

# PRODUCT OVERVIEW

## INDUSTRIAL BATTERIES / MOTIVE POWER



# 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*	MEDIUM DUTY*	HEAVY DUTY*	EXTREME DUTY*
MARATHON CLASSIC			
MARATHON EXCELL			
SENSOR			
SENSOR XGEL			
SONNENSCHN			
SONNENSCHN LITHIUM			

● Optimal area of operation    ● Potential area of operation

## \*Light Duty

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

## \*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

## \*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

## \*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



# BEST OF TECHNOLOGY OUR MAIN BRANDS



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



Strong brand for a unique product technology developed by GNB® Industrial Power. MARATHON Excell stand both for super-low maintenance batteries incorporating proven tubular plate technology and the latest battery and charger design.



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 and traction applications (ECSSM) GNB® has developed the next generation of lead-acid batteries. Increased performance, capacity and energy efficiency are the core benefits of TENSOR.



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.



TENSOR xGEL is the innovative combination of the maintenance-free Sonnenschein and the high performance TENSOR technology.



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.

TO EXTREM DUTY

SUPERIOR HANDLING  
PERFORMANCE



# MARATHON CLASSIC / MARATHON EXCELL LEAD-ACID BATTERY TECHNOLOGY WITH LIQUID ELECTROLYTE

**MARATHON**<sup>®</sup>  
Classic

## 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
- Recyclable



## 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.

### 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<sup>®</sup> 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)

**MARATHON**<sup>®</sup>  
EXCELL



## BOOST YOUR BATTERIES

**MARATHON**<sup>®</sup>  
CLASSIC+AIR

**MARATHON**<sup>®</sup>  
EXCELL+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.

**+AIR REDUCES  
ENERGY AND WATER  
CONSUMPTION**

# TENSOR

## REDUCE TOTAL COST OF OWNERSHIP FOR HEAVY-DUTY APPLICATIONS



### TENSOR POWER THAT PAYS



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® has developed the next generation of lead-acid batteries: The core benefits of TENSOR are an increase in performance, capacity and energy efficiency.



### Advantages Over Conventional Traction Batteries

- **Better performance** due to high power density
- **Longer running times** due to high energy content and efficient energy recovery
- **Longer operational life** due to low operating temperature
- **Higher energy cost savings** due to excellent energy efficiency
- Suitable for **fast charging** and **multi-opportunity charging\***
- **Fast charging** (complete recharge in 4h)\*
- **Multi-opportunity charging** possible\*
- **Increased transshipment performance** (>50%) at low temperatures
- **Maximum performance** in heavy-duty applications
- **Performance reserves** for high current demands

### Fast Charging of TENSOR Batteries and The Fast Charging Package



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.

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



## ONE FORKLIFT LIFE - ONE BATTERY OVER 10.000 OPERATING HOURS

With a TENSOR battery on board, trucks can run significantly more hours per charging cycle. This means that even for the same cyclic life the total operating hours will be much higher compared to standard batteries. Moreover, thanks to the lower average operating temperature of TENSOR, the overall battery lifetime will be increased as well. Those unique features make TENSOR technology the unbeaten operating hours champion in intralogistics.

<b>TENSOR</b>	 More than 10,000 operating hours*
STANDARD LEAD BATTERY	 6,000 - 7,000 operating hours*

# TENSOR XGEL AND SONNENSCHN HIGH PERFORMANCE AND ZERO MAINTENANCE

## TENSOR xGEL

**TENSOR<sup>®</sup>**  
**XGEL**

With the expertise of SONNENSCHN gel and TENSOR technology, GNB<sup>®</sup> Industrial Power is in an excellent position to create something new which meets the demands of the market: A zero maintenance battery offering high performance – TENSOR xGEL.

TENSOR xGEL technology offers increased available capacity and decreased time required for recharging. Additionally, TENSOR xGEL cells minimize heat evolution inside the cells, thus increasing the battery's efficiency and service life. The no-fill / no-spill nature of the TENSOR xGEL battery means no watering is required. With its larger internal surface area, opportunity charging is also possible. Ideal for use as a replacement or alternative to standard flooded batteries, also in two-shift applications. The result is a versatile maintenance-free battery technology setting a new standard of valve regulated lead-acid batteries.



## Technical Advantages & Your Benefits



**dryfit<sup>®</sup> Gel technology /  
No water refilling**



**High energy content /  
Long operational times**



**Large cell capacities  
available / More power**



**High charge acceptance /  
Quick recharge**



**Robust & maintenance-free /  
Long service life**



**Low internal resistance /  
High efficiency**

“THE **MAINTENANCE-FREE** BATTERY THAT **MATCHES**  
OR EVEN **OUTPERFORMS** CONVENTIONAL TRACTION BATTERIES”

## Sonnenschein EPzV / EPzV-BS

The dryfit<sup>®</sup> 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<sup>®</sup> technology
- No contamination or corrosion caused by liquid electrolyte
- Very low self-discharge
- Available in DIN- and BS-sizes according to IEC 60254-2
- 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

# SONNENSCHN LITHIUM MATERIAL HANDLING SOLUTIONS MOVE MORE GOODS – FASTER!



## SONNENSCHN LITHIUM

GNB's new Sonnenschein Lithium Material Handling Batteries were designed to match your demands. With a clear focus on enhancing your fleet's runtime and optimizing total cost of ownership, they keep your business up and running. With one fully charged Sonnenschein Lithium Material Handling Battery, you can enjoy up to 33% more pallet movements compared to other available systems!

An integrated monitoring system summarizes all relevant data in automatic executive reports. A traffic-light system allows potential problems to be quickly identified and corrected, saving users money and significantly increasing uptime of vehicles and batteries. Your investment is further protected by deep discharge protection and state-of-charge reporting, helping you achieve the lowest total cost of ownership.



## Our quick-fit retrofit – Safe and simple

Sonnenschein Lithium has a reputation for robust real-world performance. When retrofitting lead-acid to lithium-ion technology, we understand that keeping it simple reduces stress for your operators. The system's safety and simplicity for your operators continue Exide's achievement of the lowest total cost of ownership and the fastest retrofitting of lead-acid systems. We provide Sonnenschein Material Handling tray batteries in DIN dimensions and weights for convenient and ultrafast 1:1 replacements of lead-acid DIN tray batteries within minutes. Go Lithium now and benefit immediately from lower total cost of ownership – over €1,000,000 savings for an average-sized fleet.



**YOUR BENEFITS\***

- Up to 10% better total cost of ownership
- Up to 33% more pallet movements
- 25 vehicles = average €500,000 operational savings\*\*



\* Compared to other Lithium-ion technologies  
\*\* Over a battery life time of five years



# GNB FLEET® UP YOUR UPTIME



## Let your equipment call you before it's too late

GNB Fleet® means maximum fleet uptime. Whether you have one site or many, our smart connected chargers provide GNB Fleet® with vital battery and charger information. Detects issues with batteries or chargers well before your business is affected.

Once your batteries and chargers are online with GNB Fleet®, they may simply request Service on themselves. This keeps your intralogistics running at all times. Alternatively, site and shift managers may receive email alerts, enabling preventive servicing and other countermeasures. Let your equipment call you before it's too late. GNB Fleet® ensures constant and reliable material handling in all your warehouses at all times. Analyzing your data may also reveal optimization potential, e.g. energy management to reduce your operational expenses.

### YOUR BENEFITS

- Monitoring of battery and charger vital parameters
- Automated alarm emails for logistics management
- Corrective actions for maximum fleet uptime



## GNB Fleet® for every fleet

GNB Fleet® results in consistent use of batteries which eliminates undue stress on any one of them. It also removes downtime which keeps the fleet moving constantly and elevates the handling rate. Key Performance Indicators of one or more intralogistics sites are conveniently summarized and displayed on a dashboard. We offer several GNB Fleet® versions, from a rotation system to the most sophisticated multi-site management.

	GNB FLEET ESSENTIAL	GNB FLEET PREMIUM	GNB FLEET ULTIMATE
Indication of battery priority, battery availability	✓	✓	✓
Battery lifetime and warranty management (with BattID)	✓	✓	✓
Cloud-uplink and online access to live data anytime, anywhere and from any internet enabled device like PC, Smartphone, Tablet	✗	✓	✓
Automatic E-mail alert system	✗	✓	✓
Updates and remote support	✗	✓	✓
Fleet lifetime management and optimization	✗	✓	✓
Multi-Site Capability and Management	✗	✗	✓
Multi administrator roles	✗	✗	✓ 5 Admins
Users	1	3	5 per Unit
Managed chargers	500	500	Unlimited



# GNB CHARGERS ALWAYS A STEP AHEAD



## Charger and battery from one manufacturer are matched to perfection

We know that space and time equal money in your warehouse, so we provide highly efficient charging at the lowest energy costs with the highest power and smallest footprint. Our high-performance charger offers 24% more power per cubic meter than other systems. Space-saving, back-to-back installation leaves valuable room for your business. The perfectly matched charger and Sonnenschein Lithium Material Handling Batteries support fast and multi-opportunity charging, with a full recharge in just 1 hour.

### YOUR BENEFITS

- 24% more power per cubic meter than other systems
- Up to 52 days of extra uptime through charging at point of use
- Full charge in just 1 hour



## WEATHERPROOF AND CLIMATE CONTROLLED CHARGER

Our weatherproof and dustproof chargers may be installed at the point of use, saving valuable time spent driving to a central, remote charging station – generating up to 52 extra days of annual uptime for an average fleet. Your operators will also benefit from the user-friendly display and multi-language options.



SPACE & PROCESS SAVINGS IS  
**COST SAVING**

## NEXT GENERATION OF 2100 HP HIGH OUTPUT

GNB® has developed a unique extra high power charger to meet customer requirements and extend the existing charger range.

The new 2100 HP charger model enables fast and opportunity charging of even the largest batteries. This gives you the ability to increase your uptime and performance and helps to reduce your total cost of ownership.



**300 - 600 A**  
HIGH POWER CHARGER

**EXTENDED RANGE -  
FAST AND OPPORTUNITY  
CHARGING OF EVEN  
THE LARGEST BATTERIES!**

# DRYFIT® BLOCK TECHNOLOGY SONNENSCHN GF-Y RANGE



## 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

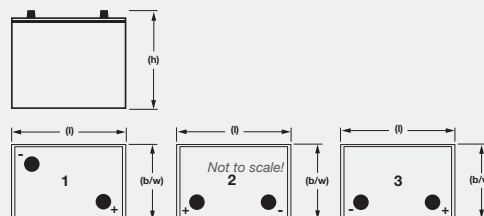
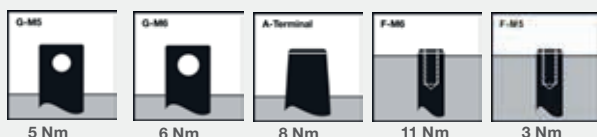


### Technical characteristics and data

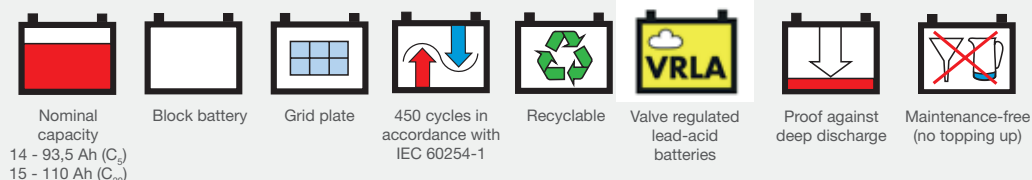
Type	Nominal voltage V	Nominal capacity C <sub>5</sub> (30 °C) Ah	Nominal capacity C <sub>20</sub> (30 °C) Ah	Length (l) max. mm	Width (b/w) max. mm	Height (h) max. mm	Weight** kg	Terminal	Terminal position
GF 12 014 Y F	12	14.0	15.0	181	76.0	167	6.00	G-M5	3
GF 12 022 Y T	12	22.2	24.0	167	176	126	8.50	F-M5	3
GF 12 025 Y G	12	25.0	28.0	197	132	180	11.1	G-M6	2
GF 12 033 Y 1	12	32.5	38.0	210	175	175	14.6	A-Terminal	3
GF 12 033 Y G1*/G2	12	32.5	38	210	175	175	14.6	G-M6	3
GF 12 040 Y	12	40	48	242	175	190	17.5	A-Terminal	3
GF 12 044 Y	12	44	50	261	135	230	18.0	A-Terminal	3
GF 12 051 Y 1/ 2*	12	51	56	278	175	190	20.8	A-Terminal	3
GF 12 051 Y G1	12	51	56	278	175	190	20.8	G-M6	3
GF 12 052 Y 0	12	52.7	60	261	170	178	19.8	F-M6	2
GF 12 063 Y04	12	63	70	261	171	210	22.2	F-M6	2
GF 12 065 Y*	12	65	78	353	175	190	26.8	A-Terminal	3
GF 12 072 Y	12	72	80	330	171	236	28.2	A-Terminal	2
GF 12 094 Y	12	93.5	110	286	269	230	38.5	A-Terminal	1

\* with hold down \*\* The weights may exhibit a tolerance of +/-5%

### Drawings with terminal position, terminal and torque



### Specifications



# DRYFIT® BLOCK TECHNOLOGY SONNENSCH EIN GF-V RANGE



## 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



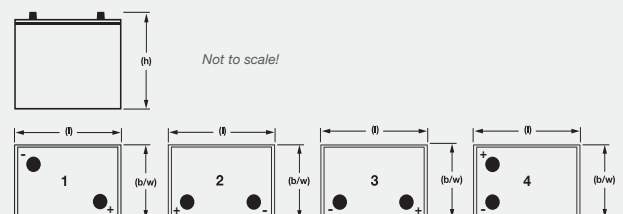
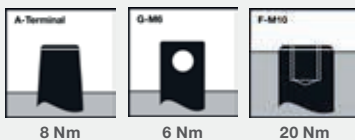
\* GNB® Industrial Power as your partner for system solutions also offers optimised chargers for these blocks.

## Technical characteristics and data

Type	Nominal voltage V	Nominal capacity C <sub>5</sub> (30 °C) Ah	Nominal capacity C <sub>20</sub> (30 °C) Ah	Length (l) max. mm	Width (b/w) max. mm	Height (h) max. mm	Weight* kg	Terminal	Terminal position
GF 06 160 V1	6	160	196	246	192	275	29.0	A-Terminal	1
GF 06 180 V	6	180	200	246	192	275	30.0	A-Terminal	1
GF 06 180 V Q	6	180	200	246	192	284	30.5	F-M10	1
GF 06 240 V	6	240	270	311	183	358	47.0	A-Terminal	1
GF 12 050 V	12	50.0	55.0	278	175	190	18.0	A-Terminal	3
GF 12 050 V G	12	50.0	55.0	278	175	190	18.0	G-M6	3
GF 12 076 V	12	76	86	330	171	236	28.8	A-Terminal	2
GF 12 090 V	12	90	98	513	189	219	36.5	A-Terminal	4
GF 12 105 V	12	105	120	345	174	283	37.5	A-Terminal	3
GF 12 110 V	12	110	120	513	223	219	45.5	A-Terminal	4
GF 12 160 V	12	160	196	518	274	238	62.5	A-Terminal	4

\* The weights may exhibit a tolerance of +/-5%

## Drawings with terminal position, terminal and torque



## Specifications

Nominal capacity 50 - 240 Ah (C <sub>5</sub> ) 55 - 270 Ah (C <sub>20</sub> )	Block battery	Grid plate	700 cycles in accordance with IEC 60254-1	Recyclable	Valve regulated lead-acid batteries	Proof against deep discharge	Maintenance-free (no topping up)





# BLOCK BATTERIES WITH TUBULAR PLATES MARATHON CLASSIC FT RANGE

## 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

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



## Technical characteristics and data

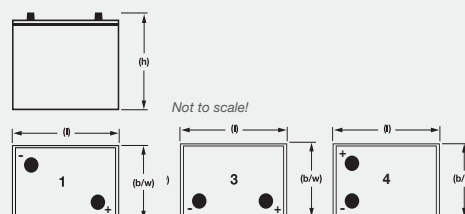
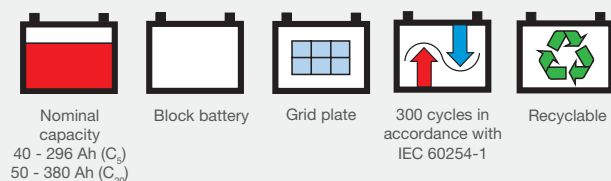
Type	Nominal voltage V	Nominal capacity C <sub>5</sub> (30 °C) Ah	Nominal capacity C <sub>20</sub> (30 °C) Ah	Length (l) max. mm	Width (b/w) max. mm	Height (h) max. mm	Weight* kg	Terminal	Terminal position
FT 06 180 1	6	180	210	246	190	276	29.0	A-Terminal	1
FT 06 180 2	6	180	210	265	184	269	29.0	A-Terminal	1
FT 06 200	6	200	235	265	185	269	32.0	A-Terminal	1
FT 12 110	12	110	132	347	176	285	39.0	A-Terminal	3

\* The weights may exhibit a tolerance of +/-5%

## Drawings with terminal position, terminal and torque



## Specifications



**MARATHON**  
classic

# BLOCK BATTERIES WITH GRID PLATES MARATHON CLASSIC FF RANGE

## 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

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

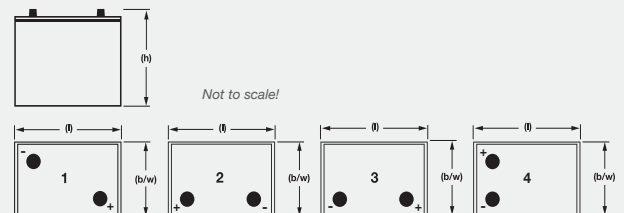
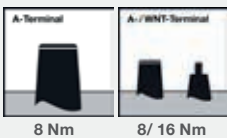


## Technical characteristics and data

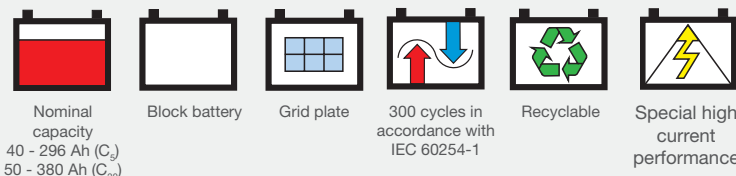
Type	Nominal voltage V	Nominal capacity C <sub>5</sub> (30 °C) Ah	Nominal capacity C <sub>20</sub> (30 °C) Ah	Length (l) max. mm	Width (b/w) max. mm	Height (h) max. mm	Weight* kg	Terminal	Terminal position
FF 06 187 L	6	187	232	260	181	286	28.0	A- / WNT-Terminal	1
FF 06 200 1	6	200	235	246	190	272	32.0	A-Terminal	1
FF 06 200 2	6	200	235	265	184	269	29.0	A-Terminal	1
FF 06 255	6	255	285	313	184	355	49.0	A-Terminal	1
FF 06 297 L	6	297	385	302	181	425	50.0	A- / WNT-Terminal	1
FF 08 147 K	8	147	183	260	181	286	30.4	WNT-Terminal	2
FF 12 040	12	40.0	50.0	210	175	190	13.7	A-Terminal	3
FF 12 050	12	50.0	62.0	242	175	190	17.3	A-Terminal	3
FF 12 060	12	60.0	75.0	278	175	190	20.7	A-Terminal	3
FF 12 080 1	12	80.0	100	353	175	190	26.4	A-Terminal	3
FF 12 080 2	12	80.0	100	349	175	235	29.2	A-Terminal	3
FF 12 085	12	85.0	110	328	174	216	27.0	A-Terminal	2
FF 12 105	12	105	125	513	189	223	34.5	A-Terminal	4
FF 12 110	12	110	130	349	175	285	32.0	A-Terminal	3
FF 12 135	12	135	180	513	223	223	47.8	A-Terminal	4
FF 12 158 L	12	158	200	397	179	378	49.4	A- / WNT-Terminal	3

\* The weights may exhibit a tolerance of +/-5%

## Drawings with terminal position, terminal and torque



## Specifications



# AGM TECHNOLOGY

## VRLA BLOCK BATTERIES

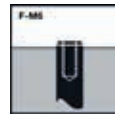
drysafe®

### 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)
- 300 cycles according to IEC 60254-1



11 Nm



#### Technical characteristics and data

Type	Nominal voltage V	Nominal capacity C <sub>5</sub> (30 °C) Ah	Nominal capacity C <sub>20</sub> (30 °C) Ah	Length (l) max. mm	Width (b/w) max. mm	Height (h) max. mm	Weight* kg	Terminal
AF 06 190 XOS	6	190.5	210.0	309	172	223	32.6	F-M6
AF 12 056 XOS	12	56.0	60.8	220	172	219	22.5	F-M6
AF 12 064 XOS	12	63.5	76.2	262	172	223	27.7	F-M6
AF 12 090 XOS	12	89.5	100.4	309	172	223	32.8	F-M6

\* The weights may exhibit a tolerance of +/-5%

### 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

#### Technical characteristics and data

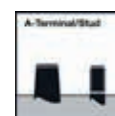
Type	Nominal voltage V	Nominal capacity C <sub>5</sub> (30 °C) Ah	Nominal capacity C <sub>20</sub> (30 °C) Ah	Length (l) max. mm	Width (b/w) max. mm	Height (h) max. mm	Weight* kg	Terminal
AS 12 045 R	12	45.0	50.0	260	171	206	18.5	Stud/A-Terminal
AS 12 050 C	12	45.0	50.0	260	170	206	17.5	A-Terminal

\* The weights may exhibit a tolerance of +/-5%

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8 Nm



8/ 37 Nm



11Nm



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