

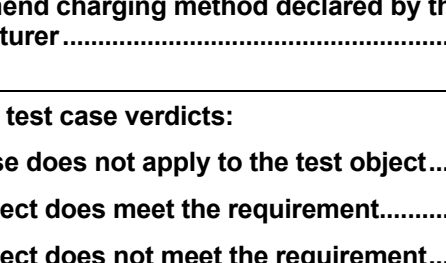
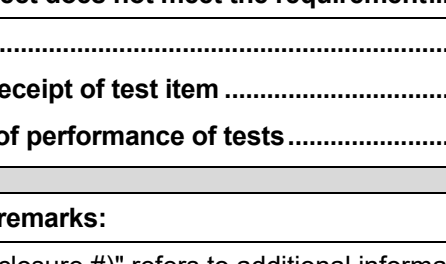
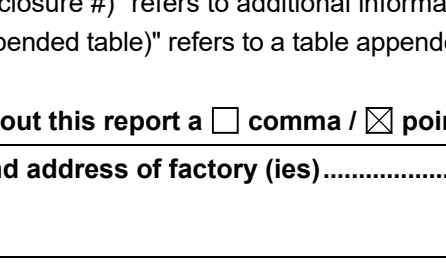
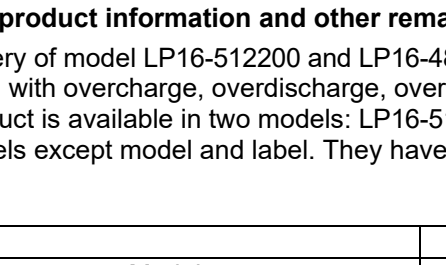
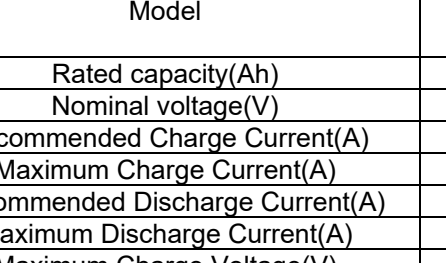
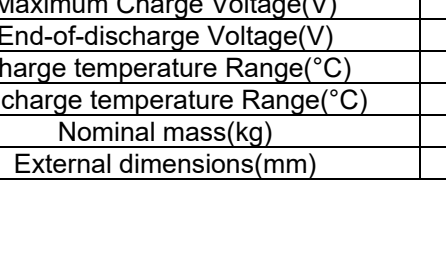
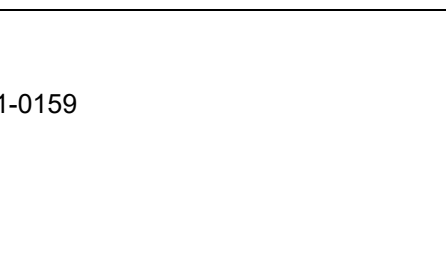

<b>TEST REPORT</b> <b>IEC 62619</b> <b>Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for secondary lithium cells and batteries, for use in industrial applications</b>														
Report Number .....	TSZ23120193-P03-R01													
Date of issue .....	2023-12-14													
Total number of pages .....	23 Pages													
Applicant's name .....	MUST ENERGY (GUANGDONG) TECHNOLOGY CO.,LTD													
Address .....	1-5F, 7F, 9F, 10F of No.8 building, No.115, Zhangcha Road 1, Chancheng district, Foshan city, Guangdong Province, P.R. China													
<b>Test specification:</b> Standard ..... IEC 62619:2022														
<b>General disclaimer:</b> 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 laboratory.														
Test item description .....	LiFePO4 BATTERY PACK													
Trade Mark(s) .....	MUST													
Manufacturer .....	Same as applicant													
Model/Type reference .....	LP16-48200 LP16-512200													
Ratings .....	51.2V, 200Ah, 10.24kWh													
<table border="1"> <tr> <td>Testing Laboratory:</td> <td colspan="2">Shenzhen Tiansu Calibration and Testing Co., Ltd.</td> </tr> <tr> <td>Testing location/ address .....</td> <td colspan="2">No.2, Jinlong Avenue, Longgang District, Shenzhen, Guangdong, China</td> </tr> <tr> <td>Tested by (name, function, signature) .....</td> <td>Gong Dan /Test engineer</td> <td rowspan="3">  </td> </tr> <tr> <td>Reviewed by (name, function, signature) ..</td> <td>Davis Ding /Reviewer</td> </tr> <tr> <td>Approved by (name, function, signature) ..</td> <td>Duan jiangtao /Approved</td> </tr> </table>		Testing Laboratory:	Shenzhen Tiansu Calibration and Testing Co., Ltd.		Testing location/ address .....	No.2, Jinlong Avenue, Longgang District, Shenzhen, Guangdong, China		Tested by (name, function, signature) .....	Gong Dan /Test engineer		Reviewed by (name, function, signature) ..	Davis Ding /Reviewer	Approved by (name, function, signature) ..	Duan jiangtao /Approved
Testing Laboratory:	Shenzhen Tiansu Calibration and Testing Co., Ltd.													
Testing location/ address .....	No.2, Jinlong Avenue, Longgang District, Shenzhen, Guangdong, China													
Tested by (name, function, signature) .....	Gong Dan /Test engineer													
Reviewed by (name, function, signature) ..	Davis Ding /Reviewer													
Approved by (name, function, signature) ..	Duan jiangtao /Approved													

Summary of testing:	
<b>Tests performed (name of test and test clause):</b> 7.2.1 External short-circuit test (cell or cell block) 7.2.2 Impact test (cell or cell block) 7.2.3 Drop test (cell or cell block, and battery system) 7.2.4 Thermal abuse test (cell or cell block) 7.2.5 Overcharge test (cell or cell block) 7.2.6 Forced discharge test (cell or cell block) 7.3.2 Internal short-circuit test (cell) 8.2.2 Overcharge control of voltage (battery system) 8.2.3 Overcharge control of current (battery system) 8.2.4 Overheating control (battery system)	<b>Testing location:</b> Shenzhen Tiansu Calibration and Testing Co., Ltd. No.2, Jinlong Avenue, Longgang District, Shenzhen, Guangdong, China
<b>The product fulfils the requirements of EN IEC 62619:2022.</b>	

**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.



<b>Test item particulars</b> .....:		
<b>Classification of installation and use</b> .....: To be defined in final product		
<b>Supply Connection</b> .....: DC connector		
<b>Recommend charging method declared by the manufacturer</b> .....: Charging the battery with 20A constant current until 57.6V, then constant voltage until charging current reduces to 10.3A		
<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> .....: 2023-12-08		
<b>Date (s) of performance of tests</b> .....: 2023-12-08 to 2023-12-14		
<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.		
<b>Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</b>		
<b>Name and address of factory (ies)</b> .....: Same as applicant		
<b>General product information and other remarks:</b>		
The battery of model LP16-512200 and LP16-48200 is composed of sixteen lithium-ion cells (16S1P), and equipped with overcharge, overdischarge, overcurrent, and short circuit protection circuits.		
The product is available in two models: LP16-512200 and LP16-48200. There is no difference between the two models except model and label. They have two appearances, which are reflected on the photo page.		
		
		
		
		
		
		
		
		

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
<b>4</b>	<b>PARAMETER MEASUREMENT TOLERANCES</b>		P
	Parameter measurement tolerances		P

<b>5</b>	<b>GENERAL SAFETY CONSIDERATIONS</b>		P
<b>5.1</b>	<b>General</b>		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
<b>5.2</b>	<b>Insulation and wiring</b>		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
<b>5.3</b>	<b>Venting</b>		P
	Pressure relief function		P
	Encapsulation used to support cells within an outer casing		P
<b>5.4</b>	<b>Temperature/voltage/current management</b>		P
	The design prevents abnormal temperature-rise		N/A
	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>		P
	Polarity marking(s)		P
	Polarity marking not provided for keyed external connector		P
	Capability to carry the maximum anticipated current		P
	External terminal contact surfaces		P
	Terminal contacts are arranged to minimize the risk of short circuits		P
<b>5.6</b>	<b>Assembly of cells, modules, or battery packs into battery systems</b>		P
5.6.1	General		P
	Independent control and protection method(s)		P

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		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>		P
	The cell operating region..... :	Upper limit charge voltage: 3.65V; Cut off discharge Voltage: 2.5V	P
	Designation of battery system to comply with the cell operating region		P
<b>5.8</b>	<b>System lock (or system lock function)</b>		N/A
	Non-resettable function to stop battery 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>		P
	Manufacturing quality plan (for example: ISO9001, etc.) prepared and implemented..... :	The manufacturer supplies a self-declaration document.	P
	The process capabilities and the process controls		P

<b>6</b>	<b>TYPE TEST CONDITIONS</b>		P
<b>6.1</b>	<b>General</b>		P
<b>6.2</b>	<b>Test items</b>		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
<b>7</b>	<b>SPECIFIC REQUIREMENTS AND TESTS</b>		P
<b>7.1</b>	<b>Charging procedure for test purposes</b>		P
	The battery discharged to a specified final voltage prior to charging	The method mentioned in manufacturer's specifications	P
	The cells or batteries charged using the method specified by the manufacturer..... :		P
<b>7.2</b>	<b>Reasonably foreseeable misuse</b>		P
7.2.1	External short-circuit test (cell or cell block)		P
	Short circuit with total resistance of $30\text{ m}\Omega \pm 10\text{ m}\Omega$ at $25\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$		P
	Results: no fire, no explosion	See Table 7.2.1	P
7.2.2	Impact test (cell or cell block)		P
	Cylindrical cell, longitudinal axis impact		N/A
	Prismatic cell, longitudinal axis and lateral axis impact		P
	Results: no fire, no explosion.		P
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)		P
	Description of the Test Unit..... :	Cell	—
	Mass of the test unit (kg)..... :	4.2	—
	Height of drop (m)..... :	1	—
	Results: no fire, no explosion		P
7.2.3.3	Edge and corner drop test (cell or cell block, and battery system)		P
	Description of the Test Unit..... :	Battery system	—
	Mass of the test unit (kg)..... :	84.5	—
	Height of drop (m)..... :	0.05	—
	Results: no fire, no explosion		P
7.2.4	Thermal abuse test (cell or cell block)		P
	Results: no fire, no explosion		P
7.2.5	Overcharge test (cell or cell block)		P
	For those battery systems that are provided with only a single protection for the charging voltage control		—
	Results: no fire, no explosion..... :	See Table 7.2.5.	P
7.2.6	Forced discharge test (cell or cell block)		P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	Cells connected in series in the battery system .....		P
	Redundant or single protection for discharge voltage control provided in battery system .....		P
	Target Voltage .....	-3.65V	P
	Maximum discharge current of the cell, $I_m$ .....	206A	P
	Discharge current for forced discharge, 1.0 $I_t$ .....	206A	P
	Discharging time, $t = (1 I_t / I_m) \times 90$ (min.) .....	90	P
	Results: no fire, no explosion .....	See Table 7.2.6.	P
<b>7.3</b>	<b>Considerations for internal short-circuit – Design evaluation</b>		P
7.3.1	General		P
7.3.2	Internal short-circuit test (cell)		P
	Samples preparation procedure: In accordance with Clause A.5 and A.6 of IEC 62133-2:2017		P
	Tested per 7.3.2 b) in an ambient temperature of $25^\circ\text{C} \pm 5^\circ\text{C}$ .		P
	The appearance of the short-circuit location recorded by photograph or other means .....	See Attachment	—
	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	400N	P
	Results: no fire .....	See Table 7.3.2.	P
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 .....	See results in Table 7.3.3	N/A

<b>8</b>	<b>BATTERY SYSTEM SAFETY (CONSIDERING FUNCTIONAL SAFETY)</b>		P
<b>8.1</b>	<b>General requirements</b>		N/A
	Functional safety analysis for critical controls		N/A
	Conduct of a process hazard analysis for both the cell manufacturing process and the battery system manufacturing process		N/A
	Conduct of risk assessment and mitigation of the battery system		N/A
<b>8.2</b>	<b>Battery management system (or battery management unit)</b>		N/A
8.2.1	Requirements for the BMS		N/A



IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	The safety integrity level (SIL) target of the BMS		N/A
	The charge control evaluated by tests in clauses 8.2.2 to 8.2.4		N/A
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		P
	Elevated temperature for charging, 5 °C above maximum operating temperature..... :	55°C	P
	Results: no fire, no explosion..... :	See Table 9.2.5	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>		N/A
	Battery system fulfil EMC requirements of the end-device application..... :		N/A

<b>10</b>	<b>INFORMATION FOR SAFETY</b>		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

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
<b>11</b>	<b>MARKING AND DESIGNATION (REFER TO CLAUSE 5 OF IEC 62620)</b>		N/A
	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>		N/A
	Refer to Annex D		N/A

<b>ANNEX A</b>	<b>OPERATING REGION OF CELLS FOR SAFE USE</b>		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

<b>ANNEX B</b>	<b>PROCEDURE OF 7.3.3 PROPAGATION TEST BY LASER IRRADIATION</b>		N/A
<b>B.1</b>	<b>General</b>		N/A
<b>B.2</b>	<b>Test conditions</b>		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 .....		—

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	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.....		—

ANNEX D	PACKAGING AND TRANSPORT		N/A
	The materials and pack design chosen in a way as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of environmental contaminants		N/A
	Regulations concerning international transport of secondary lithium batteries		N/A

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	JIANGXI GANFENG BATTERY TECHNOLOGY CO., LTD.	53173200 206Ah	3.2V, 206A, 659.2Wh	IEC 62619:2022	Tested with apparatus
-Positive electrode	RT Advanced Materials Co., Ltd	E80	LiFePO4	--	Tested with apparatus
-Negative electrode	Jiangxi Zichen Technology Co., Ltd.	FT-1	Graphite	--	Tested with appliance
-Separator	Shenzhen Senior Technology Material Co., Ltd.	PE9+3	PE, shutdown temperature: 144°C	--	Tested with appliance
-Electrolyte	Shenzhen Capchen Technology Co., Ltd.	B39	LiPF6	--	Tested with appliance
-Shell	Dongguan Junyi Electromechanical Technology Co., Ltd.	AL3003-H14	Aluminium, 54.3mm * 175mm * 205.2mm	--	Tested with appliance
-Pressure relief valve	Jiangxi BaiSiLi New Energy Technology Co., Ltd.	52173200, Secondgenera tion, top cover	0.6~0.8MPa	--	Tested with appliance
PCB	KINGBOARD LAMINATES HOLDINGS LTD	KB-6160A	V-0, 130°C	UL 94 UL 796	UL E123995
IC (UM1)	HUADA SEMICONDUCT OR Co., Ltd	HC32F460PE TB	V <sub>CU</sub> : (3.6±0.08) V, V <sub>DL</sub> : (1.65±0.02) V, T <sub>opr</sub> : -40°C to 85°C	--	Tested with appliance
MOSFET (QP1 to PQ24)	MAGNACHIP Co., Ltd	MDE10N026	V <sub>DS</sub> : 100V, V <sub>GS</sub> : ±20V, I <sub>D</sub> : 120A (T <sub>A</sub> : 25°C), T <sub>J</sub> : -55°C to 175°C	--	Tested with appliance
PTC (R308)	JinRui	JK-nSMD005	60V, 0.05A,	UL 1434	UL E217453

IEC 62619					
Clause	Requirement + Test			Result - Remark	Verdict
FUSE (R253)	Shenzhen liangsheng electronics Co., LTD	12h1400C	Vr: 63V, Ir: 4A, Interrupting Rating: 50 Amperes at 63V DC(1A~4A), 100 Amperes at 32V DC(5A)	--	Tested with appliance
NTC (RT2)	Shenzhen Sunlord Electronics Co., Ltd.	SDNT1608X1 03F3435FTF	10KΩ±1%, B(25/85): 3435K±1%, Operating temperature: -55°C to 125°C	--	Tested with appliance
Supplementary information: 1) Provided evidence ensures the agreed level of compliance. See OD-CB2039. 2) Due to the client's trade secrets, the above component information cannot be fully provided.					

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

7.2.1	TABLE: External short-circuit test (cell or cell block)					P
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	
C01#	22.9	3.386	32.6	15.2	A, E	
C02#	22.8	3.379	29.8	15.6	A, E	
C03#	22.4	3.388	33.5	15.1	A, E	
<b>Supplementary information:</b> 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)					P
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
C13#	2.871	3.535	206	4.015	58.1	A, E
C14#	2.863	3.576	206	4.015	53.1	A, E
C15#	2.861	3.544	206	4.015	59.0	A, E
<b>Supplementary information:</b> 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

<b>7.2.6</b>	<b>TABLE: Forced discharge test (cell or cell block)</b>				<b>P</b>
<b>Sample No.</b>	<b>OCV before applying reverse charge, (V dc)</b>	<b>Target Voltage (V dc)</b>	<b>Measured Reverse Charge Current It, (A)</b>	<b>Total Time for Reversed Charge Application (min)</b>	<b>Results</b>
C16#	2.867	-3.65	206	90	A
C17#	2.856	-3.65	206	90	A
C18#	2.862	-3.65	206	90	A
<b>Supplementary information:</b> 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)				P
Sample No.	OCV at start of test, (V dc)	Particle location <sup>1)</sup>	Maximum applied pressure, (N)	Results	
C19#	3.385	1	400	A, E	
C20#	3.384	1	400	A, E	
C21#	3.378	1	400	A, E	
C22#	3.382	1	400	A, E	
C23#	3.375	1	400	A, E	
<b>Supplementary information:</b> 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.  <b>Results:</b> 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): ____					



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 <sup>1)</sup>		Location of target cell		Area for fire protection (m²)		
<b>Supplementary information:</b>						
<b>1)</b> 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						
<b>2)</b> 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 2.852	100	57.424	3.597	A, D, F	
			Charge Voltage Applied Battery System: 1)			
			Whole		Part	
			64.24		--	
<b>Supplementary information:</b> 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	
B01#	45.872	60	51.864	A, D, F	
<b>Supplementary information:</b> 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):					

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict

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	
B01#	51.968	50	53.841	
Maximum Specified Temperature of Battery System, °C		Maximum Measured Cell Case Temperature, °C	Results	
50		52.4	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): _____				

**Product protective circuit module**

The circuit schematic and layout information cannot be reflected due to customer's business secrets

Product Photo



Figure 1 Front view of battery system

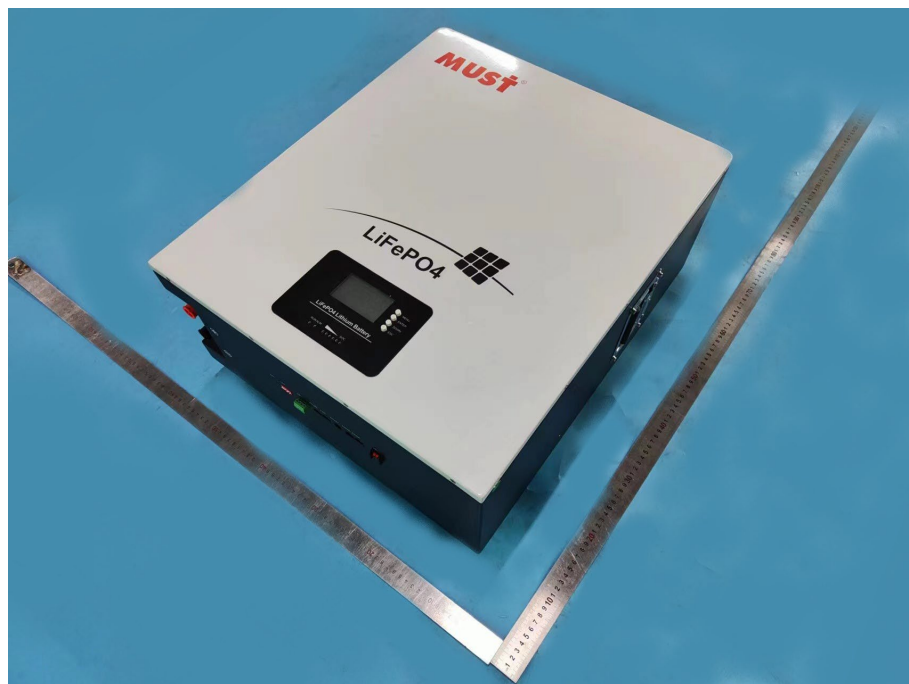


Figure 2 Back view of battery system

Product Photo

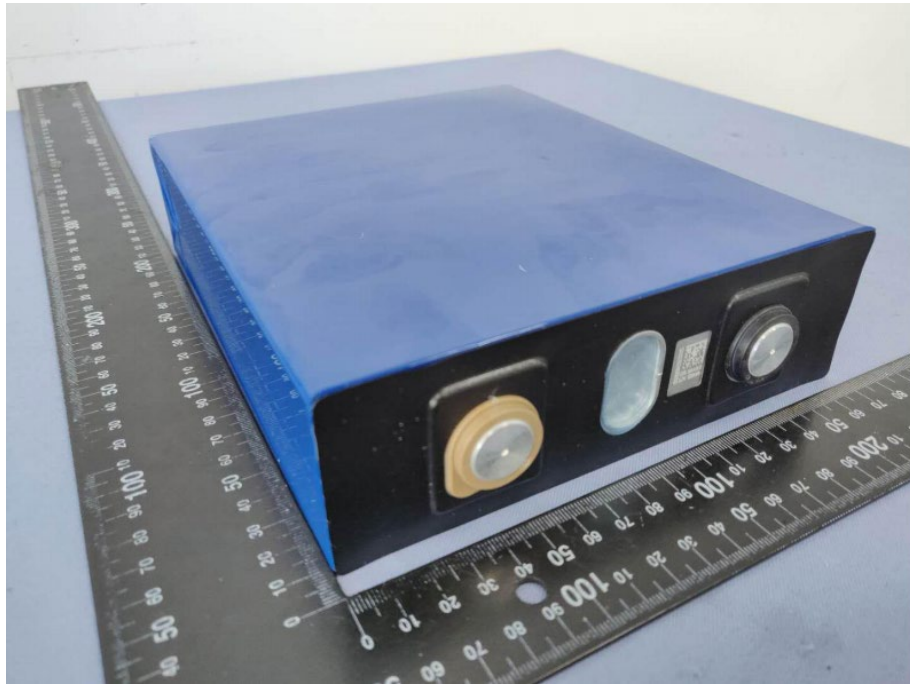


Figure 3 Front view of cell

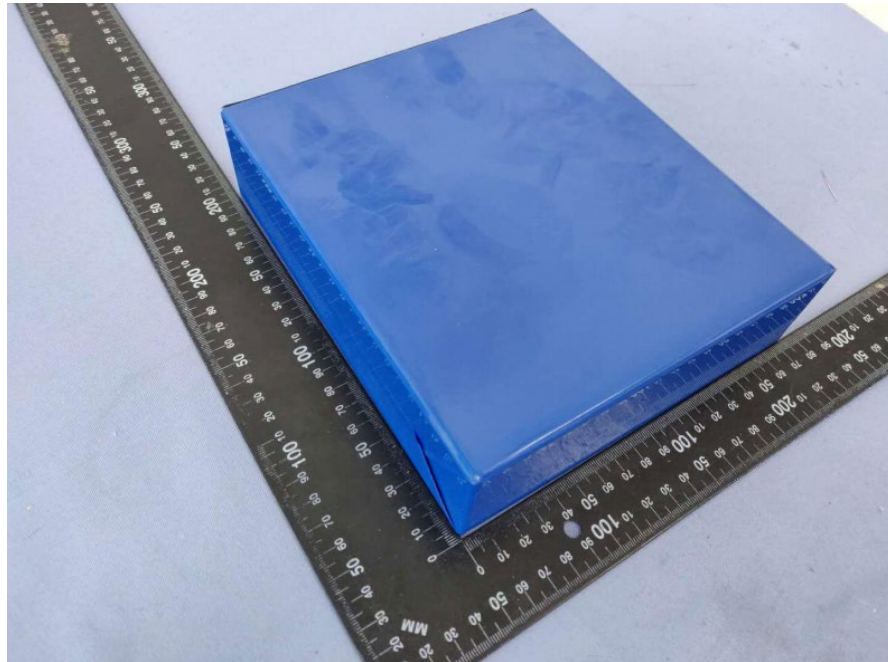


Figure 4 Back view of cell

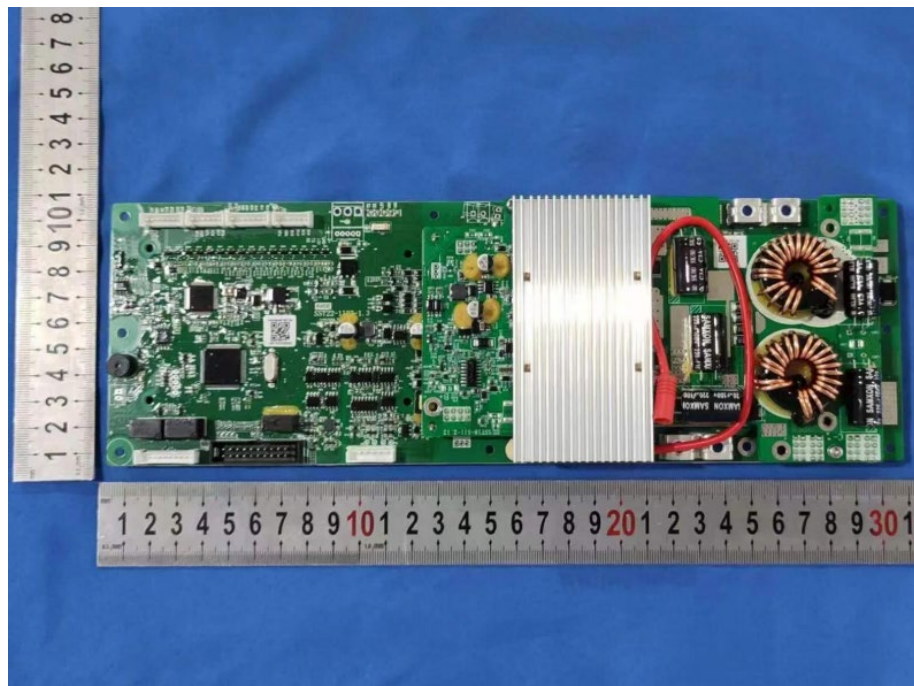


Figure 5 Front view of BMS protection board



Figure. 6 Back of BMS protection plate