522kWh Energy Storage Outdoor Cabinet

Product Specification

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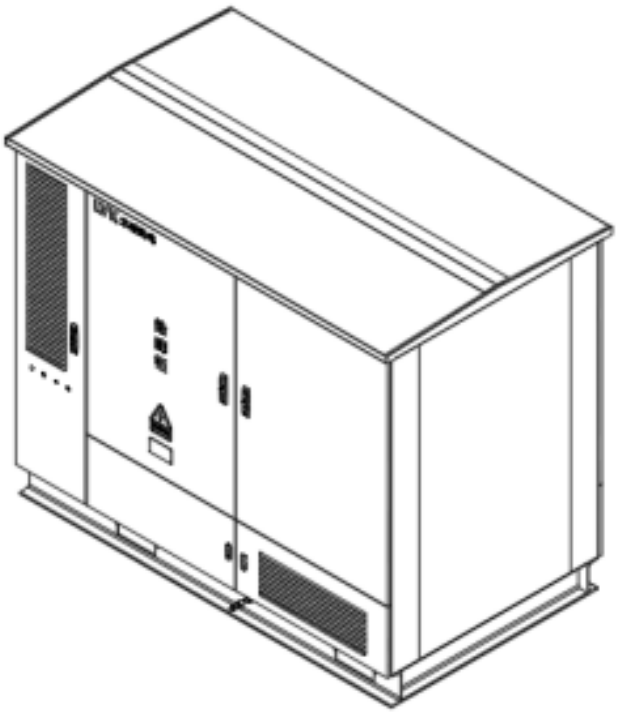
Contents

1. Product Introduction

1.1 Overview

The 522 kWh energy storage outdoor cabinet developed by our company, as a new generation of industrial and commercial energy storage solution, fully integrates advanced technologies such as “high efficiency, Full, long life, and easy expansion” to form a modular, standardized, and intelligent outdoor energy storage system.

Energy storage adopts the design concept of “safe and reliable”. Parts are self-developed or sourced from first-tier suppliers to provide customers with Provides safe, reliable, affordable, high-quality, easy-to-install, easy-to-expand, simple and easy-to-use energy storage products, making the construction of energy storage projects simpler, Easier to use and easier to operate and maintain.



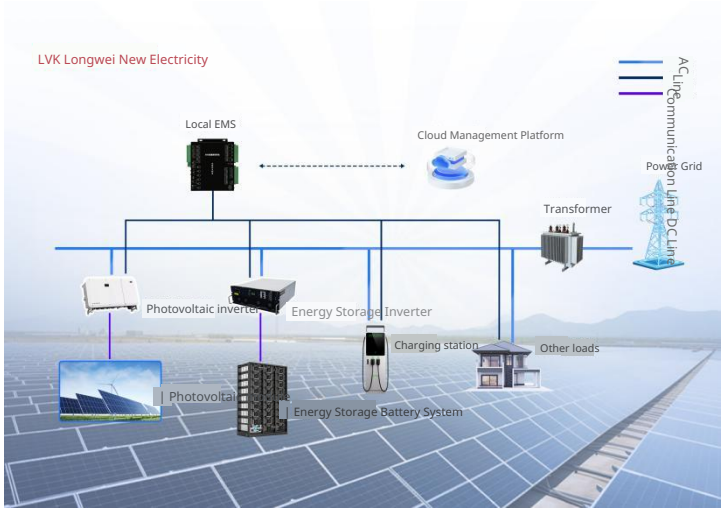
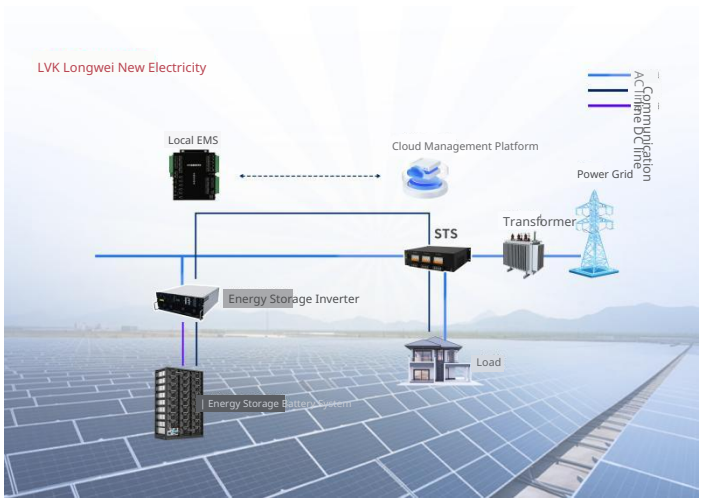
Isometric Drawing

Figure 1-1 Schematic diagram of 522kWh energy storage outdoor cabinet

Figure 1-2: 522kWh energy storage outdoor cabinet parallel connection topology (battery-PCS-grid connection cabinet)

1.2 Product application scenario 1

Scene 1	Application scenario name	User-side energy storage
	Schematic diagram display	
	Main function description	The user-side energy storage system mainly charges during electricity price troughs or flat periods and discharges during electricity price peaks or peak values, obtaining electricity price difference benefits through peak shaving and valley filling. It can also manage the maximum demand, eliminate short-term peak electricity consumption loads, and reduce the user's basic electricity expenses. It can also use energy storage for power supply during peak electricity load, supporting dynamic capacity expansion.

Scene 2	Application scenario name	PV-ESS-Charging
	Schematic diagram display	
	Main function description	Due to the large short-term capacity increase pressure of the distribution network in the city, some charging stations cannot operate normally due to insufficient power supply capacity, and the operating income is limited. In the PV-ESS-Charging system, energy storage can absorb the surplus of photovoltaic power generation or charge during the low electricity price period, and discharge during the peak electricity consumption and peak electricity price period, which can alleviate the tight capacity of the urban distribution network and impr
Scene 3	Application scenario name	Backup power function (single unit 250kW/522kWh)
	Schematic diagram display	
	Main function description	In industrial and commercial enterprises, for power consumption places with high requirements for power supply reliability, STS modules can be selected to improve power supply reliability. When the mains power fails, switch to energy storage power supply, and the STS switching time does n
Scenario 4	Application scenario name	Microgrid

	Schematic diagram display	
	Main function description	Supports power consumption scenarios in remote areas where mains power is unstable or there is no mains power access. The energy storage system is combined with other distributed power sources to form a small microgrid to ensure power supply.

1.3 Product Features

1.3.1 Product Capacity

Energy storage outdoor cabinet capacity 250kW/522kWh(0.5P), the outdoor cabinet can be freely expanded and matched according to user needs, supporting up to

Expand 10 units, capacity range 250~2500kW/522kWh~5220kWh, to meet the needs of different scale energy storage projects.

1.3.2 Product composition

The energy storage outdoor cabinet integrates 7 core systems, which can provide stable and reliable performance under different application scenarios and environmental conditions.

Performance. The core systems are introduced as follows:

1) Energy storage battery system ------ for storing and releasing electricity;

2) Battery Management System BMS ------ for battery data acquisition, status monitoring and control protection;

3) Energy Management System EMS ------ Configure power management strategies, monitor, control and power flow;

4) Fire safety system ------ provides effective means for fire safety protection;

5) Energy storage converter system PCS----Bidirectional current conversion between battery DC power and grid AC power;

6) Liquid cooling system ------- provides efficient temperature control for the cells;

7) Electrical system ----- provides reliable power supply, lighting, grounding and other functions for cabinet equipment.

1.3.3 Product Advantages

The main advantages of this series of products are as follows:

1) Adopting high-safety, high-energy-density, and long-cycle-life lithium iron phosphate polymer cells, it can adapt to various application scenarios with a 0.5P rate;

2) Adopting an efficient liquid cooling solution to effectively optimize the temperature difference between batteries and improve battery cycle life;

3) Adopting an active safety fire protection solution, equipped with a PACK-level single-package water injection fire extinguishing system, which can timely and effectively detect, alarm, and extinguish fires in the early stage, firmly guarding the lifeline of product safety;

4) Adopting a modular and standardized design scheme, a single outdoor cabinet occupies a small area, is convenient for transportation and installation, and has high adaptability to the installation site. Outdoor cabinets are easy to expand, each group can expand 1~10 units (522kWh~5220kWh), and multiple groups of outdoor cabinets can also be configured according to project needs.

5) Adopting an AC side parallel connection scheme, fundamentally eliminating the circulating current between batteries and further improving battery life.

6) Adopting an intelligent design concept, it has cloud-based remote operation and maintenance functions, full life cycle system maintenance, and can predict the impact of operating conditions on battery S0C and SOE, continuously selecting generation control strategies, so that the system is always running in the best state to reduce battery performance and life loss.

7) Adopting the design concept of active system security, 7*24 hours of real-time cloud monitoring, predicting security risks in advance, issuing security warnings in advance, and providing timely and effective protection in the event of a failure.

8) The outdoor cabinet has multiple protection functions such as "anti-corrosion, fire prevention, waterproof, dustproof, shockproof, and anti-ultraviolet", and the structural strength and space can provide favorable protection for the stable operation of the energy storage battery system.

9) Users can choose STS module according to their needs. After selection, the outdoor cabinet has backup power function, which improves the power supply reliability of important places.

10) Users can select photovoltaic MPPT module according to their needs. After selection, the outdoor cabinet has photovoltaic DC coupling function, which stores photovoltaic power into the energy storage cabinet.

11) Users can select photovoltaic energy storage dynamic regulation system according to their needs to maximize the value of photovoltaic power generation.

1.3.4 Internal layout

In order to improve system safety, reduce the probability of equipment misoperation, reduce fire safety risks, save operation cost investment, and realize the long-term stable operation of energy storage outdoor cabinet, the energy storage outdoor cabinet is divided into equipment compartment and battery compartment. High-grade thermal insulation and flame retardant materials are used for isolation between the compartments. The equipment compartment integrates liquid cooling unit, PCS equipment, etc., and the battery compartment mainly integrates battery system. The equipment compartment and the battery compartment have three functional zoning types: "temperature control", "fire safety" and "functional operation".

Table 1-1: Outdoor cabinet function zoning description

Compartment name	Main installation equipment	Fire safety	Function operation	Temperature control
Equipment compartment	Name: PCS, liquid cooling unit	External configuration water injection system	On-site operation, fault repair	Liquid cooling, natural air cooling
Battery compartment	Name: battery pack, high-voltage box, EMS	Active fire protection, PACK level Aerosol + water injection fire protection	System control, on-site operation, fault diagnosis and repair	Liquid cooling

1.4 Product configuration list

The main equipment configuration of a single energy storage outdoor cabinet is as follows:

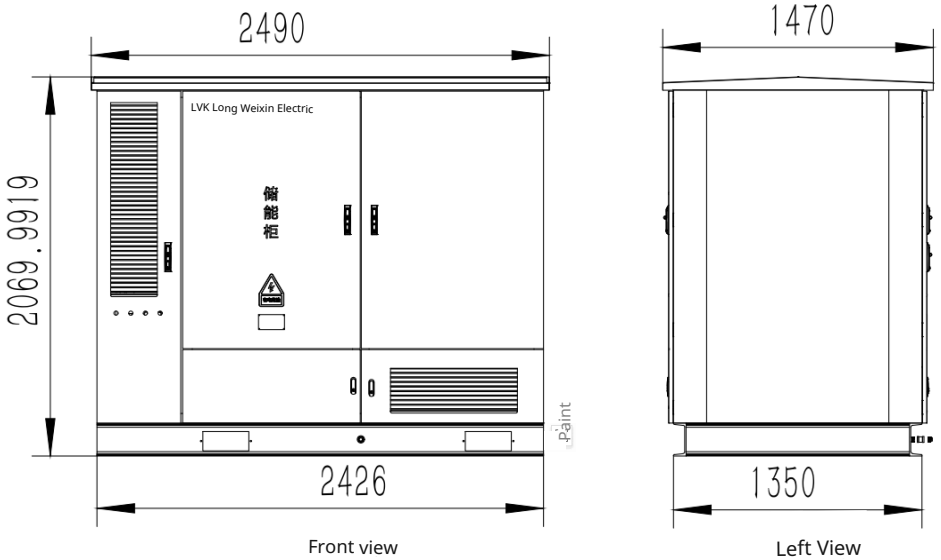
Serial number	System name	Main equipment name	Description	Unit	Quantity
1	Battery system	52kWh battery pack	Uses 3.2V/314Ah LFP battery cells	unit	10
2	Battery Management System	Slave control module	Each battery pack is equipped with 1 slave control	unit	10
3		Master control module	Each 5 battery packs are equipped with 1 master control	unit	2
4	Electrical box	High voltage box	Each outdoor cabinet is equipped with 1 high-voltage box	unit	1
6	AC/DC converter system	PCS	125kW	set	2
7	Energy Management System	EMS	Supports peak shaving and valley filling, demand control, and other functions, and is only configured in the main cabinet.	set	1
8	Fire protection system	/	PACK level water injection fire extinguishing or aerosol fire extinguishing system	set	1
9	Liquid cooling system	Cooling capacity 8kW	Cold plate, liquid cooling, etc.	set	1
10	Electrical auxiliary system	/	Low-voltage electrical appliances, DC, grounding, wiring, etc.	Unit	1
11	Cabinet	/	Cabinet sheet metal structure and its installation accessories.	set	1

Note: The device name/specification and corresponding quantity are subject to the actual supply.

1.5 Product Parameter Table

System Parameters	
Single Outdoor Cabinet Capacity	250kW/522kWh
Maximum Number of Units in Parallel per Group	10 Units
Maximum Parallel Capacity per Group	2500kW/5220kWh
Discharge Working Temperature	-15℃~45℃
Charging works stably	0℃~45℃
Storage temperature (℃)	Within one month: -20℃~45℃
	Within six months: 0℃~35℃
Noise	<75db
Cooling method	Liquid cooling
Number of cycles	8000 Times @25℃, 0.5P, 70% EOL
	4200 At @25℃, 0.5P, 80%EOL
Fire protection system	Active fire prevention warning, Pack-level aerosol fire extinguishing + water injection
Detector type	Temperature-sensitive, combustible gas
Reference dimensions (W*D*H mm)	2426*1350*2070mm
Weight (T)	4.71
Corrosion resistance Level etc.	C3/C4/C5 (Optional)
Protection Level	Battery compartment: IP54
	Equipment compartment: IP54
Permissible Relative Humidity	0~95%
Permissible Altitude	≤4000m (Discount for altitudes above 2000m)
System Efficiency	85%
Communication Protocol	Modbus TCP/RTU
System Operation Mode	Peak Shaving and Valley Filling
	Demand Control
	Dynamic Expansion
	Photovoltaic Storage
	Anti-backflow Function
	Charging pile with energy storage

Certification	Battery: GB/T36276
	BMS:GB/T 34131
	PCS:GB/T 34120
AC side parameters	
Rated AC power (KVA)	250
AC overload capacity (KVA)	275
Wiring method	Three-phase four-wire
Permissible grid voltage range (V.ac)	400 (-5%~5%)
Permissible grid frequency range (Hz)	50/60 (-2.5~2.5)
Power factor	-0.99~0.99
Maximum conversion efficiency	≥98%
Cooling method	Liquid cooling
Unbalanced load capacity	100%
DC side parameters	
Battery type	Lithium iron phosphate
Combination mode	2P260S
Rated capacity (Ah)	314
Rated energy (kWh)	522
Rated voltage (V)	832
Rated charge and discharge rate	0.5P
Operating voltage range (V)	676~936



Outdoor cabinet dimension drawing

2. Core System Introduction

2.1 Energy Storage Battery System

The grouping form of the prefabricated cabin energy storage battery system is as follows:

Table 2-1 Battery System Grouping Form

Serial number	Level	522kwh energy storage outdoor cabinet
1	Series-parallel grouping form	2P260S
2	Number of cells	520
3	Number of battery packs	26
4	Number of battery clusters	2
5	Number of high-voltage boxes	1

Note: In the grouped form, "S" represents series connection, and "P" represents parallel connection.

2.1.1 Energy storage cell

This product uses long-life 3.2V/314Ah lithium iron phosphate polymer cells, which have high safety, high energy density, long cycle life, and low cost. Currently, this cell has passed the test by a third-party authority according to the GB/T 36276-2018 standard. The basic parameters of the cell are as follows:

Table 2-23144h Basic Parameters of Battery Cell

Serial number	Project	Specification	Remarks
1	Cell model	LFP	LFP
2	Cell weight (kg)	5.6±0.15	After wrapping with blue film
3	Rated capacity (Ah)	314	25℃ standard charge and discharge
4	Nominal energy (Wh)	1004.8Wh	
5	Rated voltage (V)	3.2	
6	Charging limit voltage (V)	3.6	
7	Discharge limit voltage (V)	2.6	
8	Rated charging power	0.5P	

Serial number	Project	Specification	Remarks
9	Maximum charging power	0.5P	
10	Rated discharge power	0.5P	
11	Maximum discharge power	0.5P	
12	Number of cycles	≥8000 times	@25℃,0.5P/0.5P, EOL70%
13	AC internal resistance (mΩ)	≤0.18	

2.1.2 Battery pack

The liquid-cooled battery pack used in this product is independently researched, designed, and manufactured by our company. Its internal components mainly consist of cells, connecting copper busbars, box liquid cooling plates, acquisition communication wiring harnesses, BMS, and other components.

Each battery pack is equipped with 52 voltage acquisition points and 28 temperature acquisition points, which are connected to the BMU through acquisition wiring harnesses. The outdoor cabinet can accurately evaluate the cell status and reduce the probability of safety accidents through the temperature difference within the battery pack.

1) Battery Pack Parameter Table

Table 2-4 Battery Pack Parameter Table

Serial number	Project	Parameter	Remarks
1	Grouping Method	1P52S	
2	Rated Energy (kWh)	52	
3	Rated voltage (V)	166	
4	Working voltage range (V)	135~1187	Single cell voltage 2.6~3.6
5	Rated power (kW)	52	
6	Charging temperature range (℃)	0~45	
7	Discharging temperature range (℃)	-15~45	
8	Recommended temperature range (℃)	28±3	
9	Protection Level	IP67	
10	Thermal management method	Liquid cooling	
11	Communication method	CAN	
12	Dimensions (W*D*H, mm)	2426*1350*2070mm	

2.1.3 Battery cluster

The battery cluster is mainly composed of battery packs and high-voltage boxes. Each battery pack is installed in an outdoor cabinet and connected to the module through a DC power cable and BMU communication harness.

The high-voltage box serves as the input and output window for the energy flow and information flow of the battery cluster. Its interior includes BMU main control, contactor, electrical appliances, fuse, pre-charge resistor, switching power supply and other devices, and can be configured and modified according to project needs.

Each energy storage outdoor cabinet battery compartment is arranged with 10 battery boxes and 1 high-voltage box to form 2 battery clusters. The basic parameters of the battery cluster are as follows:

Table 2-5 Battery Compartment Battery Cluster Parameter Table

Serial number	Project	Parameter
1	Cell Selection	3.2V/314AH
2	Grouping Method	1P52S*5
3	Rated voltage (V)	832
4	Working voltage range (V)	676~936
5	Rated Energy (kWh)	522
6	Rated charge and discharge rate	0.5P/0.5P @25℃
7	Thermal management method	Liquid cooling
8	Optimal Cycle Temperature (℃)	25
9	Temperature Difference Control Range (℃)	±3
10	Protection method	Fuses, contactors, circuit breakers
11	BMS Configuration	BCU: 2 BMU: 10
12	High-voltage box configuration	1 Units

2.2 Battery Management System

The battery management system is an important foundation for the stable operation of energy storage batteries. It has multiple functions such as data acquisition, status monitoring, and control protection, which can realize comprehensive perception, early warning, and precise control of battery status.

2.2.1 BMS Equipment Composition

The BMS of this product adopts a two-level architecture scheme, which has the characteristics of wide function coverage, small size, strong anti-interference performance, safety and reliability. Each battery pack has 1 BMU (slave control unit), and each battery is equipped with 1 master control unit (BCU).

Table 2-6 Battery Management System Configuration Table

Serial number	Device Name	Configuration Description	Function Description	Installation Location
1	BMU	Slave control unit, 1 built in each battery pack	Mainly responsible for the state parameter acquisition and monitoring of the battery pack	Inside the battery pack
2	BCU	Master control unit, 1 configured for each battery cluster	Primarily responsible for data monitoring, state calculation, and charge/discharge management of single-cluster battery systems, and communicates with other devices to implement system policies.	High voltage box interior

2.2.2 Introduction to Main Functions of BMS

Serial number	Function Name	Serial number	Function Name
1	Battery voltage and temperature measurement function	7	Operating parameter setting function
2	Online SOC diagnosis	8	Active balancing function
3	Battery system protection function	9	Storage function
4	Communication function	10	Battery state estimation
5	Thermal management function	11	Time synchronization function
6	Self-diagnosis and fault tolerance function	12	Fault recording function
.....More functional requirements can be discussed with our company			

2.2.3 BMS Communication Architecture

The communication architecture of each BMS device in this product is as follows:

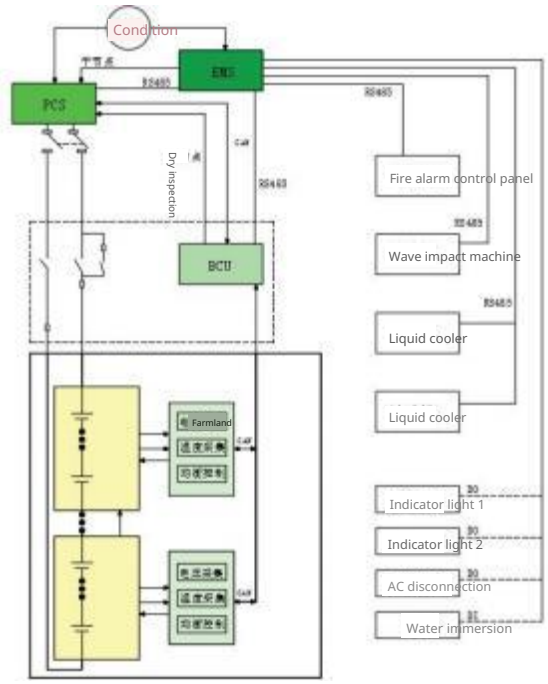


Figure 2-3 Schematic diagram of BMS communication architecture

2.2.4 BMS Parameters

Table 2-6 BMS Parameter Table

Serial number	Device Name	Project	Parameter
1	BMU Slave Control Unit	Working Voltage Range	9~32 V
2		Number of Battery Management	64 String (Max)
3		Equalization Method	Active Balancing
4		Voltage acquisition range	0~5 V
5		Temperature acquisition quantity	-40~250℃
6	BCU Master control unit	Working Voltage Range	9~32 V
7		SOC accuracy	±5%
8		SOH accuracy	±8%
9		Voltage acquisition range	0~1000 V
10		Current acquisition range	-522~522 A
11		Temperature acquisition range	-40~250℃
12		Communication interface type	CAN\RS485

2.3 Energy Management System

Energy Management System (EMS) is used to monitor, control, and optimize energy flow and energy consumption in energy systems. It is based on data acquisition, analysis, and decision support technologies, enabling real-time monitoring of the operating status of energy equipment, energy consumption, and environmental conditions, thereby achieving efficient energy management and optimization.

2.3.1 Energy dispatch and control strategies

The energy management system for outdoor energy storage cabinets has control strategies such as peak shaving and valley filling, demand control, dynamic expansion, photovoltaic storage and charging applications, energy storage and charging applications, and anti-backflow.

2.3.2 Main Features

(1) Data Monitoring and Acquisition: The energy management system can monitor the generation, storage, and consumption of energy in outdoor cabinets in real time; in addition, it can collect data from other equipment such as BMS, PCS, and environmental monitoring systems, including battery charging and discharging status, temperature, voltage, current, etc.

(2) Data Analysis and Optimization: The energy management system relies on advanced data analysis technology to process and analyze the collected system data to understand the working status and performance of the energy system. Through data analysis, potential problems in the energy system can be identified and optimization suggestions can be provided, such as adjusting charging and discharging strategies and optimizing energy utilization efficiency.

(3) Energy Dispatch and Control: The energy management system can intelligently perform energy dispatch and control based on real-time energy demand and system operation. It can reasonably arrange the charging and discharging operations of energy storage facilities based on factors such as demand forecasting, electricity price conditions, grid load, photovoltaic power output, and charging pile response.

(4) Fault Detection and Safety Protection: The energy management system can timely detect and alarm faults in energy storage facilities, such as battery over-discharge and overcharge, abnormal temperature, etc., to ensure the safe operation of energy storage facilities. At the same time, it can also be linked with the distribution network system to realize remote control and protection of energy storage facilities.

(5) Cloud Remote Operation and Maintenance: The energy management system uploads the operating and fault data collected from the equipment to the cloud, which can accurately predict and locate faults remotely, greatly reducing the operation and maintenance work of engineers.

(6) Operation Benefit Display: The energy management system can display energy storage benefits and electricity information.

2.3.3 EMS Communication Architecture Diagram

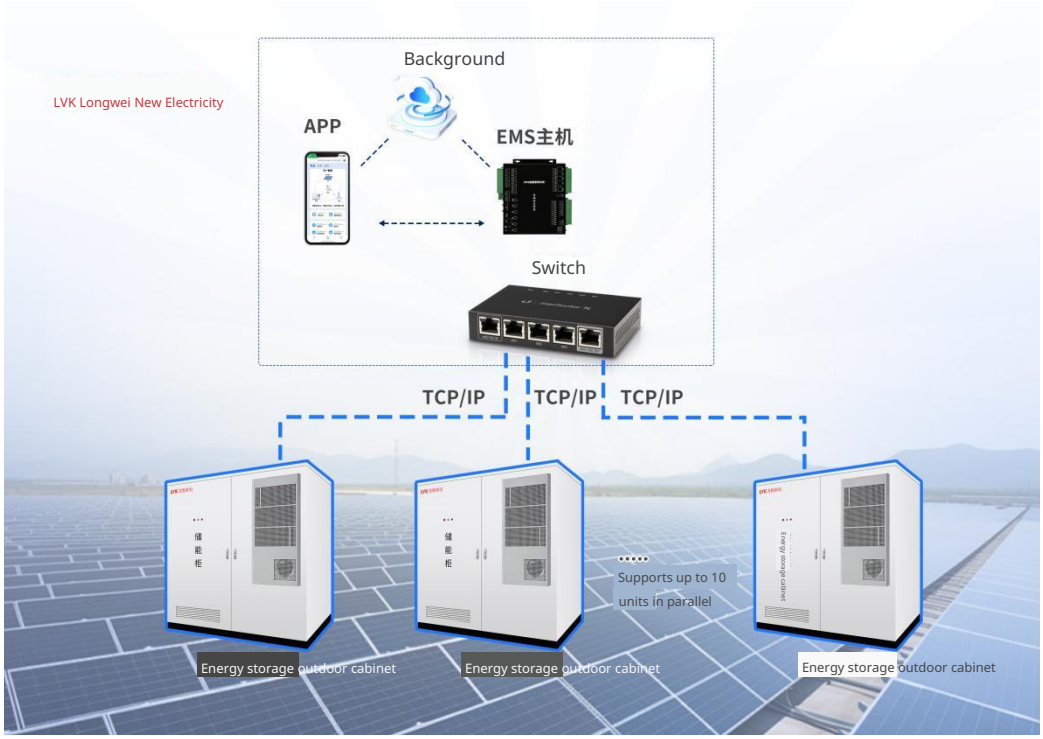


Figure 2-4 Schematic Diagram of EMS Communication Architecture

2.4 Energy storage inverter system

The energy storage outdoor cabinet is equipped with two 125kW energy storage converters (PCS). The PCS is a device used to connect the battery system and the power grid (and/or load) to realize the bidirectional conversion of electric energy. It can control the charging and discharging process of the battery and perform AC/DC conversion. It adopts a three-phase four-bridge arm topology and has the ability to control single-phase and three-phase active and reactive power, and can accurately solve the three-phase imbalance problem.

2.4.1 Control function

PCS can be paired with EMS to achieve various control functions such as peak shaving and valley filling, and demand control.

2.4.2 Protection function

PCS can perform real-time fault protection based on the grid-side voltage, frequency, and its own operating status. The protection functions include: grid over/under voltage, grid frequency over/under frequency, DC over/under voltage, AC overcurrent, DC overcurrent, phase loss, anti-islanding and other protection functions.

2.5 Fire safety system

This series of products adopts an active fire safety strategy to disconnect the high voltage electrical circuit before the cell undergoes thermal runaway, and real-time detects the temperature and voltage signals of the cell. In addition, each energy storage outdoor cabinet is set as a protection zone, with two levels of protection - pack-level protection and cabinet-level protection; among them, pack-level protection uses a two-in-one composite detector as a detection device placed in each battery pack to detect the concentration of combustible gas and temperature in the pack. Each PACK is equipped with a solenoid valve and a pack-level nozzle. The two-in-one composite detector is electrically connected to the cabinet-type energy storage non-pressurized fire extinguishing device and forwards the control command of the corresponding solenoid valve. The outlet of the cabinet-type energy storage non-pressurized fire extinguishing device is connected to the solenoid valve through a high-pressure hose and quick-plug pipe fittings. Once a battery pack undergoes thermal runaway, the two-in-one detector transmits the alarm signal to the cabinet-type energy storage non-pressurized fire extinguishing device and opens the corresponding solenoid valve. The cabinet-type energy storage non-pressurized fire extinguishing device is activated, and the water injection system or aerosol fire extinguishing agent directly acts on the runaway battery pack through the quick-connect pipeline and pack-level nozzle.

Cabinet-level protection adopts passive protection, and is used in combination with a non-pressurized water injection system fire extinguishing device and a temperature-sensitive magnetic power generation component. Once the temperature in the cabinet exceeds the starting temperature of the temperature-sensitive magnetic power generation, the temperature-sensitive magnetic power generation component will send a pulse current to start the non-pressurized water injection system or aerosol fire extinguishing device in the cabinet, and perform full flooding protection on the energy storage cabinet, and feed back the start signal to the cabinet-type energy storage non-pressurized fire extinguishing device.

2.5.1 Main equipment

(1)複合火災探知機

機能：高度に統合された方法で、一酸化炭素と温度の2つの測定パラメータを1つにまとめ、エネル

設置場所：各バッテリーパック内に1つの複合火災探知機を配置し、CANバス通信方式でキャビネ

(2)キャビネット式エネルギー貯蔵非加圧消火装置

機能：制御と消火を一体化した設計で、消火システム全体のデータ処理センターおよび火災抑制の一方では、CAN通信を通じて火災探知機と通信し、他方では装置自体に消火剤ボトルが付属しています同時に、装置内のコントローラーは、火災探知機の故障検出、警報信号出力などの機能も備えています

設置場所：エネルギー貯蔵屋外キャビネット内。

3) バックレベル注水システムまたはエアロゾルスプレーヘッド

各バッテリーパックに1つのパックレベル注水システムスプレーヘッドを配置し（バッテリーパッ
電磁弁はさらにキャビネット式エネルギー貯蔵非加圧消火装置の薬剤出口に接続します。

（4）電磁弁

機能：制御ホストからの命令を受信し、探知機によって起動され、熱暴走バッテリーパックへの単

Installation location: Arrange 1 solenoid valve on the outer panel of each battery pack.

2.5.2 Scheme Logic Control

(1) Level 1 Alarm:

Carbon dioxide concentration reaches 190ppm

Execution action: The detector increases the sampling frequency and focuses on monitoring battery packs with excessively high gas concentrations.

(2) Level 2 Alarm

-Carbon dioxide concentration ≥890ppm or temperature rise ≥1℃/s for 10 seconds Execution action: The controller passes RS485 uploads Level 2 alarm information.

(3) Level 3 Alarm

Carbon monoxide exceeds 1522ppm and (temperature ≥65℃ or temperature rise greater than 1℃/8 for 10 seconds) The controller opens Fire extinguishing agent bottle, fire extinguishing agent suppresses the battery pack through pipelines and nozzles, and the controller executes action: RS485 uploads Level 3 alarm information.

2.6 Liquid cooling system

2.6.1 Liquid cooling system

The liquid cooling system consists of a liquid cooling unit and supporting pipelines. When the cell temperature is too high or too low, the coolant circulation is used to exchange heat with the battery system to achieve the optimal operating temperature conditions for the battery pack.

2.7 Electrical system

The outdoor energy storage cabinet provides unified primary and secondary interfaces for external connections, enabling standardized power grid connection, communication, and debugging, improving the efficiency of electrical construction for the product, and reducing construction risks.

The internal wind of the outdoor energy storage cabinet is powered by both mains and DC power. The mains power mainly supplies power to non-critical loads in the cabin, such as chillers and cooling fans; DC power mainly supplies power to important equipment in the cabin such as BMS, fire protection, and EMS.

2.8 Environmental monitoring system

Temperature and humidity sensors and water immersion sensors are installed inside the outdoor energy storage cabinet. When the humidity inside the outdoor cabinet is detected to be too high, it will start to maintain a low humidity level inside the battery compartment; when abnormal temperature or water immersion is detected inside the outdoor cabinet, an alarm signal will be generated to promptly notify maintenance personnel for handling.

3．Precautions

(1) It is forbidden to immerse the product in water.

(2) Improper use and storage of the product may result in fire, explosion, and burn hazards. Do not disassemble, crush, incinerate, or heat the product.

(3) Do not throw the product into fire or expose it to high-temperature environments exceeding the temperature conditions specified in this specification for extended periods, as this may cause a fire.

(4) Keep the product out of reach of children. Do not remove the original packaging before use. Dispose of used products in a timely manner according to local recycling or waste disposal regulations.

(5) Do not disassemble, dismantle, or modify the product in any way without authorization.

(6) Do not mix products from different brands.

(7) If the product emits an odor, generates heat, deforms, discolors, or exhibits any other abnormal phenomenon, do not use it and move it to a safe location.

(8) It is strictly forbidden to make electrical connections with plastic. Incorrect electrical connections may cause the product to overheat during use.

(9) The product should be protected during use to prevent mechanical vibration, collision, and pressure impact; otherwise, the inside of the product may short-circuit, generating high temperatures and fire. The product has potential dangers, and appropriate protective measures must be taken during operation and maintenance; otherwise, serious personal injury and property damage may result. Failure to comply with the above warnings may cause various disasters.