

# 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 m<sup>2</sup> footprint

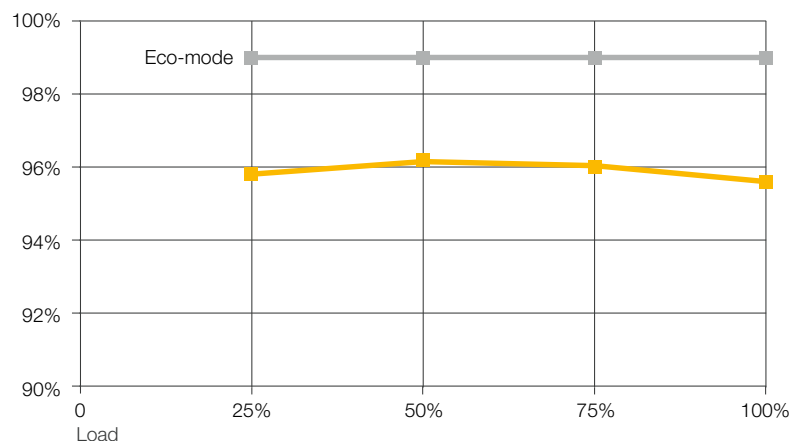
Weight (with 5 modules) 975 kg

### 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

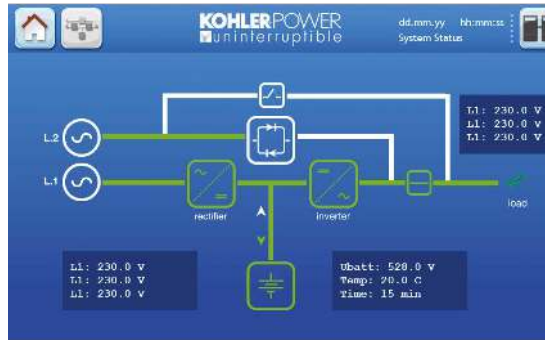
investment

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

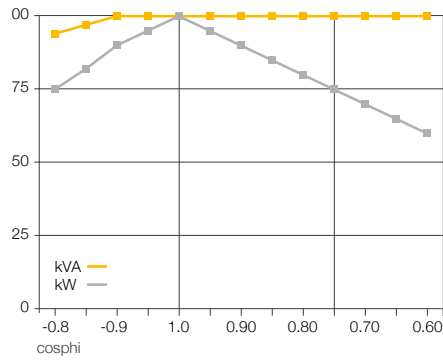
Vertical and horizontal scalability

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.

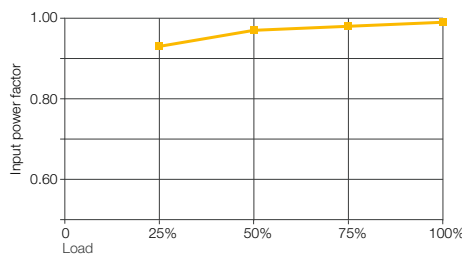
## Input and output characteristics

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

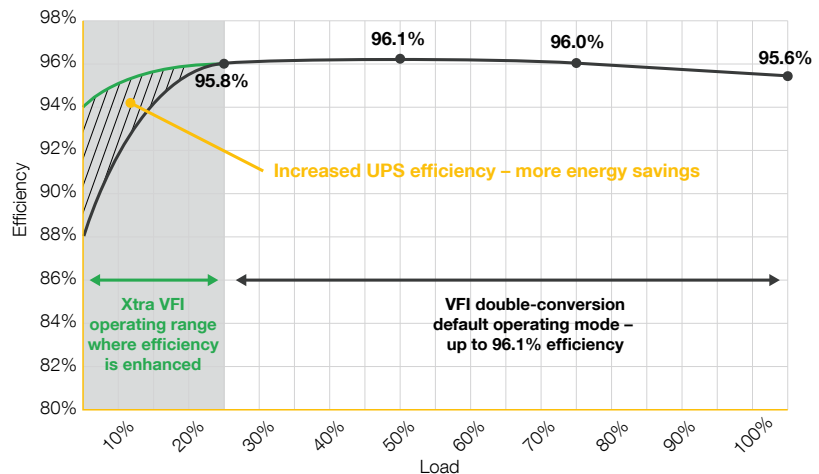
2 x 500 kW frames (10 x 100 kW)

Load power 200 kW

No. of active modules 4

Active capacity 400 kW

Standby capacity 600 kW





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