

Industrial Batteries / Motive Power

Sonnenschein Lithium



System Highlights

- > Fast Charge in 1 hour
- > 4000 cycles at 80% depth of discharge
- > Full system supply, BMS, modules, tray and charger



»The **high productivity,**
fast charge battery«

Sonnenschein Lithium

Making even your break time productive

Sonnenschein Lithium, the intelligent energy source, maximizing your productivity

GNB® can offer a range of different Lithium technologies to meet your applications needs. The current solution employs Lithium Iron Phosphate offering an optimal mix of cycling, power and safety.

Typical applications: 24/7 materials handling where battery change is necessary with lead-acid technology, fast charge applications like AGV and applications where space and/or weight is an issue.

The modular architecture of the Sonnenschein Lithium battery system allows GNB to retrofit the majority of existing tray designs.

Advantages over conventional traction batteries:

The intelligent Energy Storage System that maximizes your productivity:

- > No more need for spare batteries/trucks - using fast opportunity charging
- > Longer operating times - using breaks for fast charging
- > Reduced energy costs through efficient charging
- > No topping up required - less maintenance cost
- > Real-time data to improve fleet management
- > Flexible modular solution that meets your specific needs

Sonnenschein Lithium reduces your Total Cost of Ownership (TCO)

Lithium technology combines high performance with “install & forget“



High cycle life



Very fast opportunity charging – full recharge in 1h



No gas emission



High energy density



24/7 applications / Multi-shift



Maintenance-free during the whole service life

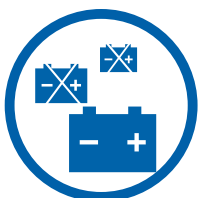


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Features and Benefits

Sonnenschein Lithium reduces your Total Cost of Ownership

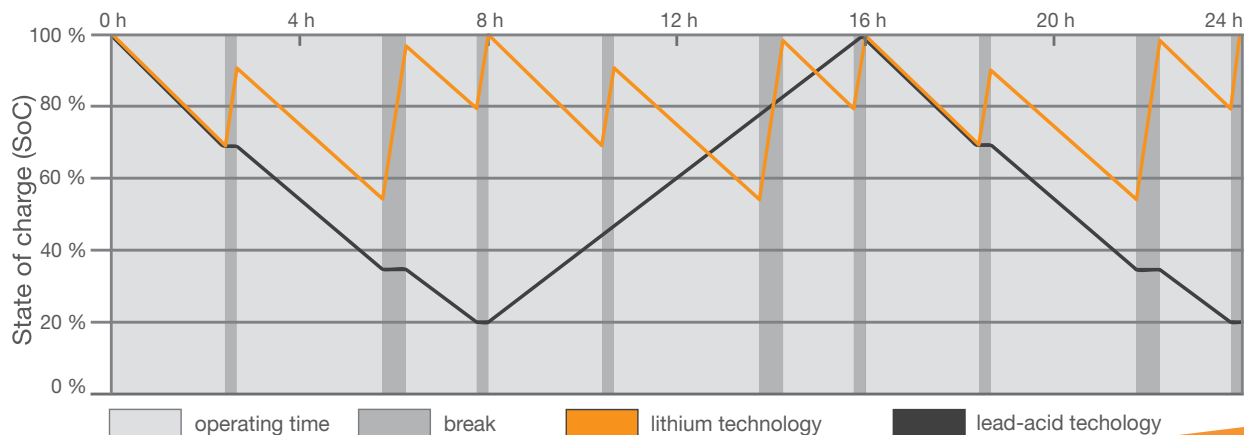
There are many elements that contribute to the low Total Cost Of Ownership of Lithium.



No need for Battery Replacement

Thanks to the fast charge capability of Lithium there is no longer any need to swap batteries. This battery replacement consumes 10 to 15 minutes on average. Avoiding this down time increases your operational efficiency and reduces your costs. Furthermore the removal of the spare batteries means you can reduce your vehicle fleet, you need less chargers and battery exchange equipment does not need to be purchased or maintained. There is more space for your core business.

Driving profile in 24/7 materials handling

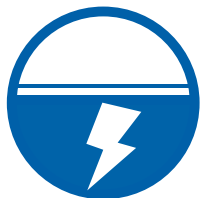


The lithium battery can be charged during breaks!



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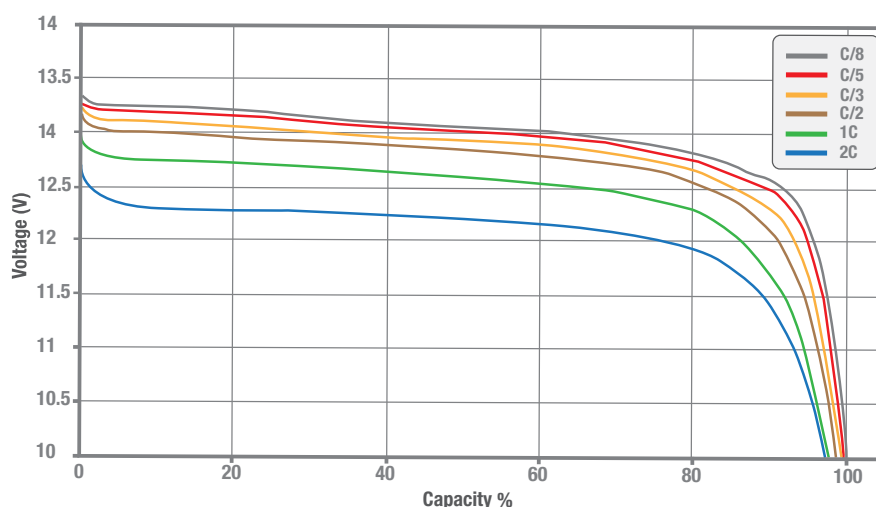
Making even your break time productive



Voltage Stability under high discharge regimes

The Sonnenschein Lithium solution maintains a very stable voltage profile even under high discharge conditions. This ensures that in a demanding environment the Sonnenschein Lithium battery delivers a higher percentage of its name plate capacity than traditional lead acid. This means that a smaller capacity Lithium battery can provide the same usable energy as a larger capacity lead acid battery.

Sonnenschein Lithium Voltage Profiles at Various Discharge Rates
23°C Ambient Temperature



Charge Efficiency

The Sonnenschein Lithium solution has an extremely high Ah charge efficiency of greater than 95%, this means that more of the energy that you pay for is used to move your goods and less energy is wasted in overcharge which lowers your costs, reduces your CO₂ footprint and impact on the environment.

The battery performs particularly well with regenerative braking. Energy recovery and charge acceptance is high making the entire system more efficient and the running costs lower.



Maintenance

The GNB Sonnenschein Lithium system is a maintenance free solution. There is no need for water filling which greatly decreases your operating costs and increases your vehicle availability.

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Total Cost of Ownership

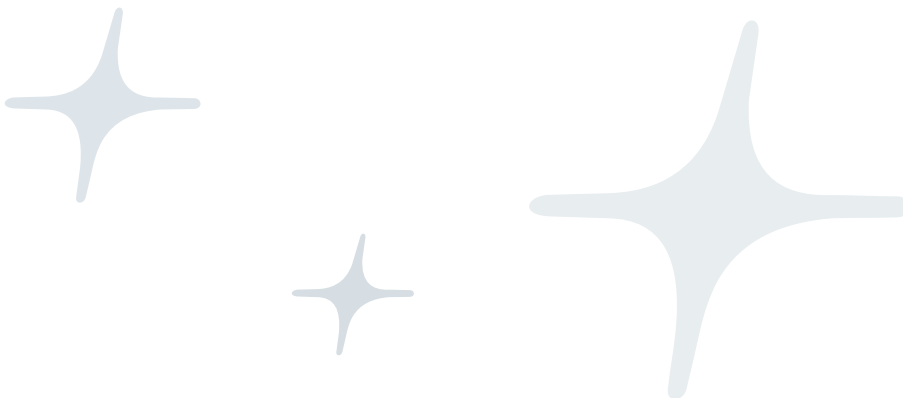
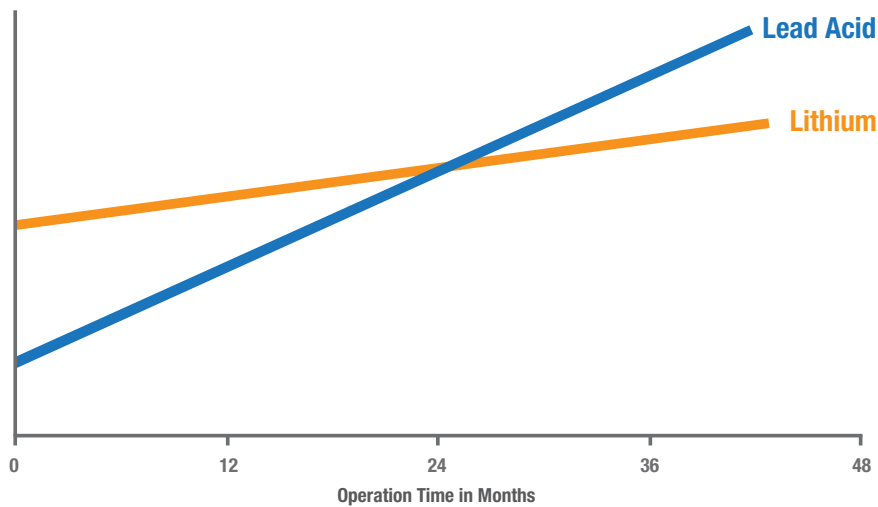


Zero Gassing

During charging there is no need for gas extrusion equipment as the battery is completely sealed. This also means that the chargers can be placed throughout the facility and do not need to be centralised as is the case with lead acid, this allows more efficient usage of the space inside your facility. Expensive acid protected charging areas are also not required.

The sealed nature of the battery makes it ideal for sensitive environments such as food or pharmaceutical for example.

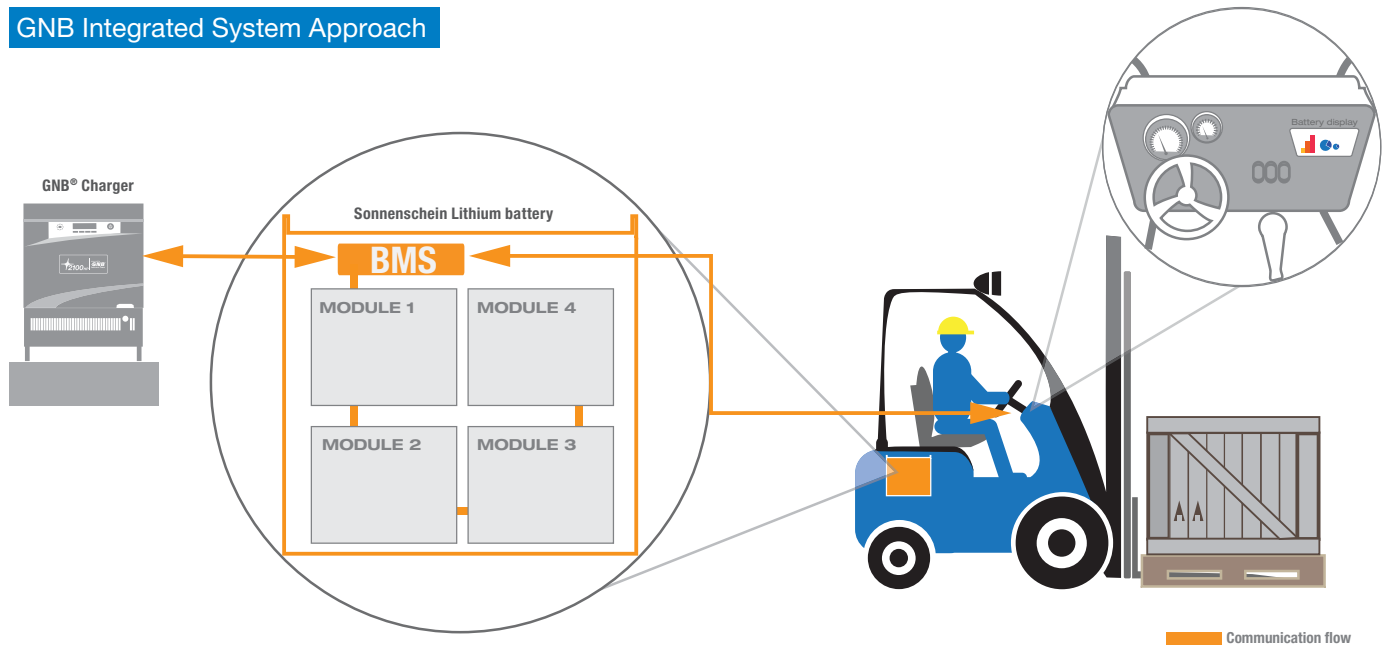
Total Cost of Ownership - Lithium vs. Lead Acid for high intensity operation



Sonnenschein Lithium BMS

Battery Management System

GNB Integrated System Approach



Specifications

- > Ensuring operational safety by monitoring and managing system parameters such as voltage, current and temperature
- > Maximising operational performance and delivered capacity through controlled balancing.
- > Control of the GNB Lithium Charger, ensuring the fastest and safest charge possible.
- > Accurate SOC calculation using algorithms developed over many years.
- > Managing the communication of data between the modules via an internal communication bus
- > Operation of thermal management systems (if required)
- > GNB can fully integrate and communicate with the vehicle. This requires the collaboration of the OEM.



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Technical data

Technical data

GNB offers a range of modules of differing voltages and capacities. These modules can be connected in series and parallel to meet your energy and power needs.

Traditional Lead Acid Voltage	System						
	Nominal Voltage	Capacity	kWhs	Cut Off Voltage	Max Charge Voltage	Constant Discharge Current	Peak Discharge Current
24 V	25.6	110	2.8	20.0	29.2	150	300
	25.6	138	3.5	20.0	29.2	150	300
	25.6	220	5.6	20.0	29.2	300	600
	25.6	276	7.1	20.0	29.2	300	600
	25.6	330	8.4	20.0	29.2	450	900
	25.6	414	10.6	20.0	29.2	450	900
48 V	51.2	110	5.6	40.0	58.4	150	300
	51.2	138	7.1	40.0	58.4	150	300
	51.2	220	11.3	40.0	58.4	300	600
	51.2	276	14.1	40.0	58.4	300	600
	51.2	330	16.9	40.0	58.4	450	900
	51.2	414	21.2	40.0	58.4	450	900
	51.2	440	22.5	40.0	58.4	600	1200
	51.2	552	28.3	40.0	58.4	600	1200
80 V	89.6	110	9.9	70.0	102.2	150	300
	89.6	138	12.4	70.0	102.2	150	300
	89.6	220	19.7	70.0	102.2	300	600
	89.6	276	24.7	70.0	102.2	300	600
	89.6	330	29.6	70.0	102.2	450	900
	89.6	414	37.1	70.0	102.2	450	900
	89.6	440	39.4	70.0	102.2	600	1200
	89.6	552	49.5	70.0	102.2	600	1200
	89.6	550	49.3	70.0	102.2	750	1500
	89.6	690	61.8	70.0	102.2	750	1500





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, photovoltaic (solar 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.