Fujian Longking Svolt Energy Storage Technology Co.,Ltd.
5.015MWh Liquid-cooling Energy Storage Product Specification

Profile Version V1.0

catalogs

I. Scope of application

This document is a product specification for the self-developed 1500V/5.015MWh system 20-foot standard container energy storage product of Fujian Longking-Svolt Energy Storage Technology Co., Ltd (hereinafter referred to as Longking-Svolt), which stipulates the conditions of use, technical specifications, performance indexes, basic functions, key parameters, interfaces, packaging, transportation, storage, and other precautions of this product.

II. referencing standards

standard number	Standard name
GB/T36558-2018	General Technical Conditions for Electrochemical Energy Storage Systems for Power Systems
GB/T36547-2018	Technical regulations for grid connection of electrochemical energy storage systems
GB/T36548-2018	Test specification for grid access of electrochemical energy storage systems
GB 51048-2014	Design Code for Electrochemical Energy Storage Plants
GB/T50064-2014	Specification for overvoltage protection and insulation fit design of alternating current electrical installations
GB/T50065-2011	Code of practice for the grounding of AC electrical installations
NB/T42091-2016	Technical Specification for Lithium-ion Batteries for Electrochemical Energy Storage Power Stations
GB 51048-2014	Design Code for Electrochemical Energy Storage Plants
GB/T36276-2018	Lithium-ion batteries for power storage
GB/T34131-2017	Technical Specification for Lithium-ion Battery Management System for Electrochemical Energy Storage Power Stations
GB/T 36549-2018	Operational indicators and evaluation of electrochemical energy storage power plants
GB/T25294-2010	General technical requirements for power integrated control cabinet
Q/SV SJ041-2019	Safety Design Code for Energy Storage System Distribution
Q/SV SJ062-2020	Energy storage commonly used copper and aluminum rows

	and cable current-carrying capacity standards
Q/SV SJ064-2020	Structural Design Code for Energy Storage Containers
Q/SV JT011-2019	Technical requirements for fire extinguishing of electrochemical energy storage systems
Q/SV JT015-2020	General requirements for communication and control technology for energy storage systems
Q/GDW 1887-2013	Technical specification for monitoring and communication of grid-configured energy storage systems
GB/T2423.1-2008	Environmental test for electrical and electronic products Part 2: Test method Test A: Low temperature
GB/T2423.2-2008	Environmental Tests for Electrical and Electronic Products Part 2: Test Methods Test B: High Temperature
GB/T2423.3-2006	Environmental testing of electrical and electronic products Part 2: Test Methods Test Cab: Constant Damp Heat Test
GB/T2423.8-1995	Electrical and Electronic Products Environmental Tests Part 2: Test Methods Test Ed: Free fall
GB/T2423.10-2008	Environmental testing of electrical and electronic products Part 2: Test method test Fc: Vibration (sine)
GB/T10125-1997	Artificial Atmosphere Corrosion Test Salt Spray Test
GB/T4208-2017	Enclosure protection class (IP code)
GB/T1804-2000	General tolerances Tolerances for linear and angular dimensions with no noted tolerances
GB50116-2013	Automatic fire alarm system design regulations
GB50370-2005	Code of practice for the design of gaseous fire extinguishing systems
GB50263-2007	Code of practice for the construction and acceptance of gaseous fire extinguishing systems
GB50166-2007	Automatic fire alarm system construction and acceptance specification
GB30122-2013	Stand-alone temperature-sensitive fire detector
GB15322.5-2003	Combustible gas detectors
GB17799.3	General Standard for Electromagnetic Compatibility Emission Standards in Residential, Commercial and Light Industrial Environments

GB17799.4	General Standard for Electromagnetic Compatibility Emission Standards in Industrial Environments
GB8702-88	Regulations on protection against electromagnetic radiation
GB/T17626	Electromagnetic compatibility test and measurement techniques
GB17625.2	Electromagnetic compatibility limits for voltage fluctuations and flicker in low-voltage supply systems for equipment with a rated current of not more than 16 A
GB/Z17625.3	Electromagnetic compatibility limits for voltage fluctuations and flicker in low-voltage supply systems for equipment with rated currents greater than 16 A

III. Terminology

3.1 Battery Cell

The basic unit for realizing the mutual conversion of chemical and electrical energy, consisting of positive pole, negative pole, diaphragm, electrolyte, shell and terminals.

3.2 Battery Pack

Battery assemblies consisting of battery units connected in series, parallel or series-parallel and having only one pair of positive and negative output terminals are also suitable to include components such as housing, management and protection devices.

3.3 Battery Cluster

A battery assembly that is connected in series, parallel, or series-parallel by a battery insertion box, and that is connected to the energy storage converter and ancillary facilities to realize independent operation, is also suitable to include a battery management system, monitoring and protection circuits, and electrical and communication interfaces, and other components.

3.4 Battery Management Unit Battery Management Unit, LK-BMU

Manages a battery insertion box, monitors battery status (voltage, temperature, etc.), and provides a communication interface.

3.5 Battery Cluster Management Unit, LK-RCU

Managing a battery cluster and summarizing the collected data from BMUs allows for cluster capacity estimation, cluster remaining charge (SOC) estimation, cluster fault diagnosis, equalization control strategy, safety control strategy, etc., as well as uploading information such as battery status and battery alarms.

3.6 Battery Management System Battery Management System, LK-SCU

Manage a unit of energy storage, including all battery clusters within the battery system, able to monitor and control all battery clusters within the system, can carry out battery cluster capacity estimation, battery cluster remaining charge (SOC) estimation, battery cluster fault diagnosis, equalization control strategy, safety control strategy, etc., and can upload information on battery system information, status and battery alarms.

3.7 Energy Management System,EMS

The energy management system is a computer system that includes a hardware and software platform that provides battery system management and PCS control, as well as application software that ensures the safe and economical operation of power distribution and electrical equipment within the energy storage system.

3.8 Fire Fighting System, FFS

Able to detect the battery system fire signal in real time, can send a fire alarm signal, in order to prevent the spread of fire and start automatic.

IV. Product overview

Model No.: LK-ES03-JC-5015.

Longking Svolt energy storage 1500V/5.015MWh liquid-cooling container system adopts the standard 20-foot container high box integrated design, with 1500V energy storage battery, high-voltage box, three-stage BMS management system, thermal management system, safety and fire protection system, the rated capacity of the system is 5.015MWh, with 12 clusters of batteries, each cluster of batteries consists of four 1P104S battery modules in series, the internal use of 314Ah cells, through the high-voltage box convergence and output to the container external interface. Each cluster of batteries consists of four 1P104S battery modules connected in series, with 314Ah cells inside, which are output to the external interface of the

container after convergence of the high voltage box, and the container as a whole adopts a non-walk-in external maintenance design, which can be combined with the new energy power generation side, the grid side (independent/shared storage), and the user side to carry out different energy storage applications, such as peak-frequency regulation, smoothing out, grid support, peak shaving, and filling in the valley, etc. energy applications. The battery system is highly integrated, intelligent and environmentally adaptable, which can effectively reduce the workload of on-site installation and commissioning and later maintenance.

五、Product System Configuration

Longking Beehive 1500V high-pressure container products are DC side energy storage products, the battery adopts lithium iron phosphate battery with high energy density and long cycle life, the cabin adopts standard container, the internal integration of control, fire fighting, lighting and other auxiliary systems, and adopts the external door design, which is convenient for maintenance and overhauling.

The high voltage energy storage system of this product consists of battery system, power distribution system, control system, thermal management system, fire protection system and external box.

Battery system: energy storage system energy source, used for the storage of electrical energy, battery clusters through the convergence of the output DC energy;

Power Distribution System: Provides electrical energy for the appliances in the energy storage system, including utility power and emergency power;

Control system: The control system composed of EMS, BMS and other control elements is used to control the normal operation of the energy storage system and fault protection;

Thermal management system: Used to ensure that the energy storage system works in a suitable temperature and humidity environment, including liquid cooling and heating system;

Fire protection system: Provide system fire warning and fire extinguishing function;

Container body: To guarantee the mechanical strength of the energy storage system and to provide protection.

VI. Battery system

The single liquid-cooling container system has a capacity of 5.015 MWh and consists of 12 battery clusters, each consisting of 4 battery modules and 1 high-voltage box, with a single battery module consisting of 1P104S for a total of 104 cells, and 1P416S for each cluster. the AC auxiliary power distribution section is externally supplied with power, and the electrical architecture is shown in the following figure:

6.1 Cell parameters

1	battery pack	parameter value	note
1.1	Rated capacity (Ah)	314	/
1.2	Rated voltage (V)	3.2	/
1.3	Operating voltage range (V)	2.8 to 3.6	/
1.4	Rated energy (Wh)	1004.8	/
1.5	Standard charge/discharge ratio	0.5C	/
1.6	Dimensions (L×W×H) (mm)	(174.26±0.6)*(207.71±1.0)*(71.92±0.8)	/
1.7	Storage temperature range (°C)	-20℃~45℃ 0℃~35℃	Short-term (January) Long-term (1 year)
1.8	Battery Individual Temperature Limit	0℃~55℃ -20℃~55℃	fig. rest and recuperate electrical discharge

6.2 Battery PACK parameters

2	Battery PACK	parameter value	note
2.1	Rated capacity (Ah)	314	/
2.2	Rated voltage (V)	332.8	/
2.3	Operating voltage range (V)	291.2 to 374.4	/
2.4	Rated energy (kWh)	104.49	/
2.5	Standard charge/discharge ratio	0.5C	/
2.6	Combination Methods	1P104S	/

2.7	Weight (kg)	690±10	subject to actual conditions
2.8	Dimensions (L×W×H) (mm)	(790±2.0) x (2180±2.0) x (245.5±2.0)	/

6.3 Battery Cluster Parameters

3	battery pack	parameter value	note
3.1	Rated capacity (Ah)	314	/
3.2	Rated voltage (V)	1331.2	/
3.3	Operating voltage range (V)	1164.8 to 1497.6	/
3.4	Rated energy (kWh)	417.996	/
3.5	Standard charge/discharge ratio	0.5C	/
3.6	Number of Battery PACKs	4	/
3.7	Combination Methods	1P416S	/
3.8	Charging high temperature protection (℃)	60	/
3.9	Discharge high temperature protection (℃)	60	/

6.4 Containerized Battery System Parameters

4	Containerized Battery Systems	parameter value	note
4.1	Rated capacity (Ah)	314	/
4.2	Rated voltage (V)	1331.2	/
4.3	Operating voltage range (V)	1164.8 to 1497.6	/
4.4	Rated charge/discharge current(A)	157	/
4.5	Installed power (MWh)	5.015	/
4.6	Standard charge/discharge ratio	0.5C	/
4.7	Number of clusters	12	/
4.8	Combination Methods	12P416S	/
4.9	Charge/discharge cycles	≥6000 times	25℃ 0.5C @90%DOD 80%EOL
4.10	Dimensions (L×W×H) (mm)	6058 x 2438 x 2896	

VII. Power distribution system

After opening the electrical room door of the Containerized Energy Storage System Control Cabinet when the system is powered up and maintained, you will see the Industrial All-in-One and the buttons, switches, and other devices that need to be operated. The operation of the above equipment is described in this section.

7.1 System power-up

The containerized energy storage system has a total of 12 battery clusters. Open the battery compartment door.

(1) Close control cabinet main power Q1, no fault;

(2) Combine liquid cooler QF1, no fault;

(3) Close air conditioning switch QF2, no fault;

(4) Close container lighting switch QF3, no fault;

(5) Close fire switch QF4, fire system starts without fault;

(6) Close cabinet lighting switch QF5, lighting is on, no fault;

(7) Close cabinet cooling fan QF6, no fault;

(8) Combine UPS power supply QF7 , UPS power supply is powered on, no fault;

(9) Close in-cabin access socket QF8, no fault;

(10) Close QFU1 high-voltage box circuit breaker switch, the battery stack is powered up, no fault;

(11) Close QFU2, 24V switching power supply is powered on, BMS general control, BMS display control, switch, I/O module is powered on, indicator light is on;

(12) Close QFU3, power on the control circuit, power on the distribution disconnecting circuit, energy storage of the disconnecting switch of the converging cabinet is ready, and the state of closing is ready;

(13) Close QFU4, power meter on, no fault;

(14) Close QFU5 and power on fire exhaust return, no fault;

(15) All switches closed, system ready, no faults;

(16) Close the circuit breaker on the high voltage box of each battery cluster of the battery container;

(17) Close the DC-side disconnect switch QS1 in the control cabinet; press the 1SH button to close and energize the main circuit of the battery stack. At this time, the energy storage converter is allowed to power on.

7.2 System shutdown

After determining that the energy storage converter has been turned off, disconnect the DC side disconnect switch QS1 in the control cabinet and the circuit breakers on each battery cluster high voltage box. The system can be operated down in the reverse order of equipment power-up.

7.3 Operational Precautions

(1) DC disconnecting switch QS1 shuts down and then the shunt indicator lights up.

(2) The personnel who operate the work must be strictly trained to master the correct operation methods and understand various safety precautions.

(3) During maintenance, the maintenance button must be in the maintenance position, the key must be removed, and the emergency stop button must be pressed to prevent misuse by personnel.

(4) When shutting down the equipment, the power supply on the distribution side should be ensured, and if long-term storage is required, the UPS power supply and fire-fighting backup power supply need to be shut down to prevent the internal battery of the equipment from being damaged due to lack of power.

(5) Personnel servicing requires turning the service/run button to the service position, removing the key, and hanging a sign.

VIII. BMS system

Longking Svolt Battery Management System includes Battery Slave Management Unit (LK-BMU or Slave Module), Battery Cluster Master Management Unit (LK-RCU or Master Module), System Master Management Unit (LK-SCU or Master Module) and System Display Management Unit (LK-MM10 or Display Module).

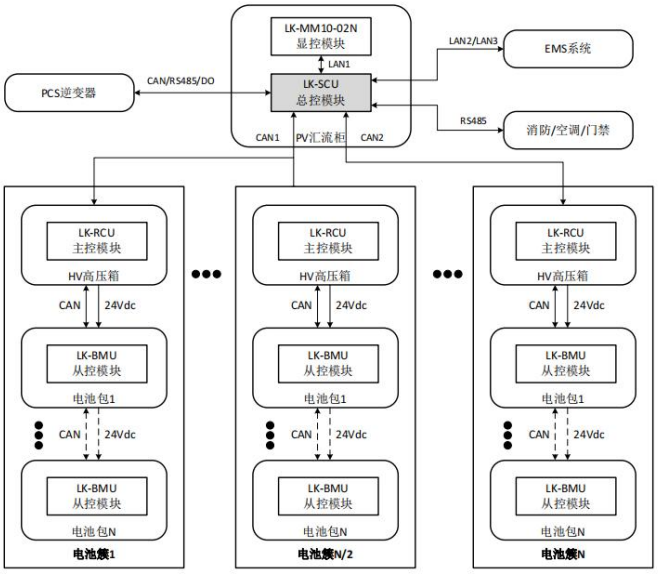
Slave control module is the control and management core of the battery pack of the energy storage system, supporting the management of the battery pack, collecting the voltage and temperature of the single cell in the battery pack, analyzing the battery operation status, and controlling the single cell equalization. All information of the slave control module communicates with the master control module through non-isolated CAN for data reporting, instruction acceptance, parameter change and fault reporting.

The master module is the control and management core of the battery cluster of the energy storage system, supporting the management of the slave modules, including communication, power supply, automatic address coding, obtaining the voltage and temperature values of all the cells in the battery cluster, and cell equalization management. The internal circuit of master control module detects battery cluster group voltage, group insulation resistance to ground, group charging/discharging current, and built-in multi-dimensional algorithm calculates and monitors the state of the battery (SOC, SOH, etc.); when there is an alarm in the battery cluster, the master control module controls the circuit breaker and relay to cut off the protection by internal circuit, and it can also determine the sticking state of the circuit breaker and relay and the temperature by DI and temperature detecting circuit, so as to realize the warning and protection for the switch in the high-voltage box. It can realize early warning and protection for the switch in the high-voltage box. All the information of the main control module communicates with the master control module through isolated CAN for data reporting, instruction acceptance, parameter change and fault reporting.

The total control module is the control and management core of the battery stack of the energy storage system, which collects, analyzes, judges and stores the battery information (voltage, temperature, current and other parameters) of all the battery clusters in the battery stack; the core CPU adopts the ARM single-core A7, with a running speed of 528MHz, which can quickly analyze and convert the data of the battery stack; and at the same time it can monitor and analyze the data of the dynamic loop environment (air conditioning, fire fighting, flooding, etc.) through the interfaces

of RS485, RS232, DO, and DI. At the same time, it can monitor and analyze the data of dynamic environment (air-conditioning, fire-fighting, flooding, etc.) through RS485, RS232, DO, DI interfaces.

The display module is the display core of the energy storage system, which communicates with the master control module through the isolated LAN, receives, displays and sets up the information collected by the master control module, including PCS equipment information, EMS system information, fire/air conditioning/access



control information, and information of all the batteries in the system (monomer, module, cluster, stack), and stores the operation, fault, alarm, and data of the stack, which is convenient for the local inspection personnel to monitor and maintain the system on site. site monitoring and maintenance.

Architecture diagram of lithium energy storage management system

IX. Thermal management systems

Longking Svolt thermal management system can realize cooling function and heating function. Cooling function: it can effectively solve the problems of thermal runaway caused by high temperature in the process of battery charging and discharging, serious battery capacity decline, product life decline, etc.; Heating function: it can effectively solve the problem of unfavorable charging and discharging of the battery in the low-temperature environment and the cold area, which can ensure

the battery normal charging and discharging and make the battery run in a high efficiency in the appropriate temperature range.

This product contains a refrigeration heating circuit and a battery pack cooling water circuit, the two circuits exchange heat through a fluorine water heat exchanger; the refrigeration circuit generates low temperature, the battery pack cooling water circuit cools the battery pack after the cooling water is heated, and then cooled again through a fluorine water heat exchanger to reach a dynamic balance, and ultimately realize the cooling of the battery pack.

The refrigeration system module consists of compressor, condenser, fluorine water heat exchanger, liquid storage tank and other components; the water circuit module consists of water pump, PTC heater, water pipe and other components.

9.1 Thermal management system system components

Equipment Classification	norm
Liquid Cooled Mainframe	60kW liquid-cooling battery thermal management unit
Primary piping	It is made of 304 stainless steel, including drain valve, piping connection, insulation cotton and all kinds of required valves and fixings.
Secondary piping	PA and other materials, inlet and outlet piping as a set, including drain valve, insulation cotton, pipe connection, exhaust valve and ball valve, fixed parts, etc..
three-stage piping	PA and other materials, wrapped with insulation foam
coolant	49.5% glycol + 50% pure water + 0.5% preservative

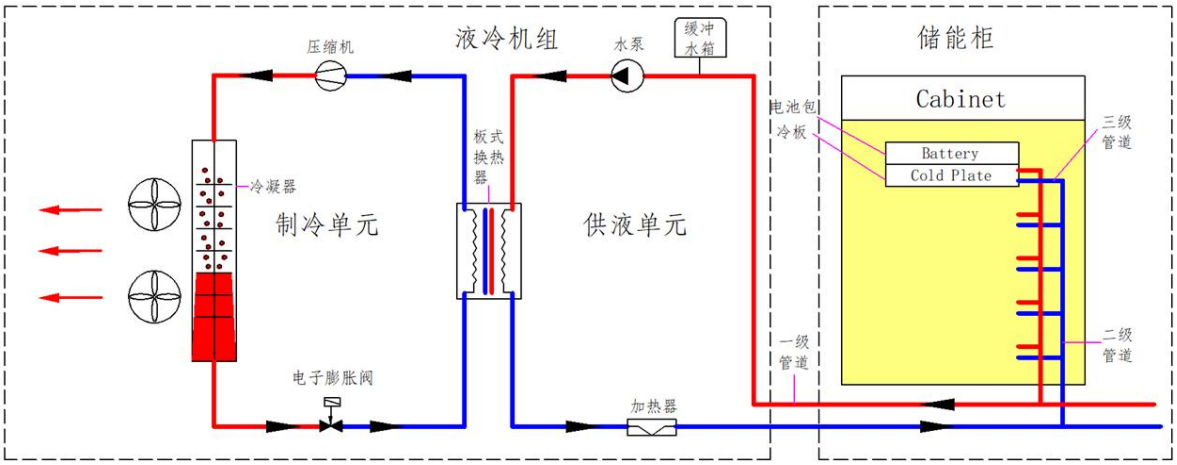
9.2 Performance parameters

serial number	Technical projects	Performance Parameters	note
Electrical parameters			
1	Power supply system	3/N AC 380V 50Hz	
2	Overall power (kW)/ Current (A)	Maximum input power ≤31kW at 45°C ambient temperature; Maximum input current ≤78A	Ambient temperature 45°C cooling

3	Compressor power (kW)	17.181kW, 45°C 14.34kW, 35°C	
4	Fan power (kW)	1kW*4	
5	Make-up water pump power (kW)	Built-in charge pump, charge pump rated power 46W/24V	
6	Power of water supply pump (kW)	4kW	
7	Heating tube power (kW)	24kW	
8	Withstand voltage fluctuation range	±15%	
9	communication interface	RS485	
10	Motor frequency conversion	Water pumps/compressors/fans frequency conversion	
Refrigeration capacity parameters			
11	medium	50% aqueous solution of ethylene glycol	
12	cooling capacity	60kW@W18/L45	
Air and fluid parameters			
13	Air volume (m^3/h)	-	
14	Coolant supply flow	500L/min@150kPa	
15	Coolant supply pressure (Bar)	＞2.5bar	
16	Maximum coolant supply pressure (Bar)	3bar	
17	Maximum coolant side pressure (Bar)	Design pressure 4.5 bar, test pressure 6.0 bar	
18	Coolant temperature setting range (°C)	15～ 35	
19	Coolant temperature control accuracy (K)	±1	
Appearance and size parameters			
21	Cabinet external dimensions (H*W*D)	2400× 1200× 400	
22	Coolant Port Size	2" clamp, /Outside diameter φ29, inside diameter φ25	Primary and secondary

			piping
23	Liquid Cooling Plate Filling/Discharging Port Size	DN14	three-stage piping
24	Cabinet Exterior Color	RAL7035	
25	water pipe connection	clamp	
26	Water inlet and outlet	lit. one offering one return	
27	Condenser Heat Dissipation Method	Air Cooling	
Other parameters			
28	efficiency ratio	Power COP with pump≥ 2.19 (18℃ @35)℃ , power unit COP without pump≥ 2.46 (18℃ @35)℃	
29	Effective volume of water tank (L)	18L	
30	refrigerants	R410A	
31	Controller Type	Debugging LCD key operation	
32	static (in a signal)	≤80dB(A)@1m	
33	Protection class of electric cabinet	IP55	
34	net weight	≤500kg	Coolant free
35	Installation	Floor standing, outdoor type	
36	Range of working environments	-30℃～ +55℃	
37	Storage environment range	-40℃～ +70℃	
39	Ambient humidity range	5%~ 95% (with condensation)	
40	Use altitude	≤4000m	
41	Lifespan of the whole machine	>10 years	

9.3 Liquid Cooled Units System Schematics



X. Fire protection systems

10.1 System components

The battery management system, fire alarm system and automatic fire extinguishing system can be activated according to the preset program when thermal runaway and fire occur in the battery compartment, and the preset program meets the relevant provisions of the "Prefabricated Compartment Lithium Iron Phosphate Battery Storage Power Station Fire Protection Technical Specification" T/CEC373-2020. The fire controller is an intelligent controller with RS485, CAN or RJ45 data interface, of which the 485 interface is a necessary interface, and 3 dry contacts are reserved for data communication with the battery management system (BMS) of the battery compartment to read raw data such as temperature and temperature rise. The system is designed according to the fire protection of battery compartment and battery PACK level, the battery PACK is equipped with composite detectors, and perfluorohexanone is selected as the whole cluster into the package to spray inhibiting agent many times for the form of thermal runaway suppression of the battery.+ Battery compartment gas flooding extinguish the fire.+ Manual water spraying. Container door set fire sound and light alarms, gas release alarms, manual alarm buttons and emergency start/stop buttons (including manual/automatic conversion function). The battery compartment is equipped with water fire fighting interface and water fire fighting pipe. The volume of the battery compartment is 36m³, and the volume of the battery PACK is 0.388m³. There are 48 battery PACKs in total, and the net space of the battery compartment is about 17.38m³.

10.2 Firefighting configuration list

No.	System type	Name	unit (of measure)	Quantity
1	Gas Extinguishing System	Fire suppression device (with container valve and cabinet)		1
2		Perfluorohexanone	KG	60
3		Motorized valves		1
4		Atomizing nozzles		3
5		Signal feedback device		1
6		Cylinder Cabinet		1
7		Gas High Pressure Hose and Fittings		1
8		Gas fire fighting lines and fittings		1
9	ventilation system	Sidewall fan (air intake)		2
10		Sidewall fan (intelligent explosion-proof, exhaust)		2
11		rain cover		4
12		pressure relief port		1
13		Fan control box		1
14	Water spray system	Galvanized steel pipe		0.3
15		pipe thread		1
16	battery pack	Composite detector		48
17		printheads		48
18		Fire Alarm Controls		1
19		Carbon Monoxide Combustible Detector		1
20		Hydrogen Combustible Detector		1
21		smoke detector		3
22		temperature-sensitive fire detector		3
23		Input/Output Modules		5

24	Fire detection and alarm systems	Detector base		6
25		Partition control valves		11
26		Acoustic and visual fire alarms		1
27		Gas Release Alarms		1
28		Emergency start/stop button/manual-automatic changeover box		1
29		Manual fire alarm button		1
30		encoders		1
31		Gas flammable other display and alarm devices		1
32		power supply		1
33	Wire & Tubing	/		1

XI. Container systems

The outer case of this energy storage system is designed as a container with an outer opening door for maintenance.

The case is welded with weather-resistant steel plate, with protection level ≥ IP54 and in accordance with the relevant provisions of IEC 60529;

Box insulation material to meet the thermal management design calculation requirements, and the material is flame retardant material;

The box meets the mechanical strength of the equipment installed in the box and transportation safety;

There are perfect power distribution lines and fire fighting pipelines planned in the box to meet the system operation requirements;

The handling method adopts bottom lifting, and the mechanical strength meets the requirement of maximum load lifting.

1	Operating temperature range (℃)	-25～ 55	
2	Operating humidity range	5～ 95%	
3	static (in a signal)	≤75db@1m	

4	protection class	IP54	
5	communication method	CAN, RS485, TCP/IP	
6	Cooling method	liquid cooling	
7	fire protection system	Water firefighting+ Automatic gas fire extinguishing system	Perfluorohexanone
8	Detector type	CO&H2&VOC Composite, Smoke, Temperature and Explosion-proof Gas Detectors	
9	Dimension(L×W×Hmm)	6058*2438*2896	
10	Weight (t)	45	
11	Altitude of use (m)	≤2000	Above 2000m need to be derated

The list of containerized materials is given below:

Container area		makings	Thickness, mm
externally	Framing and support beams	CORTEN A weathering steel	Box frame and support beams need to meet the system equipment integration is completed on the strength of the requirements: all equipment installation is completed, to meet the equipment support strength and fixed requirements; to meet the top or bottom corner lifting or bottom pull-out movable lifting point, transportation box strength requirements; to meet the site after the fixation of the strength of seismic, wind load, snow load, etc. needs;
	sidewall	CORTEN A weathering steel	2mm
	rock layer forming roof of a cave or mine	CORTEN A weathering steel	2mm
	classifier for lessons, subjects, branches of technology	CORTEN A weathering steel	3mm

	fasteners	stainless steels	Meet the outdoor use, corrosion resistance
inside (part, section)	Thermal insulation	rock wool sandwich panel	Rock wool thickness 50mm: interior walls, door bodies Rock wool thickness 50mm: top of box; Bottom rockwool until the free height is filled up.
	Side panels, top panels, doors, outer base panels	SPA-H	2mm
	inner backplane	SPA-H	4.5mm
	Other supports	Q235B	Meets the strength needs of internal equipment support, etc.

XII. Marking, packaging, transportation, storage

12.1 Logo

This product has a nameplate, which contains information including: product name, model number, nominal voltage, rated capacity, product number, etc.

This product is clearly marked with a hazard warning label.

12.2 Transportation

In the process of loading and unloading, it is forbidden to drop, roll and press heavily. During transportation, the batteries in the product are transported in half-charged state (30-50% SOC state), and should be prevented from violent vibration, impact or extrusion, sun and rain, and inverted during transportation, and are suitable for transportation by ordinary means of transportation such as automobile, train, ship, and so on.

12.3 Storage performance

Containerized energy storage products in semi-charged state (SOC of 30%-50%) should be stored in dry, ventilated and clean warehouses, with the temperature range of -40℃～ 45℃ within 1 month of storage, and -20℃～ 35℃ within 6 months of storage, and the relative humidity should not be greater than 65%. Do not allow the product with acidic substances and other corrosive substances . Long-term storage: When the battery system is not used for a long period of time, the system should be recharged every 3 months so that the SOC reaches 30% or more.

XIII. Installation instructions

13.1 Lifting and securing

The design of the cabin structure and lifting points should meet the needs of transportation and lifting of the integrated battery clusters and internal equipment, and the weight of the system integration is about 45 tons. Transportation and on-site installation are by means of lifting, and the lifting should ensure that the box is balanced at both ends and should not be tilted. Adopt 4 points lifting (2 points on each side), the lifting point is set at the bottom. The lifting point is a pull-out movable lifting point.

13.2 Electrical Installation

(1) Cable specifications

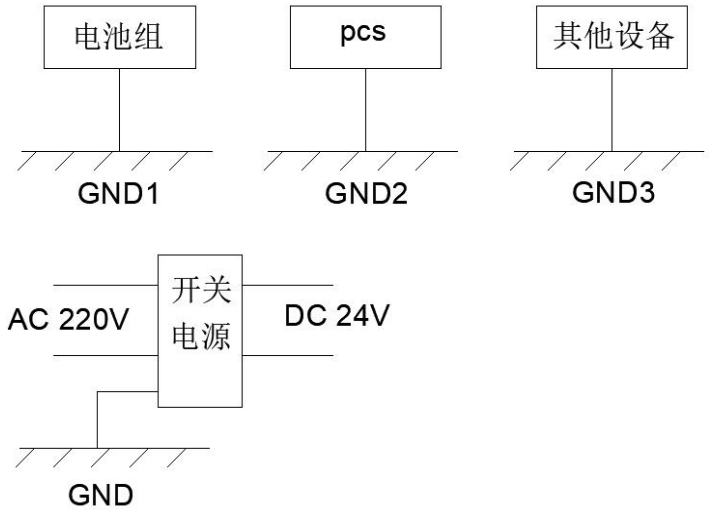
Recommended cable specifications are shown in the table below

Table 14-1 Specification of connecting cables for unit energy storage system

Cable Name	Cable Size(mm^2)	Connection Terminal
PCS+	Monopole 6*240mm^2	DT240
PCS-		DT240

(2) Grounding installation

This product is designed with independent grounding system, with more than two grounding points. Protective grounding can be directly introduced by the grounding flat steel grounding network, and the box outside the main grounding network connection, so that the box and the box equipment and the earth at the same potential level, the equipment grounding resistance ≤ 1 Ω. Prohibit the use of series grounding connection, in order to effectively avoid the potential difference in the main grounding network into the box body. The rest of the electrical grounding must use copper conductor grounding connection, grounding schematic shown in the figure below.



Box grounding method

(3) Wiring procedure

1, open the battery container cabinet door, respectively, disconnect the DC circuit breaker of each battery cluster high-voltage box.

2. Open the door of the control cabinet in the container and disconnect the AC inlet main switch and DC disconnect switch on the distribution side of the cabinet.

3, auxiliary power supply wiring: the AC input line through the bottom of the inlet and outlet holes, and connected in turn to the container control cabinet corresponding to the terminal block.

4, grounding line wiring: the ground line through the bottom of the convergence cabinet in and out of the line hole and connect it to the container control cabinet grounding copper row, grounding row to be converged into the total grounding network.

5, communication line wiring: the energy management system EMS, energy storage converter PCS and external fire and other equipment such as communication lines were through the bottom of the inlet and outlet holes, and were connected to the container control cabinet terminal block.

6, convergence cabinet to PCS wiring: the positive and negative wiring of the energy storage converter PCS through the bottom of the inlet and outlet holes, and

were connected to the container control cabinet of the "DC positive output" and "DC negative output" wiring on the copper row.

7、After wiring is completed and all connections are confirmed to be correct, re-install the wiring closure plate on the lower part of the control cabinet back into its original position and fasten the glen head on the closure plate.

XIV. Common Troubleshooting

When the containerized energy storage system is abnormal or malfunctioning, you can read the fault information in the current alarm interface on the display, please check and troubleshoot firstly according to the processing method in Table 14-1. If the problem still exists, please contact the supplier for technical support. When you need to reflect the fault situation to our company or distributor, please make sure to record and inform the equipment code (see the equipment nameplate for details).

Table 14-1 System Troubleshooting and Handling

Fault name	Treatment
AC overvoltage	Check that the mains voltage is within range
AC undervoltage	Check that the mains voltage is within range
AC overfrequency	Check that the mains frequency is within range
AC underfrequency	Check that the mains frequency is within range
Grid Reverse Sequence	Check whether the phase sequence of the power grid is reversed
Grid phase lock failure	Please contact your supplier
Auxiliary power supply failure	Please contact your supplier
High bus voltage	Please contact your supplier
Low bus voltage	Please contact your supplier
Bus voltage unbalance	Please contact your supplier
Output overload timeout	Check that the load is within the specified range
Inverter overload	Please contact your supplier
DC input overvoltage	Check if the DC side voltage is higher than the battery voltage upper limit protection value
DC input undervoltage	Check that the DC side voltage is not below the lower battery voltage protection value

AC soft start failure	Please contact your supplier
DC soft start failure	Please contact your supplier
DC current overcurrent fault	Check for short circuits in the battery ports
malfunction of communications	Check communication lines and parameter settings
Low discharge temperature Minor Alarm	Temperature sampling harness broken wire or sampling plug-in connection is reliable; BMU work whether there are abnormalities; check whether the air conditioning is operating normally, if not working properly, please contact your supplier.
High discharge temperature Minor Alarm	Temperature sampling harness broken wire or sampling plug-in connection is reliable; BMU work whether there are abnormalities; check whether the air conditioning is operating normally, if not working properly, please contact your supplier.
Minor insulation low alarm	Failure of insulation detection or system leakage
Excessive variation in monomers Minor Alarm	Detect whether the battery sampling harness is disconnected or the sampling plug-in is connected reliably; whether there is any abnormality in the work of the BMU; check the voltage of the system battery, if the battery cell is damaged, please contact your supplier to replace the damaged battery cell.
Excessive temperature differences Minor Alarm	Temperature sampling wiring harness disconnection or sampling plug-in connection is reliable; BMU work whether there is an abnormality; check whether the air conditioner is running normally, if it is not working properly, please contact your supplier.
SOC too low Minor Alarm	SOC below protection alarms are normal and are eliminated according to the control strategy. If the voltage does not match the SOC, then the SOC is not calibrated or the SOC errors have accumulated requiring a complete charge/discharge cycle of the system.
Charging temperature too low Minor Alarm	Temperature sampling harness broken wire or sampling plug-in connection is reliable; BMU work whether there are abnormalities; check whether the air conditioning is operating normally, if not working properly, please contact your supplier.
High charging temperature Minor Alarm	Temperature sampling harness broken wire or sampling plug-in connection is reliable; BMU work whether there are abnormalities; check whether the air conditioning is operating normally, if not working properly, please contact your supplier.
Discharge overcurrent slight alarm	System charge/discharge current is higher than the protection value, check the PCS for proper operation.

Minor undervoltage alarm at group end	Voltage lower than the protection value alarm is a normal phenomenon, according to the control strategy to eliminate the alarm. If the alarm cannot be eliminated, check whether the battery sampling harness is disconnected or whether the sampling plug-in is connected reliably; whether there is any abnormality in the work of BMU; check the voltage of the system battery; if the battery cell is damaged, please contact your supplier to replace the damaged battery cell.
Single unit undervoltage slight alarm	Voltage lower than the protection value alarm is a normal phenomenon, according to the control strategy to eliminate the alarm. If the alarm cannot be eliminated, check whether the battery sampling harness is disconnected or whether the sampling plug-in is connected reliably; whether there is any abnormality in the work of BMU; check the voltage of the system battery, if the battery cell is damaged, please contact your supplier to replace the damaged battery cell.
Charge overcurrent slight alarm	System charge/discharge current is higher than the protection value, check the PCS for proper operation.
Minor overvoltage alarm at group end	Voltage higher than the protection value alarm is a normal phenomenon, according to the control strategy to eliminate the alarm. If the alarm cannot be eliminated, check whether the battery sampling harness is disconnected or whether the sampling plug-in is connected reliably; whether there is any abnormality in the work of BMU; check the voltage of the system battery; if the battery cell is damaged, please contact your supplier to replace the damaged battery cell.
Minor overpressure alarm for single unit	Voltage higher than the protection value alarm is a normal phenomenon, according to the control strategy to eliminate the alarm. If it can not be eliminated, then test the battery sampling harness disconnection or sampling plug-in connection is reliable; BMU work whether there are abnormalities; check the system battery voltage, if the battery cell is damaged, please contact your supplier to replace the damaged battery cell.
Low discharge temperature Medium Alarm	Temperature sampling harness broken wire or sampling plug-in connection is reliable; BMU work whether there are abnormalities; check whether the air conditioning is operating normally, if not working properly, please contact your supplier.
High discharge temperature Medium Alarm	Temperature sampling harness broken wire or sampling plug-in connection is reliable; BMU work whether there are abnormalities; check whether the air conditioning is operating normally, if not working properly, please contact your supplier.

Insulation too low Medium Alarm	Insulation Detection Failure or System Leakage Apply remote background shutdown of PCS, BMS relays and contact your supplier.
Charging temperature too low Medium Alarm	Temperature sampling harness broken wire or sampling plug-in connection is reliable; BMU work whether there are abnormalities; check whether the air conditioning is operating normally, if not working properly, please contact your supplier.
High charging temperature Medium Alarm	Temperature sampling harness broken wire or sampling plug-in connection is reliable; BMU work whether there are abnormalities; check whether the air conditioning is operating normally, if not working properly, please contact your supplier.
Discharge overcurrent moderate alarm	System charge/discharge current is higher than the protection value, check the PCS for proper operation.
Group terminal undervoltage Medium Alarm	Voltage lower than the protection value alarm is a normal phenomenon, according to the control strategy to eliminate the alarm. If the alarm cannot be eliminated, check whether the battery sampling harness is disconnected or whether the sampling plug-in is connected reliably; whether there is any abnormality in the work of BMU; check the voltage of the system battery; if the battery cell is damaged, please contact your supplier to replace the damaged battery cell.
single-unit undervoltage (physics) Medium Alarm	Voltage lower than the protection value alarm is a normal phenomenon, according to the control strategy to eliminate the alarm. If the alarm cannot be eliminated, check whether the battery sampling harness is disconnected or whether the sampling plug-in is connected reliably; whether there is any abnormality in the work of BMU; check the voltage of the system battery, if the battery cell is damaged, please contact your supplier to replace the damaged battery cell.
Charge overcurrent moderate alarm	System charge/discharge current is higher than the protection value, check the PCS for proper operation.
Group End Overvoltage Medium Alarm	Voltage higher than the protection value alarm is a normal phenomenon, according to the control strategy to eliminate the alarm. If the alarm cannot be eliminated, check whether the battery sampling harness is disconnected or whether the sampling plug-in is connected reliably; whether there is any abnormality in the work of BMU; check the voltage of the system battery; if the battery cell is damaged, please contact your supplier to replace the damaged battery cell.

single-unit overvoltage Medium Alarm	Voltage higher than the protection value alarm is a normal phenomenon, according to the control strategy to eliminate the alarm. If it can not be eliminated, then test the battery sampling harness disconnection or sampling plug-in connection is reliable; BMU work whether there are abnormalities; check the system battery voltage, if the battery cell is damaged, please contact your supplier to replace the damaged battery cell.
Low discharge temperature Heavy Alarm	Temperature sampling harness broken wire or sampling plug-in connection is reliable; BMU work whether there are abnormalities; check whether the air conditioning is operating normally, if not working properly, please contact your supplier.
High discharge temperature Heavy Alarm	Temperature sampling wiring harness is broken or sampling plug-in connection is reliable; BMU is working abnormally; check if the air conditioner is working normally, if it is not working normally, please contact your supplier.
Insulation too low Heavy Alarm	Insulation Detection Failure or System Leakage Apply remote background shutdown of PCS, BMS relays and contact your supplier.
High column temperature Heavy Alarm	High voltage box connectors are connected reliably; check if the air conditioner is running properly, if it is not working properly please contact your supplier.
Charging temperature too low Heavy Alarm	Temperature sampling harness broken wire or sampling plug-in connection is reliable; BMU work whether there are abnormalities; check whether the air conditioning is operating normally, if not working properly, please contact your supplier.
High charging temperature Heavy Alarm	Temperature sampling harness broken wire or sampling plug-in connection is reliable; BMU work whether there are abnormalities; check whether the air conditioning is operating normally, if not working properly, please contact your supplier.
Discharge overcurrent heavy alarm	System charge/discharge current is higher than the protection value, check the PCS for proper operation.
Group terminal undervoltage Heavy Alarm	The voltage is lower than the protection value check whether PCS stops when the alarm is moderate, detect whether the battery sampling harness is broken or the sampling plug-in is connected reliably; whether there is any abnormality in the work of BMU; check the voltage of the system battery, if the battery cell is damaged, please contact your supplier to replace the damaged battery cell.

Single-unit undervoltage heavy duty alarm	The voltage is lower than the protection value check whether PCS stops when the alarm is moderate, detect whether the battery sampling harness is broken or the sampling plug-in is connected reliably; whether there is any abnormality in the work of BMU; check the voltage of the system battery, if the battery cell is damaged, please contact your supplier to replace the damaged battery cell.
Charge overcurrent heavy duty alarm	System charge/discharge current is higher than the protection value, check the PCS for proper operation.
Group End Overvoltage Heavy Alarm	Voltage is higher than the protection value check whether PCS stops at moderate alarm, check whether the battery sampling harness is disconnected or whether the sampling plug-in is connected reliably; whether there is any abnormality in the work of BMU; check the voltage of the system battery, if the battery cell is damaged, please contact your supplier to replace the damaged battery cell.
single-unit overvoltage Heavy Alarm	Voltage is higher than the protection value check whether PCS stops at moderate alarm, check whether the battery sampling harness is disconnected or whether the sampling plug-in is connected reliably; whether there is any abnormality in the work of BMU; check the voltage of the system battery, if the battery cell is damaged, please contact your supplier to replace the damaged battery cell.
Failure to communicate with master control	Check communication and power supply cables
Failure to communicate with the slave	Check communication and power supply cables
Main positive disconnect fault	Please contact your supplier
Main positive closure fault	Please contact your supplier
Main negative disconnect fault	Please contact your supplier
Main negative closure fault	Please contact your supplier
sensor failure	Please contact your supplier
High and low voltage alarm	Check AC power or voltage; re-call or power up or please contact your supplier.
High and low temperature alarm	Check whether the system air duct is smooth. Whether the ambient temperature is within the permissible range; clean regularly
High and low voltage alarms	Please contact your supplier

Compressor alarms	Clean the condenser at regular intervals; also require the user to troubleshoot the voltage to make sure it is stable and meets the design requirements; or contact your supplier;

XV. Environmental protection

This product has soundproof design, the noise is not more than 70dB@1m;

This product is made of environmentally friendly materials, with no leakage of hazardous substances;

This product does not produce sound and light pollution during normal use.

XVI. Product warning signs

Warning labels on the body of the containerized energy storage product and inside the cabinet contain important information for safe operation of the containerized energy storage product.

16-1 High Voltage Hazard Signs 16-2 Grounding Signs

XVII. Precautions for use

The operator must be completed by professional technicians and must follow the relevant local or power industry regulations; pay attention to the positive and negative marking, please do not reverse the positive and negative poles to avoid hazards.

Before using the product, please read the user's manual, product warning labels, etc. carefully.

17.1 When using this product for the first time, check the equipment for damage or other hazardous conditions, etc.; and check and verify that other external equipment or circuit connections are in a safe condition;

17.2 When using the product for the first time, it should be checked for appearance, wiring, control power supply and communication. If it is found that the product shell is seriously damaged or there is abnormal phenomenon such as odor, it

should not be continued to be used, and the product should be returned to the manufacturer;

17.3 This product is DC high voltage and should be kept away from, and not touched or operated by, persons other than specialized personnel without permission;

17.4 Prior to any installation and maintenance work, first disconnect the grid-side circuit breaker, then disconnect the battery-side DC switch and test it with the relevant equipment;

17.5 The product must not be used without plugging or unplugging the connectors;

17.6 If odor or abnormality occurs during the use of the product, please disconnect the power immediately and notify the relevant personnel;

17.7 During the use of this product, the important parameters on the control panel shall not be modified arbitrarily, so as not to affect the normal use of the product;

17.8 Long-term storage: When the battery system is not used for a long period of time, the system should be recharged every 3 months so that the SOC reaches more than 30%. When the product is stored in a low state of charge, it will lead to over-discharge of the battery, which will seriously affect the product life or even damage the product;

17.9 When operating the product by remote monitoring, care should be taken to prevent virus intrusion;

17.10 If the user finds that the battery power supply time is greatly shortened or the system frequently fails or the product appears to be unable to solve the anomalies, you should contact us as soon as possible, it is strictly prohibited to dismantle the product privately or privately change the battery in the battery pack.

XVIII. Danger warnings

18.1 It is strictly prohibited to disassemble the product and the battery inside the product. The product has an internal protection mechanism and protection circuit to avoid danger. Improper disassembly will damage the protection function and cause the battery to heat up, smoke, deform or burn;

18.2 It is strictly forbidden to short-circuit the system. Do not connect the positive and negative terminals of the product with metal, and do not store or move the product with metal. When the system is short-circuited, an extremely high current will flow, which will damage the battery and cause it to heat up, smoke, deform or burn;

18.3 Heating and burning of the product is strictly prohibited. Heating and burning of the battery will result in melting of the battery separator, loss of safety features or burning of the electrolyte. Overheating will cause the battery to heat, smoke, deform or burn;

18.4 It is strictly prohibited to rain or put the product into water. Otherwise, it will cause the loss of internal protection circuit function and abnormal chemical reaction, and the battery may heat, smoke, deformation or combustion;

18.5 Destruction of the product and the battery is prohibited. It is prohibited to chisel metal into the battery, hammer or drop the product and battery, or otherwise damage the product, as this may cause the battery to heat up, smoke, deform, or burn;

18.6 It is strictly prohibited to touch the contacts, terminals, etc. inside the grid equipment that are connected to the energy storage product, as this may result in death by electric shock or fire and combustion;

18.7 It is strictly prohibited to open the battery cabinet door or related equipment, which may result in an electric shock accident.

XIX. Product maintenance, inspection and storage

19.1 Electrical maintenance

Semi-annual electrical maintenance is required on control cabinets and indirect wiring to equipment.

1. Equipment cleaning

(1) Equipment should be de-energized and equipment with heat sinks should be covered when equipment is cleaned;

(2) Use a vacuum cleaner to suck out dust, debris, etc., and prohibit the use of compressed air to blow air into the equipment;

(3) After cleaning, check whether the wiring is loose, there are problems that need to be repaired in time.

2. Wiring check

(1) Check the cable connector to see if there is any blackening of the terminals and whether there are any traces of burnt fusion in the contacts, if there are any problems, timely maintenance is required;

(2) Check whether there is discoloration in the appearance of the copper rows, there are problems that need to be repaired in a timely manner;

(3) Check the cables and heat-shrinkable tubing for damage, and repair them promptly if there are any problems.

3. Insulation and grounding test

(1) Test the system insulation, check the equipment and cable insulation, there are problems need to be repaired in time;

(2) Measurement of grounding, measurement of grounding resistance is in the normal range, the existence of problems need to be repaired in a timely manner.

4、Power on test

(1) Relay suction sound is normal, no noise after suction, there are problems need to be repaired in time;

(2) After powering on the indicator, relay, switching power supply and other components LED lights up normally, there are problems need to be repaired in time;

(3) Use a multimeter to measure whether the voltage is within the normal range, and problems need to be repaired promptly.

5, UPS battery maintenance requirements

(1) The UPS always charges the battery when connected to the utility, regardless of whether it is turned on or off, and provides overcharge and overdischarge protection.

(2) Prevent the battery from being discharged with low current, and under no circumstances should the UPS battery be operated for more than 24 hours.

(3) If the energy storage product is not put into operation for a long time, please fill up the UPS battery first, and at the same time, charge the battery every 3 months,

each time not less than 10 hours; in a high temperature environment, when the battery has not been charged or discharged for two consecutive months, it needs to be recharged once, each time not less than 10 hours.

(4) When the battery has not been charged or discharged for 3 consecutive months, it needs to be recharged once, not less than 10 hours each time.

(5) Batteries should not be replaced individually, and the instructions of the battery supplier should be followed for overall replacement.

(6) Under normal circumstances, the battery has a life of 3 to 5 years, if it is found to be in poor condition, it must be replaced, the battery replacement must be handled by a professional, if necessary, please contact your supplier.

6. Auxiliary electrical maintenance

Check the working condition of the air conditioner, lamps and other electrical appliances in this product, if there is any problem, they should be replaced in time, please follow the spare parts list for the replacement product specification, the replacement process must be operated by professional personnel, if necessary, please contact your supplier.

7. Safety Precautions

The system is not running and dangerous voltages may still be present internally. After disconnecting the power supply, there may be an un-discharged charge on the internal bus bar, requiring the storage converter to be left standing for more than 10 minutes before internal maintenance can be performed. Before performing maintenance check with a voltmeter to ensure that the power supply is switched off and in a safe condition. Do not wear electrically conductive objects such as rings, watches, etc. during electrical maintenance operations at . Do not take safety for granted. If in doubt, ask someone familiar with the equipment or contact the supplier if necessary.

19.2 Firefighting maintenance

1、Maintenance personnel must hold the relevant operating license;

2、Regular maintenance

3. Monthly inspection program

(1) There are no abnormal changes in the appearance of the equipment;

(2) Signs and placards are in good condition;

(3) All components of the equipment shall be free of collision deformation and other mechanical damage, the surface shall be free of rust and corrosion, the protective coating shall be intact, the nameplate shall be clear, the position of the manual operation device shall be correct, and the protective cover, lead seal and safety mark shall be complete;

(4) There shall be no fire communication anomaly alarm messages on the display.

4. Quarterly inspection program

Use a smoke generator to do a smoke simulated alarm test for each detector in the fire protection system to check that the fire detectors and alarms are working properly.

NOTE: Ensure that all detector activation wires are disconnected from the fire extinguisher before the smoke simulated alarm test begins.

5、Maintenance exception handling

If any abnormality is found during maintenance or if you still have questions about the product/fire protection system, please contact the supplier in time. Do not operate without authorization, as this may cause abnormalities in the state of the fire protection system, which may affect the fire protection performance of the product.

6. Notes:

(1) When the fire extinguishing system is in alarm, all staff must immediately evacuate the site. After the fire is extinguished, the hatch must first be opened for exhaust, and only after the exhaust is removed can the staff enter the scene.

(2) gas fire extinguishing equipment for maintenance, you must first turn off the fire control host power supply or maintenance switch set to maintenance status to cut off the output circuit power! Be sure to turn the switch off to the normal position after the maintenance, otherwise the system can not work normally!

(3) Avoid touching the surface of the equipment during disassembly.

(4) Uninvolved persons shall not tamper with this equipment to avoid accidents.

(5) Detailed records must be kept of maintenance, inspections, repairs, and tests.

19.3 System inspection

The equipment should be inspected daily as conditions permit.

19.4 System storage

1, regular maintenance is very important for the performance and service life of the product, if you need to replace the device, please use the original parts;

2, maintenance should be disconnected from the equipment power supply to ensure operational safety, unless the debugging project requires power;

3. Before the equipment is disconnected, it is necessary to make sure that the equipment has stopped running, and it is not permitted to directly start the equipment power supply during the operation of the equipment;

4. Data and running programs that need to be archived for a long period of time should be backed up first, and then the operating system should be turned off and then disconnected from the power supply;

5. The site needs to be securely locked after power failure to prevent someone from accidentally sending power.

19-1 Maintenance recommendation form

serial number	Maintenance test program	cyclicality
1	Temperature and humidity alarm performance check	half a year
2	Dusting or replacing air conditioning filters (mesh)	season (sports)
3	Inspection of lightning protection devices (before the thunderstorm season)	half a year
4	Inspection of fixed gas fire extinguishing installations (pressure values in the green range)	half a year
5	Combustible Gas Alarm Inspection	half a year

6	Smoke and temperature detector alarm checks and automatic fire alarm device checks.	season (sports)
7	Ground wire inspection and grounding resistance test	half a year
8	Dust Particle Concentration Measurement	half a year
9	Auxiliary electric appliance working status	half a year
10	Power cable connection status	half a year

19-2 Common Troubleshooting

defective phenomenon	Treatment	note
Switch will not close	Check if the emergency stop button is pressed Check for circuit short circuits	
DC no output	Check that the DC switch is closed Check that the BMS power supply switch is closed	
Equipment communication failure	Reboot the corresponding device	
Door opener light doesn't come on	Check that the lighting circuit switch is closed	
UPS not available for power backup	Check that the UPS external battery switch is closed. Check that the external UPS battery voltage is less than 11V.	Replace external battery if necessary

NOTE: If the energy storage system fault light is on and you are unable to confirm the fault condition, please contact your supplier promptly.