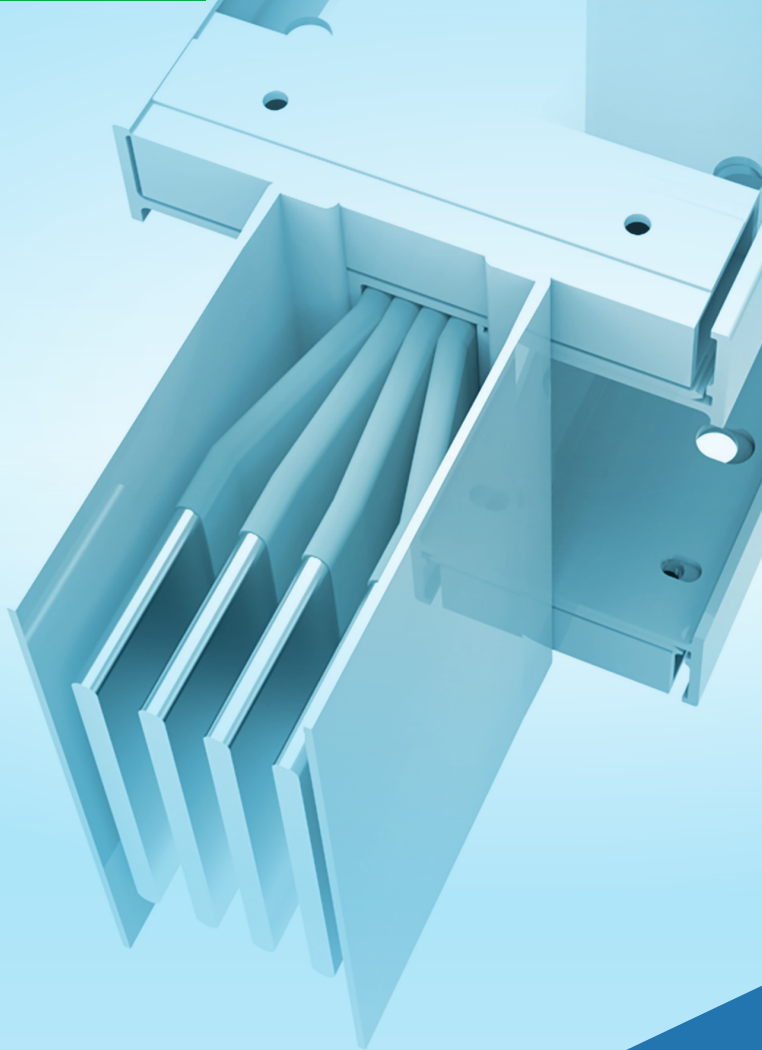




E+I ENGINEERING GROUP

HIGH POWERBAR

UL857 ALUMINUM



PowerBar



E+I Engineering's High Powerbar (HPB) UL857 range is a 600 Volt totally encased, non-ventilated, low impedance busduct. The range is available from 800A - 5000A with multiple bar configurations to suit project requirements.

The busduct is housed in an aluminum casing which acts as a ground. Ingress protection ratings are available from IP55 - IP66.

Features:

- Epoxy resin coated copper conductors with tin finish
- Joint pack construction with splice for quick installation
- Up to six busplug points per 12ft length
- All busplugs have mechanical/ electrical interlocks with a 'ground first, break last' safety feature
- Pressed out tags for busplug connections

STANDARDS

Standards

The HPB UL range is UL857 listed and manufactured in a certified management system environment where Quality ISO 9001, Safety ISO 45001 and Environmental ISO 14001 standards are applied to all aspects of the manufacturing and installation processes. We meet the requirements of NEMA, CSA, IEEE, ANSI, IEC & CE.

UL Listed

Powerbar completed extensive testing at UL accredited laboratories to ensure the product we supply meets UL requirements.

UL 857

Sub-clauses Description

8.2.1	Verification of Temperature Rise Limits
8.2.2	Verification of Dielectric Voltage Withstand Test
8.2.2.2	Clamped Joint Test
8.2.2.3	Reduced Insulation Thickness Test
8.2.3	Verification of Short Circuit Withstand
8.2.3.1.1.2	Dielectric Test Withstand Tests
8.2.6	Verification of Insulation Resistance and Dielectric Withstand After Exposure to Rain
8.2.7.1	Verification of Bending Resistance
8.2.7.2	Verification of Impact Strength
8.2.7.3	Verification of Crushing Resistance
8.2.7.4	Verification of Resistance to Bus Bar Pull Out
8.2.8	Verification of Overload and Endurance of Non-Switching Plug-in Devices
8.2.9	Verification of Resistance to Aging
8.2.10	Verification of Metallic Coating Thickness
8.2.11	Verification of Insulation Base and Support Strength
8.2.12	Gasket Tests
Ref to ANSI/UL 50	Type Rating Tests (Ingress Protection Tests) for the 2 series

Seismic Compliance

The product range is certified for Seismic withstand capability and has a qualification level - high (Zone-5) in accordance to IEEE standard 693-2005.

All certificates available on request

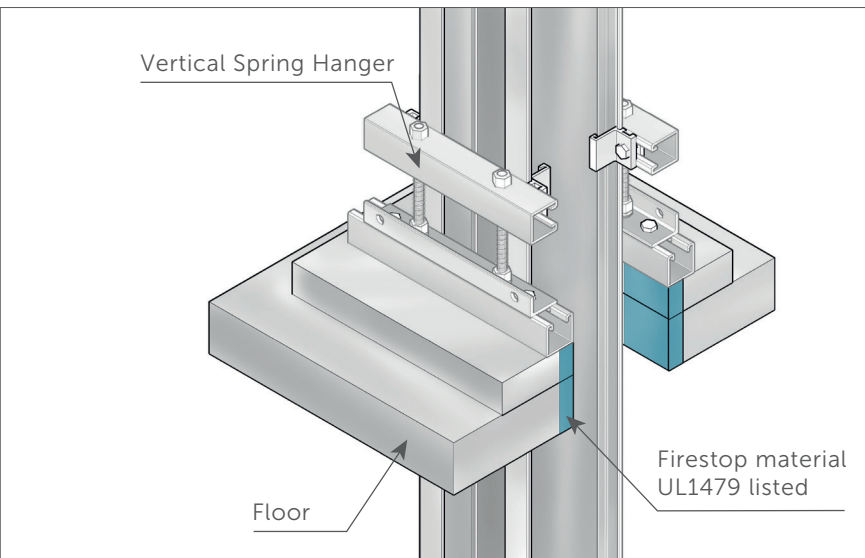


Health and Safety
ISO 45001:2018
No. 0087570

Quality Management
ISO 9001:2015
No.18346

Environmental Management
ISO 14001:2015
No. 18347

TECHNICAL FEATURES



UL Fire Stop System

- High Powerbar is constructed from high density 55% conductivity aluminum
- The low impedance sandwich design:
 - Improves heat dissipation
 - Improves short circuit rating
 - Reduces voltage drop/ impedance
 - Removes potential pathways for flame, smoke and gas
- pressed out tabs to connect busplugs protects the integrity of the conductor
- HPB is constructed with an all-aluminium housing. Aluminium is an extremely light metal and is easier to install than steel. Aluminium is much less reactive than steel so it is more durable and easier to maintain.
- E+I Engineering offer a 50% or 100% fully isolated ground for systems where ground isolation is required.
- A fully rated 200% neutral option is available for busduct systems with non-linear loads. The additional neutral capacity prevents overloading caused by zero sequence harmonic currents
- HPB UL857 can be used in 'Through-Penetration Fire Stop Systems' as listed in the UL Fire Resistance Directory

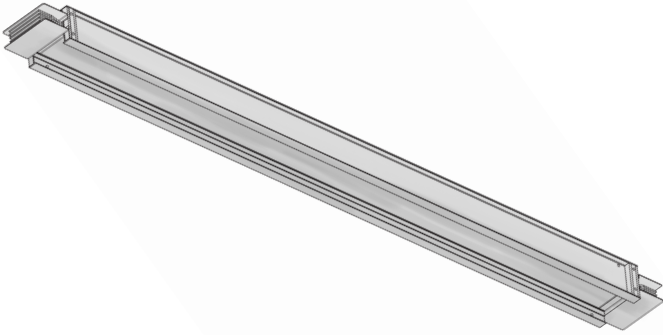
TECHNICAL FEATURES

Phase Configurations

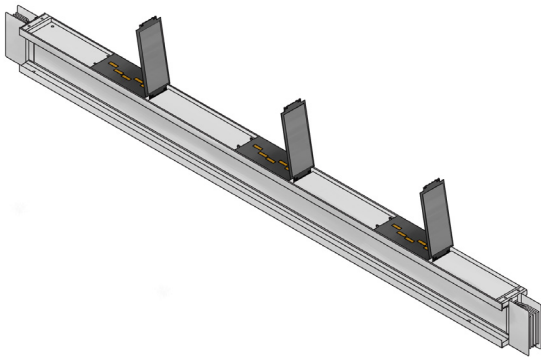
Configuration	Phases	Neutral	Ground
TP	100%	0%	Case
TP/N	100%	100%	Case
TP/E	100%	0%	100% or 50%
TP/NE	100%	100%	100% or 50%
TP/DN	100%	200%	Case

Note: Case refers to the Aluminum casing being used as a ground. 100% or 50% ground bar can either be supplied as an Isolated Ground (ISO) or an un insulated Internal Ground. (INT)

STRAIGHT LENGTHS



Feeder lengths account for the bulk of a busduct run



Distribution lengths allow Busplugs to be plugged into the busduct run

Straight Lengths

Straight lengths can be supplied at any length from 2ft - 13ft.

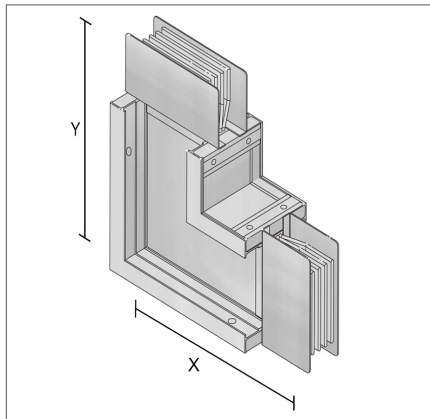
The busplug slot outlet and cover are made from a durable, high strength insulation material.

The busplug slot cover prevents access to the contacts behind the cover and protects it from the entry of dirt, dust or moisture. Busplugs are IP55 rated.

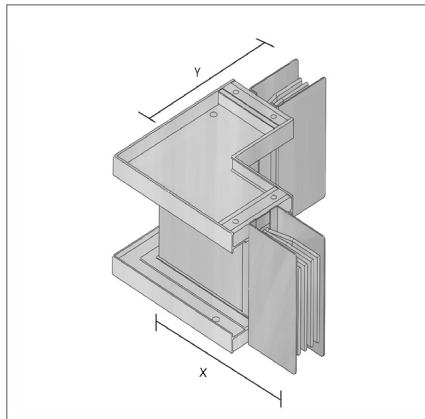
Busduct Rating (Amps)	Construction Type	Busduct Size			
		Width		Height	
		in	mm	in	mm
800A	Single	4.72"	120mm	5.83"	148mm
1000A	Single	5.51"	140mm	5.83"	148mm
1200A	Single	6.30"	160mm	5.83"	148mm
1350A	Single	6.89"	175mm	5.83"	148mm
1600A	Single	8.07"	205mm	5.83"	148mm
2000A	Single	10.24"	260mm	5.83"	148mm
2500A	Double	14.68"	373mm	5.83"	148mm
3000A	Double	17.05"	433mm	5.83"	148mm
4000A	Triple	23.66"	601mm	5.83"	148mm
4250A	Triple	26.02"	661mm	5.83"	148mm
5000A	Triple	32.52"	826mm	5.83"	148mm

Note: The maximum and minimum sizes recommended are not the limits of what can be produced, but a guideline to help you choose the correct product. Dimensions are taken from the centre of the joint.

ELBOWS



Flatwise Elbows



Edgewise Elbows

Flatwise and Edgewise Elbows

Flatwise and edgewise elbows are used to make 90° changes in the direction of the busduct system. E+I Engineering can also manufacture specially angled elbows for both flatwise and edgewise products.

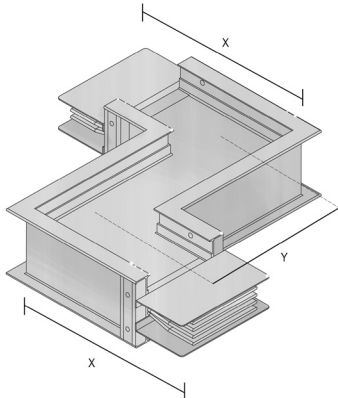
Flatwise Elbow (Up or Down)

Ratings (Amps)	Minimum Leg Size				Standard Leg Size				Maximum Leg Size			
	X		Y		X		Y		X		Y	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
800A	10.08	256	10.08	256	14	355	14	355	30	762	30	762
1000A	10.47	266	10.47	266	14	355	14	355	30	762	30	762
1200A	10.87	276	10.87	276	14	355	14	355	30	762	30	762
1350A	11.14	283	11.14	283	14	355	14	355	30	762	30	762
1600A	11.73	298	11.73	298	14	355	14	355	30	762	30	762
2000A	12.83	326	12.83	326	14	355	14	355	30	762	30	762
2500A	15.04	382	15.04	382	20	508	20	508	30	762	30	762
3000A	16.22	412	16.22	412	20	508	20	508	30	762	30	762
4000A	19.53	496	19.53	496	26	660	26	660	30	762	30	762
4250A	20.71	526	20.71	526	26	660	26	660	30	762	30	762
5000A	23.98	609	23.98	609	26	660	26	660	30	762	30	762

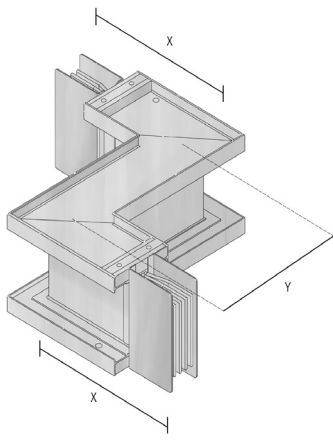
Edgewise Elbow (Left or Right)

Ratings (Amps)	Minimum Leg Size		Standard Leg Size		Maximum Leg Size	
	X and Y		X and Y		X and Y	
	in	mm	in	mm	in	mm
800A, 1000A, 1200A, 1350A, 1600A, 2000A, 2500A, 3000A, 4000A, 4250A, 5000A	12	305	14	355	24	610

OFFSETS



Flatwise Offset



Edgewise Offset

Offset Sections

An offset is used to avoid any obstacles eg. pipes or to steel columns and to conform to the structure of the building.

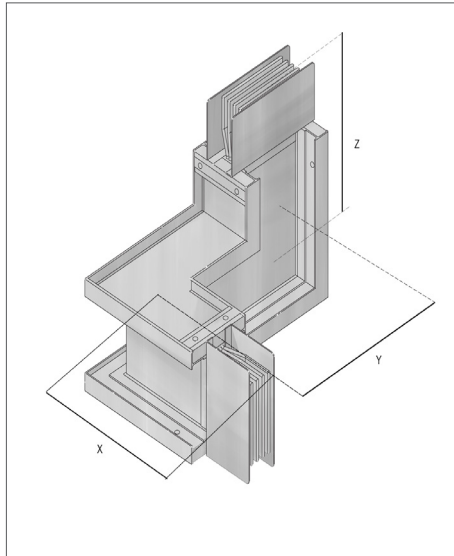
Flatwise Offset (Up or Down)

Ratings (Amps)	Minimum Leg Size				Maximum Leg Size			
	X		Y		X		Y	
	in	mm	in	mm	in	mm	in	mm
800A	10.08	256	2	51	26	660	20.12	511
1000A	10.47	266	2	51	26	660	20.91	531
1200A	10.87	276	2	51	26	660	21.69	551
1350A	11.14	283	2	51	26	660	22.28	566
1600A	11.73	298	2	51	26	660	23.46	596
2000A	12.83	326	2	51	26	660	25.63	651
2500A	15.04	382	2	51	26	660	30.08	764
3000A	16.22	412	2	51	26	660	32.44	824
4000A	19.53	496	2	51	26	660	39.06	992
4250A	20.71	526	2	51	26	660	41.42	1052
5000A	23.98	609	2	51	26	660	47.91	1217

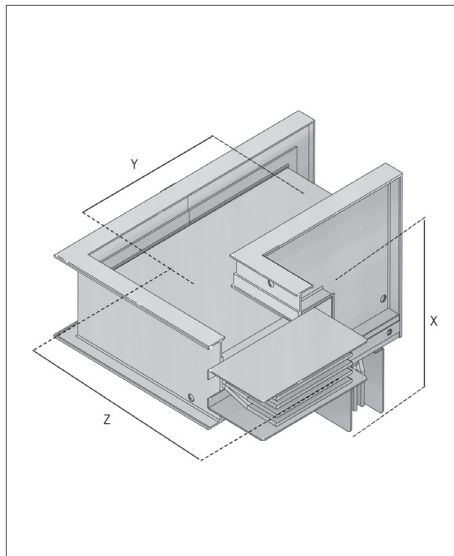
Edgewise Offset (Left or Right)

Ratings (Amps)	Minimum Leg Size				Maximum Leg Size			
	X		Y		X		Y	
	in	mm	in	mm	in	mm	in	mm
800A, 1000A, 1200A, 1350A, 1600A, 2000A, 2500A, 3000A, 4000A, 4250A, 5000A	12	305	3	76	24	610	22	569

COMBINATIONS



Edge Right Flatwise Up



Flatwise Up Edgewise Right

Combination Elbows

Combination elbows are used to conform to the building's structure and to change the direction of the busduct within a confined space.

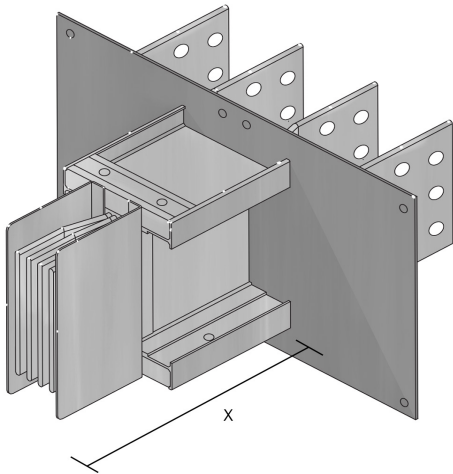
Combination Elbows

Ratings (Amps)	Minimum Leg Size					
	X (Edgewise side)		Y		Z (Flatwise side)	
	in	mm	in	mm	in	mm
800A	12	305	7.64	194	10.08	256
1000A	12	305	8.03	204	10.47	266
1200A	12	350	8.43	214	10.87	276
1350A	12	305	8.74	222	11.14	283
1600A	12	305	9.33	237	11.73	298
2000A	12	305	10.39	264	12.83	326
2500A	12	305	12.64	321	15.04	382
3000A	12	305	13.82	351	16.22	412
4000A	12	305	17.13	435	19.53	496
4250A	12	305	18.31	465	20.71	526
5000A	12	305	21.54	547	23.98	609

Combination Elbows

Ratings (Amps)	Maximum Leg Size					
	X (Edgewise side)		Y		Z (Flatwise side)	
	in	mm	in	mm	in	mm
800A	24	610	21.26	540	30	762
1000A	24	610	21.65	550	30	762
1200A	24	610	22.05	560	30	762
1350A	24	610	22.36	568	30	762
1600A	24	610	22.95	583	30	762
2000A	24	610	24.02	610	30	762
2500A	24	610	26.26	667	30	762
3000A	24	610	27.44	697	30	762
4000A	24	610	30.75	781	30	762
4250A	24	610	31.93	811	30	762
5000A	24	610	35.16	893	30	762

FLANGES



Panel Flange

Panel Flange Connections

Panel Flange connections provide a direct connection to low voltage switchgear, transformer enclosures and other electrical equipment. Standard flanges can be offset to the left or right of the section as required.

Panel Flange

Ratings (Amps)	Minimum		Maximum	
	X		X	
	in	mm	in	mm
800A, 1000A, 1200A, 1350A, 1600A, 2000A, 2500A, 3000A, 4000A, 4250A, 5000A	11	279	33	838

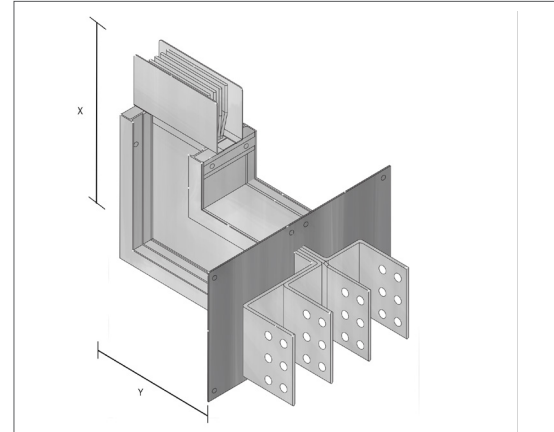
FLANGES

Combination Flange

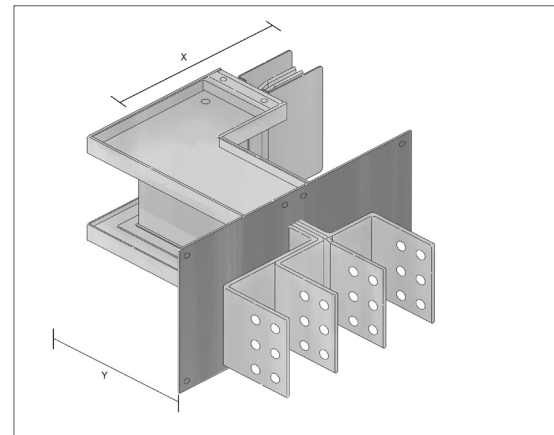
A combination flange is used when the minimum leg lengths for either the standard elbow or the standard flange cannot be met

Flange/Elbows (Flatwise)

Ratings (Amps)	Minimum Leg Size				Maximum Leg Size			
	X		Y		X		Y	
	in	mm	in	mm	in	mm	in	mm
800A	10.08	256	6.42	163	30	762	21.06	535
1000A	10.47	266	6.81	173	30	762	21.46	545
1200A	10.87	276	7.20	183	30	762	21.85	555
1350A	11.14	283	7.52	191	30	762	22.13	562
1600A	11.73	298	8.11	206	30	762	22.72	577
2000A	12.83	326	9.17	233	30	762	23.82	605
2500A	15.04	382	11.42	290	30	762	26.02	661
3000A	16.22	412	12.60	320	30	762	27.20	691
4000A	19.53	496	15.91	404	30	762	30.51	775
4250A	20.71	526	17.09	434	30	762	31.69	805
5000A	23.98	609	20.31	516	30	34.96	888	



Flatwise Elbow Flange

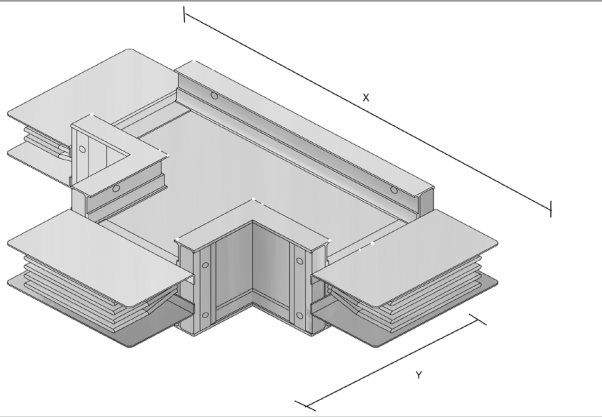


Edgewise Elbow Flange

Flange/Elbows (Edgewise)

Ratings (Amps)	Minimum Leg Size				Maximum Leg Size			
	X		Y		X		Y	
	in	mm	in	mm	in	mm	in	mm
800A, 1000A, 1200A, 1350A, 1600A, 2000A, 2500A, 3000A, 4000A, 4250A, 5000A	12	305	7	178	24	610	23	585

SPECIALS



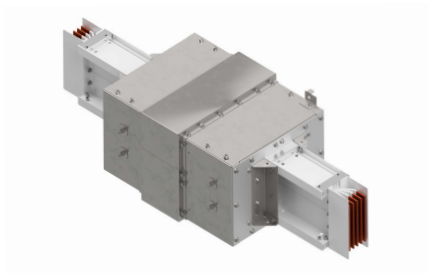
Flatwise Tee

Flatwise Tee's

Flatwise tee's are used to split one busduct run into two runs going indifferent directions.

Flatwise Tee

Ratings (Amps)	Minimum Leg Size				Standard Leg Size				Maximum Leg Size			
	X		Y		X		Y		X		Y	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
800A	20.16	512	10.08	256	28	711	14	355	60	1524	26	660
1000A	20.94	532	10.47	266	28	711	14	355	60	1524	26	660
1200A	21.73	552	10.87	276	28	711	14	355	60	1524	26	660
1350A	22.28	566	11.14	283	28	711	14	355	60	1524	26	660
1600A	23.46	596	11.73	298	28	711	14	355	60	1524	26	660
2000A	25.67	652	12.83	326	28	711	14	355	60	1524	26	660
2500A	30.08	764	15.04	382	40	1016	20	508	60	1524	26	660
3000A	32.44	824	16.22	412	40	1016	20	508	60	1524	26	660
4000A	39.06	992	19.53	496	52	1321	26	660	60	1524	30	762
4250A	41.42	1052	20.71	526	52	1321	26	660	60	1524	30	762
5000A	47.95	1218	23.98	609	52	1321	26	660	60	1524	30	762



Expansion Unit

Expansion Units

Expansion units are used to accommodate the expansion and contraction of a busduct system as well as allow for building movement. They allow for a 2" movement along the length of the busduct.

Expansion units are recommended when a straight busduct run exceeds 196ft.

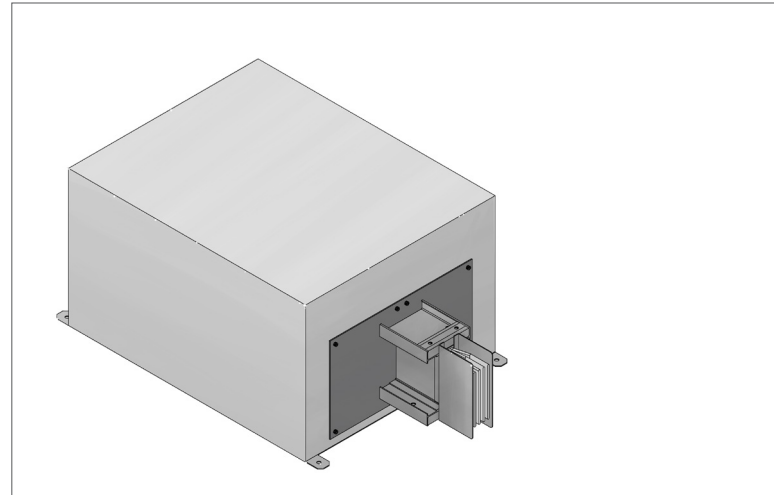
FEED UNITS AND CAPS

Cable Feed Units

End feed units are used on the ends of busduct risers which are cable fed. Center feed units are used in the middle of busduct risers which are cable fed.

The size of cable feed required depends on a number of factors:

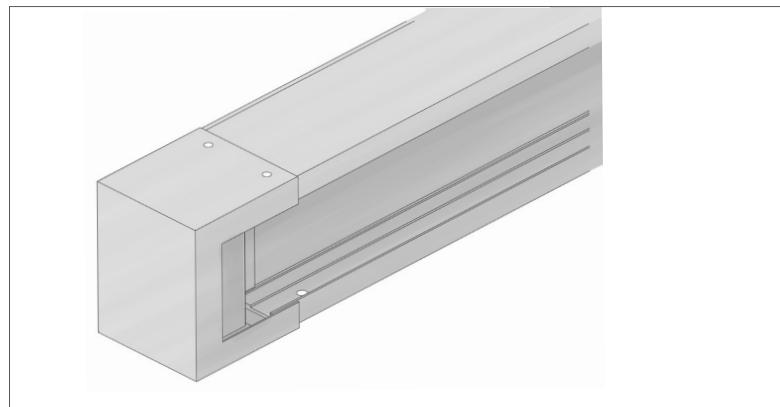
- rating of busduct
- size of cable
- number of cables
- use of a protective device or isolator



End Feed Units

End Caps

End caps are used to safely cap off the end of a busduct run. The end cap units are factory fitted but can be easily removed to allow for the extension of the system.



End Caps

SPLICE



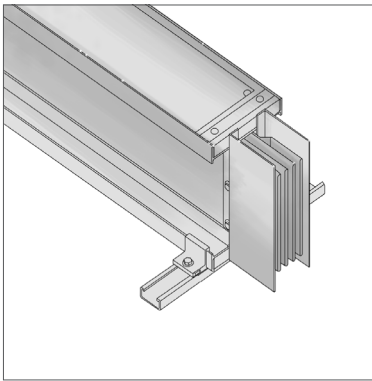
Splice

E+I Engineering's Splice

E+I Engineering's splice is a compression joint design utilising a specially designed Belleville washer to distribute the pressure evenly over the splice. The splice is supplied in specific sizes depending on the rating of busduct required.

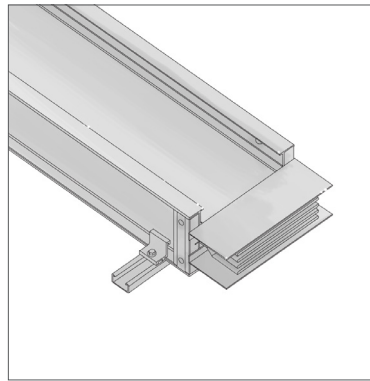
INSTALLATION

The modular design of HPB allows it to be installed flat or on its edge.



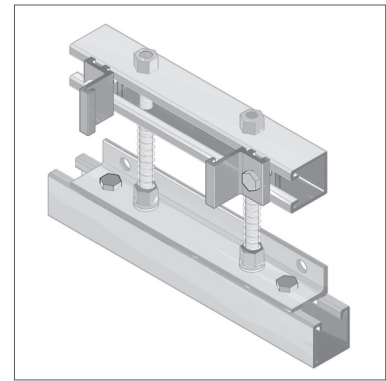
Edge installation

Edge installation is the preferred method of installation for a smaller rated busduct system.



Flat Installation

Flat installation is the preferred method of installation for a higher rated, multistack busduct system. When installed on its flat all busduct rating has a height of 148mm.



Spring Hanger

Spring hangers are used to support vertical busbar runs on each floor. They compensate for building movement and thermal expansion.

Special Pieces

E+I Engineering manufacture a variety of more specialised units and components to meet unique system requirements. These include: edgewise tee's, flatwise cross, step up/ step down reducers, phase rotation units, in-line disconnect cubicles, in-line busplugs, custom built busduct connection units.

TECHNICAL DATA

Technical Data - Aluminium					
Rated Current (A)	800	1000	1200	1350	1600
Rated Operational Voltage (V)	600	600	600	600	600
Rated Insulation Voltage (V)	600	600	600	600	600
Short Circuit					
6 Cycle RMS Symmetrical Short circuit rating (KA)	75	100	100	100	150
Phase Conductor Cross Sectional Area					
inches ²	0.56	0.74	0.93	1.07	1.35
milimeters ²	360	480	600	690	870
Neutral Conductor Cross Sectional Area					
inches ²	0.56	0.74	0.93	1.07	1.35
milimeters ²	360	480	600	690	870
Isolated 100% Ground Conductor					
inches ²	0.56	0.74	0.93	1.07	1.35
milimeters ²	360	480	600	690	870
50% Ground Cross Sectional Area					
inches ²	0.28	0.37	0.47	0.53	0.67
milimeters ²	180	240	300	345	435
Housing Ground Path					
inches ²	3.80	3.93	4.06	4.16	4.36
180milimeters ²	2454	2538	2622	2685	2811
Overall Dimensions					
Height x Width (in)	4.72 x 5.83	5.51 x 5.83	6.30 x 5.83	6.89 x 5.83	8.07 x 5.83
Height x Width (mm)	120 x 148	140 x 148	160 x 148	175 x 148	205 x 148
Weight					
Weight of 4 Bar System (lbs/ft)	6.65	7.78	8.91	9.76	11.44
Weight of 5 Bar System (lbs/ft)	7.31	8.67	10.03	11.04	13.05
Resistance					
Resistance (mΩ/100ft) at 68°F	2.510	2.009	1.397	1.245	1.165
Resistance (mΩ/100ft) at 176°F	3.15	2.527	1.754	1.562	1.466
Reactance					
Reactance (mΩ/100ft) at 60Hz	0.52	0.430	0.308	0.278	0.265
Impedance					
Impedance (mΩ/m) at 176°F	3.193	2.563	1.781	1.587	1.490
Voltage Drop Full Load 60Hz per 100ft					
Power Factor = 0.7 (V/100ft) at 176°F	3.570	3.596	3.009	3.021	3.368
Power Factor = 0.8 (V/100ft) at 176°F	3.924	3.948	3.300	3.312	3.691
Power Factor = 0.9 (V/100ft) at 176°F	4.242	4.264	3.560	3.570	3.976
Power Factor = 1.0 (V/100ft) at 176°F	4.365	4.377	3.646	3.652	4.063

Technical Data						
Rated Current (A)	2000	2500	3000	4000	4250	5000
Rated Operational Voltage (V)	600	600	600	600	600	600
Rated Insulation Voltage (V)	600	600	600	600	600	600
Short Circuit						
6 Cycle RMS Symmetrical Short circuit rating (KA)	150	200	200	200	200	200
Phase Conductor Cross Sectional Area						
inches ²	1.86	2.14	2.70	3.49	4.05	5.58
millimeters ²	1200	1380	1740	2250	2610	3600
Neutral Conductor Cross Sectional Area						
inches ²	1.86	2.14	2.70	3.49	4.05	5.58
millimeters ²	1200	1380	1740	2250	2610	3600
Isolated 100% Ground Conductor						
inches ²	1.86	2.14	2.70	3.49	4.05	5.58
millimeters ²	1200	1380	1740	2250	2610	3600
50% Ground Cross Sectional Area						
inches ²	0.93	1.07	1.35	1.74	2.02	2.79
millimeters ²	600	690	870	1125	1305	1800
Housing Ground Path						
inches ²	4.72	4.83	5.22	5.70	6.09	7.16
millimeters ²	3042	3117	3369	3676	3928	4621
Overall Dimensions						
Height x Width (in)	10.24 x 5.83	14.69x 5.83	17.05 x 5.83	23.66 x 5.83	26.02 x 5.83	32.52 x 5.83
Height x Width (mm)	260 x 148	373 x 148	433 x 148	601 x 148	661 x 148	826 x 148
Weight						
Weight of 4 Bar System (lbs/ft)	14.58	19.52	22.87	30.98	34.30	43.72
Weight of 5 Bar System (lbs/ft)	16.81	22.08	26.11	35.16	39.16	50.42
Resistance						
Resistance (mΩ/100ft) at 20°F	0.844	0.741	0.582	0.397	0.360	0.290
Resistance (mΩ/100ft) at 80°F	1.061	0.930	0.732	0.497	0.452	0.364
Reactance						
Reactance (mΩ/100ft) at 60Hz	0.201	0.160	0.134	0.094	0.086	0.071
Impedance						
Impedance (mΩ/m) at 176°F	1.080	0.944	0.744	0.506	0.460	0.371
Voltage Drop Full Load 60Hz per 100ft						
Power Factor = 0.7 (V/100ft) at 176°F	3.070	3.314	3.160	2.875	2.781	2.646
Power Factor = 0.8 (V/100ft) at 176°F	3.358	3.637	3.461	3.145	3.042	2.891
Power Factor = 0.9 (V/100ft) at 176°F	3.611	3.926	3.727	3.383	3.270	3.105
Power Factor = 1.0 (V/100ft) at 176°F	3.675	4.027	3.803	3.443	3.327	3.152

QUICK REFERENCE GUIDE

Critical Dimensions

- The distance from the centre of a joint to the wall, ceiling or floor must be at least 7 inches.
- All joints must be accessible for maintenance. Joints should not be located inside a wall, ceiling or floor.
- There must be a minimum distance of 2 inches between the busbar and any wall/ ceiling/ other busduct.
- Allow adequate space for busplug units to be installed easily and safely.
- Busbar lengths are available from 2ft - 12ft.
- Distribution busbar lengths are available from 2ft - 12ft.
- Edgewise elbow sections are available with leg lengths from 10in - 2ft.
- Flatwise elbow sections are available with a maximum leg length of 2.5ft. The minimum leg length varies depending on the busbar.

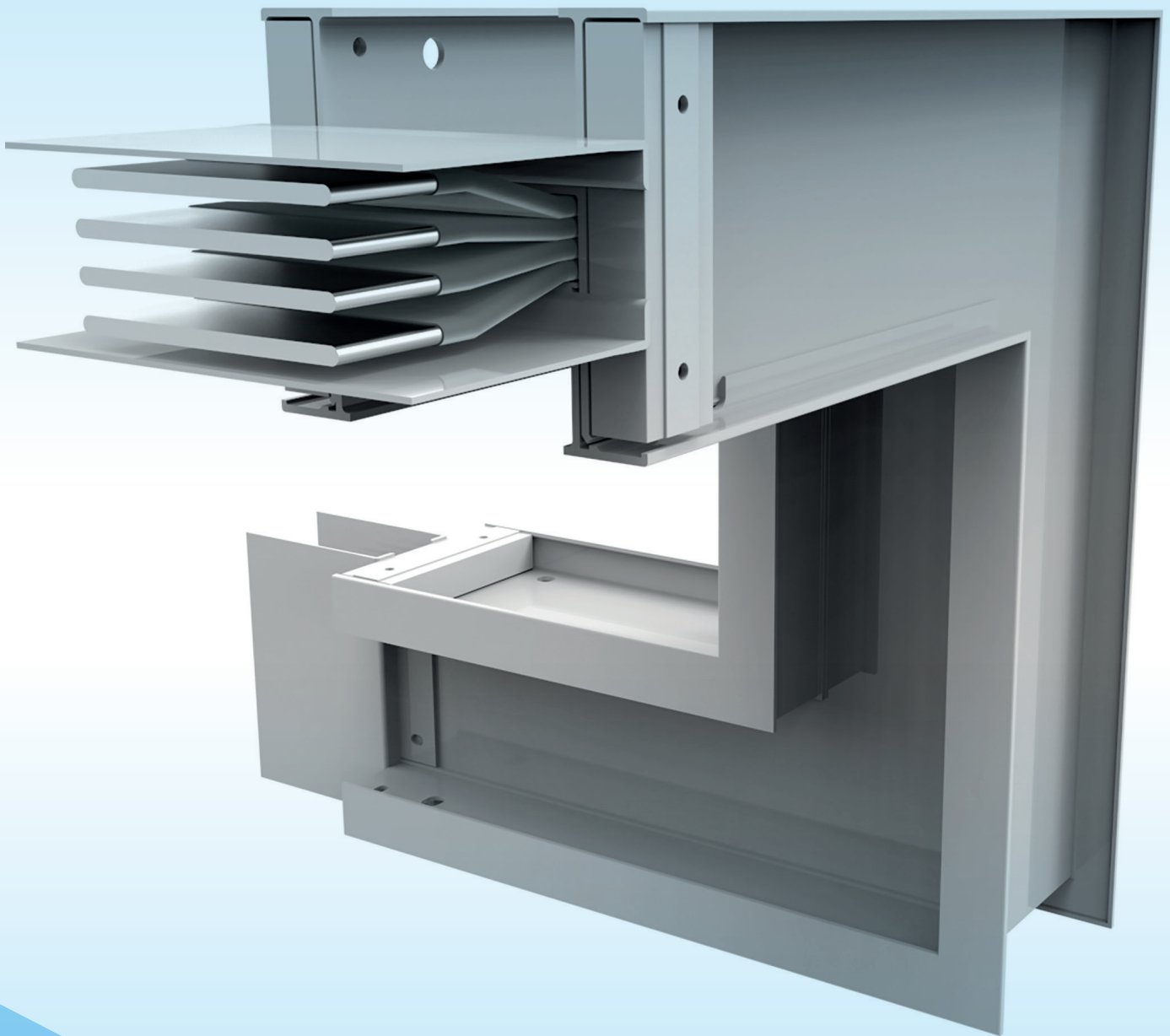
Operating Conditions

- Ambient temperature from -22°F to +131°F

- Relative humidity of 95% or below.
- This product designed for indoor use and can be installed horizontally or vertically.

Critical Details

- Busduct drawings must include all relevant dimensions. Centre-line dimensions are expected. Please highlight any dimensions that are not centre-line.
- Walls and floors must be indicated and the relevant dimensions provided.
- The phasing and location of all switchboards must be provided.
- Full details are required for any transformer connections.
- Horizontal busduct must be installed with the neutral phase to the top. Please indicate the phase orientation for vertically installed busduct





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