Huawei UPS5000-E Series 40-800kVA Modular Uninterruptible Power System

HUAWEI TECHNOLOGIES CO., LTD.

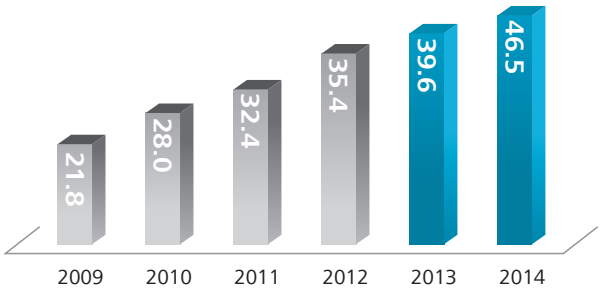
HUAWEI

About Huawei & Network Energy

Corporate Information

Huawei is a leading global ICT solutions provider. Through our dedication to customer-centric innovation and strong partnerships, we have established end-to-end capabilities and strengths across the carrier networks, enterprise, consumer, and cloud computing fields. Our telecom network equipment, IT products and solutions, and smart devices are used in 170 countries and regions. With annual sales revenue of USD39.6 billion in 2013, Huawei ranked 285th on the Global Fortune 500. The 2014 annual sales revenue is USD46.5 billion. And in 2014 Huawei enters Interbrand's Top 100 Best Global Brands list. Together with our partners, we are building a better connected world.

Sales revenue (USD billion)



Huawei's Customers

- Energy Industry: 14 of Top 20 oil and gas companies
- Grid Industry: 160+ power companies
- Public Sector: 140+ countries including both government agencies and public sectors
- Transportation Industry: 145,000+ km highway & railway
- Finance Industry: 5 of Top 10 banks

Globalization, localization

- 16 global R&D centers
- 45 global training centers
- 130+ service branches
- 31 Joint innovation centers
- 27,000+ stuffs for service
- 3,500 certification partners
- 50,000 certification engineers from partners


San Diego
USA


Dallas
USA


Moscow
Russia


Bangalore
India


Stockholm/Goteborg
Sweden


Munich
Germany

Huawei Network Energy

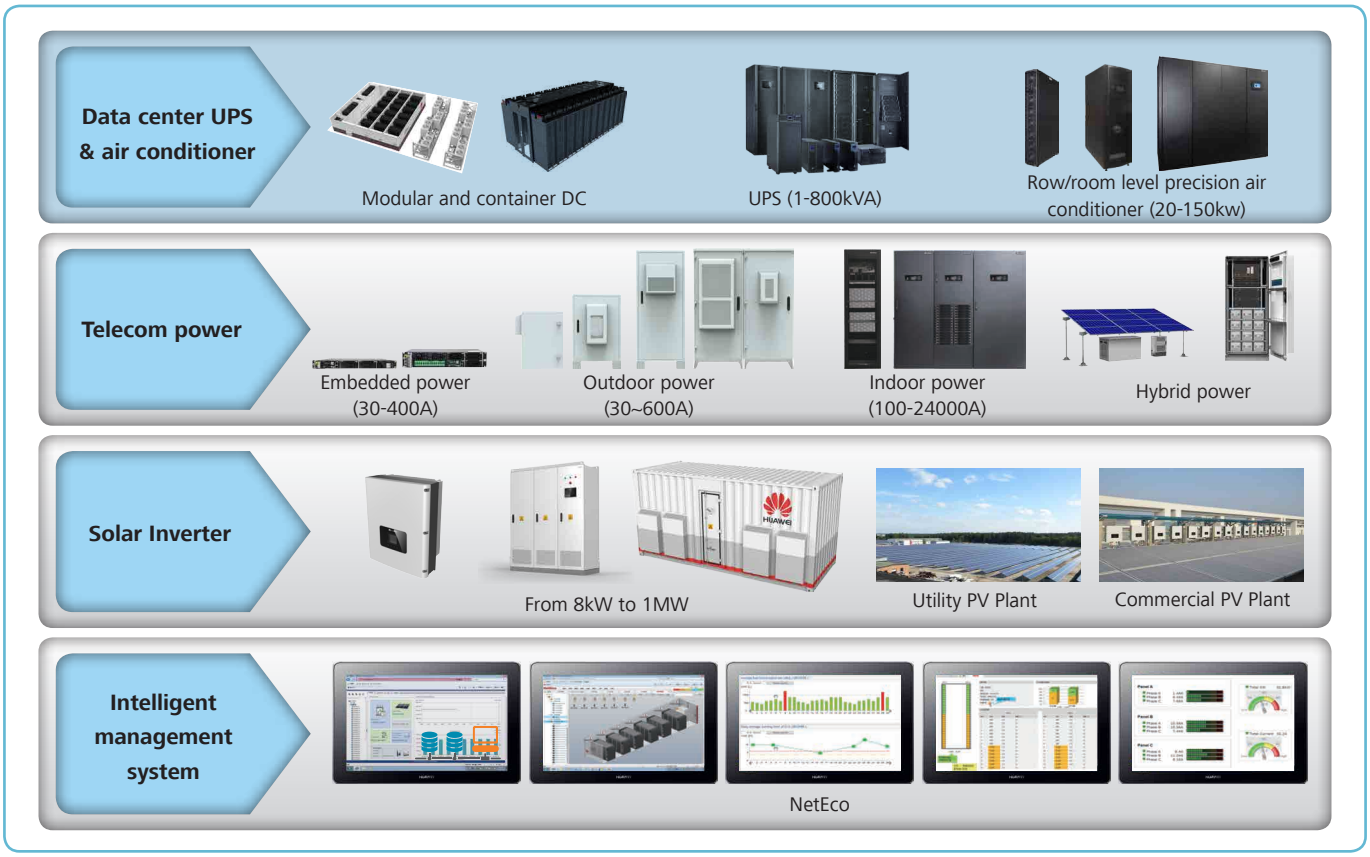
Network energy productline is one of seven main productlines in Huawei. Integrated power electronics, digital information, network communication, and IT technologies cover fields including data center energy, smart PV plants, and telecom energy. Huawei creates energy networks that are not only easy to operate and maintain, but also able to evolve to help you achieve maximum value.

Huawei network energy productline takes full advantage of the Global intellectual resources and 9 R&D centers have been set up at Germany (Nuremberg), Sweden (Stockholm) and China. As far as the end of 2014, network energy productline had filed 520+ patent applications and the sales revenue had reached 1.8 billon US dollars.

At present, more than 1.6 million power systems are deployed in various harsh environment to ensure the proper operation of ICT equipment and Huawei network energy already have helped customers construct more than 480 data centers and 5.5 GW smart PV plant globally.

- 2014 Ranked first for containerized data centers based on unit shipments worldwide (Released by IHS)
- 2014 Ranked first for modular data center & modular UPS based on china market shipments (Released by ICTresearch)
- 2014 Frost & Sullivan Global Product Leadership Award for the Direct Current (DC) Power Systems Market
- DCD Data Center "The blueprint Award" and "Green Data Center Award"
- Global first batch of "Energy star" certification
- UPS5000-E "Excellent Data Center Product Award"
- Deutsche Telekom "The best site design award"
- "Desktop cloud container data center" Uptime Institute TIER3 certification

Network Energy Product



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UPS5000-E Overview

Rated Capacity: 40-800kVA (1-20 power modules)

Rated Voltage: 380/400/415 Vac

Rated Frequency: 50/60 Hz

Type: Online, double-conversion, modular

Application scenarios:

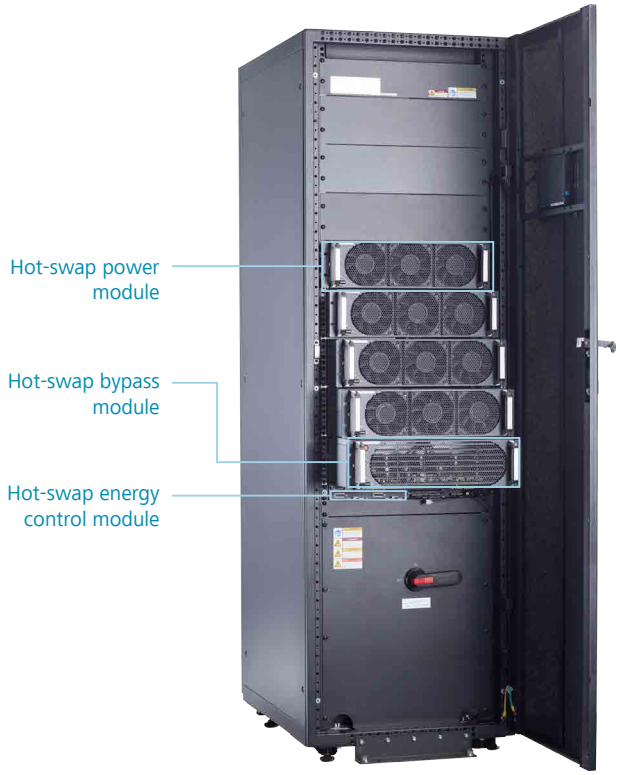
- Financial datacenter
- Internet datacenter
- Disaster recovery datacenter
- Telecom central offices

Ultra-high Availability

>> All hot-swap module design

Smooth capacity expansion

- To avoid power interruption risk in capacity expansion, the capacity of UPS system is planned large enough to meet the power demand in 3-5 years, which leads to low efficiency operation at the initial stage due to low load rate
- UPS5000-E uses module design and all of power module, bypass module, and control module support hot-swap, which makes smooth capacity expansion according to demand possible and reduces the initial investment



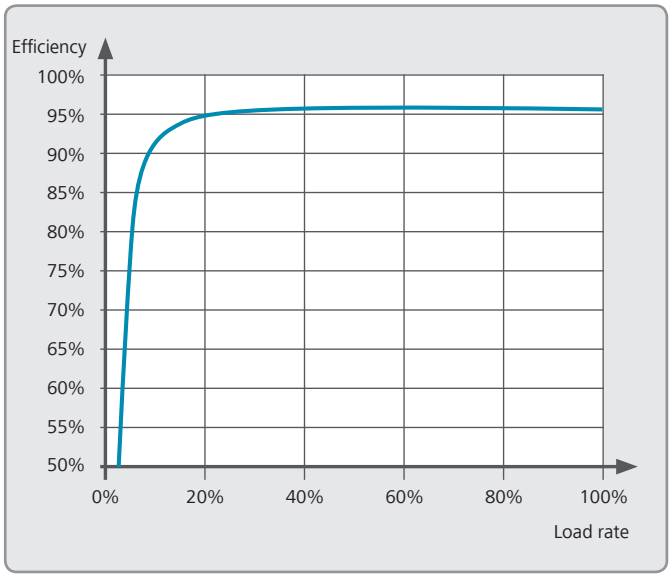
Online maintenance, reducing MTTR greatly

- Availability is used to weight the degree that a system, subsystem or equipment is in operable and committable state. It's positively related to MTBF (Mean Time Between Failures) and negatively related to MTTR (Mean Time To Repair)
- For traditional UPS, customers need seek help from the suppliers and long recovery time is required because in maintenance engineers need shutdown and dismantle the UPS, and replace the failure components or boards
- Hot-swap design makes the failure recovery time reduce greatly, and the system availability can be effectively improved as a result. The O&M engineers after trained can replace the failure module of UPS5000-E themselves in few minutes

High Operating Efficiency

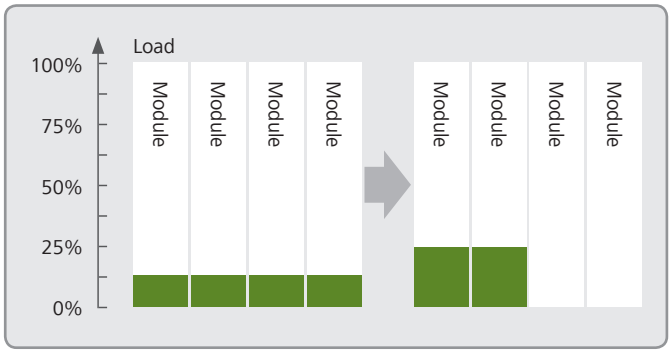
>> High efficiency at low load rate

- Due to redundancy configuration to ensure reliability and excessive configuration at the initial stage to meet the power demand in 3-5 years, the UPS system of traditional datacenter often operates at load rate of 10%-40% and the operating efficiency is far below the value claimed. It's estimated that the UPS loss takes up 6%-10% of the total power consumption in datacenter
- Huawei UPS can keep high efficiency operation at low load rate: 96% at 40% rated load and 95% at 20% rated load
- Given 200 kW load and air conditioner with a COP of 3:1,
  - 80, 183 kWh can be saved compared to traditional UPS (92% efficiency)
  - 257, 731 kWh can be saved compared to legacy UPS (86% efficiency)



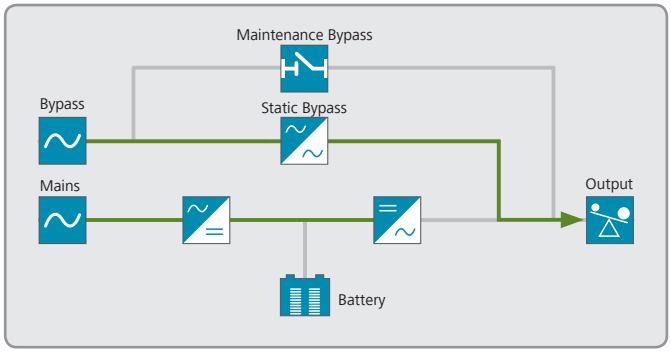
>> Intelligent hibernation design

- When the load rate is very low (below 10%-15%), intelligent hibernation can be enabled and some power modules will switch to "standby" state to boost load rate and improve operating efficiency
- To ensure reliability, at least one power module serves as redundancy module and when load increases dramatically, the sleep module will be awaked instantly



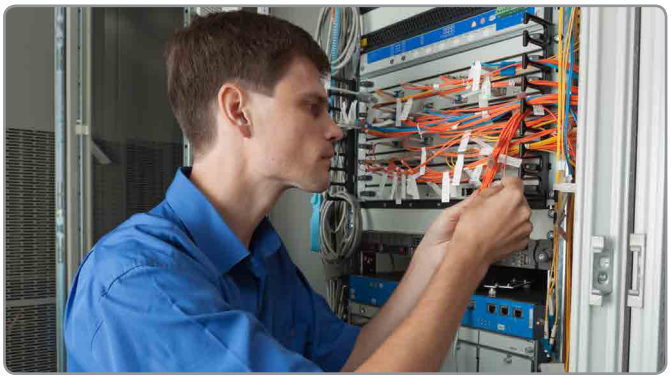
>> Achieving 99% efficiency at ECO mode

- In good grid area, ECO mode can be enabled to improve efficiency to more than 99% and the maximal energy-saving can be achieved
- At ECO mode, the load is powered by static bypass (the allowable input range can be set) and the inverter is in "standby" state
- When input abnormality occurs, UPS5000-E will transfer to online mode in several milliseconds to ensure power continuity and quality



Excellent Usability

>> Small footprint and easy construction



- High power density of up to 320kVA per cabinet, 50% footprint saving
- Front accessible maintenance
- Back-to-wall installation (40-200kVA)
- Top/bottom cable entry compatible

>> Intelligent battery management, extending battery lifespan

- Automatic switch between float charging and average charging and temperature compensation
- Battery hibernation design to avoid long-term float charging, which improves battery service time greatly
- Battery failure pre-alarm when its health grade is too low
- Flexible battery configuration: 30-40 batteries per string allow customers to get the faulty battery out instead of replacing it

>> Low investment on power distribution system

- THDi<3% & power factor>0.99 reduce the pollution to power grid and lower the expense on power distribution components including cables, breakers, etc.
- Power walk-in technology boost the ratio of UPS capacity to D. G. capacity to 1:1.1 and cut the D. G. expense down

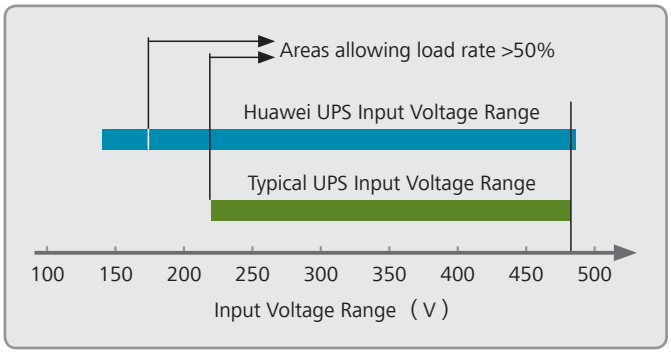
Comprehensive Reliability Assurance

>> Redundancy design

- Redundancy design for energy control unit, communication buses to eliminate single point of failure
- Fault-tolerant design for fan system: 30% load can be driven when 2 fans fail and 50% load when 1 fan fails

>> High grid adaptability

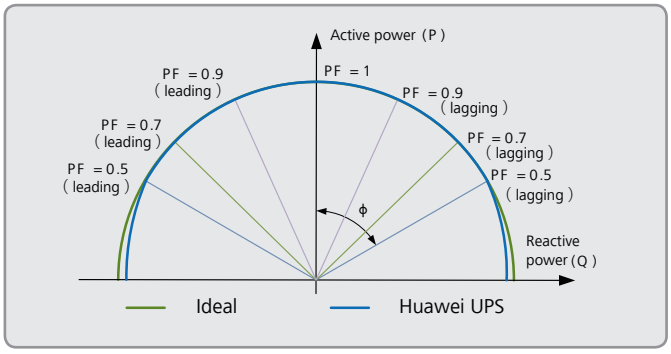
- 138-485 Vac wide input voltage range to minimize battery use: 485-305Vac for 100% load; 305-138 Vac for 100%-40% load (derating linearly)
- 6 kV/5 kA lightning protection design, reducing lightning-related failure rate



>> High load adaptability

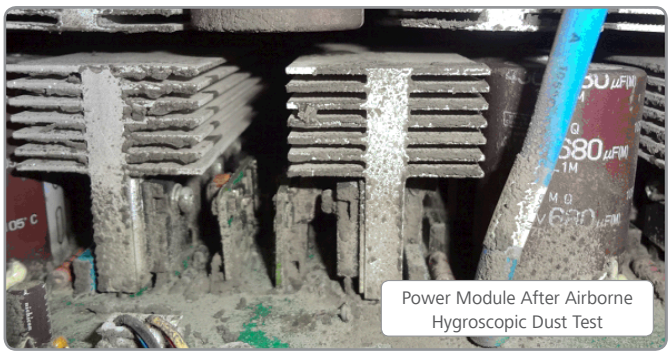
- High output power factor of up to 1, 25% more load driven than traditional UPSs

  The application of PFC technology in modern IT devices like servers, storages, routers improves the input power factor to more than 0.95. And if they are powered by UPS with output power factor of 0.7-0.8, the investment on UPS will increase remarkably
- No derating for capacitive or inductive devices with a PF>0.5



>> High environment adaptability

- No derating at 40℃ to ensure power continuity
- Conformal coating on PCB, improving adaptability to dusty or salty spray environment



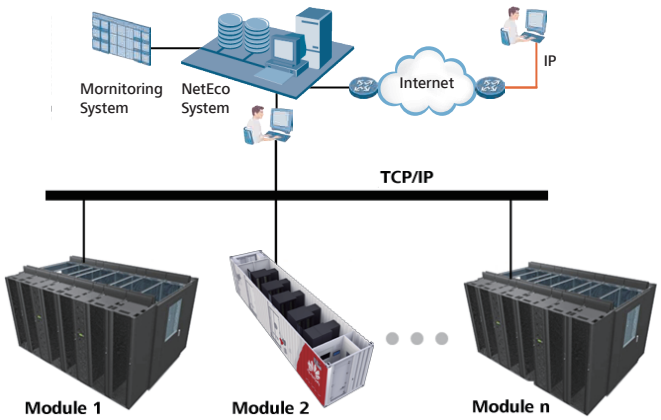
Intelligent Management System

>> NetEco 1000U Introduction

- iManager NetEco 1000U can run on the Windows operating system and can be accessed through a web browser. The iManager NetEco 1000U enables you to monitor the key performance indicators (KPIs) and alarms of the UPSs in real time. In addition, it enables you to remotely control and manage the UPSs. This increases the centralized management and remote operation and maintenance capabilities for the UPSs. NetEco 1000U supports connection through USB Data lines, RS232 cable, or network cable.

>> NetEco 6000 Introduction

- NetEco is a new generation data center management system launched by HUAWEI. It manages the real-time data and status of data center infrastructures, including power, environment, video, and door status and generates alarms if any fault occurs.
- NetEco displays data center layouts and data reports for customers to easily query equipment status, and provides a standard platform to apply to all data center solutions due to its flexible configuration, smooth capacity expansion, and hierarchical management.



Value & Features

High availability, warning and troubleshooting

- Foresight warning of faults and risks improves IDC availability
- Quickly faults location, virtual inspection

Smart interaction, energy saving

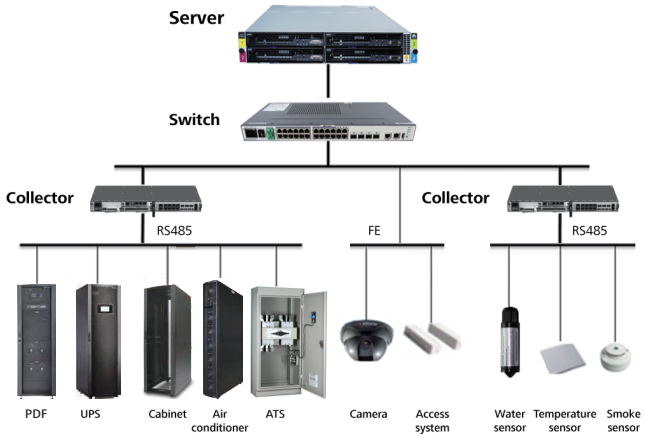
- Dynamic PUE management
- Optimizing important power and cooling services

Rapid deployment, one -button launching

- Pre-configured software and parameters, one-button launching
- Parameters of AC and UPS loading, testing time saving

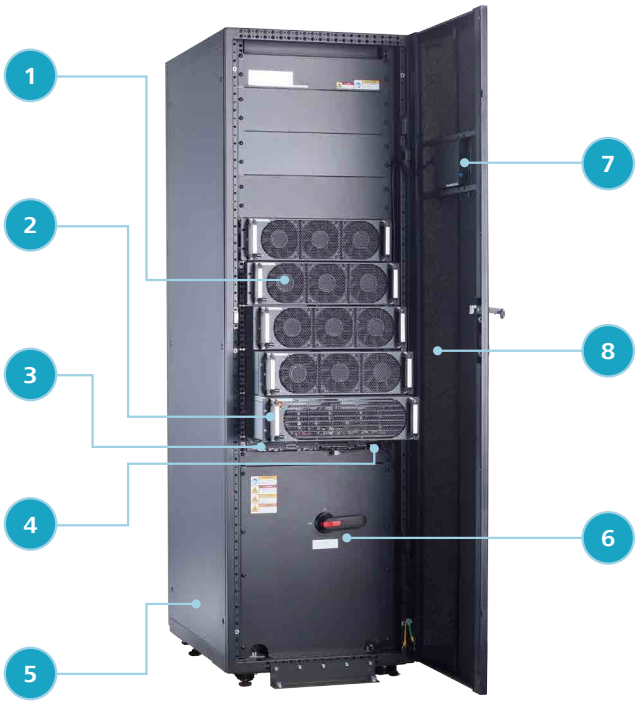
Easy visualization maintenance in 3D view

- The 3D design tool realizes 3D visual maintenance
- Dynamic 3D display of site temperature, eliminating hot spots



UPS5000-E Composition

1. 40kVA power module
2. Static bypass module
3. Energy control module
4. Monitoring unit with built-in SNMP and RS485
5. Mechanical frame
6. Maintenance bypass switch
7. 7-inch Liquid Crystal Display (LCD)
8. Dust-proof net



40-320kVA

UPS5000-E Composition

>> Power module

The Power module with rated capacity of 40 kVA/kW can eliminate all the nine common problems in public grid and output pure and stable sine wave.

Its dimensions are 130 mm (H) x 442 mm (W)x 620 mm (D).

>> Bypass module

The bypass module can provide continuous power supply to load when overload. The bypass module of UPS5000-E features concentrated design and includes 3 models with rated capacity of 200/320/480/600/800 kVA separately according to the rack type.

The dimensions of them are 130 mm (H) x 442 mm (W)x 620 mm (D).

>> Energy control module

The ECM supports intra-rack parallel CAN communication and inter-rack parallel CAN communication. The intra-rack loadshare control and inter-rack loadshare control are isolated at ECM to achieve better expandability.

>> iBox/iBat

Supports wireless transmission and voltages, resistance, and temperatures detection of single cell.

>> Dry contact card

The dry contact card allows the UPS to control and monitor the switch state of BCB box and implement EPO.

>> Dry contact extended card (Optional)

The dry contact extended card provides five relay dry contact outputs and five signal input ports. The card implements additional alarm and control functions to meet customer requirements.

>> Backfeed protection card (Optional)

The backfeed protection card sends signals to trigger alarm signals or quickly disconnect the feedback loop

>> Battery ground fault detector (Optional)

The battery ground fault detector detects battery ground fault and sends alarm signals when the ground leakage current exceeds the threshold value.

>> Battery monitoring unit (Optional)

Battery monitoring unit supports detection about the voltages, charge and discharge currents, and temperatures of 24 batteries with a rated voltage of 2–12 V DC.

Other Optional Components

Component	Function
Antiseismic kit	Reinforces the cabinet so that the cabinet meets the requirements of 9 degree seismic fortification intensity.
IP21 component	Prevents water from dropping into the cabinet, protecting the cabinet to IP21.
Top outlet kit	If you need to install the cabinet against the wall, install a top outlet kit to meet heat dissipation requirements. It's suitable for 40-200kVA.
ECM extended subrack	Install this subrack when the UPS5000-E is equipped with a backfeed protection card and dry contact extended card.
Top entry cabinet	Install a top entry cabinet to meet the requirements for routing cables from the top of the UPS5000-E cabinet. It is suitable for 240-320kVA.
Ambient temperature and humidity sensor	Battery temperature sensor can detect the battery temperature and provide reference for temperature compensation when float-charging.
Battery temperature sensor	Feedbacks real-time temperature and humidity data to dynamic environment monitoring system.

Technical Data

Model		UPS5000-E-120K-F120	UPS5000-E-200K-F200	UPS5000-E-320K-F320	UPS5000-E-480K-F480	UPS5000-E-600K-F600	UPS5000-E-800K-F800
Rated Capacity (kVA/kW)		40-120	40-200	40-320	40-480	40-600	40-800
Number of Power Modules		1-3	1-5	1-8	1-12	1-15	1-20
Input							
Mains	Input Wiring	3Ph+N+PE					
	Rated Voltage	380/400/415Vac					
	Voltage Range	138-485 Vac (305-485 Vac for 100% load; 138-305 Vac for 40%-100% load)					
	Input Frequency	40-70 Hz					
	Total Harmonic Distortion	THDi<3% for linear load, THDi<5% for nonlinear load					
	Input Power Factor	0.99					
Bypass	Rated Voltage	380/400/415 Vac					
	Input Frequency	50/60 ± 6 Hz					
Battery	Rated Voltage	360-480 Vdc (The number of batteries can be selected from 30 to 40; 32 batteries in default)					
Output							
Output Wiring		3Ph+N+PE					
Voltage		380/400/415 Vac ± 1%					
Frequency		Tracking the bypass input (Online mode); 50/60 Hz ± 0.1% (Battery mode)					
Waveform		Sine wave (THDv<1% for linear load)					
Overload Capacity		Inverter: 110% overload for 60 min; 125% overload for 10 min; 150% overload for 1 min Bypass: 135% overload for long term; >1000% overload for 100 ms					
System							
Output Power Factor		1					
Efficiency		96%					
Expandability		Up to 4 units connected in parallel					
Cable Entry Route		From the top or from the bottom					
Environment							
Operating Temperature		0-40℃					
Storage Temperature		-40-70℃					
Relative Humidity		0%-95% (No condensing)					
Maximum Operating Altitude		1000 m. Above 1000 m, derating 1% for each additional 100 m					
Audible Noise		＜65dB		＜68dB	＜70dB		
Others							
Height × Width × Depth(mm)		2000 × 600 × 850			2000 × 1200 × 850	2000 × 2000 × 850	2000 × 2400 × 850
Weight		227-293kg	227-359kg	253-480 kg	693-1050 kg	1045-1500 kg	1185-1800 kg
Certifications		YD/1095-2008;EN/IEC 62040-1; EN/IEC 62040-2; EN/IEC 62040-3; TLC;CE; CB; RoHS, REACH, WEEE, etc.					
Communications		Dry contacts, RS485, SNMP					

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