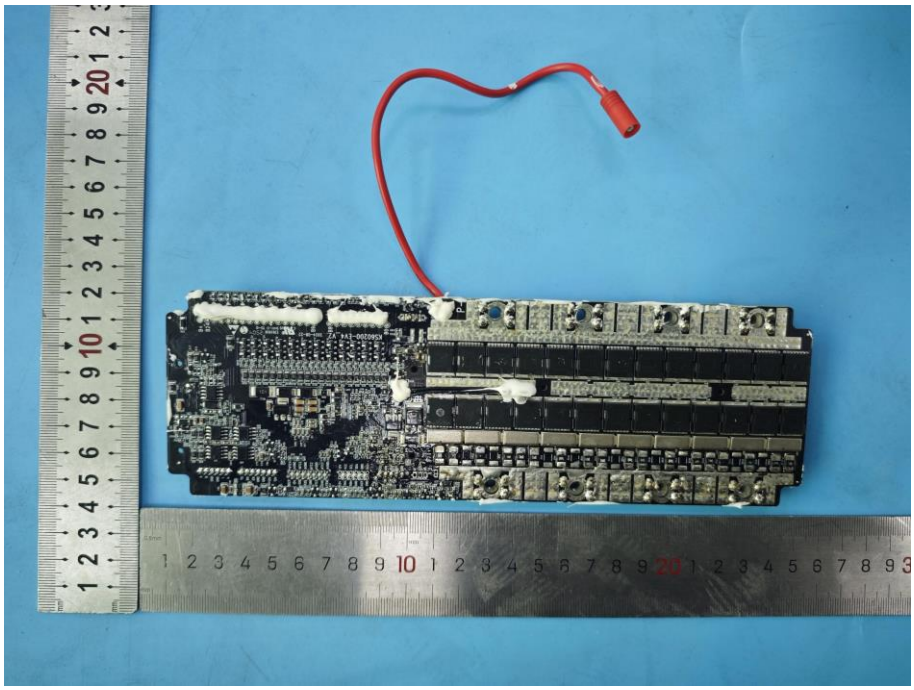
ID 02



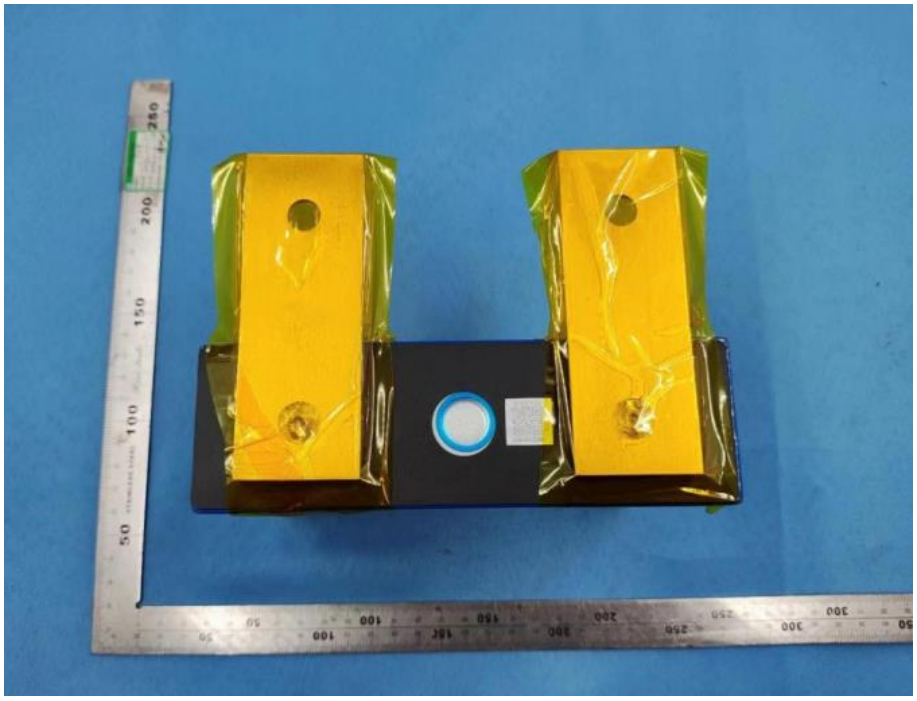


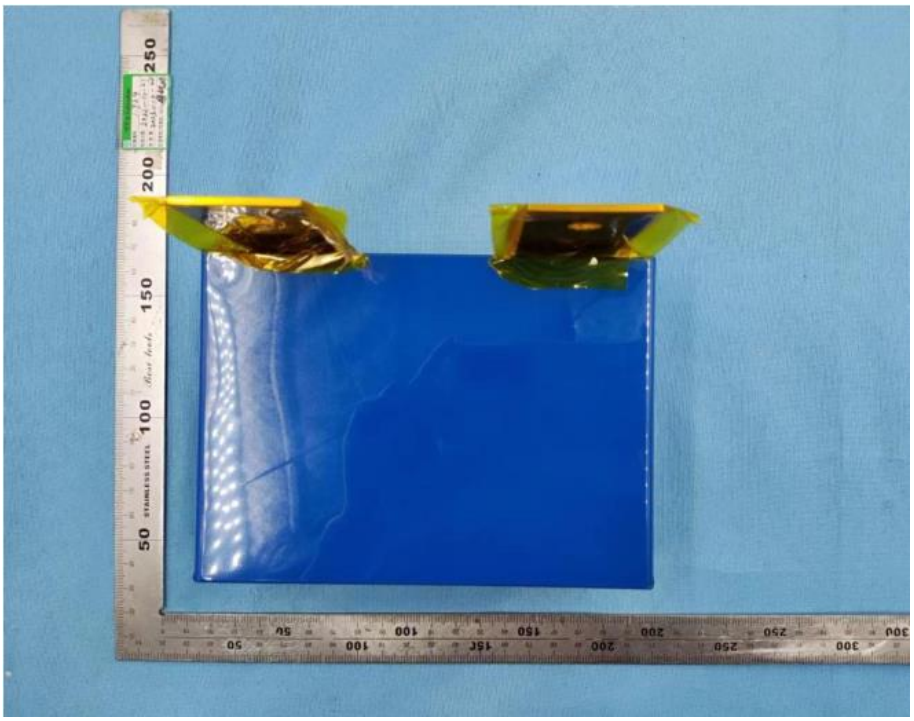
ID 03



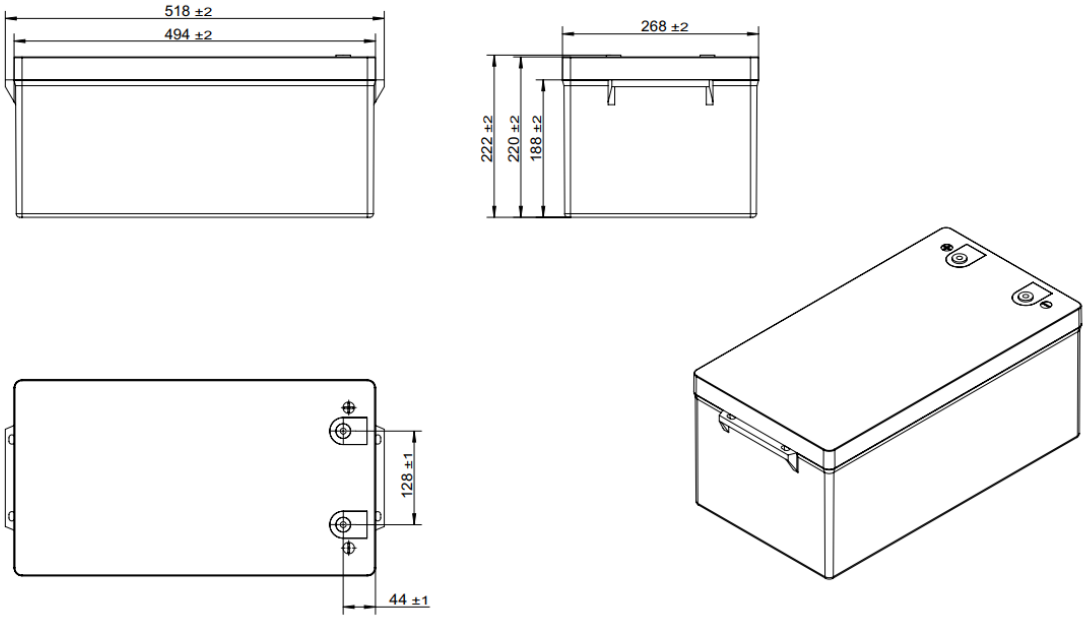


ID 04





ID 05



Battery (Unit: mm)

ID 06

Package Information	
Package Weight	43.50kg
Battery net weight	37.46kg
Battery Number	1Pcs
Package size	600mm*490mm*320mm

ID 07

13. Warnings

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

◎When recharging, use the LiFePO4 battery charger specifically for that purpose.
◎Do not strike battery with any sharp edge parts, such as Ni-tabs, pins and needles.
◎Do not immerse the battery in water and seawater.
◎Do not use and leave the battery near a heat source as fire or heater.
◎Do not reverse the positive and negative terminals.
◎Do not connect the battery to an electrical outlet.
◎Do not discard the battery in fire or heat it.
◎The battery tabs are not so stubborn especially for aluminum tab. Do not bend tab.
◎Do not short-circuit the battery by directly connecting the positive and negative terminal with metal object.
◎Do not transport and store the battery together with metal objects such as necklaces, hairpins etc.
◎Do not knock or throw, trampling battery etc.
◎Do not directly solder the battery and pierce the battery with a nail or other sharp object.
◎Do not split the battery without permission.

14. Battery operation instruction

14.1 Charging
Charging current： Do not surpass the biggest charging current which in this specification.
Charging voltage： Do not surpass the highest voltage which in this specification.
Charge temperature： The charge temperature is in according to this specification.

14.2 Discharging
Discharge current: Do not surpass the biggest discharge current which in this specification.
Discharging with a higher current may result in the capacity fade and over-heat.
Discharge temperature: The discharge temperature is in according to this specification.

14.3 Over-discharges
After the short time excessively discharges charges immediately cannot affect the use, but the long time excessively discharges can cause the battery the performance, battery function losing. The battery long-term has not used, has the possibility to be able to be at because of its automatic flashover characteristic certain excessively discharges the condition, for prevented excessively discharges the occurrence, the battery should maintain the certain electric quantity.

14.4 Storing the Batteries
The battery should store in the product specification book stipulation temperature range. If has surpasses above for 3 months the long time storage, suggested you should carry on additional charge to the battery.

14.5 Please do not continuously charge the battery over 8hours.