

20kW/50kWh

Industrial energy storage system

Product manual

Reference Standards

The design, manufacturing, inspection, storage, transportation and operation of this energy storage system comply with the following standards (priority order: specific requirements of this technical agreement > special technical conditions > general technical conditions).

For standards without publication years, the latest version applies:

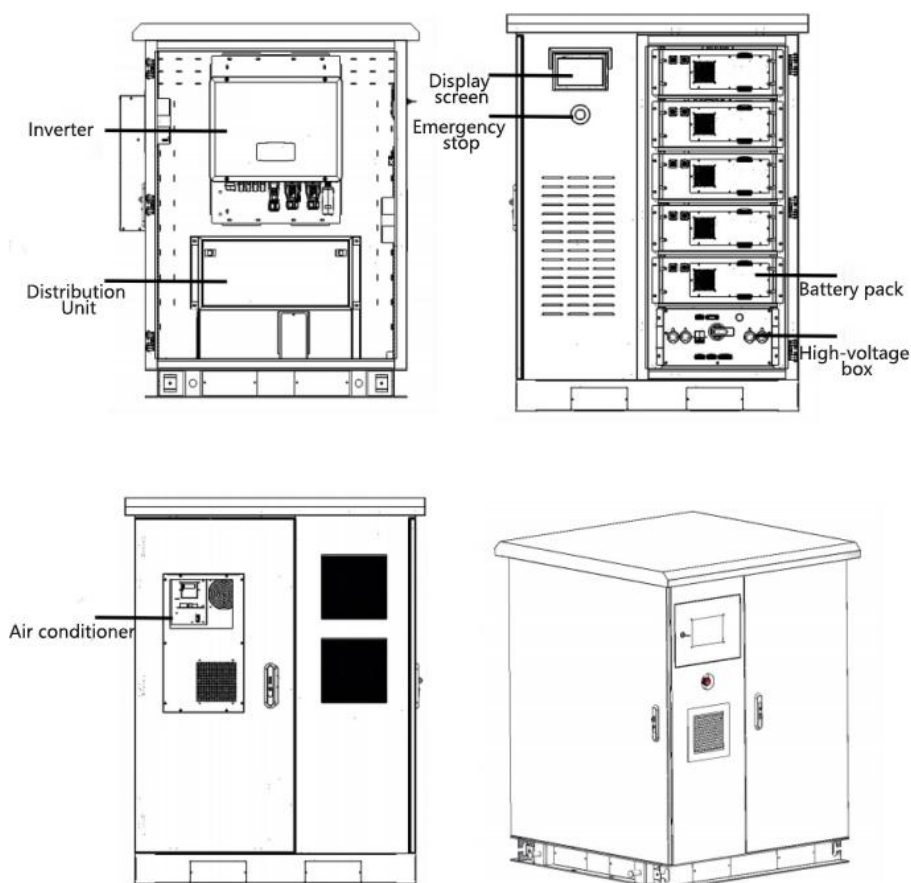
Primary references:

GB/T 42288-2022	Safety Code for Electrochemical Energy Storage Power Stations
GJB 4477-2002	General Specification for Lithium-ion Battery Packs
GB/T 2297-1989	Terminology for Solar Photovoltaic Energy Systems
GB 2900.11-1988	Battery Terminology
GB 4208-2008	Degrees of Protection Provided by Enclosures (IP Code)
GB/T 17626 -2006	Electromagnetic Compatibility Testing and Measurement Techniques (Series Standards)
GB 14048.1-2006	Low-voltage Switchgear and Controlgear - Part 1: General Requirements
GB 8702-88	Electromagnetic Radiation Protection Regulations
GB 50057-2010	Code for Design of Lightning Protection of Buildings
DL/T 5429-2009	Technical Code for Power System Design
DL/T 5136-2001	Technical Code for Secondary Wiring Design of Thermal Power Plants and Substations
DL/T 478-2013	General Specification for Relaying Protection and Security Automatic Equipment
DL/T 620-1997	Overvoltage Protection and Insulation Coordination for AC Electrical Installations
DL/T 621-1997	Earthing for AC Electrical Installations
GB 50217-2007	Code for Design of Electric Power Cables
GB 2894-2008	Safety signs and guideline for the use
GB 50054	Code for Low-voltage Electrical Design
GB/T 13384-2008	General Technical Conditions for Mechanical and Electrical Product Packaging
GB/T 191-2008	Packaging-Pictorial Marking for Handling of Goods
GB/T 1413-2008	Series 1 freight containers - Classification, dimensions and ratings

GB/T 14598.27-2008	Measuring relays and protection equipment -- Part 27: Product safety requirements
GB/T 15945-2008	Power quality - Frequency deviation for power system
GB/T 12325-2008	Power quality - Deviation of supply voltage
GB/T 12326-2008	Power quality - Voltage fluctuation and flicker
GB/T 15543-2008	Power quality - Three-phase voltage unbalance
GB/T 14549-1993	Quality of electric energy supply Harmonics in public supply network

System Design

This system uses modular design for flexible configuration to meet various application scenarios including peak shaving, backup power, demand management, and power quality improvement. It features outdoor IP54 protection, integrating high-safety long-life battery systems, BMS, energy storage inverters, grid/off-grid switches, temperature control, and fire safety systems into a 20kW/50kWh package. Multiple units can be paralleled for different capacity requirements.



System Overview

Energy Storage System

Integrated design with lithium iron phosphate batteries, BMS, energy storage inverter, intelligent distribution unit, etc. Key features include: - Three-phase active/reactive power independent control with 100% unbalanced load capability - WiFi data transmission to APP/web platform for smart O&M - Aerosol fire protection system - Industrial-grade air conditioner with optimized thermal management - Dual protection (AC/DC fuses and circuit breakers) - System-level protection interlock (BMS/PCS/thermal management/fire)

NO.	Component	Specification	Unit	Qty	Remarks
1	Battery Module	102.4V100Ah	PCS	5	512V100Ah
2	High-voltage Box	Hangzhou Kgooer	Set	1	
3	20kW Inverter	Shanghai Afore	PCS	1	
4	Outdoor Cabinet	IP54	PCS	1	
5	Fire System	Pack & cabinet aerosol	Set	1	
6	Air Conditioner	Envicool	PCS	1	
7	Accessories	/	Set	1	

System Parameters

NO.	Item	Parameters
DC Side Parameters		
1	Cell Configuration	1P32S
2	System Configuration	1P5S
3	Rated Voltage	512Vdc
4	Rated Capacity	100Ah
5	Rated Energy	51.2kWh
6	Voltage Range	448-576Vdc
7	Max Charge/Discharge Current	50Adc
AC On-grid Parameters		
8	Rated Output Power	20kW
9	Max Output Power	22kVA
10	Rated Voltage	230/400Vac
11	Grid Voltage Range	AC400Vac(-20%~15%)
12	Max Input/Output Current	32Aac
13	Output Frequency	50Hz/60Hz
14	Power Factor Range	~1/0.8 leading~0.8 lagging
15	THDi	<3% (rated power)
16	DC Component of Current	≤0.5%
17	Grid/Off-grid Switching Time	≤10ms
18	Wiring Configuration	3L+N+PE
AC Off-grid Parameters		
19	Rated Output Power	20kW
20	Max Output Power	22kVA
21	Rated Output Voltage	230/400Vac
22	Rated Output Frequency	50/60Hz
23	Max Output Current	32Aac

24	Unbalanced Load Capability	100%
25	Overload Capability	1.1* (1min)
26	Wiring Configuration	3L+N+PE
PCS Efficiency		
27	Max Efficiency	98.3%
Protection Functions		
28	Emergency Stop	Yes
29	Surge Protection	Yes
30	DC Switch	Yes
31	AC Short-circuit Protection	Yes
32	AC Overcurrent Protection	Yes
33	Anti-islanding Protection	Yes
34	Reverse Polarity Protection	Yes
35	Leakage Current Protection	Yes
Basic Parameters		
36	Operating Temperature	0~40°C
37	Relative Humidity	0~95%
38	Max Altitude	4000m (>2000m)
39	Cooling Method	Smart air cooling
40	Weight	<950kg
41	Dimensions	1173x1258.8x1725mm
42	Protection Class	IP54
43	Fire System	Aerosol

System Features

System Functions

1. Bidirectional AC power flow for battery charging/discharging
2. Local/remote parameter configuration
3. Automatic energy balancing with remote dispatch support
4. Air-conditioned thermal management for batteries
5. Forced air cooling for power components

System component description

Battery Module

32pcs 3.2V 100Ah lithium iron phosphate cells (1P32S) - Built-in BMU and fan

No.	Item	Unit	Specification
1	Cell Count	Pcs	32
2	Pack Count	Pcs	5
3	Configuration	/	1P32S
4	BMU Count	Pcs	5
5	Rated Voltage	V	102.4
6	Voltage Range	V	86.4-115.2V
7	Rated Capacity	Ah	100
8	Rated Energy	kWh	10.24

Energy Storage Inverter (PCS)

No.	Item	Specification
AC Side Parameters		
9	Rated Output Power	20kW
10	Max Output Power	22kVA
11	Rated Voltage	380/400Vac
12	Grid Voltage Range	AC400Vac(-20%~15%)
13	Max Input/Output Current	32Aac
14	Output Frequency	50Hz/60Hz
15	Power Factor Range	~1/0.8 leading~0.8 lagging
16	THDi	<3% (rated power)
17	DC Component of Current	≤0.5%
18	Grid/Off-grid Switching Time	≤10ms
19	Wiring Configuration	3L+N+PE
AC Off-grid Parameters		
20	Rated Output Power (Off-grid)	20kW
21	Max Output Power	22kVA
22	Rated Output Voltage	400Vac
23	Rated Output Frequency	50/60HZ
24	Max Output Current	32Aac
25	Unbalanced Load Capability	100%
26	Overload Capability	1.1x (1min)

27	Efficiency	3L+N+PE
PCS efficient		
28	Efficiency	99%
Protection		
29	Emergency Stop	Yes
30	Surge Protection	Yes
31	DC Switch	Yes
32	AC Short-circuit Protection	Yes
33	AC Overcurrent Protection	Yes
33	Anti-islanding Protection	Yes
34	Reverse Polarity Protection	Yes
35	Leakage Current Protection	Yes
Basic Parameters		
36	Operating Temperature	0~40°C
37	Relative Humidity	0~95%
38	Max Altitude	4000m (>2000m)

The high-reliability intelligent power module-based design enables an integrated PV+energy storage solution. Precise energy management significantly reduces grid electricity purchases and enhances users' energy independence by aligning with their consumption patterns and grid tariff structures.

Accurate and flexible charge/discharge control modes
Soft grid-connection and power quality optimization
Comprehensive self-diagnostic and protection capabilities

EMS System (Optional)

The local EMS system provides integrated design for data acquisition, protocol conversion, energy management, and HMI display. Equipment start/stop control via user interface. Multi-unit paralleling support

Protection functions: overvoltage, undervoltage, overcurrent, short-circuit, low/high leakage, high/low temperature

BMS System

After prolonged series batteries, battery internal resistance and voltage fluctuations cause cell-to-cell inconsistencies. High-power charging/discharging generates heat gradients within modules, further reducing uniformity and capacity. The BMS addresses this by:

Monitoring Functions

Cell voltage, pack voltage/current, ambient/cell temperatures

Alarm Functions

Communication faults

Cell overvoltage/undervoltage

Pack overvoltage/undervoltage/overcurrent

High/low temperature

Protection Functions

Cell voltage limits

Pack overvoltage/undervoltage/short-circuit

Temperature thresholds

Insulation detection failure

Equipment malfunctions

Cooling System

The system uses an Envicool AC-powered air conditioner (600W cooling/500W heating) with integrated temperature control to maintain optimal internal conditions for reliability and longevity.

Cooling System Features

Professional dehumidification design
Variable-speed fan standard
Electric heating standard
4-20mA temperature/humidity signal output
DC220V/AC250V alarm dry contacts
Operational up to 55°C
R134a eco-friendly refrigerant (RoHS compliant)
IP55 protection rating
Optional smoke/door/water leak sensors
Power-failure recovery and multiple alarm modes



Fire Protection System

The aerosol automatic fire suppression system utilizes thermal aerosol technology compliant with XF499.1-2010 standards. It provides:

Rapid suppression of Class B/D/E fires and A-class fire containment
Thermally activated triggering via heat-sensitive cables
Environmentally safe, non-corrosive, and non-toxic gas discharge
Compact, flexible design with multi-point detection



Warranty Terms

60-month warranty from delivery date
Free repairs/replacements for quality-related issues during warranty period
Fee-based maintenance services after expiration