



**Huawei UPS5000-E Series 40-480kVA
Modular Uninterruptible Power System**

HUAWEI TECHNOLOGIES CO., LTD.

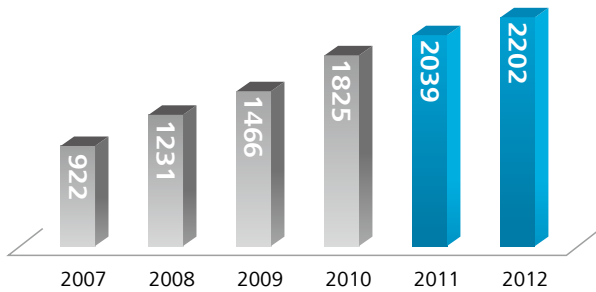


About Huawei Network Energy

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. Huawei is among the world top 500 enterprises, our products and solutions have been deployed in over 140 countries, serving more than one third of the world's population. There are total 155,000 employees working here.

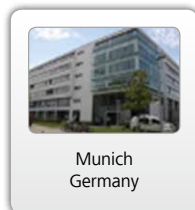
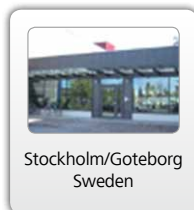
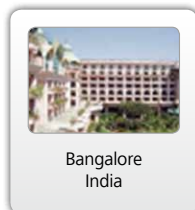
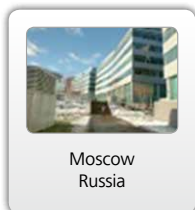
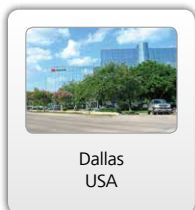
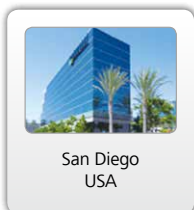
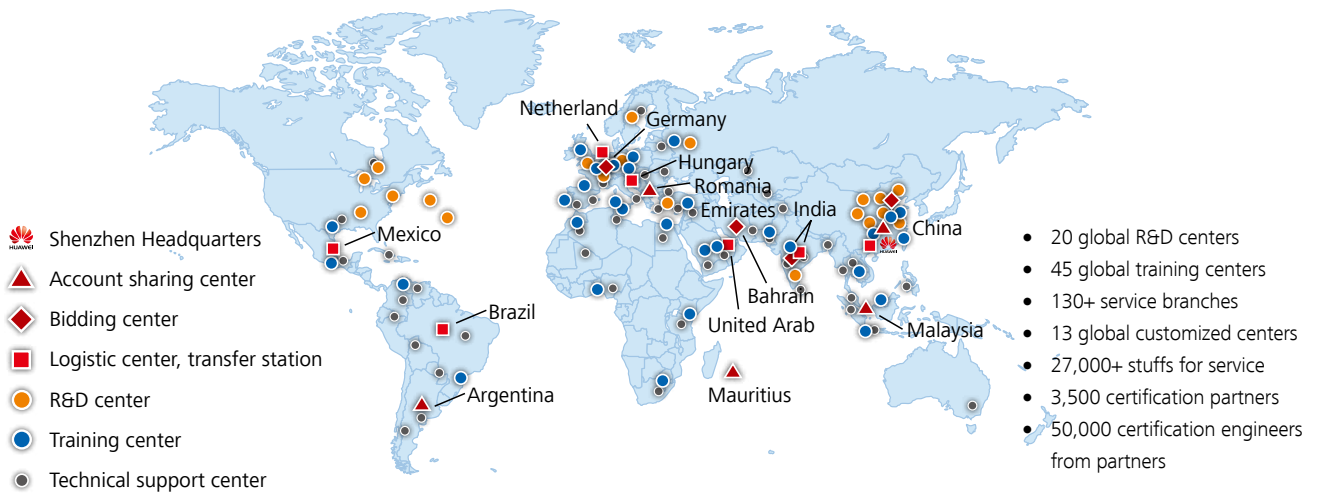
Sales revenue (CNY 0.1 billion)



Market & Management

- Leading global ICT solution provider
- Major contributor of telecom standard, first share of many products and solutions
- Create value for customers continuously for 20 years, grow steadily for 20 years
- Sales revenue reached CNY 220.2 billion in 2012
- Three BGs (carrier BG, enterprise BG, consumer BG) were founded in 2011, the enterprise BG and consumer BG grow fast and become two new and stable economic growth points of the group

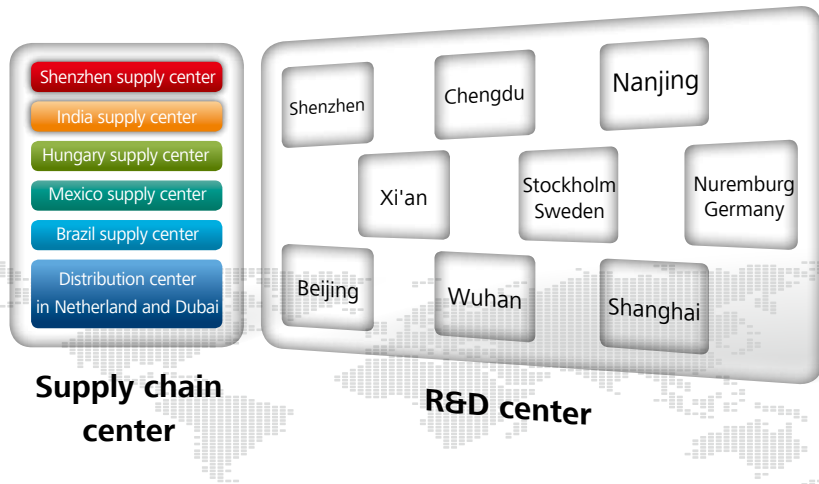
Globalization, localization



Huawei Network Energy

Network energy productline is one of four main productlines in Carrier BG. We are committed to help our customer build strong infrastructures for network and protect the long-term investment in energy infrastructure through providing efficient, reliable and intelligent network energy. 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 2012, network energy productline had filed 550+ patent applications and the sales revenue had reached 1 billion US dollars.

- Huawei 5000-E "Data Center Product Excellence Award"
- CommunicAsia "Green science and Technology Award"
- DCD Data Center "The blueprint Award"
- "Energy star" certification
- Deutsche Telekom "The best site design award"
- "Desktop cloud container data center" Uptime Institute TIER3 certification



Network Energy Product

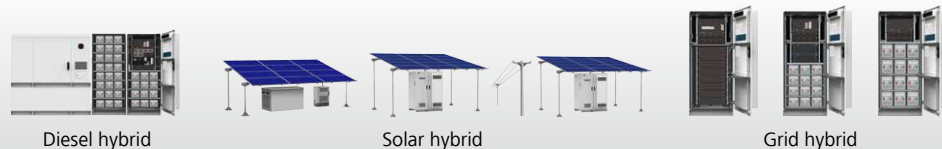
Data center UPS & air conditioner



Site power



Hybrid power



Intelligent management system



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UPS5000-E Overview



Rated Capacity: 40-480kVA (1-12 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

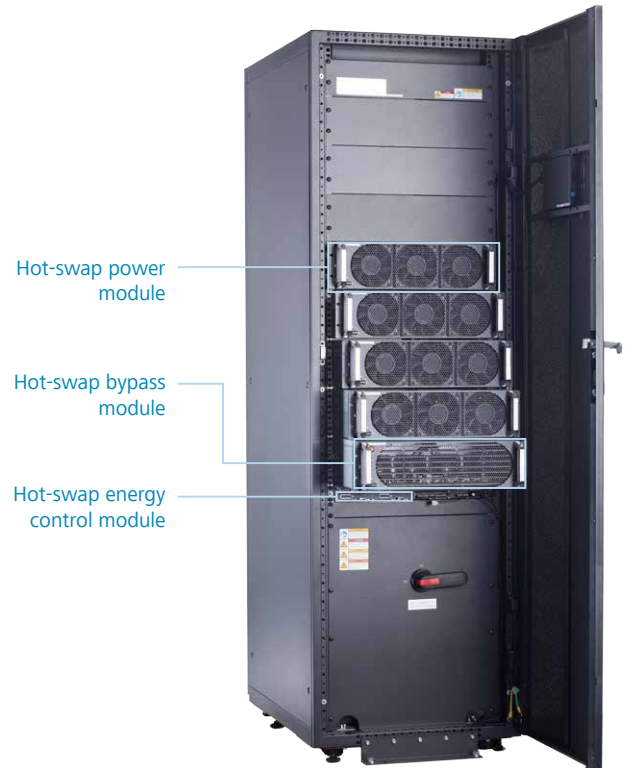


Ultra-high Availability

>> 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

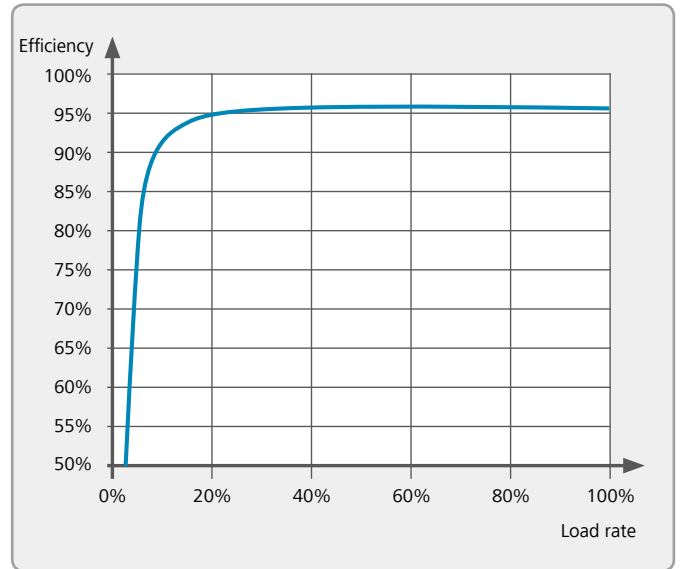
- Availability is used to weight the degree that a system, subsystem or equipment is in operable and committable state. It's positively related to MTBF (Mean Time Between Failures) and negatively related to MTTR (Mean Time To Repair)
- For traditional UPS, customers need seek help from the suppliers 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

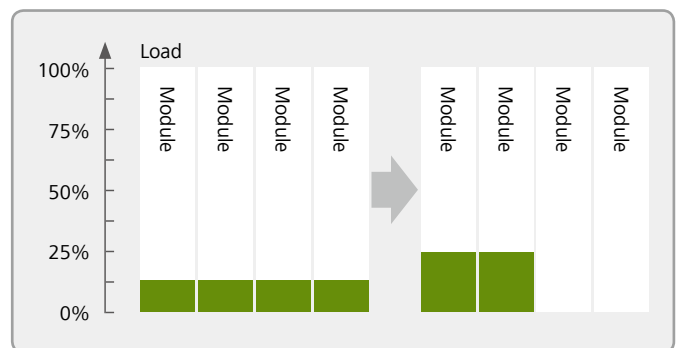
>> High efficiency at low load rate

- 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)



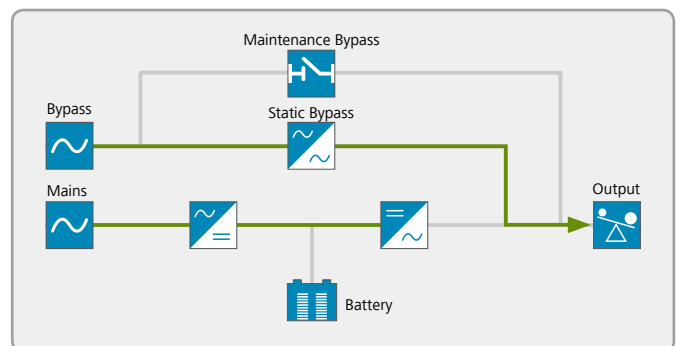
>> Intelligent hibernation design

- 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 awakened 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

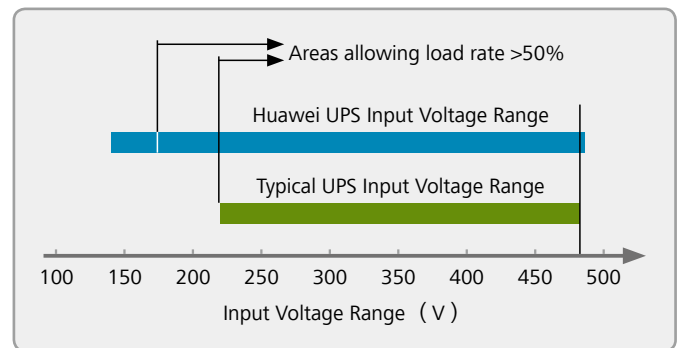
>> Redundancy design

- 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



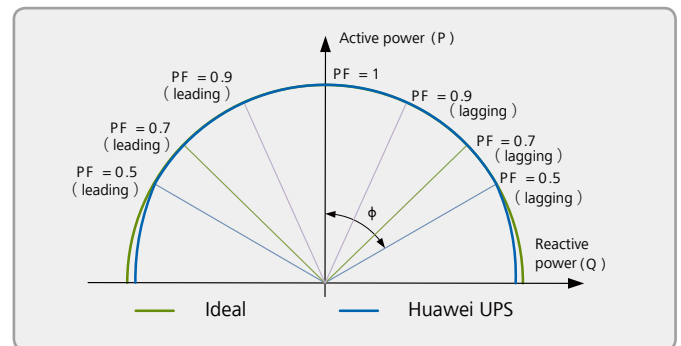
>> High grid adaptability

- 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



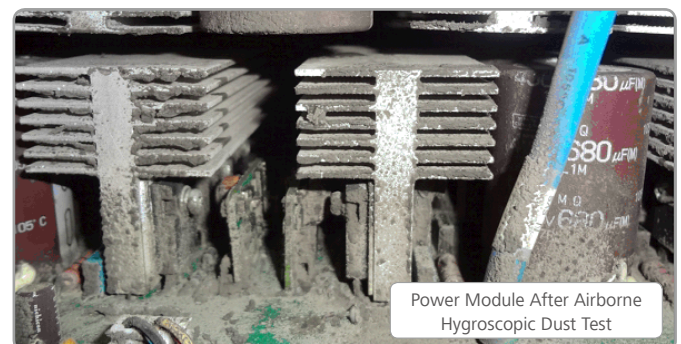
>> High load adaptability

- 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°C to ensure power continuity
- Conformal coating on PCB, improving adaptability to dusty or salty spray environment



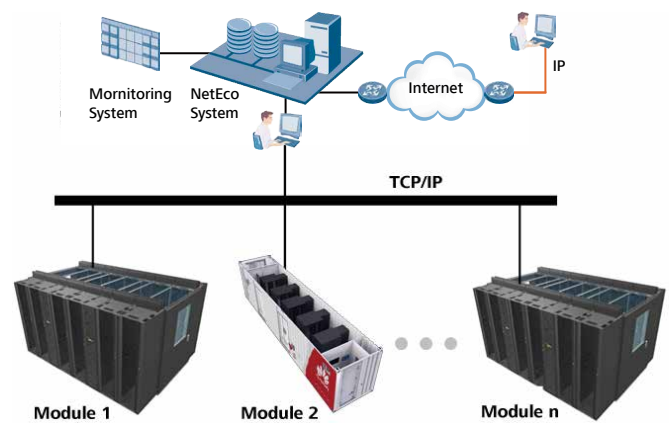
Intelligent Management System

>> 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

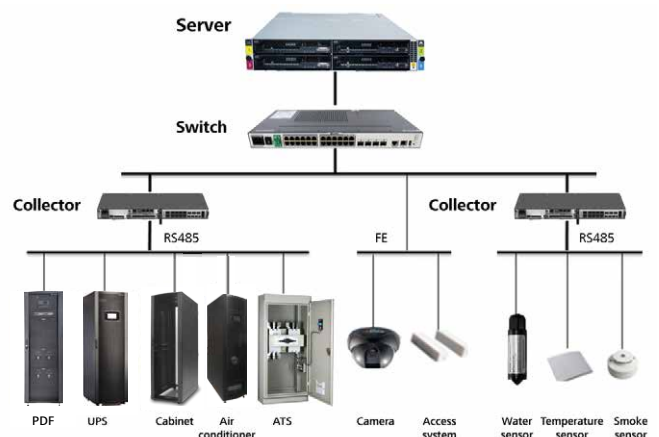
- Dynamic PUE management
- Optimizing important power and cooling services

Rapid deployment, one-button launching

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

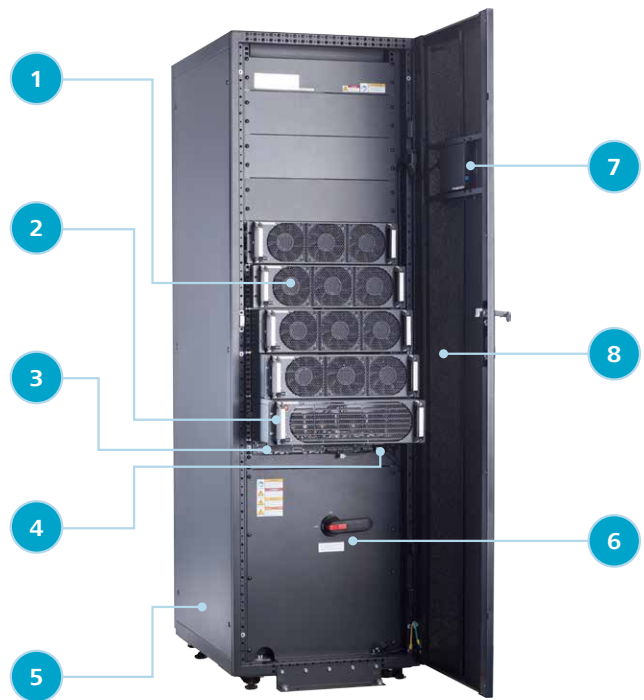
Easy visualization maintenance in 3D view

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

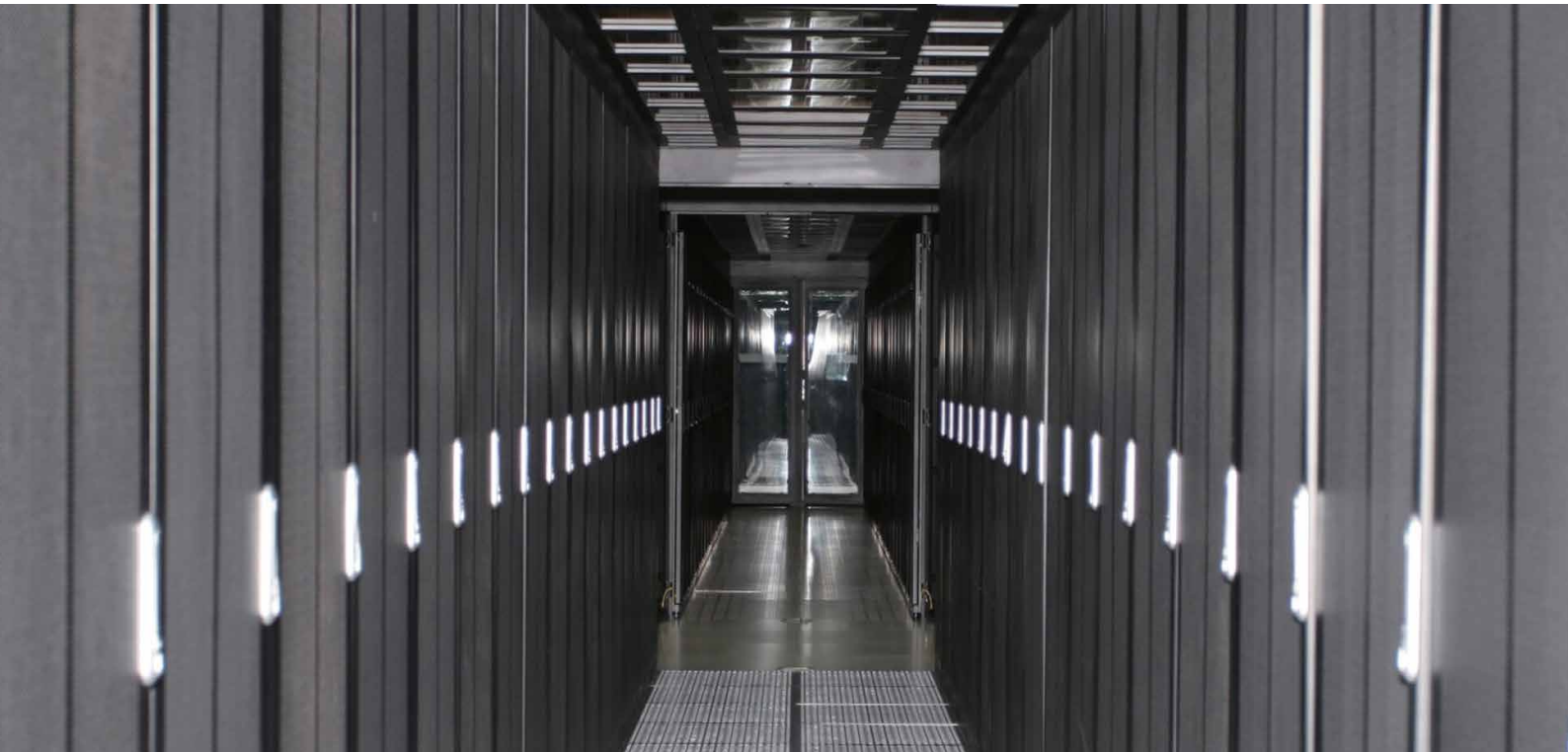


UPS5000-E Composition

- 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 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.



Input power distribution cabinet (Optional)

- Supports 2 UPS5000-Es paralleled together
- Built-in 630A/4P ATS
- Real-time detection about input parameters and breaker state
- Built-in Class C surge protection device
- Supports customization as required



Output power distribution cabinet (Optional)

- Supports 2 UPS5000-Es paralleled together
- 8-way output breakers
- Real-time detection about input parameters and breaker state
- Built-in Class C surge protection device and residual current circuit breaker
- Supports customization as required

>> 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 | Feeds back 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 |
|----------------------------|---------------------------|---|---------------------|-----------------------------------|---|
| Rated Capacity (kVA/kW) | | 40/80/120 | 40/80/120/160/200 | 40/80/120/160 /200/240/280/320 | 40/80/120/160/200/240 /280/320/360/400/440/480 |
| Number of Power Modules | | 1-3 | 1-5 | 1-8 | 1-12 |
| 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 | Input Wiring | 3Ph+N+PE | | | |
| | 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; THDv<3% for non-linear load) | | | |
| Output Power Factor | | 1 | | | |
| Efficiency | | 96% | | | |
| 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 100ms | | | |
| Environment | | | | | |
| Operating Temperature | | 0-40°C | | | |
| Storage Temperature | | -40-70°C | | | |
| 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 | < 72dB | |
| Others | | | | | |
| Height × Width × Depth(mm) | | 2000 × 600 × 850 | | | 2000 × 1200 × 850 |
| Weight | | 227-293kg | 227-359kg | 227-480kg | 693-1050kg |
| Certifications | | EN/IEC 62040-1; EN/IEC 62040-2; EN/IEC 62040-3; CE; CB; RoHS, REACH, WEEE, etc. | | | |
| Communications | | Dry contacts, RS485, SNMP | | | |




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