GNB®
INDUSTRIAL POWER
A Division of Exide Technologies

Industrial Batteries

System solutions for railways

» Compact low maintenance battery systems.«

Sonnenschein®

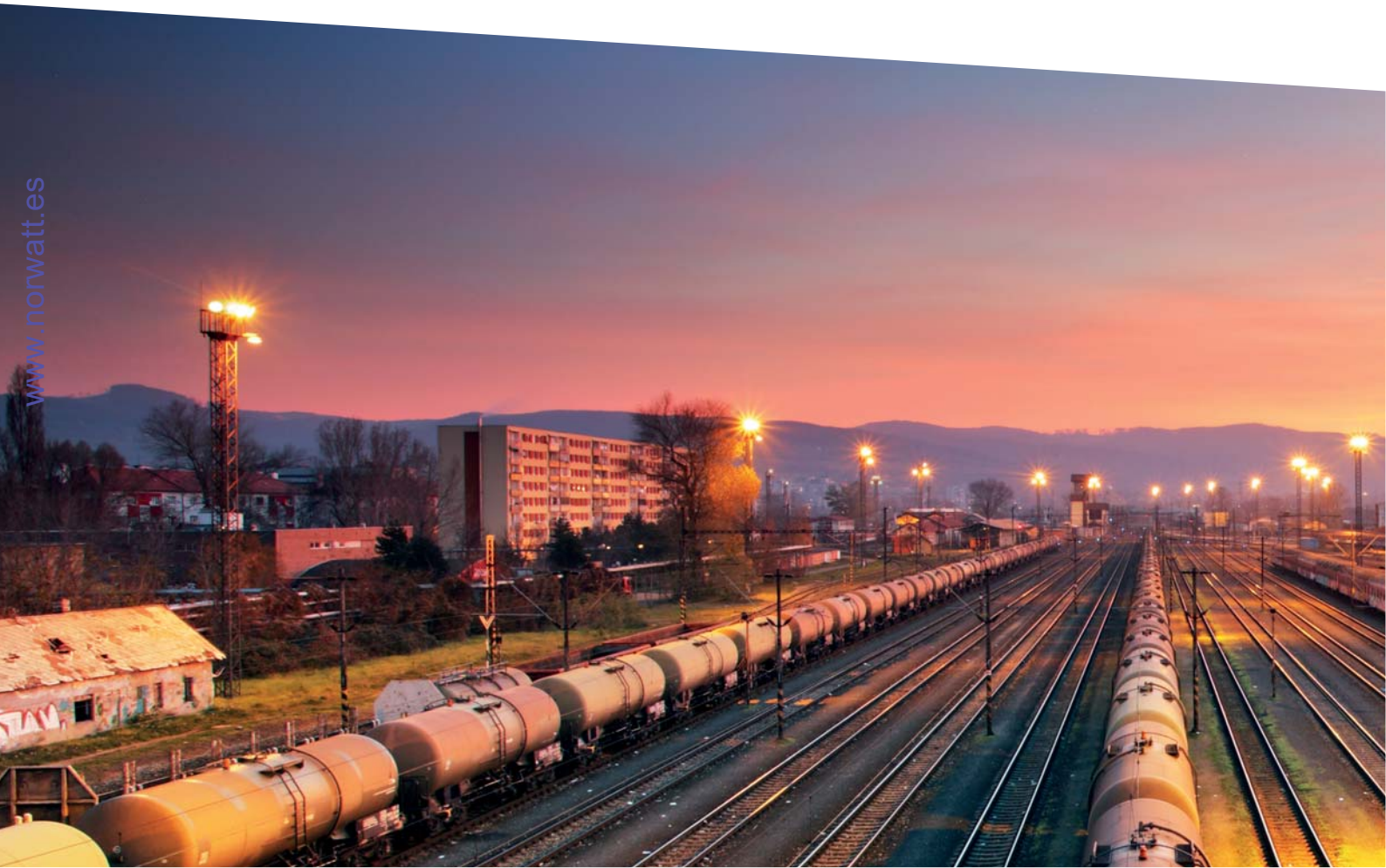
MARATHON®

Classic®

Batteries for railway rolling stock

Superior system technology

As a worldwide leading manufacturer of lead-acid batteries for railway rolling stock, GNB Industrial Power offers battery systems for typical applications in locomotives, coaches and modern train sets in regional and main-line service.
In addition, GNB Industrial Power also produces particularly compact battery systems for international high-speed trains and all mass transit applications (e. g. sub and tramways). The batteries are designed according to EN 50547.
GNB Industrial Power sets great store on keeping financing and maintenance costs as low as possible to help our OEM and operator customers to reduce costs. We want to make our customers successful!

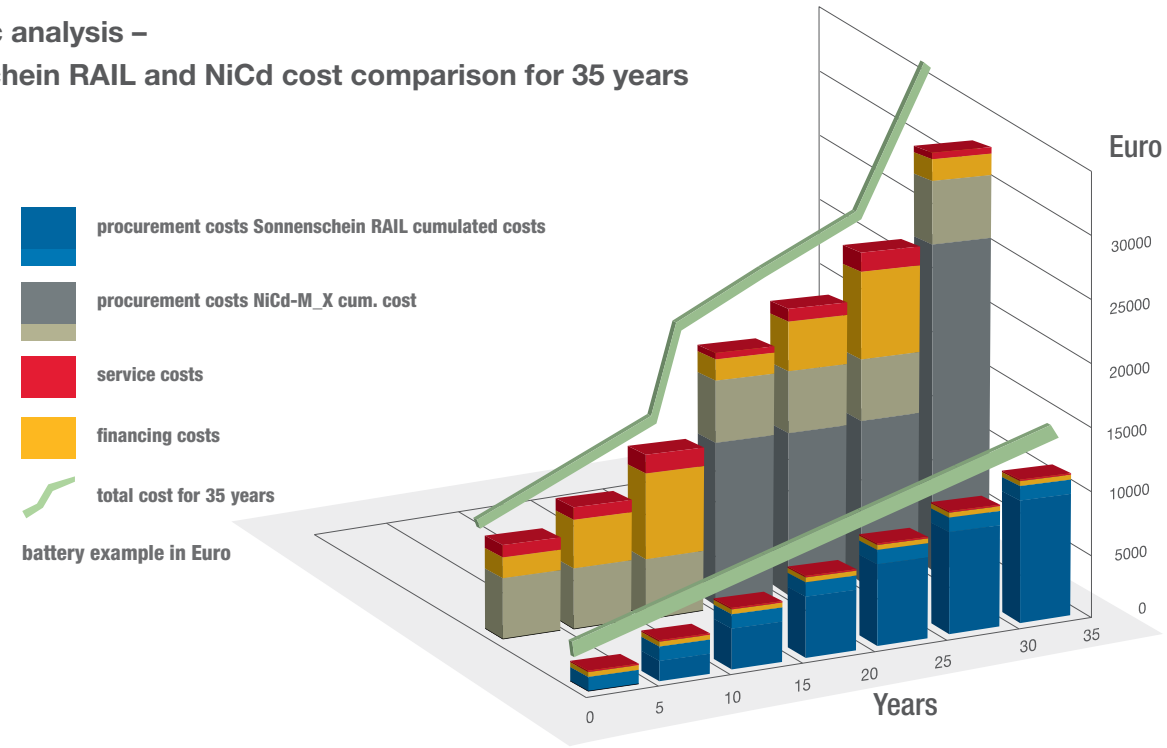


Economic analysis

Cost-saving, versatile, reliable

Flooded or valve-regulated batteries from GNB Industrial Power, particularly maintenance-free (VRLA), are outstanding value for money. The following graph shows a comparison with the much higher priced nickel cadmium (NiCd) railway battery. When financing over the 35 year train life is taken into account plus the maintenance cost, it is clear that the GNB Industrial Power products will require a smaller budget.

Economic analysis –
Sonnenschein RAIL and NiCd cost comparison for 35 years



Sonnenschein RAIL

Technical data and benefits

GNB can provide bespoke technical advice for an optimised design layout, assembly and maintenance, leading to reduced costs for both original equipment and existing installations.

Your benefits:

> **dryfit® Gel –** VRLA technology

> **Outstanding standby and cycling behaviour –** Long life

> **Proof against deep discharge –** greater long-term energy delivery

> **Excellent energy storage capacity –** high reliability

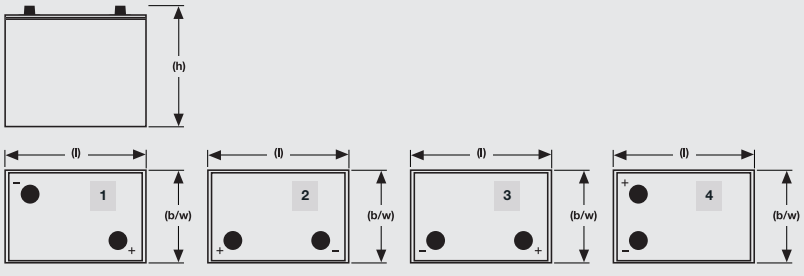
> **Completely recyclable –** low CO_2 footprint

Sonnenschein RAIL

Type*** flame retardant acc. to UL94-V0	Part number	Nominal voltage V	Nominal capacity (30 °C, 1.70 Vpc Ah / C_5	Dimensions Length (l) max. mm	Width (b/w) max. mm	Height (h) max.mm	Weight approx. kg	Terminal	Terminal position
SR 6V 180 A	NGRC060180VS0CA	6	180	244	190	275	31.0	A	1
SR 6V 240 A	NGRC060240VS0CA	6	240	312	182	359	47.0	A	1
SR 12V 33 G	NGRC120033VS0BA	12	33	210	175	175	14.6	G-M6	3
SR 12V 40 A	NGRC120040VS0CA	12	40	242	175	190	18.0	A	3
SR 12V 51 A	NGRC120051VS0CA	12	51	278	175	190	20.8	A	3
SR 12V 61 A	NGRL120061VS0CA	12	61	353	175	190	23.0	A	3
SR 12V 61 F10	NGRL120061VS0FA	12	61	353	175	196*	23.6	F-M10	3
SR 12V 65 A	NGRC120065VS0CA	12	65	353	175	190	26.8	A	3
SR 12V 65 G	NGRC120065VS0BA	12	65	353	175	190	26.8	G-M6	3
SR 12V 80 A	NGRP120080VS0CA	12	80	330	171	236	29.2	A	2
SR 12V 82 A RF	NGRP120075VS0CA	12	82**	330	171	236	29.2	A	2
SR 12V 85 A	NGRL120085VS0CA	12	85	284	267	231	33.0	A	1
SR 12V 85 F10	NGRL120085VS0FA	12	85	284	267	237*	33.5	F-M10	1
SR 12V 88 A RF	NGRP120080VS0CB	12	88**	330	171	236	29.2	A	2
SR 12V 105 A	NGRC120105VS0CA	12	105	345	172	283	37.5	A	3
SR 12V 105 F10	NGRC120105VS0FA	12	105	345	172	289	38.0	F-M10	3
SR 12V 122 A	NGRP120122VS0CA	12	122	513	223	223	47.0	A	4
SR 12V 155 FT	NGRL120155VS0MA	12	155	568	128	320	58.4	M-M8-45°	4
SR 12V 165 A	NGRL120165VS0CA	12	165	518	274	238	64.0	A	4
SR 12V 175 A	NGRP120175VS0CA	12	175	518	274	238	67.0	A	4
SR 12V 175 F10	NGRP120175VS0FA	12	175	518	274	244*	67.5	F-M10	4

** add. 24 mm for connector and screw **Nominal capacity at 30 °C / C_{20} / 1.75 V / cell *** UL94-HB version available on request*

Terminal position, terminal and torque

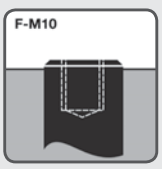


Not to scale!

6 Nm

8 Nm

8 Nm



17 Nm

Sonnenschein PzV

Technical data and specification

Sonnenschein PzV

Type*	Nominal capacity	Typical battery systems		Typical battery systems		
	C5 / Ah	Nominal voltage (V)	Number of crates/trays parts	Length (l) max. mm	Width (b/w) max. mm	Height (h) max.mm
26V 2 PzV 110	110	104	4	712	218	380
18/16V 3 PzV 165	165	104	6	712	218	380
26V 2 PzV 100	100	104	4	653	258	370
54V 3 PzV 210	210	108	2	696	847	460
12V 2 PzV 100	100	24 / 108	2 / 9	384	255	377
8V 3 PzV 165**	165	24 / 112 / 120	3 / 14 / 15	384	255	365
6V 4 PzV 220	220	24 / 120	4 / 20	384	255	377
4V 6 PzV 330**	330	24	6	384	255	365
4V 7 PzV 385**	385	24 / 120	6 / 30	384	255	365
4V 8 PzV 440**	440	24	6	384	255	365
12V 8 PzV 440	440	24	2	800	350	380
14V 3 PzV 210	210	112	8	586	230	465
8V 6 EPzV 420 R	420	64	8	500	215	470
8V 8 EPzV 440 R	440	64	8	700	203	376
Cells				Dimensions per cell		
2V 5 PzV-BS 145	145	96	48	109	158	275
2V 6 PzV-BS 175	175	18	9	125	158	275

** other DIN & BS cell and battery types are available on request* *** positive plate with 23 tubes*

Specification for Sonnenschein RAIL and Sonnenschein PzV

- Designed in accordance with EN 50547
- Trouble free transport of operational blocs or cells, no restrictions for rail, road, sea and air transportation (IATA, DGR clause A67)
- Very low gassing thanks to the internal gas recombination
- Nominal capacity 33–440 Ah C_5
- For RAIL blocs the container material is flame retardant according to UL94-V0 and DIN 5510-2. In addition this material has been tested according to the following standards: NF F 16-101 & 102, STM S-001, N FX 70-100, N FX 10-702, NF EN ISO 4589, NF EN 60695
- Polypropylene (PP) battery container
- Long-lasting and good cycle performance
- Shock & vibration tests according to IEC 61373 standard on complete integrated systems have been performed with Sonnenschein RAIL reference types
- Different installation positions or combinations possible

Marathon L / XL and M - FT

Technical data, specification and benefits

Designed for durability in railway applications, the Marathon L / XL and M - FT series provide high performance and reliability in medium and long duration discharges. For the M - FT the location of the terminals on the front (vs. the top) of the battery greatly facilitates the installation and maintenance of the product.

Technical data

Range	Type*	Part number	Nom. voltage (V)	Nominal capacity C_{10} 1.80 Vpc 20°C Ah	Capacity C_8 1.75 Vpc 20°C Ah	Length (l) mm	Width (b/w) mm	Height (h) max. mm	Weight approx. kg	Terminal
Marathon L / XL	L2V220	NALL020220VM0FA	2	220	214	209	136	265	16.0	F-M8
	L2V270	NALL020270VM0FA	2	270	263	209	136	265	18.3	F-M8
	L2V320	NALL020320VM0FA	2	320	312	209	202	265	24.2	2xF-M8
	L2V375	NALL020375VM0FA	2	375	365	209	202	265	26.5	2xF-M8
	L2V425	NALL020425VM0FA	2	425	414	209	202	265	28.8	2xF-M8
	L2V470	NALL020470VM0FA	2	470	458	209	270	265	32.6	2xF-M8
	L2V520	NALL020520VM0FA	2	520	508	209	270	265	35.0	2xF-M8
	L2V575	NALL020575VM0FA	2	575	560	209	270	265	37.3	2xF-M8
	L6V110	NALL060110VM0MC	6	112	110	272	166	190	23.0	M-M8
	XL6V180	NAXL060180VM0FA	6	179	176	309	172	223	30.0	F-M6
Marathon M - FT	M12V105FT	NAMF120105HM0FA	12	100	100	511	110	238	35.8	F-M6-90°
	M12V155FT	NAMF120155HM0FA	12	150	151	559	124	283	53.8	F-M6-90°

** other types of the Marathon range are available on request*

Specifications / benefits

Valve-regulated batteries (VRLA)

> High-Compression Absorbent Glass Mat (AGM) technology
> Maintenance-free (no topping up) during the whole service life
> No liquid electrolyte – no spilling
> No insulation faults due to wet batteries
> No wet, sticky or corroded battery boxes
> No risk of excessive or insufficient topping-up
> Reduced risk of fire caused by neglecting to top-up
> Can be recycled easily and completely
> Full capacity from charge retention (no standby capacity reduction)
> Proof against deep-discharge
> Designed in accordance with EN 50547 and IEC 60896-21 (respectively)
> Very low self-discharge, long storage period
> High mechanical strength and resistance against vibration and shock thanks to the VRLA design

Classic rail and Classic PzS

Technical data, specification and benefits

Classic PzS

Classic PzS flooded cells are built with thick tubular positive plates, offering excellent cycling performance and proven reliability. Cell dimensions are according to DIN or BS standards.

Type*	Nominal capacity	Typical battery systems		Dimensions per crates / trays		
	C_5/Ah	Nominal voltage (V)	Number of crates / trays Parts	Length (l) max. mm	Width (b/w) max. mm	Height (h) max.mm
26V 2 PzS 110	110	104	4	712	218	380
18/16V 3 PzS 165	165	104	6	712	218	380
26V 2 PzS 110	110	104	4	653	258	370
54V 4 PzS 280	280	108	2	683	841	460
52V 3 EPzB 96	96	104	2	688	583	398
26V 2 PzS 120	120	104	4	688	583	398
12V 2 PzS 110	110	24 / 108	2 / 9	384	255	370
8V 3 PzS 165 **	165	24 / 112 / 120	3 / 14 / 15	384	255	365
6V 4 PzS 220	220	24 / 120	4 / 20	384	255	370
4V 6 PzS 330 **	330	24	6	384	255	365
4V 7 PzS 385 **	385	24 / 120	6 / 30	384	255	365
4V 8 PzS 440 **	440	24	6	384	255	365
6V 4 EPzS 320	320	24	4	265	210	441
8V 8 EPzS 480	480	24	3	488	215	405
14V 3 EPzS 240	240	112	8	586	230	465
6V 3 EPzS 240	240	24	4	345	230	444
8V 6 EPzS 400	440	24	3	502	250	440
4V 8 EPzS 480	480	24	6	570	186	365
8V 8 EPzB 440 R	440	64	8	578	214	450
8V 9 EPzB 495 R	495	64	8	690	172	440

** other DIN & BS cell and battery types and models are available on request* *** cells with 23 positive tubes*

Classic rail

Classic rail is using reinforced positive and negative grid plates in low-antimony alloy, especially optimized for cyclic applications. The use of pocket separators with micro-porous glass mat prevents positive mass shedding and short circuits at the bottom of the container.
The translucent polypropylene container with base hold-down is shock and vibration proof and allows the control of the electrolyte level.

Type	Nominal capacity	Nominal voltage	Dimensions			Weight
	C_5/Ah	V	Length (l) max. mm	Width (b/w) max. mm	Height (h) max.mm	approx. kg.
CR 12V 40	40	12	210	175	190	13.7
CR 12V 50	50	12	242	175	190	17.3
CR 12V 60	60	12	278	175	190	20.7
CR 12V 80 L	80	12	353	175	190	26.4
CR 12V 105	105	12	513	189	223	45.5
CR 12V 135	135	12	513	223	223	47.8
CR 12V 190	190	12	518	276	242	61.0

Specifications / benefits

Vented batteries

> with high-performance tubular plates (Classic PzS) or compact block (Classic rail) batteries with grid plates.
> Reliable, robust lead-acid battery technology with liquid electrolyte
> High operational safety even under rough conditions
> A range of topping-up systems are available
> Full capacity from charge retention (no standby capacity reduction)
> High mechanical strength and resistance against vibration and shock due to proven design

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.

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GNB® INDUSTRIAL POWER devises enduring energy concepts that convince with efficiency, flexibility and profitability.