



**HYNN**  
TECHNOLOGY

# SMART INTEGRATED ENERGY SOLUTIONS FOR GLOBAL CLIENTS

Products, Solutions and Services

A large photograph of a wind farm at sunset. The sun is low on the horizon, creating a warm, golden glow. Several wind turbines are visible, with the one in the foreground being the most prominent. The background shows rolling hills and a distant city skyline.

# HYNN

Guangdong Hynn Technology Co., Ltd.




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Pioneer with Innovative Solutions



# SMART INTEGRATED ENERGY SOLUTIONS FOR GLOBAL CLIENTS

Over 19 Years of Experience in Li-ion Cell Intelligent Manufacturing Equipment

 **500+GWh**  
Accumulated Delivery

 **100,000+m<sup>2</sup>**  
Office and Factory Area

 **2000+**  
Global Staff

 **500+**  
R&D Staff and Technicians

 **10+**  
Overseas Delivery Countries

 **7+**  
Foreign Subsidiaries

Established in 2006, HYNN TECHNOLOGY has been committed to providing intelligent production lines, full life cycle testing lines and smart integrated energy solutions for all scenarios, and has become one of the tier-one suppliers in global market.

The company has more than 2,000 employees, distributed in China, Germany, France, Sweden, Japan, South Korea, The United States, etc., has an R&D and technician team of more than 500 people.

To date, HYNN has delivered cell production and testing lines to 10 countries and more than 42 domestic cities in China mainland, accumulated over 500 GWh.

Under the intense challenges of mass production lines, HYNN acquired rich tech and project experience, hence has grown into a core supplier of the world's leading battery manufacturers, car makers, ESS integrators, etc.

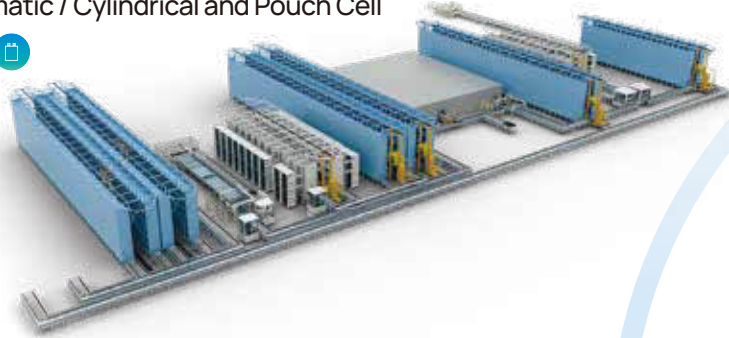


# Business Panorama

## Renewable Energy Full Life-Cycle Applications

### Cell Formation & Test

Turnkey Automated Cell Finishing Solutions for Prismatic / Cylindrical and Pouch Cell



### Module PACK Test & Application

200V Test Equipment



1650V Test Equipment



2500V Test Equipment



PACK Test



Charging / Swapping Station



Energy Storage Battery Test

### Energy Storage Products & Solutions

PCS



Integrated Inverter Step-up Transformer System

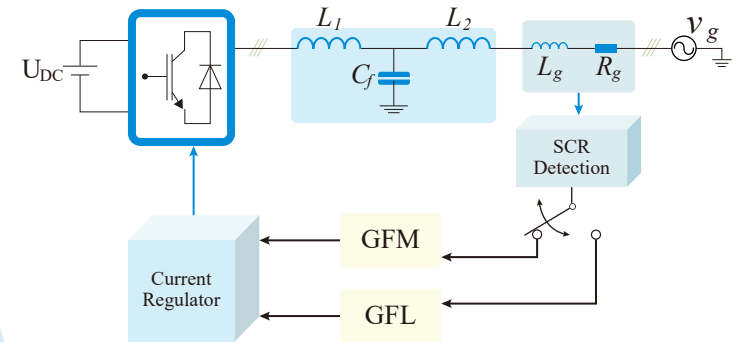


Renewable Power Station

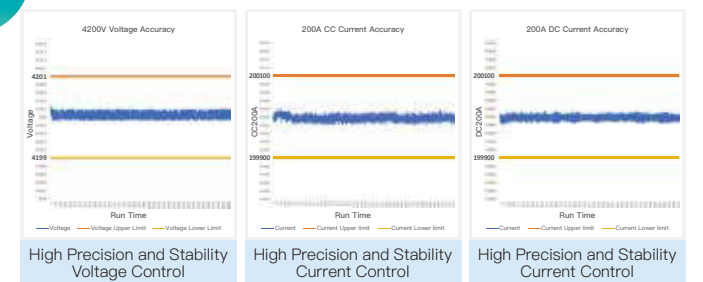


Micro-Grid

### Comprehensive & Reliable Power Electronics Technology



### Cell-Level Control Technology

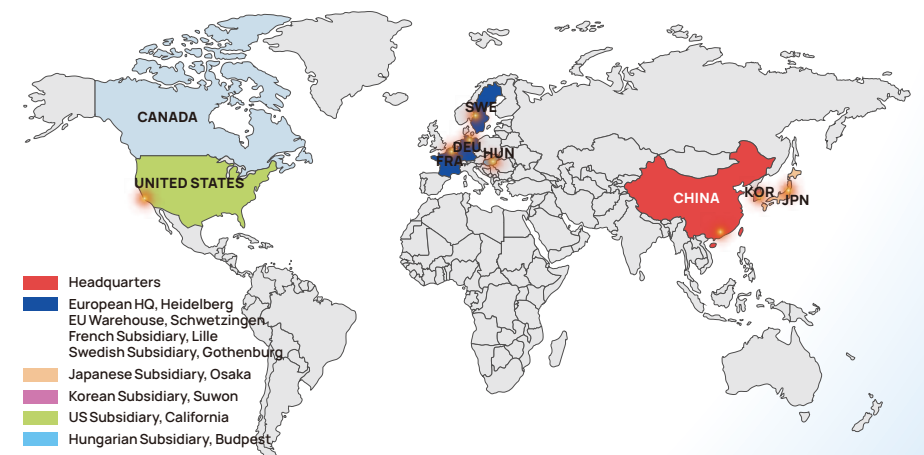


High Precision and Stability Voltage Control

High Precision and Stability Current Control

High Precision and Stability Current Control

### Global Turnkey Delivery Experience

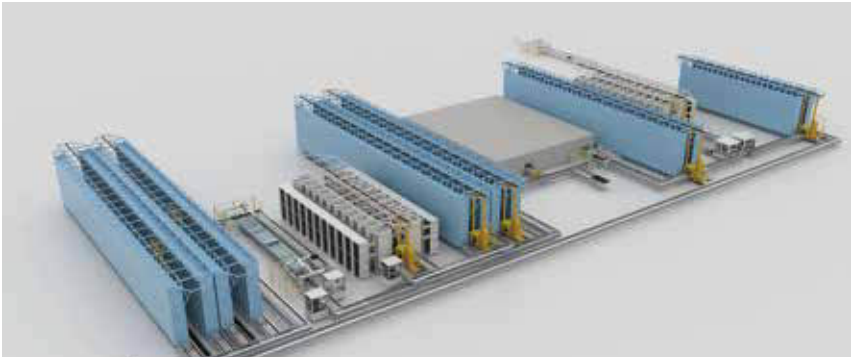


Application Scenarios

Core Advantages

# Application Scenarios

## LiB Cell Manufacturing & Testing



Cell Finishing Energy-Saving Solution

## Industrial & Commercial Parks



Micro-Grid Energy-Saving D-Bus Solution

## Solar Storage Station



Energy Storage System Solution

## Charging & Swapping Station



Solar, Storage, Charging and Testing Integrated Solution

## Cell Formation & Test



Energy-saving Testing Solution

## Lab



Lab Testing Solution



Application Scenarios

# Customers



\* Only part of the clients. Names not listed in order.

# Energy Storage System Qualification



CQC Certified



VDE Certified



SAA Certified



CEC Certified



FCC Certified



CE Certified



UL Certified



CSA Certified

# Project Reference



▶ Containerized testing system for BESS Battery manufacturer, multiple projects in China



▶ Energy-saving testing for PV station Energy group, Jiangsu, China



▶ Containerized testing system for BESS Energy group, France



▶ D-BUS energy saving solutions Battery manufacturer, France



▶ Inverter + step-up boost system Energy group, Henan, China



▶ Inverter + step-up boost system Energy group, Inner Mongolia, China



▶ Inverter + step-up boost system Energy group, Jiangsu, China



▶ Solar, Storage, Charging and Testing Integrated Solution Municipal investment Group, Guangdong, China



▶ BESS Energy group, Heilongjiang, China



▶ Fishing & PV complementary power Station Municipal investment Group, Guangdong, China



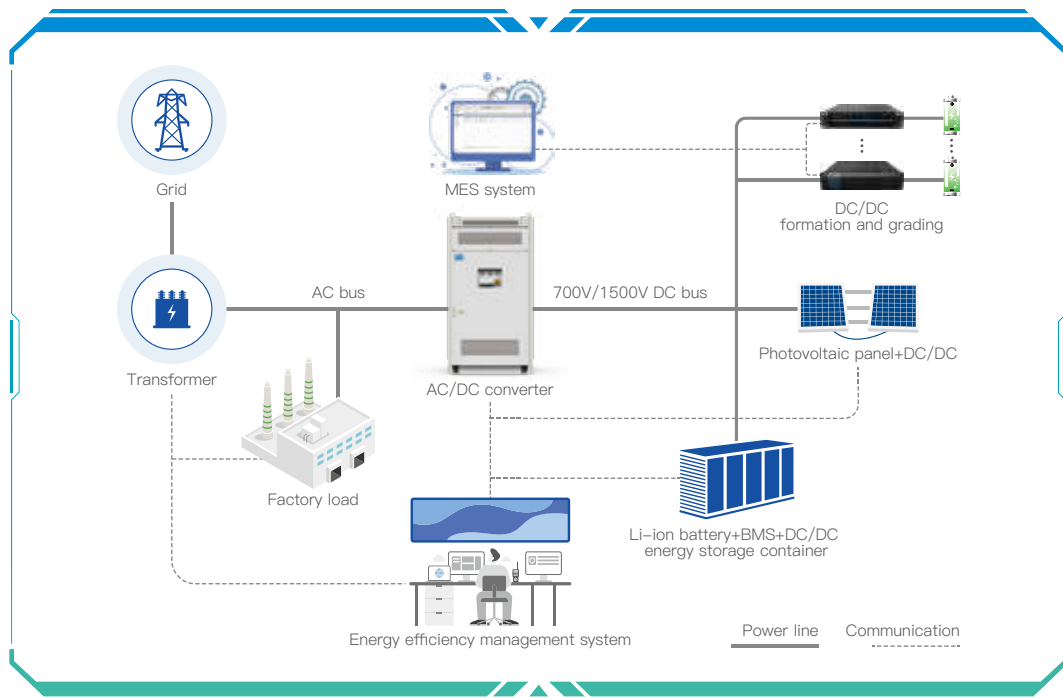
▶ Temporary Power Supply Solution for Construction Site (Middle East Region)



▶ Temporary Energy Supply MW-Level Solution for Electric Heavy Truck (European Customer)

# Solution Highlights

## Micro-Grid Energy Saving Solution



### Design Principle

AC/DC converters, energy storage containers, and DC/DC power modules connected through 700V/1500V DC bus coupling. The energy in the factory can be dispatched in real time by the EMS energy efficiency management system.

### Solution Advantages



Multiple converters in parallel  
AC/DC hybrid integrated

20%

#### Energy Saving Effect

Compared to the traditional formation and grading scheme, the DC bus voltage is higher, the current is lower, and the wire loss is smaller. The overall energy-saving efficiency will be improved by 20%.

10%

#### Overall Cost

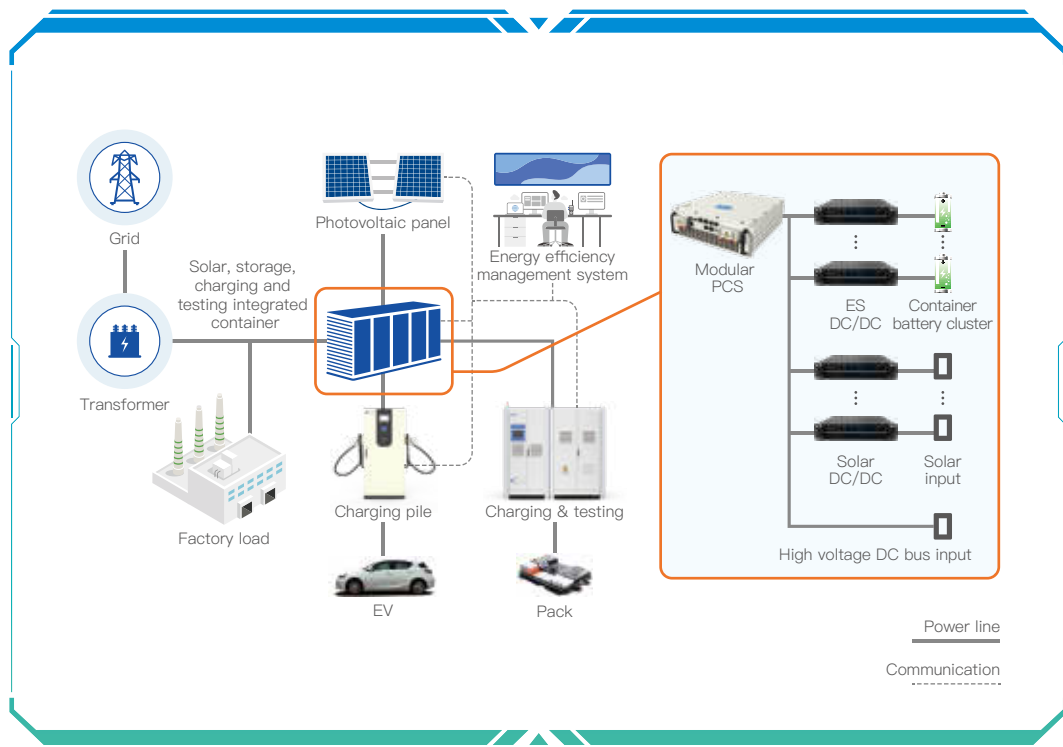
Compared to the traditional formation and grading scheme, AC/DC adopts a high-power all-in-one machine, which can save 10% of the overall cost.

15%

#### Stability Performance

Achieve ACDC non-isolated parallel control of multiple PCS. Through common-mode voltage suppression strategy, circulating current suppression tech and multi-machine parallel resonance suppression algorithm, the system efficiency is increased by more than 15%.

# Solar, Storage, Charging and Testing Integrated Solution






## Design Principle

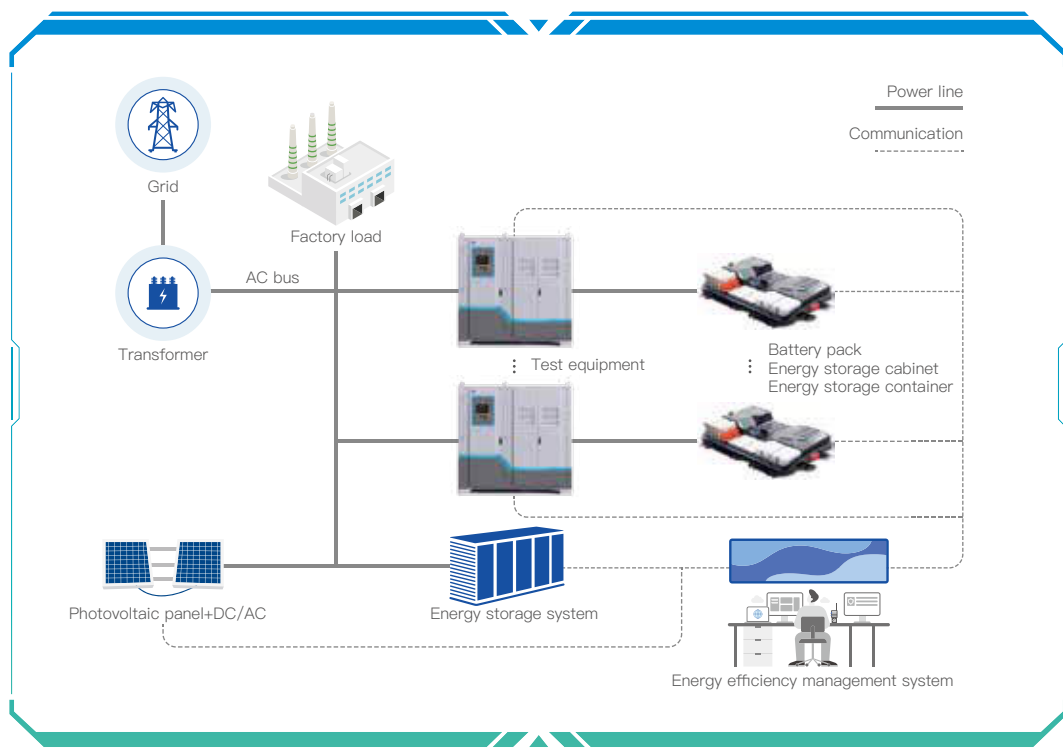
The system consists of a PCS, an integrated solar-storage container, a charging station, testing equipment, and an intelligent energy management system.

The energy management system enables real-time, optimal scheduling of energy flows for improved efficiency.

## Solution Advantages

<div style="text-align: center;">  <p><b>10%</b></p> </div> <p style="text-align: center;"><b>Energy Efficiency Improvement</b></p> <p>Multi energy complementary, mitigating the impact of charging load fluctuations and improving energy efficiency by 10%.</p>	<div style="text-align: center;">  <p><b>10%</b></p> </div> <p style="text-align: center;"><b>Overall Cost</b></p> <p>Flexible configuration, high system conversion efficiency, high-voltage DC bus scheme, overall cost reduction of 10%.</p>	<div style="text-align: center;">  <p><b>15%</b></p> </div> <p style="text-align: center;"><b>Safety Improvement</b></p> <p>Multi channel signal acquisition, real-time monitoring, abnormal fluctuation warning, system safety performance increased by 15%.</p>
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# Energy-Saving Testing Solution for Power Battery



## Design Principle

The system consists of power battery testing equipment, photovoltaic power generation system, energy storage container, electric vehicle pack, and supporting intelligent energy efficiency management system. The factory energy can be dispatched and distributed in real-time by the energy efficiency management system.

## Solution Advantages

15%

### Energy-Saving Improvement

The system has been optimized by the energy efficiency management system, achieving multiple complementary functions and increasing the energy-saving effect by 15%.

50%

### Efficiency Improvement

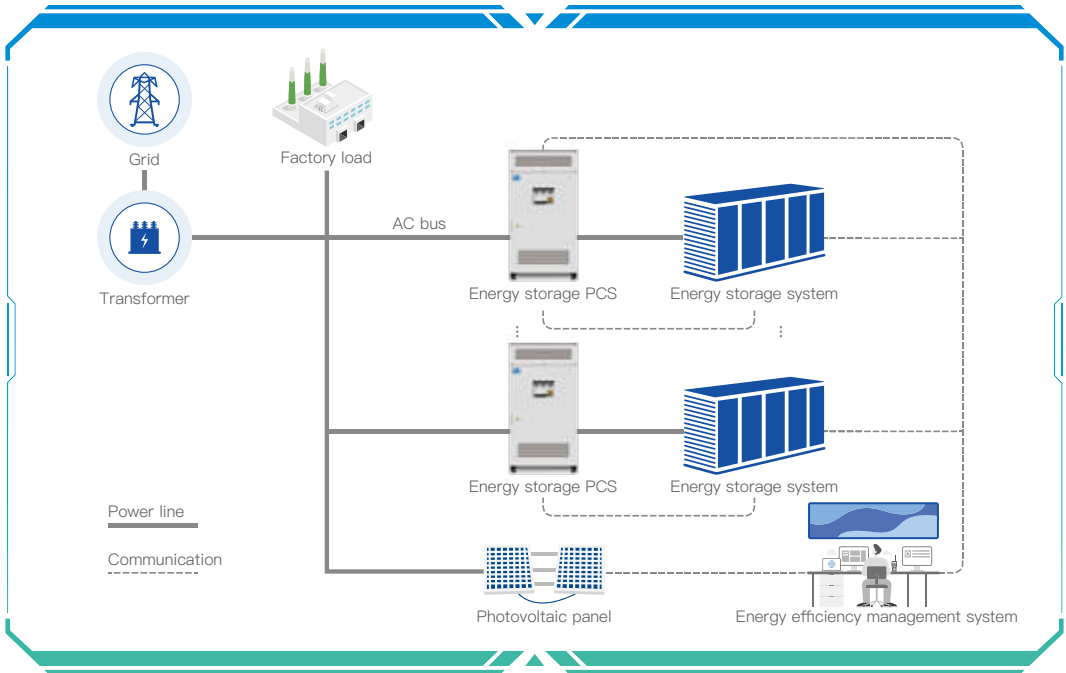
Based on partial charge and discharge data, predict the complete charge and discharge curve of the battery, shorten the testing process, and improve the testing efficiency by 50%.

20%

### Safety Improvement

Multi level software and hardware fuse protection, high security protection for data recording, and 20% improvement in security performance.

# Energy Storage System Solution



## Design Principle

The system includes a PCS, a photovoltaic power generation system, an energy storage container, and an intelligent energy management system. Each unit is connected via an AC bus. The energy management system enables real-time optimization and scheduling for improved overall efficiency.

## Solution Advantages



### Energy Saving

Based on power output prediction and energy storage discharge scheduling, intermittent and fluctuating renewable energy generation output can be smoothly controlled to meet grid connection needs.



### Efficiency Improvement

The energy storage system enables peak shaving and valley filling, and rapid frequency regulation to ensure power quality and safe and system stability. The energy management system improves efficiency through managing multi-parallel PCS units.



### Electricity Cost

Charging the energy storage system at low electricity prices and discharging the at high prices can achieve peak-valley arbitrage, self-use backup and other demands.

# Featured Equipment

## PCS



### Efficient

Three-level control, the maximum conversion efficiency reaches 99%.



### Easy O&M

Higher Safety  
Higher protection level  
Multi-level AC/DC fuse protection

## Product Features



### All-Scenarios

Equipped with VSG, VF, PQ, black start and other functions suitable for power generation side, grid side, user side and etc.



### Grid Support

Comply with CE, GB/T34120, GB/T34133 standards.  
Support high/low voltage and frequency ride-through.  
Enhanced power grid adaptability.  
Fast response.

## Parameters

### PCS Series

PCS1100-1000TA

PCS1250-1500TA

PCS1725-1500TA

PCS2500-1500TA



Rated AC power  
**1100/1250/1725/2500kW**

AC overload capacity  
**1210/1375/1895/2750kW**

Rated grid voltage  
**400/690Vac**

Rated grid frequency  
**50/60Hz**

DC voltage range  
**650~1000/1000~1500Vdc**

Maximum DC current  
**1861/1375/1895/2750A**

Maximum conversion efficiency  
**99%**

Communication protocols  
**IEC104/IEC61850/MODBUS TCP**

### PCS Module

PCS0125-1500MA

PCS0215-1500MA

PCS0215-1500MS

PCS0430-1500MS



Rated AC power  
**125/215/430kW**

Communication overload capacity  
**137.5/237/473kW**

Rated grid voltage  
**400/690Vac**

Rated grid frequency  
**50/60Hz**

DC voltage range  
**650~1000/1000~1500Vdc**

Maximum DC current  
**212/237/473A**

Maximum conversion efficiency  
**99%**

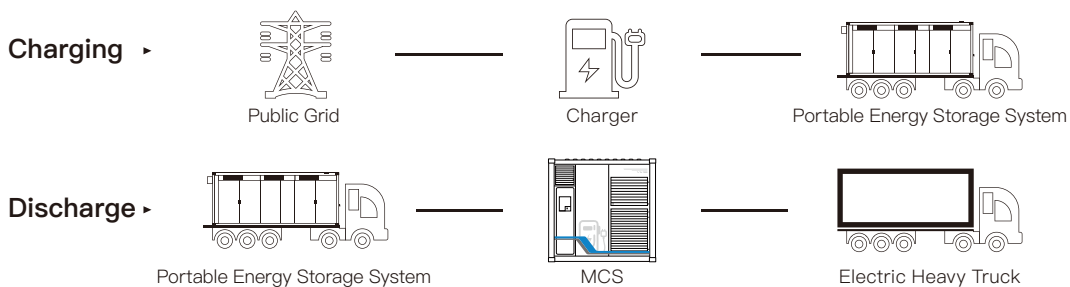
Communication protocols  
**IEC104/IEC61850/MODBUS TCP**

Protection level  
**IP 65**

# Mobile Energy Storage



## Mobile Energy Storage for Grid Applications



### Higher Flexibility, Quick Setup

Off-grid power supply, place anywhere you need.

No extra setup required, plug in and power up.

Highly flexible to meet the sudden power demands.

### High Capacity, High Power

Equipped with high-energy density power batteries.

2MWh per cabinet, supporting parallel connection.

1.8MW charge/discharge power, boosting production efficiency.

## Product Features

### Wide Applications

Configurable charging connector based on different application scenarios.

Applications including mobile EV charging station, outdoor events, rural and remote areas, construction sites, logistics parks, industrial production, mining areas, and etc.

### Secure, Stable, and Smart Management

24/7 smart monitoring with real time battery status evaluation.

Multi-level and all-round protection from components, modules, to system.

Smart monitoring enables optimal charging/discharging strategy.

## Application Scenarios for the Mobile Energy Storage

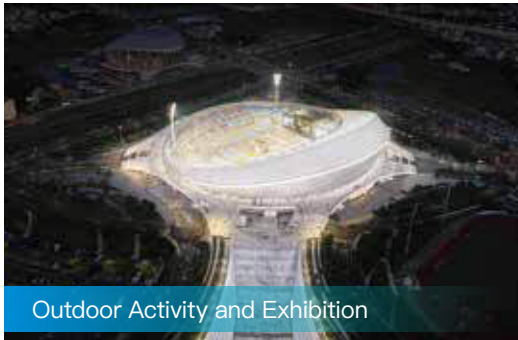
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Mobile EV Charging Station



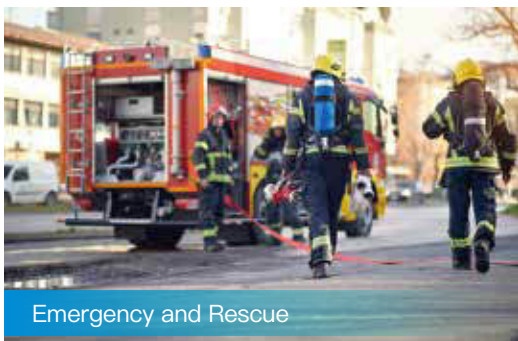
Agriculture and Remote Areas



Outdoor Activity and Exhibition



Charging for Mining Truck



Emergency and Rescue



Industry and Construction Site

## Project Reference

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- ▶ Temporary Power Supply Solution for Construction Site (Middle East Region)



- ▶ Temporary Energy Supply MW-Level Solution for Electric Heavy Truck (European Customer)

## Parameters

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### Parameters for Battery Cabinet

Battery type  
**LFP**

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Nominal voltage  
**614.4Vdc**

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Rated storage energy  
**1836kWh**

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Battery string  
**3\*3P192S**

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System safety standards  
**GB/T38031/UN3536/UN38.3**

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Thermal management approach  
**Liquid cooling**

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IP protection level  
**IP 65**

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Permitted running temperature  
**-30°C~+50°C**

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Container dimension  
**3020(L)\*2438(W)\*2896(H)mm**

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### Parameters for Charging Cabinet

Rated output power  
**1500kW**

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Rated output voltage  
**1000Vdc**

---

Rated output current  
**1500A**

---

Output voltage range  
**200~1000Vdc**

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Charging port interface  
**MCS/CCS1/CCS2 (Optional)**

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Cooling approach  
**Intelligent air-cooling**

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IP protection level  
**IP 54**

---

Permitted running temperature  
**-30°C~+50°C**

---

Container dimension  
**3020(L)\*2438(W)\*2896(H)mm**

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# Cell / Battery PACK & Cluster Testing System

## 5V High Precision Battery Testing Lab Equipment



### High Power Density

DC/DC uses third-generation semiconductor device to increase switching frequency and reduce power supply size.

AC/DC uses single transistor instead of IGBT module to increase switching frequency and reduce cost.

### High Efficiency

The use of 750V and 15V secondary common bus bar makes the power cycle more efficient.

LLC soft-switching technology to achieve high-frequency isolation and improve efficiency.

## Product Features

### High Reliability

AC/DC uses three-level technology to reduce harmonic components and common-mode interference.

Using interleaving technology to reduce the output current ripple.

Full fill safety standards:  
EN62477-1.

EMC compliance:  
EN61000-6-2/EN61000-6-4.

### High Performance

Modular design, cross-module parallel support 3000A.

Support CC, CV, DC, DV, Pulse, simulation etc.

Using CANFD Communication.

High-precision sampling ADC: 24bit.

1ms high speed sampling.

Current grade (patent no.  
CN202323053472.7)

Current dynamic response 1ms.

## Parameters

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**DECT05300A**

**DECT05600A**

**DECT051200A**

**DECT052400A**

**DECT053000A**

Model

**DECT5300A-3000A**

Channel quantity

**1~32CH or Adjustable**

Voltage accuracy

**±0.02%FS**

Voltage resolution

**0.1mV**

Current accuracy

**±0.05%FS (Grading: 75A/Grade)**

Current resolution

**0.1mA**

Charging output voltage range

**0~5V**

Dis-charging input voltage range

**1.5~5V (0V Adjustable)**

Current response

**2ms (10%~90%)**

High speed sampling

**1ms**

Charging peak efficiency

**83%**

Dis-charging peak efficiency

**78%**

Auxiliary channels

**Voltage / Temperature / Pressure Sensor**

Auxiliary channels voltage sampling board

**Sampling voltage 0V~+6V, Deviation  $\leq \pm 2\text{mV}$ , Resolution rate 0.01mV**

Auxiliary channels temperature sampling board

**Range -40°C~120°C, Deviation  $\leq \pm 1^\circ\text{C}$ , Resolution 0.1°C**

Device input voltage

**380V3P**

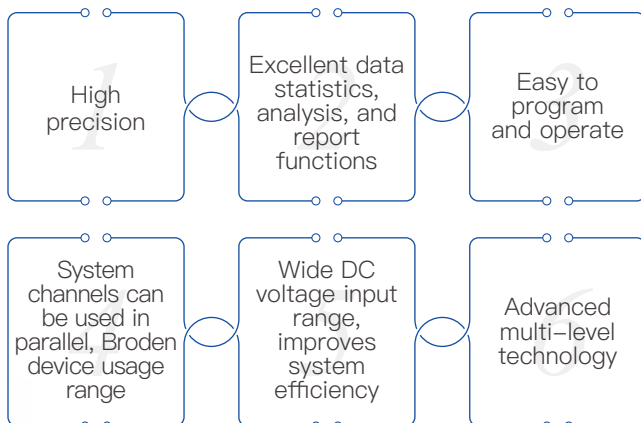
Equipment working environment temperature

**-10°C~35°C**

# Regenerative Digital Battery Tester (with Energy Feedback Function)



## Features



## Parameters

20V10A-24H	30V30A-24H	60V60A-24H
100V120A-8H	100V300A-2H	200V800A-1H
AC input voltage range <b>380VAC ±10%, three-phase five-wire system</b>	Input power frequency range <b>50±2Hz</b>	Maximum AC input power <b>5.5~180kW</b>
Power range <b>4.8~160kW</b>	Power factor <b>&gt;0.99 (Rated power)</b>	Charging efficiency <b>≥90%</b>
Grid current (THD) <b>≤5% (Rated power)</b>	Discharge efficiency <b>≥90%</b>	Power accuracy <b>2‰</b>
Number of output channels <b>1~24CH</b>	Output DC voltage range <b>20~200V</b>	Output DC current range <b>10~800A</b>
Output voltage control accuracy <b>±0.03%FS</b>	Output current control accuracy <b>±0.03%FS</b>	Voltage rise/Fall response time <b>≤10ms (10%~90%)</b>
Battery voltage range <b>20~200V</b>	Maximum battery current input <b>10~800A</b>	Battery voltage display resolution <b>0.1mV</b>
Battery current display resolution <b>0.1mA</b>	Data acquisition period <b>10ms</b>	Data upload and recording period <b>100ms</b>
Communication interface <b>LAN/CAN2.0/RS 485/SMBUS</b>	Protection rating <b>IP 20</b>	Operating temperature range <b>-10°C~+45°C</b>
Humidity range <b>0~90% (Non-condensing)</b>	Size (W*D*H) <b>800*800*2200mm</b>	Auxiliary power supply <b>Voltage ±5V, temperature -40°C~+200°C</b>

# High Power Energy Storage Container / Battery Cluster Testing Equipment

► Applicable to 2500V high voltage complex environment



High-quality energy feedback, maximum efficiency  $\geq 96\%$



High power factor value,  $>0.99$



Total harmonic content of grid-tied current  $\leq 5\%$



I-type three-level technology, wide voltage range output, small ripple

## Test Items

Short circuit, insulation, withstand voltage

Working condition simulation, capacity, cycle life

Pulse charge & discharge characteristics

ACIR, DCIR, BMS performance

Charge & Discharge Efficiency

Consistency test evaluation

Overcharge and over-discharge endurance

## Product Features

Multi-level authorization

MES data access

BMS two-way communication, customize BMS values as control / protection parameters

Working condition simulation

System channels can be used in parallel

DSP full digital control

Anti-reverse connection, Data security protection

## Parameters

**0-200V  
10-300kW**

**0-1000V  
50-800kW**

**0-2500V  
1000kW-6.3MW**

Current up/down reaction time  **$<5\text{ms}$**

Charge/discharge switch time  **$<10\text{ms}$**

Voltage accuracy  **$\pm 0.03\%FS$**

Voltage resolution  **$0.1\text{mV}$**

Current accuracy  **$\pm 0.03\%FS$**

Current resolution  **$0.1\text{mA}$**

# Integrated Inverter Step-up Transformer System



## Highly Integrated

Modular design improves space utilization  
Pre-installed and pre-engineered to reduce on-site work  
Easy to install and transport

## Efficient & Reliable



IP 54 protection level, adapt to various environments  
Inverter and transformer unit optimized to improve system efficiency

## Product Features



## Energy Saving Cost Down

Three level topology, with maximum conversion efficiency of 98.5%  
High integration and small footprint.  
Easy to transport and install, reducing on-site construction costs

## Grid-Tied



Equipped with LVRT and HVRT  
Equipped with active and reactive four-quadrant adjustment function  
Fast power response (<10ms)

## Parameters

### IBC-1500V-5MW

Max DC power  
**3450/5000/5160kW**

DC input channels  
**2/4/24**

Rated AC current  
**1588A\*2/1150A\*4/198A\*24**

Grid frequency range  
**50/60Hz**

Transformer type  
**Dry/Oil**

Max efficiency  
**99%**

### IBC-1500V-6.25MW

DC voltage range  
**1000~1500V**

Precision of current & voltage regulation  
**±1%**

Rated AC voltage  
**690V**

Output current (THD)  
**<3% (Rated power)**

Rated power  
**3500/5100kVA**

Protection level  
**IP 54**

### IBC-1500V-6.9MW

Max DC current  
**1897A\*2/1375A\*4/236A\*24**

Max AC power  
**3795/5500kW**

AC voltage range  
**586~759V**

Power factor and adjustable range  
**≥0.99 / -1~1**

Voltage transformation ratio  
**37/0.69kV**

Allowable environment temperature  
**-35°C~+60°C**

# 6MW level BESS Pioneer in Industry Testing System Project

6.3MW energy storage container test system is customized and designed according to customer needs. All energy storage equipment and distributed systems uniformly interact with MES through the dispatching system to realize the integration of equipment and upstream and downstream systems.



## Project Features



Control strategy for paralleling multiple devices to achieve flexible configuration



Complete multi-level protection mechanism to achieve reliable operation



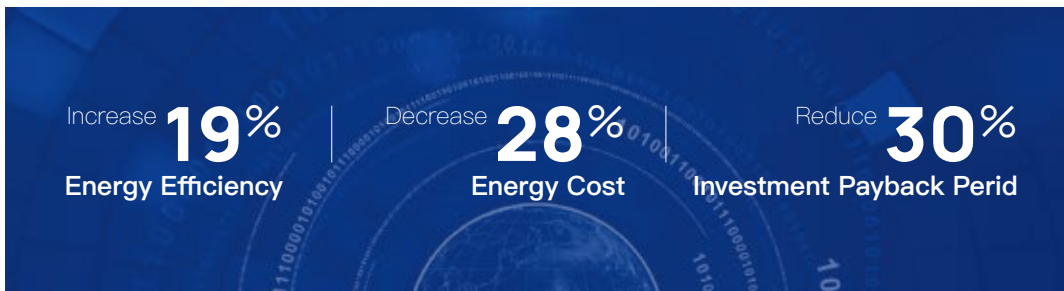
Excellent software, hardware and system design, high precision and high reliability

# Energy Efficiency Management System

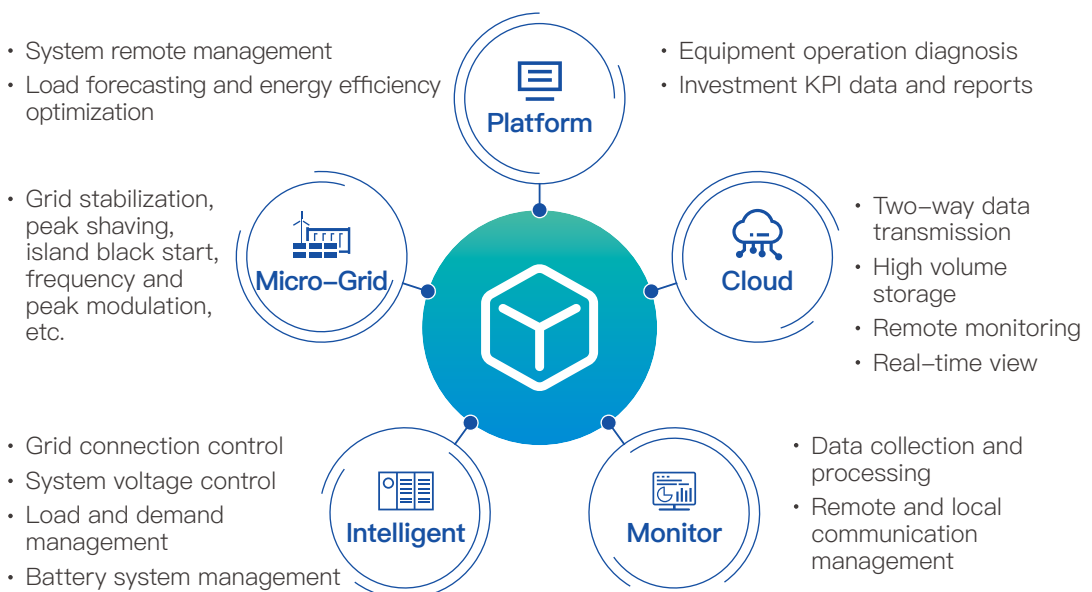
By predicting the power demand of the industrial park/station micro-grid, the charge and discharge ratio is adjusted to achieve optimal DC bus charge and discharge balance control, hence to realize real-time optimal energy management and reduce power consumption. Supports a variety of application scenarios, such as frequency and peak regulation, smooth output, black start after islanded system, peak shaving etc.



## Advantages



## Features





With the aim of maximizing customers' value, we achieve the maximization of our enterprise value.

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