

MODULAR THREE-PHASE UPS SYSTEMS

## **DPA 250 S4 (50 kW – 1,500 kW)**

The most energy-lean UPS  
on the market



- Modular architecture – easily expandable up to 1.5 MW
- Low cost of ownership
- Flexible and highly efficient

# Technological innovation and energy saving in action

The DPA 250 S4 online double conversion modular uninterruptible power supply (UPS) represents the latest technological innovation.

The DPA 250 S4 has a high-efficiency, modular architecture that offers best reliability for environmentally conscious organizations that also need zero downtime and low cost of ownership. The DPA 250 S4 is specially designed for critical, high-density computing environments such as small- to medium-sized data centers.

The DPA 250 S4 sets the standard for the next decade of UPS progress with advanced features such as its transformer-free IGBT converters that feature three-level topology with interleaving controls to enable market-leading efficiency of 97.6 percent for the UPS module. This high efficiency reduces operational costs and minimizes environmental impact.

This modular UPS is based on **decentralized parallel architecture (DPA™)**, where every UPS module is practically its own UPS, having all the essential functional units needed for independent operation. DPA increases system reliability and availability compared to other modular UPS solutions in the market, as there is inherent redundancy between the UPS modules on all functional levels.

The DPA 250 S4 is specially designed for critical, high-density computing environments such as:

- Small- to medium-sized data centers
- Commercial buildings and general IT applications
- Healthcare facilities
- Railway signaling applications and airports



**50 kW** power in one UPS module. Truly scalable power - featuring DPA.



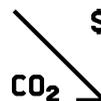
**250 kW N+1** redundant power. In one UPS frame cabinet.



**1,500 kW** power in one system. By paralleling up to six frames.



**97.6%** module efficiency. Top-of-the-market performance.



**> 30%** reduced power losses. Compared to similar products in the market.



**< 10min** service time. All it takes to exchange one UPS module.

# High efficiency reduces total cost of ownership (TCO)

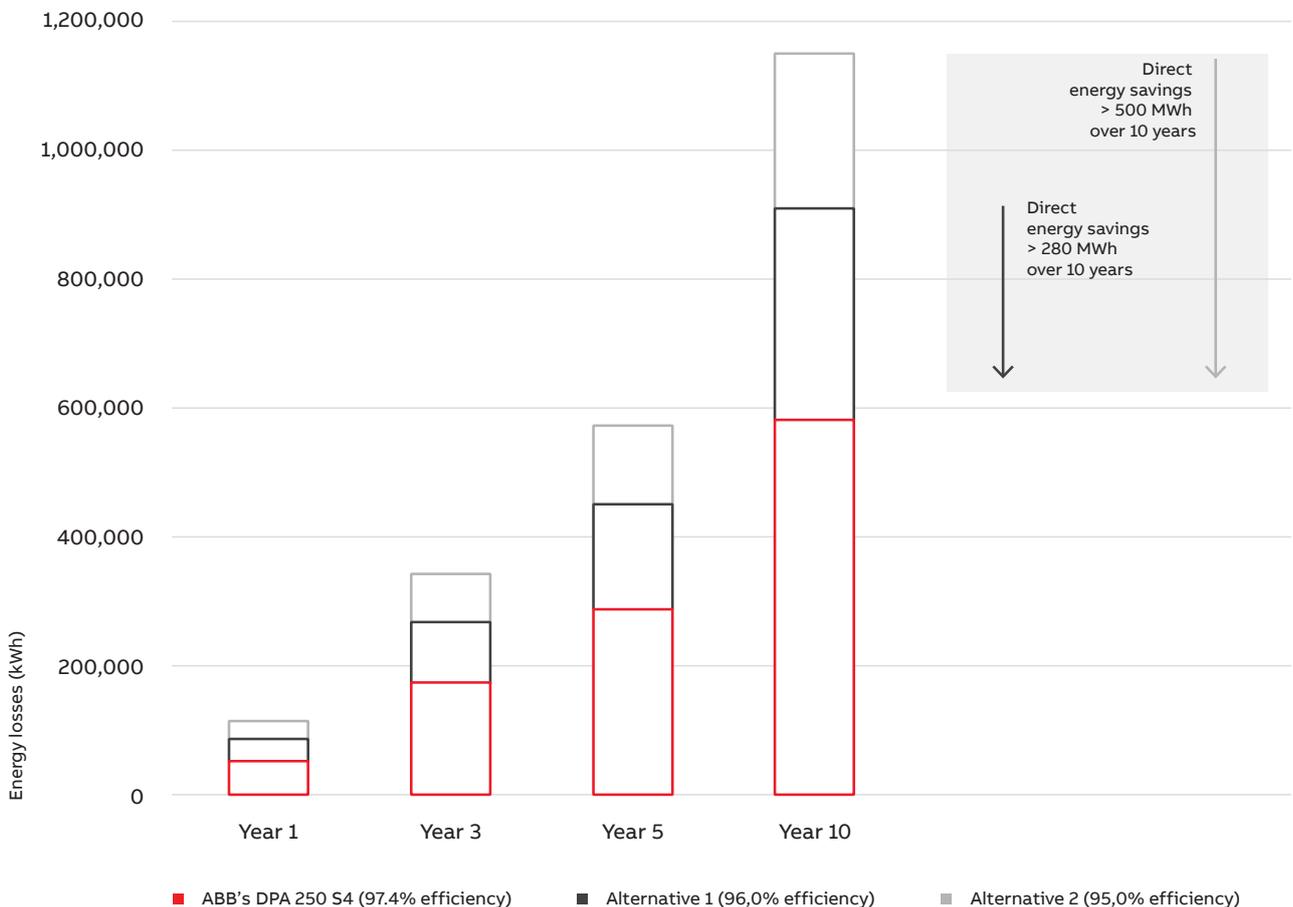


— 01  
The DPA 250 S4 significantly reduce your energy costs over time. For example, with a 250 kW load, you can have direct losses reduced by more than 500 MWh over 10 years, which at current price of electricity (0.1 EUR/kWh) results in savings of 50,000 EUR. With a reduced need for cooling and optimized electrical infrastructure, savings are even greater.

Selecting a UPS with high efficiency saves operational expenditures over the service lifetime and minimizes the impact it has on the environment. Power losses are pure overhead costs and the DPA 250 S4 can reduce those losses by more than 30 percent compared to similar products in the market.

**Featuring superior 97.6 percent UPS module efficiency and 97.4 percent system efficiency**, the DPA 250 S4 reduces energy losses that create pure costs as direct electricity spend and costs for cooling. Thanks to three-level interleaved technology, the DPA 250 S4 achieves an efficiency of over 97 percent in a wide operating range, when the load is between 25 and 75 percent of nominal capacity.

**Direct energy losses with 250 kW load**  
(losses generated by cooling etc, are not considered)



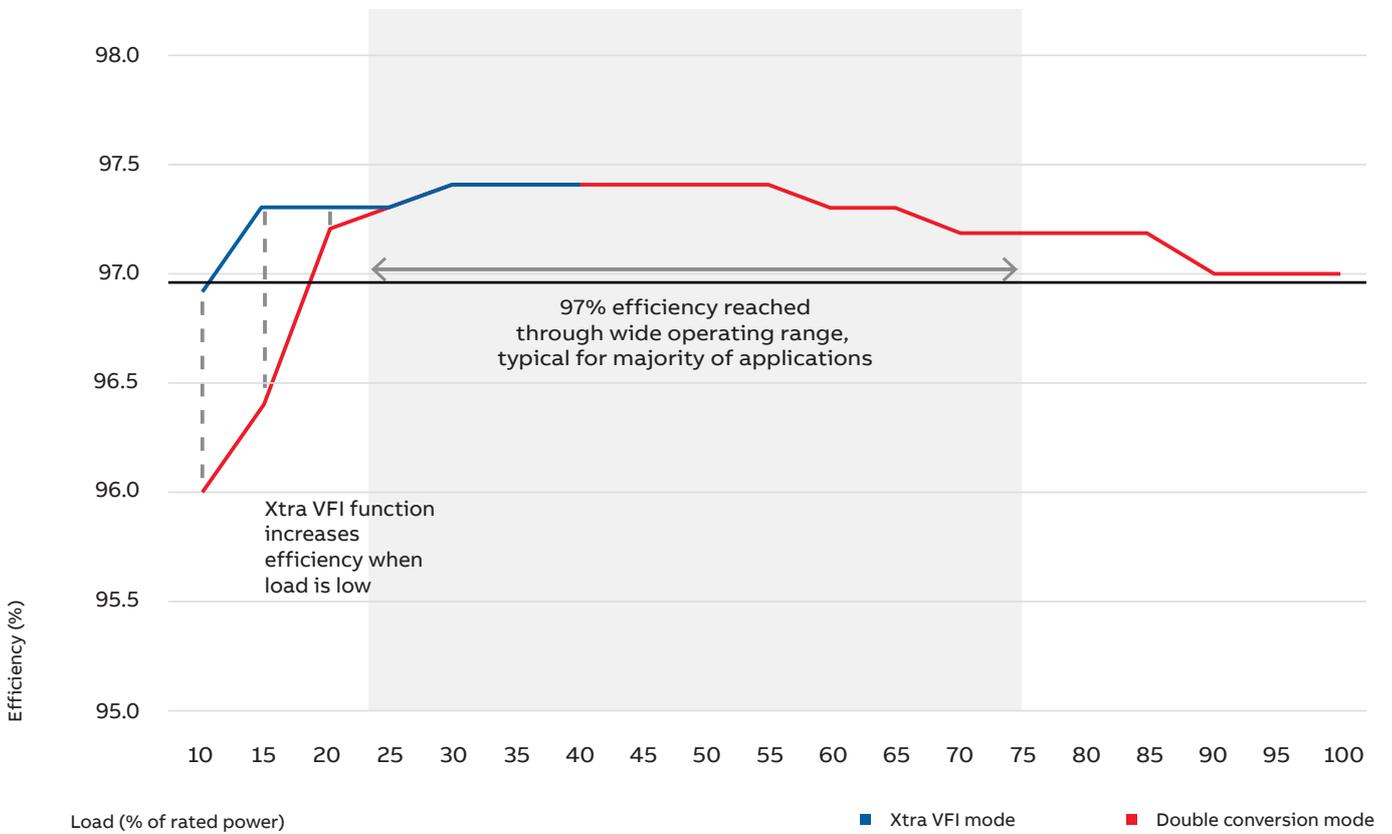


01 Superior double conversion efficiency helps to decrease costs of operation. The Xtra VFI feature boosts efficiency when the UPS operates with low load compared to nominal capacity.

**Xtra VFI – double conversion mode maximizes efficiency under low-load conditions**

Under operating conditions where the load is low compared to UPS total capacity, efficiency typically suffers and relative power losses are increased. Under these conditions, by using ABB's intelligent Xtra VFI – double conversion mode, the

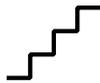
DPA 250 S4 can step up the system efficiency by optimizing the number of modules used in double conversion mode to feed the load. In case of a load step, more modules are switched automatically in milliseconds to online mode to secure the critical load.



# Uninterruptable power – scalable from 50 kW up to 1.5 MW

- 01 50 kW power in one UPS module
- 02 1,500 kW power in one UPS system
- 03 DPA – delivering almost infinite reliability and availability

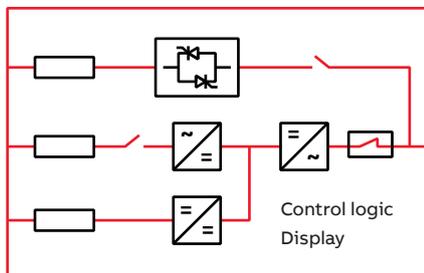
A benefit of a modular UPS is that capacity can be easily scaled up or down. UPS system power can be optimized to match the load and upgraded easily if power demand increases. The same power protection concept can be used by loads with different power demand characteristics. This makes things easy for operations personnel and equipment maintenance.



### 50 kW power in one UPS module

The DPA 250 S4 modular UPS is built up from 50 kW UPS modules. Featuring the most reliable DPA architecture, each module is capable of working independently. Modules include all necessary functional parts, such as rectifier, inverter, battery converter, static bypass and back-feed protection. This allows the modules to be fully redundant with each other for maximal reliability.

### DPA 250 S4 50 kW UPS module



— 01



— 03



### 250 kW N+1 redundant power in one UPS cabinet

The DPA 250 S4 250 kW cabinet can host up to six 50 kW modules for 250 kW N+1 redundant power. Modules are easy to slide in and slide out. Featuring smart and secure power connectors, the DPA 250 modules can be removed, or added, while other UPS modules in the system support the load in double conversion mode.



### 1,500 kW power in one UPS system

Up to six 250 kW frames and up to 30 modules can be paralleled for an amazing 1,500 kW of uninterrupted power. Secure ring-bus communication ensures there is no single point of failure in the system.



Up to 6 x 250 kW frames in parallel

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# Full flexibility to meet a variety of installation schemes



**Small installation footprint saves space**  
The DPA 250 S4 provides up to 250 kW N+1 secured power in 0.75 m<sup>2</sup>. In addition, maintenance, service and all cable connections can be managed from the front of the frame cabinet, so no side or rear access is required.



**Adaptable to different installation schemes**  
The DPA 250 S4 can be wired to have separate or common input feeds to the rectifier and static bypass. The wiring scheme is easy to change on-site before installation. Top or bottom cable entry can be chosen as a factory-installed option.



**Variety of options for energy backup, including lithium-ion batteries**  
The DPA 250 S4 can be installed with module-specific backup energy for highest availability – or a common battery for the whole UPS rack to optimize cost. The DPA 250 S4 is also compatible with lithium-ion batteries – a good option for those who look for further space savings without compromise in backup time.

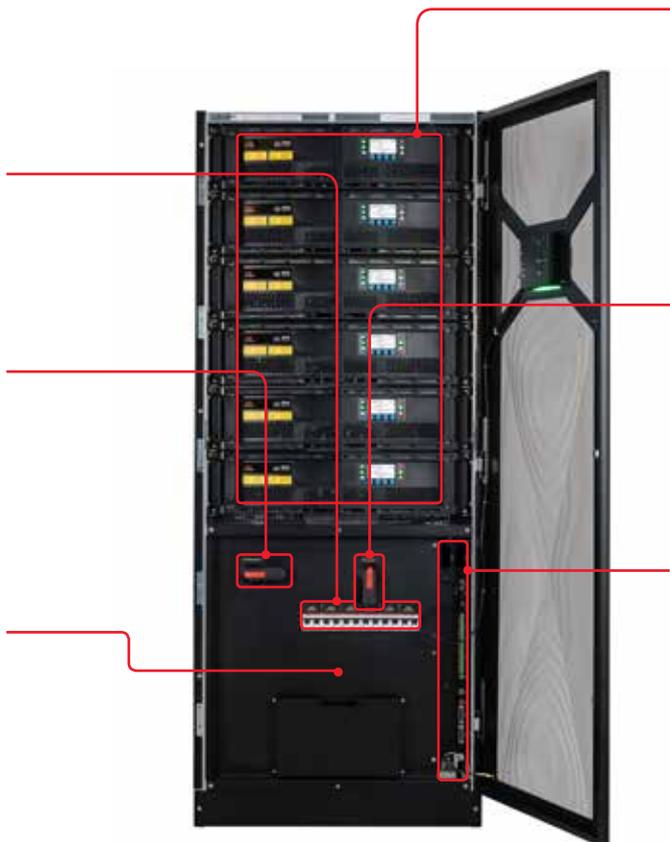


**Short recharge time**  
Compared to other UPSs on the market, the DPA 250 S4's battery charger is very powerful. Each 50 kW module can provide up to 15 kW recharging power. This means that batteries are charged up quickly, ready to support the critical load in the next outage.

**DC (battery) breakers**  
DC breakers for energy storage connection on each module separately.

**Maintenance bypass (optional)**  
Integrated MBS is available as option for enhanced service ability with single frame installations.

**I/O section and DC wiring**  
Wiring area has good space for service. Single and dual input feed supported as well as common or separate battery. Top or bottom cable entry supported.



**Up to 6 x 50 kW UPS module**  
Integrated UPS module with all UPS essential functions: rectifier, inverter, static bypass, control logic and display.

**Output isolation switch**  
Included in the standard configuration to allow disconnection of complete UPS cabinet from load supply line.

**Connectivity section**  
Two slots for connectivity cards, eg. SNMP web card and relay board. USB and RS-232 comm. ports. Building alarm inputs / relay outputs. Connection point for parallel system communication cable.

# Maximized availability with decentralized parallel architecture DPA™

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01 Fail-safe  
operation for high  
power applications

With DPA, the UPS is modularized, and each module has all the hardware and software needed for autonomous operation: rectifier, inverter, battery converter, static bypass switch, back-feed protection, control logic, display, and mimic diagram for monitoring and control. A module's output is not affected by failures elsewhere in the modular UPS system. If one module is lost, the others take up its load. In other words, a multimodule system is fault tolerant and there are no single points of failure. Uptime is guaranteed, and availability is maximized.



**Online swappable module for continuous uptime**  
DPA architecture enables UPS modules to operate completely independently of each other. This means that in case one UPS module needs to be removed or added to the system, this can be managed fast and seamlessly.

The DPA 250 S4 has a very robust design and features strong and practical handles. It is only possible to insert modules into the rack in the correct orientation and the slide rails have mechanical stoppers to stop the module from sliding out too

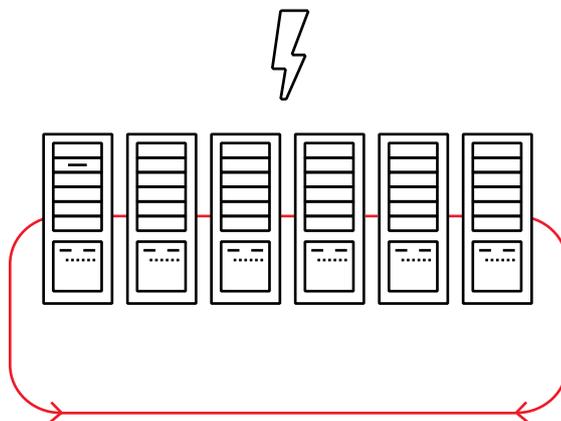


far, thus preventing an unintentional drop.

**Fail-safe operation for high power applications**

When multiple DPA 250 S4 cabinets are connected in parallel for capacities beyond 250 kW, secure ring-bus communication ensures system reliability is maintained, and that there is no single point of failure.

The ring-bus technique loops back the parallel communication cable from the last frame in the system. This introduces an alternative communication path in case one cable in between two frames is disconnected for some reason.



## Easy to operate – fast and secure to maintain

The DPA 250 S4 UPS modules have a very high power density. However, in this extremely compact design, serviceability has not been compromised. A well-thought-out electrical and mechanical scheme reduces scope for human error and makes the DPA 250 S4 fast and secure to maintain and service.



### < 10 min service time

The UPS modules have virtually no wiring. The circuit boards and other internal components have been positioned in such way that consumable parts that may require replacement during service life are easily extractable – making servicing safer and faster. It takes only 10 minutes to extract a module, replace consumable parts, insert it back to the system and turn it back online.



### Ease of monitoring at system and module level

The system graphical display provides a clear system overview, system level commands, measurements and system status, navigation into module level, and module level measurements and status. The DPA module display allows for easy module-level data access and module management.



# ABB – best quality for products and services

## Certified products

The DPA\_250\_S4 conforms to the following IEC/EN standards:

|             |                  |
|-------------|------------------|
| Safety      | IEC / EN 62040-1 |
| EMC         | IEC / EN 62040-2 |
| Performance | IEC / EN 62040-3 |

According to the IEC 62040-3 standard, the UPS has Classification Code VFI-SS-111, where "VFI" stands for voltage and frequency independent - ie, the device is independent of the supply voltage and frequency fluctuations and protects loads against harmful effects of such fluctuations without discharging the power storage device. "SS" means waveforms are sinusoidal in both normal or bypass mode (the first "S") and in power save mode (the second "S"). The three digits in "111" tell that the UPS output voltage remains within the limit values of the curve 1 set out in IEC 62040-3:

## When your business requires a global support network

ABB service engineers and a partner network in over 100 locations support our customers anywhere in the world, at any time.

ABB's UPS service portfolio is designed to maximize your return on investment and to keep equipment operating at the highest efficiency and availability throughout its entire lifetime. We are committed to the reliability of your operations, which is why we make every possible effort to guarantee your power availability – no matter what happens on the power supply side. We work closely with our research and development organization to develop the most advanced service technologies for our product portfolio and ensure a proactive product life cycle management.

Our services include:

- Installation and commissioning
- Maintenance
- Repairs
- Spares and consumables
- Extensions, upgrades and retrofits
- Replacement
- Training
- Service agreements
- Advanced services
- Factory acceptance tests



### Tested and trusted

Comprehensive testing is crucial. Therefore, companies usually test individual products before they leave the factory. But out in the field, real life often throws up unexpected operating conditions once devices are assembled into a larger system. That is why ABB has built a facility to test even the largest UPS configurations as one entity. The facility is designed to accommodate extended UPS systems – including, for example, energy storage such as battery banks, and input and output switchgear. ABB's test capabilities allow us to address trends toward bigger, more power-hungry data centers and industrial plants that require ever-larger UPS systems.

### The test center at a glance:

- The modular infrastructure enables flexible testing of one 4 MW system or two smaller systems. The UPS can be tested together with associated equipment – such as switchgear, static transfer switches, transformers, etc. - so the whole system can be quickly and smoothly integrated into the power infrastructure onsite.
- The test center can handle UPS systems for small- and medium-sized applications, as well as for power-hungry data centers and industrial plants.
- Different countries have different voltage standards - 208, 400, 480 VAC - and they can all be tested here.
- Customers and ABB engineers have a safe environment from which they can closely monitor the entire test process.
- As well as direct visual access, measurements from the test bays are displayed in the conference room.
- The facility is fully equipped with teleconference and video services to allow customer participation from anywhere on the planet.
- Around 90 percent of the power used in testing is recirculated. This massively reduces the electrical energy that is pulled from the public grid.



# Technical specification

| <b>GENERAL DATA</b>                          |  |
|--|--|
| System power range                           | 50 - 1,500 kW  |
| Nominal power per module                     | 50 kW  |
| Nominal power / frame                        | 250 kW (N+1)   |
| Number of UPS modules                        | 5 + 1  |
| Topology                                     | Online double conversion   |
| Parallel configuration                       | Up to 30 modules   |
| Cable entry                                  | Top or bottom  |
| Output power factor                          | 1.0  |
| Serviceability                               | Only frontal access needed   |
| Back-feed protection                         | Built-in as standard   |
| <b>INPUT</b>                                 |  |
| Nominal input voltage                        | 380 / 400 / 415 VAC  |
| Voltage tolerance (referred to 400 V)        | - 40% at partial loads   |
| Current distortion THDi                      | <2.8%  |
| Frequency range                              | 35 – 70 Hz   |
| Power factor                                 | 0.99   |
| Walk in / soft start                         | Yes  |
| <b>OUTPUT</b>                                |  |
| Rated output voltage                         | 380 / 400 / 415 VAC  |
| Voltage tolerance (referred to 400 V)        | ± 2.0%   |
| Voltage distortion THDU                      | <2.0%  |
| Frequency                                    | 50 or 60 Hz (selectable)   |
| Rated power factor                           | 1.0  |
| <b>EFFICIENCY</b>                            |  |
| Module efficiency                            | Up to 97.6%  |
| Overall system efficiency                    | Up to 97.4%  |
| In eco-mode                                  | Up to 99%  |
| <b>ENVIRONMENT</b>                           |  |
| Protection rating                            | IP 20 (IP 21 optional)   |
| Storage temperature                          | -25 °C to +70 °C   |
| Operating temperature                        | 0°C to +40°C   |
| Altitude (above sea level)                   | 1,000 m w/o derating   |
| <b>BATTERIES</b>                             |  |
| Types  | VRLA, open cells, NiCd and Li-Ion  |
| Battery charger                              | Decentralized charger per module   |
| <b>COMMUNICATIONS</b>                        |  |
| User interface                               | Graphical touch screen (one per frame as standard)<br>Decentralized LCD and mimic diagram (one per module as standard) |
| Communication ports                          | Communication ports USB, RS-232, potential-free contacts, SNMP (optional)  |
| Customer interface                           | Remote shutdown, gen-set interface, external bypass contact  |
| <b>COMPLIANCY</b>                            |  |
| Safety                                       | IEC / EN 62040-1   |
| EMC  | IEC / EN 62040-2   |
| Performance                                  | IEC / EN 62040-3   |
| Manufacturing                                | ISO 9001:2015, ISO 14001:2015, OHSAS18001  |
| <b>DIMENSIONS</b>                            |  |
| Weight (without modules / without batteries) | 270 kg   |
| Weight module                                | 68 kg  |
| Dimensions w x h x d                         | 791 x 1975 x 923 mm  |



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[abb.com/ups](http://abb.com/ups)