

# UPS ENERTRONIC modular SE

- Modular three-phase UPS system
- Highest efficiency and operational availability
- Smart Grid deployable

**BENNING**  
World Class Power Solutions

Excellent Technology, Efficiency and Quality

## Key benefits : UPS Enertronic modular SE

- Maximum availability
  - Very high reliability
  - Very low mean time to repair (MTTR)
  - „hot swap“ modularity
  - Modular self-configuration for N+1 redundancy
- No single point of failure
  - Redundant circuits in each module
  - Multi-master operation
  - Decentralised parallel architecture
- Lowest operational costs
  - up to 96% efficiency in double conversion mode
  - up to 99% efficient in „super efficiency“ mode
  - „Pay as you grow“ scalability up to 1000kW
- Highest power quality
  - UPS classification VFI-SS-111
  - Input current total harmonic distortion (THDi) <3%
  - Input power factor  $\geq 0.99$
  - Very high overload capability

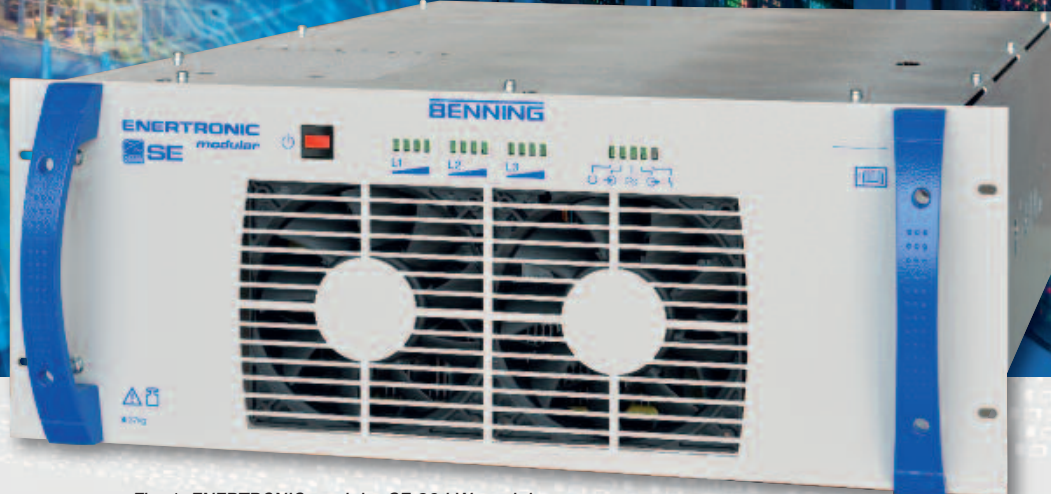


Fig. 1: ENERTRONIC modular SE 20 kW module

## Highest availability and lowest total cost of ownership

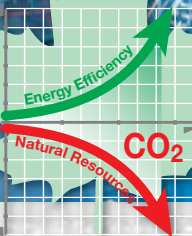
The ENERTRONIC modular SE combines the benefits of very high reliability and a very low mean time to repair (MTTR) to create a UPS system with the highest possible availability.

By using only the highest quality components, over specifying critical components and ensuring the design values reliability before cost, Benning has created a UPS with industrial grade reliability.

When such reliability is combined with the repair and maintainability benefits of true “hot swap” modularity that can replace an entire UPS module in less than 10 minutes you have a UPS with “six nines” (99.9999%) availability.

With its “pay as you grow” scalability and very high operating efficiency, even at partial loads, the real running costs of the ENERTRONIC modular SE

are minimised without the need to compromise on power quality. Each ENERTRONIC modular SE UPS module is a highly efficient double conversion, serial on-line UPS (VFI-SS-111). By supplying the critical load via the ENERTRONIC modular SE’s rectifier and inverter the quality of voltage and frequency experienced by the critical load is significantly improved.





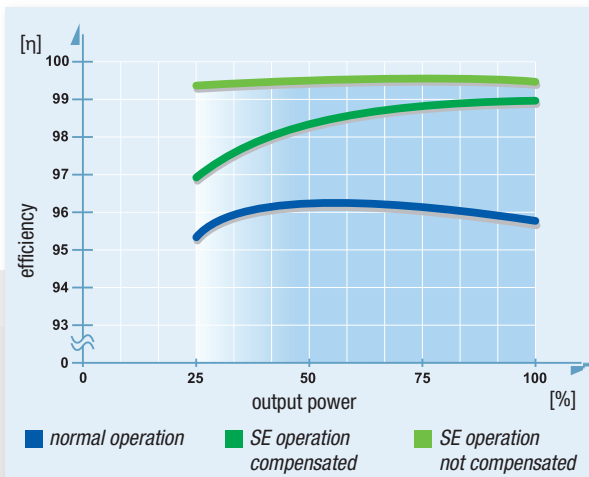


Fig. 2: Efficiency vs. output power



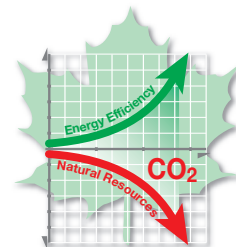
Fig. 3: ENERTRONIC modular SE, 40 kW module IT-series



Fig. 4: ENERTRONIC modular SE, 200 kW

## Best values for energy efficiency through high degree of effectiveness – even at partial loads

If the highest possible efficiency is more important than voltage and frequency quality, the ENERTRONIC modular SE can be operated in its “Super Efficiency” mode. In this mode the critical load is fed via the static bypass line until the voltage and/or frequency of the mains moves outside of pre-set tolerances. At this point the critical load is break-free transferred onto the UPS inverter and is therefore fully protected from damaging mains borne disturbances including brown-outs and black-outs.



## All the benefits of power capacity and parallel redundancy

All modules automatically parallel with each other in either a parallel capacity or parallel redundant mode. The parallel mode is determined by the size of the load so the UPS system is parallel redundant if it can be and parallel capacity if it has to be.

UPS modules are paralleled together in cabinets and cabinets can be paralleled together to create a system of up to 1,000kW.

### Technical data: ENERTRONIC modular SE

Power ( $\cos\varphi = 1.0$ )	20 ... 500 kW	40 ... 1000 kW
Power per Module	20 kW	40 kW
Footprint cabinet (W x D)	600 x 800 mm	600 x 800 mm
Power per m <sup>2</sup>	up to 250 kW/m <sup>2</sup>	up to 415 kW/m <sup>2</sup>
Maximum number of modules/system	25	
Operating temperature range	0 ... 40 °C (reduction in power beyond this)	
Relative humidity	5 ... 95% (non-condensing)	
Volume	typical < 65 dBA (as a function of power)	
Protection class	IP20 (further classes on request)	
Installation height	1000 m (without reduction in power)	
Cable entry	bottom (top on request)	
Colour	RAL 7035 (other colours on request)	
Ventilation	redundant forced-air ventilated	
Classification	VFI-SS-111 (according IEC / EN 62040-3)	
<b>Standards</b>		
Safety	IEC / EN 62040-1, IEC / EN 60950-1	
EMC	IEC / EN 62040-2	
Performance	IEC / EN 62040-3	
<b>Input</b>		
Voltage	3 / N 400 V $\pm$ 15%	
Frequency	50 Hz $\pm$ 5% / 60 Hz $\pm$ 5%	
Mains distortion THDi (100% load)	$\leq$ 3%	
Input power factor	$\geq$ 0.99	
<b>Output (inverter operation)</b>		
Voltage	380 V / 400 V / 415 V	
Voltage tolerance (static)	$\pm$ 1%	
Frequency tolerance	$\pm$ 0.1%	
Total harmonics distortion THDu	Linear load: $\leq$ 1%	
Efficiency	99% (SE-Mode), 96% (double conversion)	
Overload operation - inverter	200% for 200 ms, 150% for 60 s, 125% for 10 min, 110% for 30 min	
Overload operation - bypass	1000% for 100 ms, 150% for 10 min, 125% continuously	
Short-circuit behaviour - inverter	> 220% for 1 s	
Short-circuit behaviour - bypass	1000% for 100 ms	
<b>Battery</b>		
Nominal voltage	480 - 576 V (240 - 288 Pb cells)	
Battery technologies	Lead, nickel cadmium, lithium ion (optional)	

Technical data subject to change without further notice.

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