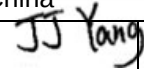




Test Report issued under the responsibility of:



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..... :	SHES231001985701
Date of issue	2023-12-26
Total number of pages	24
Name of Testing Laboratory preparing the Report	SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
Applicant's name	Shinson Technology Co.,Ltd
Address	Block#201,No.9 Chuangye Road,Changzhou,Jiangsu,PRC
Test specification:	
Standard	IEC 62619:2022
Test procedure.....	CB Scheme
Non-standard test method.....	N/A
TRF template used	IECEE OD-2020-F1:2022, Ed.1.5
Test Report Form No.	IEC62619B
Test Report Form(s) Originator....	UL Solutions (Demko)
Master TRF	Dated 2023-02-24
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General disclaimer:	
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Test item description..... :	Rechargeable Lithium-ion Battery System	
Trademark(s) :		
Manufacturer :	Same as applicant	
Model/Type reference :	SNE-SLBS5, SNE-SLBS10, SNE-SLBS15, SNE-SLBS20, SNE-SLBS25, SNE-SLBS30, SNE-SLBS35, SNE-SLBS40	
Ratings :	SNE-SLBS5: 102,4 V; 50 Ah SNE-SLBS10: 204,8 V; 50 Ah SNE-SLBS15: 307,2 V; 50 Ah SNE-SLBS20: 409,6 V; 50 Ah SNE-SLBS25: 512 V; 50 Ah SNE-SLBS30: 614,4 V; 50 Ah SNE-SLBS35: 716,8 V; 50 Ah SNE-SLBS40: 819,2 V; 50 Ah	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒	CB Testing Laboratory:	SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
Testing location/ address..... :		588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China
Tested by (name, function, signature)..... :		JJ Yang  Project Engineer
Approved by (name, function, signature).... :		Bruce Wu  Report Reviewer
☐	Testing procedure: CTF Stage 1:	N/A
Testing location/ address..... :		
Tested by (name, function, signature)..... :		
Approved by (name, function, signature).... :		
☐	Testing procedure: CTF Stage 2:	N/A
Testing location/ address..... :		
Tested by (name + signature) :		
Witnessed by (name, function, signature) . :		
Approved by (name, function, signature).... :		
☐	Testing procedure: CTF Stage 3:	N/A
☐	Testing procedure: CTF Stage 4:	N/A
Testing location/ address..... :		
Tested by (name, function, signature)..... :		

Witnessed by (name, function, signature) . :		
Approved by (name, function, signature)... :		
Supervised by (name, function, signature) :		

List of Attachments (including a total number of pages in each attachment): Attachment 1: 10 pages of Photo documentation; Attachment 2: 7 pages of Information for safety; Attachment 3: 1 page of Packaging; Attachment 4: 4 pages of Product specification.	
Summary of testing: The sample(s) tested complies with the requirements of IEC 62619:2022. Remark: 1. Battery system models (SNE-SLBS5, SNE-SLBS10, SNESLBS15, SNE-SLBS20, SNE-SLBS25, SNESLBS30, SLBS35, SNESLBS40) are identical except for number of batteries connected in series. Battery system model SNE-SLBS5 consists of a battery and a high voltage box. Battery system model SNE-SLBS10 consists of 2 batteries and a high voltage box. Battery system model SNE-SLBS15 consists of 3 batteries and a high voltage box. Battery system model SNE-SLBS20 consists of 4 batteries and a high voltage box. Battery system model SNE-SLBS25 consists of 5 batteries and a high voltage box. Battery system model SNE-SLBS30 consists of 6 batteries and a high voltage box. Battery system model SNE-SLBS35 consists of 7 batteries and a high voltage box. Battery system model SNE-SLBS40 consists of 8 batteries and a high voltage box. Battery system model SNE-SLBS5 was tested as typical model. Test results of this model are considered to be representative of other models of this series listed in this report. The component cell (model: ITPt123/123/310-500E) was certified according to IEC 62619:2022 by TÜV Rheinland with the CB test report No. CN22WLRB 001, CB certificate No. JPTUV-140956. 2. The functional safety requirement in clause 8 was evaluated according to Annex H of IEC 60730-1:2013, AMD1:2015, AMD2:2020 (TÜV SÜD Report No. 5061923022701-00 FS).	
Tests performed (name of test, test clause and date test performed): ☐ 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) ☐ 7.3.3 Propagation test (battery system) ☒ 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)	Testing location: (CBTL, SPTL, CTF, Subcontractor) SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. 588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China
Summary of compliance with National Differences (List of countries addressed): EU Group Differences ☒ The product fulfils the requirements of 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.

Rechargeable Lithium-ion Battery System

+ Model name:SNE-SLBS5
102.4V, 50Ah, 5.12kWh
Standard charge current: 25A
Max. charge voltage: 115.2V
Measured rated capacity of cell: 50Ah
Number of cell connected in parallel: 1
Calculated rated capacity(Ah)=50Ah × 1 = 50Ah
IFpP13/123/356[(32S)M/-20+50/95
Date: 2023XXXX
Sunnix Energy Co.,Ltd.
Caution:
Prohibition short circuit.
Don't reverse the positive and negative terminals.
Don't discard the battery in fire or heater.
Don't directly solder the battery.
- Don't pierce the battery with a nail or other sharp object.
Never disassemble the battery.

Rechargeable Lithium-ion Battery System

+ Model name:SNE-SLBS10
204.8V, 50Ah, 10.24kWh
Standard charge current: 25A
Max. charge voltage: 230.4V
Measured rated capacity of cell: 50Ah
Number of cell connected in parallel: 1
Calculated rated capacity(Ah)=50Ah × 1 = 50Ah
IFpP13/123/356[(32S)2S]M/-20+50/95
Date: 2023XXXX
Sunnix Energy Co.,Ltd.
Caution:
Prohibition short circuit.
Don't reverse the positive and negative terminals.
Don't discard the battery in fire or heater.
Don't directly solder the battery.
- Don't pierce the battery with a nail or other sharp object.
Never disassemble the battery.

Rechargeable Lithium-ion Battery System

+ Model name:SNE-SLBS15
307.2V, 50Ah, 15.36kWh
Standard charge current: 25A
Max. charge voltage: 345.6V
Measured rated capacity of cell: 50Ah
Number of cell connected in parallel: 1
Calculated rated capacity(Ah)=50Ah × 1 = 50Ah
IFpP13/123/356[(32S)3S]M/-20+50/95
Date: 2023XXXX
Sunnix Energy Co.,Ltd.
Caution:
Prohibition short circuit.
Don't reverse the positive and negative terminals.
Don't discard the battery in fire or heater.
Don't directly solder the battery.
- Don't pierce the battery with a nail or other sharp object.
Never disassemble the battery.

Rechargeable Lithium-ion Battery System

+ Model name:SNE-SLBS20
409.6V, 50Ah,20.48kWh
Standard charge current: 25A
Max. charge voltage: 460.8V
Measured rated capacity of cell: 50Ah
Number of cell connected in parallel: 1
Calculated rated capacity(Ah)=50Ah × 1 = 50Ah
IFpP13/123/356[(32S)4S]M/-20+50/95
Date: 2023XXXX
Sunnix Energy Co.,Ltd.
Caution:
Prohibition short circuit.
Don't reverse the positive and negative terminals.
Don't discard the battery in fire or heater.
Don't directly solder the battery.
- Don't pierce the battery with a nail or other sharp object.
Never disassemble the battery.

Rechargeable Lithium-ion Battery System

+ Model name:SNE-SLBS25
512V, 50Ah, 25.6kWh
Standard charge current: 25A
Max. charge voltage: 576V
Measured rated capacity of cell: 50Ah
Number of cell connected in parallel: 1
Calculated rated capacity(Ah)=50Ah × 1 = 50Ah
IFpP13/123/356[(32S)5S]M/-20+50/95
Date: 2023XXXX
Sunnix Energy Co.,Ltd.
Caution:
Prohibition short circuit.
Don't reverse the positive and negative terminals.
Don't discard the battery in fire or heater.
Don't directly solder the battery.
- Don't pierce the battery with a nail or other sharp object.
Never disassemble the battery.

Rechargeable Lithium-ion Battery System

+ Model name:SNE-SLBS30
614.4V, 50Ah,30.72kWh
Standard charge current: 25A
Max. charge voltage: 691.2V
Measured rated capacity of cell: 50Ah
Number of cell connected in parallel: 1
Calculated rated capacity(Ah)=50Ah × 1 = 50Ah
IFpP13/123/356[(32S)6S]M/-20+50/95
Date: 2023XXXX
Sunnix Energy Co.,Ltd.
Caution:
Prohibition short circuit.
Don't reverse the positive and negative terminals.
Don't discard the battery in fire or heater.
Don't directly solder the battery.
- Don't pierce the battery with a nail or other sharp object.
Never disassemble the battery.

Rechargeable Lithium-ion Battery System

+ Model name: SNE-SLBS35
 716.8V, 50Ah, 35.84kWh
 Standard charge current: 25A
 Max. charge voltage: 806.4V
 Measured rated capacity of cell: 50Ah
 Number of cell connected in parallel: 1
 Calculated rated capacity(Ah)=50Ah × 1 = 50Ah
 IFpP13/123/356[(32S)7SJ]M/-20+50/95
 Date: 2023XXXX
 Sunnix Energy Co., Ltd.
Caution:
 Prohibition short circuit.
 Don't reverse the positive and negative terminals.
 Don't discard the battery in fire or heater.
 Don't directly solder the battery.
 - Don't pierce the battery with a nail or other sharp object.
 Never disassemble the battery.

Rechargeable Lithium-ion Battery System

+ Model name: SNE-SLBS40
 819.2V, 50Ah, 40.96kWh
 Standard charge current: 25A
 Max. charge voltage: 921.6V
 Measured rated capacity of cell: 50Ah
 Number of cell connected in parallel: 1
 Calculated rated capacity(Ah)=50Ah × 1 = 50Ah
 IFpP13/123/356[(32S)8SJ]M/-20+50/95
 Date: 2023XXXX
 Sunnix Energy Co., Ltd.
Caution:
 Prohibition short circuit.
 Don't reverse the positive and negative terminals.
 Don't discard the battery in fire or heater.
 Don't directly solder the battery.
 - Don't pierce the battery with a nail or other sharp object.
 Never disassemble the battery.

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WARNING

- B Do not disconnect or disassemble by non-professional personnel.
- B Do not drop, deform, impact, cut or spear with a sharp object.
- B Do not place at children's or pet's reach area.
- B Do not place near open flame or flammable material.
- B Do not cover or wrap the product case.
- B Do not sit or put heavy things on battery.
- B Do not touch the leaking liquid.
- B Avoid of direct sunlight, moisture or liquid.
- B The product Ingress Protection (IP) class is IP54.
- B Make sure the grounding connection set correctly before operation.
- B Follow the product manual to make wiring connection.
- B If leaked, fire, wet or damaged, switch off the breaker on DC side and stay away from battery.
- B Contact your supplier within 24 hours if anything failure happens.

**Remark:**

1. Battery system with keyed external connector which prevents reverse polarity connections.
2. Disposal instructions and recommended charge instructions are included in Battery System Specification, see attachment 2 and attachment 4 for details.

Test item particulars.....: --	
Classification of installation and use.....: --	
Supply Connection: --	
.....:	
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: 2023-10-23	
Date (s) of performance of tests: 2023-10-25 to 2023-11-24	
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. This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document.aspx. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60060-2:	
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:

Product description:	Rechargeable Lithium-ion Battery System
Model of battery:	SNE-SLBS5
Designation of battery:	IFpP13/123/356[32S]M/-20+50/95
Rated voltage:	102,4 V
Rated capacity:	50 Ah
Maximum charge current:	35 A
Maximum discharge current:	35 A
Number of cells in battery:	32S
Charge operating temperature:	0-55 °C
Discharge operating temperature:	-20-60 °C
Cell description:	Pouch secondary lithium cell
Model of component cell:	ITPt123/123/310-500E
Rated voltage:	3,2 V
Rated capacity:	50 Ah
Maximum charge current:	75 A
Charge operating temperature:	0-55 °C

Specification of energy storage system

Scalability (Number of modules in series)	Model	Rated voltage (V)	Maximum charge voltage (V)	Designation
1	SNE-SLBS5	102,4	116,8	IFpP13/123/356[32S]M/-20+50/95
2	SNE-SLBS10	204,8	233,6	IFpP13/123/356[(32S)2S]M/-20+50/95
3	SNE-SLBS15	307,2	350,4	IFpP13/123/356[(32S)3S]M/-20+50/95
4	SNE-SLBS20	409,6	467,2	IFpP13/123/356[(32S)4S]M/-20+50/95
5	SNE-SLBS25	512	584	IFpP13/123/356[(32S)5S]M/-20+50/95
6	SNE-SLBS30	614,4	700,8	IFpP13/123/356[(32S)6S]M/-20+50/95
7	SNE-SLBS35	716,8	817,6	IFpP13/123/356[(32S)7S]M/-20+50/95
8	SNE-SLBS40	819,2	934,4	IFpP13/123/356[(32S)8S]M/-20+50/95

Specification for all models of battery system

Product description:	Stackable Lithium Ion Battery System
Rated capacity:	50 Ah
Maximum charge current:	35 A
Maximum discharge current:	35 A
Charging temperature range:	0-55 °C
Discharge temperature range:	-20-60 °C

Remark: See Attachment 4 for details.

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	Battery system: Metal enclosure secured by screws, aperture as the venting mechanism of battery module.	P
	Encapsulation used to support cells within an outer casing	Metal encapsulation was used to support cells, will not cause the system to overheat during normal operation nor inhibit pressure relief.	P
5.4	Temperature/voltage/current management		P
	The design prevents abnormal temperature-rise	BMS was used to prevent abnormal temperature-rise.	P
	Voltage, current, and temperature limits of the cells	Battery system was designed within voltage, current, and temperature limits specified by the cell manufacturer.	P
	Specifications and charging instructions for equipment manufacturers		P
5.5	Terminal contacts of the battery pack and/or battery system		P
	Polarity marking(s)		P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	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
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..... : Voltage range: 2 V to 3,65 V Maximum charge current: 75 A Maximum discharge current: 100 A Charge temperature range: 0-55 °C Discharge temperature range: -20-60 °C		P
	Designation of battery system to comply with the cell operating region		P
5.8	System lock (or system lock function)		P
	Non-resettable function to stop battery operation		P
	Manual with procedure for resetting of battery operation		P
	Emergency battery final discharge		P
5.9	Quality plan		P
	Manufacturing quality plan (for example: ISO9001, etc.) prepared and implemented..... :	Quality plan was provided.	P

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	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

7	SPECIFIC REQUIREMENTS AND TESTS		P
7.1	Charging procedure for test purposes		P
	The battery discharged to a specified final voltage prior to charging		P
	The cells or batteries charged using the method specified by the manufacturer	Charging the battery with a constant current 25 A until 116,8 V, then constant voltage until charging current reduces to 2,5 A	P
7.2	Reasonably foreseeable misuse		P
7.2.1	External short-circuit test (cell or cell block)		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		P
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

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
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)..... :	48,771 kg	—
	Height of drop (m)..... :	10 cm	—
	Results: no fire, no explosion		P
7.2.4	Thermal abuse test (cell or cell block)		N/A
	Results: no fire, no explosion		N/A
7.2.5	Overcharge test (cell or cell block)		N/A
	For those battery systems that are provided with only a single protection for the charging voltage control		—
	Results: no fire, no explosion..... :		N/A
7.2.6	Forced discharge test (cell or cell block)		N/A
	Cells connected in series in the battery system..... :		N/A
	Redundant or single protection for discharge voltage control provided in battery system..... :		N/A
	Target Voltage..... :		N/A
	Maximum discharge current of the cell, 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)	Has been considered in cell test report.	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

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
7.3.3	Propagation test (battery system)	Internal short-circuit test has been considered in cell CB report.	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	The functional safety requirement in clause 8 was evaluated according to Annex H of IEC 60730-1:2013, AMD1:2015, AMD2:2020 (TÜV SÜD Report No. 5061923022701-00 FS).	P
	Functional safety analysis for critical controls		P
	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		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	PLc per Annex H of IEC 60730-1	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

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	The cooling system, if provided, was disconnected	No cooling system	N/A
	Elevated temperature for charging, 5 °C above maximum operating temperature..... :	Maximum charging 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		P
	Battery system fulfil EMC requirements of the end-device application..... :	The EMC requirement was evaluated according to EN IEC 61000-6-3:2021 and EN IEC 61000-6-1:2019 (SGS Report No. SHEMA230900594901)	P

10	INFORMATION FOR SAFETY		P
	The cell manufacturer provides information about current, voltage and temperature limits of their products		N/A
	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.		P
	Cell or battery system has clear and durable markings		P
	Cell designation		N/A
	Battery designation	See page 9 for details.	P
	Battery structure formulation		P

12	PACKAGING AND TRANSPORT		P
	Refer to Annex D		P

ANNEX A	OPERATING REGION OF CELLS FOR SAFE USE		N/A
----------------	---	--	------------

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
A.1	General	Has been considered in cell test report.	N/A
A.2	Charging conditions for safe use		N/A
A.3	Consideration on charging voltage		N/A
A.4	Consideration on temperature		N/A
A.5	High temperature range		N/A
A.6	Low temperature range		N/A
A.7	Discharging conditions for safe use		N/A
A.8	Example of operating region		N/A

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		N/A
	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		—

IEC 62619			
Clause	Requirement + Test	Result - Remark	Verdict
	– 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	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	EVPS Anhui Power Battery Co., Ltd.	ITPt123/123 /310-500E	3,2 V, 50 Ah	IEC 62619:20 22 EN 62619:20 22	TÜV Rheinland CB report No. CN22WLRB 001, CB certificate No. JPTUV-140956	
Enclosure of battery for High voltage control box	Jiangsu Rongyuan Mechanical Technology Co., Ltd.	Metal sheet	700 mm*310 mm*136 mm	--	--	
Magnetic Contactor	BYD (HUIZHOU) BATTERY COMPANY LTD	EVR40CI-A	40 A	UL 60947-4- 1	UL (E489222)	
Connector	QC Solar (Suzhou) Corporation	QC4.3	30 A, IP 67, -40-85 °C	IEC 62852	TUV SUD (B 077362 0004 REV. 06)	
Com connector (service and inverter)	Shenzhen Longshi Electronic Technology Co., Ltd.	LR20-FS- R5-011	CONTACT RESISTANCE: 30 mΩ MAX., INSULATION RESISTANCE: 500 mΩ MIN., LIFE TEST: 750 CYCLES	--	--	
Power connector	SHENZHEN CONNECTOR TECHNOLOGY CO LTD	CNT01-25C- P	35 A,1500 V	--	UL (E307884)	
Alt	SHENZHEN CONNECTOR TECHNOLOGY CO LTD	CNT01-25C- S	35 A,1500 V	--	UL (E307884)	
Fuse	Xi'an Sinofuse Electric Co Ltd	RS308-HB- 4G	DC 750 V,63 A	UL 248-1	UL (E353337)	

IEC 62619					
Clause	Requirement + Test		Result - Remark		Verdict
Switch for signal line	VaneAims Industrial Electric Co., Ltd.	HS22F-11E/J/S	Diameter 22 mm, self-locking switch	--	--
Insulating Tape	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	CT	130 °C	UL 510A	UL (E165111)
Internal wiring 1	DONGGUAN CITY MINGHE ELECTRONIC CO LTD	3239	10 AWG,600 Vdc, 200 °C	UL 758	UL (E353337)
Internal wiring 2	HANSTAR FLUORO-PLASTIC INSULATED ELECTRIC WIRES	1569	22 AWG,300 Vdc, 105 °C	UL 758	UL (E159007)
BMS (Slave module)	Jiangsu Shixing Technology Co., Ltd	BSU-Y21K-32S16T	32 single battery voltage monitoring 16 channels temperature monitoring	IEC 60730-1	TUV SUD (50619230227 01-00 FS)
-PCB material	Shenzhen Suntak Multilayer PCB Co.,Ltd.	STD-3	V-0, 130 °C, Thickness: 1,6 mm	UL 796	UL (E207844)
-MCU (U4)	GigaDevice	GD32F303C CT6	Operating Voltage: 2-3,6 Vd.c., TA: -40-85°C	--	--
-IC for DCDC (U9)	Onsemi	SC9901B	Supply Voltage: 5-100 Vd.c., Operating temperature: -40-160 °C	--	--
-IC for LDO power (U12)	Chipown	HM6206P33 2MR	Supply Voltage: 0-7 Vd.c., Operating temperature: -40-85 °C	--	--
-Balanced resistance (R58)	YAGEO	RMH25FE6 R8	6,8 Ω, 2512, 5%, 2 W, -55-155 °C, 200 V d.c.	--	--
-IC for AFE (U2)	SinoWealth	SH367309	Supply voltage: 0-70 Vd.c., Temperature: -40-85 °C	--	--
-FUSE (F1)	AEM COMPONENTS (SUZHOU) CO LTD	MF2410F	250Vd.c.,1A, Breaking Capacity 100A	UL 248-1	UL (E232989)

IEC 62619					
Clause	Requirement + Test		Result - Remark		Verdict
-MOSFET (Q4)	NCEPOWER	NCE3416 N-Channel	Vdss=20 V, Id=6,5 A, Pd=1,4 W	--	--
-Optocoupler (U3)	LITEON	LTV-217-G	IF=20 mA, Vceo=70 V	--	--
-Digital isolator (U5)	NOVOSENSE	NSI-8100W	Isolation voltage: 5000 Vd.c., Operational voltage: -0,5-6,5 Vd.c., Operational temp: -40-125 °C	--	--
BMS (Main board)	YIHE Technology Co.,Ltd.	BMU: BMU-YL01-02 Hardware Version: V02, Software Version: V18-32S	Overcharge detection voltage for each cell: 3,70 V±5 mV, Overdischarge detection voltage for each cell: 2,50 V±5 mV, Charge overcurrent detection current: 40 A±1,5 A, Discharge overcurrent detection current: 48 A±1,5 A, High temperature protection: 58±1 °C, Low temperature protection: -20±1 °C	IEC 60730-1:2013, AMD1:2015, AMD2: 2020	TUV (50619230227 01-00 FS)
-PCB material	Shenzhen Suntak Multilayer PCB Co.,Ltd.	STD-3	V-0, 130 °C, Thickness: 1,6 mm	UL 796	UL (E207844)
-MCU (U17)	GigaDevice	GD32F305V CT6	Operating Voltage: 2-3,6 Vd.c., TA: -40-85 °C	--	--
-IC for Communication (U18)	Atmel	AT24C64	Operating Voltage: 1,8-5,5 Vd.c., TA: -40-85 °C	--	--
-IC for DCDC (U2)	XLSEMI	XL1509-5.0V	Supply Voltage: 4,5-40 Vd.c., Operating temperature: -40-125 °C	--	--
-IC for POWER (U4)	Onsemi	NCP1351	Supply Voltage: 0-28Vd.c., Operating temperature: -60-150 °C	--	--
-MOSFET (Q2, Q4, Q5)	VISHAY	IRFBG30PBF	Vdss=1000 V, Id=3,1 A, Pd=125 W	--	--
-NTC (N1)	Sunlord	SDNT1608X103J3950H TF	Max. Permissive Operating Current: 0,31 mA, Operating temperature: -55-125 °C	--	--

IEC 62619					
Clause	Requirement + Test			Result - Remark	Verdict
-Transformer (DS1)	JUST FOR YOU ENTERPRISE CO LTD	Viking B-2	150-900 V/60 VA	UL 1446	UL (E211883)
-Optocoupler (U6, U42)	Lite-On Technology Corporation	LTV-217-G	IF=20 mA, Vceo=70 V	IEC 60747-5-5	VDE (138213)
-Relay for insulator checking (RY1, RY3)	Sanyou Corporation Limited	G4A-1A-PE	Supply Voltage:24 Vd.c., Operating temperature: -40-85 °C	IEC 61810-1	TUV (R50142420)
Supplementary information:					
1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.					

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: --						

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: --						

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 I _t , (A)	Total Time for Reversed Charge Application (min)	Results	
--	--	--	--	--	--	--
Supplementary information: --						

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: --					

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 (m²)		
--		--		--		
Supplementary information: --						

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	
M1	3,054-3,156	35	116,8	3,644	A, D, F	
			Charge Voltage Applied Battery System: 1)			
			Whole	Part		
			128,48 Vdc	--		
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): ____						

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	
M1	99,6	42	116,8	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): _____					

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	Measured Maximum Charging Voltage, V dc	
M1	105,6	35	105,6	
Maximum Specified Temperature of Battery System, °C		Maximum Measured Cell Case Temperature, °C	Results	
55		55	A, D, F, H	
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): Protected immediately when charging				

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: See EMC report No. SHEM230900594901					

- End of Report -

Attachment 1 Photo documentation

Overall view of battery

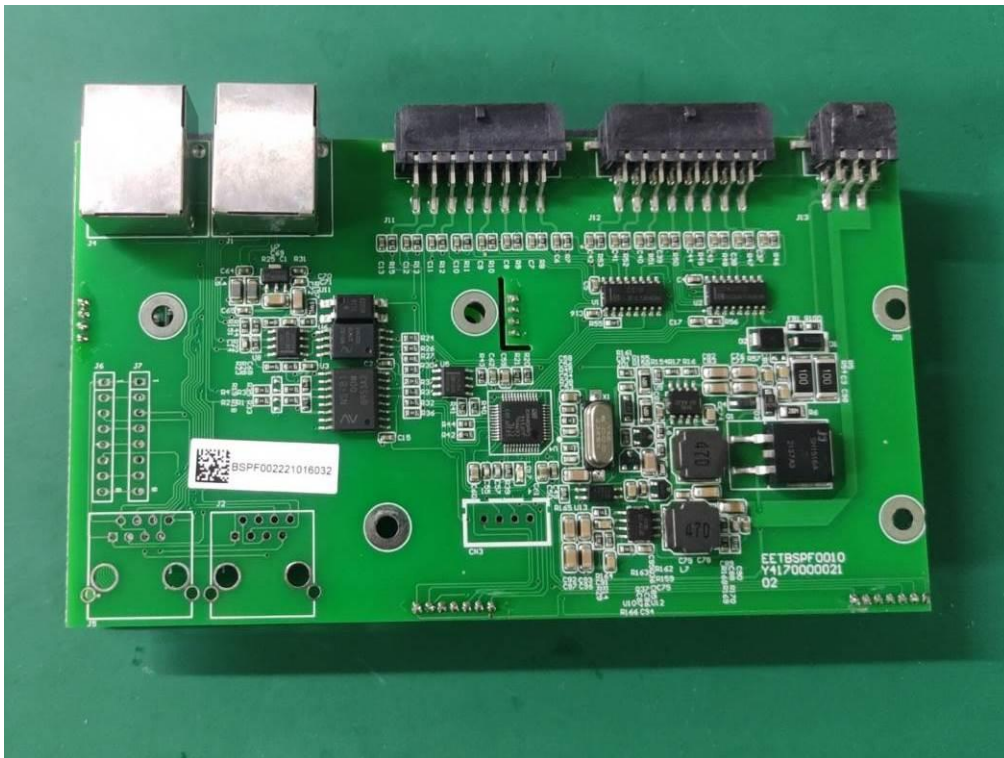


Attachment 1 Photo documentation

Internal view of battery



PCB view of battery



Attachment 1 Photo documentation

PCB view of battery



Overall view of high voltage box



Attachment 1 Photo documentation

Overall view of high voltage box

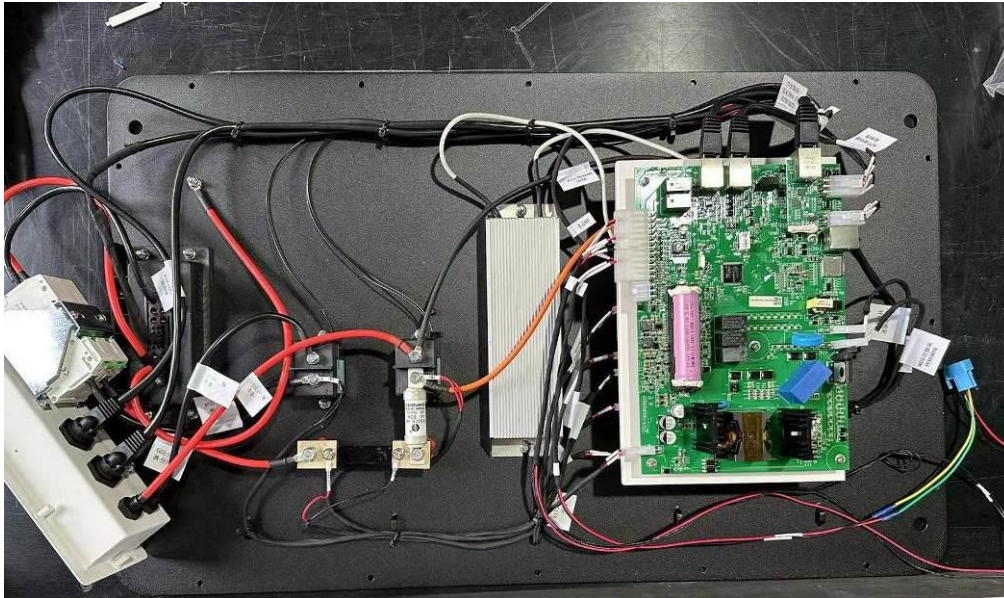


Internal view of high voltage box



Attachment 1 Photo documentation

Internal view of high voltage box

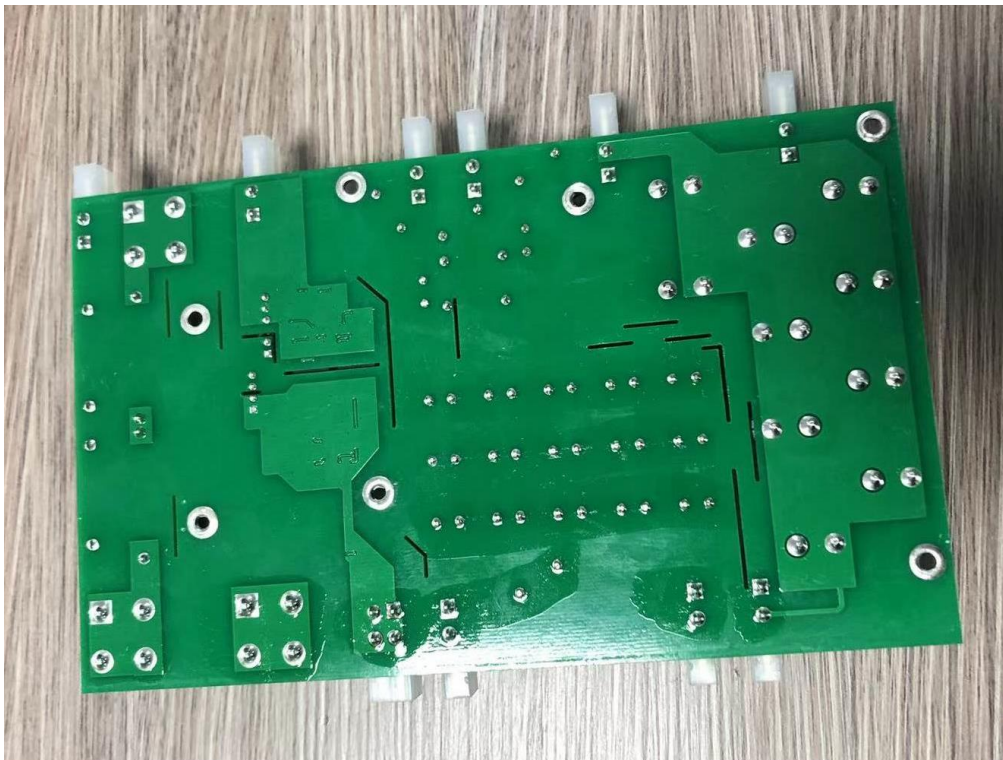


Main board view of high voltage box



Attachment 1 Photo documentation

Slave module view of high voltage box



Attachment 1 Photo documentation

SNE-SLBS5



SNE-SLBS10



Attachment 1 Photo documentation

SNE-SLBS15



SNE-SLBS20



Attachment 1 Photo documentation

SNE-SLBS25



SNE-SLBS30



Attachment 1 Photo documentation

SNE-SLBS35



SNE-SLBS40



- - - End of Attachment 1 - - -

Attachment 2 Information for safety

※ 2.1 Safety Notes

Before installation, please read this manual and warning labels on battery carefully and follow the instructions in this manual strictly.

※ 2.2 Important Safety Matters

SAVE THESE IMPORTANT SAFETY INSTRUCTIONS.

SNE-ES HV5 stackable lithium battery system installation and repair instructions assume knowledge of high voltage electricity and should only be performed by Sunnix Energy certified installers. Sunnix Energy assumes no liability for injury or property damage due to repairs attempted by unqualified individuals or a failure to properly follow these instructions. These warnings and cautions must be followed when using our product.

 Warning	Read this entire document before installing or using SNE-ES HV5 stackable battery system. Failure to do so or to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, or death, or can damage SNE-ES HV5 stackable battery system, potentially rendering it inoperable.
 Warning	A battery can present a risk of electrical shock, fire, or explosion from vented gases. Observe proper precautions.
 Warning	SNE-ES HV5 stackable battery system installation must be carried out only by Sunnix Energy Certified Installers, who have been trained in dealing with high voltage electricity.
 Warning	The product is heavy and challenging to lift.

Attachment 2 Information for safety

 Warning	Use SNE-ES HV5 stackable battery only as directed.
 Warning	Do not use SNE-ES HV5 stackable battery if it is defective, appears cracked, broken, or otherwise damaged, or fails to operate.
 Warning	Do not use SNE-ES HV5 stackable battery if it is defective, appears cracked, broken, or otherwise damaged, or fails to operate.
 Warning	Do not attempt to open, disassemble, repair, tamper with, or modify SNE-ES HV5 stackable battery. SNE-ES HV5 stackable battery is not user serviceable. LFP Cells in SNE-ES HV Battery are not replaceable. Contact the SNE-ES HV Authorized Reseller who sold the SNE-ES HV5 stackable battery for any repairs.
 Warning	Do not connect SNE-ES HV5 stackable battery to alternating current carrying conductors. SNE-ES HV5 stackable battery system including battery and battery must be wired to either a battery or a DC combiner panel that is then wired to an inverter. No other wiring configuration may be used.
 Warning	SNE-ES HV5 stackable battery contains components, such as switches and relays, that can produce arcs or sparks.
 Warning	To protect SNE-ES HV5 stackable battery and its components from damage when transporting, handle with care. Do not impact, pull, drag, or step on SNE-ES HV5 stackable Battery. Do not subject SNE-ES HV5 stackable Battery to any strong force. To prevent damage, leave SNE-ES HV5 stackable battery in its shipping packaging until it is ready to be installed.
 Warning	Do not insert foreign objects into any part of SNE-ES HV5 stackable battery.

Attachment 2 Information for safety

 Warning	Do not expose SNE-ES HV5 stackable battery or its components to direct flame.
 Warning	Do not install SNE-ES HV5 stackable battery near heating equipment.
 Warning	Do not immerse SNE-ES HV5 stackable battery or its components in water or other fluids.
 Caution	Do not use cleaning solvents to clean SNE-ES HV5 stackable battery, or expose SNE-ES HV5 stackable battery to flammable or harsh chemicals or vapors.
 Caution	Do not use fluids, parts, or accessories other than those specified in this manual, including use of non-genuine SNE-ES HV5 parts or accessories, or parts or accessories not purchased directly from SNE-ES HV5 or a SNE-ES HV5 -certified party.
 Caution	Do not place SNE-ES HV5 stackable battery in a storage condition for more than one (1) month, or permit the electrical feed on the SNE-ES HV5 stackable battery to be severed for more than one (1) month, without placing SNE-ES HV5 into a storage condition in accordance with SNE-ES HV5's storage specifications.
 Caution	Do not paint any part of SNE-ES HV Battery, including any internal or external components such as the exterior shell or casing.
 Caution	Do not connect SNE-ES HV Battery directly to photovoltaic (PV) solar wiring.

Attachment 2 Information for safety

 Caution	When installing SNE-ES HV5 stackable battery in a garage or near vehicles, keep it out of the driving path. If possible, install the SNE-ES HV5 stackable battery on a side wall and/or above the height of vehicle bumpers.
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※ 2.3 Environmental Conditions

 Warning	Install SNE-ES HV5 stackable battery at a height that prevents damage from flooding.
 Warning	Operating or storing SNE-ES HV5 stackable battery in temperatures outside its specified range might cause damage to SNE-ES HV5 stackable battery.
 Warning	Do not expose the SNE-ES HV5 stackable battery to ambient temperatures above 45°C (113°F) or below 0°C (32°F).
 Caution	Ensure that no water sources are above or near SNE-ES HV5 stackable battery including downspouts, sprinklers, or faucets.

※ 2.4 Statement

Sunnix Energy Co.,Ltd. has the right not to undertake quality assurance in any of the following circumstances:

- ① Damages caused by improper transportation.
- ② Damages caused by incorrect storage, installation or use.

Attachment 2 Information for safety

- ③ Damages caused by installation and use of equipment by non-professionals or un-trained personnel.
- ④ Damages caused by failure to comply with the instructions and safety warnings in this document.
- ⑤ Damages of running in an environment that does not meet the requirements stated in this document.
- ⑥ Damages caused by operation beyond the parameters specified in applicable technical specifications.
- ⑦ Damages caused by unauthorized disassembly, alteration of products or modification of software codes.
- ⑧ Damages caused by abnormal natural environment (force majeure, such as lightning, earthquake, fire, storm, etc.).
- ⑨ Any damages caused by the process of installation and operation which don't follow the local standards and regulations.
- ⑩ Products beyond the warranty period.

※ 2.5 Symbol on the Battery Label

Sunnix Energy Co.,Ltd. has the right not to undertake quality assurance in any of the following circumstances:

- ① Damages caused by improper transportation.
- ② Damages caused by incorrect storage, installation or use.

Symbol	Description
	Do not sit or put things on battery.
	Do not disconnect or disassemble by non-professional personnel.

Attachment 2 Information for safety

	Do not place near open flame or flammable material.
	Do not place at a children's or pet's reach area.
	Electric shock hazard, live parts, risk of electric shock, do not touch.
	If fire, switch off the breaker on DC side and stay away from battery.
	Please read the instructions carefully before installation.
	The battery cannot be disposed of with household waste.

Attachment 2 Information for safety

※ 2.6 Symbol on the Packing Box

Symbol	Description
	Handle with care.
	This side up.
	Keep dry.
	Stacked layers.

- - - End of Attachment 2 - - -

Attachment 3 Packaging



--- End of Attachment 3 ---

Attachment 4 Product specificationSpecification

Product	Rechargeable Lithium-ion Battery System
Model	SNE-SLBS5
Rated capacity	50 Ah
Rated voltage	102,4 V
Standard charge current	25 A
Standard discharge current	25 A
Maximum charge current	35 A
Maximum discharge current	35 A
Charge cut-off voltage	116,8 V
Standard charging method	Charging the battery with a constant current 25 A until 116,8 V, then constant voltage until charging current reduces to 2,5 A
Discharge cut-off voltage	86,4 V
Charge operating temperature	0-55 °C
Discharge operating temperature	-20-60 °C

Product	Rechargeable Lithium-ion Battery System
Model	SNE-SLBS10
Rated capacity	50 Ah
Rated voltage	204,8 V
Standard charge current	25 A
Standard discharge current	25 A
Maximum charge current	35 A
Maximum discharge current	35 A
Charge cut-off voltage	233,6 V
Standard charging method	Charging the battery with a constant current 25 A until 233,6 V, then constant voltage until charging current reduces to 2,5 A
Discharge cut-off voltage	172,8 V
Charge operating temperature	0-55 °C
Discharge operating temperature	-20-60 °C

Product	Rechargeable Lithium-ion Battery System
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Attachment 4 Product specification

Model	SNE-SLBS15
Rated capacity	50 Ah
Rated voltage	307,2 V
Standard charge current	25 A
Standard discharge current	25 A
Maximum charge current	35 A
Maximum discharge current	35 A
Charge cut-off voltage	350,4 V
Standard charging method	Charging the battery with a constant current 25 A until 350,4 V, then constant voltage until charging current reduces to 2,5 A
Discharge cut-off voltage	259,2 V
Charge operating temperature	0-55 °C
Discharge operating temperature	-20-60 °C

Product	Rechargeable Lithium-ion Battery System
Model	SNE-SLBS20
Rated capacity	50 Ah
Rated voltage	409,6 V
Standard charge current	25 A
Standard discharge current	25 A
Maximum charge current	35 A
Maximum discharge current	35 A
Charge cut-off voltage	467,2 V
Standard charging method	Charging the battery with a constant current 25 A until 467,2 V, then constant voltage until charging current reduces to 2,5 A
Discharge cut-off voltage	345,6 V
Charge operating temperature	0-55 °C
Discharge operating temperature	-20-60 °C

Product	Rechargeable Lithium-ion Battery System
Model	SNE-SLBS25
Rated capacity	50 Ah
Rated voltage	512 V

Attachment 4 Product specification

Standard charge current	25 A
Standard discharge current	25 A
Maximum charge current	35 A
Maximum discharge current	35 A
Charge cut-off voltage	584 V
Standard charging method	Charging the battery with a constant current 25 A until 584 V, then constant voltage until charging current reduces to 2,5 A
Discharge cut-off voltage	432 V
Charge operating temperature	0-55 °C
Discharge operating temperature	-20-60 °C

Product	Rechargeable Lithium-ion Battery System
Model	SNE-SLBS30
Rated capacity	50 Ah
Rated voltage	614,4 V
Standard charge current	25 A
Standard discharge current	25 A
Maximum charge current	35 A
Maximum discharge current	35 A
Charge cut-off voltage	700,8 V
Standard charging method	Charging the battery with a constant current 25 A until 700,8 V, then constant voltage until charging current reduces to 2,5 A
Discharge cut-off voltage	518,4 V
Charge operating temperature	0-55 °C
Discharge operating temperature	-20-60 °C

Product	Rechargeable Lithium-ion Battery System
Model	SNE-SLBS35
Rated capacity	50 Ah
Rated voltage	716,8 V
Standard charge current	25 A
Standard discharge current	25 A
Maximum charge current	35 A

Attachment 4 Product specification

Maximum discharge current	35 A
Charge cut-off voltage	817,6 V
Standard charging method	Charging the battery with a constant current 25 A until 817,6 V, then constant voltage until charging current reduces to 2,5 A
Discharge cut-off voltage	604,8 V
Charge operating temperature	0-55 °C
Discharge operating temperature	-20-60 °C

Product	Rechargeable Lithium-ion Battery System
Model	SNE-SLBS40
Rated capacity	50 Ah
Rated voltage	819,2 V
Standard charge current	25 A
Standard discharge current	25 A
Maximum charge current	35 A
Maximum discharge current	35 A
Charge cut-off voltage	934,4 V
Standard charging method	Charging the battery with a constant current 25 A until 934,4 V, then constant voltage until charging current reduces to 2,5 A
Discharge cut-off voltage	691,2 V
Charge operating temperature	0-55 °C
Discharge operating temperature	-20-60 °C

- - - End of Attachment 4 - - -