



Product & Service Catalogue

KOHLER POWER
uninterruptible

Contents

CAB 2





About KUP	4	Modes	59
KUP Products	11	Lithium-ion Batteries	60
Single Phase	13	PowerWAVE Generators	64
MINIpowerPLUS	14	PowerWAVE EL	70
PowerWAVE 1000	18	PowerNSURE	74
PowerWAVE 3000/TP	22	PowerREPORTER	78
Three Phase	27	Service Solutions	82
PowerWAVE 5000/TP	28	Maintenance	84
PowerWAVE 6000	32	Batteries	85
PowerWAVE 8000DPA	36	Monitoring	86
PowerWAVE 9000DPA	42	On-site	88
PowerWAVE 9250DPA	48	Technical Specifications	91
PowerWAVE 9500DPA	54		

About KUP



What makes us different?

Our aim is simple – to be the best power protection company there is.

Together with our parent company, the Kohler Company's Power Group, Kohler Uninterruptible Power Limited (KUP) is a driving force within the power protection industry offering pioneering product technology, service excellence and global reach.

Best in class power protection solutions

Central to our product portfolio is a range of the highest quality, class-leading three-phase and single-phase uninterruptible power supplies. Developed to offer the highest levels of efficiency, availability, scalability and flexibility.

Leveraging Kohler's technical leadership in global power protection, the full power protection portfolio includes:

Uninterruptible power supply (UPS)

Standby diesel generators

Battery systems

Emergency lighting static inverters

Switchgear

Software and ancillaries

Service excellence guaranteed

KUP has built an outstanding reputation for service excellence through its unrivalled pre and post sales support. Our wide range of services includes initial site surveys, system design, installation & commissioning, preventative maintenance, training, remote monitoring and technical support.

With 24/7 availability, all these services are delivered by a dedicated and extensive network of trained service engineers and service support staff - ensuring lifelong and reliable operation of the power protection solutions it provides.

Quality management and certifications

KUP's quality management system is certified to NQA EN ISO 9001, its environmental procedures to ISO 14001 and its health & safety procedures to OHSAS 18001, and is recognised as an Investor in People. KUP is also certified under the SafeContractor scheme. These certifications guarantee that all its customer obligations under health and safety and environmental legislation are met.

Why choose us?

KUP takes a comprehensive, end-to-end approach to meeting our customers' specific and demanding requirements. From initial contact through installation, service, maintenance and disposal, KUP provides its customers with an unrivalled partner for complete peace of mind.

We understand that every client is different and each has its own specific opportunities to consider and challenges to overcome. The key, we believe, is to spend the time required to truly understand the business and how it operates. Only then can we apply our comprehensive product range, combined with our broad support services offering, to provide power protection solutions which exceed expectations.

This also means KUP continuously invests in product and system development, the talent of its employees, broadening its range of services, and improving its service delivery. By doing so, KUP expertly meets the present and future needs of its customers and achieves its objective – to be a leader of power protection solutions and services.

Satmetrix – customer satisfaction

Kohler Uninterruptible Power take customer satisfaction very seriously. In order for us to ensure all of our procedures, policies, products and services meet or exceed our customers' expectations, we undertake regular, random customer satisfaction surveys. All survey forms are regularly reviewed by senior management and the contents of such surveys are treated with the strictest of confidence. We have contracted with NICE Satmetrix, a professional, objective provider of customer experience management solutions, to conduct the survey on our behalf.

About Kohler Co.

Established in 1873, Kohler Co. has a pedigree for quality, innovation and exceptional craftsmanship. In 1920, it launched the world's first engine powered electric generator. Since then, it has been developing products for every aspect of critical load protection and is one of the world's largest power protection equipment manufacturers with products in use on every continent.

Together, KUP and Kohler bring a potent, global force of longevity, pedigree, pioneering product technology, service excellence and global reach to the power protection industry.

The KUP mission

To continuously delight our customers through the provision of industry-leading Power Protection Solutions and Support Services.





Made in Switzerland

For over 20 years, KUP has led the UK in terms of power protection innovation. Today, the company is recognised as one of the industry's most innovative organisations – thanks in part to the success of its class-leading products and services, and the introduction of game-changing technologies to the UK market – several of which are now considered almost ubiquitous within the power protection industry.

Throughout this period, KUP has worked with a single manufacturing partner, based in Switzerland, where the vast majority of KUP's products are designed and constructed. This consistency and close cooperation benefits KUP's clients in countless ways, not least through additional resources and investment, and access to an extensive team of R&D specialists in more than 20 countries.



Product overview: Industry-leading products

KUP's product portfolio contains some of the most technologically advanced power protection products. At the core of its product portfolio is a range of high quality and reliable three-phase and single-phase uninterruptible power supplies.

Single-phase UPS from 1–20 kVA, parallelable up to 80 kVA

Three-phase transformerless UPS from 10–500 kVA scalable up to 5 MVA

Standby diesel generators

Battery systems

Switchgear

Emergency lighting static inverters

Software and ancillaries

Service overview

24/7 onsite service

Initial site survey

System design

Installation

Commissioning

Preventative maintenance

Repair

Battery maintenance, replacement and testing

Capacitor replacement

Remote monitoring

Load bank testing

Witness testing

Disposal

Enhanced Capital Allowance Scheme

Specific products within KUP's product range are now included on the Carbon Trust's Enhanced Capital Allowance approved product list. This offers customers the opportunity of significant tax savings on the capital investment, and the knowledge that they are purchasing equipment with class-leading efficiency.

Market overview

From financial services and Colo providers to retail and manufacturing giants, KUP's products are being utilised in a broad range of markets, supporting an even broader range of applications.

Regardless of whether you need a multi-MVA system to support a tier 4 data centre or a 10 kVA UPS to support an emergency lighting system, KUP has the perfect solution. Our teams of sales managers and engineers have extensive experience in developing tailor-made solutions, specifically designed to meet your particular challenges and ensure that any requirement can be satisfied, no matter the business or area of operation.

"KUP's team presented its latest product development to us, the PowerWAVE 9500DPA, and thankfully it answered all of our needs. Its ability to support a load of 400 kVA within a single frame, whilst still offering N+1 redundancy, was a big advantage over competitors' products."

Phil Jones, Business Manager,
Royal Bank of Scotland

Testimonials

"The purchase, installation and subsequent maintenance has been smooth and without fault. The process of purchasing the communications card was easy and the support provided before the purchase was made was very informative."

Richard McLennan, The Law Society

"The Trust has been a KUP customer for a number years. The UPS sits in the corner of the data centre and does the job. Any minor power interruptions have been handled without an issue. Service, support and preventative maintenance have always been handled in a professional manner with the engineers being knowledgeable and friendly."

Mark Caines, The Ipswich Hospital NHS Trust

"KUP gives us the peace of mind we need, knowing we're protected and that professionals are on hand to ensure everything always goes smoothly."

Conleth McCallan Managing Director, Datonet

"I am always told when the engineers will arrive On-site; the service I receive is outstanding. If anything was to change in my service visits I am always notified in good time."

Mo Knott, Tesco Stores Ltd

"After 30 years plus of working in the building services, and past service contracts with you, I have always had a reliable service, with emergencies always being resolved without dramas."

Gary Sturges, Wren Environmental Ltd

"A quick response to initial enquiry with quotation and technical information. Delivery and commissioning all as detailed. Overall excellent service."

Darryl Behn, Fenner Nash Electrical Ltd

"The engineer who attends our site is very competent, answers any questions and leaves you feeling that your building is covered in all eventualities."

William McGuiggan, John Lewis





KUP Products

KUP's product portfolio contains some of the most technologically advanced power protection products. At the core of its product portfolio is a range of high quality and reliable three-phase and single-phase uninterruptible power supplies.





Single Phase

MINIpowerPLUS

(1.25–10 kVA)



Designed to be the most reliable and resilient single-phase UPS available.

MINIpowerPLUS

Expandable in 1.25 kVA modular steps to 10 kVA

Online double conversion technology for a clean and protected supply

Internal N+1 parallel redundancy for high availability and reliability

Easy-to-use LCD interface for programming, status reporting and diagnostics

Expandable up to 8 hours' battery autonomy

Tower or 19" rack-mounted configurations

Onsite, flexible upgrade capability

Near unity input power factor at partial and full loads

Single-phase, scalable critical power protection up to 10 kVA.

The MINIpowerPLUS range is ideal for small low power protection applications where reliable power must be scaled to cost and space constraints. Available in an office-friendly tower or compact 19" rack-mounted modular configuration, the MINIpowerPLUS is one of our most reliable and resilient single-phase UPS currently available.



Total flexibility

Ability to 'right size' the system

Simple installation of new UPS modular power boards

Reduced total cost of ownership

Total flexibility is a key benefit of the MINiPowerPLUS. It is possible to simply add UPS power boards – in cost-effective incremental steps – to the MINiPowerPLUS as the critical load requirement grows. This ensures the UPS is 'right sized' to the critical load at initial installation. This 'right sizing' reduces initial costs, optimises operating efficiency and helps reduce the total cost of ownership. Adding or replacing existing boards also enables easy system upgrades or repairs.

Battery autonomy is similarly flexible, and can be customised using battery kits. The capacity of one string, containing three batteries is 9 Amp per hour. These can be standalone or integrated with the UPS power boards. Full-load battery standby time of up to eight hours is available with a rapid recharge capability. Battery redundancy can also be built-in for guaranteed continuity of supply.

The right solution MINiPowerPLUS is available in two different versions

MINiPowerPLUS tower

MINiPowerPLUS tower systems deliver up to either 5 kVA (MINiPowerPLUS 5000) or 10 kVA (MINiPowerPLUS 10000) in a compact unit measuring only 270 x 475 x 570 mm.

MINiPowerPLUS 5000 uses the space-saving single tower to accommodate up to four 1.25 kVA UPS power boards and four strings of batteries. The capacity of one string, containing three batteries is 9 Amp per hour. Battery autonomy can be increased by adding a separate battery cabinet.

MINiPowerPLUS 10000 allows four to eight 1.25 kVA UPS power boards to be accommodated in one tower to provide a maximum output of 10 kVA. Up to ten strings of batteries can be housed in a separate cabinet.

MINiPowerPLUS rack

MINiPowerPLUS rack-mounted version uses 6U of a standard 19" rack. With four UPS power boards, this version provides up to 5 kVA in capacity or 3.75 kVA in parallel redundant (N+1) mode. Batteries are internal. Autonomy can be extended simply by mounting additional batteries in a separate rack-mounted battery unit.

Features of both the tower and rack-mounted MINiPowerPLUS include automatic bypass, battery test function, load/temperature dependent fan speed and an RS232 port allowing the use of diagnostic or auto-shutdown software.

High up time

Internal N+1 parallel redundancy

If one of the modules stops working, the others will all continue supplying the load without any interruption, redistributing the percentage of load that was previously supplied by the module now out of order. This redundancy ensures continuous up time.



MINiPowerPLUS tower



MINiPowerPLUS rack



PowerWAVE 1000 (1-10 kVA)



For server, network, storage, VoIP and telecommunication applications – combining high reliability with low upfront costs to make it the perfect solution for mission critical applications.

PowerWAVE 1000

Compact design, offered in both 19" rack and tower versions

Up to 94% efficiency

High efficiency eco-mode

0.9 power factor (1–3 kVA)

Unity power factor (6–10 kVA)

Interfaces: USB, RS-232, SNMP, Modbus, potential free contacts, EPO contact inputs

Flexible battery configuration – programmable number of batteries (6–10 kVA)

Designed for single-phase uninterruptible power supply requirements.

Manufactured with the flexibility to meet the demands of today's critical applications, the PowerWAVE 1000 can be used as a standalone UPS device or installed into a standard 19" rack configuration, with connectivity options available for each.

The UPS completely regenerates the utility power to correct power disturbances in the mains and provides clean AC power, with voltage and frequency independency from the mains power supply (VFI).



Hot-swappable batteries

Replace or add battery packs with no downtime/no risk

With the PowerWAVE 1000's front access panel, replacing battery packs no longer requires the critical load to be interrupted, ensuring you are always protected 24/7.

With the 6–10 kVA versions, the number of batteries is programmable allowing for a flexible battery configuration.

High reliability

Automatic (6–10 kVA UPS) redundant parallel operation

Increasing load and protection levels is made quick and easy with the PowerWAVE 1000. A larger load or N+1 parallel redundancy can easily be achieved by simply connecting up to four units, using the CAN-bus (RJ45) on the rear of the unit. Versions are available for 1, 2, 3 or 4 x UPS to create a 1+1, 2+1 or 3+1 redundancy system. This 'right sizing' reduces initial cost, optimises operating efficiency and helps reduce total cost of ownership.

In addition, matching battery cabinets can be added to extend the back-up time for several hours.

Advanced battery discharge management

Reduced recovery time from discharge

The PowerWAVE 1000 automatically manages the end-discharge voltage of the internal batteries according to the load, preventing deep discharge of the batteries during a power failure.

User-friendly display

Quick glance screen

An easy-to-read display provides a real-time view of all major system parameters and current status, including load level, battery level, system wiring faults, overload and programmable output status.

Power distribution and bypass

Optional manually operated maintenance bypass switch, which facilitates electrical and physical isolation of the UPS. Power distribution (1, 2 and 3 kVA UPS) facilitates easy electrical connection of devices to the UPS. The units can fit in as a tower or rack version.

Low cost of ownership

High operating efficiency

0.9 Unity power factor & low input THDi

The PowerWAVE 1000 delivers high efficiency of up to 94%. The eco mode allows this to be increased to 98%.

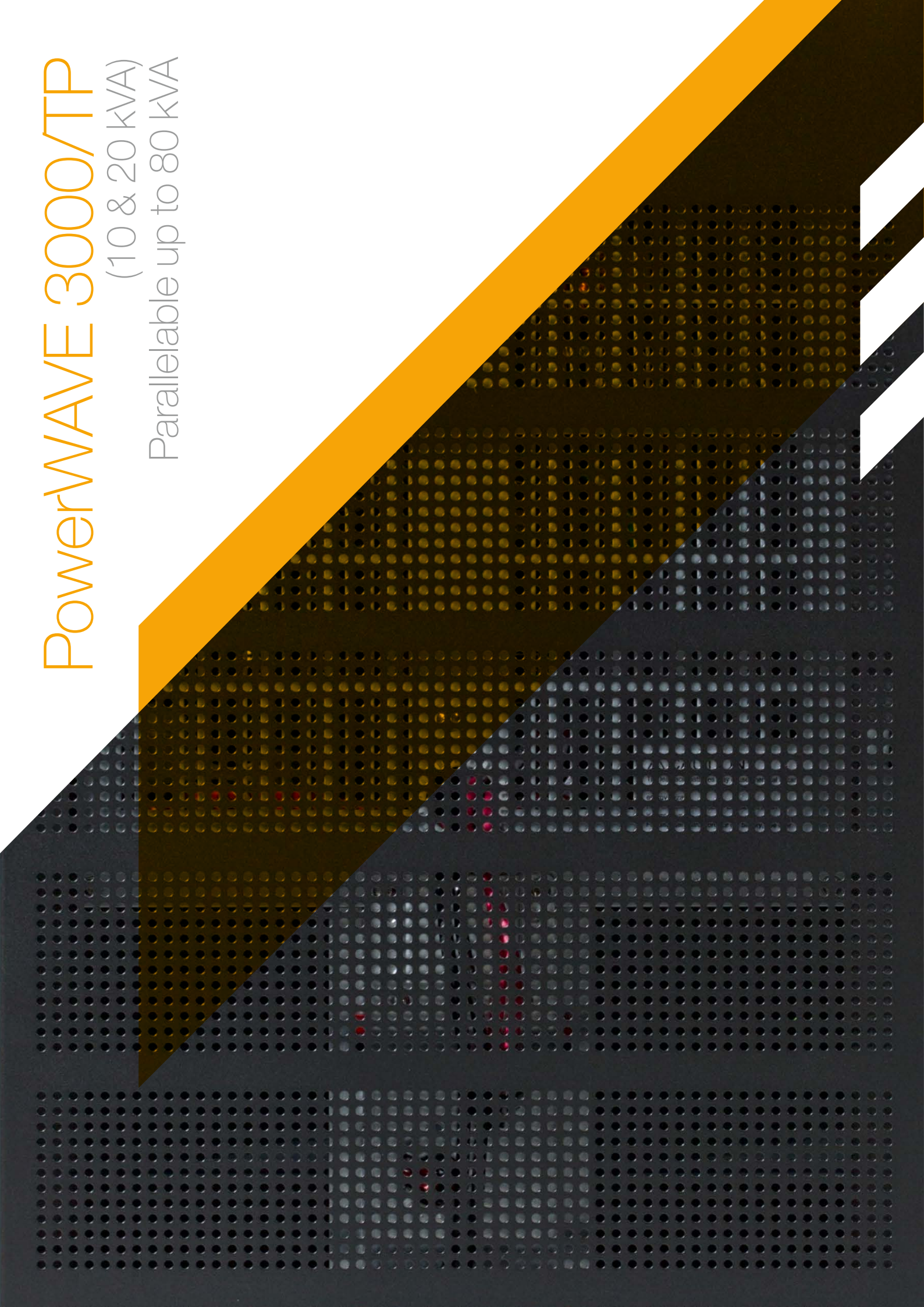
The PowerWAVE 1000 provides an output factor of 0.9 (1 kVA, 2 kVA and 3 kVA) and unity (6 kVA and 10 kVA), as well as a low input THDi of <3%.



PowerWAVE 3000/TP

(10 & 20 kVA)

Parallelable up to 80 kVA



Single-phase UPS for midsize server rooms, networks, telecommunications systems and industrial processes.

PowerWAVE 3000/TP

Energy savings up to 93% efficiency

97% efficiency in eco mode

Low harmonic distortions (< 5% THDi) and active power factor correction (0.99 input PF) eliminate interference from other equipment in the network

Paralleling up to 4 units allows for increase of capacity and introduction of redundancy to system to enhance availability

Integrated manual bypass switch simplifies maintenance and reduces need for external switchgears

Can operate as frequency converter (50 Hz to/from 60 Hz)

Power factor 0.9

Same model supports different wiring schemes: three-phase and single-phase input as well as single and dual input feed

Extended autonomy with matching battery cabinets

Compact, single-phase critical power protection up to 20 kVA.

The PowerWAVE 3000/TP UPS delivers reliable power, low running costs, long battery life, easy maintenance and high levels of flexibility.

Featuring double-conversion, voltage and frequency independent (VFI) topology, the PowerWAVE 3000/TP is available in both 10 and 20 kVA versions, with the option to configure up to four units in parallel to boost power capability or provide redundancy.

Three-phase or single-phase inputs can also be accommodated, as well as single or dual supply inputs – allowing the customer to manage two independent power sources.

Simple to install and with a small footprint, the PowerWAVE 3000/TP provides stable, regulated, transient-free, pure sine wave AC power with extremely tight output voltage regulation.





Reliable

Online double conversion topology delivers constant and stable power to the load even in the presence of severe disturbances in the utility

Parallelable up to four units to provide system redundancy

Programmed and automated battery tests ensure optimised battery management, operation and lifetime

Flexible

Single or three-phase input is field configurable – adaptable to installation requirements

Single or dual input power source compatible (field configurable)

Scalable

Different autonomy variations with inbuilt batteries or additional battery cabinets

Simple power increase (pay-as-you-grow) by paralleling up to four units

Communication options

Through monitoring devices, any abnormal situation (events/alarms) can be detected immediately

Dry-contact card – relay interface card enables advanced communication between the UPS systems

Network interface cards – control and monitoring of the UPS via a web browser

Sensors – combined with the network interface card, humidity and temperature sensors can be integrated into the system and monitored remotely via a web browser

Battery options

Additional battery cabinets that match perfectly with the UPS for scaling autonomy time

Reduced costs

High efficiency reduces the quantity of power consumed by your installation

Reduced heat losses maintain a lower operating temperature, prolonging the lifetime of components and batteries whilst also reducing cooling costs

The small footprint saves space and makes installation simpler

Battery runtime (half load/full load)

	10 kVA	20 kVA
UPS internal battery	39/16	16/5 minutes
UPS + battery cabinet	152/70	70/29 minutes

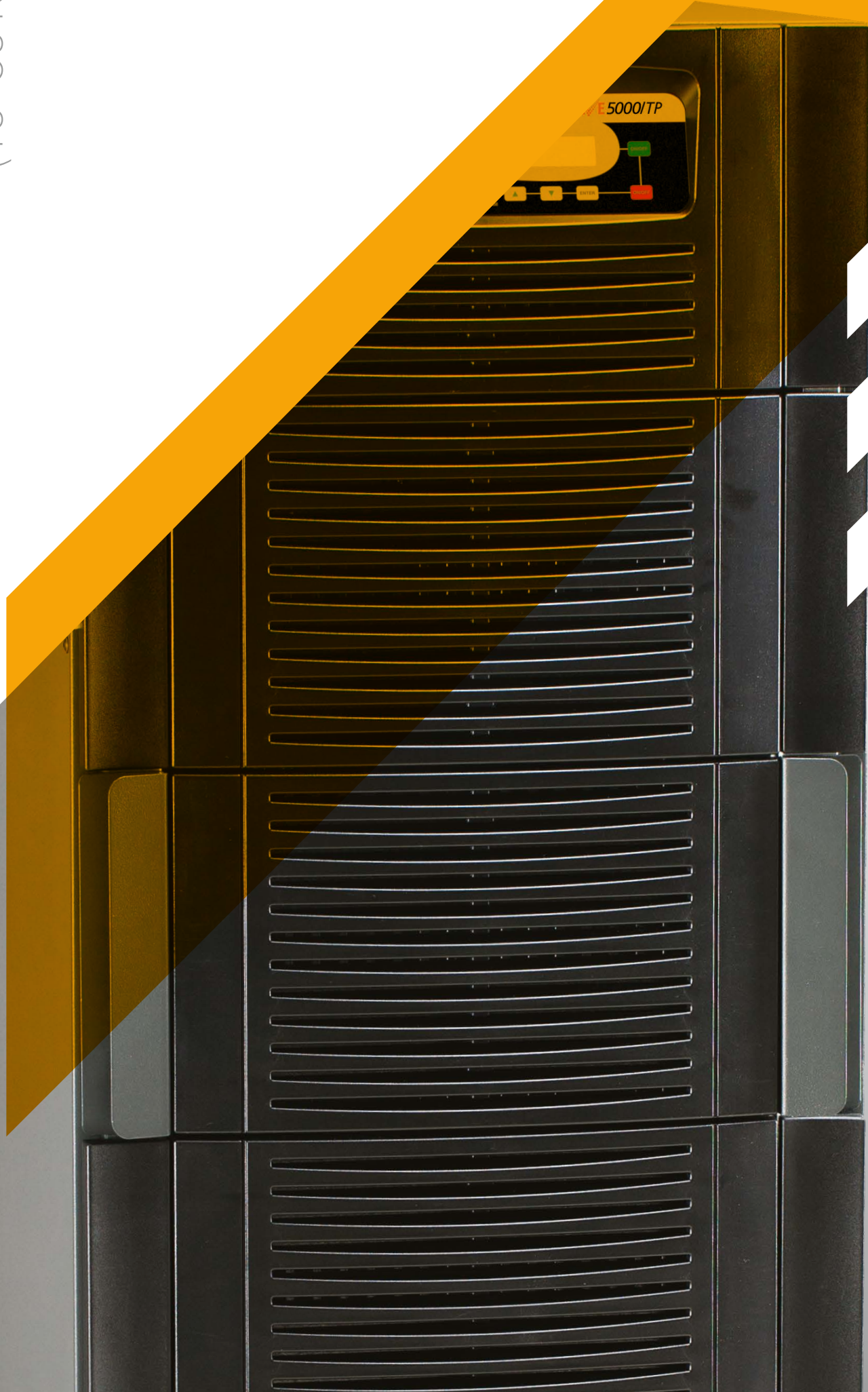




Three Phase

PowerWAVE 5000/TP

(10–50 kVA)



Three-phase UPS for midsize server rooms, networks, telecommunication systems and industrial processes.

PowerWAVE 5000/TP

Capacities from 10 kVA to 50 kVA
three phase

On-line double conversion,
transformerless technology for high
reliability

Parallel capability of up to 20 units

Intelligent battery management

95.5% efficiency across a wide load
range

Integral batteries

Near unity input power factor (0.99)

Low input harmonic distortion
(THDi <3%)

Small footprint and low weight

Ergonomic design for easy serviceability

Energy saving and low carbon footprint

Extended autonomy with matching
battery cabinets

A true on-line, double-conversion, VFI (voltage frequency independent) UPS that provides enhanced power protection in a compact format.

Its outstanding price and performance deliver the best value for money in its category with uncompromised system reliability and power availability.



Flexible battery configuration

Optimal sizing of battery capacity

10–50 kVA with different sized cabinets

Extended autonomy with matching battery cabinets

PowerWAVE 5000/TP is available in three cabinet sizes, enabling you to choose the ideal capacity and required autonomy for your critical load. The smaller 10–25 kVA units are available in two cabinet sizes, dependent on the required level of autonomy, with the larger units (25–50 kVA) available in a third cabinet size, which can house both 7/9 Ah and 28 Ah batteries.

Additional battery cabinets that match perfectly with the UPS for scaling autonomy time.

Highest load availability

Productivity maximised, ‘downtime’ minimised

Paralleled systems are designed to ensure availability by significantly increasing system redundancy. In the case of a power failure, should a UPS unit fail, the remaining units are still able to continue to support the critical load. Redundant paralleled systems also enable regular maintenance to be carried out on the system without any requirement to remove the critical load from conditioned power.

High efficiency for lowest lifetime costs

High efficiency at partial and rated loads

Low carbon footprint

With a transformerless design and Energy Saving Inverter Switching (ESIS) technology, PowerWAVE 5000/TP delivers efficiency at partial and rated loads (up to 95.5%). This level of efficiency dramatically reduces the total cost of ownership of the UPS during its lifecycle.

Ripple-free and optional temperature controlled battery chargers protect batteries and extend the life-time performance, further reducing running costs.

These benefits combine to make the PowerWAVE 5000/TP a truly eco-friendly solution for all power protection requirements.

Space saving

Reduced footprint

Valuable floor space maximised

With a footprint of only 0.4 m² at 50 kVA, the PowerWAVE 5000/TP has a power density of up to 100 kW/m². As a result, substantial and valuable space savings are achieved even at the highest power ratings.

LCD display

Output contacts and SNMP card (optional)

Customer inputs
RS232 interface

Rectifier and
bypass fuses

Batteries

Battery fuses

Maintenance
bypass switch

Parallel isolator

Battery containment

Input/output connection



UPS cabinet A (10–20 kVA)



Dimensions (W x D x H)

345 x 710 x 720 mm

Weight without battery

10 kVA: 60 kg

15 kVA: 62 kg

20 kVA: 64 kg

Weight with 48 x 7/9 Ah battery

10 kVA: 180 kg

15 kVA: 182 kg

20 kVA: 184 kg



Available in three different cabinet sizes

Cabinet A: 10 – 20 kVA

Cabinet B: 10 – 25 kVA

Cabinet C: 25 – 50 kVA

UPS cabinet B (10–25 kVA)



Dimensions (W x D x H)

345 x 710 x 1045 mm

Weight without battery

10 kVA: 88 kg

15 kVA: 90 kg

20 kVA: 92 kg

25 kVA: 94 kg

Weight with 96 x 7/9 Ah battery

10 kVA: 328 kg

15 kVA: 330 kg

20 kVA: 332 kg

25 kVA: 334 kg

UPS cabinet C (25–50 kVA)



Dimensions (W x D x H)

440 x 910 x 1420 mm

Weight: 7/9 Ah cabinet without battery

25 kVA: 151 kg

30 kVA: 160 kg

40 kVA: 165 kg

50 kVA: 170 kg

Weight: 28 Ah cabinet without battery

25 kVA: 135 kg

30 kVA: 145 kg

40 kVA: 150 kg

50 kVA: 155 kg

Weight with 144 x 7/9 Ah battery

25 kVA: 540 kg

30 kVA: 550 kg

40 kVA: 555 kg

50 kVA: 560 kg

Weight with 48 x 28 Ah battery

25 kVA: 605 kg

30 kVA: 615 kg

40 kVA: 620 kg

50 kVA: 625 kg

PowerWAVE 6000

(S3 60–120 kVA)

(6000 160–500 kVA)

Parallelable up to 5 MVA/MW



The best combination of energy efficiency, reliability and low cost of ownership – capacity from 60 kVA/kW to 5 MVA/MW.

PowerWAVE 6000

Single unit capacities from 60 kVA/kW to 500 kVA/kW

Capacity up to 5 Megawatts (5 MVA/MW) with 10 units in parallel

Power density of up to 363 kW/m²

High efficiency and minimum cost of ownership

Low input harmonic distortion: THDi =3.5%

Near unity input power factor of 0.99

Fully rated output power (blade friendly)

Full front access maximises system serviceability

Transformerless design

Three-phase UPS with unity power delivers the best combination of availability, energy efficiency, overall power performance and lowest total cost of ownership in its class.

Offering both intelligent energy management and maximum power protection it uses less energy, achieves significant cost reductions, saves on valuable floor space (leaving room for revenue-earning equipment) and has a reduced impact on the environment.



Improved input performance

- Low input harmonic distortion (THDi)
- Near unity input power factor
- Reduced installation costs

PowerWAVE 6000 manages the Total Input Harmonic Distortion (THDi) at a low level (3.5% at 100% load). It does this by neutralising the emission of harmonics at the input of the UPS. Low harmonic distortion saves unnecessary oversizing of generators, cabling and ancillary equipment (such as circuit breakers), avoids extra heating of input transformers (thus wasting less energy) and extends the lifetime of all input components.

High efficiency is further enhanced by removing any requirement for additional phase compensating devices.

Flexible batteries

- Bespoke configuration
- Extended battery life
- Front access for ease of installation and servicing

PowerWAVE 6000 allows the freedom to tailor the battery installation to the requirements of the critical load at the lowest possible cost. By adding external battery cabinets, it enables each battery configuration to match the required autonomy, ensuring smallest system footprint and easy usability.

Running costs are further reduced by ripple-free and temperature controlled chargers that protect batteries and extend life-time performance. Front access also aids easy installation and servicing.

Product range

60–120 kVA



Dimensions W x D x H (mm)

550 x 750 x 1820
Footprint: 0.3 m²

160–200 kVA



Dimensions W x D x H (mm)

850 x 750 x 1820
Footprint: 0.64 m²

250–300 kVA



Dimensions W x D x H (mm)

1100 x 750 x 1920
Footprint: 0.82 m²

400–500 kVA



Dimensions W x D x H (mm)

1650 x 850 x 1994
Footprint: 1.4 m²

Blade friendly

- Supports high powered servers such as blade servers
- Supports leading power factors

Blade servers typically have a leading power factor and this can present problems to those UPS systems that are not designed to manage such loads. The PowerWAVE 6000 is designed to power all types of electrical loads, including high-powered servers. It can provide fully rated output power to power factors from 0.9 leading to 0.9 lagging.

Space saving

- Reduced footprint
- Valuable floor space maximised

PowerWAVE 6000's class-leading power density (up to 363 kW/m²) is driven by the UPS's small physical footprint of 0.3 m² up to 100 kVA/kW, 0.64 m² up to 200 kVA/kW, 0.82 m² up to 300 kVA/kW, and 1.4 m² up to 500 kVA/kW. As a result, substantial and valuable space savings are achieved even at the highest power ratings.

For data centres in particular, this helps to maximise floor space for revenue-earning servers.

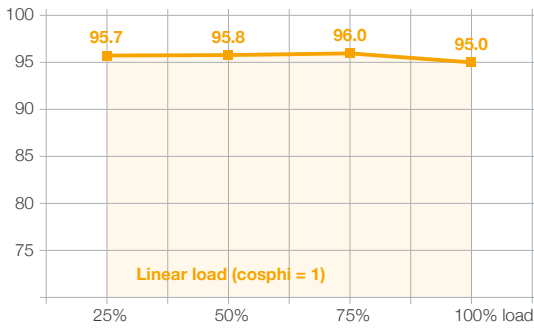
Connectivity

- Multiple interface options
- Supports monitoring and control

PowerWAVE 6000 is equipped with multiple interfaces that can be used for local and remote monitoring, status signalling, control, maintenance and firmware upgrade.

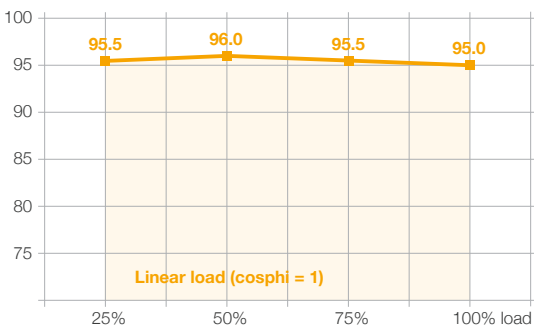
Understanding efficiency and power

AC-AC efficiency (60–120)



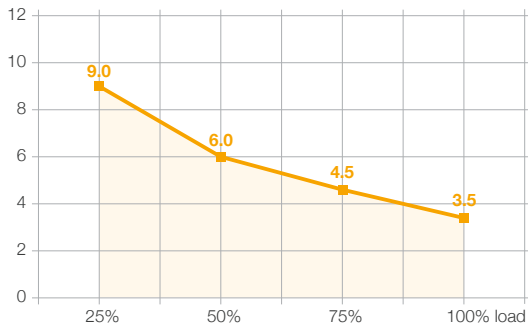
Top-of-market 96.0% efficiency in double conversion mode reduces running costs without compromising reliability. This UPS has a very flat efficiency curve so high efficiency is reached at low load levels.

AC-AC efficiency (160–500)



With a transformerless design and Energy Saving Inverter Switching (ESIS) technology, the PowerWAVE 6000 delivers high efficiency at partial and full load (up to 96.0% in double conversion online mode). This level of efficiency dramatically reduces the total cost of ownership of the UPS system during its life cycle.

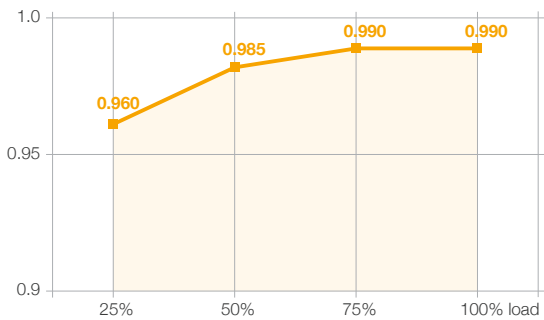
Input current total harmonic distortion (THDi)



The PowerWAVE 6000 actively manages the input current total harmonic distortion (THDi) at a low level (3.5% at 100% load). PowerWAVE's unique technology neutralises the emission of harmonics at the input of the UPS system, providing greater reliability of operations for circuit breakers and extending the overall service life of the equipment.

Low harmonic distortion saves unnecessary oversizing of gensets, cabling and circuit breakers, avoids extra heating of input transformers and extends the overall service life of all upstream components.

Input power factor versus load



Thanks to the near-to-unity input power factor of 0.99, the PowerWAVE 6000 reduces the input installation costs by enabling the use of smaller cables. Furthermore, it avoids the unnecessary use of additional phase compensating devices, which consequently keeps the overall UPS efficiency high.

PowerWAVE 8000DPA

(10–20 kVA/kW)

Parallelable up to 400 kVA/kW



Modular UPS designed for low and medium power applications.

Key benefits

Individual static switches per module

Each module has its own display and controller

Each module has its own control logic

Separate or common battery configuration

Ideal for low to medium, high-density critical power protection applications.

Three-phase UPS built for low to medium, high-density power protection applications. Leading-edge modular design using proven Decentralised Parallel Architecture (DPA) technology. The PowerWAVE 8000DPA offers incredible energy efficiency, 99.9999% availability and flexible scalability in either a tower or rack-mountable solution.

PowerWAVE 8000DPA

Capacities from 10 kVA/kW to 200 kVA/kW in 10 kVA/kW or 20 kVA/kW modular steps

Parallelable frames up to 400 kVA/kW

Available as tower (ST) or 19" rack-mountable (RI) solutions

Fully rated output power (blade friendly); 20 kVA = 20 kW

N+1 redundancy up to 180 kVA/kW N+1 in a single frame

'Six nines' (99.9999%) availability

Up to 95.5% efficiency across a wide load range

Near unity input power factor at partial and full loads (PF=0.99 @ 100% load)

Low input harmonic distortion (THDi<3%)



The right solution – PowerWAVE 8000DPA is available in two versions

PowerWAVE 8000DPA ST (tower) is available for high-density applications requiring a standard power protection solution including frame, UPS, battery and communication. This solution delivers power protection from 10–200 kVA/kW (180 kVA/kW N+1) in 10 kVA/kW or 20 kVA/kW modular steps to provide a maximum power density of 472 kW/m². PowerWAVE 8000DPA cabinets can be paralleled horizontally to increase the capacity up to 400 kVA/kW.

The PowerWAVE 8000DPA RI (19" rack-mountable) solution includes UPS, battery and communication, which can be integrated into any 19" rack (independent of manufacturer) and provides up to 80 kVA/kW (60 kVA/kW N+1) making it ideal for integrated IT, telecom or other applications.

Advanced Decentralised Parallel Architecture (DPA)

- Distributed control and power
- Independent hot-swap modules
- No single points of failure

Decentralised Parallel Architecture (DPA) means each UPS module contains all the hardware and software required for full-system operation. They share no common components so a DPA parallel system offers extremely high availability. In addition, potential single points of failure are eliminated and system uptime is maximised. PowerWAVE 8000DPA UPS modules can be paralleled to provide redundancy (parallel redundancy) or to increase the system's total capacity.

Easy to replace 'hot-swap' modules

- Replace or add modules with no downtime
- Cost effective scalability & 'right sizing'
- Simple power upgrade
- Future proof investment

True 'hot-swap' modularity enables the safe removal and/or insertion of UPS modules into a PowerWAVE 8000DPA system without risk to the critical load and without the need to either transfer the critical load onto raw mains or remove power from the critical load. This directly addresses today's requirement for continuous uptime, reducing mean time to repair (MTTR).

PowerWAVE 8000DPA ST (tower)

Up to 10 UPS modules

Slot for optional SNMP card

Customer inputs and volt-free outputs / RS232 serial interface

Maintenance bypass switch

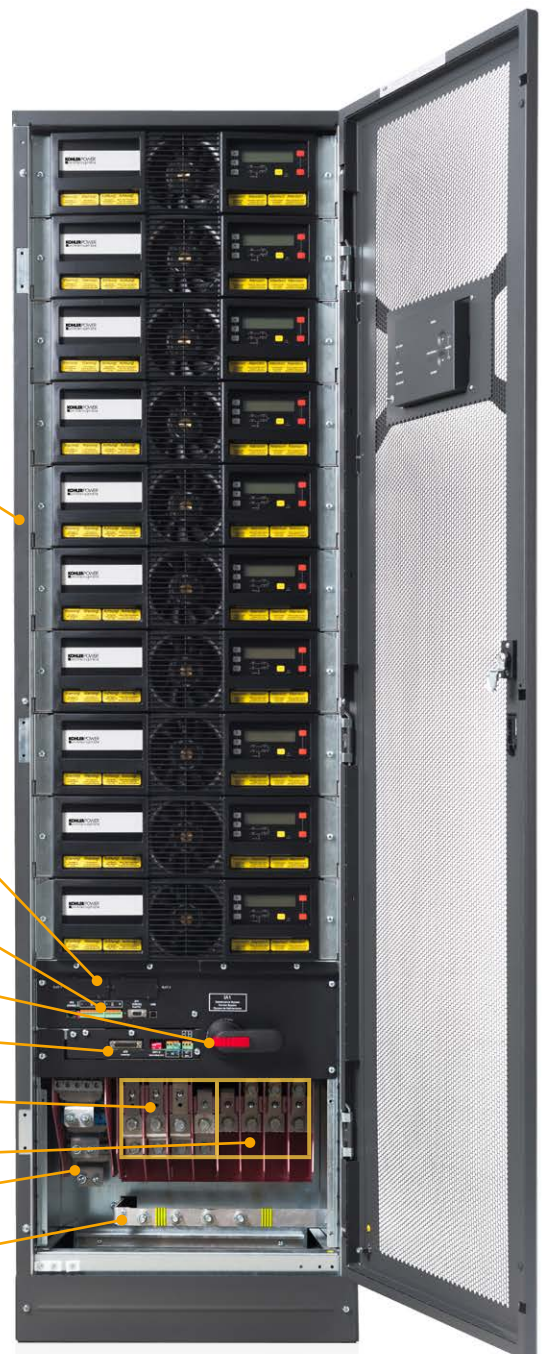
Parallel interface

AC input terminals

AC output terminals

Battery terminal rail

Earth bar



High reliability

Reliability maximised

Automatic parallel redundant operation

Parallel redundant (N+1) UPS systems provide the highest level of reliability by ensuring that the number of UPS modules in a system is a minimum of one over and above the number required (N) to fully support the critical load.

The PowerWAVE 8000DPA is designed to automatically operate as a parallel redundant system, ensuring that the critical load always receives the highest level of power protection.

Blade friendly

Supports blade servers

Supports leading power factors

Blade servers typically have a leading power factor, which can present problems to UPS systems, particularly if they are not designed to power such loads. The PowerWAVE 8000DPA is designed to power all types of electrical loads, including blade servers. It can provide fully rated output power to power factors in the range of 0.9 leading to 0.8 lagging.

Generator friendly

Generator compatible

Soft start – introduces the generator load in steps

The PowerWAVE 8000DPA offers a highly effective solution when introducing a generator to the critical load. If the load exceeds 50 per cent of the generator's standby rating, switching the load in a single step presents a number of dangers. To negate this, each of the 'hot-swap' modules within the PowerWAVE 8000DPA's modular frame come equipped with 'soft start' capability. This allows the modules to be switched on sequentially, introducing the generator to the load in more manageable steps.

PowerWAVE 8000DPA RI (19" rack-mountable)

UPS modules

Internal battery storage

RS232 serial interface

Customer inputs and volt-free outputs

Maintenance bypass switch

Slot for optional SNMP card

Battery fuses



Class-leading energy efficiency – low total cost of ownership

Very high operating efficiency

Reduced installation and upgrade costs

Near unity input power factor and low input (THDi) – reduces running costs

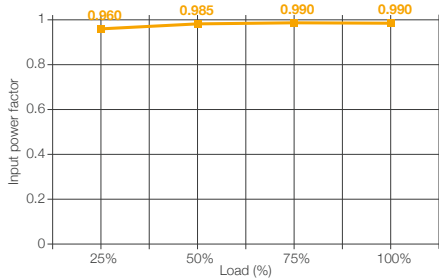
The PowerWAVE 8000DPA delivers class-leading efficiency of up to 95.5% across a wide load range, significantly reducing system running costs and site air conditioning costs.

Additionally, PowerWAVE 8000DPA has a near unity input power factor at full load (and even partial loads) reducing the size of the input cable and fuses, thereby saving on materials and costs.

Input current total harmonic distortion (THDi) of less than 3% virtually eliminates harmonic distortion of the mains supply. This saves unnecessary oversizing of gen-sets, cabling and circuit breakers; avoids extra heating of input transformers; and extends the overall lifetime of all input components.

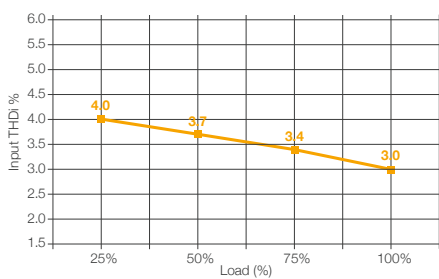
All these benefits ensure that the PowerWAVE 8000DPA offers one of the lowest 'total cost of ownerships' and smallest carbon footprints of any UPS system in its class.

Input power factor versus load (Leading)



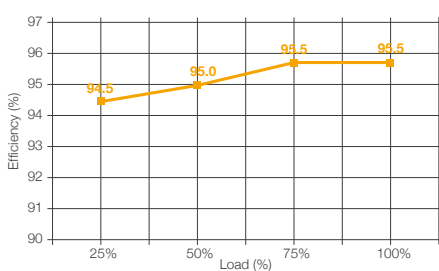
PowerWAVE 8000DPA has a near unity input power factor at full load (and even partial loads) reducing the size of the input cable and fuses, thereby saving on materials and costs.

Input current distortion THDi



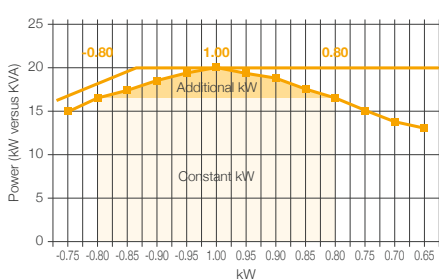
Input current total harmonic distortion (THDi) of <3% virtually eliminates harmonic distortion of the mains supply.

Reduced TCO – AC-AC efficiency



The PowerWAVE 8000DPA's 95.5% true online efficiency significantly reduces system running costs and site air-conditioning costs. This helps reduce the organisation's carbon footprint, depending on configuration.

Blade server friendly power



Designed to power all types of electrical loads including blade servers, the PowerWAVE 8000DPA can provide fully rated output power from 0.9 leading to 0.8 lagging, depending on battery configuration.

PowerWAVE 8000DPA ST

ST tower range – 10–200 kVA/kW



ST 40 – 2 modules

Dimensions W x D x H:
550 x 770 x 1135 mm

No. of internal batteries:
2 x 40 x 7.2/9Ah
Total 80 blocks



ST 60 – 3 modules

Dimensions W x D x H:
550 x 770 x 1975 mm

No. of internal batteries:
3 x (2x40) x 7.2/9Ah
Total 240 blocks



ST 80 – 4 modules

Dimensions W x D x H:
550 x 770 x 1135 mm

External battery ONLY



ST 120 – 6 modules

Dimensions W x D x H:
550 x 770 x 1975 mm

External battery ONLY



ST 200 – 10 modules

Dimensions W x D x H:
550 x 770 x 1975 mm

External battery ONLY

PowerWAVE 8000DPA RI

19" rack-mountable range – 10–80 kVA/kW



With batteries RI 11 – 1 module

Dimensions W x D x H:
448 x 735 x 487 mm (11 HU)



RI 12 – 1 module

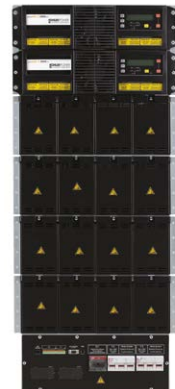
Number of batteries: 40



RI 22 – 2 modules

Dimensions W x D x H:
448 x 735 x 665 mm (15 HU)

Number of batteries: 80



RI 24 – 2 modules

Dimensions W x D x H:
448 x 735 x 798 mm (18 HU)

Number of batteries: 80



Without batteries RI 10 – 1 module

Dimensions W x D x H:
448 x 735 x 310 mm (7 HU)



RI 20 – 2 modules

Dimensions W x D x H:
448 x 735 x 440 mm (10 HU)



RI 40 – 4 modules

Dimensions W x D x H:
448 x 735 x 798 mm (18 HU)

PowerWAVE 9000DPA

(30–50 kVA)

Parallelable up to 1.5 MVA



Designed to meet the requirements of today – and tomorrow.

PowerWAVE 9000DPA

Up to 250 kVA (200 kVA N+1) in a single frame

Parallelable up to 1.5 MVA

Transformerless technology

96% true online efficiency

Near unity input power factor at partial and full loads (0.99% @ 100% load)

Low input harmonic distortion (THDi<3%)

Fully rated output power (blade friendly)

Online double conversion technology

Low running costs

Key benefits

Individual static switches per module

Each module has its own display and controller

Each module has its own control logic

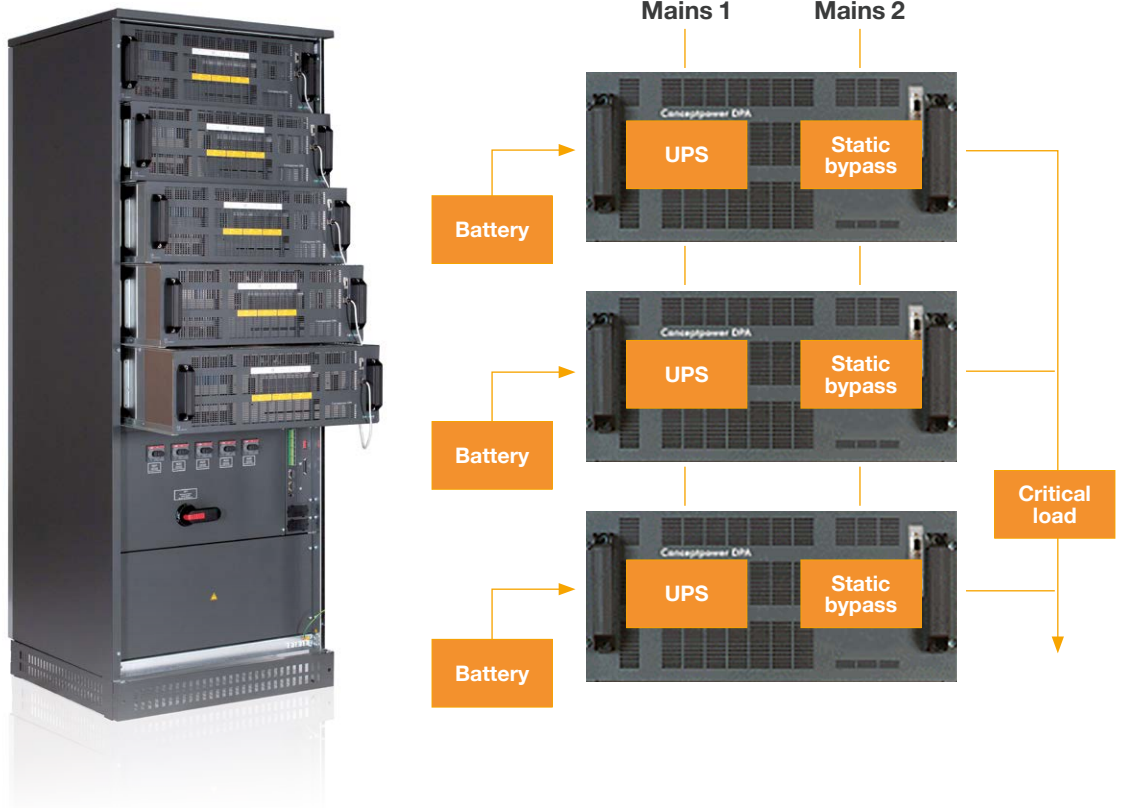
Separate or common battery configuration

Delivers class-leading 'six nines' (99.9999%) power availability.

A revolutionary rack-mounted uninterruptible power supply designed with 'hot swap' modules for future scalability. A transformerless UPS system with class-leading 'six nines' (99.9999%) power availability for demanding IT environments and data centres.



In today's 'on demand' world, highly reliable power protection systems are essential to the protection of critical data and to ensure 24/7 availability for business applications.



Advanced Decentralised Parallel Architecture (DPA)

- Distributed control and power
- Independent hot-swap modules
- No single points of failure

Decentralised Parallel Architecture (DPA) means each UPS module contains all the hardware and software required for full system operation. They share no common components, so a DPA parallel system offers extremely high availability. In addition, potential single points of failure are eliminated and system uptime is maximised. PowerWAVE 9000DPA UPS modules can be paralleled to provide redundancy (parallel redundancy) or to increase the system's total capacity.

Easy to replace 'hot-swap' modules

- Replace or add modules with no downtime/no risk
- Simple power upgrade

True 'hot-swap' modularity enables the safe removal and/or insertion of UPS modules into a PowerWAVE 9000DPA system without risk to the critical load and without the need to either transfer the critical load onto raw mains or remove power from the critical load. This directly addresses today's requirement for continuous uptime, reducing mean time to repair (MTTR).

Future proof installation

- Investment protection

Future proof installation is assured with the PowerWAVE 9000DPA's scalability and ability to supply the most demanding of modern loads.

Smallest footprint saves space

Extremely high power density

Uses less valuable floor space

Class-leading power density of 342 kW/m² significantly minimises the floor space required to accommodate the PowerWAVE 9000DPA. This is particularly important in data centres where space must be maximised to accommodate revenue-earning equipment.

Maximum availability

Six nines availability 99.9999%

PowerWAVE 9000DPA maximises availability by combining the benefits of Decentralised Parallel Architecture, parallel redundancy and 'hot-swap' modularity with low MTTR.



Vertical scalability

Horizontal scalability

High reliability

Reliability maximised

Automatic parallel redundant operation

Parallel redundant (N+1) UPS systems provide the highest level of reliability by ensuring that the number of UPS modules in the system is a minimum of one over and above the number required (N) to fully support the critical load. The PowerWAVE 9000DPA is designed to automatically operate as a parallel redundant system, ensuring that the critical load always receives the highest possible level of power protection.

Low running costs

High operating efficiency, regardless of loading

Reduced installation and upgrading costs

Near unity input power factor and low input THDi

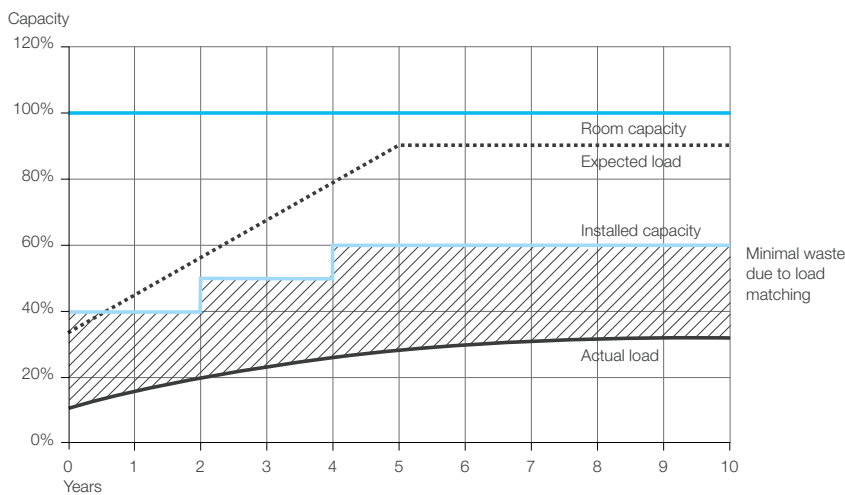
By delivering energy efficiency, scalable flexibility and ergonomic design, the PowerWAVE 9000DPA offers a low total cost of ownership and easy serviceability.

Blade friendly

Supports blade servers

Supports leading power factors

Blade servers typically have a leading power factor, which can present problems to UPS systems, particularly if they are not designed to power such loads. The PowerWAVE 9000DPA is designed to power all types of electrical loads, including blade servers. It can provide fully rated output power to power factors in the range of 0.9 leading to 0.8 lagging.



Right sizing

Cost-effective scalability

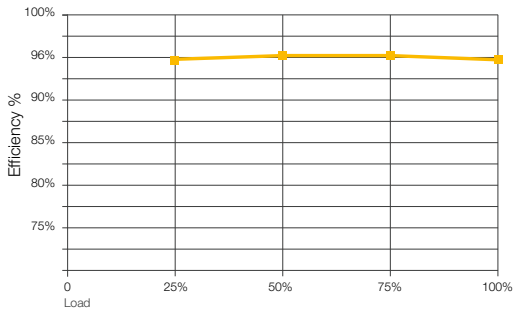
Ability to 'right size' the system over time

Simple installation of new modules

UPS modules can be added in cost-effective incremental steps as the critical load power requirement grows. This 'right sizing' reduces initial cost, optimises operating efficiency and helps reduce total cost of ownership.

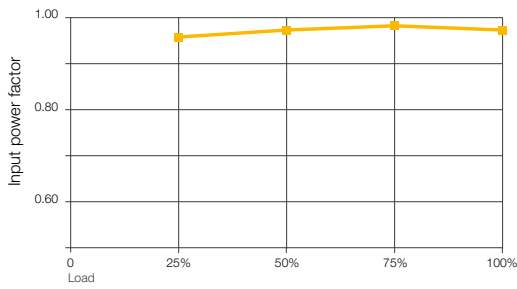
Up to five UPS modules can be paralleled in a single rack-format cabinet to enable up to 200 kW (342 kW/m²) of power capacity per cabinet, providing 'vertical scalability'. If more capacity is required, cabinets can be paralleled providing 'horizontal scalability'.

AC- AC Efficiency



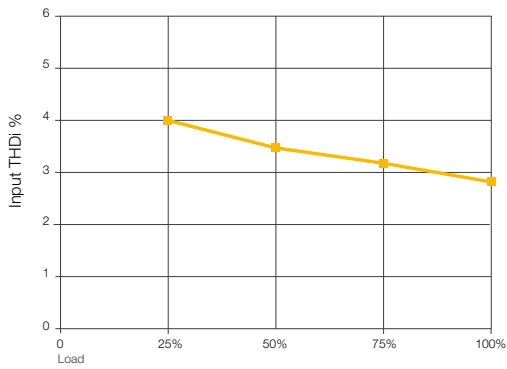
The PowerWAVE 9000DPA's 96% true online efficiency, significantly reduces system running costs and site air-conditioning costs. This helps reduce the organisation's carbon footprint.

Input power factor



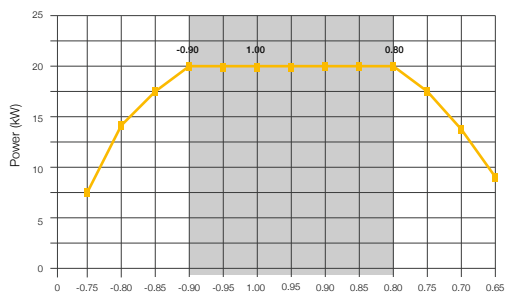
Near unity input power factor, at partial and full load, reduces the required size of the input cable and fuses, thereby reducing the materials (and costs) associated with the system's electrical installation.

THDi



Input current total harmonic distortion (THDi) of <3% virtually eliminates harmonic distortion of the mains supply.

Leading/Lagging



Fully rated output power in the range of 0.9 leading and 0.8 lagging

PowerWAVE 9250DPA

(50-300 or 250 N+1 kVA/kW)



True modular UPS for medium power applications in critical, high-density computing environments such as small to medium-sized data centres, plus industrial automation processes and healthcare facilities.

The 9250DPA's highly efficient modular architecture offers the best reliability for environmentally conscious organisations that also need zero downtime and low cost of ownership.



The UPS sets the standard for the next generation of UPS progress with advanced features such as its transformer-free IGBT converters that include three-level topology and interleaving controls to enable market-leading efficiency of 97.6 per cent.

It also supports Xtra VFI, which further minimises power consumption by intelligently configuring the number of modules required to support the current critical load. When Xtra VI is enabled, the number of active modules required will adjust accordingly, with modules not needed switching to a standby state of readiness but primed to become active again if the load increases.

PowerWAVE 9250DPA

Six frames can be connected in parallel for 1.5 MW total system power.

Frame-rated power 300 kW N+1 (hosting up to 5+1 modules).

Module-rated power 50 kW.

Unity power factor.

Efficient – up to 97.4% at system level.

Scaling the UPS capacity to match the load power is simple.

Xtra VFI mode: the smart way to enhance efficiency at low load levels.

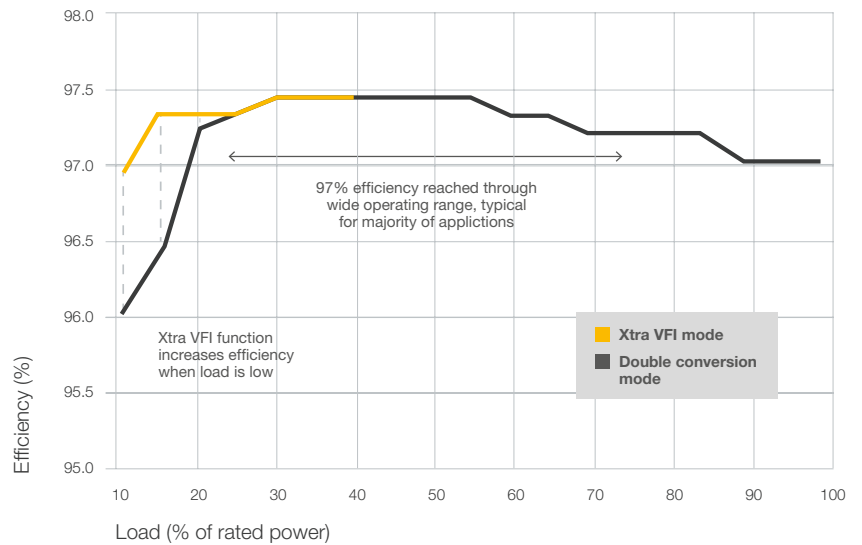
Energy storage: lithium-ion, VRLA, NiCD battery; common battery (per frame) or dedicated battery for each UPS module.

Adding redundancy to increase availability and reliability is easy.

Rated voltage 380/ 400/ 415 Vac.

Robust ring-bus communication for increased reliability.

Designed for even easier access to consumable parts in order to further improve availability and reduce mean time to repair (MTTR).



Horizontal scalability up to 1.5 MW
(up to 30 modules)

Vertical scalability to 300 kW or 250 kW (N+1)

50–300 kW [N+1] uninterrupted power in a single frame

The use of DPA™ (Decentralised Parallel Architecture) ensures 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. If one module is lost, the others take up the load, meaning that the system is fault tolerant and there are no single points of failure. Uptime is guaranteed, and availability is maximised.

Scalability and redundancy inside one single frame

Ability to host up to six 50 kW UPS modules with N+1 redundancy for up to 300 kW N+1 clean, secured power in single UPS cabinet with small footprint.

Features DPA™ where each UPS module is a comprehensive and independent functional unit for true redundancy.

Wiring options secure compliancy for any site installation need

Supports top or bottom cable entry.

Supports single or dual input feed.

Separate (per module) or common battery.

Integrated switchgears complete the system

Output isolation switch to disconnect the UPS from downstream.

Optional maintenance bypass switch for enhanced serviceability.

Easy to monitor and manage

Intuitive, graphical system user interface.

Each module features dedicated display for module specific data access.

Advanced software and connectivity options.



From 50 kW up to 1.5 MW secured power

Featuring superior 97.6 per cent UPS module efficiency and 97.4 per cent system efficiency, the 9250DPA reduces energy losses that create pure costs as direct electricity spend and costs for cooling. Thanks to three-level interleaved technology, the 9250DPA achieves an efficiency of over 97 per cent in a wide-operating range, when the load is between 25 and 75 per cent of nominal capacity.

True modular UPS for medium power applications

50 kW module-based UPS solution to medium-power commercial applications.

300 kW UPS frame can host up to six modules for N+1 redundancy.

Scaling of power easily and securely from 50 kW to 1.5 MW.

High efficiency and proven technology

Minimises TCO by facilitating top-of-market efficiency of over 97%, leveraging 3-level converter technology and featuring efficiency optimising Xtra VFI – double-conversion mode.

Secures highest availability thanks to inherently redundant modular concept, with decentralised parallel architecture (DPATM) and robust ring-bus communication between modules.

Compact design saves floor space – 0.73m² footprint.



Features

DC (battery) breakers

DC breakers for energy storage connection on each module separately.

Maintenance bypass (optional)

Integrated MBS is available as an 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

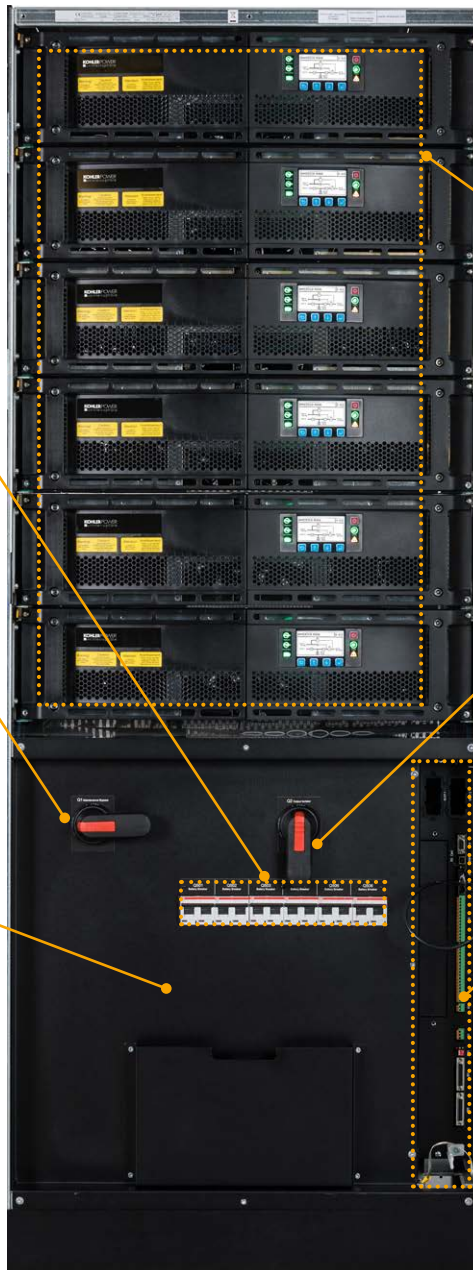
Integrated UPS module with all UPS essential functions: rectifier, inverter, static bypass, control logic and display.

Output isolation switch

Included in the standard configuration to allow disconnection of complete UPS cabinet from load supply.

Connectivity section

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



User interface

System graphical display

Touch screen interface – one per system.

Interactive mimic diagram.

Coloured and graphical display.

Integrated buzzer for alarms.

18-languages selection.

Extended events log (1,000 events).

Clear system overview, measurements and system status.

Navigation into module level, module level measurements and status.

System level commands.

DPA module display

240 x 128 pixel graphical display.

Five-line menu.

Capacitive buttons/key.

Status LED RG/RGB.

Allows for easy module level data access and module management.



BRAKE RELEASE
JOINT 3 JOINT 2 JOINT 1

++ A1 --



PowerWAVE 9500DPA

(100–500 kVA/kW)

Parallelable up to 3 MVA/MW



500 kVA/KW modular UPS, designed with high efficiency and maximum flexibility at its core.

Total vertical and horizontal scalability using hot swap modularity.

Key benefits

Individual static switches per module

Each module has its own display and controller

Each module has its own control logic

Separate or common battery configuration

PowerWAVE 9500DPA boasts low total cost of ownership through a combination of high energy efficiency, scalability and ergonomic design.

A class-leading online energy efficiency of up to 96% significantly reduces system running and cooling costs, helping to reduce the organisation's carbon footprint. Further energy savings can be made by operating the PowerWAVE 9500DPA in eco-mode, which increases the efficiency to $\geq 99\%$.

The UPS can be 'right sized' to optimise the power required to match the critical load and modules can be added incrementally as the load increases. This means that you only power and cool what you need, saving power usage over the life of the UPS.

Additionally, PowerWAVE 9500DPA has a near unity input power factor at full load reducing the size of the input cable and fuses, thereby saving on materials and costs. Input current total harmonic distortion (THDi) of less than 3.5% virtually eliminates harmonic pollution of the mains supply. This saves unnecessary oversizing of gen-sets, cabling and circuit breakers, avoids extra heating of input transformers and extends the overall lifetime of all input components.

PowerWAVE 9500DPA

Up to 96% true online efficiency

Eco-mode efficiency $\geq 99\%$

Cost effective scalability to 'right size' system

Unity power factor and low input THDi

Up to 500 kVA/KW (400 kVA/kW N+1) in a single frame

Scalable to 3 MVA/MW

Transformerless technology

Hot swappable 100 kVA/kW modules

Low total cost of ownership

99.9999% (six nines) availability

Small footprint/high power density

Unity power factor (kW = kVA)

Low input harmonic distortion (THDi $<3.5\%$)

Top and bottom cable entry

Graphical touchscreen system display

Xtra VFI mode: maximum efficiency even when underloaded

Dimensions and clearances

Dimensions

Width 1580 mm

Depth 940 mm

Height 1975 mm

1.49 m² footprint

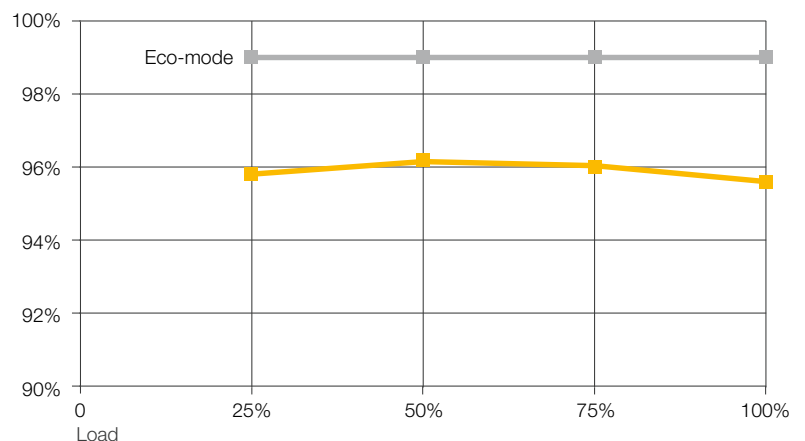
Weight (with 5 modules) 975 kg

Minimal clearances

Front 1000 mm

Back 300 mm (air outlet)

AC/AC Efficiency with linear, resistive load



High efficiency reaching 96.1%
Flat curve \rightarrow 95.8% at 25% load

Hot swappable modules

Replace or add modules with no downtime

Simple power upgrade

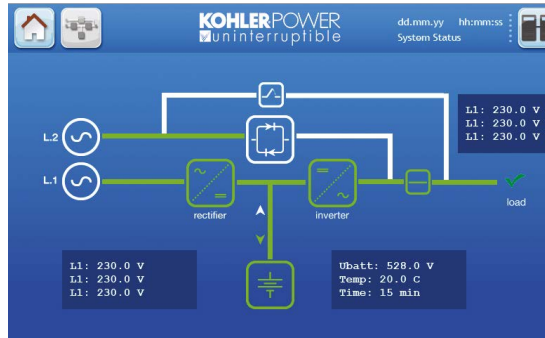
investment

True 'hot-swap' modularity enables the safe removal and/or insertion of UPS modules into a PowerWAVE 9500DPA system without risk to the critical load and without the need to either transfer the critical load onto raw mains or remove power from the critical load.

Modules can be replaced or added without any system downtime. Simple power upgrades are therefore possible as the critical load power requirements grow. Additionally, modules can easily be removed for service or replaced if faulty without compromising the availability of the system.



Hot swappable module



Graphical touchscreen system display

PowerWAVE 9500DPA UPS 500 kVA/kW

500 kVA/kW



Vertical scalability



Six nines availability

99.9999% availability

By combining the benefits of Decentralised Parallel Architecture, parallel redundancy and hot swap modularity, PowerWAVE 9500DPA has a high mean time between failure (MTBF) and a much reduced mean time to repair (MTTR). This delivers six nines availability – a highly desirable quality required by data centres in pursuit of zero downtime.

Advanced Decentralised Parallel Architecture (DPA)

Distributed control and power

Independent hot-swap modules

No single points of failure

Decentralised Parallel Architecture (DPA) means each UPS module contains all the hardware and software required for full system operation. They share no common components so a DPA parallel system offers extremely high availability. In addition, potential single points of failure are eliminated and system uptime is maximised. UPS modules can be paralleled to provide redundancy (parallel redundancy) or to increase the system's total capacity.

Graphical touchscreen display

System level display

Individual module displays

The 7" colour touchscreen display provides a clear overview of the UPS at a system level. Graphical and intuitive, the display provides easy navigation to drill down on the performance and status of the individual modules within the system. Additionally, each module has its own display.



Scalable up to 3 MVA/MW

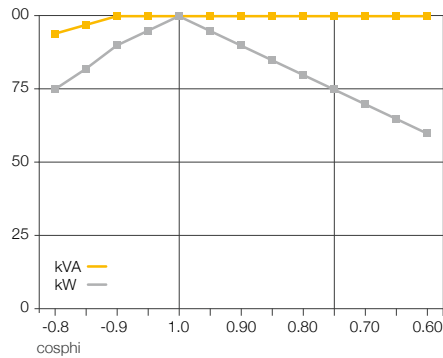
Vertical and horizontal scalability

Cost effective 'right sizing'

PowerWAVE 9500DPA can be scaled vertically in 100 kVA/kW modular steps to provide up to 500 kVA/kW of power in a single frame. This enables power to be added as requirements grow, without the impact on footprint. Horizontal scalability is also possible, with up to 6 frames in parallel, to increase total power up to 3 MVA/MW. This two-dimensional scalability means that there is no need to overspecify the original configuration, as modules and/or frames can be added to optimise the power requirements and increase/decrease power to meet future requirements.

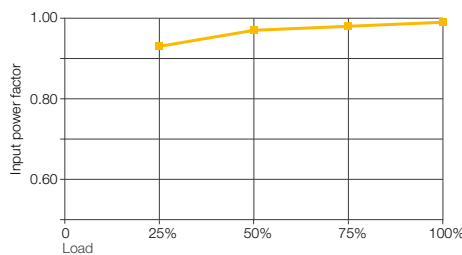
Input and output characteristics

Power vs power factor



No derating in the range 0.9 leading to 0.6 lagging

Input power factor



Near unity input power factor, at partial and full load, reduces the required size of the input cable and fuses, thereby reducing the materials (and costs) associated with the system's electrical installation.

Scalable up to 3 MVA/MW

**Vertical scalability:
one to five modules in one single cabinet**



**Horizontal scalability:
six cabinets in parallel configuration up to 3 MVA/MW**

Modes

Eco-mode

In Eco-mode, power is fed directly from the utility mains to the load during normal operation, so removing the rectifier and inverter inefficiencies. If a mains problem is detected, the critical load is switched to the UPS's inverter output.

While Eco-mode's efficiency can reach 99% or more, it exposes the load to any incoming mains problems throughout most of its operational life. Additionally, it relies on the load's IT equipment power

supplies having sufficient capacitance to 'ride through' the switch between mains and inverter, and vice versa, and prevent the UPS supplying a transient inrush current to restore lost energy after an outage. Otherwise, line impedance between the UPS and power supplies may cause this current to create a significant power supply input voltage drop.

For these reasons, users should consider the benefits of increased operating efficiency vs the extra requirements and risk associated with operating in Eco-mode.



Xtra VFI: maximum efficiency – even when underloaded.

When a UPS is operating significantly under capacity, its energy efficiency can be negatively impacted. With PowerWAVE 9500DPA, featuring Xtra VFI, this problem is solved.

Key benefits

Xtra VFI scales the UPS module active capacity according to the load to maximise efficiency

The system calculates the optimal % value for maximum efficiency, taking into account desired redundancy

The redundancy level for active capacity and the highest expected load step can be configured by the user to guarantee highest protection level

In case of mains failure or alarm, Xtra VFI gets deactivated automatically all modules switch to 'Active' status

Module rotation between active and standby extends the service life and stabilises aging

With Xtra VFI mode enabled, the PowerWAVE 9500DPA automatically adjusts the number of active modules according to the load requirements. Modules that are not needed are switched to standby but remain in state of readiness, primed to kick in and transfer to active mode if the load increases or the mains fails. The efficiency improvements achieved by this mode of operation are especially significant when the load is less than 25% of full UPS system capacity.

In addition, Xtra VFI has the added benefit of rotating modules between active and standby, therefore extending the service life of the UPS.

Xtra VFI

Maximum load 800 kW

Redundancy N+2

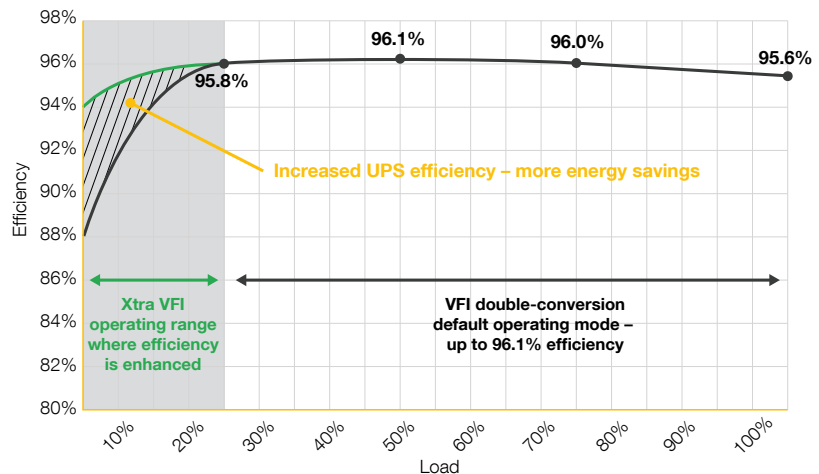
2 x 500 kW frames (10 x 100 kW)

Load power 200 kW

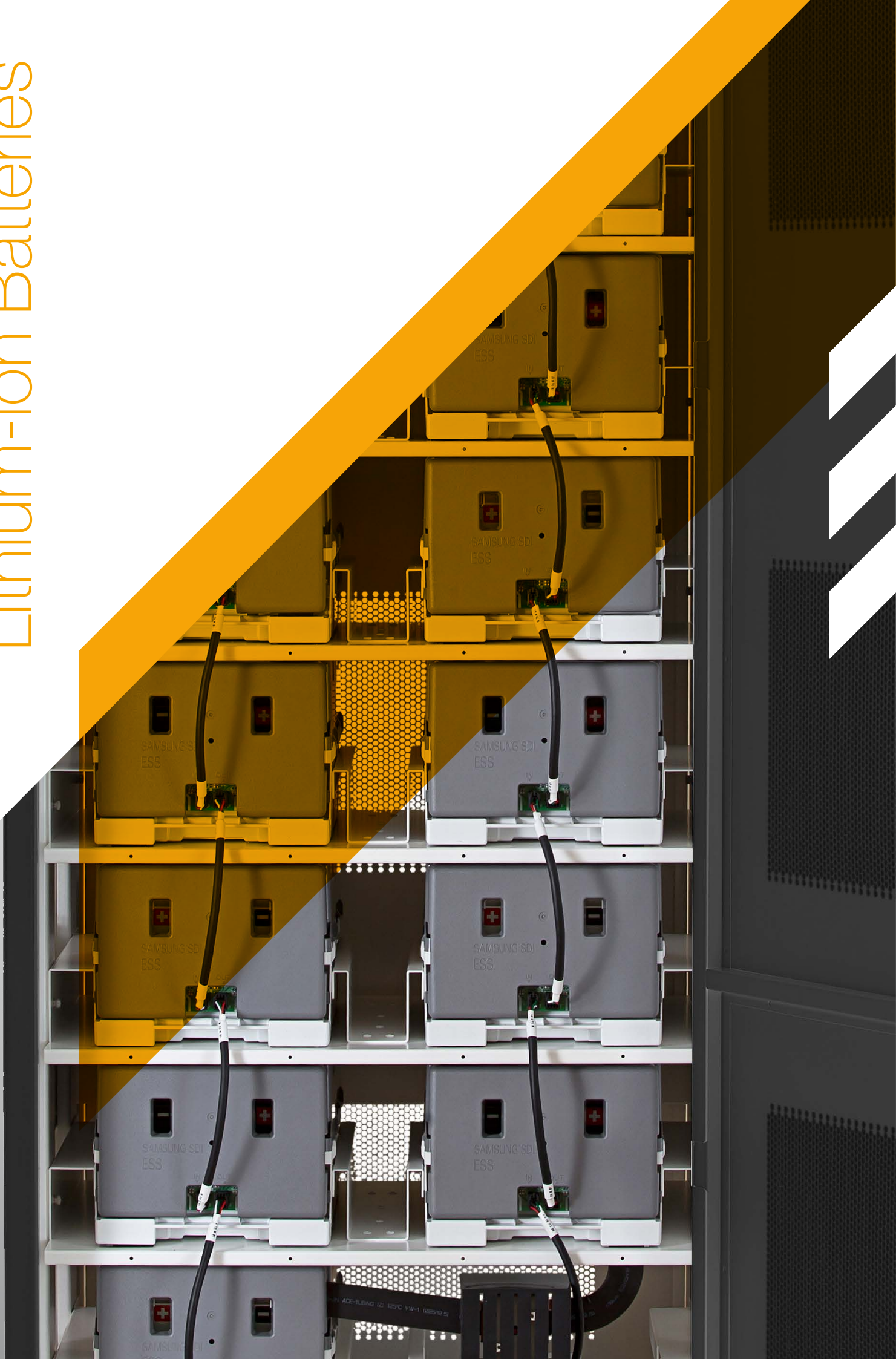
No. of active modules 4

Active capacity 400 kW

Standby capacity 600 kW



Lithium-ion Batteries



Reliable, lightweight and compact UPS energy storage for critical applications such as data centres, healthcare, building infrastructures, transportation, and manufacturing.

For additional battery capacity, cabinets can be installed in parallel to increase capacity up to 5 MW per single system.



Lithium-ion battery solution

Outstanding performance

Higher reliability than VRLA

Single cell temperature, current, voltage and charge status are all monitored

Fast charge and discharge rate

Higher power and efficiency

Low total cost of ownership

Lower maintenance overhead

Less need for cooling

Longer battery life

Increased power density

Reduced footprint and volume

Wide operating temperature range

High safety level

Scalable

Lightweight (60-80% less than VRLA)

When you want power protection for a data centre, production line or any other type of critical process, lithium-ion battery solutions provide peace of mind and the performance you need.

Housed in a tough enclosure, lithium-ion battery technology provides reliable, lightweight and compact energy storage for UPS systems.

Why lithium-ion batteries?

Valve-regulated lead acid (VRLA) batteries – sometimes known as sealed lead-acid batteries – have many advantages and have traditionally been the battery of choice for backup power in UPS systems. However, battery technology has progressed rapidly in recent years.

Today, lithium-ion battery technology is an attractive option – especially where high energy density and low weight are important. Advantages such as longer lifespan, smaller size and weight, shorter recharging times and falling prices only add to the appeal of lithium-ion battery solutions.

For best performance and lifetime, it is essential to keep VRLA battery rooms at a reasonably constant temperature (20–25°C). Keeping things cool can be problematic and costly, especially in hot countries. With lithium-ion batteries, this problem virtually disappears, as lithium-ion batteries are much more tolerant to changes in environmental temperature and can operate over a broader temperature range.

Lithium-ion batteries are easy to handle too – they are safe and do not contain mercury, lead, cadmium, or other hazardous materials. In most cases, traditional batteries would need to be replaced multiple times before a lithium-ion battery is replaced once. When it comes to operating expenses, lithium-ion batteries offer a lower total cost of ownership.

Battery management system

Features

Each battery cabinet has dedicated battery management systems at single module and rack level, plus fuse, circuit breaker protection and a dedicated 24 V power supply

A single cabinet configuration of 34.6 kWh comprises one switchgear, one switched mode power supply (SMPS) and 17 battery modules

Switchgear collects all information about each battery cell and controls all battery module management systems calculating state of charge (SoC) and state of health (SoH). It also contains a moulded case circuit breaker and a shunt resistor

SMPS supplies the power for BMS and communicates with UPS and other racks in parallel. It is available in two versions with or without BMS for single or multiple parallel configuration

Battery module contains eight series-connected 67 Ah, 3.8 V cells and a dedicated battery module management system

Accommodated in a standard 19" cabinet

Battery cabinets can be connected in parallel to achieve the power needed

Switchgear

Battery management system

Switched-mode power supply (SMPS)

Battery module



Runtime and performance

Lead acid

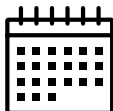
Charge 0–1C
Discharge 2C*



Weight 2500kg
Volume 2 m³*



3–7 years*



Lithium-ion

Faster charge and higher discharge rate
Charge 0.5C
Discharge 6C*

Less space and weight

Weight 550kg
Volume 0.8 m³*

Longer life

15 years*

Lithium-ion batteries can be charged much more quickly than conventional batteries, so after use they can be charged back up to full strength in a shorter time. This means full availability in less time.

Lithium-ion batteries also provide higher power density and efficiency, especially under heavy discharge rates. This means that no battery oversizing is needed.

Low weight (60–80 percent less than VRLA) means reduced civil engineering overheads and easier physical installation.

*Example 190kW power/10 min autonomy

PowerWAVE Generators



Single and three-phase standby generators.

24/7 standby power.

Total power protection solutions

No longer simply a back-up plan, critical power protection is an essential requirement of every business. If critical applications must be available at all times, without downtime, then a standby generator is the only practical source for long-term power protection during an extended mains outage.

Part of the Kohler Company's Global Power Group, KUP leverages Kohler's technical leadership in the global generator industry to provide a comprehensive range of standby diesel generators to deliver reliable power when it's needed most.

PowerWAVE generators

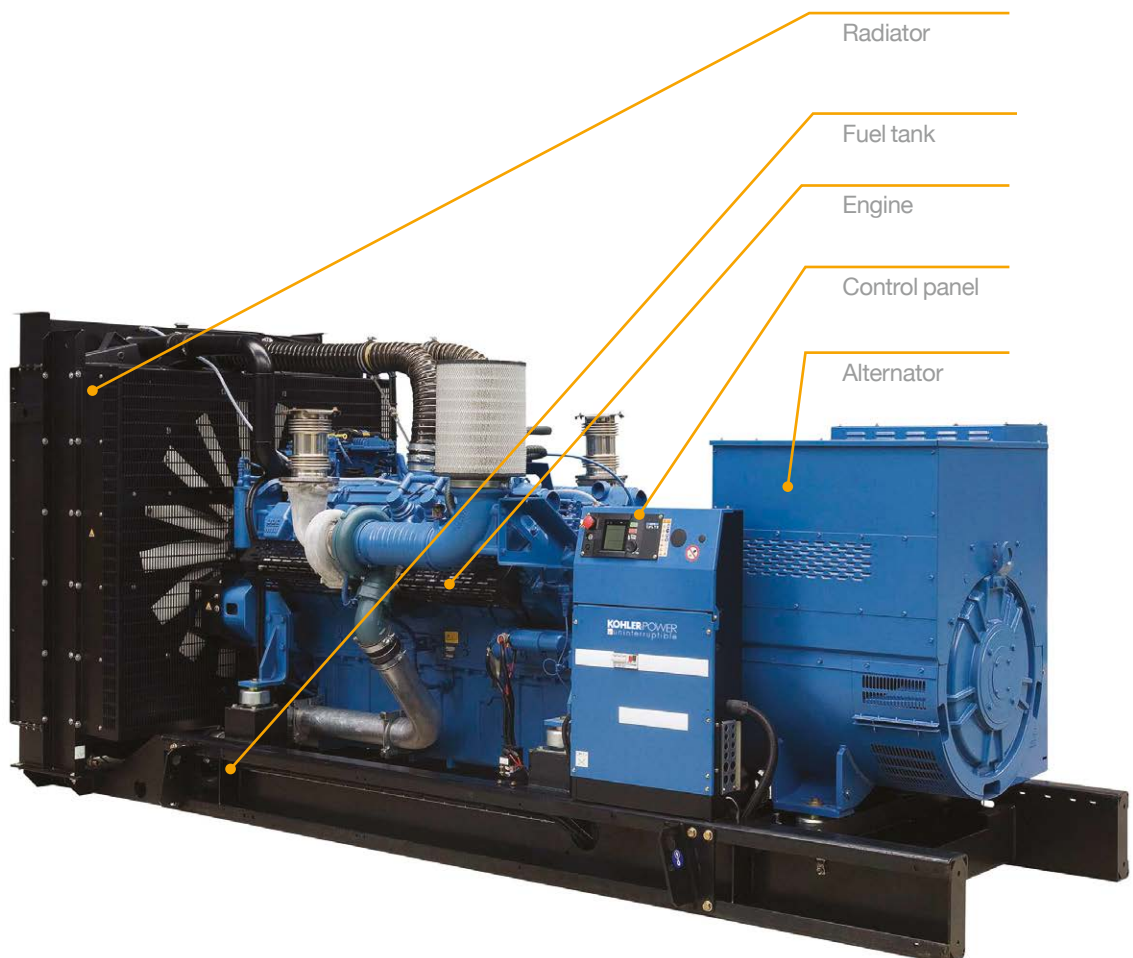
Standby generators for total power protection

Integrated PowerWAVE generators and UPS systems

Fully matched solutions for true, 'no-break', total power protection

Single source installation, technical support and service

A truly turnkey, one-stop-shop for standby power





Standalone generator

Whether it's a standalone generator or a generator and UPS combined as a total standby power solution, KUP supplies products engineered to the highest specifications for today's commercial environments.

The PowerWAVE generator brand stands for high reliability, low cost and durability. Whether you buy a single generator or a complete solution, all products have the backing of comprehensive technical support, commissioning and maintenance services with excellent service delivery.

One-stop-shop – installation and services 'turnkey' solution

KUP's turnkey UPS and generator package guarantees both systems are fully matched, which ensures a true no-break supply in the event of a power failure. Turnkey supply and project management ensures the correct sizing of the generator set with respect to the UPS and critical load. Our fully trained service engineers will test the complete installation to verify system integrity, removing the problem of demarcation between different suppliers.

Reliability and durability

PowerWAVE generators are highly reliable. We only supply products that we know are going to be with you a long time and which will reliably provide you with back-up power when you need it. PowerWAVE generators offer leading-edge control panel technology, versatility, durability, operation and maintenance. Weatherproof enclosures, for example, and protective coverings for vital parts, reduce wear and tear and aid longevity.

PowerWAVE generators
Single and three-phase standby
generators. 24/7 standby power.

Acoustic enclosures

Noise compliant to latest EC directive
2000/14/EC

Integral bunded fuel tanks

KUP's range of acoustic enclosures has been designed to withstand even the harshest and most extreme climate conditions. Their compact design has been developed specifically to save space and costs – a plus for today's streamlined business environments. They are highly transportable, easy to install and due to their integrated cooling system, sound attenuation and silencers are completely self-contained.

Bulk fuel tanks

Environment Agency PPG02 compliant
Content gauges and overflow alarms

'Bunding', in a fuel tank, minimises the risk of spillage and offers total security alongside compliance with Environment Agency PPG2 regulations for the storage of diesel fuel. We can provide a wide range of bunded fuel tanks, ready to use. All our tanks are available in different specifications, depending on customer and site requirements. The correct installation of bunded fuel tanks is just as important as the quality of the tank itself. Using single or double-skinned pipework, our team of experts install and test bunded fuel tanks to ensure they are fully compliant with applicable regulations and in complete working order.

Bespoke acoustic packages

Plantroom attenuation
Acoustic enclosures/containers

Every installation is different and some require bespoke acoustic engineering. At KUP, we've made it our business to design solutions around the customer and this is evidenced by our ability to customise acoustic packages that include container design, plantroom design, groundworks, mechanical installation, cabling, pipework and associated works required to meet the exact requirements of the installation.

PowerWAVE T series

Single phase (8–17 kVA)

Three phase (11–22 kVA)

Powerful series of standby generators available in six models for single and three-phase business applications. Each generator is built with a high performance Mitsubishi engine for reduced noise pollution and improved fuel efficiency. Available as an 'open' generator or within an acoustic enclosure to further minimise noise emissions. Standard and DW24 tank options.

PowerWAVE J series

Three phase (22–250 kVA)

Series of three-phase UPS generators providing power from 22 to 250 kVA. Each generator is powered by a John Deere engine for reliable backup during power failures. Bunded fuel tank minimises diesel spillage, with additional fuel tank capacity to extend run time. Models available for commercial and industrial use. Standard, DW24 and DW48 tank options.

PowerWAVE D series

Three phase (275–830 kVA)

Power products generating set, equipped with a DOOSAN engine. Standard and DW24 tank options.

PowerWAVE K series

Single phase (6–26 kVA)

Three phase (9–44 kVA)

Reliable series of single and three-phase standby generators from 6 kVA to 44 kVA. Each generator is built with a high-performance Kohler engine to help you achieve more. Available as an 'open' generator or within an acoustic enclosure to further minimise noise emissions.

PowerWAVE V series

Three phase (275–700 kVA)

High specification range of UPS generators providing 'turnkey' backup power with APM control panels fitted as standard. Each generator is powered by a Volvo engine. Built-in fault-finding tools and remote operation for a reliable power supply during mains failures. Available 'open' or within a weatherproof enclosure for added protection from the elements. Standard and DW24 tank options.

All sets available open or canopied.

Your choice of control

Most generators supplied by KUP have a choice of control panel options. Generators these days are extremely reliable with almost all enabling both automatic and manual operation. The choice of an appropriate control panel is therefore down to how much additional monitoring is desired. A more advanced control panel offers enhanced user-friendliness and diagnostics capability. It does all this with a reduced number of buttons, thus simplifying operation.

Changeover panels

KUP provide a choice of two high quality automatic changeover panels – the VERSO 100 and 200 – to enable automatic start-up of the standby generator and safe, fast transfer of the load in the event of a mains power cut. When mains power is restored, these changeover panels will automatically disconnect the generator and connect the load back to the mains.

The VERSO 100 is rated for applications from 35 to 160 amp.

The VERSO 200 is rated for higher applications from 200 to 1600 amp and has the additional benefit of an LCD, allowing the voltage and frequency parameters on both the mains and generator sides to be simultaneously displayed.



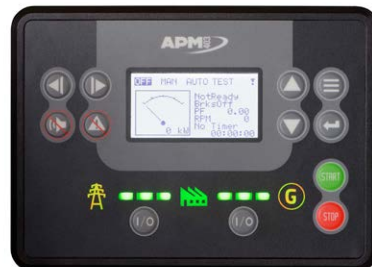
APM 303 control panel

Entry level control panel

LCD screen for basic engine and alternator operational parameters

LED alarm and fault indication

Our entry level product is the APM 303 panel. APM 303 is fitted as standard on all PowerWAVE T and J series standby generators. It provides both manual and automatic operational control of the generator and provides a basic indication of operational parameters, as well as alarm and fault indication via its standard LCD screen. Additionally, LED indication of alarms and faults are also provided.



APM 403 control panel

Control panel for remote monitoring

Graphical LCD Screen

Messages for alarms and faults

The APM403 panel is fitted as standard on all PowerWAVE V and D Series standby generators. This control panel is designed for low voltage industrial diesel generator sets and its remote management and supervision functions allows monitoring and even operation at anytime, anywhere. The APM403 control panel is simple to use and comes with built in intuitive configurations to cater to different backup system setups.



APM 802 control panel

Advanced control panel

Large colour graphical touch display

Continuous 24-hour data logging

The APM802 panel is fitted as an option on PowerWAVE V and D Series standby generators. This advanced control panel provides system monitoring, and system diagnostics for optimum performance. It uses software logic to manage alternator thermal overload protection features normally requiring additional hardware.



PowerWAVE EL

(Single-phase 500 VA–30 kVA
Three-phase 10–160 kVA)



PowerWAVE EL

Designed to the latest European
EN 50171

True double-conversion and PWM
technology

Inverter stage output galvanic isolation
transformer included

Capable of 120% continuous overload
to meet European emergency lighting
regulations

Parallel mode operation (optional) (hot
standby, redundant, symmetric parallel)

Large charger for faster recharge of
batteries

Maintenance bypass (for complete
isolation of the inverter during
maintenance)

Unique inverter design to suit high inrush
lighting loads

Bypass to load (changeover mode) user
selectable

LCD panel providing accurate detailed
information about load, batteries and
inverter with advanced diagnostics

RS232 and dry contacts for
communication and remote monitoring

Efficient power for
emergency lighting
and safety equipment.



Addresses the need for a range of high performance static inverters manufactured using state-of-the-art technology to give your operation the peace of mind it needs.

Boasting true double-conversion and PWM technology, the entire range is capable of 120% continuous overload and has optional parallel modes. KUP's most intelligent battery monitoring maximises service life and a galvanic isolation transformer is included as standard.



Common applications

- Emergency lighting systems
- Central power supply systems
- Fire alarm and safety systems
- System and battery test function
- Hospital and medical systems
- Cinemas and entertainment venues
- Retail

PowerWAVE EL 100XA series

High performance static inverter (500–3000 VA)

- Wall-mounted and standalone options
- Allows for an internal self-contained battery system capable of supplying standard emergency lighting of 3 hour autonomies
- Fully encapsulated product for lower rated requirements
- High reliability with low maintenance
- Low operating cost
- Wide range of standard ratings available
- Battery options to suit all applications
- Intelligent battery monitoring to maximise service life
- Simple & easy to install with front access

PowerWAVE EL 100 series

Single-phase input and output online static inverter (4–12 kVA)

- Solution for higher power, single-phase loads
- Galvanic isolation transformer at the inverter stage
- High reliability with low maintenance
- Low operating cost
- Wide range of standard ratings available
- Battery options to suit all applications
- Intelligent battery monitoring to maximise service life
- Simple & easy to install with front access



PowerWAVE EL 300 DSP series

Three-phase input and output static inverter (10–160 kVA)

Solution for higher power, three-phase loads

High reliability with low maintenance

Low operating cost

Wide range of standard ratings available

Battery options to suit all applications

Intelligent battery monitoring to maximise service life

Simple & easy to install with front access

IP41 as standard: suitable for harsher environments

BS1 kitemark certified to BS EN 50171



VM 55954
BS EN 50171



PowerWAVE EL MOD series

High performance emergency lighting inverter (4–24kVA)

1/1 and 3/1 configuration via display

Hot-swap power module

True sine wave output

Output configurable to three modes of operation (changeover/inverter/non-maintained)

No break load transfer for use with discharge lamps

Deep discharge protection

Reverse battery polarity protection

Front access for maintenance and repair

Each module automatically equally shares the input and output current; all inverter modules share the batteries

Battery short circuit protection

Battery discharge management, auto-transfer between floating and equal charging, temperature compensation

PowerNSURE

Battery system care



Battery design, installation and continuous care.

PowerNSure battery services

Advice on battery system design

'Made to measure' battery installation service

Battery impedance testing to track battery condition

Inspection, cleaning and maintenance options to ensure battery working life is optimised

Battery replacement programme for a wide range of battery supported products

Safe battery disposal

Monitoring and regulation of batteries to extend battery life and prevent unexpected failure using PowerNSURE

Pioneering solutions for total power protection.

The battery plays a key role in the overall reliability and availability of a power protection system. It supplies the energy required by the critical load in the event of a mains utility failure or when the input mains voltage and frequency are outside the acceptable values. Moreover, the battery represents an important share of the total cost of the UPS, and therefore battery care and management are of paramount importance when a UPS is designed.

KUP provides a range of remote monitoring and diagnostics services to provide early fault detection and prevention. PowerNSURE is the most advanced monitoring product on the market today.



PowerNSURE

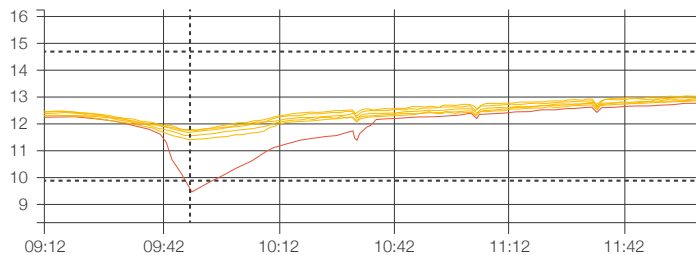
Extends battery life by equalisation

Monitors and regulates the battery charging process and avoids undercharging

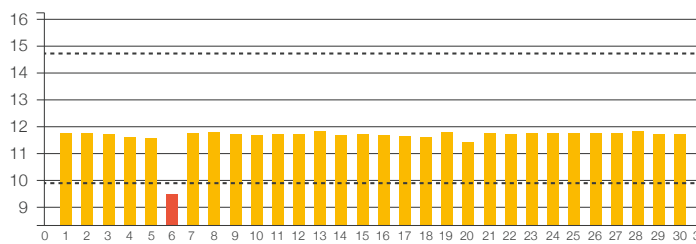
Indicates battery problems before failure

Monitors condition of every battery individually including temperature

The PowerNSURE system from KUP is the most advanced product on the market today, providing an ethernet-network integrated battery monitoring and management system. Using web-management technology, it checks the internal resistance, temperature and voltage of every single battery sequentially. Through the equalisation process, the system corrects the charging voltage operating range. This prevents gassing, dry-out and thermal runaway. The constant monitoring and controlling of the individual charging voltages for each battery guarantees the availability of the battery at all times.



Block voltage



Battery block numbers

PowerNSURE reporting

The reporting system displays the status of all lead-acid batteries. Any change in impedance, temperature and voltage is displayed and stored. Reports can be run regularly on-site, enabling constant monitoring of the system using the PowerNSURE viewer. Through regular monitoring of key parameters, the system will provide a warning when attention is required.

The graph above demonstrates that battery 6 is weak after 30 minutes of discharge into a 45-minute run. This early warning system enables the user to replace the weak performing battery and thus increase the lifetime of the complete battery system.



Inspection, cleaning and maintenance

Regular maintenance optimises the working life of a battery installation and ensures early detection of weak or faulty battery blocks. If not replaced, a compromised battery would threaten the integrity of the whole power protection system. Routine battery maintenance provided by our skilled team of specialist engineers includes:

- Checking the open circuit battery and UPS float voltages
- Inspecting the physical condition of batteries, terminals and connections
- Environmental checks – ambient temperature of battery room
- Checking the cleanliness of equipment
- Assessing the condition of battery cabinets
- Performing a detailed examination of individual cells for post and interconnector corrosion
- Taking voltage readings – block and string voltages

Impedance testing

Our impedance testing provides a means of assessing the internal condition of batteries. Almost any battery problem will lead to an increase in internal impedance. Recorded at regular intervals, impedance testing will track battery condition and enable end-of-working-life prediction. This service is included as part of the PowerNSURE system or can be purchased separately.

Replacement and upgrade

We supply and fit batteries of all types into all models of UPS and secure power systems. Additionally, KUP offers a battery replacement programme for a wide range of battery supported products. These include AC UPS, DC equipment, emergency lighting units and generator starting batteries.

Disposal

Batteries are classed as hazardous waste and, in the UK and Ireland, must be disposed of in line with the Hazardous Waste Regulations 2005. As a registered carrier of such waste (registration number TWE/675610), KUP ensures that all the legal requirements associated with the removal, transportation and disposal of waste batteries are fully complied with.

Quality guaranteed

Our quality assurance, health and safety and environmental procedures are NQA EN ISO 9001, OHSAS 18001 and ISO 14001 certified. We are also certified under the SafeContractor scheme (www.safecontractor.com). These certificates ensure that all of your obligations under health and safety legislation are fully met. All battery maintenance visits and activities are fully documented.

PowerREPORTER



24-hour remote monitoring service for UPS systems.

PowerREPORTER benefits

Continuous monitoring and management of your UPS

Ideal for mission-critical systems and unmanned sites

Alarm-triggered interrogation of UPS parameters for remote diagnosis

Prevention and early fault detection

Dedicated KUP Support Centre – manned 24/7/365 to ‘collect, assess and respond’

Combined with a maintenance contract, PowerREPORTER improves service levels, enabling an engineer to arrive onsite with the correct spares

Complete assurance of continuous availability

A ‘virtual’ power engineer on your site 24 hours a day.

Total power protection solutions

PowerREPORTER is specifically designed to ensure your business’ critical load is protected by dedicated, trained personnel, even when your facility is unmanned.



How PowerREPORTER works

PowerREPORTER communicates constantly with your UPS system in order to automatically detect any error or alarm messages. In the event of an incident being detected, PowerREPORTER automatically connects with KUP's Service Centre network via email, transmitting a status message and providing any available details relating to the fault, as well as a device identification string.

KUP's Service Centre personnel are then able to liaise with the company's field service team who can interrogate and manage the UPS, performing all necessary remote diagnostics before reaching the facility within the contracted service agreement timeframe.



Your fully customised monitoring solution

Installation and maintenance of your power surveillance system

Email connectivity

Real-time email notification sent in response to alarm/critical events directly to KUP Support Centre

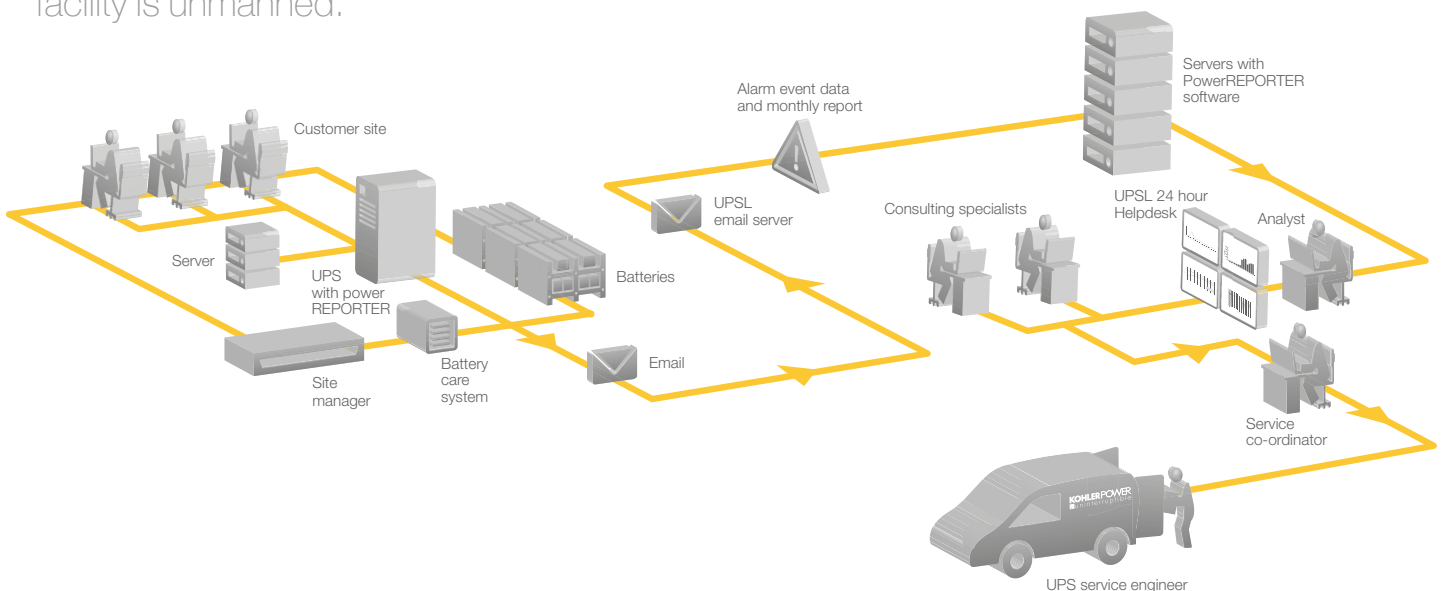
Monthly KUP status report detailing trends and alarms

Optional battery monitoring via PowerNSURE – measuring battery parameters to help prevent battery failure

"PowerREPORTER provides valuable eyes and ears in our server room during weekends, out of hours and unmonitored periods with engineer backup. We have previously been called by the engineer, out of hours, and the problem rectified before the next working day. PowerREPORTER communicates securely and further provides the capability for us to monitor the system's web front-end, plus it has a remote power-off capability."

A London-based Hedge Fund organisation

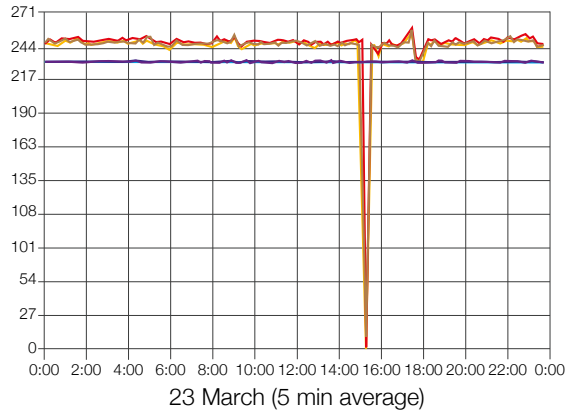
PowerREPORTER
Specifically designed to ensure your business' critical load is protected by dedicated, trained personnel, even when your facility is unmanned.



Monthly KUP Status Report

Example screenshots of power outages from a client site.

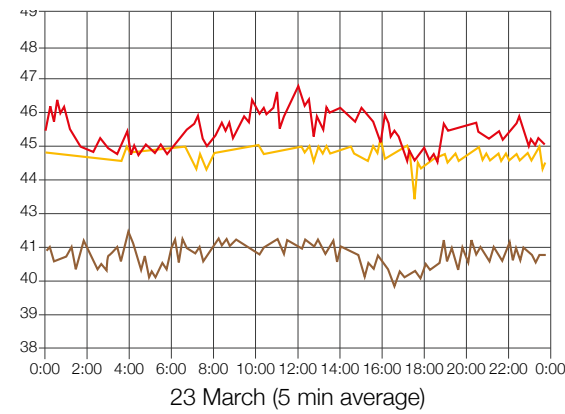
Input and output voltage



- Input voltage (1)
- Input voltage (2)
- Input voltage (3)
- Input voltage (1)
- Output voltage (2)
- Output voltage (3)

The input voltage data on this graph clearly shows the first major power cut. The output voltage is unaffected and steady on all 3 phases throughout.

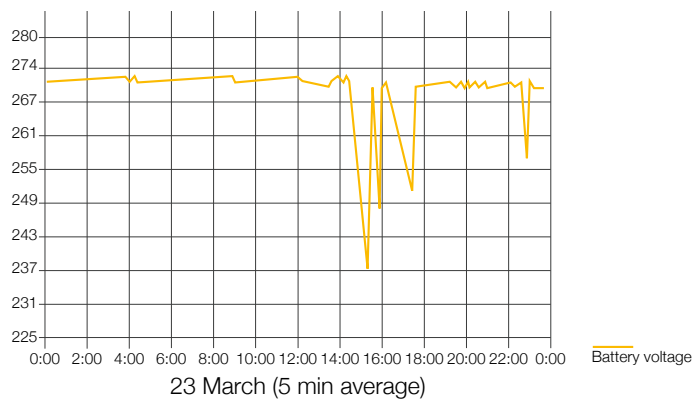
Load



- Load (1)
- Load (2)
- Load (3)

This graph demonstrates how the load was supplied throughout the mains failures.

Battery voltage



- Battery voltage

This graph clearly shows the battery voltage discharge and recovery as the charger returns after each mains failure.

Service Solutions



Flexible service plans,
load bank testing,
UPS and generator rental.

Service solutions

Maintenance

UPS maintenance contracts

Generator maintenance contracts

Batteries

Battery replacement and upgrade

Load bank testing

Impedance testing

Lithium-ion batteries

PowerNSURE battery monitoring

Battery disposal

Monitoring

PowerNSURE battery monitoring

PowerREPORTER remote UPS
monitoring

Generator monitoring

SNMP onsite monitoring

Onsite

Site survey

Installation and commissioning

Black building testing

Load bank testing

UPS relocation and disposal

Pioneering solutions for
total power protection.

At KUP, our core business is the design, installation and maintenance of secure power protection systems. Delivered by our trained engineers and support staff, we offer the most comprehensive and cost-effective service plans available ensuring your power protection systems are expertly maintained on a regular basis and ready to support your business load.



UPS maintenance contracts

KUP's maintenance plans offer the flexibility to choose the level of service needed to ensure that risks and costs are minimised. They all provide regular maintenance visits and you can choose the level of service time you need to suit your business requirements. To maximise the reliability of your UPS, a service plan from KUP also ensures critical component degradation is identified and that repairs or replacements are carried out before a fault occurs. Immediate spares availability is assured through our extensive spares inventory.

Features

Routine inspection and preventative maintenance

Emergency call-out options including guaranteed speed of response, 24 hours a day, 365 days a year

Remote monitoring (optional)

Battery maintenance

A range of cover available

Key benefits

Comprehensive plans competitively priced optimising UPS availability – with no unscheduled budgetary surprises

Guaranteed response times to site – we're there when we say we'll be there

24/7 telephone support for an instant response to your service needs

Extensive network of trained field service engineers

Service for a wide range of UPS brands

Support contracts tuned precisely to each installation, so you only pay for the service level you need

Remote monitoring options to complement telephone support

Extensive spare parts inventory ensuring maintenance and repairs are carried out without delay

Generator maintenance contracts

KUP offers a comprehensive and cost-effective range of service plans to ensure your standby generator is ready to perform when it is needed most. Our standby generator service plans cover all key components including engine, alternator, control system, fuel, exhaust, cooling and air handling systems.

Since generators are usually inoperative for long periods, regular service is needed to ensure that they are fully functional and able to supply power when required. All our service plans offer the flexibility to choose the level of service needed to ensure that risks and costs are minimised. They all provide regular maintenance visits and you can choose the level of response time you need to suit your business requirements.

Features

Inspection and cleaning

Electrical, hydraulic and lubricant checks

Engine maintenance and repair

Battery checks and maintenance

Fuel checks and replenishment

Oil sampling and changing, air and water filter replacement

24/7 emergency support

Load bank testing (optional)

Identification of critical component degradation

Immediate spares availability

We will communicate with you right through the service process, proactively managing your service visits and organising the best time to visit to minimise any disruption.

All this not only ensures your power protection system will guarantee your business continuity but assures your peace of mind.

Battery replacement and upgrade

We supply and fit batteries of all types into all models of UPS and secure power systems. KUP also offers a battery replacement programme for a wide range of battery supported products. We can supply a replacement UPS battery compatible with your AC UPS, DC equipment, emergency lighting and generator starting batteries

A key benefit of regular battery maintenance is the early detection of weak battery blocks. As they are such a critical part of a power protection system, replacement of weak battery blocks should therefore take place before they fail. If a UPS replacement battery is not purchased, a weak or faulty battery will compromise the integrity of the whole power protection system.

Impedance testing

Almost any battery problem will lead to an increase in internal impedance. Recorded at regular intervals, impedance testing will track battery condition and enable end-of-working-life prediction for individual cells, so batteries can be replaced before they cause a critical power protection failure

An electrical current is passed through each battery in turn and a measurement taken. The internal impedance of each battery is then calculated, logged in a table and plotted on a graph.

A report will be provided after the batteries have been tested detailing the status of each bank and advising which, if any, will need to be replaced.

This service is included as part of the PowerNSURE system or can be purchased separately.

Load bank testing

Comprehensive commissioning procedures and the regular testing and maintenance of UPS systems and batteries go a long way towards ensuring the integrity of a power protection system. However, there is only one certain way of establishing that all the components of the system will function correctly together and perform as intended when required – load bank testing.

Fully loading the power support system stresses all components. It is clearly preferable to identify potential weaknesses under controlled conditions rather than to wait until the system is supporting a critical load. It is also cost effective to acquire this service and the expertise and experience of a professional specialist service provider.

Load bank testing is the provision and connection of an electrical load to a power supply, often a UPS, in order to simulate the client's load and prove the integrity of the overall system. Load bank testing ascertains the performance of the UPS, and of the entire electrical supply infrastructure including cabling, switchgear, generator and fuses. A load bank can also be used to discharge batteries as an effective, accurate and relatively low cost method of determining battery autonomy.

Key benefits

Mobile AC/DC load banks of any size

Engineer-controlled tests carried out to individual requirements

Battery autonomy and integrity testing

Out-of-hours testing to suit the client's operational requirements

PowerNSURE battery monitoring

The PowerNSURE system from KUP is the most advanced product on the market today, providing an ethernet-network integrated battery monitoring and management system.

Using web-management technology, PowerNSURE checks the internal resistance, temperature and voltage of every single battery sequentially. Through the equalisation process, the system corrects the charging voltage operating range. This prevents gassing, dry-out and thermal runaway. The constant monitoring and controlling of the individual charging voltages for each battery ensures the availability of the battery at all times.

Battery disposal

We manage the safe and environmental disposal of batteries and replacement UPS batteries in line with Hazardous Waste Regulations. As a registered carrier of such waste, KUP ensures that all the legal requirements associated with the removal, transportation and disposal of waste batteries are fully complied with.

PowerNSURE battery monitoring and care

All UPS systems rely on the integrity of batteries to protect the critical load in the event of a power failure. To ensure the integrity of your secure power system is not compromised, we provide a comprehensive range of battery services including design installation, maintenance, monitoring, replacement and disposal.

See pages 72–75.

PowerREPORTER remote UPS monitoring

PowerREPORTER is specifically designed to ensure your business' critical load is protected by dedicated trained personnel, even when your facility is unmanned.

See pages 76–79.

SNMP onsite monitoring

Connect your UPS directly to your computer network as a network device with KUP's SNMP solution. Contact us on 0800 731 3269 for more information.

Generator monitoring

The new Remote Monitoring Systems are much more than just a piece of communication hardware fitted to your generator. KUP's Remote Monitoring System is an industry-leading, monitoring, management and fault rectification system integrating GSM communications technology with the best 24/7 generator support personnel anywhere in the world.

Once a week, the system automatically starts your generator and runs it for 10 minutes, checking vital operating parameters such as voltage, frequency, oil and water temperature, battery condition, emergency stop and fuel levels. After the test, a full condition report is sent to the remote monitoring centre via phone line or GSM upload. You can also choose to receive SMS or voicemail reports sent to nominated numbers.

If your standby generators are in action, or you're using prime power generators equipped with the latest monitoring system, you get 24-hour monitoring, 365 days a year.

Features include:

Fully automatic operation 24/7

Continuous monitoring of generator conditions

Notification of mains failure and generator operation

Confirmation of a successful test run

Automatic low fuel warning

Based on a common platform, the monitoring system can be fitted to new or existing generators and programmed to monitor a huge range of parameters including:

- Electrical – voltage, current, frequency of generator and mains power
- Mechanical – engine data including speed, oil pressure, and temperature
- Physical – location of the generators using the GPS network
- Remote control – test running, fuel levels, alarms and alerts
- Site specific requirements – intruder alarms, fire alarm, etc.



Site survey

KUP's experienced team of engineers are able to provide a free site survey, to offer you a choice of power protection solutions tailored to your requirements and budget.

The free survey is offered during normal working hours within our service network covers area.

A typical UPS site survey will last around 1-2 hours depending on the size of the installation. Full recommendations and quotations will be provided after the survey has been completed.

KUP endeavours to assess the following areas during the survey:

- Load size
- Physical location and environment
- Suitability for existing UPS and battery installation
- Delivery route and logistics requirements
- Remote monitoring requirements
- Ongoing maintenance and technical support requirements
- General programme of works and preferred installation timeframe

Installation and commissioning

Both UPS and generators must be properly installed and commissioned to ensure a long and trouble-free working life. Whilst small less sophisticated UPS systems simply plug into a standard mains socket, larger UPS systems – must be electrically installed and commissioned by skilled and qualified professionals. Likewise with generators; larger standby generator systems should be professionally installed and commissioned. Additionally, a generator must be properly matched with all other power equipment for continuous power to be guaranteed.

As a leading generator supplier, our project team will work closely with you, from start to finish, ensuring your UPS and/or generator installation is commissioned safely, on time and with minimal disruption to your business.

Our factory trained, highly skilled field-service engineers will commission and test the complete power protection system. They work in accordance with factory-issued commissioning procedures and written method statements and provide full commissioning certification for warranty validation.

Key benefits

Full project management including site assessment, delivery and positioning

Organisation of any electrical and mechanical work required

Extensive network of trained field service engineers

Certification to BSI EN ISO 9001, environmental procedures ISO 14001, health & safety procedures OHSAS 18001 and SafeContractor scheme

Black building testing

KUP's trained service engineers can be on hand to monitor your UPS systems during your annual IST (Integrated System Test) black building testing.

Black building tests are normally carried out to test for high availability, performance, business continuity plans and recovery capabilities in a disaster-like scenario. For example, the testing will result in the electrical power to the entire building being shut off imitating a street power outage.

Black building tests tend to be carried out to:

- Simulate a total power failure – leading to a complete power shut-down in a facility
- Test the functionality of generators, simulating a total (external) power outage, replaced by generator-provided energy. This does not touch any equipment except generators, thus not causing any disruption to systems

Why is the test important?

Equipment loss of power can result in compromised:

- Safety
- Product and equipment protection
- Comfort
- Staff convenience

Key benefits

KUP offers skilled and qualified engineers to attend site during the test period to monitor the UPS systems

Fully documented, procedures ensuring full traceability of all test events and actions

'Safe method of work' covering the power down and power up of a UPS and/or generator

KUP's ISO procedures and certifications assure quality of service and compliance with health and safety legislation

Load bank testing

Comprehensive commissioning procedures and the regular testing and maintenance of UPS systems and batteries go a long way towards ensuring the integrity of a power protection system. However, there is only one certain way of establishing that all the components of the system will function correctly together and perform as intended when required – load bank testing.

Fully loading the power support system stresses all components. It is clearly preferable to identify potential weaknesses under controlled conditions rather than to wait until the system is supporting a critical load. It is also cost effective to acquire this service and the expertise and experience of a professional, specialist service provider.

Load bank testing is the provision and connection of an electrical load to a power supply, often a UPS, in order to simulate the client's load and prove the integrity of the overall system.

Load bank testing ascertains the performance of the UPS, and of the entire electrical supply infrastructure including cabling, switchgear, generator and fuses. A load bank can also be used to discharge batteries as an effective, accurately and relatively low cost method of determining battery autonomy.

Key benefits

Mobile AC/DC load banks of any size

Engineer-controlled tests carried out to individual requirements

Battery autonomy and integrity testing

Out-of-hours testing to suit the client's operational requirements

UPS relocation and disposal

Relocation

If you have a requirement for a UPS to be relocated either to a different room within the same building or to a brand new location, KUP can assist you.

The relocation of a UPS involves the decommissioning, safe transportation and recommissioning of the UPS, associated batteries and electrical switchgear. Using trained engineers and our highly experienced logistics team, KUP can assist with this. Should you require help with the associated electrical works, we can accommodate this using one of our electrical contractor service partners.

UPS disposal

If you have a requirement to dispose of a UPS, KUP can assist with a wide range of UPS brands.

Using trained engineers and our highly experienced logistics team, we can carry out the disposal of the UPS and associated batteries. Our engineer will ensure that the UPS is safely decommissioned ready for our logistics team to pack and palletise the UPS and batteries for transportation and disposal.





Technical Specifications

Correct at time of printing, please consult the website for the most up-to-date versions.

All models

Input									
Input voltage (nominal)	230 V								
Input frequency	50/60 Hz \pm 2% autosensing								
Input voltage range	184 to 264 V at 100% load, 100 to 264 V at 50% load								
Input power factor	>0.99 at 20% load								
Input current total harmonic distortion	<3%								
Output voltage	230 V \pm 1%								
Output frequency	50/60 Hz synchronised								
Overload capacity									
Online modes	150% for 30s, 200% for 5s, 300% for 1s								
Battery modes	160% for 15s								
Protection degree	IP 21								
Standards	EN62040-1, EN50091-2, EN62040-3								
Batteries	3 x 12 V 9 Ah sealed lead-acid, maintenance-free batteries per board (standard) Up to several hours available on request								
MINIpowerPLUS tower	5000				10000				
Rated power (kVA)	1.25	2.5	3.75	5	5	6.25	7.5	8.75	10
Active power (kW)	0.875	1.75	2.625	3.5	3.5	4.375	5.25	6.125	7
Dimensions (mm) W x D x H	270 x 475 x 570				270 x 475 x 570				
Weight (kgs)	23.5	34	43	53	24	26.5	29	31.5	34
Battery	Internal (external optional)				External (additional cabinets)				
MINIpowerPLUS rack	5000								
Rated power (kVA)	1.25	2.5	3.75	5					
Active power (kW)	0.875	1.75	2.625	3.5					
Dimensions (mm) W x D x H	485.5 x 600 x 266		(6 U)						
Weight (kgs)	23.5	34	43	53					
Battery	Internal (external optional)								

See page 14 for full product overview.

PowerWAVE 1000 (1–3 kVA)

Model	1 kVA	2 kVA	3 kVA
Input			
Nominal voltage	110–130 VAC @ 60% load/150–300 VAC @ 75% load/180–300 VAC @ 100% load		
Frequency	50/60 Hz ±5 Hz (auto sensing)		
Phase	Single phase		
Power factor	≥0.99 (full load)		
Output			
Voltage (VAC)	200/208/220/230/240		
Voltage regulation	+/-1% (until low battery warning)		
Capacity	1000 VA / 900 W	2000 VA / 1800 W	3000 VA / 2700 W
Wave form	Sine wave, THD<3% (no load to full load)		
Frequency	50–60 Hz +/-0.2% unless synchronised to line		
Transfer time inverter to bypass	4 ms (typical)	4 ms (typical) / 0 ms (optional)	
Crest factor	3:1		
Efficiency (AC to AC) full load @ 230 V	90%	91%	91%
Efficiency (eco mode)	97%	97%	97%
Autonomy (built-in battery)	>4 min		>3 min
DC start	Yes		
Battery			
Type	Sealed lead acid maintenance free		
Capacity	7 Ah		9 Ah
Quantity (pcs)	3	6	6
Display			
LED/LCD	Normal, battery, bypass, programmable outlet 1, programmable outlet 2, self-test, battery weak and bad, site wiring fault, fault, overload, and load/battery level conditions		
Key	On button/off button (test/alarm silence button)		
Self-diagnostics	Upon power on and software control		
Protection			
Overload AC mode & backup mode (delay before switching to bypass)	<105% continuously. >106%–120% for 30 seconds transfer to bypass. >121%–150% for 10 seconds transfer to bypass. >150% immediately transfer to bypass. Buzzer continuously alarms		
Epo	UPS shuts down immediately		
Alarms			
Audible & visual	Line failure, battery low, overload, system fault conditions		
Physical			
Dimensions (mm) W x D x H	440 x 405 x 88	440 x 600 x 88	
Net weight (Kg)	11.7	21.8	24.6
Environment			
Operating temperature	0°C – 40°C		
Altitude	0-2000 m up to 40°C / 3000 m up to 35°C		
Humidity	90% RH maximum, non-condensing		
Environment – heat dissipation (approx)	150 W	275 W	415 W
Noise	≤ 50 dBA		
Computer interface			
Interface type	EPO, Standard RS232		
Communication slots	Relay contact board, SNMP card		
Compatible platforms	Windows, Linux, Mac, Novell NetWare		

Continued overleaf

Model	1 kVA	2 kVA	3 kVA
Safety conformance			
Quality assurance	ISO9001 certified company		
Safety standard	EN62040-1-1		
Performance	EN62040-3 complied		
EMC standard	EN62040-2, EN61000-3-2, EN61000-3-3		
Protection class	IP20		

See page 18 for full product overview.

PowerWAVE 1000 (6–10 kVA)

Model	6 kVA	10 kVA
Input		
Voltage	176–280 VAC – line to neutral @ 100% load	
Frequency	45–70 Hz	
Phase	Single phase	
Power factor	≥0.99 @ 100% linear load	
Output		
Voltage distortion (THD)	≤2% @ 100% linear load, ≤7% @ run linear load with CF:25	
Voltage	200/208/220/230/240 vac selectable	
Voltage regulation	+/-1% (until low battery warning)	
Capacity	6000 VA/6000 W	10000 VA/10000 W
Rated power factor	1.0	
Wave form	Pure sine wave	
Transfer time inverter to bypass	0 ms	
Crest factor	3:1	
Efficiency (mains operation)	93%	94%
Efficiency (AC to AC, ECO)	98%	98%
External battery cabinet		
Type	Sealed lead acid maintenance free	
Capacity	12 V/9 AH	
No. of battery blocks per cabinet	20 pcs (connected or a single battery string)	
Display		
Readings on LCD	Input voltage, input frequency, output voltage, output frequency, load percentage, battery voltage, and inner temperature	
Self-diagnostics	Upon power-on and front panel setting	
Alarms		
Audible	Battery mode, battery low, overload, general error	
Protection		
Overload	Inverter supply: sliding scale: 105% continuous operation, 150% 160 ms, >150% switch to bypass	
Physical		
Dimensions (mm) W x D x H without battery	440 x 680 x 88	440 x 680 x 132
Input/output connection	Hardwire	
External battery connection	Plug-in and play	
Net weight (kg)	24	45
Environment		
Operating temperature	0°C – 40°C	
Altitude	0–1000 m without derating	
Humidity	20–95% non-condensing	
Environment – heat dissipation (approx)	<450 W	<650 W
Noise at 1 metre	≤55 dBA	
Computer interface		
Interface type	Standard RS232/EPO interface/USB	
Communication slots	2nd RS232, USB, relay contact, SNMP/WEB card	

Continued overleaf

Safety conformance

Quality assurance	ISO 9001:2000
Safety standard	EN62040-1-1, UL1778
EMC standard	EN 62040-2, EN 61000-3-2, EN61000 -3-3 FCC Part 15 class A
Certification protection class	CE (1P/1P), CTUVus (3P/1P)
Protection class	IP20

Battery bank

Model	Battery type	Maximum quantity	With batteries (Kg)	Dimension (W x H x D) mm
PWBAT-9-20	9AH	20 pcs	65.4	440 x 132 x 680 (3u)

See page 18 for full product overview.

PowerWAVE 3000/TP

General data	10 kVA	10 kVA (5 min)	10 kVA (16 min)	20 kVA	20 kVA (5 min)
Topology	True online double conversion			True online double conversion	
Parallel configuration	Up to 4 units				
Inbuilt batteries	No	Yes	Yes	No	Yes
Input					
Nominal input voltage	1ph + N: 220 / 230 / 240 VAC 3ph + N: 380 / 400 / 415 VAC				
Input voltage tolerance	1ph -230 V: -23%, +15%, 3ph -400 V: -23%, +15%				
Input current THD	< 5% linear load, < 7% non-linear load				
Frequency range	45–55 Hz for 50 Hz systems / 55–65 Hz for 60 Hz system				
Power factor	0.99				
Output					
Output rated power [W]	9 kW			18 kW	
Output power factor	0.9			0.9	
Rated output voltage	220 / 230 / 240 VAC				
Voltage tolerance	± 2%				
Voltage distortion	2 % linear load, 5 % non-linear load				
Overload capability (linear load)	5 min: 105 % ~ 110 %, 1 min: 110% ~ 130 %, 10 s: 130 % ~ 150 %, 25 ms: > 150 %				
Nominal frequency	50 or 60 Hz ± 0.1 Hz				
Crest factor	3:1				
Efficiency					
Overall efficiency	Up to 93.6%				
In eco-mode configuration	Up to 97%				
Environment					
Protection rating	IP 20				
Storage temperature	-15 – +60°C for UPS, 0–35°C for battery				
Operating temperature	0–40°C				
Relative humidity	0–95 % (non-condensing)				
Altitude (above sea level)	1000 m without de-rating				
Batteries					
Type	VRLA, vented lead-acid				
Inbuilt batteries	-	1x 24	2 x 24	-	2 x 24
Battery capacity	-	9 Ah	9 Ah	-	9 Ah
Charging current	4 A	4 A	4 A	4 A	4 A
Recharge time	-	3 h to 90%	up to 8 h to 90%	-	8 h to 90%
Communications					
User interface	LCD display				
Communication cards (option)	Network interface (SNMP card), dry-contact card (AS400)				
Standards					
Safety	IEC / EN 62040-1				
EMC	IEC / EN 62040				
Performance	IEC / EN 62040-3				
Manufacturing	ISO 9001, ISO 14001				
Weight /Dimensions					
Weight	56 kg	117 kg	177 kg	66 kg	187 kg
Dimensions (mm) W x D x H	350 x 712 x 890				

See page 22 for full product overview.

PowerWAVE 5000/TP

General data	10 kVA	15 kVA	20 kVA	25 kVA	30 kVA	40 kVA	50 kVA
Topology	True online double conversion						
Parallel configuration	Up to 20 units						
Integral batteries	Yes						
Input							
Nominal input voltage	3 x 380 / 220 V + N, 3 x 400 V / 230 V + N, 3 x 415 / 240 V + N						
Voltage tolerance	(-23%/+15%) 3 x 308/177 V to 3 x 460/264 V for <100% load						
Input distortion THDi	3.0% @ 100% load						
Frequency range	35–70 Hz						
Power factor	0.99 @ 100% load						
Output							
Output rated power	9 kW	13.5 kW	18 kW	22.5 kW	27 kW	36 kW	45 kW
Output power factor	0.9						
Rated output voltage	3 x 380 / 220 V + N, 3 x 400 / 230 V + N, 3 x 415 / 240 V + N						
Voltage tolerance	1% static, 4% dynamic						
Voltage distortion	< 2% with linear load, < 4% with non-linear load						
Overload capability (0.9 p.f)	10 min: 110% load, 1 min: 130% load						
Nominal frequency	50 or 60 Hz						
Crest factor	3:1						
Efficiency							
Overall efficiency	Up to 95.5%						
In eco mode configuration	Up to 98%						
Environment							
Protection rating	IP 20 (IP 21 option)						
Operating temperature	0°C–40°C						
Positional clearances	Front: 900 mm minimum						
	Left: 600 mm minimum						
	Right: 600 mm minimum						
	Rear: 200 mm minimum for cooling, 600 mm minimum for service						
Input & output power cabling accessibility	Cabled at the rear (A and B cabinets only)				–		
	–			Cabled at the front (C cabinets only)			
Relative air humidity	Up to 95% (non condensing)						
Batteries							
Min/max number of 12V blocks per string	22–50	32–50	32–50	40–50	24–50	32–50	40–50
Charging current	4 A				6 A		
Battery type	Maintenance free VRLA or NiCd						
Standards							
Safety	IEC/EN 62040-1-1:2003, IEC/EN 60950-1:2001/A11:2004						
EMC	IEC/EN 62040-2:2005, IEC/EN61000-3-2:2000, IEC/EN61000-6-2:2001						
Performance	IEC/EN62040-3:2001						

See page 28 for full product overview.

PowerWAVE 6000 / PowerWAVE 6000 S3

General data	60 kVA	80 kVA	100 kVA	120 kVA	160 kVA	200 kVA	250 kVA	300 kVA	400 kVA	500 kVA
Topology	True online double conversion									
Parallel configuration	Up to 10 units									
UPS type	Standalone									
Cable entry	Bottom front								Bottom front or top	
Input										
Nominal input voltage	3 × 380 / 220 V + N, 3 × 400 / 230 V + N, 3 × 415 / 240 V + N									
Voltage tolerance (ref. to 3 × 400 / 230 V)	For loads < 100% (-23%, +15%), < 80% (-30%, +15%), < 60% (-40%, +15%)									
Input distortion THDi	≤ 3.5% at 100%									
Frequency	35–70 Hz									
Power factor	0.99 at 100% load									
Output										
Output power max.	60 kW	80 kW	100 kW	120 kW	160 kW	200 kW	250 kW	300 kW	400 kW	500 kW
Output power factor	1.0									
Rated output voltage	3 × 380 / 220 V + N, 3 × 400 / 230 V + N, 3 × 415 / 240 V + N									
Voltage distortion	< 2%									
Frequency	50 or 60 Hz									
Overload capability	10 min.: up to 125 % or 1 min.: up to 150%									
Unbalanced load	100% possible									
Crest factor	3:1									
Efficiency										
Overall efficiency	Up to 96%									
In eco-mode configuration	≥ 99%				98%					
Environment										
Storage temperature	-25–70 °C									
Operating temperature	0–40 °C									
Altitude configuration	1000 m without derating									
Battery										
Battery type	Maintenance-free VRLA or NiCd									
Communications										
Graphical display	Optional							Yes		
Standards										
Safety	IEC / EN 62040-1									
Electromagnetic compatibility (EMC)	IEC / EN 62040-2									
Performance	IEC / EN 62040-3									
Product certification	CE									
Protection rating	IP 20									
Manufacturing	ISO 9001, ISO 14001									
Weight/Dimensions for PowerWAVE 6000 S3 60–120 kVA										
Weight (without batteries)	230 kg	240 kg	245 kg	280 kg						
Dimensions (mm) W x D x H	615 x 480 x 1945			850 x 750 x 1820						
Weight/Dimensions for PowerWAVE 6000 160–500 kVA										
Weight (without batteries)					290 kg	310 kg	390 kg	410 kg	950 kg	1000 kg
Dimensions (mm) W x D x H					850 x 750 x 1820		1100 x 750 x 1920		1650 x 850 x 1994	

See page 32 for full product overview.

PowerWAVE 8000DPA ST

General data	ST40	ST60	ST80	ST120	ST200
System power range	10–400 kVA/kW				
Max power per module	10–20 kVA/kW				
Max power per frame	40 kVA/kW	60 kVA/kW	80 kVA/kW	120 kVA/kW	200 kVA/kW
Number of UPS modules per cabinet	1 to 2	1 to 3	1 to 4	1 to 6	1 to 10
Max. number of inbuilt batteries (7/9 Ah)	80	240	–	–	–
Topology	Online double conversion				
Maximum number of parallel cabinets	4			3	2
UPS type	Modular (Decentralised Parallel Architecture)				
Input					
Nominal input voltage	3 × 380 / 220 V + N, 3 × 400 / 230 V + N, 3 × 415 / 240 V + N				
Voltage tolerance (referred to 3 × 400 / 230 V)	For loads <100% (-23%, +15%), <80% (-30%, +15%), <60% (-40%, +15%)				
Input distortion THDi @ 100% load	<4% (10 kW module), <3% (20 kW module),				
Frequency	35 –70 Hz				
Power factor	0.99 @ 100% load				
Output					
Output power factor	1.0				
Rated output voltage	3 × 380 / 220 V + N, 3 × 400 / 230 V + N, 3 × 415 / 240 V + N				
Voltage distortion (referred to 3 × 400 / 230 V)	<1.5% linear load				
Frequency	50 Hz or 60 Hz				
Overload capability	1 min.: up to 150% / 10 min.: up to 125%				
Unbalanced load	100% (all three phases regulated independently)				
Crest factor	3:1 (load supported)				
Efficiency					
Overall efficiency	Up to 95.5%				
In eco-mode configuration	98%				
Environment					
Storage temperature	-25 °C to +70°C (cabinet), -20°C to +40°C (batteries)				
Operating temperature	0 °C to +40°C				
Altitude configuration	1000 m without derating				
Communications					
LCD	Yes (per module); system display optional (graphical touch screen display)				
LEDs	LED for notification and alarm				
Communication ports	USB, RS-232, SNMP slot, potential-free contacts				
Standards					
Safety	IEC / EN 62040-1				
Electromagnetic compatibility (EMC)	IEC / EN 62040-2				
Performance	IEC / EN 62040-3				
Product certification	CE				
Manufacturing	ISO 9001, ISO 14001, OHSAS18001				
Degree of protection	IP20				
Weight/Dimensions					
Weight (with modules/without batteries)	Up to 136 kg	Up to 238 kg	Up to 169 kg	Up to 263 kg	Up to 389 kg
Dimensions (mm) W x D x H	550 x 770 x 1135	550 x 770 x 1975	550 x 770 x 1135	550 x 770 x 1975	550 x 770 x 1975

See page 36 for full product overview.

PowerWAVE 8000DPA RI

General data	RI10	RI11	RI12	RI20	RI22	RI24	RI40
Max power per module	10–20 kVA/kW						
Max power per frame	20 kVA/kW	20 kVA/kW	20 kVA/kW	40 kVA/kW	40 kVA/kW	40 kVA/kW	80 kVA/kW
UPS modules	1	1	1	1 to 2	1 to 2	1 to 2	1 to 4
Maximum number of inbuilt batteries (7/9 Ah)	–	40	80	–	80	160	–
Output power factor	1.0						
Topology	Online double conversion						
UPS type	Modular (Decentralised Parallel Architecture)						
Input							
Nominal input voltage	3 × 380 / 220 V + N, 3 × 400 / 230 V + N, 3 × 415 / 240 V + N						
Voltage tolerance (referred to 3 × 400 / 230 V)	For loads <100% (-25%, +15%), <80% (-30%, +15%), <60% (-40%, +15%)						
Input distortion THDi	≤3%						
Frequency	35–70 Hz						
Power factor	0.99						
Output							
Rated output voltage	3 × 380 / 220 V + N, 3 × 400 / 230 V + N, 3 × 415 / 240 V + N						
Voltage distortion	<1.5% linear load						
Frequency	50 Hz or 60 Hz						
Overload capability	1 min.: 150% / 10 min.: 125%						
Unbalanced load	100% (all three phases regulated independently)						
Crest factor	3:1 (load supported)						
Efficiency							
Overall efficiency	Up to 95.5%						
In eco-mode configuration	98%						
Environment							
Storage temperature	-25°C to +70°C (cabinet)/-20°C to +40°C (batteries)						
Operating temperature	0°C to +40°C						
Altitude configuration	1000 m without derating						
Communications							
LCD	Yes (per module)						
LEDs	LED for notification and alarm						
Communication ports	USB, RS-232, SNMP slot, potential-free contacts						
Standards							
Safety	IEC / EN 62040-1						
Electromagnetic compatibility (EMC)	IEC / EN 62040-2						
Performance	IEC / EN 62040-3						
Product certification	CE						
Manufacturing	ISO 9001, ISO 14001, OHSAS18001						
Weight/Dimensions							
Weight (with modules/without batteries)	Up to 39 kg	Up to 62 kg	Up to 78 kg	Up to 68 kg	Up to 109 kg	Up to 136 kg	Up to 136 kg
Dimensions (mm) W x D x H	448 x 735 x 310 (7 HU)	448 x 735 x 487 (11 HU)	448 x 735 x 665 (15 HU)	448 x 735 x 440 (10 HU)	448 x 735 x 798 (18 HU)	448 x 735 x 1153 (26 HU)	448 x 735 x 798 (18 HU)

See page 36 for full product overview.

PowerWAVE 9000DPA

General data

System power range	30–1500 kVA
Max power per module	30 kVA / 40 kVA / 50 kVA
Max power per frame	250 kVA
Number of UPS modules in each frame	1 to 5
Weight (with modules/without batteries)	421–439 kg
Dimensions (mm) W x D x H	730 x 1975 x 800
Topology	Online double conversion
Parallel configuration	Up to 30 modules
UPS type	Modular (Decentralised Parallel Architecture)

Input

Nominal input voltage	3 x 380 / 220 V + N, 3 x 400 / 230 V + N, 3 x 415 / 240 V + N
Voltage tolerance (referred to 3 x 400 / 230 V)	For loads <100% (-25%, +15%), <80% (-30%, +15%), <60% (-40%, +15%)
Input distortion THDi	<3% @ 100% load
Frequency	30–70 Hz
Power factor @ 100% load	0.99

Output

Output power factor	0.8
Rated output voltage	3 x 380 / 220 V + N, 3 x 400 / 230 V + N, 3 x 415 / 240 V + N
Voltage distortion (referred to 3 x 400 / 230 V)	<±2% with linear load
Frequency	50 Hz or 60 Hz
Overload capability	1 min.: up to 150% / 10 min.: up to 125%
Unbalanced load	100% (all three phases regulated independently)
Crest factor	3 : 1 (load supported)

Efficiency

Overall efficiency	Up to 95.5%
In eco-mode configuration	99%

Environment

Storage temperature	-25°C to +70°C
Operating temperature	0°C to +40°C
Altitude	1000 m without derating

Battery

Battery capacity	Configurable up to several hours
Internal batteries	240 x 7/9 Ah (150 frame) / External batteries only (250 frame)

Communications

LCD	Yes (per module)
LEDs	LED for notification and alarm
Communication ports U	SB, RS-232, SNMP slot, potential-free contacts

Standards

Safety	IEC / EN 62040-1
Electromagnetic compatibility (EMC)	IEC / EN 62040-2
Performance	IEC / EN 62040-3
Manufacturing	ISO 9001, ISO 14001, OHSAS18001
Product certification	CE
IP rating	IP 20

See page 42 for full product overview.

PowerWAVE 9250DPA

General data

System power range	50–1,500 kVA
Nominal power per module	50 kW
Nominal power / frame	300 kW or 250kW (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	Front access
Back-feed protection	Built-in as standard
Input	
Nominal input voltage	380/400/415 VAC
Voltage tolerance % (applicable for 400 V nominal voltage)	Load ≤ 100% (-10%, +15%) Load ≤ 80% (-20%, +15%) Load ≤ 60% (-30%, +15%)
Current distortion THDi	<3%
Frequency range	35–70 Hz
Power factor	0.99
Walk in/soft start	Yes
Output	
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)
Output power factor	1.0
Efficiency	
Module efficiency	Up to 97.6%
Overall system efficiency	Up to 97.4%
In eco-mode	Up to 99%

See page 48 for full product overview.

Environment	
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
Batteries	
Types	VRLA, open cells, NiCd and Li-Ion
Battery charger	Decentralised charger per module
Communications	
User interface	Graphical touch screen (one per frame as standard) Decentralised 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
Compliance	
Safety	IEC / EN 62040-1
EMC	IEC / EN 62040-2
Performance	IEC / EN 62040-3
Manufacturing	ISO 9001:2015, ISO 14001:2015, OHSAS18001
Weight/Dimensions	
Weight (without modules/ without batteries)	270 kg
Weight (per module)	66 kg
Dimensions (mm) W x D x H	795 x 943 x 1978

PowerWAVE 9500DPA

General data

System power range	100 kVA/kW – 3 MVA/MW
Max power per module	100 kVA/kW
Max power per frame	500 kVA/kW
Topology	Double conversion, transformer-free, modular, Decentralised Parallel Architecture
Parallel configuration	Up to 5 modules in one frame (500 kW) / up to 6 frames in parallel (3 MW)
Cable entry	Bottom or top as standard
Serviceability	Fully front serviceable
Back-feed protection	Built-in as standard

Input

Nominal input voltage	3 x 380 / 220 V + N, 3 x 400 / 230 V + N, 3 x 415 / 240 V + N
Voltage tolerance	308–460 V (-10 – +15%) < 100% load (-20 – +15%) < 80% load, (-34 – +15%) < 60% load
Input distortion THDi	< 3.5% at 100% load
Frequency range	45–70 Hz
Power factor	0.99 @ 100% load
Walk in/Soft start	Yes

Output

Output power factor	1.0
Rated output voltage	3 x 380 / 220 V + N, 3 x 400 / 230 V + N, 3 x 415 / 240 V + N
Output voltage variation	< +/-1.5
Voltage distortion	< 2% with linear load < 4% with non-linear load
Frequency	50 or 60 Hz (selectable)

Efficiency

Overall efficiency	Up to 95.8%
In eco-mode	≥ 99%

Environment

Protection rating	IP 20
Storage temperature	-25° – +70°
Operating temperature	0° – +40°C
Altitude (above sea level)	1000 m without de-rating

Batteries

Number of 12V blocks / string	Flexible number from 40–50 blocks
Types	VRLA, vented lead-acid, NiCd, Lithium-Ion
Battery charger	Decentralised charger per module

Communications

User interface	Graphical touch screen (one per frame as standard) Decentralised LCD + mimic diagram (one per module as standard)
Communication ports	USB, RS-232, voltage-free contacts, SNMP (optional)
Customer interface	Remote shutdown, gen-set interface, external bypass contact

Compliance

Safety	IEC / EN 62040-1
EMC	IEC / EN 62040-2
Performance	IEC / EN 62040-3
Manufacturing	ISO 9001, ISO 14001

Weight/Dimensions

Weight	Approx. 975 kg (500 kW system without batteries)
Dimensions (mm) W x D x H	1580 x 940 x 1975

See page 54 for full product overview.

Lithium-ion batteries

UPS lithium-ion battery system

General data

Nominal energy (kWh)	34.6
Capacity (Ah)	67
Open circuit voltage (V)	516.8
Number of modules	17
Operating temperature (recommended)	0 +40°C / (25°C)
Maximum cell temperature	67°C
Minimum discharge	470A (60 sec) 600A (1 sec)
Communication	RS485-TCP/IP – dry contact

Product compatibility

PowerWAVE 9250DPA	Yes
PowerWAVE 9500DPA	Yes
MNS-UP	Yes

Batteries

Type	Li-Ion
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Weight

Weight with batteries (kg)	550
Module weight (kg)	17

Dimensions

Dimensions WxDxH (mm)	600 x 650 x 2055
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See page 60 for full product overview.

PowerWAVE Generators

Canopied units

T Series generating sets from 8.6–12 kVA (single-phase) or 11.5–16 kVA (three-phase) with weatherproof/acoustic enclosure

Single-phase (230 V) Mitsubishi engine	Standby rating kVA (0.8pf)	Prime rating (kVA @ 0.8pf)	Base tank options	Dimensions L x W x H (mm)	Dry weight (kg)	Run time @ 100% prime load (hours)	Run time @ 75% prime load (hours)	Enclosure reference	Acoustic pressure level dB(A) @ 1 m
T9KM	8.6	7.8	Standard day tank (50L)	1750 x 775 x 1230	544	16	20	M126	71
			DW24 tank option (93L)	1797 x 775 x 1391	625	30	37	M126 DW	71
T12KM	12	10.9	Standard day tank (50L)	1750 x 775 x 1230	630	11	14.5	M126	72
			DW24 tank option (93L)	1797 x 775 x 1391	668	21	27	M126 DW	71
Three-phase (400/230 V)	Standby rating kVA (0.8pf)	Prime rating (kVA @ 0.8pf)	Base tank options	Dimensions L x W x H (mm)	Dry weight (kg)	Run time @ 100% prime load (hours)	Run time @ 75% prime load (hours)	Enclosure reference	Acoustic pressure level dB(A) @ 1 m
T12K	11.5	10.5	Standard day tank (50L)	1750 x 775 x 1230	530	16	20	M126	71
			DW24 tank option (93L)	1797 x 775 x 1391	615	30	37	M126 DW	71
T16K	16	14.5	Standard day tank (50L)	1750 x 775 x 1230	554	11	14.5	M126	72
			DW24 tank option (93L)	1797 x 775 x 1391	633	21	27	M126 DW	71

V Series generating sets from 275 kVA to 700 kVA with weatherproof/acoustic enclosure

Three-phase (400/230 V) Volvo engine	Standby rating kVA (0.8pf)	Prime rating (kVA @ 0.8pf)	Base tank options	Dimensions L x W x H (mm) *includes additional 300 mm for bund	Dry weight (kg)	Run time @ 100% prime load (hours)	Run time @ 75% prime load (hours)	Enclosure reference	Acoustic pressure level dB(A) @ 1 m
V275C2	275	250	Standard day tank (390L)	4004 x 1380 x 2445*	3130	7	9	M227	78
			DW24 tank option (950L)	4056 x 1380 x 2340	3850	17.5	22	M227 DW	77
V350C2	350	318	Standard day tank (470L)	4475 x 1410 x 2430	4035	7	9.5	M228	77
			DW24 tank option (1368L)	4527 x 1410 x 2700	4558	21.5	28	M228 DW	80
V400C2	390	355	Standard day tank (470L)	4475 x 1410 x 2730*	4082	6.5	8.5	M228	77
			DW24 tank option (1368L)	4527 x 1410 x 2700	4612	19	25.5	M228 DW	80
V440C2	440	400	Standard day tank (470L)	4475 x 1410 x 2730*	4080	5.5	7	M228	78
			DW24 tank option (1368L)	4527 x 1410 x 2700	4740	16	21.5	M228 DW	81
V500C2	500	455	Standard day tank (470L)	4475 x 1410 x 2730*	4360	5	6.5	M228	78
			DW24 tank option (1368L)	4527 x 1410 x 2700	4910	14.5	19.5	M228 DW	81
V550C2	550	500	Standard day tank (500L)	5031 x 1560 x 2735*	4870	4.5	6.5	M229	76
			DW24 tank option (1770L)	5083 x 1560 x 2700	5590	17	23.5	M229 DW	76
V650C2	650	591	Standard day tank (610L)	5031 x 1690 x 2972*	5300	5	7	M230	80
			DW24 tank option (1950L)	5083 x 1690 x 2932	5910	16.5	22.5	M230 DW	80
V700C2	700	650	Standard day tank (610L)	5031 x 1690 x 2972*	5410	4.5	6	M230	85
			DW24 tank option (1950L)	5083 x 1690 x 2932	6140	13.5	18.5	M230 DW	85

Based on manufacturer's information; may be subject to change.

See page 64 for full product overview.

K Series generating sets from 6–26 kVA (single-phase) or 9–44 kVA (three-phase) with weatherproof/acoustic enclosure

Single-phase (230 V) Kohler Engine	Standby rating kVA (0.8pf)	Prime rating (kVA @ 0.8pf)	Base tank options	Dimensions L x W x H (mm)	Dry weight (kg)	Run time @ 100% prime load (hours)	Run time @ 75% prime load (hours)	Enclosure reference	Acoustic pressure level dB(A) @ 1 m
K6M	6.4	5.8	Standard day tank (50L)	1482 x 760 x 1030	390	20	26	M125	67
K10M	9	8.2	Standard day tank (50L)	1750 x 775 x 1230	520	15	20	M126	67
			DW24 tank option (93L)	1797 x 775 x 1391	670	28	37	M126 DW	66
K12M	11.8	10.7	Standard day tank (50L)	1750 x 775 x 1230	610	10	13.5	M126	74
			DW24 tank option (93L)	1797 x 775 x 1391	760	18.5	25	M126 DW	74
K17M	15.5	14.1	Standard day tank (50L)	1750 x 775 x 1230	700	11	15	M126	71
			DW24 tank option (93L)	1797 x 775 x 1391	850	20.5	28	M126 DW	71
K26M	26	23.6	Standard day tank (100L)	2100 x 938 x 1285	809	13	17.5	M137	76
			DW24 tank option (240L)	2100 x 932 x 1486	1018	32	42	M137 DW24	75
			DW48 tank option (470L)	2100 x 932 x 1539	1025	62.5	82	M137 DW48	75
Three-phase (400/230 V) Kohler engine	Standby rating kVA (0.8pf)	Prime rating (kVA @ 0.8pf)	Base tank options	Dimensions L x W x H (mm)	Dry weight (kg)	Run time @ 100% prime load (hours)	Run time @ 75% prime load (hours)	Enclosure reference	Acoustic pressure level dB(A) @ 1 m
K9	8.9	8.1	Standard day tank (50L)	1482 x 760 x 1030	390	20	26	M125	67
K12	12	10.9	Standard day tank (50L)	1750 x 775 x 1230	510	15	20	M126	67
			DW24 tank option (93L)	1797 x 775 x 1391	660	28	37	M126 DW	66
K16	16.5	15	Standard day tank (50L)	1750 x 775 x 1230	580	10	13.5	M126	74
			DW24 tank option (93L)	1797 x 775 x 1391	730	18.5	25	M126 DW	74
K22	21.5	19.5	Standard day tank (50L)	1750 x 775 x 1230	660	11	15	M126	71
			DW24 tank option (93L)	1797 x 775 x 1391	800	20.5	58	M126 DW	71
K27	26.5	24.1	Standard day tank (50L)	1750 x 775 x 1230	710	8	11	M126	76
			DW24 tank option (93L)	1797 x 775 x 1391	860	15.5	21	M126 DW	76
K33	33	30	Standard day tank (100L)	2100 x 938 x 1285	773	13	17.5	M137	76
			DW24 tank option (240L)	2100 x 932 x 1486	982	32	42	M137 DW	75
			DW48 tank option (470L)	2100 x 932 x 1539	989	62.5	82	M137 DW48	75
K44	44	40	Standard day tank (100L)	2100 x 938 x 1285	806	10.5	14	M137	76
			DW24 tank option (240L)	2100 x 932 x 1486	1015	25.5	33.5	M137 DW	76
			DW48 tank option (470L)	2100 x 932 x 1539	1022	50	66	M137 DW48	75

J Series generating sets from 22–250 kVA with weatherproof/acoustic enclosure

Three-phase (400/230 V) John Deere Engine	Standby rating (kVA @ 0.8pf)	Prime rating (kVA @ 0.8pf)	Base tank options	Dimensions L x W x H (mm) *includes additional 300 mm for bund	Dry weight (kg)	Run time @ 100% prime load (hours)	Run time @ 75% prime load (hours)	Enclosure reference	Acoustic pressure level dB(A) @ 1 m
J22	22	20	Standard day tank (100L)	2080 x 960 x 1415	980	14	20	M127	75
			DW24 tank option (230L)	2160 x 966 x 1582	1160	32.5	46	M127 DW	74
			DW48 tank option (420L)	2160 x 966 x 1631	1124	60	84	M127 DW48	74
J33	33	30	Standard day tank (100L)	2080 x 960 x 1415	980	14	20	M127	75
			DW24 tank option (230L)	2160 x 966 x 1582	1160	32.5	46	M127 DW	74
			DW48 tank option (420L)	2160 x 966 x 1631	1165	60	84	M127 DW48	74
J44K	44	40	Standard day tank (100L)	2080 x 960 x 1415	1040	10	13	M127	74
			DW24 tank option (230L)	2160 x 966 x 1582	1227	23	30.5	M127 DW	74
			DW48 tank option (420L)	2160 x 966 x 1631	1215	42.5	56	M127 DW48	74
J66K	66	60	Standard day tank (180L)	2300 x 1060 x 1680	1432	11	15	M128	73
			DW24 tank option (390L)	2344 x 1060 x 1900	1679	24	32.5	M128 DW	72
			DW48 tank option (700L)	2344 x 1060 x 1989	1709	43.5	58	M128 DW48	72
J77K	77	70	Standard day tank (180L)	2300 x 1060 x 1680	1548	11	15	M128	74
			DW24 tank option (390L)	2344 x 1060 x 1900	1735	24	32.5	M128 DW	73
			DW48 tank option (700L)	2344 x 1060 x 1989	1765	43.5	58	M128 DW48	73
J88K	88	80	Standard day tank (180L)	2300 x 1060 x 1680	1508	9	12.5	M128	76
			DW24 tank option (390L)	2344 x 1060 x 1900	1695	20	27.5	M128 DW	75
			DW48 tank option (700L)	2344 x 1060 x 1989	1725	35.5	50	M128 DW48	75
J110K	110	100	Standard day tank (190L)	2554 x 1150 x 1680	1587	8	11.5	M129	78
			DW24 tank option (505L)	2602 x 1150 x 1900	2006	21	30.5	M129 DW	77
			DW48 tank option (825L)	2602 x 1150 x 1948	2012	35	50	M129 DW48	77
J130K	132	120	Standard day tank (340L)	3508 x 1200x 2130*	2088	13	18	M226	75
			DW24 tank option (868L)	3560 x 1200 x 2182	2488	33	46.5	M226 DW	74
			DW48 tank option (1630L)	3560 x 1200 x 2364	2656	62.5	88	M226 DW48	74
J165K	165	150	Standard day tank (340L)	3508 x 1200x 2130*	2168	10	13.5	M226	75
			DW24 tank option (868L)	3560 x 1200 x 2182	2561	25.5	34.5	M226DW	74
			DW48 tank option (1630L)	3560 x 1200 x 2364	2816	48.5	65	M226 DW48	74
J200K	200	182	Standard day tank (340L)	3508 x 1200x 2130*	2320	8	10.5	M226	76
			DW24 tank option (868L)	3560 x 1200 x 2182	2713	21	27.5	M226DW	76
			DW48 tank option (1630L)	3560 x 1200 x 2364	2978	39.5	52	M226 DW48	76
J220C2	220	200	Standard day tank (340L)	3508 x 1200x 2130*	2366	7.5	10	M226	77
			DW24 tank option (868L)	3560 x 1200 x 2182	2736	19	25.5	M226DW	77
			DW48 tank option (1630L)	3560 x 1200 x 2364	2994	36	47.5	M226 DW48	77
J250K	250	227	Standard day tank (340L)	3508 x 1200x 2130*	2400	7	9	M226	82
			DW24 tank option (868L)	3560 x 1200 x 2182	2740	18	24	M226DW	82
			DW48 tank option (1630L)	3560 x 1200 x 2364	2800	34.5	45	M226 DW48	82

Based on manufacturer's information; may be subject to change.

D Series generating sets from 275–830 kVA with weatherproof/acoustic enclosure

Three-phase (400/230 V) Doosan engine	Standby rating (kVA @ 0.8pf)	Prime rating (kVA @ 0.8pf)	Base tank options	Dimensions L x W x H (mm) *includes additional 300 mm for bund	Dry weight (kg)	Run time @ 100% prime load (hours)	Run time @ 75% prime load (hours)	Enclosure reference	Acoustic pressure level dB(A) @ 1 m
D275	275	250	Standard day tank (390L)	4004 x 1380 x 2445*	3160	6.5	8.9	M227	83
			DW24 tank option (950L)	4056 x 1380 x 2340	3600	16	21.5	M227 DW	83
			DW48 tank option (2130L)	4056 x 1380 x 2618	3960	36.5	48.5	M227 DW24	83
D300	300	273	Standard day tank (390L)	4004 x 1380 x 2445*	3250	6.5	8.9	M227	83
			DW24 tank option (950L)	4056 x 1380 x 2340	3690	16	21.5	M227 DW	83
			DW48 tank option (2130L)	4056 x 1380 x 2618	4050	36.5	48.5	M227 DW24	83
D330	330	300	Standard day tank (470L)	4475 x 1410 x 2730*	3540	7	10	M228	81
			DW24 tank option (1368L)	4527 x 1410 x 2700	4060	21.5	29	M228 DW	81
D440	440	400	Standard day tank (500L)	5031 x 1560 x 2735*	4090	5.5	7.5	M229	85
			DW24 tank option (1770L)	5083 x 1560 x 2700	4750	19.5	27	M229 DW	85
D550	550	500	Standard day tank (500L)	5031 x 1560 x 2735*	4262	4	6	M229	84
			DW24 tank option (1770L)	5083 x 1560 x 2700	5044	15	21	M229 DW	84
D630	630	573	Standard day tank (610L)	5031 x 1690 x 2972*	5381	4.5	6	M230	88
			DW24 tank option (1950L)	5083 x 1690 x 2932	6099	15.5	20.5	M230 DW	88
D700	694	634	Standard day tank (610L)	5031 x 1690 x 2972*	5381	4	5.5	M230	88
			DW24 tank option (1950L)	5083 x 1690 x 2932	6099	14	18.5	M230 DW	88
D830	825	750	Standard day tank (610L)	5031 x 1690 x 2972*	5670	3.5	5	M230	88
			DW24 tank option (1950L)	5083 x 1690 x 2932	6370	12	16	M230 DW	88

Based on manufacturer's information; may be subject to change.

Open units

T Series generating sets from 8.6–12 kVA (single-phase) or 11.5–16 kVA (three-phase)

Single-phase (230 V) Mitsubishi engine	Standby rating (kVA @ 0.8pf)	Prime rating (kVA @ 0.8pf)	Base tank options	Dimensions L x W x H (mm)	Dry weight (kg)	Run time @ 100% prime load (hours)	Run time @ 75% prime load (hours)
T9KM	8.6	7.8	Standard day tank (50L)	1405 x 715 x 1053	396	16	20
T12KM	12	10.9	Standard day tank (50L)	1405 x 715 x 1053	406	11	14.5
Three-phase (400/230 V) Mitsubishi engine	Standby rating (kVA @ 0.8pf)	Prime rating (kVA @ 0.8pf)	Base tank options	Dimensions L x W x H (mm)	Dry weight (kg)	Run time @ 100% prime load (hours)	Run time @ 75% prime load (hours)
T12K	11.5	10.5	Standard day tank (50L)	1405 x 715 x 1053	387	16	20
T16K	16	14.5	Standard day tank (50L)	1405 x 715 x 1053	406	11	14.5

K Series generating sets from 6–26 kVA (single-phase) or 9–44 kVA (three-phase)

Single-phase (230 V) Kohler engine	Standby rating (kVA @ 0.8pf)	Prime rating (kVA @ 0.8pf)	Base tank options	Dimensions L x W x H (mm)	Dry weight (kg)	Run time @ 100% prime load (hours)	Run time @ 75% prime load (hours)
K6M	6.4	5.8	Standard day tank (50L)	1220 x 700 x 920	290	20	26
K10M	9	8.2	Standard day tank (50L)	1410 x 720 x 1020	350	15	20
K12M	11.8	10.7	Standard day tank (50L)	1410 x 720 x 1020	440	10	13.5
K17M	15.5	14.1	Standard day tank (50L)	1410 x 720 x 1080	530	11	15
K26M	26	23.6	Standard day tank (100L)	1700 x 896 x 1200	621	13	17.5
Three-phase (400/230 V) Kohler engine	Standby rating (kVA @ 0.8pf)	Prime rating (kVA @ 0.8pf)	Base tank options	Dimensions L x W x H (mm)	Dry weight (kg)	Run time @ 100% prime load (hours)	Run time @ 75% prime load (hours)
K9	8.9	8.1	Standard day tank (50L)	1220 x 700 x 920	290	20	26
K12	12	10.9	Standard day tank (50L)	1410 x 720 x 1020	340	15	20
K16	16.5	15	Standard day tank (50L)	1410 x 720 x 1020	410	10	13.5
K22	21.5	19.5	Standard day tank (50L)	1410 x 720 x 1080	490	11	15
K27	26.5	24.1	Standard day tank (50L)	1410 x 720 x 1080	540	8	11
K33	33	30	Standard day tank (100L)	1700 x 896 x 1200	585	13	17.5
K44	44	40	Standard day tank (100L)	1700 x 896 x 1200	618	10.5	14

Based on manufacturer's information; may be subject to change.

J Series generating sets from 22–250 kVA

Three-phase (400/230 V) John Deere engine	Standby rating (kVA @ 0.8pf)	Prime rating (kVA @ 0.8pf)	Base tank options	Dimensions L x W x H (mm) *includes additional 300 mm for bund	Dry weight (kg)	Run time @ 100% prime load (hours)	Run time @ 75% prime load (hours)
J22	22	20	Standard day tank (100L)	1700 x 896 x 1221	750	14	20
J33	33	30	Standard day tank (100L)	1700 x 896 x 1221	750	14	20
J44K	44	40	Standard day tank (100L)	1700 x 896 x 1221	820	10	13
J66K	66	60	Standard day tank (180L)	1870 x 994 x 1360	995	11	15
J77K	77	70	Standard day tank (180L)	1870 x 994 x 1360	1128	11	15
J88K	88	80	Standard day tank (180L)	1870 x 994 x 1360	1088	9	12.5
J110K	110	100	Standard day tank (190L)	1950 x 1084 x 1330	1187	8	11.5
J130K	132	120	Standard day tank (340L)	2370 x 1114 x 1780*	1498	13	18
J165K	165	150	Standard day tank (340L)	2370 x 1114 x 1780*	1578	10	13.5
J200K	200	182	Standard day tank (340L)	2370 x 1114 x 1780*	1716	8	10.5
J220C2	220	200	Standard day tank (340L)	2398 x 1114 x 1835*	1766	7.5	10
J250K	250	227	Standard day tank (340L)	2398 x 1114 x 1835*	1800	7	9

V Series generating sets from 275–700 kVA

Three-phase (400/230 V) Volvo engine	Standby rating (kVA @ 0.8pf)	Prime rating (kVA @ 0.8pf)	Base tank options	Dimensions L x W x H (mm) *includes additional 300 mm for bund	Dry weight (kg)	Run time @ 100% prime load (hours)	Run time @ 75% prime load (hours)
V275C2	275	250	Standard day tank (390L)	2900 x 1300 x 1890*	2200	7	9
V350C2	350	318	Standard day tank (470L)	3160 x 1340 x 2105*	3103	7	9.5
V400C2	390	355	Standard day tank (470L)	3160 x 1340 x 2105*	2972	6.5	8.5
V440C2	440	400	Standard day tank (470L)	3160 x 1340 x 2105*	3110	5.5	7
V500C2	500	455	Standard day tank (470L)	3160 x 1340 x 2105*	3250	5	6.5
V550C2	550	500	Standard day tank (500L)	3470 x 1500 x 2343*	3620	4.5	6.5
V650C2	650	591	Standard day tank (610L)	3470 x 1630 x 2395*	3780	5	7
V700C2	700	650	Standard day tank (610L)	3470 x 1630 x 2350*	4020	4.5	6

D Series generating sets from 275–830 kVA

Three-phase (400/230 V) Doosan engine	Standby rating (kVA @ 0.8pf)	Prime rating (kVA @ 0.8pf)	Base tank options	Dimensions L x W x H (mm) *includes additional 300 mm for bund	Dry weight (kg)	Run time @ 100% prime load (hours)	Run time @ 75% prime load (hours)
D275	275	250	Standard day tank (390L)	2900 x 1300 x 1970*	2310	6.5	8.9
D300	300	273	Standard day tank (390L)	2900 x 1300 x 1970*	2400	6.5	8.9
D330	330	300	Standard day tank (470L)	3160 x 1340 x 1892*	2440	7	10
D440	440	400	Standard day tank (500L)	3470 x 1500 x 2129*	2910	5.5	7.5
D550	550	500	Standard day tank (500L)	3470 x 1500 x 2115*	3220	4	6
D630	630	573	Standard day tank (610L)	3470 x 1630 x 2462*	3700	4.5	6
D700	694	634	Standard day tank (610L)	3470 x 1630 x 2462*	3700	4	5.5
D830	825	750	Standard day tank (610L)	3470 x 1630 x 2485*	4080	3.5	5

Based on manufacturer's information; may be subject to change.

PowerWAVE EL 100

Model	EL104	EL105	EL106	EL108	EL110	EL112
Power rating kVA/kW	4/2.8	5/3.5	6/4.2	8/5.6	10/7	12.5/8.75
Power factor	0.7					
Input						
Voltage/tolerance	230 VAC single phase, +/-15%					
Bypass voltage	230 VAC single phase					
Input frequency	50 Hz +/-5%					
Max RFI	EN50091-2 Class A					
Output						
Voltage	230 VAC single phase					
Voltage stability	Static (balanced load) +/-1%, static (unbalanced load) +/-2%, dynamic (step load 0–100%) +/-5%					
Voltage recovery time	After step load 0–100% max. 20 ms					
Frequency	50 Hz					
Frequency tolerance	Line synchronised +/-1% / free running +/-0.2%					
Efficiency at 100% load	>87–91%					
Crest factor	3:1					
Short circuit protection	Electronic short circuit					
Overload capacity	120% continuous, 120–150% load 10 min. 150–180% 1 min					
Total Harmonic Distortion (THD)	Linear load <3%					
Batteries						
Type	Sealed lead acid – maintenance free					
Number of 12 V blocks	16	18			20	
Float charging voltage	216 Vdc	243 Vdc			270 Vdc	
End of discharge voltage	160 Vdc	180 Vdc			200 Vdc	
Battery ambient temperature	20°C					
Battery protection	Circuit breaker					
Battery test	Automatic battery test once a week					
General						
Serial communication	Dry contacts plus RS232					
Software	T-Mon standard / SNMP module optional					
Protection degree	IP41					
Ambient operating temperature / altitude	0–40°C/<1000 m (above sea level)					
Standard	Emergency lighting EN 50171					
Ventilation	Forced air cooling					
Acoustic noise at 1 m distance	<56 dB					
Weight (kgs)	85	95	110	125	150	155
Dimensions (mm) W x D x H	570 x 370 x 1210					

See page 72 for full product overview.

PowerWAVE EL 100XA

Model	EL1005XA	EL1012XA	EL1030XA
Power rating VA/W	500/400	1250/1000	3000 /240
Power factor	0.8		
Input			
Voltage/tolerance	230 VAC single phase / 184V~285V		
Frequency	50 Hz +5%		
Max. RFI	EN50091-2 CLASSA		
Output			
Voltage	230 VAC Single phase		
Voltage stability	Changeover mode +10% / battery mode +3%		
Voltage recovery time	After step load 0–100%. Max. 20 ms.		
Frequency	50 Hz		
Frequency tolerance	±1% in battery mode		
Efficiency at 100% load	>97%		
Crest factor	3:1		
Short circuit protection	Electronic short circuit		
Overload capacity	120% continuous		
Batteries			
Type	Sealed lead acid – maintenance free		
Number of 12 V blocks (internal)	4	4	4 or 8
Float charging voltage	54 VDC	54 VDC	54 VDC
End of discharge voltage	42 VDC	42 VDC	42 VDC
Battery ambient temperature	20°C	20°C	20°C
Battery protection	Double pole DC circuit breaker		
Battery test	Automatic battery test/smart battery management		
General			
Serial communication	Dry contacts plus RS232		
Software	Optional monitoring and shutdown/optional SNMP module		
Protection degree	IP21		
Ambient operating temperature/ altitude	0–40°C/<1000 m above sea level		
Standard	Emergency lighting EN50171		
Ventilation	Forced air cooling		
Acoustic Noise at 1 m distance	<56 dB		
Dimensions (mm) W x D x H	750 x 250 x 850	750 x 250 x 1250	750 x 400 x 1250

See page 72 for full product overview.

PowerWAVE EL MOD

Model	ELMOD 11						ELMOD 31	
Power rating kVA	4	8	12	16	20	24	12	24
Mains input								
Input mode	1-phase +N +E						3-phase +N +E	
Input voltage	220 V / 230 V / 240 V ±25%							
Input frequency	50 Hz ± 10%, 60 Hz ± 1%							
Maximum input current	20 A	40 A	60 A	80 A	100 A	120 A	60 A	120 A
Power walk-in (seconds)	60 secs							
THDi (%)	< 3%							
Input PF	≥ 0.99							
Bypass input								
Input voltage	220 V / 230 V / 240 V ± 20%							
Input frequency	50 Hz, 60 Hz							
Range of frequency synchro	50 Hz ± 4%, 60 Hz ± 4%							
DC input								
Rated Input voltage	±240 VDC							
Max DC current	10 A	20 A	30 A	40 A	50 A	60 A	30 A	60 A
Battery charging								
Charging current limited	Yes							
Charging ability	12 hours (3 hours back-up)							
Stability of charging voltage	±1%							
AC output								
Output power factor	0.9							
Output voltage	220, 230, 240 VAC							
Output frequency	±4%; ±0.2% (battery supply)							
Output current	15.6 A	31.3 A	46.9 A	62.6 A	78.2 A	93.9 A	46.9 A	93.9 A
Output voltage stability	±1%							
Output voltage recovering time	20 ms (load 0–100% change)							
Overload ability	120% continuous, 150% for 10 minutes, 175% for 1 minute							
Transfer from mains to battery supply	0 ms							
Transfer from changeover to inverter supply	<1 ms							
Peak factor	3:1							
Waveform distortion	≤ 1% (linear load), ≤ 3%(non-linear load)							
Overall efficiency	≥ 93% inverter mode, ≥ 98% changeover mode							
Load share precision	≤5%							
Environment								
Operating temperature	-5°C–40°C							
Maximum operation altitude	≤ 1000 m							
Relative humidity	≤ 93% non-condensing							
Protection degree	IP30							
Cooling	Forced cooling front to back							
Applicable safety standards	EN62040-1-1:2003 IEC60950-1:2001 EN50171							
Electromagnetic compatibility	EN62040-2:2006							
Acoustic noise	≤ 55DB							
Other								
Interface	RS232, RS485, 4 dry contact, TCP/IP adapter							
Dry ports	Mains failure/common alarm/on battery/battery low							
Dimensions (mm) W x D x H	850 x 510 x 1340							

Model	ELM-04
Capacity	4 KVA
Input/Output mode	1/1
Input PF	≥ 0.99
THDi (%)	≤ 3%
Overload ability	Comply to system overload requirement
Charging power	1600 W
Weight (kg)	7

Heat dissipation at 100% load and fully charged battery

Configuration	1 Module	2 Modules	3 Modules	4 Modules	5 Modules	6 Modules
Changeover mode	120 W	240 W	360 W	480 W	600 W	720 W
Inverter mode	280 W	560 W	840 W	1120 W	1400 W	1680 W
Non-maintained mode	120 W	240 W	360 W	480 W	600 W	720 W

See page 72 for full product overview.

PowerWAVE EL 300 DSP

Model	EL310 DSP	EL320 DSP	EL330 DSP	EL340 DSP	EL360 DSP	EL380 DSP	EL3100 DSP	EL3120 DSP	EL3160 DSP	
Power rating kVA/kW	10/9	20/18	30/27	40/36	60/54	80/72	100/90	120/108	160/144	
Power factor	0.99									
General										
Serial communication	Dry contacts plus RS232									
Software	T-Mon standard/SNMP module optional									
Protection degree	IP41									
Ambient operating temperature / altitude	0–40°C / <1000 m (above sea level)									
Standard	Emergency lighting EN 50171									
Ventilation	Forced air cooling									
Relative humidity	10–90% (non-condensed)									
Acoustic noise at 1m distance	<62 dB				<64 dB		<68 dB			
Input										
Voltage / tolerance	380/400/415 VAC (3PH + N + PE)									
Bypass voltage	230/400 VAC three phase									
Input frequency	50 Hz +/-5%									
Max RFI	EN50091-2 Class A									
Harmonic distortion	<5% @ 100% load									
Output										
Voltage	230/400 VAC three phase									
Voltage stability	Static (balanced load) +/-1%, Static (unbalanced load) +/-2%, Dynamic (stop load 0-100%) +/-5%									
Voltage recovery time	After step load 0–100% max. 20 ms									
Frequency	50 Hz									
Frequency tolerance	Line synchronised +/-1% / free running +/-0.2%									
Efficiency at 100% load	>87–91%									
Crest factor	3:1									
Short circuit protection	Electronic short circuit									
Overload capacity	120% continuous, 120–150% load 10 min. 150–180% 1 min									
Total Harmonic Distortion (THD)	Linear load <3%									
Batteries										
Type	Sealed lead acid – maintenance free									
Number of 12 V blocks	30									
Float charging voltage	405									
End of discharge voltage	300 VDC									
Battery ambient temperature	20°C									
Battery protection	Circuit breaker									
Battery test	Automatic battery test once a week									
Weight/Dimensions										
Weight (kg) excluding batteries	91	100	173	197	209	220	232	265	482	
Dimensions (mm) W x D x H	400 x 815 x 1040				515 x 855 x 1440				880 x 775 x 1900	

See page 73 for full product overview.



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