

EvoRail™ 4PzV280



*VRLA GEL Battery Technology
for Rolling Stock Applications*



*High cycle
performance*

*Very good deep
discharge recovery*

Maintenance free

V-0 flame retardant



Keeping you on track

Hawker® EvoRail™ 4PzV280

Technical specifications

Part number: 1882504V0CP

Electrical Data

Nominal voltage	2 V
Number of cells	1 (VRLA, tubular GEL Technology)
Rated capacity C ₁₀ to 1.80 Vpc at 20 °C	275 Ah
Rated capacity C ₅ to 1.70 Vpc at 30 °C	280 Ah
Current/Power for 0.25 h back-up time 1.60 Vpc 20 °C	396.3 A / 650 W
Current/Power for 0.5 h back-up time 1.60 Vpc 20 °C	282.0 A / 479 W
Current/Power for 1.0 h back-up time 1.60 Vpc 20 °C	180.1 A / 317 W
Current/Power for 3.0 h back-up time 1.70 Vpc 20 °C	76.8 A / 142 W
Current/Power for 5.0 h back-up time 1.75 Vpc 20 °C	50.0 A / 94 W
Current/Power for 8.0 h back-up time 1.75 Vpc 20 °C	34.4 A / 66 W
Current/Power for 10.0 h back-up time 1.80 Vpc 20 °C	27.5 A / 53 W
Current/Power for 24.0 h back-up time 1.80 Vpc 20 °C	13.4 A / 26 W
Conversion to capacity at 25 °C	102% of Current/Power at 20°C
Internal resistance to IEC/EN 60896-21	0.61 mΩ
Short circuit current to IEC/EN 60896-21	3.35 kA
Self discharge at 20 °C to IEC/EN 60896-21	max. 3% / Month
Heat loss during float service at 20°C	≈ 0.38 W

Mechanical Data

Weight	19.3 kg ±2%
Height of cell / over terminal cover	405 mm / 435 mm
Width	198 mm
Depth	83 mm
Number of terminals	1 + / 1 -
Dimension of terminal screw hole	M10 x 22 deep, female thread
Torque terminal screw	25 Nm ±2
Terminal insulation class according to IEC/EN 60529	IP 20
Diameter of diagnostic hole for voltage probe	2 mm
Maximum cable cross-section	95 mm ²
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)	Category 1, Class B (IEC 61373:2011)

Environmental Data

Installation	vertically
Cell assembly distance	not required; for higher loads 5-10 mm recommended for cooling
Material of case/cover; Flame retardancy rating (according to)	PP - FR or PP (on request) V-0 (UL94); I2 / F1 (NF F 16-101) or HB (UL94)
Flame barriers at vents	Yes
Rail service life expected at 15 °C	6 years (max. 30% DOD / day)
Cycle Endurance (DB Test : 30% DOD/8h)	> 80% C _{nom} after 1'300 cycles
Design life (Eurobat classification)	12+ Long Life
Shipping name	Batteries, wet, non spillable

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Operating specifications

Figure 1



Figure 2

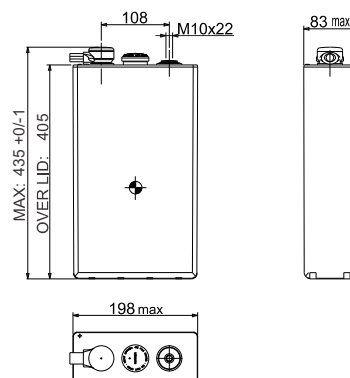
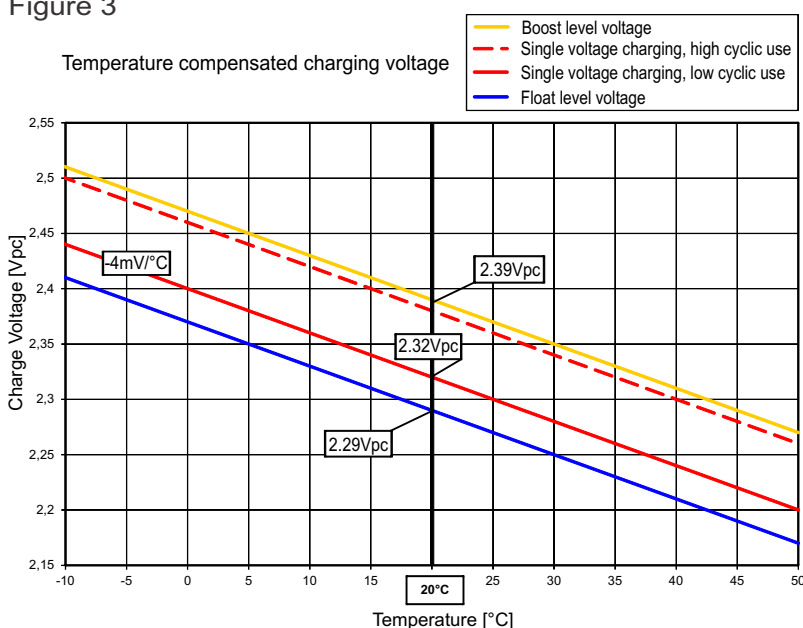


Figure 3



Temperature in °C	Percent of the rated capacity (C ₅)
40	107.0
35	105.8
30	104.0
25	102.0
20	100.0
15	97.8
10	94.5
5	91.0
0	86.0
-5	80.0
-10	72.5
-15	64.0
-20	47.0
-25	31.0
-30	14.0

*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	2.39 Vpc (Volt per cell)
Lower level or constant voltage setting at 20°C	2.32 ... 2.38 Vpc (low ... high cyclic use)
Charge current for IU or IU0U-charging (DIN 41773)	51 ... 76 A (minimum for cyclic use: 64 A)
Voltage compensation in function of temperature	- 4 mV/K per cell
Float level voltage setting at 20°C (± 1%)	2.29 Vpc (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 2.39 Vpc)
Preferred operating temperature range	Between 15°C - 25°C
Maximum long term operating temperature	+40°C with ventilation assured (reduced service life)
Maximum short term operating temperature (< 3h)	+50°C with ventilation assured (reduced service life)
Minimum operating and storage temperature	- 40°C (in charged condition)

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Discharge data per cell

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

Voltage [Vpc]	Temp	Discharge time [h:min]																		
		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	12:00	24:00
1.90	20°C	201.3	189.4	174.9	161.2	149.9	140.6	131.8	118.3	107.3	98.6	79.4	67.0	51.7	42.3	36.1	25.4	21.4	18.5	11.2
	25°C	201.9	190.2	177.0	164.0	152.9	143.6	135.1	121.6	110.6	101.7	82.1	69.3	53.6	43.9	37.4	26.3	22.1	19.1	11.5
1.85	20°C	267.5	254.6	231.0	212.0	196.2	182.2	170.3	151.1	135.8	123.9	98.1	81.9	62.3	50.7	43.0	30.0	25.2	21.8	12.6
	25°C	268.1	256.3	234.4	216.0	200.5	186.9	175.2	156.1	140.7	128.4	101.9	85.2	64.8	52.8	44.7	31.1	26.1	22.5	12.9
1.80	20°C	336.5	315.6	283.3	257.9	236.7	218.8	203.8	178.5	159.0	143.8	112.4	92.9	69.7	56.3	47.5	32.9	27.5	23.7	13.4
	25°C	336.5	318.7	288.0	263.7	243.0	225.4	210.2	185.2	165.3	149.8	117.4	96.9	72.7	58.7	49.4	34.1	28.5	24.6	13.8
1.75	20°C	407.7	374.3	331.8	299.0	272.3	250.1	230.8	200.2	176.7	158.5	121.8	99.8	74.1	59.6	50.0	34.4	28.8	24.8	13.8
	25°C	407.7	378.8	338.3	306.5	280.5	258.4	239.4	208.5	184.6	165.8	127.6	104.5	77.5	62.2	52.2	35.8	29.8	25.7	14.2
1.70	20°C	478.9	429.9	376.6	336.1	302.9	275.4	252.4	216.3	189.3	168.5	127.9	104.0	76.8	61.4	51.4	35.0	29.1	25.0	13.8
	25°C	478.9	435.7	385.2	345.8	313.4	286.0	262.9	226.2	198.5	176.9	134.4	109.1	80.3	64.2	53.7	36.3	30.2	25.9	14.2
1.65	20°C	550.1	483.4	418.4	368.6	328.5	296.0	269.3	228.0	198.1	175.4	131.9	106.5	77.5	61.5	51.4	35.0	29.1	25.0	13.8
	25°C	550.1	490.9	428.8	380.7	341.3	308.8	281.8	239.5	208.4	184.6	138.8	112.1	81.3	64.4	53.7	36.3	30.2	25.9	14.2
1.60	20°C	621.2	534.6	456.1	396.3	349.7	312.2	282.0	236.6	204.3	180.1	132.8	106.5	77.5	61.5	51.4	35.0	29.1	25.0	13.8
	25°C	621.2	544.1	469.0	410.9	364.8	327.2	296.2	249.2	215.4	190.1	140.2	112.1	81.3	64.4	53.7	36.3	30.2	25.9	14.2

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

Voltage [Vpc]	Temp	Discharge time [h:min]																		
		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	12:00	24:00
1.90	20°C	382.5	360.5	332.3	307.1	285.7	267.8	251.7	226.3	206.1	189.6	153.3	130.1	100.6	83.1	70.8	50.0	42.1	36.4	22.0
	25°C	383.0	361.0	336.4	312.2	291.1	273.8	258.0	232.1	212.2	195.5	158.3	134.6	104.1	86.0	73.3	51.6	43.5	37.6	22.6
1.85	20°C	494.2	470.8	427.6	393.4	365.1	339.6	318.0	282.9	255.3	232.8	186.2	155.7	119.5	97.6	83.3	57.9	48.9	42.3	24.5
	25°C	495.5	474.5	433.7	401.1	373.4	348.3	326.9	292.2	264.0	241.3	193.4	161.9	124.2	101.3	86.4	60.1	50.6	43.8	25.1
1.80	20°C	605.7	568.2	511.0	466.7	429.7	398.3	371.6	327.7	293.2	265.6	209.2	174.2	131.9	106.9	90.7	63.0	52.8	45.7	25.9
	25°C	605.7	573.8	519.6	476.7	440.6	409.5	383.0	339.4	304.5	276.7	218.2	181.7	137.4	111.4	94.2	65.5	54.6	47.3	26.7
1.75	20°C	707.0	652.7	583.5	527.5	482.6	444.5	412.3	360.2	320.4	288.8	224.1	185.0	138.7	112.0	94.5	65.6	54.6	47.3	26.6
	25°C	707.1	659.8	594.6	540.3	496.3	459.3	427.0	374.5	333.9	301.5	234.5	193.4	144.7	117.0	98.3	68.2	56.7	49.0	27.4
1.70	20°C	807.8	727.5	642.8	578.3	524.8	480.0	442.4	382.9	337.8	303.1	232.7	190.7	142.1	114.7	96.3	66.5	55.1	47.6	26.6
	25°C	807.9	736.8	655.7	593.8	541.5	497.3	459.8	399.5	353.4	317.3	244.0	199.7	148.6	119.8	100.5	69.1	57.3	49.3	27.4
1.65	20°C	906.7	796.7	694.1	618.3	557.0	506.5	464.1	397.9	349.0	311.5	237.5	193.8	143.3	115.1	96.3	66.5	55.1	47.6	26.6
	25°C	906.7	808.8	710.2	636.9	576.6	526.5	484.0	416.5	366.2	326.9	249.6	203.6	150.2	120.3	100.6	69.1	57.3	49.3	27.4
1.60	20°C	989.2	859.7	738.4	649.9	581.1	524.9	478.9	407.4	356.0	316.6	239.1	194.0	143.3	115.1	96.3	66.5	55.1	47.6	26.6
	25°C	989.2	873.8	757.8	671.6	603.7	547.7	500.9	427.9	374.1	333.1	252.1	204.1	150.2	120.3	100.6	69.1	57.3	49.3	27.4

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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