SOLARWIND
LA RÉVOLUTION SOLAIRE AUTONOME

Energy storage liquid cooling outdoor integrated cabinet

105kW/232kWh

Product Specifications

Release date: 2024-11-21

Modify resume

Version	Summary of Revisions	Revision Date	Revised by
1	Initial release	2024-03-21	LZY
2	(1).Revised product dimensions; (2).Revised communication methods.	2024-03-29	LZY

Table of contents

1.Overview

This product specification is applicable toDongxing BatteryDesigned and produced105kW/232kWhEnergy storage liquid cooling outdoor integrated cabinet, describes the product's functional design, structure, performance and other aspects.

2.Reference Standards

The following documents are essential for the application of this document. For any referenced document with a date, only the version with the date is applicable to this document. For any referenced document without a date, the latest version (including all amendments) is applicable to this document.

GB/T	36276-2018	Lithium-ion batteries for power storage
GB/T	31485-2015	General technical requirements for lithium-ion batteries
GB/T	34131-2017	Technical specification for lithium-ion battery management system for electrochemical energy storage power stations
GB/T	34120-2017	Technical Specifications for Energy Storage Converters of Electrochemical Energy Storage Systems
GB/T	34133-2017	Technical regulations for testing energy storage converters
GB/T	36547-2018	Technical regulations for the connection of electrochemical energy storage systems to the power grid
GB/T	36548-2018	Test specification for electrochemical energy storage system access to the grid
GB/T	32589-2017	Technical regulations for microgrid access to power system
GB/T	36558-2018	General technical requirements for electrochemical energy storage systems in power systems
GB/T	15945-2008	Energy Quality Power System
GB/T	15543-2008	Frequency Deviation Energy quality three-phase voltage unbalance
GB/T	14549-2008	Energy Quality Utility Grid Harmonics
GB/T	12326-2008	Energy quality, voltage fluctuations and flicker
GB/T	13384-2008	General technical requirements for packaging of electromechanical products
GB/T	191-2008	Packaging, storage and transportation logo
GB/T	2423.1-2008	Environmental testing for electrical and electronic products2Part: Test methods testA： Low temperature
GB/T	2423.2-2008	Environmental testing for electrical and electronic products2Part: Test methods testB： High temperature
GB	4208-2008	Enclosure protection grade (IPCode)
GB/T	17626 -2006	Electromagnetic compatibility test and measurement technology
GB	14048.1-2006	Low voltage switchgear and controlgear1Section: General
GB	8702-88	Regulations on electromagnetic radiation protection
GB	21966-2008	Safety requirements for lithium primary cells and batteries during transportation
T/CEC	373-2020	Fire protection technical specification for prefabricated cabin type lithium iron phosphate battery energy storage power station

3.Definition of terms

Battery Cell

The basic unit for realizing the mutual conversion between chemical energy and electrical energy is composed of positive electrode, negative electrode, separator, electrolyte, shell and terminals.

Battery Module

A battery assembly consisting of battery cells connected in series, parallel or series-parallel and having only one pair of positive and negative output terminals should also include a casing, management and protection components.

Battery Cluster

A battery assembly that is composed of battery modules connected in series, parallel or series-parallel, and that can achieve independent operation after being connected to an energy storage inverter and ancillary facilities should also include components such as a battery management system, monitoring and protection circuits, and electrical and communication interfaces.

High voltage box

Used for protection and control during the charging and discharging process of battery clusters, it consists of cluster-level battery management units, relays, fuses, power resistors and circuit breakers.

Energy Storage ConverterPCS

In an electrochemical energy storage system, a converter connected between the battery system and the power grid (and/or load) to achieve bidirectional conversion of electrical energy.

Energy Management System - EMS

The brain of the energy storage system realizes energy storage system monitoring, power control and energy management.BMSandPCSCentralized monitoring, unified operation, maintenance, repair and management.

Battery Management System - BMS

A device that detects battery voltage, current, temperature and other parameter information, and manages and controls the battery status.

Nominal voltage

An approximate value of voltage that identifies or characterizes a battery or electrochemical system.

Charging rate

The ratio of the charging power to the energy value of the product measured multiple times by the battery management system.
For example: The product energy is 960Wh, the charging power is 480W When the charging rate is 0.5P; When the product energy decays to 800Wh, the charging power is 400W When the charging rate is 0.5P.

Discharge rate

The ratio of the discharge power to the energy value of the product measured multiple times by the battery management system. For example: the product energy is 960Wh, the discharge power is 480W When the discharge and charge rate is 0.5P; When the product energy decays to 800Wh, the discharge power is 400W When , the discharge rate is 0.5P.

Standard charging

At room temperature (5±2)℃, by 0.5P Constant power charging to any battery cell voltage in the container 3.65V, stop charging, Standstill 30min.

Standard discharge

At room temperature (25±2)℃, by0.5P Constant power discharge to any battery cell voltage in the container 2.50V, stop discharging, Standstill 30min.

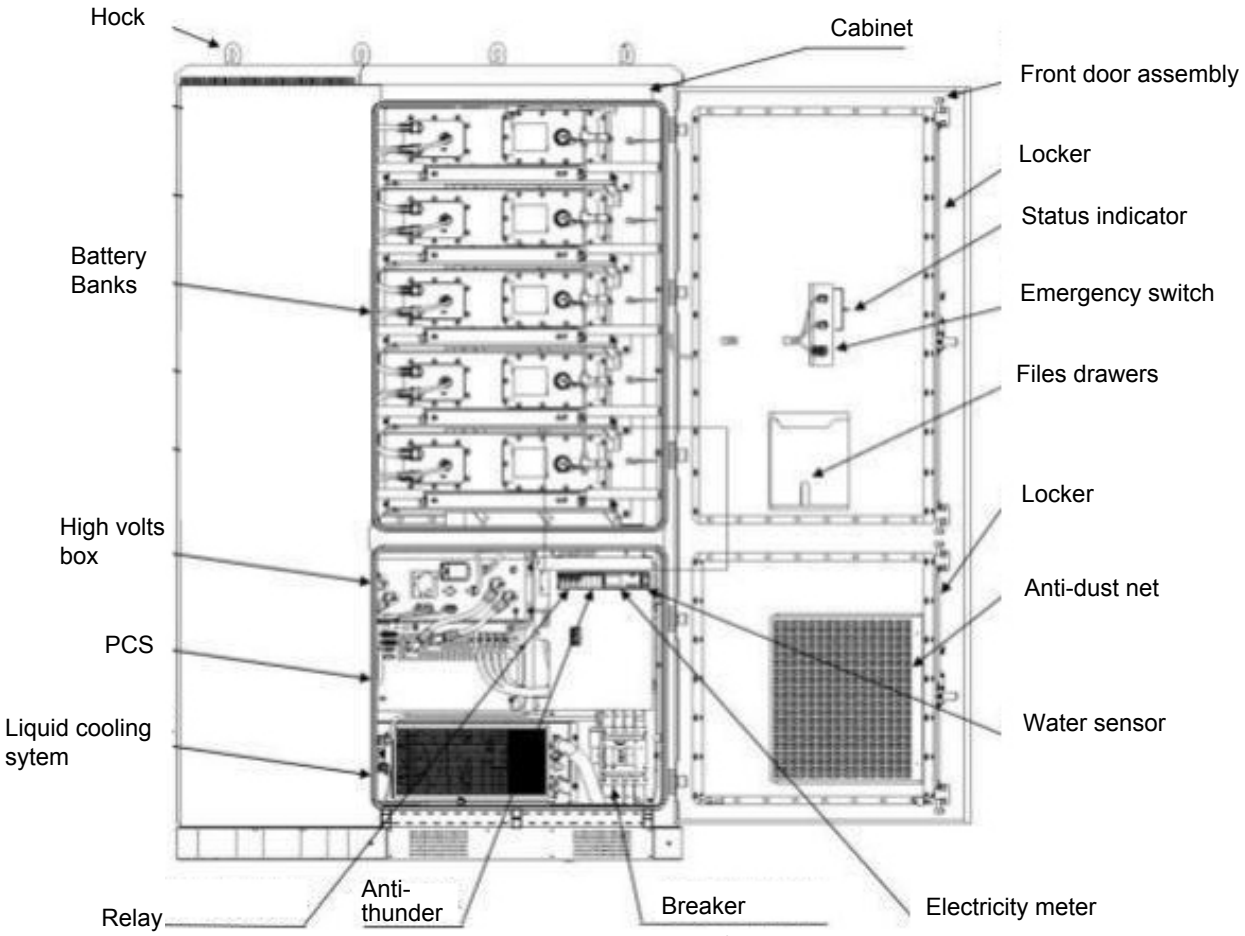
4. Product design parameters

4.1 Product Appearance

Picture 4-1 ESS Matrix Product appearance

Picture 4-2 ESS Matrix Product appearance

4.2 Product layout



picture 4.2 ESS Matrix Structure diagram

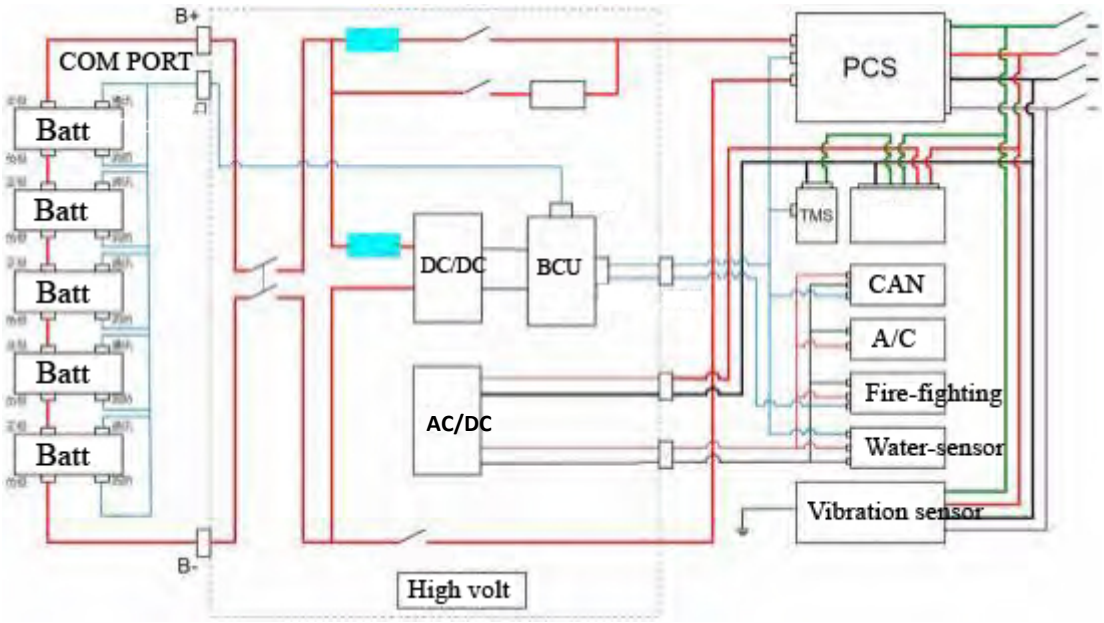
4.3 Design parameters

surface 4-1 Energy storage cabinet parameter configuration table

Serial number	project	Specifications	Remark
1	name	ESS Matrix	
2	Dimensions (width x depth x height)	1300mm×1300mm×2340mm	Without lifting ring
3	Rated voltage/rated capacity	832V/280Ah	
4	Grouping method	1P260S	
5	Rated energy	232.96kWh	
6	Operating voltage	DC:650V~949V	
7	weight	2600kg±100kg	
8	Rated Power	105kW@25℃	
9	Maximum continuous charging power	110kW@25℃	
10	Maximum continuous discharge power	110kW@25℃	
11	Cooling mode	Liquid Cooling	
12	Heating mode	Liquid Heat	

13	Insulation properties	≥550MΩ@1000VDC	
14	Pressure resistance	≤5mA@3390VDC	
15	Protection level	IP54	
16	Operating temperature	Charge:0℃~55℃	
17		Discharge:-30℃~55℃	
18	Altitude	≤5000m	> 2000mTime derating
19	Storage temperature	- 20℃~35℃	
20	Relative humidity	0~95%, no condensation	

4.4 Electrical Schematic



picture 4.4 ESS Matrix Electrical schematic diagram

5.Product Introduction

5.1Battery System

5.1.1 Single cell

This product adopts3.2V/280AhSquare aluminum shell lithium iron phosphate battery cell, the technical parameters of the battery cell are as follows:

surface 5-1 Battery parameter configuration table

Serial number	Project	Specifications
1	Battery specifications	LFP71173207
2	Material system	Lithium Iron Phosphate
3	size	174.7mm×71.65mm×207.11mm
4	Nominal voltage	3.2V
5	Nominal capacity	280Ah

6	Internal resistance	0.18±0.05mΩ
7	weight	5.43±0.2kg
8	Energy density	⩾160Wh/kg
9	Operating voltage	T＞0℃, 2.5V~3.65V;T⩽0℃, 2.0V~3.65V
10	Charging temperature	0℃~60℃
11	Discharge temperature	- 30℃~60℃
12	Storage temperature	- 20℃~35℃
13	Maximum continuous charging rate	1C
14	Maximum continuous discharge rate	1C

5.1.2Battery Module

The battery module is made of 52 * 3.2V/280Ah Lithium iron phosphate cells are connected in series, with a total energy 46.59kWh. It has the characteristics of high energy density, wide temperature range, long life, light weight and high safety.

Surface 5.1.2 Battery module parameters

Parameter	Specification	Remark
Grouping method	1P52S	
Nominal capacity	280Ah	@25±2℃, 0.5P
Rated energy	46.59kWh	@25±2℃, 0.5P
Nominal voltage	166.4V	@25±2℃, 0.5P
Operating voltage range	130V~189.8V	@25±2℃, 0.5P
Dimensions (length x width x height)	1163.3mm×800.6mm×234.5mm	
weight	337±10kg	
Rated charge/discharge rate	0.5P	@25±2℃
Cooling method	Liquid Cooling/Liquid Heating	
Protection level	IP67	
Discharge temperature range	- 30℃~55℃	
Charging temperature range	0℃~55℃	
Storage temperature	- 20℃~35℃	

Picture 5.1.2 Battery module schematic

5.1.3 Battery Cluster

This product battery pack includes 5 Battery modules and 1 Set of high voltage boxes, total 1 P260S, group energy 232.96kWh, the specific system parameters are shown in the following table.

surface 5.1.3 Battery Cluster Specifications

Serial number	parameter	Specification	Remark
1	Nominal capacity	280Ah	
2	Serial-parallel mode	1P260S	
3	Nominal voltage	832V	
4	Rated energy	232.96kWh	
5	Rated Power	0.5P	
6	Operating voltage range	650~949V	
7	Charging temperature range	0℃~55℃	
8	Discharge temperature range	- 30℃~55℃	

5.1.4 High voltage box

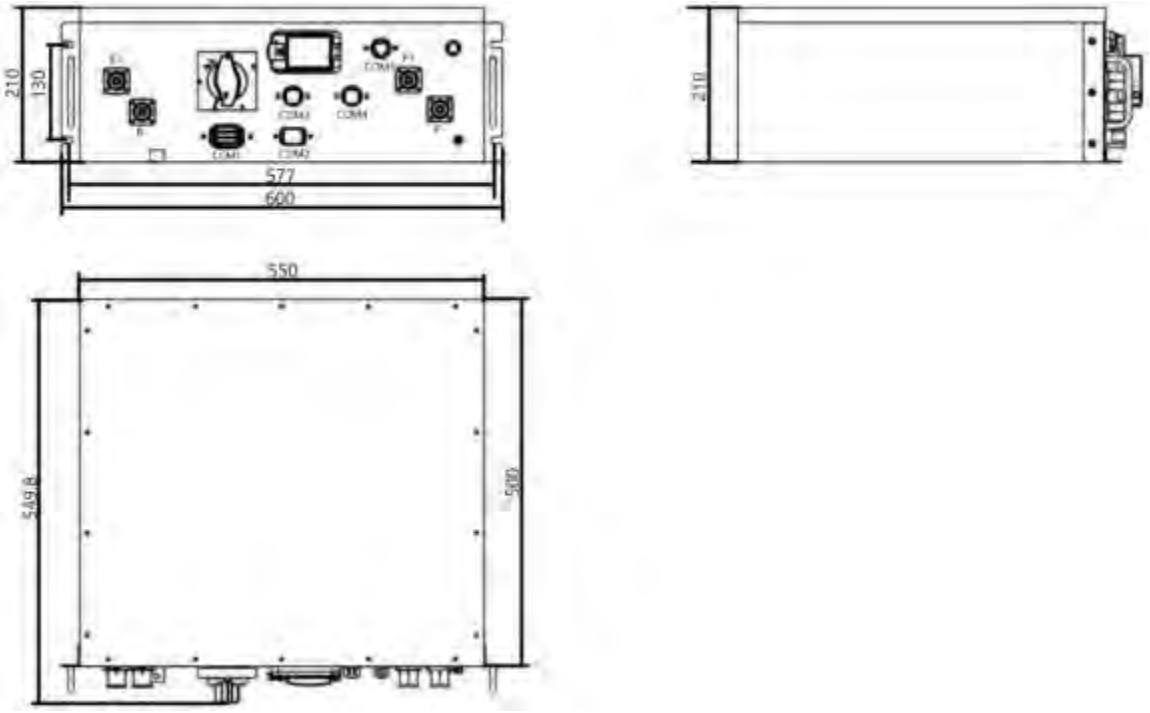
The high-voltage control box of the battery management system is a standardized and configurable high-voltage power circuit management unit designed for the energy storage system. It is an intermediate unit connecting the battery cluster and the energy storage converter. It has the functions of collecting the battery cluster voltage and current, and controlling and protecting the battery cluster circuit contactor. The high-voltage control box of the battery management system is equipped with circuit breakers, contactors, fuses, pre-charge control circuits, current sensors, and the main control unit for the battery cluster control (BCU), switching power supply, etc., the electrical characteristics, safety performance and operability and maintainability of each component have been fully considered during the design, and it has the characteristics of compact structure, flexible configuration, safety and reliability.

Built-in energy storage battery cluster controls main control unit (BCU), has CAN RS485 Communication bus interface and can realize the connection between high-voltage control box and energy storage battery management module, energy storage battery management system host and energy storage converter, EMS Communication function between realize the control, protection and data communication functions of energy storage battery cluster.

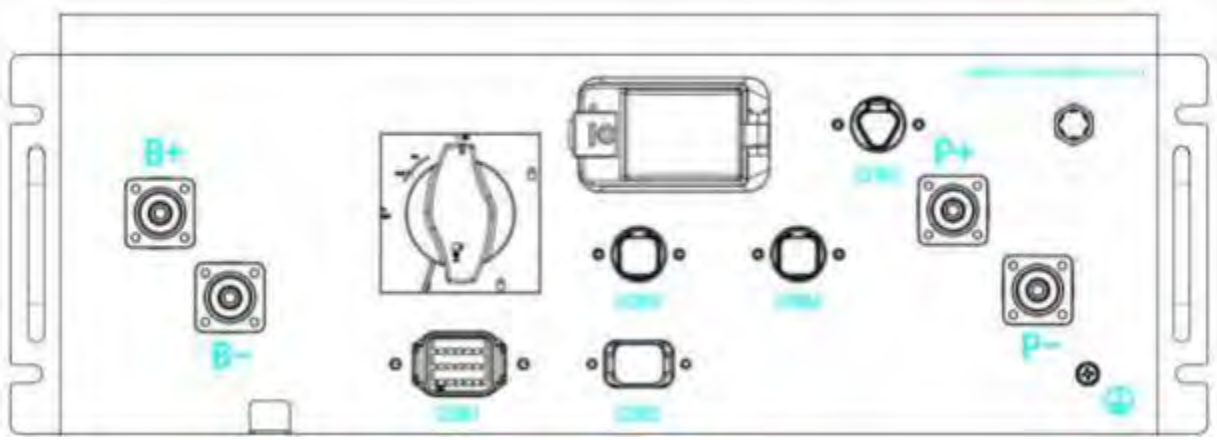
surface 5.1.4 High voltage box specification table

Serial number	name	quantity	Functional Description	Remark
1	Molded case circuit breaker	1	Manual separation and automatic separation of battery cluster circuits	
2	DC contactor	1	Automatic separation and closing of positive circuit of battery cluster	
3	DC contactor	1	Automatic separation and connection of negative circuit of battery cluster	
4	Pre-charged contactor	1	Automatic opening and closing of pre-charging circuit	
5	Pre-charge resistance	1	Pre-charge and circulation circuit current limiting	
6	Shunt	1	Current measurement	
7	Fuse	1	Protect the main circuit from overcurrent	
8	Switching Power Supply	1	External AC power supply	AC/DC
9	Switching Power Supply	1	Battery cluster power supply	DC/DC
10	Control unit	1	Battery Cluster Control Management Unit	
11	Power connector	4	High voltage circuit input and output	

12	COM1	1	Communication port	
13	COM2	1	Output24V	
14	COM3	1	Debug port	
15	COM4	1	Master-slave communication port	
16	COM5	1	Input AC220V	



Picture 5.1.4.1 High voltage box schematic



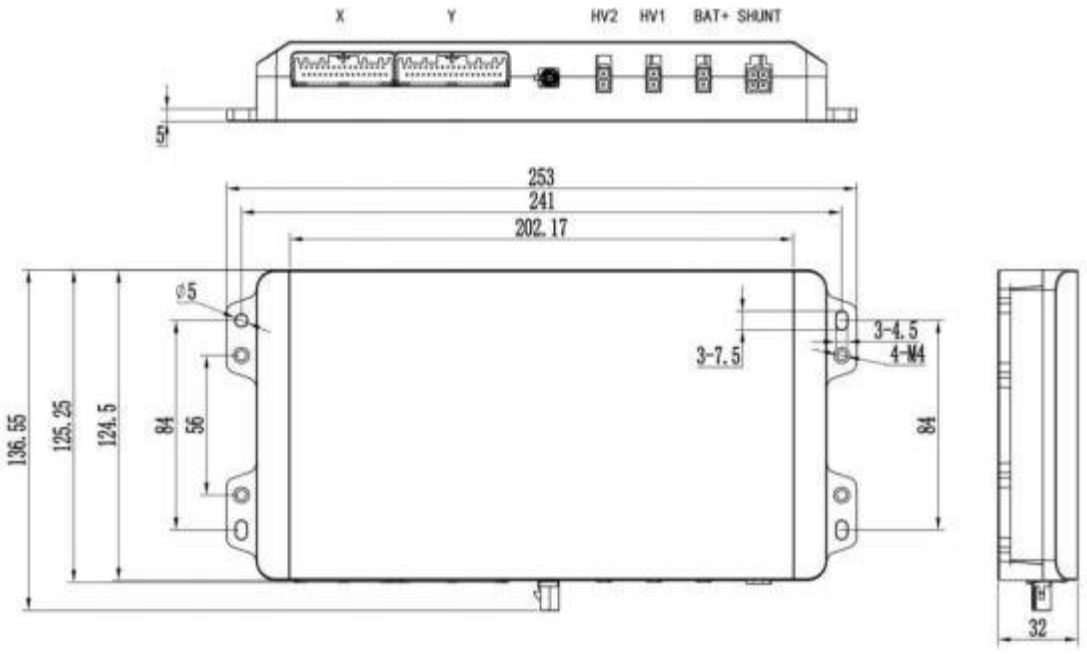
Picture 5.1.4.2 High voltage power port name

5.1.5 Battery Management System (BMS)

Battery Management System (BMS) is used to monitor the status and performance of energy storage components to ensure their life and safety, and to determine whether maintenance or replacement is needed by monitoring battery data in real time.

surface 5.1.5 BMS Technical Parameters

Serial number	Project	Parameters	Remark
1	Specifications	P750	
2	size	253mm×136.55mm×32mm	
3	System power supply	6V~36V	
4	Battery monitoring string number	260S	
5	Voltage detection range	0~5V	
6	Temperature detection quantity	maximum64indivual	
7	Temperature detection range	- 40℃~125℃	
8	Battery balancing method	Passive Balance	
9	Battery balancing current	≤100mA	
10	Data communication interface	CAN	
11	High voltage detection accuracy	±0.5%or0.5V	
12	Current detection accuracy	±0.5%FSR	
13	Insulation detection accuracy	±15%or15kΩ	
14	SOCEstimation accuracy	≤5%	
15	Temperature detection accuracy	±1℃（10KNTC）	
16	Operating temperature	- 30℃~85℃	
17	Storage temperature	- 40℃~105℃	
18	Operating humidity	5%~95%	
19	Operating power consumption	200mA@12V	
20	Power consumption when shutdown	100uA@12V	



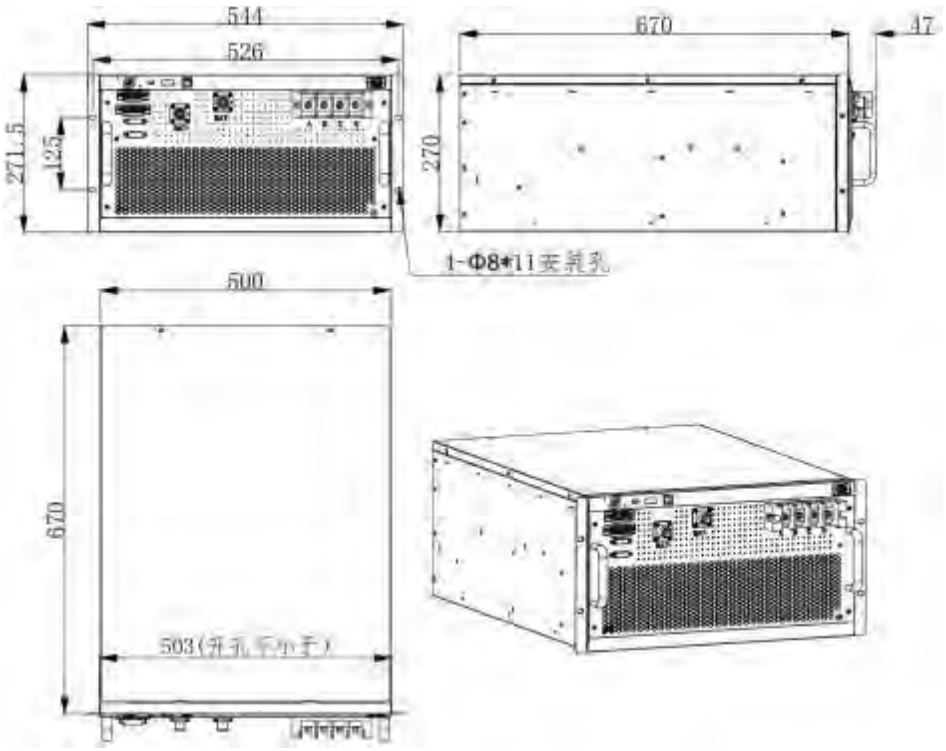
picture 5.1.5.1 BCU Schematic diagram

5.2 Energy storage converter (PCS)

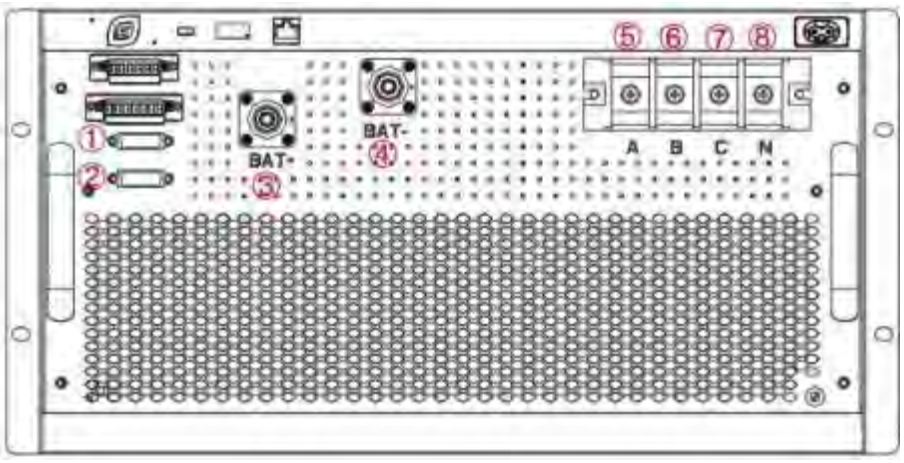
Energy storage converter (PCS) is a bidirectional current controllable conversion device that connects the energy storage battery system and the power grid. Its main function is to realize the energy exchange between the battery and the power grid, and to control and manage the charging and discharging of the battery.
In the grid-connected mode, it can realize peak shaving and valley filling, peak and frequency regulation, virtual capacity expansion, and off-grid backup power.PCSIt also supports multiple charging and discharging modes including constant voltage, constant current and floating charge

surface 5.2 PCS Parameter Table

Serial number	project		Specifications
1	Specification		EPCS
2	size		544mm×717mm×271.5mm
3	weight		38kg±5kg
4	Operating temperature		- 30℃~55℃
5	Storage temperature		- 45℃~70℃
6	Cooling method		Intelligent forced air cooling
7	Protection level		IP20
8	Grid support		L/HVRT,Active and reactive power control
9	Communication interface		CAN/RS485
10	DC side	Full load voltage range	105kVA
11		Full load voltage range	680V~950V
12		Maximum current	170A
13	AC side (Grid-connected)	Rated voltage	400V
14		Voltage deviation	-10%~+15%
15		Maximum current	167A
16		AC output type	(3W+N+PE) Three-phase four-wire
17		Rated output power	105kW
18		Rated grid frequency	50Hz
19		Power Factor	0.99
20		Current distortion rate	＜3% (rated power)
21		Overload capacity	110%long
22	AC side (Off-grid)	Rated output voltage	400V
23		AC voltage harmonics	＜3% (Linear load)
24		Rated frequency	50Hz
25		Rated output power	105kW
26		Maximum output current	167A



picture 5.2.1 PCS Schematic diagram



picture 5.2.2 PCS Wiring port diagram

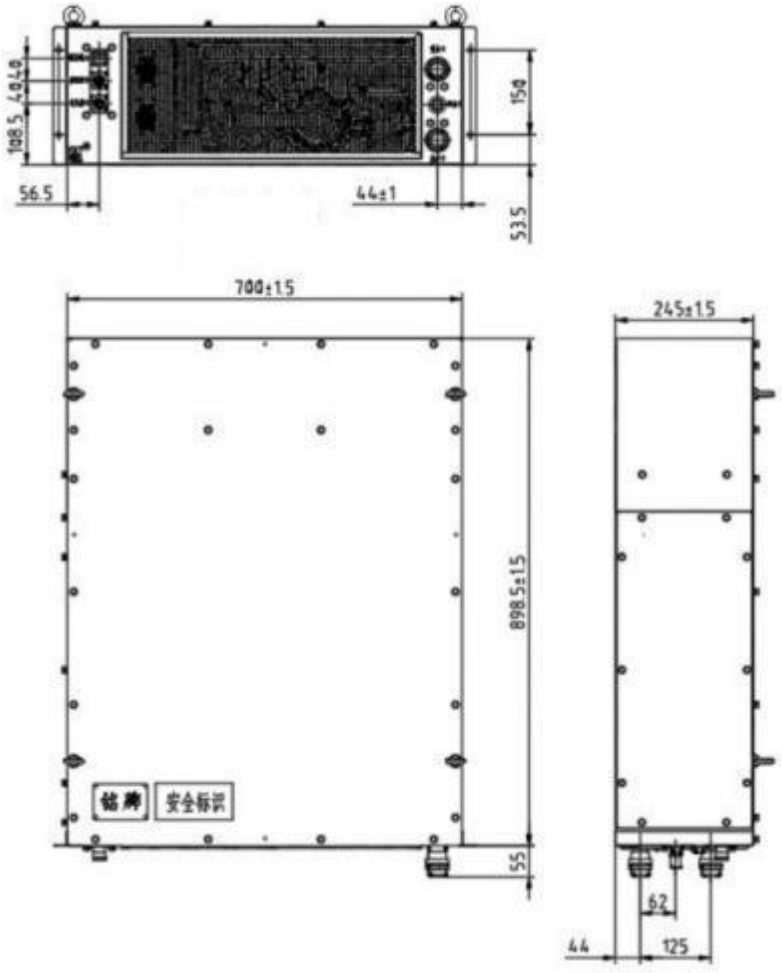
PCS Wiring port description			
Serial number	**Location**	**name**	**describe**
①	COM1	communication1	Communication port1
②	COM2	communication2	Communication port2
③	BAT+	Battery positive terminal +	Battery positive input terminal
④	BAT-	Battery negative terminal -	Battery negative input terminal
⑤	A	AMutually	communicate A Mutually
⑥	B	BMutually	communicate B Mutually
⑦	C	CMutually	communicate C Mutually
⑧	D	Three-phase four-wire neutral input N Wire	communicate N Wire

5.3 Water cooling unit

The water cooling unit controller monitors the outlet water temperature in real time and makes intelligent adjustments according to the temperature setting, so that the battery in the energy storage cabinetThe operating temperature is stable within the appropriate range.

surface 5.3 Liquid cooling unit parameters

Serial number	Specification	Value
1	Overall dimensions (width x depth x height)	700mm×953.5mm×245mm
2	Unit net weight	100kg±5kg
3	System rated voltage	AC220V±10%,50/60Hz
4	Rated current	3.5A
5	Installation	Embedded
6	Protection level	Machine:IPX5, Electric control box:IP66
7	Cooling capacity	5kW@W18/ L45℃
8	Heating capacity	2kW
9	Coolant	50%Ethylene glycol aqueous solution
10	Storage environment range	- 40°C ~55°C
11	Work Environment	- 40°C ~55°C



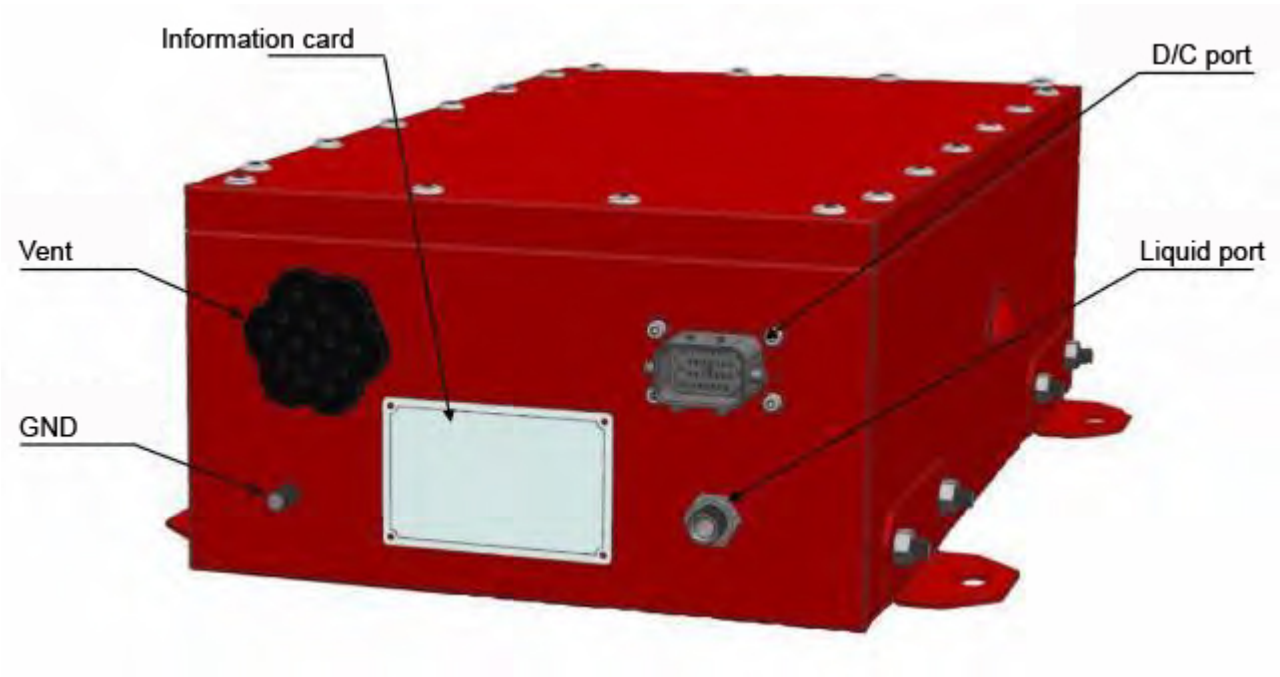
picture 5.3 Dimensions of water cooling unit

5.4 Fire protection system

The fire protection system is mainly composed of the suppression device host (the host integrates the suppressant bottle group, controller, drive device, signal feedback device, battery), detection device, alarm start switch, wiring harness, pipes, pipe fittings, nozzles and other components. It is suitable for suppressing the lithium battery box and lithium battery compartment of new energy vehicles.A\B\C\EClass fire.

Suppression device host

The main structure and use of the suppression device host. The main host of the suppression device consists of a box, an inhibitor bottle group, a controller, a drive device, a signal feedback device, a battery and other components. The main host acts as a control center, which can collect signals from the detector, monitor the leakage of its own inhibitor bottle group, send relevant information to the alarm start switch, and intuitively reflect the working status of the prevention and control product system through sound and light alarm signals. It can also judge the input information of the external detector and the alarm start switch, start the inhibitor bottle group, and spray the inhibitor.



picture 5.4 Schematic diagram of the suppression device host

Alarm start switch

The alarm start switch consists of a plastic shell, a circuit board, an indicator light, an emergency start button, etc. During normal operation, different sound and light alarm information is displayed according to the system self-check results of the controller in the suppression device host. When it is found that the battery box has an early warning of thermal runaway, the emergency start button can be used to manually start the suppression device host to spray the inhibitor.

Detection device

The detection device consists of a housing, a circuit board, a sensor, etc. It can monitor the carbon monoxide gas concentration, smoke concentration and temperature before the module thermal runaway, and realize the early warning of battery thermal runaway and the activation of the prevention and control device through calculation and analysis.

6. Product packaging, transportation, installation instructions

6.1 Package

1) The packaged products should be placed in dry, dust-proof and moisture-proof packaging boxes;

2) The packaging box should be marked with the product name, model, quantity, manufacturer, production date or batch number, and should have necessary packaging, storage and transportation signs and warning signs such as "upward", "avoid rain", and "stacked layer limit";

3) Packaging storage and transportation graphic signs should be in accordance withGB/T 191-2008Implementation of relevant regulations.

6.2 Transportation

1) Avoid severe mechanical impact, exposure to the sun, rain, and inversion during transportation and loading and unloading. During loading and unloading, the equipment should be handled with care and no dropping, rolling, or heavy pressure is allowed.

2) Transportation should be carried out by sea or by road with good road conditions. Railway and air transportation are not supported. Bumping and tilting should be minimized during transportation.

6.3 Install

6.3.1 Foundation requirements

1) The energy storage system needs to be installed on a flat foundation with a flame-retardant surface or a structure supported by channel steel. The embedded bolts are aligned with the holes at the bottom of the channel steel of the energy storage system to fix the energy storage system to the foundation.

2) When installing on a foundation, the foundation must be flat and solid and have sufficient bearing capacity. It is strictly forbidden to have a dent or tilt on the foundation surface.

6.3.2 Wiring requirements

1) The cables used in the system are divided into power cables and communication cables;

2) Power cables and communication cables should be placed in different cable trenches to reduce the interference of power cables on other cables.

6.3.3 Wiring requirements

1) In order to prevent the wire nose from loosening due to stress, causing poor contact, or increased contact resistance leading to heating or even fire, ensure that the corresponding torque requirements are met when tightening the screws of the wire nose;

2) In order to reduce the stress on the copper nose, the cable should be fixed at an appropriate position;

3) When installing and connecting the power cable, avoid scratching the cable insulation to avoid short circuit, and fix it properly.

7.Precautions

1) Do not immerse the product in water;

2) Improper use and storage of the product may result in the risk of fire, explosion and burns.

Do not disassemble, crush, incinerate or Heat

3) Do not put the product into fire or expose it to high temperature environment exceeding the temperature conditions specified in this specification for a long time, otherwise it may cause fire. Under any normal use, the temperature of the battery cell in the system cannot exceed 60℃, If the temperature exceeds 60℃,The product needs to be shut down and stopped running;

4) Keep the product out of the reach of children, do not remove the original packaging of the product before use, and dispose of used products in a timely manner according to local recycling or waste regulations;

5) Do not disassemble, dismantle or repair the product in any way without authorization;

6) Do not mix products of different specifications, brands and batches;

7) If the product emits an odor, becomes hot, deformed, discolored, or exhibits any other abnormality, it must not be used and should be moved to a safe location;

8) It is forbidden to short-circuit the positive and negative poles of the product, otherwise the strong current and high temperature may cause personal injury or fire. When assembling and connecting the battery system, there should be sufficient safety protection to avoid short circuit;

9) Connect the positive and negative poles of the product strictly according to the markings and instructions. Reverse or cross-connection charging is prohibited.

10) It is forbidden to overcharge or over-discharge the product, otherwise, it may cause overheating and fire accidents of the battery cells in the battery cluster. During the installation and use of the product, multiple overcharge and over-discharge failure safety protection of hardware and software shall be implemented;

11) Improper termination of charging may occur during the charging process of the product. For example, the charging time exceeds the allowed time, the charging voltage is too high and the charging is terminated, or the charging current is too strong and the charging is terminated. The above phenomenon is defined as "improper termination of charging". When the above phenomenon occurs, it may mean that the battery system is leaking or some components are faulty. Continuing to charge the product before the root cause is found and thoroughly resolved may cause the battery cells in the battery cluster to overheat or cause a fire;

12) Customers should securely fix the product on a solid surface and tie the power cord securely in place to avoid friction that may cause arcs and sparks;

13) It is strictly forbidden to use plastic for electrical connection. Incorrect electrical connection method may cause the product to overheat during use;

14) When electrolyte leaks, avoid contact between skin and eyes. If contact occurs, wash the contacted area with plenty of water and seek medical help. Do not allow any person or animal to swallow any part of the product;

15) The product should be protected from mechanical vibration, collision and pressure shock during use, otherwise the product may short-circuit internally, generating high temperature and fire. The product is potentially dangerous, and appropriate protective measures must be taken during operation and maintenance; improper operation during safety performance testing may cause the battery cells in the product to catch fire or explode. Safety performance testing can only be performed by professionals equipped with appropriate protective equipment in professional laboratories. Otherwise, it may cause serious personal injury and property damage. Failure to comply with the above warnings may cause a variety of disasters;

16) The customer is aware of the following potential dangers during the use and operation of the product: the operator may be harmed by chemicals, electric shock or arc during operation; although the human body reacts differently to direct current and alternating current. The 50V direct current voltage is as harmful to the human body as the alternating current, so the customer must take a conservative posture during operation to avoid harm from the current;

17) Customers and their employees must consider the above potential risks when operating the product and selecting personal protective equipment to prevent accidental short circuits, arcing, explosion or thermal runaway.

8. Other agreements

1) When you need technical support from SolarWind & partners during product installation and use of the SolarWind Battery, We can provide service and technical support. If the product problem is caused by failure to use in accordance with the contents of this specification, SolarWind Battery Technical guidance can be provided, but free replacement service is not promised; customers should use the product strictly in accordance with the contents of this specification, and customers should ensure that the users of the product use the product in accordance with the contents of this specification, otherwise, any product parameter discrepancy, quality problem, failure and any loss be caused on Battery, then No responsibility will be assumed by SolarWind.

2) The customer has the obligation to keep the contents of this specification confidential and shall not disclose it to any third party without authorization. For specific details, please refer to the confidentiality agreement signed by both parties.

3) Without SolarWind & patners written consent of the customer, the product user and any related party shall not integrate, separate or modify the technical solution of the product, or conduct any spying or reverse engineering on the product under any circumstances;

4) SolarWind & partners reserves the right to modify the specifications and performance parameters of the products. Before ordering SolarWind Technology's products, customers need to contact SolarWind & partners and confirm the latest specifications and performance parameters of the product in advance;

5) Product samples are in the development stage and are only for testing. Customers need to contact us for specific test items. SolarWind & partners, the merchant is determined and it is prohibited to sell it to any third party without authorization;

6) If improper use of the product by customers, product users or any other related parties causes social impact, If the reputation of the Company is affected, customers, product users and any related parties shall compensate SolarWind & Partners for all losses;

7) The contents of acceptance, quality assurance, after-sales and technical services shall be subject to the business agreement between the two parties;

8) If there are inconsistencies in the contents of the relevant documents provided to the customer, SolarWind & partners reserve the right of final interpretation.

No text below