EvoRail™ 8PzV440

HAWKER® EvoRail™

VRLA GEL Battery Technology for Rolling Stock Applications

High cycle performance

Very good deep discharge recovery

Maintenance free

V-0 flame retardant

EnerSys® Power/Full Solutions | RAIL

Keeping you on track

Hawker® EvoRail™ 8PzV440

Technical specifications

Part number: 1881508V0CP

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	432 Ah
Rated capacity C_5 to 1.70 Vpc at 30 °C	440 Ah
Current/Power for 0.25 h back-up time 1.60 Vpc 20 °C	622.7 A / 1021 W
Current/Power for 0.5 h back-up time 1.60 Vpc 20 °C	443.1 A / 753 W
Current/Power for 1.0 h back-up time 1.60 Vpc 20 °C	283.1 A / 498 W
Current/Power for 3.0 h back-up time 1.70 Vpc 20 °C	120.6 A / 223 W
Current/Power for 5.0 h back-up time 1.75 Vpc 20 °C	78.6 A / 148 W
Current/Power for 8.0 h back-up time 1.75 Vpc 20 °C	54.1 A / 103 W
Current/Power for 10.0 h back-up time 1.80 Vpc 20 °C	43.2 A / 83 W
Current/Power for 24.0 h back-up time 1.80 Vpc 20 °C	21.1 A / 41 W
Conversion to capacity at 25 °C	102% of Current/Power at 20°C
Internal resistance to IEC/EN 60896-21	0.46 mΩ
Short circuit current to IEC/EN 60896-21	4.40 kA
Self discharge at 20 °C to IEC/EN 60896-21	max. 3% / Month
Heat loss during float service at 20°C	≈ 0.60 W

Mechanical Data

Weight	31.1 kg ±2%
Height of cell / over terminal cover	340 mm / 370 mm
Width	198 mm
Depth	155 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 mm²
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

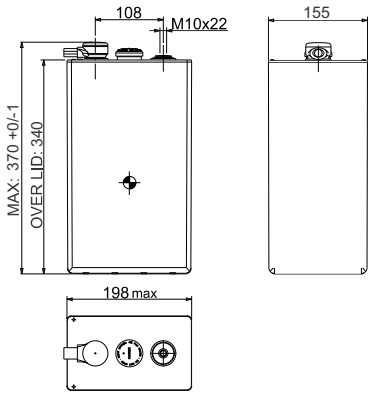
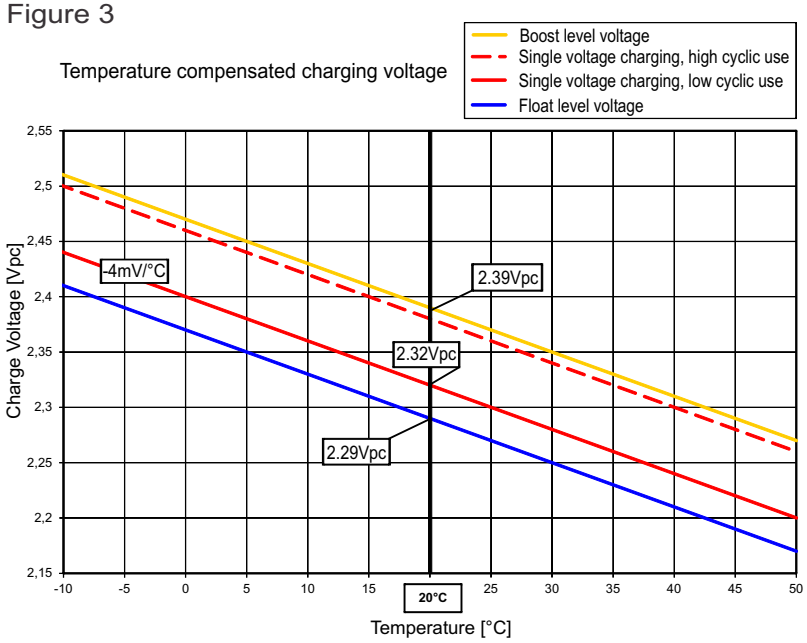


Figure 3



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)	80 A ... 120 A (minimum for cyclic use: 100 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	316.3	297.6	274.8	253.3	235.6	220.9	207.1	186.0	168.7	154.9	124.8	105.3	81.2	66.5	56.7	40.0	33.6	29.1	17.6
	25°C	317.2	298.8	278.1	257.6	240.2	225.7	212.3	191.1	173.8	159.8	129.0	109.0	84.2	68.9	58.7	41.3	34.7	30.0	18.1
1.85	20°C	420.3	400.0	363.0	333.1	308.4	286.3	267.6	237.4	213.5	194.7	154.1	128.7	98.0	79.7	67.6	47.2	39.6	34.2	19.8
	25°C	421.3	402.8	368.3	339.4	315.1	293.8	275.4	245.2	221.1	201.8	160.2	133.9	101.8	82.9	70.2	48.8	40.9	35.4	20.3
1.80	20°C	528.8	496.0	445.1	405.3	371.9	343.8	320.2	280.4	249.8	226.0	176.7	146.0	109.5	88.5	74.6	51.7	43.2	37.3	21.1
	25°C	528.8	500.8	452.5	414.4	381.9	354.2	330.3	291.0	259.8	235.4	184.4	152.3	114.2	92.2	77.7	53.6	44.8	38.6	21.7
1.75	20°C	640.7	588.2	521.4	469.9	427.9	393.1	362.6	314.6	277.7	249.0	191.5	156.8	116.5	93.6	78.6	54.1	45.2	38.9	21.7
	25°C	640.7	595.3	531.6	481.6	440.7	406.0	376.1	327.7	290.1	260.5	200.5	164.2	121.8	97.7	82.0	56.2	46.9	40.3	22.4
1.70	20°C	752.6	675.5	591.9	528.2	476.0	432.8	396.7	340.0	297.5	264.8	201.0	163.4	120.6	96.5	80.7	54.9	45.7	39.3	21.7
	25°C	752.6	684.6	605.3	543.4	492.5	449.4	413.2	355.5	312.0	278.0	211.1	171.4	126.3	100.8	84.3	57.1	47.4	40.7	22.4
1.65	20°C	864.4	759.7	657.4	579.2	516.2	465.2	423.1	358.3	311.2	275.6	207.3	167.3	121.7	96.7	80.7	54.9	45.7	39.3	21.7
	25°C	864.4	771.3	673.8	598.2	536.3	485.2	442.8	376.4	327.4	290.1	218.1	176.1	127.7	101.2	84.3	57.1	47.4	40.7	22.4
1.60	20°C	976.2	840.1	716.7	622.7	549.6	490.7	443.1	371.7	321.1	283.1	208.7	167.3	121.7	96.7	80.7	54.9	45.7	39.3	21.7
	25°C	976.2	855.0	737.1	645.7	573.2	514.2	465.5	391.6	338.5	298.7	220.3	176.1	127.7	101.2	84.3	57.1	47.4	40.7	22.4

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	601.0	566.4	522.3	482.7	449.0	420.9	395.6	355.6	323.8	297.9	240.9	204.4	158.0	130.5	111.3	78.5	66.1	57.2	34.6
	25°C	601.9	567.3	528.6	490.7	457.5	430.2	405.4	364.8	333.4	307.3	248.7	211.5	163.6	135.1	115.2	81.1	68.3	59.0	35.4
1.85	20°C	776.5	739.8	671.9	618.2	573.8	533.6	499.7	444.5	401.2	365.9	292.7	244.7	187.8	153.4	130.8	91.1	76.8	66.5	38.4
	25°C	778.7	745.7	681.6	630.3	586.8	547.4	513.7	459.1	414.9	379.1	304.0	254.5	195.2	159.2	135.7	94.4	79.5	68.8	39.5
1.80	20°C	951.8	892.9	803.0	733.3	675.2	625.9	583.9	515.0	460.8	417.4	328.8	273.7	207.3	167.9	142.5	99.1	82.9	71.8	40.7
	25°C	951.8	901.7	816.4	749.1	692.4	643.5	601.8	533.3	478.5	434.8	342.9	285.5	216.0	175.0	148.1	102.9	85.9	74.3	41.9
1.75	20°C	1111.0	1025.7	916.9	829.0	758.3	698.6	648.0	566.0	503.5	453.9	352.2	290.7	218.0	176.1	148.4	103.1	85.8	74.3	41.7
	25°C	1111.1	1036.8	934.4	849.1	779.9	721.7	671.0	588.5	524.7	473.8	368.5	304.0	227.4	183.8	154.4	107.1	89.1	76.9	43.0
1.70	20°C	1269.4	1143.3	1010.2	908.7	824.7	754.2	695.2	601.7	530.9	476.3	365.7	299.7	223.3	180.3	151.3	104.4	86.7	74.9	41.8
	25°C	1269.5	1157.8	1030.4	933.1	850.9	781.5	722.5	627.8	555.3	498.6	383.4	313.8	233.5	188.3	158.0	108.7	90.1	77.5	43.1
1.65	20°C	1424.9	1251.9	1090.8	971.7	875.2	795.9	729.3	625.3	548.4	489.6	373.2	304.6	225.1	180.8	151.3	104.4	86.7	74.9	41.8
	25°C	1424.9	1270.9	1116.0	1000.9	906.1	827.4	760.6	654.5	575.4	513.7	392.2	319.9	236.0	189.1	158.1	108.7	90.1	77.5	43.1
1.60	20°C	1554.5	1351.0	1160.4	1021.2	913.2	824.8	752.6	640.2	559.5	497.6	375.7	304.8	225.1	180.8	151.3	104.4	86.7	74.9	41.8
	25°C	1554.5	1373.1	1190.9	1055.4	948.7	860.6	787.1	672.4	587.9	523.5	396.1	320.7	236.0	189.1	158.1	108.7	90.1	77.5	43.1

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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