Conductor Systems

SIMBAL 'Powerline W' Single Pole Conductor systems

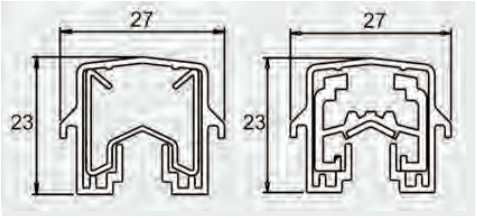
Introduction

'Powerline W' is a high quality single – pole conductor system distributed exclusively in the UK by SIMBAL Ltd, it is available in intensities from 60 Amp up to 400 Amp.
The 60 / 100 / 125 Amp systems use a galvanised steel conductor material, 200 & 315 Amp systems are from aluminium with a stainless steel running strip, 160, 250 & 400. Amp systems all use a copper conductor which provides improved conductivity hence reducing voltage drop and allowing use of smaller systems for a given application.

'Powerline W' also provides a solution for applications where high ambient temperatures are present, the standard system is suitable for operating temperatures from –30 up to +55 deg C, in addition a high temperature version is available which is designed to withstand temperatures up to 85 deg C.

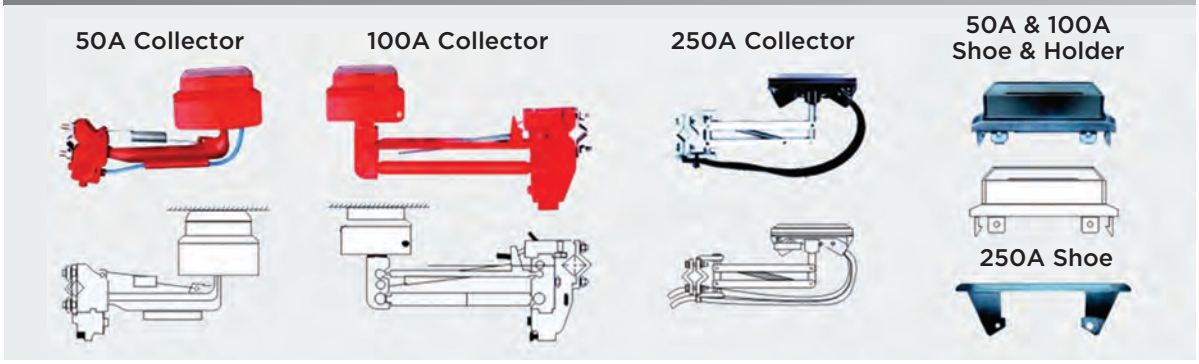
'Powerline W' offers many advantages when compared with other popular conductor systems as follows :

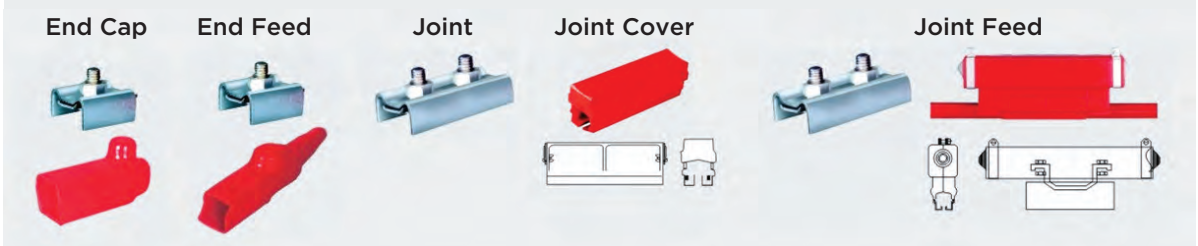
- Finger proof insulation preventing accidental contact with live parts
- Quick & easy installation with single bolt 4 pole hangers
- Compact cross section all sizes from 60 to 400Amp in same section
- 60, 100 & 125 Amps – Galvanised steel conductor
- 200 & 315 Amps – Aluminium / Stainless steel conductor
- 160, 250 & 400 Amps – Copper conductor
- 4.50m standard bar length
- Covers designed to shed water & dust
- Joint cover provides total protection of joints
- Enclosed wiring connections on collectors for safe, simple installation
- No expansion joints on systems up to 150m
- Available in straight or curved configuration



Profile cross section (same for all intensities 60–400 Amps)

Current Collectors





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'Powerline W' – Technical Data

Conductor Bar System	Galvanised Steel			Copper			Aluminium / SS	
Type	**WG-60**	**WG-100**	**WG-125**	**WG-160**	**WG-250**	**WG-400**	**WG-200**	**WG-315**
Nominal current (A) at 100% Duty and 35° C	60	100	125	160	250	400	200	315
DC resistance (Ω/M) at +35° C	0.003584	0.002867	0.001933	0.000342	0.000274	0.000184	0.000301	0.000261
Impedence (Ω/M) at +35° C	0.003604	0.002891	0.001968	0.000364	0.000300	0.000221	0.000325	0.000288
Voltage grade (V)	600							
Support spacing (mm)	1125							
Bar length (mm)	4500							
Outside dimensions (mm)	23 x 275							
Permissible ambient temperature	–30°C + 55°C (standard insulation) –30°C + 85°C (high temperature insulation)							

Current Capacity Factors for different ambient temperatures

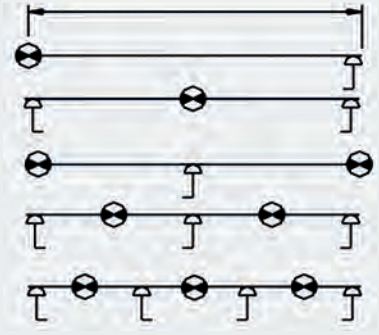
Ambient temperature			35°C	40°C	45°C	50°C	55°C	60°C	65°C	70°C	75°C	80°C	85°C
Standard Insulation	Aluminium Rail	fA	1.0	0.92	0.81	0.76	0.68						
	Copper Rail		1.0	0.93	0.87	0.82	0.78						
High Temperature Insulation	Aluminium Rail	fA					1.0	0.92	0.81	0.76	0.68	0.63	0.59
	Copper Rail						1.0	0.93	0.87	0.82	0.78	0.74	0.72

Intermittent Conductor Rating

	% Rating			
	100%	80%	60%	40%
Allowable Current (AMPS)	60	66	77	94
	100	111	129	158
	125	138	161	197
	160	177	206	252
	200	222	258	316
	250	277	322	395
	315	349	406	497
	400	444	516	632
	500	555	645	790
	800	888	1032	1264
	1000	1110	1290	1590
	1250	1387	1612	2038

Effects of various power feed positions on volt drop calculations

Selection of feed–in points. The feed–in point for every application must be selected because the length L between power feed and conductor rail end is used for calculating the voltage drop. Following feed–in points can normally be used.

Powerfeed Position	Schematic Diagram Collector symbol indicates positions of Maximum Volt Drop	Effective length to be used in Volt Drop Calculations
Endfeed		LVD = L
Centre feed		$LVD = \frac{L}{2}$
Two end feed		$LVD = \frac{L}{4}$
Two feeds both in from end		$LVD = \frac{L}{6}$
Three feeds at $\frac{L}{10}$ in from ends and centre		$LVD = \frac{L}{10}$

Voltage Drop

The allowable volt drop determines the allowable resistance of conductor. The value of volt drop within a conductor system is effected by effective length of system and current drawn.

Voltage Drop Calculation

For AC Machine 3 phase

Δ U Volt drop = length (D) x Impedance (Z) x Current (I) x $3\sqrt{}$

$$U\% = \frac{\Delta U}{Un} \times 100\ (\%)$$

Typical assembly of system