



ZeMaRail™ Batteries 200P18: Technical Data

VRLA AGM/GEL - BATTERY TECHNOLOGY FOR ROLLING STOCK APPLICATIONS

Thanks to the purity of materials, the ZeMaRail™ range of Valve-Regulated Lead-Acid (VRLA) batteries combine reduced corrosion and water losses with extended storage and service life.

Advanced lead-acid gel electrolyte absorbed glass mat (AGM) batteries are designed to withstand the shock and vibration requirements in rail.

- **High Energy Density:** Delivers more power in a compact design, maximizing efficiency without compromising space.
- **Maintenance-Free:** No water topping required, offering you hassle-free, reliable performance.
- **Long Service Life:** Ensures durable, long-lasting energy.
- **Excellent Deep Discharge Recovery:** Advanced Thin Plate Pure Lead (TPPL) ZeMaRail™ battery technology, with a small addition of tin to the positive plates, ensures superior recovery from accidental deep discharges.

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200P18 BATTERIES

KEEPING YOU ON TRACK



Electrical Data

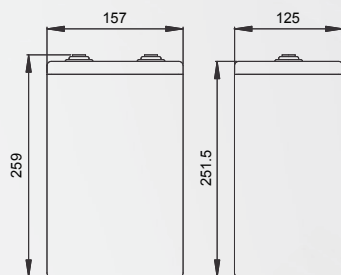
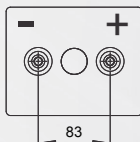
Nominal voltage	2 V
Number of cells	1 (VRLA (AGM), TPPL+Sn Technology)
Rated capacity C ₁₀ to 1.80 Vpc at 20 °C	208 Ah
Rated capacity C ₅ to 1.70 Vpc at 30 °C	200 Ah
Current/Power for 0.25 h back-up time 1.60 Vpc 20 °C	430 A / 754 W
Current/Power for 0.5 h back-up time 1.60 Vpc 20 °C	258 A / 480 W
Current/Power for 1.0 h back-up time 1.60 Vpc 20 °C	150 A / 280 W
Current/Power for 3.0 h back-up time 1.70 Vpc 20 °C	60 A / 115 W
Current/Power for 5.0 h back-up time 1.75 Vpc 20 °C	37.6 A / 73 W
Current/Power for 8.0 h back-up time 1.75 Vpc 20 °C	25.8 A / 48.5 W
Current/Power for 10.0 h back-up time 1.80 Vpc 20 °C	20.8 A / 40.5 W
Current/Power for 24.0 h back-up time 1.80 Vpc 20 °C	9.8 A / 19 W
Conversion to capacity at 25 °C	102% of Current/Power at 20°C
Internal resistance (± 10%) to IEC/EN 60896-21	0.43 mOhm
Short circuit current (± 10%) to IEC/EN 60896-21	4.9 kA
Self discharge at 20 °C to IEC/EN 60896-21	max. 3% / Month
Heat loss during float service at 20°C	≈ 0.22 W

Mechanical Data

Weight	14.5 kg +/-2%
Height over terminal	259 mm
Width	157 mm
Depth	125 mm
Number of terminals	1+ / 1-
Dimension of terminal screw hole	M10 x 20 deep, female thread
Connection torque	20 Nm
Terminal insulation class according to IEC/EN 60529	IP 20
Diameter of diagnostic hole for voltage probe	2 mm
Maximum cable cross-section	185 mm ²
Complete connector and terminal connection	use flexible EVO or PerfectPlus- connectors
Connector (copper, tin-coated and insulated)	For Rolling Stock flexible connectors are recommended
Shock + Vibration rating (according)	Categorie 1, Class B (IEC61373:2011)

Environmental Data

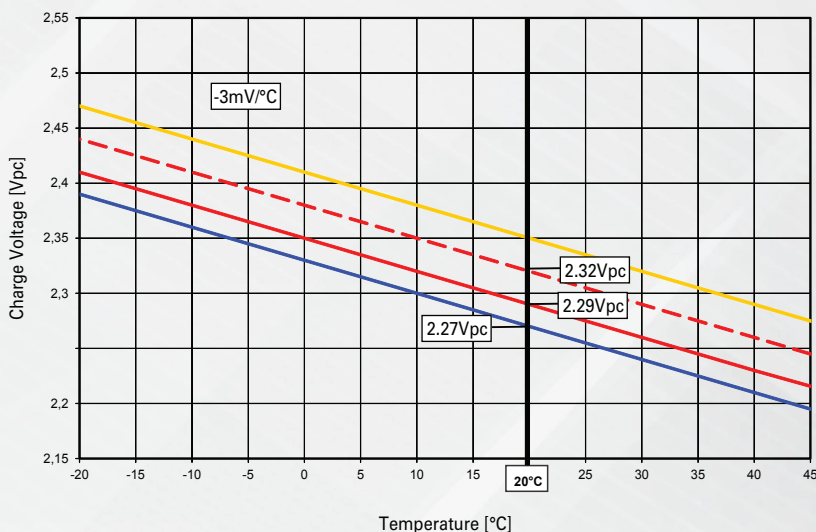
Installation	vertically
Cell assembly distance	The cells must be installed within a solid battery tray, use spacers to secure required fixation and compression
Material of case/cover:	PC+ABS FR
Flame retardancy rating (according to)	V-0 (UL94) ; I3 /F2 (NF F 16-101)
Flame barriers at vents	Yes
Rail service life expected at 15 °C	10 years (max. 30% Depth of Discharge (DoD) / day)
Cycle Endurance (60% DOD or 80% DOD)	1200 / 700 cycles
Design life (Eurobat classification)	>12 years
Shipping name	Batteries, wet, non spillable



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Temperature compensated charging voltage

- Boost level voltage
- - - Single voltage charging, high cyclic use
- Single voltage charging, low cyclic use
- Float level voltage



Temperature compensated charging voltage	
Temperature in °C	Percentage of the rated capacity (C ₅)
40	106
35	105
30	104
25	102
20	100
15	98
10	96
5	92
0	89
-5	84
-10	71
-15	58
-20	51
-25	44
-30	38

*Estimated Values
 Should be verified with actual load profile*

Battery Installation and Operation

Recommended charging for rolling stock applications (standby parallel operation)	IU0U- charging: 2 level charging (acc. DIN 41773) with current limitation and temperature compensation
Boost level voltage setting at 20°C	2.40 Vpc
Lower or single level voltage setting at 20°C	2.30 ... 2.35 Vpc (low ... high cyclic use)
Charge current for IU or IU0U-charging (DIN 41773)	80 A (minimum for cyclic use: 40 A)
Voltage compensation in function of temperature	-2 mV/K to -4mV/K per cell
Float level voltage setting at 20°C (± 1%)	2.29 V/Z (also valid for long term trickle charging at workshop and storage)
Air exchange	As a VRLA battery according to EN 50272-2 : 2001 $Q = 0.05 * N_{cells} * I_{gas} * C_{AhC10} * 10^{-3} [m^3/h]$ $I_{gas} = 1$ (at 2.29 Vpc) ; $I_{gas} = 8$ (at 2.40 Vpc) e.g. 36 V: 0.187 m ³ /h (at 2.29 Vpc)
Maximum long term operating temperature	+40°C with ventilation assured (reduced service life)
Maximum short term operating temperature (< 3h)	+55°C with ventilation assured (reduced service life)
Minimum operating and storage temperature	- 40°C (in charged condition)
Minimum operating and storage temperature	- 40°C (in charged condition)

Constant current performance [Ampere] to the defined end of discharge voltage

Voltage	Temp	Discharge time [h:min]																		
		Vpc	°C	0:01	0:05	0:10	0:15	0:20	0:25	0:30	0:40	0:50	1:00	1:30	2:00	3:00	4:00	5:00	8:00	10:00
1.90	20°C	389.7	358.1	299.6	255.1	222.8	195.2	180.0	151.7	131.5	116.1	87.7	71.1	52.5	42.0	35.2	24.1	20.1	172	9.7
	25°C	389.7	362.8	304.9	261.2	228.5	204.6	185.2	156.5	135.8	119.6	90.4	73.3	54.1	43.2	36.2	24.7	20.6	176	9.9
1.85	20°C	500.7	462.4	368.6	306.9	262.3	229.9	204.8	169.2	144.8	127.2	94.1	75.4	54.9	43.5	36.3	24.6	20.4	175	9.8
	25°C	500.7	470.8	377.0	315.3	270.7	237.1	211.7	175.0	149.7	131.5	97.2	77.9	56.6	44.8	37.3	25.3	20.9	18.0	10.0
1.80	20°C	655.2	548.5	425.5	344.5	290.7	250.8	221.6	180.4	152.9	133.2	97.4	77.6	55.9	44.2	36.7	24.8	20.6	176	9.8
	25°C	655.2	557.4	437.2	355.9	300.9	260.0	229.7	187.1	158.5	138.1	100.8	80.2	57.7	45.5	37.8	25.5	21.1	18.1	10.0
1.75	20°C	790.3	631.3	471.8	374.5	311.2	266.2	233.2	188.0	158.4	137.4	99.6	78.9	56.6	44.6	37.0	25.0	20.7	177	9.8
	25°C	790.3	643.7	486.0	387.6	322.8	276.7	242.3	195.4	164.5	142.5	103.1	81.7	58.5	46.0	38.1	25.6	21.2	18.1	10.0
1.70	20°C	932.5	714.9	523.8	411.4	338.7	288.7	251.4	201.1	168.6	145.6	104.8	82.7	59.0	46.3	38.3	25.7	21.3	18.2	10.0
	25°C	932.4	699.3	506.8	396.4	325.9	277.3	241.5	193.3	162.2	140.2	101.1	79.8	57.1	44.9	37.2	25.0	20.7	17.7	9.8
1.65	20°C	1021.2	765.6	549.2	427.0	349.3	296.1	257.1	204.7	171.1	147.4	105.7	83.2	59.2	46.5	38.4	25.8	21.3	18.2	10.0
	25°C	1014.5	746.9	530.4	410.8	335.4	284.1	246.6	196.6	164.4	141.9	101.9	80.4	57.3	45.1	37.3	25.1	20.8	17.8	9.8
1.60	20°C	1050.0	775.9	545.2	420.0	341.2	288.2	249.6	198.5	165.7	142.8	102.5	80.7	57.5	45.2	37.4	25.1	20.8	17.8	9.8
	25°C	1049.9	796.4	565.2	437.0	355.6	300.6	260.3	206.8	172.5	148.5	106.3	83.6	59.4	46.6	38.5	25.8	21.3	18.2	10.0

Constant power performance [Watt per cell] to the defined end of discharge voltage

Voltage	Temp	Discharge time [h:min]																		
		Vpc	°C	0:01	0:05	0:10	0:15	0:20	0:25	0:30	0:40	0:50	1:00	1:30	2:00	3:00	4:00	5:00	8:00	10:00
1.90	20°C	813.0	710.0	589.5	506.3	446.4	401.5	364.1	312.0	272.8	244.8	185.0	149.5	109.6	87.0	72.5	49.3	41.2	35.4	19.7
	25°C	878.0	766.8	630.8	536.7	468.7	421.6	382.3	324.5	283.7	252.2	189.6	152.5	111.7	88.7	74.0	50.3	42.0	36.1	20.1
1.85	20°C	1079.3	901.5	717.1	596.7	514.6	453.0	408.4	341.4	294.9	263.4	194.3	155.4	112.5	88.9	73.7	49.9	41.5	35.4	19.6
	25°C	1165.7	973.7	767.3	632.5	540.3	475.6	428.8	355.0	306.7	271.3	199.1	158.5	114.7	90.6	75.2	50.9	42.4	36.1	20.0
1.80	20°C	1331.5	1068.2	816.6	663.8	561.9	489.8	436.3	360.7	309.2	274.2	199.8	158.9	114.2	89.9	74.3	50.1	41.6	35.7	19.8
	25°C	1438.0	1153.6	873.7	703.6	590.0	514.3	458.1	375.2	321.5	282.5	204.8	162.1	116.5	91.7	75.7	51.1	42.4	36.4	20.1
1.75	20°C	1561.1	1207.8	893.4	712.2	596.5	513.8	455.2	372.8	320.0	281.6	204.3	161.1	115.3	90.5	74.7	50.4	41.7	35.6	19.7
	25°C	1686.0	1304.4	955.9	754.9	626.3	539.5	477.9	387.7	332.8	290.0	209.4	164.3	117.6	92.3	76.2	51.4	42.5	36.3	20.1
1.70	20°C	1762.9	1323.0	954.8	748.6	620.5	532.8	468.9	381.4	325.0	284.9	205.9	162.6	116.1	91.0	75.0	50.5	41.6	35.8	19.7
	25°C	1903.9	1428.8	1021.7	793.5	651.6	559.4	492.3	396.6	338.1	293.5	211.0	165.8	118.4	92.8	76.5	51.5	42.4	36.5	20.0
1.65	20°C	1902.1	1398.5	991.7	769.9	635.1	542.3	476.9	388.1	330.2	288.4	207.5	163.5	116.3	91.2	75.1	50.4	41.8	35.7	19.6
	25°C	2054.3	1510.4	1061.1	816.1	666.9	569.4	500.7	403.6	343.4	297.0	212.6	166.7	118.6	93.0	76.6	51.4	42.6	36.4	20.0
1.60	20°C	1990.0	1442.4	1043.1	782.9	643.0	548.7	481.7	389.3	331.7	290.1	207.2	163.9	116.6	91.1	75.2	50.4	41.8	35.7	19.6
	25°C	2149.2	1557.8	1116.1	829.9	675.2	576.1	505.7	404.9	345.0	298.8	212.4	167.2	118.9	92.9	76.7	51.4	42.6	36.4	20.0

Constant discharge values without voltage loss in connectors and cables!
 Our technical support offers to calculate the discharge curve for a specific load profile.



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