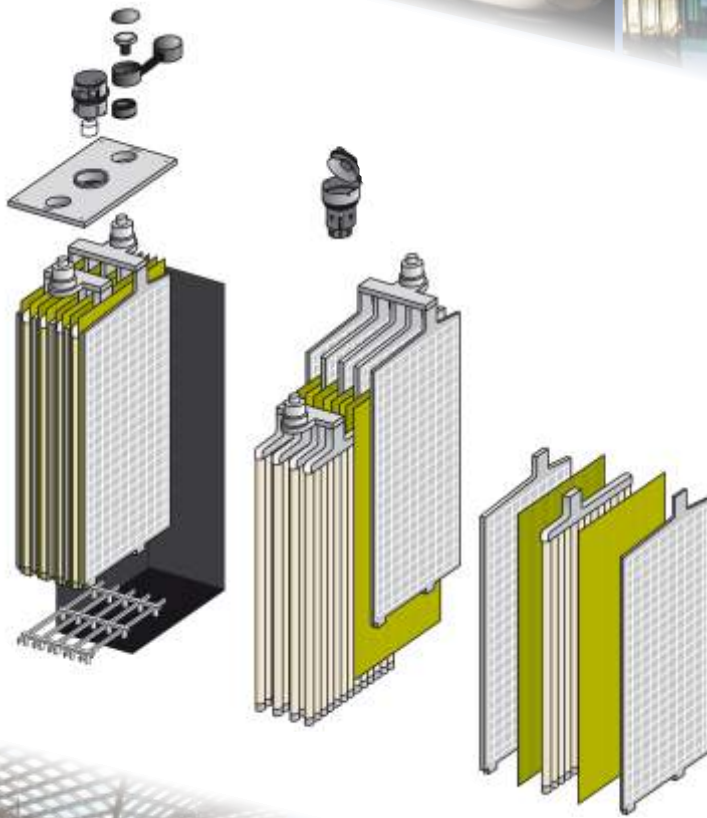


PerfectRail™ 7PzS490



*Lead-Acid Battery Technology
for Rolling Stock Applications*



Robust cell construction

Low maintenance

Shock and vibration resistant

Very high cycle performance

V-0 Flame retardant



Keeping you on track

Hawker® PerfectRail™ 7PzS490

Technical specifications

Part number: 3563136

Electrical Data

Nominal voltage	2 V
Number of cells	1 (Lead-Acid tubular Technology)
Specific gravity of acid	1.24 kg/l (at 30°C) on request 1.27 and 1.29 available
Rated capacity C ₁₀ to 1.80 Vpc at 20 °C	509Ah
Rated capacity C ₅ to 1.70 Vpc at 30 °C	490 Ah
Current/Power for 0.25 h back-up time 1.60 Vpc 20 °C	622.7 A / 1016 W
Current/Power for 0.5 h back-up time 1.60 Vpc 20 °C	462.8 A / 782 W
Current/Power for 1.0 h back-up time 1.60 Vpc 20 °C	302.3 A / 535 W
Current/Power for 3.0 h back-up time 1.70 Vpc 20 °C	134.0 A / 250 W
Current/Power for 5.0 h back-up time 1.75 Vpc 20 °C	89.3 A / 170 W
Current/Power for 8.0 h back-up time 1.75 Vpc 20 °C	62.2 A / 119 W
Current/Power for 10.0 h back-up time 1.80 Vpc 20 °C	50.9 A / 99 W
Current/Power for 24.0 h back-up time 1.80 Vpc 20 °C	24.9 A / 51 W
Conversion to capacity at 25 °C	103 % of Current/Power at 20°C
Internal resistance	0.46 mΩ
Short circuit current	4.42 kA
Self discharge at 20 °C	max. 6% / Month
Heat loss during float service at 20°C	≈ 0.67 W

Mechanical Data

Weight	31.3 kg ±2%
Height of cell / over terminal cover	405 mm / 435 mm
Width	198 mm
Depth	137 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)
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	12+ Long Life, according Eurobat Classification
Shipping name	Batteries, wet, filled with acid

Hawker® PerfectRail™ 7PzS490

Operating specifications

Figure 1



Figure 2

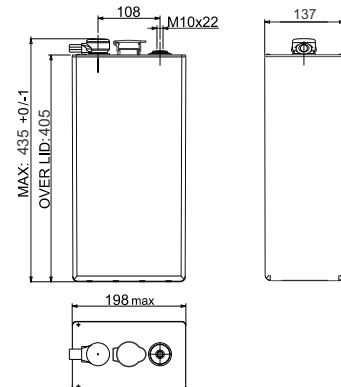
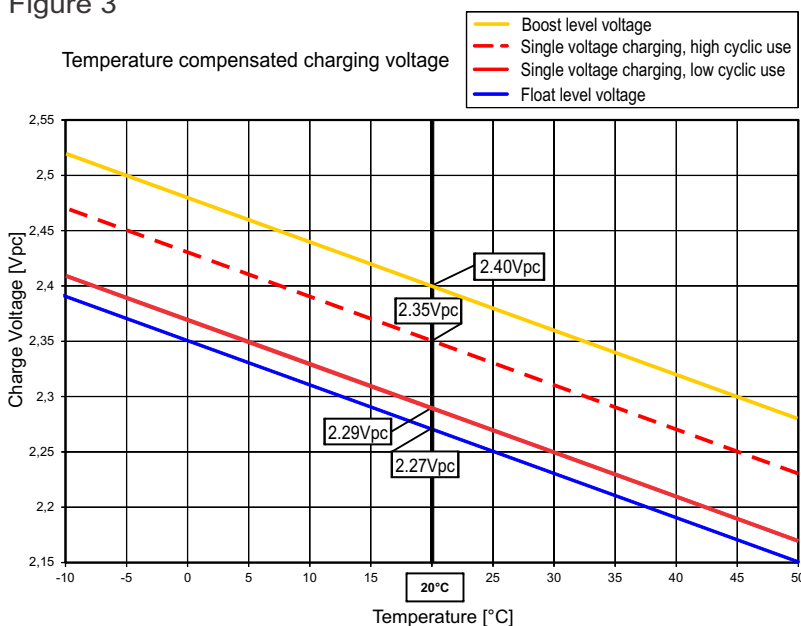


Figure 3



Temperature in °C	Percent of the rated capacity (C ₅)
40	113
35	109
30	106
25	103
20	100
15	97
10	93
5	89
0	84
-5	77
-10	70
-15	62
-20	52
-25	40
-30	29

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 (Volt per cell)
Lower or single level voltage setting at 20°C	2.29 ... 2.35 Vpc (low ... high cyclic use)
Charge current for IU or IU0U-charging (DIN 41773)	89 ... 134 A (minimum for cyclic use: 111 A)
Voltage compensation in function of temperature	- 4 mV/K per cell
Float level voltage setting at 20°C (± 1%)	2.27 Vpc (valid for long term trickle charging at workshop and storage)
Air exchange	According to EN 50272-2 : 2001 $Q = 0.05 * N_{cells} * I_{gas} * C_{AhC10} * 10^{-3} [m^3/h]$ $I_{gas} = 5$ (at 2.29 Vpc) ; $I_{gas} = 20$ (at 2.40 Vpc)
Water refill	manual / optional 'aquamatic' system
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 [V _{pc}]	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	301.6	301.6	301.6	293.9	274.9	258.3	243.8	219.9	200.9	185.1	151.0	128.8	100.6	83.8	72.3	51.9	44.0	38.2	21.7
	25°C	301.6	301.6	301.6	298.5	280.1	263.8	249.6	225.8	206.8	190.7	156.0	133.3	104.2	86.7	74.8	53.7	45.3	39.4	22.3
1.85	20°C	410.7	410.7	388.9	358.2	332.6	310.5	291.9	261.3	237.0	217.1	174.8	147.4	113.6	93.4	80.1	57.0	48.2	41.8	23.7
	25°C	410.7	410.7	394.4	364.8	339.8	318.3	299.6	269.2	244.8	224.7	181.4	153.0	118.0	96.9	83.1	59.0	49.8	43.1	24.3
1.80	20°C	524.1	509.1	456.8	417.7	385.7	359.2	336.2	297.7	267.9	244.0	194.0	162.0	123.3	100.6	85.6	60.4	50.9	44.1	24.9
	25°C	524.1	514.6	464.2	426.3	394.8	368.6	346.2	308.0	277.7	253.4	202.0	168.7	128.5	104.6	89.0	62.6	52.7	45.6	25.6
1.75	20°C	636.8	585.9	522.1	473.8	435.1	402.8	375.0	329.6	294.2	266.1	208.7	172.8	130.2	105.5	89.3	62.2	52.1	45.0	25.2
	25°C	636.8	593.0	531.5	484.8	446.8	414.5	387.3	342.1	306.2	277.4	218.0	180.5	135.9	110.0	93.0	64.6	54.0	46.6	25.9
1.70	20°C	746.6	659.6	584.0	526.9	480.7	441.8	409.0	356.3	315.6	283.4	219.3	180.3	134.0	107.4	90.2	62.2	52.1	45.0	25.2
	25°C	746.6	668.3	595.4	540.2	495.2	456.8	424.0	370.9	329.6	296.5	229.7	188.7	140.3	112.1	94.1	64.7	54.0	46.6	25.9
1.65	20°C	853.1	730.1	642.7	576.8	522.3	476.6	438.3	377.8	332.4	296.5	225.2	182.1	134.0	107.4	90.2	62.2	52.1	45.0	25.2
	25°C	857.8	740.5	656.4	592.4	539.6	494.7	456.3	394.8	348.3	311.2	237.1	191.3	140.3	112.1	94.1	64.7	54.0	46.6	25.9
1.60	20°C	875.4	796.5	698.7	622.7	559.5	506.6	462.8	394.7	344.9	302.3	225.2	182.1	134.0	107.4	90.2	62.2	52.1	45.0	25.2
	25°C	875.4	808.4	714.8	641.8	580.3	528.1	483.6	413.9	362.3	319.6	237.1	191.3	140.3	112.1	94.1	64.7	54.0	46.6	25.9

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

Voltage [V _{pc}]	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	570.0	570.0	570.0	560.0	524.4	493.6	467.2	422.1	386.1	356.9	292.4	250.5	196.6	164.5	142.1	103.0	88.6	77.8	45.2
	25°C	570.0	570.0	570.0	568.4	533.8	504.1	477.6	433.3	397.2	367.1	302.2	258.7	203.7	170.0	147.1	106.0	91.1	80.0	46.3
1.85	20°C	754.6	754.6	718.7	665.0	618.7	579.9	546.5	491.6	447.3	410.7	332.9	281.8	219.2	180.3	155.6	111.3	95.2	83.8	48.8
	25°C	754.5	754.5	728.4	676.2	632.1	594.1	560.1	505.5	461.3	424.8	344.8	292.7	227.6	187.1	161.2	115.2	98.1	86.2	50.0
1.80	20°C	941.1	914.8	822.9	754.9	699.7	653.8	614.0	548.4	496.5	454.2	362.7	305.6	234.9	192.4	164.4	116.6	98.9	87.1	50.9
	25°C	941.2	924.4	835.9	769.7	715.5	669.9	631.3	565.8	513.6	470.8	377.6	318.0	244.3	200.2	170.5	120.8	102.1	89.7	52.2
1.75	20°C	1110.6	1025.4	917.1	835.5	770.7	716.6	670.2	593.1	534.8	487.3	385.7	321.5	244.9	200.1	169.6	119.3	100.5	88.2	51.4
	25°C	1110.7	1036.8	933.6	853.9	790.7	736.9	691.0	614.3	554.5	506.5	402.4	335.2	255.1	208.5	176.6	124.1	104.2	90.9	52.7
1.70	20°C	1268.0	1121.7	998.5	906.7	832.2	769.7	716.6	630.1	562.6	510.9	401.1	331.4	250.4	203.1	171.2	119.4	100.5	88.2	51.4
	25°C	1268.0	1136.2	1016.4	929.4	855.4	793.9	741.3	654.4	585.7	532.1	419.5	346.4	261.7	212.0	178.6	124.2	104.2	90.9	52.7
1.65	20°C	1410.4	1209.5	1068.3	966.2	883.2	812.9	753.8	657.8	583.8	526.6	410.9	334.6	250.4	203.1	171.2	119.4	100.5	88.2	51.4
	25°C	1414.5	1225.4	1090.0	990.6	909.9	840.9	781.4	685.1	609.9	549.8	430.5	351.5	262.0	212.0	178.6	124.2	104.2	90.9	52.7
1.60	20°C	1434.8	1283.4	1130.9	1016.5	923.8	846.6	781.6	678.1	598.9	535.4	411.2	334.6	250.4	203.1	171.2	119.4	100.5	88.2	51.4
	25°C	1437.4	1301.7	1156.6	1044.5	954.4	878.1	812.6	708.0	627.1	562.6	431.8	351.5	262.0	212.0	178.6	124.2	104.2	90.9	52.7

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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