

Specifications

ENERTRONIC modular
Three Phase UPS Systems
10 – 480 kVA

BENNING
World Class Power Solutions

Excellent Technology, Efficiency and Quality



Features of the ENERTRONIC *modular* UPS Systems:

- Scaleable UPS systems with hot-plug power modules
- N+1 redundancy ensures maximum availability
- Advanced UPS design with IGBT and MOSFET semiconductors and DSP processors
- UPS classification VFI-SS-111 in accordance with EN/IEC 62040-3
- High efficiency, also at partial load, reduces energy losses
- Sinewave input current (powerfactor 0.99)
- Input current with low harmonic distortion (THDi < 5 %)
- Short MTTR (Mean Time To Repair)
Replacement of modules without load interruption
- Online diagnosis and monitoring

Fig. 1: ENERTRONIC modular with 10 kVA power modules.
Output power 90 kVA (n+1)



ENERTRONIC modular Three Phase UPS Systems

Technical specification and dimensions

BENNING followed the request of many customers and has developed the reliable and cost-effective ENERTRONIC *modular* UPS Range with parallel operating three phase hot-plug power modules.

The ENERTRONIC *modular* UPS range consists of power modules rated at 10 kVA, 20 kVA and 40 kVA.

These modules allow the design of UPS systems with output power ratings between 10 kVA and 480 kVA.

Each power module represents a complete double conversion UPS system with three phase input, rectifier, inverter, static by-pass, DSP processor regulation and three phase output.

The hot plug power modules are mounted inside the UPS system cabinets and can be replaced at any time whilst the load continues to be supplied with secure UPS power.



Fig. 2: ENERTRONIC modular with 20 kVA power modules.
Output power 80 kVA (n+1)



Fig. 3: ENERTRONIC modular with 40 kVA power modules and distribution cabinet.
Output power 200 kVA (n+1)

The UPS system cabinets with dimensions (H x W x D) 1800 x 600 x 800 mm can accommodate 8 off 10 kVA, 5 off 20 kVA or 4 off 40 kVA power modules.

2000 mm high cabinets can accommodate up to 10 off 10 kVA, 6 off 20 kVA or 5 off 40 kVA power modules.

Please note that the width of system cabinets for 40 kVA power modules is always 800 mm.

Behind a door, the lower part of the cabinet contains the terminals for mains, load, monitoring and battery cables, plus the maintenance bypass switch.

ENERTRONIC *modular* UPS systems with 240 kVA output power consist of two cabinets. One system cabinet for up to 6 power modules and one distribution cabinet (fig. 3). The distribution cabinet contains the parallel connections for all the power modules and terminals for mains, battery and monitoring cables.

The UPS monitoring and control panel is mounted on the front door of the distribution cabinet.

Enertronic modular UPS systems from 280 kVA up to 480 kVA output power consist of two system cabinets and one distribution cabinet.

UPS systems with built-in batteries are available in combination cabinets. The output power ranges between 10 kVA and 40 kVA (Fig. 4).

See page 4 for the specification of these systems.

Technical Specification

ENERTRONIC modular 10 – 480 kVA

UPS ENERTRONIC modular with 10 kVA modules

Rated output power	[kVA]	10	20	30	40	50	60	70	80	90	100	
	[kW]	8	16	24	32	40	48	56	64	72	80	
No. of modules		1	2	3	4	5	6	7	8	9	10	
Input												
Input current	[A]	15.4	30.8	46.2	61.6	77	92.4	107.8	123.2	138.6	154	
Distortion factor (THDi)	[%]	≤ 5										
Power factor (cos φ)		≥ 0.99										
Nominal voltage	[V]	3 x 400 / 230 ± 15 %, +N										

UPS ENERTRONIC modular with 20 kVA modules

Rated output power	[kVA]	40	60	80	100	120						
	[kW]	32	48	64	80	96						
No. of modules		2	3	4	5	6						
Input												
Input current	[A]	62	93	124	155	186						
Distortion factor (THDi)	[%]	≤ 5										
Power factor (cos φ)		≥ 0.99										
Nominal voltage	[V]	3 x 400 / 230 ± 15 %, +N										

UPS ENERTRONIC modular with 40 kVA modules

Rated output power	[kVA]	80	120	160	200	240*1	280*1	320*1	360*1	400*1	440*1	480*1
	[kW]	64	96	128	160	192	224	256	288	320	352	384
No. of modules		2	3	4	5	6	7	8	9	10	11	12
Input												
Input current	[A]	124	186	248	310	372	434	496	558	620	682	744
Distortion factor (THDi)	[%]	≤ 5										
Power factor (cos φ)		≥ 0.99										
Nominal voltage	[V]	3 x 400 / 230 ± 15 %, +N										

Output

Output voltage	[V]	3 x 400 / 230 +N (± 5 % programmable)									
Voltage tolerance											
static		≤ 1									
asymmetric load	[%]	≤ 2 with 100 % load									
dynamic		≤ 5 with 100 % load step									
Regulation time	[ms]	≤ 20									
Nominal frequency	[Hz]	50 ± 0.1 %									
Distortion factor	[%]	≤ 2 with linear load									
		≤ 5 with non linear load EN 50091-1-1									
Crest factor	[%]	≥ 3 : 1									
Overload											
Inverter		150 % for 60 sec, 125 % for 10 min with three phase load									
Electronic by-pass		150 % for 10 min, 500 % for 100 ms									
Short circuit		200 % for 3 sec									
Maintenance by-pass		installed									

Other specifications

Efficiency	[%]	94.5									
EMC		IEC 62040 - C3									
Permitted ambient temp.	[°C]	0 to +40									
Storage temp.	[°C]	-25 to +70									
Relative humidity	[%]	5 – 95 non condensing									
Installation height	[m]	2000 m ASL derating									
Cabinet protection		IP 20									
Painting		RAL 7035 textured									
Weight / 10 kVA modules		22									
20 kVA modules	[kg]	40									
40 kVA modules		65									

Pb-Battery

No. of cells / 10 kVA modules		2 x 108 – 144									
20 kVA modules		2 x 108 – 144									
40 kVA modules		2 x 120 – 144									

Standards EN 60801, EN 60950, EN 61000, EN 62040-1, EN 62040-2, EN 62040-3, EN 62040-1-1, VGB 4

(*1: Systems above 240 kVA output power need an additional distribution cabinet.)

Specifications are subject to change without notice.

Combination cabinets with built-in batteries

Cabinet dimensions: 1800 X 600 x 800 mm (H x W x D)

Output power [kVA]	No. of modules	Battery time (at max. output power) [min]
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UPS systems with 10 kVA power modules

10	1	82
20	2	32
30	3	22

UPS systems with 20 kVA power modules

20	1	32
40	2	13

System and distribution cabinets

Output power [kVA]	No. of modules	Height x Width x Depth [mm]	Weight* [kg]
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Systems with 10 kVA modules

80	1 – 8	1800 x 600 x 800	190
100	1 – 10	2000 x 600 x 800	210

Systems with 20 kVA modules

100	1 – 5	1800 x 600 x 800	190
120	1 – 6	2000 x 600 x 800	210

Systems with 40 kVA modules

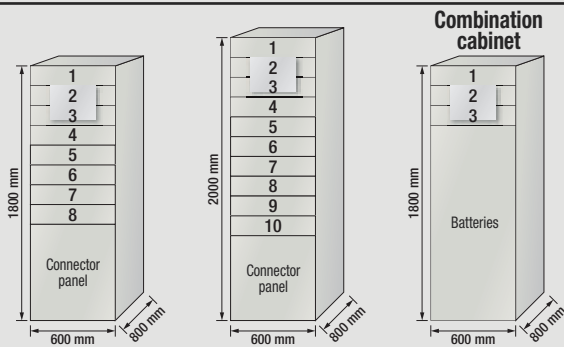
160	1 – 4	1800 x 800 x 800	210
200	1 – 5	2000 x 800 x 800	240
240	1 – 6	(2x) 2000 x 800 x 800	240 + 250
480	1 – 12	(3x) 2000 x 800 x 800	240 + 240 + 250

(* Without modules. See page 3 for module weights.)

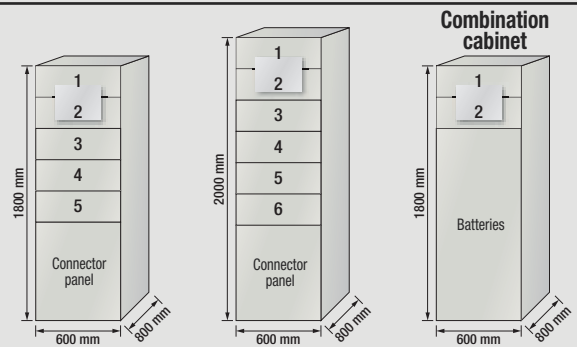


Fig. 4: ENERTRONIC modular with built-in batteries. Output power 20 kVA (n+1)

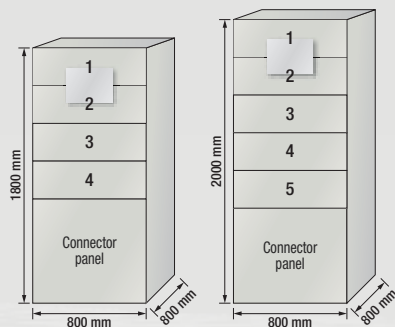
Systems with 10 kVA modules



Systems with 20 kVA modules



Systems with 40 kVA modules



Systems with 40 kVA modules and distribution cabinets

