

Excellent Technology, Efficiency and Quality

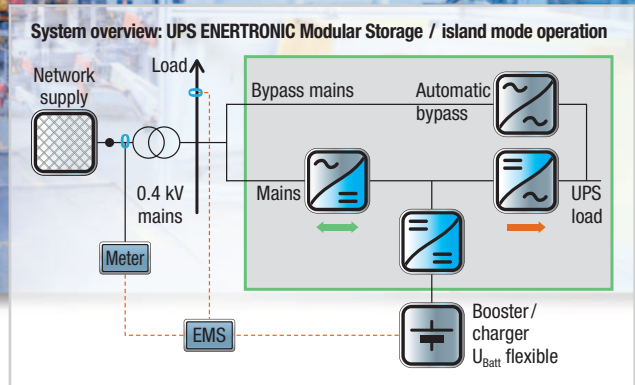


ENERTRONIC modular Storage

Peak shaving, load levelling, UPS mode,
day to night energy transfer

**Produced and developed in Germany!
Industrial quality since 1938**

Economy and return on investment combined with security of the load



Advantages

- Storage and UPS function
- Decentralised parallel architecture
- Modular-expandable hot pluggable system
- Flexible battery configurations (accumulator, group battery, individual battery)
- Can be used in conjunction with regenerative energy systems such as PV, hydro or wind power
- Option of connecting up to low-voltage mains as per VDE AR-N4105
- Greater efficiency
- Rapid return of investment

- Maximum availability
- Minimised operating costs
- Variable component concept

Figure 7: The UPS protects the critical loads from mains disruptions. At the same time, in conjunction with the "on-board" EMS, the system takes on load management tasks and thus contributes significantly to faster return of the investment compared to systems without a storage function.



Figure 8: The Monitoring and Control Unit (MCU) supports a range of protocols and interfaces for connecting the system EMS from the widest range of software manufacturers. The MCU 3000 system controller, which is installed in the cabinet door of the power supply system, has a 10.4" touchscreen.

Key hardware for your company's energy transition



Hardware for multiple applications

Hardware based on industrial UPS modules

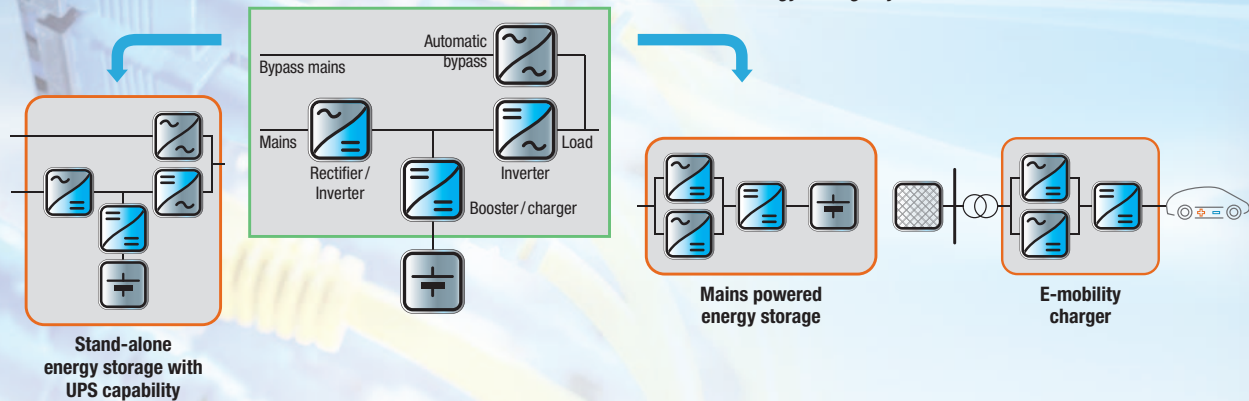


Figure 1: BENNING supplies modular architecture – based on tried & tested industry grade UPS systems – for construction of cost-effective energy storage systems

Sustained reduction in operating costs, Increasing efficiency

Smart load management means that enhancing the reliability and efficiency of your power supply system goes hand-in-hand with a sustained reduction in operating costs. Applications whose power consumption can be fully or partially offset thanks to power storage provide an ideal opportunity.

BENNING, with its new ENERTRONIC modular Storage range, offers individually tailored energy storage systems with genuine UPS operation and “on-board” EMS (Energy Management System).

ENERTRONIC modular Storage is tailored for:

- Industrial applications
- Storage of regeneratively sourced power
- Micro grids

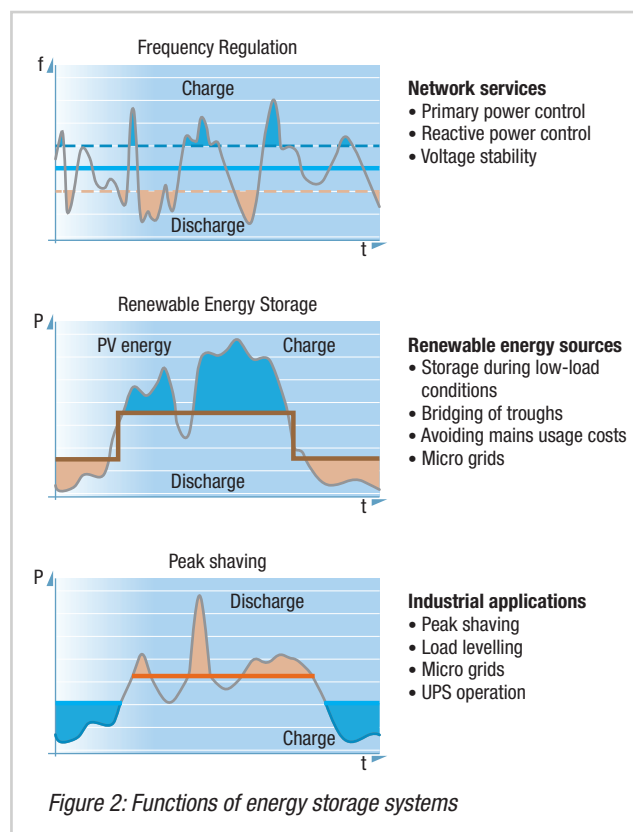


Figure 2: Functions of energy storage systems

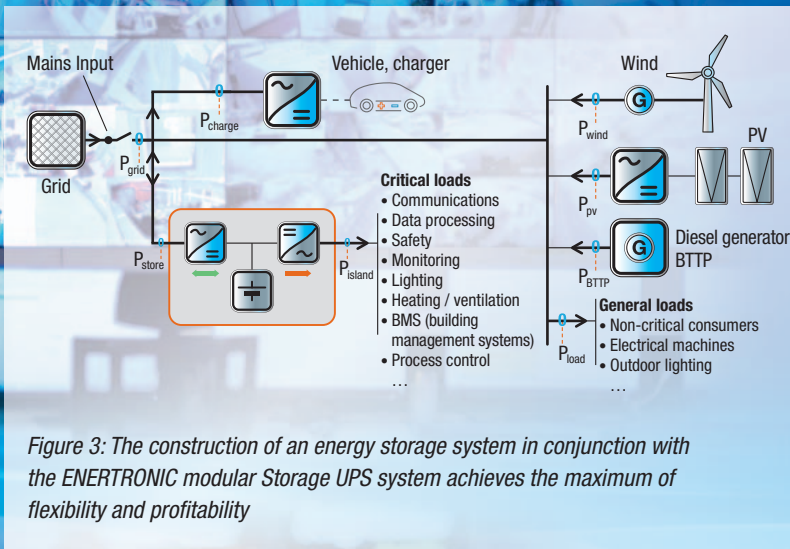


Figure 3: The construction of an energy storage system in conjunction with the ENERTRONIC modular Storage UPS system achieves the maximum of flexibility and profitability



Figure 4: ENERTRONIC modular Storage

Storage systems with UPS capability provide flexibility and economy

- Peak shaving
- Load levelling
- Optimised power take-up (7000 h rule)
- Day-to-night energy transfer
- Flexibly definable energy reserve
- Storage during low-load conditions
- Boost power during high-load conditions
- Suitable for lead and lithium batteries
- Optimising internal consumption
- Reliable UPS operation (VFI-SS-111)
- Reactive power compensation

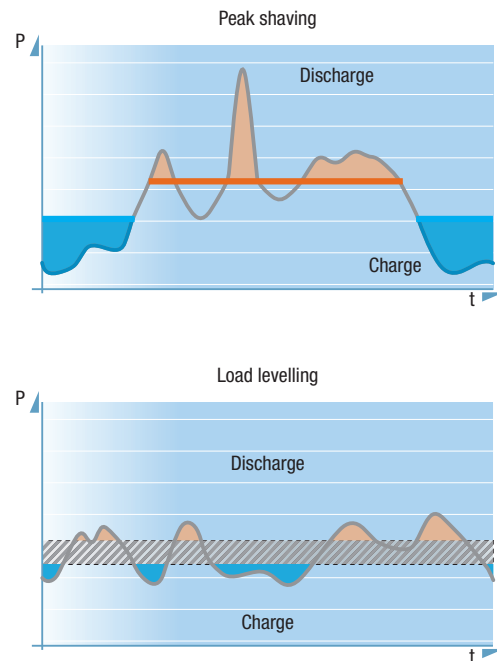


Figure 5: ENERTRONIC modular Storage covers load management functions such as load levelling and peak shaving

Reduce your companies impact of rising energy costs

Technical data

ENERTRONIC modular Storage		
Power (cos φ = 1.0)	20 ... 500 kW	40 ... 1000 kW
Module power	20 kW	40 kW
USB cabinet footprint (W x D)	600 x 800 mm	600 x 800 mm
Output per m ²	up to 250 kW/m ²	up to 415 kW/m ²
Maximum number of modules per system	25	
Operating temperature range	0 ... 40 °C (above which: power is reduced)	
Relative atmospheric humidity	5 ... 95 % (non-condensing)	
Noise level	typically < 65 dBA (dependent on output)	
Protection mode	IP20 (details on request)	
Installation height	1000 m (without power loss)	
Cable entry	bottom (or specify top entry)	
Colour	RAL 7035 / RAL 7021 (or others on request)	
Ventilation	forced ventilation with redundancy	
Classification as per IEC / EN 62040-3	VFI-SS-111	
Standards		
Safety	IEC / EN 62040-1, IEC / EN 60950-1	
EMC	IEC / EN 62040-2	
Output	IEC / EN 62040-3	

Input	
Voltage	380 / 400 / 415 V \pm 15 % 3ph + N
Frequency	50 Hz \pm 5 % / 60 Hz \pm 5 %
Total harmonic distortion THDi (100% load)	\leq 3 %
Input power factor	\geq 0.99
Output (inverter mode)	
Voltage	380 V / 400 V / 415 V
Voltage tolerance (static)	\pm 1 %
Frequency tolerance	\pm 0.1 %
Total distortion THDu	Linear load: \leq 1 %
Efficiency	99 % (SE Mode), 96 % (double conversion mode)
Inverter overload mode	150 % for 60 s, 125 % for 10 min, 110 % for 30 min
Overload mode bypass	1000 % for 100 ms, 150 % for 10 min, 125 % continuous
Inverter short-circuit characteristics	> 300 % for 40 ms, > 220 % for 1 s
Short-circuit characteristics, bypass	1000 % for 100 ms
Battery	
Voltage range	396 – 691 V
Battery technologies	Lithium ion, lead, nickel cadmium

Subject to technical changes

Turnkey – your turnkey energy systems solutions, from a single source

BENNING offers turnkey solutions both for grid-dependent and for off grid self-managed systems (refer Figure 3). These systems comprise a range of outputs of up to a megawatt for a single power feed. In addition, even larger systems can be installed, with further power feeds within a single user's network. Furthermore, this decentralised scalability enables optimised, cost-effective integration into existing infrastructures. Finally, you can make use of modular UPS technology to upgrade or retrofit your existing power storage systems to the level of smart power supply systems with independent capability.

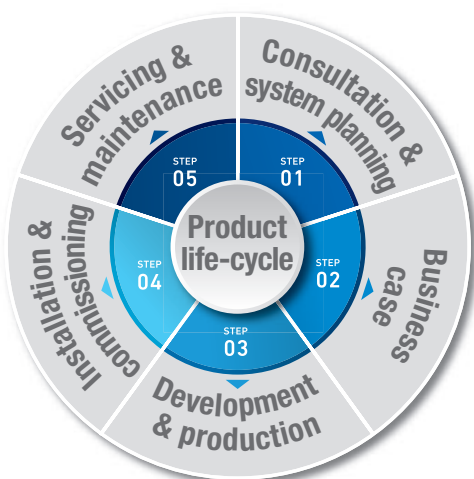


Figure 6: Support throughout life-cycle

BENNING offers you a total range of solutions from a single source

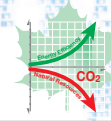
- System analysis in your company
- Optimum sizing for plant & battery output – depending on your starting point
- Total cost of ownership study as basis for your investment decision
- Hardware supply, installation and commissioning
- Incorporation of integrated EMS into your building management infrastructure
- Support for integration into existing EMS
- Servicing, maintenance or responsible operation management throughout life-cycle

ISO
9001

ISO
14001

ISO
50001

SCCP



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