

## Industrial Batteries / Motive Power

### Product Overview

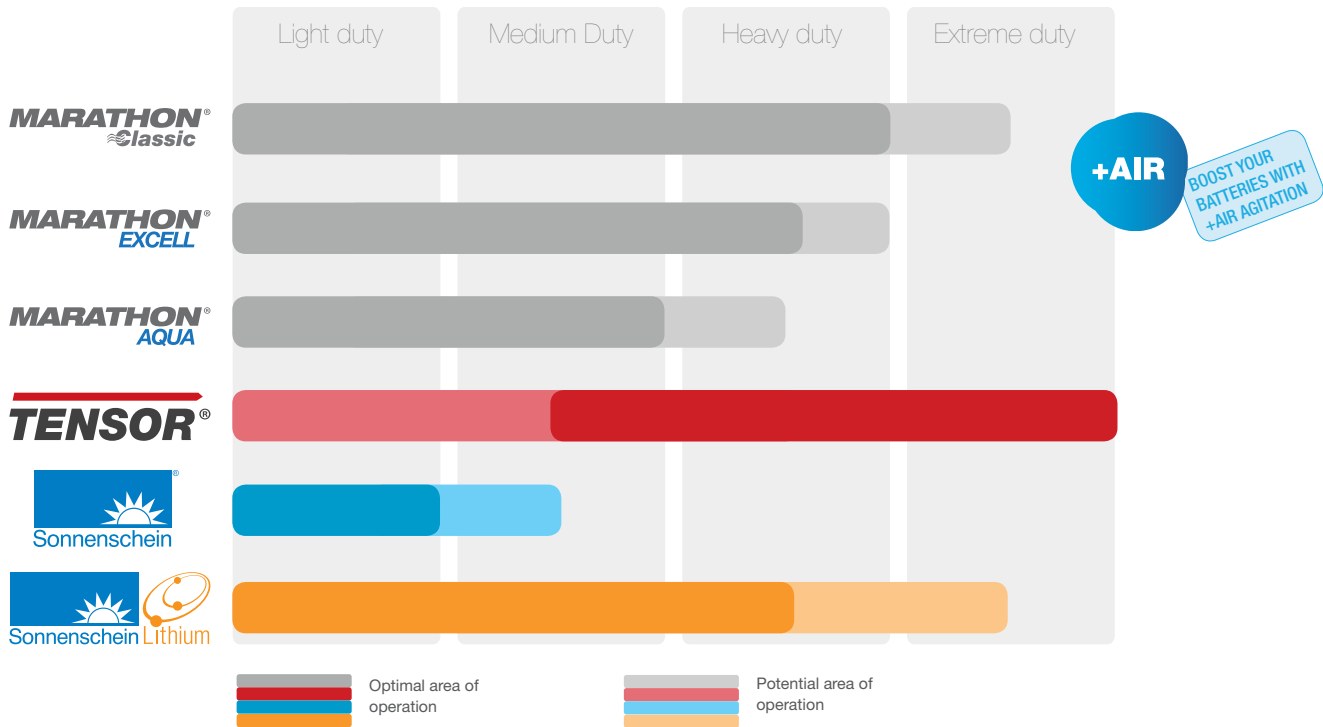
»*Powering a world  
on the move*«



## Energy solutions

### More than just batteries

Widely recognized as the superior stored electrical energy solution supplier, GNB® Industrial Power offers proven solutions for materials handling equipment, road vehicles, tow tractors, and other electric vehicles with high energy and cyclic endurance demands. Regardless of what your requirements are, GNB® will deliver the ideal system solution.



#### Light Duty

- > Limited handling performance
- > 1 or 2-shift operations
- > Normal environmental conditions
- > Indoor applications, even ground
- > Example: hand pallet truck in a supermarket

#### Medium Duty

- > Medium handling performance
- > 1 or 2-shift operations
- > Temperature variations, dust
- > Partial outdoor applications, uneven ground
- > Example: 1-2t forklift at a loading ramp

#### Heavy Duty

- > High handling performance
- > 2 or 3-shift operations
- > Elevated temperatures, dust
- > Partial outdoor applications, uneven ground
- > Examples: 3-5t forklift, order picker, VNA truck in warehouse

#### Extreme Duty

- > Superior handling performance
- > 2 or 3-shift operations
- > High dust load, very high or low temperatures
- > Indoor/outdoor applications
- > Accessory equipment (clamps, multiple forks)
- > Examples: Forklifts over 5t, distribution centres, cold storage, mining, chemical industry

# RUNNING FOR YOUR BUSINESS

From now on, GNB Liberator and Classic batteries combine all of their power **under the new MARATHON brand.**



GNB® Industrial Power uses its technical expertise to make your business more profitable. The efficient and reliable GNB MARATHON team goes the distance for your business.

## Lead-acid battery technology with liquid electrolyte

### Marathon Classic / Marathon Excell

#### Marathon Classic

EPzS batteries are the ideal means of energy storage for all warehousing applications. They can power materials handling machines, cleaning machines and tractors as well as mobile lifting platforms, electric road vehicles and electric/hybrid boats with the energy and the cycle performance they require.

##### Main technical features and benefits:

- > Vented, robust lead-acid battery technology with liquid electrolyte
- > Proven tubular plate technology for highest performance levels and reliability
- > Long cycle life and high energy density
- > Fully insulated, bolted terminals and connectors
- > Leak-proof terminal bushing
- > Manufactured in accordance with DIN EN ISO 9001
- > DIN cells according to IEC 60254-2 series L
- > Environmental management in accordance with DIN EN ISO 14001
- > Option: Explosion-proof version (ATEX)
- > Recyclable

**MARATHON®**  
*Classic*



#### Marathon Excell

With proven PzS technology and a unique low antimony lead alloy, the Marathon Excell series impresses with its high efficiency combined with minimal service. Watering intervals of up to 24 weeks reduce the service costs to a minimum. With a wide range of cell variants, the Marathon Excell is also perfectly suited to all applications.

**MARATHON®**  
**EXCELL**



##### Main technical features and benefits:

- > Unique low antimony alloy for minimum maintenance and maximum reliability over the lifetime of the battery
- > Significantly reduced water loss and adjusted charging regime give both cost savings and a reduced carbon footprint
- > Sensor to indicate electrolyte level of the batteries and automatic watering system are available
- > Optimised charge characteristics of GNB® chargers allow extended watering intervals: Marathon Excell 16 weeks (80 cycles) / with AIR agitation up to 24 weeks (120 cycles)
- > Use of proven PzS technology (tubular plates) guarantees long durability
- > Exceptional cell diversity for all application areas:  
DIN EPzS (120 – 1240 Ah) and BS EPzB cells (110 – 800 Ah)



## Minimum maintenance

### Marathon Aqua

#### Marathon Aqua

For maximum extended watering intervals, Marathon Aqua is the right choice. Based on the proven and reliable tubular plate, this technology is an evolution with extremely low maintenance and operational costs.

**MARATHON**  
**AQUA**

#### Main technical features and benefits:

- > Unique low antimony alloy and high electrolyte content for minimum maintenance and maximum reliability
- > Reduced water loss due to optimized charging regime
- > Extended watering intervals from 30 weeks (150 cycles) up to 40 weeks (200 cycles)
- > Long watering intervals during the whole service life (no poisoning of negative plates)
- > Proven PzS technology (tubular plates) guarantees long durability
- > Electrolyte level sensor and automatic watering system as standard



#### Expert tip:

##### Upgrade your Batteries with +AIR!

- > Air agitation system (EUW) benefits:
  - > Reduces energy and water consumption
  - > Extends service life by reducing chemical stress and temperature rises when charging
  - > Speeds up the charging process and ensures smooth opportunity charging

**+AIR**

#### BOOST YOUR BATTERIES

**MARATHON**  
**CLASSIC+AIR**

**MARATHON**  
**EXCELL+AIR**

**MARATHON**  
**AQUA+AIR**

All MARATHON batteries can be equipped with AIR agitation – a forced electrolyte circulation system – for extended water-refilling intervals and high cycle life. +AIR reduces energy and water consumption even further to maximise cost savings and minimise your CO<sub>2</sub> footprint.



## Maintenance-free Batteries

### Sonnenschein and Sonnenschein Lithium

#### Range EPzV / EPzV-BS

The dryfit® EPzV(-BS) series is suitable for all warehousing applications. It can be used in forklift trucks, cleaning machines and electric road vehicles. Due to its high operational safety, this model is particularly suitable for applications in the food, pharmaceutical and chemical industry.



#### Main technical features and benefits:

- > VRLA (valve regulated battery technology), electrolyte is fixed in a gel
- > Maintenance-free (no topping up) during the whole service life due to the Sonnenschein dryfit® technology
- > No contamination or corrosion caused by liquid electrolyte
- > Very low self-discharge
- > Available in DIN- and BS-sizes according to IEC 60254-2
- > Option: Explosion-proof version (ATEX)
- > Recyclable



#### Batteries up to 15 kWh for light and medium applications

- > 80 % depth of discharge
- > Intermediate recharge permissible
- > Recharge possible in 10 hours (60% DoD, depending on assigned charging current)

#### Sonnenschein Lithium

GNB® can offer a range of different Lithium technologies to meet your application 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.



#### Main technical features and benefits:

- > Fast charging capability in 1 hour
- > Optimised for opportunity charging
- > Zero maintenance
- > No gassing
- > Key parameters measured and recorded
- > Full system including modules, BMS, tray and charger
- > Operation of thermal management systems (if required)
- > GNB can fully integrate and communicate with the vehicle



## Lead-acid battery technology with liquid electrolyte

### TENSOR<sup>®</sup>

#### TENSOR

The increasing demands of modern trucks require batteries which comprise high performance and energy efficiency. Based on many years extensive experience of producing high performance batteries (e.g. for submarines), GNB<sup>®</sup> has developed the next generation of lead-acid batteries: The core benefits of TENSOR are an increase in performance, capacity and energy efficiency.

#### Technical features and benefits:

- > Increased performance due to high power density
- > Increased run time due to high energy content and efficient energy recovery
- > Longer operational life due to low operating temperature
- > Energy cost savings due to excellent energy efficiency
- > Suitable for ultra fast charging and opportunity charging\*
- > High performance in cold storage and outdoor applications
- > Especially suitable for heavy-duty and high-current applications

\* when used with AIR agitation system and GNB<sup>®</sup> charger (2100HP)

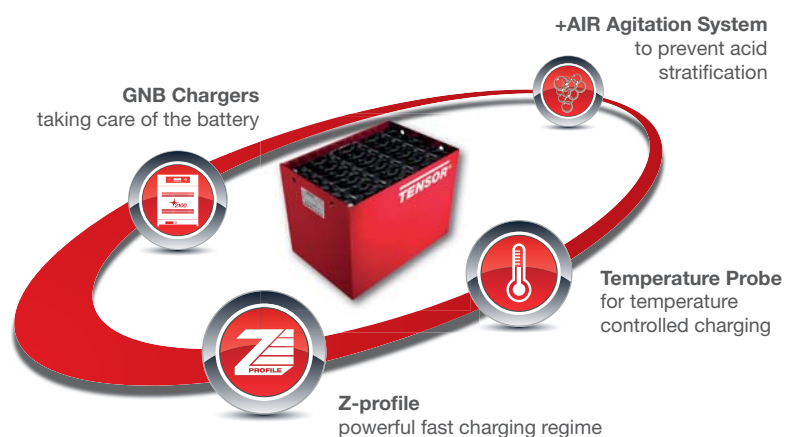


#### Fast charging of TENSOR batteries

TENSOR batteries are designed to significantly decrease downtimes, therefore these batteries allow a full recharge from 80% depth of discharge in just 4 hours. This is possible due to the excellent charge acceptance of TENSOR batteries and the high efficiency, which leads to a cooler battery and very low energy losses.

#### The TENSOR fast charging package

All components of the GNB fast charging package for TENSOR batteries are working perfectly together with one goal – fast recharging of TENSOR batteries under optimized conditions.



#### Multi-charging characteristic Z-profile

The highly sophisticated charging regime (Z-profile) in combination with +AIR agitation and a temperature probe supports the excellent fast charging characteristics of TENSOR. At the same time this TENSOR fast charging setup enables frequent fast opportunity charging of TENSOR batteries during available pauses. The +AIR agitation effectively prevents the acid stratification effect and ensures that the TENSOR battery stays powerful and healthy.

## Flooded block batteries

### Flat (grid) and tubular plate

#### Range FF

The FF range\* is suitable for mobile elevating work platforms, cleaning machines, leisure and many other Motive Power applications because of its good high-rate discharge capability.

##### Main technical features and benefits:

- > Vented batteries with positive flat (grid) plates
- > Good high-rate discharge capability
- > 300 cycles according to IEC 60254-1

**MARATHON®**  
Classic



#### Range FT

The FT range\* is suitable for applications in harsh environments e.g. golf carts, cleaning machines, mobile elevating work platforms, electric elevating platform trucks.

##### Main technical features and benefits:

- > Vented batteries with positive tubular plates
- > Reliable and durable
- > Good performance values for medium and low discharge currents
- > 900 cycles according to IEC 60254-1

**MARATHON®**  
Classic



\* GNB® Industrial Power as your partner for system solutions also offers optimised chargers for these blocks.



## VRLA block batteries

### dryfit® technology

#### Range GF-Y (dryfit® A500 Cyclic)

The GF-Y range\* is particularly suitable for the leisure and mobility market with applications including electric boats, golf carts, wheelchairs, and scooters.



##### Main technical features and benefits:

- > VRLA (valve regulated battery technology), electrolyte is fixed in a gel
- > Maintenance-free (no topping up) during the whole service life due to the Sonnenschein dryfit® technology
- > 450 cycles according to IEC 60254-1
- > Very robust



#### Range GF-V (dryfit® traction block)

The GF-V range\* of blocks is suitable for heavy industrial use. This includes applications for automated guided vehicles, mobile elevating work platforms, cleaning machines, walk behind pallet trucks, electric cars, and buses.



##### Main technical features and benefits:

- > VRLA (valve regulated battery technology), electrolyte is fixed in a gel
- > Maintenance-free (no topping up) during the whole service life due to the Sonnenschein dryfit® technology
- > 700 cycles according to IEC 60254-1
- > Extremely robust



\* GNB® Industrial Power as your partner for system solutions also offers optimised chargers for these blocks.

## VRLA block batteries

### AGM technology

#### Range AF (AGM Technology)

The AF\* range of batteries is suitable for all light traction applications and combines favorable investment costs with no maintenance over the entire battery life.

##### Main technical features and benefits:

- > VRLA (valve regulated battery technology) battery, AGM technology
- > Maintenance-free (no topping up)
- > 350 cycles at 60% depth of discharge (DoD)



**drysafe®**

#### Range AS with spiral wound technology

The AS\* range is suitable for all applications with a high power demand (discharge currents and charge acceptance), like hybrid drive and automated guided vehicle systems.

Additionally, AS-batteries offer excellent micro-cycle durability for applications with high opportunity charge rates, for example cleaning machines.

##### Main technical features and benefits:

- > VRLA battery with grids in spiral wound design
- > Maintenance-free (no topping-up)
- > Superior high power performance (discharge and charge acceptance)
- > Good high power performance at low temperature
- > Ideal for opportunity charging and fast charging
- > Excellent micro-cycle durability, especially at partial state of charge
- > Vibration resistant
- > 450 cycles according to IEC 60254-1



**drysafe®**  
RECUP

\* GNB® Industrial Power as your partner for system solutions also offers optimised chargers for these blocks.

## More capacity with safety in potentially hazardous areas

### ATEX

#### Certified safety accreditation

Hazardous area traction batteries by GNB<sup>®</sup> Industrial Power meet the demands required by the EC Directive 1999/92 (ATEX 137) 'user guide line' and EC 94/9 (ATEX 95) 'producer guideline'. GNB<sup>®</sup> Industrial Power ATEX batteries can be used in sensitive areas by offering the highest level of protection. The specially developed trays are characterised by effective ventilation, robust construction and compact design. This gives the potential to provide the maximum battery capacity needed in ATEX protected trucks.



#### Main technical features and benefits:

- > GNB<sup>®</sup> ATEX batteries completely fulfil the ATEX directive 94/9 EC
- > Due to the compact tray design, the installation of battery capacities equal to standard batteries for conventional applications is possible
- > Safe bolted connectors facilitate easy maintenance and repair of the battery in combination with special screws
- > Special batteries are also possible within the design constraints of ATEX
- > ATEX batteries are available in single, double or multi tray arrangements
- > The specially developed tray air ventilation prevents a dangerous concentration of hydrogen on the surface of the cells
- > The tray lid has appropriate ventilation slots and fulfills the above requirements of protection class IP23



## Chargers

### 2100 Chargers, Fleet Management and Battery Monitoring

#### 2100 Charger range

To meet the increased requirements of modern Motive Power batteries, GNB® Industrial Power uses its integrated project planning expertise to offer the ideal charging technology for your energy system. You benefit from better solutions and increased economic efficiency!

As a system provider of energy solutions, GNB® possesses more experience than any other company in the field. The combination of efficient GNB® charging technology and optimally adapted components ensures long service life and high performance for your valuable battery. GNB's powerful 2100 range includes an extensive portfolio of chargers for every type of Motive Power battery.




#### 2100.net Fleet Management

The innovative 2100.net system from GNB combines intelligent fleet management with comprehensive battery monitoring. With more than 120 years of experience in battery development, production and application, GNB is your reliable partner for energy and cost-efficient customised solutions:

- > Low operating costs – optimise utilisation of your battery fleet
- > Central monitoring – determine battery availability via a central computer
- > Access all important data over the entire service life of the battery
- > Identify errors quickly and reliably



#### 2100 Battery Monitoring

The battery monitoring function of 2100.net gives you access to all important data throughout the service life of a battery. With 2100.net, you require no electronic devices on the battery. A plug with an integrated RFID chip enables accurate battery identification and provides an extensive reporting system for battery picks, chargers and individual batteries.



Battery



BattID



Charger



## Accessories

### Useful add-ons for your batteries

#### Automatic watering system

For quick and safe topping-up of vented batteries, single point watering systems are recommended to enhance economy and safety.

GNB® Industrial Power offers two systems:

- > Float system
- > Injector system



#### Watering tanks

GNB® Industrial Power also offers many useful components, including watering systems.

- > Mobile or wall mounted
- > Water gun and equipment
- > Water deioniser

#### AIR agitation (EUW)

Flooded cells can be equipped with a forced electrolyte circulation system (EUW). The cells will be equipped with a flexible tube with a tee. This tube is installed next to the plate set.



#### Electrolyte level sensors

To ensure safe use of Motive Power batteries, various sensors have been developed to control the electrolyte level of batteries. All sensors are of the same design and incorporate the same technology.

Optional extras:

- > LED for remote dashboard
- > Multilayer
- > Battery-plug mounted

## GNB® Service

Keeping your business moving

### GNB® is the expert

Who could do the job better than the professionals at a company with more than 120 years of experience in battery development and production?

**Leave batteries and charger maintenance to the professionals. A GNB® service contract delivers exceptional time savings, cost savings and increased safety!**

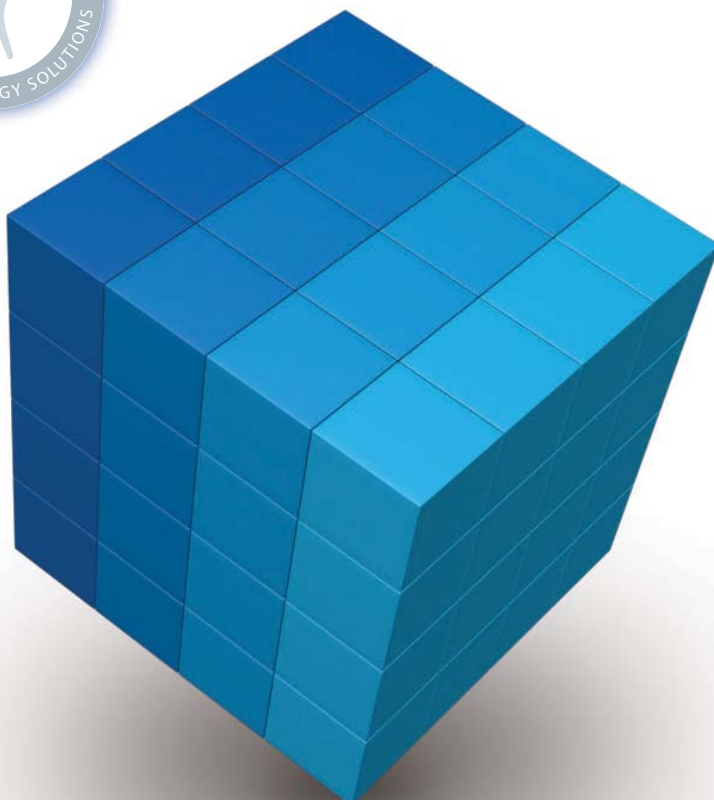


### Whatever your application – GNB® has the experience



Professional handling is the key to a long service life for your batteries and chargers and to the maximum uptime of your fleet.

Based on many years of experience GNB® is your competent partner for all questions regarding batteries and chargers. GNB® offers tailored solutions to power your intralogistic operations.



- ✦ **Inspection Contract**
- ✦ **Maintenance Contract**
- ✦ **Lifetime Warranty Contract**
- ✦ **Full Service Contract**



»GNB® Service –  
*individualised, professional  
service across Europe!*

## Best of battery technology

### Our Brands


**MARATHON®**  
*Classic*

MARATHON Classic, formerly known as Classic, represents quality and durability in Motive Power applications with products that have been designed and manufactured with highest precision.


**MARATHON®**  
**EXCELL**

**MARATHON®**  
**AQUA**

Two new strong brands for a unique product technology developed by GNB® Industrial Power: Marathon Excell and Marathon Aqua stand both for super-low maintenance batteries incorporating proven tubular plate technology and the latest battery and charger design.


**TENSOR®**

The TENSOR brand stands for the innovative high-power battery made by GNB® Industrial Power. Based on many years of experience with the CSM technology for submarine batteries, stationary applications (OCSM) and traction applications (ECSM) GNB® has developed the next generation of lead-acid batteries. Increased performance, capacity and energy efficiency are the core benefits of TENSOR.


**Sonnenschein®**

A global brand with a strong reputation and technical image providing market-leading Gel-technology batteries for most Motive Power applications. Sonnenschein was established in 1910 and under this brand, the famous dryfit® technology was invented.


**Sonnenschein Lithium**

Sonnenschein Lithium brings together the global reputation of the Sonnenschein brand with the latest Lithium technology. With outstanding cycling, fast charge and high energy density Sonnenschein Lithium represents a major step forward in energy storage capability.


**drysafe®**

GNB® offers AGM batteries for traction applications under the drysafe® brand. A speciality of this range are the drysafe® RECUP batteries manufactured by GNB® – VRLA battery with grids in spiral wound design, which are characterized by high-current capability and micro-cycle tolerance.

**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.

**www.gnb.com**