

# EvoRail™ 3PzV165



*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™ 3PzV165

## Technical specifications

Part number: 1881503V0CP

### 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	162 Ah
Rated capacity C <sub>5</sub> to 1.70 Vpc at 30 °C	165 Ah
Current/Power for 0.25 h back-up time 1.60 Vpc 20 °C	233.5 A / 383 W
Current/Power for 0.5 h back-up time 1.60 Vpc 20 °C	166.2 A / 282 W
Current/Power for 1.0 h back-up time 1.60 Vpc 20 °C	106.2 A / 187 W
Current/Power for 3.0 h back-up time 1.70 Vpc 20 °C	45.2 A / 84 W
Current/Power for 5.0 h back-up time 1.75 Vpc 20 °C	29.5 A / 56 W
Current/Power for 8.0 h back-up time 1.75 Vpc 20 °C	20.3 A / 39 W
Current/Power for 10.0 h back-up time 1.80 Vpc 20 °C	16.2 A / 31 W
Current/Power for 24.0 h back-up time 1.80 Vpc 20 °C	7.9 A / 15 W
Conversion to capacity at 25 °C	102% of Current/Power at 20°C
Internal resistance to IEC/EN 60896-21	1.23 mΩ
Short circuit current to IEC/EN 60896-21	1.65 kA
Self discharge at 20 °C to IEC/EN 60896-21	max. 3% / Month
Heat loss during float service at 20°C	≈ 0.23 W

### Mechanical Data

Weight	12.8 kg ±2%
Height of cell / over terminal cover	340 mm / 370 mm
Width	198 mm
Depth	65 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

# Hawker® EvoRail™ 3PzV165

## Operating specifications

Figure 1



Figure 2

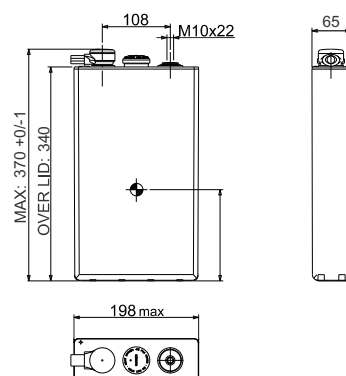
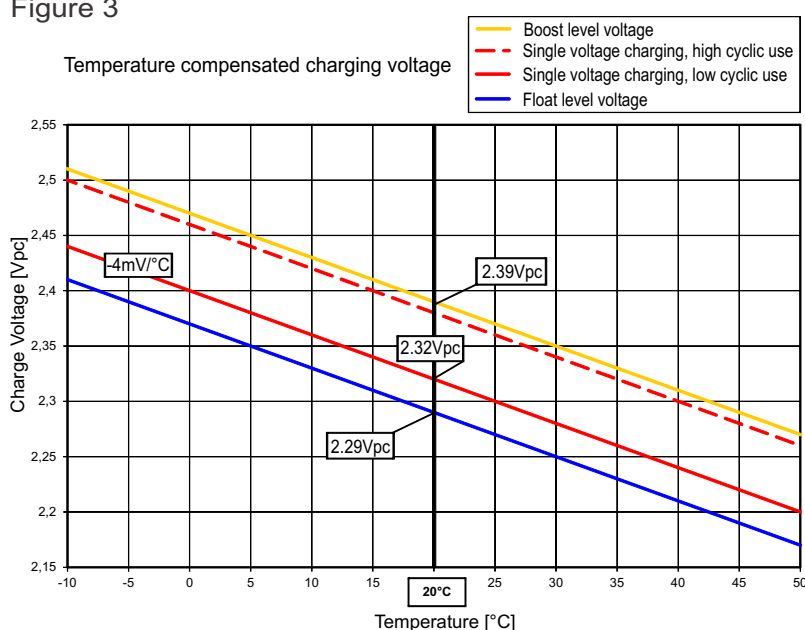


Figure 3



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)	30 ... 45 A (minimum for cyclic use: 38 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)

# Hawker® EvoRail™ 3PzV165

## 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	118.6	111.6	103.1	95.0	88.3	82.8	77.7	69.7	63.3	58.1	46.8	39.5	30.5	24.9	21.3	15.0	12.6	10.9	6.6
	25°C	118.9	112.1	104.3	96.6	90.1	84.6	79.6	71.7	65.2	59.9	48.4	40.9	31.6	25.8	22.0	15.5	13.0	11.3	6.8
1.85	20°C	157.6	150.0	136.1	124.9	115.6	107.4	100.4	89.0	80.1	73.0	57.8	48.3	36.7	29.9	25.3	17.7	14.8	12.8	7.4
	25°C	158.0	151.0	138.1	127.3	118.2	110.2	103.3	92.0	82.9	75.7	60.1	50.2	38.2	31.1	26.3	18.3	15.4	13.3	7.6
1.80	20°C	198.3	186.0	166.9	152.0	139.5	128.9	120.1	105.2	93.7	84.7	66.3	54.7	41.1	33.2	28.0	19.4	16.2	14.0	7.9
	25°C	198.3	187.8	169.7	155.4	143.2	132.8	123.9	109.1	97.4	88.3	69.2	57.1	42.8	34.6	29.1	20.1	16.8	14.5	8.1
1.75	20°C	240.3	220.6	195.5	176.2	160.5	147.4	136.0	118.0	104.1	93.4	71.8	58.8	43.7	35.1	29.5	20.3	16.9	14.6	8.1
	25°C	240.3	223.2	199.3	180.6	165.3	152.3	141.1	122.9	108.8	97.7	75.2	61.6	45.7	36.6	30.7	21.1	17.6	15.1	8.4
1.70	20°C	282.2	253.3	221.9	198.1	178.5	162.3	148.8	127.5	111.6	99.3	75.4	61.3	45.2	36.2	30.3	20.6	17.1	14.7	8.1
	25°C	282.2	256.7	227.0	203.8	184.7	168.5	154.9	133.3	117.0	104.2	79.2	64.3	47.3	37.8	31.6	21.4	17.8	15.3	8.4
1.65	20°C	324.2	284.9	246.5	217.2	193.6	174.4	158.7	134.4	116.7	103.3	77.7	62.7	45.6	36.3	30.3	20.6	17.1	14.7	8.1
	25°C	324.2	289.3	252.7	224.3	201.1	182.0	166.0	141.1	122.8	108.8	81.8	66.0	47.9	37.9	31.6	21.4	17.8	15.3	8.4
1.60	20°C	366.1	315.0	268.8	233.5	206.1	184.0	166.2	139.4	120.4	106.2	78.3	62.7	45.6	36.3	30.3	20.6	17.1	14.7	8.1
	25°C	366.1	320.6	276.4	242.2	215.0	192.8	174.6	146.8	126.9	112.0	82.6	66.0	47.9	37.9	31.6	21.4	17.8	15.3	8.4

### 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	225.4	212.4	195.8	181.0	168.4	157.8	148.3	133.4	121.4	111.7	90.3	76.6	59.3	48.9	41.7	29.4	24.8	21.4	13.0
	25°C	225.7	212.7	198.2	184.0	171.6	161.3	152.0	136.8	125.0	115.2	93.3	79.3	61.3	50.7	43.2	30.4	25.6	22.1	13.3
1.85	20°C	291.2	277.4	252.0	231.8	215.2	200.1	187.4	166.7	150.5	137.2	109.7	91.8	70.4	57.5	49.1	34.1	28.8	25.0	14.4
	25°C	292.0	279.6	255.6	236.4	220.1	205.3	192.7	172.2	155.6	142.2	114.0	95.4	73.2	59.7	50.9	35.4	29.8	25.8	14.8
1.80	20°C	356.9	334.8	301.1	275.0	253.2	234.7	219.0	193.1	172.8	156.5	123.3	102.6	77.7	63.0	53.4	37.2	31.1	26.9	15.3
	25°C	356.9	338.2	306.2	280.9	259.7	241.3	225.7	200.0	179.4	163.0	128.6	107.1	81.0	65.6	55.5	38.6	32.2	27.9	15.7
1.75	20°C	416.6	384.6	343.8	310.9	284.4	262.0	243.0	212.3	188.8	170.2	132.1	109.0	81.7	66.0	55.7	38.7	32.2	27.9	15.7
	25°C	416.7	388.8	350.4	318.4	292.5	270.6	251.6	220.7	196.8	177.7	138.2	114.0	85.3	68.9	57.9	40.2	33.4	28.9	16.1
1.70	20°C	476.0	428.7	378.8	340.8	309.3	282.8	260.7	225.6	199.1	178.6	137.1	112.4	83.7	67.6	56.7	39.2	32.5	28.1	15.7
	25°C	476.1	434.2	386.4	349.9	319.1	293.1	270.9	235.4	208.2	187.0	143.8	117.7	87.6	70.6	59.2	40.7	33.8	29.1	16.2
1.65	20°C	534.3	469.5	409.0	364.4	328.2	298.5	273.5	234.5	205.7	183.6	140.0	114.2	84.4	67.8	56.7	39.2	32.5	28.1	15.7
	25°C	534.3	476.6	418.5	375.3	339.8	310.3	285.2	245.4	215.8	192.6	147.1	120.0	88.5	70.9	59.3	40.7	33.8	29.1	16.2
1.60	20°C	582.9	506.6	435.1	383.0	342.5	309.3	282.2	240.1	209.8	186.6	140.9	114.3	84.4	67.8	56.7	39.2	32.5	28.1	15.7
	25°C	582.9	514.9	446.6	395.8	355.8	322.7	295.2	252.2	220.5	196.3	148.5	120.2	88.5	70.9	59.3	40.7	33.8	29.1	16.2

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



Global & Americas  
Headquarters  
**EnerSys**  
2366 Bernville Road  
Reading,  
Pennsylvania 19605  
USA  
Tel. + 1-610-208-1991

EMEA  
Headquarters  
**EH Europe GmbH**  
Löwenstrasse 32  
8001 Zürich  
Switzerland  
Tel: +41 (0)44 215 74 10  
Fax: +41 (0)44 215 74 11

**EH Europe GmbH**  
**PDAC EMEA**  
Hagnastrasse 27  
4132 Muttenz  
Switzerland  
Tel: +41 61 706 36 36  
Fax: +41 61 706 36 37