Fujian Longking Svolt Energy Storage Technology Co., Ltd.

LONGKING
龙 净 蜂 巢

EnergyStorageAI-in-OneSystem LK-ES03-DA-125/261W

Product Specification

Catalog

Foreword

This specification defines the terminology, composition, functions and performance indicators, test methods, inspection rules, as well as the requirements for marking, packaging, transportation, and storage of the commercial and industrial energy storage all-in-one system, which is provided by Fujian Longking-Svolt Energy Storage Technology Co., Ltd.

This system is designed and manufactured by Fujian Longking Svolt Energy Storage Technology Co., Ltd.

This specification is applicable to the Energy Storage All-in-One System model LK-ES03-DA-125/261W.

1. Terminology Definitions

The terms and definitions defined in DL/T 2528, along with the following terms and definitions, apply to this document.

Power Conversion Cystem(PCS)

A system paired with the energy storage battery pack, connected between the battery pack and the power grid, which stores electrical energy from the grid into the battery pack or feeds the energy of the battery pack back to the grid.
The system mainly consists of a powerconverter and its control system.

Batter Cell

The basic unit that converts chemical energy and electrical energy, consisting of a positive electrode, negative electrode, separator, electrolyte, casing, and terminals.

Battery Module

A battery assembly in which cells are connected in series, in parallel, or in a series-parallel configuration, and which has only one pair of positive and negative output terminals. It may also include components such as a housing, management system, and protection devices.

Battery Cluster

A battery assembly formed by multiple battery packs connected in series, in parallel, or in a series-parallel configuration, serving as a fundamental unit of the energy storage system. It may also include cluster-level battery management system (BMS), monitoring and protection devices, electrical interfaces, and communication interfaces.

Battery Management System(BMS)

A system that monitors the status of the battery (such as temperature, voltage, current, state of charge, etc.) and provides management functions and communication interfaces for the battery.

Rate Charging/Discharging

The method of charging or discharging a battery at a multiple of its rated power under specified test conditions and procedures.

Energy Management System(EMS)

An EMS is a computer-based system that includes hardware and software platforms for battery system management and PCS control, as well as application software that ensures safe and economical operation of power distribution and electrical equipment within the energy storage system.

Fire Fighting System(FFS)

A system capable of detecting fire signals from the battery system in real time and issuing fire alarms, providing control and indication to prevent fire spread and to activate automatic fire extinguishing equipment.

2. Applicable Standards

Standard	Description
GB/T 36276	Lithium-ion batteries for electrical energy storage
GB/T 44026	Technical specifications for prefabricated container-type lithium-ion battery energy storage systems
DL/T 527	Technical requirements for power supply modules (subassemblies) of relay protection and control devices
GB/T 13384	General technical conditions for packaging of mechanical and electrical products
GB/T 14537	Shock and crush tests for measuring relays and protection devices
GB/T 14598.27	Measuring relays and protection devices – Part 27: Product safety requirements
DL/T 478	General technical conditions for relay protection and automatic safety devices
GB/T 191	Pictorial markings for packaging, storage, and transportation
GB/T 2423.1	Environmental testing for electric and electronic products – Part 2: Test methods – Test A: Low temperature
GB/T 2423.2	Environmental testing for electric and electronic products – Part 2: Test methods – Test B: High temperature
GB/T 2423.3	Environmental testing – Part 2: Test methods – Test Cab: Damp heat, steady state
GB/T 2423.7	Environmental testing – Part 2: Test methods – Test Ec: Rough handling shocks (primarily for equipment-type specimens)
GB/T 2423.10	Environmental testing – Part 2: Test methods – Test Fc: Vibration (sinusoidal)
GB/T 4208	Rating for protection provided by enclosure (IP Code)
GB/T 17626	Electromagnetic compatibility – Testing and measurement techniques
GB 14048.1	Low-voltage switch and controling devices – Part 1: General rules
GB/T 4026	Basic and safety principles for man-machine interface, marking and identification – Identification of equipment terminals, conductor terminations, and conductors
GB 8702	Limits for controlling electromagnetic environment
DL/T 5429	Technical code for designing power systems
DL/T 620	Overvoltage protection and insulation coordination for AC electrical devices
GB 50217	Standard for design of cables in power engineering
GB/T 2900.41	Electrotechnical terminology – Primary and secondary cells and batteries
GB 21966	Safety requirements for lithium primary and secondary cells and batteries in transporting
Q/GDW 564	Technical requirements for energy storage systems connected to distribution networks
NB/T 33014	Technical specifications for operation and control of electrochemical energy storage systems connected to distribution networks
NB/T 33015	Technical requirements for electrochemical energy storage systems connected to distribution networks
NB/T 33016	Testing regulations for electrochemical energy storage systems connected to distribution networks
DL/T 2528	Basic terminology for electrical energy storage

3. Product Model

Product Name:All in one Energy Storage Machine

Product Specification: 125kW/261kWh

Product Model: LK-ES03-DA-125/261W

4. Technical Specifications

4.1 Product Overview

The 261 kWh Energy Storage All-in-One System uses 314 Ah lithium iron phosphate ($LiFePO_4$) cells, with the following configuration:

Level	Item	Specification
Battery Cell	Rated Capacity(Ah)	314
	Rated Voltage(V)	3.2
	Operating Voltage Range (V)	2.5～3.65
Battery Module	Cell Connection (Series/Parallel)	1P52S
	Operating Voltage Range (V)	130～189.8
	Rated Energy (kWh)	52.25
Energy Storage All-in-One System	Module Connection (Series/Parallel)	1P5S
	Cell Connection (Series/Parallel)	1P260S
	Operating Voltage Range (V)	DC728～936V
	Rated Energy (kWh)	261

4.2 Technical Specifications of the Energy Storage All-in-One System

DC-Side Parameters	
DC Voltage Range	DC728～936V
Rated Power	125kW
AC-Side Parameters	
AC Rated Power	125 kW
AC Max Power	137.5kW
Total Harmonic Distortion	<3% (at rated power)
AC Rated Voltage	AC400V
Allowable Grid Voltage Deviation	-15%~+15%
AC Connection Method	3W+N+PE
Rated Grid Frequency	50/60Hz
Power Factor Range	-1(leading)~1(lagging)
Voltage Ripple Coefficient	≤1%

Product System Parameters	
Battery Type	Lithium Iron Phosphate (LFP)
Single Cell Capacity	3.2V/314Ah
Cell Configuration	1P260S
Battery System Rated Capacity	261kWh
Battery System Rated Voltage	832V
Battery System Voltage Range	DC728～936V
Charge/Discharge Rate	Rated 0.5P
Depth of Discharge	95%
Battery Cooling Method	Liquid Cooling
Dimension(L×W×H)	1350×994×2320.5mm
Weight	2500±5%kg
IP Rating	IP54
Operating Temperature Range	-30℃~55℃
Operating Humidity	≤95%
Battery Temperature Control Method	Liquid Cooling
Fire Fighting System	Aerosol
Maximum Operating Altitude	>2000m(derating required)
Noise Level	< 75dB
Cooling Method	Battery Module (Liquid Cooling) / PCS (Air Cooling)
BMS Communication Interface	CAN
EMS Communication Interface	RS485/LAN
BMS Communication Protocol	CAN2.0
EMS Communication Protocol	RS485/Modbus TCP

4.3 Technical Specifications of the Battery Management System (BMS)

Operating Voltage	24V
Operating Temperature	-40~85℃
High-Side Relay Control	1A, peak 5A @ 100 ms
Voltage Measurement Accuracy	< 5mV
Current Measurement Accuracy	≤2A@<200A；≤1%@≥200A
SOC Accuracy	Measurement Error < 5%
SOH Accuracy	Measurement Error < 5%
Communication Method	CAN

4.4 Technical Specifications of the Power Conversion System (PCS)

4.4.1 Basic Functions

1）Capable of grid connection, with independent decoupled control of active and reactive power during grid operation.

2）Able to cooperate with the BMS and EMS to implement advanced applications in the power system.

4.4.2 Charge/Discharge Management

Equipped with battery charge and discharge management functions, supporting constant voltage (CV), constant current (CC), and constant power (CP) charging and discharging. When the battery pack reaches the maximum allowed value, the energy storage converter automatically adjusts to ensure that the battery pack voltage does not exceed the specified limit. The energy storage converter can take necessary current-limiting measures based on commands from the BMS or EMS to prevent charge/discharge currents from damaging the battery or the system.

4.4.3 Communication and Monitoring

Supports connection to monitoring devices such as RS485, LAN, and EMS. Supports CAN connection to the BMS.

4.4.4 Power Control

Can perform active power control and reactive power regulation according to control system commands. The energy storage converter can adjust active power based on control system instructions, ensuring that its maximum output power and power ramp rate do not exceed the specified limits.

4.4.5 Safety and Protection

The PCS is equipped with both hardware fault protection and software protection. The protection functions are comprehensive, with overlapping coverage and no blind spots, ensuring system safety under various fault conditions.

The protection functions include:

1）AC input phase sequence error protection;

2）Grid voltage unbalance protection;

3）AC/DC overcurrent and short-circuit protection;

4）AC/DC overvoltage and undervoltage protection;

5）AC overfrequency and underfrequency protection;

6）DC polarity reversal protection;

7）Cooling system fault protection;

8）Overtemperature protection;

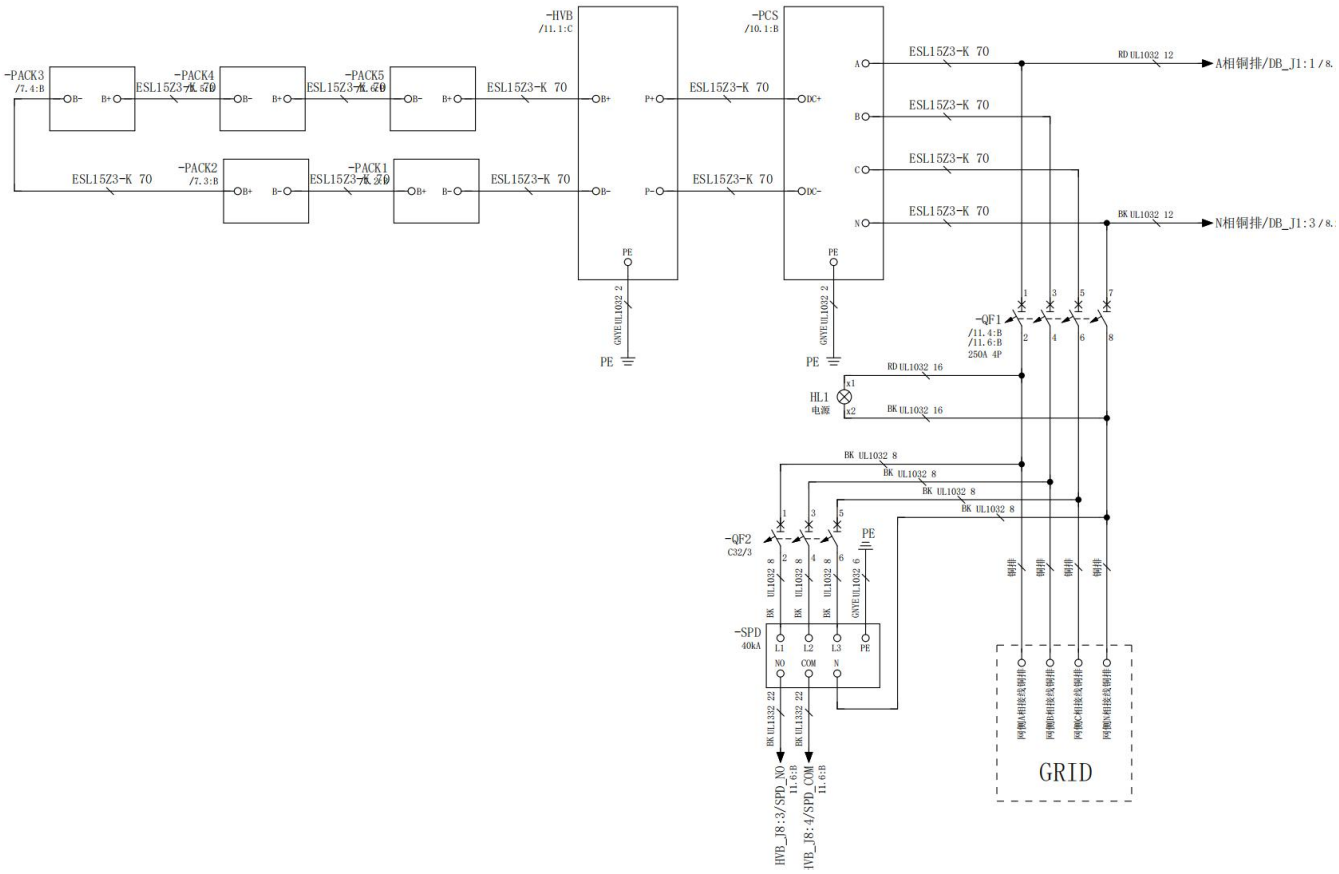
9）Battery overcharge and overdischarge protection;

10）Communication fault protection.

5. Electrical Schematic and Overall Dimensions of the Product

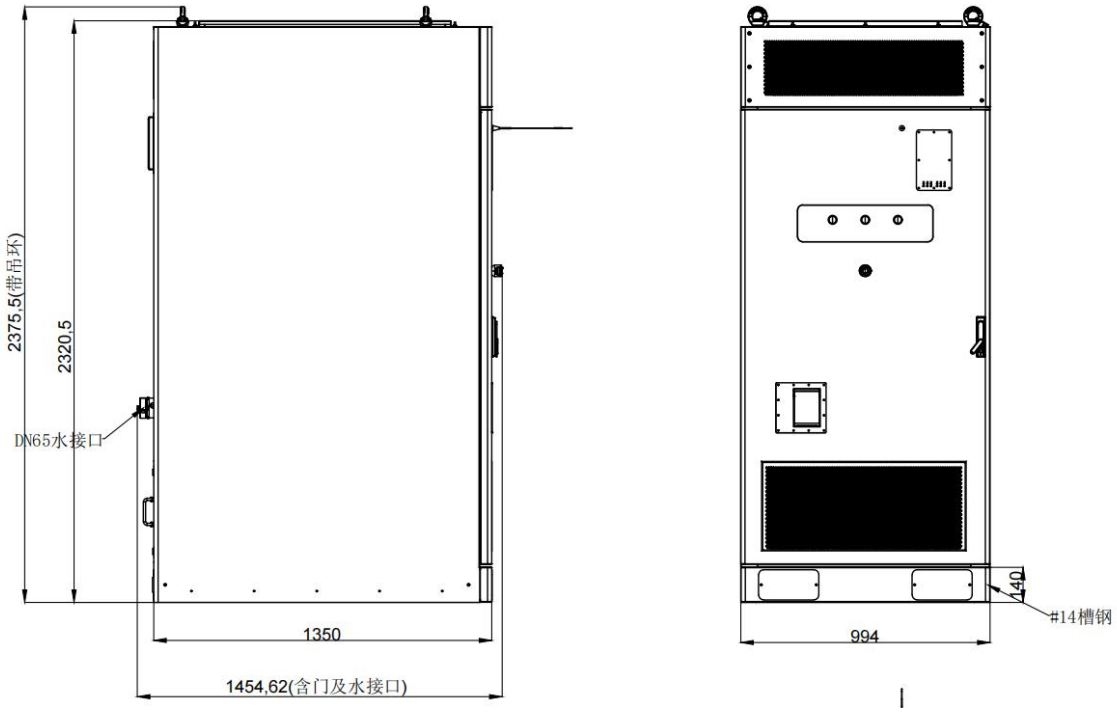
5.1 Electrical Schematic Diagram of the Product

The electrical schematic diagram of the Energy Storage All-in-One System is shown as follows:



5.2 Overall Dimensions of the Product

The overall dimensions of the Energy Storage All-in-One System are shown as follows:



6. Labeling, Packaging, Transportation, and Storage

6.1 Labeling

1. The product is equipped with a nameplate, which includes the following information: product name, model, nominal voltage, rated capacity, and product serial number.
2. The product has clearly visible warning labels indicating hazards.

6.2 Transportation

1. During handling, dropping, rolling, or applying excessive pressure is strictly prohibited. During transportation, the battery within the product shall be in a partially charged state (30–50% SOC). Transport must avoid severe vibration, impact, or compression, and the product should be protected from direct sunlight, rain, and being placed upside down. The product is suitable for transportation by common vehicles, including trucks, trains, ships, and airplanes.
2. The product is compatible with forklift handling from the bottom and crane lifting from the top. For lifting or transferring the entire product, forklifts or cranes with a rated capacity of no less than 10 tons shall be used.

6.3 Storage

1. Energy storage products in a partially charged state (SOC 30%–50%) should be stored in a dry, well-ventilated, and clean warehouse. For storage up to 1 month, the temperature range shall be -30 °C to 45 °C; for storage up to 6 months, the temperature range shall be -20 °C to 35 °C. The relative humidity shall not exceed 65%.
2. The product shall not be stored together with acidic or other corrosive substances.
3. Long-term inactivity: If the battery system is left unused for an extended period, it should be charged once every 3 months to ensure the SOC is above 30%.

7. Precautions for use

Operation of the product must be performed by qualified technical personnel in accordance with local regulations or relevant power industry standards. Pay attention to the polarity markings; do not reverse the positive and negative terminals to avoid hazards.

Before using the product, carefully read the user manual and all product warning labels.

1. Before first use, inspect the equipment for any damage or hazardous conditions. Verify that all external devices or circuits are safely connected.
2. During the first use, conduct a visual inspection, wiring check, control power check, and communication check. If severe damage to the enclosure or abnormal conditions such as unusual odors are detected, do not use the product and return it to the manufacturer.
3. This product contains high-voltage DC. Unauthorized personnel must keep away, and no one should touch or operate the system except qualified personnel.
4. Before any installation or maintenance work, first disconnect the AC-side circuit breaker, then disconnect the DC-side battery switch, and use appropriate testing equipment to verify the circuit status.
5. Do not insert or remove connectors arbitrarily during operation.
6. If unusual odors or abnormal phenomena occur during operation, immediately disconnect the power and notify relevant personnel.
7. Do not modify critical parameters on the control panel during operation, as this may affect normal product operation.
8. If the battery system is left unused for an extended period, charge it once every 3 months to ensure the SOC remains above 30%. Storing the product at low SOC may cause deep discharge, severely affecting battery life or damaging the product.
9. When operating the product via remote monitoring, take precautions against potential malware or virus intrusion.
10. If the battery runtime is significantly reduced, the system experiences frequent faults,

or any unresolvable abnormal condition occurs, contact the manufacturer immediately. Do not disassemble the product or replace cells in the battery pack without authorization.

8. Danger Warning

1. Do not disassemble or modify the product or its battery pack. The product contains internal protective mechanisms and circuits to prevent hazards. Improper disassembly may damage these protections, potentially causing battery overheating, smoke, deformation, or fire.

2. Do not short-circuit the system. Never connect the positive and negative terminals with metal objects, nor store or move the product together with metal. A short-circuit can cause extremely high current flow, damaging the battery and leading to overheating, smoke, deformation, or fire.

3. Do not heat or incinerate the product. Heating or burning the battery may melt insulation materials, disable safety features, or ignite the electrolyte. Overheating can cause the battery to overheat, emit smoke, deform, or catch fire.

4. Do not expose the product to rain or immerse it in water. Doing so may disable internal protection circuits and trigger abnormal chemical reactions, potentially causing overheating, smoke, deformation, or fire.

5. Do not physically damage the product or battery. Do not pierce the battery with metal objects, hammer, drop, or otherwise damage the product or battery, as this may lead to overheating, smoke, deformation, or fire.

6. Do not touch terminals, contacts, or other points connected to the grid or the energy storage product. Doing so may result in electric shock, fire, or fatal injury.

7. Do not open the battery cabinet or associated equipment. Unauthorized access may lead to electric shock or other serious accidents.