1.0 Reference and Address			
Report Number	221124009GZC-001	Original Issued: 9-Jun-2023	Revised: None
Standard(s)	Batteries for Use in Stationary and Motive Auxiliary Power Applications [ANSI/CAN/UL 1973:2022 Ed.3]		

Applicant	Shenzhen Wirentech Co.,Ltd.	Manufacturer	**Huizhou Bohairongchuan Technology Co.,Ltd**
Address	C602, Innovation Plaza, No.2007, Pingshan street,Pingshan District, Shenzhen	Address	6th Floor. Block 1, Yongchang Industrial Park, No.10 Shihua Avenue,Dayawan District, Huizhou Guangdong
Country	China	Country	China
Contact	Chen yu	Contact	Chen yu
Phone	15779888006	Phone	15779888006
FAX	NA	FAX	NA
Email	chaney@wirentech.com	Email	chaney@wirentech.com

2.0 Product Description	
Product	Lithium ion Battery
Brand name	NA
Description	The product covered in this report is Lithium ion Battery. It's a Rechargeable Lithium-ion Battery system and Home Energy Storage System. They have overcharge, over-discharge, over current and short-circuits proof circuit.
Models	WH12100, WH12190
Model Similarity	Model WH12100 and WH12190 have the same BMS board. Model WH12100 contains 4 cells in 4S1P and model WH12190 contains 12 cells in 3P4S.
Ratings	For Model WH12100 Nominal Voltage: 12.8Vdc Rated Capacity: 100Ah Nominal Energy: 12800Wh Short Current and Duration: 814A, 3.636ms IP67 For Model WH12190 Nominal Voltage: 12.8Vdc Rated Capacity: 190Ah Nominal Energy: 2432Wh Short Current and Duration: 1680A, 823us IP67
Other Ratings	NA
Conditions of Acceptability	The products covered in this Report are incomplete in construction features or limited in performance capabilities and are intended for use and evaluation in other products. Consideration should be given to the following when the component is used in or with another product. 1. The Minimum Flammability Rating of the enclosure should be 5VA or better when installed in the end product. 2. Temperature Testing should be performed on this component when installed in the end product. 3. System safety analysis should be evaluated when installed in the end product. 4. The battery pack only provide one overcharge and overdischarge protective circuits and controls, and the single fault conditions should be evaluated when installed in the end product.

3.0 Product Photographs

Photo 1 - External view for model WH12100

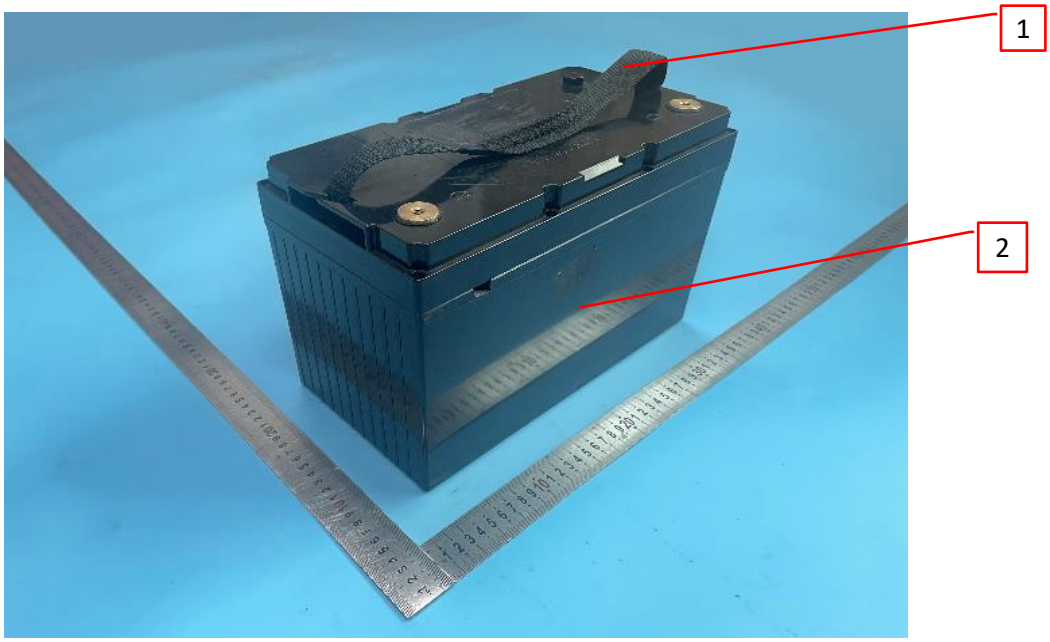
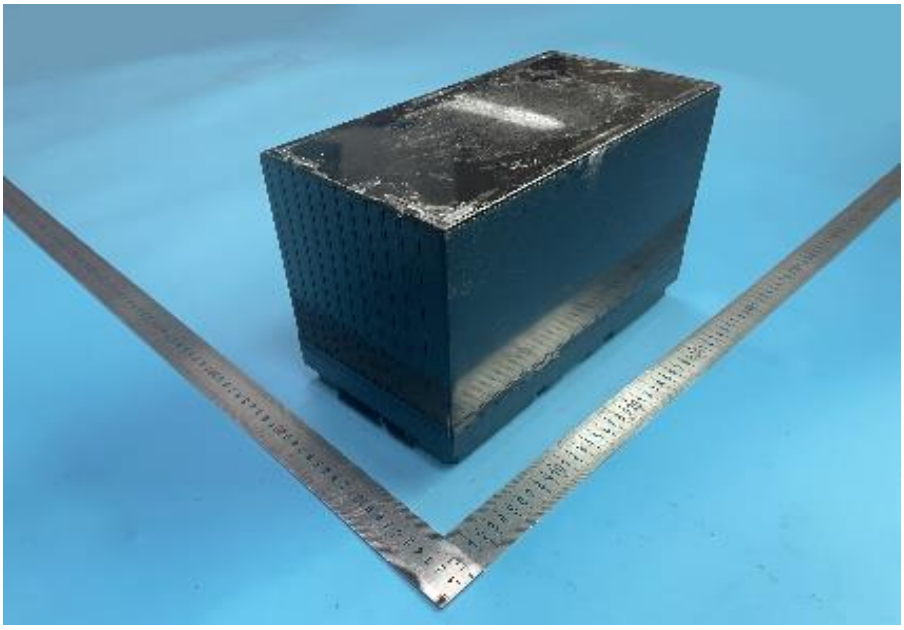


Photo 2 - External view for model WH12100



3.0 Product Photographs

Photo 3 - External view for model WH12190

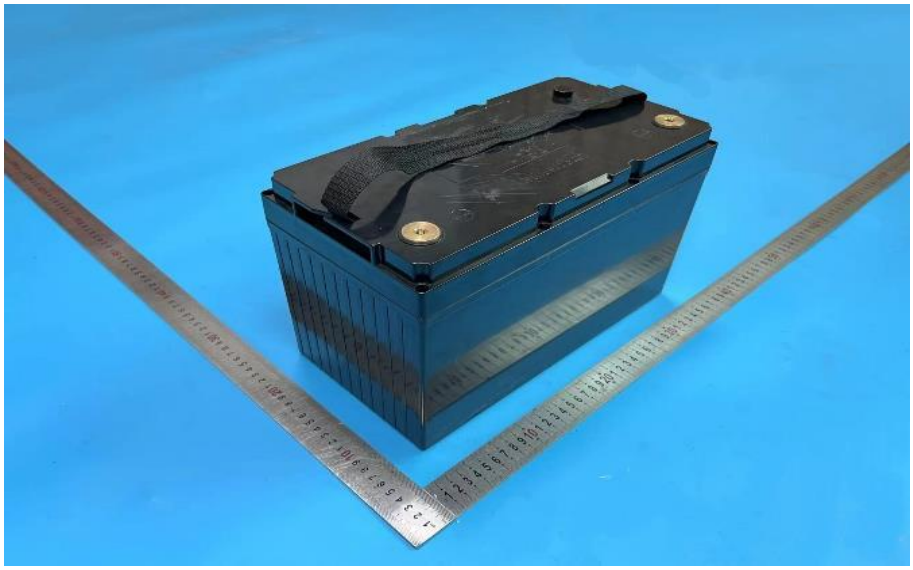
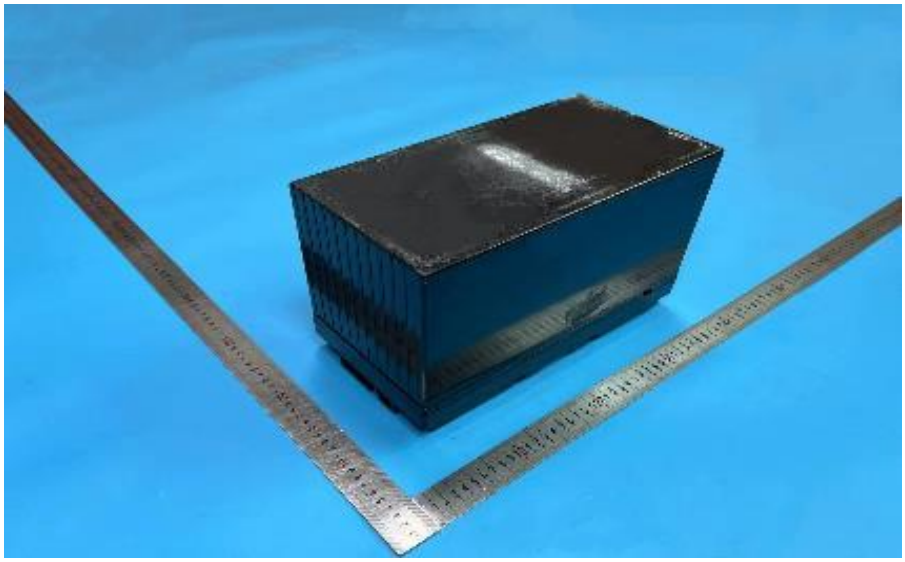


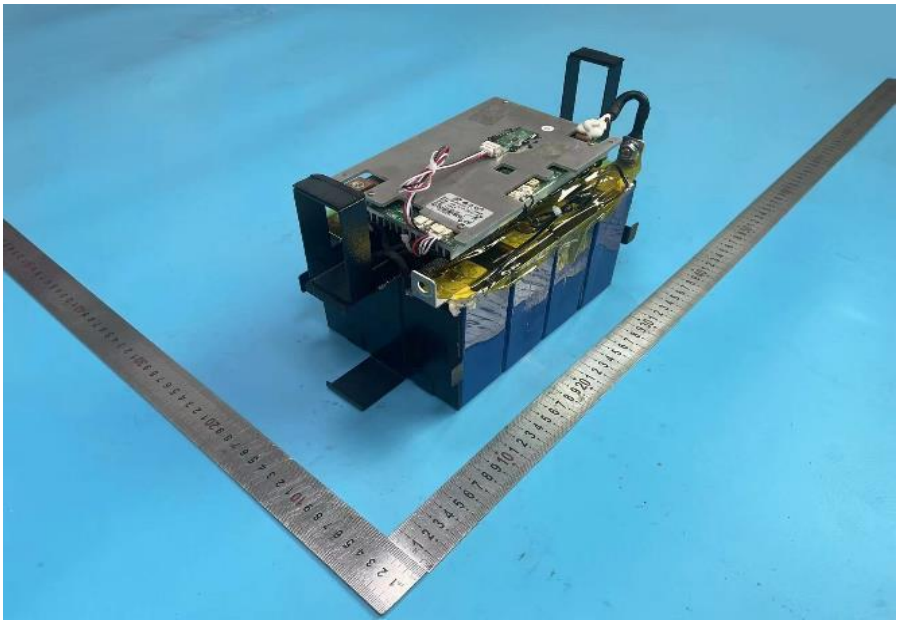
Photo 4 - External view for model WH12190



3.0 Product Photographs

Photo 5 - Internal view for model WH12100

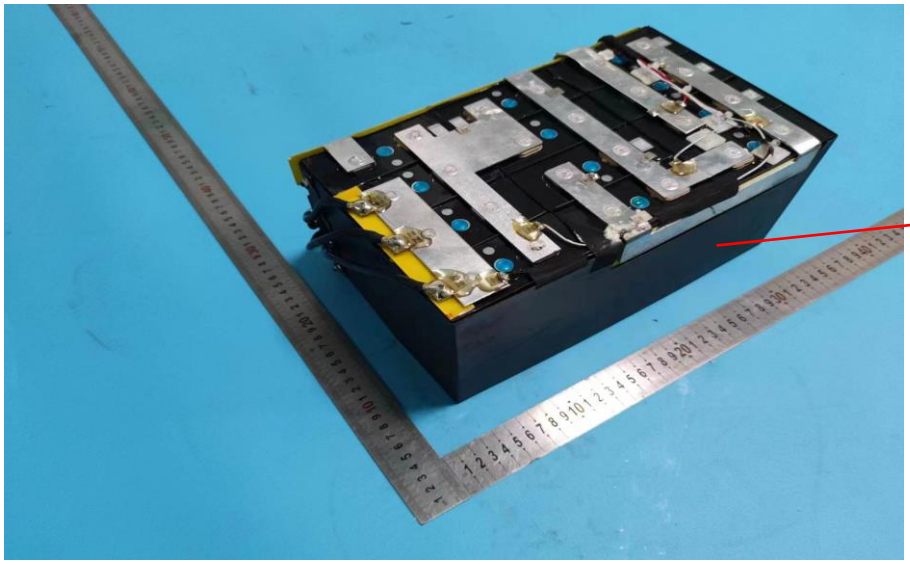
Photo 6 - Internal view for model WH12100



3.0 Product Photographs

Photo 7 - Internal view for model WH12190

Photo 8 - Internal view for model WH12190



3.0 Product Photographs

Photo 9 - Cell view for model WH12100

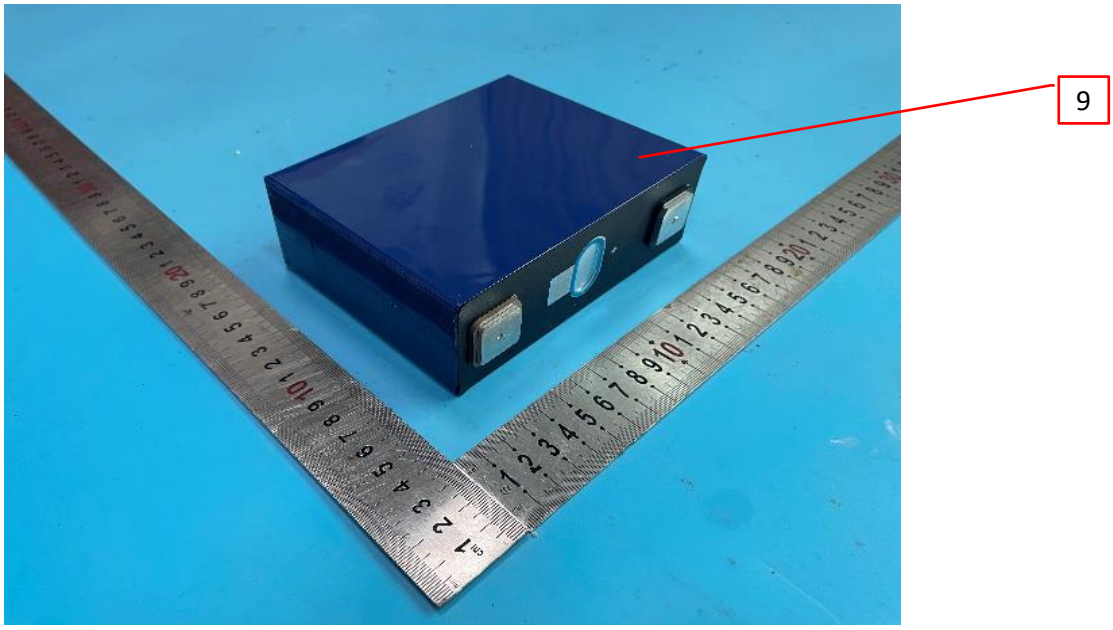
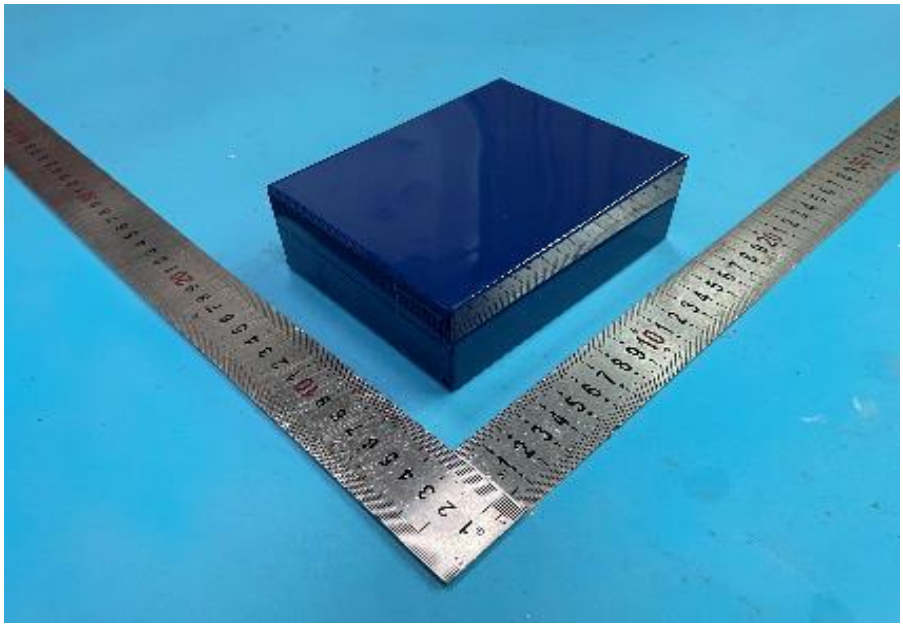


Photo 10- Cell view for model SWH12100



3.0 Product Photographs

Photo 11 - Cell view for model SWH12190

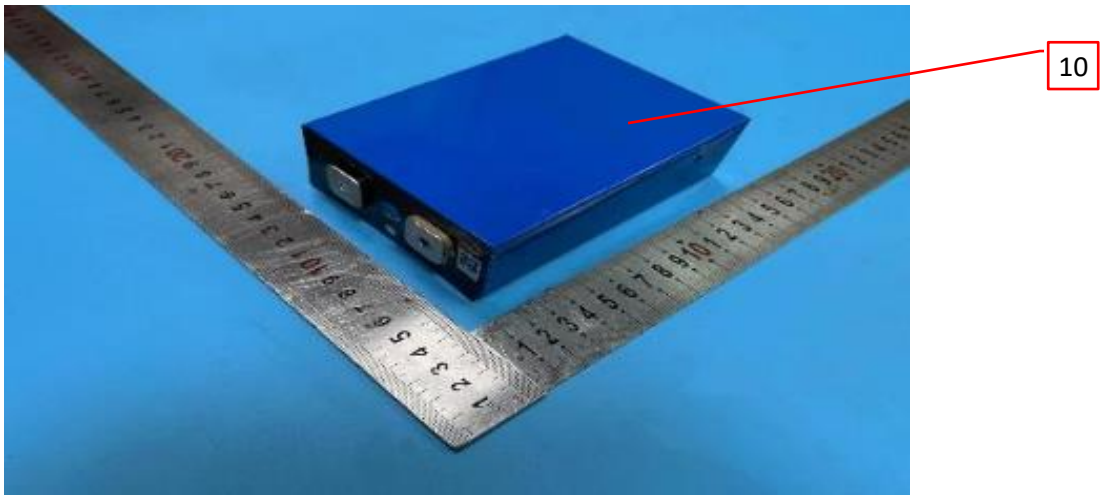
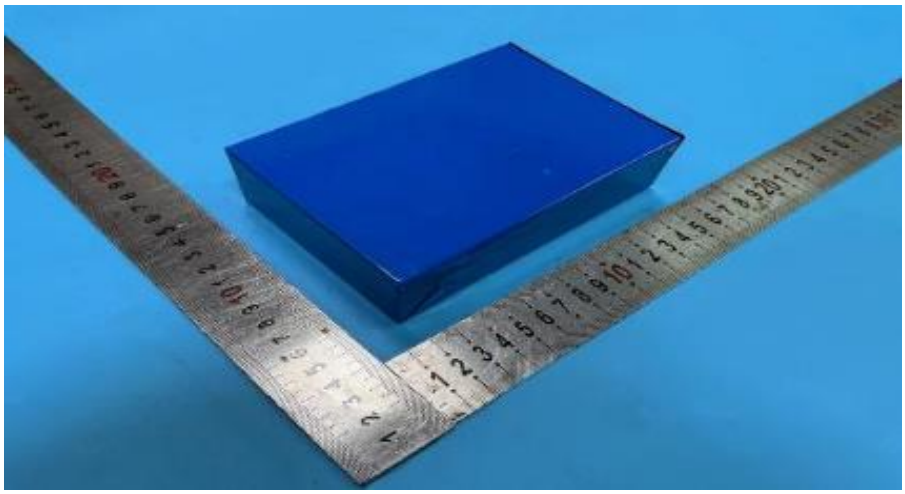


Photo 12- Cell view for model SWH12190



3.0 Product Photographs

Photo 13 - PCB view

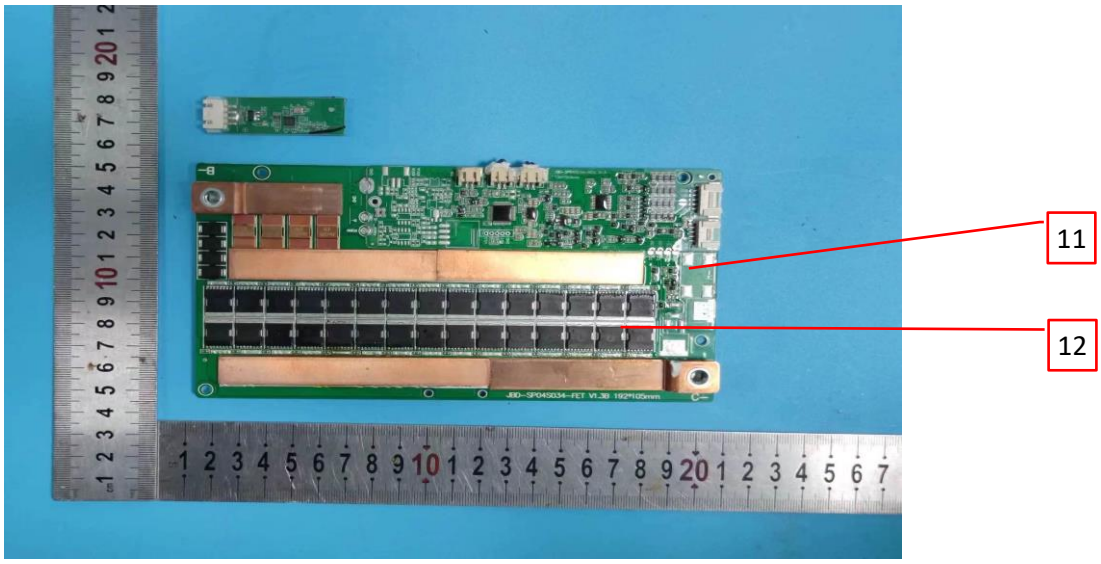
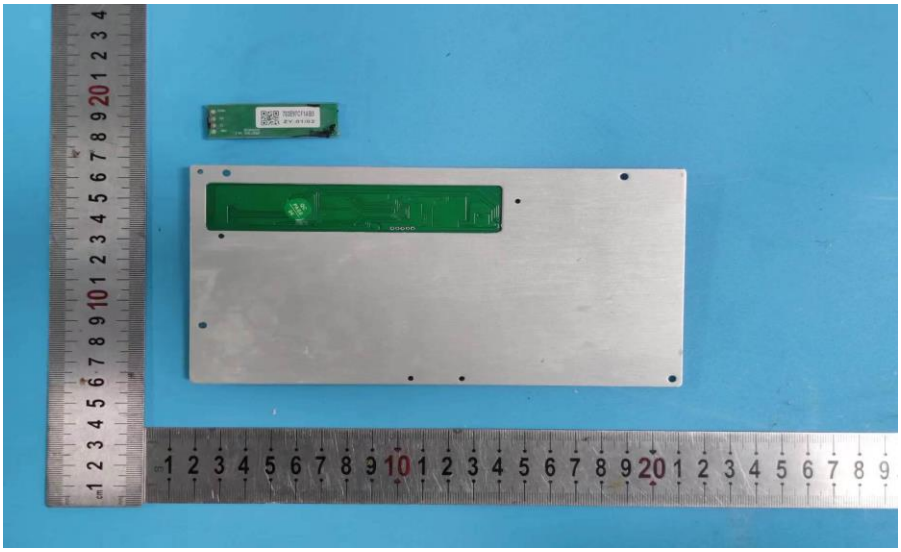


Photo 14- PCB view



3.0 Product Photographs

Photo 15- PCB view

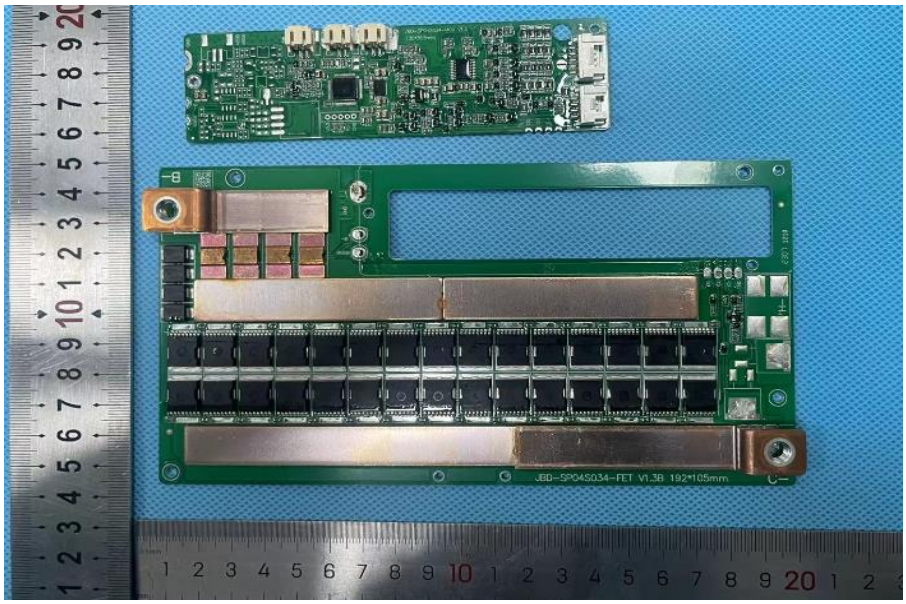
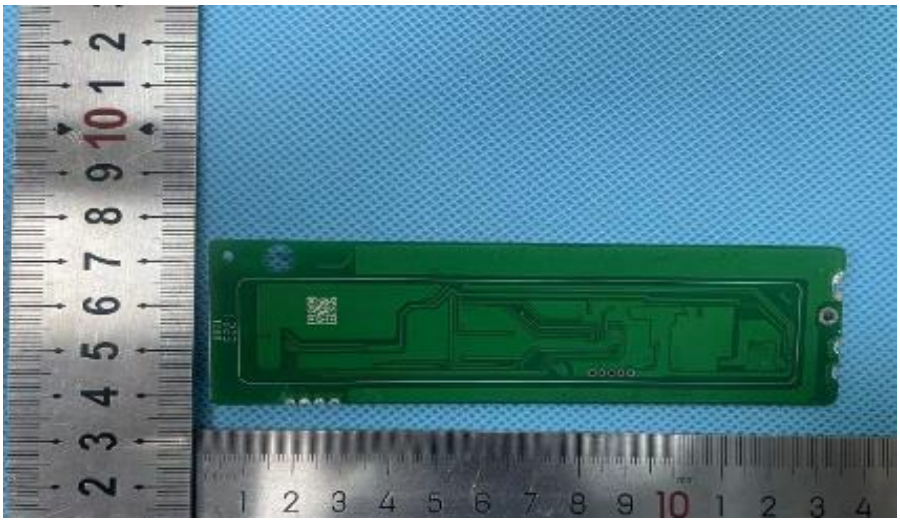


Photo 16- PCB view



4.0 Critical Components						
Photo #	Item no.[1]	Name	Manufacturer/ trademark[2]	Type / model[2]	Technical data and securement means	Mark(s) of conformity [3]
1	1	Handle	Jiangxi Xiongtao Technology Co. LTD	500N	PPyarn manufacture 390mm*25mm, min 1.1mm thickness	NR
1	2	Plastic Enclosure	NINGBO LG YONGXING CHEMICAL CO LTD	LUPOY GN-5007F(#)	ABS/PC, Min. 1.5mm, V-0, 90ºC	cURus
1	3	Label (not shown)	ARMSTRONG TECHNOLOGY (WUXI) CO LTD	ATW01	Polyphenylene oxide/ether, surface: 80°C.	cURus
			Various	Various	Polyphenylene oxide/ether, surface: 80°C.	cURus
5	4	Cord	Dongguan Chuantai Wire Products Co., Ltd	1330	Connected to B-,B+ Minimum 4 AWG, minimum 600V, minimum 200°C, VW-1	cURus
			Various	1330		cURus
5	5	Gasket	GUANGDONG RUIFU SEALING TECHNOLOGY CO LTD	NBR220	Solid Material: NBR -20°C to 60°C	cURus
5	6	Internal wire	Dongguan Chuantai Wire Products Co., Ltd	1007	Minimum 24 AWG, minimum 300V, minimum 80°C	cURus
			Various	1007		cURus
7	7	Epoxy board	Shenzhen Hongdayuan Light Rubber Products Co., Ltd	3a	Min. thickness: 1.56mm, V-1, 125ºC	cURus
8	8	Cell Bracket	Dongguan xinmei Precision Hardware Co. , Ltd	WR3660	SPCC-1.2, 314mm*141.3mm*1.2mm	NR
9	9	Cell	REPT BATTERO Energy Co., Ltd.	CB56	For model WH12100 only. 3.2V, 100Ah	UR
11	10	Cell	Hefei Gotion High-tech Power Energy Co Ltd	IFP42100140A-67Ah	For model WH12190 only. 3.2V, 67Ah	UR

4.0 Critical Components

Photo #	Item no.[1]	Name	Manufacturer/ trademark[2]	Type / model[2]	Technical data and securement means	Mark(s) of conformity [3]
13	11	PCB	Shenzhen jialichuang Electronic Technology Co., Ltd	JLC-1	V-0, 130°C	cURus
			Various	Various	V-0, 130°C	cURus
13	12	MOSFET	Skysemi	SS018N08LS	MC1, to MC15, MD1, to MD15 VDSS: 85V, ID: 281A, Tstg: -55℃ to 175℃	NR
13	13	MCU (not shown)	Nuvoton Technology Corporation	NANO100SD3BN	U2 VDD: 1.8V to 3.6V, TA : -40°C to 85°C	NR
13	14	Protection IC (not shown)	HOLTEK	HT7533-1	U3 VIN: 30V, Operating Temperature: -40°C to 85°C	NR
13	15	NTC (not shown)	DONG GUAN SENSICOM ELECTRONICS TECHNOLOGY CO LTD	SNS103J	RT2, RT3 125℃, Resistance at 25°C: 10KΩ	cURus

NOTES:

1) Not all item numbers are indicated (called out) in the photos, as their location is obvious.

2) “Various“ means any type, from any manufacturer that complies with the "Technical data and securement means" and meets the "Mark(s) of conformity" can be used.

3) Indicates specific marks to be verified, which assures the agreed level of surveillance for the component. "NR" - indicates Unlisted and only visual examination is necessary. "See 5.0" indicates Unlisted components or assemblies to be evaluated periodically refer to section 5.0 for details.

5.0 Critical Unlisted CEC Components

No Unlisted CEC components are used in this report.

6.0 Critical Features

Recognized Component - A component part, which has been previously evaluated by an accredited certification body with restrictions and must be evaluated as part of the basic product considering the restrictions as specified by the Conditions of Acceptability.

Listed Component - A component part, which has been previously Listed or Certified by an accredited Certification Organization with no restrictions and is used in the intended application within its ratings.

Unlisted Component - A part that has not been previously evaluated to the appropriate designated component standard. It may also be a Listed or Recognized component that is being used outside of its evaluated Listing or component recognition.

Critical Features/Components - An essential part, material, subassembly, system, software, or accessory of a product that has a direct bearing on the product's conformance to applicable requirements of the product standard.

Construction Details - For specific construction details, reference should be made to the photographs and descriptions. All dimensions are approximate unless specified as exact or within a tolerance. In addition to the specific construction details described in this Report, the following general requirements also apply.

1. Mechanical Assembly - Components such as switches, fuseholders, connectors, wiring terminals and display lamps are mounted and prevented from shifting or rotating by the use of lockwashers, starwashers, or other mounting format that prevents turning of the component.
2. Corrosion Protection - All ferrous metal parts are protected against corrosion by painting, plating or the equivalent.
3. Polarized Connection - This product is provided with a polarized power supply connection.
4. Internal Wiring - Internal wiring is routed away from sharp or moving parts. Internal wiring leads terminating in soldered connections are made mechanically secure prior to soldering. Recognized Component separable (quick disconnect) connectors of the positive detent type, closed loop connectors, or other types specifically described in the text of this report are also acceptable as internal wiring terminals. At points where internal wiring passes through metal walls or partitions, the wiring insulation is protected against abrasion or damage by plastic bushings or grommets. Details please see Sec. 4.0.
5. Schematics - Refer to Section 7.0, Illustration 2, 2a and 2b schematics requiring verification during Field Representative Inspection Audits.
6. Markings - The product is marked on a labeling system as described in item 3 of Section 4.0 as follows:
   - Applicant's name or brand name;
   - Model number;
   - Electrical ratings(in volts dc and capacity in Ampere hours or Watt hours and chemistry);
   - Polarity of battery system terminals.
   - Maximum short circuit current and duration;
   - Date of manufacturer;
   - IP rating.
7. Cautionary Markings - Refer to Section 7.0, Illustration 1.
8. Installation, Operating and Safety Instructions - Instructions for installation and use of this product are provided by the manufacturer. Refer to Section 7.0, lllustration 5 and 5a.

7.0 Illustrations

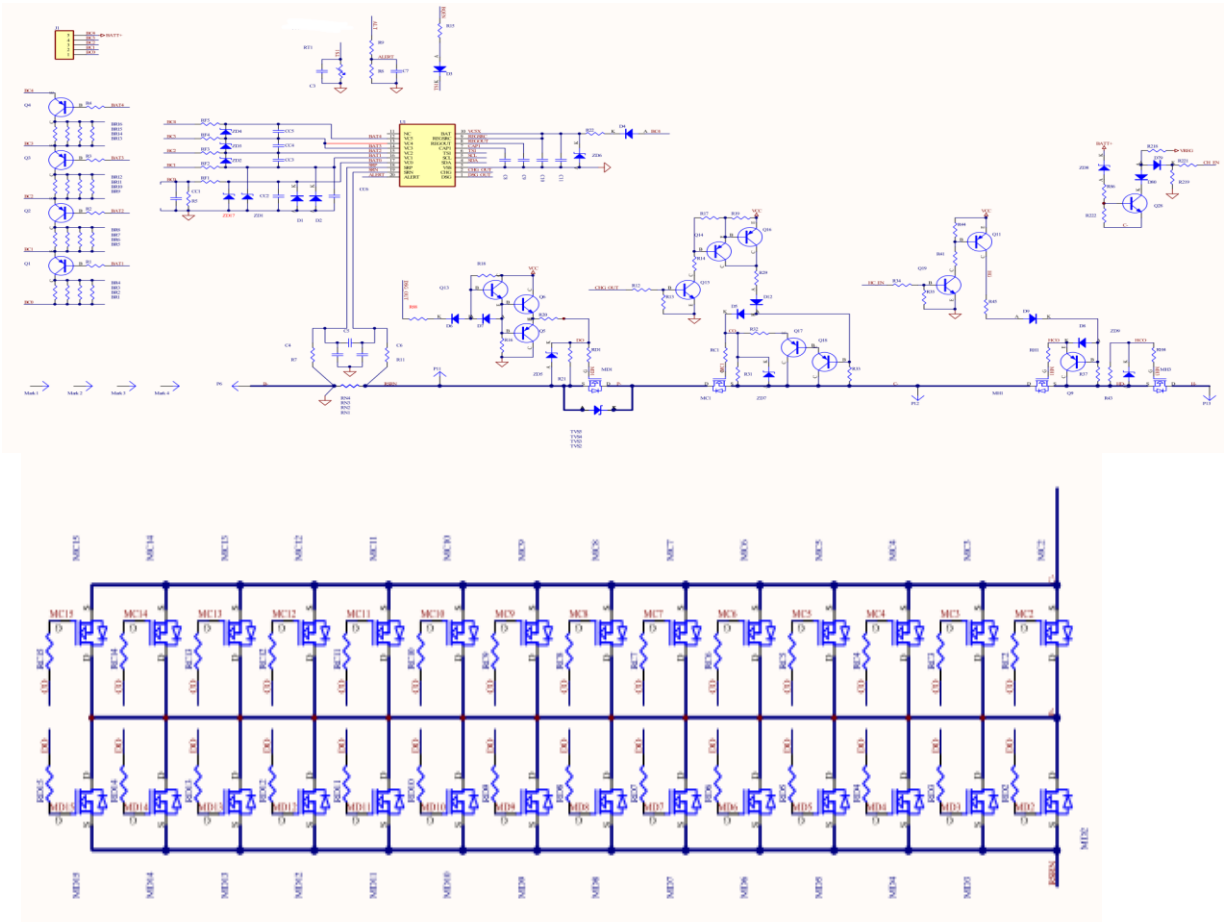
Illustration 1 - Cautionary marking

Caution
read instruction manual
Warning: Risk of fire, explosion, or burns. Do not disassemble, heat above 55 °C (or 131°F), or incinerate.
WARNING
Corrosive fluid inside, only maintained by the manufacturer
No User Serviceable parts, only mechanically recharged or refueled by authorized service personnel

Avertissement
Lire le manuel d'instruction
Mise en garde : Risque d'incendie, d'explosion ou de brûlures. Ne pas démonter, chauffer à plus de 55 °C (ou 131°F) ou incinérer.
AVERTISSEMENT
Fluide corrisif à l'intérieur, seul le fabricant doit s'occuper de l'entretien
Aucune des pièces ne peut être réparée par l'utilisateur; recharger mécaniquement ou ravitailler par un personnel d'entretien qualifié uniquement.

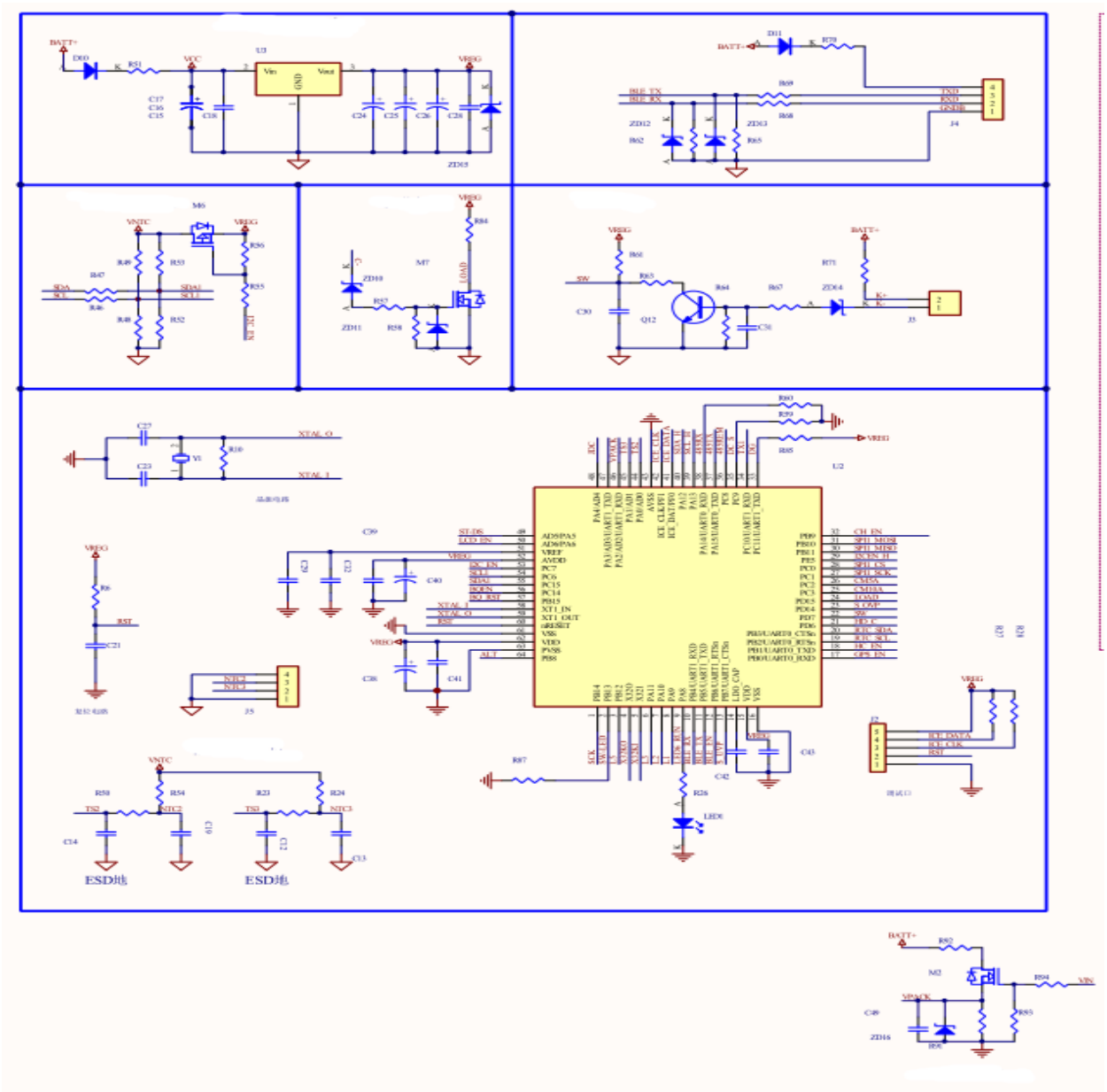
7.0 Illustrations

Illustration 2 - Circuit diagram



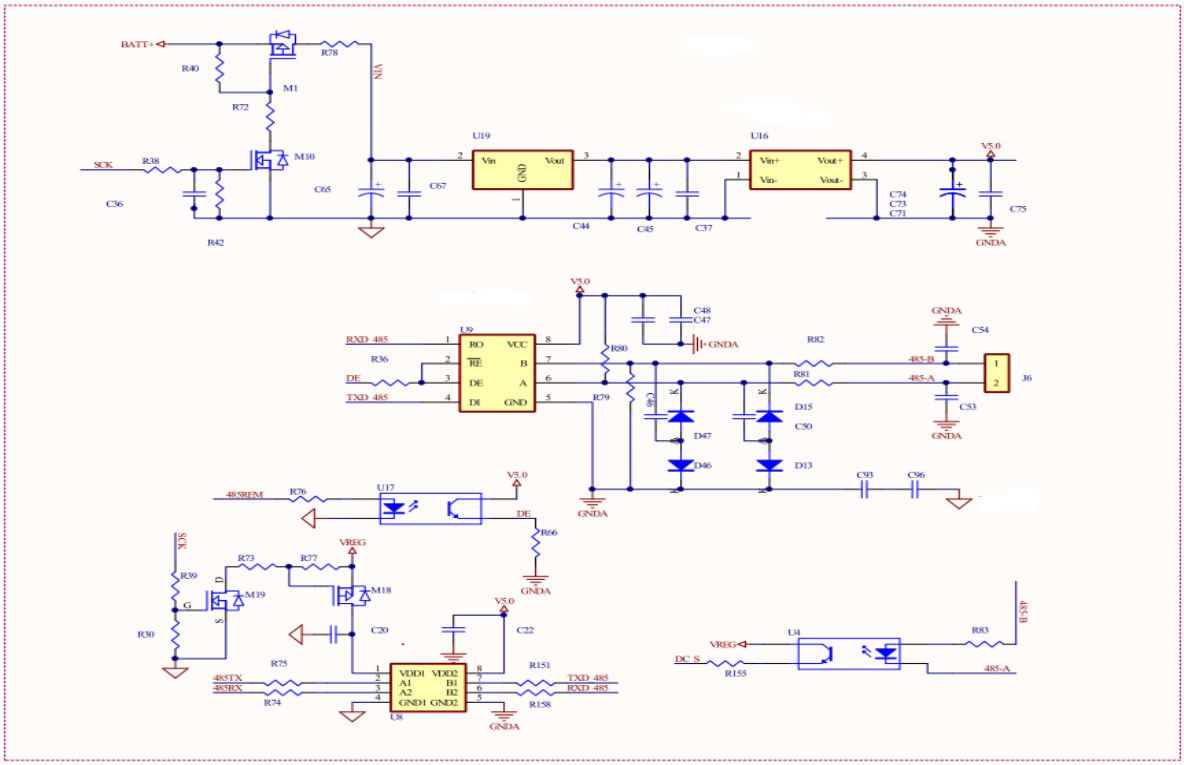
7.0 Illustrations

Illustration 2a - Circuit diagram



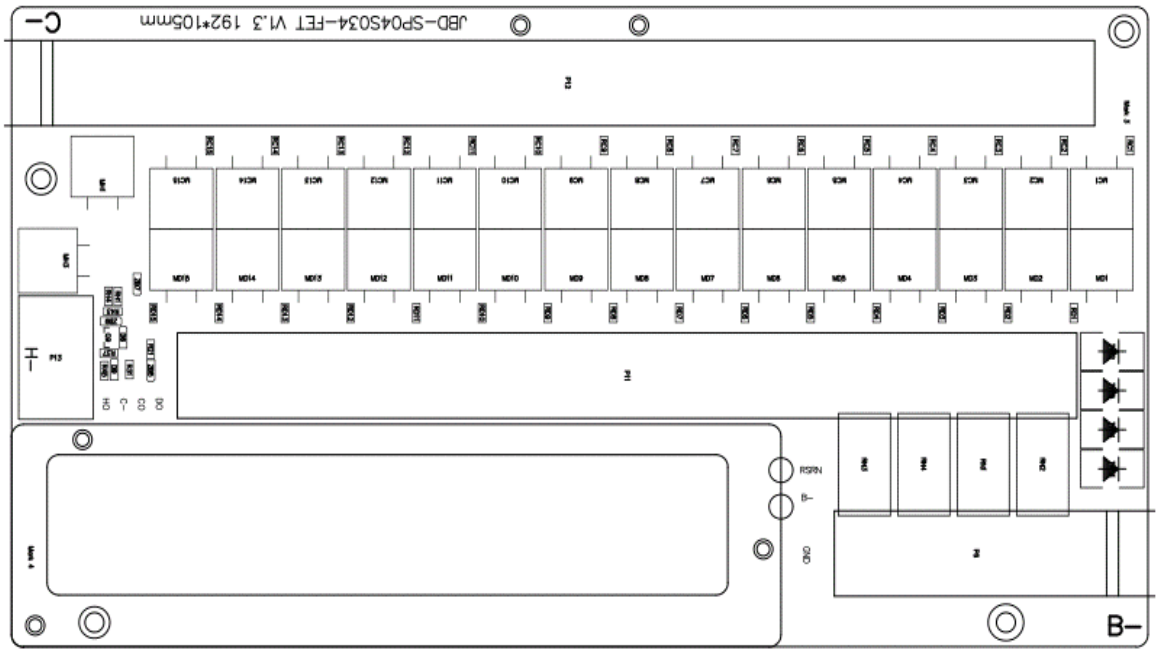
7.0 Illustrations

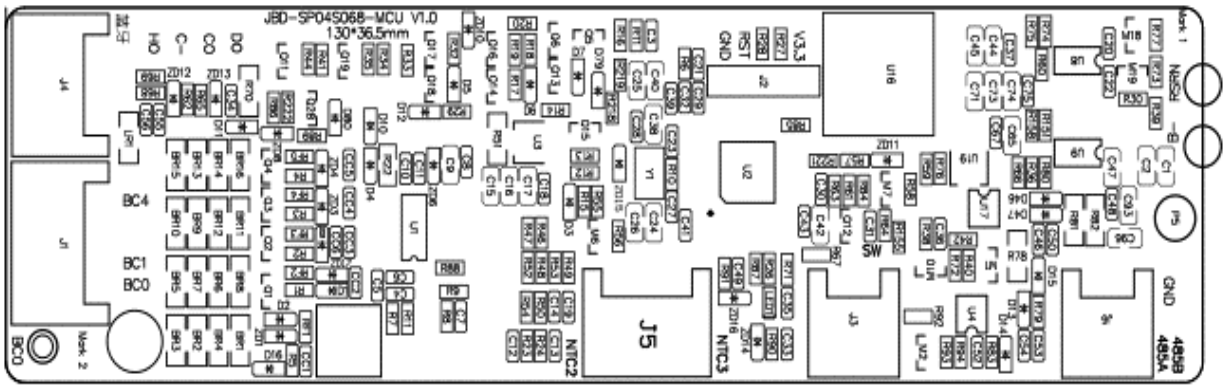
Illustration 2b - Circuit diagram

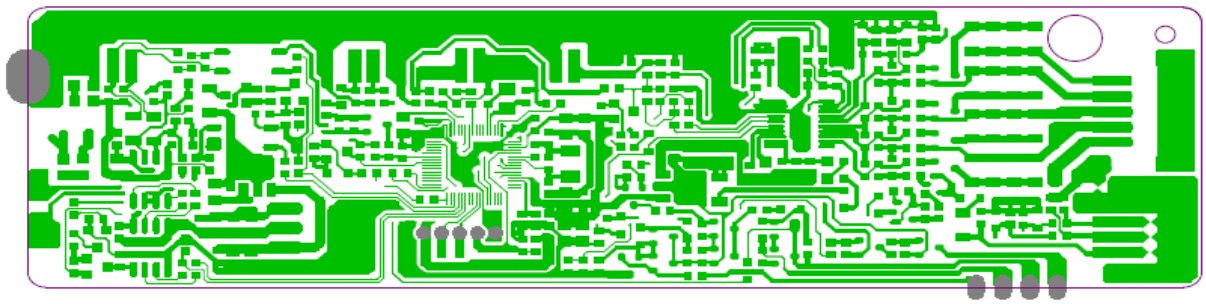


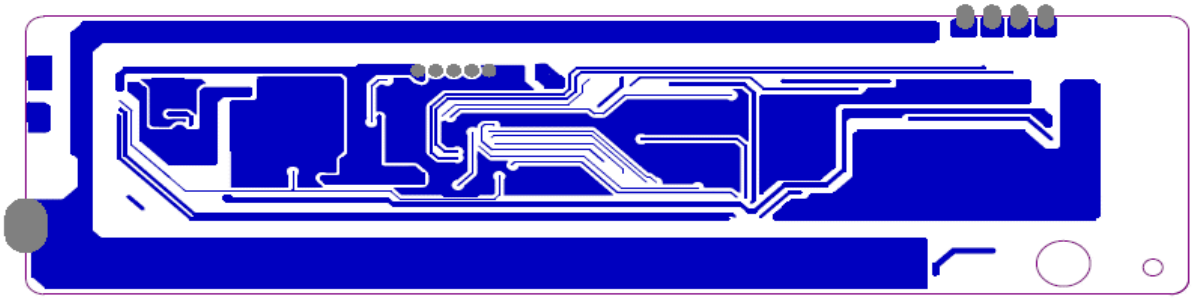
7.0 Illustrations

Illustration 3 - PCB layout



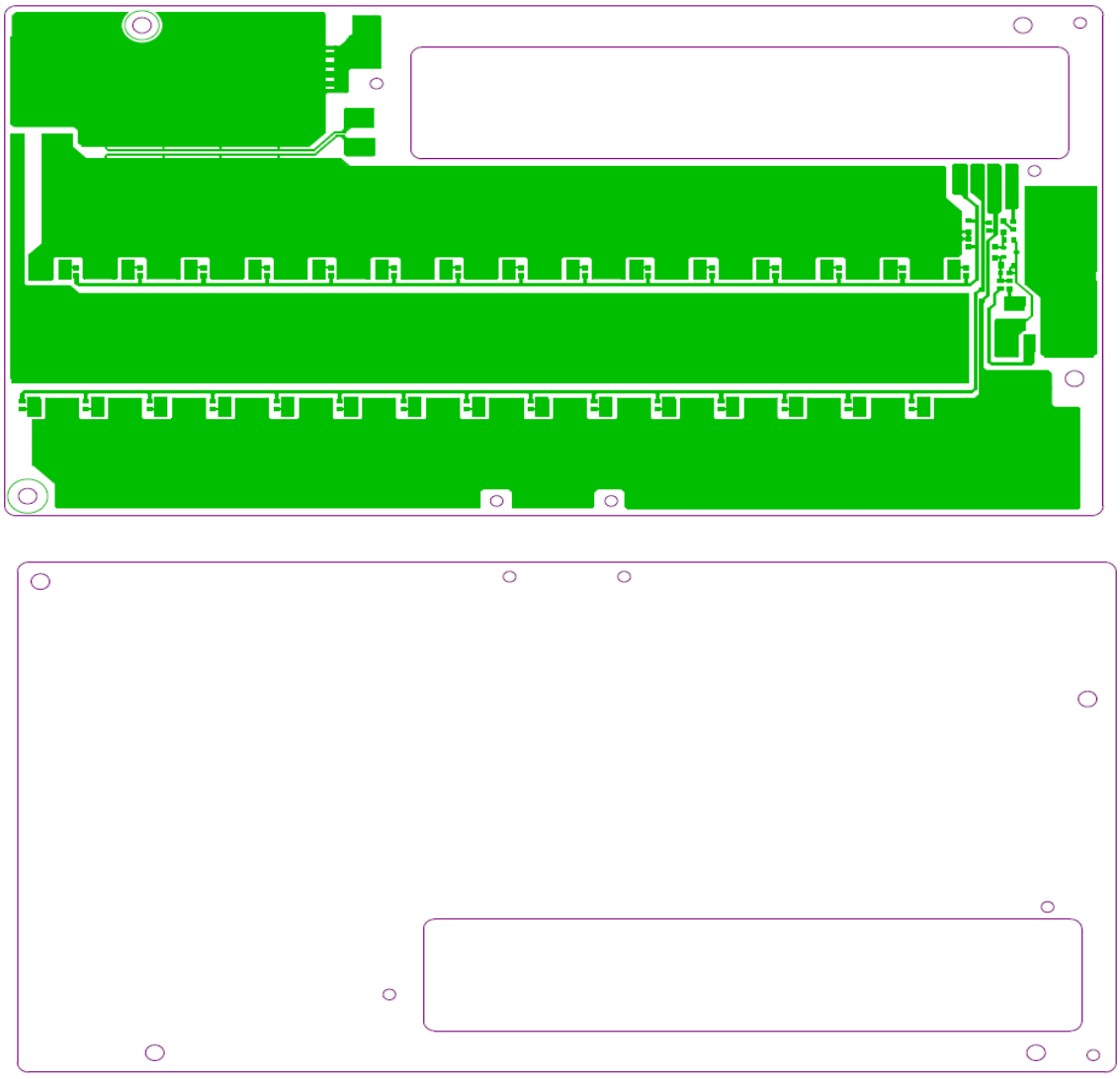






7.0 Illustrations

Illustration 3a - PCB layout



7.0 Illustrations

Illustration 4 - The specification of battery module

Product technical data		
Model No.	WH12100	WH12190
Technology or Configuration:XP/YS	4S1P	4S3P
Rated capacity (Ah)	100Ah	190Ah
Nominal voltage(V)	12.8V	12.8V
Standard charge current (A)	50A	95A
Maximum charge current (A)	100A	150A
End of Charging Current (A)	1A	3A
Standard Charge voltage(V)	14.6V	14.6V
Max. Charge voltage(V)	14.6V	14.6V
Standard discharge current (A)	50A	95A
Maximum discharge current (A)	150A	190
Final discharge voltage(V)	10V	10V
Charging Temperature Range, ℃	-4℃～55℃	0°C～55°C
Discharging Temperature Range, ℃	-20℃～55℃	-20℃～55℃

7.0 Illustrations

Illustration 5 - User manual (Representative)(Partial)

Installation

Installation

The batteries may be hooked in any orientation. But care must be taken in connecting tothe battery terminals. The positive and negative terminals are labeled and color coded (red for +, black for -).

DO NOT REVERSE POLARITY THE BATTERY AS THIS WILL DAMAGE BOTH THE BATTERY AND THE DEVICE BEING CONNECTED!!!

The batteries come with a standard flag style terminal post with a 3/8" hole to accommodate a M8 bolt and lug sizes up to 2 AWT. All batteries ship with 18-8 stainless steel M8 bolts, washers. If multiple lugs are used, the washers may be removed, or longer bolts maybe required in order for the bolt to fully seat into the copper pillar.

Les batteries peuvent être accrochées dans n' importe quelle orientation. Mais il faut être prudent lors de la connexion aux bornes de la batterie. Les bornes positives et négatives sont étiquetées et codées en couleur (rouge pour +, noir pour -).

Ne pas inverser la polarité de la batterie car cela endommagera à la fois la batterie et l' appareil connecté!!!

Les batteries sont livrées avec un bornier standard de style drapeau avec un trou de 3/8 "pour accueillir un boulon M8 et des tailles de pattes jusqu' à 2 AWT. Toutes les batteries sont livrées avec 18-8 boulons en acier inoxydable M8, rondelles. Si plusieurs pattes sont utilisées, les rondelles peuvent être enlevées, ou des boulons plus longs peuvent être nécessaires pour que le boulon s'insère complètement dans le pilier de cuivre.

7.0 Illustrations

Illustration 5a - User manual(Representative)(Partial)

Millertech Cautions:

- **Only charge the battery with a Millertech-approved LiFePO4 lithium battery charger.**
- **Do not short-circuit battery.**
- **Do not immerse battery in water.**
- **Never charge or discharge battery with more than its rated amps.**
- **Always fully charge the battery before connecting in series with another battery.**
- **Do not disassemble or remove any labels.**
- **Failure to follow the above instructions could be dangerous and can void the warranty.**

Millertech met en garde:

- **Ne chargez la batterie qu' avec un chargeur de batterie au lithium LiFePO4 approuvé par millertech.**
- **Ne court-circuitez pas la batterie.**
- **Ne pas immerger la batterie dans l' eau.**
- **Ne jamais charger ou décharger la batterie avec plus que ses ampères nominaux.**
- **Chargez toujours complètement la batterie avant de la connecter en série avec une autre batterie.**
- **Ne démontez ni n' enlevez aucune étiquette.**
- **Le non-respect des instructions ci-dessus pourrait être dangereux et peut annuler la garantie.**

Storage and maintenance

Storage

Storage could not be easier simply charge the batteries to at least 50%/13.3V state-of-charge and disconnect from any charge or discharge and repeat this step every quarter/3 months

Maintenance

The LiFePo4 batteries require very little maintenance if any at all. If your batteries are in series and not being charged by a multi-bank charger, it is recommended that you fully charge the batteries individually once a year. This will balance out the entire battery bank to ensure the batteries will reach its expected life span. If your batteries are in parallel this is not necessary. The BMS has a built in passive balancing system that will take care of this.

Stockage et maintenance

stockage

Le stockage ne pourrait pas être plus facile chargez simplement les batteries à au moins 50%/13.3V état de charge et déconnectez-vous de toute charge ou décharge et répétez cette étape tous les trimestre /3 mois

Entretien

Les batteries LiFePo4 nécessitent très peu d' entretien, voire pas du tout. Si vos batteries sont en série et ne sont pas chargées par un chargeur multi-banques, il est recommandé de charger complètement les batteries individuellement une fois par an. Cela équilibrera l' ensemble de la banque de batteries pour s' assurer que les batteries atteignent leur durée de vie prévue. Si vos batteries sont en parallèle, ce n' est pas nécessaire. Le BMS dispose d' un système d' équilibrage passif intégré qui s' en chargera.

8.0 Test Summary					
Evaluation Period	3-Jan-2023 to 29-May-2023			Project No.	221124009GZU
Sample Rec. Date	3-Jan-2023	Condition	Prototype	Sample ID.	S221124009-001~002
Test Location	Intertek Testing Services Shenzhen Ltd. Zengcheng Branch C2-1, Heping Xu, Yongning Street, Zengcheng District, Guangzhou, China				
Test Procedure	Testing Lab				

Determination of the result includes consideration of measurement uncertainty from the test equipment and methods. The product was tested as indicated below with results in conformance to the relevant test criteria.

The following tests were performed:

Test Description	[ANSI/CAN/UL 1973:2022 Ed.3] Clauses	--	--
Overcharge	15	--	--
High Rate Charge	16	--	--
Short Circuit Test	17	--	--
Overload Under Discharge	18	--	--
Overdischarge Protection Test	19	--	--
Temperature and Operating Limits Check	20	--	--
Imbalanced Charging	21	--	--
Electrostatic discharge	27.2	--	--
Radio-frequency electromagnetic field	27.3	--	--
Fast transient/burst immunity	27.4	--	--
Surge immunity	27.5	--	--
Radio-frequency common mode	27.6	--	--
Power-frequency magnetic field	27.7	--	--
Operational verification	27.8	--	--
Imbalanced Charging	21	--	--
Static Force	31	--	--
Impact	32	--	--
Drop Impact (rack mounted module)	33	--	--
Wall Mount Fixture/Handle Test	34	--	--
Mold Stress	35		
Resistance to Moisture	39	--	--
Salt Fog	40	--	--
Single Cell Failure Design Tolerance(lithium ion)	42	--	--

8.0 Test Summary					
Evaluation Period	3-Jan-2023 to 29-May-2023			Project No.	221123085GZU
Sample Rec. Date	3-Jan-2023	Condition	Prototype	Sample ID.	S221124009-001~002
Test Location	Intertek Testing Services Shenzhen Ltd. Guangzhou Branch Room 02, & 101/E201/E301/E401/E501/E601/E701/E801 of Room 01 1-8/F., No. 7-2. Caipin Road, Science City, GETDD, Guangzhou, Guangdong, China				
Test Procedure	Testing Lab				
Determination of the result includes consideration of measurement uncertainty from the test equipment and methods. The product was tested as indicated below with results in conformance to the relevant test criteria.					
The following tests were performed:					

Test Description	[UL 60730-1:2016 Ed.5] & [CSA E60730-1:2015 Ed.5+A1:2017] Clauses	--	--
Environmental stress of temperature	16.2	--	--
Thermal cycling test	H.17.1.4.2	--	--
Surge immunity test	H.26.8	--	--
Electrical fast transient/burst immunity test	H.26.9	--	--
Ring wave immunity test	H.26.10	--	--
Electrostatic discharge test	H.26.11	--	--
Radio-frequency electromagnetic field immunity-Immunity to conducted disturbances	H.26.12.2	--	--
Radio-frequency electromagnetic field immunity-Immunity to radiated disturbances	H.26.12.3	--	--
Power frequency magnetic field immunity test	H.26.14	--	--
Evaluation of compliance	H.26.15	--	--
Software evaluation	H.11.12	--	--
Component testing reviewer	Runze Hu	--	--

8.1 Signatures			
A representative sample of the product covered by this report has been evaluated and found to comply with the applicable requirements of the standards indicated in Section 1.0.			
Completed by:	David Yao	Reviewed by:	Carl Chen
Title:	Engineer	Title:	Reviewer
Signature:		Signature:	

9.0 Correlation Page For Multiple Listings	
The following products, which are identical to those identified in this report except for model number and Listee name, are authorized to bear the ETL label under provisions of the Intertek Multiple Listing Program.	
BASIC LISTEE	Shenzhen Wirentech Co.,Ltd.
Address	C602, Innovation Plaza, No.2007, Pingshan street,Pingshan District, Shenzhen
Country	China
Product	Lithium ion Battery

MULTIPLE LISTEE 1	None
Address	
Country	
Brand Name	
ASSOCIATED MANUFACTURER	
Address	
Country	

MULTIPLE LISTEE 1 MODELS	BASIC LISTEE MODELS

MULTIPLE LISTEE 2	None
Address	
Country	
Brand Name	
ASSOCIATED MANUFACTURER	
Address	
Country	

MULTIPLE LISTEE 2 MODELS	BASIC LISTEE MODELS

MULTIPLE LISTEE 3	None
Address	
Country	
Brand Name	
ASSOCIATED MANUFACTURER	
Address	
Country	

MULTIPLE LISTEE 3 MODELS	BASIC LISTEE MODELS

10.0 General Information

The Applicant and Manufacturer have agreed to produce, test and label ETL Listed products in accordance with the requirements of this Report. The Manufacturer has also agreed to notify Intertek and to request authorization prior to using alternate parts, components or materials.

COMPONENTS

Components used shall be those itemized in this Intertek report covering the product, including any amendments and/or revisions.

LISTING MARK

The ETL Listing mark applied to the products shall either be separable in form, such as labels purchased from Intertek, or on a product nameplate or other media only as specifically authorized by Intertek. Use of the mark is subject to the control of Intertek.

The mark must include the following four items:

1) applicable country identifiers "US" and/or "C" or "US", "C" and "EU"
2) the word "Listed" or "Classified" or "Recognized Component" (whichever is appropriate)
3) a control number issued by Intertek
4) a product descriptor that identifies the standards used for certification. Example:

For US standards, the words, “Conforms to” shall appear with the standard number along with the word, “ Standard” or “Std.” Example: “Conforms to ANSI/UL Std. XX.”

For Canadian standards, the words “Certified to CAN/CSA Standard CXX No. XX.” shall be used, or abbreviated, “Cert. to CAN/CSA Std. CXX No. XX.”

Can be used together when both standards are used.

If all standards on the ATM have the same standard title, the shared title or its abbreviation may be used in place of the examples above. Example: "Medical Electrical Equipment" or "MEE"; "Information Technology Equipment" or "ITE"; "Audio/Video Information And Communication Technology Equipment" or "A/V ICTE".

Note: A facsimile must be submitted to Intertek, Attn: Follow-up Services for approval prior to use. The facsimile need not have a control number. A control number will be issued **after signed Certification Agreements** have been received by the Follow-up Services office, approval of the facsimile of your proposed Listing Mark, satisfactory completion of the Listing Report, and scheduling of a factory assessment in your facility.

MANUFACTURING AND PRODUCTION TESTS

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

FOLLOW-UP SERVICE

Periodic unannounced audits of the manufacturing facility (and any locations authorized to apply the mark) shall be scheduled by Intertek. An audit report shall be issued after each visit. Special attention will be given to the following:

1. Conformance of the manufactured product to the descriptions in this Report.
2. Conformance of the use of the ETL mark with the requirements of this Report and the Certification Agreement.
3. Manufacturing changes.
4. Performance of specified Manufacturing and Production Tests.

In the event that the Intertek representative identifies non-conformance(s) to any provision of this Report, the Applicant shall take one or more of the following actions:

1. Correct the non-conformance.
2. Remove the ETL Mark from non-conforming product.
3. Contact the issuing product safety evaluation center for instructions.

10.1 Evaluation of Unlisted Components

Because Unlisted Components are uncontrolled, and they do not fall under a third party follow up program, Intertek may require these components to be tested and/or evaluated at least once annually, more often for certain components, as part of the independent certification process. The Unlisted Components in Section 5.0 require testing and/or evaluation as indicated.

The Applicant will be notified, in writing, via the applicable contact methods, as defined in Section 1.0, when these components must be selected and sent to Component Evaluation Center (CEC) for re-evaluation.

Due to particular testing requirements, some components may be requested to be shipped to specific labs. Thus, specific shipment destination(s) for each sample will be provided in the written notification.

Managing CEC Location:
Intertek Testing Services Shenzhen Limited Guangzhou Branch
ETL Component Evaluation Center
Room 02, &101/E201/E301/E401/E501/E601/E701/E801 of Room 01 1-8/F., No. 7-2, Caipin Road, Science City
GETDD Guangzhou, Guangdong, China
Attn: Ms. Joey Kuang
Sample Disposition: Due to the destructive nature of the testing, all samples will be discarded at the conclusion of testing unless, the manufacturer specifically requests the return of the samples. The request for return must accompany the initial component shipment.

11.0 Manufacturing and Production Tests
The manufacturer agrees to conduct the following Manufacturing and Production Tests as specified: **Required Tests** None

12.0 Revision Summary				
The following changes are in compliance with the declaration of Section 8.1:				
Date/ Proj # Site ID	Project Handler/ Reviewer	Section	Item	Description of Change
				None