




PREFORMED LINE PRODUCTS

The connection you can count on.

 COMMUNICATIONS

 **ENERGY**

 SYSTEM ENCLOSURES

 SPECIAL INDUSTRIES



SUBSTATIONS CATALOGUE



Australian Manufacturer of
Busbar Systems
For Substations



POWERFORMED LINE PRODUCTS
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POWERFORMED® Substations System Catalogue

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Introduction to POWERFORMED®

BUSLIGN™ for Busbars, SUBLIGN™ for Flexible Conductors

Preformed Line Products (PLP)

Preformed Line Products (PLP) is a worldwide designer, manufacturer and supplier of high quality products for the electric power Distribution and Transmission industries. With an equally strong presence in the Communications and Solar industry segments, PLP is a global power and fibre infrastructure specialist.

Located in 16 countries around the world, PLP's flexibility and global presence allows it to respond to customer's needs quickly and with precision. With ground breaking and innovative solutions like THERMOLIGN® products for high temperature transmission lines and COYOTE® Fibre Optic Products PLP have consistently pioneered advances in power utility communications and communications networks since 1947.

PLP was founded on technology for supporting, protecting, terminating and splicing transmission and distribution lines, OPGW (Optical Ground Wire) and ADSS (All Dielectric Self Supporting) fibre optic cables. The Company's reputation, product reliability and longevity speaks for itself. You can count on PLP's energy products and people day in and day out, year after year. That is because a steadfast commitment to quality is not just a goal at PLP, it's an obsession. In our engineering laboratories, on the manufacturing lines and all the way to field installation, it's the guiding principle of everything we do.

POWERFORMED® Substation Systems

Preformed Line Products POWERFORMED® Substation systems are a product of the company's global engineering design, testing and manufacturing strengths. Proven over many years of reliable in-service performance at voltages up to 500kV, the intellectual property and designs that underpin POWERFORMED® fittings are drawn from as far afield as Australia, New Zealand, Poland, South Africa, and Thailand.

Within the POWERFORMED® range are two distinct families of connectors, clamps and hardware for substation products. The families are called **BUSLIGN™** and **SUBLIGN™**. Within these families, the fittings have been divided into three distinct groups which are structured around application voltages within substations:

1. Fittings that are designed to be applied at voltages up to and including 230kV
2. Fittings that are designed to be applied at voltages between 245kV and 400kV
3. Fittings that are designed to be applied at voltages between 400kV and 500kV

BUSLIGN™: Substation Fittings for Tubular Aluminium Busbars


POWERFORMED® BUSLIGN™ aluminium substation fittings includes both bolted, and welded solutions. Designed to be used to create high current tubular aluminium busbar systems in high voltage AC and DC substations, BUSLIGN™ fittings are available to suit both SPS (Standard Pipe Size) and Metric aluminium busbar tubes as large as 8 inch and 250mm OD (Outside Diameter). Conservatively designed for long and reliable in-service life, PLP's BUSLIGN™ range represents some of the latest thinking in power engineering product design, backed by mechanical, heat cycle, Corona and RIV short circuit testing at up to 63kA/1s.



SUBLIGN™: Substation Fittings for Flexible Aluminium Conductors


POWERFORMED® SUBLIGN™ flexible conductor fittings encompasses bolted, welded and compression fitting solutions for AAC, AAAC, ACSR and ACAR flexible aluminium conductors. With some of the most unique and flexible designs available, installation is fast, easy and most importantly reliable for critical substation assets. Backed by extensive testing to NEMA, ANSI and IEC standards, SUBLIGN™ connectors are the low risk choice for substation assets.

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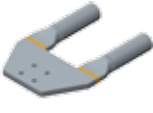
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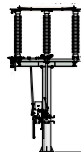
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User Guide

POWERFORMED® Catalogue

SUBLIGN™ and BUSLIGN™ Product Dimensions

Within the Australian POWERFORMED® Substation System Catalogue, PLP has taken the approach of providing only the critical dimensions for each SUBLIGN™ and BUSLIGN™ product. Examples of critical dimensions include: conductor centres for multiple conductor bundles; pitch circle diameters for insulator mountings; and the busbar centerline heights over post insulators. Fully dimensioned Sales Drawings are available for each SUBLIGN™ and BUSLIGN™ item from PLP on request.

SUBLIGN™ and BUSLIGN™ Continuous Current Ratings

Neither the SUBLIGN™ nor BUSLIGN™ catalogue pages list continuous current ratings for each individual item within a product family.

The approach to engineering design for POWERFORMED® products is conservative with continuous current rating limits being determined by factors including current density (cross sectional area and surface area contact), contact force, windspeed, and emissivity. POWERFORMED® continuous current ratings are backed by test data to standards including NEMA CC1, ANSI C119.4, and IEC 61284. Not all POWERFORMED® products have been tested because the diversity of SUBLIGN™ and BUSLIGN™ products is simply too great to achieve 100% type test status. Where products are not tested, the design is verified by tests on similar products where it is possible to extrapolate performance between assemblies. Continuous current ratings are available for all items and listed on the PLP Sales Drawing for each individual item.

SUBLIGN™ and BUSLIGN™ Short Circuit Ratings

In 2008 and 2009 Electropar PLP (New Zealand) embarked upon a programme to mathematically validate and then short circuit test a full size bay width of phase to phase insulated 220kV 200mm OD (4000amp) busbar and interplant connections at 25kA, 31.5kA, 40kA, 50kA and 63kA fault levels. The objectives of the testing were to prove the integrity of PLP's Powerformed fittings designs and to determine whether the existing method of calculation used to determine short circuit performance of substation components is valid (by comparing calculated load and displacement values to actual load and displacement values).

The testing took place at Powertech Lab's in Vancouver, Canada in June 2009 after a global search for laboratories with the capability to complete this scope. Under varying short circuits applied between 25kA/0.3s and 63kA/1sec (including long duration tests at 40kA/3s) measurement of the loads and displacements of the system under varying fault conditions took place. In all, 59 short circuit tests were completed over a 5 day test period with data collected by a combination of high speed cameras, still cameras, video and fibre optic sensors.

The data obtained from short circuit testing many SUBLIGN™ and BUSLIGN™ products in a real life environment underpins fundamental aspects of POWERFORMED® product designs.



FULL SCALE SHORT CIRCUIT TESTING TO 63 kA/1sec
POWERTECH LABORATORY, VANCOUVER, 2009.

Australian Standard Terminal Palms

Dimensions and Types - Dimensions in Millimetres



Standard Primary Equipment Stud Sizes

Dimensions, Types and Thread Details

SUBLIGN and BUSLIGN™ IEC

Each BUSLIGN™ and SUBLIGN™ catalogue page within this catalogue that is relevant to primary equipment stud connections lists standard stud diameters in millimetres.

If the stud is threaded, details regarding the stud size (diameter and length), whether the thread is Coarse or fine and the thread pitch will be required. Standard coarse and fine I.S.O metric threads are tabulated below. PLP will supply a special catalogue number and sales drawing to define the BUSLIGN™ and SUBLIGN™ product requirements.

I.S.O Metric Coarse Threads	
Stud Outside Diameter (mm)	Pitch (mm)
10.0	1.50
12.0	1.75
14.0	2.00
16.0	2.00
18.0	2.50
20.0	2.50
22.0	2.50
24.0	3.00
27.0	3.00
30.0	3.50
33.0	3.50
36.0	4.00
39.0	4.00
42.0	4.50
45.0	4.50
48.0	5.00
52.0	5.00
56.0	5.50
60.0	5.50
64.0	6.00
68.0	6.00

Standard I.S.O Metric Fine Threads	
Stud Outside Diameter (mm)	Pitch (mm)
12.0	1.25
16.0	1.50
20.0	1.50
24.0	2.00
30.0	2.00
36.0	3.00
42.0	3.00
48.0	3.00
56.0	4.00
64.0	4.00



Nominal Dimensions and Weights

Metric Aluminium Busbar Tubes

Outside Diameter	Wall Thickness	Cross Sectional Area	Weight
mm	mm	mm ²	kg/m
50.0	4.0	578	1.57
50.0	6.0	829	2.24
63.0	4.0	741	2.01
63.0	6.0	1074	2.91
75.0	4.0	892	2.41
75.0	6.0	1301	3.52
80.0	4.0	955	2.58
80.0	6.0	1395	3.77
80.0	10.0	2199	5.94
100.0	4.0	1206	3.26
100.0	6.0	1772	4.79
100.0	8.0	2312	6.25
100.0	10.0	2827	7.64
120.0	4.0	1458	3.94
120.0	6.0	2149	5.81
120.0	8.0	2815	7.61
120.0	10.0	3456	9.34
125.0	6.0	2243	6.06
125.0	10.0	3613	9.76
140.0	6.0	2526	6.82
140.0	8.0	3318	8.96
140.0	10.0	4084	11.03
150.0	8.0	3569	9.64
150.0	10.0	4398	11.88
150.0	12.0	5202	14.05
160.0	6.0	2903	7.84
160.0	8.0	3820	10.32
160.0	10.0	4712	12.73
160.0	12.0	5579	15.07
200.0	6.0	3657	9.88
200.0	8.0	4825	13.03
200.0	10.0	5969	16.12
200.0	12.0	7087	19.14
250.0	6.0	4599	12.42
250.0	8.0	6082	16.43
250.0	10.0	7540	20.36
250.0	12.0	8972	24.23

Current Ratings by Temperature

Metric Aluminium Busbar Tubes

0-25°C Ambient, Operating Temperature 90°C maximum

Aluminium Tube			Current Rating					
Outside Diameter	Wall Thickness	Cross Sectional Area	0°C Ambient	5°C Ambient	10°C Ambient	15°C Ambient	20°C Ambient	25°C Ambient
mm	mm	mm ²	Amps	Amps	Amps	Amps	Amps	Amps
50.0	4.0	578	1604	1548	1490	1431	1371	1309
50.0	6.0	829	1920	1852	1783	1713	1641	1566
63.0	4.0	741	1958	1889	1819	1747	1673	1598
63.0	6.0	1074	2355	2272	2188	2101	2012	1921
75.0	4.0	892	2275	2195	2113	2030	1944	1856
75.0	6.0	1301	2744	2647	2549	2448	2345	2239
80.0	4.0	955	2405	2320	2234	2146	2055	1962
80.0	6.0	1395	2903	2801	2697	2590	2481	2369
80.0	10.0	2199	3587	3461	3332	3200	3065	2927
100.0	4.0	1206	2913	2811	2706	2599	2490	2377
100.0	6.0	1772	3527	3403	3277	3147	3014	2878
100.0	8.0	2312	4013	3872	3728	3581	3430	3274
100.0	10.0	2827	4384	4230	4073	3912	3747	3577
120.0	4.0	1458	3408	3289	3167	3041	2913	2781
120.0	6.0	2149	4134	3989	3841	3689	3533	3373
120.0	8.0	2815	4713	4547	4378	4205	4028	3845
120.0	10.0	3456	5159	4978	4793	4603	4409	4209
125.0	6.0	2243	4284	4134	3980	3823	3661	3495
125.0	10.0	3613	5350	5162	4970	4774	4572	4365
140.0	6.0	2526	4729	4563	4393	4219	4041	3858
140.0	8.0	3318	5398	5208	5015	4816	4613	4404
140.0	10.0	4084	5917	5709	5497	5279	5057	4828
150.0	8.0	3569	5735	5534	5328	5118	4902	4680
150.0	10.0	4398	6290	6069	5844	5613	5376	5133
150.0	12.0	5202	6709	6474	6233	5986	5734	5474
160.0	6.0	2903	5313	5126	4936	4741	4541	4335
160.0	8.0	3820	6070	5857	5640	5417	5188	4953
160.0	10.0	4712	6661	6427	6188	5943	5693	5435
160.0	12.0	5579	7108	6858	6603	6342	6075	5800
200.0	6.0	3657	6457	6231	5999	5762	5519	5269
200.0	8.0	4825	7388	7129	6864	6592	6314	6028
200.0	10.0	5969	8118	7833	7542	7244	6938	6624
200.0	12.0	7087	8675	8370	8059	7741	7414	7078
250.0	6.0	4599	7854	7579	7297	7008	6713	6409
250.0	8.0	6082	8996	8680	8358	8027	7688	7340
250.0	10.0	7540	9895	9548	9193	8830	8457	8074
250.0	12.0	8972	10586	10214	9835	9446	9047	8638

Basis of Ratings Calculations

Material	6101 T6 Aluminium Alloy
Resistivity (at 20°C)	0.030μΩm
Wind Velocity	0.6 m/s
Conductor Emissivity	0.5



Current Ratings by Temperature

Metric Aluminium Busbar Tubes

30-50°C Ambient, Operating Temperature 90°C maximum

Aluminium Tube			Current Rating				
Outside Diameter	Wall Thickness	Cross Sectional Area	30°C Ambient	35°C Ambient	40°C Ambient	45°C Ambient	50°C Ambient
mm	mm	mm ²	Amps	Amps	Amps	Amps	Amps
50.0	4.0	578	1245	1179	1111	1040	966
50.0	6.0	829	1490	1411	1329	1245	1156
63.0	4.0	741	1520	1439	1356	1270	1179
63.0	6.0	1074	1828	1731	1631	1527	1418
75.0	4.0	892	1766	1672	1575	1475	1370
75.0	6.0	1301	2130	2017	1900	1779	1653
80.0	4.0	955	1866	1767	1665	1559	1448
80.0	6.0	1395	2253	2134	2011	1882	1749
80.0	10.0	2199	2784	2636	2484	2326	2161
100.0	4.0	1206	2261	2141	2018	1889	1755
100.0	6.0	1772	2737	2593	2443	2287	2125
100.0	8.0	2312	3115	2950	2779	2602	2417
100.0	10.0	2827	3403	3223	3036	2843	2641
120.0	4.0	1458	2645	2505	2361	2210	2053
120.0	6.0	2149	3209	3039	2863	2681	2490
120.0	8.0	2815	3658	3464	3264	3056	2839
120.0	10.0	3456	4004	3792	3573	3345	3108
125.0	6.0	2243	3325	3149	2967	2778	2581
125.0	10.0	3613	4152	3932	3705	3469	3223
140.0	6.0	2526	3670	3476	3275	3066	2849
140.0	8.0	3318	4189	3968	3738	3500	3252
140.0	10.0	4084	4592	4349	4098	3836	3564
150.0	8.0	3569	4451	4216	3972	3719	3455
150.0	10.0	4398	4882	4624	4356	4079	3789
150.0	12.0	5202	5207	4932	4646	4350	4041
160.0	6.0	2903	4124	3905	3679	3445	3200
160.0	8.0	3820	4712	4462	4204	3936	3657
160.0	10.0	4712	5170	4896	4613	4319	4012
160.0	12.0	5579	5517	5225	4922	4609	4282
200.0	6.0	3657	5012	4747	4472	4187	3890
200.0	8.0	4825	5734	5431	5117	4791	4451
200.0	10.0	5969	6301	5967	5622	5264	4890
200.0	12.0	7087	6733	6377	6008	5625	5226
250.0	6.0	4599	6096	5773	5440	5093	4731
250.0	8.0	6082	6982	6613	6230	5833	5419
250.0	10.0	7540	7680	7274	6853	6416	5961
250.0	12.0	8972	8216	7781	7331	6864	6377

Basis of Ratings Calculations	
Material	6101 T6 Aluminium Alloy
Resistivity (at 20°C)	0.030μΩm
Wind Velocity	0.6 m/s
Conductor Emissivity	0.5

Short Circuit Ratings

Metric Aluminium Busbar Tubes

Aluminium Tube			Current Rating	
Outside Diameter	Wall Thickness	Cross Sectional Area	3 Second Short Circuit Duration	1 Second Short Circuit Duration
mm	mm	mm ²	kA	kA
50.0	4.0	578	31.7	54.9
50.0	6.0	829	45.5	78.8
63.0	4.0	741	40.7	70.4
63.0	6.0	1074	58.9	102.1
75.0	4.0	892	48.9	84.8
75.0	6.0	1301	71.3	123.6
80.0	4.0	955	52.4	90.7
80.0	6.0	1395	76.5	132.5
80.0	10.0	2199	120.6	208.9
100.0	4.0	1206	66.2	114.6
100.0	6.0	1772	97.2	168.3
100.0	8.0	2312	126.8	219.7
100.0	10.0	2827	155.1	268.6
120.0	4.0	1458	80.0	138.5
120.0	6.0	2149	117.9	204.1
120.0	8.0	2815	154.4	267.4
120.0	10.0	3456	189.5	328.3
125.0	6.0	2243	123.0	213.1
125.0	10.0	3613	198.2	343.2
140.0	6.0	2526	138.5	240.0
140.0	8.0	3318	182.0	315.2
140.0	10.0	4084	224.0	388.0
150.0	8.0	3569	195.7	339.0
150.0	10.0	4398	241.2	417.8
150.0	12.0	5202	285.3	494.2
160.0	6.0	2903	159.2	275.8
160.0	8.0	3820	209.5	362.9
160.0	10.0	4712	258.5	447.7
160.0	12.0	5579	306.0	530.0
200.0	6.0	3657	200.6	347.4
200.0	8.0	4825	264.7	458.4
200.0	10.0	5969	327.4	567.1
200.0	12.0	7087	388.7	673.3
250.0	6.0	4599	252.3	436.9
250.0	8.0	6082	333.6	577.8
250.0	10.0	7540	413.5	716.3
250.0	12.0	8972	492.1	852.4

Basis of Ratings Calculations

Ambient Temperature	20°C
Conductor Temperature - Continuous	70°C
Conductor Temperature - Short Time	250°C



Thermal Expansion

Metric Aluminium Busbar Tubes

10-50°C Temperature Change

Length	Change in Length				
	10°C temperature change	20°C temperature change	30°C temperature change	40°C temperature change	50°C temperature change
m	mm	mm	mm	mm	mm
3.05	0.7	1.4	2.1	2.8	3.5
6.1	1.4	2.8	4.2	5.6	7.0
9.14	2.1	4.2	6.3	8.4	10.5
12.19	2.8	5.6	8.4	11.2	14.0
15.24	3.5	7.0	10.5	14.0	17.5
18.29	4.2	8.4	12.6	16.8	21.0
21.34	4.9	9.8	14.7	19.6	24.5
24.38	5.6	11.2	16.8	22.4	28.0
27.43	6.3	12.6	18.9	25.2	31.5
30.48	7.0	14.0	21.0	28.0	35.0

60-100°C Temperature Change

Length	Change in Length				
	60°C temperature change	70°C temperature change	80°C temperature change	90°C temperature change	100°C temperature change
m	mm	mm	mm	mm	mm
3.05	4.2	4.9	5.6	6.3	7.0
6.10	8.4	9.8	11.2	12.6	14.0
9.14	12.6	14.7	16.8	18.9	21.0
12.19	16.8	19.6	22.4	25.2	28.0
15.24	21.0	24.5	28.0	31.5	35.1
18.29	25.2	29.4	33.7	37.8	42.1
21.34	29.4	34.3	39.3	44.2	49.1
24.38	33.7	39.3	44.9	50.5	56.1
27.43	37.8	44.2	50.5	56.8	63.1
30.48	42.1	49.1	56.1	63.1	70.1

Basis of Calculations	
Coefficient of Thermal Expansion	0.000023 in/in.°C

Deflection Values

Metric Aluminium Busbar Tubes

5.0-13.0m Spans

Tube Size		Span Length (m)								
OD (mm)	WT (mm)	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0
50.0	4.0	11.6	24.1	44.6						
50.0	6.0	12.6	26.0	48.2						
63.0	4.0	7.1	14.7	27.2	46.4					
63.0	6.0	7.5	15.6	29.0	49.4					
75.0	4.0	4.9	10.2	18.8	32.1	51.4				
75.0	6.0	5.2	10.7	19.8	33.8	54.2				
80.0	4.0	4.3	8.9	16.4	28.0	44.9				
80.0	6.0	4.5	9.3	17.3	29.4	47.2				
80.0	10.0	5.0	10.3	19.0	32.5	52.0				
100.0	4.0	2.7	5.6	10.3	17.6	28.2	42.9	62.8		
100.0	6.0	2.8	5.8	10.7	18.3	29.3	44.7	65.4		
100.0	8.0	2.9	6.0	11.2	19.0	30.5	46.5	68.0		
100.0	10.0	3.0	6.3	11.6	19.8	31.7	48.3	70.7		
120.0	4.0	1.8	3.8	7.1	12.0	19.3	29.4	43.1	61.0	
120.0	6.0	1.9	3.9	7.3	12.5	19.9	30.4	44.5	63.0	
120.0	8.0	2.0	4.1	7.5	12.9	20.6	31.4	46.0	65.2	
120.0	10.0	2.0	4.2	7.8	13.3	21.3	32.5	47.5	67.3	
125.0	6.0	1.7	3.6	6.7	11.4	18.3	27.9	40.9	57.9	
125.0	10.0	1.9	3.9	7.1	12.2	19.5	29.7	43.5	61.7	
140.0	6.0	1.4	2.9	5.3	9.0	14.4	22.0	32.2	45.7	62.9
140.0	8.0	1.4	2.9	5.4	9.3	14.9	22.7	33.2	47.0	64.7
140.0	10.0	1.5	3.0	5.6	9.5	15.3	23.3	34.1	48.3	66.6
150.0	8.0	1.2	2.5	4.7	8.0	12.9	19.6	28.7	40.6	55.9
150.0	10.0	1.3	2.6	4.8	8.2	13.2	20.1	29.4	41.7	57.4
150.0	12.0	1.3	2.7	5.0	8.5	13.5	20.6	30.2	42.8	59.0
160.0	6.0	1.0	2.2	4.0	6.8	10.9	16.7	24.4	34.6	47.6
160.0	8.0	1.1	2.2	4.1	7.0	11.2	17.1	25.0	35.5	48.8
160.0	10.0	1.1	2.3	4.2	7.2	11.5	17.5	25.7	36.4	50.1
160.0	12.0	1.1	2.3	4.3	7.4	11.8	18.0	26.3	37.3	51.3
200.0	6.0	0.7	1.4	2.5	4.3	6.9	10.5	15.4	21.8	30.0
200.0	8.0	0.7	1.4	2.6	4.4	7.0	10.7	15.7	22.2	30.6
200.0	10.0	0.7	1.4	2.6	4.5	7.2	10.9	16.0	22.7	31.3
200.0	12.0	0.7	1.4	2.7	4.6	7.3	11.2	16.3	23.2	31.9
250.0	6.0	0.4	0.9	1.6	2.7	4.4	6.7	9.7	13.8	19.0
250.0	8.0	0.4	0.9	1.6	2.8	4.4	6.8	9.9	14.0	19.3
250.0	10.0	0.4	0.9	1.6	2.8	4.5	6.9	10.1	14.2	19.6
250.0	12.0	0.4	0.9	1.7	2.9	4.6	7.0	10.2	14.5	19.9

(Continued)



Deflection Values

Metric Aluminium Busbar Tubes

14.0-21.0m Spans

Tube Size		Span Length (m)							
OD (mm)	WT (mm)	14.0	15.0	16.0	17.0	18.0	19.0	20.0	21.0
140.0	6.0	84.6							
140.0	8.0	87.0							
140.0	10.0	89.5							
150.0	8.0	75.2							
150.0	10.0	77.3							
150.0	12.0	79.3							
160.0	6.0	64.1	84.4						
160.0	8.0	65.7	86.6						
160.0	10.0	67.3	88.8						
160.0	12.0	69.0	91.0						
200.0	6.0	40.4	53.2	68.9	87.8	110.4			
200.0	8.0	41.2	54.3	70.3	89.6	112.6			
200.0	10.0	42.0	55.4	71.7	91.4	114.9			
200.0	12.0	42.9	56.5	73.2	93.2	117.2			
250.0	6.0	25.6	33.7	43.6	55.5	69.8	86.7	106.4	129.3
250.0	8.0	26.0	34.2	44.3	56.4	70.9	88.1	108.1	131.4
250.0	10.0	26.4	34.8	45.0	57.4	72.1	89.5	109.9	133.5
250.0	12.0	26.8	35.3	45.7	58.3	73.2	90.9	111.6	135.7

Basis of Calculations

Maximum deflections shown here are calculated assuming a simply supported beam

Maximum deflections of beams fixed at both ends is approximately 1/5 of the values shown here

See Deflection and Stress Formulae page for equations

Standards

Busbar Tube and Flexible Conductor Fittings, Design, Testing and Manufacture

The following standards are used by PLP for the design and supply of POWERFORMED® Products and Systems.

Design Standards		
AS 62271.301	High voltage switchgear 301: Dimensional standardization of terminals	2005
BS 159	Specification for high voltage busbars and busbar connections	1992
NEMA CC 1	Electrical Power Connections for Substations	2009
AS1154.1	Insulator and Conductor fittings for overhead power lines. Performance, material, general requirements and dimensions	2009
AS1154.3	Insulator and Conductor fittings for overhead power lines. Performance and General requirements for helical fittings	2009
IEC 60865	Short circuit currents - Calculation of effects Part 1 Definitions and calculation methods	2011
IEEE 605	IEEE Guide for bus design in air insulated substations	2008
Testing Standards		
IEC 61238-1 2nd Edition	Compression and mechanical connectors for power cables with copper or aluminium conductors - Part 1: Test methods and requirements	2nd Edition (2003)
IEC 61284	Overhead lines - Requirements and tests for fittings	1997
ANSI C119.4	Connectors for use between aluminium to aluminium and aluminium to copper conductors designed for normal operation at or below 93 degree C and copper to copper conductors designed for normal operation at or below 100 degree C	2011
Material Standards		
AS/NZS 1531	Conductors - Bare overhead - Aluminium and Aluminium Alloy	1991
BS 2898	Specification for wrought aluminium and aluminium alloys for electrical purposes - bars, extruded round tubes and sections	1970
AS 1866	Aluminium and Aluminium alloys - Extruded rod, bar, solid and hollow shapes	1997
AS 2848.1	Aluminium and Aluminium alloys - Compositions and designations - Wrought products	1998
AS 3607	Conductors - Bare overhead, aluminium and aluminium alloy - Steel reinforced	1989
BS EN 755-2	Aluminium and aluminium alloys - extruded rod/bar, tube and profiles. Mechanical properties	2008
BS EN 1706	Aluminium and aluminium alloys - Castings. Chemical composition and mechanical properties	2010
ADC Handbook	Australian Aluminium Council Specifications	1994
Manufacturing Standards		
AS 1665	Welding of Aluminium structures	2004
Miscellaneous Standards		
AS/NZS 4680	Hot dip galvanized (zinc) coatings on fabricated ferrous articles	2006
IEC 17025	General requirements for the competence of testing and calibration laboratories	2005



Busbar Tube Aluminium Alloys

Mechanical and Electrical Properties

Bus Alloys: Comparison Of Properties

Alloy and Temper	Thermal Conductivity At 25°C (W/m.k)	Electrical Conductivity At 20°C % IACS Equal Volume	Electrical Resistivity at 20°C (μΩ.m)	Average Coefficient of Thermal Expansion Per °C	Melting Range Approx (°C)	Ultimate Tensile Strength (MPa) Min	Yeild Tensile Strength (MPa) Min
6060 T5	209	55	0.031	23.4	615-650	150	110
6060 T6	201	54	0.032	23.4	615-650	205	170
6061 T6	167	43	0.040	23.4	580-650	260	240
6063 T5	209	55	0.031	23.4	615-650	120	110
6063 T6	201	53	0.033	23.4	615-650	205	170
6101 T5	218	57	0.030	23.4	615-650	150	110
6101 T6	218	57	0.030	23.4	615-650	205	170

Alloys For Compression Fitting Barrels: Comparison Of Properties

Alloy and Temper	Thermal Conductivity At 25°C (W/m.k)	Electrical Conductivity At 20°C % IACS Equal Volume	Electrical Resistivity at 20°C (μΩ.m)	Average Coefficient of Thermal Expansion Per °C	Melting Range Approx (°C)	Ultimate Tensile Strength (MPa) Min	Yeild Tensile Strength (MPa) Min
1350 - F	234	61	0.028	23.8	645-655	60	30
1200 - F	222	60	0.029	24.0	645-655	90	35

Temper Designation Table			
U.K/EN	U.S.A. or CANADA	ISO Temper	Description of Designation
O	O	O	Annealed
F	F	F	As fabricated, as manufactured or as cast
T3	T3	TD	Solution heat treated, cold worked and naturally aged
T4	T4	TB	Solution heat treated, naturally aged and amenable to artificial ageing
T5	T5	TE	Artificially aged or precipitation heat treated
T6	T6	TF	Solution heat treated and precipitation heat treated

Sources:

Aluminium Development Council of Australia handbook
BSEN 755-2 : 1997 Aluminium and aluminium alloys – Extruded rod/bar, tube and profilesw

Busbar Tube Aluminium Alloys

Mechanical and Electrical Properties

Actual Temper Designations

Temper designations occur as a suffix at the end of the alloy's numeric designation, an example would be 6061-T6, the "T6" is the temper designation.

F	means the alloy is "as fabricated", no special control over strain hardening is noted
O	means that it has been annealed only, the alloy has been recrystallized, this is the softest temper
H1	means that it has strain hardened only
H2	means that it has been strain hardened and partially annealed
H3	means that it has been strain hardened and thermally stabilized
W	means that it has been solution heat treated
T1	means that it has been partially solution heat treated (cooled from an elevated-temperature shaping process such as extrusion), and naturally aged
T2	means that it has been cooled from an elevated-temperature shaping process, (casting), cold worked, and naturally aged
T3	means that it has been solution heat treated, then cold worked and naturally aged
T4	means that it has been solution heat treated, and naturally aged, it applies to alloys not cold worked after solution treatment, or where the effect of cold working may not be recognized in applicable specifications
T5	means that it has been partially solution heat treated and artificially aged, the temper is produced after an elevated temperature, rapid cool fabrication process, (like extrusion)
T6	means that it has been solution heat treated and then artificially aged, without cold working
T7	means that it has been solution heat treated and stabilized to control characteristics such as grain growth, distortion, or residual stresses
T8	means that it has been solution heat treated, then cold worked, and artificially aged
T9	means that it has been solution heat treated, artificially aged, and then cold worked
T10	means that it has been partially solution treated (cooled from an elevated shaping process, such as extrusion), cold worked, then artificially aged



Deflection and Stress Formulae

For Standard Pipe Size (SPS) and Metric Aluminium Busbar Tubes

	Continuous Beam			
	Simply Supported Beam	Beam Fixed At Both Ends	2 Spans	More Than 2 Spans
Maximum Deflection	$D = \frac{5wL^4}{384EI}$	$D = \frac{wL^4}{384EI}$	$D = \frac{5wL^4}{185EI}$	①
Maximum Moment	$M = \frac{wL^2}{8}$ ②	$M = \frac{wL}{12}$ ③	$M = \frac{wL^2}{8}$ ④	$M = 0.107wL^2$ ④
Fiber Stress	$f^1 = \frac{wL^2}{8S}$ ②	$f^1 = \frac{wL^2}{12S}$ ③	$f^1 = \frac{wL^2}{8S}$ ④	$f^1 = \frac{0.107wL^2}{S}$ ④
Maximum Load	$W = \frac{8fS}{l}$	$W = \frac{12fS}{L}$	$W = \frac{8fS}{L}$	$W = \frac{fS}{0.1071}$
Maximum Span	$L = \sqrt{\frac{8fS}{w}}$	$L = \sqrt{\frac{12fS}{w}}$	$L = \sqrt{\frac{8fS}{w}}$	$L = \sqrt{\frac{fS}{0.107w}}$

Symbols:	Units:
D = deflection	in
w = load	lb/in
W = total uniform load	lb
L = span	in
E = modulus of elasticity	lb/in ²
I = second moment of area ④	in
M = bending moment	lb.in
S = section modulus ②	in
f ¹ = fiber stress	lb/in ²
f = maximum allowable fiber stress	lb/in ²

Notes:

- ① Maximum deflection occurs in the end spans and is only slightly more than that for a continuous beam of 2 spans.
- ② Maximum moment and fiber stress for simple beams occur at the center of the span.
- ③ Maximum moment and fiber stress for beams fixed at both ends occur at the points of support.
- ④ Maximum moment and fiber stress for continuous beams occur at the second support from each end.

Aluminium Casting Alloys

Specification, Designations, Compositions and Properties

Specification Designations

Aluminium Association (AA)	Aluminium Development Council of Australia (ADC)	British Standard (BS)	France NF A57-702 NF A57-703	Germany DIN 1725	Italy U.N.I.
A413	CC401	LM6	A-S13	G-AISI12	4514
A356	CC601	LM25	AS7G	-	3599

Aluminium Association (AA)	Japan JIS	Spain UNE	Sweden SIS	ISO
A413	AC3A	L-2520	144261	Al-Si 12
A356	AC4C	L-2651	144244	Al-Si7Mg

Chemical Composition Of Aluminium Castings (BS1490:1988)

Alloy	Silicon (Si)	Iron (Fe)	Copper (Cu)	Manganese (Mn)	Magnesium (Mg)	Nickel (Ni)
LM6	10.0 - 13.0	0.6*	0.1*	0.5*	0.1*	0.1*
LM25	6.5 - 7.5	0.5*	0.2*	0.3*	0.2 - 0.6	0.1*

Alloy	Zinc (Zn)	Tin (Sn)	Lead (Pb)	Titanium (Ti)	Other Elements	Aluminium (Al)
LM6	0.1*	0.05*	0.1*	0.2*	0.2*	Remainder
LM25	0.1*	0.05*	0.1*	0.2*	0.2*	Remainder

*Maximum Value

Typical Properties Of Aluminium Castings

Alloy and Temper	Casting Method	Thermal Conductivity At 25°C (W/m.K)	Electrical Conductivity At 20°C (%IACS Equal Volume)	Density (kg/m ³)
CC401 F1	Sand	142	37	2650
	Permanent Mould	142	37	2650
CC601 T5	Sand	151	39	2680
	Permanent Mould	151	40	2680



Damping Conductors

Application in All Busbar Tubes

When the calculated resonant frequency of a length of busbar tube is less than 2.75 Hz in accordance with IEC 60865-1, damping is normally required to minimise aeolian vibration.

PLP recommend damping a busbar tube by installing a flexible conductor (AAC, ACSR or AAAC) inside the busbar tube fixed to the tube at one end. Damping conductors can be fixed into the tube by spot welding or by using a damping conductor type flat end cap or corona end cap.

Normally the flexible conductor mass per unit length should be between 10% and 15% of the mass per unit length of the busbar. In addition, the flexible conductor should be no less than two thirds the length of the busbar.

Examples (Metric Aluminium Tubes)

Tube Outside Diameter (OD)	Tube Wall Thickness (WT)	Tube Mass / Unit Length kg/m	Damping Conductor Type	Damping Conductor Mass / Unit Length kg/m	Mass Per Unit Length Ratio
200.0 mm	6.0 mm	9.88	Cicada	1.73	17.5%
160.0 mm	10.0 mm	12.73	Venus	1.86	14.6%
120.0 mm	8.0 mm	7.61	Centipede	1.15	15.0%

Expansion Supports and Connectors

All Busbar Tubes

Within substations, thermal expansion and contraction of busbar tubes occurs as a result of variations in busbar temperature. Busbar temperatures increase when there is a higher electrical load or if, given a constant load, the ambient temperature increases (summer). This will cause the busbar to expand. Busbar temperatures decrease when there is a lighter electrical load or if, given a constant load, the ambient temperature decreases (winter). This will cause the busbar to contract.

Elsewhere in the General Information section of this catalogue, PLP lists values for the thermal expansion Metric aluminium busbar tubes. The thermal expansion tables list the change in length of Metric aluminium busbar tubes based on changes in temperature over given busbar tube lengths.

The values for expansion and contraction of busbar tubes are not dependent on the busbar tube outside diameter or wall thickness i.e. for the same span length, every size of busbar tube will expand and contract the same amount in the axial direction based on identical temperature changes.

BUSLIGN™ expansion fittings for busbar tubes are applied when busbars are being connected to primary equipment (e.g. an HV disconnecter) or located on top of post insulators. The expansion supports eliminate the possibility of the busbar tube applying a mechanical load to the substation primary equipment or post insulators. Mechanical load applied to substation primary equipment can potentially damage the equipment or pre-load the equipment connections so that in the event of a short circuit the mechanical forces applied to the equipment are intensified.

POWERFORMED® expansion type BUSLIGN™ fittings are designed, when installed correctly, to account for a busbar tube operational temperature range of -20°C to 90°C continuous. For example, if a BUSLIGN™ expansion type primary equipment connector is installed on the end of a 15.3 metre busbar which is at 20°C (equal to ambient), the assembly can account for at least 24.5mm of expansion which will occur when the busbar reaches an operating temperature of 90°C . It can also account for a contraction of at least 14.0mm which will occur when the busbar reaches an operating temperature of -20°C .



Busbar temperature = -20°C



Busbar temperature = 20°C
(As Installed)



Busbar temperature = 90°C

Principles of Electrical Jointing

For Aluminium and Copper Conductors

CORROSION OF CONNECTORS

Two factors are associated with corrosion:

1. Atmospheric action
2. Galvanic action

For atmospheric action to result in corrosion, there must be moisture and oxygen. Galvanic action results in corrosion when two dissimilar metals in the electrolytic series, for example, aluminium and copper, are in physical contact. In this case, moisture acts as an electrolyte. In such an instance, the copper becomes a cathode and receives a positive charge; the aluminium becomes the anode and receives a negative charge.

The resultant current flow attacks the aluminium leaving the copper unharmed. Both factors described above are influenced by environmental conditions -the chemical attack of airborne pollutants. This occurs in rural areas to a lesser extent than in urban centres and more so in heavy industry locations such as steelworks, chemical plants, refineries, etc.

The problem of the mechanical jointing of two dissimilar metals in physical contact with each other, such as aluminium and copper, stems from their difference in electrical potential.

The column of metals listed here shows their relative positions in the Electrolytic Series, with the more anodic metals in the higher positions and the more cathodic in the lower.

The extent, or severity, of the corrosive action is proportional to the distance of separation of the metals in the list. i.e. the magnitude of the difference in electrolytic potential of the two metals, aluminium and copper, is quite considerable.

Aluminium to Aluminium Connections

No problem exists in the jointing of these conductors as electrolytic action is nonexistent. Nevertheless, care must be taken to prevent crevice corrosion and to select an aluminium alloy connector body not liable to stress corrosion cracking.

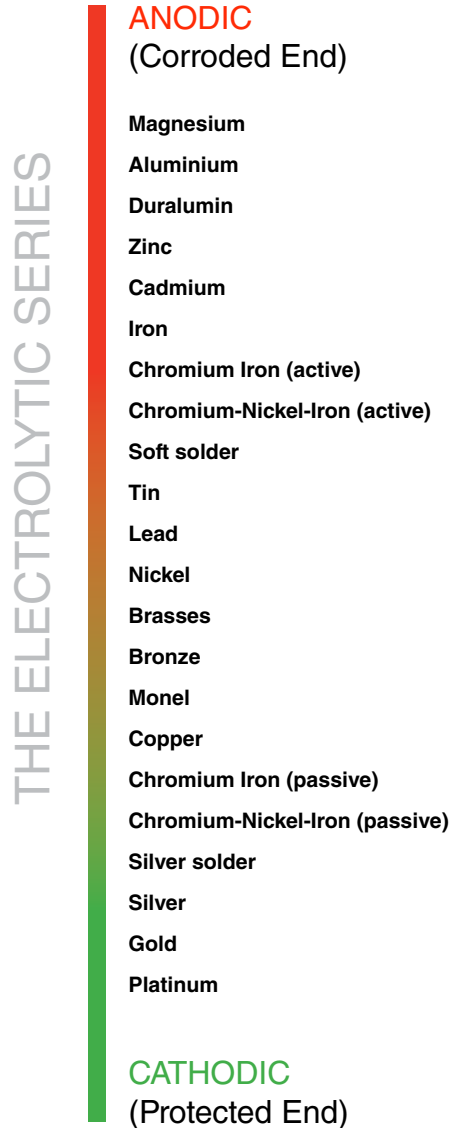
Aluminium to Copper Connections

The best choice is an aluminium bodied connector since it is not subject to the galvanic attack of the more vulnerable element - the aluminium conductor. It is essential to use a jointing compound on the aluminium connector body and brushed into the strands of the aluminium conductor. Wherever possible, install the aluminium conductor above the copper to prevent pitting from the galvanic action of copper salts washing over the aluminium connector and conductor when in a lower position.

Copper to Copper Connections

No problem exists in the jointing of these conductors as electrolytic action is non-existent.

Torque Settings



Principles Electrical Jointing

Contact Sealant

Various sealant formulations have been developed to provide improved electrical and mechanical performance as well as environmental protection to the contact area. The use of sealants is recommended for aluminium to aluminium or aluminium to copper connections. Sealants are also recommended for copper to copper joints which are subject to severe corrosive environments. Non-gritted sealants are recommended for flat connections and as a groove sealant in bolted connectors such as parallel groove clamps. Our gritted sealant is primarily used in compression connectors. The sharp metallic grit particles provide multi-contact current carrying bridges through remaining oxide films to ensure superior electrical conductivity.

Tightening Torque

The tightening torque for either stainless or galvanised fasteners should be as recommended by AS62271.301. These values are 45Nm for M12 nuts/bolts and 90Nm for M16. Fasteners should be tightened alternatively to achieve this value.

Product Name	Description	Recommended Applications	
Alvania ALV300	A mineral oil based corrosion inhibitor with added lithium. Drop point 180°C	Bolted Connections - Alum to Alum - Alum to Copper - Copper to Copper	Palm to Palm - Copper to Copper
Alminox ALM325G	A mineral oil based corrosion inhibitor with added zinc grit. Drop point 188°C. Provides excellent outdoor weathering protection.	Compression Joints Bolted Connections - Alum to Alum - Alum to Copper	

Jointing Guideline For Substation Fittings

To ensure satisfactory bolted joints in substation equipment, the correct bolt torque and joint preparation is needed. In making the following recommendations, direction has been taken from the ADC book Aluminium Electrical Engineering, AS 62271.304-2005 as well as jointing standards by several Australian Power Authorities. The following guidelines are not however intended to supersede any Authority's own construction manuals or safety standards.

Aluminium To Aluminium Joints

Aluminium as soon as it is exposed to the air forms an invisible oxide film which does not conduct electricity. Before making an electrical bolted joint it is necessary to remove this film and ensure that oxide cannot reform during the life of the joint. To ensure this the following method should be used.

The contact face is to be cleaned with a stainless steel wire brush or a scotchbrite pad, dusted to remove any loose dirt or grit and then coated immediately with a thin coating of Alminox aluminium jointing compound. The prepared joint is then protected while the other face is made ready in a similar manner. The joint is assembled, the bolts torqued down and any excess compound squeezed from the joint wiped off.

Tinned Aluminium Or Copper Fitting

Oxide formation on tinned parts is not as rapid, nor as severe as with aluminium so the tinned surface may not need any preparation if the surface has been protected. If there is evidence of a weathered surface, then a similar procedure to that described above may be used but extreme care must be taken to ensure that the surface of the tinned component is not damaged or a galvanic situation may occur. Jointing compound application and assembly should be carried out in the same manner as for aluminium to aluminium joints.



Metric Fastenings

Torque Settings

Recommended Tightening Torque For Galvanised Steel Bolts With Lubricant Coating

Bolt Diameter	Torque	
	ft lbs	Nm
M12	33	45
M16	66	90

Recommended Tightening Torque For Galvanised Steel High Tensile Bolts With Lubricant Coating

Bolt Diameter	Torque	
	ft lbs	Nm
M12	33	45
M16	66	90

Recommended Tightening Torque For Aluminium Bolts With Lubricant Coating

Bolt Diameter	Torque	
	ft lbs	Nm
M12	25	34
M16	40	54

Recommended Tightening Torque For Stainless Steel

Bolt Diameter	Torque	
	ft lbs	Nm
M12	33	45
M16	66	90

Bolted Aluminium Joints

Installation Instructions

FASTENER SET ARRANGEMENTS

- i. Typical fastener set arrangements are shown in Figures A, B, C and D below.
- ii. Tools needed for installation (Fig 1) – Flat file, torque wrench, socket, spanner, stainless steel wire brush, Emery paper, Uni-Seal jointing compound.



CONSTRUCTING THE JOINT

1. Remove the protective covering from the bolted joint palms. Inspect the contact surfaces and use a flat file to remove any raised imperfections (Fig 2).
2. Using a stainless steel wire brush, scouring pad or Emery paper, clean the contact surfaces of the palms (Fig 3). Apply Uni-Seal jointing compound to both contact surfaces immediately (Fig 4).



DO NOT USE THE SAME ABRASIVE TOOLS FOR COPPER AND ALUMINIUM AS THIS MAY CAUSE GALVANIC CORROSION.

3. Join the contact surfaces together and apply fasteners according to the correct arrangement illustrated in Figures A, B, C or D. Ensure the threads of the bolts are lubricated using a non-gritted compound or Uni-Seal jointing compound. Using a torque wrench, tighten the nut to the specified torque according to the bolt size (Fig 5).

For double nut arrangements (Fig B), apply the second nut and tighten against the first nut to the specified torque.

4. Wipe away any excess Uni-Seal jointing compound from the completed bolted aluminum electrical joint.



Fig A S/S OR HDG BOLTS AND NUTS WITH LARGE SERIES LOAD SPREADING WASHERS AND SPRING WASHERS

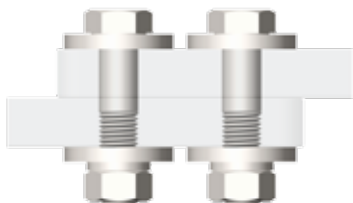


Fig B S/S OR HDG BOLTS AND NUTS WITH LARGE SERIES LOAD SPREADING WASHERS AND DOUBLE NUTS

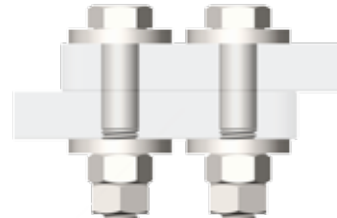


Fig C S/S OR HDG BOLTS AND NUTS WITH STANDARD SERIES WASHERS AND DOUBLE NUTS

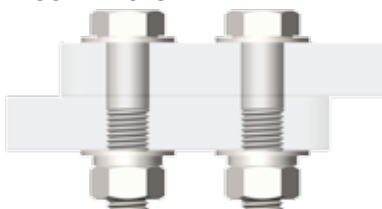
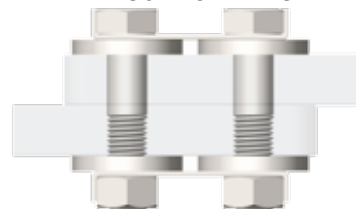


Fig D S/S BOLTS AND NUTS WITH LARGE SERIES WASHERS AND LOCKING PLATES



Non Tension Compression Fittings

Installation Instructions

I. Preparation

Make sure the conductor is in good condition along the full length of the joint. Cut away damaged or corroded sections before constructing the joint and ensure conductor ends are cut square and not deformed. To prevent interlayer slippage and birdcaging, the conductor should be secured at all times using a combination of electrical tape and hose clamps or twisted aluminium wire.

- i. Determine the preparation method along the compression length (Fig i):
 - a. For new, bright finish, fully greased conductors no unwinding of conductor layers is required. Cleaning and oxide removal is required on the outermost surface of the conductor only.
 - b. For partially greased / ungreased conductors, all ungreased layers must be unwound and filled with POWERFORMED® Uni-Seal jointing compound. Cleaning and oxide removal is required down to the layer in contact with the steel core or a maximum of two layers, whichever is less.
 - c. For aged or dirty conductors – Ensure that all aluminium and steel strands are not corroded, and prepare as per Case (b) above.



- ii. Tools needed for installation (Fig ii) – Hacksaw, conductor trimming tool, tape measure, marker pen, zip ties, insulation tape, utility knife, stainless steel wire brush, Emery paper, Uni-Seal jointing compound, compression dies, compression tool, vernier callipers, file.



II. Constructing the Joint

1. Ensure that the work area is clean, dry and protected from dust and water. Mark the conductor end at a distance to the knurl mark of the Joint (Fig 1). Straighten the conductor end to a distance of 2.5 times the marked length. Secure firmly at this point before preparing the conductor end (refer to Part I-i). For Case (a) proceed to Step 2, for Case (b) or (c) proceed to Step 3.
2. Clean the outermost layer of the conductor end using a stainless steel wire brush, scouring pad or Emery paper, and apply POWERFORMED® Uni-Seal jointing compound immediately (Fig 2). Proceed to Step 4.
3. Secure the conductor end firmly at a distance 2.5 times the compression length. Unwind each layer in small groups, following the natural lay of the conductor, and allowing for access along the entire compression length (Fig 3a). Ensure that the strands are not deformed during this process. Starting at the innermost exposed layer, clean strands using a stainless steel wire brush, scouring pad or Emery paper, and apply POWERFORMED® Uni-Seal jointing compound immediately. Wind the layers back (Fig 3b).



Non Tension Compression Fittings

Installation Instructions

4. Fully insert the conductor end into the compression barrel up to the mark. Using the correct aluminium die, compress the joint on to the conductor, starting at the knurl line and working out towards the conductor (Fig 4a). The die bites should be overlapped by a minimum of a half inch. Keep the joint as level as possible and rotate the fitting or die by one flat with each compression to avoid 'banana-ing' (Fig 4b).
5. Remove any die flash or sharp edges with a file or Emery paper. Wipe away any excess jointing compound.
6. Measure the AF (across flat) dimensions across all faces of the joint in several locations to ensure that the correct compression has been achieved.



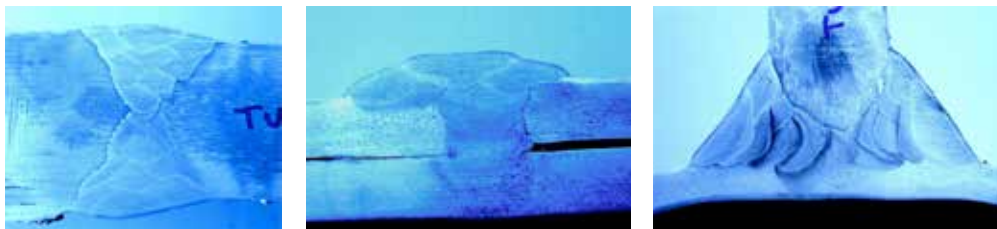
Welding

SUBLIGN™ and BUSLIGN™ Aluminium Fittings

Welding of high current aluminium substation busbar tubes, BUSLIGN™ busbar tube fittings and SUBLIGN™ flexible conductor fittings must be completed in accordance with a welding specification and welding procedure and must only be completed by properly trained and qualified personnel.

Welding Equipment	Both Metal Inert Gas (MIG) and Tungsten Inert Gas (TIG) welding are acceptable. The shielding gas must be pure argon or a helium argon mix and the filler wire must be type 4043.
Welding Environment	Welding must be carried out in a still, clean and dry environment. Welding POWERFORMED® fittings, aluminium busbars or flexible conductors on a substation site will normally require an enclosure or tent to be erected around the welding area and the welder.
Welding Test Piece	Before site welding of POWERFORMED® fittings, aluminium busbars or conductors, PLP recommends that a welding test piece is completed to demonstrate compliance with welding specifications and procedures. Contact PLP for welding test piece details.
Welding Procedure	The weld procedure must include (but not be limited to) specific instructions and details around weld preparation (chamfering), degreasing, tack welding, use of a stainless steel wire brush for cleaning, preheating, post weld cooling, location of the root run and the maximum temperature of the work for subsequent passes. Post weld processing and surface finish criteria should also be addressed.
Welding Destructive Testing	Macro examinations and fillet break-over tests are acceptable testing techniques for prequalifying weld test pieces.
Welding Non Destructive Testing	Both X-Ray and Ultrasound are acceptable non-destructive testing techniques for prequalifying weld test pieces and in-process testing of aluminium welds. Typical industrial x-rays images or busbar tube welds below.
Welding Acceptance Criteria	Loss of cross section of the weldment as a result of internal porosity shall not exceed 5% of the total cross sectional area of the weld. Good quality welding should not require grinding of the cap weld.

Typical X-Ray Non Destructive Weld Quality Analysis Images:





PREFORMED LINE PRODUCTS
The connection you can count on.

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End Caps



BBEC

Busbar End Cap (Weld-on)

Cast Aluminium End Caps, designed to effectively seal the ends of Busbars. Busbar end caps are manufactured to suit the following standard sizes of Busbars. Spherical type end caps provide maximum corona protection for extra high voltage bus systems. Please contact PLP for custom sizes.

Part Number	Busbar Ø (mm)
BBEC-120-PLP	100
BBEC-145-PLP	125

Part Number System

BBEC	Busbar End Cap
120	End Cap Outer Diameter
PLP	End Cap Type – PLP Welded



BBEC

Busbar End Cap (Spherical)

Part Number	Busbar Ø (mm)
BBEC-100-SPH	100
BBEC-125-SPH	125
BBEC-141-SPH	141
BBEC-160-SPH	160

Part Number System

BBEC	Busbar End Cap
100	Busbar Outer Diameter
SPH	End Cap Type - Spherical



BBEC

Busbar End Cap (Plug)

Part Number	Busbar Ø (mm)
BBEC-72-PLUG	72
BBEC-68-PLUG	68
BBEC-92-PLUG	92
BBEC-88-PLUG	88
BBEC-80-PLUG	80
BBEC-113-PLUG	113
BBEC-105-PLUG	105
BBEC-140-PLUG	140

Part Number System

BBEC	Busbar End Cap
72	Busbar Inner Diameter
PLUG	End Cap Type - Plug



BBEC

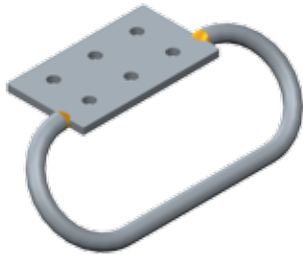
Busbar End Cap (Corona Dome)

Part Number	Busbar Ø (mm)
BBEC-70-CD	80

Part Number System

BBEC	Busbar End Cap
70	Busbar Inner Diameter
CD	Corona Dome

Earthing



ESP

Earthing Stirrup Plate

Part Number	Palm Type	Stirrup Ø (mm)	Stirrup Bend Angle°
ESP-AS# - *	AS#	22.2	*

Part Number System

ESP	Earthing Stirrup Plate
AS#	Palm Type E.g. AS1, AS2 etc...
*	Stirrup bend angle (0,15,30,45 or 90)

Example: ESP-AS5-45

BBES

Busbar Earthing Stirrup

Welded to tubular busbar. Please contact PLP for various other sizes and styles.



Part Number	Width (mm)	Height (mm)	Stirrup Ø (mm)
BBES-200150	200	150	22.2

Part Number System

BBES	Busbar Earthing Stirrup
200	Stirrup Width
150	Stirrup Height



Palms/Flags



BBAP

Busbar Aluminium Palm (Inline)

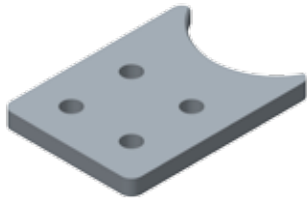
Palms can be welded to busbars or end caps and current ratings are matched to the rating of the Busbars. Choose palm types from the selection below. Please contact PLP for various other sizes and styles.

Part Number	Palm Type
BBAP-AS#	AS#

Part Number System

BBAP	Busbars Aluminium Palm Inline
AS#	Palm Type E.g. AS1, AS2 etc...

Example: BBAP-AS5



BBAPT

Busbar Aluminium Palm (Transverse)

Part Number	Busbar Outer Ø (mm)	Palm Type
BBAPT-080-AS#	80	AS#
BBAPT-100-AS#	100	AS#
BBAPT-125-AS#	125	AS#
BBAPT-141-AS#	141	AS#
BBAPT-160-AS#	160	AS#

Part Number System

BBAPT	Busbar Aluminium Palm Transverse
080	Busbar Outer Diameter
AS#	Palm Type E.g. AS1, AS2 etc...

Example: BBAP-080-AS5



BBECP

Busbar End Cap Palm

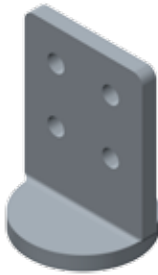
Part Number	Busbar Outer Ø (mm)	Palm Type
BBECP-080-AS#	80	AS#
BBECP-100-AS#	100	AS#
BBECP-125-AS#	125	AS#
BBECP-141-AS#	141	AS#
BBECP-160-AS#	160	AS#

Part Number System

BBECP	Busbar End Cap Palm
080	Busbar Outer Diameter
AS#	Palm Type E.g. AS1, AS2 etc...

Example: BBECP-080-AS5

Palms/Flags



BBEP

Busbar End Palm (Capped)

Part Number	Busbar Outer Ø (mm)	Palm Type
BBECP-080-AS#	80	AS#
BBECP-100-AS#	100	AS#
BBECP-125-AS#	125	AS#
BBECP-141-AS#	141	AS#
BBECP-160-AS#	160	AS#

Part Number System

BBECP	Busbar End Palm Capped
080	Busbar Outer Diameter
AS#	Palm Type E.g. AS1, AS2 etc...

Example: BBECP-080-AS5



BBEPL

Busbar End Palm (L-Type)

Can be used as an end cap palm and/or fixed support.

Part Number	Busbar Outer Ø (mm)	Palm Type
BBEPL-080-AS#	80	AS#
BBEPL-100-AS#	100	AS#
BBEPL-125-AS#	125	AS#
BBEPL-141-AS#	141	AS#
BBEPL-160-AS#	160	AS#

Part Number System

BBEPL	Busbar End Palm (L Type)
080	Busbar Outer Diameter
AS#	Palm Type E.g. AS1, AS2 etc...

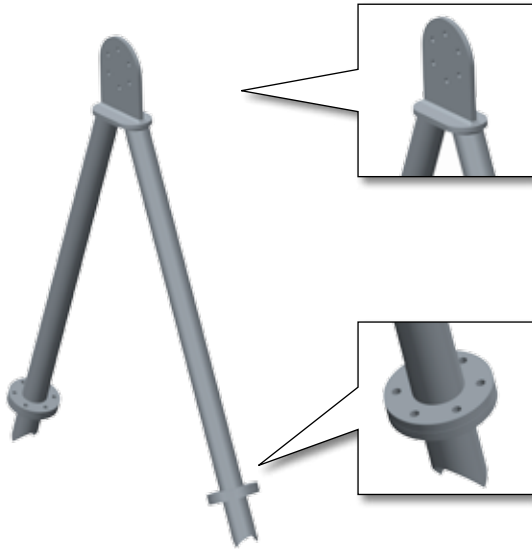
Example: BBEPL-080-AS5

A Frames

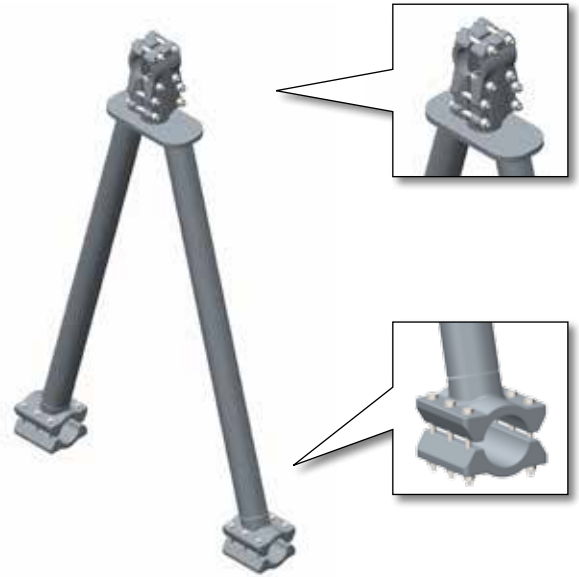
BBAFA

Busbar A-Frame Aluminium

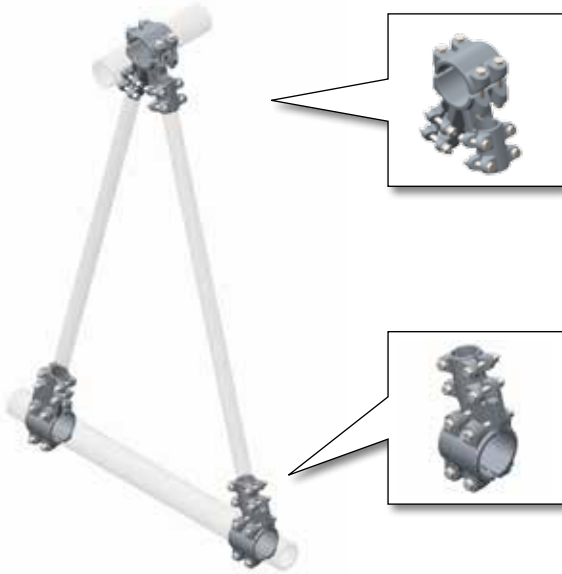
A - Frames can be supplied as components for on-site welding, bolted or pre-fabricated in PLP factory. Contact PLP with height, width, flange size and tube details.



Flange Type



Bolted Type

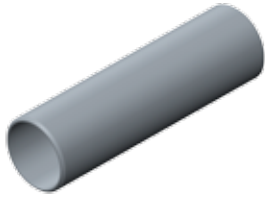


Angled Elbow Type



Welded Type

Busbar Joint Sleeve



BBJS

Busbar Joint Sleeve

Part Number	Busbar Outer Ø (mm)	Busbar Inner Ø (mm)	Length (mm)
BBJS-100-80	100	80	300
BBJS-100-88	100	88	300
BBJS-100-92	100	92	300
BBJS-100-94	100	94	300
BBJS-125-105	125	105	300
BBJS-125-113	125	113	300

Part Number System

BBJS	Busbar Joint Sleeve
100	Busbar Outer Diameter (mm)
80	Busbar Inner Diameter (mm)



BBBJS

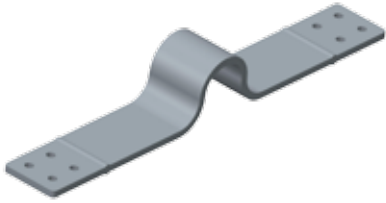
Busbar Bolted Joint Sleeve

Part Number	Busbar Outer Ø (mm)
BBJS-100	100

Part Number System

BBJS	Busbar Bolted Joint Sleeve
100	Busbar Outer Diameter (mm)

Aluminium Flexible Connectors



AFC

Aluminium Flexible Connector - TYPE A

Type 'A' flexible connectors are designed for mounting on the side of Busbars where they may be used with double roller or roller/fixed supports. Common palms are No. AS5 and AS8.

Note: maximum ratings are shown for various palms. Other palms can be requested for custom applications; however fittings may be de-rated to suit.

Current Rating (A)	Laminations	Lamination Width	Palm Number
1200	10 x 1.2mm	100	AS5
1500	13 x 1.2mm	100	AS5
2000	13 x 1.2mm	130	AS8
2500	16 x 1.2mm	130	AS8

- Nominate palm type e.g. (AS5, AS8, etc...)
- Nominate separation length and height
- Offset palms available



AFC

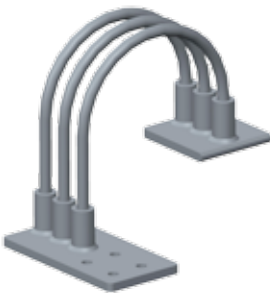
Aluminium Flexible Connector - TYPE B

Type 'B' flexible connectors are designed for mounting on the top of Busbars where they may be used with double roller or roller/fixed supports. Common palms used are No. AS5 and AS8.

Note: maximum ratings are shown for various palms. Other palms can be requested for custom applications; however fittings may be de-rated to suit.

Current Rating (A)	Laminations	Lamination Width	Palm Number
1200	10 x 1.2mm	100	AS5
1500	13 x 1.2mm	100	AS5
2000	13 x 1.2mm	130	AS8

- Nominate palm type e.g. (AS5, AS8, etc...)
- Nominate separation length



AFC

Aluminium Flexible Connector - TYPE C

Type 'C' is another style of flexible connector incorporating conductor rather than laminations and may also be used with double roller or roller/fixed supports or attachment on to disconnectors.

Note: maximum ratings are shown for various palms. Other palms can be requested for custom applications; however fittings may be de-rated to suit.

Current Rating (A)	Stranding	Palm Type	Hole Ø (mm)	Palm Thickness (mm)
1800	3 x 37/3.00	4 Hole 60 x 70	18	16
2500	4 x 37/3.00	4 Hole 60 x 70	18	16

- Nominate palm type e.g. (AS5, AS8, etc...)
- Nominate separation length and height

Aluminium Flexible Connectors



AFC

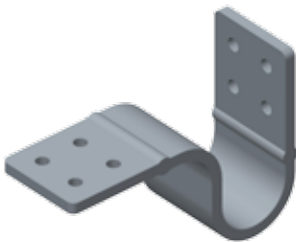
Aluminium Flexible Connector - TYPE D

Type 'D' flexible connectors are similar to type 'B' but incorporating conductor rather than laminations and are designed for mounting to an end or a side palm where they may be used with double roller or roller/ fixed supports. Commonly used palms are No. 5 and 7.

Note: maximum ratings are shown for various palms. Other palms can be requested for custom applications; however fittings may be de-rated to suit.

Current rating (A)	Stranding
600	1 x 37/3.75
1000	1 x 61/3.75

- Nominate palm type e.g. (AS6, AS7, etc...)
- Nominate separation length and height



AFC

Aluminium Flexible Connector - TYPE E

Type 'E' flexible connectors are used at disconnector positions and in conjunction with fixed or roller supports. They are designed to be mounted under the disconnector palm. Centre of busbar to upper palm surface dimension should be 130mm + thickness of disconnector palm.

Note: Maximum ratings are shown for various palms. Other palms can be requested for custom applications; however fittings may be de-rated to suit.

Current Rating (A)	Laminations	Lamination Width (mm)	Palm Number	Palm Thickness (mm)
1500	14 x 1.2mm	100	AS5	16
1650	16 x 1.2mm	100	AS5	20
2000	13 x 1.2mm	130	AS8	16
2500	16 x 1.2mm	130	AS8	20
2500	16 x 1.2mm	130	AS9	20
3150	17 x 1.2mm	200	AS9	20

- Nominate palm type e.g. (AS5, AS8, etc...)
- Nominate separation length and height



Copper Flexible Connectors



FL_C

Copper Flexible Connector - TYPE FL_C

Designed for flexible end to end connections between rectangular busbars or connections between busbars and terminal palms. Connectors consist of a series of high conductivity copper laminates pre-formed to allow movement during expansion of the busbar system. Laminated connectors of other sizes and forms can be made to customers' specifications.

Part Number	Fig. No.	Dimensions (mm)						Approx. Current Rating (amp)	Approx. Thickness (mm)
		A	C	D	E	W	L		
D-FL4C 800	1	50	25	50	M12	102	400	800	6
D-FL4C 1200	1	50	25	50	M12	102	400	1200	9
D-FL4C 1800	1	50	25	50	M12	102	400	1800	13
D-FL4C 2400	1	50	25	50	M12	102	400	2400	17

Note: Other lengths and drilling to customer specifications are available.

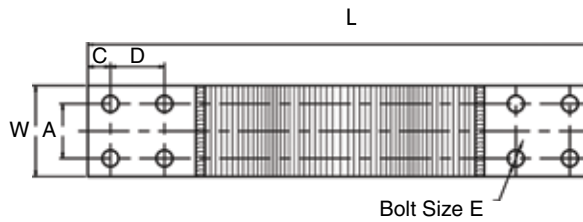


Fig.1

Copper Flexible Connectors



CBL

Copper Bonding Lead (Single Hole)

Copper bonding leads comprise of one to six tinned copper flat braids depending on the current ratings required. Single and double hole configurations come in the following standard configurations, please contact PLP for other sizes available.

Part Number	Current Rating (A)	Length (mm)	Width (mm)	Bolt Size	No. Braids
CBL-100300-M10	100	300	25	M10	1
CBL-300300-M10	300	300	25	M10	4
CBL-450300-M10	450	300	25	M10	6
CBL-100300-M12	100	300	25	M12	1
CBL300300-M12	300	300	25	M12	4
CBL450300-M12	450	300	25	M12	6



CBL

Copper Bonding Lead (Double Hole)

Part Number	Current Rating (A)	Length (mm)	Hole Centres (mm)	Width (mm)	Bolt Size	No. Braids
CBL-100300-29	100	300	22	25	M10	1
CBL-300300-22	300	300	22	25	M10	4
CBL-450300-22	450	300	22	25	M10	6
CBL-100300-29	100	300	29	25	M10	1
CBL300300-29	300	300	29	25	M10	4
CBL450300-29	450	300	29	25	M10	6



Tinned Flexible Connectors



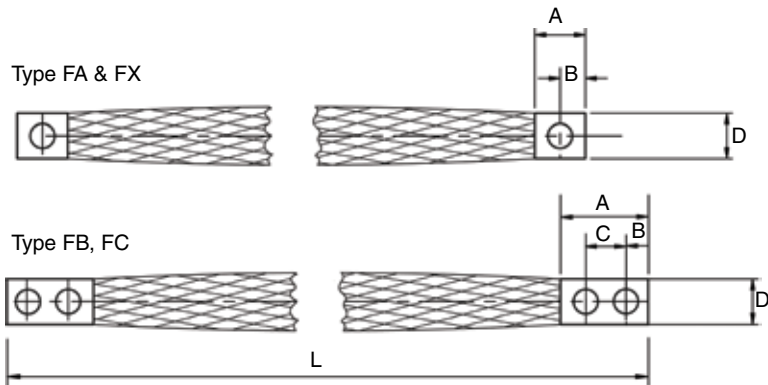
D-F

Tinned Flexible Connector - Flat Braid (Type F Series)

Series "F" flexible braid connectors consist of one or more tinned copper flat braids. Specially formed tinned copper ferrules are swaged onto the ends of the braids under high pressure to form solid rectangular terminals. Short Time Rating - Based on maximum density being below 115 amps per mm². Time period basis, 3 seconds.

Part Number	Current Rating	Short Time Current Rating	No. of Braids	Thicknesses	Dimensions (mm)					Bolt Size
					A	B	C	D	L	
D-FA10300	100	2600	1	6	25	14	-	25	300	M10
D-FA30300	300	10700	4	8	25	14	-	25	300	
D-FA45300	450	16100	6	10	25	14	-	25	300	
D-FX10300	100	2600	1	6	25	14	-	25	300	M12
D-FX30300	300	10700	4	8	25	14	-	25	300	
D-FX45300	450	16100	6	10	25	14	-	25	300	
D-FB10300	100	2600	1	6	54	13	22	25	300	M10
D-FB30300	300	10700	4	8	54	13	22	25	300	
D-FB45300	450	16100	6	10	54	13	22	25	300	
D-FC10300	100	2600	1	6	54	13	22	25	300	M10
D-FC30300	300	10700	4	8	54	13	22	25	300	
D-FC45300	450	16100	6	10	54	13	22	25	300	

Note: 300mm Standard length. Other lengths and drilling to customer specifications available.



Tinned Flexible Connectors



D-R

Tinned Flexible Connector - Round Braid (Type R Series)

Series "R" flexible braid connectors consist of one or more tinned copper round braids with specially formed tinned copper ferrules swaged onto the ends of the braids under high pressure to form solid rectangular terminals.

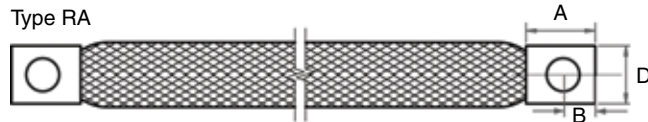
Short Time Rating - Based on maximum density being below 115 amps per mm².
Time period basis - 3 seconds.

Part Number	Current Rating	Short Time Current Rating	No. of Braids	Approx. Thickness	Dimensions (mm)					Bolt Size
					A	B	C	D	L	
D-RA20300	200	6200	1	7.0	25	13	-	25	300	M10
D-RA40300	400	12500	2	8.5	25	13	-	25	300	
D-RB20300	200	6200	1	7.0	54	13	22	25	300	M10
D-RB40300	400	12500	2	8.5	52	13	22	25	300	
D-RC20300	200	6200	1	7.0	54	13	29	25	300	M10
D-RC40300	400	12500	2	8.5	54	13	29	25	300	
D-RC50300	500	20000	2	12.0	54	13	29	25	300	
D-RE70*	700	30000	3	14.0	83	19	40	40	*	M10
D-RE80*	800	37000	3	17.0	83	19	40	40	*	
D-RF60*	600	25000	2	10.5	152	25	50	49	*	M16
D-RF1K*	1000	50000	4	17.0	152	25	50	49	*	

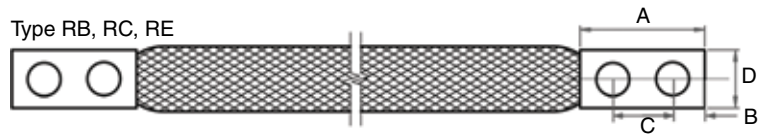
Note: *OVERALL LENGTH For types RA, RB & RC - standard length 300mm. Other lengths and drilling to customer specifications are available.

For types RE and RF - required length in millimetres to be added to catalogue number e.g. D-RE70450.

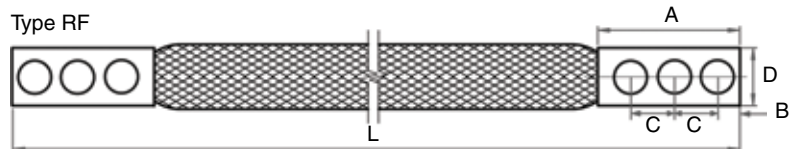
Type RA



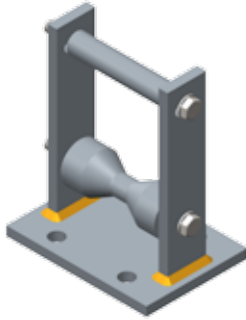
Type RB, RC, RE



Type RF



Support - Single



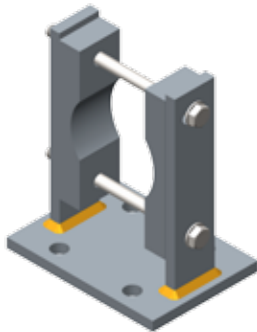
BBSA

Busbar Support Assembly (Roller Type)

PLP roller supports are designed for mounting on disconnector palms or post insulators. Standard centre heights are 130mm over mounting palm to busbar centre line - up to busbar diameter of 141mm.

Please contact PLP for various other sizes and styles.

Part Number	Busbars Outer Ø (mm)	Base Size L x W x H (mm)	Hole Diameters and Centres			
			No.5 (Holes)	No.8 (Holes)	76 P.C.D. (Holes)	127 P.C.D. (Holes)
BBSA-080-R	80	150 x 130 x 12			14mm	18mm
BBSA-02	100	180 x 130 x 12			14mm	18mm
BBSA-02A	100	180 x 130 x 12		18mm		
BBSA-04	100	180 x 130 x 12	14mm			
BBSA-125-R	125	200 x 130 x 12	14mm	14mm	14mm	18mm
BBSA-141-R	141	240 x 150 x 12				18mm
BBSA-160-R	160	225 x 225 x 20				18mm



BBSA

Busbar Support Assembly (Fixed Type)

Available for the range of Busbar diameters below, with hole diameters and centres listed. Please contact PLP for various other sizes and styles.

Part Number	To Suit Busbar Ø (mm)	Base Size L x W x H (mm)	Hole Diameters and Centres				
			No.5 (Holes)	No.8 (Holes)	76 P.C.D. (Holes)	127 P.C.D. (Holes)	No.9 (Holes)
BBSA-080-F	80	150 x 130 x 12			14mm	18mm	
BBSA-01	100	180 x 130 x 12			14mm	18mm	
BBSA-100-F	100	180 x 130 x 12					14mm
BBSA-125-F	125	200 x 130 x 12	14mm	14mm	14mm	18mm	
BBSA-141-F	141	240 x 150 x 12				18mm	
BBSA-160-F	160	225 x 225 x 20				18mm	

Support - Single



BBFS

Busbar Fixed Support (Weld-On U-Type)

Part Number	Busbar Outer Ø (mm)	P.C.D
BBFS-080-#	80	#
BBFS-100-#	100	#
BBFS-125-#	125	#
BBFS-141-#	141	#
BBFS-200-#	200	#

Part Number System

BBFS	Busbar Fixed Support U-Type
080	Busbar Outer Diameter (mm)
#	P.C.D. (76 or 127)



BBEPL

Busbar End Palm (L-Type)

Can be used as an end cap palm and or fixed support

Part Number	Busbar Outer Ø (mm)	Palm Type
BBEPL-080-AS#	80	AS#
BBEPL-100-AS#	100	AS#
BBEPL-125-AS#	125	AS#
BBEPL-140-AS#	140	AS#
BBEPL-160-AS#	160	AS#

Part Number System

BBEPL	Busbar End Palm L-Type
080	Busbar outer Diameter
AS#	Palm Type E.g. AS1, AS2 etc...



BBEPLS

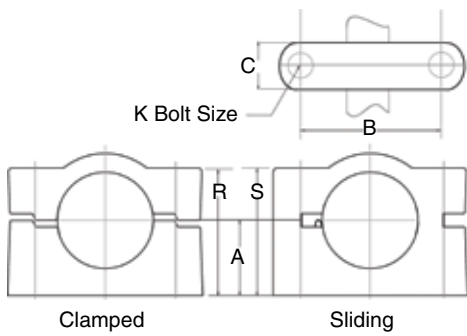
Busbar End Palm L Type (Sliding Support)

Part Number	Busbar Outer Ø (mm)	Palm Type
BBEPLS-080-AS#	80	AS#
BBEPLS-100-AS#	100	AS#
BBEPLS-125-AS#	125	AS#

Part Number System

BBEPLS	Busbar End Palm L Type Sliding Support
080	Busbar outer Diameter
AS#	Palm Type E.g. AS1, AS2 etc...

Support - Single



D-ABS

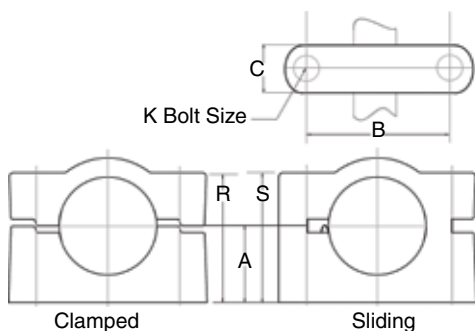
Aluminium Busbar Support Clamp (Type ABS)

Busbar support clamps are cast to size in Aluminium Alloy and fitted with stainless steel bolts. Clamps may be converted from clamping to sliding type or vice versa, by simply reversing the cap.

Part Number	O.D. Tube (mm)	Dimensions (mm)					
		A	B	C	K	R	S
D-ABS15	12.7	21	76	25	M12	37	38
D-ABS17	15.9	23	51	25	M10	36	37
D-ABS25	19.1	25	76	25	M12	41	42
D-ABS30	25.4	25	51	32	M10	41	46
D-ABS35	25.4	25	76	38	M12	46	51
D-ABS40	31.8	27	51	38	M10	46	51
D-ABS42	41.3	33	76	38	M12	56	59
D-ABS45	31.8	29	76	38	M12	52	54
D-ABS50	38.1	32	51	32	M10	57	59
D-ABS55	38.1	33	76	38	M12	57	59
D-ABS60	50.8	40	76	38	M12	70	72
D-ABS65	57.2	43	76	38	M12	76	78
D-ABS70	60.3	43	76	38	M12	76	79
D-ABS75	63.5	54	127	51	M16	98	100
D-ABS80	80.0	54	127	51	M16	103	105
D-ABS85	76.2	54	127	51	M16	103	105
D-ABS100	88.9	60	127	51	M16	110	111
D-ABS102	100.0	61	127	51	M16	110	112

D-BS

Copper Busbar Support Clamp (Type BS)



Part Number	O.D. Tube (mm)	Dimensions (mm)					
		A	B	C	K	R	S
D-BS5	6.35	14.0	50.8	25.4	M10	25.4	26.9
D-BS10	12.70	19.0	50.8	28.5	M10	31.7	33.3
D-BS15	12.70	19.0	76.2	28.5	M12	36.5	38.1
D-BS17	15.88	22.0	50.8	25.4	M10	38.1	36.5
D-BS20	19.05	22.0	50.8	28.5	M10	34.9	36.5
D-BS25	19.05	25.4	76.2	28.5	M12	39.7	41.2
D-BS30	25.40	25.4	50.8	28.5	M10	46.0	47.6
D-BS35	25.40	25.4	76.2	28.5	M12	41.2	42.8
D-BS40	31.75	28.5	50.8	28.5	M10	49.2	50.8
D-BS45	31.75	28.5	76.2	28.5	M12	42.8	44.4
D-BS50	38.10	31.7	50.8	28.5	M10	53.9	55.5
D-BS55	38.10	31.7	76.2	28.5	M12	49.2	50.8
D-BS60	50.80	38.0	76.2	28.5	M12	68.2	69.8
D-BS70	63.50	44.5	127.0	31.7	M16	82.5	84.1

Note: Adaptor plate part no. E8045 available to suit 127mm PCD insulators and above BS type connectors.

Rigid Support - Single

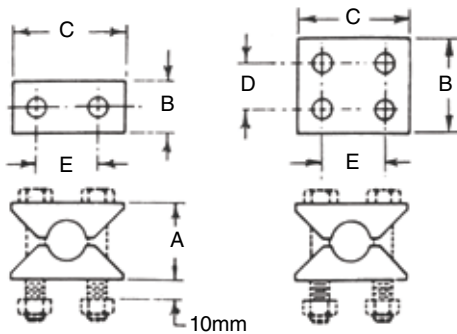
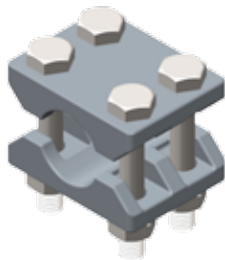


Fig.1

Fig.2

D-TF

Tube Connector (Type TF Copper & ATF Aluminium)

These connectors provide an inexpensive tube to flat termination. They also combine with the flexible braid connections to provide expansion joints between tubes in lines, tubes at right angles and between tube and flat terminals. Connectors can be supplied with stainless steel bolts and nuts.

Part Number	Without Bolts	With Bolts	O.D. Tube (mm)	Fig. No.	Dimensions (mm)					Bolt Size
					A	B	C	D	E	
10		D-TF10B	12.7	1	32	25	54	-	29	M10
D-TF15		D-TF15B	15.9	1	32	25	54	-	29	M19
D-TF20		D-TF20B	15.9	2	32	48	54	22	29	M10
D-TF25		D-TF25B	19.1	1	38	25	57	-	32	M10
D-TF30		D-TF30B	19.1	2	35	48	57	22	32	M10
D-TF34		D-TF34B	25.4	1	44	22	57	-	38	M10
D-TF35		D-TF35B	25.4	1	44	29	60	-	38	M10
D-TF40		D-TF40B	25.4	2	41	48	60	22	38	M10
D-TF45		D-TF45B	25.4	2	41	54	64	29	38	M10
D-TF4522		D-TF4522B	25.4	2	40	76	76	51	51	M10
D-TF45A		D-TF45AB	27.0	2	43	54	64	29	38	M10
D-TF46		D-TF46B	28.6	1	44	29	60	-	38	M10
D-TF47		D-TF47B	28.6	2	44	54	64	29	38	M10
D-TF49		D-TF49B	30.0	2	46	54	70	29	44	M10
D-TF50		D-TF50B	31.8	2	48	54	70	29	44	M12
D-TF52		D-TF52B	34.0	2	51	54	70	29	44	M10
D-TF53		D-TF53B	35.0	2	51	54	70	29	44	M10
D-TF54		D-TF54B	38.1	1	57	22	70	-	51	M10
D-TF55		D-TF55B	38.1	2	54	54	76	29	51	M10
D-TF56		D-TF56B	38.1	2	60	76	83	44	54	M12
D-TF57		D-TF57B	40.0	2	56	55	76	29	51	M10
D-TF60		D-TF60B	48.0	2	64	57	83	29	57	M10
D-TF65		D-TF65B	50.8	2	67	54	89	29	64	M10
D-TF67		D-TF67B	60.0	2	80	54	98	29	73	M10
D-TF70		D-TF70B	63.5	2	84	54	105	29	80	M10
D-TF75		D-TF75B	76.2	2	95	54	114	29	89	M10

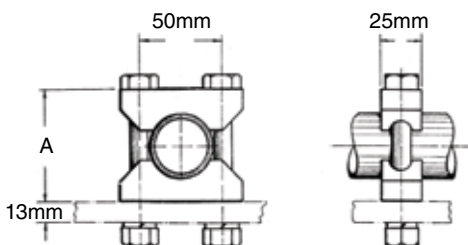
Note: For current rating of parts on this page, contact PLP direct.



D-PTC

Tube Connector (Type TPC Copper)

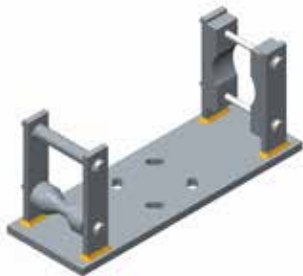
For the connection of tubular busbar to switchgear terminal plates with four 14mm diameter holes at 50mm centres. Two PTC connectors are required per termination. **Materials:** High copper content alloy castings. Stainless steel bolts, washers and nuts.



Support - Double



Roller/Roller



Roller/Fixed



Fixed/Fixed



Fixed/Sliding

BBSA

Busbar Support Assembly (Double)

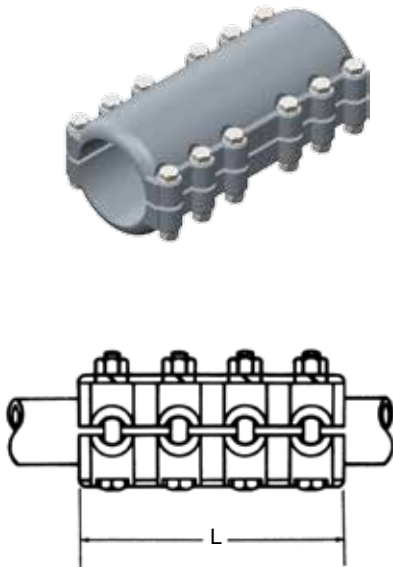
Double supports are designed to be mounted on Post insulators where busbars need to be connected via flexible connectors. Standard centre heights are 130mm over mounting palm to busbar centre line – up to busbar diameter of 141mm. Please contact PLP for various other sizes and styles.

Double Supports are available in the following three designs;

- Roller/Roller
- Roller/Fixed
- Fixed/Fixed
- Fixed/Sliding

Part Number	To Suit Busbar Ø (mm)	Support Type	Base Size L x W x H (mm)	Hole Diameters and Centres (mm)	
				76 P.C.D. (Holes)	127 P.C.D. (Holes)
BBSA-05	100	Roller-Roller	270x180x12	14	18
BBSA-100-FF	100	Fixed-Fixed	270x180x12		18
BBSA-100-RF	100	Roller-Fixed	270x180x12		18
BBSA-100-RR	100	Roller-Roller	400x225x12		18
BBSA-125-RR	125	Roller-Roller	270x200x20		18
BBSA-141-RF	141	Roller-Fixed	250x240x12		18
BBSA-141-RR	141	Roller-Roller	250 x 240 x 12		18
BBSA-160-RR	160	Roller-Roller	270 x 200 x 20		18

Bolted Connections



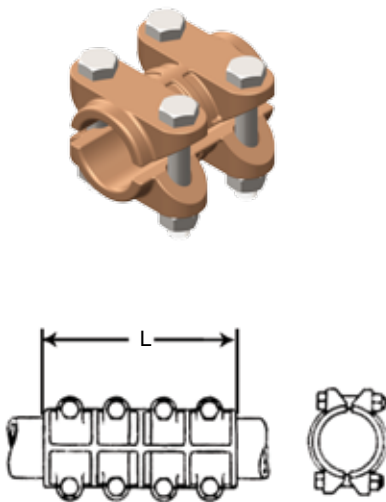
D-AST

Aluminium Busbar to Busbar (Type AST)

Type AST straight connectors are cast to size in high strength aluminium alloy and fitted with stainless steel bolts and nuts. Both connector halves are identical.

Part Number	O.D. Tube (mm)	Length L (mm)	Bolt Size
D-AST5	19.1	105	M10
D-AST20	25.4	127	M12
D-AST35	31.8	152	M12
D-AST50	38.1	152	M12
D-AST85	50.8	178	M12
D-AST86	57.2	191	M12
D-AST88	60.3	191	M12
D-AST90	63.5	191	M12
D-AST95	76.2	216	M12
D-AST80M	80.0	178	M12
D-AST100	88.9	216	M12
D-AST100M	101.6	184	M12

Note: Favailable to suit a wide range of busbar sizes, contact PLP for further details.



Fg.2



Fg.1

D-ST

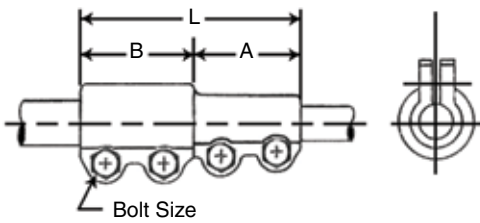
Straight Connector Busbar to Busbar (Type ST Copper)

This heavy duty connector is cast to size. The minute surface projections provide a multiple point high pressure contact which gives a low resistance joint. Both connector halves are identical. Connectors are supplied with stainless steel bolts, nuts and spring washers.

Part Number	O.D. Tube (mm)	Fig.	Dim. L (mm)	Bolt Size
D-ST5	19.1	1	70	M10
D-ST20	25.4	1	83	M12
D-ST20C	25.4	2	127	M10
D-ST27	28.6	2	140	M10
D-ST35	31.8	1	102	M12
D-ST50	38.1	1	102	M12
D-ST85	50.8	2	159	M12
D-ST95	76.2	2	229	M12

Note: For current rating of parts on this page, contact PLP direct.

Bolted Connections



D-RS

Reducer Busbar or Studs (Type RS - Copper)

The type RS reducer is designed for use with solid copper busbar tube and equipment studs.

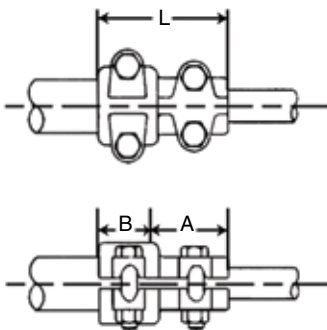
Materials: High copper content alloy casting. Stainless steel bolts, washers and nuts.

Part Number	O.D. Tube (mm)		Dimensions (mm)			Bolt Size
	Tube1	Tube2	A	B	L	
D-RS1110	28.6	25.4	57	51	108	M10
D-RS1210	30.2	25.4	57	51	108	M10
D-RS1508	38.1	22.2	60	57	117	M10
D-RS1509	38.1	25.0	60	57	117	M10
D-RS1511	38.1	28.6	60	54	114	M10
D-RS1512	38.1	30.2	60	54	114	M10
D-RS1514	38.1	34.9	60	54	114	M10
D-RS1610	39.7	25.4	60	57	117	M10
D-RS1818	44.5	44.5	76	76	152	M12

D-RT

Reducer Busbars (Type RT - Copper)

The type RT is a two piece design suitable for use with tubular busbar. It is cast in high copper content alloy and fitted with stainless steel bolts, nuts and spring washers.



Part Number	O.D. Tube (mm)		Dimensions (mm)			Bolt Size
	Tube1	Tube2	A	B	L	
D-RT15	25.4	19.1	44	35	79	M10
D-RT30	31.8	19.1	48	32	79	M10
D-RT32C	31.8	25.4	57	56	114	M10
D-RT45	38.1	25.4	51	51	102	M12
D-RT47	38.1	30.2	51	51	102	M12
D-RT60	44.5	25.4	54	44	98	M12
D-RT65	44.5	31.8	62	46	108	M12
D-RT75	50.8	25.4	54	44	98	M12
D-RT80	50.8	38.1	64	48	111	M12
D-RT90	76.2	38.1	64	51	114	M12

Note: For current rating of parts on this page, contact PLP direct.

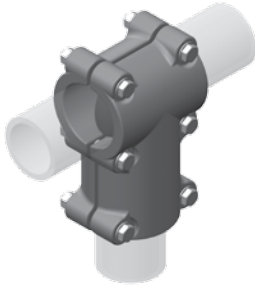
Bolted Connections

2

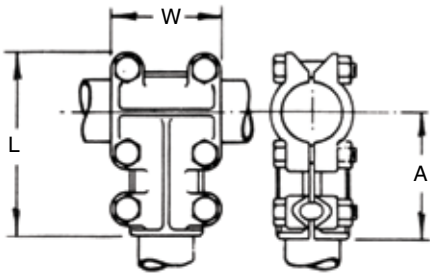
 BUSLIGN™ Fittings
 For Rigid Busbar

D-ATT

Aluminium Tee Connector Busbar to Busbar (Type ATT)



Type ATT tee connectors are cast to size in high strength aluminium alloy. Both connector halves are identical. Supplied with stainless steel bolts and nuts.



Part Number	O.D. Tube (mm)		Dimensions (mm)			Bolt Size
	Run	Tap	A	B	C	
D-ATT28	28.6	25.4	75	111	44	M10
D-ATT35	31.8	31.8	108	152	83	M12
D-ATT3830	38.1	30.0	106	149	86	M12
D-ATT50	38.1	38.1	111	156	90	M12
D-ATT75	50.8	25.4	108	159	76	M12
D-ATT2020	50.8	50.8	127	178	102	M12
D-ATT2410	60.3	25.4	114	171	89	M12
D-ATT2413	60.3	31.8	114	171	102	M12
D-ATT2415	60.3	38.1	114	171	102	M12
D-ATT88	60.3	60.3	133	187	108	M12
D-ATT89	63.5	63.5	137	191	121	M12
D-ATT93	76.2	50.8	130	194	99	M12
D-ATT95	76.2	76.2	175	238	114	M12
D-ATT8064	80.0	63.5	184	248	114	M12
D-ATT8080	80.0	80.0	175	238	114	M12
D-ATT99	88.9	50.8	143	222	105	M12
D-ATT100	88.9	60.3	146	219	108	M12
D-ATT3535	88.9	88.9	197	270	146	M12
D-ATT10060	100.0	60.3	201	282	127	M16
D-ATT10080	100.0	80.0	202	283	143	M16
D-ATT100100	100.0	100.0	305	283	143	M16
D-ATT4525	114.3	63.5	194	292	117	M12
D-ATT11480	114.3	80.0	210	298	152	M16
D-ATT4533	114.3	82.6	210	298	152	M16

Note: For current rating of parts on this page, contact PLP direct.

Bolted Connections

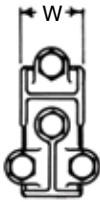
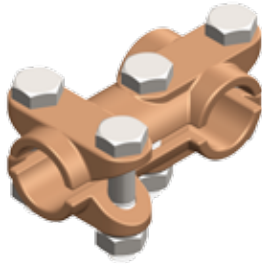


Fig. 1

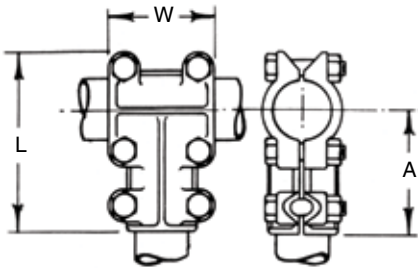


Fig. 2

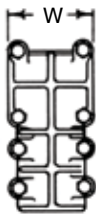


Fig. 3

D-TT

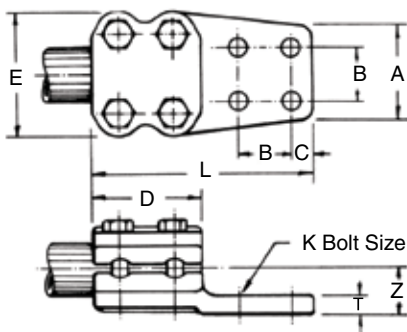
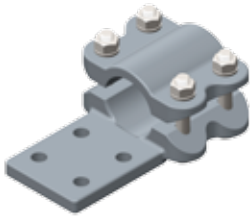
Tee Connector Busbar to Busbar (Type TT Copper)

This heavy duty connector is cast to size. The minute surface projections provide a multiple point high pressure contact which gives a low resistance joint. Both connector halves are identical. Connectors are supplied with stainless steel bolts and nuts. Refer to table on adjoining page for conductor ranges and dimensions.

Part Number	O.D. Tube (mm)		Fig. No.	Dimensions (mm)			Bolt Size
	Run	Tap		A	L	W	
D-TT3	15.9	15.9	1	55	80	35	M10
D-TT5	19.1	19.1	1	57	83	38	M10
D-TT7	20.6	20.6	1	57	83	38	M10
D-TT10	19.1	25.4	1	68	98	44	M12
D-TT15	25.4	19.1	1	62	92	38	M10
D-TT17	22.2	20.6	1	68	98	44	M12
D-TT20	25.4	25.4	1	70	103	43	M12
D-TT20C	25.4	25.4	2	68	98	76	M10
D-TT21	28.6	28.6	1	71	107	44	M12
D-TT25	25.4	38.1	1	87	121	44	M12
D-TT27	28.6	15.9	2	73	108	50	M10
D-TT28	30.2	25.4	1	75	111	44	M12
D-TT30	31.8	19.1	1	64	95	44	M10
D-TT32	31.8	25.4	1	75	111	44	M12
D-TT35	31.8	31.8	1	76	114	44	M12
D-TT40	31.8	44.5	2	102	138	86	M12
D-TT45	38.1	25.4	1	76	117	50	M12
D-TT45C	38.1	25.4	2	76	114	92	M10
D-TT50	38.1	38.1	2	105	146	83	M12
D-TT50C	38.1	38.1	2	80	117	92	M10
D-TT55	38.1	50.8	2	110	149	97	M12
D-TT60	44.5	25.4	1	80	124	50	M12
D-TT65	44.5	31.8	1	110	156	73	M12
D-TT70	44.5	44.5	2	110	154	89	M12
D-TT75	50.8	25.4	1	84	133	50	M12
D-TT78	48.4	31.8	2	102	151	90	M12
D-TT79	50.8	31.8	2	102	151	90	M12
D-TT80	50.8	38.1	2	108	157	90	M12
D-TT83	48.4	50.8	2	116	164	95	M12
D-TT84	48.4	48.4	2	116	164	95	M12
D-TT85	50.8	50.8	2	116	162	95	M12
D-TT86	54	50.8	2	116	168	95	M12
D-TT88	63.5	38.1	2	114	168	95	M12
D-TT90	76.2	38.1	2	114	178	83	M12
D-TT95	76.2	76.2	3	156	216	95	M12
D-TT100	88.9	60.3	2	140	211	109	M12

Note: For current rating of parts on this page, contact PLP direct.

Bolted Connections



D-ABT

Aluminium Terminal Lug Busbar to Palm (Type ABT)

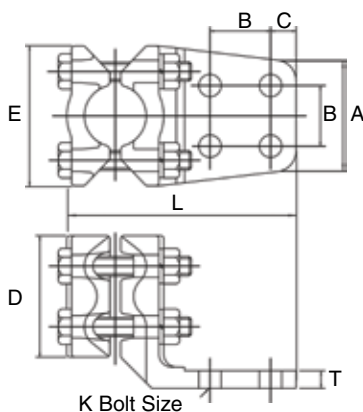
For terminating tubular aluminium busbar at switchgear palms. Castings are in high strength aluminium. Bolts and nuts are stainless steel.

Part Number	O.D. Tube (mm)	No. of holes in Palm	Dimensions (mm)								
			A	B	C	D	E	K	L	T	Z
D-ABT20	25.4	2	38	38	16	83	83	M12	162	10	32
D-ABT30	31.8	2	38	38	16	83	83	M12	162	10	32
D-ABT40	38.1	4	67	38	16	76	86	M12	156	11	35
D-ABT50	50.8	4	83	50	16	76	100	M12	165	14	42
D-ABT54	57.2	-	83	-	-	80	105	-	168	14	44
D-ABT57	60.3	-	83	-	-	83	108	-	171	14	46
D-ABT63	61.0	2	83	50	30	83	100	M12	172	14	46
D-ABT64	63.5	4	83	50	16	83	100	M12	172	14	46
D-ABT80	80.0	4	83	50	15	83	130	M12	172	16	57
D-ABT95	76.2	-	83	-	-	83	171	-	172	16	55
D-ABT105	88.9	-	102	-	-	83	140	-	184	14	61

D-ABTL

Right Angle Aluminium Terminal Lug Busbar to Palm (Type ABT-L)

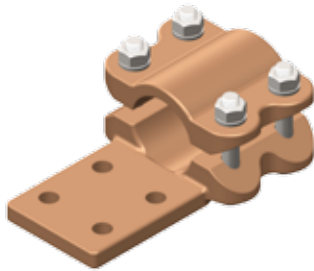
Designed for terminating tubular aluminium busbar at right angles to the contact surface. Castings are in high strength aluminium. Bolts and nuts are stainless steel.



Part Number	O.D. Tube (mm)	No. of holes in Palm	Dimensions (mm)							
			A	B	C	D	E	L	K	T
D-ABT30L	31.8	2	67	38	16	83	81	156	M12	13
D-ABT40L	38.1	4	67	38	16	76	87	143	M12	13
D-ABT57L	60.3	-	83	-	-	79	105	185	-	14
D-ABT250L	63.5	4	89	38	25	89	111	216	M12	14

Note: For current rating of parts on this page, contact PLP direct.

Bolted Connections



D-BT

Terminal Lug Busbar To Palm (Type BT Copper)

Designed for tube to flat connections. Castings are of high copper content alloy. Lugs are machined on underside. Lugs are supplied with stainless steel bolts and nuts. Note type BT20A is machined on both sides of the lug.

Part Number	O.D. Tube (mm)	No. of holes in Palm	Dimensions (mm)								
			A	B	C	D	E	L	K	T	Z
D-BT2	12.7	2	29	---	14	32	38	64	M10	6	16
D-BT3	15.9	2	32	---	16	32	49	70	M10	10	16
D-BT5	19.1	2	32	---	16	35	52	73	M12	10	20
D-BT10	19.1	1	33	29	13	35	52	94	M10	10	20
D-BT20	25.4	1	41	38	16	44	67	121	M12	10	23
D-BT20A	25.4	5	38	---	19	51	59	108	M12	6	16
D-BT30	31.8	1	48	38	16	51	59	127	M12	10	26
D-BT33	33.3	3	70	38	16	51	76	130	M12	10	30
D-BT40	38.1	3	70	38	16	51	80	130	M12	11	30
D-BT46	46.0	4	70	38	16	64	89	146	M12	11	37
D-BT50	50.8	4	70	38	16	70	95	152	M12	11	37

Note: For current rating of parts on this page, contact PLP direct.

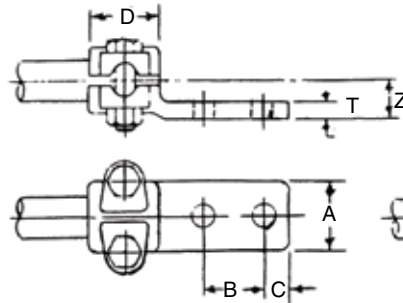


Fig.1

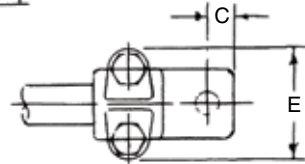


Fig.2

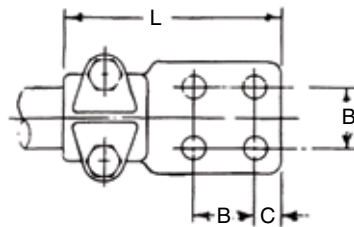


Fig.3

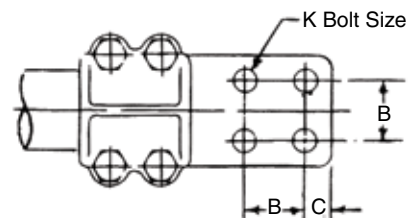


Fig.4

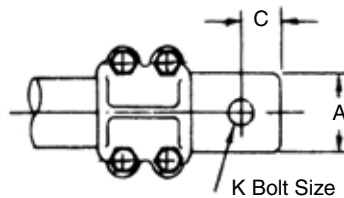


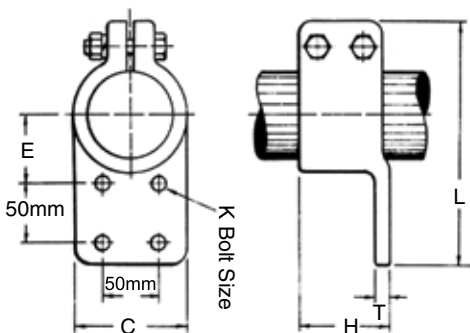
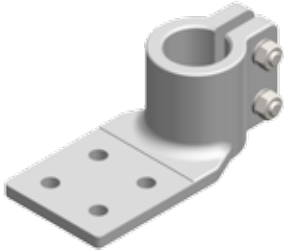
Fig.5

Bolted Connections

D-LS

Tinned Coper Right Angle Terminal Lug Busbar to Palm (Type LS)

Designed for terminating tubular copper busbar at right angles to the contact surface. Castings are in high strength copper with a tinned surface finish. Bolts and nuts are stainless steel.



Part Number	O.D. Tube mm	Dimensions (mm)					
		C	E	H	L	T	K
D-LS5	19.1	79	35	44	133	10	M12
D-LS7	22.2	79	35	44	133	10	M12
D-LS20	25.4	76	41	64	143	10	M12
D-LS20C	25.4	102	57	64	171	13	M12
D-LS25	30.2	102	67	76	184	19	M12
D-LS25C	30.2	102	57	64	171	13	M12
D-LS28A	30.2	140	75	76	235	13	M16
D-LS30	31.8	83	43	64	146	13	M12
D-LS40	38.1	102	57	60	184	13	M12
D-LS50	50.8	102	60	73	193	13	M12
D-LS54	57.2	102	73	76	200	13	M12
D-LS95	76.2	102	67	83	216	13	M12
D-LS2018	30.2	76	54	64	143	10	M10

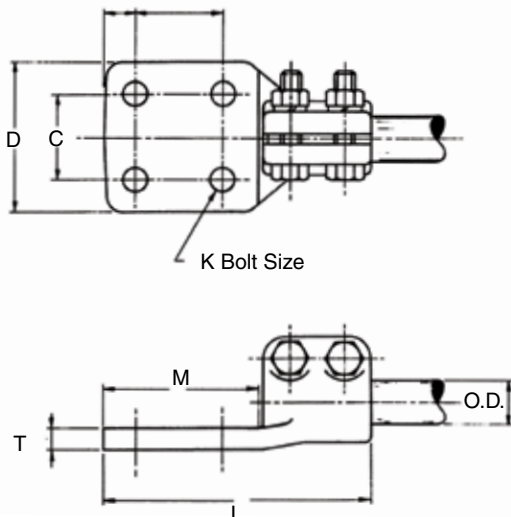
Note: For current rating of parts on this page, contact PLP direct.

D-CS

Terminal Lug Stud or Busbar to Palm (Type CS Copper)

For the connection of vertical tubular busbar to switchgear terminal plates. Also used on equipment studs to provide a flat contact palm.

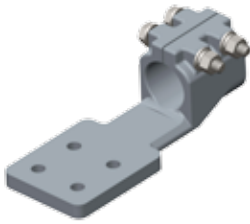
Materials: Terminal lugs are cast in high copper content alloy. Bolts, nuts and spring washers are stainless steel.



Part Number	O.D. Tube (mm)	Dimensions (mm)							
		A	B	C	D	L	M	T	K
D-CS5	19.1	16	51	51	83	130	83	10	M12
D-CS20	25.4	16	51	51	83	149	83	13	M12
D-CS20B	25.4	19	38	38	83	149	83	13	M10
D-CS112	28.6	16	38	38	76	149	76	10	M12
D-CS28	30.2	---	---	---	76	146	76	10	M12
D-CS28C	30.2	25	51	51	102	171	108	13	M12
D-CS30C	31.8	25	51	51	102	171	108	13	M12
D-CS38	34.9	25	51	51	102	171	105	13	M12
D-CS40C	38.1	25	51	51	102	171	105	13	M12
D-CS42	39.7	25	51	51	102	171	105	13	M12
D-CS42A	39.7	35	70	70	140	210	143	13	M16
D-CS181	46.0	25	38	51	102	178	105	16	M12
D-CS231	58.7	25	38	51	102	203	108	19	M12
D-CS250	63.5	25	38	51	102	203	108	19	M12



Bolted Connections



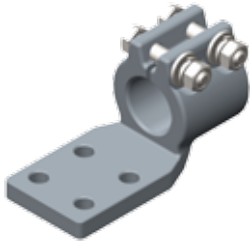
BBTL

Busbar Terminal Lug

Part Number	Pin Ø	Palm Type	Bend Angle
BBTL-25-AS#-*	25	AS#	*
BBTL-30-AS#-*	30	AS#	*
BBTL-40-AS#-*	40	AS#	*
BBTL-50-AS#-*	50	AS#	*

Part Number System

BBTL	Busbar Terminal Lug
Ø80	Pin Diameter
AS#	Palm Type eg. AS1, AS2, AS3
*	Bend Angle 0,15, 30, 45 or 90



BBTLS

Busbar Terminal Lug - Short

Part Number	Pin Ø	Palm Type	Bend Angle
BBTLS-25-AS#-*	25	AS#	*
BBTLS-30-AS#-*	30	AS#	*
BBTLS-40-AS#-*	40	AS#	*
BBTLS-50-AS#-*	50	AS#	*



BBBIP

Busbar Bolted Inline Palm

Part Number	Busbar Outer Ø (mm)	Palm Type
BBBIP-050-AS#	50	AS#
BBBIP-080-AS#	80	AS#
BBBIP-100-AS#	100	AS#

Part Number System

BBBIP	Busbar Bolted Inline Palm
50	Busbar Outer Diameter
AS#	Palm Type E.g. AS1, AS2 etc...



BBBES

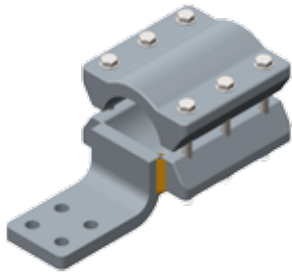
Busbar Bolted Earth Stirrup

Part Number	Busbar Outer Ø (mm)
BBBES-050	50
BBBES-080	80
BBBES-100	100

Part Number System

BBBES	Busbar Bolted Earth Stirrup
50	Busbar Outer Diameter

Bolted Connections



BBBTP

Busbar Bolted Terminal Palm

Part Number	Busbar Outer Ø (mm)	Palm Type
BBBTP-050-AS#	50	AS#
BBBTP-080-AS#	80	AS#
BBBTP-100-AS#	100	AS#

Part Number System

BBBTP	Busbar Bolted Terminal Palm
50	Busbar Outer Diameter
AS#	Palm Type E.g. AS1, AS2 etc...



POWERFORMED[®]
Substation Systems



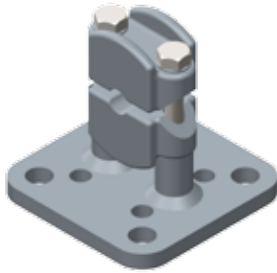
POWERFORMED LINE PRODUCTS
The connection you can count on.

Section 3 - SUBSLIGN™ Fittings For Flexible Conductors And Strung Bus

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Supports



BBFCS

Busbar Fixed Conductor Support

Part Number	Conductor Diameter Range (mm)	P.C.D. (mm)	Hole Ø (mm)
BBFCS-135195-127-76 (-T)	13.5 - 19.5	127 and 76	18/14
BBFCS-196240-127-76 (-T)	19.6 - 24.0	127 and 76	18/14
BBFCS-241300-127-76 (-T)	24.1 - 30.0	127 and 76	18/14
BBFCS-301350-127-76 (-T)	30.1 - 35.0	127 and 76	18/14

Note: T at the end of the part number refers to tin plating

Part Number System

BBFCS	Busbar Fixed Conductor Support
175	Conductor Outer Diameter
127	P.C.D.
76	P.C.D.



BRPI

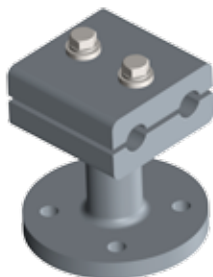
Bolted Run Post Insulator

The BRPI is a heavier duty version of the BBFCS.

Part Number	Conductor Ø Range (mm)	P.C.D mm	Hole Ø mm
BRPI-135195-127	13.5 - 19.5	127	18
BRPI-196240-127	19.6 - 24.0	127	18
BRPI-241300-127	24.1 - 30.0	127	18
BRPI-301350-127	30.1 - 35.0	127	18

Part Number System

BRPI	Bolted Run Post Insulator
175	Conductor Outer Diameter
127	P.C.D.
18	Hole Ø



DCRIP

Double Conductor Run (Insulator Post)

The DCRIP is a double version of the BRPI.

Part Number	Conductor Diameter (mm)	Conductor Spacing (mm)	P.C.D. (mm)
DCRIP-293-74-127	29.3	74	127
DCRIP-338-74-127	33.8	74	127
DCRIP-355-74-127	35.5	74	127

Part Number System

DCRIP	Double Conductor Run Insulator Post
293	Conductor Outer Diameter
74	Conductor Spacing
127	P.C.D.

Supports



SPSD

Substation Parallel Spacer Double (Post Insulator Mounted)

Part Number	Conductor Diameter (mm)	Conductor Centre Spacing (mm)	P.C.D. (mm)	Hole Ø (mm)
SPSD-240-050PI	24.0	50	127 and 76	18/14
SPSD-263-070PI	26.3	70	127 and 76	18/14
SPSD-293-070PI	29.3	70	127 and 76	18/14
SPSD-293-125-PI	29.3	125	127 and 76	18/14
SPSD-315-070PI	31.5	70	127 and 76	18/14
SPSD-315-125PI	31.5	125	127 and 76	18/14

Part Number System

SPSD	Substation Parallel Spacer Double
240	Conductor Outer Diameter
050	Conductor Centre Spacing
PI	Post Insulator Mounted (76/127PCD)



SPST

Substation Parallel Spacer Triple (Post Insulator Mounted)

Part Number	Conductor Diameter (mm)	Conductor Centre Spacing (mm)
SPST-315-070PI	31.5	70.0

Part Number System

SPST	Substation Parallel Spacer Triple
315	Conductor Outer Diameter
070	Conductor Centre Spacing
PI	Post Insulator Mounted (76/127PCD)



SPSQ

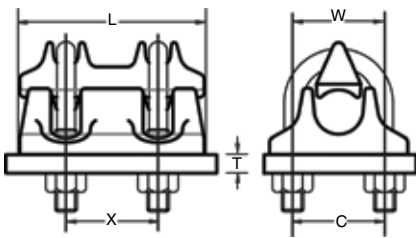
Substation Parallel Spacer Quad (Post Insulator Mounted)

Part Number	Conductor Diameter (mm)	Conductor Centre Spacing (mm)	P.C.D. (mm)	Hole Ø (mm)
SPSQ-293-070PI	29.3	70	127 and 76	18/14

Part Number System

SPSQ	Substation Parallel Spacer Quad
240	Conductor Outer Diameter
070	Conductor Centre Spacing
PI	Post Insulator Mounted (76/127PCD)

Supports



D-PC

Palmless Connector (Types PC & PCS Copper, APC & APCS Aluminium)

Low cost connectors for clamping cable to switchgear terminal plates with four 14mm diameter holes at 50mm centres. Castings are of high copper content alloy. U-bolts, nuts and spring washers are stainless steel.

Part Number	Cable Range		Dimensions (mm)					No. of Holes
	Area (mm ²)	O.D.	C	L	T	W	X	
D-PCS1	25 - 120	6.75 - 14.21	22	32	7	44	-	2 x 9.5
D-PCS2	50 - 300	8.90 - 22.68	33	38	7	50	-	2 x 11.5
D-PC3	70 - 150	10.70 - 16.00	50	102	13	76	50	4 x 14.0
D-PC4	150 - 240	15.00 - 21.00	50	102	13	76	50	4 x 14.0
D-PC5	240 - 400	20.00 - 25.65	50	102	13	76	50	4 x 14.0
D-PC7	500 - 630	28.80 - 33.80	50	102	13	76	50	4 x 14.0

Note: For current rating of parts on this page, contact PLP direct.

Earthing



ESTS

Earthing Stirrup Transverse Single

Part Number	Conductor Diameter Range (mm)	Stirrup Bend Radius (mm)	Stirrup Ø mm
ESTS-175	13.5 - 18.5	R50	25.4
ESTS-210	19.6 - 24.0	R50	25.4
ESTS-270	24.1 - 30.0	R50	25.4
ESTS-338	30.1 - 35.0	R50	25.4

Part Number System

ESTS	Earthing Stirrup Transverse Single
175	Conductor Outer Diameter

Earthing



ESTD

Earthing Stirrup Transverse Double

Twin version of ESTS.

Part Number	Conductor Diameter (mm)	Conductor Spacing (mm)	Stirrup Bend Radius (mm)	Stirrup Ø (mm)
ESTD-190-#	19.0	70 or 125	R50	25.4
ESTD-210-#	21.0	70 or 125	R50	25.4
ESTD-240-#	24.0	70 or 125	R50	25.4
ESTD-263-#	26.3	70 or 125	R50	25.4
ESTD-293-#	29.3	70 or 125	R50	25.4
ESTD-315-#	31.5	70 or 125	R50	25.4
ESTD-338-#	33.8	70 or 125	R50	25.4

Part Number System

ESTD Earth Stirrup Transverse Double

190 Conductor Outer Diameter

Conductor Spacing (070 or 125mm)

Example: ESTD-190-070



ESTT

Earthing Stirrup Transverse Triple

Conductor Diameter Ranges mm	Conductor Spacing (mm)	Stirrup Bend Radius (mm)	Stirrup Ø (mm)
ESTT-263-#	70 or 125	R50	25.4
ESTT-293-#	70 or 125	R50	25.4
ESTT-315-#	70 or 125	R50	25.4
ESTT-338-#	70 or 125	R50	25.4

Part Number System

ESTT Earth Stirrup Transverse Triple

263 Conductor Outer Diameter

Conductor Spacing (070 or 125mm)

Example: ESTT-263-070



BBESA

Busbar Earthing Stirrup Assembly

This is another version of the ESTS.

Part Number	Conductor Diameter Range (mm)	Stirrup Bend Radius (mm)	Stirrup Ø (mm)
BBESA-175	13.5 - 18.5	R50	25.4
BBESA-210	19.6 - 24.0	R50	25.4
BBESA-293	24.1 - 30.0	R50	25.4
BBESA-338	30.1 - 35.0	R50	25.4

Part Number System

BBESA Busbar Earthing Stirrup Assembly

175 Conductor Outer Diameter



Conductor Terminations

CTA

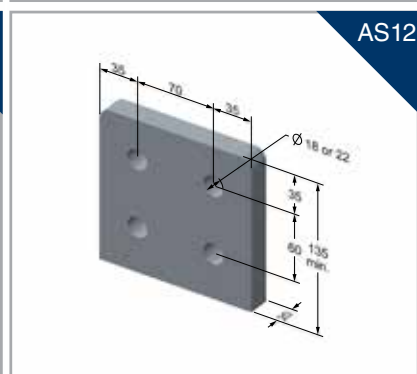
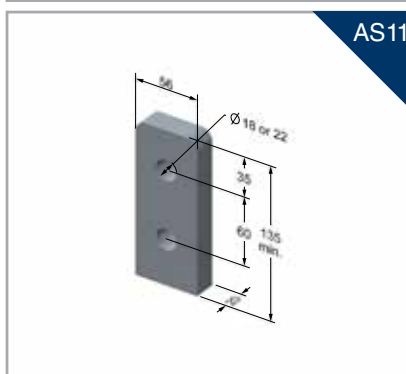
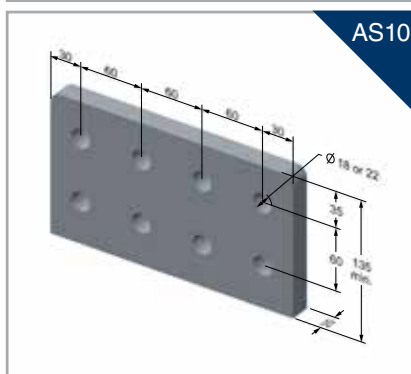
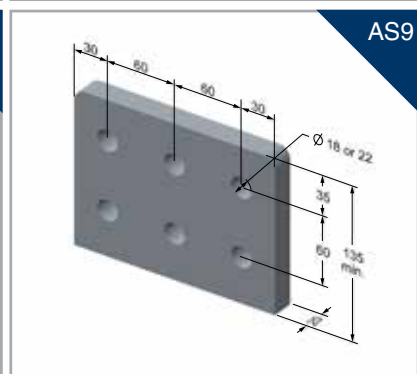
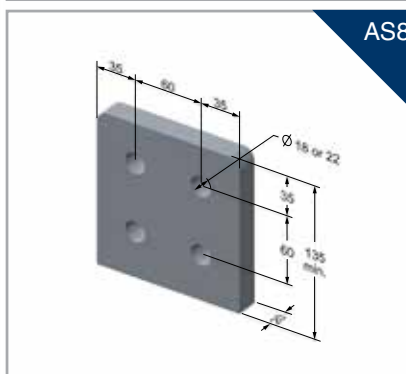
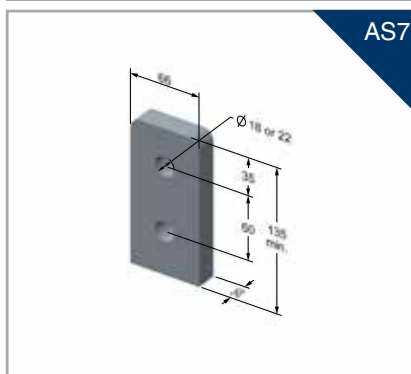
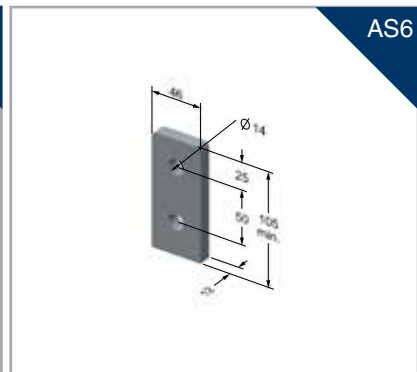
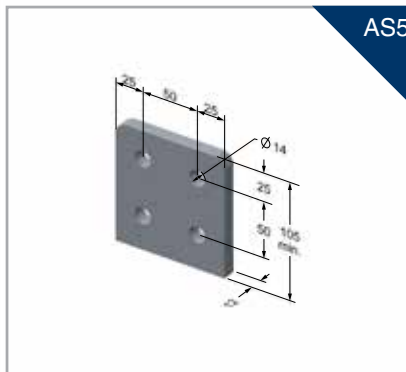
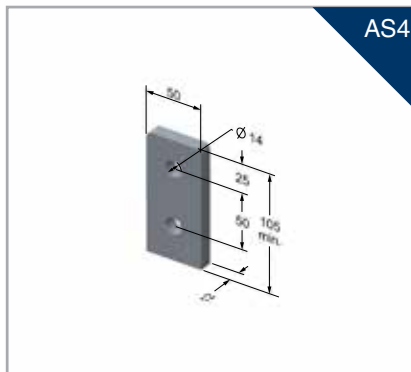
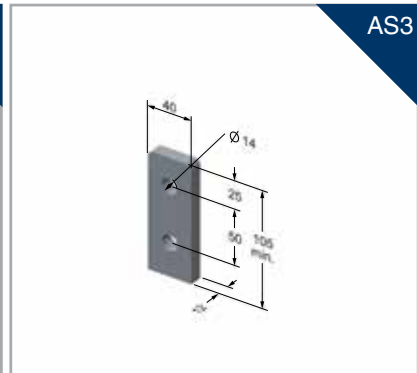
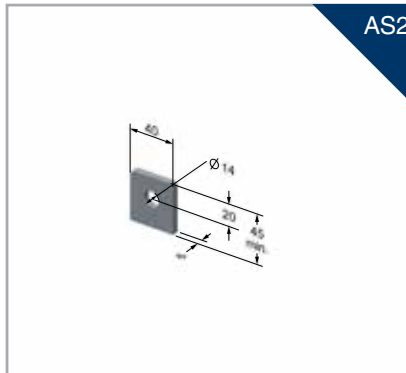
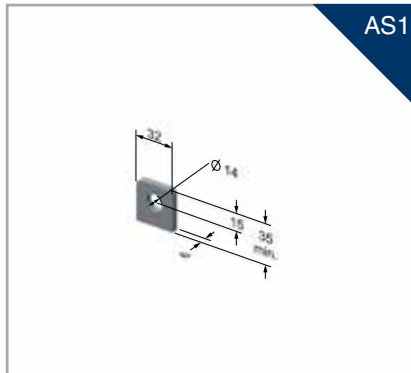
Aluminium Compression Terminal

Please fill in the following information for PLP to manufacture compression terminals to suit your requirement. Copy and fax or scan and email your completed catalogue page to us.

Fax: (02) 8805 0090 **Email:** plp-salesupport@preformed.com.au

Conductor Stranding

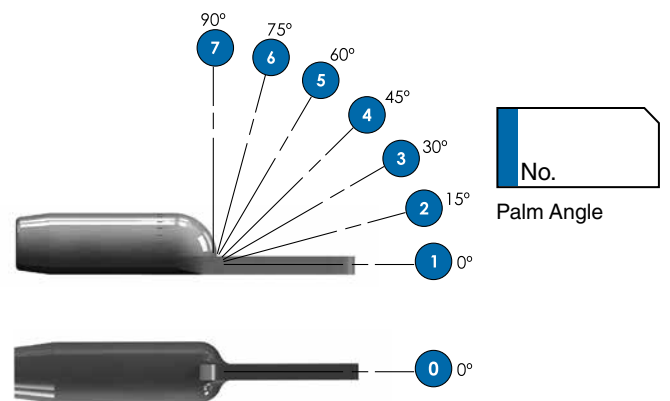
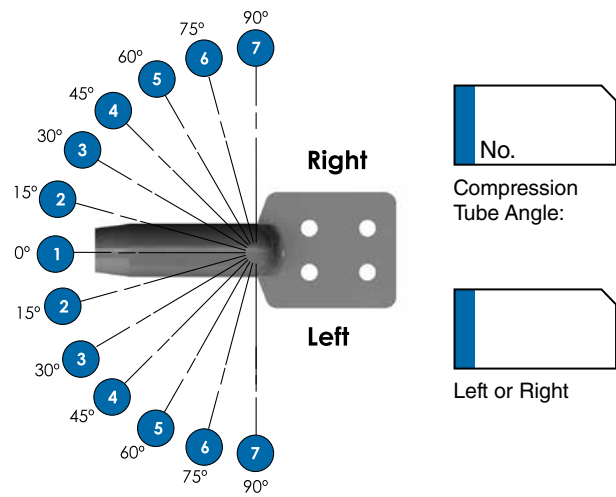
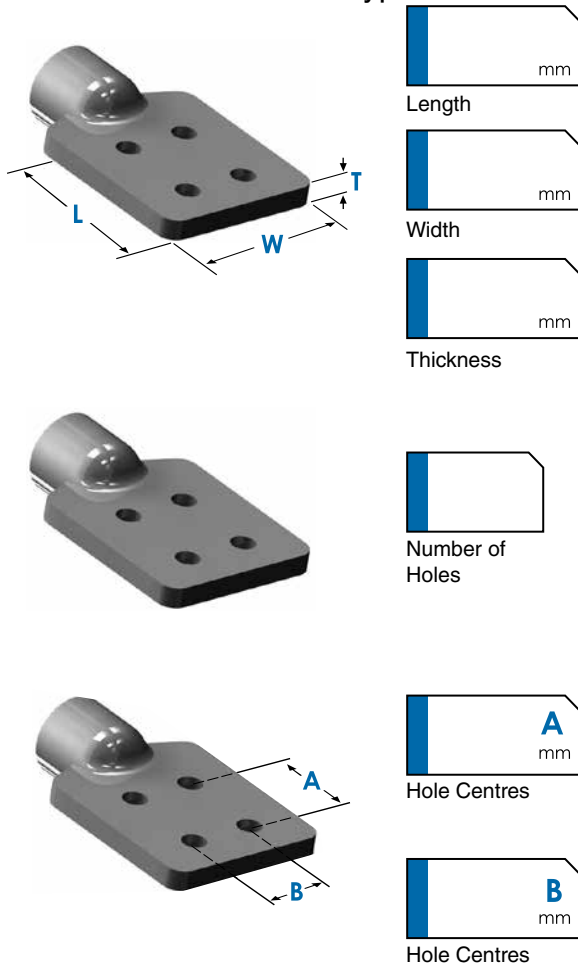
Choose from Australian standard palm types AS 62271.301



Conductor Terminations

CTA

For Non Standard Palm Types

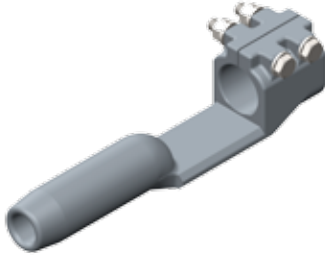


Palm Terminal Characteristics

AS 62271.301

Terminal Number	Bolt Hole Ø (mm)	Net Contact Area (mm) ²	Min Thickness (Al)	Assigned Current Rating (Al)
1	14	780	6	80
2	14	1,430	6	200
3	14	3,670	12	630
4	14	4,670	12	800
5	14	9,300	12	1,250
6	14	4,270	12	630
7	18 or 22	7,730	20	1,250
8	18 or 22	15,300	20	2,000
9	18 or 22	21,000	20	3,150
10	18 or 22	28,100	20	4,000
11	18 or 22	6,430	20	1,000
12	18 or 22	17,183	20	2,500

Conductor Terminations



CTAPTW

Compression Terminal Aluminium Pin Type

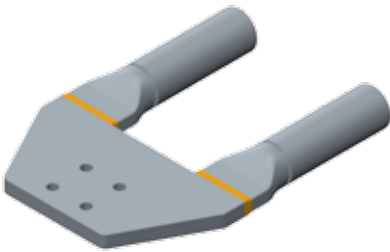
Pin type compression terminals are used to connect strung bus to equipment bushings and pins. Standard designs will carry up to 1100Amps but heavier designs are available for higher system loads. Please advise PLP of the current load expected when requesting this product. Tin plating is available as an option where connection onto copper occurs.

Part Number	Conductor Ø (mm)	Pin Ø (mm)	Bend Angle° (mm)
CTAPTW-143 - # - *	14.3	#	*
CTAPTW-188 - # - *	18.8	#	*
CTAPTW-199 - # - *	19.9	#	*
CTAPTW-238 - # - *	23.8	#	*
CTAPTW-263 - # - *	26.3	#	*
CTAPTW-293 - # - *	29.3	#	*
CTAPTW-315 - # - *	31.5	#	*
CTAPTW-338 - # - *	33.8	#	*

Part Number System

CTAPTW	Compression Terminal Aluminium Pin Type
113	Conductor Outer diameter
#	Pin diameter mm, Enter Pin Diameter (25, 30, 40 or 50mm)
*	Bend Angle° Enter angle - 0, 15, 30, 45, 90

Example: CTAPT-113-45-30



CTAT

Compression Terminal Aluminium Twin Type

Part Number	Conductor Ø (mm)	Conductor Spacing	Palm Type	Bend Angle°
CTAT-263 - # - * - ^	26.3	#	*	^
CTAT-270 - # - * - ^	27.0	#	*	^
CTAT-293 - # - * - ^	29.3	#	*	^
CTAT-338 - # - * - ^	33.8	#	*	^

Part Number System

CTAT	Compression Terminal Aluminium Twin (Type)
263	Conductor Outer diameter
#	Conductor Spacing – 115 or 160
*	Palm Type - e.g. AS1, AS2, AS3
^	Bend Angle° - 0, 15, 30, 45 or 90

Example: CTAT-263-115-AS5-30

Conductor Terminations

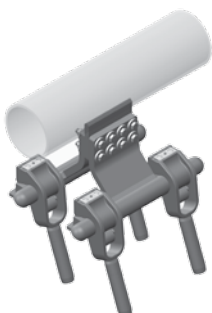


CDET

Compression Deadend Terminal

Jumper terminals are manufactured from forged aluminium and have the compression area clearly identified. Compression jumper terminals outlined below are indicative only. Palm angle is normally 30° to match a dead-end with an in-line palm. When ordering jumper terminals, please ensure the palm configuration matches the compression dead-end palm to which the terminal is to be fitted. Tin plating is available as an option where connection onto copper occurs.

Part Number	Stranding
CDET-163	19/3.25
CDET-175	30/7/2.50
CDET-210	30/7/3.00
CDET-210	37/3.00
CDET-238	19/4.75
CDET-245	30/7/3.50
CDET-263	37/3.75
CDET-270	61/3.00
CDET-270	54/7/3.00
CDET-293	61/3.25
CDET-293	54/7/3.25
CDET-315	61/3.50
CDET-315	54/7/3.50
CDET-338	61/3.75
CDET-338	54/3.75+19/2.25



QDC

Quick Disconnect System

PLP's quick disconnect system (QDC) is designed to provide a quick, easy and effective means of creating physical disconnect points in substations at voltages between 11kV and 275kV. The single conductor disconnect system can be deployed to create a disconnect point between flexible conductors. In addition, the QDS can also be used as a low cost alternative to high voltage bus section isolators in substations with only a limited loss of operational flexibility. The QDC is designed to be permanently installed to any standard flexible AAC, ACSR or AAAC aluminium conductor via industry standard hexagonal compression in a similar manner to a conventional compression terminal. The QDC can be installed by hand or by hotstick.

At installation, the bolts must be tightened with a torque wrench to the specified torque settings. The QDC is available with a single or twin conductor connector. Owing to the number of connector combinations that are possible with the QDC there is no tabulation of standard catalogue numbers provided.



Conductor Terminations



CRCTC

Compression Run Compression Tee (Closed)

Part Number	Run Conductor Ø (mm)	Tee Conductor Ø (mm)
CRCTC-263-293	26.3	29.3

Part Number System

CRCTC	Compression Run Compression Tee (Closed)
26.3	Run Conductor Outer Diameter
29.3	Tee Conductor Outer Diameter



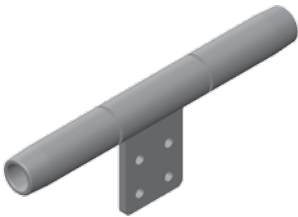
CRCTO

Compression Run Compression Tee (Open)

Part Number	Run Conductor Ø (mm)	Tee Conductor Ø (mm)
CRCTO-263-293	26.3	29.3

Part Number System

CRCTO	Compression Run Compression Tee (Open)
26.3	Run Conductor Outer Diameter
29.3	Tee Conductor Outer Diameter



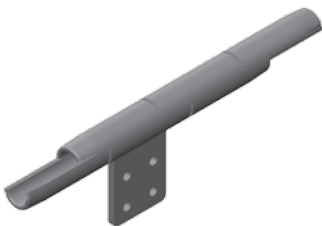
CRPCT

Compression Run Palm Tap (Closed)

Part Number	Conductor Ø (mm)	Palm No.
CRCTC-263-AS#	26.3	AS#

Part Number System

CRCTO	Compression Run Palm Tap (Closed)
26.3	Run Conductor Outer Diameter
AS#	Palm Type - e.g. AS1, AS2, AS3



CRPTO

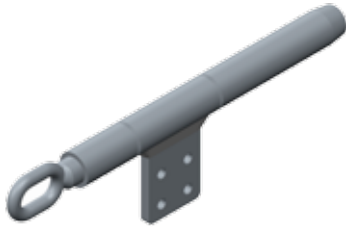
Compression Run Palm Tap (Open)

Part Number	Conductor Ø (mm)	Palm No.
CRCTO-263-AS#	26.3	AS#

Part Number System

CRCTO	Compression Run Palm Tap (Open)
26.3	Run Conductor Outer Diameter
AS#	Palm Type - e.g. AS1, AS2, AS3

Conductor Terminations



CDE

Compression Dead-ends (ACSR Conductors)

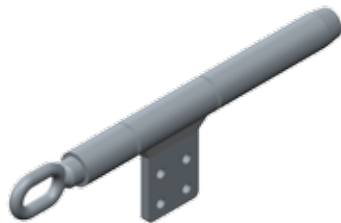
Part Number	Conductor Stranding	Outer Sleeve Die Size	Inner Sleeve Die Size	Palm #
CDE-113-1	6/2/3.75	18 A/F	18 A/F	-
CDE-125	12/7/2.50	28.50 A/F	16 A/F	AS4
CDE-143-1	6/4.75+7/1.60	21 A/F	9.5 A/F	AS4
CDE-146	7/4.39+7/1.93	22 A/F	9.5 A/F	AS4
CDE-159	26/2.54+7/1.90	28.50 A/F	11 A/F	AS4
CDE-165-1	30/7/0.093	28.50 A/F	14.2 A/F	AS4
CDE-175-1	30/7/2.50	28.5 A/F	16 A/F	AS4
CDE-181-1	30/7/2.59	34.50 A/F	16 A/F	AS4
CDE-195-1	30/7/2.79	34.50 A/F	16 A/F	AS4
CDE-199-1	26/3.14+7/2.44	34.50 A/F	16 A/F	AS4
CDE-210-1	30/7/3.00	34.50 A/F	17 A/F	AS4
CDE-219	26/3.45+7/2.68	34 A/F	19 A/F	-
CDE-224-1	30/7/3.20	34.50 A/F	19 A/F	AS4
CDE-235-1	30/7/0.132	40 A/F	19 A/F	-
CDE-236	26/3.71 7/2.89	40 A/F	19 A/F	-
CDE-245-1	30/7/3.50	40 A/F	19 A/F	AS4
CDE-250	48/3.00+7/2.33	34 A/F	17.3 A/F	-
CDE-260-1	30/7/3.71	40 A/F	19 A/F	AS4
CDE-270-1	54/7/3.50	44.50 A/F	17 A/F	AS5
CDE-271	45/3.38/7/2.25	44.50 A/F	17 A/F	AS5
CDE-286-1	54/7/3.18	41 A/F	19 A/F	AS5
CDE-293-1	54/7/3.25	44.50 A/F	19 A/F	AS5
CDE-300-1	54/7/3.35	44.50 A/F	19 A/F	AS5
CDE-308-1	4.50/3.85/7/2.57	44.50 A/F	19 A/F	AS5
CDE-315-1	54/7/3.50	47.50 A/F	19 A/F	AS5
CDE-318-1	54/7/3.53	47.50 A/F	19 A/F	AS5
CDE-324	42/2.72+19/2.59	47.50 A/F	26 A/F	AS5
CDE-338-1	54/3.75-19/2.25	47.50 A/F	20 A/F	AS5
CDE-362-1	54/4.02+19/2.41	50 A/F	20.5 A/F	AS5

Note: Confirm stranding when ordering.
Contact PLP for transverse palm.

CDEA

Compression Dead-ends (AAC Conductors)

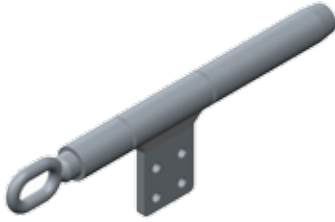
Please confirm stranding when ordering.



Part Number	Stranding	Palm No.	Outer Sleeve Die Size	Part Number System	
				CDEA	Compression Dead-end AAC
CDEA-163 -1	19/3.25	AS#4	28.5 A/F	163	Conductor Outer diameter
CDEA-175 -1	19/3.50	AS#4	28.8 A/F	-1	Standard
CDEA-188 -1	19/3.75	AS#4	34.5 A/F		
CDEA-210 -1	37/3.00	AS#4	34.5 A/F		
CDEA-238 -1	19/4.75	AS#4	40 A/F		
CDEA-293 -1	61/3.25	AS#5	44.5 A/F		
CDEA-338 -1	61/3.75	AS#5	47.5 A/F		



Conductor Terminations



CDEAAAC

Compression Dead-ends (AAAC Conductors)

Suits both 1120 and 6201 grade aluminium conductors.
Please confirm stranding when ordering.

Part Number	Stranding	Palm Number	Outer Sleeve Die Size
CDEAAAC-135 -1	7/4.50	AS# 4	21 A/F
CDEAAAC-163 -1	19/3.25	AS#4	28.5 A/F
CDEAAAC-188 -1	19/3.75	AS#4	30 A/F
CDEAAAC-210 -1	37/3.00	AS#4	34.5 A/F
CDEAAAC-238 -1	19/4.75	AS#4	40 A/F
CDEAAAC-263 -1	37/3.75	AS#4	40 A/F
CDEAAAC-270 -1	61/3.00	AS#5	40 A/F
CDEAAAC-293 -1	61/3.25	AS#5	44.5 A/F
CDEAAAC-315 -1	61/3.50	AS#5	48 A/F
CDEAAAC-338 -1	61/3.75	AS#5	47.5 A/F

Part Number System

CDEAAAC	Compression Dead-end AAAC
135	Conductor Outer diameter
-1	Standard

CDS

Compression Dead-ends - Eye Type (SC/GZ and SC/AC)

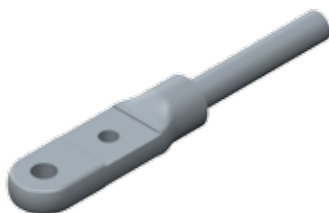


Part Number	Conductor Stranding	Die Size
CDS-083-1	7/2.75	17 A/F
CDS-090	4/3/3.00	17 A/F
CDS-098-1	7/3.25	17 A/F
CDS-105	19/2.00	19 A/F
CDS-113-2	7/3.75	19 A/F
CDS-120-1	7/4.00	19 A/F
CDS-128-2	7/4.25	19 A/F

Note: Made from 304 grade stainless steel incorporating an earth bonding point.

CDST

Compression Dead-ends - Tongue Type (SC/GZ and SC/AC)



Part Number	Conductor Stranding	Die Size
CDST-083	7/2.75	17 A/F
CDST-090	3/4/3.00	17 A/F
CDST-098	7/3.25	17 A/F
CDST-113	7/3.75	19 A/F
CDST-128	7/4.25	19 A/F

Note: Made from 304 grade stainless steel incorporating an earth bonding point.

Spacers



SPSD

Substation Parallel Spacer Double

Part Number	Conductor Ø (mm)	Conductor Centre Spacing (mm)
SPSD-240-#	24.0	#
SPSD-263-#	26.3	#
SPSD-293-338-#	293-338	#

Part Number System

SPSD	Substation Parallel Spacer Double
293	Conductor Outer diameter
#	Conductor Spacing – (070 or 125mm)

Example: SPSP-293-070



SPST

Substation Parallel Spacer Triple

Part Number	Conductor Ø (mm)	Conductor Centre Spacing (mm)
SPST-263-#	263	#
SPST-293-338-#	293-338	#

Part Number System

SPST	Substation Parallel Spacer Triple
315	Conductor Outer Diameter
#	Conductor Spacing (070 or 125mm)

Example: SPST-293-070



SPSQ

Substation Parallel Spacer Quad

Part Number	Conductor Ø (mm)	Conductor Centre Spacing (mm)
SPSQ-293-338-#	293-338	#

Part Number System

SPSQ	Substation Parallel Spacer Quad
ø	Conductor Outer diameter
#	Conductor spacing (070 or 125mm)

Example: SPSQ-293-070



SPB

Substation Parallel Spacer Bars

Part Number	Conductor Ø (mm)	Conductor Centre Spacing (mm)
SPB-263-#	263	200
SPB-293-#	293	150 & 200
SPB-315-#	315	380 & 460
SPB-338-#	338	180 & 200

Part Number System

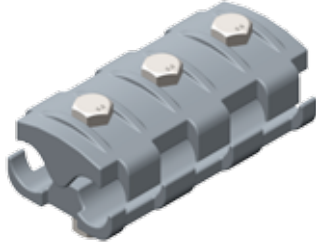
SPB	Spacer Bar
ø	Conductor Outer Diameter
#	Conductor Spacing

Note: Contact PLP for more available combinations

Bolted Connections

APG

Aluminium Parallel Groove (Clamp)

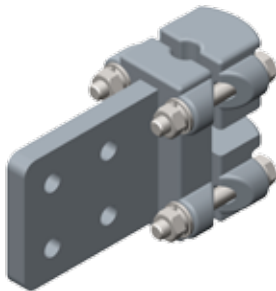


Many parallel groove clamps are available tin plated for use with copper conductor. Please contact PLP for your specific requirements.

Part Number	Clamp Diameters (mm)	Material
APG-135	5.25 - 13.5	Al
APG-188DG	8.0 - 19.0	Al
APG-188SG	9.0 - 19.0	Al
APG-263104-T	10.4 - 26.3	Tinned Al
APG-163105-T	10.5 - 16.3	Tinned Al
APG-210DG	12.0 - 22.0	Al
APG-315-315-2	16.3 - 33.8	Al
APG-263165-T	16.5 - 26.3	Tinned Al
APG-338165-T	16.5 - 33.8	Tinned Al
APG-238-238	22.0 - 24.0	Al
APG-293-293-1	27.0 - 30.0	Al
APG-315-338-1	31.5 - 33.8	Al

BRPT

Bolted Run Palm Tap



Many bolted tee fittings are designed as low current connections for instrument transformers or for high current/short duration such as surge arrestors. Current rating is dependent on palm or conductor size and customers are advised to request details of current rating for the selected fittings.

Part Number	Conductor Ø (mm)	Palm Type
BRPT-175-AS#	13.5-19.5	AS#
BRPT-210-AS#	19.6-24.0	AS#
BRPT-263-AS#	24.1-30.0	AS#
BRPT-338-AS#	30.1-35.0	AS#
BRPT-380-AS#	38.0	AS#
BRPT-396-AS#	39.6	AS#

Part Number System

BRPT	Bolted Run Palm Tap
175	Conductor Outer diameter
AS#	Palm Type E.g. AS1, AS2, AS3 etc...

Example: BRPT-163-AS5

BRPTT

Bolted Run Palm Tap Transverse



Part Number	Conductor Ø (mm)	Palm Type
BRPTT-175-AS#	13.5-19.5	AS#
BRPTT-210-AS#	19.6-24.0	AS#
BRPTT-263-AS#	24.1-30.0	AS#
BRPTT-338-AS#	30.1-35.0	AS#
BRPTT-380-AS#	38.0	AS#
BRPTT-396-AS#	39.6	AS#

Part Number System

BRPTT	Bolted Run Palm Tap Transverse
175	Conductor Outer diameter
AS#	Palm Type E.g. AS1, AS2, AS3 etc...

Example: BRPTT-163-AS5

Bolted Connections



BRCT

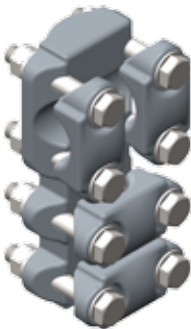
Bolted Run Compression Tee

Part Number	Bolted Run Conductor Ø Range (mm)	Tee Conductor Ø (mm)
BRCT#-143	#	14.3
BRCT#-165	#	16.5
BRCT#-175	#	17.5
BRCT#-188	#	18.8
BRCT#-193	#	19.3
BRCT#-210	#	21.0
BRCT#-235	#	23.5
BRCT#-238	#	23.8
BRCT#-245	#	24.5
BRCT#-252	#	25.2
BRCT#-254	#	25.4
BRCT#-260	#	26.0
BRCT#-263	#	26.3
BRCT#-270	#	27.0
BRCT#-286	#	28.6
BRCT#-293	#	29.3
BRCT#-315	#	31.5
BRCT#-338	#	33.8

Part Number System

BRCT	Bolted Run Compression Tee
#	Bolted Run Conductor Diameter
Insert one of the following:	
	175 (13.5 - 19.5)
	210 (19.6 - 24.1)
	263 (24.1 - 30.0)
	315 (30.1 - 35.0)

Example: BRCT-175-143



BRBT

Bolted Run Bolted Tee

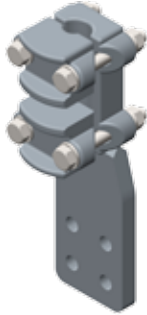
Bolted run bolted tee fittings are designed to connect stranded conductors.

Part Number	Run - Conductor Outer Ø Range (mm)	Tee - Conductor Outer Ø Range (mm)
BRBT-135195-135195	13.5 - 19.5	13.5 - 19.5
BRBT-135195-196240		19.6 - 24.0
BRBT-135195-241300		24.1 - 30.0
BRBT-135195-301350		30.1 - 35.0
BRBT-196240-135195	19.6 - 24.0	13.5 - 19.5
BRBT-196240-196240		19.6 - 24.0
BRBT-196240-241300		24.1 - 30.0
BRBT-196240-301350		30.1 - 35.0
BRBT-241300-135195	24.1 - 30.0	13.5 - 19.5
BRBT-241300-196240		19.6 - 24.0
BRBT-241300-241300		24.1 - 30.0
BRBT-241300-301350		30.1 - 35.0
BRBT-301350-135195	30.1 - 35.0	13.5 - 19.5
BRBT-301350-196240		19.6 - 24.0
BRBT-301350-241300		24.1 - 30.0
BRBT-301350-301350		30.1 - 35.0

Part Number System

BRBT	Bolted Run Bolted Tee
210	Run Conductor Outer Diameter Range
210	Tee Conductor Outer Diameter Rang

Bolted Connections



BRTL

Bolted Run Terminal Lug

Part Number	Conductor Ø Range (mm)	Palm Type
BRTL-175-AS#	13.5-19.5	AS#
BRTL-238-AS#	19.6 -24.1	AS#
BRTL-263-AS#	24.1 - 30.0	AS#
BRTL-315-AS#	30.1 - 35.0	AS#

Part Number System

BRTL	Bolted Run Terminal Lug
175	Conductor Outer Diameter Range
AS#	Palm Type E.g. AS1, AS2 etc...

Example: BRTL-175-AS5



BRBS

Bolted Run Bolted Stem

Pin type bolted fittings are designed to be as through connections to equipment bushings and pins and are not designed to carry high current loads. Tin plating is available as an option where connection onto copper occurs.

Part Number	Conductor Ø Bolted Run (mm)	Bolted Stem ID (mm)
BRBS-143-25	13.5-19.5	25.0
BRBS-163-26	13.5-19.5	26.0
BRBS-210-30	19.6-24.0	30.0
BRBS-315-30	30.1-35.0	30.0

Part Number System

BRBS	Bolted Run Bolted Stem
143	Run - Conductor Outer Diameter
25	Stem Diameter



DCRPT

Double Conductor Run Palm Tap

Part Number	Conductor Ø Bolted Run (mm)	Palm Type
DCRPT-210-AS#	19.6 - 24.0	AS#
DCRPT-263-AS#	24.1 - 30.0	AS#
DCRPT-338-AS#	30.1 - 35.0	AS#

Part Number System

DCRPT	Double Conductor Run Palm Tap
210	Run - Conductor Outer Diameter
AS#	Palm Type E.g. AS1, AS2 etc...

Example: DCRPT-210-AS5

Bolted Connections



DCRPTT

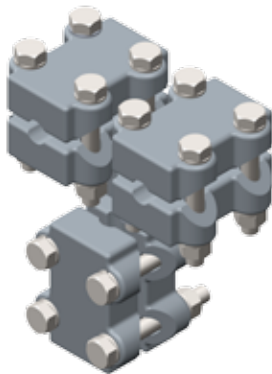
Double Conductor Run Palm Tap Transverse

Part Number	Conductor Ø Bolted Run (mm)	Palm Type
DCRPTT-210-AS#	19.6 - 24.0	AS#
DCRPTT-263-AS#	24.1 - 30.0	AS#
DCRPTT-338-AS#	30.1 - 35.0	AS#

Part Number System

DCRPTT	Double Conductor Run Palm Tap Transverse
210	Run - Conductor Outer Diameter
AS#	Palm Type E.g. AS1, AS2 etc...

Example: DCRPT-210-AS5



DCRBT

Double Conductor Run Bolted Tee

Part Number	Bolted Run Ø Range (mm)	Conductor Ø Bolted Tee (mm)
DCRBT-210-210	19.6 - 24.0	19..6 - 24.0
DCRBT-338-338	30.1 - 35.0	30.1 - 35.0

Part Number System

DCRBT	Double Conductor Run Bolted Tee
210	Run - Conductor Outer Diameter
210	Tee - Conductor Outer Diameter



DCRBS

Double Conductor Run Bolted Stem

Pin type bolted fittings are designed to be as through connections to equipment bushings and pins and are not designed to carry high current loads. Tin plating is available as an option where connection onto copper occurs.

Part Number	Bolted Run Ø Range (mm)	Bolted Stem ID (mm)
DCRBS-315-30-1	30.1 - 35.0	30

Part Number System

DCRBS	Double Conductor Run Bolted Stem
315	Run - Conductor Outer Diameter
30	Stem - Diameter

Bolted Connections

D-T

Tee Connector Busbar to Conductor (Type T Copper)

A heavy duty tube-to-conductor tee connector. The adjustable tap takes a large range of conductors which may be clamped before attaching to tubular bus.

Materials: High copper content alloy casting. Stainless steel U-bolts, bolts, spring washers and nuts.

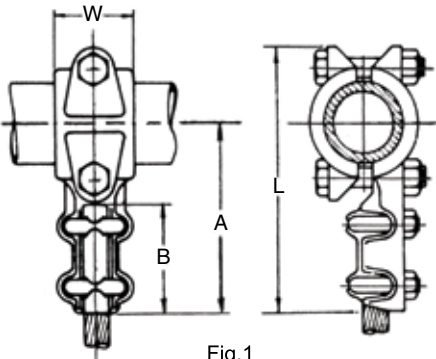


Fig.1

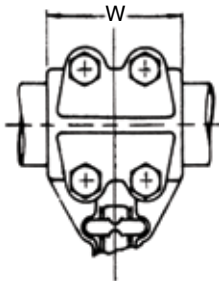


Fig.2

Part Number	O.D. Tube (mm)	Conductor Range		Fig. No.	Dimensions (mm)			
		Area (mm) ²	O.D. (mm)		A	B	L	W
D-T10	19.1	25 - 95	6.42 - 12.46	1	81	51	106	35
D-T15	19.1	35 - 95	7.65 - 12.60	1	90	60	117	35
D-T20	25.4	25 - 95	6.42 - 12.46	1	84	50	113	35
D-T25	25.4	35 - 95	7.65 - 12.60	1	92	60	121	35
D-T30	25.4	70 - 150	10.70 - 15.75	1	106	70	142	44
D-T31C	25.4	150 - 240	15.75 - 20.25	2	110	80	140	60
D-T33	30.2	70 - 150	10.70 - 15.75	1	106	70	140	44
D-T35	31.8	35 - 95	7.65 - 12.60	1	103	60	142	51
D-T40	31.8	70 - 150	10.70 - 15.75	1	110	70	146	51
D-T45	31.8	150 - 240	15.75 - 20.25	1	117	76	156	51
D-T46	31.8	240 - 400	20.25 - 25.65	2	121	83	156	70
D-T48	34.1	70 - 150	10.70 - 15.75	1	110	73	148	51
D-T50	38.1	35 - 95	7.65 - 12.60	1	106	60	146	51
D-T55	38.1	70 - 150	10.70 - 15.75	1	113	70	152	51
D-T55C	38.1	70 - 150	10.70 - 15.75	2	111	70	148	76
D-T60	38.1	150 - 240	15.75 - 20.25	1	119	76	159	51
D-T64	40.0	630 - 800	32.76 - 37.05	2	146	102	192	80
D-T65	50.8	35 - 95	7.65 - 12.60	1	111	60	156	51
D-T69	48.4	70 - 150	10.70 - 15.75	1	118	70	164	51
D-T70	50.8	70 - 150	10.70 - 15.75	1	121	70	168	51
D-T75	50.8	150 - 240	15.75 - 20.25	1	127	76	175	51
D-T77	60.3	70 - 150	10.70 - 15.75	1	130	70	187	57
D-T80	76.2	35 - 95	7.65 - 12.60	1	127	60	191	57
D-T85	76.2	70 - 150	10.70 - 15.75	1	137	70	200	57
D-T90	76.2	150 - 240	15.75 - 20.25	1	140	76	206	57
D-T105	88.9	150 - 240	15.75 - 20.25	1	151	80	222	64

Note: For current rating of parts on this page, contact PLP direct.

Bolted Connections



D-E

End Connector Busbar to Conductor (Type E Copper)

A heavy duty tube-to-conductor end connector. The adjustable tap takes a large range of conductors which may be clamped before attaching to tubular bus.

Materials: High copper content alloy casting with stainless steel bolts, U-bolts, washers and nuts.

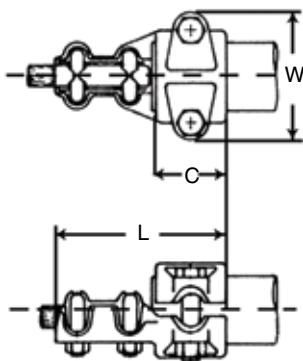


Fig.1

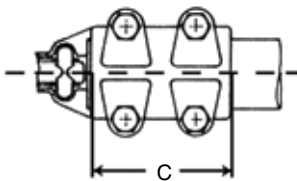


Fig.2

Part Number	O.D. Tube Run (mm)	Conductor Range		Fig. No.	Dimensions (mm)		
		Area (mm ²)	O.D. (mm)		C	L	W
D-E5	12.7	16 - 95	5.10 - 12.60	1	31.7	86.5	42.9
D-E10	19.1	25 - 95	6.42 - 12.60	1	35.0	88.9	52.4
D-E15	19.1	35 - 95	7.65 - 12.60	1	35.0	98.4	52.4
D-E17	22.2	25 - 95	6.42 - 12.60	1	35.0	88.9	54.0
D-E20	25.4	25 - 95	6.42 - 12.60	1	35.0	88.9	58.8
D-E25	25.4	35 - 95	7.65 - 12.60	1	35.0	98.4	58.8
D-E30	25.4	70 - 150	10.70 - 15.75	1	44.5	117.5	68.2
D-E31C	25.4	150 - 240	15.75 - 20.25	2	60.3	141.3	58.8
D-E32C	25.4	500 - 630	28.80 - 33.80	2	76.2	190.5	73.0
D-E33C	30.0	70 - 150	10.70 - 15.75	2	63.5	139.7	47.6
D-E35	31.8	35 - 95	7.65 - 12.60	1	50.8	117.5	76.2
D-E40	31.8	70 - 150	10.70 - 15.75	1	50.8	127.0	76.2
D-E45	31.8	150 - 240	15.75 - 20.25	1	50.8	136.5	76.2
D-E46	31.8	240 - 400	20.25 - 25.65	2	76.2	168.3	69.9
D-E50	38.1	35 - 95	7.65 - 12.60	1	50.8	117.5	81.0
D-E55	38.1	70 - 150	10.70 - 15.75	1	50.8	123.9	81.0
D-E55C	38.1	70 - 150	10.70 - 15.75	2	76.2	149.3	76.2
D-E60C	38.1	150 - 240	15.75 - 20.25	2	76.2	155.6	76.2
D-E65	50.8	35 - 95	7.65 - 12.60	1	50.8	117.5	95.3
D-E70	50.8	70 - 150	10.70 - 15.75	1	50.8	127.0	95.3
D-E75	50.8	150 - 240	15.75 - 20.25	1	50.8	130.1	95.3
D-E80	76.2	35 - 95	7.65 - 12.60	1	57.1	108.0	127.0
D-E85	76.2	70 - 150	10.70 - 15.75	1	57.1	127.0	127.0
D-E90	76.2	150 - 240	15.75 - 20.25	1	57.1	142.8	127.0

Note: For current rating of parts on this page, contact PLP direct.

Bolted Connections



D-AT

Aluminium Tee Connector Busbar to Conductor (Type AT)

A heavy duty tube-to-cable tee connector. The adjustable tap takes a large range of cables which may be clamped before attaching to tubular bus.

Materials: Cast aluminium alloy body, stainless steel bolts, U-bolts, washers and nuts.

Part Number	O.D. Tube (mm)	Range for Aluminium & Cu Cond.	
		(mm ²)	Dia. Range
D-AT2550	25.4	35 - 95	7.65 - 12.46
D-AT1065	25.4	70 - 150	10.70 - 15.75
D-AT10102	25.4	240 - 400	20.25 - 25.65
D-AT301521	30.0	175 - 345	15.00 - 21.00
D-AT3034	30.0	500 - 630	28.80 - 33.80
D-AT1350	31.8	35 - 95	7.65 - 12.46
D-AT1465	34.9	70 - 150	10.70 - 15.75
D-AT14837	34.9	150 - 240	15.75 - 20.25
D-AT1550	38.1	35 - 95	7.65 - 12.46
D-AT15837	38.1	150 - 240	15.75 - 20.25
D-AT15102	38.1	240 - 400	20.25 - 25.65
D-AT50102	50.0	240 - 400	20.25 - 25.65
D-AT2065	50.8	70 - 150	10.70 - 15.75
D-AT2365	57.2	70 - 150	10.70 - 15.75
D-AT2465	60.3	70 - 150	10.70 - 15.75
D-AT24102	60.3	240 - 400	20.25 - 25.65
D-AT3065	76.2	70 - 150	10.70 - 15.75
D-AT80837	80.0	150 - 240	15.75 - 20.25
D-AT80102	80.0	240 - 400	20.25 - 25.65
D-AT3565	88.9	70 - 150	10.70 - 15.75
D-AT35837	88.9	150 - 240	15.75 - 20.25
D-AT351339	88.9	500 - 630	28.80 - 32.76
D-AT100837	100.0	150 - 240	15.75 - 20.25
D-AT100102	100.0	240 - 400	20.25 - 25.65

Note: For current rating of parts on this page, contact PLP direct.

Bolted Connections



D-AE

Aluminium End Connector Busbar to Conductor (Type AE)

A heavy duty tube-to-conductor end connector. The adjustable tap takes a large range of conductors which may be clamped before attaching to tubular bus.

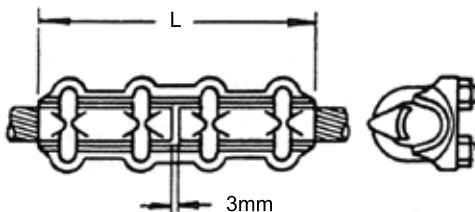
Materials: Cast aluminium alloy body, stainless steel bolts, U-bolts, washers and nuts.

Part Number	O.D. Tube (mm)	Range for Aluminium & Cu Cond.	
		(mm ²)	Dia. Range
D-AE1065	25.4	70 - 150	10.70 - 15.75
D-AE1265	30.2		
D-AE1365	31.8		
D-AE1565	38.1		
D-AE3065	76.2		
D-AE12102	30.2	240 - 400	20.25 - 25.65
D-AE13102	31.8		
D-AE14102	34.9		
D-AE15102	38.1		
D-AE80M837	80.0		
D-AE80M102	80.0	240 - 400	20.25 - 25.65
D-AE10837	25.4		
D-AE60837	60.0	150 - 240	15.75 - 20.25
D-AE15117	38.1	400 - 500	25.65 - 28.80
D-AE35837	88.9	150 - 240	15.75 - 20.25
D-AE2550	25.4	35 - 95	7.65 - 12.46

D-SC

Straight Connector Conductor to Conductor (Type SC Copper)

Suitable for sub-station applications which require rugged and vibration proof connections. The longitudinal wave cast in both connector base and clamping bar assures high pull-out strength. Connectors are supplied with stainless steel U-bolts and nuts.



Part Number	Conductor Range				Dim. L (mm)
	Conductor 1		Conductor 2		
	Area (mm ²)	O.D.	Area (mm ²)	O.D.	
D-SC1	16 - 35	5.10 - 7.65	16 - 35	5.10 - 7.65	79
D-SC2	25	6.42	25	6.75	105
D-SC3	35 - 95	7.65 - 12.46	35 - 95	7.65 - 12.60	127
D-SC4	70 - 150	10.70 - 15.75	25	6.75	127
D-SC5	70 - 150	10.70 - 15.75	70 - 150	10.70 - 15.75	143
D-SC7	150 - 240	15.75 - 20.25	25	6.75	149
D-SC8	150 - 240	15.75 - 20.25	70 - 150	10.70 - 15.75	149
D-SC9	150 - 240	15.75 - 20.25	150 - 240	15.75 - 20.25	156

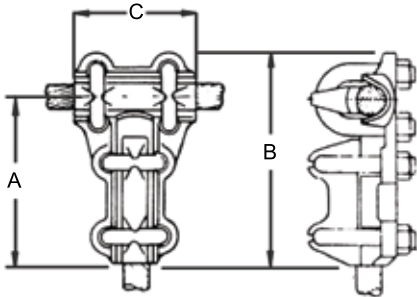
Note: For current rating of parts on this page, contact PLP direct.

Bolted Connections

D-ATC

Aluminium Tee Connector Conductor to Conductor (Type ATC)

A high strength aluminium alloy tee connector for all aluminium and SCA run and tap conductors. U-bolts and nuts are stainless steel.



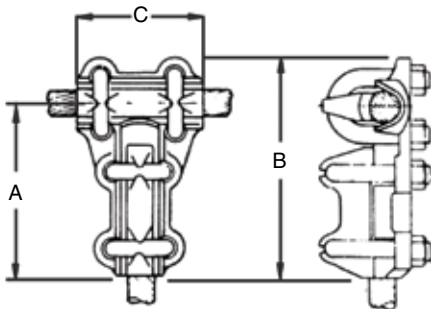
Part Number	Conductor Range OD (mm)		Dimensions (mm)		
	Run	Tap	A	B	C
D-ATC2	6.17 - 11.35	6.17 - 11.35	71	94	51
D-ATC5	10.20 - 16.30	10.20 - 16.30	92	116	70
D-ATC8	16.30 - 21.00	10.20 - 16.30	111	137	83
D-ATC9	16.30 - 21.00	16.30 - 21.00	110	136	83
D-ATC10	21.00 - 26.50	16.30 - 21.00	119	156	89
D-ATC12	21.00 - 26.50	21.00 - 26.50	127	165	89
D-ATC13	25.40 - 22.80	16.30 - 21.00	116	157	102
D-ATC15	25.40 - 33.80	25.40 - 33.80	130	170	89

Note: For current rating of parts on this page, contact PLP direct.

D-TC

Tee Connector Conductor to Conductor (Type TC Copper)

Designed for substation applications such as strain buses, suspension of long droppers and for making important tee-off connections which require rugged and vibration-proof connectors. The longitudinal wave cast in both the connector base and clamping bar assures high pull-out strength. Connectors are supplied with stainless steel U-bolts, and nuts.



Part Number	Conductor Range				Dimensions (mm)		
	Run		Tap		A	B	C
	Area (mm ²)	O.D.	Area (mm ²)	O.D.			
D-TC1	16 - 35	5.10 - 7.65	10 - 35	5.10 - 7.65	60	79	38
D-TC2	25 - 70	6.42 - 10.70	25 - 70	6.42 - 10.70	70	90	51
D-TC3	35 - 95	7.65 - 12.60	35 - 95	7.65 - 12.60	83	103	60
D-TC4	70 - 150	10.70 - 15.75	25 - 70	6.42 - 10.70	75	98	70
D-TC5	70 - 150	10.70 - 15.75	70 - 150	10.70 - 15.75	92	116	70
D-TC6	70 - 150	10.70 - 15.75	150 - 240	15.75 - 20.25	95	122	70
D-TC7	150 - 240	15.75 - 20.25	25 - 70	6.42 - 10.70	76	105	76
D-TC8	150 - 240	15.75 - 20.25	70 - 150	10.70 - 15.75	95	122	76
D-TC9	150 - 240	15.75 - 20.25	150 - 240	15.75 - 20.25	102	127	76
D-TC12	240 - 400	20.25 - 25.65	240 - 400	20.25 - 25.65	121	156	83
D-TC20	500 - 630	28.80 - 32.76	500 - 630	28.80 - 33.80	140	178	102

Bolted Connections

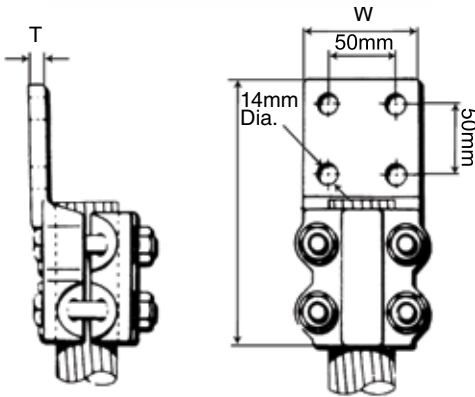


D-AN

Aluminium Terminal Lug Conductor to Palm (Types AN & AN-B22)

A clamp-type aluminium alloy terminal which accommodates a broad range of aluminium, copper and SCA conductors. Type AN75 is normally supplied with blank palm. 1 or 2 bolt drilling can be supplied to customers' specifications.

Type AN93-B22 through AN134-B22 has four 14mm holes drilled at 50mm centres. Other drilling on request. Heads of bolts are captured to permit single spanner installation. Suitable for use on copper or aluminium terminal pads when installed with Alminox. Standard hardware is stainless steel.

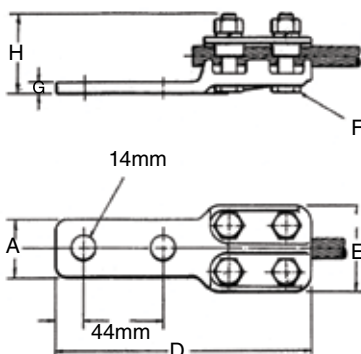


Part Number	Conductor Range OD (mm)		Dimensions (mm)			No. of Holes
	Area (mm ²)	O.D.	A	B	C	
D-AN75	35 - 185	7.65 - 17.64	149	44	85	-
D-AN93B22	150 - 300	15.75 - 22.68	171	83	89	4
D-AN113B22	300 - 500	22.68 - 28.80	179	83	96	4
D-AN134B22	500 - 630	28.80 - 33.80	188	83	95	4

D-NT

Terminal Lug Conductor to Palm (Type NT Copper)

The type NT terminal lug is designed for use with imported switchgear having the NEMA standard terminal drilling. Castings are of high copper content alloy. Bolts, nuts and spring washers are stainless steel.



Part Number	Conductor Range		Dimensions (mm)					
	Area (mm ²)	O.D.	A	D	E	F	G	H
D-NT1	6.17 - 11.35	5.10 - 10.70	32	129	49	M10	6	40
D-NT2	10.20 - 16.30	10.70 - 15.75	38	129	56	M10	8	46
D-NT3	16.30 - 21.00	15.75 - 20.25	44	146	62	M10	10	52
D-NT4	16.30 - 21.00	20.25 - 25.65	54	152	76	M12	13	59
D-NT5	21.00 - 26.50	25.65 - 33.80	64	159	83	M12	13	65

Note: For current rating of parts on this page, contact PLP direct.



Bolted Connections



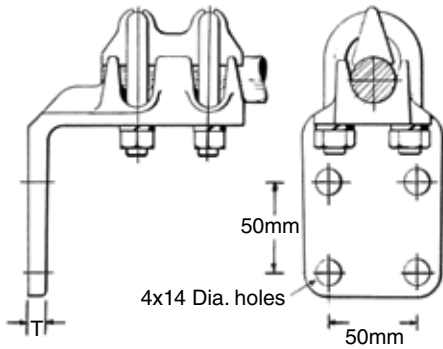
D-TL

Right Angle Terminal Lug Conductor to Palm (Type TL_C Copper & ATL_C Aluminium)

For use when terminating conductors at right angles to switchgear terminal plates. Castings are in high copper content alloy. U-bolts, nuts and spring washers are stainless steel.

Part Number	Conductor Range		Dimensions (mm)
	Area (mm ²)	O.D.	A
D-TL3C22	70 - 150	10.70 - 15.75	8
D-TL4C22	150 - 240	15.75 - 20.25	10
D-TL7C22	500 - 630	28.80 - 33.80	11

Note: To order in aluminium, add prefix 'A' to part number. For current rating of parts on this page, contact PLP direct.



Bolted Connections

D-TL

Terminal Lug Conductor to Palm (Type TL Copper & ATL Aluminium)



A high compression lug particularly suited to connections subject to vibration and strain. The longitudinal wave case of both lug and clamping bar assures high pullout strength. Supplied with stainless steel hardware.

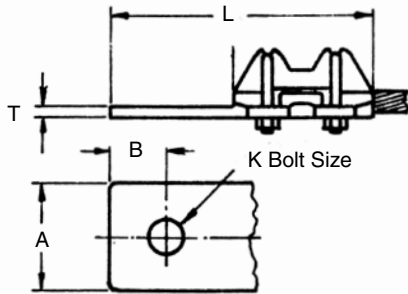


Fig.1

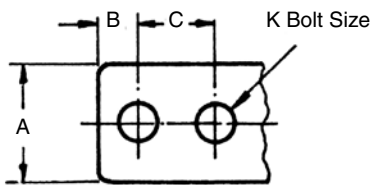


Fig.2

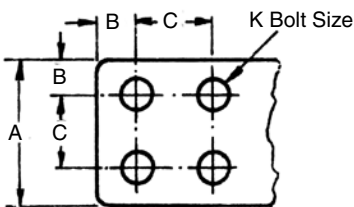


Fig.3

Part Number	Conductor Range		Fig. No.	Dimensions (mm)					
	Area (mm ²)	O.D. (mm)		A	B	C	K	T	L
D-TL0	16 - 35	5.10 - 7.65	1	25	13	-	M10	6	67
D-TL0 2B1	16 - 35	5.10 - 7.65	1	50	25	-	M10	7	92
D-TL0 187	16 - 35	5.10 - 7.65	2	25	13	48	M10	7	113
D-TL1	25 - 70	6.75 - 10.70	2	32	13	29	M10	6	105
D-TL2	35 - 95	7.65 - 12.60	2	32	13	29	M10	8	117
D-TL2 150	35 - 95	7.65 - 12.60	2	32	16	38	M10	9	137
D-TL2 187	35 - 95	7.65 - 12.60	2	32	13	48	M10	9	137
D-TL2 200	35 - 95	7.65 - 12.60	2	32	16	50	M12	9	149
D-TL2 B1	35 - 95	7.65 - 12.60	1	44	22	---	M20	9	108
D-TL3	70 - 150	10.70 - 15.75	2	35	16	38	M12	10	140
D-TL3 B22	70 - 150	10.70 - 15.75	3	79	14	50	M12	8	160
D-TL3 187	70 - 150	10.70 - 15.75	2	35	16	48	M12	10	149
D-TL3 2B1	70 - 150	10.70 - 15.75	1	50	25	---	M10	9	127
D-TL3 B4	70 - 150	10.70 - 15.75	3	64	13	38	M10	7	137
D-TL3 B22C	70 - 150	10.70 - 15.75	3	102	25	50	M12	14	181
D-TL4	150 - 240	15.75 - 20.25	2	38	16	38	M12	10	146
D-TL4 B22	150 - 240	15.75 - 20.25	3	83	16	50	M12	10	165
D-TL4 187	150 - 240	15.75 - 20.25	2	38	16	48	M12	10	156
D-TL4 B4	150 - 240	15.75 - 20.25	3	64	13	38	M10	8	140
D-TL4 B5	150 - 240	15.75 - 20.25	3	76	13	50	M10	7	159
D-TL5	240 - 400	20.25 - 25.65	2	41	16	38	M12	13	156
D-TL5 B22	240 - 400	20.25 - 25.65	3	83	16	50	M12	10	173
D-TL5 187	240 - 400	20.25 - 25.65	2	41	16	48	M12	13	165
D-TL5 B4	240 - 400	20.25 - 25.65	3	76	19	38	M10	9	165
D-TL5 B5	240 - 400	20.25 - 25.65	3	76	13	50	M10	9	165
D-TL6	400 - 500	25.65 - 28.80	2	48	19	38	M12	14	165
D-TL6 B22	400 - 500	25.65 - 28.80	3	83	16	50	M12	9	176
D-TL7	500 - 630	28.80 - 32.76	2	48	19	38	M12	16	178
D-TL7 B22	500 - 630	28.80 - 32.76	3	83	16	50	M12	11	187
D-TL7 B4	500 - 630	28.80 - 32.76	3	76	19	38	M10	10	184
D-TL7 B5	500 - 630	28.8 - 32.76	3	76	13	50	M10	10	184

Note: To order in aluminium, add prefix 'A' to part number. For current rating of parts on this page, contact PLP direct.

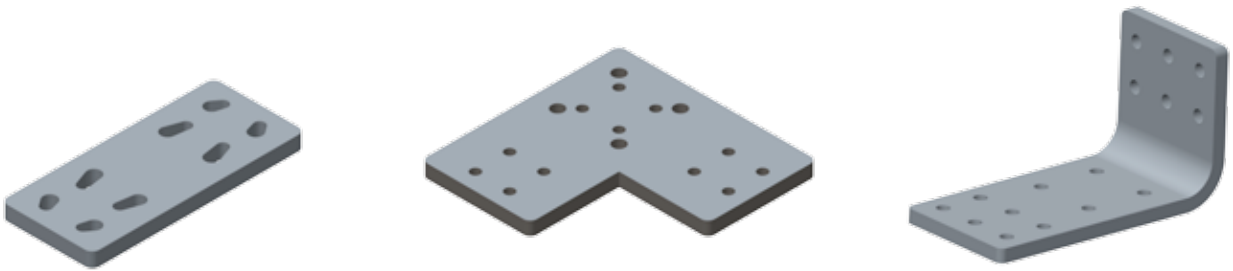


Adaptor Plates

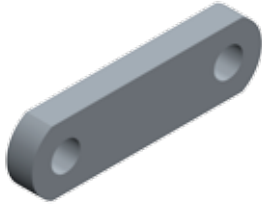
AAP

Aluminium Adaptor Plate

Adaptor plates are designed to be used on equipment, post insulators and other custom application within a switch yard and are manufactured to suit. Adaptor plates are generally made from 5000 or 6000 series aluminium with Australian standard palm configurations. Please contact PLP with required dimensions and specific needs.



Overhead & Landing Span Fittings



LSP

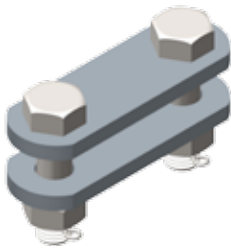
Link (Single Plate) Galvanised Steel

Part Number	Rating kN	Hole Separation (mm)
LSP-070-#	70	#
LSP-120-#	120	#
LSP-160-#	160	#
LSP-210-#	210	#
LSP-270-#	270	#

Part Number System

LSP	Link Single Plate
070	Link Plate Rating (070, 120, 160 available)
#	Hole Separation (100, 150, 200, 250, 300, 350)

Example: LSP-070-100



L

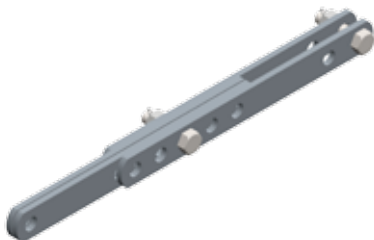
Link (Double Plate) Galvanised Steel

Part Number	Rating (kN)	Hole Separation (mm)
L-070-#	70	#
L-120-#	120	#
L-160-#	160	#
L-210-#	210	#

Part Number System

L	Link Single Plate
070	Link Plate Rating (070, 120, 160 available)
#	Hole Separation (100, 150, 200, 250, 300, 350)

Example: L-070-100



CTSL

Clevis Tongue Sag Link Galvanised Steel

Part Number	Rating (kN)	Hole Ø (mm)	Range (mm)	
			Minimum	Maximum
CTSL-070-1	70	18	556	974
CTSL-120	120	18	565	870
CTSL-160-1	160	22	535	735
CTSL-210-1	210	22	535	735

Part Number System

CTSL	Clevis Tongue Sag Link
070	Sag Link Rating (070, 120, 160 available)



Overhead & Landing Span Fittings



MTL

Maintenance Tension Link Galvanised Steel

Part Number	Tension Rating (kN)	Hole Centre Spacing (mm)
MTL-160-4	160	60



YPT

Yoke Plate Triangular Galvanised Steel

Part Number	Tension Rating (kN)	Hole Centre Spacing (mm)
YPT-070-#	70	#
YPT-120-#	120	#
YPT-160-#	160	#
YPT-210-#	210	#

Part Number System

YPT	Yoke Plate Triangular
070	Yoke Plate Rating (070, 120, 160 available)
#	Hole Separation (070, 100, 125, 150, 200, 250, 380, 460 available)

Example: YPT-070-100



YPR

Yoke Plate Rectangular Galvanised Steel

Part Number	Tension Rating (kN)	Hole Centre Spacing (mm)
YPR-070-#	70	#
YPR-120-#	120	#
YPR-160-#	160	#

Part Number System

YPR	Yoke Plate Rectangular
070	Yoke Plate Rating (070, 120, 160 available)
#	Hole Separation (070, 100, 125, 150, 200, 250, 380, 460 available)

Example: YPR-070-100

Overhead & Landing Span Fittings

BE

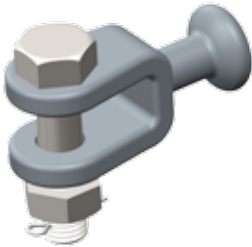
Ball Eye Galvanised Steel



Part Number	Tension Rating (kN)	Ball Size (mm)
BE-070-1	70	16
BE-120	120	20
BE-160	160	20

BC

Ball Clevis Galvanised Steel



Part Number	Tension Rating (kN)	Bolt Size (mm)
BC-070-1	70	M16
BC-120-1	120	M16
BC-160-3	160	M20

ET

Eye Tongue Galvanised Steel



Part Number	Tension Rating (kN)
ET-070-1	70
ET-120-1	120
ET-160-1	160

TET

Twisted Eye Tongue Galvanised Steel



Part Number	Tension Rating (kN)
TET-070	70
TET-120-1	120
TET-160-1	160

Overhead & Landing Span Fittings

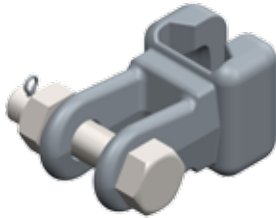


SB

Socket Ball Galvanised Steel

- Available with 'W' or 'R' type security clips
- Used with deep skirt 'Fog' Insulators

Part Number	Tension Rating (kN)	Socket Size (mm)	Ball Size (mm)
SB-070-1	70	16	16
SB-120-3	120	20	20
SB-160-4	160	20	20



SC

Socket Clevis Galvanised Steel

Available with 'W' or 'R' type security clips.

Part Number	Tension Rating (kN)	Socket Size (mm)	Bolt Size (mm)
SC-070-1	70	16	M16
SC-120-1	120	16	M16
SC-160-1	160	20	M20



TST

Twisted Socket Tongue Galvanised Steel or Cast Iron

Available with 'W' or 'R' type security clips.

Part Number	Tension Rating (kN)	Bolt Size (mm)
TST-070-1	70	M16
TST-120-1	120	M16
TST-160-1	160	M20



TC

Tongue Clevis Galvanised Forged Steel

Part Number	Tension Rating (kN)	Bolt Size (mm)
TC-070-1	70	M16
TC-120-1	120	M16

Overhead & Landing Span Fittings



TCT

Twisted Clevis Tongue Galvanised Forged Steel

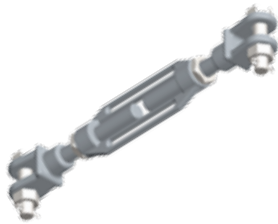
Part Number	Tension Rating (kN)	Bolt Size (mm)
TCT-070-1	70	M16
TCT-160-1	160	M20



S

Shackle Galvanised forged Steel

Part Number	Tension Rating (kN)	Bolt Size (mm)
S-070-1	70	M16
S-120-1	120	M16
S-160-1	160	M20



TBCC

Turnbuckles - Clevis/Clevis Galvanised Forged Steel

Part Number	Rating (kN)	Bolt Size (mm)	Range (mm)	
			Minimum	Maximum
TBCC-070-1	70	M16	350	480
TBCC-160-1	160	M20	480	600



TBCT

Turnbuckles - Clevis/Tongue Galvanised forged Steel

Part Number	Rating (kN)	Bolt Size (mm)	Range (mm)	
			Minimum	Maximum
TBCT-070-1	70	M16	350	480
TBCT-160-1	160	M20	480	600



Overhead & Landing Span Fittings



TBEC

Turnbuckles - Eye/Clevis Galvanised forged Steel

Part Number	Rating (kN)	Bolt Size (mm)	Range (mm)	
			Minimum	Maximum
TBEC-070-1	70	M16	350	480
TBEC-160-1	160	M20	480	600



TBEE

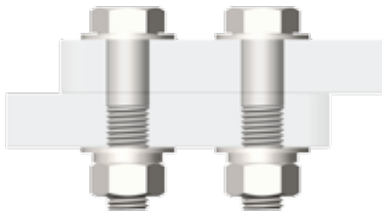
Turnbuckles - Eye/Eye Galvanised Forged Steel

Part Number	Rating (kN)	Range (mm)	
		Minimum	Maximum
TBEE-070-1	70	350	480
TBEE-160-1	160	480	600

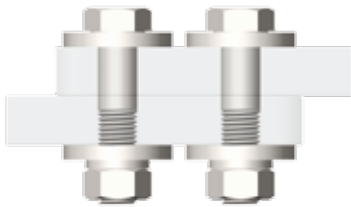
Overhead & Landing Span Fittings

Fasteners

Galvanised & Stainless Steel Assemblies



Assembly D



Assembly E



Assembly F

Part Number (Galvanised)	Part Number (Stainless Steel)	Assembly Type	Metric Type
GHBA-12050D-8.8	SHBA-12050D-S/S	D (1 BOLT, 1 NUT, 1 SPRING WASHER, 2 FLAT WASHERS)	M12
GHBA-12060D-8.8	SHBA-12060D-S/S		
GHBA-12070D-8.8	SHBA-12070D-S/S		
GHBA-12080D-8.8	SHBA-12080D-S/S		
GHBA-12090D-8.8	SHBA-12090D-S/S	E (1 BOLT, 1 NUT, 1 SPRING WASHER, 2 HEAVY DUTY WASHERS)	
GHBA-12050E-8.8	SHBA-12050E-S/S		
GHBA-12060E-8.8	SHBA-12060E-S/S		
GHBA-12070E-8.8	SHBA-12070E-S/S		
GHBA-12080E-8.8	SHBA-12080E-S/S		
GHBA-12090E-8.8	SHBA-12090E-S/S	F (1 BOLT, 1 NYLOC NUT, 1 SPRING WASHER, 2 HEAVY DUTY FLAT WASHER)	
	SHBA-12050F-S/S		
	SHBA-12060F-S/S		
	SHBA-12070F-S/S		
	SHBA-12080F-S/S		
	SHBA-12090F-S/S	D (1 BOLT, 1 NUT, 1 SPRING WASHER, 2 FLAT WASHERS)	M16
GHBA-16050D-8.8	SHBA-16050D-S/S		
GHBA-16060D-8.8	SHBA-16060D-S/S		
GHBA-16070D-8.8	SHBA-16070D-S/S		
GHBA-16080D-8.8	SHBA-16080D-S/S		
GHBA-16090D-8.8	SHBA-16090D-S/S		
GHBA-16050E-8.8	SHBA-16050E-S/S	E (1 BOLT, 1 NUT, 1 SPRING WASHER, 2 HEAVY DUTY WASHERS)	
GHBA-16060E-8.8	SHBA-16060E-S/S		
GHBA-16070E-8.8	SHBA-16070E-S/S		
GHBA-16080E-8.8	SHBA-16080E-S/S		
GHBA-16090E-8.8	SHBA-16090E-S/S		
	SHBA-16050F-S/S	F (1 BOLT, 1 NYLOC NUT, 1 SPRING WASHER, 2 HEAVY DUTY FLAT WASHER)	
	SHBA-16060F-S/S		
	SHBA-16070F-S/S		
	SHBA-16080F-S/S		
	SHBA-16090F-S/S		

To minimise the risk of 'galling' or cold welding that occurs with stainless fasteners, PLP does two things.

1. Threads are lubricated with black graphite grease. Care should be taken to ensure this is not wiped completely off during handling.
2. By using different stainless alloy grades for the bolt and the nut galling can be reduced. The key is the mating of materials that have different hardness. By using 316 nuts and 304 bolts, there is less chance of galling than if the two are the same alloy grade. This is because the different alloys work-harden at different rates and so cold welding is minimised.

SSLP

Stainless Steel Locking Plates (GR 304)



Part Number	Hole Centres (mm)	Length (mm)	Width (mm)	Hole Diameter (mm)
SSLP-25-44-3	44	82	25	14
SSLP-25-50-3	50	90	25	14
SSLP-30-60-3	60	114	30	18



Conductors

PLP imports a full range of AAC, AAAC-1120, ACSR, aluminium clad steel (SC/AC), and Optical Fibre Ground Wire (OPGW) for overhead transmission, and distribution power lines and substation. A range of commonly used conductors are stocked in Sydney in full length drums. PLP provides a de-coiling service for the supply of less than drum lengths. Conductor is manufactured to Australian Standard and/or IEC and supplied with Factory Acceptance Test reports as is required by these Standards.

Type AAC 1350 – All Aluminum Conductor

AS 1531-1991

Part Number	Conductor Code	Stranding and Wire Diameter (No/mm)	Nominal Overall Diameter (mm)	Cross Sectional Area (mm ²)	Approx. Mass (kg/km)	Breaking Load (kN)	Modulus of Elasticity (GPa)	Coefficient of Linear Expansion (x10 ⁻⁶ /oC)	DC Resistance (Ω/km)
AAC-7/2.50	Leo	7/2.50	7.50	34.36	94.3	5.71	65	23.0	0.833
AAC-7/2.75	Leonids	7/2.75	8.25	41.58	113	6.72	65	23.0	0.689
AAC-7/3.00	Libra	7/3.00	9.00	49.48	135	7.98	65	23.0	0.579
AAC-7/3.75	Mars	7/3.75	11.30	77.28	211	11.8	65	23.0	0.370
AAC-7/4.50	Mercury	7/4.50	13.50	111.30	304	16.9	65	23.0	0.258
AAC-7/4.75	Moon	7/4.75	14.30	124.00	339	18.9	65	23.0	0.232
AAC-19/3.25	Neptune	19/3.25	16.30	157.60	433	24.7	65	23.0	0.183
AAC-19/3.50	Orion	19/3.50	17.50	182.80	503	28.7	65	23.0	0.157
AAC-19/3.75	Pluto	19/3.75	18.80	209.80	576	31.9	65	23.0	0.137
AAC-37/3.00*	Saturn	37/3.00	21.00	261.60	721	42.2	64	23.0	0.110
AAC-37/3.25	Sirius	37/3.25	22.80	307.00	845	48.2	64	23.0	0.094
AAC-19/4.75	Taurus	19/4.75	23.80	336.70	924	51.3	65	23.0	0.0857
AAC-37/3.75*	Triton	37/3.75	26.30	408.50	1120	62.2	64	23.0	0.0706
AAC-61/3.25*	Uranus	61/3.25	29.30	506.10	1400	75.2	64	23.0	0.0573
AAC-61/3.50	Ursula	61/3.50	31.50	586.90	1620	87.3	64	23.0	0.0493
AAC-61/3.75*	Venus	61/3.75	33.80	673.40	1860	97.2	64	23.0	0.0429

* Represents conductors held in stock at PLP Australia. Stocked conductors can be supplied to required length. All remaining conductors have a minimum order quantity of 1000 metres. Please contact PLP Australia for more details

Conductors

Type AAAC 1120 – All Aluminum Alloy Conductor

AS 1531-1991

Part Number	Conductor Code	Stranding and Wire Diameter (No/mm)	Nominal Overall Diameter (mm)	Cross Sectional Area (mm ²)	Approx. Mass (kg/km)	Breaking Load (kN)	Modulus of Elasticity (GPa)	Coefficient of Linear Expansion (x10 ⁻⁶ /oC)	DC Resistance (Ω/km)
AAAC/1120 - 7/2.50	Chlorine	7/2.50	7.50	34.36	94.3	8.18	65	23.0	0.864
AAAC/1120 - 7/2.75	Chromium	7/2.75	8.25	41.58	113	9.91	65	23.0	0.713
AAAC/1120 - 7/3.00	Fluorine	7/3.00	9.00	49.48	135	11.8	65	23.0	0.599
AAAC/1120 - 7/3.75	Helium	7/3.75	11.30	77.28	211	17.6	65	23.0	0.383
AAAC/1120 - 7/4.50	Hydrogen	7/4.50	13.50	111.30	304	24.3	65	23.0	0.266
AAAC/1120 - 7/4.75	Iodine	7/4.75	14.30	124.00	339	27.1	65	23.0	0.239
AAAC/1120 - 19/3.25	Krypton	19/3.25	16.30	157.60	433	37.4	65	23.0	0.189
AAAC/1120 - 19/3.50	Lutetium	19/3.50	17.50	182.80	503	41.7	65	23.0	0.163
AAAC/1120 - 19/3.75*	Neon	19/3.75	18.80	209.80	576	47.8	65	23.0	0.142
AAAC/1120 - 37/3.00	Nitrogen	37/3.00	21.00	261.60	721	62.2	64	23.0	0.114
AAAC/1120 - 37/3.25	Nobelium	37/3.25	22.80	307.00	845	72.8	64	23.0	0.0973
AAAC/1120 - 19/4.75	Oxygen	19/4.75	23.80	336.70	924	73.6	65	23.0	0.0884
AAAC/1120 - 37/3.75*	Phosphorus	37/3.75	26.30	408.50	1120	93.1	64	23.0	0.0731
AAAC/1120 - 61/3.25	Selenium	61/3.25	29.30	506.10	1400	114	64	23.0	0.0592
AAAC/1120 - 61/3.50	Silicon	61/3.50	31.50	586.90	1620	127	64	23.0	0.0511
AAAC/1120 - 61/3.75*	Sulphur	61/3.75	33.80	673.40	1860	145	64	23.0	0.0444

Type ACSR-GZ 1350

AS 3607-1989

Part Number	Conductor Code	Stranding and Wire Diameter		Nominal Overall Diameter (mm)	Cross Sectional Area (mm ²)	Approx. Mass (kg/km)	Breaking Load (kN)	Modulus of Elasticity (GPa)	Coefficient of Linear Expansion (x10 ⁻⁶ /oC)	DC Resistance (Ω/km)
		Aluminum (No/mm)	Steel (No/mm)							
ACSR - 61/2.50	Almond	6/2.50	1/2.50	7.5	34.36	119	10.5	83	19.3	0.975
ACSR - 61/2.75	Apricot	6/2.75	1/2.75	8.3	41.58	144	12.6	83	19.3	0.805
ACSR - 61/3.00	Apple	6/3.00	1/3.00	9.0	49.48	171	14.9	83	19.3	0.677
ACSR - 61/3.75	Banana	6/3.75	1/3.75	11.3	77.31	268	22.7	83	19.3	0.433
ACSR - 6/4.75 /7/1.60	Cherry	6/4.75	7/1.60	14.3	120.4	402	33.4	80	19.9	0.271
ACSR - 30/7/2.50	Grape	30/2.50	7/2.50	17.5	181.6	677	63.5	88	18.4	0.196
ACSR - 30/7/3.00	Lemon	30/3.00	7/3.00	21.0	261.5	973	90.4	88	18.4	0.136
ACSR - 30/7/3.25	Lychee	30/3.25	7/3.25	22.8	306.9	1140	105	88	18.4	0.116
ACSR - 30/7/3.50	Lime	30/3.50	7/3.50	24.5	356.0	1320	122	88	18.4	0.100
ACSR - 54/7/3.00	Mango	54/3.00	7/3.00	27.0	431.2	1440	119	78	19.9	0.0758
ACSR - 54/7/3.25	Orange	54/3.25	7/3.25	29.3	506.0	1690	137	78	19.9	0.0646
ACSR - 54/7/3.50	Olive	54/3.50	7/3.50	31.5	586.9	1960	159	78	19.9	0.0557
ACSR - 54/3.719/2.25	Pawpaw	54/3.75	19/2.25	33.8	672.0	2240	178	77	20.0	0.0485
ACSR - 3/4/2.50	Rasin	3/2.50	4/2.50	7.5	34.36	195	24.4	136	13.9	1.59
ACSR - 4/3/3.00	Sultana	4/3.00	3/3.00	9.0	49.48	243	28.3	119	15.2	0.897
ACSR - 4/3/3.75	Walnut	4/3.75	3/3.75	11.3	77.31	380	43.9	119	15.2	0.573

* Represents conductors held in stock at PLP Australia. Stocked conductors can be supplied to required length. All remaining conductors have a minimum order quantity of 1000 metres. Please contact PLP Australia for more details



POWERFORMED[®]
Substation Systems



PPF LINE PRODUCTS
The connection you can count on.

Section 4 - Protection & Earthing

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Corona Protection

GRS

Grading Rings

Corona/grading rings are designed to reduce electrical stresses on busbar fittings and overhead and landing span fittings. Manufactured inhouse from extruded aluminium tube, corona rings can be designed to customer requirements. Please contact PLP with required dimensions and specific needs.



Earthing

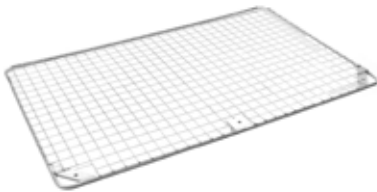


ESB

Earth Stub Brass

Earthing stubs are made from high purity brass, able to carry fault currents up to 40kA for 0.5 seconds or equivalent and suitable for connection of earthing devices onto structures.

Part Number	Description
ESB-95213	Earth Stub Brass - M16 Tap
ESB-M12-1	Earth Stub Brass - M12 Tap Stainless steel bolt included

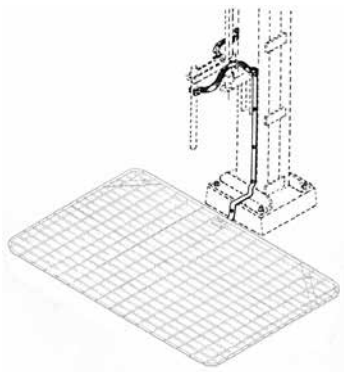


EARTHMAT

Earth Mats

Galvanised Steel Earth Mats can be either permanently installed and attached to the earthing system where maintenance is required. Various sizes are available as described below.

Part Number	Dimensions L x W (mm)
EARTHMAT-1	2500 x 1200
EARTHMAT-2	2500 x 1000
EARTHMAT-3	1500 x 1000
EARTHMAT-A	2400 x 1200
D-EARTHMAT	1500 x 900
EARTHMAT-C	600 x 450
D-KITY	Switching Kit to D-EARTHMAT



D-KITY



Earth Rods & Accessories



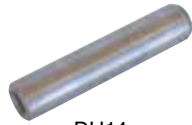
Extendable Earth Rods

Taperlock Coupled Type CTE Copper Clad (Sheathed)

Type CTE earth rods are among the simplest to use. They have identical taper ends and are joined by a one-piece tapered coupling which locks upon driving. These rods may be driven by hand or machine.

Part Number	Length (mm)	Description
D-DHT15	-	13mm hand driving head (average driving)
D-DHT15	-	15mm hand driving head (average driving)
D-DHTU25	-	15mm hand driving head (hard driving)
D-CTE1312	1200	13mm earth rods (10 pack)
D-CTE1314	1440	13mm earth rods (10 pack)
D-CTE1318	1800	13mm earth rods (5 pack)
D-CTE1324	2400	13mm earth rods (5 pack)
D-CTE1330	3000	13mm earth rods (5 pack)
D-CTE1512	1200	15mm earth rods (10 pack)
D-CTE1514	1440	15mm earth rods (5 pack)
D-CTE1518	1800	15mm earth rods (5 pack)
D-CTE1524	2400	15mm earth rods (5 pack)
D-CTE1530	3000	15mm earth rods (5 pack)
D-CCT13	-	13mm coupling
D-CCT15	-	15mm coupling
D-DPT13	-	13mm driving point
D-SDP13T	-	13mm driving point
D-DPT15	-	15mm driving point
D-SDP15T	-	15mm driving point

Earth Rods & Accessories



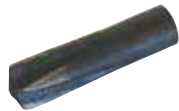
DH14

SDE
Tapered End

SCT13



DP12



SDP12T

Tapered Earth Rods

Taperlock Coupled Type STE Stainless Steel Clad (Sheathed)

Type STE earth rods are among the simplest to use. They have identical taper ends and are joined by a one-piece tapered coupling which locks upon driving. These rods may be driven by hand or machine.

Part Number	Length (mm)	Description
D-DHT15	-	13mm hand driving head (average driving)
D-DHT15	-	14mm hand driving head (average driving)
D-STE1312	1200	13mm earth rods (10 pack)
D-STE1314	1440	13mm earth rods (10 pack)
D-STE1318	1800	13mm earth rods (5 pack)
D-STE1324	2400	13mm earth rods (5 pack)
D-STE1330	3000	13mm earth rods (5 pack)
D-STE1412	1200	15mm earth rods (10 pack)
D-STE1415	1440	15mm earth rods (5 pack)
D-STE1418	1800	15mm earth rods (5 pack)
D-STE1424	2400	15mm earth rods (5 pack)
D-STE1430	3000	15mm earth rods (5 pack)
D-SCT13	-	13mm coupling
D-SCT15	-	14mm coupling
D-DPT12	-	13mm coupling (average driving)
D-SDP12T	-	13mm coupling (hard driving)
D-DPT15	-	14mm coupling (average driving)
D-SDP15T	-	14mm coupling (hard driving)



Earth Rods & Accessories



DH15

CCE1314
Swaged End

CCA13

DP13

SDP13

Extendable Deep Driving Rods

Flush Jointed Series Type CCE - Copper Clad (Sheathed)

These deep driving flush-jointed electrodes have identical swaged ends to take driving points and coupling pins. They may be either hand or machine driven.

Part Number	Length (mm)	Description
D-DH15	-	13mm hand driving head (average driving)
D-DH15	-	15mm hand driving head (average driving)
D-CCE1312	1200	13mm earth rods (10 pack)
D-CCE1314	1440	13mm earth rods (10 pack)
D-CCE1318	1800	13mm earth rods (5 pack)
D-CCE1324	2400	13mm earth rods (5 pack)
D-CCE1330	3000	13mm earth rods (5 pack)
D-CCE1512	1200	15mm earth rods (10 pack)
D-CCE1514	1440	15mm earth rods (5 pack)
D-CCE1518	1800	15mm earth rods (5 pack)
D-CCE1524	2400	15mm earth rods (5 pack)
D-CCE1530	3000	15mm earth rods (5 pack)
D-CCA13	-	13mm coupling
D-CCA15	-	15mm coupling
D-DP13	-	13mm driving point (average driving)
D-SDP13	-	13mm driving point (hard driving)
D-DP15	-	15mm driving point (average driving)
D-SDP15	-	15mm driving point (hard driving)

Earth Rods & Accessories



DH14

SDE
Machined End

C14L

DP14

SDP14D

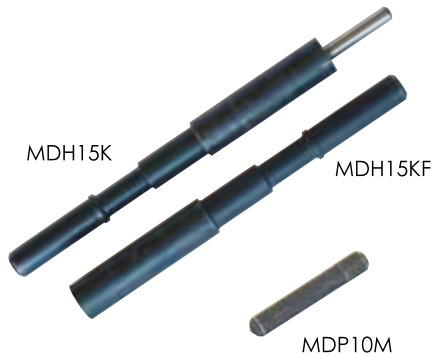
Extendable Earthing Rods

Expansion Jointed - Type SDE (Telstra) Stainless Steel Clad (Sheathed)

Telstra designed and approved earth rod featuring corrosion resistant stainless steel clad rods, extendable in 1440mm lengths. The coupling system comprises of a stainless steel sleeve and hardened steel pin having a raised convolution at the midpoint. A secure and non-detachable joint is achieved by means of the pins convolute expanding and deforming the ends of the rod into the coupling sleeve as the rods are driven together.

Part Number	Length (mm)	Description
D-DH14	-	14mm hand driving head (average driving)
D-SDE1412K	1200	14mm earth rod (10 pack)
D-SDE1414L	1440	14mm earth rod (10 pack)
D-C14L	-	14mm coupling
D-DP14	-	14mm driving point (average driving)
D-SDP14D	-	14mm driving point (hard driving)

Earth Rods & Accessories



Earth Rod Driving Accessories

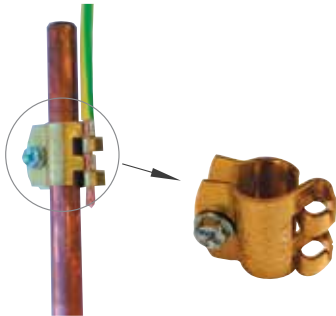
For Kango tool/machine only

Part Number	Description
D-MDH15K	For tapered end extendable rods (CTE & STE)
D-MDH15KF	For flush jointed extendable rods (CCE)
D-MDP10M	Machine Driving Pin (for use with the above tools)

Non-extendable Earth Rods (Domestic)

Copper Clad (Sheathed)

Dulmison manufacture a broad range of non-extendable earth rods. Each rod incorporates an integral driving point, machined (not ground) to preserve the strength and rigidity of cold-drawn steel. The flat tip was developed for penetrating all types of soil.



Part Number	Description
D-CNE1314	Domestic earth rods (10 pack)
D-EC13D	Earth clip - Suitable for cables in the range 4 - 25mm ² (10 pack)

Non-Extendable Earth Rods - Heavy Duty Series (Industrial) Type LGR - Copper Clad (Sheathed)

Clamp Types EP; ET; GB and FSC provide a copper to copper connection, either in parallel or right angle mode, accommodating single, two & three conductors.



Part Number	Length (mm)	Pack Qty
D-LGR1918	1800	5
D-LGR1920	2000	3
D-LGR1924	2400	3
D-LGR1930	3000	3
D-LGR1936	3600	3
D-LGR1945	4500	3

Earth Rods & Accessories



Earthing Bond

For Commercial Earthing Installations

The earthing bond system provides an earth connection welded to the steel reinforcement, thus offering a virtually indestructible, stable and low resistance path to earth soil. Please enquire about other sizes available.

Part Number	Description
D-C70	Bonding Cable: 70mm ² 1 sec Short Current Rating: 5kA Weldable Lug Dia: 12mm Terminal Thread: M10 Thread Depth: 20mm Cable Length: 3m
D-C95	Bonding Cable: 95mm ² 1 sec Short Current Rating: 8kA Lug Dia: 16mm Terminal Thread: M10 Thread Depth: 20mm Cable Length: 3m
D-C120	Bonding Cable: 120mm ² 1 sec Short Current Rating: 10kA Lug Dia: 20mm Terminal Thread: M10 Thread Depth: 20mm Cable Length: 3m

Heavy Duty Earthing Connector

Type CEC

- High strength, high conductivity connection
- Shake-proof, permanent and corrosion resistant
- High fault current capacity
- Versatile: covers wide variety of single or multi-earthing applications including grid systems
- Two profiles - '6' and 'C' - cover a wide variety of applications

Profile 6



Profile 6 Part Number	Open Sec.	Tap Off Dia. (mm)	Conductor Cross Sec. mm ²	Die Set	Pack Qty
D-CEC15035	Conductors 50 - 120mm ² or Earth rods 13 - 15mm diameter	8.4	25 - 40	DU1315	5
D-CEC15070		11	50 - 70	DU1315	3
D-CEC15120		15	95 - 120	DU1315	3
D-CEC15150		16.5	120 - 150	DU1315	3

Profile C



Profile C Part Number	Die Set	Conductor Combination mm ²	Pack Qty
D-CEC070	DUOT	70 - 35 50 - 50 70 - 50 70 - 70	50
D-CEC095	DU1315	70 - 95 95 - 95	50

Earth Rods & Accessories

Earth Rod Clamps

Types GB & EL



This clamp is designed for either parallel or right angle connections.

Material: High copper content alloy, with stainless steel U bolt, spring washers and nuts.

Part Number	Conductor Range		Diameter of Electrode (mm)
	mm ²	Dia. (mm)	
D-GB1	16 - 35	5.10 - 7.65	13 - 19
D-GB2	50 - 120	8.90 - 14.21	13 - 19
D-GB3	150 - 185	15.75 - 17.64	13 - 19
D-EL21090	35 - 120	7.65 - 14.21	12 - 15

Earth Rod Clamps

Types EP & ET For Multi-Conductor Earthing

For two earth conductors parallel to rod, or two or three earth conductors at right angles to rod.

Materials: Body - high copper content alloy; Hardware - stainless steel.



Type EP



Type ET



Type EP3

Part Number	O.D. Ground Rod (mm)	Conductor Range		Fig No.	No. Of Conductor
		mm ²	Dia (mm)		
		Multiple Conductor Installations			
D-EPO1	14-16	16 - 35	5.10 - 7.65	1	1
D-EP1	17-19	16 - 120	5.10 - 14.21	1	1
D-EP3	17-19	16 - 35	5.10 - 7.65	2	2
D-EP4	17-19	50 - 120	8.90 - 14.21	2	2
D-ET1	17-19	16 - 35	5.10 - 7.65	3	2
D-ET2	17-19	50 - 120	8.90 - 14.21	3	2
D-ET4	17-19	50 - 120	8.90 - 14.21	4	3

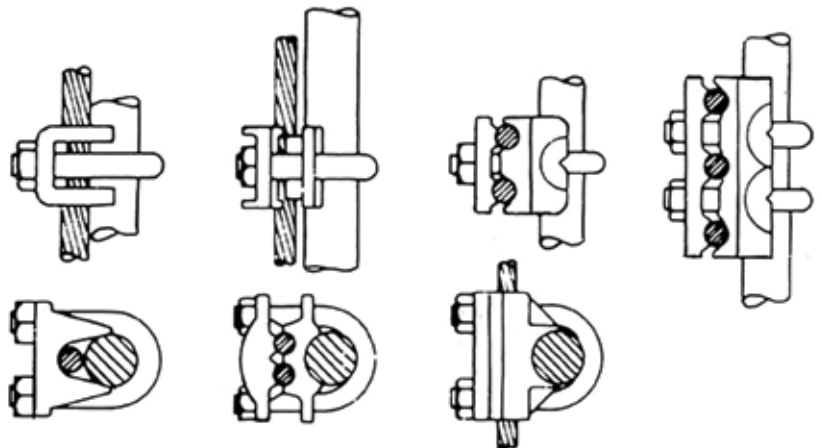


Fig.1

Fig.2

Fig.3

Fig.4

Earth Rods & Accessories



Earth Rod Clamps

Type GP For Connecting Up To 3 Conductors To Galvanised Pipe

This clamp makes all connections parallel to the pipe.

Materials: Clamp body - high copper content alloy.

Hardware: Comprising U-bolts, washers and nuts - stainless steel.

Part Number	BS Pipe Series		Conductor Range		Fig. No.	No. of Cond	A	B	C	U-bolt Dia.
	OD of Pipe	Nom. Bore	mm ²	Dia. (mm)						
D-GP01	26	19.00	16 - 35	5.10 - 7.65	1	1	57	32	71	M10
D-GP1	34	25.40	16 - 35	5.10 - 7.65	1	1	65	32	86	M10
D-GP3					2	2	76	32	86	
D-GP5					3	3	95	38	86	
D-GP7	43	32.00	16 - 35	5.10 - 7.65	1	1	73	32	95	M10
D-GP9					2	2	81	32	95	
D-GP11					3	3	103	38	95	
D-GP13	48	38	16 - 35	5.10 - 7.65	1	1	80	32	102	M10
D-GP15					2	2	80	32	102	
D-GP19	60	51.00	16 - 35	5.10 - 7.65	1	1	100	32	124	M12
D-GP21					2	2	100	32	124	
D-GP23					4	3	100	38	124	
D-GP02	26	19.00	50 - 120	8.90 - 14.21	1	1	57	32	71	M10
D-GP2	34	25.40	50 - 120	8.90 - 14.21	1	1	65	32	86	M10
D-GP4					2	2	76	32	86	
D-GP6					3	3	95	38	86	
D-GP8	43	32.00	50 - 120	8.90 - 14.21	1	1	73	32	95	M10
D-GP10					2	2	81	32	95	
D-GP12					3	3	103	38	95	
D-GP14	48	38.00	50 - 120	8.90 - 14.21	1	1	80	32	102	M10
D-GP16					2	2	80	38	102	
D-GP20	60	51.00	50 - 120	8.90 - 14.21	1	1	100	32	124	M12
D-GP22					2	2	100	32	124	
D-GP24					4	3	100	38	124	

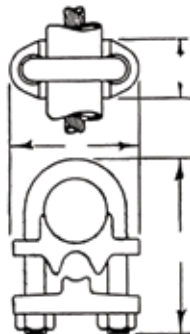


Fig.1

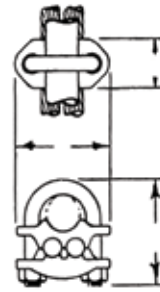


Fig.2

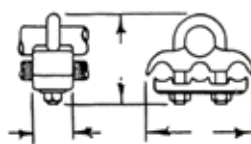


Fig.3

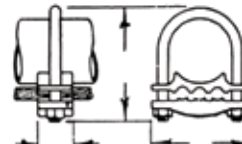


Fig.4

Earth Rods & Accessories

Earth Rod Clamps

Type FSC For Earth To Flat Bar



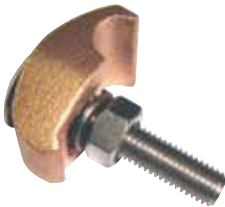
For connecting copper earthing strip at right angles or parallel to the earthing electrode.

Material: High strength copper casting; stainless steel U-bolt, nuts and spring washers.

Part Number	Earth Rod Dia. (mm)
D-FSC4	13 - 14
D-FSC5	15 - 16
D-FSC6	17 - 19

Earth Rod Clamps

Type GF For Conductor To Flat Bar



For clamping earth cable to flat metal. Needs only one spanner as head of bolt has square shank to prevent turning. Standard bolt grips 6mm bar.

Material: Cast copper alloy body accommodates range of cable sizes; stainless steel bolt, nut and spring washer.

Part Number	Conductor Range	
	mm ²	Dia. (mm)
D-GF42	16 - 70	5.10 - 10.70
D-GF58	70 - 135	10.70 - 15.25

Earth Rod Clamps

Single Conductor - Parallel



CLAMP210



GRC5

Simple and robust, these pinch and U-Bolt type clamps have a vee groove embodied in the casting to accommodate the earthing cable.

Material: Bodies are made from a high copper content alloy.



EP1

Part Number	Rod Dia. (mm)	Conductor Range	
		mm ²	Dia. (mm)
D-GRC5	13 - 15	10 - 35	4.05 - 7.65
D-CLAMP210	13 - 15	16 - 120	5.10 - 14.21
D-EP1	17 - 19	16 - 120	5.10 - 14.21

Earth Rods & Accessories



Earthing Enhancement Compounds

Features: Stable, high conductivity providing long term low ground resistance. High expansion, low shrink characteristics. Non-toxic, non-corrosive.

Installation: Apply as a dry mix or pourable slurry. Dry mix will yield a volume of approximately 0.0176m³ (roughly 57 bags to the cubic metre). Slurry will yield a volume of approximately 0.030m³ when mixed with 20 to 25 litres of water (roughly 33 bags to the cubic metre).

Packaging: 20kg non-tear, plastic lined bags.

Part Number	Composition	Standard
D-EARTHFIL	Bentonite, Gypsum, Sodium Sulphate	Conforms to AS2239
D-EARTHRITE	Bentonite, Gypsum, Sodium Sulphate	N/A
D-EARTH5050	Bentonite, Gypsum	Conforms to AS2239



ERB1

Connection Boxes

Boxes ERB1 and ERB3 feature hinged inspection lids & cable entry holes on the sides. Both boxes provide ample space for conductors and clamps.

Part Number
D-ERB1
D-ERB3



ERB3

Portable Earth

Earth Heads



Available in the following formats

LLC13 - 32mm Brass Ring

LLC13S - Tee Spindle - 6mm

LLC13H - Insulated Moulded Handle

- Aluminium Alloy Body - Stainless steel spindle
- Accepts conductors - 5 up to 35mm Diameter
- 2 bolt lug attachment - M10
- Short time current rating - min 40kA for 1 sec



Available in the following formats

LLC14A - Blank Spindle

LLC14R3 - 32mm Brass Ring

LLC14T - Tee Spindle - 6mm

LLC14H - Insulated Moulded Handle

- Aluminium Alloy Body - Stainless steel spindle
- Accepts conductors - 5 up to 40mm Diameter
- Also accepts Busbar in two orientations, Horizontal - 40 x 35mm & Vertical - 7 x 50mm
- Single lug attachment hole - M12
- Short time current rating - min 31.5kA for 1 sec



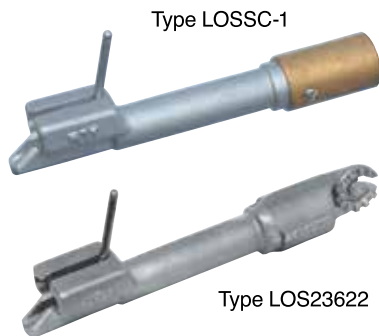
Available in the following formats

L4A202W - Tee Spindle - 3mm

L4A202WP - Blank Spindle

- Cast Gunmetal Body - Tin Plated - Stainless steel spindle
- Accepts conductors and busbars - 10 up to 50mm Diameter
- Spring tensioned main jaw - constant force
- Single lug attachment hole - M12
- Short time current rating - min 37.3kA for 0.5 sec

Portable Earth



Operating Heads Sprung Loaded

Earthing stick accessories are utilised, for the temporary attachment of Earth clamps, pulling fuses and carriers, as well as disconnecting dropout fuses. Accessories are typically either clamped or screwed onto earth sticks, as shown on prior pages in this section. Compatibility is as indicated.

- Cast Aluminium Body
- Stainless Steel operating hook to capture brass ring on earth clamp
- Spring loaded for positive alignment
- Captures the 32mm Brass Ring on all types of earth clamps

Part Number	Connection Type	Suits Stick No/s
D-LOSSC-1	Screw - Female - 5/8" UNF	Type FOS#-1 & Type FXS#-1
D-LOS23622	Universal	Type FOS#-1A & FXS#-1A



Earthing Leads

Due to the nature and variety of lead sizes, lugs and end configurations, it is not possible to list the available products in this catalogue. An inquiry sheet is located on page 4-17 which allows you to specify both the earth clamps and stick requirements, as well as the lead lengths and end attachment options. Earth leads are generally designed to meet short time current rating requirements unless specified otherwise.

Portable Earth



TYPE FOS6-1



TYPE FOS6-2



TYPE FOS6-1A



TYPE FXS6-1



TYPE FEHX-2



TYPE FEX6-1A

Insulated Earthing Sticks

A comprehensive range of insulated earthing sticks are available, for both permanent attachment or temporary removable attachment, to all types of earthing clamps.

Where a permanent attachment is required to create a rigid earthing stick assembly or 3 phase earthing set, the earth clamps are pinned or screwed to attaching fixtures to join the insulated stick to the earthing head. Where there is a need to temporarily connect an earth stick to an earth clamp, a series of standard earth sticks and attachment devices are available. All Earth sticks are provided with warning labels which include recommended voltage rating clearances, and handling warning. All Earth sticks are rated at 100kV per foot (300mm).

TYPE FOS6-1: One piece sticks - All fitted with rubber end boots

Part Number	Length (mm)	End Connection Type
D-FOS4-1	1220	Screw - Male - 5/8" UNF
D-FOS6-1	1830	Screw - Male - 5/8" UNF
D-FOS8-1	2440	Screw - Male - 5/8" UNF
D-FOS10-1	3050	Screw - Male - 5/8" UNF
D-FOS11-1	3350	Screw - Male - 5/8" UNF
D-FOS12-1	3660	Screw - Male - 5/8" UNF

TYPE FOS6-2

Part Number	Length (mm)	End Connection Type
D-FOS4-2	1220	Bayonet - Male
D-FOS6-2	1830	Bayonet - Male
D-FOS8-2	2440	Bayonet - Male

TYPE FOS6-1A

Part Number	Length (mm)	End Connection Type
D_FOS6-1A9	900	Universal
D-FOS6-1A	1830	Universal

TYPE FXS6-1: Extension Sticks - To be used with one piece sticks

Part Number	Length (mm)	End Connection Type
D-FXS4-1	1220	Screw - Male - 5/8" UNF
D-FXS6-1	1830	Screw - Male - 5/8" UNF
D-FXS8-1	2440	Screw - Male - 5/8" UNF
D-FXS10-1	3050	Screw - Male - 5/8" UNF
D-FXS12-1	3660	Screw - Male - 5/8" UNF

TYPE FEHX-2

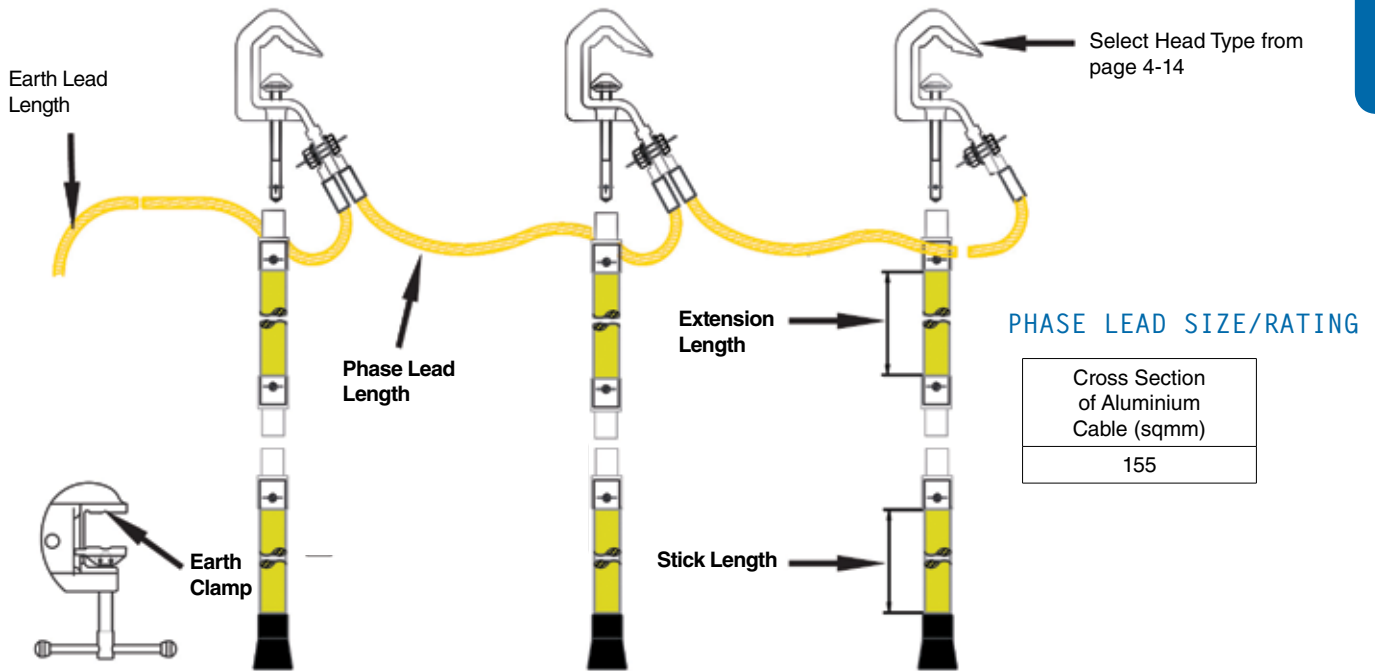
Part Number	Length (mm)	End Connection Type
FEHX-2	300	LV Fuse Extractor - Pigtail
FXSX6A	1830	LV Fuse Extractor - Pigtail

TYPE FXS6-1A

Part Number	Length (mm)	End Connection Type
FXS6-1B9	900	Universal
FXS6-1A	1830	Universal

Portable Earth

Earth Selection Guide



New Configurations

For a new Earth-set configuration, simply fill in the part number description below.

Part Number Description								
Phase	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>					
Head Type	<input type="text"/> Select Head Type from page 4-14							
Phase Lead Length (m)	1 <input type="checkbox"/>	2 <input type="checkbox"/>	3 <input type="checkbox"/>	4 <input type="checkbox"/>	5 <input type="checkbox"/>	6 <input type="checkbox"/>	7 <input type="checkbox"/>	Other <input type="text"/>
Earth Lead Length (m)	3 <input type="checkbox"/>	5 <input type="checkbox"/>	7 <input type="checkbox"/>	9 <input type="checkbox"/>	12 <input type="checkbox"/>	24 <input type="checkbox"/>	25 <input type="checkbox"/>	Other <input type="text"/>
Phase Lead Size (mm ²)	35 <input type="checkbox"/>		95 <input type="checkbox"/>					
Stick Length (m)	1.8 <input type="checkbox"/>	3.6 <input type="checkbox"/>		Other <input type="text"/>				
Extension Length (m)	1.8 <input type="checkbox"/>	3.6 <input type="checkbox"/>						



Jointing



D-ALM

Alminox

Recommended for aluminium to aluminium bolted or compression connections. Alminox contains sharp, conductive zinc granules suspended in a viscous petroleum base. Under pressure these granules make high pressure contact points with the parent metal to effect a sound electrical connection, whilst the base material seals the joint to prevent further corrosion. Catalogue number D-ALM325G, supplied in 325g squeeze tubes.

Part Number	Net Weight
D-ALM325G	325g



D-S

Scratch Brushes

The use of a suitable scratch brush to remove any existing oxide film, dirt or grease from the conductor is essential to ensure a sound electrical connection. PLP produces separate brushes for use on aluminium and copper conductors to prevent transference of metal particles.

Part Number	Description
D-SB3	White brush for use on aluminium
D-SB4	Black brush for use on copper



Cable Clamps & Blocks



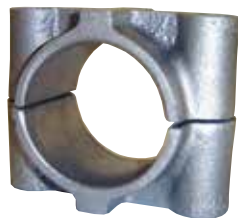
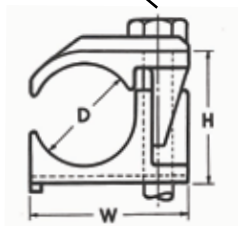
D-CAB

Cable Clamp - Single Way Single Bolt Clamp (Type CAB)

- A self aligning, interlocking, non-magnetic clamp
- Fits standard channels

Part Number	Cable Ø D (mm)		Dimensions (mm)		
	Min	Max	H	W	Bolt Ø
D-CAB5125	19	25	31	41	10
D-CAB5130	24	30	36	46	10
D-CAB5135	29	35	41	51	10
D-CAB5141	34	41	48	58	10
D-CAB5147	40	47	54	64	10
D-CAB5154	46	54	61	71	10

(Bolt not supplied)

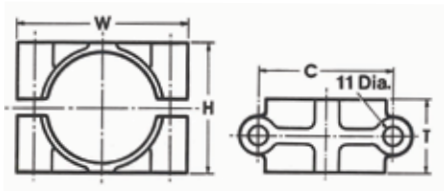


D-CAB

Cable Clamp - Single Way Two Bolt Clamp (Type CAB)

- For larger diameter cables
- Non magnetic
- For flat or channel mounting

Part Number	Cable Ø (mm)	Dimensions (mm)			
		H	C	T	W
D-CAB5960	55-60	72	73	45	96
D-CAB5967	60-67	79	80	45	105
D-CAB5974	67-74	88	89	50	112
D-CAB5981	74-81	95	96	50	121
D-CAB59105NI	101-105	124	120	65	154



Note: Fasteners not included

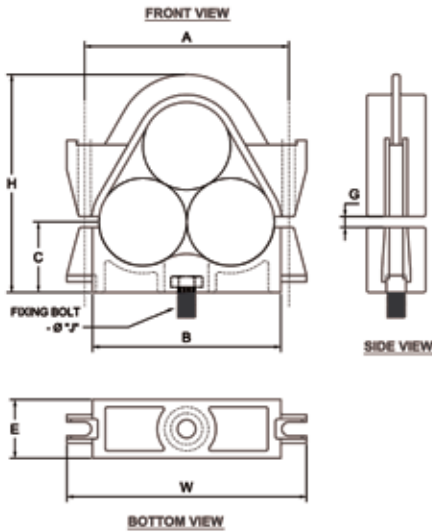
Cable Clamps & Blocks



D-CAB

Cable Clamps (Type CAB) - Three Way

- Three Way (Trefoil) 2 Bolt Clamps
- High strength cast aluminium
- 20kN bursting strength

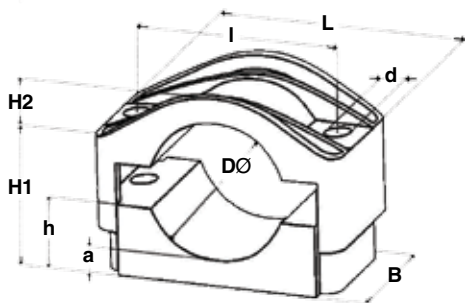


Part Number	Cable O.D. (mm)	Clamp Dimensions (mm)								
		A	B	C	E	G	H	J	K Bolt Ø	W
D-CAB5420	19 - 20	65	73	17.5	37	5	63	-	8	73
D-CAB5427	25 - 27	65	80	20	38	5	67	-	8	86
D-CAB5429	27 - 29	70	80	20	38	5	70	-	8	90
D-CAB5435	33.5 - 35	86	76	30	38	5	89	10	8	104
D-CAB5437	35 - 37	89	79	32	38	5	95	12	10	111
D-CAB5440	38 - 40	98	87	35	41	6.5	104	12	10	118
D-CAB5441	39 - 41	98	87	35	41	6.5	104	12	10	121
D-CAB5442	40.5 - 42.5	102	94	35	41	6.5	111	12	10	124
D-CAB5444	42 - 44	104	96	35	41	6.5	104	12	10	126
D-CAB5446	44.5 - 46.5	108	102	38	45	6.5	111	12	10	128
D-CAB5448	46 - 48	114	106	39	45	6.5	118	12	10	132
D-CAB5449	48 - 50	115	108	41	45	6.5	127	12	10	137
D-CAB5452	50 - 52	120	112	42	45	6.5	130	12	10	142
D-CAB5454	52 - 54	126	116	42	45	6.5	131	12	10	148
D-CAB5456	54 - 56	127	120	44	46	6.5	135	12	10	150
D-CAB5459	56.5 - 59	130	121	45	48	6.5	137	16	10	152
D-CAB5466	63.5 - 66	151	146	50	48	6.5	165	16	10	178
D-CAB5472	66 - 72	165	160	52	60	6.5	158	-	12	195
D-CAB5476	74 - 76	172	170	54	62	6.5	165	-	12	202
D-CAB5478	76 - 78	192	165	55	60	10	170	-	12	225
D-CAB5482	80 - 82	196	178	66	64	10	204	16	12	228

Notes:

- Bolt assemblies included as pictured
- Fixing bolt not included

Cable Clamps & Blocks



PSCCS

Plastic Substation Cable Clamp Single

The Single Hole type cable clamps fasten a wide range of single and multi conductor low, medium and high voltage cables. Designed to provide superior mechanical strength, ideal for installations where cables are subject to short circuits. The wide contact area provides controlled pressure on the cable to prevent damage to the conductor insulation. Contact PLP with specific requirements and conductor diameters.

Characteristics:

- Made of glass fibre reinforced polyamide (PA)
- Resistant to oils, UV, ozone, salts, moisture, acids and even radioactive emissions
- Self-extinguishing V-0 (UL94), halogen-free, low smoke
- Temperature range from -40°C to 120°C
- Black coloured
- Available pre-mounted
- Stainless steel fasteners included

Testing:

By UL, KEMA, Eaton and Centrilab (reports available upon request).

Type	Dimensions (mm)									Mechanical Strength
	DØ	L	B	I	d	H1	H2	h	a	
PSCCS26-38	26-38	92	60	60	12	33-49	7	18	7	30,000Nm
PSCCS36-52	36-52	105	60	75	12	39-55	15	23	8	20,000Nm
PSCCS50-75	50-75	126	60	95	12	46-71	22	30	9	20,00Nm
PSCCS75-100	75-100	200	80	150	12	70-95	32	45	10	68,000Nm
PSCCS100-135	100-135	225	82	175	15	85-120	43	58	10	67,400Nm



Dutchclamp®

Cable Clamps & Blocks



PSCCT

Plastic Substation Cable Clamp Triple

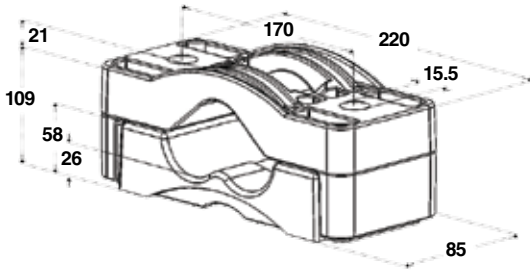
Triple type cable clamps fasten a wide range of single and multi conductor low, medium and high voltage cables in triangular formation. Designed to provide superior mechanical strength, ideal for installations where cables are subject to short circuits. The wide contact area provides a controlled pressure on the cable and prevents damage to the conductor insulation. Contact PLP with specific requirements and conductor diameters.

Characteristics:

- Made of glass fibre reinforced polyamide (PA)
- Resistant to oils, UV, ozone, salts, moisture, acids and even radioactive emissions
- Self-extinguishing V-0 (UL94), halogen-free, low smoke
- Temperature range from -40°C to 120°C
- Black coloured
- Available pre-mounted
- Stainless steel fasteners included

Testing:

By UL, KEMA, Eaton and Centrilab (reports available upon request).



Part Number	Dimensions (mm)									Mechanical Strength
	DØ	L	B	l	d	H1	H2	h	a	
PSCCT27-38	3X27-38	180	75	125	15.5	63	12	35	16.5	35,900Nm
PSCCT38-51	3x38-51	195	80	145	15.5	84	16	45	20	39,800Nm
PSCCT51-69	3x51-69	220	85	170	15.5	109	21	58	26	69,900Nm
PSCCT69-90	3x69-90	266	90	215	15.5	-	-	72	-	47,800Nm
PSCCT90-118	3x90-118	321	100	270	15.5	-	-	89	-	55,400NM

Cable Clamps & Blocks



PSCCB

Plastic Substation Cable Clamp Blocks

Cable Blocks fasten cable diameters from 12 mm up to 32 mm. By means of 2 block parts, 4 cables can be fastened alongside each other. Additional cables are able to be fastened alongside each other by coupling the block parts together using the standard dovetail connection. Contact PLP with specific requirements and conductor diameters.

Characteristics:

- Made of glass fibre reinforced polyamide (PA).
- Resistant to oils, UV, ozone, salts, moisture, acids and even radioactive emissions.
- Self-extinguishing V-0 (UL94), halogen-free, low smoke.
- The mounting holes are Ø13 mm, allowing the all thread to be extended with threaded bushes at any desired location, thereby eliminating the possibility of damage when cables are installed in multiple layers. The existing configuration can be expanded at any time... easily, simply and at little cost.
- Temperature range from -40°C to 120°C.
- Mechanical strength: 29,500 Nm.
- Stackable.
- Dovetail connections for end-to-end attachment.
- Black coloured.
- Available pre-mounted.
- Fasteners meeting your specifications can be included

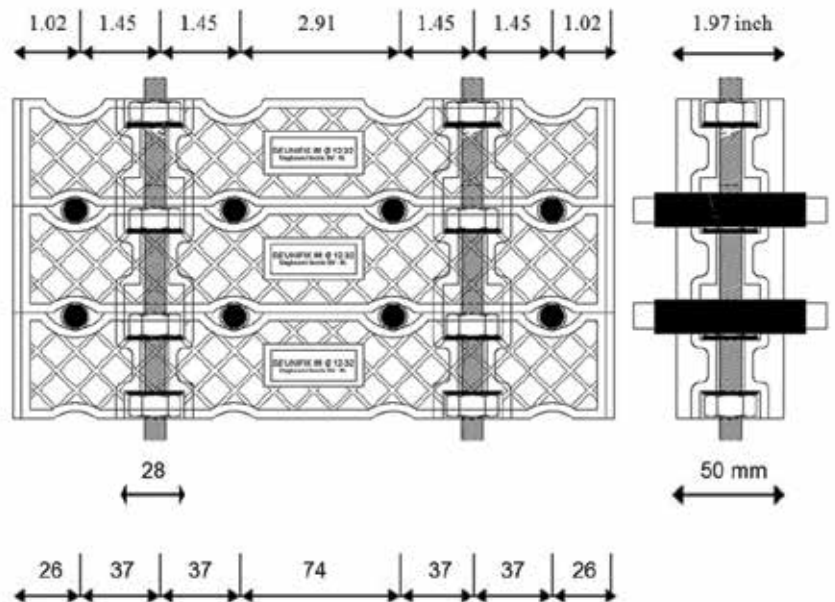
Testing:

By UL, KEMA, Eaton and Centrilab (reports available upon request).

PSCCB-Ø			
No. Of Cables	Qty of PSCCB	Cable Ø	Cable Ø
4	2	12-32	32-48
8	3	12-32	32-48
12	4	12-32	32-48
16	5	12-32	32-48
20	6	12-32	32-48

Part Number System

PSCCB	Multiple Clamp
12-32	Diameter of Cable (Ø)



Dutchclamp®

Cable Clamps & Blocks



POLEFIX

Applications:

Using a stainless steel strap and two Polefix holders, all types of Dutchclamp cable clamps, cable blocks and other products can be attached to (steel or concrete) poles that may not or cannot be drilled into.

Characteristics:

- Made of glass fibre reinforced polyamide (PA).
- Resistant to oils, UV, ozone, salts, moisture, acids and even radioactive emissions.
- Self-extinguishing V-0 (UL94), halogen-free, low smoke.
- Temperature range from -40 °C to 120 °C.
- Black coloured.

Dimensions in (mm)

Part Number	Mounting Hole \varnothing	L	W	H	Thickness	Groove Length	Groove Width
Polefix	15	80	47	33	6	40	2.5



Section 5 - Primary Equipment

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Primary Equipment

DB36 - D362 Disconnectors

36kV - 362kV



The AEM type High Voltage (HV) Double Break Disconnectors are designed for outdoor transmission substation isolation duty in power transmission networks.

Rated up to 4000A continuous current and fault withstand up to 50kA rms for 1 second (125kAp), with remote automatic operation and associated earth switches, the proven safety and reliability it a first choice for a long life quality disconnector.

PLP's local engineering team can design structure heights, spacing, insulator options and configuration to suit your site and operating standards.

The AEM type DB disconnectors comply with AS62771.102-2005 and IEC62271.102-2003.

Safety:

- Robust mechanical and electrical interlocking to ensure operator and network safety
- Mechanical interlocks prevent dangerous earth switch - phase switch combinations
- Optional solenoid bolt interlocks are available for remote interlocking of associated earth switches and stand alone earth switches.
- Electrical interlocking with the optional motor actuator prevents incorrect remote operation
- Disconnectors are designed to comply with AS1170.2-2002 (Wind load code - tropical cyclone) and AS1170.4-2007 (seismic) when so specified

Performance:

- Self gripping contact design for high short circuit current capability
- Low operating force for easy manual operation
- "Easy Open" earth switch operation

Reliability:

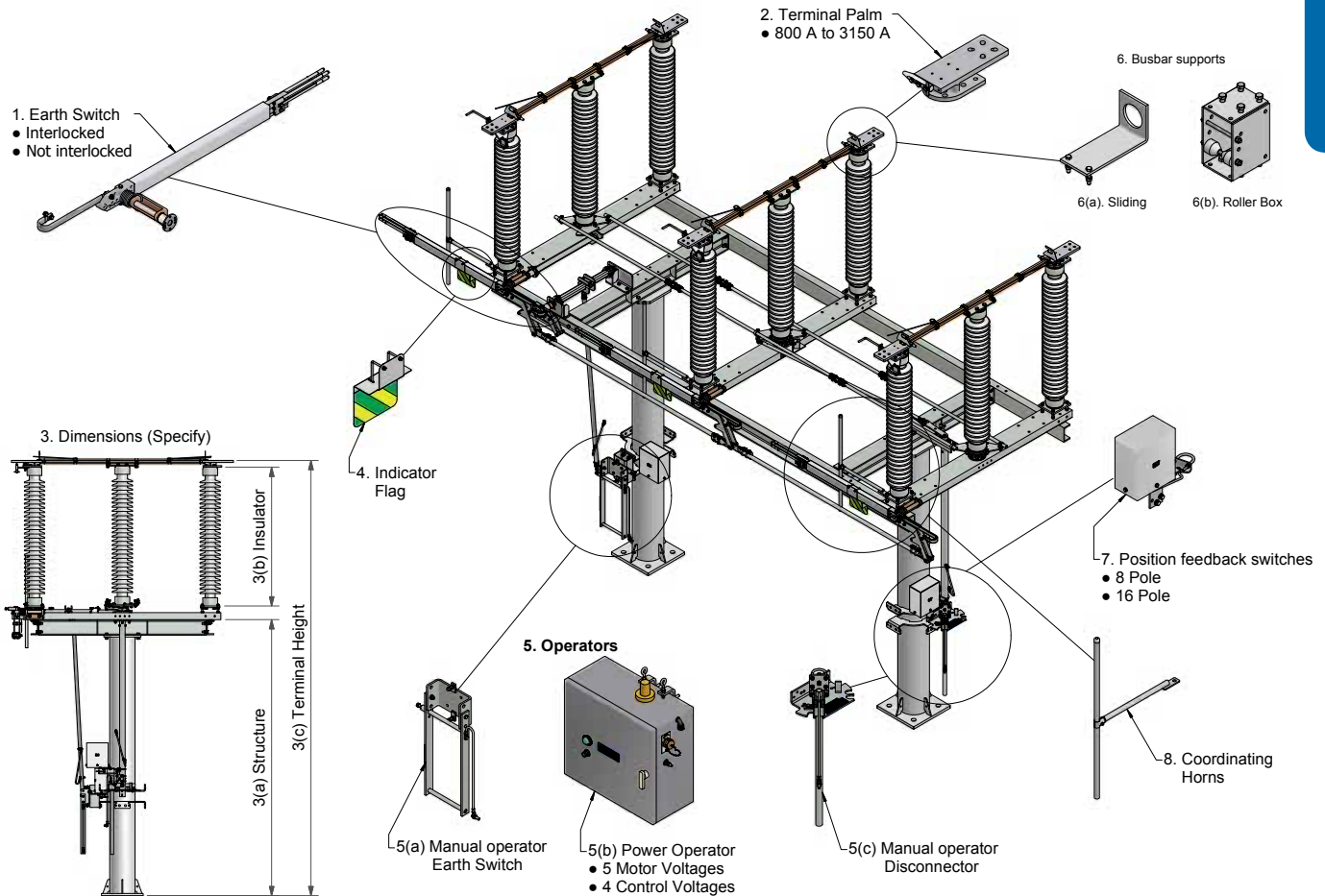
- Corrosion resistant galvanised structures
- Maintenance free linkages and PTFE bearings
- Comprehensive installation, operation and maintenance manuals plus drawings are provided
- Quick Field replacement of contact system
- Overcentre mechanism to ensure positive locking in open or close positions



Primary Equipment

Popular Options For DB36, DB72 & DB145

(each numbered item is a set of options)



Specifications

Ratings	DB36	DB72	DB145
Disconnecter Designation (Type)	DB36 (Double Break)	DB72 (Double Break)	DB145 (Double Break)
Earthing Switch Designation (Type)	SE36 (Vertical Break)	SE72 (Vertical Break)	SE145 (Vertical Break)
Rated Voltage	36kV	72.5kV	145kV
Disconnecter Endurance Class	M1	M1	M1
Earthing Switch Endurance Class	M1	M1	M1
Rated Frequency	50Hz	50Hz	50Hz
Rated Normal Current	800A to 3150A	800A to 3150A	800A to 3150A
Rated Peak Withstand Current	50 to 100kAp	50 to 125kAp	40 to 125kAp
Rated Short Time Current/ 1 sec - STC	20kA to 40kA rms	16kA to 50kA rms	16kA to 50kA rms
Resistance of Main Circuit	<98μ Ω	<144μ Ω	<202μ Ω
Rated 1 minute Power Frequency Withstand Voltage : To Earth	>7kV rms	>140kV rms	>275kVrms
Rated 1 minute Power Frequency Withstand Voltage : Across Open Gap	>80kV rms	>160kV rms	>315kV rms
Rated Lightning Impulse Withstand Voltage: To Earth	>200kVp	>350kV rms	>650
Rated Lightning Impulse Withstand Voltage: Across Open Gap	>230kVp	>402.5kVp	>750kVp
Max RIV @ 1MHz and 23kV	N/A	N/A	<2500μV
Max Permissible Load on Terminal	500N	500N	500N



Primary Equipment

Specifications

Contacts/ Terminals	DB36	DB72	DB145
Contact Type: Disconnecter & Earthing Switch	Rod & Wedge	Rod & Wedge	Rod & Wedge
Number of Breaks per Phase: Disconnecter (Earthing Switch)	2 (1)	2 (1)	2 (1)
Contact Material	Silver Plated Copper	Silver Plated Copper	Silver Plated Copper
Rated Contact Force	110N	110N	110N
Recommended Contact Lubricant:	KOPRCOTE	KOPRCOTE	KOPRCOTE
Terminal Material	Aluminium or Copper	Aluminium	Aluminium

Drive Gear	DB36	DB72	DB145
Operating Method	Power or Manual	Power or Manual	Power or Manual
Max Operating Effort of Manual Handle: Vertical Spade Type	<250N	<250N	<250N
Max Operating Effort of Manual Handle: Horizontal Type	<250N	<250N	<250N
Max Operating Effort of Manual Handle: Rotary Crank Type	<90N	<90N	<90N
Construction of Main Bearing : Disconnecter	Laminated PTFE on stainless steel shaft	Laminated PTFE on stainless steel shaft	Laminated PTFE on stainless steel shaft
Construction of Main Bearing :Earthing Switch	Bronze on stainless steel shaft	Bronze on stainless steel shaft	Bronze on stainless steel shaft
Construction of Linkage Bearings: Disconnecter & Earthing Switch	PTFE on Brass	PTFE on Brass	PTFE on Brass
Recommended Maintenance Interval on Drive Gear	Maintenance Free	Maintenance Free	Maintenance Free

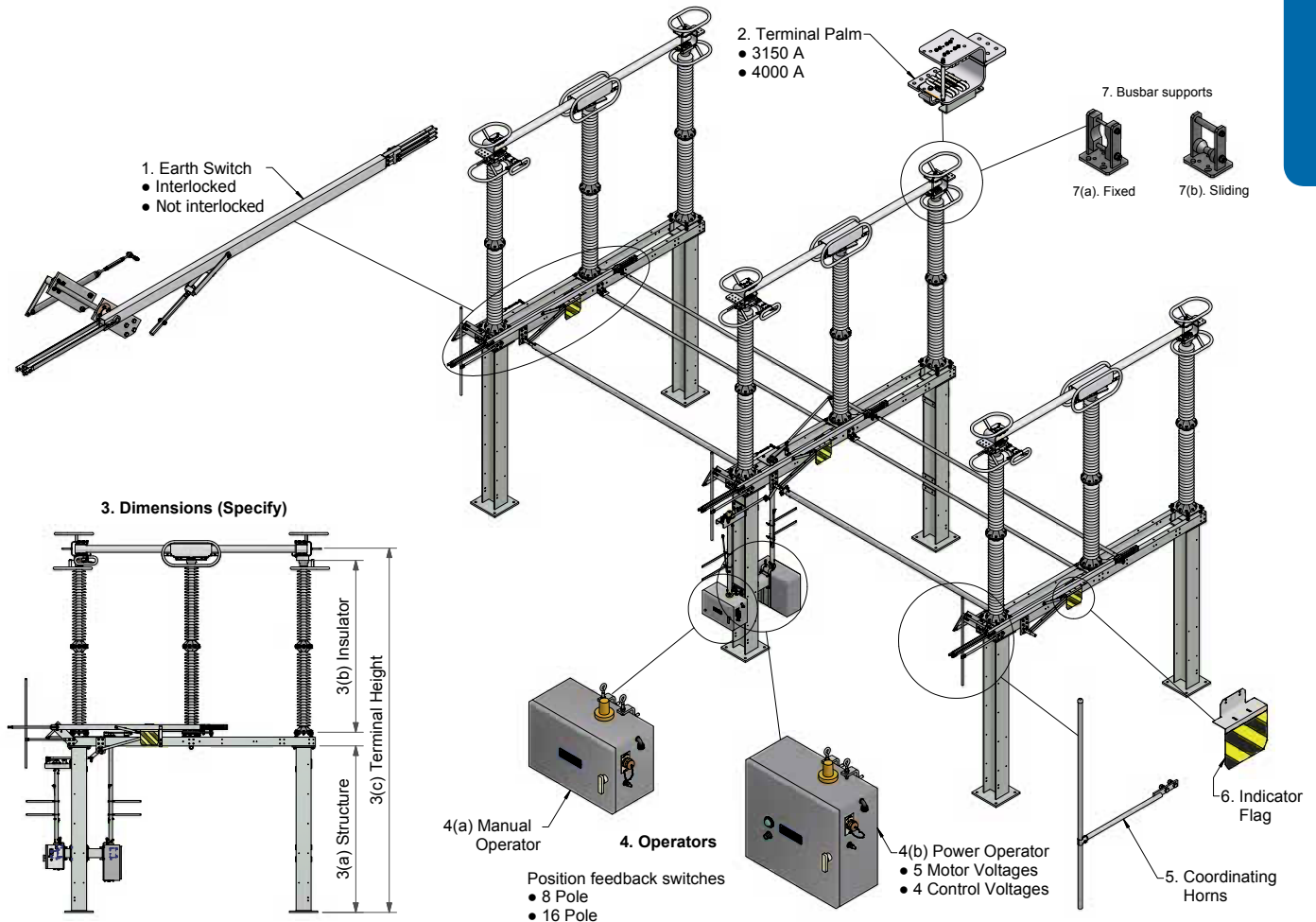
Auxiliary Devices	DB36	DB72	DB145
Power Operator Voltage: Motor	32 to 250V DC & 230/240V AC	32 to 250V DC & 230/240V AC	32 to 250V DC & 230/240V AC
Power Operator Voltage: Control	32 to 250V DC	32 to 250V DC	32 to 250V DC
Control Box with Solenoid Bolt Interlock Voltage	32 to 250V DC	32 to 250V DC	32 to 250V DC
Auxiliary Switch Size	4, 6, 8, 12, 16 Pole	4, 6, 8, 12, 16 Pole	4, 6, 8, 12, 16 Pole
Number of Breaks per Auxiliary Switch Pole	2	2	2
Rated Continuous Current of Auxiliary Switch 125V DC	10A	10A	10A

Typical Mass and Bundling Data	DB36	DB72	DB145
Mass of Disconnecter (c/w Power Operator)	180kg (285kg)	220kg (325kg)	475kg (580kg)
Mass of Earthing Switch	125kg	125kg	200kg
Mass of Support Structure up to 2500mm high	255kg	315kg	675kg
Mass of Insulator	21kg ea	45kg ea	95kg ea

Primary Equipment

Popular Options For DB245 - DB362

(each numbered item is a set of options)



Specifications

Ratings	DB245	DB362
Disconnecter Designation (Type)	DB245 (Double Break)	DB362 (Double Break)
Earthing Switch Designation (Type)	SE245 (Vertical Break)	SE362 (Vertical Break)
Rated Voltage	245kV	362kV
Disconnecter Endurance Class	M1	M1
Earthing Switch Endurance Class	M1	M1
Rated Frequency	50Hz	50Hz
Rated Normal Current	2500A to 4000A	2500A to 4000A
Rated Peak Withstand Current	100 to 125kAp	100 to 125kAp
Rated Short Time Current/ 1 sec - STC	40kA to 50kA rms	40kA to 50kA rms
Resistance of Main Circuit	<85 $\mu\Omega$	<85 $\mu\Omega$
Rated 1 minute Power Frequency Withstand Voltage : To Earth	>450kV rms	>460kV rms
Rated 1 minute Power Frequency Withstand Voltage : Across Open Gap	>460kV rms	>520kV rms
Rated Lightning Impulse Withstand Voltage: To Earth	>1050kVp	>1300kVp
Rated Lightning Impulse Withstand Voltage: Across Open Gap	>1095kVp	>1380kVp
Max RIV @ 1MHz and 23kV	<2500 μ V	<2500 μ V
Max Permissible Load on Terminal	4.1kN	4.1kN



Primary Equipment

Specifications

Contacts/ Terminals	DB245	DB362
Contact Type: Disconnecter (Earthing Switch)	Roll Over Reverse loop (Rod & Wedge)	Roll Over Reverse loop (Rod & Wedge)
Number of Breaks per Phase: Disconnecter (Earthing Switch)	2 (1)	2 (1)
Contact Material	Silver Plated Copper	Silver Plated Copper
Rated Contact Force	110N	110N
Recommended Contact Lubricant:	KOPRCOTE	KOPRCOTE
Terminal Material	Aluminium	Aluminium

Drive Gear	DB245	DB362
Operating Method	Power or Manual	Power or Manual
Max Operating Effort of Manual Handle: Vertical Spade Type	<250N	<250N
Max Operating Effort of Manual Handle: Rotary Crank Type	<90N	<250N
Construction of Main Bearing : Disconnecter	PTFE on galvanised steel	<90N
Construction of Main Bearing :Earthing Switch	Bronze on stainless steel shaft	Laminated PTFE on stainless steel shaft
Construction of Linkage Bearings: Disconnecter (Earthing Switch)	PTFE on stainless steel (Bronze on stainless steel)	Bronze on stainless steel shaft
Recommended Maintenance Interval on Drive Gear	Maintenance Free	PTFE on Brass

Auxiliary Devices	DB245	DB362
Power Operator Voltage: Motor	32 to 250V DC & 230/240V AC	32 to 250V DC & 230/240V AC
Power Operator Voltage: Control	32 to 250V DC	32 to 250V DC
Auxiliary Switch Size	4, 6, 8, 12, 16 Pole	4, 6, 8, 12, 16 Pole
Number of Breaks per Auxiliary Switch Pole	2	2
Rated Continuous Current of Auxiliary Switch 125V DC	10A	10A

Typical Mass and Bundling Data	DB245	DB362
Mass of Disconnecter (c/w Power Operator)	1355kg	140kg
Mass of Earthing Switch	410kg	420kg
Mass of Support Structure up to 2500mm high	3600kg	3600kg
Mass of Insulator	155kg ea	200kg ea



Section 6 - Insulators

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Insulators



PLP Insulators

For Power Transmission and Distribution Networks

- Porcelain & Polymeric Insulators
- Commitment to Quality
- State-of-the-art Manufacturing and In-House Testing Facilities
- IEC & Australian Standards
- Batch Tested as per Australian Standards
- Long Life & Reliable Performance

Preformed Line Products (Australia) Pty Ltd (PLP) is Australia's leading manufacturer and supplier of cable line hardware for aerial power and communications networks. Preformed Line Products products have benchmarked industry standards in technology and quality, to deliver highly dependable products, making PLP one of the most trusted names in the industry.

In a world where efficiency powers bottom lines, reliability becomes the key driver for productivity and performance, and consistent reliability can be achieved only through a focused approach and proficient implementation of world class practices. Insulators supplied by PLP are designed to meet dimensional, electrical and mechanical requirements of the Australian and IEC standards. The market demands that insulators supplied have a minimum life of 20 years, in all types of natural conditions, such as industrial pollution, salt-spray fog, rain, external heat and cold.

PLP's focus is to provide Porcelain and Polymer insulators for electrical transmission, distribution, sub-station and all other applications. Tested in world class laboratory facilities to Australian and IEC Standards, PLP supply voltage ranges varying from 11kV – 500kV in both Porcelain and Polymeric designs. PLP also cater for LV/MV range insulators. Munsell Grey is the color of choice unless a special glaze requirement is requested.

Insulators



Disc Insulators

Porcelain

Features:

- Manufactured and supplied by Aditya Birla Insulators, India
- ABI- Third largest manufacturer of Insulators in the world
- World class quality Standards
- State-of-the-art manufacturing and In-House test facilities
- Manufactured from non-porous electrical porcelain
- Sacrificial "Zn" collar standard on all pins
- Insulators tested at CPRI, a NABL accredited testing facility (NATA equivalent)
- Batch tested to Australian Standards

Part Number	Fixing	Security Clip	Spacing (mm)	Creepage Distance	Electro Mechanical Strength (kN)
I-U70B-PWZ	Ball & Socket	W	146	320	70
I-U70C-PZ	Tounge & Clevis		146	320	70
I-U160BS-PRZ	Ball & Socket	R	146	320	160

Note:

- Dimensional and performance characteristics in accordance with IEC and Australian standards
- Higher rated units can be supplied upon request



Disc Insulators

Glass

Part Number	Fixing	Security Clip	Spacing (mm)	Creepage Distance	Electro Mechanical Strength (kN)
I-U70B-GWZ*	Ball & Socket	R	146	320	70
I-U120B-GWZ*	Ball & Socket	R	146	320	120
I-U160B-GWZ*	Ball & Socket	R	146	400	160

* Non stocked item

Insulators



Station Post Insulators

Porcelain

Features:

- ABI- Third largest manufacturer of Insulators in the world
- World class quality Standards
- State-of-the-art manufacturing and In-House test facilities
- Capability up to 800kV
- Type tested at NATA equivalent laboratories
- Batch tested to Australian Standards
- Stocked at PLP Australia

Part Number	Rated Volt. (kV)	BIL (kV)	Cantilever Strength (kN)	Polution Level	Creepage (mm)	Height
I-C6-650-4495C-1500H 127/127	132	750	6	4	4495	1500
I-C10-650-3625C-1500H 127/127	132	750	10	3	3625	1500
I-C12.5-650-3625C-1500H 127/254	132	650	12.5	3	3650	1500
I-C6-650-3730C-1473H 127/127	132	650	6	3	3733	1473
I-C8-350-II-76HT	66	350	8	2	1690	762
I-C10-325-1815C-770H 127/127	66	325	10	3	1820	770
I-C6-200-I-508HT	33	200	6	1	840	508
I-C4-200-1000C-400H 76/76	33	200	4	3	1000	400
I-C4-200-200-I-458HT	33	200	4	1	850	458
I-C10-200-II-458HT	33	200	10	2	950	458
I-C10-200-900C-475H 76/76	33	200	10	3	950	475
I-C8-225-810C-381H	36	170	3	3	810	381
I-C6-150-I-355HT	22	150	6	1	610	355
I-C4-150-500C-300H 76/76	22	150	4	3	500	300
I-C9-125-400C-254HT TR-205	11	110	10	3	400	255
I-C6-1050-7595C-2300H	220	1050	6	4	7595	2300

Notes:

- Dimensional and performance characteristics in accordance with IEC and Australian standards (AS 4395.1)
- Details of Station Posts not mentioned above can be provided upon request

Insulators



Polymeric Insulators (Longrod & Line Post Type)

Long Rod & Line Post Type

Features:

- Wide product range
- Substation, Traction, Line Post and Transmission Insulators
- Insulators manufactured and tested per IEC and Australian Standards
- Tested at NATA equivalent testing facilities

Part Number	Rated Voltage (kV)	Min Creepage Distance (mm)	SML (kV)	Critical Impulse Voltage (kV)	Length (mm)	End Fittings
I-CS70-15-CT-H	15	425	70	155	330+-15	Clevis-Tounge
I-CS70-25-CT-H	25	645	70	220	430+-20	Clevis-Tounge
I-CS70-35-CT-H	35	859	70	275	525+-25	Clevis-Tounge
I-CS70-36-BS	36	1180	70	275	610+-10	Ball-Socket
I-CS70-36-CT-H	36	1180	70	275	635+-10	Clevis-Tounge
I-CS120-36-BS	36	1180	120	275	640+-10	Ball-Socket
I-CS120-36-CT-H	36	1180	120	275	655+-10	Clevis-Tounge
I-CS70-36-BS	36	1180	70	410	640	Ball-Socket
I-CS70-36-CT-H	36	1180	70	410	640	Clevis-Tounge
I-CS120-36-BS	36	1180	120	410	640	Ball-Socket
I-CS120-36-CT-H	36	1180	120	410	640	Clevis-Tounge
I-LPO-36-TT-1140C	36	1140	12.5	210	480	Tie-Top
I-CS140-69-SB*	69	1790	140	395	750+-5	Clevis-Tounge
I-CS120-135-SB*	135	3520	120	735	1329	Clevis-Tounge

* Non stocked item

Notes:

- Dimensional and performance characteristics in accordance with IEC and Australian standards
- Other voltages and SMLs available on request



POWERFORMED[®]
Substation Systems



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TERMS & CONDITIONS OF SALE

1. APPLICATION

- 1.1. These Terms apply to all goods sold by the Company.
- 1.2. No amendment, alteration, waiver or cancellation of any of these Terms is binding on the Company unless confirmed by the Company in writing.
- 1.3. The Customer acknowledges that no employee or agent of the Company has any right to make any representation, warranty or promise in relation of the Goods or the sale of the Goods other than as contained in these Terms.

2. TERMS OF PAYMENT

- 2.1. Prices are subject to change on thirty (30) days notice.
- 2.2. Payments are to be made direct to the Company, strictly net, without any deduction or discount other than as stated in these Terms or in the relevant invoice or statement.
- 2.3. Payments are to be made within thirty (30) days of the date of the Company's statement or invoice, whichever is the earlier.
- 2.4. Interest is payable on all overdue accounts calculated on a daily basis at the rate of 2% per month as from the due date for payment until payment is received by the Company.
- 2.5. The Company will charge a handling fee of \$100 or such other greater amount for orders of an invoice value under \$1,000 or such higher amount as the Company determines.

3. PROPERTY IN GOODS

Legal and beneficial ownership of Goods supplied by the Company will not pass to the Customer until such time as the Goods so supplied have been paid in full in cash or cleared funds.

4. RE-SALE OF GOODS

- 4.1. If the Customer is a re-seller then, subject to sub-clause 4.2.4, the Customer has the right to sell the Goods in its own name at full market value and in the ordinary course of business.
- 4.2. Until the amount payable to the Company in respect of the Goods has been paid in full in cash or cleared fund:
 - 4.2.1. the Customer will hold the Goods only as bailee for the Company;
 - 4.2.2. the Goods must be stored in such manner that they are readily distinguishable from other goods owned by the Customer or other persons and so as to clearly show that they are the property of the Company;
 - 4.2.3. the Customer must indemnify the Company from and against any Claim incurred or suffered by the Company arising out of the possession, use or disposal of the Goods by the Customer or repossession or attempted repossession of them by the Company; and
 - 4.2.4. any sale of the Goods under clause 4.1 will only be effected by the Customer as trustee for the Company and the proceeds of such sale and the rights of the Company's Customer against its customer arising from such sale will be held on trust for the Company. The said proceeds must be held in a separate account or otherwise clearly identified in the books and records of the Customer.
- 4.3. The Customer must ensure that the Goods are stored in accordance with any reasonable direction or instructions from the Company and, without the prior written consent of the Company, must not treat, alter, or incorporate the Goods into or with another product of the Company or any third party, or otherwise vary the Goods as supplied by the Company.

- 4.4. If the Customer resells any Goods then, unless the Goods are clearly identifiable by serial numbers or other distinguishing marks, the Customer is deemed to have disposed of the Goods in the chronological order of supply by the Company to the Customer (oldest to most recent).
- 4.5. On the resale of the Goods by the Customer, the Customer must ensure that any contract between the Customer and its customer limits or excludes any liability of the Company to such customer on no less favourable terms than the Company's liability to the Customer under clause 19 or on more limiting terms.
- 4.6. Despite clause 4.5, the Customer must indemnify the Company from and against any Claim incurred or suffered by the Company arising out of the resale of the Goods by the Customer.

5. INCORPORATION OF GOODS

- 5.1. If the Customer uses the Goods in some manufacturing or construction process of its own or on behalf of some third party and receives monies from time to time in respect of such use then the Customer must hold a portion of such monies received, calculated in accordance with clause 5.2, in trust for the Company.
- 5.2. The portion referred to in clause 5.1 will be so much of the monies received as equals the amount owing by the Customer to the Company at the time of the receipt of such monies by the Customer.
- 5.3. Money received by the Customer excludes any debts due to other parties by the customer but not yet paid by the Customer.
- 5.4. In the circumstances outlined in clause 5.1, the Customer must not assign or deal with its debts in any way prior to payment of the moneys receivable by the Customer in respect of the Goods as their use as described in clause 5.1 prior to their payment to the Company.

6. INSTALLATION OF GOODS

- 6.1. All Goods must be handled, mounted and installed:
 - 6.1.1. by an appropriately licensed technician/tradesman; and
 - 6.1.2. in accordance with:
 - 6.1.2.1. the manufacturer's directions, if any;
 - 6.1.2.2. the relevant Application Procedure found at http://www.phhttp://www.preformed.com/index.php?option=com_phocadownload&view=category&id=29&Itemid=194refor med.com/index.php?option=com_phocadownload&view=category&id=29&Itemid=194; and/or
 - 6.1.2.3. the applicable industry standard, as the case may be.
- 6.2. If any Goods are not handled, mounted or installed in accordance with clause 6.1 then, subject to any statutory provision or other general law obligation to the contrary, the Company will not be liable for any defect or fault in the Goods or for any loss or damage to the Customer caused by the Goods.

7. DEFAULT

- If:**
- 7.1. the Goods are not paid for in accordance with these Terms or any other written agreement between the Company and the Customer;
 - 7.2. the Company receives notice of, or reasonably believes that a third party may attempt to levy execution against or attach the Goods; or
 - 7.3. any other event occurs which in the Company's opinion is likely to adversely affect the Customer's ability to pay for the Goods (including but not limited to the appointment of Insolvency Representative to the Customer's undertaking),

then the Company may at any time thereafter, without notice to the Customer and without prejudice to any other rights which it may have against the Customer, terminate any Contract relating to the Goods and the bailment referred to in clause 4.2.1.

8. RIGHT TO ENTER PREMISES

In any of the circumstances referred to in clause 7, the Customer:

- 8.1. authorises the Company by itself, its agents or representatives at all reasonable times, without notice, to enter onto (with force if reasonably necessary) and at all necessary time(s), to remain in and on any premises where the Goods are located in order to collect the Goods, without being guilty of any manner of trespass; and
- 8.2. assigns to the Company all the Customer's rights to enter onto and remain in and on such premises until all the Goods have been collected.

9. ADMINISTRATION & RECEIVERSHIP

In any of the circumstances referred to in clause 7.3:

- 9.1. neither the Customer nor its Insolvency Representative or any other person acting for the Customer and/or its creditors is entitled to sell, charge, remove, dispose of, use or otherwise deal with the Goods in any way inconsistent with the Company's ownership of the Goods, without the Company's prior written approval;
- 9.2. the Customer, its Insolvency Representative and every other person acting for or on behalf of the Customer and/or its creditors is obliged to re-deliver the Goods to the Company immediately or immediately on his appointment, as the case may be, at its or his expense; and
- 9.3. if the Goods are returned to or collected by the Company, the Company will within twenty-eight (28) days, account to the Customer or its Insolvency Representative for all monies received for the Goods from the Customer less the Company's reasonable administration charges, expenses incurred and loss of profits involved.

10. CUSTOMER AS TRUSTEE

If the Customer carries on business as trustee of a trust then the Customer warrants that:

- 10.1. the Customer enters into a Contract or Contracts to purchase the Goods as trustee of a trust;
- 10.2. the Customer has all requisite powers to enter into a Contract under these Terms;
- 10.3. the beneficiary of the trust approves the purchase of the Goods on the terms of the Contract; and
- 10.4. the assets of the trust are available to the Company in satisfaction of any debt incurred by the Customer for the purchase of the Goods.

11. GOODS AND SERVICES TAX

- 11.1. GST is not included in the quoted price.
- 11.2. If GST is imposed on the Company in respect of the Goods then the Customer must pay the amount of such GST to the Company in addition to the quoted price.
- 11.3. The Company must give the Customer written notice of the amount of any GST payable under this clause and provide a tax invoice showing the amount of GST payable.

12. CUSTOMS DUTIES, TARIFFS AND LEVIES

All applicable customs duties, tariffs and levies are payable by the Customer unless the order, order confirmation, invoice or other writing indicates otherwise.

13. DELIVERY

- 13.1. Availability dates are estimates only, but the Company will use its best endeavours to maintain these estimates.
- 13.2. If the place of delivery to or collection of the Goods by the Customer is within Australia then the Company will, at the Customer's request, arrange for the delivery of the Goods at the Company's expense.

14. DELIVERY BY INSTALMENTS

- 14.1. The Company reserves the right to deliver the Goods in whole or by instalments as well as to deliver prior to the date for delivery and in any such event the Customer must not refuse to take delivery of the Goods.
- 14.2. Where the Goods are delivered by instalments, each instalment is sold under a separate Contract.
- 14.3. Any failure on the part of the Company to deliver instalments within any specified time does not entitle the Customer to repudiate the Contract with regard to the balance of the Goods remaining undelivered.

15. RISK

- 15.1. The Goods are entirely at the risk of the Customer from the moment the Goods leave the Company's premises or physical custody.
- 15.2. The Customer must at its own expense, maintain the Goods and insure them for the benefit of the Company for their full replacement value against theft, destructions, fire, water and other risks, as from the moment of delivery to or collection by the Customer until property of and title to the Goods have passed to the Customer.
- 15.3. The Customer must take all reasonable measures to ensure that the Company's title to the Goods is in no way prejudiced. If any of the Goods are lost, destroyed or damaged, any insurance proceeds relating to the Goods in respect of such event that are received by the Customer are held on trust for the Company and must be paid to the Company immediately on receipt but only up to the amount that the Customer owes the Company in respect of those Goods.

16. INSPECTION

Unless the Customer has inspected the Goods and given written notice to the Company within seven (7) days after collection or delivery that the Goods do not comply with the relevant specifications or descriptions, the Goods are deemed to have been accepted in good order and condition.

17. RETURN OF GOODS

- 17.1. No returns will be accepted unless the Company has previously agreed in writing. If the Company agrees to the return of Goods, they must be unsoiled, undamaged and in a resaleable condition (or Customer pays for all costs of replacement or repair) and delivered at the Customer's expense to the Company's premises unless otherwise agreed by the Company in writing.
- 17.2. Goods imported especially for the Customer or non-standard equipment made to special order cannot under any circumstances be returned and/or credited.

18. CANCELLATION OF ORDER

No order may be cancelled, modified or deferred without the prior written consent of the Company (which is at the Company's sole discretion) and if consent is given, then such consent will, at the Company's election, be subject to the Company being reimbursed all losses, including loss of profits, and paid a cancellation and restocking fee (being not less than 10% of the invoice value of the Goods).

19. COMPANY'S LIABILITY LIMITED

- 19.1. The Customer acknowledges and agrees that:
 - 19.1.1. the Customer has determined that the Goods are fit for the purpose for which the Customer requires them;
 - 19.1.2. the Customer has the right to inspect the Goods in accordance with clause 19 to satisfy itself that the Goods are fit for purpose and/or are of merchantable and acceptable quality;
 - 19.1.3. the Customer has not relied on the Company's skill and judgment in selecting the Goods; and
 - 19.1.4. the Company is not responsible if the Goods do not comply with any applicable safety standard(s) or similar regulation(s), and that the Company is not liable for any Claim resulting from such non-compliance.
- 19.2. The Company is not subject to, and the Customer releases the Company from any liability (including but not limited to Consequential Loss or Damage, removal costs or re-installation costs or liability for loss of use or profit) arising from any delay in delivery or defect or fault in the Goods or any negligence by the Company in relation to the Goods (including but not limited to their manufacture), to the full extent permitted by law.
- 19.3. If, despite clause 19.2, the statutory provisions under the *Competition and Consumer Act 2010* (Cth), the *Sale of Goods Act 1923* (NSW) or any other act or the general law impose on the Company a liability for a defect or fault in the Goods then, to the extent to which the Company is entitled to do so, the Company's liability under the statutory provisions is limited, at the Company's option, to:
 - 19.3.1. replacement or repair of the Goods;
 - 19.3.2. supply of equivalent Goods; or
 - 19.3.3. payment of the cost of replacing or repairing the Goods or of acquiring equivalent Goods,and in any case:
 - 19.3.4. the Company will not be liable for any Consequential Loss or Damage or any other loss or damage; and
 - 19.3.5. the Company's total liability to the Customer is limited to the invoice value of the Goods.

20. WARRANTIES AND WARRANTY CLAIMS

- 20.1. The Company warrants that the Goods are free of substantive defects.
- 20.2. The Company also warrants to the Customer that the Goods will be supplied in an undamaged condition.
- 20.3. Except for any guarantees imposed by the *Competition and Consumer Act 2010* (Cth) and the warranties stated in clauses 20.1 and 20.2, the provision of any other act or law implying terms, conditions, guarantees and/or warranties which might otherwise apply to or arise out of the Contract are hereby expressly negated and excluded to the full extent permitted by law.
- 20.4. On discovery of any defect in the Goods, the Customer must notify the Company in writing of such defect.
- 20.5. All warranty claims must be received by the Company within thirty (30) days of the day of delivery. This warranty extends only to the Customer and to no other person.
- 20.6. The Customer's failure to provide written notice to the Company within the required time of any alleged breach of the above warranty will release and discharge the Company from any obligation or liability for that breach of warranty.
- 20.7. The Customer must not carry out any remedial work to allegedly defective Goods without first obtaining the written consent of the Company to do so

otherwise all of the Company's warranties will be voided to the full extent permitted by law.

- 20.8. The warranties stated in clauses 20.1 and 20.2 do not apply in circumstances where the Customer treats, alters, incorporates the Goods into or with another product of the Company or any third party, or otherwise varies the Goods as supplied by the Company.

21. CATALOGUES

Particulars in leaflets, catalogues, drawings, brochures and other printed material are illustrations only, form no part of the Contract between the Company and the Customer, and are not binding on the Company.

22. CUSTOMER'S PROPERTY

- 22.1. All Customer's property in or under the Company's custody or control will be entirely at the Customer's risk in regard to loss or damage from any cause whatsoever.
- 22.2. The Company will have a first and paramount lien upon all Customer's property (including but not limited to dies provided by or manufactured for the Customer) which is in the Company's possession or control until all accounts due to the Company by the Customer are paid in full.
- 22.3. The Company may sell any of the Customer's property on which the Company has a lien if:
- 22.3.1. a sum in respect of which the lien exists is presently payable;
- 22.3.2. the Company has, not less than fourteen (14) days before the date of the sale, given the Customer a written notice setting out, and demanding payment of such part of the sum in respect of which the lien exists as is presently payable; and
- the Customer has failed to pay the sum referred to in the notice.
- 22.4. The proceeds of the sale will be applied by the Company:
- 22.4.1. firstly to cover the costs of the sale;
- 22.4.2. secondly in payment of such part of the sum in respect of which the lien exists as is presently payable; and
- 22.4.3. by way of accounting to the Customer.

23. TOOLING

- 23.1. If the Company agrees to supply Tooling to the Customer then the Tooling remains the property of the Company and despite the fact that the Customer may have borne or contributed to the cost of the development and manufacture of the Tooling.
- 23.2. The Company reserves the right to recall the Tooling from the Customer at any time.

24. PERSONAL PROPERTY SECURITY

- 24.1. The Customer acknowledges that if the Company has a security interest in:
- 24.1.1. the Goods;
- 24.1.2. the proceeds of the Goods;
- 24.1.3. the Customer's property referred to in clause 22.1; and/or
- 24.1.4. the Tooling,
- for the purposes of the PPSA then the Company may register its security interest in the Goods, proceeds, Customer's property and/or Tooling, as the case may be, on the PPSR.
- 24.2. The Customer undertakes, at its own expense, to promptly do anything (such as supplying information) which the Company requests and reasonably requires the Customer to do for the purposes of ensuring that the security interest is enforceable, perfected or otherwise effective.

- 24.3. The Customer acknowledges that if the Company has a security interest in the Goods, proceeds, Customer's property and/or Tooling, as the case may be, then the Company may register its security interest on the PPSR and the Customer, in accordance with section 157(3)(b) of the PPSA, waives the right to receive notification of the registration.

25. COPYRIGHT

- 25.1. The Customer warrants that:
- 25.1.1. the drawing of any extruded shape submitted by the Customer; and
 - 25.1.2. any Tooling made in accordance with such drawing; and
 - 25.1.3. any article of extruded design made from such Tooling,
- does not infringe the rights of any third party (whether copyright, registered design pattern, trademark, confidential information or otherwise) or breach any applicable law.
- 25.2. In the event of any Claim or order for costs (including legal expenses on a solicitor and client basis) referable to the rights and/or laws referred to in clause 25.1 being made or brought against the Company, the Customer must fully indemnify the Company and keep the Company indemnified from and against same.

26. SAMPLES

Any sample inspected by the Customer is solely for the Customer's convenience and does not constitute a sale by sample. All samples remain the property of the Company.

27. SPECIFICATIONS

- 27.1. Unless otherwise agreed in writing, the Goods are supplied subject to any specification as to weight, quantity, size, dimensions, finishes, chemical composition and physical properties as may be published generally by the Company or as may be set out in any specification issued by the Company in relation to the Goods or, if no such specification has been published or set out, subject to such specification as is normally regarded as being commercially acceptable.
- 27.2. Where any specification for the Goods are to be supplied by the Customer, they must be supplied in a reasonable time to enable the Company to complete delivery by the date for delivery.

28. CONTRACT

- 28.1. The terms of the Contract between the parties are wholly contained in these Terms and any other writing signed by both parties.
- 28.2. The Contract under these Terms is deemed to have been made at the Company's place of business in Sydney, New South Wales and any cause of action is deemed to have arisen there.
- 28.3. The Contract is governed by the law of New South Wales.
- 28.4. The Customer irrevocably and unconditionally submits to the non-exclusive jurisdiction of the courts of New South Wales and any courts which have jurisdiction to hear appeals from those courts about any proceedings in connection with these Terms and waives any right to object to proceedings being brought in those courts for any reason.
- 28.5. The provisions of the United Nations Convention on Contracts for the International Sale of Goods adopted at Vienna, Austria on 10 April 1980 does not apply to any Goods supplied by the Company to the Customer.

29. FORCE MAJEURE

The Company will not be liable for any breach of contract due to any matter or thing beyond the Company's control (including but not limited to transport stoppages,

transport breakdown, fire, flood, earthquake, acts of God, strikes, lock-outs, work stoppages, wars, riots or civil commotion, intervention of public authority, explosion or accident).

30. DISPUTE RESOLUTION

- 30.1. The Company and/or the Customer must not commence any court proceedings in respect of a dispute arising out of these Terms unless it has complied with this clause 30.
- 30.2. Should at any time a party assert that a dispute exists between the parties arising out of or in connection with these Terms, then that party must submit a written notice ("**Notice of Dispute**") to the other party specifying:
 - 30.2.1. the nature of the dispute that has arisen;
 - 30.2.2. the major issues for determination; and
 - 30.2.3. the relief or outcome being sought.
- 30.3. Within seven (7) days from receipt of the Notice of Dispute, the other party must provide a written response ("**Notice of Response**") stating its position in relation to the dispute, including:
 - 30.3.1. any additional issues that should be referred for determination; and
 - 30.3.2. any comment on the relief or outcome referred to in the Notice of Dispute.
- 30.4. During the fourteen (14) day period after the Notice of Response is issued, the parties must take reasonable steps to seek to resolve the dispute.
- 30.5. If the dispute is not resolved within the period referred to in clause 30.4 then the parties must, within an additional fourteen (14) days agree to refer the dispute to a single expert for determination.
- 30.6. If the parties are unable to agree on a expert within the time stipulated in clause 30.5, then either party may refer the dispute to an expert as nominated by Unisearch Expert Opinion Services, for determination.
- 30.7. The determination of the expert:
 - 30.7.1. must be in writing, accompanied by reasons; and
 - 30.7.2. will be final and binding on the parties as to any findings of fact relating to any matter arising from these Terms.
- 30.8. The parties are to bear their own costs of the dispute and the costs of the expert are to be borne by the party found to be at fault by the expert and, in the event that no such finding is made, the costs are to be borne by the parties equally.

31. WAIVER OF BREACH

No failure by the Company to insist on strict performances of any of these Terms is a waiver of any right or remedy which the Company may have, and is not a waiver of any subsequent breach or default by the Customer.

32. NO ASSIGNMENT

Neither the Contract nor any rights arising under the Contract may be assigned by the Customer without the prior written consent of the Company which is at the Company's absolute discretion.

33. SEVERABILITY

If any provision contained in these Terms is held by a court to be unlawful, invalid or unenforceable, the validity and enforceability of the remaining provisions are not affected.

34. INTERPRETATION

In these Terms:

- 34.1. "**Claim**" means a claim, action, suit, demand, proceeding, damage, loss, cost, expense or liability incurred or suffered by the Company.

-
- 34.2. **“Company”** means Preformed Line Products (Australia) Pty Limited ABN 27 004 533 877 and its successors and assigns.
- 34.3. **“Consequential Loss or Damages”** means all or any of the following:
- 34.3.1. loss of profit;
 - 34.3.2. loss or denial of opportunity;
 - 34.3.3. loss of use;
 - 34.3.4. loss of revenue;
 - 34.3.5. loss of production;
 - 34.3.6. loss of labour;
 - 34.3.7. loss of access to markets;
 - 34.3.8. loss of goodwill;
 - 34.3.9. loss of anticipated savings;
 - 34.3.10. loss of business reputation including future reputation;
 - 34.3.11. loss arising from adverse publicity;
 - 34.3.12. damage to credit rating;
 - 34.3.13. removal costs;
 - 34.3.14. re-installation costs;
 - 34.3.15. commissioning costs;
 - 34.3.16. increase in operating costs;
 - 34.3.17. increase in maintenance costs;
 - 34.3.18. financial costs;
 - 34.3.19. any indirect, remote, abnormal or unforeseeable loss;
 - 34.3.20. any consequential loss or damage not included in the above; and
 - 34.3.21. any similar loss whether or not in the reasonable contemplation of the parties at the time entry into the Contract, and in any case whether arising out of contract or tort (including negligence) or by statute or otherwise, at law or in equity.
- 34.4. **“Contract”** means the contract for the sale of the Goods by the Company to the Customer.
- 34.5. **“Customer”** means the party to whom the Company has agreed to sell the Goods.
- 34.6. **“Goods”** means the goods agreed to be sold by the Company to the Customer.
- 34.7. **“GST”** means the Goods and Services Tax imposed by a *New Tax System (Goods and Services Tax) Act 1999* (Cth) and any related act and/or regulations.
- 34.8. **“Insolvency Representative”** includes but is not limited to a receiver, receiver and manager, administrator, controller, liquidator, provisional liquidator, trustee or similar person.
- 34.9. **“PPSA”** means the *Personal Property Securities Act 2009* (Cth).
- 34.10. **“PPSR”** means the personal property security register created under the PPSA.
- 34.11. **“Terms”** means these terms and conditions of sale as amended from time to time.
- 34.12. **“Tooling”** means any tooling supplied by the Company to the Customer from time to time.



SUBSTATIONS CATALOGUE



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