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STORING WIND AND SOLAR ENERGY BENEFITTING THE WORLD

ENERGY STORAGE SYSTEM PRODUCT MANUAL

ShenZhen CEGN Co., Ltd.

CONTENTS

1 About Us

As a leading comprehensive service provider of new energy in China, Shenzhen CEGN Co., Ltd. (CEGN) provides partners with core technologies and systematic solutions in such fields as wind-power photovoltaic energy storage, NEV charging, and other generic energy fields.

Based on the listed company, Shenzhen CLOU Electronics Co. Ltd., CEGN was founded in April 2016. In 2022, CEGN finished the reform toward mixed systems and introduced the industry and strategic capital from China Merchants Capital, Virtue Capital, CIC Deloitte, and Huarui Intelligent Manufacturing. The diversified share-holder background and rich industry resources will further promote our sustainable and rapid development.

Based on years of experience and technical strengths, CEGN has established a sound charging and energy storage equipment and product system and built a smart energy cloud platform. With a focus on wind power, photovoltaic energy storage, and NEV charging energy management, it has created a unified open Internet platform for new energy power supply, grid, load, and energy storage.

In the pursuit of comprehensive service development for new energy, CEGN will cooperate with more partners to shoulder the mission of "carbon neutrality" and forge the green and new energy era together.

www.cegncn.com

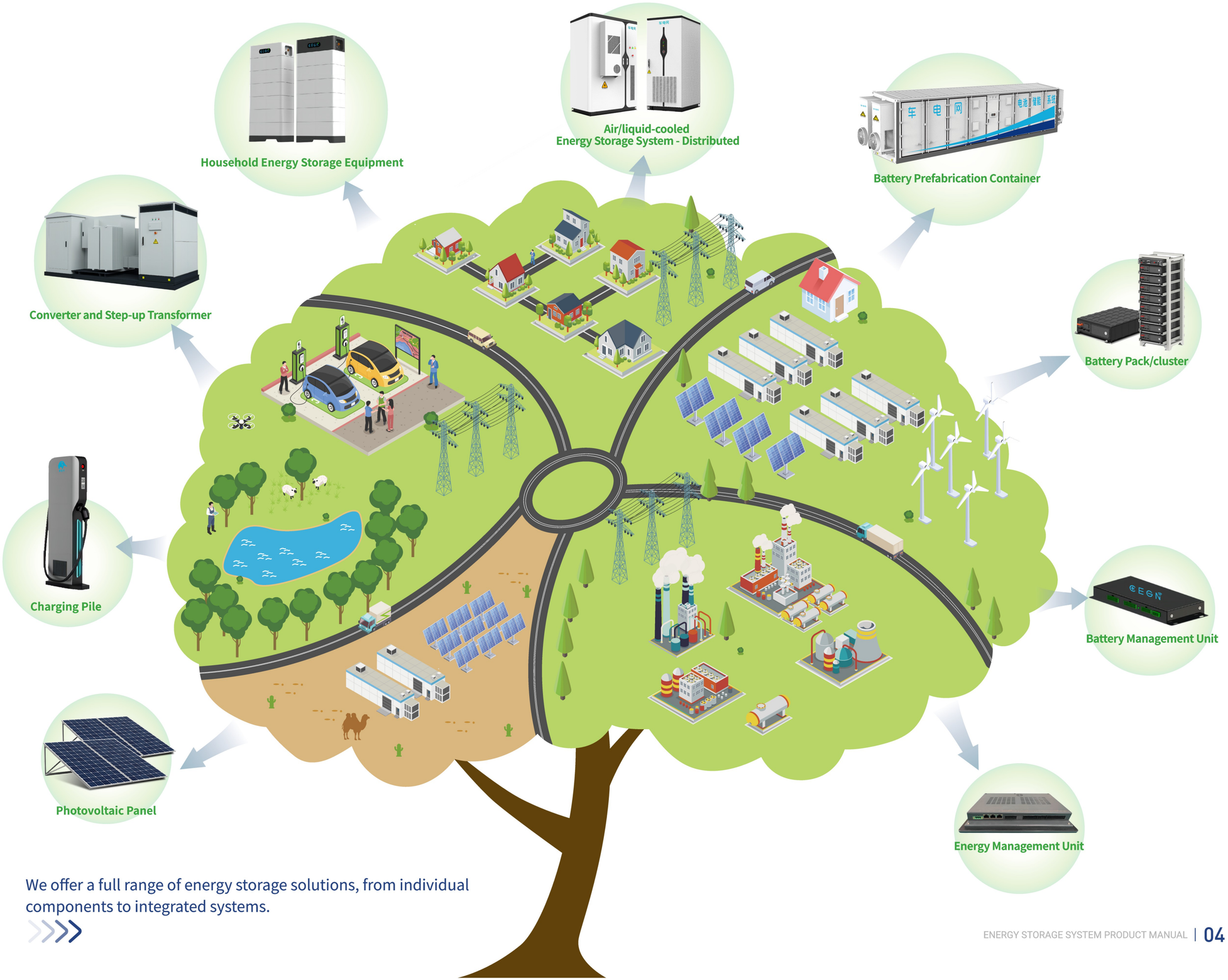
CEGN

Integrated service provider of new energy

ENVIRONMENT

2 Product Family

PRODUCT



We offer a full range of energy storage solutions, from individual components to integrated systems.

3 Liquid-cooled Energy Storage System - Centralized

Product Features

Safe and Reliable

- Providing detection and firefighting equipment for each battery pack, multi-level
- Multi-stage fuse and interlocking mechanism for protection
- Modular design and online insulation monitoring provide higher safety

Economical and Efficient

- Self-adaption for multi-scene reduces the cost per kilowatt-hour, and Intelligent algorithms improve system efficiency
- Water cooling improves heat dissipation performance by 6%, and the battery cell life is increased by 10%, reducing auxiliary power consumption by 3

The Power of Integration

- Electric and battery-separated design, easy maintenance
- The liquid- cooled battery system saves 40% or more in footprint
- The prefabricated container installation scheme reduces site installation costs and commissioning time

Advanced Function

- Support HVRT, LVRT, black start, SVG, VSG, PQ, and VF
- SOC computations have a 5% accuracy or higher. Smart online debugging and updating

Product Parameter

Product Model	CDWJBH-20L3727	CDWJBH-20L5000
System Parameter		
System Efficiency	⩾88%	⩾88%
System Cycle Life	⩾6000 times@25°C ,0.5C	⩾6000 times@25°C ,0.5C
Rated Charge/discharge Ratio	0.5C	0.5C
Noise	⩽75dBA	⩽75dBA
Working Altitude	3000m	3000m
Communication Protocol	LAN、CAN、RS485	LAN、CAN、RS485
Design Standard	GB/T36276、GB/T34131、UN38.3、UL9540A、UN3536、UL1642、UL1973、IEC62619	
DC Parameter		
Type of Battery	LFP3.2V/280Ah	LFP3.2V/314Ah
Rated Capacity	3727kWh	5015kWh
Composing Form	1P52S*8*10cluster	1P52S*8*12cluster
Size(w*d*h)	6058*2438*2896mm (20foot)	6058*2438*2896mm (20foot)
Rated Charge/discharge Current	1400A	1884A
Max Direct Voltage	1500V	1500V
Operating Voltage Range	1164V~1497V	1164V~1497V
Rh	5%~95%	5%~95%
Cooling Mode	liquid cooling	liquid cooling
Firefighting System	perfluoro/ heptafluoropropane	perfluoro/ heptafluoropropane
IP Rating	IP55	IP55
AC Parameter		
Rated Output Power	1725kW	2500kW
Max Output Power	1897kW	2750kW
Pcs Output Voltage	690V	690V
Allowable Voltage	587-759V	587-759V
Size of Booster Converter Integrated Machine (w*d*h)	6000*2800*2960mm	6000*2800*2960mm
Rated Frequency	50Hz/60Hz	50Hz/60Hz
Adjustable Range of Power Factor	-1~+1	-1~+1

4 Air-cooled Energy Storage System - Centralized

Product Features

Safe and Reliable

- Choose a LFP cell of high thermal stability
- Multi-stage fuse and interlocking mechanism for protection
- Multi-point monitoring and independent firefighting early warning system

Economical and Efficient

- Large installed capacity, Low cost per kilowatt-hour, self-adaption for multi-scene
- The full-frequency air conditioner helps the comprehensive energy efficiency ratio of the whole lifecycle to be greater

The Power of Integration

- The electric and battery-separated design makes it easy to maintain
- With modularized and highly integrated design, the floor area is reduced by 35%
- The prefabricated container installation scheme reduces site installation costs and commissioning time

Advanced Function

- Support HVRT, LVRT, black start, SVG, VSG, PQ, and VF
- SOC computations have a 5% accuracy or higher. Smart online debugging and updating

Product Parameter

Product Model	CDWJBH-40A5000	CDWJBH-40A6000
System Parameter		
System Efficiency	⩾86%	⩾86%
System Cycle Life	⩾6000 times@25°C ,0.5C	⩾6000 times@25°C ,0.5C
Rated Charge/discharge Ratio	0.5C	0.5C
Noise	⩽75dBA	⩽75dBA
Working Altitude	3000m	3000m
Communication Protocol	LAN、CAN、RS485	LAN、CAN、RS485
Design Standard	GB/T36276、GB/T34131、UN38.3、UL9540A、UN3536、UL1642、UL1973、IEC62619	
DC Parameter		
Type of Battery	LFP3.2V/280Ah	LFP3.2V/280Ah
Rated Capacity	5017kWh	6021kWh
Composing Form	1P20S*20*14cluster	1P20S*21*16cluster
Size(w*d*h)	12192*2438*2896mm (40foot)	12192*2438*2896mm (40foot)
Rated Charge/discharge Current	980A×2	1120A×2
Max Direct Voltage	1500V	1500V
Operating Voltage Range	1120V~1440V	1176V~1500V
Rh	5%~95%	5%~95%
Cooling Mode	air cooling	air cooling
Firefighting System	perfluoro/ heptafluoropropane	perfluoro/ heptafluoropropane
IP Rating	IP55	IP55
AC Parameter		
Rated Output Power	2500kW	3000kW
Max Output Power	2750kW	3311kW
Pcs Output Voltage	690V	690V
Allowable Voltage	587-759V	587-759V
Size of Booster Converter Integrated Machine (w*d*h)	6000*2800*2960mm	6000*2800*2960mm
Rated Frequency	50Hz/60Hz	50Hz/60Hz
Adjustable Range of Power Factor	-1~+1	-1~+1

5 Liquid-cooled Energy Storage System - Distributed

Product Features

Optimize Performance with Smart Liquid Cooling

- Liquid cooling efficient heat dissipation, heat dissipation performance is improved by16%, auxiliary power consumption is reduced by 30%
- The system temperature difference is within 3°C, and the battery cell life is increased

Comprehensive Cloud Management

- Cloud platform interconnected, remote one-click upgrade, real-time status monitoring, and fault recording
- Al cell monitoring, operation decision analysis, and intelligent scheduling

Unbreakable Protection

- A single cluster is finely controlled, and an unparalleled connection exists on the DC side with a low short-circuit current
- Separate the battery compartment from the electrical compartment to achieve electric firefighting isolation

The Power of Integration

- Modular architecture enables seamless connection of multiple machines, facilitating flexible capacity expansion to meet
- Versatility extends to all scenarios, spanning from power generation to the user side, ensuring comprehensive

Product Parameter

Product Model	CDWGAH-03L233	CDWGAH-03L261
System Parameter		
System Efficiency	⩾91%	⩾91%
System Cycle Life	⩾6000 times@25°C ,0.5C	⩾6000 times@25°C ,0.5C
Rated Charge/discharge Ratio	0.5C	0.5C
Rated Grid Voltage	400V	400V
Noise	⩽65dBA	⩽65dBA
Working Altitude	2000m	2000m
Communication Protocol	RS485、CAN、LAN	RS485、CAN、LAN
Size(w*d*h)	1000*1300*2400mm	1000*1300*2400mm
Weight	2500kg	2500kg
IP Rating	IP54	IP54
Design Standard	GB/T36276、GB/T34131、UN38.3、UL9540A、UN3536、UL1642、UL1973、IEC62619	
DC Parameter		
Type of Battery	LFP3.2V/280Ah	LFP3.2V/314Ah
Rated Capacity	232.96kWh	261.25kWh
Composing Form	1P52S*5	1P52S*5
Rated Charge/discharge Current	140A	140A
Max Direct Voltage	1000V	1000V
Operating Voltage Range	728~936V	728~936V
Rh	5%~95%	5%~95%
Cooling Mode	liquid cooling	liquid cooling
Firefighting System	perfluoro/ heptafluoropropane	perfluoro/ heptafluoropropane
AC Parameter		
Rated Output Power	125kW	125kW
Max Output Power	137kW	137kW
Pcs Output Voltage	400V	400V
Allowable Voltage	360-440V	360-440V
Rated Alternating Current	180A	180A
Rated Frequency	50/60Hz	50/60Hz
Adjustable Range of Power Factor	-1~+1	-1~+1

6 Air-cooled Energy Storage System - Distributed

Product Features

Comprehensive Cloud Management

- Seamless cloud platform integration enables remote one-click upgrades, real-time status monitoring, and comprehensive fault logging for proactive maintenance
- Advanced AI capabilities encompass cell monitoring, operation decision analysis, intelligent scheduling, optimizing performance,and maximizing efficiency

Unbreakable Protection

- **Single cluster with precise control:** No parallel connections exist on the DC side, leading to a lower short-circuit current
- **Enhanced safety through separation:** The battery compartment is isolated from the electrical compartment for both electrical and firefighting purposes

The Power of Integration

- Modular architecture empowers seamless integration of multiple machines, facilitating flexible capacity expansion to match evolving needs
- Adaptable to every scenario, spanning from power generation to the user side, ensuring comprehensive compatibility

Product Parameter

Product Model	CDWGAH-01A200	CDWGAH-02A233	
system parameter			
System Efficiency	⩾87%	⩾90%	
System Cycle Life	⩾6000 times@25°C ,0.5C	⩾6000 times@25°C ,0.5C	
Rated Charge/discharge Ratio	0.5C	0.5C	
Rated Grid Voltage	400V	400V	
Noise	⩽65dBA	⩽65dBA	
Working Altitude	2000m	2000m	
Communication Protocol	RS485、CAN、LAN	RS485、CAN、LAN	
Size(w*d*h)	1600*1100*2400mm	1200*1100*2350mm	
Weight	2000kg	2200kg	
IP Rating	IP54	IP54	
Design Standard	GB/T36276、GB/T34131、UN38.3、UL9540A、UN3536、UL1642、UL1973、IEC62619		
DC parameter			
Type of Battery	LFP3.2V/280Ah	LFP3.2V/280Ah	
Rated Capacity	200.7kWh	232.9kWh	
Composing Form	1P16S*14	1P20S*13	
Rated Charge/discharge Current	140A	140A	
Max Direct Voltage	1000V	1000V	
Operating Voltage Range	627~806V	728~936V	
Rh	5%~95%	5%~95%	
Cooling Mode	air cooling	air cooling	
Firefighting System	perfluoro/ heptafluoropropane	perfluoro/ heptafluoropropane	
AC parameter			
Rated Output Power	100kW	100kW	125kW
Max Output Power	110kW	110kW	137kW
Pcs Output Voltage	400V	400V	400V
Allowable Voltage	360-440V	360-440V	360-440V
Rated Alternating Current	145A	145A	180A
Rated Frequency	50/60Hz	50/60Hz	50/60Hz
Adjustable Range of Power Factor	-1~+1	-1~+1	-1~+1

7 Liquid cooled battery pack/cluster

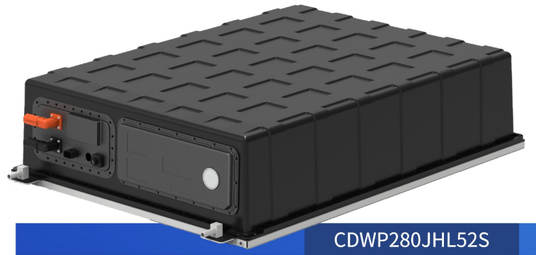
Pack Features

Effortless Maintenance

- **Effortless Maintenance for Fire Detectors and Fuses:** No unpacking is required, saving time and
- **Self-Sealing Pipelines Eliminate Drainage Hassles:** Maintain without disruptions or fluid loss

Prioritize Safety, Optimize Efficiency

- Pack-level fire detection and protection systems safeguard against fire hazards, ensuring safety down to the individual pack



CDWP280JHL52S

电池簇特点 cluster features

CDWC280JHL52S8

Tailor-Made Solutions

- Modular design concepts empower effortless scalability through the seamless integration of standard modules

Intelligent Liquid Cooling

- **Low Intra-Cluster Temperature Difference (Below 5°C):**
  For maximum efficiency and extended lifespan,our innovative design ensures minimal heat build-up

Product Parameter

Product Parameter

Product Model	CDWP280JHL52S	CDWC280JHL52S8	CDW314JHL52S	CDW314JHL52S5
Product Name	Liquid-cooled pack	Liquid-cooled cluster	Liquid-colled pack	Liquid-colled cluster
Cell Type	LFP3.2V/280Ah	LFP3.2V/280Ah	LFP3.2V/314Ah	LFP3.2V/314Ah
Composing Form	1P52S	1P52S*8	1P52S	1P52S*5
Rated Charge/discharge Ratio	0.5C	0.5C	0.5C	0.5C
Rated Charge/discharge Current	140A	140A	157A	157A
Rated Voltage	DC166.4V	DC1331.2V	DC166.4V	DC832V
Rated Capacity	46.6kWh	372.7kWh	52.25kWh	261.25kWh
Self-discharge Rate	⩽3%/ month	⩽3%/ month	⩽3%/ month	⩽3%/ month
Allowable Ambient Temperature	charge：0°C~+60°C discharge：-30°C~+60°C	charge：0°C~+60°C discharge：-30°C~+60°C	charge：0°C~+60°C discharge：-30°C~+60°C	charge：0°C~+60°C discharge：-30°C~+60°C
Size(w*d*h)	785*1130*252mm	785*1170*2529mm	785*1130*252mm	785*1170*1728mm
Weight	about 350kg	about 3200kg	about 350kg	about 2100kg

08 Air-cooled battery pack/cluster

Pack Features

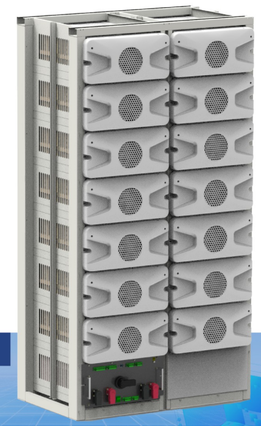
Effortless Maintenance

- **Front-accessible components for streamlined maintenance:** Quickly and easily assemble or disassemble components from the front, simplifying upkeep and reducing downtime
- **Palm rejection technology for safe interactions:**Prevent accidental activation or interference during maintenance, ensuring operator safety
- **Reverse polarity-proof design for peace of mind:**
  Eliminate the Risk of electrical damage caused by incorrect power connections, safeguarding both equipment and personnel

Unparalleled Safety

- **Pack-level fire detection systems:**
  Early identification of potential threats
- **Comprehensive fire protection measures:**
  Mitigation of risks at the source
- **Safety assurance down to the individual pack/module:**
  Comprehensive protection for maximum peace of mind

CDWP280JHA16S



CDWC280JHA16S14

Cluster Features

Tailor-Made Solutions

- Modular design concepts empower effortless scalability through the seamless integration of standard modules

Optimize Efficiency, Prioritize Safety

- Combining heat diffusion prevention with unparalleled 3S management-level fire protection, this system forms an ironclad inner layer of defence against fire threats

Product Parameter

Product Model	CDWP280JHA16S	CDWC280JHA16S14	CDWP280JHA20S	CDWC280JHA20S21
Product Name	Air-cooled pack	Air-cooled cluster	Air-cooled pack	Air-cooled cluster
Cell Type	LFP3.2V/280Ah	LFP3.2V/280Ah	LFP3.2V/280Ah	LFP3.2V/280Ah
Composing Form	1P16S	1P16S*14	1P20S	1P20S*21
Rated Charge/discharge Ratio	0.5C	0.5C	0.5C	0.5C
Rated Charge/discharge Current	140A	140A	140A	140A
Rated Voltage	DC51.2V	DC716.8V	DC64V	DC1344V
Rated Capacity	14.336kWh	200.7kWh	17.92kWh	376.32kWh
Self-discharge Rate	⩽3%/ month	⩽3%/ month	⩽3%/ month	⩽3%/ month
Allowable Ambient Temperature	charge:0°C~+60°C discharge:-30°C~+60°C	charge:0°C~+60°C discharge:-30°C~+60°C	charge:0°C~+60°C discharge:-30°C~+60°C	charge:0°C~+60°C discharge:-30°C~+60°C
Size(w*d*h)	488*678*230mm	1079*682*2003mm	488*828*230mm	1575*856*2180mm
Weight	about105kg	about1500kg	about125kg	about2700kg

9 Energy management unit

Ethe EMU (Energy Management Unit) seamlessly orchestrates system monitoring, energy scheduling, data storage and communication, and charge and discharge strategy optimization for unparalleled efficiency and control.

Key Product Functions

Comprehensive Energy Management Monitoring:

- **Gathers and displays a wealth of information from the distributed energy storage system, including:**
  - · BMS collection data · Firefighting status · Access control logs · Water immersion sensors
  - · Temperature and humidity readings · Air conditioning data
- Facilitates communication control and storage uploading for seamless data management

Anti-Counter-Current Protection:

- · Collects and analyses information from electricity metering and anti-counter-current meters
  · Activates anti-counter-current measures through precise PCS control, safeguarding system integrity

Product Features

Centralized Control:

- Manage up to 10 distributed energy storage systems using a single merging point for streamlined and efficient control

Interactive Energy Management:

- · Monitor and control load energy storage in real-time with interactive options
  · Access comprehensive measurement data displayed on the cloud platform
  · Manage revenue streams through dedicated menus

Advanced Battery Health and Safety:

- · Gain deep insights into battery health and safety status with advanced diagnostic tools
  · Enjoy the reliability and flexibility of 4G wireless Internet of Things (IoT) communication

Product Parameter

Technical Parameters	
CPU	ARM platform, A8 core, 800MHz main frequency
Ram	512MB LPDDR
Capacity	256MB NAND；32GB eMMC；SD card (interface)
Number of Batteries Can Be Detected	max 450 bunch × 60 cluster
Type of Alarm	Sound and light alarm, and display the alarm content, fault output node closed
Communication Interface	3 Lans, 2 isolation CAN, 4 isolated RS485, 1 HOST USB, 1 UART debugging port, 1 UART parameter setting port, 1 4G communication port, and WIFI port
Pwm Fan Interface	Two PWM fan driver ports
Protocols	Support MQTT ; Supports Modbus TCP
Emu Power Supply	DC24V
Emu Power Consumption	＜5W
Communication Baud Rate	9600bps @ RS485、250Kbps @ CAN、100Mbps/1000Mbps @ LAN
Veneer Size	240×140mm
Protection Grade	IP20
Power-frequency Withstand Voltage	2500VAC
Work Environment	Ambient temperature: -25 ~ +60°C; Relative humidity: 5%-95%RH, no condensation

Energy Management Smart Cloud Platform

Empowering remote control and management through dedicated PC and mobile app platforms. Monitor working conditions, diagnose issues, receive fault alerts, schedule repairs, and analyze station-level equipment's electricity income

Key Product Functions

- **Data collection and inquiry:**
  - ·Track power load, voltage, current, power factor, and power quality metrics
  - ·Access historical data for in-depth analysis and insights
- **In-Depth Energy Statistical Analysis:**
  - ·Optimize energy strategies with virtual power plant scheduling
  - ·Receive real-time alerts for proactive protection
  - ·Evaluate energy-saving measures for continuous improvement
- **Intelligent Energy Management Cloud Platform:**
  - ·Visualize operations and revenue data on a large-screen dashboard
  - ·Monitor equipment access for seamless integration and performance tracking
- **Simplified Terminal Management:**
  - ·Reduce power costs through strategic optimization
  - ·Manage equipment alarms efficiently for proactive maintenance
  - ·Maintain grid stability with intelligent support and control systems

Smart Cloud Platform

1.Comprehensive Station Monitoring: Real-time visibility into operating status,equipment working conditions, environmental controls,and security data for proactive awareness

2.Seamless Data Collection and Processing: Efficiently gathers and processes remote communication,telemetry,and alarm data from all station equipment

3.Enhanced Control and Analysis: Enables real-time operation monitoring, remote station control, intelligent early warning with hierarchical alarms, in-depth equipment operation analysis, and energy consumption insights for informed decision-

4.Secure and Efficient Data Handling: Protects sensitive information with data encryption technology and optimizes transmission bandwidth using data compression techniques

5.Cloud-Based Data Processing: Receives, analyses, cleans, and processes data within the cloud for enhanced accessibility and scalability

Cloud monitoring platform to improve overall management and control efficiency