

# SVOLT



## SVOLT Energy Technology Co.,Ltd.

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## SVOLT Energy Technology Co., Ltd.

3S Energy Storage Product Introduction

IEEE/UL Battery  
Sizing by  
**MooreU**  
610-952-6067  
www.mooreu.com



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# About **SVOLT**



## 01

About SVOLT

Page 01-07

## 02

Research and Development

Page 08-11

## 03

Innovative Products

Page 08-23

## 04

Social Responsibility

Page 24-25

SVOLT, established in 2018 and headquartered in Changzhou, Jiangsu province, is a global high-tech company specializing in the development and manufacture of battery materials, cells, modules, Pack and BMS as well as energy storage products.

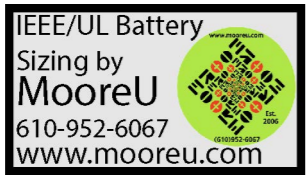


# Contents



# Vision and Perspective

## Mission



- Green Energy Everywhere

## Vision

- To Be a Global Energy Interconnection Technology Company

## Spirit

- Driven By Innovation

## Values

- Customers First, Striver-Focused Innovation-Rooted, Synergy-Supported

# Development Milestone



**2012**

Started with Battery Pack Project Team

**2017**

Invest in Pilbara Minerals in Australia

**2018**

**In February**  
SVOLT Energy Technology Co., Ltd. was Established

**2019**

**11/27**  
Grand Opening of Automotive Grade Intelligent Factory in Changzhou

**03/14**

Established Wuxi R&D Center

**2020**

**11/17**  
Established Europe production base in Saarland, Germany

**04/29**

Pre-A Financing  
SDIC Invested  
1Billion RMB in SVOLT

**12/11**

B+round Financing

**12/10**

New production base in Shangrao

**10/29**

New production base in Yancheng

**09/16**

New production base in Chengdu

**07/30**

B round Financing

**07/16**

SOP of Cobalt-free Battery

**2021**

**06/22**

New production base in Nanjing

**04/28**

New R&D and production base in Ma'anshan

**02/25**

A round Financing

**02/19**

New production base in Huzhou

**01/27**

New production base in Suining

**2022**

**06/13**

Together with Sichuan NEP and EVE invested in lithium salt project in Sichuan

**06/10**

Established Dezhou lithium industrial park

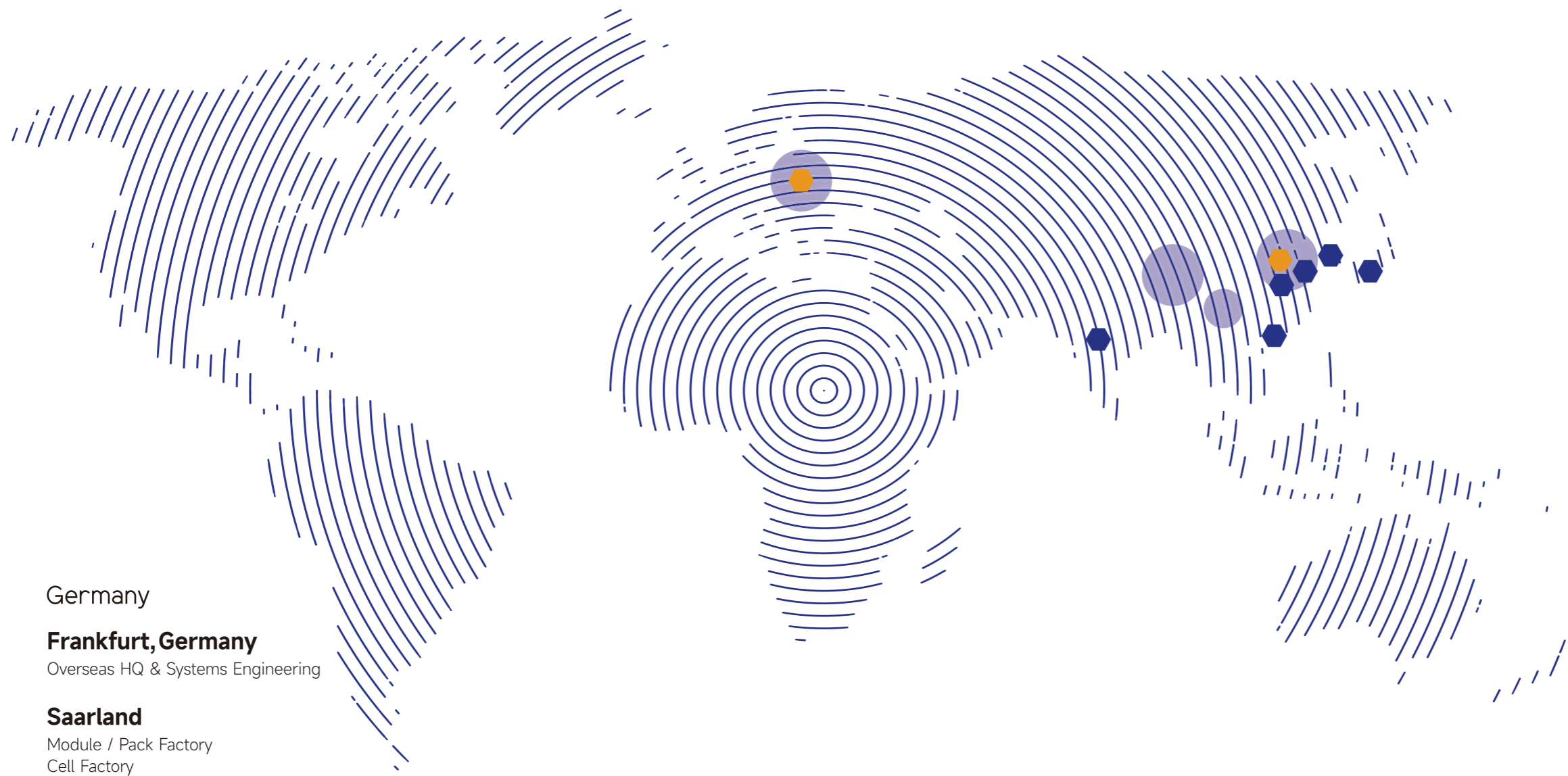
**03/30**

Invested in Yongshan Lithium with BASF SHANSHAN

**01/06**

Established Shanghai R&D Center

# Global Layout



## Germany

### Frankfurt, Germany

Overseas HQ & Systems Engineering

### Saarland

Module / Pack Factory  
Cell Factory

## China

### Northern China

Baoding

### Western China

Suijing  
Chengdu  
Dazhou

### Yangtze River Delta

Changzhou  
Huzhou  
Yancheng  
Taizhou  
Ma'anshan  
Nanjing

### Central China

Shangrao

### Baoding

Product R&D

### Wuxi

R&D HQ—Global Innovation Center

### Shanghai

AI 2035 Laboratory

### Shenzhen

Cylindrical Cell & AI R&D

### Changzhou

Co-free Material & Battery

### Ma'anshan

LFP/Cylindrical Cells

### Bangalore

BMS R&D

### Europe

Product Localization R&D

### Seoul

Advance Material & Equipment



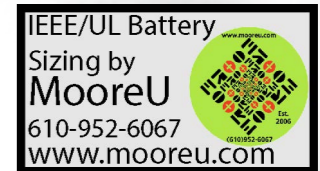
# Research and Development



## R&D centers layout stretch worldwide Production bases increase continuously

As a high-tech enterprise in the battery industry, SVOLT planned R&D and manufacturing globally. In China, Baoding and Wuxi are the main bases for the R&D of battery and supporting technology. Globally, SVOLT has 12 manufacturing bases such as Changzhou, Suining, Huzhou, Ma'anshan, Nanjing and Germany to expand production capacity to meet the battery demand of the new energy vehicle industry.

# R&D Achievement



The latest data of applied patents (2022. Q2)

**> 4,000**  
Patent Applications

**> 1,300**  
Invention Patents

**> 200**  
Overseas Patents

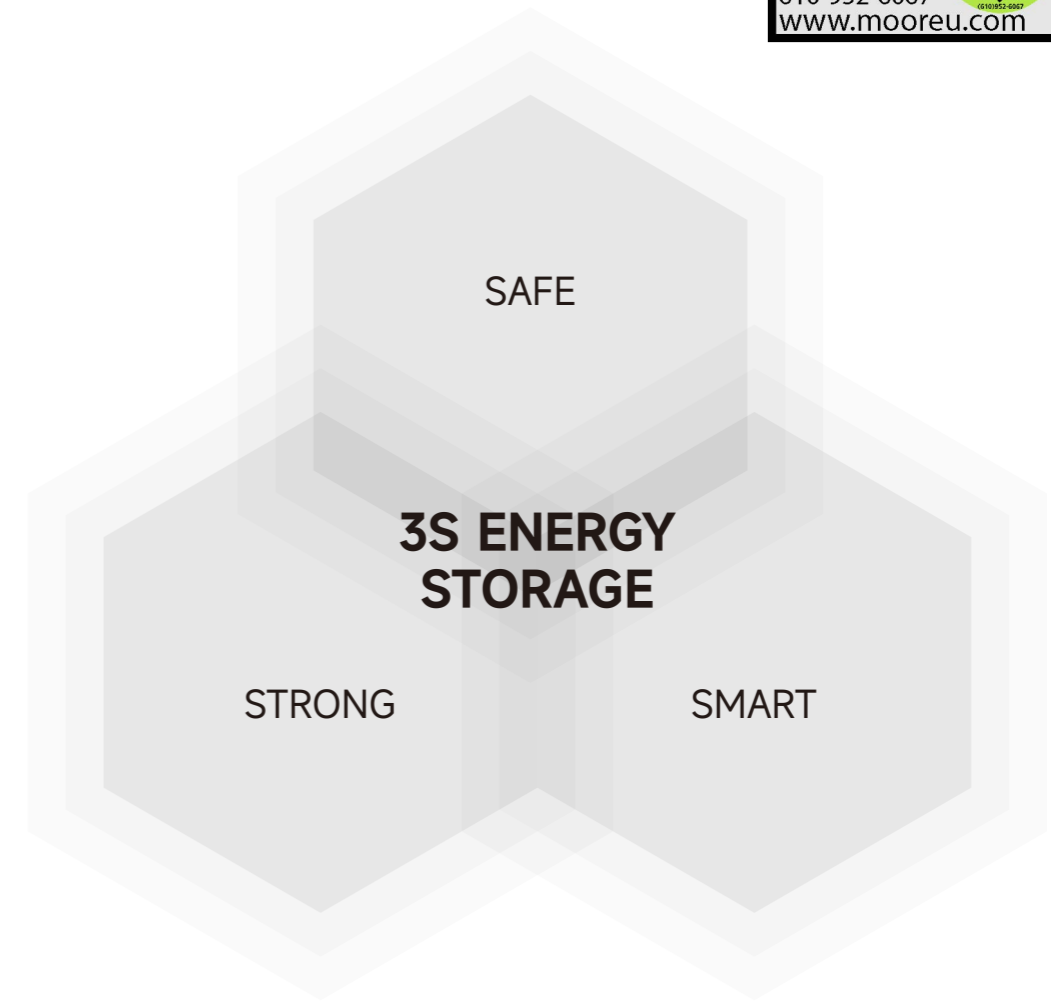
R&D Team

**> 500**  
Foreign / Experienced Industry Experts

**> 3,000**  
R&D Staff



# Energy Storage Concept



**SAFE**

Comprehensive Safety Strategy, from cell to whole life cycle, to ensure worry-free throughout process from production to delivery and to O&M (operation and monitoring).



**STRONG**

automotive grade premium-quality R&D and manufacturing DNA integrated with complete cycle-life optimization principle and efficient O&M technology, to ensure biggest stability and reliability.



**SMART**

AI and big data based intelligent measures to realize automatic monitoring, pre-warning, regional collaborative control and strategy optimization. Thus, to offer customers all-round intelligent experience flexibly and smartly.

## 3S ENERGY STORAGE ADVOCATE

To support carbon neutralization target, we understand the desire of energy storage industry thoroughly.

We develop our energy storage solutions based on 3S principles – Safe, Strong and Smart.

We keep being honed and cultivated with ingenuity, to conduct our promise.

# Innovative Products

SVOLT energy adheres to the vehicle level lean management and the future-oriented 3S energy storage system set or technology and product concept (Safe, Strong, Smart), and has creatively developed and created three series of energy storage products: CE, EQ and EI. According to the needs of different market segments, SVOLT energy is committed to providing one-stop energy solutions for customers at home and abroad.

 **CE**  
Scale  
Application



CE-L series



CE-U series



CE-M series



CE-C series

 **EQ**  
Small Capacity  
Application



EQ-C series



EQ-M series



EQ-BC series



EQ/E series

 **EI**  
Intelligent  
Application



EI-E series



EI-C series



# CE-L series

## LARGE SCALE ENERGY STORAGE

It is applicable to large-scale wind-solar power stations, power grids, substations, industrial parks and other applications, features new energy co-generation, lower wind/solar curtailment, auxiliary services (peak shaving, frequency regulation, etc.), electricity expansion, power quality management, power-on maintenance, distributed power grid connection and control.

### High Safety

- 100% real-time monitoring of cell, combustible gas and circulating current
- Inter cluster circulation suppression, I / O redundancy protection and outdoor emergency power-off protection
- Internal short circuit 7 days in advance
- Early warning / joint control of thermal runaway 5 ~ 8 minutes in advance

### High Reliability

- - 30 ~ 45 °C can be used in extreme weather
- Seismic grade of UBC zone 4
- ≥ 35m / s wind resistance grade

### High Intelligence

- Electric core level intelligent temperature control, energy efficiency increased by 1%
- Intelligent charge and discharge management
- Intelligent early warning to improve the operation safety of the system
- Remote maintenance and control strategy upgrade



	Characteristic	Specification
<b>Environment conditions</b>	Installation environment	Outdoors
	Ambient temperature	°C -30 ~ 45°C
	Humidity	% 5% ~ 90%
	Altitude	m ≤3000m(capacity reduction to be considered at an altitude > 3,000m)
<b>AC grid connection parameters</b>	Wiring system	3 Phase
	Rated voltage	AC380/400V AC550/690V
	Rated frequency	50Hz 50Hz
	Power factor	±1 ±1
<b>DC side parameters</b>	Output harmonics	≤3 % ≤3 %
	Nominal battery voltage	761.6V 1254.4V
	Battery voltage range	DC666.4 ~ 844.9V DC910 ~ 1328.6V
<b>Power/capacity parameters</b>	Split type	250kW-1260kWh / 500kW-3400kWh 4816kWh-5217kWh
	Integrated type	250kW-630kWh/ 500kW-2500kWh -
<b>Other parameters</b>	IP rating	IP54
	Heat dispersion method	A/C cooling + natural air cooling
	Noise	≤70dB
	Seismic grade	UBC Zone4
<b>Standards and certification</b>	Wind resistance rating	Category 15 hurricane
	Battery	IEC62619, UN38.3, GB/T36276
<b>Dimensions</b>	Width × Depth × Height	mm 40-50ft container

# CE-U series

## ENERGY STORAGE UNIT

This product, as a representative of highly modularized and standardized SVOLT products, is designed according to the 3S concept and the automotive grade quality requirements, features peak shaving, new energy co-generation, dynamic capacity expansion, demand management, power quality management, distributed power generation, emergency power standby and other functions, and can effectively support the rapid charging demand of electric vehicles. It can be widely used in large wind power stations, substations, large industrial and commercial parks, etc.

### High Safety

- 100% cell real-time monitoring
- The battery shall be isolated by compartment for 2h fire prevention and thermal insulation
- 1230 fire fighting gas and water
- Big data active analysis and early warning; Cluster level and unit level fault isolation

### Fine Management

- One to one fine temperature control, energy efficiency increased by 1.5%
- $\leq 35\text{ }^{\circ}\text{C}$  cell temperature,  $\leq 5\text{ }^{\circ}\text{C}$  cell temperature difference
- Branch charging and discharging and distributed module unit management

### High Reliability

- - 40 ~ 50  $^{\circ}\text{C}$  wide temperature adaptability
- 15 hurricane wind resistance grade and UBC zone 4 earthquake resistance grade
- IP55 high protection grade, C4 high anti-corrosion grade

### Flexibility

- Small volume unit design, high site utilization
- Building block combination, supporting 500kWh ~ 10MWh multi scenario applications
- AC and DC are coupled in parallel to support the mixed use of old and new batteries



### Characteristic

### Specification

	Characteristic	Specification
<b>Battery cluster</b>	Number of battery modules	15-17
	Battery clustering mode	1P210S/1P224S/1P238S
	Nominal voltage	672/716.8/761.6V
	Battery cluster capacity	188.2-213.2kWh
<b>Unit energy storage system</b>	Number of battery clusters	3
	Nominal system capacity	564.5-639.6kWh
	Battery container dimension	4640*1200*2896mm

S/N	Power/kW	Nominal capacity/kWh	Endurance/h	Quantity of unit energy storage system	Remark
1	250	564	2	1	0.5P
2	250	1128	4	2	0.25P
3	500	1128	2	2	0.5P
4	500	1692	3	3	0.3P
5	500	2256	4	4	0.25P
6	630	1279	2	2	0.5P
7	630	2822.5	4	4	0.5P

# CE-M series

## MEDIUM SIZED ENERGY STORAGE

The product integrates battery, BMS, PCS, EMS, air conditioning and fire protection system. It can be widely used in substation, small industrial and commercial, hospital building, charging station, household electricity consumption, etc. It has the functions of peak-shaving, new energy co-generation, dynamic capacity increasing, demand management, power quality management, emergency power backup, etc.



**CE-M-30/64.5      CE-M-60/175      CE-M-100/200**

	CE-M-30/64.5	CE-M-60/175	CE-M-100/200	
<b>AC grid connection parameters</b>	Wiring system	3 Phase/PE	3 Phase	3 Phase
	Rated power	30kW	60kW	100kW
	Rated voltage	AC400V	AC380V	AC400V
	Voltage range	AC400V(-20%~+15%)	AC380V(±15%)	AC400V (-15%~10%)
	Rated frequency	50Hz/60Hz	50Hz/60Hz	50Hz/60Hz (Settable)
	Power factor	±0.8	±1	±1
<b>DC side parameters</b>	Nominal battery voltage	537.6V	729.6V	716.8V
	Battery voltage range	470.4-604.8V	638.4V ~ 820.8V	627.2V ~ 795.2V
	Nominal battery capacity	64.5kWh	175kWh	200.64kWh
Maximum efficiency	86%	90%	90%	
Allowable ambient temperature	-20 ~ 55°C (power reduction required at a temperature above 45°C)	-20 ~ 55°C	-20 ~ 50°C	
IP rating	IP55	IP54	IP55	
Cooling method	A/C cooling	A/C cooling	A/C cooling+natural air cooling	
Salt spray resistance rating	C3	C3	C3	
Noise	< 75dB	< 75dB	< 75dB	
<b>Other parameters</b>	Seismic grade	Grade 9	Grade 9	Grade 8
	Allowable relative humidity	5%-95% with no condensation	5%-95% with no condensation	5%-95% with no condensation
	Maximum allowable altitude	2000m	2000m	2000m
	Communication interface	Ethernet, RS485	Ethernet, RS485	Ethernet
	Wiring method	Incoming and outgoing from bottom	Incoming and outgoing from bottom	Incoming and outgoing from bottom
Weight	~1.2t	~2.8t	~2.9t	
Dimensions (W * H * D)	1433mm*2100mm*1064mm	1900mm*2430mm*1350mm	2150mm*2450mm*1000mm	
Standards and certification	IEC62619,UN38.3, VDE-AR-N 4105, IEC62477-1	IEC62619, UN38.3	GB36276, IEC62619,UN38.3	

### Highly Integrated

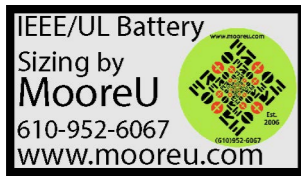
- Modular design
- Fixed with ground bolt
- Small footprint
- Quick installation

### Flexible Expansion

- Building block expansion, supporting 20 standard products directly connect in parallel.
- Long durable for 2-6 hours application

### Various functions

- Integrated control of "cloud, edge and end" and online optimization of strategy
- Support peak shaving and valley filling, dynamic capacity expansion, reactive power compensation, reverse power control, AGC response and other functions



# CE-C series

## Liquid Cooling Energy Storage

### Integrated for transportation

- Suitable for Sea & Road
- 36% less Space occupied
- 5% on transportation cost

### Autonomous plant-level EMS system

- SVOLT IP with core algorithms
- over 10 cellular data stacks simultaneous access
- cloud collaboration

### Quick Expansion

- Both AC/DC side expansion possible
- More plant layout friendly
- Less than 5% oversizing in battery
- Cost efficiency

### Armature simulation system

- Thermal & mechanical simulation to ensure performance
- thermal management performance improved by >10% compared to before simulation adopted
- system energy lose reduced by 1.4%



Item	Technical Parameter	
Battery Parallel	2P416S@222Ah	
Nominal Voltage	Vdc	1,331.2
Nominal Power	kWh	591.05
Operating Voltage	Vdc	1,164.8 - 1,497.6
Rate of Standard Charge	P	1P
Rate of Standard Discharge	P	1P
Round Cycle Efficiency	%	94%
Humidity	≤90% RH	
Altitude	m	≤2000m
Cooling Method	Liquid Cooling	
IP Rate	IP54	

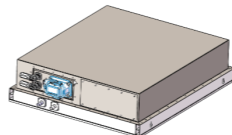


# Liquid Cooled

## PACK-222Ah Based

# Liquid Cooling

## RACK-222Ah Based



Item	Technical Parameter	
Battery Parallel	1P52S@222 Ah	
Nominal Voltage	Vdc	166.4
Nominal Power	kWh	36.94
Operating Voltage	Vdc	130V ~189.8
Operating Temperature	°C	0-55
Rate of Standard Charge	P	1P
Rate of Standard Discharge	P	1P
Humidity	≤95% RH	
Altitude	≤2,000m	
Cooling Method	Liquid Cooling	
IP Rate	IP65	
Weight	kg	280(±3)
Dimension (D*W*H)	mm	810±2*964±3*237±2

Item	Technical Parameter	
Battery Parallel	1P416S@222Ah	
Nominal Voltage	Vdc	1,331.2
Nominal Power	kWh	295.53
Operating Voltage	Vdc	1,164.8 - 1,497.6
Operating Temperature	°C	0-55
Rate of Standard Charge	P	1P
Rate of Standard Discharge	P	1P
Round Cycle Efficiency	%	94%
Humidity	≤90% RH	
Altitude	m	≤2000m
Cooling Method	Liquid Cooling	
IP Rate	IP20	
Weight	kg	2,300 kg ±3%
Dimension (D*W*H)	mm	920±3 * 1,000±3 * 2,330±5

# 222Ah LFP Cell



Cell Format	Prismatic LFP	
Technical Data		
Nominal Capacity	Ah	222 Ah, 1C@25°C
	Vdc	3.20
Operating Voltage	Vdc	2.5-3.65
Cycle Life	Cycle	6,000 cycles @1C/1C, 100% DoD, 80% EOL
Calendar Life	years	15
Charge & Discharge Conditions		
Rate of Standard Charge	C	1.0 C
Rate of Standard Discharge	C	1.0 C
Round Cycle Efficiency	%	94 - 95%
Other Parameter		
Dimension (L x W x D)	mm	207 x 173 x 54 mm
Weight	kg	4.3 ± 0.3 Kg

# EI-EMS

Energy storage equipment and comprehensive coordination and management center of "generation-Grid-load-storage".

The hardware has passed FCC / CE / EMC level 4 certification and can respond at ms level.

Meanwhile, it integrates superbms, which ensures system security, improving operation efficiency, prolonging service life.

It reduces operation and maintenance cost, providing microgrid control, multi-energy complementary energy management and so on.



## Security Guarantee

- Multi level fault identification and real-time hierarchical control
- Built in thermal runaway warning and cell identification algorithm, which can quickly judge and respond
- Network access adopts bridging mechanism, strengthens encryption algorithm, and prevents data intrusion and leakage

## Efficiency Improvement

- Adaptive optimal temperature control scheme to improve system efficiency by 1-3%
- Adaptive optimal PCs control power based on SOC and PCs state to optimize operation efficiency
- Real time and dynamic optimization of BMS safety threshold window to prolong battery life and improve revenue
- Convenient remote programming, remote debugging and one click Project Import greatly shorten the delivery cycle and reduce the operation and maintenance cost

## Intelligent Management

- It integrates data acquisition, communication management, data processing, edge computing, policy control and remote service
- Modular wind / light, storage, charging and other comprehensive energy management schemes and strategies, which can be combined and matched freely

# EI-Cloud ESS & Big Data Platform Of Integrated Services

The cloud ESS & big data platform of integrated services is a major product launched in response to SVOLT's digital and intelligent transformation. The platform is built with a multi-source access data fusion platform base, and mainly features collaborative monitoring, intelligent O&M, energy revenue evaluation, intelligent warning, control strategy optimization and other functions to support the open services of the platform; the platform is suitable for energy ecology related services such as green building energy consumption, new energy power generation, vehicle-grid integration and hydrogen-electricity integration.



## Security Management

- Patented deep learning algorithm (internal short circuit algorithm, thermal runaway algorithm, etc.) to greatly improve safety
- Dynamic BMS parameter adjustment to improve 1% - 3% efficiency

## Collaborative Monitoring

- 3D visualization; High performance electric core level monitoring and improving operation and maintenance efficiency by 30%

## Intelligent Operation and Maintenance

- The operation and maintenance expert knowledge base can automatically push the operation and maintenance scheme, reduce the operation and maintenance difficulty by 100% and save the operation and maintenance cost by 50%

## Energy Aggregation

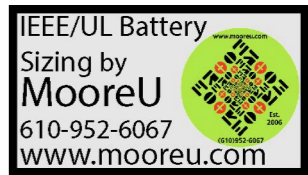
- Built in multiple energy service sectors
- Blockchain smart contract technology ensures the safety of power consumption and transaction

## Smart Trading

- AI technology depth prediction (electricity price, supply and demand, etc.); Dynamically adjust the operation strategy to maximize the income of energy storage



# Social Responsibility



## Comprehensive System of Battery Production, Application and Recycling



SVOLT Energy Technology Co., Ltd. 3S Energy Storage Product Introduction

