

ENERGY STORAGE SYSTEM SOLUTION

储能系统解决方案



Sineng Electrical Co., Ltd.

Address: No. 6 Hehui Road, Huishan District, Wuxi City, Jiangsu Province

Telephone : 0510 - 88888118

Postal Code : 214174





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500

Integrating Photovoltaic Business of
Top 500 Enterprises in the World

Top3

Top Three of Inverter converter
Manufacturers in China

100

Top 100 Renewable Energy Pioneers
Leading enterprise in China



Sineng Electric Industrial Park (Wuxi, China)

Sineng Electric Co., Ltd. is a national high-tech enterprise focusing on R&D, manufacturing, sales and service of power electronic products. The company is deeply engaged in the field of power electronic power conversion and control. Provide a full range of photovoltaic grid-connected inverter solutions, energy storage system solutions, power quality management solutions, new energy vehicle charging solutions. Business covers the whole system of power generation, power supply and distribution, and power consumption. It is the world's leading equipment manufacturer and solution provider in the industry.

Introduction

In 2014, Sineng Electric integrated the photovoltaic business of the world's top 500 enterprises, undertook the first-class power electronics technology platform and accumulated experience of foreign enterprises over the past 100 years. In R&D, management and market areas, It is in line with the world's advanced level in an all-round way. Relying on the technology accumulation and R&D platform of the top 500 enterprises in the world, Sineng Electric has two R&D centers in Shenzhen and Wuxi, China. It has established enterprise technology center, enterprise academician workstation, post-doctoral innovation practice base and high-efficiency photovoltaic inverters engineering technology research center.

As the world's leading photovoltaic inverters solution provider, Sineng Electric has a full range of Distributed, centralized and Group string of photovoltaic inverters solutions covering all kinds of application scenarios. A modern production base of 10GW photovoltaic inverters has been established in Wuxi, China. It was awarded the title of "Green Factory" by the Ministry of Industry and Information Technology of China. For three consecutive years, it has been the core supplier of the Leader Base Inverter Solutions. And it has established overseas production bases in India. It has covered India, Southeast Asia, Middle East, Australia, Africa, South America and other markets. Depending on the accumulation of world-class power conversion technology, Sineng Electric's long-term layout energy storage system is developed, manufactured and sold. Provide EH series, ES series, EC series, EM series energy storage bidirectional converters, which are widely used in power generation side of new energy grid-connected and thermal energy storage joint frequency modulation field, power grid side frequency modulation peak regulation field, user side of industrial and commercial energy storage, auxiliary distributed new energy grid-connected field and micro-grid field.

Sineng Electric upholds the enterprise concept of "sincerity, unity and enterprising". Integrating the excellent concepts and technology platforms of the Fortune 500 in the world. Driven by innovative technology, we provide the world's leading power electronics products and solutions. Sineng Electric is committed to providing clean energy for mankind, realizing sustainable development, and making energy change for me, becoming a world-class power supply enterprise.



© Sineng Electric Overseas Manufacturing Base (Bangalore, India)

Distributed Container Energy Storage Integrated System CESS-500-1576



40-foot Standard Cabinet Container
Power:500kW, Capacity:1576kWh

Feature 1: Integrated modularization

- Integration of highly integrated energy storage containers to facilitate transportation, installation and maintenance
- Modular design, linear expanded battery unit and bidirectional energy storage inverter unit
- Fast engineering installation, low operation and maintenance cost
- One-stop turnkey engineering service system with higher stability and better coordination

Feature 2: Safety and reliability

- Three-level battery control system, effectively collect information of battery system, provide perfect strategy and protection function
- Perfect automatic fire control system, effective control of fire hazards
- Industrial air conditioning system, effective heat management , and prevention of hidden dangers from the root
- Design of multi-level circuit breaker and contactor to effectively carry out electrical safety management, short circuit fast interruption and arc extinguishing functions
- Double work power supply design, safe and reliable

Characteristic 3: High efficiency and flexibility

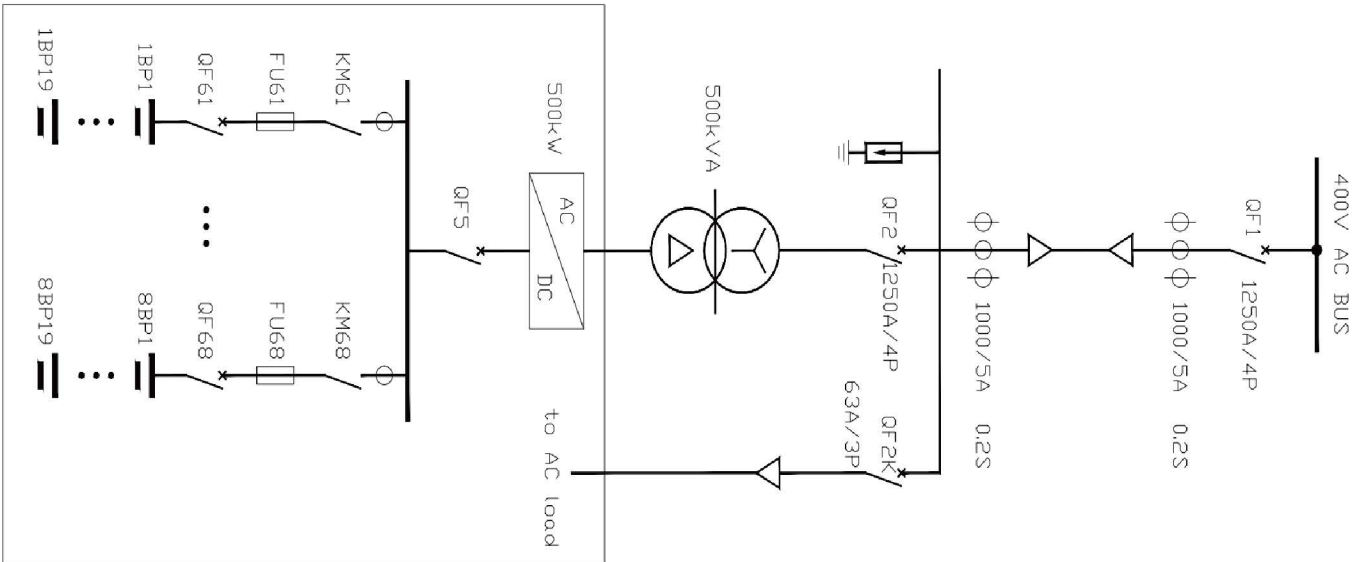
- response rate in second, high efficiency inverters, high efficiency of energy conversion
- Fault classification mechanism, response to default failure scenarios
- Modular and flexible parallel design,Balanced management strategy,Easy system expansion and unified management

Characteristic 4: Wisdom and friendly

- Friendly human-computer interaction, hierarchical privilege settings
- Multilayer EMS control system,cloud platform and local PLC, to realize the safe and automatic operation of the system
- Multiple charging and discharging strategies,flexible choice for users
- Efficient data storage, enquiry historical data and real-time data at any time

Technical index		CESS-500-1576
Battery parameters	Cell type	3.2V/90Ah eve
	System Battery Configuration	Eight cluster battery systems,Number of single cells: 3P228S,Total number of cells: 24P228S
	Rated capacity of batteries system	1576kWh
	Battery system voltage	voltage range : 638.4~832.2Vdc rated voltage : 729.6Vdc
	Communication Interface and Protocol	RS485, Ethernet Modbus RTU, Modbus TCP
AC side parameters	Rated AC power	500kW
	Maximum AC power	600kW
	Grid voltage	Rated voltage: 380Vac, voltage range 340-440 Vac, three-phase four-wire
	frequency	50/60 Hz
	Harmonic distortion rate	<1.5%(>50% load)
	power factor	>0.99(>20% load)
	Adjustable range of power factor	-1~+1
Overall parameters of energy storage system	Container size	40 feet 12192 x 2438 x 2591 mm
	total weight of container	<27T
	temperature	-20~50°C
	humidity	<90%
	Protection level	IP54
	Temperature Control and Cooling Method	Industrial grade temperature control air conditioning;The Inverter is Temperature Controlled Forced Air Cooling
	Fire fighting system	Panlong Fire System:JB-QB-EIN70
	EMS Energy Management System	Cloud Platform+PLC+Touch Screen Human-Computer Interaction
	Monitoring system	1 Set of Monitoring System optional

Circuit block diagram



Distributed Container Energy Storage Integrated System CESS-100-352



10-foot Standard Cabinet Container
Power:100kW, Capacity:352kWh

Feature 1: Integrated modularization

- Integration of highly integrated energy storage containers to facilitate transportation, installation and maintenance
- Modular design, linear expanded battery unit and bidirectional energy storage inverter unit
- Fast engineering installation, low operation and maintenance cost
- One-stop turnkey engineering service system with higher stability and better coordination

Feature 2: Safety and reliability

- Three-level battery control system, effectively collect information of battery system, provide perfect strategy and protection function
- Perfect automatic fire control system, effective control of fire hazards
- Industrial air conditioning system, effective heat management , and prevention of hidden dangers from the root
- Design of multi-level circuit breaker and contactor to effectively carry out electrical safety management, short circuit fast interruption and arc extinguishing functions
- Double work power supply design, safe and reliable

Characteristic 3: High efficiency and flexibility

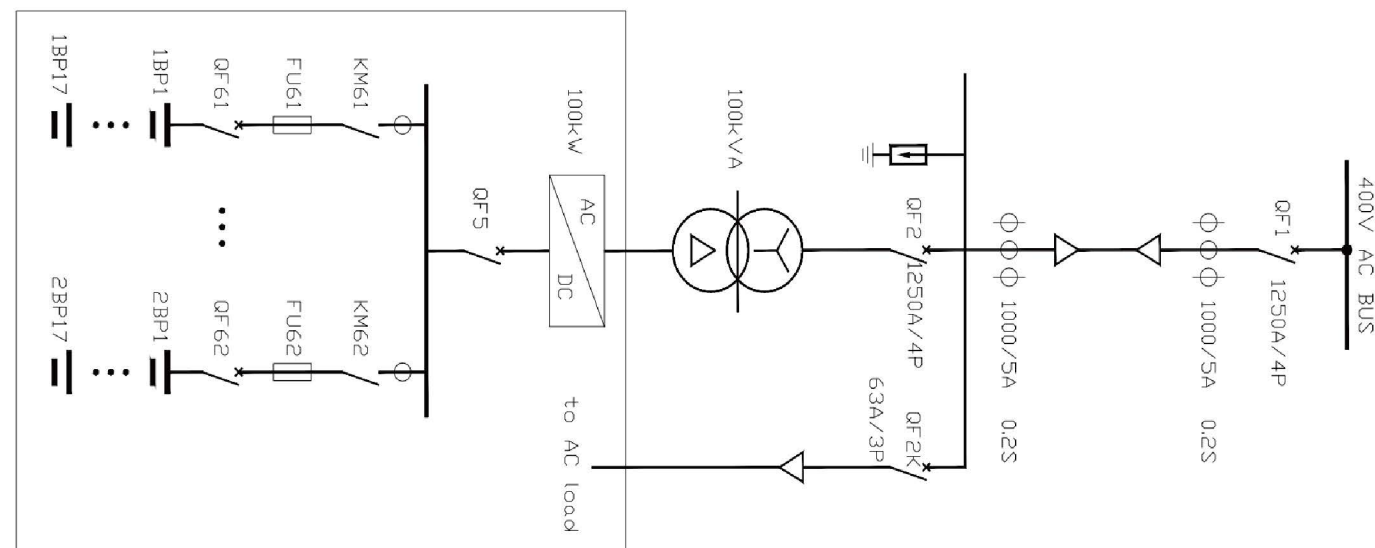
- response rate in second, high efficiency inverters, high efficiency of energy conversion
- Fault classification mechanism, response to default failure scenarios
- Modular and flexible parallel design, Balanced management strategy, Easy system expansion and unified management

Characteristic 4: Wisdom and friendly

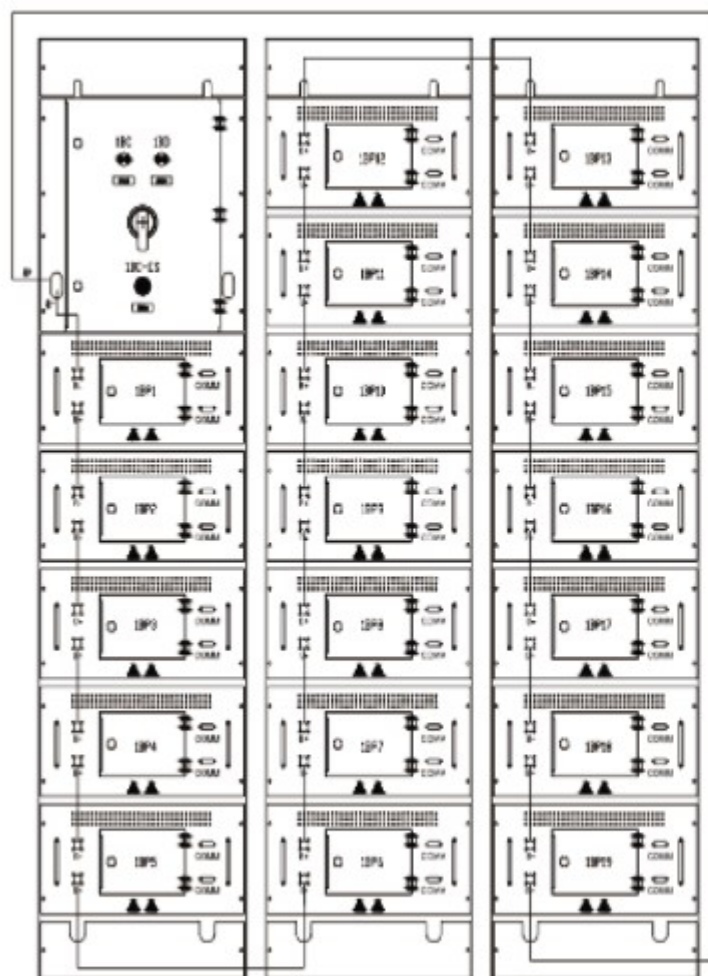
- Friendly human-computer interaction, hierarchical privilege settings
- Multilayer EMS control system, cloud platform and local PLC, to realize the safe and automatic operation of the system
- Multiple charging and discharging strategies, flexible choice for users
- Efficient data storage, enquiry historical data and real-time data at any time

Technical index		CESS-100-352	
Battery parameters	Cell type	3.2V/90Ah eve	
	System Battery Configuration	Eight cluster battery systems,Number of single cells: 3P204S,Total number of cells: 6P204S	
	Rated capacity of batteries system	352kWh	
	Battery system voltage	voltage range：571.2~744.6Vdc rated voltage：652.8Vdc	
	Communication Interface and Protocol	RS485, Ethernet Modbus RTU, Modbus TCP	
AC side parameters	Rated AC power	100kW	
	Maximum AC power	110kW	
	Grid voltage	Rated voltage: 380Vac, voltage range 323-418Vac, three-phase four-wire	
	frequency	50/60 Hz	
	Harmonic distortion rate	<1.5%(>50% load)	
	power factor	>0.99(>20% load)	
	Adjustable range of power factor	-0.8~-0.8	
	Overall parameters of energy storage system	Container size	10 feet 2991 x 2438 x 2591 mm
	total weight of container	<13T	
	temperature	-20~50℃	
	humidity	<90%	
	Protection level	IP54	
	Temperature Control and Cooling Method	Industrial grade temperature control air conditioning;The Inverter is Temperature Controlled Forced Air Cooling	
	Fire fighting system	Panlong Fire System:JB-QB-EIN70	
	EMS Energy Management System	Cloud Platfrom+PLC+Touch Screen Human-Computer Interaction	
	Monitoring system	1 Set of Monitoring System optional	

Circuit block diagram



Single Cluster Battery System ESCS-197



Technical Parameter

Item	Parameter
Model	ESCS-197
Magnification	$\leq 0.5C$
Cell Selection	LF90/3.2V, eve
Combination Mode	3P228S
Key Components	19 drawers, 1 switch box
Nominal Capacity	270Ah
Nominal Energy	197kWh
Nominal Voltage	729.6V
Voltage Range	638.4~832.2V
Dimension (mm) (W*D*H)	1650 x 700 x 2200
Weight (Kg)	Approximate 2400

Characteristic

- The cabinet adopts a closed hexahedron frame structure;
- The cabinet casing is clean and tight, and does not deform or corrode for 10 years;
- Upper-incoming and upper-outgoing DC busbar;
- Install at least 3 battery modules per drawer unit ~~pack~~, weighing no more than 100kg;
- Battery cabinet can be installed with at least 7 drawer units;
- Battery cabinet integrates high voltage units, built-in DC circuit breaker, DC contactor and DC fuse;
- High voltage drawer unit has electrified ~~and~~ discharging indicators;
- There are vents and strong exhaust fans in battery cabinet;
- Identification number on the top of the cabinet;
- No external exposed electrified metal parts after packaging;
- No insulation breakdown in the battery cabinet.

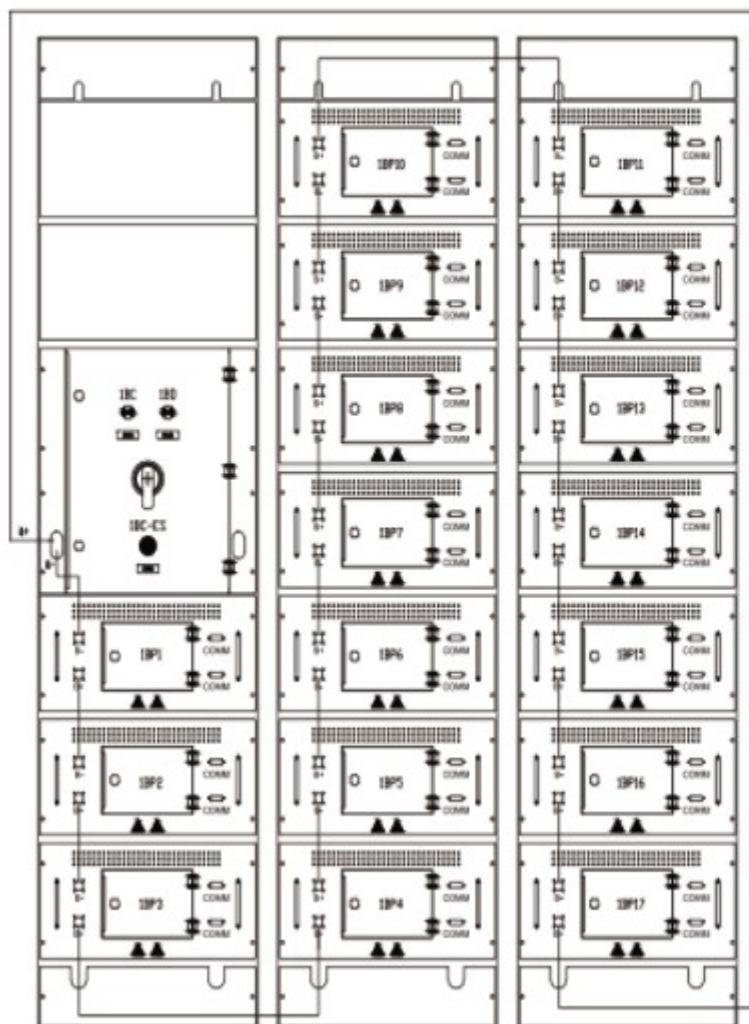
Single Cluster Battery System ESCS-176

Technical Parameter

Model	ESCS-176
Magnification	$\leq 0.5C$
Cell Selection	LF90/3.2V, eve
Combination Mode	3P204S
Key Components	17 drawers, 1 switch box
Nominal Capacity	270Ah
Nominal Energy	176kWh
Nominal Voltage	652.8V
Voltage Range	571.2~744.6V
Dimension (mm) (W*D*H)	1650 x 700 x 2200
Weight (Kg)	Approximate 2220

Characteristic

- The cabinet adopts a closed hexahedron frame structure;
- The cabinet casing is clean and tight, and does not deform or corrode for 10 years;
- Upper-incoming and upper-outgoing DC busbar;
- Install at least 3 battery modules per drawer unit & pack weighing no more than 100kg;
- Battery cabinet can be installed with at least 7 drawer units;
- Battery cabinet integrates high voltage units, built-in DC circuit breaker, DC contactor and DC fuse;
- High voltage drawer unit has electrified discharging indicators;
- There are vents and strong exhaust fans in battery cabinet;
- Identification number on the top of the cabinet;
- No external exposed electrified metal parts after packaging;
- No insulation breakdown in the battery cabinet.



EC Series Modular Energy Storage Converter



Product characteristics

- Advanced T-type three electrical level technology,Improving conversion efficiency and power quality
- Modular design combined with intelligent dormancy technology to achieve efficient energy storage conversion
- Perfect battery management system to support different characteristics of battery access
- Friendly grid adaptability, acceptance of grid dispatch, active and reactive power compensation
- Intelligent automatic switching can be realized by supporting grid-connected and off-grid operatio
- Perfect protection measures, with active fault monitoring and protection capabilities
- Automatic disconnection technology of fault module to reduce system maintenance time



Modular Design

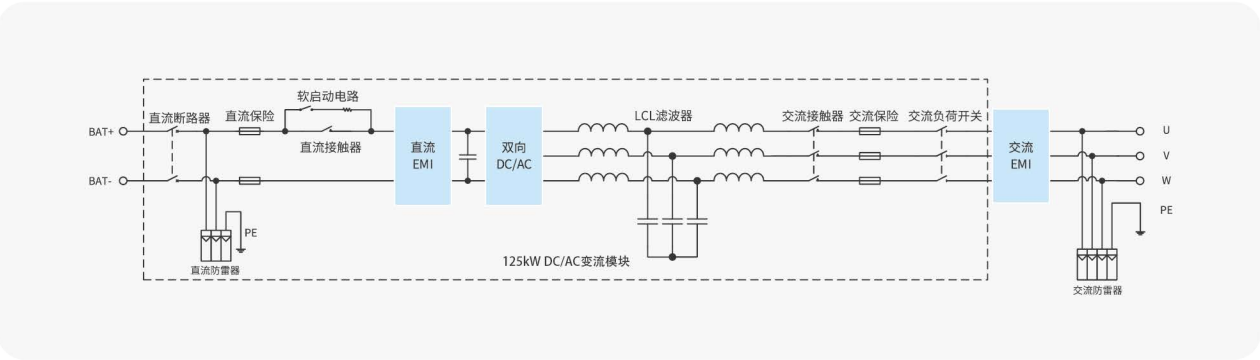


Three Electrical Level Design



Intelligent Protection

A Circuit block diagram



Technical Parameter

Model	EC-0100
DC Side Parameters	
Maximum input voltage	1000V
Maximum DC Current	200A
Voltage range of battery pack	600~850V
Number of accessible batteries	1
Grid Side Parameters	
Rated AC power	100kW
Maximum AC power	110kW
Rated grid voltage	380V,3W+PE
Voltage range of power grid	323~418V
Maximum AC current	168A
Rated grid frequency	50/60Hz
Total harmonic distortion rate at rated power	<1.5%(>50%Load)
Power actor	>0.99 (>20%Load)
Adjustable range of power factor	-0.8 ~ +0.8
System Characteristics	
Isolation mode	No transformer
Maximum efficiency	99.0%
Protection level	IP20 (IP21 Optional)
Working environment temperature	-30~+55℃
Permissible humidity range	0~95% (No condensation)
Altitude of no reduction of power	3000m
Cooling mode	Temperature-controlled forced air cooling
Communication interface	RS485/CAN/Ethernet
Mechanical Parameters	
Dimension (mm) (W×H×D)	800×2000×700mm
Weight	400kg

EH Series Modular Energy Storage Converter



Product characteristics

- DC side wide voltage range, suitable for a variety of batteries
- Supporting multiple parallel connection functions, facilitating expansion
- Perfect protection measures, with active fault monitoring and protection capabilities
- Intelligent multi-stage AC fan speed regulation technology to reduce system loss
- Friendly grid adaptability, accepting grid dispatch for active and reactive power compensation
- High/Low Voltage Crossing Function
- Independent Inverter Function of Microgrid System



Wide DC voltage

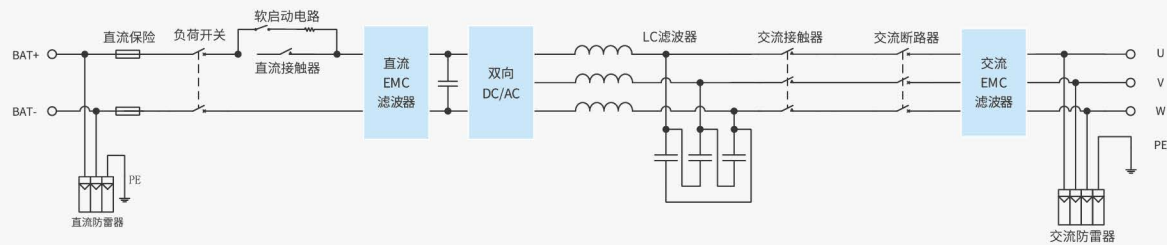


High-power



Intelligent protection

A Circuit block diagram



Technical Parameter

Model	EH-0500-B
DC Side Parameters	
Maximum input voltage	1000V
Maximum DC Current	1055A
Voltage range of battery pack	580~850V
Number of accessible batteries	1
Grid Side Parameters	
Rated AC power	500kW
Maximum AC power	600kW
Rated grid voltage	400V,3W+PE
Voltage range of power grid	340~440V
Maximum AC current	866A
Rated grid frequency	50/60Hz
Total harmonic distortion rate at rated power	<1.5%(>50%Load)
Power actor	>0.99 (>20%Load)
Adjustable range of power factor	-0.8 ~ +0.8
System Characteristics	
Isolation mode	No transformer
Maximum efficiency	99.0%
Protection level	IP20 (IP21 Optional)
Working environment temperature	-30~+55℃
Permissible humidity range	0~95% (No condensation)
Altitude of no reduction of power	3000m
Cooling mode	Temperature-controlled forced air cooling
Communication interface	RS485/CAN/Ethernet
Mechanical Parameters	
Dimension (mm) (W×H×D)	1205×2050×750mm
Weight	855kg

Energy Manager System : EMS

The Energy Management System : EMS is based on multivariate constraints and deep learning mechanism. It is a cloud local two-way synchronized energy storage control and management system. By analyzing loads and capacity demands, EMS can configure real-time charge/discharge strategies to achieve optimal performance while maintaining the system efficiency under control. The cloud-based EMS continuously monitors all the energy storage systems in operation, alerts and intervenes for anomalies; while simultaneously send system operating historical data to authorized accounts.



Energy Manager System: management interface

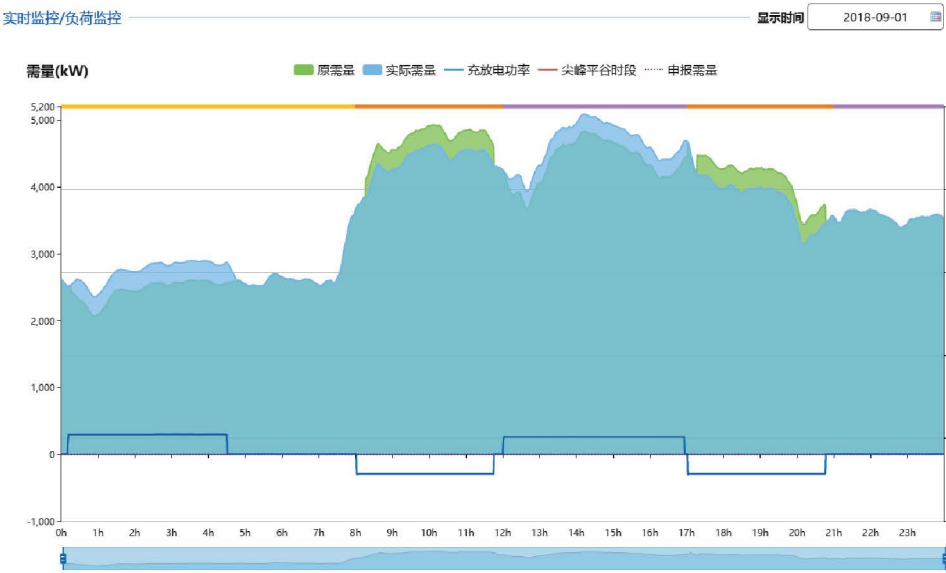


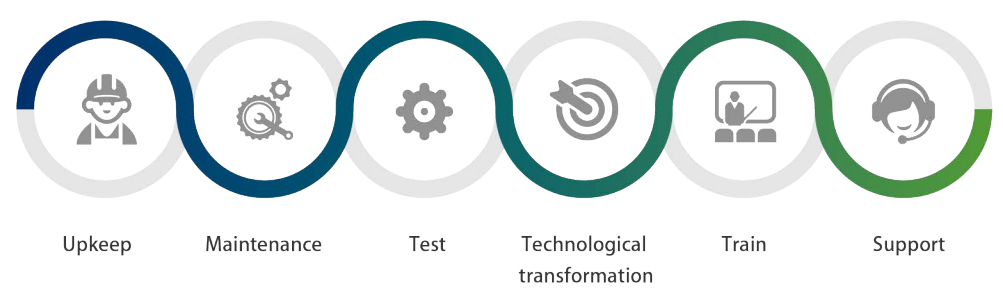
Strengths

- Multiple platform management, anytime, anywhere, convenient;
- Rich data analysis capabilities and customizable features based on needs;
- Comprehensive and detailed data monitoring;
- Retrospective analysis of historical data;
- Reporting function based on customer needs ;support Excel export;

Features

- In-could dispatching platform operating environment:
 - Adopt Alibaba Cloud platform server;
 - Support MySQL database;
 - Cross-platform support for multiple browser access.
- Operation monitoring data includes each switch, contactor position remote signal, PCS operation data, battery voltage and temperature data, and environmental control system operation data, etc. Data synchronization refresh time is less than 2 seconds, with data saving at least once per minute. Power consumption and electricity cost statistics are supported, while electricity rates are automatically adapted by region and the billing period can be defined. The storage period of records is not less than 10 years.
- Strategy configuration supports TOU,PDS, ADR modes, which can be configured by day and time period; and the strategy can be updated in real time.
- Support event records; and records storage period is not less than 10 years.
- The system can prevent malicious attacks, effectively prevent MAC spoofing and ARP attacks, protect against DDoS attacks, and perform port-scan and intrusion detection, Trojan and vulnerability scanning, etc.; system data is backed up at least once a day, with fast automatic fault recovery.





Case



- 01 National Electric Power Investment Demonstration Project for Optical Storage in the Multi-energy Complementary Base of the Yellow River Hydropower Station. Ternary Lithium Battery
- 02 Huaneng Clean Energy Golmud Phase IV Direct Current Optical Storage Project-Lithium Iron Phosphate Battery
- 03 Huaneng Clean Energy Golmud Phase IV Direct Current Optical Storage Project - Lead-carbon Batteries
- 04 Haixin Yangzhou Distributed Energy Storage Project
- 05 North Control Clean Energy Lixin Zhenjiang Industrial Park Optical Storage Project-Lithium iron phosphate