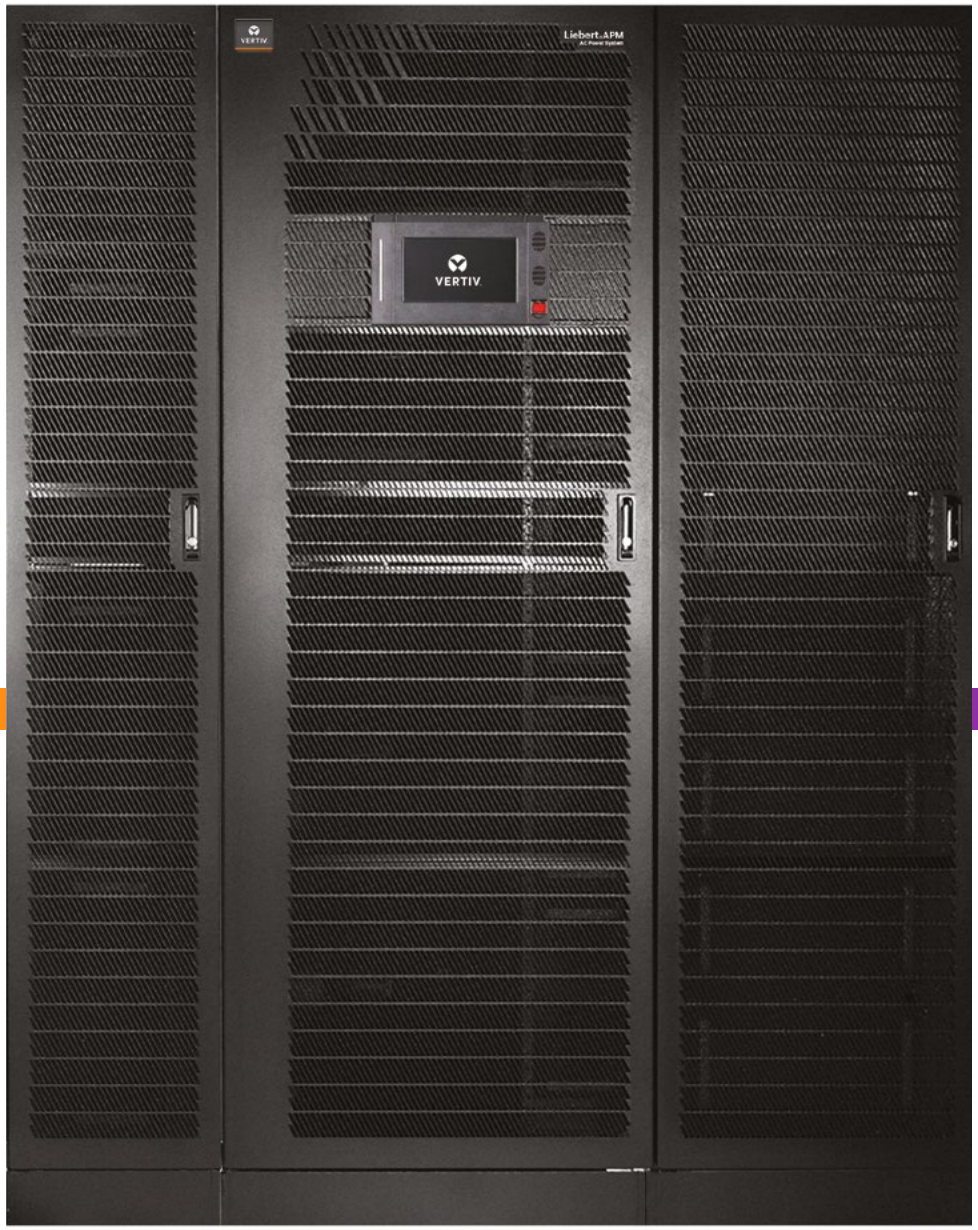
Liebert® APM

From 30 kW to 600 kW

The Versatile and Modular UPS Fit for Row and Room Applications



About Vertiv™

Vertiv brings together hardware, software, analytics and ongoing services to ensure its customers' vital applications run continuously, perform optimally and grow with their business needs. Vertiv solves the most important challenges facing today's data centers, communication networks and commercial and industrial facilities with a portfolio of power, cooling and IT infrastructure solutions and services that extends from the cloud to the edge of the network. Headquartered in Columbus, Ohio, USA, Vertiv employs around 20,000 people and does business in more than 130 countries. For more information, and for the latest news and content from Vertiv, visit Vertiv.com.

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OUR PURPOSE

We believe there is a better way to meet the world's accelerating demand for data - one driven by passion and innovation.

OUR PRESENCE

GLOBAL PRESENCE

Manuf. and Assembly Locations **19**
Service Centers **270+**
Service Field Engineers **2,700+**
Technical Support/Response **330+**
Customer Experience Centers/Labs **17**

US AND CANADA

Manuf. and Assembly Locations **7**
Service Centers **120+**
Service Field Engineers **850+**
Technical Support/Response **120+**
Customer Experience Centers/Labs **4**

LATIN AMERICA

Manuf. and Assembly Locations **1**
Service Centers **20+**
Service Field Engineers **300+**
Technical Support/Response **25+**
Customer Experience Centers/Labs **2**

EUROPE, MIDDLE EAST AND AFRICA

Manuf. and Assembly Locations **5**
Service Centers **70+**
Service Field Engineers **600+**
Technical Support/Response **95+**
Customer Experience Centers/Labs **6**

ASIA PACIFIC

Manuf. and Assembly Locations **6**
Service Centers **60+**
Service Field Engineers **950+**
Technical Support/Response **90+**
Customer Experience Centers/Labs **5**

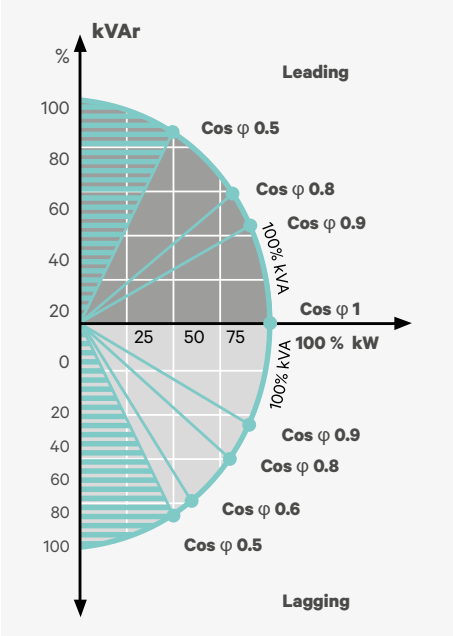
Liebert® APM from 30 kW to 600 kW

The Liebert® APM is a versatile and modular, transformer-free UPS designed to operate with a maximum energy efficiency of up to 96.3% for the protection of medium to large-sized business-critical applications.
Its modular and scalable configuration may house both power and battery modules inside the same UPS cabinet, or simply include power modules depending on the UPS rating. This guarantees maximum adaptability to every possible requirement in terms of footprint, power and runtime. Liebert APM's architecture allows for scalability while delivering an ideal balance of high availability, reliability and efficiency. With its high power density it also reduces system footprint in either row or room applications.

FEATURES AND PERFORMANCES

- Remarkable double conversion efficiency - up to 96.3%
- Flat efficiency curve
- High power density
- Fit for row or room applications
- Modular and scalable
- Flexible configuration with 30 kW and 50 kW power module capacities
- Hot- swappable power modules
- Independent module control system
- Unitary output power factor and symmetrical power factor diagram
- Integrated parallel and load bus synchronization
- Integrated autonomy for ratings up to 90 kW

The built-in scalability of the Liebert APM also allows for fast, simple increases in system capacity through featured FlexPower technology™.
Each power module combines scalable power with independent DSP control to auto-regulate operation, thus enhancing overall availability.
The Liebert APM is able to reach a total of 600 kW of active power in a single unit and up to a maximum of 2.4 MW in a complete parallel configuration. At the same time, it delivers an excellent integrated autonomy of up to 30 minutes for a 30 kW configuration and up to five minutes in the 90 kW configuration. For higher ratings, runtime extension is still possible via external battery cabinets.



Liebert APM - output power factor diagram

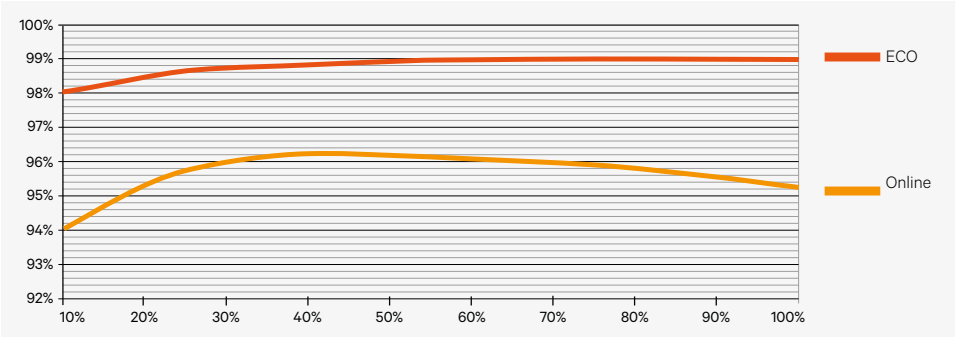
Efficiently Protecting Mission-Critical Loads

Enhanced Active Power

With its unitary output power factor (kVA= kW), Liebert APM offers an increased level of active power to support mission-critical loads.
The added advantage of increased active power allows customers to select the most appropriate rating for their critical application, sizing the system based on the actual active power requirements, thus minimizing the initial investment and maximizing TCO.
Liebert APM provides enhanced flexibility to ensure superior protection for all load types (lagging or leading) without derating.

Efficiency

The Liebert APM is capable of reaching the remarkable efficiency level of up to 96.3% in true online double conversion mode. With its flat efficiency curve, it delivers maximum efficiency regardless of the load level. In fact, it is capable of achieving an efficiency above 96% as well as maintaining flat efficiency levels at partial loads. This level of operating efficiency results in significant cost savings while at the same time contributes to reducing the carbon footprint of the installation and optimizing Power Usage Effectiveness (PUE).
Moreover, whenever input conditions and load nature allow, Liebert APM is further able to increase efficiency to 99% by operating in ECO mode.



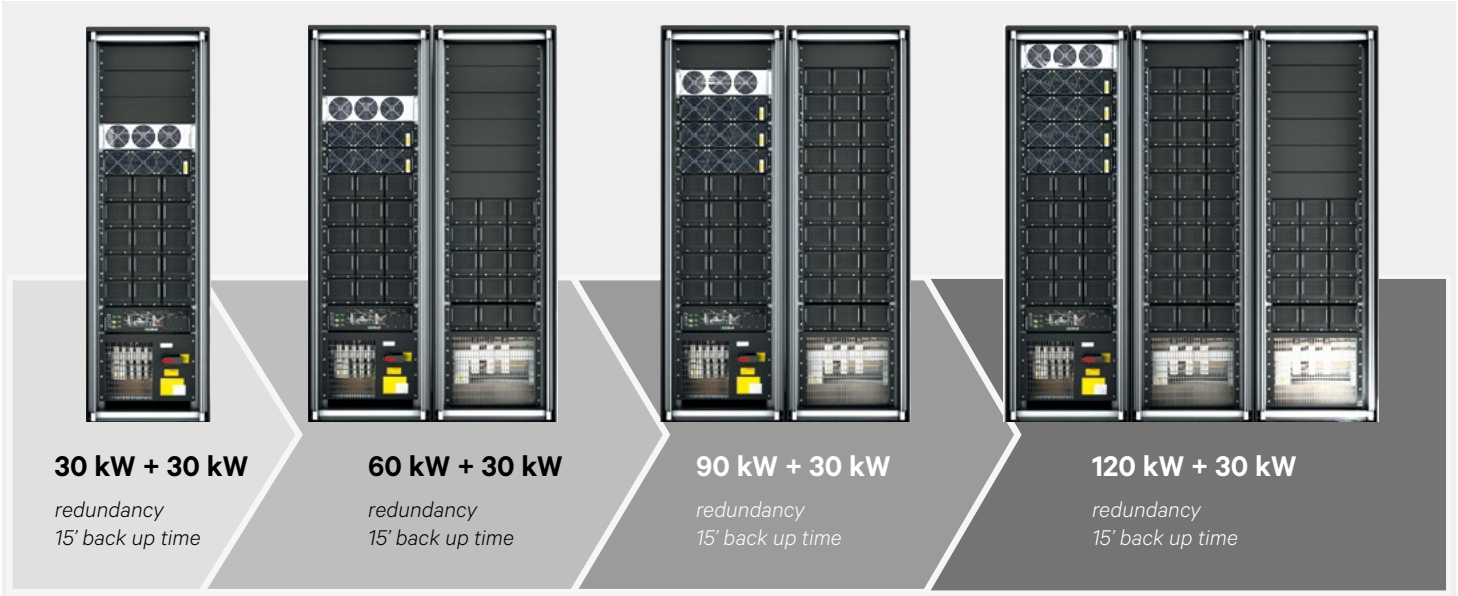
Liebert APM - efficiency curve

Modular, Scalable Configuration

The modular architecture of the Liebert® APM allows a single unit capacity to be scaled up to a maximum of 600 kW in one single unit. There are four different models available, each with specific power module and maximum cabinet capacity:

- **Liebert APM 30 kW - 150 kW:** reaching up to 150 kW in a single server rack cabinet in 30 kW increments and allowing for integrated runtime inside the cabinet
- **Liebert APM 30 kW - 300 kW:** reaching up to 300 kW with 30 kW power increments in a frame two times larger than a server rack cabinet, with the ability to extend runtime with dedicated battery cabinets
- **Liebert APM 50 kW - 250 kW:** reaching up to 250 kW with 50 kW power increments in a frame 1.65 times larger than a server rack cabinet, with the ability to extend runtime with dedicated battery cabinets
- **Liebert APM 50 kW - 600 kW:** reaching up to 600 kW with 50 kW power increments in a frame three times larger than a server rack cabinet, with the ability to extend runtime with dedicated battery cabinets.

Increases in capacity and redundancy can be made both vertically and horizontally by adding power modules to an existing UPS cabinet or, by connecting complete UPS systems in parallel in order to reach a maximum of 2.4 MW of active power.



Liebert APM 30-150 kW

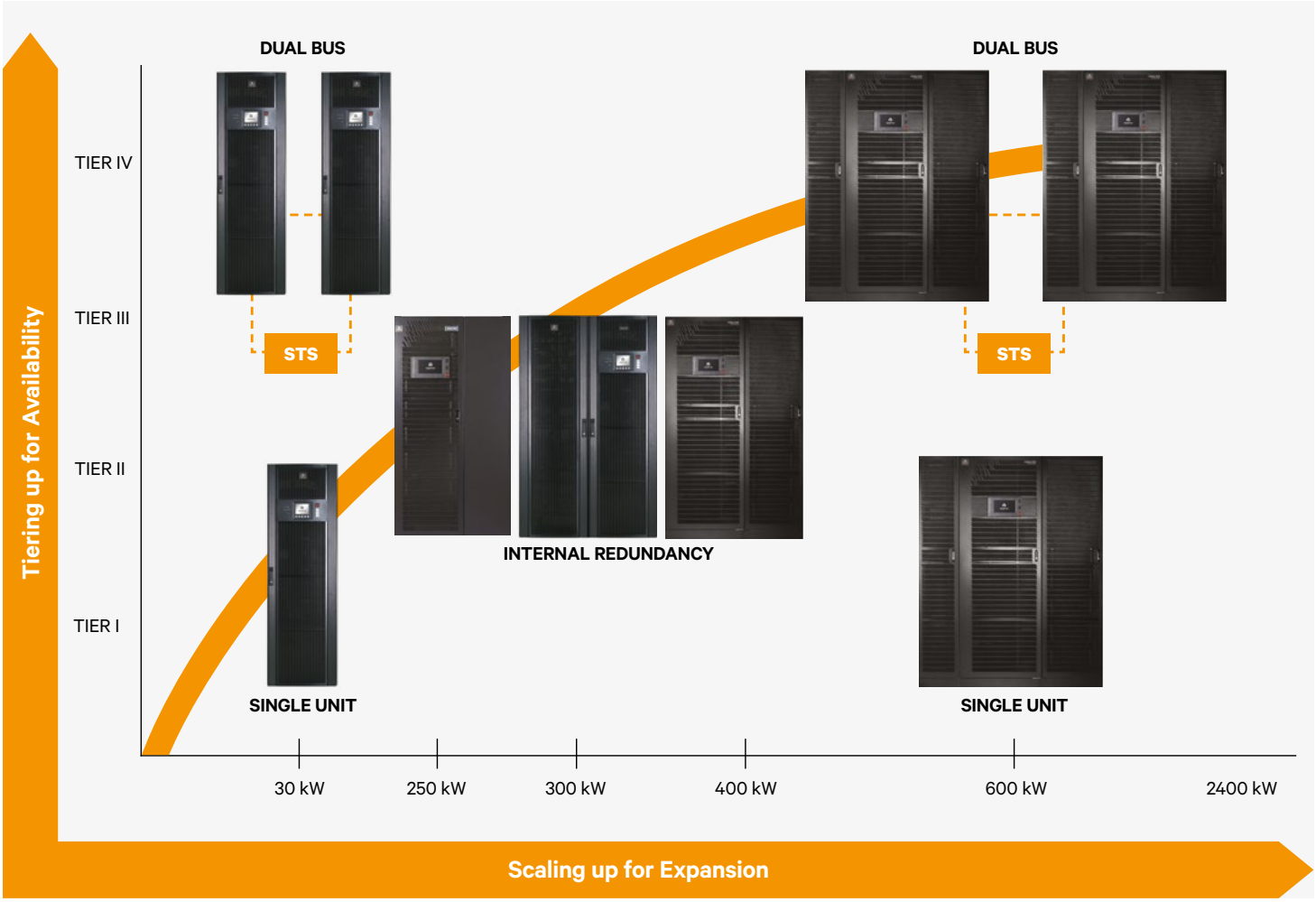
Liebert APM 50-600 kW

Parallel and Dual Bus Ready

Liebert® APM can be connected with up to two or four units in parallel depending on the configuration.

A single unit can be set up to work in parallel through the use of a communication cable set, allowing the system to be customized for the required configuration.

Additionally, Liebert APM allows easy deployment of Tier 4 architecture through its integrated dual bus control.



Liebert APM - Designed for "pay-as-you-grow" deployment

FLEXIBLE BATTERY CONFIGURATION

The flexible battery configuration of the Liebert APM is designed to meet individual installation availability and back up time requirements.

Liebert APM is compatible with numerous battery configurations including internal[1] and external modular solutions, as well as traditional external battery banks with string lengths between 30 and 40 batteries.

In a parallel system batteries can be installed in a common bank to maximize cost effectiveness and minimize floor space. Alternatively, a single battery bank can be dedicated to each UPS, delivering full redundancy and avoiding the possibility of a single point of failure.

Extended battery life is further ensured through a temperature compensated charging algorithm which prevents battery damage, thus prolonging lifespan.

1. Valid for Liebert APM 150 kW only

In The Field

Communication

Liebert® APM features a large multi-lingual LCD display giving users access to key operating information including alarm status, configuration, start-up/shutdown, transfer and advanced metering. The micro-processor based display functions independently from the system control and provides access to:

- real-time meter readings of system currents, voltages, active and reactive power
- status reports and history files
- system power flow one-line diagram

Liebert APM also offers communication features through Web (HTTP), Modbus and SNMP protocol.

Software

Vertiv connects and protects your network with core-to-edge solutions and unmatched expertise.
For maximum visibility and effective monitoring in one view, pair your Vertiv™ UPS with a software solution.

Vertiv™ Environet™ Alert

Vertiv™ Environet™ Alert provides industry companies with critical facility monitoring software that is affordable and easy to use. This solution delivers superior monitoring, alerting, trending and data organization. Get monitoring, alerting and trending at a price that's right for your business.

Vertiv™ Power Insight

Vertiv Power Insight is a complimentary web-based software designed for users with a distributed infrastructure that need a way to manage multiple devices.
It is a simple to install, easy to use solution that provides a single interface for up to 100 UPSs or rPDUs.

Serviceability and Maintainability

The Liebert APM is designed to facilitate effortless installation and simplify service with its easy to remove power modules. The hot-swappable module-based architecture considerably decreases the mean time to repair (MTTR) and facilitates maintenance operations by allowing single modules to be serviced while the remaining modules continue to power the load.
All power modules and critical components are easily accessible from the front of the unit.

VERTIV™ LIFE™ Services Remote Diagnostic and Preventive Monitoring

Vertiv's service program is designed to ensure that your critical power protection system is maintained in an optimum state of readiness at all times.

The **Vertiv LIFE™ Services** remote diagnostic and preventive monitoring service provides early warning of UPS conditions and out of tolerances.
This allows effective proactive maintenance, fast incident response and remote trouble shooting, giving customers complete security and peace of mind.

With **Vertiv LIFE** Services you will benefit from:

Uptime Assurance

Constant monitoring of UPS parameters, thus maximizing the system's availability.

First Time Fix Rate

Pro-active monitoring and data measuring ensure that when our customer engineers are dispatched on-site, they arrive prepared for first time resolution.

Proactive Analysis

From Vertiv LIFE Service centers, our experts proactively analyze the data and trends of your equipment, to recommend actions to ensure their best performance.

Minimized Total Cost of Ownership of Your Equipment

The continuous monitoring of all relevant parameters in turn maximizes unit performance, reduces on-site maintenance and extends the life of your equipment.

Fast Incident Response

Vertiv LIFE Services allow for immediate definition of the best course of action, as a result of the regular communication between your Liebert APM system and our Vertiv LIFE Service centers.

Reporting

You will receive a comprehensive report detailing the working order of your equipment and its operational performance.

Liebert® APM Specifications

Technical Characteristics					
Power Module (kVA/ kW)	30	30	50	50	50
Power (kVA)	30 - 150	30 - 300	50 - 250	50 - 400	50 - 600
Power (kW)	30 - 150	30 - 300	50 - 250	50 - 400	50 - 600
System Efficiency					
AC - AC on-line double conversion efficiency (%)	Between 95% and 96% for load >30%		Between 95.5% and 96.3% for load >30%		
AC - AC Eco mode efficiency (%)	>98%		>99%		
Input Parameters					
Rated input voltage (VAC)	380/400/415 VAC, three-phase four-wire				
Rated operating frequency (Hz)	50/60 Hz				
Input voltage range (VAC)	477 VAC - 305 VAC at full load, 477 VAC - 228 VAC at 70% load				
Input frequency range (Hz)	40 Hz - 70 Hz				
Input power factor	>0.99 at full load, >0.98 at half load		>0.99		
Input THDI (%)	<5%		≤3%		
DC Parameters					
Battery number	30, 32, 34, 36, 38, 40		32, 34, 36, 38, 40, 42, 44		
Battery Compensation	Yes				
Maximum runtime with internal battery	30 kVA: 30' 60 kVA: 10' 90 kVA: 5'		N/A N/A N/A		
DC ripple current	≤0.05C_{10}				
Output Parameters					
Inverter output voltage (VAC)	380/400/415 VAC, three-phase four-wire				
Inverter output frequency (Hz)	50/60 Hz				
Output frequency stability (Hz)	50Hz/60 Hz ±0.02%				
Voltage stability in steady state	±1%				
Voltage stability in transient state	Complies with IEC/EN 62040-3, class 1				
Inverter overload capacity	1 hour for 105%, 10 mins for 125%, 1 min for 150%, 200 ms for >150%		1 hour for 110%, 10 mins for 125%, 1 min for 150%, 200 ms for >150%		
THDv					
100% linear load	<1				
100% non-linear load	<4		<3		
Bypass Parameter					
Bypass input voltage	380/400/415 VAC, three-phase four-wire				
Bypass voltage range settable through software	Default: -20% to + 15%, other values, such as -40%, -30%, -10% and 10%, +15%				
Bypass overload capacity	135% long term, 170% for 1 hour, 1000% for 100 ms		110% continuous operation, 125% for 10 mins, 150% for 1 min, >400% for 100 ms		
Environmental Conditions					
Operating temperature range (°C)	0 - 40˚C*				
Storage temperature (°C)	-25 to 70˚C				
Maximum Operating altitude	≤1 000 m, when operating at 1000 - 2000 m, derated by 1% for every 100 m increase of altitude		≤3000 m above sea level		
Relative Humidity	≤95%				
Noise (1m)	52 - 62 dBA, adjusted according to load rate and number of modules	60 - 65 dBA, adjusted according to load rate and number of modules	<70 dBA		
Protection Level	IP20				
Standards					
Low Voltage Directive	2006/95/EC with the Amendment Directive 93/68/EEC Directive for electromagnetic compatibility 2004/108/EC				
General and safety requirements for UPS used in operator access areas	IEC/EN/BS 62040-1:2008				
Electromagnetic compatibility (EMC) requirements for UPS	IEC/EN/BS 62040-2: Immunity category C2, Emission category C2	IEC/EN/BS 62040-2: Immunity category C3, Emission category C3		IEC/EN/BS 62040-2: Immunity category C3, Emission category C3	
Environmental aspects	EN/IEC/BS 62040-4				
Dimensions and Weight					
Dimension, w x h x d (mm)	600 x 1996 x 1100	1200 x 1996 x 1100	1000 x 2000 x 1000	1400 x 2000 x 950	1800 x 2000 x 950
Weight (kg)	30 kVA: 280 60 kVA: 315 90 kVA: 350 120 kVA: 385 150 kVA: 420	30 kVA: 362 60 kVA: 397 90 kVA: 432 120 kVA: 466 150 kVA: 500 180 kVA: 535 210 kVA: 570 240 kVA: 602 270 kVA: 635 300 kVA: 670	50 kVA: 411 100 kVA: 454 150 kVA: 497 200 kVA: 540 250 kVA: 583	300 kVA: 862 350 kVA: 905 400 kVA: 948	300 kVA: 986 350 kVA: 1029 400 kVA: 1072 450 kVA: 1115 500 kVA: 1158 550 kVA: 1201 600 kVA: 1244

*Conditions apply

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