LISTING REPORT/INSPECTION PROCEDURE

620 Old Peachtree Road NW, Suite 100, Suwanee, GA 30024 USA (770) 570-1800

Test Report Number: CQES240100003461

A representative sample of the product covered by this report has been evaluated and found to comply with the applicable requirements of Standard for Safety for Batteries for Use in Stationary and Motive Auxiliary Power Applications, ANSI/CAN/UL 1973, Third Edition, Dated February 25, 2022.

This report supersedes and replaces previous copies of same project number.

Issuing Laboratory ..... :	SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch
Address ..... :	No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China
Applicant (Certificate Holder) ..... :	GoodWe Technologies Co., Ltd.
Address ..... :	No. 90 Zijin Road, New District, Suzhou, 215011, Jiangsu, China
Contact Details ..... :	Xiaoshu Huan Phone: +86 18261533751 Email: xiaoshu.huan@goodwe.com
Manufacturer ..... :	GoodWe Technologies Co., Ltd.
Address ..... :	No. 90 Zijin Road, New District, Suzhou, 215011, Jiangsu, China
Contact Details ..... :	Xiaoshu Huan Phone: +86 18261533751 Email: xiaoshu.huan@goodwe.com
Factory 1 ..... :	Goodwe (Guangde) Power Supply Technology Co., Ltd.
Address ..... :	No. 8, Dongting Rd., Guangde Economic Development Zone, Anhui, China
Contact Details ..... :	Xiaoshu Huan Phone: +86 18261533751 Email: xiaoshu.huan@goodwe.com

Product Type.....: Rechargeable lithium-ion battery system

Trade Mark .....: GOODWE

Product description.....: Lithium-ion battery system
(Product name: Rechargeable Li-ion Battery system)
For both indoor use and outdoor use.

Model Number(s) .....: LX F9.6-30, LX F12.8-30, LX F16.0-30, LX F19.2-30

Model Differences.....: All models have the same basic module, model: LX F3.2-30, and the same high voltage control box, the only difference is the number of modules for each system. Model LX F9.6-30, model LX F12.8-30, model LX F16.0-30 and model LX F19.2-30 has 3, 4, 5, 6 basic battery modules respectively.

Electrical Ratings .....:

Model	LX F9.6-30	LX F12.8-30	LX F16.0-30	LX F19.2-30
Rated Voltage, V	192	256	320	384
Rated Capacity, Ah	50	50	50	50
Rated Capacity, kWh	9.6	12.8	16.0	19.2
Operating voltage range, V	171-216	228-288	285-360	342-432

Other Ratings.....:

Models	LX F9.6-30, LX F12.8-30, LX F16.0-30, LX F19.2-30
Max. charging current, A	35
Max. discharging current, A	35
Charging Temperature range (ambient), °C	0 - 50
Discharging Temperature range (ambient), °C	-15 - 50
Altitude, m	3000
IP Rating	IP65

Accessories.....: N/A

Testing Laboratory 1.....: SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

Address 1.....: No.2, Jianghao Industrial Factory Area, No.430, Jihua Road, Bantian Street, Longgang District, Shenzhen, Guangdong, China

Testing Laboratory 2 ..... : SGS-CEC New Energy Technology (Chongqing) Co., Ltd

Address 2.....: Building 13 &14, No. 1839, Ranjun Road, Shuangfu Street, Jiangjin District, Chongqing, China

Testing Laboratory 3 ..... : Compliance Certification Services (Kunshan) Inc.

Address 3.....: No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China

Date of receipt of test item.....: 2024-07-10 (Original date: 2022-06-08, 2022-12-07, 2024-01-10)

Date(s) of performance of tests.....: 2024-07-11 (Original date: 2022-07-08 to 2022-08-29, 2022-12-08 to 2023-01-10, 2024-01-16 to 2024-03-15)

Certification Conditions (X Condition).....: N/A

Component Conditions (U Condition).....:	1. The enclosure of battery system was evaluated to establish an IP rating of IP65 with the Standard for Degrees of Protection Provided by Enclosure (IP Code), IEC 60529. 2. The lithium-ion battery system provided one grounding screw in high voltage control box to be grounded through grounding conductors to the earth in the end installation. The lithium-ion battery system has been subjected to ground continuity test only between the metal enclosure and grounding screw of pack, grounding conductors between the grounding screw of the pack to the earth should be provided in the end installation and the acceptance of the continuity of the whole grounding system should be determined in the end application. 3. The maximum configuration of battery system, model LX F19.2-30, is 6 modules and the high voltage control box. It's only investigated for the series connection, not for parallel connection. The maximum voltage of battery system is 432 Vdc, the spacings requirement shall be considered if series connected more than 6 modules in the end use application. 4. The instructions for the proper installation and use including charging and discharging, storage, recycling and disposal shall be required for the end use application. These instructions shall include temperature limits, charging and discharging limits as well as instructions regarding the use of any controls or monitoring systems.

CO-LISTING PAGE

CO-LISTING APPLICANT I

Applicant's Name: _____

Address: _____

_____

Primary Contact: _____

Phone: _____

Fax: _____

Email: _____

Product Correlation:

Basic Models	Co-Listed Models	Note any differences between Basic and Co-Listed models

CO-LISTING APPLICANT II

Applicant's Name: _____

Address: _____

_____

Primary Contact: _____

Phone: _____

Fax: _____

Email: _____

Product Correlation:

Basic Models	Co-Listed Models	Note any differences between Basic and Co-Listed models

GENERAL INFORMATION

Components
Components used in the covered products must be those outlined in the latest edition of the Listing Report.

Listing Marking
This report along with a valid certificate authorizes the certificate holder to use the Listing Marking of SGS North America only on products covered by this report and in accordance with the Product Certification Program Policy Handbook.

Production Line Tests
Manufacturing and Production Tests shall be performed as required by this Report.

Responsibility of the Manufacturer and Factory

1) It is the manufacturer and factory's responsibility to restrict the use of markings which reference SGS to those products which are found by the manufacturers own inspection to comply with the product description in this report. This includes reference to SGS directly and/or indirectly.

2) During hours in which the factory is in operation, the SGS inspector shall be given unlimited access to any portion of the premises where the product and/or parts are being produced, assembled, inspected and labeled; and to the test area designated for routine tests. The SGS inspector shall be permitted to inspect and subject the products to prescribed tests prior to shipment any product bearing or intended to bear marking referencing SGS.

3) The factory shall provide all required testing equipment and facilities including trained personnel for conducting all routine tests that are to be performed at the factory. These shall be available when needed so that the inspection work can proceed without delays.

Follow up Inspections

As part of the SGS Follow-Up inspection, it is required that an inspector periodically visit the factory location(s) and select for examination and/or testing, the most recent production sample of the product covered in the Listing Report.

SGS Inspector

1) A product which is found by the SGS inspector to have features which make it unacceptable to bear marking referencing SGS shall be corrected if the listing marking is to be used. The inspector shall carefully check additional production for such features until conditions are considered normal.

2) A product which does not comply with the provisions of the listing report shall have all reference to SGS removed. If the rejection of the product is questioned by the factory representative, it may be put on hold in separate area of location pending appeal. The factory shall satisfy the inspector that all marks referencing SGS are removed from the rejected material or finished product. Factory shall destroy product and or turn over to inspector for destruction.

3) All discrepancies between the product and the listing report shall be immediately stated to the attention of the factory representative. This shall be noted in the follow-up inspection report as a discrepancy.

GENERAL CONSTRUCTIONAL REQUIREMENTS TO BE VERIFIED

Construction Details - This section specifies construction and component details in addition to the critical components table which are to be verified during factory follow-up inspections. Details or photos shall be provided here on any specific areas the inspector shall verify on the production line.

Electrical Drawings – The following table lists the electrical drawings (Schematics, BOM, PCB Layout) used during evaluation.

Item No.	Drawing Title	Drawing Number	Revision	Date (mm/dd/yy)
1	Bom of BCU	BCU-B30-202-002	V2.4	01/05/2023
2	Schematic of BCU	BCU-B30-202-002	V1.2	06/27/2022
3	PCB Layout of BCU	BCU-B30-202-002	V1.2	06/27/2022
4	Bom of BMU	BMU-B30-24-204	V1.5	06/27/2023
5	Schematic of BMU	BMU-B30-24-204	V1.4	11/01/2021
6	PCB Layout of BMU	BMU-B30-24-204	V1.4	11/01/2021
7	Bom of DC/DC	290-50096	T0	12/08/2023
8	Schematic of DC/DC	290-50096	T0	12/08/2023
9	PCB Layout of DC/DC	190-50093	T0	12/07/2023

ROUTINE TESTS FOR MANUFACTURING AND PRODUCTION

The manufacturer shall perform the following Manufacturing and Production Tests on 100% of equipment produced which has both hazardous live parts and accessible conductive parts.

1, **Active Controls Checked**

Battery systems shall be subjected to 100% production screening to determine that any active controls utilized for safety are functioning.

2, **Dielectric Voltage Withstand Test**

As a routine production line test, each appliance shall be subjected either to a voltage of substantially sine-wave form having a frequency of 50 Hz or 60 Hz, or to a d.c. test voltage equal to the peak voltage of the prescribed a.c. test voltage, and shown in the table below:

The results are acceptable if there is no dielectric breakdown.

Test Point	Test Voltage	Test Time
Module +/- to Metal Enclosure of Module	2500 Vd.c.	Min. 1 second
System +/- to Metal Enclosure of high voltage control box	2500 Vd.c.	Min. 1 second
System +/- to communication circuit of BMU	4000 Vd.c.	Min. 1 second
System +/- to communication circuit of BCU	4000 Vd.c	Min. 1 second

3, **Continuity Test**

A continuity check of the grounding system using a milliohmmeter or other method, shall be conducted on 100% production employing protective grounding. The continuity check shall determine that measurements made on any two points of the grounding system do not exceed 0.1 Ω.

A visual or audible device (ohmmeter, buzzer, etc.) may be used to indicate grounding continuity.

PHOTOGRAPHS

External view of battery system, model LX F9.6-30

PHOTO NO. 1-2

External view of battery system, model LX F12.8-30

PHOTO NO. 3-4

External view of battery system, model LX F16.0-30

PHOTO NO. 5-6

External view of battery system, model LX F19.2-30

PHOTO NO. 7-8

Base of Battery System

PHOTO NO. 9-10

External view of basic battery module, model: LX F3.2-30

PHOTO NO. 11-12

Internal view of basic battery module, model: LX F3.2-30

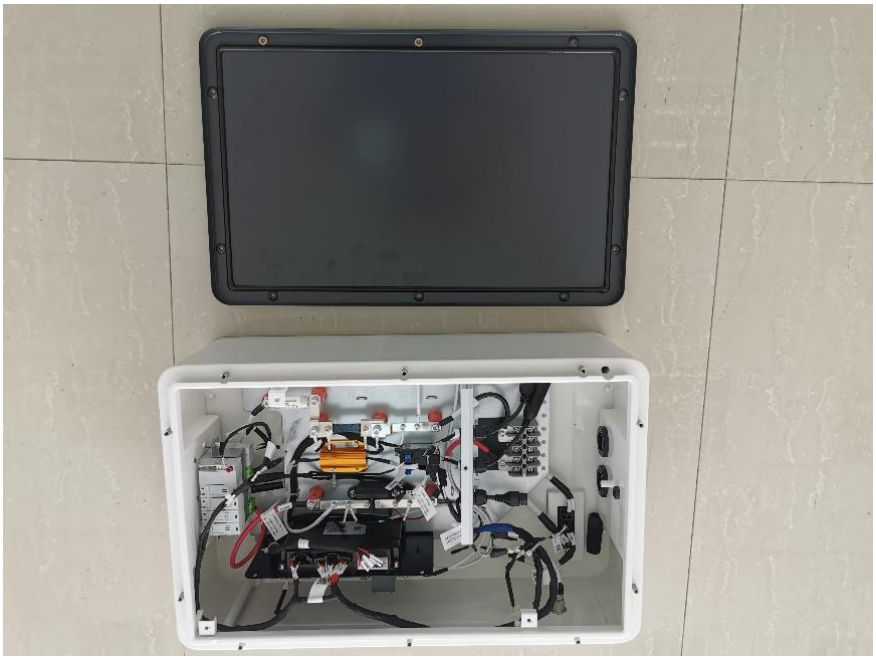
PHOTO NO. 13-14

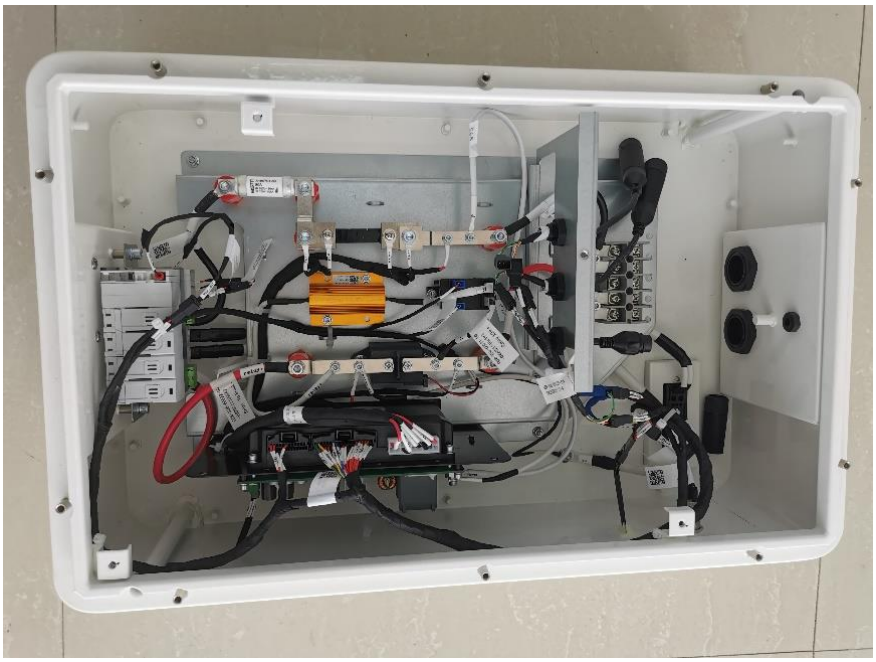
External view of high voltage control box

PHOTO NO. 15-16

Internal view of high voltage control box

PHOTO NO. 17-18

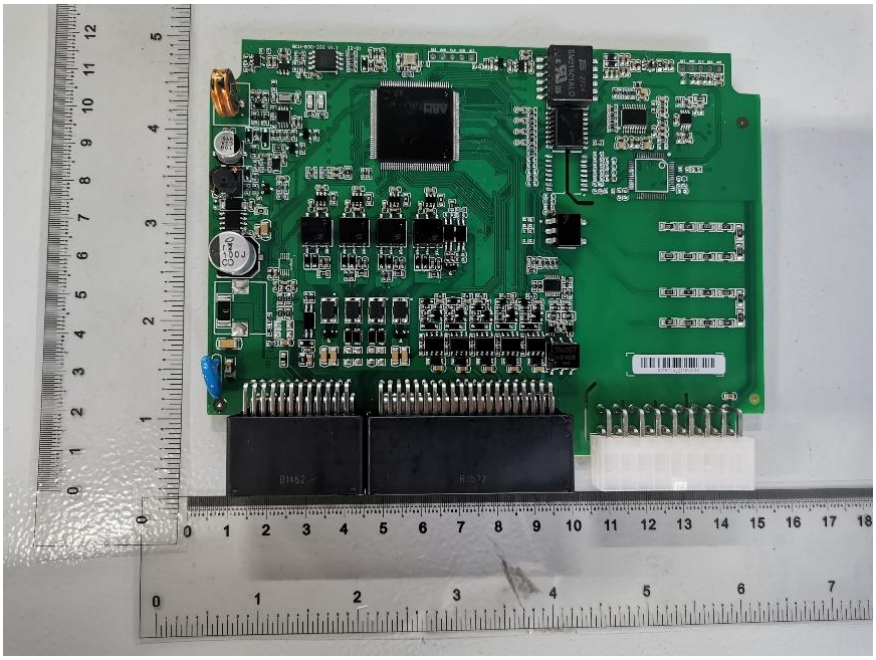


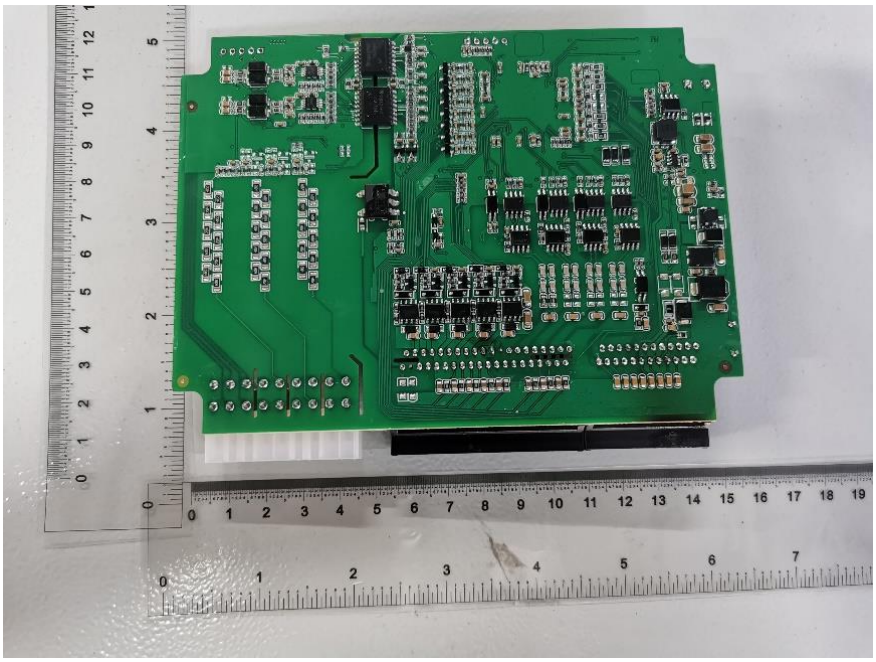


External view of BCU box

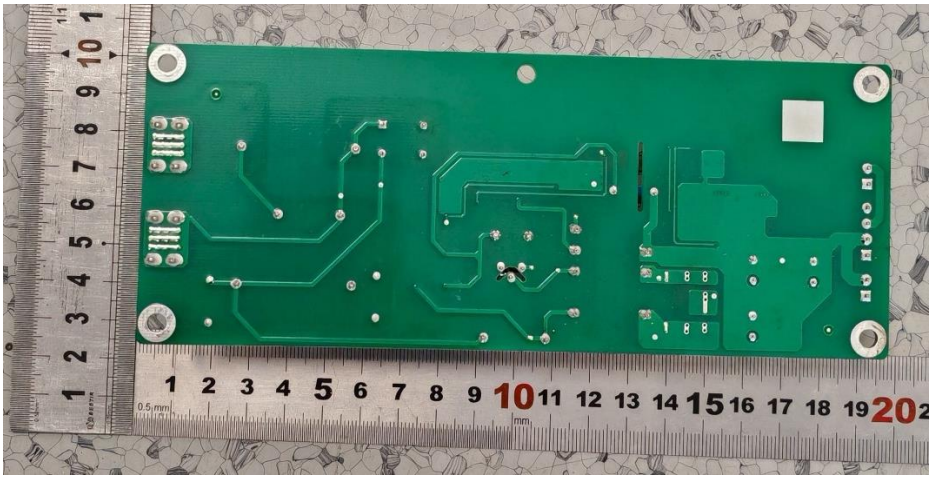
PHOTO NO. 19-20

View of PCBA of BCU

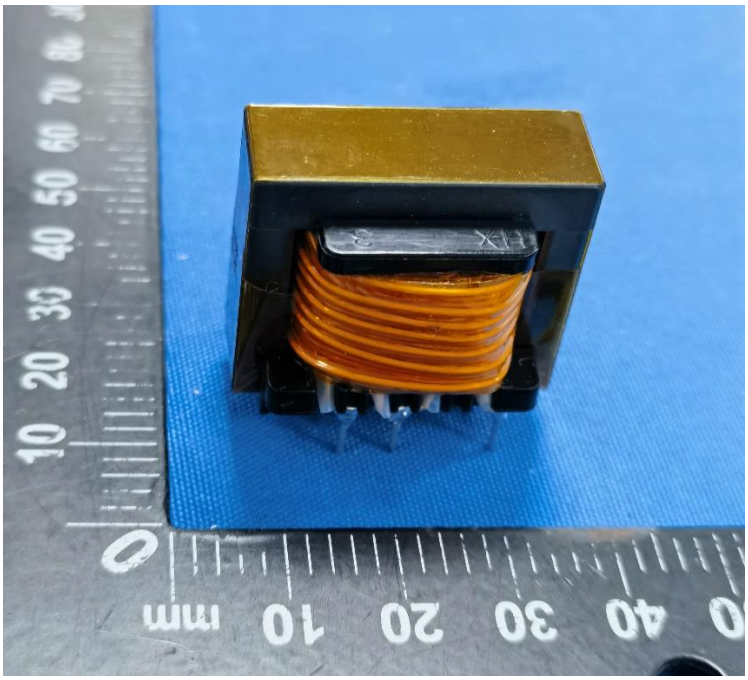


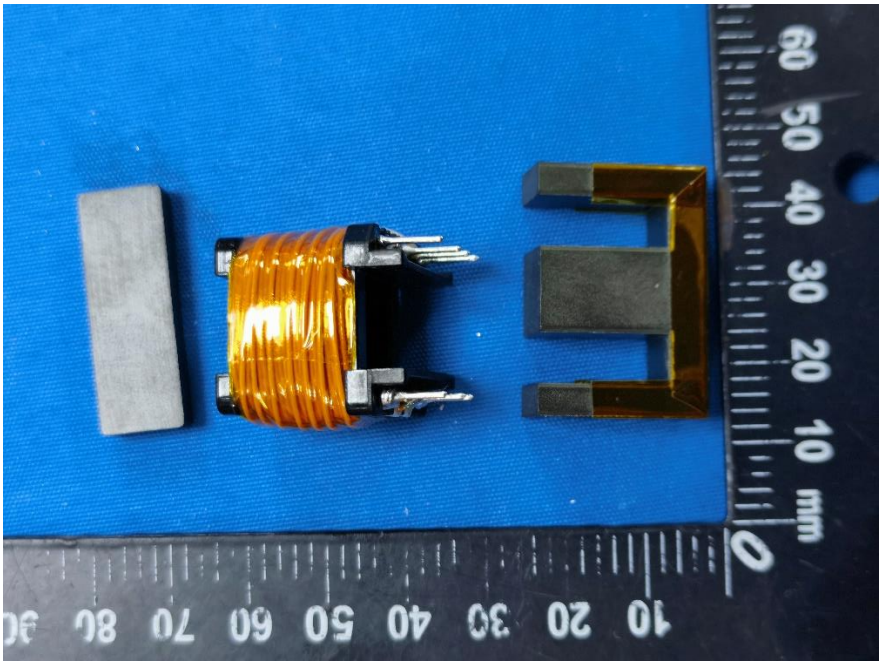


View of DC/DC Module



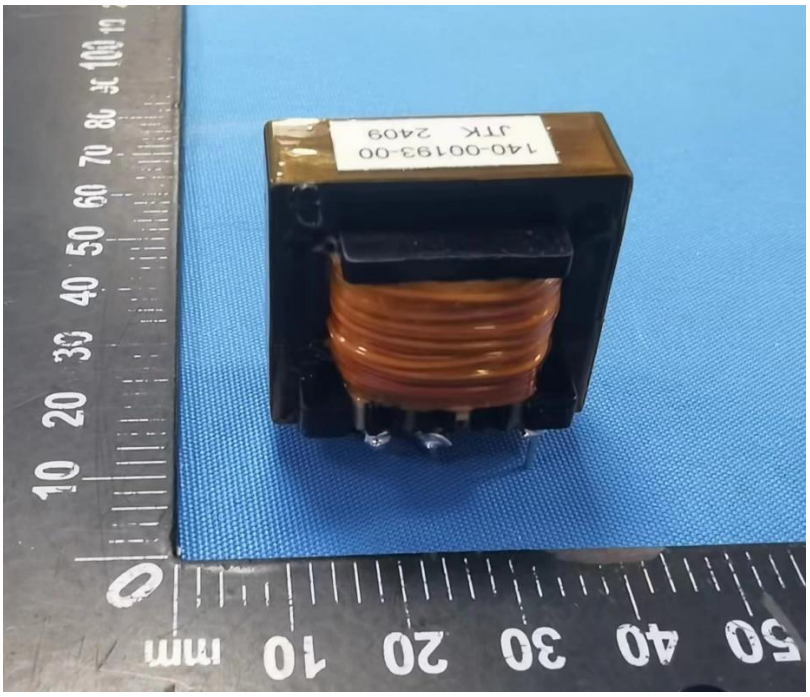
View of Transformer of DC/DC Module, Model 140-00193-00 by Lianfeng

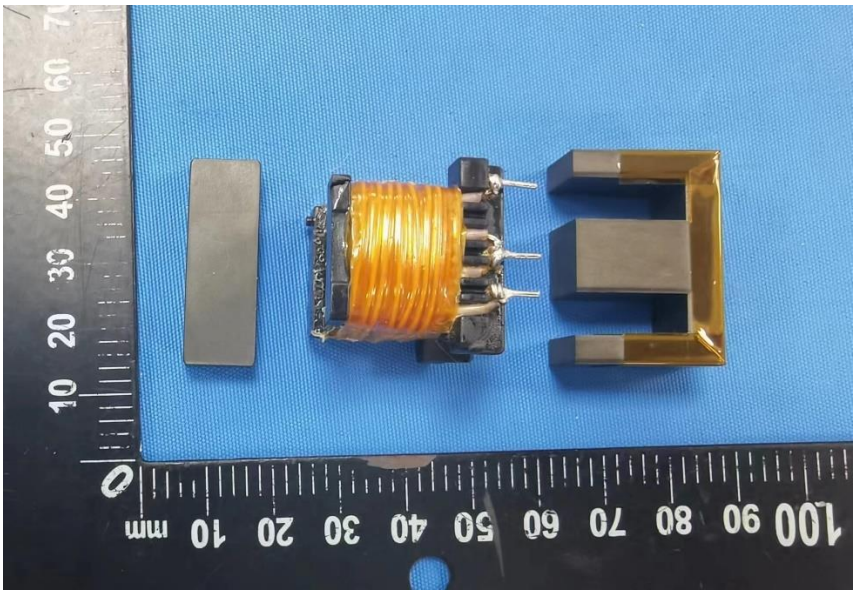




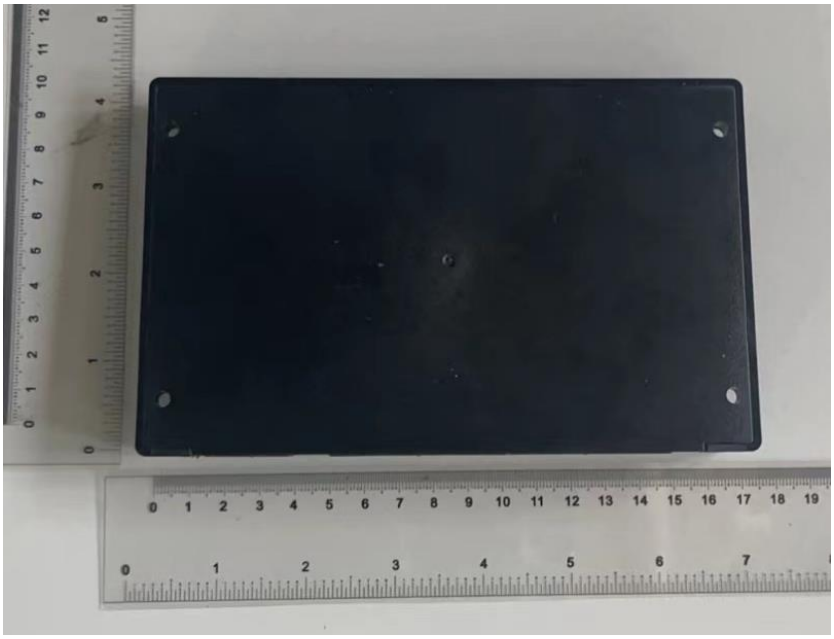
View of Transformer of DC/DC Module, Model 140-00193-00 by JTK

PHOTO NO. 27-28

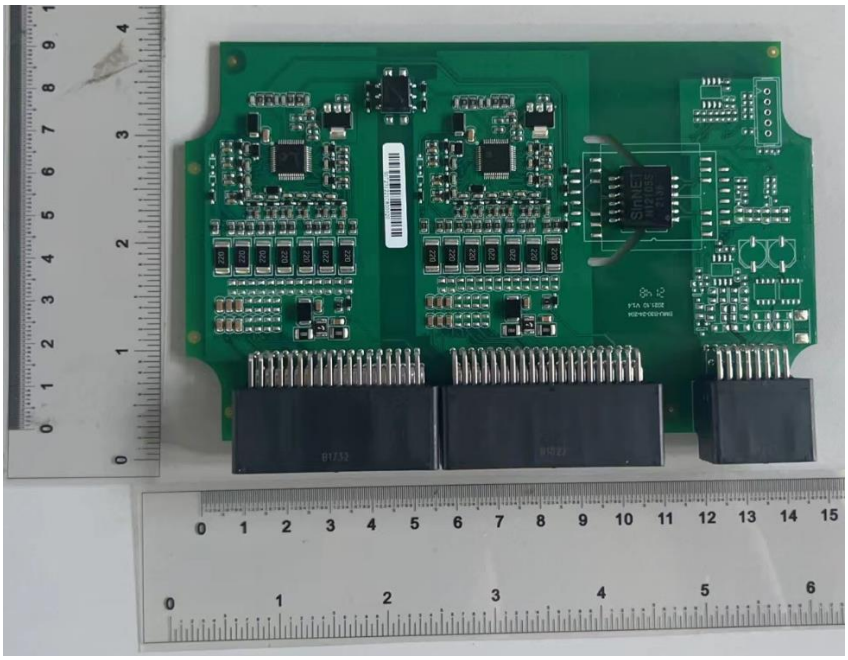


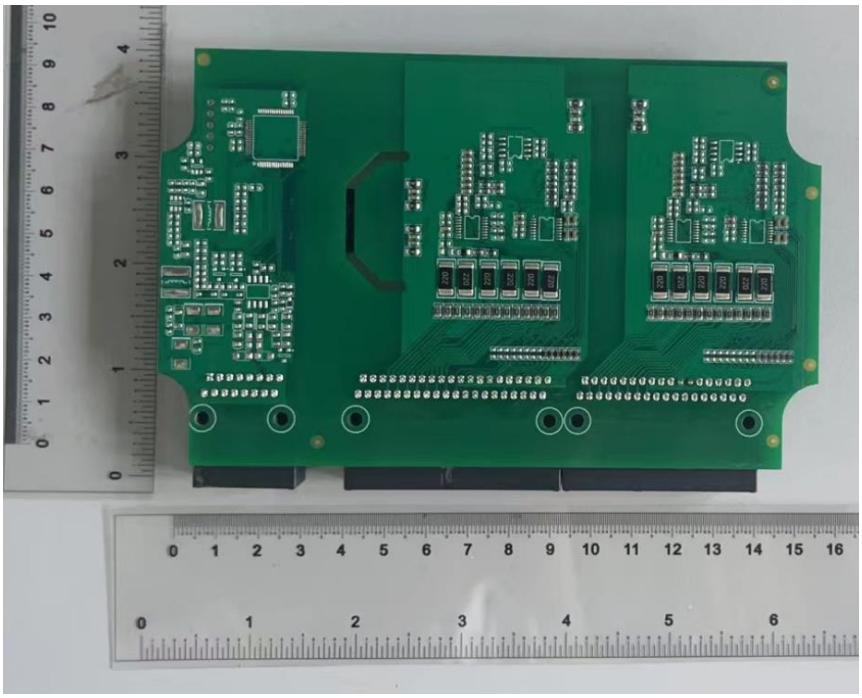


External view of Basic Battery Module Sub-Control Box

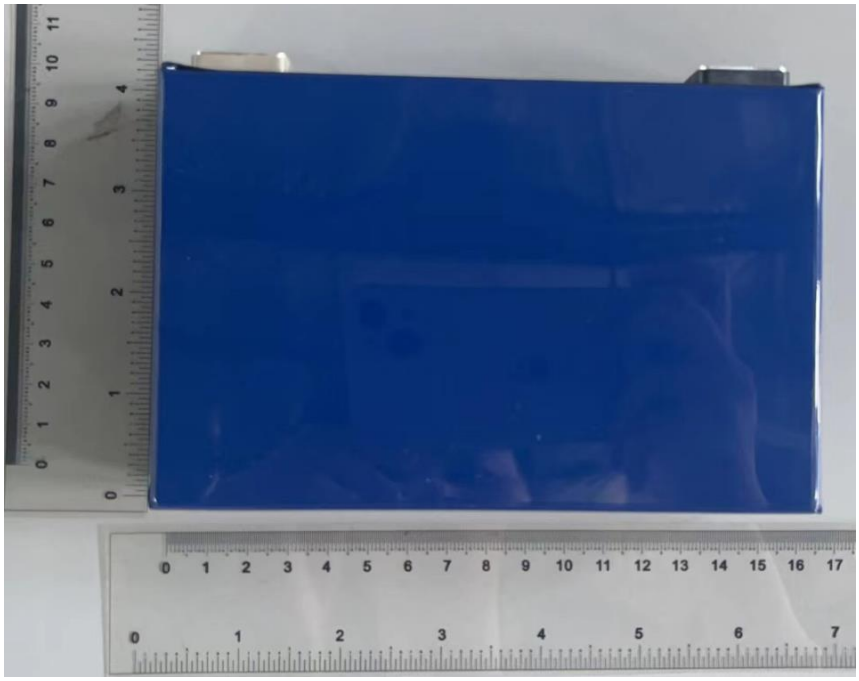


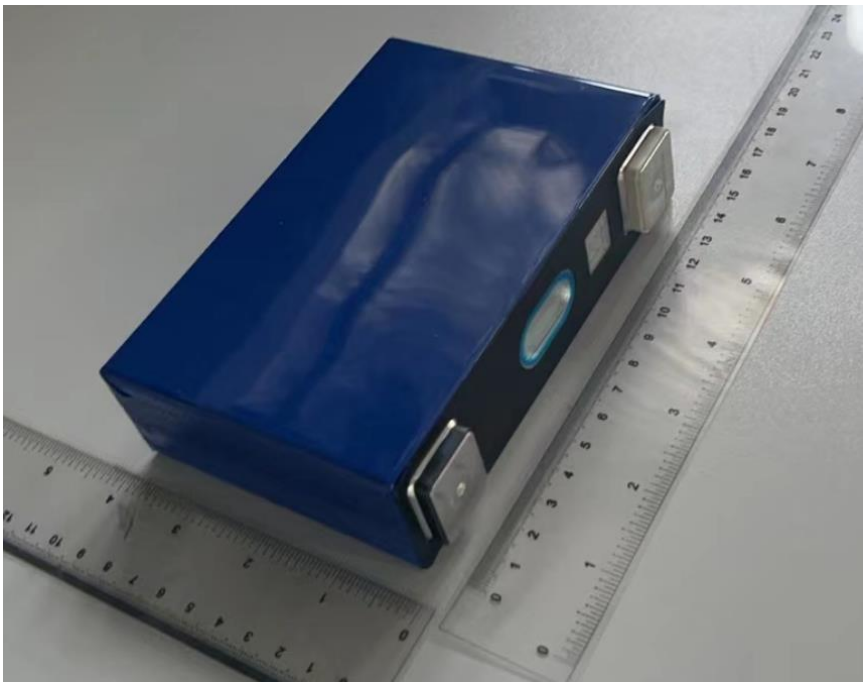
View of PCBA of Basic Battery Module Sub-Control



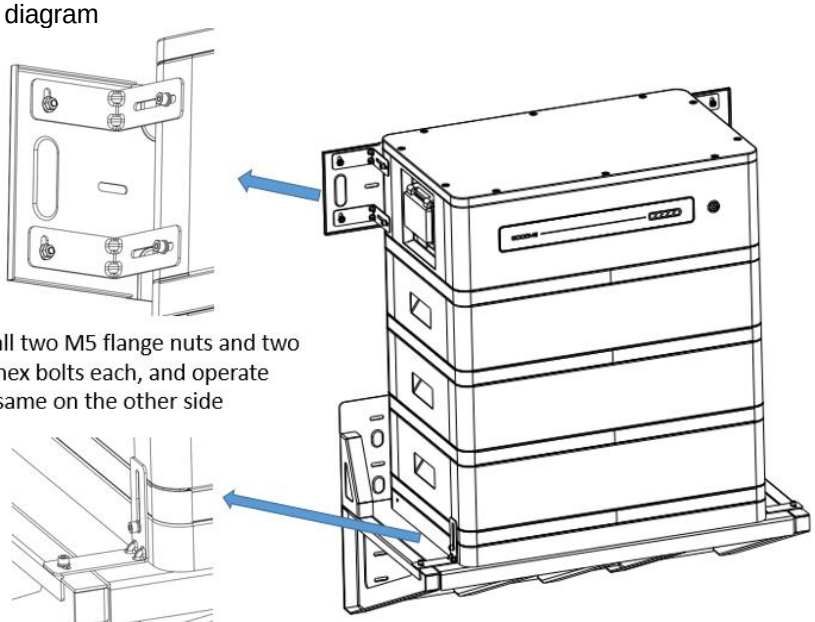


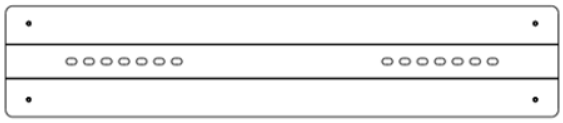
View of Cell



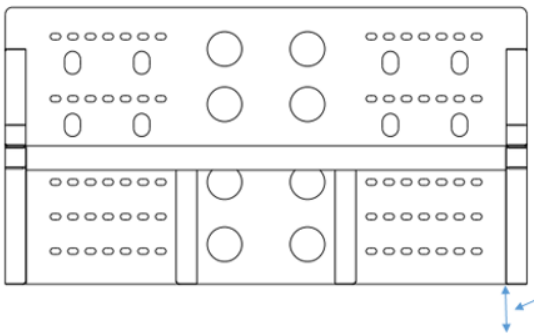


Wall mounting schematic diagram





The hole at the arrow position needs to be installed with expansion screws M8 or self drilling screws M8 and fixed on the wall



0mm≤Distance from the ground ≤ 150mm

CRITICAL COMPONENTS

The following components are considered “critical” in terms of this certification and must be verified during factory inspections. No substitutions or alternate components are allowed unless specifically as stated in this report.

Photo No.	Item No.	Component name	Manufacturer/ trademark	Type/model	Technical data	Standard	Mark(s) of conformity
	1	Marking label	Interchangeable	Interchangeable	Min. range (min. temp -20 °C, max temp 80 °C), suitable for adhering on SPCC surface	UL 969, CSA C22.2 No. 0.15	UR
1-8	2	Metal enclosure	Interchangeable	Interchangeable	SPCC: Min. thickness: 1.2 mm	--	*
	3	Seal rings for metal enclosure	SuZhou Jin Teng Electronics Co Ltd	JTR1795-1800	Ambient Service Temperature Range: -50 °C – 150 °C	UL 157	UR (MH65658)
	4	Coating for metal enclosure	AkzoNobel Coatings S.L.U.	Interpon D1036	Red, white, and black colors only. Min. dry film thickness 0.0015 in.	UL 1332	UR (MH26202)
	5	Insulation Tube	Interchangeable	Interchangeable	Min. 105 °C, VW-1	UL 224, CSA-C22.2 No. 198.1 (2006)	UR
	6	Insulation Tube	Interchangeable	Interchangeable	Min. 105 °C, VW-1	UL 1441, CSA-C22.2 No. 198.3	UR
	7	Signal Wiring	Interchangeable	Interchangeable	Min. 80 °C, Min. 300 V, Min. 22 AWG	UL 758, CSA-C22.2 No. 127	UR
	8	Power Wiring	WUXI XINHONGYE WIRE & CABLE CO LTD	10269	105 °C, 1250 Vdc, 8 AWG	UL 758, CSA-C22.2 No. 127	UR (E248566)
	8a	Power Wiring (Alt.)	Interchangeable	Interchangeable	Min. 105 °C, Min. 750 Vdc, Min. 8 AWG	UL 758, CSA-C22.2 No. 127	UR

	9	Power Connector	AVIC JONHON OPTRONIC TECHNOLOGY CO., LTD	DLA21T-YY, DLA21Z-YY	1500 V, 35 A, -55 °C – 125 °C	UL 1977, CSA-C22.2 No. 182.3	UR (E203642)
	10	Black Signal Connector of PCBA (J1, J2, JV1~JV3)	LOTES CO LTD	AAUS01AP2	3 A, -40 °C to 85 °C	UL 1977, CSA-C22.2 No. 182.3	UR (E187055)
	10a	Black Signal Connector of PCBA (J1, J2, JV1~JV3) (Alt.)	Interchangeable	Interchangeable	3 A, -40 °C to 85 °C	UL 1977, CSA-C22.2 No. 182.3	UR
21-24, 31, 32	11	PWB	KUNSHAN HUATAO ELECTRONICS CO LTD	HT-D	V-0, 130 °C	UL 796, CSA C22.2 No. 0.17	UR (E318580)
	11a	PWB (Alt.)	Interchangeable	Interchangeable	V-0, 130 °C	UL 796, CSA C22.2 No. 0.17	UR
Battery Pack, Model LX F3.2-30							
33, 34	12	Cell	REPT BATTERO Energy Co., Ltd.	CB3914895EA	3.2 V, 50 Ah (20S1P)	ANSI/CAN/UL 1973:2022	CSA MASTER CONTRACT: 301650, REPORT: 80064143
	13	Busbar	Interchangeable	Interchangeable	AL1060, 140 A, Minimum thickness:1.5 mm	--	*
	14	Orange Plastic insulator of sub-module terminals	Interchangeable	Interchangeable	Min. V-2, min. 80 °C	UL 94, UL 746, CSA C22.2 No. 0.17	UR
	15	Black Plastic cover of sub-module	Interchangeable	Interchangeable	Min. V-2, min. 80 °C	UL 94, UL 746, CSA C22.2 No. 0.17	UR
	16	Insulation Tape	Interchangeable	Interchangeable	Min. 105 °C	ANSI/CAN/UL 510A	UR
	17	Epoxy board	Interchangeable	Interchangeable	Min. V-2, min. 80 °C, min. thickness 1 mm	UL 94, UL 746, CSA C22.2 No. 0.17	UR

	18	Yellow Power Connector	Changzhou Amass Electronics Co Ltd	XT90H-F, XT90H-M	500 V, 30 A	UL 1977, CSA-C22.2 No. 182.3	UR (E482722)
	19	Black Module Connector	Interchangeable	Interchangeable	V-2, 80 °C	UL 1977, CSA-C22.2 No. 182.3	UR
	20	NTC Sensor	THINKING ELECTRONIC INDUSTRIAL CO LTD	TSM1A103	10 kohm at 25 °C, T_{moa} 125 °C	UL 1434 or UL60730-1, CAN/CSA-E60730-1	UR (E138827)
27, 28	21	Battery Manage Unit (BMU)	Hangzhou Xieneng Technology Co., Ltd.	BMU-B30-24-204-000-001	--	--	*
	21-1	Enclosure of BMU	FORMOSA CHEMICALS & FIBRE CORP PLASTICS DIV	AC310(+)	V-0, 85 °C, min. thickness 1.5 mm	UL 94, UL 746, CSA C22.2 No. 0.17	UR (E162823)
	21-2	Transformer (TJ4)	SHENZHEN SINODRIVE ELECTRIC TECHNOLOGIES CO., LTD	N12105S	-40 °C to +125 °C, 1600 VDC	UL 62368-1, CAN/CSA-C22.2 No. 62368-1	UR (E523028)
	21-3	AFE (U1_V1, U1_V2)	ADI	ADBMS6815	0 V ~ 5V, -40 °C to 125 °C	--	*
	21-4	Balanced resistance (RV99_V1, RV101_V1, RV103_V1, RV105_V1, RV107_V1, RV109_V1, RV111_V1, RV113_V1, RV115_V1, RV117_V1, RV119_V1, RV121_V1, RV123_V1, RV99_V2, RV101_V2,	UNI-ROYAL	25121WF430JT4E	22 Ω, 1 W, 1%	--	*

		RV103_V2, RV105_V2, RV107_V2, RV109_V2, RV111_V2, RV113_V2, RV115_V2, RV117_V2, RV119_V2, RV121_V2, RV123_V2)					
High-voltage control box, Model PCU-F21							
	22	Film indicator	SABIC INNOVATIVE PLASTICS B V	9030(f1)(m)	HB, Min. 1.5 mm thickness, 125 °C	UL 94, UL 746C, CSA C22.2 No. 0.17	UR (E45329)
	22a	Film indicator (Alt.)	TEIJIN LIMITED RESIN AND PLASTIC	L-1250U(#)(f1)	V-2, Min. 0.84 mm thickness, 115 °C	UL 94, UL 746C, CSA C22.2 No. 0.17	UR (E50075)
	23	Seal rings for Film indicator	SuZhou Jin Teng Electronics Co Ltd	JTR1795-1800	Ambient Service Temperature Range: -50 °C – 150 °C	UL 157	UR (MH65658)
	24	Breaker Cover	CHI MEI CORPORATION	PC-6710(f1)(a)	V-0, 120 °C, minimum thickness 3.0 mm	UL 94, UL 746C, CSA C22.2 No. 0.17	UR (E56070)
	25	Circuit Breaker	NOARK ELECTRIC USA INC	Ex9BP	600 Vdc, 50 A	UL 1077, CSA-C22.2 No. 235	UR (E355391)
	26	Stuffy Cover and Vent Valve	BASF SE	A3UG5 (t)(f1)	5VA, 90 °C, minimum thickness 1.5 mm	UL 94, UL 746C, CSA C22.2 No. 0.17	UR (E41871)
	27	Main Relay	SHANGHAI LIANGXIN ELECTRICAL Co., Ltd.	NDZ3T-40	750 Vdc, 40 A, -40 °C - 85 °C	UL 508, CSA-C22.2 No. 14	UR (E514982)
	28	Pre-charge Relay	Y M TECH	EVR10-24S	750 Vdc, 10 A, -40 °C - 85 °C	UL 508, CSA-C22.2 No. 14	UR (E210800)

	29	Terminal Block	SHENZHEN CONNECTION ELECTRONIC CO LTD	DRTB16-R60(54)	600 V, 65 A, -55 °C – 125 °C	UL 486	UR (E304128)
25, 26	30	Transformer (TX100)	Haining Lianfeng Dongjin Electronics Co., Ltd.	140-00193-00	Output 24 Vdc, 0.96 mH±10%, -40 °C – +130 °C	--	*
	30-1	Bobbin	CHANG CHUN PLASTICS CO LTD	T375HF	Min. thickness 0,43 mm, V-0, 150 °C, CTI 3	UL 94, UL 746	UR (E59481)
	30-1	Bobbin (Alt.)	SUMITOMO BA KELITE CO LTD	PM-9630 PM-9820	Min. thickness 0,43 mm, V-0, 150 °C, CTI 3	UL 94, UL 746	UR (E41429)
	30-2	Triple Insulated Wire for Primary/Secondary	SHENZHEN KAIZHONG HEDONG NEW MATERIALS CO LTD	TIW-B*	130 °C, Class B	UL 2353	UR (E357240)
	30-2	Triple Insulated Wire for Primary/Secondary (Alt.)	KBI COSMOLINK CO.,LTD	TIW-M	130 °C, Class B	UL2353	UR (E213764)
	30-3	Glue	DONG GUAN SHI PAI HUA CHUANG MATERIAL FTY	H907-HF-Z	Min. thickness 4,75 mm, V-0, 130 °C	UL 94, UL 746	UR (E304477)
	30-4	Tube	GREAT HOLDING INDUSTRIAL CO LTD	TFL	Max rms 150 V, Max Oper. Temp 200 °C	UL 224	UR (E156256)
	30-5	Varnishes	SUZHOU TAIHU ELECTRIC ADVANCED MATERIAL CO LTD	T-4260(a)	155 °C	UL 1446	UR (E228349)
	30-6	Tape	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	CT* (c)(g)	130 °C	UL 510A	UR (E165111)

27, 28	30a	Transformer (TX100) (Alt.)	JTK TECHNOLOGY(SUZHOU) CO., LTD	140-00193-00	Output 24 Vdc, 0.96 mH±10%, -40 °C – +130 °C	--	--
	30a-1	Bobbin	CHANG CHUN PLASTICS CO LTD	T375HF	Min. thickness 0.43 mm, V-0, 150 °C	UL 94 UL 746	UR (E59481)
	30a-2	Triple Insulated Wire for Primary/Secondary	SU ZHOU YU SHENG ELECTRIC CO., LTD	TIW-B*	130 °C, Class B	UL 2353	UR (E332529)
	30a-2	Triple Insulated Wire for Primary/Secondary (Alt.)	WUHU OULY ELECTRONICS CO., LTD	OLTIW-B*	130 °C, Class B	UL 2353	UR (E466302)
	30a-3	Glue	DONGGUAN EATTO ELECTRONIC MATERIAL CO., LTD	E-500(XX)	Min. thickness 3 mm, V-0,130 °C	UL 94 UL 746	UR (E218090)
	30a-4	Tube	CHANGYUAN ELECTRONICS GROUP CO., LTD	CB-TT-L	Max rms 150 V, Max Oper Temp 200 °C	UL 224	UR (E180908)
	30a-5	Varnishes	SUZHOU TAIHU ELECTRIC ADVANCED MATERIAL CO LTD	T-4260(a)	155 °C	UL 1446	UR (E228349)
	30a-6	Tape	JINGJIANG YAHUA PRESSURE SENSITIVE GLUE CO LTD	PF*(d)(g)	180°C	UL 510A	UR (E165111)
	31	DC Link Capacitor (C2, C3)	XIAMEN FARATRONIC CO LTD	C3D	800 V, 10 µF ± 5%, -40 °C - 105 °C	ANSI/UL 810, CSA-C22.2 No. 190	UR (E256238)
	32	24 V DC Connector Enclosure (CN101)	Celanese (Suzhou) Engineering Plastics Co Ltd	A 63 R V0 (a)(b)(f2)	V-0, 105 °C, min. thickness 0.38 mm	UL 94, UL 746, CSA C22.2 No. 0.17	UR (E331274)
	33	Control MOS (Q100)	ONSEMI	FQP6N90C	900 V, 6 A	--	*

	34	Y Capacitor (C122)	Walsin Technology Corp	AH Series (#)(&) Y1	400 Vac, 4700 pF, Lower Temp - 40 °C, Upper Temp 125 °C	UL 60384-14, CAN/CSA-E60384-14	UR (E146544)
	35	FUSE	ADVANCED SURGETECH MATERIALS LTD	A180701-80	DC 700V, 80 A	UL 248-1, CSA C22.2 No. 248.1	UR (E470032)
	36	Pre-charge resistor	VICTORY CHINA FAR EAST ELECTRONICS CO., LTD OF BENGBU	RX24	100 Ω, 75 W	--	*
	37	Current diverter	Anhui Laifu Electronic Technology Co.,Ltd	FL-2	75 mΩ, 75 A	--	*
	38	Button switch	ZHEJIANG QIANNIAN ELECTRONIC CO LTD	C-QN19-S	24 V, 1 A	UL 61058-1, CSA-C22.2 No. 61058-1	UR (E489975)
	39	Signal Connector	Interchangeable	Interchangeable	250 V, 5 A	UL 1977, CSA-C22.2 No. 182.3	UR
	40	Red Insulation Block	Interchangeable	Interchangeable	Min. V-2, min. 80 °C, min. height 35 mm	UL 94, UL 746, CSA C22.2 No. 0.17	UR
	41	Cover for Hole through power wiring	BASF SE	A3UG5 (t)(f1)	5VA, 90 °C, minimum thickness 1.5 mm	UL 94, UL 746, CSA C22.2 No. 0.17	UR (E41871)
19, 20	42	Battery Control Unit (BCU)	Hangzhou Xieneng Technology Co., Ltd.	BCU-B30-202-002-001	--	--	*
	42-1	Enclosure of BCU	FORMOSA CHEMICALS & FIBRE CORP PLASTICS DIV	AC310(+)	V-0, 85 °C, min. thickness 1.5 mm	UL 94, UL 746C, CSA C22.2 No. 0.17	UR (E162823)

	42-2	Network transformer (TR2)	SHENZHEN SINODRIVE ELECTRIC TECHNOLOGIES CO., LTD	N12105S	-40 °C to +125 °C, 1600 VDC	UL 62368-1, CAN/CSA-C22.2 No. 62368-1	UR (E523028)
	42-3	Optical Isolators (UH1, UH2)	Panasonic Industry Co., Ltd.	AQV	5000 Vac, -40 °C to 85 °C	UL 1577	UR (E191218)
	42-4	Communication isolation chip (U13, U14, U15)	Suzhou Novosense Microelectronics Co., Ltd	NSI82xxWx-DSWR	5000 Vac, -40 °C to 125 °C	UL1577	UR (E500602)
	42-5	MCU (U6)	ST	STM32F407ZGT6	1.8 V ~ 3.6 V, -40 °C to 85 °C	--	*
	42-6	Communication chip (UN3, UN5)	3PEAK	TP1051V	3 V ~ 5.5 V, -40 °C to 125 °C	--	*
	42-7	AFE (U17, U18)	Texas Instruments	INA239	16 Bit, -40 °C to 125 °C	--	*
	42-8	AFE (U16)	Texas Instruments	ADS1147	16 Bit, -40 °C to 105 °C	--	*
	42-9	White Signal Connector (J3)	CHANGJIANG CONNECTORS CO LTD	C4201	600 V, 9 A, -40 °C to 85 °C	UL 1977, CSA-C22.2 No. 182.3	UR (E326732)
	42-9a	White Signal Connector (J3) (alt.)	Interchangeable	Interchangeable	600 V, 9 A, -40 °C to 85 °C	UL 1977, CSA-C22.2 No. 182.3	UR
	42-10	MOSFET (QHL1, QHL9, QHL10)	NIKO	P9006EVA	Vds: 60 V, Id: 3.6 A	--	*
35, 36	43	Wall mounting accessory (Optional)	Interchangeable	Material: Steel	Min. thickness: 1.5 mm	--	*

*Tested as part of apparatus.

ANNUAL RE-TESTING OF UNLISTED COMPONENTS

The unlisted components on this page are uncontrolled (not falling under a third party certification program) and require periodic retesting and/or evaluation.

Note to SGS Follow Up Inspector: The inspection office will notify you in writing when these components must be selected and sent to the Lab indicated below for re-evaluation.

Ship the samples to: N/A

The unlisted components covered by this report and are required to be re-tested/evaluated are shown in the following table:

PHOTO #	ITEM #	DESCRIPTION	MFR	TYPE/ MODEL	RATING

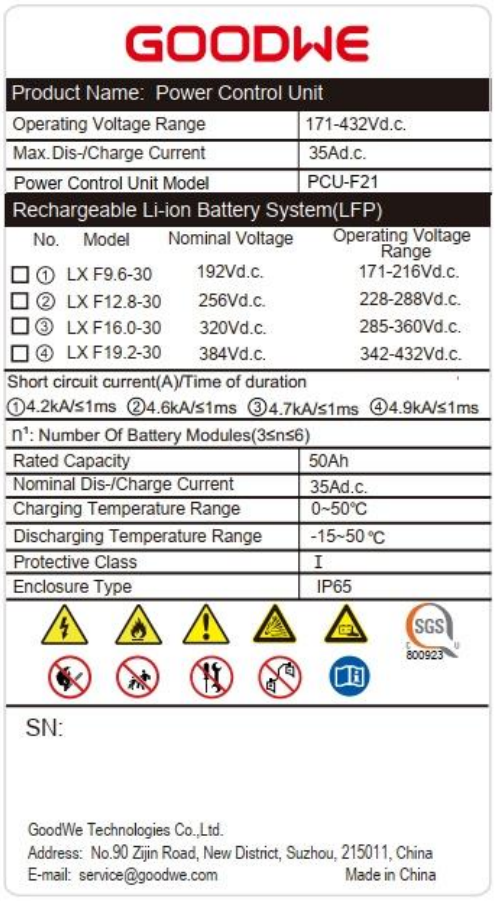
VERIFICATION PROCESS			
Test Standard:			
Frequency of Testing:		No. of Test Samples:	

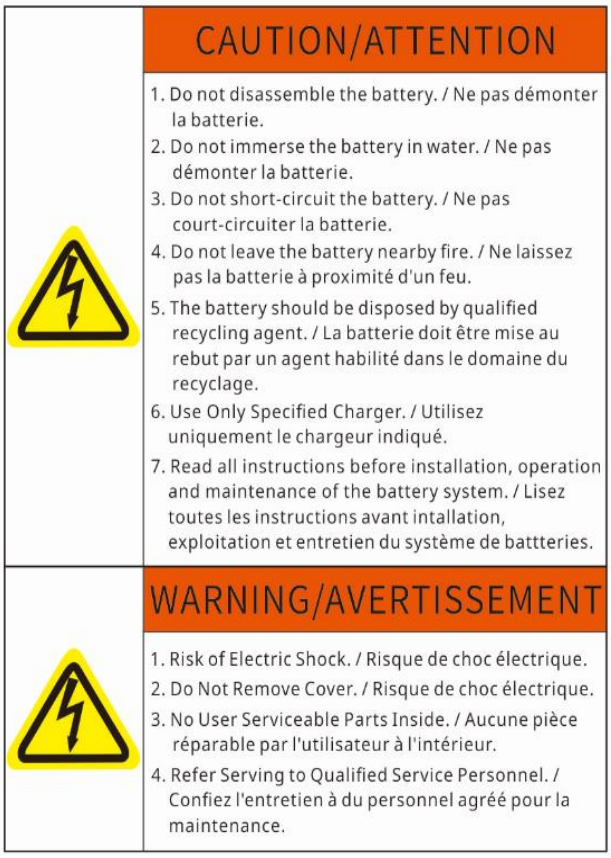
Clause No.	TEST	PARAMETERS

MARKINGS

The following markings are required:

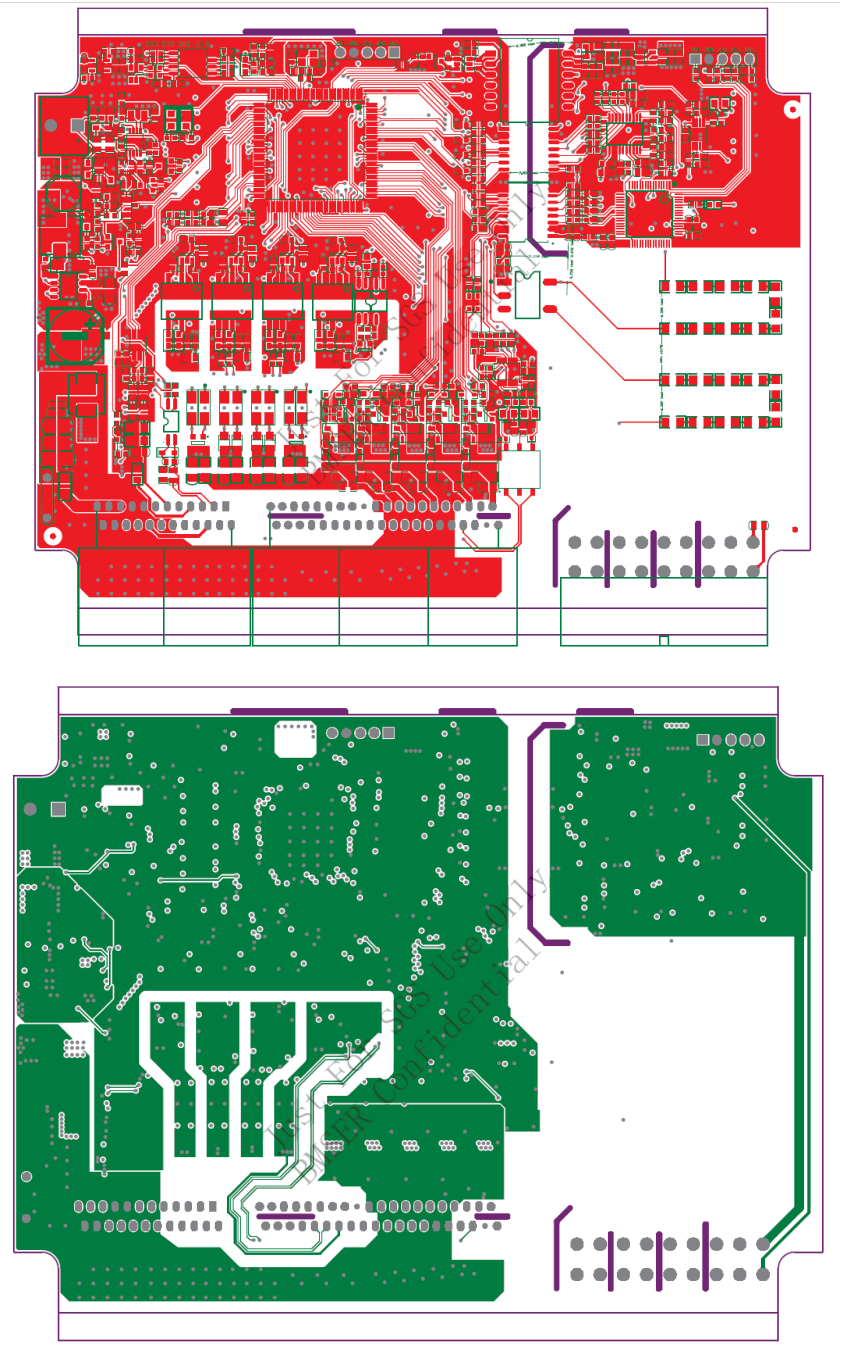
Model LX F9.6-30, LX F12.8-30, LX F16.0-30, LX F19.2-30

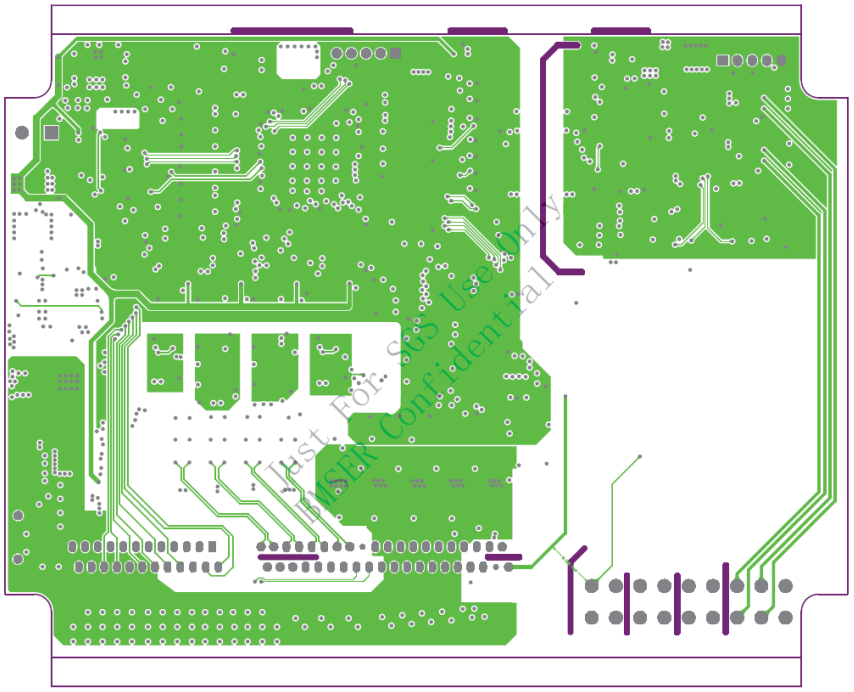




Remark:
1. Height of SGS Logo shall be min. 5mm.
2. Date code: 2269
   22 means year, such as 22 means 2022, 23 means 2023, etc.
   6 means months, such as 1 means January, 2 means February, ……, 9 means September, A means October, B means November, C means December.
   9 means day, such as 1 means 1st, 2 mean 2nd, ……, 9 means 9th, A means 10th, B means 11th, ……, H means 17th, J means 18th, ……, N means 22th, P means 23th, ……, X means 31th, from A to X, jumped I and O.
3. “P+”, “P-” are marked near the polarity of the terminal block of battery system.

ILLUSTRATION 1
PCB Layout of BCU





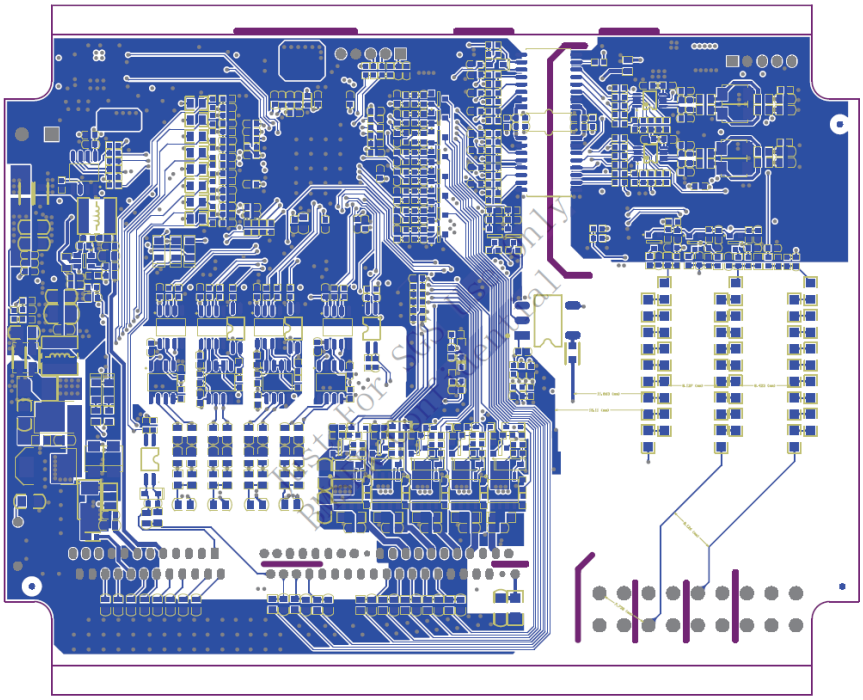
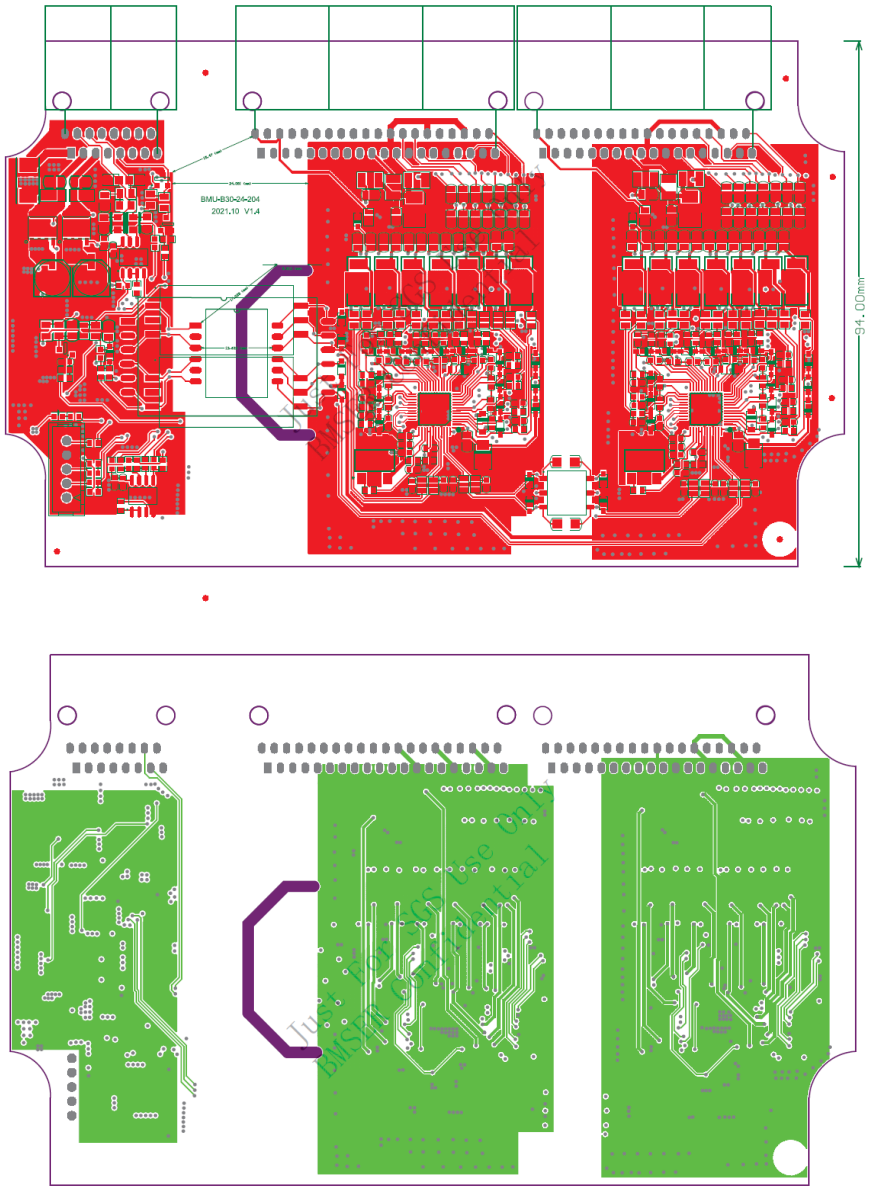
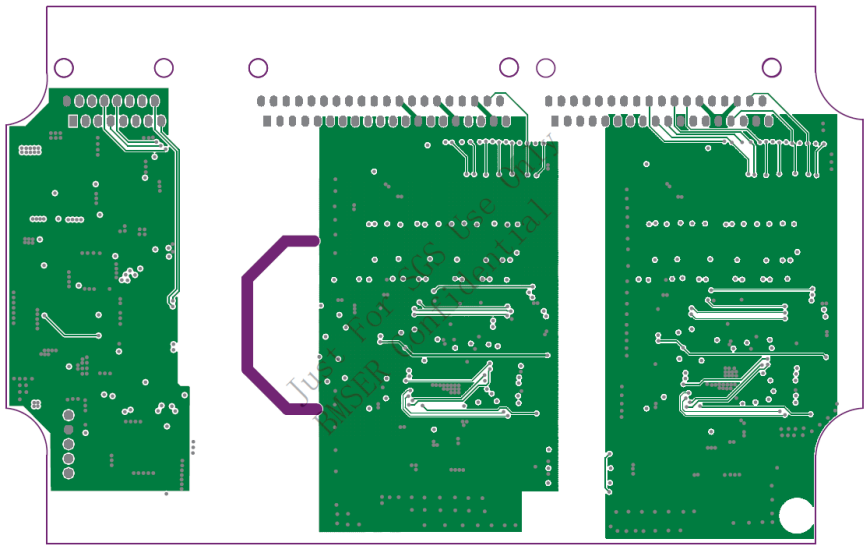


ILLUSTRATION 2
PCB Layout of BMU





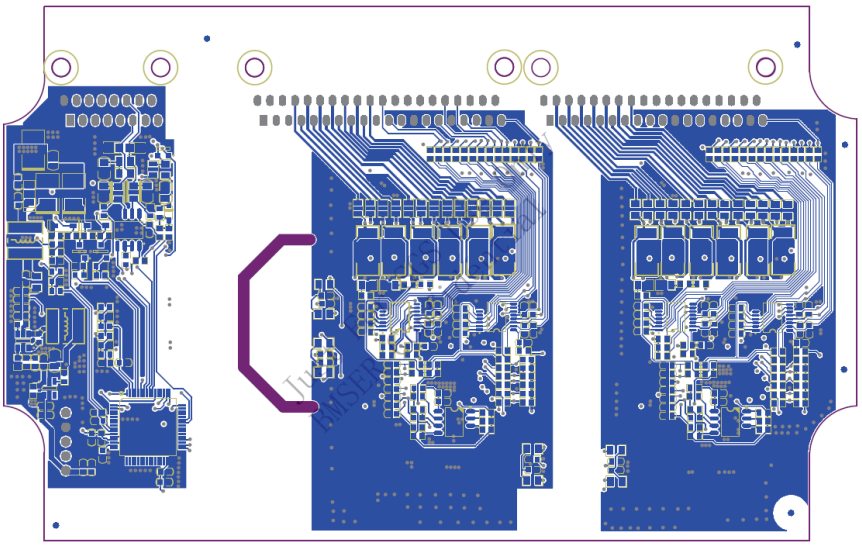


ILLUSTRATION 3
PCB Layout of DCDC Module

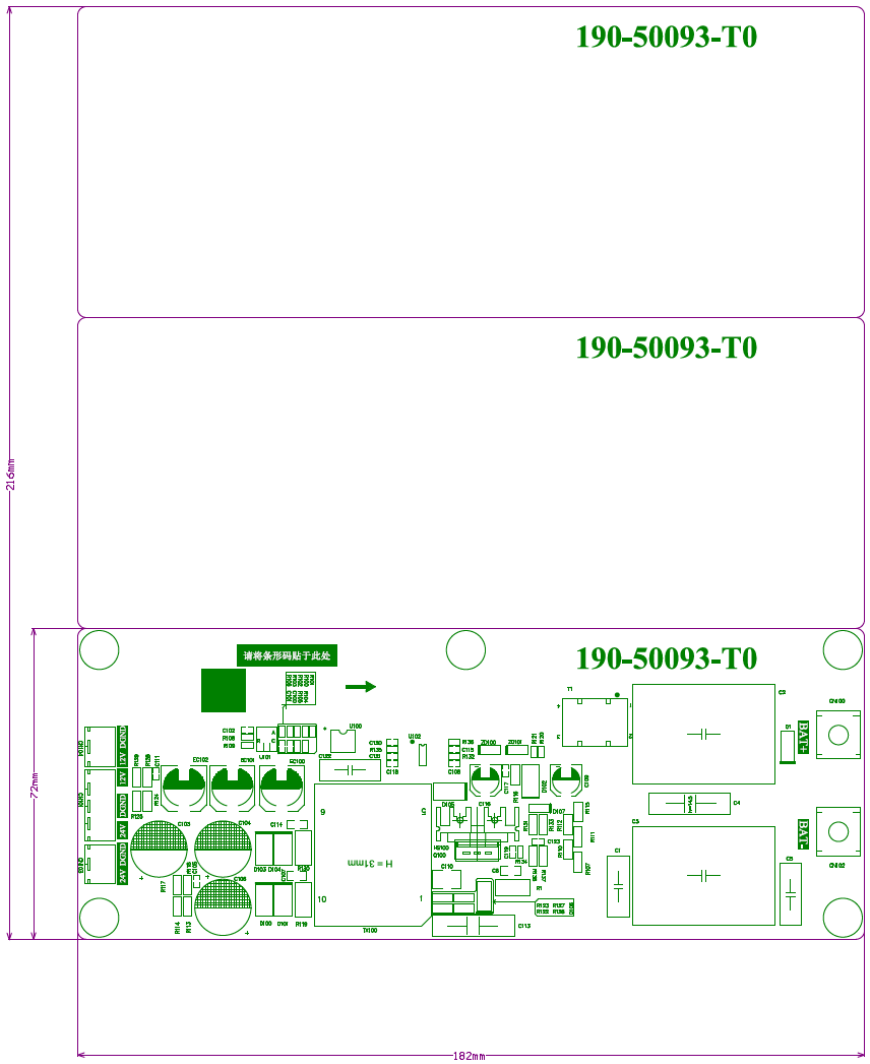


ILLUSTRATION 4

Battery System Overall Dimensions, model LX F9.6-30 (unit: mm)

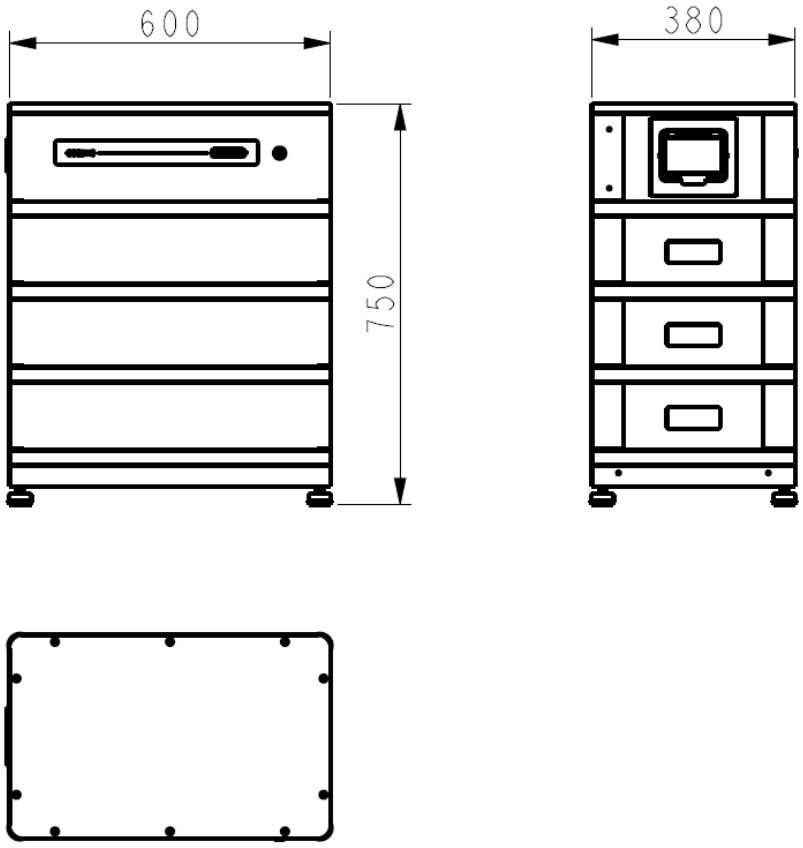


ILLUSTRATION 4

Battery system Overall Dimensions, model LX F12.8-30 (unit: mm)

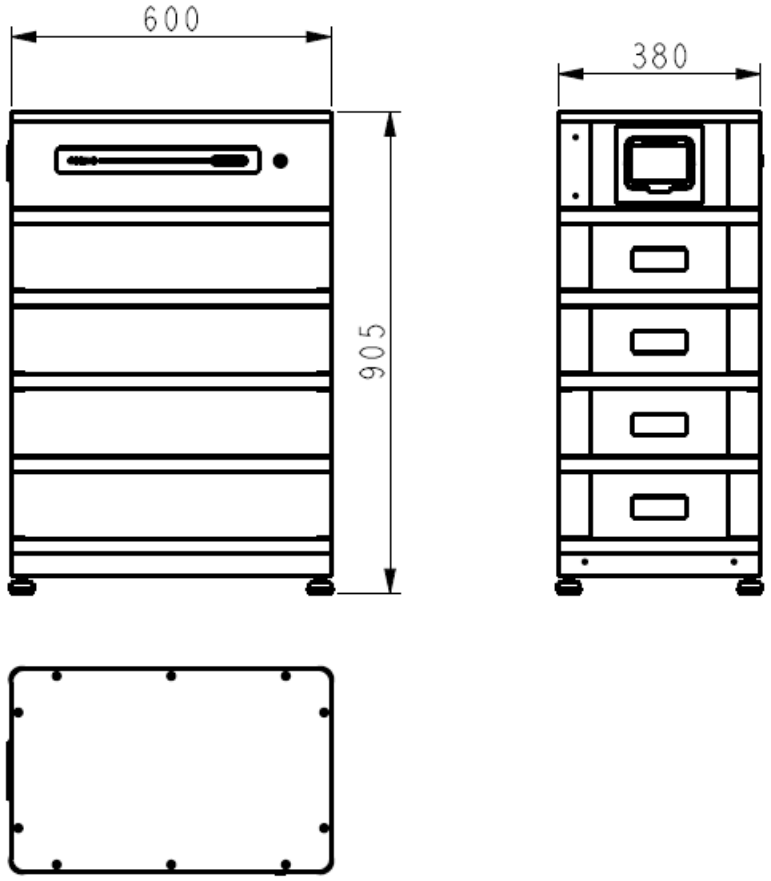


ILLUSTRATION 4

Battery system Overall Dimensions, model LX F16.0-30 (unit: mm)

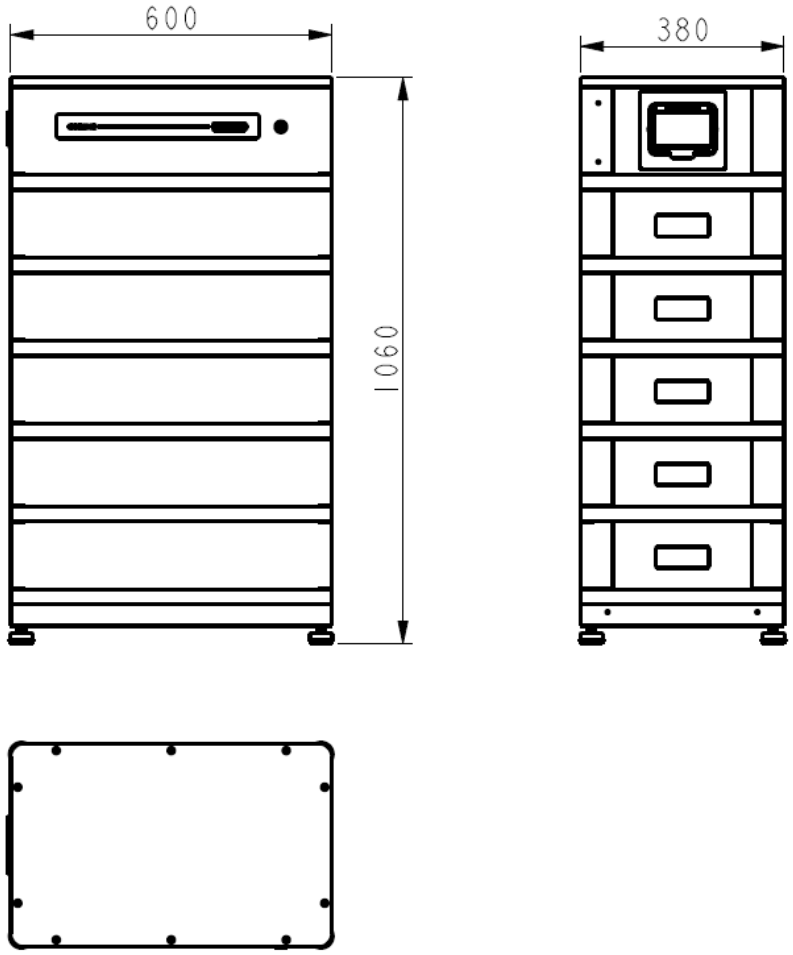


ILLUSTRATION 4

Battery system Overall Dimensions, model LX F19.2-30 (unit: mm)

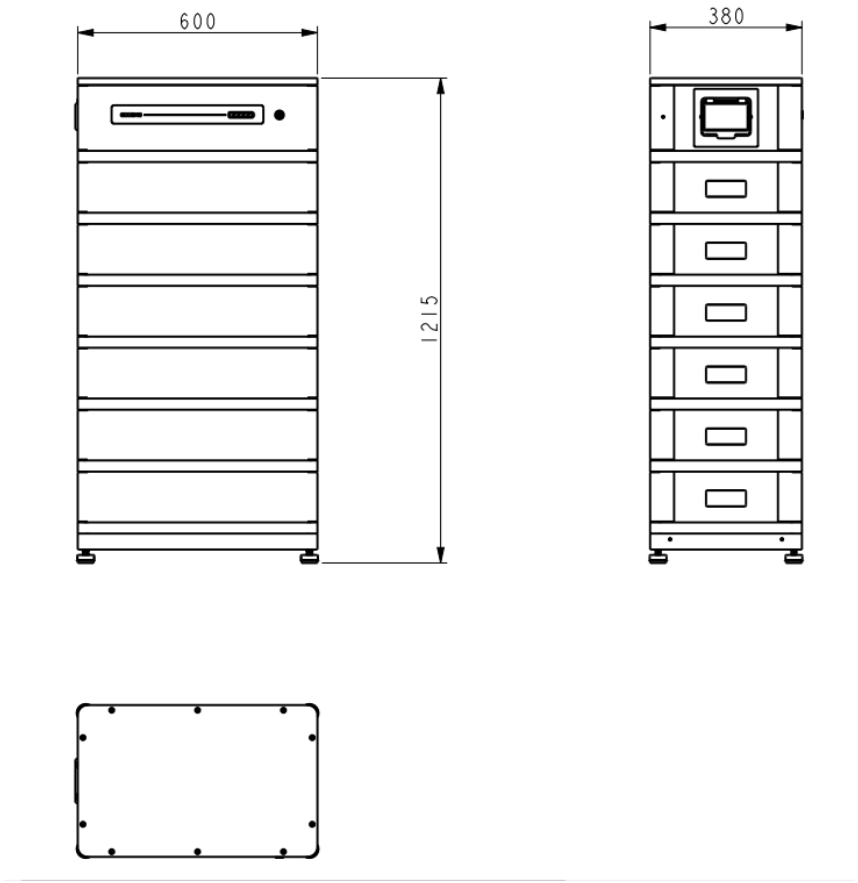


ILLUSTRATION 5
Specification

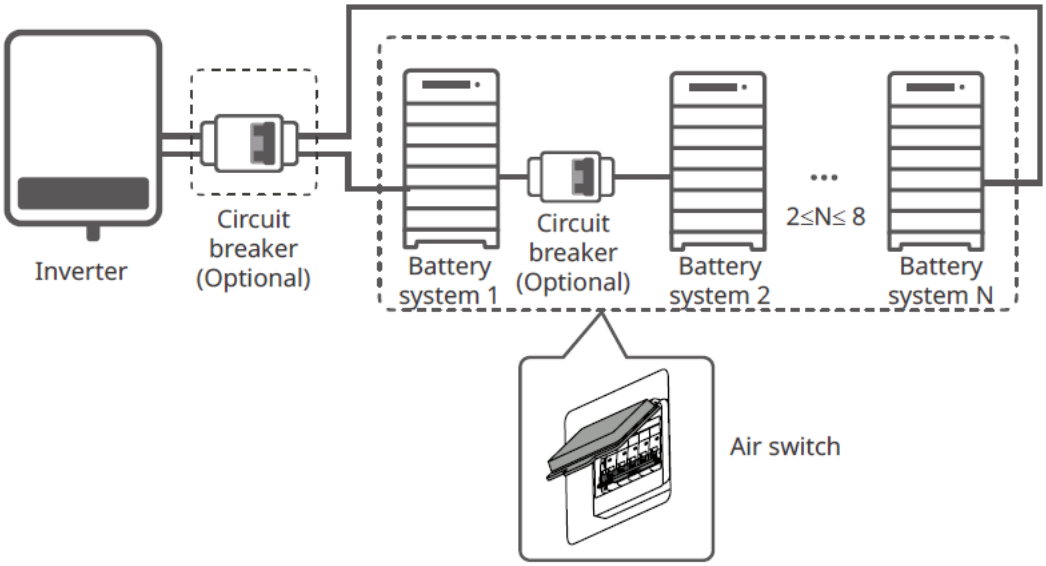
Installation Tool Requirements

The following tools are recommended when installing the equipment. Use other auxiliary tools on site if necessary.

Installation Environment Requirements

1. Do not install the equipment in a place near flammable, explosive, or corrosive materials.
2. Do not install the equipment in a place that is easy to touch, especially within children's reach. High temperature exists when the equipment is working. Do not touch the surface to avoid burning.
3. Avoid thewater pipes and cables buried in the wall when drilling holes.
4. Install the equipment in a sheltered place to avoid direct sunlight, rain, and snow. Build a sunshade if it is needed.
5. Install the equipment in a well-ventilated place to ensure good dissipation. Also, the installation space should be large enough for operations.
6. The equipment with a high ingress protection rating can be installed indoors or outdoors. The temperature and humidity at the installation site should be within the appropriate range.
7. Install the equipment at a height that is convenient for operation and maintenance, electrical connections, and checking indicators and labels.
8. The altitude to install the equipment shall be lower than the maximum working altitude 3000m (9842ft).

ILLUSTRATION 5
Specification



Label Description

	Potential risks exist. Wear proper personnel protective equipment before any operations.		Install the equipment away from fire sources.
	HIGH VOLTAGE HAZARD High voltage exists during the equipment's running. Ensure the equipment is power off before any operations.		Keep the equipment away from children.
	Operate the equipment properly to avoid explosion danger.		It is forbidden to dismantle the equipment personally.
	The equipment contains corrosive electrolytes. In case of a leak in the equipment, avoid contact the leaked liquid or gas.		Do not short-circuit the positive and negative pole of the equipment. Otherwise it may cause damage to the cables.
	Batteries contain flammable materials, beware of fire.		Grounding point.
	Read through the user manual before any operations.	SGS 800923	SGS marking for United States and Canada

ILLUSTRATION 5
Specification

4.3 Storage

If the equipment is not to be installed or used immediately, please ensure that the storage environment meets the following requirements:

1. Do not unpack the outer packing box or throw the desiccant away.
2. Complete the equipment installation in three days after unpacking it. Pack and store the equipment using the original packing box if it is not installed.
3. Stack the equipment complying with the labels and requirements on the packing box.
4. The equipment must be stacked with caution to prevent them from falling.
5. Keep the equipment away from flammable, explosive, and corrosive matters.
6. Place the equipment in a cool place where away from direct sunlight.
7. Store the equipment in a clean place. Make sure the temperature and humidity are appropriate and no condensation.
8. Storage SOC: 25%~50% SOC. Circle the charge-discharge every 6 months.
9. Recommended storage temperature: 0℃~35℃ (less than one year), -20℃~0℃ or 35℃~45℃(less than one month).
10. Recommended storage humidity: 0%~95%RH (no condensation). Do not install the battery if there is any moisture or condensation.

5 System Installation

5.1 Installation Requirements

Installation Environment Requirements

1. Do not install the equipment in a place near flammable, explosive, or corrosive materials.
2. Do not install the equipment in a place that is easy to touch, especially within children's reach. High temperature exists when the equipment is working. Do not touch the surface to avoid burning.
3. Avoid thewater pipes and cables buried in the wall when drilling holes.
4. Install the equipment in a sheltered place to avoid direct sunlight, rain, and snow. Build a sunshade if it is needed.
5. Install the equipment in a well-ventilated place to ensure good dissipation. Also, the installation space should be large enough for operations.
6. The equipment with a high ingress protection rating can be installed indoors or outdoors. The temperature and humidity at the installation site should be within the appropriate range.
7. Install the equipment at a height that is convenient for operation and maintenance, electrical connections, and checking indicators and labels.
8. The altitude to install the equipment shall be lower than the maximum working altitude 3000m (9842ft).

ILLUSTRATION 5
Specification

6 Electrical Connection

6.1 Safety Precaution

DANGER(DANGER)

INSTRUCTIONS PERTAINING TO A RISK OF FIRE OR ELECTRIC SHOCK

- Perform electrical connections, including operations, cables, and component specifications in compliance with local laws and regulations ANSI/NFPA 70.
- The battery system exists high voltage during the equipment running. Please keep Power Off before any operations to avoid danger. Strictly follow all safety precautions outlined in this manual and safety labels on the equipment during the operation.
- All operations, cables and parts specification during the electrical connection shall be in compliance with local laws and regulations.
- Tie the same type cables together, and place them separately from cables of different types. Do not place the cables entangled or crossed.
- When crimping the terminals, ensure that the conductor part of the cable is in full contact with the terminals. Do not crimp the cable jacket with the terminal. Otherwise the charger may not operate, or its terminal block getting damaged due to heating and other phenomenon because of unreliable connection after operation.

INSTRUCTIONS CONCERNANT LES RISQUES D'INCENDIE OU D'ÉLECTROCUTION

- Effectuez les connexions électriques, y compris les opérations, les câbles et les spécifications des composants, conformément aux lois et réglementations locales ANSI/NFPA 70.
- Le système de batterie présente une haute tension pendant le fonctionnement de l'équipement. Veuillez couper l'alimentation avant toute intervention pour éviter tout danger. Suivez strictement toutes les précautions de sécurité décrites dans ce manuel ainsi que les étiquettes de sécurité sur l'équipement pendant l'opération.
- Toutes les opérations, les câbles et les spécifications des pièces lors de la connexion électrique doivent être conformes aux lois et réglementations locales.
- Attachez les câbles de même type ensemble et placez-les séparément des câbles de types différents. Ne laissez pas les câbles s'entremêler ou se croiser.
- Lors du sertissage des bornes, assurez-vous que la partie conductrice du câble est en contact complet avec les bornes. Ne serrez pas la gaine du câble avec la borne. Sinon, le chargeur pourrait ne pas fonctionner, ou son bornier pourrait être endommagé en raison d'un échauffement ou d'autres phénomènes dus à une connexion peu fiable après l'opération.

ILLUSTRATION 5
Specification

NOTICE(AVIS)
• Wear personal protective equipment like safety shoes, safety gloves, and insulating gloves during electrical connections. • All electrical connections should be performed by qualified professionals. • Cable colors in this document are for reference only. The cable specifications shall meet local laws and regulations. • Portez des équipements de protection individuelle (EPI) tels que des chaussures de sécurité, des gants de protection et des gants isolants lors des connexions électriques. • Toutes les connexions électriques doivent être réalisées par des professionnels qualifiés. • Les couleurs des câbles mentionnées dans ce document sont données à titre indicatif uniquement. Les spécifications des câbles doivent être conformes aux lois et réglementations locales.

8.2 Routine Maintenance

⚠ WARNING(AVERTISSEMENT)
• Contact the after-sales service for help if you find any problems that may influence the battery or the hybrid inverter. Disassemble without permission is strictly forbidden. • Contact after-sale service for help if the copper conductor is exposed. Do not touch or disassemble privately because the high voltage danger exists. • In case of other emergencies, contact the after-sales service as soon as possible. Operate following the instructions or wait for the after-sales service personnel. • En cas de problème susceptible d'affecter le système de batterie ou l'onduleur de stockage, veuillez contacter le service après-vente. Il est strictement interdit de procéder à un démontage sans autorisation. • Si des fils de cuivre internes du conducteur électrique sont exposés, ne les touchez pas (danger de haute tension), contactez le service après-vente et ne procédez pas à un démontage sans autorisation. • En cas d'autres situations d'urgence, contactez immédiatement le service après-vente et suivez ses instructions ou attendez l'intervention sur place du personnel après-vente.

ILLUSTRATION 5
Specification

Maintaining Item	Maintaining Period
Checkwhether the locking bracket is secured, tighten it if not.	Once every 6 months
Check whether the outer enclosure is broken. Repair the painting or contact the after-sales service if there is any broken.	Once every 6 months
Check whether there is an exposed cable. Replace the exposed cable or contact the after-sales service for help.	Once every 6 months
Check whether there is any dust around the battery module. Clean the dust if there is any to avoid affecting heat dissipation.	Once every 6 months
Check whether there is any liquid or pest near the battery to avoid intrusion in a long term.	Once every 6 months

8.3 Recycling and Disposal

It is forbidden to dispose of used batteries at will, and the disposaI of used batteries shall comply with the laws and regulations of each federation.

SUMMARY OF TEST RESULTS

The following tests were performed:

Standard for Safety for Batteries for Use in Stationary and Motive Auxiliary Power Applications, ANSI/CAN/UL 1973:2022, Third Edition, Dated February 25, 2022.

Section	Test Description
15	Overcharge Test
16	High Rate Charge
17	Short Circuit Test
18	Overload Under Discharge
19	Overdischarge Protection Test
20	Temperature and Operating Limits Check Test
21	Imbalanced Charging Test
22	Dielectric Voltage Withstand Test
23	Continuity Test
25	Working Voltage Measurements
27	Electromagnetic Immunity Tests
31	Static Force test
32	Impact test
33	Drop Impact Test
34	Wall Mount Fixture/Support Structure/Handle Test
35	Mold Stress Test
39	Resistance to Moisture Test
40	Salt Fog Test
42	Single Cell Failure Design Tolerance

The following tests were performed to the transformers, model 140-00193-00 by Liangfeng and model 140-00193-00 by JTK on DC/DC module:

Standard for Safety for Batteries for Audio/Video, Information and Communication Technology Equipment – Part 1: Safety Requirements, UL 62368-1, CAS C22.2 No. 62368-1:19, Third Edition, Dated December 13, 2019

Section	Test Description
5.4.2, 5.4.3, 5.4.4.5 a), b)	Minimum Clearances/Creepage distance
5.4.9	Electric Strength test
6.4(B.3-B.4)	Abnormal Operating and Fault Conditions Test

Results of the tests indicate the specimens conform to the test criteria that were found to be applicable.

REVISION TABLE

The following changes have been made to this Report:

Revision No.	Date	Project #	Revision prepared by	Page	Description of Change
00	2024-04-18	CQES2401000034BA	Brian Han	-	-
01	2024-05-30	CQES2401000034BA	Kyle Tian	3	Add test location of EMC tests
02	2024-08-20	CQES2407000611BA	Kyle Tian	1	Change Contact Details and Factory address
				3	Change Altitude from 2000 m to 3000 m
				27	Correct Photo 36 of Wall mounting schematic diagram
				30	Correct Balanced resistance manufacturer to “UNI-ROYAL”
				42	Correct layout of DCDC
03	2025-04-29	CQES2504000389BA	Kyle Tian	3	Change IP rating from IP55 to IP65
				19, 20	Correct photo name from BMS to BCU
				37	Revise the IP rating on battery system label
				49 to 52	Add instructions

CONCLUSION

Samples of the products covered by this Report have been found to comply with the applicable requirements of Stationary and Motive Auxiliary Power Application, ANSI/CAN/UL1973:2022, Third Edition, Dated February 25, 2022.

Report Prepared by:

Kyle Tian
Engineer

Report Approved by:

Ryan Hu
Certification Reviewer