

# EvoRail™ 2PzV110



*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™ 2PzV110

## Technical specifications

Part number: 1881502V0CP

### Electrical Data

Nominal voltage	2 V
Number of cells	1 (VRLA, tubular GEL Technology)
Rated capacity C <sub>10</sub> to 1.80 Vpc at 20 °C	108 Ah
Rated capacity C <sub>5</sub> to 1.70 Vpc at 30 °C	110 Ah
Current/Power for 0.25 h back-up time 1.60 Vpc 20 °C	155.7 A / 255 W
Current/Power for 0.5 h back-up time 1.60 Vpc 20 °C	110.8 A / 188 W
Current/Power for 1.0 h back-up time 1.60 Vpc 20 °C	70.8 A / 124 W
Current/Power for 3.0 h back-up time 1.70 Vpc 20 °C	30.2 A / 56 W
Current/Power for 5.0 h back-up time 1.75 Vpc 20 °C	19.7 A / 37 W
Current/Power for 8.0 h back-up time 1.75 Vpc 20 °C	13.5 A / 26 W
Current/Power for 10.0 h back-up time 1.80 Vpc 20 °C	10.8 A / 21 W
Current/Power for 24.0 h back-up time 1.80 Vpc 20 °C	5.3 A / 10 W
Conversion to capacity at 25 °C	102% of Current/Power at 20°C
Internal resistance to IEC/EN 60896-21	1.85 mΩ
Short circuit current to IEC/EN 60896-21	1.10 kA
Self discharge at 20 °C to IEC/EN 60896-21	max. 3% / Month
Heat loss during float service at 20°C	≈ 0.15 W

### Mechanical Data

Weight	8.9 kg ±2%
Height of cell / over terminal cover	340 mm / 370 mm
Width	198 mm
Depth	47 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 <sup>2</sup>
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 <sub>nom</sub> 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

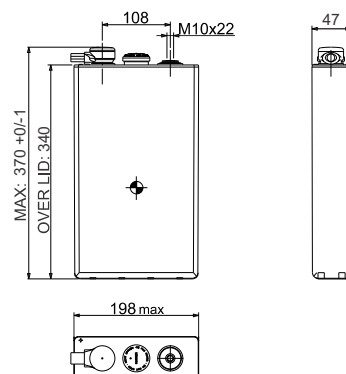
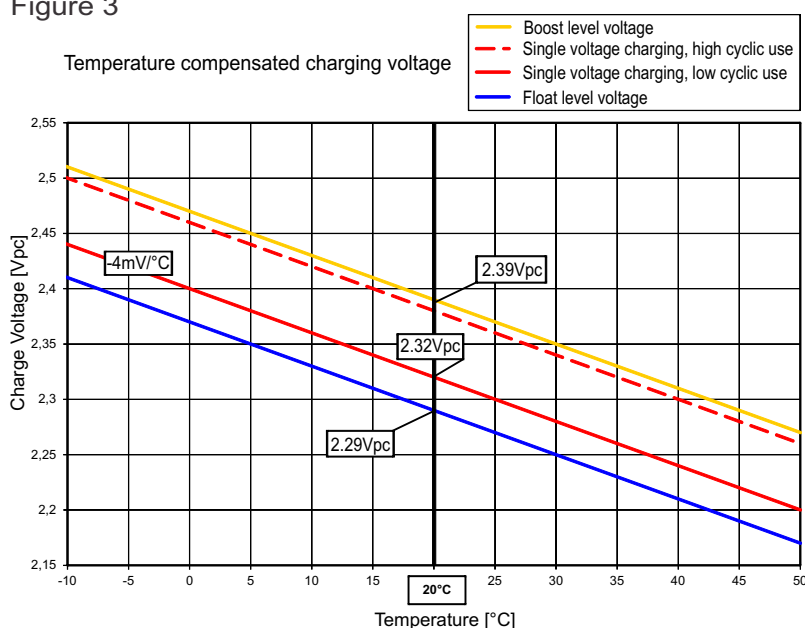


Figure 3



Temperature in °C	Percent of the rated capacity (C <sub>5</sub> )
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)	20 ... 30 A (minimum for cyclic use: 25 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	79.1	74.4	68.7	63.3	58.9	55.2	51.8	46.5	42.2	38.7	31.2	26.3	20.3	16.6	14.2	10.0	8.4	7.3	4.4
	25°C	79.3	74.7	69.5	64.4	60.0	56.4	53.1	47.8	43.5	39.9	32.3	27.2	21.1	17.2	14.7	10.3	8.7	7.5	4.5
1.85	20°C	105.1	100.0	90.7	83.3	77.1	71.6	66.9	59.4	53.4	48.7	38.5	32.2	24.5	19.9	16.9	11.8	9.9	8.6	4.9
	25°C	105.3	100.7	92.1	84.9	78.8	73.4	68.8	61.3	55.3	50.4	40.0	33.5	25.5	20.7	17.5	12.2	10.2	8.8	5.1
1.80	20°C	132.2	124.0	111.3	101.3	93.0	85.9	80.0	70.1	62.5	56.5	44.2	36.5	27.4	22.1	18.6	12.9	10.8	9.3	5.3
	25°C	132.2	125.2	113.1	103.6	95.5	88.5	82.6	72.8	65.0	58.9	46.1	38.1	28.6	23.1	19.4	13.4	11.2	9.7	5.4
1.75	20°C	160.2	147.1	130.3	117.5	107.0	98.3	90.7	78.7	69.4	62.3	47.9	39.2	29.1	23.4	19.7	13.5	11.3	9.7	5.4
	25°C	160.2	148.8	132.9	120.4	110.2	101.5	94.0	81.9	72.5	65.1	50.1	41.1	30.5	24.4	20.5	14.1	11.7	10.1	5.6
1.70	20°C	188.1	168.9	148.0	132.0	119.0	108.2	99.2	85.0	74.4	66.2	50.3	40.8	30.2	24.1	20.2	13.7	11.4	9.8	5.4
	25°C	188.1	171.2	151.3	135.9	123.1	112.3	103.3	88.9	78.0	69.5	52.8	42.9	31.6	25.2	21.1	14.3	11.9	10.2	5.6
1.65	20°C	216.1	189.9	164.4	144.8	129.1	116.3	105.8	89.6	77.8	68.9	51.8	41.8	30.4	24.2	20.2	13.7	11.4	9.8	5.4
	25°C	216.1	192.8	168.5	149.6	134.1	121.3	110.7	94.1	81.9	72.5	54.5	44.0	31.9	25.3	21.1	14.3	11.9	10.2	5.6
1.60	20°C	244.1	210.0	179.2	155.7	137.4	122.7	110.8	92.9	80.3	70.8	52.2	41.8	30.4	24.2	20.2	13.7	11.4	9.8	5.4
	25°C	244.1	213.8	184.3	161.4	143.3	128.6	116.4	97.9	84.6	74.7	55.1	44.0	31.9	25.3	21.1	14.3	11.9	10.2	5.6

### 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	150.2	141.6	130.6	120.7	112.2	105.2	98.9	88.9	81.0	74.5	60.2	51.1	39.5	32.6	27.8	19.6	16.5	14.3	8.7
	25°C	150.5	141.8	132.1	122.7	114.4	107.6	101.4	91.2	83.4	76.8	62.2	52.9	40.9	33.8	28.8	20.3	17.1	14.8	8.9
1.85	20°C	194.1	185.0	168.0	154.5	143.4	133.4	124.9	111.1	100.3	91.5	73.2	61.2	46.9	38.3	32.7	22.8	19.2	16.6	9.6
	25°C	194.7	186.4	170.4	157.6	146.7	136.8	128.4	114.8	103.7	94.8	76.0	63.6	48.8	39.8	33.9	23.6	19.9	17.2	9.9
1.80	20°C	237.9	223.2	200.8	183.3	168.8	156.5	146.0	128.7	115.2	104.4	82.2	68.4	51.8	42.0	35.6	24.8	20.7	18.0	10.2
	25°C	237.9	225.4	204.1	187.3	173.1	160.9	150.5	133.3	119.6	108.7	85.7	71.4	54.0	43.8	37.0	25.7	21.5	18.6	10.5
1.75	20°C	277.8	256.4	229.2	207.2	189.6	174.6	162.0	141.5	125.9	113.5	88.1	72.7	54.5	44.0	37.1	25.8	21.5	18.6	10.4
	25°C	277.8	259.2	233.6	212.3	195.0	180.4	167.7	147.1	131.2	118.5	92.1	76.0	56.9	45.9	38.6	26.8	22.3	19.2	10.8
1.70	20°C	317.3	285.8	252.5	227.2	206.2	188.6	173.8	150.4	132.7	119.1	91.4	74.9	55.8	45.1	37.8	26.1	21.7	18.7	10.4
	25°C	317.4	289.4	257.6	233.3	212.7	195.4	180.6	157.0	138.8	124.6	95.8	78.4	58.4	47.1	39.5	27.2	22.5	19.4	10.8
1.65	20°C	356.2	313.0	272.7	242.9	218.8	199.0	182.3	156.3	137.1	122.4	93.3	76.2	56.3	45.2	37.8	26.1	21.7	18.7	10.4
	25°C	356.2	317.7	279.0	250.2	226.5	206.9	190.2	163.6	143.9	128.4	98.1	80.0	59.0	47.3	39.5	27.2	22.5	19.4	10.8
1.60	20°C	388.6	337.8	290.1	255.3	228.3	206.2	188.1	160.1	139.9	124.4	93.9	76.2	56.3	45.2	37.8	26.1	21.7	18.7	10.4
	25°C	388.6	343.3	297.7	263.8	237.2	215.2	196.8	168.1	147.0	130.9	99.0	80.2	59.0	47.3	39.5	27.2	22.5	19.4	10.8

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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