INNOVA

shoto

High Rate Battery Solutions for IDC

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SHUANGDENG GROUP CO.,LTD

It makes sure that you and I are always connected

Shoto, a leading integration service provider of green energy storage in the era of big data, using cutting-edge energy technology, with its global deployment, shares a green world with its all customer.

Shoto has full range of data room backup power solutions to provide a solid green energy protection. It provides efficient, stable and reliable backup power for all kinds of usage scenarios such as base stations, data rooms, and power availability for more than 3 million base stations worldwide. Shoto's solution has been applied in different environments and scenarios. The continuous advanced innovation and technology have made Shoto 's Green Communication Energy Storage System a valuable application worldwide.

Catalog

Beijing Headquarter

Nanjing Research Institute

Jiangsu Taizhou High-rate Lead-acid Battery Production Base

Company Profile

Shoto, a leading integration service provider of green energy storage in the era of big data, using cutting-edge energy technology, with customers around the world, shares a green world with customer.

We actively explore and discover a new world of energy. For telecom industry, Shoto has a full range of energy storage solutions, and provides reliable green energy security. For power industry, we are becoming a core hub of creating future smart grid networks. For transportation industry, Shoto is supplying new, clean and high-efficiency energy to offer infinite assistance to social development. In recycling industry, Shoto is the first to build recycling industry chains for lead acid battery in China to protect the earth.

We pursue perfection and create an enterprise with strong ability to develop new technology. Shoto is the only “National Eco-friendly Enterprise” in the industry, “National Key High-tech Industry Group”, one of “China Top 100 Electronic Information Enterprises” and one of “World Top 500 New Energy Enterprises”.

We take advantage of the Internet platform, big data and cloud storage to pursue perfect service to our customers. We own the largest market share among domestic main telecom operators for years and the on-line application is up to 30%, Shoto has supplied products to European and American countries and exported products to 127 countries across the five continents. Shoto insists the “new energy, recycling and high-tech, focusing on the management of design and development, green procurement, system management, recycling, energy conservation and emission reduction, so as to create green development pattern for industry and green lifestyle for human, and store the green energy for the future!

Xiangyang battery production base

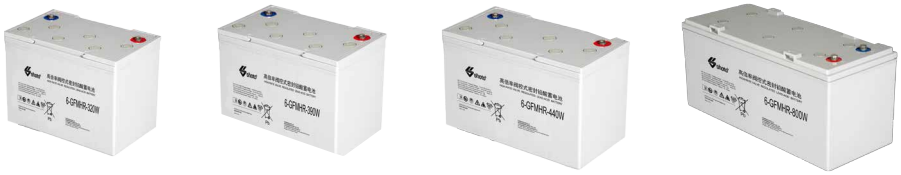
Taizhou lithium-ion battery production base

Nantong Battery Recycling Base

New high-rate battery

Product Models

12V Top terminal high-rate series



6-GFMHR-320W
6-GFMHR-390W
6-GFMHR-440W
6-GFMHR-500W
6-GFMHR-550W
6-GFMHR-630W
6-GFMHR-700W
6-GFMHR-750W
6-GFMHR-800W

12V Front terminal high-rate series

6-GFMHR-350XW
6-GFMHR-410XW
6-GFMHR-500XW
6-GFMHR-590XW
6-GFMHR-630XW
6-GFMHR-700XW

2V High-rate series

GFMHR-600W | GFMHR-900W | GFMHR-1150W | GFMHR-1450W | GFMHR-1700W | GFMHR-2250W | GFMHR-2750W

* Note: Battery labels and silk screen printing is optional

Research Results

Shoto leaded the drafting of industry standard of "High-power VRLA batteries for communication" and has published 6 papers in professional academic journals, and also applied for more than 10 related patents of high-rate battery.

In October 2015, the high-rate UPS battery was awarded the first batch of certificate of honor of innovation products and solutions in communication industry issued by China association of communication enterprises.

In November 2015, Shoto won the outstanding supplier award of China data center by China national engineering construction standardization association.

In September 2016, the ministry of industry and information technology approved the project of the industrial standard of the high-rate battery, which was drafted by Shoto.

In September 2016, the ministry of industry and information technology approved the project of applied research of 240V/336V lithium battery, which was drafted by Shoto.

Patent Application

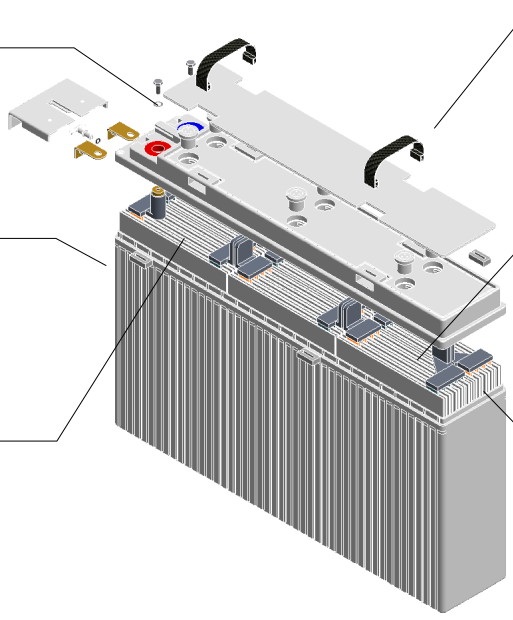
Field of application

- Data center, UPS power system
- High-power, high-current discharge scenarios
- High-precision equipment backup power supply
- Industrial backup, emergency lighting

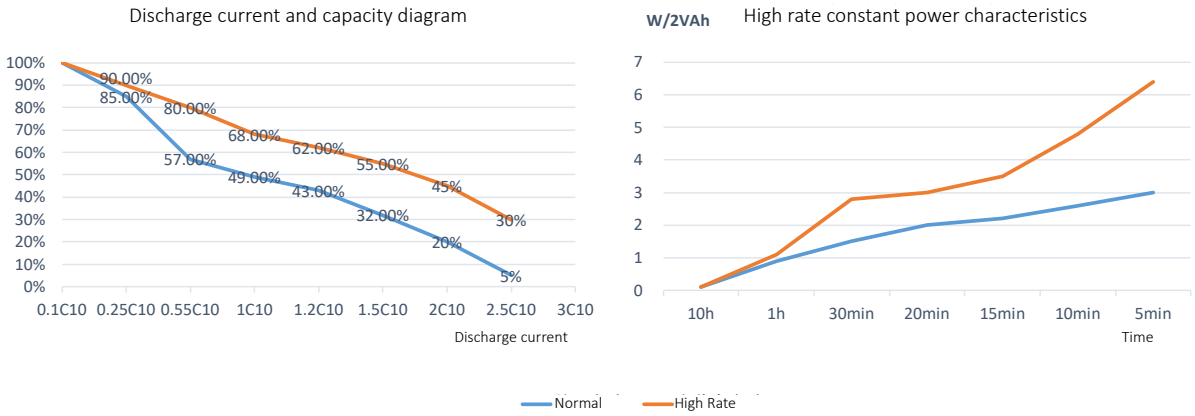
Performance characteristics

- Designed for high current high-power applications
- High security, reliability and stability
- Small internal resistance and voltage drop, suitable for high power, high current discharge
- Low self-discharge rate, strong charging acceptance, high sealing reaction efficiency

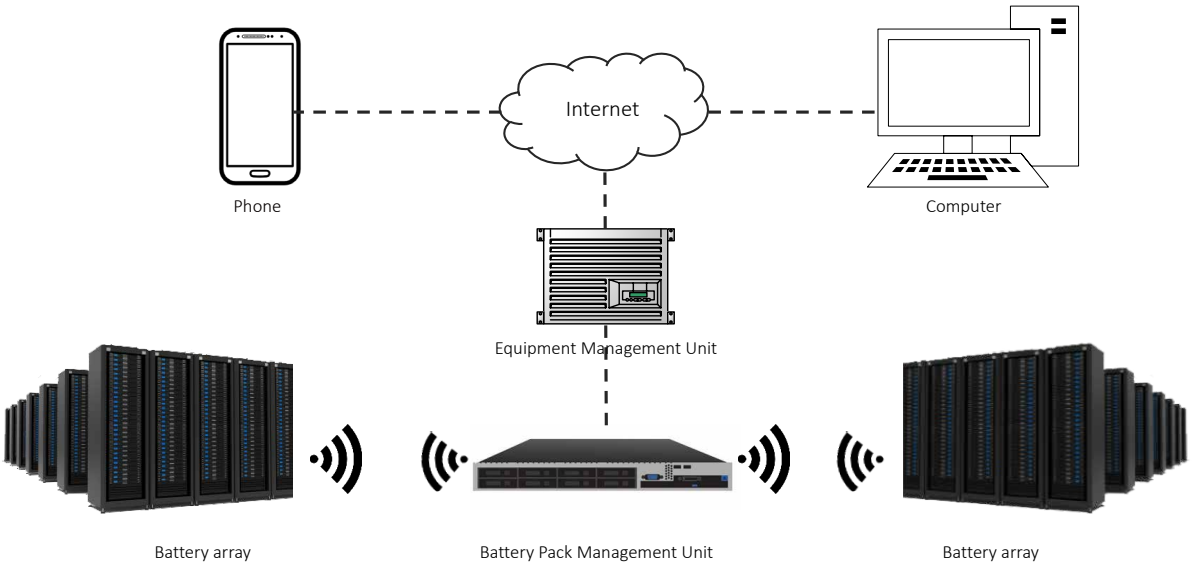
Process characteristics



Power characteristics



Intelligent *



SOH — Special algorithm to accurately determine the current SOH

SOC — Powerful calculation function to accurately measure battery SOC

Scientific Battery management accurate positioning of the faulty battery

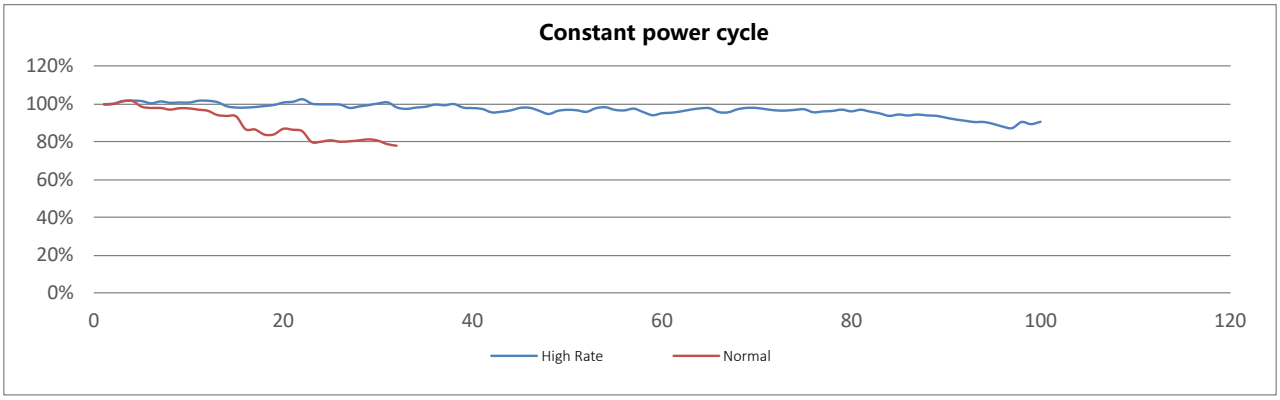
Realize wireless data transmission, eliminating wiring problems

Remote monitoring, real-time detection of battery status

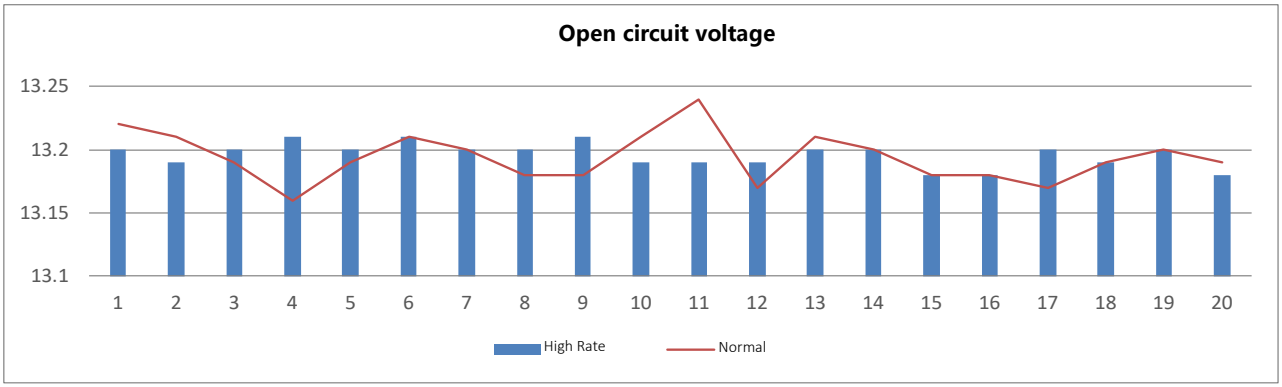
Accurate real-time acquisition of voltage, current, internal resistance, temperature

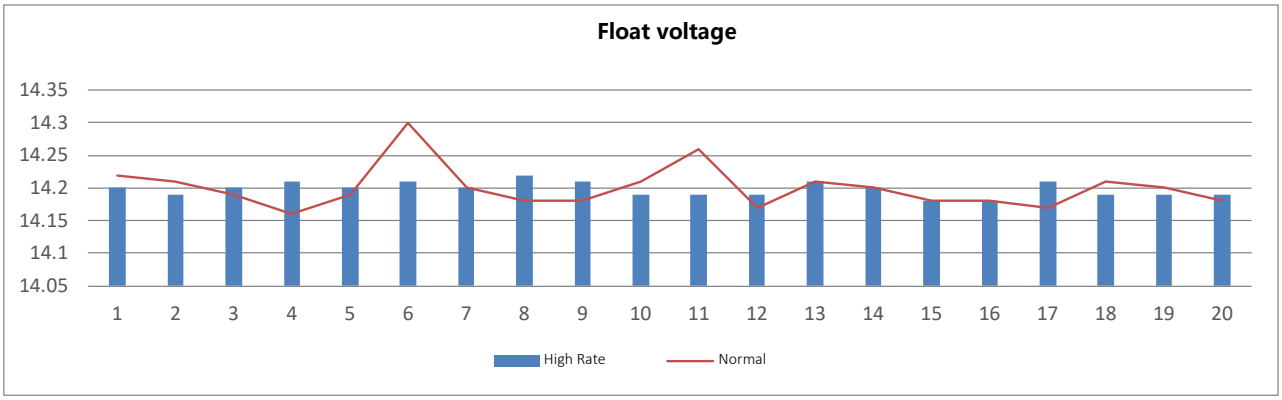
*Note: Intelligent control is an extra feature, optional

Long life



High consistency





Performance	Standard requirement	Standard	Actual Data*		Performance trend
			Normal	High Rate	
2V Float voltage difference	≤90mV	Industry standard version	52 mV	23 mV	Improved
2V Float voltage difference	≤480mV	Industry standard version	129mV	63 mV	Improved
Power consistency	≤8%	Industry standard version	--	6%	--
Internal resistance consistency	≤15%	Industry standard version	11.50%	5.50%	Improved

**Note: The data comes from laboratory products*

High cost-effective

Example: UPS system is 220KVA/480V, with end voltage 1.67V/cell and standby time 15min:

Standby Time	15 min	15 min	15 min
DC Voltage （V）	480	480	480
Effectiveness (η)	0.95	0.95	0.95
Power factor	0.9	0.9	0.9
Safety factor	1.25	1.25	1.25
Total power WP(kVA)	220	220	220
Number of parallel groups	3	3	2
Battery quantity	120	120	80
Single block power （W）	329	329	493
Battery model	6-GFM-120	6-GFMHR-390W	6-GFM-150
Capacity （Ah）	120	85	150
Battery power (w)	329	330	517
End-off voltage	1.67	1.67	1.67
Battery quantity (pcs)	120	120	80
Investment saving	--	-22.10%	-8.30%
Space saving	--	-30.20%	-7.70%
Advantage of bearing	--	-20.60%	-10.20%

Conclusion: The high rate battery has advantages on cost, space, and bearing while meeting the power requirements.

6-GFMHR Top Terminal Series

Product introduction

6-GFMHR top terminal high-rate series lead-acid battery is new 12V battery series developed by Shoto for data center, UPS system and power system. The product adopts special corrosion resistant alloy and thin plate design which is with larger surface space and uses proprietary additive and combination labyrinth pole sealing technology. It is dedicated to provide stable, reliable, efficient and environmentally friendly backup power supply for data machine room, UPS system and power system.

Advantages

- High rate, can be used in the standby power which less than 15min
- Compared with the traditional battery purchase cost, the space, the load reduction is up to 10%
- High consistency, safety, reliability and stability.
- Good anti-high current performance
- Good anti-impact performance

Technical characteristics

- High strength glass fiber technology, gas compound effciency is over 99%
- Double-sided coating and casting welding, to improve battery consistency
- High strength ABS shell and patented sealing technology
- The discharge voltage platform is stable

Models

Model	Voltage(V)	15min , 1.67V/cell (W, 25°C)	Dimension (mm)				Terminal	Torque (Nm)	IR (mΩ)	Weight (kg)
			L	W	H	TH				
6-GFMHR-320W	12	320	289	174	214	222	M8	15~17	3.8	26.5
6-GFMHR-390W	12	390	289	174	214	222	M8	15~17	3.4	28.5
6-GFMHR-440W	12	440	331	174	214	222	M8	15~17	3	32
6-GFMHR-500W	12	500	472	174	225	233	M8	15~17	2.8	42.4
6-GFMHR-550W	12	550	472	174	225	233	M8	15~17	2.5	44.5
6-GFMHR-630W	12	630	472	174	225	233	M8	15~17	2.2	46
6-GFMHR-700W	12	700	503	212	225	233	M8	15~17	2.2	58.1
6-GFMHR-750W	12	750	503	212	225	233	M8	15~17	2.1	60.5
6-GFMHR-800W	12	800	503	212	225	233	M8	15~17	1.8	61

6-GFMHR-X Front terminal series

Product introduction

6-GFMHR-X front terminal series is the new 12V battery developed by Shoto for data center, UPS system and power system. The product adopts unique long and narrow design. The ration of long and width is 3.75~5.00, with excellent heat dissipation performance. It is front terminal design on the external connection of the battery to make the battery loading and unloading simplify.

Advantages

- High rate, can be used in the standby power which less than 15min
- Applicable to 19"-30" standard cabinet/rack
- High consistency, security, reliability and stability
- Fast charging speed and low self-discharge rate
- Excellent anti-over-discharge and over-charging performance

Product features

While satisfying the power requirements, the front terminal high rate battery space is 15% less than the normal top of 12V, and the purchase cost is reduced by 10%!

Models

Model	Voltage (V)	15min , 1.67V/cell (W, 25°C)	Dimension (mm)				Terminal	Torque (Nm)	IR (mΩ)	Weight (kg)
			L	W	H	TH				
6-GFMHR-350XW	12	350	395	110	286	286	M8	15~17	3.6	31
6-GFMHR-410XW	12	410	395	110	286	286	M8	15~17	3.4	33
6-GFMHR-500XW	12	500	549	110	310	310	M8	15~17	3.6	46.8
6-GFMHR-590XW	12	590	549	110	310	310	M8	15~17	3.3	49.5
6-GFMHR-630XW	12	630	559	125	315	315	M8	15~17	2.9	57.5
6-GFMHR-700XW	12	700	559	125	315	315	M8	15~17	2.8	60

GFMHR series

Product introduction

The new type GFMHR series is 2V new type battery that Shoto developed for data center and UPS system with the most advance technology. Its various performance indexes reached the leading level in the industry. The product uses multiple corrosion resistance alloy, special design of plate, exclusive additives, unique design of plate matching, low ratio of plate density electrolyte and combined labyrinth sealing technology, aiming to provide stable, reliable, efficient and environmental-friendly backup power supply for data room, UPS systems and power systems.

Advantages

- Specially designed for large current and high-power application scenarios with high energy density
- Designed product life is 15 years
- Convenient to maintain and low at total TCO cost
- Secure, reliable and highly stable

Technical characteristics

- Small internal resistance and voltage drop, suitable for high power and large current discharge
- Low self-discharge rate, strong charging acceptance, high efficiency of sealing reaction
- Excellent production process and high consistency of battery

Models

Model	Voltage (V)	C_{10} (Ah, 25°C)	15min , 1.67V/cell (W, 25°C)	Dimension (mm)				Terminal	Torque (Nm)	IR (mΩ)	Weight (kg)
				L	W	H	TH				
GFMHR-600W	2	200	600	90	181	346	365	M8	15 ~ 17	1	13.2
GFMHR-900W	2	300	900	124	181	346	365	M8	15 ~ 17	0.54	18.4
GFMHR-1150W	2	400	1150	158	181	346	365	M8	15 ~ 17	0.42	24.1
GFMHR-1450W	2	500	1450	191	181	346	365	M8	15 ~ 17	0.3	29.8
GFMHR-1700W	2	600	1700	225	181	346	365	M8	15 ~ 17	0.28	36.2
GFMHR-2250W	2	800	2250	303	181	346	365	M8	15 ~ 17	0.35	49
GFMHR-2750W	2	1000	2750	370	181	346	365	M8	15 ~ 17	0.3	59

High voltage DC lithium-ion battery system

China mobile (Harbin) data center, 336V200Ah lithium battery system

The new type of high voltage DC lithium battery system is developed independently by Shoto. It is a high- tech energy-saving and environment-protected product of integration, miniaturization, light – scale and intelligence. It adopts the standard cabinet installation which is centralized monitoring and convenient to maintain.

It is 48 V standard module, covering DC voltage range 192 v to 480 v. The product can meet the demand of 4C discharge. It has been widely used in communication core rooms, UPS mainframe, Internet data center (IDC), data information port, DC remote power supply, power grid, intelligent manufacturing and other fields as a backup power supply.

Array cabinet

Distributed type

Product characteristics

High-rate performance

The system has excellent charging/discharge performance,. Normally, the charging is 0.2c, and can support 4.0c for 15min, which meets the requirements of data center for the large current discharging.

N+1 Cascading usage

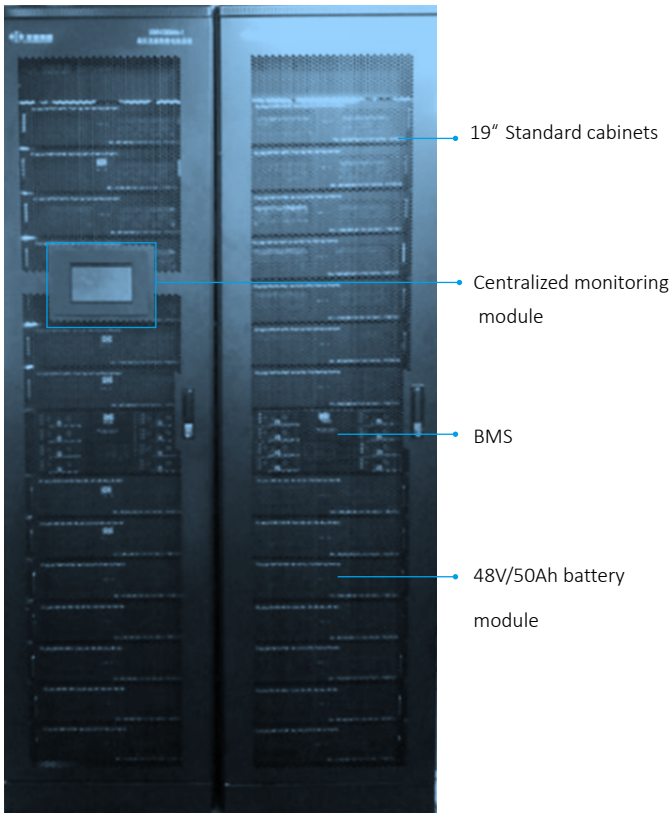
Adopt the standard modular design, with the protection function of multi-stage current, voltage and temperature. In the process of using, any bank of high-voltage DC batteries can safely release or access, which ensure the safety, stability and reliability of the system.

BMS

The BMS system communicates through CAN to obtain the battery cell data and monitors the operation state of the unit BMS and control the opening and closing of the charging and discharging circuit. HVDC adopts the technology of limit charging current and automatic discharging with equal flow, which has the functions of anti-short-circuit protection and anti-reverse connection protection.

Centralized monitoring module

The centralized monitoring module communicates with the HVDC power supply system and the dynamic ring monitoring system uniformly and obtains the information state and alarm events of the battery pack through CAN communication. Through RS485, accept the query of the mobile ring monitoring system and send out all information of the system. Through RS485 communication, it accepts all information query and setting related controlling parameters from HMI (man-machine interface).



336V/200Ah Lithium battery system

Product technical parameters

Model	Nominal Voltage (V)	Rated Capacity (Ah)	Dimension (mm)	Weight (kg)
SDB10–336100	336	100	600×1000×2200	650
SDB10–336200	336	200	1200×1000×2200	1300
SDB10–240100	240	100	600×1000×1800	580
SDB10–240200	240	200	1200×1000×1800	1160
SDB10–480100	480	100	1200×1000×2200	900
SDB10–480200	480	200	2400×1000×2200	1800

Note:

The system can be specially designed according to the special requirements of users.

The external dimensions can be determined according to the actual situation.

Lithium Application cases

Cases	Battery Bank Capacity	Group Mode
China mobile design institute Harbin new data center	336V/100Ah	Each battery cabinet is equipped with 2 banks of 336V/50Ah batteries (the 336V battery in each group consists of 7 48V/50Ah battery modules in series) and 2 BMS
Jiangsu Yancheng telecom Customer service and network monitor room	240V/100Ah	Each battery cabinet is equipped with 2 banks of 240V/50Ah batteries (the 240V battery in each group consists of 5 48V/50Ah battery modules in series) and 2 BMS
Xinjiang special police squadron Swat car	240V/50Ah	Each battery cabinet is equipped with 2 banks of 240V/50Ah batteries (the 240V battery in each group consists of 5 48V/50Ah battery modules in series) and 2 BMS
China mobile Harbin data center	336V/200Ah	Each battery cabinet is equipped with 2 banks of 336V/50Ah batteries (the 336V battery in each group consists of 7 48V/50Ah battery modules in series) and 2 BMS
China mobile Gansu Northwest big data industrial park	336V/200Ah	Each battery cabinet is equipped with 2 banks of 336V/50Ah batteries (the 336V battery in each group consists of 7 48V/50Ah battery modules in series) and 2 BMS

Application cases

China telecom cloud computing information park in Guizhou province

The project provides high-speed mass storage and computing services for the government, enterprises, finance, Internet and other industries. Meanwhile it provides the cloud storage and elastic computing services for end customers. Shoto provides integration solutions of matching UPS and cabinet to ensure the reliable operation of the system. Shoto has delivered lead-acid batteries used in data center 5 million W during first stage of the project.

Tianjin airport Unicom IDC

Tianjin airport Unicom IDC is the largest and most advanced data center of IDC. The total export bandwidth of the machine room can reach to 400G, which is independent of Tianjin metropolitan area network, but directly connected with China Unicom national backbone equipment. Shoto has delivered 28 million W lead-acid batteries used in data center.

China mobile group data center of Xinjiang

It is officially located in Karamay, which means China Mobile group firmly implements One Belt and One Road strategic and Internet + plan. Shoto delivered 10 million W lead-acid batteries used in data center.

Zhoupu cloud data center

With the integrated solution of the modular data center, Zhoupu cloud data center realized the rapid deployment, smooth expansion, and high reliability and high energy saving of efficiency intelligent management. Shoto delivered 10 million W lead-acid batteries used in data center.

Application cases

IDC in Majuqiao， Shoto has delivered 5 million W lead-acid batteries used in data center during first stage project

China Unicom cloud Data center

Mongolia telecom cloud computing center

Cloud data center of Guangtong world company

Application cases

Telenor Pakistani data center

China mobile Yudong data center in Shantou

China mobile airport data center

Shanghai Shenxin information park

Beijing Unicom digital building

Hangzhou Unicom Bingjiang building 2

Hebei Unicom IDC in Langfang

Hebei Unicom 2 hub IDC in Shi Jiazhuang

Customer references

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