



# TEST REPORT

Applicant : Guangzhou Felicity Solar Technology Co., Ltd.  
Address : No. 2, Donghua Huaye Road, Renhe Town, Baiyun Area, Guangzhou

Manufacturer : Guangzhou Felicity Solar Technology Co.,Ltd.  
Address : No. 2, Donghua Huaye Road, Renhe Town, Baiyun Area, Guangzhou

Product Name : Lithium iron phosphate battery  
Brand Name : felicitysolar  
Model No. : FLA48500  
Ratings : 51.2Vd.c. 500Ah

Standard : Secondary cells and batteries containing alkaline or other non-acid electrolytes  
- Safety requirements for secondary lithium cells and batteries, for use in industrial applications  
IEC 62619: 2022

Date of Receiver : March 27, 2024  
Date of Test : March 28, 2024 to April 18, 2024  
Date of Issue : October 22, 2024  
Test Report Form No : NTCS-IEC 62619: 2022  
Test Result : Pass \*

This Test Report is Issued Under the Authority of :

Compiled by

Mark Wei / Engineer

Approved by

Jason Tong / Manager



\*Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of Shenzhen Nore Testing Center Co., Ltd. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.



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

Attachment 1: Photo documentation (5 pages).

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

cl.7.2.3.3 Edge and corner drop test (Battery System)  
cl.8.2.2 Overcharge control of voltage (Battery system)  
cl.8.2.3 Overcharge control of current (Battery system)  
cl.8.2.4 Overheating control (Battery system)

The component cell (FLS-250AH) was evaluated according to IEC 62619:2022 by Shenzhen Nore Testing Center Co., Ltd. Report No.: SZNTC24031033SV00.

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

Factory : Guangzhou Felicity Solar Technology Co.,Ltd.

Address : No. 2, Donghua Huaye Road, Renhe Town, Baiyun Area, Guangzhou

Remark:The test report is based on SZNTC24031031SV00,updated model name and appearance of product.

**Testing location:**

ATS Electronic Technology Co., Ltd.

3/F. of Building A, 1/F. of Building B & 1/F. of Building C, No.1, Hedong 3rd Road, Jinxia Community, Changan, Dongguan, Guangdong, China

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

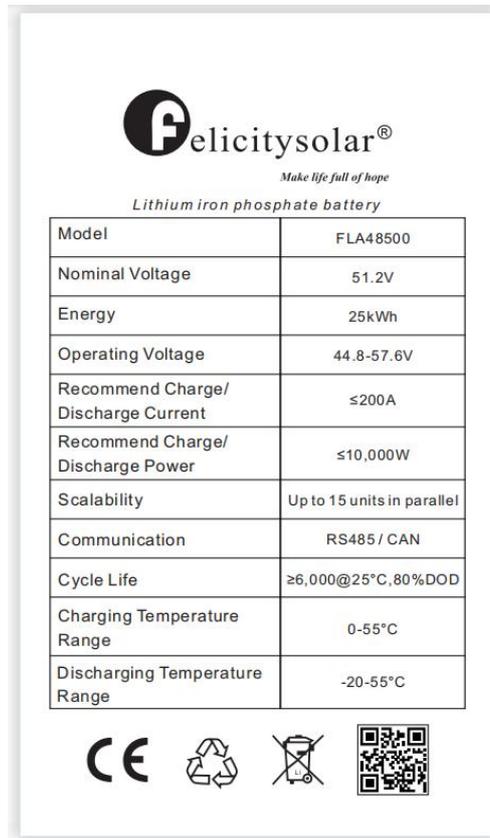
N/A

The product fulfils the requirement of EN IEC 62619:2022

**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

Battery Label:



Label of caution:



<b>Test item particulars</b> ..... :	
<b>Classification of installation and use</b> ..... :	To be defined in final product
<b>Supply Connection</b> .....	Not directly connected to mains
<b>Possible test case verdicts:</b>	
- 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)	
<b>Testing</b> .....:	
<b>Date of receipt of test item</b> .....	2024-03-27
<b>Date (s) of performance of tests</b> .....	2024-03-28 to 2024-04-18
<b>General remarks:</b> "(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.	
<b>Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60335-1:</b>	
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"/> <b>Yes</b> <input checked="" type="checkbox"/> <b>Not applicable</b>
<b>When differences exist; they shall be identified in the General product information section.</b>	

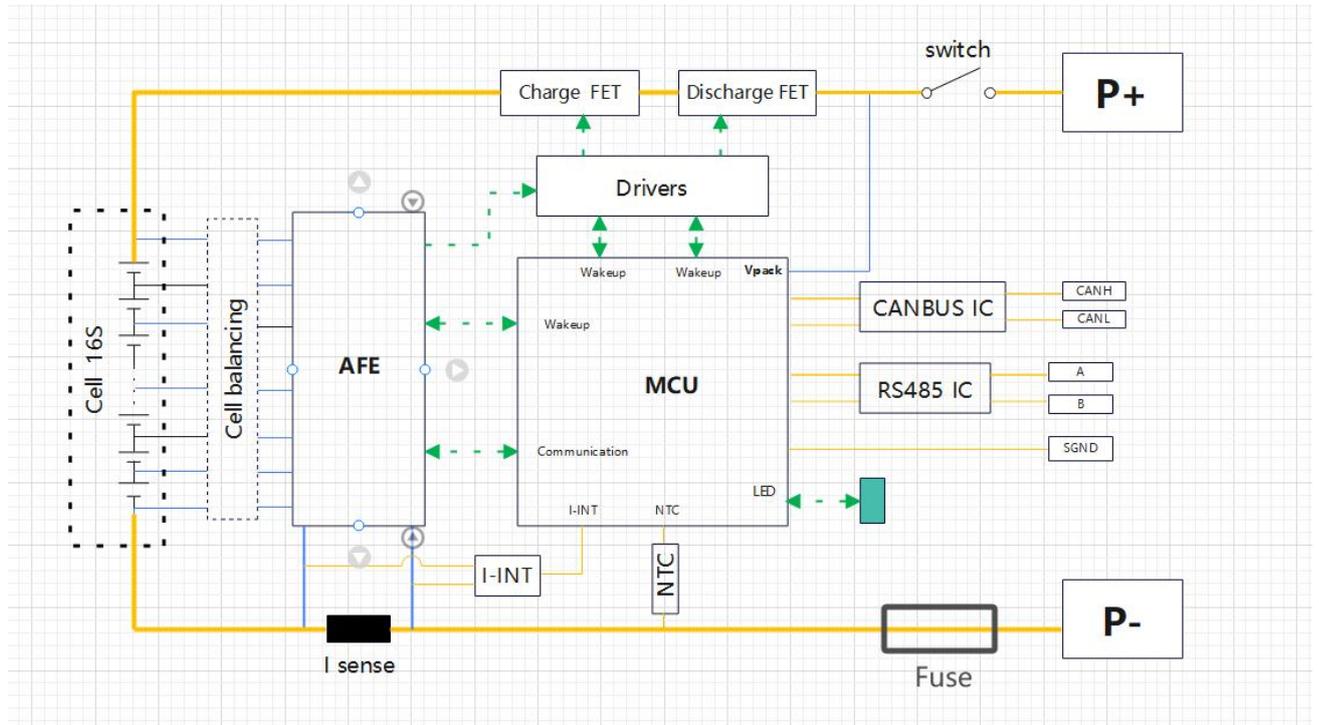
**General product information and other remarks:**

-The FLA48500 is a LiFePO4 Battery System with a nominal voltage of 51.2Vd. c and a nominal capacity of 100Ah (LiFePO4 51.2V 500Ah) which is used in energy storage applications.

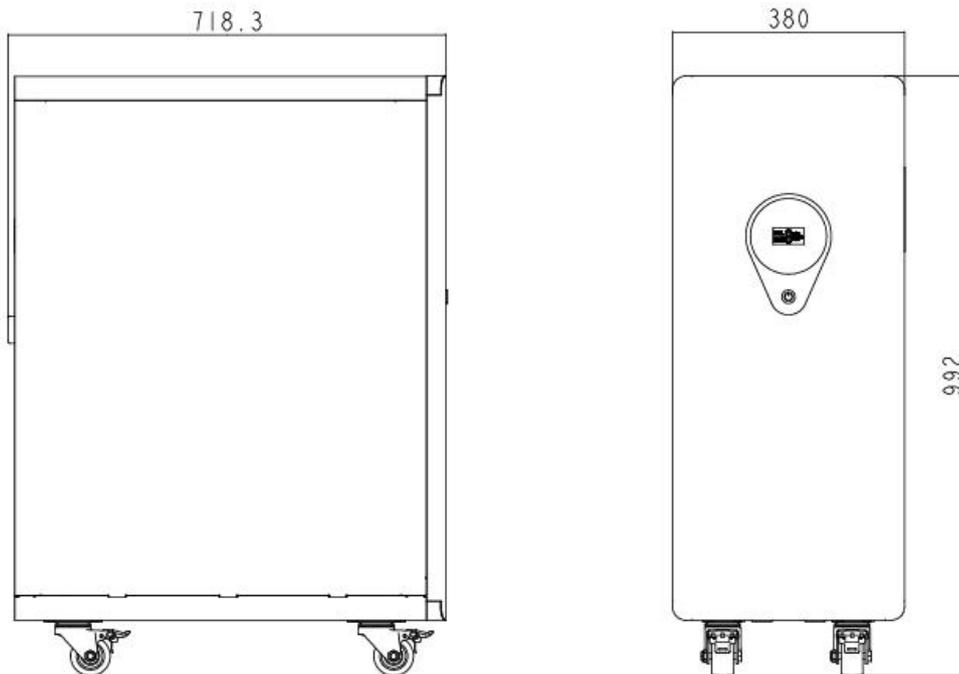
The main features of the battery are shown as below:

Item	Component Cell used inside	Battery System
Model Designation	FLS-250AH	FLA48500
Rated capacity (Ah)	250Ah	500
Nominal voltage (V)	3.2	51.2
Maximum Charging Current (A)	250	200
Maximum Discharging Current (A)	250	200
Charge temperature Range (°C)	0 to 60	0 to 55
Discharge temperature Range (°C)	-30 to 65	-20 to 55
Standard Fully Charge Voltage (V)	3.65	57.6
Maximum Charging Voltage (V)	3.75	57.6
End of discharge voltage (V)	2.5	48
Weight	4.17±0.16kg	Approx. 218kg
Designation	IFpP/55/175/208/M/-20+60/95	IFpP/55/175/208/[2P16S]M/-20+50/95
Battery configuration		
Cell in connection	16S2P	
Recommend charging method declared by the manufacturer	Constant current 100A charged to 57.6V, then switch to constant voltage 57.6V charged till charge current decline to 10A.	
Recommend discharging method declared by the manufacturer	Discharging the battery with 100A constant current to discharge cut off voltage 48V.	
External dimension (mm)	718mm * 380mm * 992mm (Length x Width x Height)	

The topology diagram as followed:



Structure (mm):



IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

<b>4</b>	<b>PARAMETER MEASUREMENT TOLERANCES</b>		<b>P</b>
	Parameter measurement tolerances		P

<b>5</b>	<b>GENERAL SAFETY CONSIDERATIONS</b>		<b>P</b>
<b>5.1</b>	<b>General</b>		<b>P</b>
	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
<b>5.2</b>	<b>Insulation and wiring</b>		<b>P</b>
	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
<b>5.3</b>	<b>Venting</b>		<b>P</b>
	Pressure relief function	Vent design in cell.	P
	Encapsulation used to support cells within an outer casing		P
<b>5.4</b>	<b>Temperature/voltage/current management</b>		<b>P</b>
	The design prevents abnormal temperature-rise	Overcharge, over discharge, over current and short-circuit proof circuit used in this battery.	P
	Voltage, current, and temperature limits of the cells		P
	Specifications and charging instructions for equipment manufacturers		P
<b>5.5</b>	<b>Terminal contacts of the battery pack and/or battery system</b>		<b>P</b>
	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
<b>5.6</b>	<b>Assembly of cells, modules, or battery packs into battery systems</b>		<b>P</b>
5.6.1	General		P
	Independent control and protection method(s)		N/A

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	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	No such design.	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
<b>5.7</b>	<b>Operating region of lithium cells and battery systems for safe use</b>		<b>P</b>
	The cell operating region..... :	Listed in the specification of cell.	P
	Designation of battery system to comply with the celloperating region	Information mentioned in manufacturer's specifications.	P
<b>5.8</b>	<b>System lock (or system lock function)</b>		<b>P</b>
	Non-resettable function to stop battery operation	The battery system not deviates from the operating region during operation.	N/A
	Manual with procedure for resetting of battery operation		N/A
	Emergency battery final discharge		N/A
<b>5.9</b>	<b>Quality plan</b>		<b>P</b>
	Manufacturing quality plan (for example: ISO9001, etc.) prepared and implemented..... :	ISO9001 certificate implemented.	P
	The process capabilities and the process controls		P
<b>6</b>	<b>TYPE TEST CONDITIONS</b>		<b>P</b>
<b>6.1</b>	<b>General</b>		<b>P</b>
<b>6.2</b>	<b>Test items</b>		<b>P</b>
	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
<b>7</b>	<b>SPECIFIC REQUIREMENTS AND TESTS</b>		<b>P</b>
<b>7.1</b>	<b>Charging procedure for test purposes</b>		<b>P</b>
	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

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
<b>7.2</b>	<b>Reasonably foreseeable misuse</b>		<b>P</b>
7.2.1	External short-circuit test (cell or cell block)	Approved cell used.	N/A
	Short circuit with total resistance of $30m \pm 10m$ at $25^{\circ}C \pm 5^{\circ}C$		N/A
	Results: no fire, no explosion		N/A
7.2.2	Impact test (cell or cell block)	Approved 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)	The mass of battery system is more than 50 kg.	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)	Tested complied.	P
	Description of the Test Unit..... :	Battery system	—
	Mass of the test unit (kg)..... :	213.5kg	—
	Height of drop (m)..... :	0.025m	—
	Results: no fire, no explosion		P
7.2.4	Thermal abuse test (cell or cell block)	Approved cell used.	N/A
	Results: no fire, no explosion		N/A
7.2.5	Overcharge test (cell or cell block)	Approved 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)	Approved cell used.	N/A
	Cells connected in series in the battery system..... :		N/A
	Redundant or single protection for discharge voltage control provided in battery system..... :		N/A
	Target Voltage..... :		N/A
	Maximum discharge current of the cell, $I_m$ ..... :		N/A
	Discharge current for forced discharge, $1.0 I_t$ ..... :		N/A
	Discharging time, $t = (1 I_t / I_m) \times 90$ (min.)..... :		N/A
	Results: no fire, no explosion..... :	.	N/A

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
<b>7.3</b>	<b>Considerations for internal short-circuit – Design evaluation</b>		<b>N/A</b>
7.3.1	General	Approved 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, no explosion .....	7.3.2 for cell have been tested.	N/A
<b>7.3.3</b>	<b>Propagation test (battery system)</b>		<b>N/A</b>
	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

<b>8</b>	<b>BATTERY SYSTEM SAFETY (CONSIDERING FUNCTIONAL SAFETY)</b>		<b>P</b>
<b>8.1</b>	<b>General requirements</b>		<b>P</b>
	Functional safety analysis for critical controls	Not request by client	N/A
	Conduct of a process hazard analysis for both the cell manufacturing process and the battery system manufacturing process		P
	Conduct of risk assessment and mitigation of the battery system	Not request by client	N/A
<b>8.2</b>	<b>Battery management system (or battery management unit)</b>		<b>P</b>
8.2.1	Requirements for the BMS		P
	The safety integrity level (SIL) target of the BMS		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) .....		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

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	Results: no fire, no explosion .....	See Table 8.2.3	P
	The BMS detected the overcharging current and controlled the charging to a level below the maximum charging current		P
8.2.4	Overheating control (battery system)		P
	The cooling system, if provided, was disconnected		P
	Elevated temperature for charging, 5 °C above maximum operating temperature .....		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
<b>9</b>	<b>EMC</b>		<b>N/A</b>
	Battery system fulfil EMC requirements of the end-device application .....	Intended for to be tested in the end use application [include specific application]	N/A
<b>10</b>	<b>INFORMATION FOR SAFETY</b>		<b>P</b>
	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
<b>11</b>	<b>MARKING AND DESIGNATION (REFER TO CLAUSE 5 OF IEC 62620)</b>		<b>N/A</b>
	The marking items shown in Table 1 in IEC 62620 indicated on the cell, battery system or instruction manual.		N/A
	Cell or battery system has clear and durable markings		N/A
	Cell designation		N/A
	Battery designation		N/A
	Battery structure formulation		N/A
<b>12</b>	<b>PACKAGING AND TRANSPORT</b>		<b>N/A</b>
	Refer to Annex D		N/A
<b>ANNEX A</b>	<b>OPERATING REGION OF CELLS FOR SAFE USE</b>		<b>P</b>
A.1	General		P
A.2	Charging conditions for safe use		P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
A.3	Consideration on charging voltage		P
A.4	Consideration on temperature		P
A.5	High temperature range	Charging high temperature limit 60°C	P
A.6	Low temperature range	Charging low temperature limit -20°C	P
A.7	Discharging conditions for safe use	-20~60°C	P
A.8	Example of operating region		P

ANNEX B	PROCEDURE OF 7.3.3 PROPAGATION TEST	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 .....	—

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
C.3	Method used for initiating the thermal runaway. 1) Heater (Heater, Burner, Laser, Inductive heating) 2) Overcharge 3) Nail penetration of the cell 4) Combination of above methods 5) Other methods .....		—

ANNEX D	PACKAGING AND TRANSPORT		N/A
	The materials and pack design chosen in such 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

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 <sup>1)</sup>	
Cell	Guangzhou Felicity Solar Technology Co., Ltd	FLS-250AH	3.2V, 250Ah	IEC 62619:2022	Shenzhen Nore Testing Center Co., Ltd. Report No.: SZNTC24031033SV00.	
Lead wire	DONGGUAN WENCHANG ELECTRONIC CO LTD	3512	2AWG, 105°C, 600Vac	IEC 62619:2022	Test in appliance	
Metal Case	DONGGUAN DIYE METAL MANUFACTURING CO.,LTD	Iron Shell	Sheet Metal, min. 1.0mm thick.	IEC 62619:2022	Test in appliance	
Air switch (Breaker)	PROJOY	PEBS-L	Rated voltage: 80V DC, Rated current: 125A*4,	IEC 62619:2022	Test in appliance	
FUSE	Adler	AEY3250900	70VDC, 250A	IEC 62619:2022	Test in appliance	
NTC (close to cells)	Shenzhen Linxiang Electronics	CWFL153F3950F CZ41	15K±1%, Ta: -40 to 125°C	IEC 62619:2022	Test in appliance	
NTC(H1,H2)	Guangdong Xinshiheng Technology Co. , Ltd	MF52A14 73F3955	R25: 47KΩ±1% B25: 3435K±1% Topr : -40°C to 105 °C	IEC 62619:2022	Test in appliance	
DC Connector	Shenzhen City GU Precision Technology Co.,Ltd	DRTB35-QC-NH RD	250A/600V	IEC 62619:2022	Test in appliance	
PCB1, PCB2	HUIZHOU GLORYSKY ELECTRONICS CO LTD	GS-M	V-0, 130°C,	UL 94 UL 796	UL E257384	
IC (U1)	SINO WEALTH	SH367309	V <sub>BAT</sub> : 8.5 to 65V, T <sub>A</sub> : -40 to 85°C	IEC 62619:2022	Test in appliance	
IC (U2, U3)	TEXAS INSTRUMENTS	ISO1050	VDD to VSS: 7 to 40V, T <sub>A</sub> : -40 to 85°C	IEC 62619:2022	Test in appliance	
IC (U4)	TEXAS INSTRUMENTS	ISO3082	V <sub>CC</sub> : -0.3V to 6V, T <sub>J</sub> : -40 to 85°C	IEC 62619:2022	Test in appliance	

IEC 62619					
Clause	Requirement + Test			Result - Remark	Verdict
IC (U7)	GigaDevice	GD32F305RCT6	VDD to VSS: 7 to 40V, TA: -40 to 85°C	IEC 62619:2022	Test in appliance
MOSFET (Q17, Q32, Q31, Q34 to Q65, Q83 to Q89, Q91 , Q93, Q94)	NCEPOWER	NCEP039N10D	VDS: 100V, VGS: ±20V, ID: 135A, TJ, TSTG: -55 to 175°C	IEC 62619:2022	Test in appliance
Supplementary information:					
1) Provided evidence ensures the agreed level of compliance.					

7.2.1	TABLE: External short-circuit test (cell or cell block)					N/A
Sample No.	Ambient (at25°C±5°C)	OCV at start of test (V dc)	Resistance of Circuit (mΩ)	Maximum Case Temperature Rise ΔT (°C)	Results	
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**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
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**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
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**Supplementary information:**  
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 <sup>1)</sup>	Maximum applied pressure, (N)	Results	
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**Supplementary information:**  
<sup>1)</sup>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
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--	--	--	--	--	--
--	--	--	--	--	--
Method of cell failure <sup>1)</sup>		Location of target cell		Area for fire protection (m <sup>2</sup> )	
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**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
ATSP2403049G A-001	3.094~3.113	200	58.178	3.642	A, D, F
			Charge Voltage Applied Battery System: <sup>1)</sup>		
			Whole	Part	
			66	N/A	

**Supplementary information:**

<sup>1)</sup>The exceeded voltage can be applied to only a part of the system such as the cell(s) in the battery system per Figure 6 of IEC 62619, if it is difficult to do it in using the whole battery system.

Results:

- A – No Fire or Explosion
- B – Fire
- C – Explosion
- D – The voltage of the measured cells or cell blocks did not exceed the upper limit charging voltage
- E – The voltage of the measured cells or cell blocks did exceed the upper limit charging voltage
- F – All function of battery system did operate as intended during the test.
- G – All function of battery system did not operate as intended during the test.
- H – Other (Please explain): \_\_\_\_

8.2.3	TABLE: Overcharge control of current (battery system)			P
Sample No.	OCV at start of test, (V dc)	Max. Charging Current, (A)	Max. Charging Voltage, (V dc)	Results
ATSP2403049H A-001	48.651	240	53.103	A, D, F
ATSP2403049H A-001	45.098	505	50.012	A, D, F
ATSP2403049H A-001	45.744	600	51.234	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	Maximum Charging Voltage, V dc	
ATSP2403049H A-001	52.619	200	55.041	
Maximum Specified Temperature of Battery System, °C		Maximum Measured Cell Case Temperature, °C	Results	
54		55	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): \_\_\_\_\_

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): \_\_\_\_\_

Photo documentation

Photo 1



(Overall view 1 of battery)

Photo 2



(Overall view 2 of battery)

Photo 3



(Internal view 1 of battery)

Photo 4



(Internal view 2 of battery)

Photo 5



(Internal view 3 of battery)

Photo 6



(Overall view 1 of (BMS )PCB1)

Photo 7



(Overall view 2 of (BMS) PCB1)

Photo 8



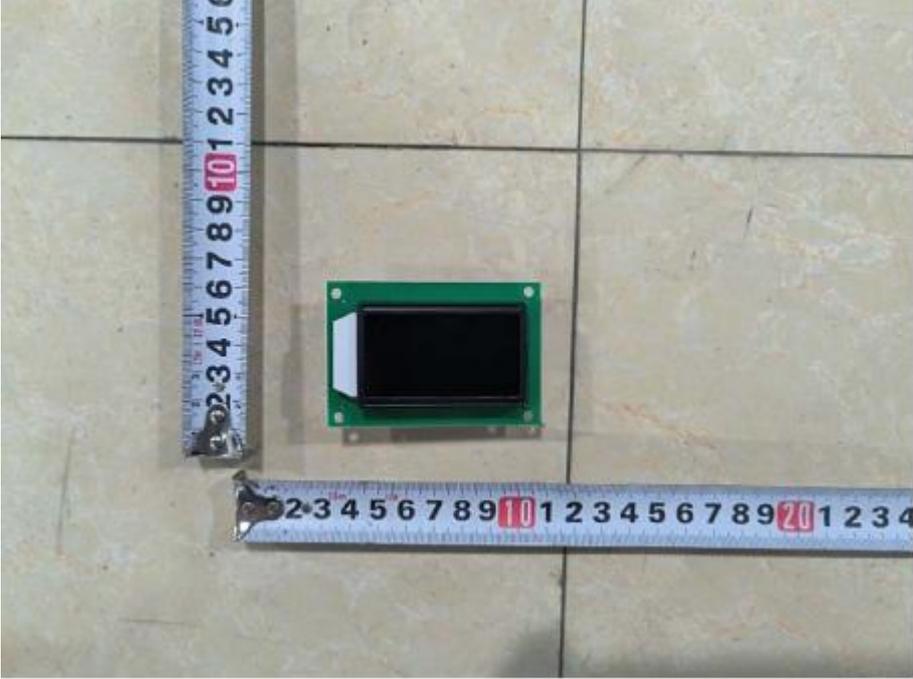
( Overall view 3 of (BMS) PCB1)

Photo 9



( Overall view 1 of PCB2)

Photo 10



(Overall view 2 of PCB2)

Photo 11



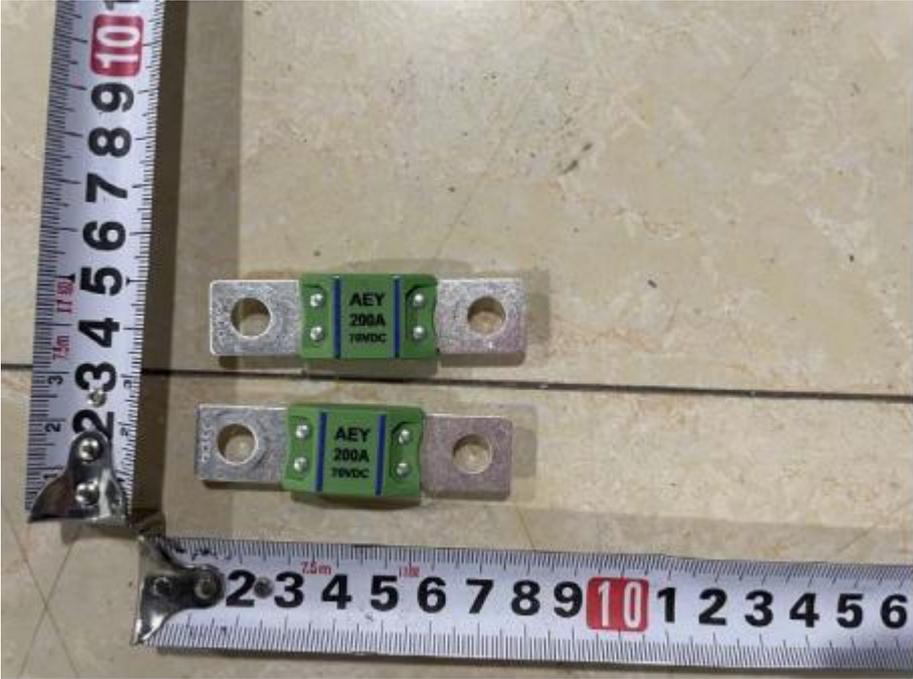
(Overall view 1 of Air switch )

Photo 12



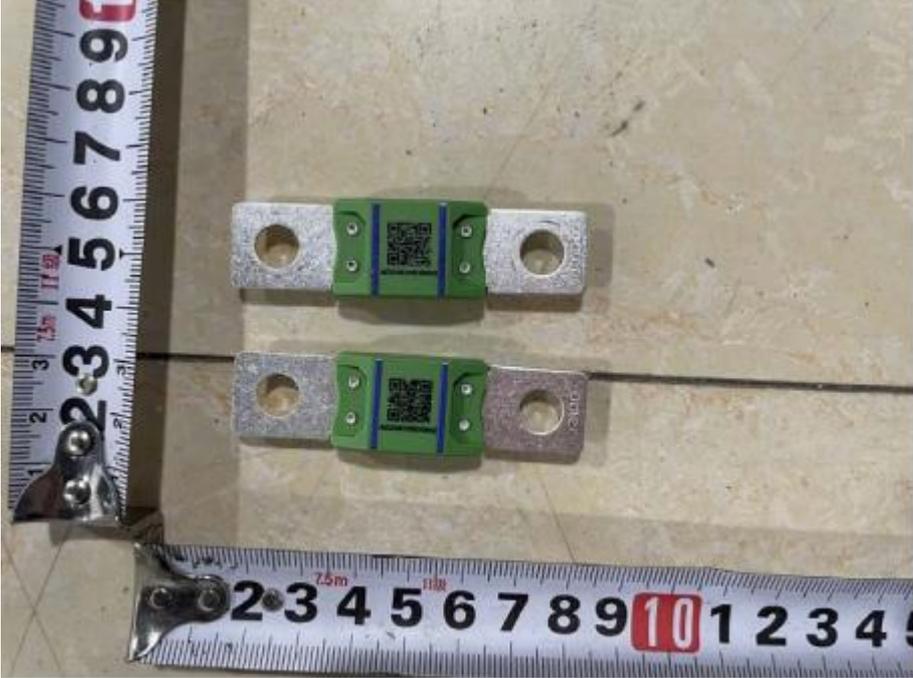
(Overall view 2 of Air switch)

Photo 13



(Overall view 1 of FUSE )

Photo 14



(Overall view 2 of FUSE)

----- END OF THIS REPORT -----