HIGH RATE ENERGY STORAGE

QINKUAL Energy Storage Product Manual

Leading the trend of high-rate energy storage

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QINKUAL 颀刻®

LEADING THE TREND OF
HIGH-RATE ENERGY STORAGE

SUPERIOR PERFORMANCE
QINKUAL CREATION

Company Profile

QINKUAL 沨刻®

CELL LEADER OF
FULL TEMPERATURE ADAPABILITY
HIGH C-RATE

Focus in Battery Technology Innovation
Create Zero-carbom Future Together

Shaanxi Qinkual Energy Technology Co, Ltd. is a technology company belongs to the larges-cale state-owned energy and chemical group Shaanxi Coal & Chemical Industry Group, focusing on energy storage and application.

Qinkual Energy focuses on high-power energy storage application scenarios, building a matrix of long-lasting, high-safety, high-rate lithium-ion batteries and system products. Its professional EPC team implements refined project management and delivery, forming a full-chain solution from R&D, manufacturing to delivery and operation. It promotes the intelligent and green transformation of energy storage technology globally.

500 Million Investment | **4** GWh Annual Capacity | **10+** Years Development history

Introduction to Application

Source Side

For the source side, energy storage systems provide energy translation function, optimize the output curve, reduce the unavailable wind and solar power, improve the response speed of thermal power units, and also provide system inertia control and adjust speed and accuracy.

Applications:

- Peak shaving
- Power smoothing
- Frequency modulation auxiliary service
- Reserve capacity
- Schedule tracking

Load Side

For the load side, energy storage systems provide intelligent load management for the power grid, modulate peak and frequency according to the grid load, and ensure stable operation of distribution side equipment to efficiently support the transmission of new power systems.

Applications:

- Relieve capacity blockage
- Voltage support
- Delay PTD expansion and upgrading
- Ancillary service in power market

User Side

For the user side, energy storage systems provide users with efficient energy management services, reducing their electricity costs by commercial models such as peak valley arbitrage, demand control, and demand side response, and can also be backup power to reduce outage loss. Besides, user side can be extended to more applications, such as communication stations power, PV + ES + charger system, and virtual power plants, to assist in new power system construction.

Applications:

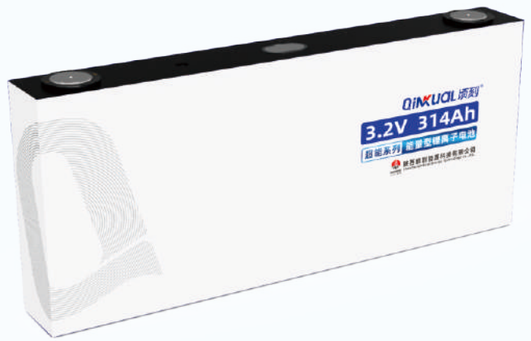
- Peak-valley arbitrage
- Demand control
- Communication station backup power
- PV + ES + charger system
- Virtual power plants

Micro Grid

Micro grid is constructed by energy storage systems and new energy generation equipment combining diesel generators, to provide power to remote or island areas, achieving multi-energy complementarity and spontaneous self-use in no-electricity areas. Industrial and commercial microgrids can also continuously provide clean energy for DC or AC loads.

Energy Storage Products

Large Cells for Energy Storage



The picture is for reference only; the actual item is to be taken as the standard.

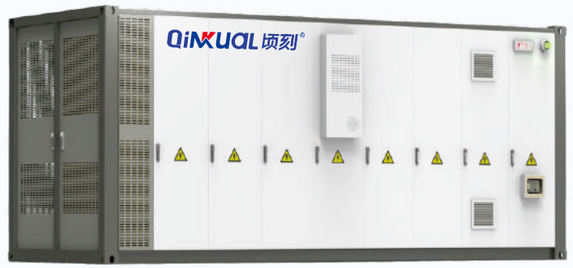
1. **High power** — Supports a maximum continuous discharge of 2C and 1P system power, and is compatible with 1-2h frequency modulation and peak shaving requirements
2. **High energy efficiency** — 1P energy efficiency > 94%, 0.5P energy efficiency > 95%
3. **High security** — The long and thin design enhances heat dissipation performance, with a temperature rise of less than 3°C for 1P, high overload safety overcurrent for 4P
4. **High security** — 8000 times cycle, achieveing the requirement of "co-lifespan of photovoltaic and energy storage"

Type	QPF314CA	QPF200CA
Dimension	48*365*158mm	54*174*207mm
Nominal Capacity	3.2V/314Ah@1C	3.2V/200Ah@1C
Internal resistance	0.18±0.05mΩ	0.13±0.05mΩ
Weight	(6250±300)g	(4165±60) g
Operating Temperature	-20~60℃	-20~60℃
Maximum Charge/ Discharging Rate	1P	1C
Maximum Pulse Charging/ Discharging Rate	1.5P	2C
Energy density	170Wh/kg	151Wh/kg
Standard cycles	8000	4500

UN38.3 GB/T 36276-2023 GB/T 44240 IEC62619 IEC60730

Large-scale Storage Solutions

Energy Storage Container



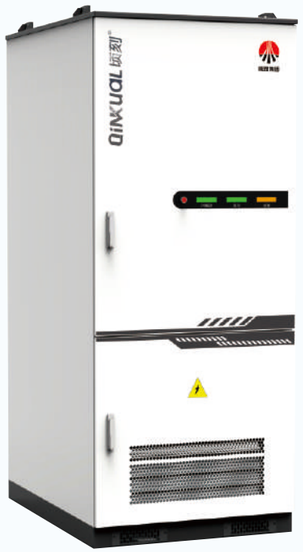
The picture is are for reference only, please refer to the actual product

1. **High Power** — Support 0.25P-2P system power covering both high power and high capacity type
2. **Long Life** — Maintain temperature difference of cells within 2℃ and 5℃ between racks, supporting 10 years calendar life
3. **Real Safety** — Integrate battery cells explosion proof valve detection
Integrate pack, rack, and system triple fire suppression
IP67 battery module protection level
4. **Easy to Integrate** — Support one-rack-one-unit by battery modular design, no inter-rack circulation
Compatible with full series of Qinkual high power cell products
5. **Easy to Configure** — Flexible expansion and place
6. **Easy to Manage** — Data interacts in real time.
Support electricity statistics,fault alarm, thermal runaway alarm, etc.

Capacity	3.54MW/1.77MWh	2.5MW/2.5MWh	4MW/4MWh	2.5MW/5MWh	
Number of Racks	2	1	1	1	0.5
Configuration	14	10	10	12	12
Nominal Voltage (V)	14*1P396S	10*1P392S	10*1P400S	12*1P420S	12*1P416S
Voltage Range (VDC)	1267.2	1254.4	1280	1344	1331.2
Nominal Power (MW)	1108.8~1425.6	1094.6~1425.6	1120~1440	1176~1500	1164.8~1497.6
Nominal Capacity (MWh)	3.54	2.5	4	5	2.5
Nominal Charging Discharging Current (A)	1.77	2.5	4.02	5.06	5.02
Nominal Charging Discharging C-rate (P)	2*1400	2*1000	2*1570	2*1884	1884
Number of Branch	2	2	2	2	1
Fire Suppression	Perfluoro + water spray				
Cooling	Liquid cooling				
Dimension (mm)	6350*2438*2896	6058*2438*2896	6058*2500*2896	7000*2600*2896	6058*2438*2896
Weight (t)	35	28	41	48	41

Industrial and Commercial Energy Storage Solutions

Liquid Cooling Energy Storage Cabinet



The picture is are for reference only, please refer to the actual product

1. **Real Safety** — Single-unit design without inter-rack circulation, integrate pack and rack level perfluoro fire suppression
2. **High Efficiency** — No transformer with higher system efficiency
3. **Long Life** — Maintain temperature difference of cells within 2℃ and 5℃ between racks, increasing 20% system life
4. **Easy to Configure** — Flexible expansion and place
5. **Grid Friendly** — Three-phase three-wire system that increases transmission efficiency and ensures grid safety

	Capacity	215kW/418kWh	125kW/261kWh	125kW/143kWh	240kW/241kWh
DC Side	Battery Type	LFP			
	Configuration	1P416S	1P260S	1P224S	1P240S
	Nominal Voltage (V)	1331.2	832	716.8	768
	Operating Voltage Range (V)	1164.8 ~ 1497.6	728 ~ 936	627.2 ~ 806.4	672 ~ 864
	Electricity (kWh)	418	261	143	241
AC Side (Ongrid)	Nominal AC Power (kW)	215	125	125	240
	Nominal Current (A)	180	180	180	346
	Nominal AC Voltage	400/230 (-20%~15%)			
	Frequency Range (Hz)	50 / 45~55			
	Harmonic	<3% (Nominal Power)			
	Adjustable power factor	−0.95 ~ 0.95			
AC Side (Offgrid)	Nominal AC Power (kVA)	215	125	125	240
	Nominal AC Voltage (V)	400/230 (-5%~5%)			
	Harmonic	<1%(Nominal Power)			
	Frequency Range (Hz)	50/45~55			
System	Weight (kg)	0.99			
	Protection Level	IP55			
	Environment Temperature	-30 ~ +55℃			
	Maximum Height	4000m(derating above 3000m)			

UN38.3 · GB/T 36276-2023 · GB/T 44240 · IEC62619 · IEC60730

Intelligent Manufacturing

SUPERIOR PERFORMANCE
QINKUAL CREATION

Sharpening craftsmanship

Deeply customized machines and advancing processes, increasing more than 10% energy density More than 96% cell efficiency



Excellent quality control

Full coverage quality control

11,000+ quality control points
90% online monitoring proportion

High products consistency and reliability

Tolerance <1%, voltage difference <5mV

Full-line semiconductor-grade environmental monitoring architecture

Core regional environment is higher than Class 100,000 cleanliness standard

Highly automated and digitized

90% Overall automation rate full-chain digital management bidirectional traceability of product information

Enterprise qualifications

Environmental Management System Certification

Certification of Occupational Health and Safety Management System

Quality Management System Certification

CNAS Laboratory Accreditation Certificate

IEC62619

IEC62620

IATF16949

Project Cases

High-power energy storage applications

Local Rooted, Global Expanding, Leading High Power Energy Storage Trend

THERMAL POWER PLANT FREQUENCY REGULATION

Huaneng World's First Super Capacitor Combined FM Project

15MW / 7.5MWh DC side + 5MW super capacitor

Xinyuan Clean Energy: Northwestern's First Sodium-ion Battery Combined FM Project

10MW / 5MWh Lithium battery system + 1MW / 0.5MWh sodium-ion battery system

Tongchuan Power Plant: Shaanxi's First Super Capacitor Combined FM Project

15MW / 15MWh Lithium battery system + 5MWsuper capacitor

Shaanxi's first high power LFP battery +flywheel combined FM project

10MW/7.28MWh

PEAK SHAVING

Wuhe Green Energy base: PV+ES Project

40. 5MW/81MWh

Yuncheng Power Plant: Peak Shaving Project

120MW/240MWh

Xinyuan Clean Energy Carbide(CaC2) Factory: Peak Shaving Project

50MW/100MWh

INDUSTRIAL & COMMERCIAL ENERGY STORAGE

Taiwan Zero-Carbon Industrial Park: Region's First on/off grid switching ES Project

0.5MW/1MWh

Shenmu Sewage Treatment Plant: Northern Shaanxi's First User Side Benchmark ES Project

1500kW/3132kWh

In the future, QINKUAL®
will continue to be motivated by technological innovation.

Join hands with global customers to
enter a zero-carbon society and
guide the world towards a green future

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