conceptpower™ Modular

Premium Power Protection

On demand power protection concept with scalable and redundant 10-100kVA hot-swappable modules for business-critical environments

Represents a unique modular, three-phase Power Protection Concept (PPC) for increasingly changing business-critical environments.

On demand Modular design to meet a wide window of power protection requirements.

Setting a new standard in high availability power protection for business-critical computing.

Extend your power protection capacity to fit your business demand and keep a constant eye on your environment and your cost of ownership.

Modular hot-swappable design means reducing service and maintenance cost.

Redundant Power Management Display advances the Power Protection Manageability Concept.

newave
ups systems

www.newave.ch

conceptpower™

Represents a unique modular, three-phase Power Protection Concept (PPC) for increasingly changing business-critical environments

Information and telecommunication technology are experiencing an exciting development making it possible to have on-line access to virtually all information at any time and at any place. Enterprise data availability dependence has become a vital issue and a business without the immediate and on-line access to information is difficult to imagine. In today's enterprise server environments the number of loads falling into the mission-critical category is rapidly expanding as an increasing range of microprocessor-based equipment enters both industrial and commercial marketplaces like transaction processing and e-commerce. These mission-critical applications demand ever-increasing scalability and availability from enterprise server environments.

To match the advanced computing technology a new equally advanced power protection technology has been developed. Newave UPS Systems has designed conceptpower™ the first and unique three-phase modular, n+1 redundant UPS-technology allowing you to scale your power capacity along with business demands and providing continuous and highest power availability. No enterprise can afford cessation of the business process, expensive hardware failure, production loss or communication loss due to power supply shortcomings or non-adequately chosen power protection solution.

conceptpower™ is not just a UPS - it represents a new Power Protection Concept for enterprise datacentres with manifold advantages over traditional single and double conversion three-phase UPS's.

conceptpower™ is a flexible power protection system composed of three-phase UPS-modules in the range of 10 to 100kVA that can be paralleled for capacity upgrade or redundancy either vertically or horizontally. Various frames are available to fit the modules in order to meet the exact customer space, performance and availability requirements.

Power Protection Concept (PPC) features at a glance:

The advanced PPC **conceptpower™** makes power protection planning for the future easy. To meet commercial and industrial needs the **conceptpower™** has comforting flexibility and is available in tower and rack-mount versions.
The unique fault-tolerant Distributed Parallel Architecture (DPA) with redundancy protects against single point-of-failure and ensures maximum uptime and continuous availability. The exceptional scalability feature protects your investment and allows you to simply scale along by adding power capacity and runtime as your business grows. With low energy losses, low input THD and low audible noise **conceptpower™** is an environmentally friendly UPS. Modular design means simple serviceability and reduction of cost of ownership.
Enhanced manageability means that **conceptpower™** is easy to manage. Every module includes an integrated redundant Power Management Display (PMD) for local management. Remote management capabilities are provided by means of SNMP-adapters for networks or by means of modems and telephone lines.
The **conceptpower™** PPC responds to virtually all power protection demands today and tomorrow.

modularity concept

On demand modular design to meet a wide range of power protection requirements

The **conceptpower™** UPS-modular design is the answer not only to the standard commercial and industrial needs, but also to customized demands. Power protection planning for the future will become easier thanks to the compact UPS-modules. The microprocessor-based process-controls in industrial markets have been lacking compact modular 3phase UPS-designs to fit into customized power protection frames. The exciting conceptpower™ 19"-rack-mount UPS-module can easily be fitted in special frames providing a uniquely flexible power protection environment to meet changing application demands.

UPS-module flexibility:

conceptpower™ standard UPS-modules contain all UPS power and control circuits including rectifier/booster, inverter, static bypass and their control circuits as well as the CPU board and the paralleling control.

conceptpower™ 10-40kVA standard UPS-module is a plugable 19"-rack-mount design ready to be fitted in existing Newave frames (Classic-frame, Gemini-frame or Upgrade-frame) or in customized frames (on request). Weight of one 40kVA UPS-module is 59kg, 30kVA 55kg and 40kg for the 10-20kVA. The paralleling is achieved vertically (Gemini-frame and Upgrade-frame) which is a space saving solution or horizontally (Classic-frame).

conceptpower™ 60-100kVA standard UPS-module is a plugable 19"-rack-mount design ready to be fitted in existing 300kVA frames (Upgrade-frame) or in customized frames (on request). The paralleling is achieved vertically which is a space saving solution. The 60-100kVA modules are composed of 2 modules: passive module and active module.

conceptpower™ standard UPS-modules are parallelable to an unlimited number of modules, so there is no limitation to the power protection capacity.

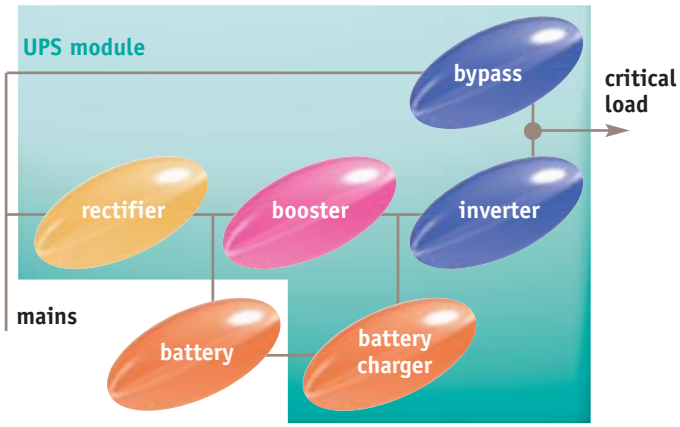
UPS Module 10-40kVA

UPS Module 60-100kVA
(composed of 2 modules)

Passive module Active module

On-line, double conversion topology; highest degree of power protection availability

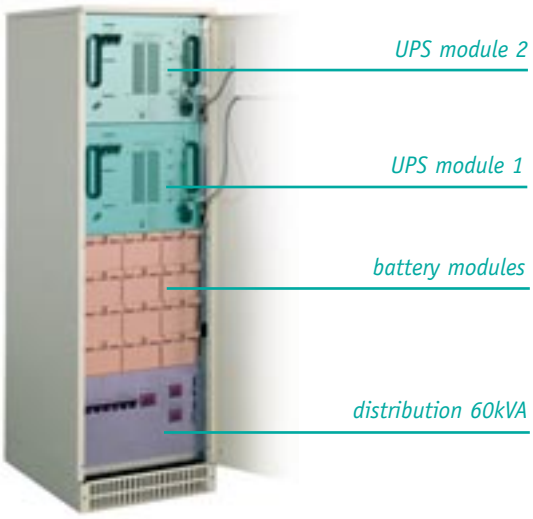
The conceptpower™ UPS-module is a second-generation transformerless, true on-line, double-conversion UPS-system with static bypass.
This advanced UPS design offers the greatest degree of critical supply integrity in that the load is supplied with processed power at all times. When the UPS input mains power supply is present the rectifier, booster and inverter are all active and the critical load is supplied by the inverter and is protected from input supply aberrations. If the input voltage is outside a preset range or fails totally the critical load will continue to be supplied by the inverter and battery without any interruption.



redundancy concept

Setting a new standard in high availability power protection for business-critical computing

There are two major reasons for installing a parallel system. The first is to increase the effective UPS capacity to enable the system to power a larger load than is otherwise possible with a single module. The second is to introduce a measure of module redundancy to improve the UPS system reliability. Parallel systems are therefore commonly categorised as either capacity or redundancy systems, although some are intelligent enough to operate as either, depending on the prevailing circumstances. The unique fault-tolerant, Distributed Parallel Architecture (DPA) designed by Newave protects against single point-of-failure and ensures maximum uptime and continuous availability. In the unlikely event of a module fault the other module will continue to provide full power keeping the application up and running. Quick recovery to redundant operation is achieved by replacing the faulty module, while the other module is running.



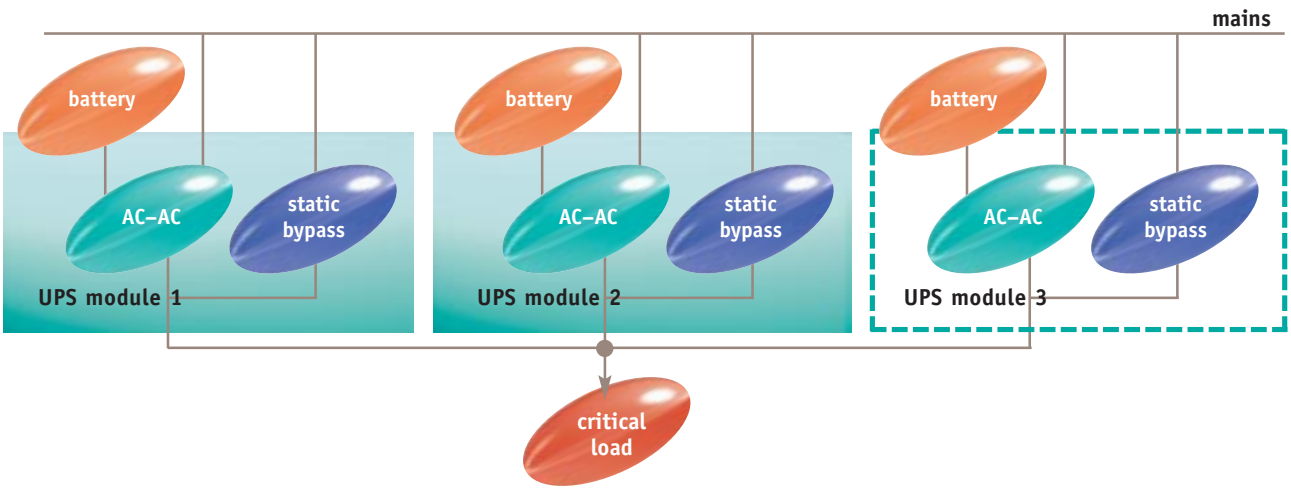
Gemini-line (2 modules + battery)

This UPS-Model was designed for the specific applications where a 1+1 redundant UPS-system with a small autonomy and smallest foot-print is required (vertical scalability). The Gemini frame is available only for models 10-30kVA.

What is Distributed Parallel Architecture (DPA)?

The DPA of Newave is a distributed parallel architecture where each module appears as a completely independent UPS-entity with integral power and control electronic circuits for AC-DC, DC-DC, DC-AC and static bypass. Furthermore, each module includes CPU's and parallel intelligence, reducing the system common point only to the parallel control bus lines. The DPA intelligence ensures the supply by the UPS-power as long as the UPS-power is higher or equal to the critical load power, without transferring the critical load to the bypass. The transfer to bypass will occur in the event of overload or short-circuit. To increase bypass availability and consequently the total system availability the DPA is extended to the bypasses ensuring highest availability even in case of overloads or short-circuits.

Redundancy means that 2 or more UPS's are sharing the connected critical load. In the Figure below 3 parallel UPS-modules are sharing the load. Example: The critical load is 60kVA. Each module has a rated power of 30kVA. In a truly load sharing redundant configuration the 3 UPS's will supply 2/3 each of their rated power (i.e. 20kVA each). In the unlikely event of a faulty UPS-module (No.3), the remaining two modules will continue to supply the load without interruption and with 30kVA power each, ensuring continuous supply to the critical load.



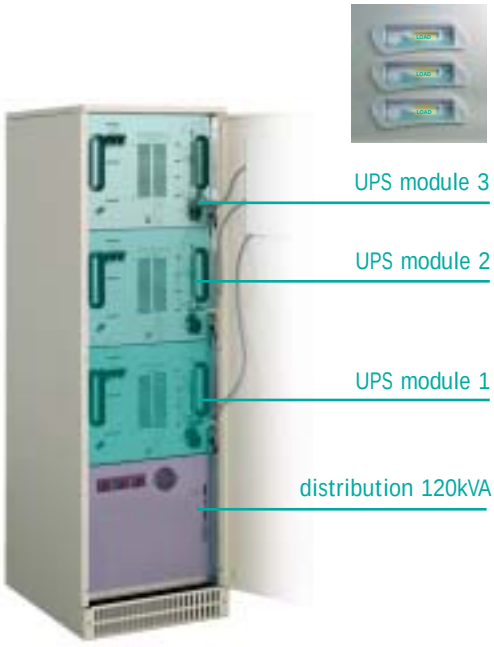
scalability concept

Extend your power protection capacity at a pace that fits your business

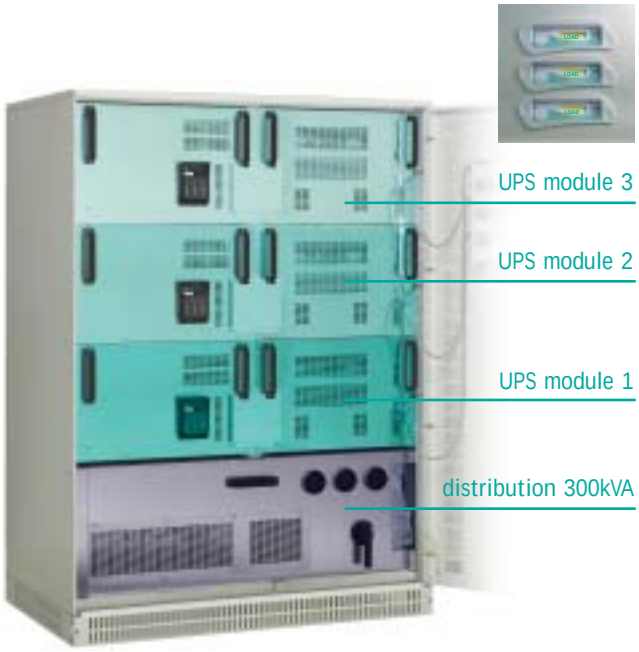
It's one thing to build a power protection infrastructure that adequately handles your business needs today, it's quite another to ensure that the same infrastructure will handle your business's future.
conceptpower™ is designed for unlimited scalable performance of power capacity and runtime by simply adding independent UPS or battery increments. This gives you the flexibility to protect your IT investment while enabling your system to grow. Your planning for future power protection needs becomes simple. You pay as you grow. **conceptpower™** allows both horizontal and vertical scalability of UPS-modules.

Upgrade-line (3 modules)

With the upgrade-Model maximum flexibility in terms of scalability and redundancy can be achieved. Up to three modules can be fitted in the upgrade frame. Upgrade frames can also be paralleled to increase capacity.



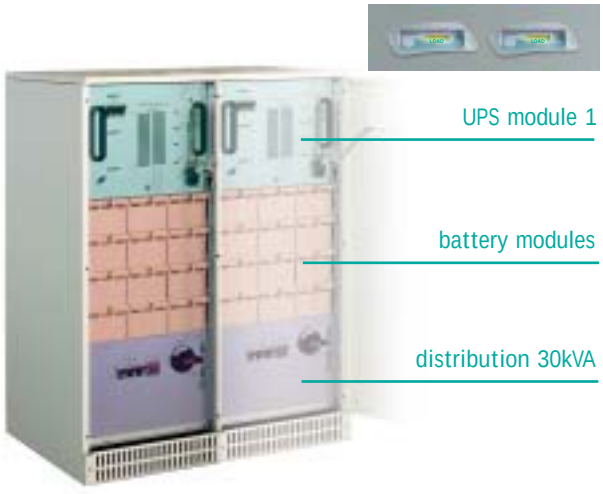
Upgrade Frame 120kVA
(for modules 10, 15, 20, 30 or 40kVA)



Upgrade Frame 300kVA
(for modules 60, 80 or 100kVA)

Classic-line (1 module + battery)

The classic model ressembles the traditional UPS-systems where the adding of modules is achieved horizontally.



World's first hot-swappable high-end modular power protection

The introduction of the transformer-less UPS has revolutionized UPS design. Bulky output transformers, weighing literally hundreds of kilos, which are used to step up inverter output voltages are being more and more substituted by smaller DC to DC boosters with input power factor correction. This advanced power protection technology has enabled the design of unique modular, hot-swappable 60, 80 and 100kVA modules.

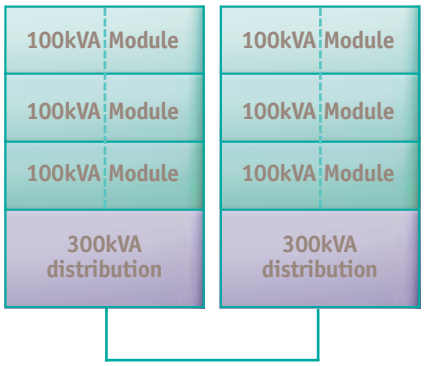
The dream of many end-users to replace large and bulky maintenance-intensive high-end UPS Systems (>300kVA) by smaller, more efficient and hot-swappable modules (60, 80 and 100kVA) has become reality.

Comparison between traditional transformer-based and innovative modular transformer-less technologies

The following example of comparison between the traditional transformer-based technology and the new transformer-less modular technology shows all the advantages of the modular design at a glance and it proves why the new modular power protection concept has been established.

Traditional Transformer-based Technology (1+1)-Redundant Parallel Configuration based on 2x500kVA standalone UPS's

Innovative Modular Transformer-less Technology (5+1)-Redundant Parallel Configuration 6x100kVA based on hot-swappable 100kVA modules.



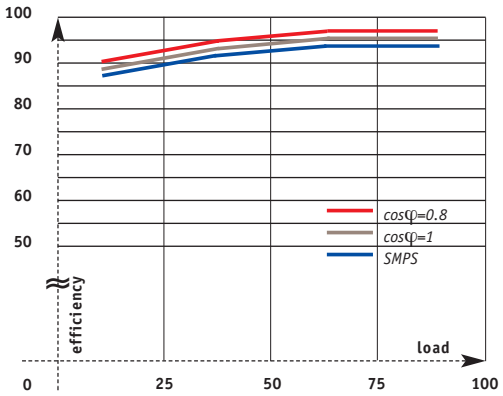
Features	Traditional transformer-based UPS configuration 2x500kVA with 12pulse rectifier or filter (typical values)	New transformer-less UPS configuration with 6x100kVA modules (typical values)	Benefits of modular technology
Power Protection Concept	non - modular	modular	cost-effective scalability
Hot-Swappable	no	yes	shorter MTTR
MTTR	6 h	0.5 h	higher availability
Foot-Print	6 m^2	2.4 m^2	space cost saving
Weight	6000-8000 kg	1000 kg	freight cost saving
Input Power Factor	0.85	0.98	installation cost saving
Input Current THD	12%	7 – 9%	generator cost saving
Efficiency	89% at 50% Load	94%	operating costs saving

environmental concept

Keep a constant eye on your environment and your cost of ownership

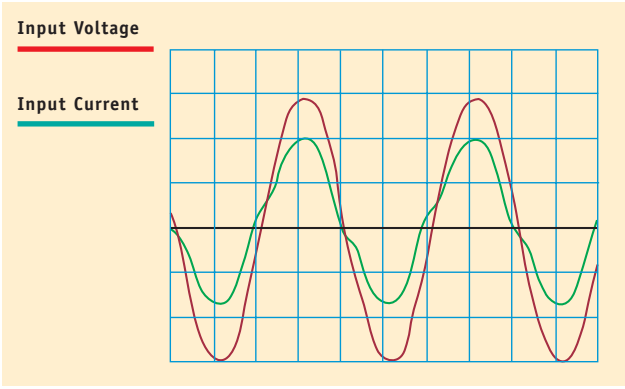
conceptpower™ was designed to meet also important environmental demands and to focus on the cost of ownership of a power protection infrastructure. Features like low heat emission, low level of harmonic pollution or low level audible pollution are part of the Power Protection Concept (PPC) and have been built into the **conceptpower**™ design.

High Efficiency



High conceptpower™ efficiency means low heat emission and therefore no unnecessary overheating of our environment. In addition to that, low losses means less energy consumption, which can differ substantially from one product technology to another. Furthermore the heat must always be evacuated by cooling systems, which must be sized to the amount of losses emitted by the UPS's. That is also a cost that must be considered during the entire lifecycle of the UPS. Thanks to the transformerless technology and the unique ESIS (Energy Saving Inverter Switching) Technology the conceptpower™ reaches double conversion efficiencies of up to 96%. This advanced high efficiency design has in average at least 5% higher efficiency than equivalent traditional double-conversion designs and has similar efficiency compared to single conversion technologies.

High Input Power Factor/Sinewave Input Current



The near to one input power factor of conceptpower™ reduces the input installation cost by using smaller cable sections and smaller fuse sizes. Thanks to the low input current THDI = 7-9% (sinewave input current) the level of harmonic pollution of the conceptpower™ is very low. The low harmonic emission into the mains saves unnecessary oversizing of the gen-sets.
The near to one input power factor and the low input current THDI = 7-9% of conceptpower™ are electronically regulated and there is therefore no need for expensive filtering or 12pulse rectification like in traditional double conversion topologies.

Low Audible Noise

With its low audible noise conceptpower™ is a very comforting UPS that does not disturb the working environment. Thanks to the load dependent noise level regulation the noise level is even more reduced when the load is < 70% of the UPS's rated power.

Battery Protection and Battery Management

conceptpower™ is provided with a unique ripple-free battery charger that protects the battery from overheating and consequently increases the battery lifecycle. A further battery protection feature is the temperature regulated battery charge voltage. The battery charger automatically regulates the battery charge voltage as the ambient temperature changes. The built-in Flexible Battery Management (FBM) periodically and automatically checks the fitness of the battery and alerts immediately if any anomaly appears. The FBM allows the use of various numbers (30-50) of battery blocks to provide the exact battery runtime and thus optimize battery cost.

Scalable Power Protection Concept for Internet Infrastructures

Conceptpower modular power capacity matches the Data Centre current needs (Phase 1) and can easily be expanded simply by adding UPS-modules. The modular conceptpower design allows expansion of power capacity increments on demand which eliminates the high initial investment cost of purchasing power capacity that is not required at the stage of installation. This unique concept allows you to pay as you grow eliminating additional electrical intallation investments.

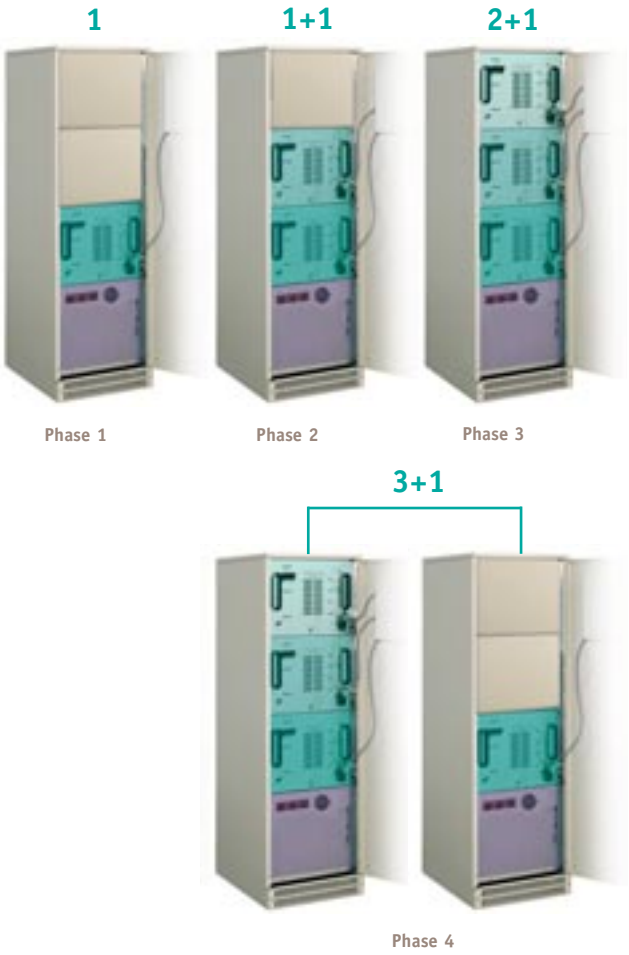
Conceptpower solution

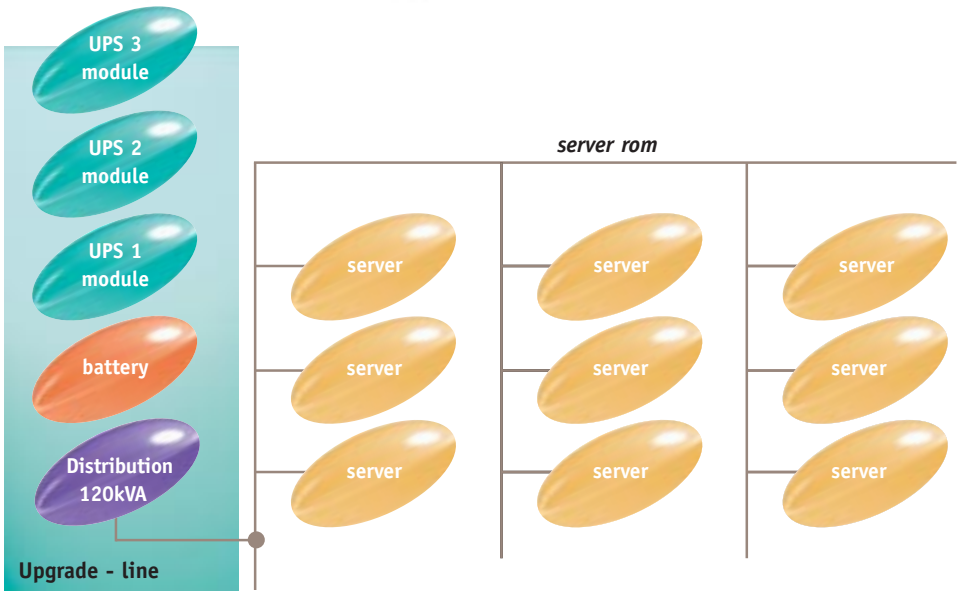
a. *Modular Upgrade UPS (3x40kVA)*
b. *External Modular Battery Cabinet*
c. *Distribution Cabinet*

Manageability

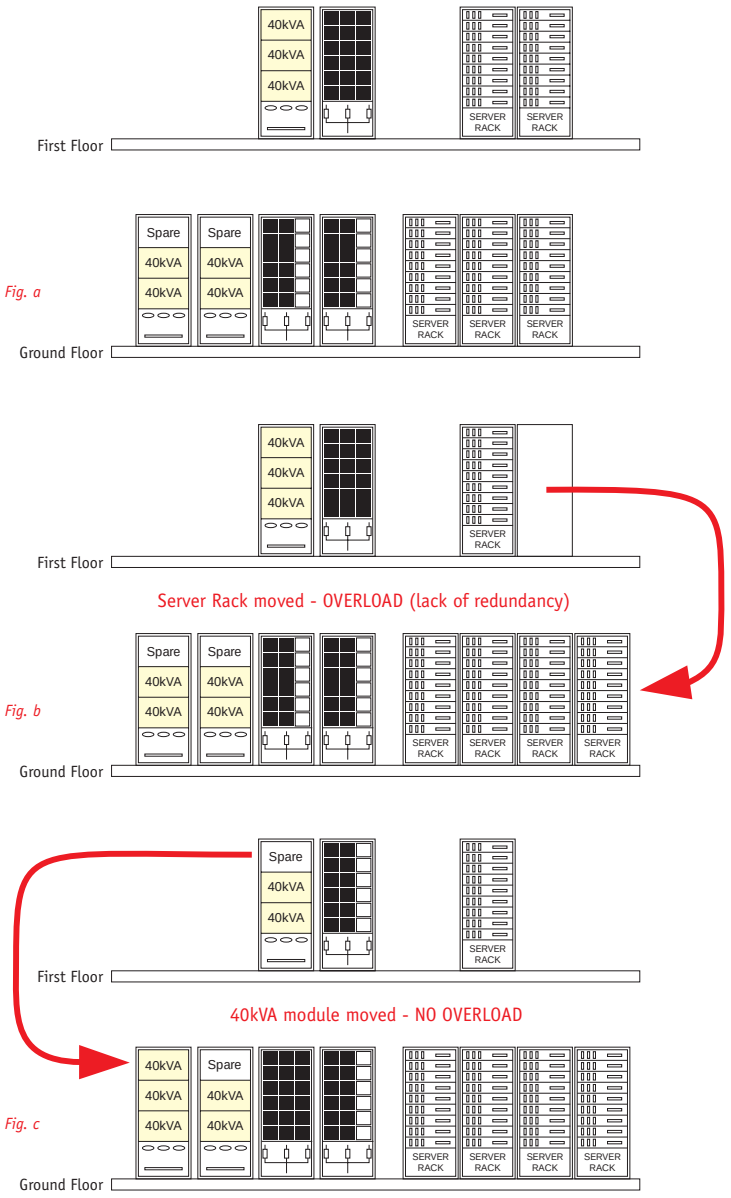
nmentally Friendly

Highest flexibility
add modules as your power capacity needs grow in the future.





conceptpower™ protects multiple server configurations
In the figure on the left an example is shown of a multiserver application which is protected by a redundant **conceptpower™** to provide highest availability and continuous operation.



The figure illustrates a sophisticated UPS installation utilising rackmounted UPS modules.
On the first floor (Figure a), a three module UPS is configurated with three 40kVA UPS modules supporting two server/comms racks with redundancy (load 80kVA).
On the gound floor, four 40kVA modules support three server/comms racks with redunancy and with two spare slots to allow for expansion (load 120kVA).

The user decides to move one of the server/comms racks to the ground floor, overloading (lack of redundancy) the existing power support system there (Figure b). It is a simple matter to move one UPS module and battery bank to the ground floor to restore the balance (Figure c). There are now spare slots on the ground and first floors to allow for expansion of the protected system and, of course, further capacity can be added at any time by introducing additional modules. The important point is that all of these changes can be made with minimum effort, low incremental cost, without using any more floor space, and without transferring the load to mains.

availability concept

Higher power protection availability with hot-swappable modules

The high cost associated with downtime not only frustrates business users but also results in loss of productivity and possible loss of revenue. Moreover damages are not limited to financial costs, downtime can harm company reputation, erode customer loyality and strain relationship with suppliers, channel partners, business partners, banks and employees.

Availability

Availability is a useful measure for systems subject to failure and repair; it is defined as the probability that the system is operational at time t. It is a function of MTBF and MTTR and is calculated by means of the following equation:

$$A = MTBF / (MTBF+MTTR)$$

From the above formula we can deduce that higher availability is reached when MTBF is high and MTTR is short.

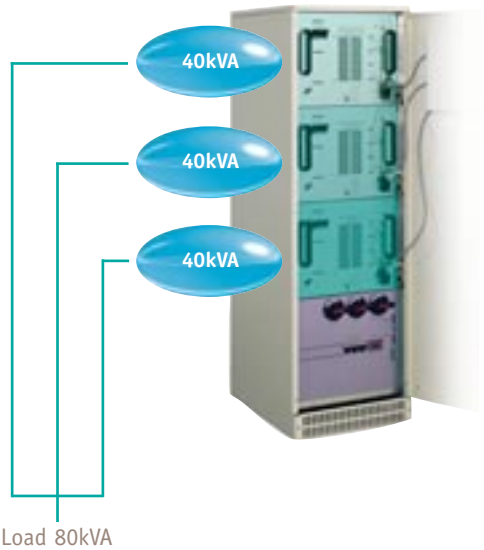
MTBF Mean Time Between Failures is a measure of probability and is the average failure-free time between subsequent failures.
MTTR Mean Time To Repair is the elapsed time from the error acknoweledgement until repair is completed. MTTR depends on many factors such as size and quality of the service organisation and the availability of spare parts, etc.

How to reduce the MTTR of a UPS

The following example shows how important the parameter MTTR is for reaching high availabilities. If in a redundant configuration one UPS-unit fails, there will be no redundancy left (low-availability regime) and the faulty UPS/module repared/replaced as quickly as possible, in order to restore the redundancy (high-availability-regime).
With the modular hot-swappable power concept shortest MTTR's and highest availabilities are reached even when larger numbers of modules are paralleled.
Typically it takes less than 30 minutes to replace a module if spare module available. A further improvement can be made if the repair can be undertaken by the user as this eliminates the need for external technical intervention.

Solution 1:
Stand Alone (1+1) redundant configuration

Solution 2:
Modular Hot-swappable (2+1) redundant configuration



Example	Solution 1	Solution 2
MTBF	900'000	600'000
MTTR	6h	0.5h
Availability	0.999993 (5 nines)	0.9999991 (6 nines)

serviceability concept

Modular design means minimizing service and maintenance cost

The advanced serviceability concept of **conceptpower™** maximizes power protection availability to the critical application. Here are some key features that reduce the Mean Time To Repair (MTTR) of modular power protection designs and consequently increase the overall availability.

Intelligent built-in diagnosis performs early notification and reports any needed action on the PMD (Power Management Display). Any anomalous operation will immediately be detected and registered in the event log. In the event of a fault in a UPS-module it will immediately be isolated in order not to compromise the rest of the system. This ensures continuous power supply of the critical load.

conceptpower™ is designed for easy and quick serviceability to minimize operating cost.

The modular design ensures rapid replacement of faulty modules from redundant power systems without power disruption to the application. Once the module is replaced it automatically starts communicating with the rest of the system and is ready-to-go. The Mean Time To Repair (MTTR) of modular power protection systems is shorter than of traditional non-modular designs.

Newave provides tailored service support training courses that will increase the skills of Service Engineers and reduce the MTTR and therefore reduce the cost of service and maintenance.

Hot-swap capability enables module-level repair

Redundant Power Management Display advances the Power Protection Manageability Concept

conceptpower™ can be managed locally and remotely by means of computer networks or modems and telephone lines.

Local Management

Each UPS-module of **conceptpower**™ is provided with a Power Management Display (PMD).
In a parallel redundant system the PMD's are also redundant. The User Interface PMD is easy to use:

- Intuitive and consistent PMD for ease of learning and execution.
- Problem and event reporting on display for rapid response.
- Common data execution functions for parallel systems on redundant parallel PMD's. The complete parallel system may be managed by any one of the parallel PMD's.
- PMD consists of mimic diagram for system status, pushbutons for single module and parallel system control and LCD for monitoring, event logs and diagnosis.

Remote Management

Each UPS-module of **conceptpower**™ is provided with communication ports for remote monitoring, shut-down and management.

Remote Signalling Panel (RSP)

The RSP provides remote warnings and UPS status change on LED indicators and with mimic diagram. A general audible and visual alarm is available. The monitoring may be achieved to distances of up to 100m.

Shutdown and Management Software (Wavemon)

Wavemon is the management and shutdown software that can be used with virtually all operating systems available in the marketplace. The software is available also for crossplatform shutdown and monitoring.

Each UPS-module is provided with a slot for an optional SNMP-card and can be monitored independently. In addition to this solution it is possible to implement a more cost/effective solution where only one SNMP-card is necessary for the entire parallel UPS system also called Multidrop solutions.

technical specifications

conceptpower 10-40kVA

General Data						
Output Rated Power	**kVA**	**10**	**15**	**20**	**30**	**40**
Output Power Factor		0.8				
Topology		On-Line, Double Conversion, VFI				
Construction		Modular (Stand-alone and Rack-mount)				
Parallel Technology		Distributed Parallel Architecture				
Redundancy n+1		High reliability, no limitation of paralleling				
Capacity Upgrade		Add your power as you grow (no limitation)				
Static and Maintenance Bypass		standard				
Accessibility		Front accessibility for service and maintenance (no need for side,top or rear access)				
Efficiency (Double Conversion)		Up to 96%				
Audible Noise With 100%/75% Load	dBA	55 / 49	57 / 49	57 / 49	59 / 51	63 / 53
Standards		EN 50091, part 1, 2 and 3, IEC 62040, part 1, 2 and 3				

Input Data		
Input Voltage	V	3x380/220V+N, 3x400V/230V+N, 3x415/240V+N
Input Voltage Tolerance (Ref. to 3x400/230V)		For loads <100% (-23%, +15%), <80% (-30%, +15%), <60% (-40%, +15%)
Input Frequency	Hz	35 – 70
Input Power Factor		0.98 (electronically regulated)
Input Current Form		Sinewave THDI = 7-9% at 100% load
Inrush Current		Soft-start
Input Cabling		Hardwired

Output Data		
Output Voltage	V	3x380/220V+N, 3x400V/230V+N, 3x415/240V+N
Output Voltage Tolerance	%	+/- 1 (linear load), +/- 3 (non-linear load)
Output Voltage Tolerance (Load Jumps 0-100% and 100-0%)	%	+/- 4%
Output Frequency	Hz	50 or 60
Output Frequency Tolerance	%	+/- 0.1 (free-running), +/- 4 (with mains, adjustable)
Crest Factor		3 : 1
Overload	%	150% for 1min., 125% for 10min.
Permissible Unbalanced Load	%	100% (all 3 phases regulated independently)

Monitoring and Control Data	
Power Management Display (PMD)	With LCD, Mimic Diagram, Control
Communication Port (Smart Port)	Serial RS 232
Communication Port (Dry Port)	Volt-free relays
SNMP	Yes
Shutdown and Monitoring Software	Yes (Wavemon)
Emergency Power Off (EPO)	Yes

Mechanical Data			
Size Classic Frame	mm	550 x 1400 x 750 (WxHxD), with batter.	550 x 1800 x 750
Size Gemini Frame	mm	550 x 1800 x 750 (WxHxD), with batteries	
Size Upgrade Frame	mm	550 x 1800 x 750 (WxHxD), w/o batteries	
Size Additional Battery Frame Classic(CBAT-30CS)	mm	580 x 1400 x 750 (WxHxD)	
Size Additional Battery Frame Gemini/Upgrade(CBAT-30GU)	mm	580 x 1800 x 750 (WxHxD)	
Weight Classic Frame w/o batteries with 40kVA module	kg	280	
Weight Gemini Frame w/o batteries with 2x30kVA modules	kg	290	
Weight Upgrade Frame w/o batteries with 3x40kVA modules	kg	306	

Specifications are subject to change without notice.

technical specifications

conceptpower 60-100kVA

General Data				
Output Rated Power	**kVA**	**60**	**80**	**100**
Output Power Factor		0.8		
Topology		On-Line, Double Conversion, VFI		
Construction		Modular (Stand-alone and Rack-mount)		
Parallel Technology		Distributed Parallel Architecture		
Redundancy n+1		High reliability, no limitation of paralleling		
Capacity Upgrade		Add your power as you grow (no limitation)		
Static and Maintenance Bypass		standard		
Accessibility		Front accessibility for service and maintenance (no need for side,top or rear access)		
Efficiency (Double Conversion)		Up to 96%		
Audible Noise With 100%/75% Load	dBA	69 / 65	69 / 65	69/ 65
Standards		EN 50091, part 1, 2 and 3, IEC 62040, part 1, 2 and 3		

Input Data		
Input Voltage	V	3x380/220V+N, 3x400V/230V+N, 3x415/240V+N
Input Voltage Tolerance (Ref. to 3x400/230V)		For loads <100% (-23%, +15%), <80% (-30%, +15%), <60% (-40%, +15%)
Input Frequency	Hz	35 – 70
Input Power Factor		0.98 (electronically regulated)
Input Current Form		Sinewave THDI = 7-9% at 100% load
Inrush Current		Soft-start
Input Cabling		Hardwired

Output Data		
Output Voltage	V	3x380/220V+N, 3x400V/230V+N, 3x415/240V+N
Output Voltage Tolerance	%	+/- 1 (linear load), +/- 3 (non-linear load)
Output Voltage Tolerance (Load Jumps 0-100% and 100-0%)	%	+/- 4%
Output Frequency	Hz	50 or 60
Output Frequency Tolerance	%	+/- 0.1 (free-running), +/- 4 (with mains, adjustable)
Crest Factor		3 : 1
Overload	%	150% for 1min., 125% for 10min.
Permissible Unbalanced Load	%	100% (all 3 phases regulated independently)

Monitoring and Control Data	
Power Management Display (PMD)	With LCD, Mimic Diagram, Control
Communication Port (Smart Port)	Serial RS 232
Communication Port (Dry Port)	Volt-free relays
SNMP	Yes
Shutdown and Monitoring Software	Yes (Wavemon)
Emergency Power Off (EPO)	Yes

Mechanical Data		
Size Upgrade Frame	mm	1400 x 1900 x 870 (WxHxD), w/o batteries
Size Additional Battery Frame Upgrade	mm	580 x 1800 x 750 (WxHxD)
Weight Upgrade Frame w/o batteries with 3x60kVA modules	kg	670
Weight Upgrade Frame w/o batteries with 3x80kVA modules	kg	688
Weight Upgrade Frame w/o batteries with 3x100kVA modules	kg	700

Specifications are subject to change without notice.

The following are just some of the companies using the products and services of Newave SA:

Asea Brown Boveri
Acer
American British Racing
American Express
AEG SVS
Benning
Biz Basel
British Telecom
Cable and Wireless
Cambridge University
Coca Cola
Credit Suisse
Danfoss
Deutsche Bank
Glaxo Smith Kline
Hewlett Packard
Hilti
Hilton
Honeywell
Hyatt
Intel
IBERIA
IBM
Lloyds TSB
Meridien
Metropolitana Lisboa
Mobistar
Motorola
Nestlè
Novartis
Nuffield Hospitals
Oracle Corporation
Oxford University
Procter & Gamble
Rabo Bank
REPSOL-YPF
Ritz
Royal Bank of Scotland
Royal Scandinavia
ROS Telecom
Sheraton
Swiss Reinsurance
Technion
Televisión Española
Williams
United Bank of Switzerland(UBS)
Vodaphone
Zürcher Kantonalbank

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ISO 9001
REGISTRATION NO. 14879
CE

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