Energy Storage System

BEIJING SOJO ELECTRIC CO., LTD.

SOJO

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Company Profile

SOJO Group focuses on the manufacturing of power distribution and control equipment. With the research and development of environmentally friendly new products and technologies as its technical core, the Group is committed to building a robust and intelligent power distribution network. By deeply integrating digitalisation, online monitoring and distribution equipment with control systems, SOJO has developed an intelligent power distribution system featuring advanced integration and smart operation.In the renewable energy sector, with wind and solar energy as the core, and leveraging its long-established R&D strengths in the power distribution field, SOJO has developed a new-generation intelligent power generation system integrating wind power, photovoltaic power, energy storage, charging and battery swapping. Supported by source–grid–load–storage interaction and multi-energy complementary integration, SOJO promotes a new pattern of power development that is clean and low-carbon, safe and controllable, flexible and efficient, intelligent and user-friendly, as well as open and interactive. After years of development, based on transmission and distribution and driven by the national dual-carbon strategy, SOJO has been building a new-type power system and a digital energy development framework, advancing energy digitalisation and contributing to the achievement of carbon peaking and carbon neutrality.

Since its establishment in 2002, SOJO Group has taken transmission and distribution equipment as its foundation, comprehensive energy services as its objective, intelligent manufacturing as its main line, and digital transformation as its driving force, continuously enhancing its operational capability and market service level. As a recognised Beijing Municipal Enterprise Technology Centre, a sub-station of the Haidian Park Postdoctoral Research Workstation, and supported by its corporate research institute, SOJO continuously strengthens its technological capabilities, fully implements its development strategy, and has formed a diversified industrial layout covering intelligent electrical equipment, smart energy and digital energy innovation.

Intelligent Electrical Equipment

In the field of intelligent electrical equipment, SOJO consistently adheres to the product development philosophy of "green, environmentally friendly and sustainable development", establishing full life-cycle production, operation and management, and creating a "digital lighthouse factory" for the power industry. By developing a highly flexible, lean, efficient, intelligent and green manufacturing mode, SOJO has built an advanced intelligent manufacturing demonstration factory in the power distribution sector. With a focus on improving quality, enhancing flexibility and increasing efficiency, SOJO has established a domestic-leading and internationally first-class brand for products and services.

Covering the full product life cycle, end-to-end business operations and all manufacturing elements, SOJO is shaping a future-oriented factory with refined brand image, advanced manufacturing capability and an optimised industrial park environment. With large-scale, professional customised intelligent manufacturing as its core carrier, SOJO has formed a strong core competitiveness, fully meeting the development requirements of its intelligent electrical business and setting a benchmark for the industry.

SOJO's main products include ring main units (RMUs), box-type substations, pole-mounted switches, high- and low-voltage switchgear assemblies, distribution automation monitoring systems and other distribution automation equipment. The company has achieved multiple technological breakthroughs in environmental friendliness, compact design, intelligence and maintenance-free operation. To date, it has obtained 58 invention patents, 158 utility model and design patents, and nearly 100 proprietary non-patented technologies. Among them, the solid-insulated ring main unit is an independently developed innovative product of SOJO, which has been awarded the National Key New Product Certificate by four national ministries and commissions, among other honours, and has been included in the First Batch Catalogue of Key New Technologies for Promotion issued by State Grid Corporation of China.

Smart Energy

In the smart energy sector, under the dual-carbon objectives, SOJO remains committed to energy conservation and emission reduction, actively responding to national initiatives by developing green power systems and wind power systems, and delivering smart energy solutions based on green electricity. The company undertakes the development, design, construction and operation and maintenance of photovoltaic power plants, charging stations, microgrids, intelligent operation and maintenance services, power engineering projects and integrated energy management systems.

SOJO provides complete equipment solutions for photovoltaic power plants, charging stations, energy storage systems and microgrids, including inverters, combiner boxes, inverter–transformer integrated units, step-up transformers, prefabricated switch stations, power quality management devices, intelligent system monitoring and microgrid control equipment. These are complemented by power quality management systems, intelligent measurement and control systems and intelligent operation and maintenance platforms. The solutions are suitable for a wide range of operating environments, offering reliable system compatibility, helping customers control construction costs and reduce long-term equipment maintenance expenses.

Digital Energy Innovation

In the field of digital energy innovation, guided by market trends and customer needs, and driven by the substitution of green electricity for fossil energy, SOJO relies on the integrated development of the energy network, transportation network and information network. This enables intelligent interaction and deep integration between clean energy, transportation, charging and energy storage.

As a pioneer in the industry, SOJO has integrated station-side, vehicle-side and financial resources to launch its proprietary battery swapping ecosystem, providing efficient, convenient and cost-controllable integrated intelligent charging and battery swapping solutions for industries such as mining, energy transportation and ports, thereby delivering comprehensive green power solutions.

Looking ahead, SOJO Group will closely follow industrial development trends in China and worldwide, consistently taking technological innovation as its driving force and delivering first-class products and services to customers. SOJO is committed to building its brand into the leading RMU brand and the leading microgrid brand in China, realising its vision of becoming a first-class equipment supplier in the intelligent power grid sector and a first-class industrial operator in the smart energy sector, fulfilling its social responsibilities and creating value for society.

Advancing in step with the times, SOJO will move steadily towards the future.

SOJO Changfeng Digital Industrial Base

Construction of the Changfeng Base commenced in 2019, and the facility was completed and put into operation in 2021. As a digitalised base integrating photovoltaic power generation and energy storage, it fully embodies the concept of a green, low-carbon, modern factory. By combining product manufacturing processes with big data analytics and adopting digitalised overall coordination, the base applies SCADA and MES systems for industrial management, establishing SOJO's integrated information-driven and intelligent industrial chain.Serving society and creating lasting value for the people.

PACK Production Line

In 2022, the SOJO Hefei PACK production line was officially commissioned. The production processes include material feeding, bracket bonding, electric welding, inspection, and other manufacturing operations. Core equipment comprises laser welding machines and various bonding and monitoring devices, enabling compatibility with multiple system solutions and flexible adaptation to the cell configurations of mainstream battery manufacturers across different models.

SOJO Sheet Metal Flexible Production Line

SOJO has introduced a complete TRUMPF flexible sheet metal production line from Germany. All processes, including sheet metal bending, cutting and punching, are fully automated by machinery, ensuring comprehensive compliance with the precision requirements for SOJO switchgear manufacturing

Automated High-Bay Warehouse

The automated high-bay warehouse is interconnected with the product assembly production lines and the ERP system through an integrated information platform. It adopts an advanced production-line material demand–driven warehouse kitting and inventory management model.

Quality Assurance

Overview

SOJO Electric has always maintained an unwavering focus on the impact of its products on the human living environment. The company is committed to the continuous R&D and manufacture of advanced, energy-efficient, clean and environmentally friendly green power products in the true sense. From the very beginning of product design, each unit is defined as a green technology product with minimal environmental impact. Close attention is given at every stage of the product lifecycle, including design, production, manufacturing, sales, recovery, and waste treatment.

All products leaving the factory are subject to strict management in accordance with established recycling procedures.


质量管理体系认证证书

北京双杰电气股份有限公司

GB/T 19001-2016 / ISO 9001:2015

北京大陆航星质量认证中心股份有限公司

Technical Features

Reliability

- All R&D, manufacturing and inspection activities strictly comply with the latest international and national standards.
- Certified to the ISO 9001:2015 Quality Management System.
- All low-voltage products have obtained CCC (China Compulsory Certification) test reports.

Safety

- All designs strictly adhere to the principle of “Safety First”.
- Protection schemes and functions, including five-prevention interlocking, mechanical and electrical interlocks, locking mechanisms, and battery protection strategies, comply with or exceed the requirements of applicable standards.


环境管理体系认证证书

北京双杰电气股份有限公司

GB/T 24001-2016 / ISO 14001:2015

北京大陆航星质量认证中心股份有限公司

Certification System

- Quality Management System Certification: ISO 9001:2015
- Environmental Management System Certification: ISO 14001:2015
- Occupational Health and Safety Management System Certification: ISO 45001:2018
- All corporate functional departments operate under an EMS-based management system, with strict implementation of standardised procedures.
- All departments, including commercial, marketing, manufacturing, logistics and finance, are certified to ISO 9001:2015.

All manufacturing, testing and logistics systems are certified to ISO 14001:2015.


职业健康安全管理体系认证证书

北京双杰电气股份有限公司

GB/T 45001-2020 / ISO 45001:2018

北京大陆航星质量认证中心股份有限公司

Qualifications / Honours


储能产品认证证书


检 测 报 告


产品型号注册证书
PRODUCT TYPE CERTIFICATION


CQC 标志认证
试 验 报 告


检 验 报 告
No: JW212431


检 验 报 告
Test Report


检 验 报 告
TEST REPORT


检 验 报 告
TEST REPORT

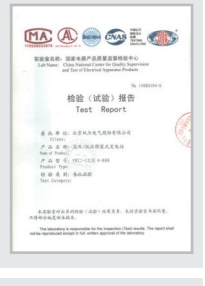

检 验 报 告


检验（试验）报告
Test Report


检 验 报 告
TEST REPORT


检 验 报 告
Test Report


检 验 报 告
TEST REPORT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Test Report


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Test Report


检验（试验）报告
Test Report


检 验 报 告
Test Report


检验（试验）报告
Test Report


检验（试验）报告
Test Report


太阳能光伏产品金太阳认证证书

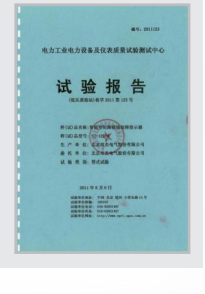

光伏并网逆变器中国效率认证证书


太阳能光伏产品金太阳认证证书


检 验 报 告
TEST REPORT


检 测 报 告
TEST REPORT


检 验 报 告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中国国家强制性产品认证证书


中国国家强制性产品认证证书


中国国家强制性产品认证证书


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中国质量认证中心


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中国质量认证中心


产品型号使用证书
PRODUCT TYPE CERTIFICATION


电磁兼容检验证书
EMC TEST CERTIFICATION


检验（试验）报告
Test Report


检测报告
Test Report


检测报告
Test Report


检验报告


检测报告


检测报告


国家火炬计划
产业化示范项目证书


福布斯
Forbes
2011福布斯
中国潜力企业
2011 Forbes China Best SMEs
北京双杰电气股份有限公司
Beijing SOJO Electric Co., Ltd


质量管理体系认证证书
北京双杰电气股份有限公司


环境管理体系认证证书
北京双杰电气股份有限公司


职业健康安全管理体系认证证书
北京双杰电气股份有限公司


健康、安全与环境管理体系
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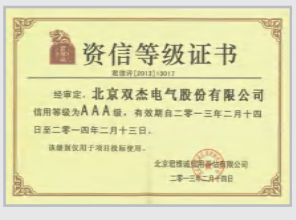
北京双杰电气股份有限公司


资信等级证书
经审定，北京双杰电气股份有限公司
信用等级为AAA级，有效期自二零一三年二月十四
日至二零一四年二月十三日。


2011中关村新锐企业百强
北京双杰电气股份有限公司


北京市火炬计划项目证书


中关村
Z-Park
中关村国家自主创新示范区
“十百千工程”企业
中关村创新平台
二〇一一年十月


高新技术企业
证书


中关村国家自主创新示范区
新技术新产品（服务）证书


第五届中国建筑电气行业发展论坛
2008中国建筑电气行业
节能减排贡献奖
北京双杰
北京双杰电气股份有限公司

SOJO
双杰集团

Energy Storage Products

Energy Storage System

Introduction

In the development of a zero-carbon intelligent power grid, energy storage systems play an irreplaceable role. Across the stages of power generation, transmission, and distribution, energy storage systems are required to support a wide range of integrated applications, including peak shaving and valley filling, mitigation of renewable energy intermittency, peak and frequency regulation, black start, and demand-side response. A Battery Energy Storage System (BESS) consists of battery modules, a containerised system (including the container enclosure, fire protection system, monitoring system, and cooling system), a Battery Management System (BMS), an Energy Management System (EMS), a Power Conversion System (PCS), and secondary electrical control equipment.

Battery PACK

BMS

EMS

PCS

High-Voltage Box

Combiner Cabinet

Application Scenarios

Application scenarios are classified into the generation side, grid side, and end-user side.

Thermal Power Plants

Power Grid

Wind Power Plants

Photovoltaic Power Plants

Electrical Loads

Charging Stations and Battery Swapping Stations

Modular Energy Storage Power Conversion System

Product Features

- Three-phase, four-leg design, providing both single-phase and three-phase active and reactive power control.
- Support for multi-unit parallel operation, offering excellent scalability and easy capacity expansion.
- 100% three-phase unbalanced load capability, with strong resistance to impact loads.
- Three-level topology with efficiency of up to 99%, delivering superior power quality.
- Modular rack-mounted design, featuring compact size, light weight and high power density.

Technical Parameters

Product Model	SJPCS–160–M	SJPCS–180–M	SJPCS–200–M
DC Side Parameters			
Maximum DC Voltage	1500V	1500V	1500V
Maximum DC Power	180kW	202kW	224kW
Maximum DC Current	224A	225A	221A
DC Voltage Range	800-1500V	900-1500V	1000-1500V
Grid Side Parameters			
Rated AC Power	160kW	180kW	200kW
Maximum AC Power	176kW	198kW	220kW
Rated Grid Voltage	550V	630V	690V
Grid Voltage Range		3W+PE,–15%～+10%	
Maximum AC Current	184A	184A	184A
Rated Grid Frequency	50/60Hz		
Adjustable Power Factor Range	–1～+1		
THD (at Rated Power)	<1.5%		
System Characteristics			
Maximum Efficiency	99%		
Degree of Protection	IP65		
Operating Temperature Range	–30°C～+60°C		
Permissible Humidity Range	0–100%(Non–condensing)		
Maximum Operating Altitude	3000m		
Cooling Method	Temperature–controlled forced air cooling		
Communication Interfaces	RS485/CAN/LAN		
Mechanical Parameters			
Overall Dimensions	810×845×275mm		
Weight	98kg		

High-power Energy Storage PCS

Product Features

- Three-level topology with efficiency up to 99%, delivering superior power quality
- Dual battery string access, enabling independent charge and discharge management for enhanced battery protection
- Intelligent multi-stage fan speed control, ensuring reliable operation over a wide temperature range
- Supports PQ, VF, SVG, and VSG control modes, with high/low voltage ride-through capability
- Fast power dispatch, off-grid operation, and black start capability, providing strong grid adaptability
- Highly integrated design with a compact footprint, facilitating transportation, installation, operation, and maintenance

Technical Parameters

Product Model	SJPCS–2750–M	SJPCS–3150–M	SJPCS–3450–M
DC Side Parameters			
Maximum DC Voltage	1500V	1500V	1500V
Maximum DC Current	3850A	3860A	3870A
Battery String Voltage Range	800 – 1500V	900 – 1500V	1000 – 1500V
Number of Connectable Battery Strings	1/2	1/2	1/2
Grid Side Parameters			
Rated AC Power	2750kW	3150kW	3450kW
Maximum AC Power	3020kW	3500kW	3800kW
Rated Grid Voltage	550V,3W+PE	630V,3W+PE	690V,3W+PE
Grid Voltage Range	460V – 605V(Configurable)	530V – 690V(Configurable)	580V – 760V(Configurable)
Maximum AC Current	3180A	3180A	3180A
Rated Grid Frequency	50/60Hz		
Power Factor	>0.99(>20% Load)		
Adjustable Power Factor Range	–1～+1		
System Characteristics			
Maximum Efficiency	99%		
Degree of Protection	IP20(IP65 optional)		
Operating Temperature Range	–40°C～+60°C		
Permissible Humidity Range	0 – 98%(Non-condensing)		
Maximum Operating Altitude	3000m		
Cooling Method	Temperature-controlled forced air cooling		
Communication Interfaces	RS485/CAN/LAN		
Mechanical Parameters			
Overall Dimensions	1710×1700×2453mm		
Weight	2700kg		

1500V Centralised Energy Storage PCS

Product Features

- Three-level topology with conversion efficiency of up to 99%, delivering superior power quality
- Modular design for easy maintenance, enabling system recovery within < 1.5 hours
- Intelligent multi-stage fan speed control with wide temperature operation, no derating at 45 °C
- Supports PQ, VF, SVG and VSG control modes, with high/low voltage ride-through capability
- Fast power dispatch, off-grid operation, and black start capability, ensuring strong grid adaptability
- Higher energy density with a compact footprint, enabling more efficient transportation, lifting, and installation

Technical Parameters

Product Model	SJPCS–1725–M	SJPCS–2000–M
SJPCS-4000-W		
Maximum Battery Voltage	1500V	1500V
Maximum DC Current	1936A	2245A
Battery String Voltage Range	1000–1500V	1000–1500V
Number of Connectable Battery Strings	1	1
AC Side Parameters (Grid connected)		
Rated AC Power	1725kVA(35°C)	2000kVA(35°C)
Rated AC Voltage	690V,3W+PE	
AC Voltage Range	580–760V(Configurable)	
Maximum AC Current	1587A	
Rated Grid Frequency	50/60Hz	
Adjustable Power Factor Range	–1～+1	
Current THD	＜1.5%(Rated Power)	
AC Side Parameters (Off grid)		
Rated AC Voltage	690V,3W+PE	
Total Harmonic Distortion of Voltage (THDv)	＜3%(Linear Load)	
DC Voltage Component	＜0.5%Un(Linear Balanced Load)	
Unbalanced Load Capability	100%	
Rated Frequency	50/60Hz	
System Characteristics		
Maximum Efficiency	99%	
Degree of Protection	IP65	
Operating Temperature Range	–40°C～+60°C	
Permissible Humidity Range	0–100%(Non-condensing)	
Maximum Operating Altitude	3000m	
Cooling Method	Temperature-controlled forced air cooling	
Communication Interfaces	RS485/CAN	
Mechanical Parameters		
Overall Dimensions	1150×2350×1450mm	
Weight	1300kg	

All-in-One Energy Storage PCS

Product Features

- Three-level topology with efficiency of up to 99%, delivering superior power quality
- Supports dual battery string connection, enabling independent charge and discharge control for enhanced battery protection
- Intelligent multi-stage fan speed control, ensuring reliable operation over a wide temperaturerange
- Supports PQ, VF, SVG and VSG control modes, with high/low voltage ride-through capability
- Fast power dispatch, off-grid operation, and black start capability, providing strong grid adaptability
- Highly integrated design with a compact footprint, facilitating transportation, installation, and operation & maintenance

Technical Parameters

Product Model	SJPCS–2750–W	SJPCS–3150–W	SJPCS–3450–W
DC Side Parameters			
Maximum DC Voltage	1500V	1500V	1500V
Maximum DC Current	3850A	3860A	3870A
Battery String Voltage Range	800–1500V	900–1500V	1000–1500V
Number of Connectable Battery Strings	1/2	1/2	1/2
Grid Side Parameter			
Rated AC Power	2750kW	3150kW	3450kW
Maximum AC Power	3020kW	3500kW	3800kW
Rated Grid Voltage		10–35kV	
Rated Grid Frequency		50 / 60Hz	
THD (at Rated Power)		＜1.5%	
Power Factor		＞0.99(＞20% Load)	
Adjustable Power Factor Range		–1～+1	
System Characteristics			
Isolation Method		Dry–type / Oil-immersed Transformer	
Maximum Efficiency		98%	
Degree of Protection		IP54(Power Conversion System (PCS) IP65)	
Operating Temperature Range		–30°C～+60°C	
Permissible Humidity Range		0–100%(Non–condensing)	
Maximum Operating Altitude		3000m	
Cooling Method		Temperature-controlled forced air cooling	
Communication Interfaces		RS485/CAN/LAN	
Mechanical Parameters			
Overall Dimensions		7000×3000×3100 mm(Reference Dimensions)	
Weight		17000kg(Dry-type Transformer)/18000kg(Oil-immersed Transformer)	

1500V Centralized PCS-Transformer Integrated Unit

Product Features

- Three-level topology with conversion efficiency of up to 99%, delivering superior power quality
- Modular design for simplified maintenance, enabling restoration to operation within <1.5 hours
- Intelligent multi-stage fan speed control, supporting wide-temperature operation with no derating at 45 °C
- Supports PQ, VF, SVG and VSG control modes, with high/low voltage ride-through capability
- Fast power dispatch, off-grid operation, and black start capability, ensuring strong grid adaptability
- Higher energy density and compact footprint, enabling more efficient transportation, lifting and installation

Technical Parameters

Product Model	SJPCS–3450–W	SJPCS–4000–W
DC Side Parameters		
Maximum Battery Voltage	1500V	1500V
Maximum DC Current	3872A	4490A
Battery String Voltage Range	1000–1500V	1000–1500V
Number of Connectable Battery Strings	2	2
AC Side Parameters (Grid connected)		
Rated AC Power	3450kVA	4000kVA
Rated Grid Voltage	10–35kV	
Rated Grid Frequency	50 / 60Hz	
Adjustable Power Factor Range	–1～+1	
Current THD	<1.5%(Rated Power)	
System Characteristics		
Isolation Method	Dry–type / Oil-immersed Transformer	
Maximum Efficiency	98%	
Degree of Protection	IP54	
Operating Temperature Range	–40°C～+60°C	
Permissible Humidity Range	0–100%(Non-condensing)	
Maximum Operating Altitude	3000m	
Cooling Method	Temperature-controlled forced air cooling	
Communication Interfaces	RS485/CAN	
Mechanical Parameters		
Overall Dimensions	6500×3000×3100mm(Reference Dimensions)	
Weight	15000kg(Dry-type Transformer)/16000kg(Oil-immersed Transformer)	

Battery PACK

The PACK system comprises standardised module design, module thermal dissipation modelling, thermal runaway prevention mechanisms, lightweight battery system design, high-efficiency temperature equalisation thermal management, intelligent remote monitoring, and multi-level safety warning functions.

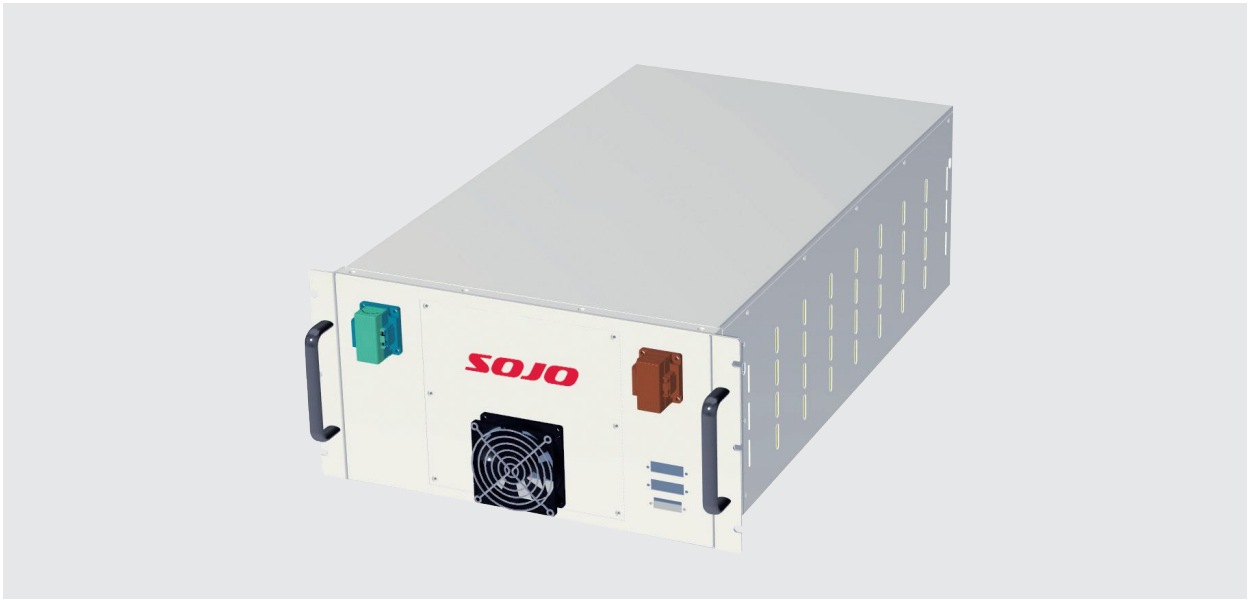
Air-cooled Battery PACK

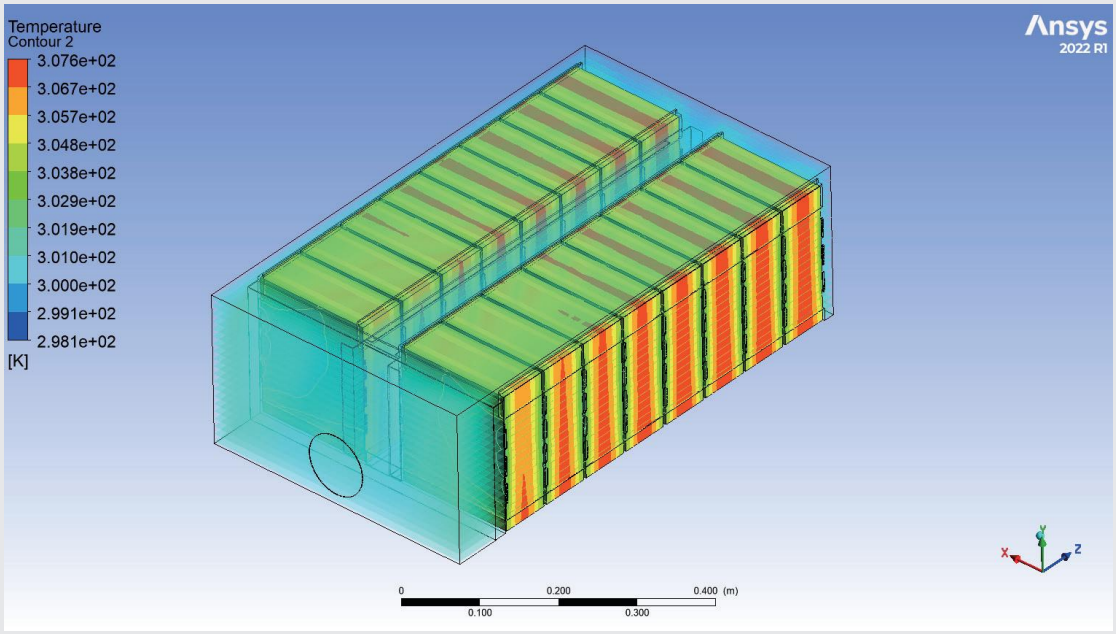
Product Structure

- The battery box consists of two 1P8S modules connected in series, forming a 1P16S configuration.
- Main components include positive and negative output connectors, a Battery Management Unit (BMU), cooling fans, and the enclosure.
- Axial exhaust fans are adopted. Cool air enters the enclosure through side openings, flows through the gaps between battery cells to remove heat, and is discharged outside the enclosure via the front axial fan.

Product Features

- High reliability: the enclosure and cover are fabricated from bent and welded sheet metal. The Degree of Protection is not less than IP20.
- Ease of maintenance: all components are mounted on the front panel, facilitating replacement and maintenance.





Technical Parameters

Item	Parameter	Remarks
Configured energy(kWh)	14.336	
Configuration	Two battery modules connected in series	
Continuous charge/ discharge duration	＞2h	
Thermal management	Forced air cooling	
Voltage range(V)	44.8-57.6	Single cell: 2.8-3.6
Dimensions(D*W*H)mm	755×420×235	Enclosure only, excluding mounting brackets
Weight(kg)	110±3	

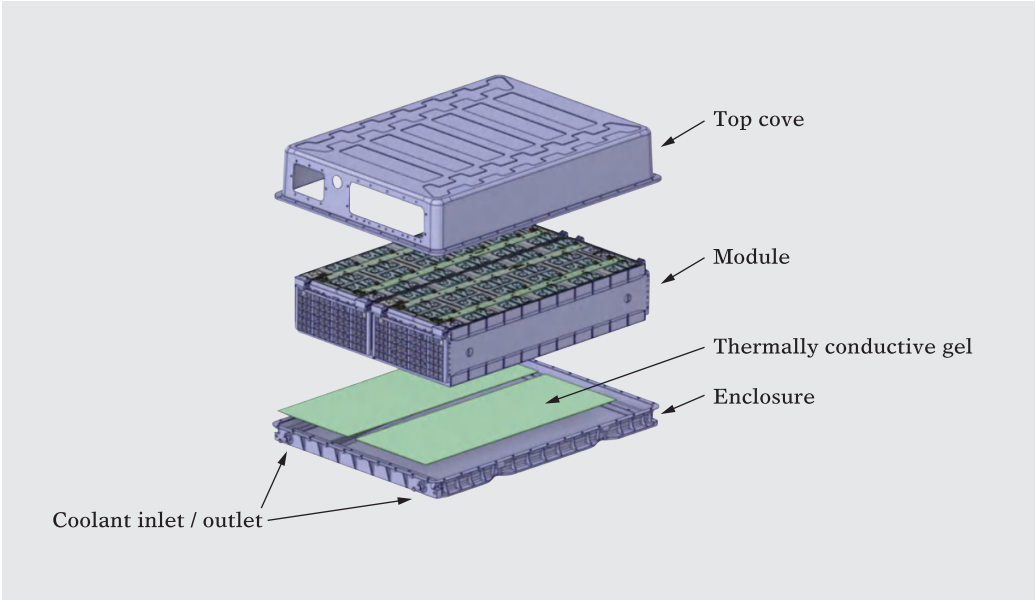
Liquid-cooled Battery Pack

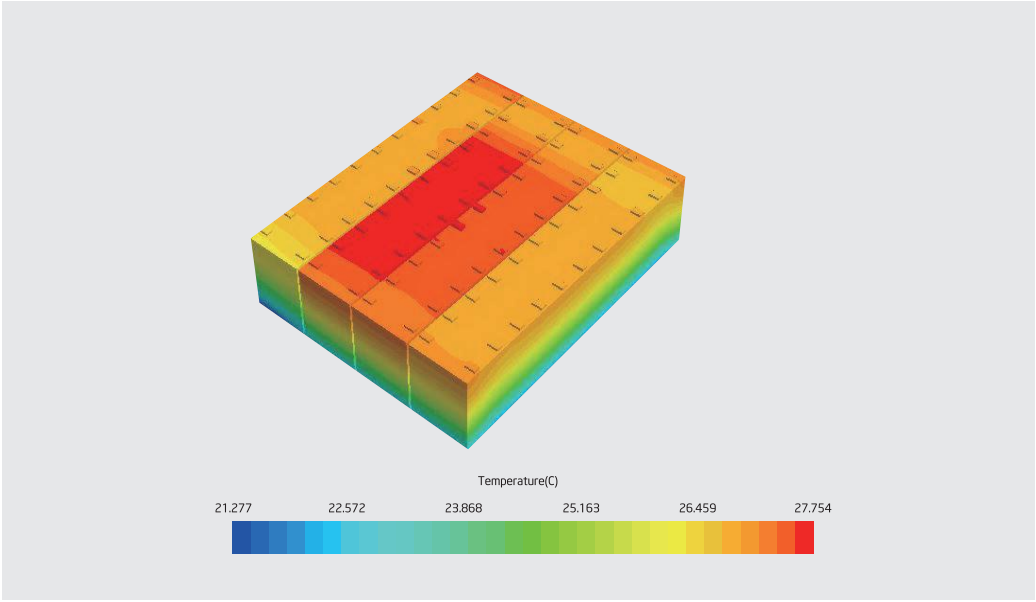
Product Structure

- Single pack configuration: 1P44S, comprising 44 × 300 Ah lithium iron phosphate (LFP) cells.
- The pack mainly consists of a top cover, modules, thermally conductive gel, and an integrated liquid-cooled enclosure.

Product Features

- High reliability: an integrated die-cast structure combining the enclosure and liquid cooling plate is adopted, ensuring structural robustness and dry–wet separation, effectively eliminating the risk of coolant leakage into the battery pack and significantly enhancing overall reliability.
- High safety: the liquid-cooling channels are integrated into the bottom plate of the enclosure, which reduces the overall pack height while achieving complete separation between coolant and battery cells, thereby ensuring system safety.
- Excellent thermal performance: thermally conductive gel is filled between the battery cells and the cooling plate, enabling efficient heat transfer.





Technical Parameters

Item	Parameters	Remarks
Configured energy(kWh)	42.24	
Configuration	Two battery modules connected in series	
Continuous charge/discharge duration	>2h	
Thermal management	Liquid cooling	
Voltage range(v)	123.2-158.4	Single cell: 2.8-36
Dimensions(D*W*H)mm	1069×787×235	
Weight(kg)	300	

High-Voltage Control Box

Product Features

- The Battery High-Voltage Control Box for Energy Storage Systems is a dedicated high-volage power circuit management unit designed specifically for battery energy storage systems. It serves as the intermediate interface between the battery pack and the Power Conversion System (PCS).
- The high-voltage control box provides functions including battery pack voltage and current measurement, as well as control and protection of battery circuit contactors.
- The control box is equipped with circuit breakers, contactors, fuses, circulating current control circuits, current sensors, a Energy Storage Battery Cluster Module (ESBCM), and switch-mode power supplies, among other components.
- During the design phase, full consideration is given to the electrical characteristics, thermal performance, safety performance, and operability/maintainability of all components. The internal layout is well organised, featuring a compact structure, flexible configuration, and high levels of safety and reliability.

Technical Parameters

Current / Voltage	150A	250A	400A
1000V	SJ–H10–150	SJ–H10–250	SJ–H10–400
1500V	SJ–H15–150	SJ–H15–250	SJ–H15–400

Product Functions

- Supports AC 220 V or DC 24 V power supply.
- Provides power supply for the Battery Management Unit (BMU) of the energy storage system; the supply capacity can be configured according to the number of BMU modules.
- Establishes CAN communication with the Battery Asset Management System to enable battery cluster data upload and reception, as well as charge and discharge management.
- Equipped with a DC circuit breaker, allowing the battery cluster output to be disconnected under emergency conditions.
- Provides battery cluster terminal voltage and current measurement, as well as insulation resistance monitoring of the battery cluster.
- Power cables, communication cables and connectors are all arranged on the front panel, facilitating operation and maintenance.

Energy Storage Integrated Control Cabinet

Product Features

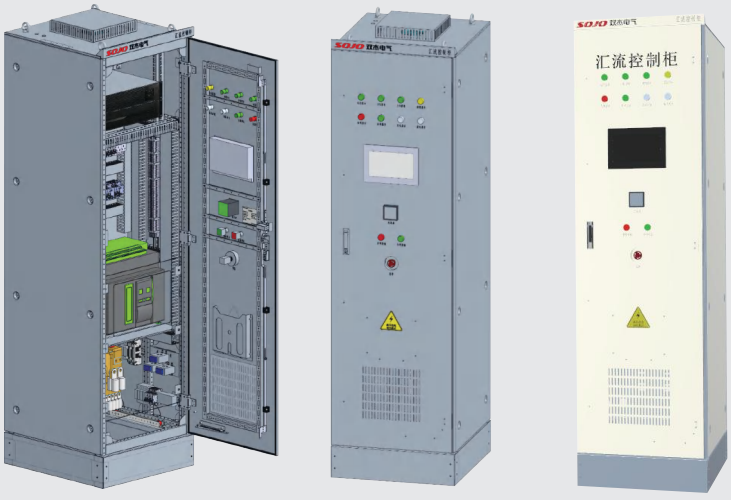
The Energy Storage Integrated Control Cabinet (624 × 680 × 2232 mm) is a DC-side busbar and control unit specifically designed for energy storage systems. It serves as the intermediate interface between the High-Voltage Control Box and the Energy Storage Power Conversion System (PCS).

In addition, the cabinet also provides AC power distribution functions, allowing the installation of auxiliary equipment such as dynamic environmental monitoring devices, back-end host computers, and UPS power supplies within the cabinet, thereby enabling AC metering, centralised control and back-end communication.

The integrated control cabinet is equipped with battery stack busbar circuit breakers, a Energy System Management Unit, power supplies, and other components.

During the design process, full consideration has been given to the electrical characteristics, thermal performance, safety performance, and operability/maintainability of all components. The internal layout is rational and compact, offering flexible configuration, high safety and reliability.

The cabinet is fitted with a Energy System Management Unit and provides CAN, RS-485 and RJ45 Ethernet communication interfaces, enabling communication with the High-Voltage Control Box, PCS and/or EMS, and supporting data communication, control and protection of the energy storage battery system.



Battery Management System (BMS)

Product Features

The Battery Management System (BMS) ensures effective management of the energy storage battery by real-time monitoring and acquisition of battery cell status parameters. Through necessary analysis and calculation of these parameters, the BMS derives additional system state assessment parameters. Based on predefined protection and control strategies, it enables effective control of the energy storage battery, ensuring the safe and reliable operation of the entire battery energy storage unit, extending battery service life, and protecting personnel safety.

Via its communication interfaces and input/output interfaces, the BMS exchanges information with external systems such as the Power Conversion System (PCS), Energy Management System (EMS), and fire protection system, enabling coordinated and interlocked control among all subsystems within the energy storage power station, and ensuring safe, reliable and efficient operation of the plant.

Technical Parameters

Technical Specifications

- Rated operating voltage: ≤1500 V
- High-voltage measurement accuracy: ＜0.5%
- Cell voltage measurement accuracy: typ. 2mV
- Current measurement accuracy: ＜0.5%
- Temperature measurement accuracy: ＜2°C

Safety Design

- Reinforced insulation: 1500 V, compliant with UL 60950 requirements
- Pollution degree: 2
- Creepage distance between high-voltage and low-voltage circuits: up to 30 mm
- Clearance between high-voltage and low-voltage circuits: up to 8.4 mm
- Dielectric withstand voltage: >4300 VDC
- Maximum operating altitude: 2000m

Battery Control Unit (BCU)

Product Features

- Acquires pack total voltage, main circuit current, and insulation resistance.
- Controls the main contactor and pre-charge contactor (if applicable) and monitors their operating status.
- Communicates with Battery Management Units (BMUs) to collect individual cell voltage and temperature data.
- Communicates with the Battery Aggregation Unit (BAU) to upload battery cluster information.
- Performs alarm generation and protection actions based on acquired data.
- Performs single-cluster SOC and SOH estimation.
- Supports active and passive cell balancing algorithms.
- Supports automatic assignment of BMU IDs.
- Controls high-voltage box indicator lamps (if equipped).
- Controls battery cluster cooling fans (if equipped).
- Communicates with PCS, EMS, and display unit (applicable to secondary-architecture systems only).

Battery Management Unit (BMU)

Product Features

- Acquires individual cell voltage.
- Acquires individual cell temperature.
- Supports active and passive cell balancing.
- Supports independent control of module cooling fans, with PWM speed regulation.
- Supports module fan feedback monitoring

Battery Aggregation Unit (BAU)

Product Features

- Communicates with the Battery Control Unit (BCU) to query detailed and summary information from the master controller.
- Aggregates information from multiple battery clusters, supporting up to 32 clusters connected in parallel.
- Communicates with the Human–Machine Interface (HMI), responding to query requests and forwarding control commands issued via the HMI.
- Communicates with the back-end system, responding to data queries and executing BMS control commands from the back-end.
- Communicates with the Power Conversion System (PCS) to upload battery data and control PCS charging and discharging operating states.
- Provides configurable dry contact input/output interfaces as required.
- Performs stack-level SOC and SOH estimation.
- Supports data storage, including overall system status, individual cell voltage, individual cell temperature, and alarm information.
- Supports communication with auxiliary systems such as environmental monitoring and fire protection systems, as required.

Human–Machine Interface (HMI)

Product Features

- Displays BMS summary information, detailed information, and alarm information.
- Controls BMS main circuit connection/disconnection and other control operations.
- Configures BMS alarm and protection thresholds.
- Supports data storage (optional).

Energy Management System (EMS)

Product Overview

The Energy Management System (EMS) is the energy dispatching and management center of the energy storage system.

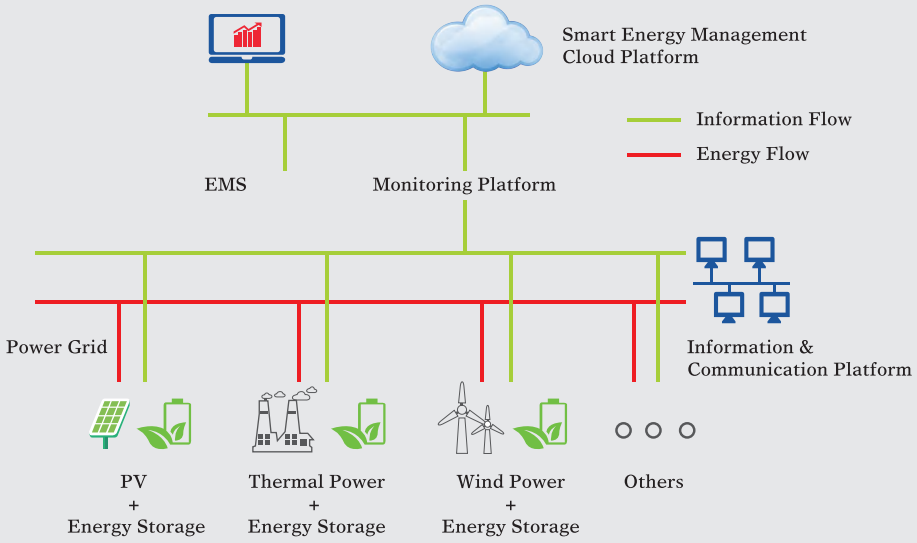
Through real-time communication with the BMS (Battery Management System), PCS (bidirectional Energy Storage Power Conversion System), circuit energy meters, controllable loads (such as EV charging stations), and auxiliary equipment (air conditioning, fire protection systems), the EMS collects key data from all communication substations.

By acquiring, processing, and analyzing the data and performing internal logical calculations, the EMS ensures orderly, stable, and reliable operation of the entire energy storage system.

Product Features

- EMS Main Controller: Based on an embedded ARM architecture and Linux operating system, featuring high-efficiency, stable, and industrial-grade hardware design.
- Efficient Operation & Maintenance Management: Supports remote commissioning, remote firm ware upgrades, remote maintenance, and remote optimization and configuration of control strategies, significantly reducing O&M costs.
- Modular Control Strategy Design: Modular control strategies that can be freely combined and configured, enabling rapid adaptation to various application scenarios.
- Powerful Edge Computing Capability:Based on multi-level coordinated safety control strategies involving battery cells, fire protection systems, and control algorithms, integrating data acquisition, communication management, data processing, strategy execution, and remote services into a unified platform.
- Comprehensive Data Recording:Provides complete operational status and data recording at both local and cloud levels, supporting big data analysis and performance prediction.

Product Applications

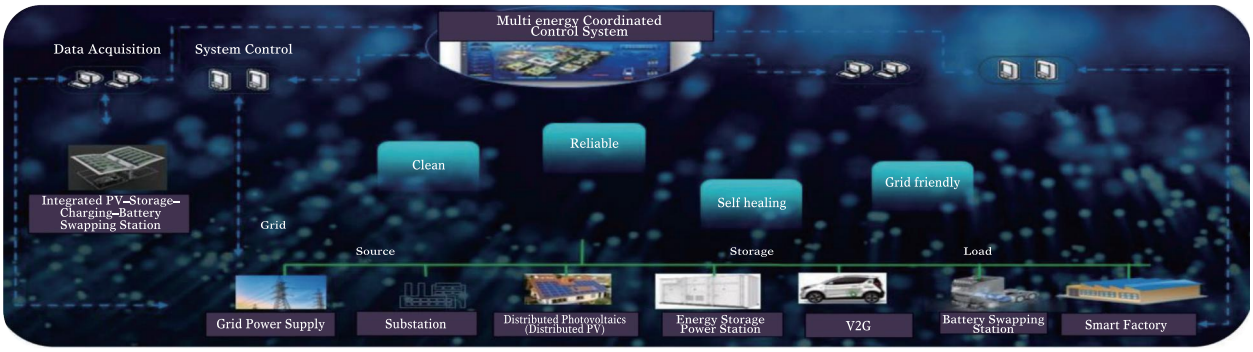


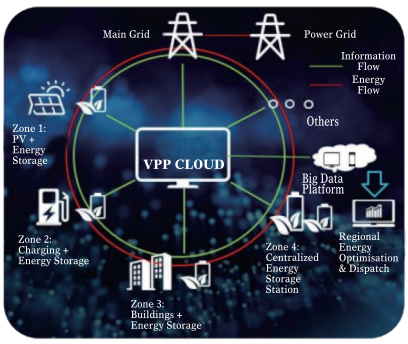
Product Categories

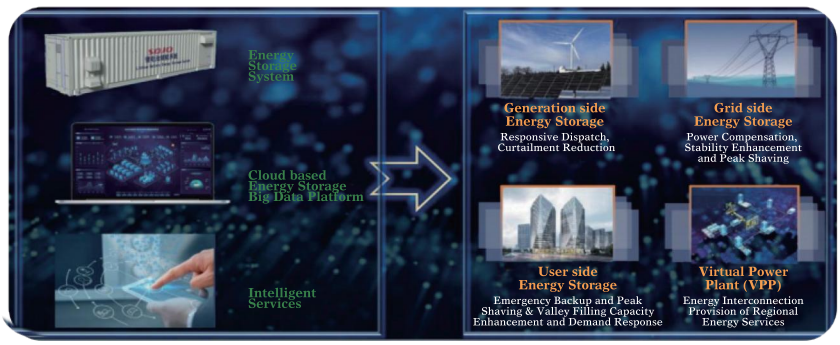
Floor standing type

Wall mounted type

EMS Interface Overview







Air-Cooled Centralized Energy Storage System

Product Applications

High Integration

- Integrated design with PCS, batteries, BMS, and power distribution integrated into 1–2 containers

Safe & Reliable

- Online insulation monitoring with coordinated protection using multi-level fuses and circuit breakers
- Dual emergency stop (E-stop) protection
- Intelligent fire protection system with multi-point monitoring, early warning, and rapid fire suppression

Strong Environmental Adaptability

- No derating below 45 °C, Cold-start heating supported down to –30 °C

Economical & Efficient

- 280 Ah high energy-density cells, cycle life >6,000 cycles (100% DOD)
- Intelligent air-cooling design with smart charge/discharge management to extend battery cycle life
- 96% battery round-trip efficiency
- SOC accuracy better than ±5% across the full operating range, with intelligent online commissioning, firmware upgrades, and fault recording for precise troubleshooting

Highly Standardized

- Standard container sizes available: 10 ft, 20 ft, 40 ft, and 45 ft

Technical Parameters

Item	Parameters			
Ambient Temperature	–35°C～45°C			
Humidity Range	5–90%			
Altitude	⩽ 3000 m (derating required at high altitude)			
Degree of Protection	IP54			
Cooling Method	Air-conditioning cooling + air cooling			
Seismic Rating	UBC Zone4			
Wind Resistance	Category 15 hurricane			
Weight	10T/25T/50T/62T			
Operating Temperature	–20°C～55°C			
Rated Charge/Discharge C-rate	0.5C			
Dimensions	10ft	20ft	40ft	45ft
Rated Voltage	AC380/400V	AC550/690V	AC550/690V	AC550/690V
Nominal Battery Voltage	761.6V	761.6V/1254.4V	761.6V/1254.4V	1254.4V
Power / Energy Capacity	500kW/1MWh	1.1MW/2.2MWh	1.1MW/2.2MWh	2.5MW/5MWh

Liquid-Cooled Centralized Energy Storage System

Product Applications

Highly Standardized

- Standardized containerized design (20-ft container)

Safe and Reliable

- Online insulation monitoring with multi-stage fuse coordination and circuit breaker interlocking protection
- Dual emergency stop (E-stop) protection design
- Intelligent fire suppression system with multi-point monitoring, early warning, and rapid fire extinguishing

High Intelligence

- Cell-level intelligent thermal control, improving system energy efficiency by 1%; intelligent charge/discharge management and smart early warning to enhance operational safety
- Remote maintenance and control strategy upgrades

High Reliability

- Operable under extreme ambient conditions from –30 °C to +45 °C
- Seismic rating: UBC Zone 4
- Wind resistance: up to 235 m/s

Innovative PACK Design

- Single-layer liquid cooling with double-sided heat dissipation, reducing the number of cooling plates and overall system cost
- Compatible with PCS at 1500 V (6 modules), 1000 V (4 modules), and 900 V (3 modules)

Technical Parameters

Item	Parameters
Ambient Temperature	–35°C～45°C
Humidity Range	5–90%
Altitude	⩽3000 m (derating required at high altitude)
Degree of Protection	IP54
Cooling Method	Liquid Cooling
Seismic Rating	UBC Zone4
Wind Resistance	Category 15 hurricane
Operating Temperature	–20°C～55°C
Rated Charge/Discharge C-rate	0.5C
Dimensions	20–ft Container
Rated Voltage	AC550/690V
Nominal Battery Voltage	1267.2V
Power / Energy Capacity	1.71MW/3.42MWh
Weight	34T

Air-cooled C&I Energy Storage System

Product Features

High Efficiency & Stability

- NPC three-level topology with a maximum efficiency of ≥99%
- Supports 110% continuous overload operation and 120% overload for no less than 10minutes, ensuring high system reliability

Strong Environmental Adaptability

- Suitable for user-side, grid-side, and generation-side energy storage applications
- Designed to operate reliably in harsh environments such as high temperature, high humidi ty, and high altitude
- Ultra-wide operating temperature range with low-temperature heating startup capability

Rich Functionalities

- Supports high/low voltage ride-through (HVRT/LVRT) and functions including Black Start, SVG, VSG, PQ, and VF control
- Supports multi-unit parallel operation for flexible power expansion
- Equipped with multiple communication interfaces for flexible networking
- Intelligent online commissioning and firmware upgrades, with fault waveform recording for rapid fault localization

Long Service Life

- Precision intelligent thermal management system combined with pack-level exhaust fans maintains internal temperature difference within 5°C, ensuring high system consistency
- Extends system lifespan by dynamically adjusting depth of discharge (DOD) and continuously optimizing charge/discharge control strategies

Flexible & Scalable

- Single unit footprint less than 2 m²; factory-assembled and plug-and-play, significantly reduc- ing on-site construction costs
- Modular and flexible capacity expansion, supporting up to 1,000 units in parallel to meet energy storage project capacities ranging from 200 kWh to 200 MWh
- High-performance EMS enables fast response and coordinated control of multiple units

Technical Parameters

Item	Parameters	Remarks
Rated Energy Capacity	200kWh	
Maximum Charging Power	100kW	
Maximum Discharging Power	100kW	
Output Voltage	Three-phase380Vac	Three-phase three-wire or three-phase four-wire
Operating Ambient Temperature	-30°C～45°C	
Overall Efficiency	87.4%	
Storage Ambient Temperature	-35°C～55°C	
Operating Relative Humidity	0～95%	
Storage Relative Humidity	0～95%	
Altitude	⩽2000m	
Installation Type	High-density outdoor cabinet	
External Communication Interfaces	Ethernet, RS485	

Liquid-cooled C&I Energy Storage Product

Product Features

Flexible Configuration & Strong Compatibility

- Flexible configuration with a standardised and modular design, supporting DC 1000 V / DC 1500 V platforms.

Easy Maintenance

- Fire detectors and fuses can be serviced without dismantling the battery pack.
- A self-sealing piping system enables maintenance without coolant draining, ensuring safe operation and maintenance.

Rich Functions

- Supports high/low voltage ride-through (HVRT/LVRT), with Black Start, SVG, VSG, PQ and VF operating modes.
- Supports parallel operation of multiple units for flexible and scalable power expansion.
- Equipped with multiple communication interfaces for flexible system networking.
- Supports intelligent online commissioning and firmware upgrades, with fault waveform recording for rapid fault localisation.

Intelligent Liquid Cooling Temperature Control

- Proprietary patented liquid cooling plate flow-channel design, maintaining a temperature difference within a battery cluster of less than 5°C.Provides comprehensive, real-time monitoring of cell operating parameters, and dynamically optimises charge and discharge strategies by adjusting the depth of discharge (DoD), thereby extending service life.

Multiple Protection for Enhanced Safety

- Multi-level protection strategy with dual-layer short-circuit protection.Supports pack-level fire detection and fire suppression system integration.

Technical Parameters

Item	Parameters	Remarks
Rated Energy Capacity	211kWh	
Maximum Charging Power	100kW	
Maximum Discharging Power	100kW	
Output Voltage	Three-phase 380V AC	Three-phase three-wire or three-phase four-wire
Operating Ambient Temperature	-30°C～45°C	
Overall Efficiency	87.4%	
Storage Ambient Temperature	-35°C～55°C	
Operating Relative Humidity	0～95%	
Storage Relative Humidity	0～95%	
Altitude	≤4000m	
Installation Type	High-density outdoor cabinet	
External Communication Interfaces	Ethernet, RS485	

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Cases

Chisha Substation, Guangzhou Power Supply Bureau Project, 30 MW / 60.38 MWh

Chengbei Substation, Guangzhou Power Supply Bureau Project, 30 MW / 60.97 MWh

110 kV Substation Project, Guangzhou Power Supply Bureau, 13 MW / 29.354 MWh

PowerChina Energy Storage Project, 24 MW / 50 MWh

China National Nuclear Energy Storage Project (CNNC), 5 MW / 10 MWh

Jiayuguan Energy Storage Project, 154 MW / 308 MWh

SOJO Electric

NATIONAL NEW ENERGY STRATEGY PRACTITIONER
INTEGRATED ENERGY SOLUTION SERVICE PROVIDER

BEIJING SOJO ELECTRIC CO., LTD.

Website:https://en.sojoline.com/
E-mail: export@sojoline.com
24 Hour After-sales Service: 400-697-9948
Tel: 8610-62983386 Fax: 8610-62988464
Add: Building 1, Zone A, Shangdong Digital Valley, No.8 Dongbeiwangxi Road,
Haidian District, Beijing, China. 100080