Industrial Batteries / Network Power

Restore 500

»Containerized Energy Storage System«
The growing integration of renewable energy into the electrical grid creates new challenges to grid operators as well as producers and consumers of electrical energy. Renewable energy sources are highly volatile, and the power generation from wind or sun cannot be controlled. Therefore, energy might be generated when there is no consumption or there will be consumption when no renewable energy is available.

Battery energy storage solutions play a major role in compensating this imbalance and its related costs. GNB® Industrial Power has developed Restore 500, a modular „Plug & Store“ energy storage system that helps to control energy from renewables and stabilizes the power generation and consumption.

The Restore 500 series is a turn-key solution for easy transportation and installation. The planning and execution schedules can be significantly reduced thanks to the modular and standardized assembly. GNB’s integrated Battery Management System continuously detects and evaluates relevant battery data to operate the battery in partial state of charge - this ensures a significant reduction of total cost of ownership of the overall system.

Restore 500 is the right choice for applications such as Hybrid & Green Deployment, Grid & Power Quality, Renewable Energy Management, or Back-up Power (UPS).

**Benefits**

- **Plug & Store**
  
  Turn-key solution, easy to install on customer site

- **Standardized and certified design**
  
  Standardized building blocks fulfilling all norms for battery rooms, certification according to CE; UL, TÜV and others possible

- **Ready for worldwide use**
  
  Fulfills all requirements for transport, auxiliary voltage and climatisation

- **Extended cycle life**
  
  GNB® battery management algorithms to maximize battery life

- **Reduction of investment cost**
  
  Advanced lead-acid batteries enable maximum performance at minimum invest costs.

- **Optimization of operational cost**
  
  Significant reduction of total cost of ownership through integration of the cost optimized and durable Restore 500

- **Environmentally friendly and sustainable**
  
  Recyclable and energy efficient production
Batteries & Battery Rack
Restore 500 systems are equipped with proven dryfit® Gel batteries, which were developed specifically for applications where high energy throughput and cycling is required.

Battery Monitoring and Management System
Optimized charging and control algorithms will maximize the high cycle life of the GNB batteries and ensure an optimal performance of the system.

Climate Control
The climate control ensures optimal and controlled operating temperature of the cells even at harsh environmental conditions.

Ventilation
The ventilation system is designed according to DIN EN 50272-2 which defines the safety standards for batteries.

Monitoring and Control Unit
Peripheral equipment such as uninterruptible power supply, circuit breaker and communication infrastructure are included in the electrical cabinets.

Connection Unit
Restore 500 can be connected easily to the complete system due to „Plug & Play“.
## Specifications

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimensions</strong></td>
<td>20 ft Standard Sea Container (Length 6.06 m x Width 2.44 m x Height 2.60 m)</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>27 t</td>
</tr>
<tr>
<td><strong>Battery voltage</strong></td>
<td>560 V (Voltage adjustment possible)</td>
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<tr>
<td><strong>DC voltage range</strong></td>
<td>476 V to 756 V (Voltage adjustment possible)</td>
</tr>
<tr>
<td><strong>Auxiliary AC voltage</strong></td>
<td>88 V to 260 V, 50 Hz – 60 Hz, 1 Phase</td>
</tr>
<tr>
<td><strong>BMS</strong></td>
<td>Integrated Battery Monitoring and Management System</td>
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<tr>
<td><strong>DATA storage / logger</strong></td>
<td>Up to 8 GB local, additional centralized data storage via reliable data communication such as e.g. VPN</td>
</tr>
<tr>
<td><strong>UPS System</strong></td>
<td>Integrated uninterruptible power supply</td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td>VPN communication, IPSec, Modbus TCP, IP/UDP, Modbus RTU/ASCII, CAN, Profibus, RS232 und RS485</td>
</tr>
<tr>
<td><strong>Environmental conditions</strong></td>
<td>Ambient temperature: -20 °C to +44 °C</td>
</tr>
<tr>
<td><strong>IP protection class</strong></td>
<td>IP 44</td>
</tr>
</tbody>
</table>

### Restore 500 with A602 1130 Solar*

- **3000+ cycles** at 60 % DoD $C_{10}$
- **Recyclable**
- **Valve regulated lead-acid batteries**
- **Proof against deep discharge**
- **Maintenance-free (no topping up)**
- **Tubular plate**

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* Final discharge voltage 1.6 Vpc (Volt per cell)
** With IUI charging, at 20 °C
**Restore 500**

**Applications**

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**Hybrid & Green Deployment**

- Optimizing or replacing diesel generators
- Grid stabilization
- Grid building

Combine and optimize different power sources and storage devices to reduce operating costs and CO₂ footprint.

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**Renewable Energy Management**

- Own consumption
- Generation smoothing
- Ramp rate control

Improve and increase the integration of renewable energy sources into the existing grids to enhance CO₂-free power production and make renewable energy more controllable.

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**Grid & Power Quality**

- Grid stabilization
- Peak shaving
- Control power
- Intra day energy trading

Ensure the availability and quality of the electrical grid. Stabilize frequency and voltage and reduce the requirement for grid extension. Balance power production and consumption at different grid levels.

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**Back-Up Power (UPS)**

Ensure your operation runs 24/7, even during periods with limited or weak energy supply.
Exide Technologies, with operations in more than 80 countries, is one of the world’s largest producers and recyclers of lead-acid batteries. Exide Technologies provides a comprehensive and customized range of stored electrical energy solutions. Based on over 120 years of experience in the development of innovative technologies, Exide Technologies is an esteemed partner of OEMs and serves the spare parts market for industrial and automotive applications.

GNB Industrial Power – A division of Exide Technologies – offers an extensive range of storage products and services, including solutions for telecommunication systems, railway applications, mining, renewable energy, uninterrupted power supply (UPS), electrical power generation and distribution, fork lifts and electric vehicles.

Exide Technologies takes pride in its commitment to a better environment. An integrated approach to manufacturing, distributing and recycling of lead-acid batteries has been developed to ensure a safe and responsible life cycle for all of its products.

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