



E+I ENGINEERING GROUP

HIGH POWERBAR

COPPER UL857



PowerBar



HIGH POWERBAR

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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 600A - 6000A with multiple bar configurations to suit project requirements.

The busduct is housed in an aluminum casing which acts as a ground. Ingress protection ratings of IP55 and IP65 are available.

Features:

- Epoxy resin coated copper conductors with tin or silver coated finish
- Joint pack construction with double-headed shear nut for quick installation
- Up to 6 plug points per 12ft length
- All bus plugs have mechanical/ electrical interlocks with a 'ground first, break last' safety feature
- Pressed out tags for busplug connections

STANDARDS

Standards

The HPB 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

- 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 Type Rating Tests (Ingress Protection Tests) for the 2 series /UL 50

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

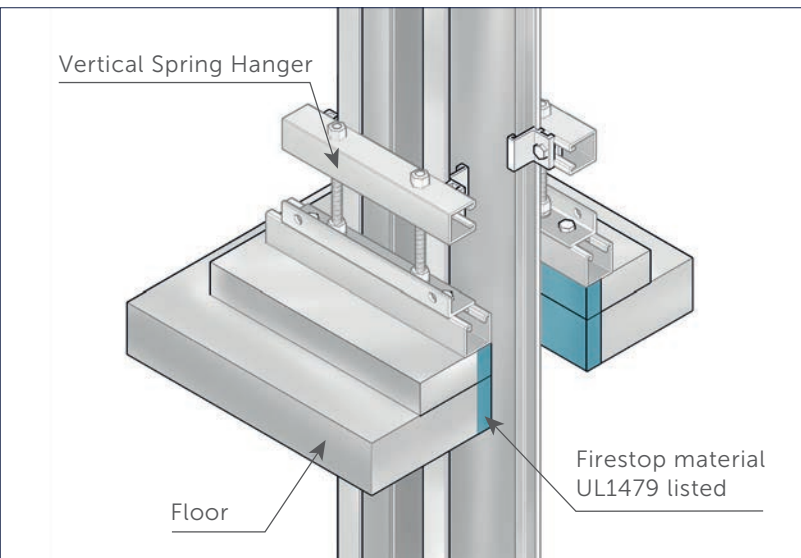


Health and Safety
ISO 45001:2018
No. 0087570

Quality Management
ISO 9001:2015
No.18346

Environmental Management
ISO 14001:2015
No. 18347

TECHNICAL FEATURES



UL Fire Stop System

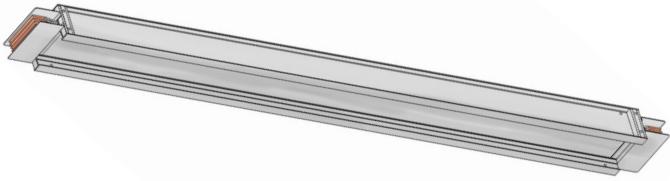
- High Powerbar is constructed from high density 99.99% conductivity copper
- The conductors are insulated with a Class B epoxy insulation applied uniformly using an electrostatic coating process. The epoxy coating is non-hygroscopic and chemical resistant with outstanding heat transfer characteristics
- The low impedance sandwich design:
 - Improves heat dissipation
 - Improves short circuit rating
 - Reduces voltage drop/ impedance
 - Removes potential pathways for flame, smoke and gas
- E-I Engineering's patented process of pressed out tabs to connect busplugs protects the integrity of the conductor
- HPB is constructed with an all-aluminum housing. Aluminum is an extremely light metal and is cheaper and easier to install than steel. Aluminum 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

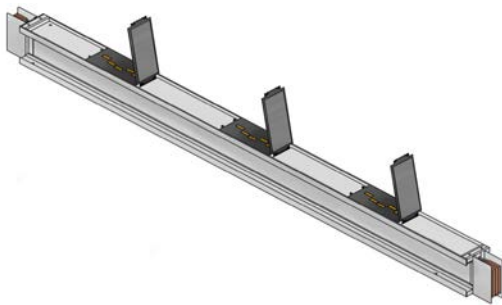
Configuration	Phases	Neutral	Ground
TP	100%	0%	Case
TP/N	100%	100%	Case
TP/E	100%	0%	100% or 50%
TP/NE	100%	100%	100% or 50%
TP/DN	100%	200%	Case

Note: Case refers to the aluminum casing being used as an integral ground. 100% or 50% ground bar can either be supplied as an isolated ground (ISO) or uninsulated internal ground (INT).

STRAIGHT LENGTHS



Feeder lengths account for the bulk of a busbar run



Distribution lengths allow tap off units to be plugged into the busbar run

Straight Lengths

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

The busplug slot outlet and cover are made from a durable, high strength, Class B, 130°C 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 as standard.

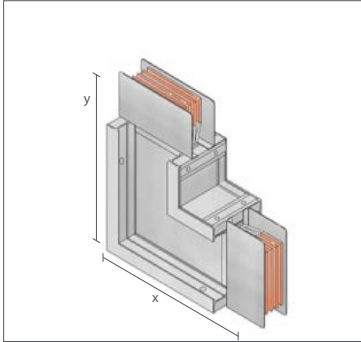
Busduct Rating (Amps)	Construction Type	Busduct Size			
		Width		Height	
		in	mm	in	mm
600A	Single	5.82	148	3.74	95
800A	Single	5.82	148	4.13	105
1000A	Single	5.82	148	4.33	110
1200A	Single	5.82	148	4.72	120
1350A	Single	5.82	148	5.31	135
1600A	Single	5.82	148	6.30	160
2000A	Single	5.82	148	7.87	200
2500A	Single	5.82	148	9.84	250
3000A	Double	5.82	148	13.50	343
3200A	Double	5.82	148	14.29	363
4000A	Triple	5.82	148	19.53	496
5000A	Triple	5.82	148	23.66	601
6000A	Triple	5.82	148	27.80	706

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 center of the joint.

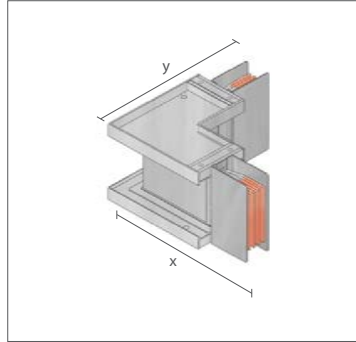
ELBOWS

Flatwise and Edgewise Elbows

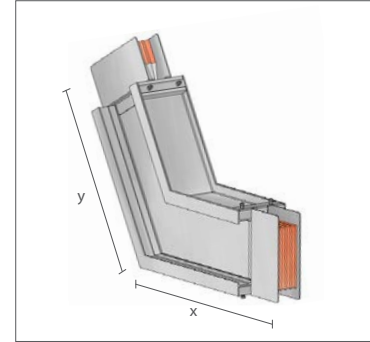
Flatwise and edgewise elbows are used to make 90° changes in the direction of the busduct system. E+I Engineering can also manufacture specially angled elbows for both flatwise and edgewise products.



Flatwise Elbows



Edgewise Elbows



Custom Elbows

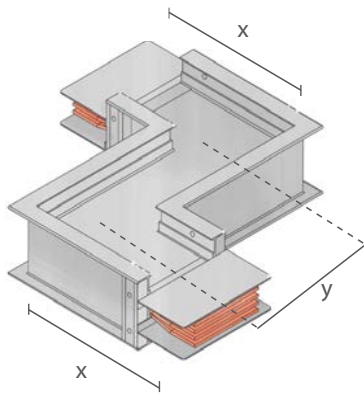
Flatwise Elbow (Up or Down)

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
600A	9.57	243	9.57	243	14	355	14	355	30	762	30	762
800A	9.76	248	9.76	248	14	355	14	355	30	762	30	762
1000A	9.88	251	9.88	251	14	355	14	355	30	762	30	762
1200A	10.08	256	10.08	256	14	355	14	355	30	762	30	762
1350A	10.35	263	10.35	263	14	355	14	355	30	762	30	762
1600A	10.87	276	10.87	276	14	355	14	355	30	762	30	762
2000A	11.65	296	11.65	296	14	355	14	355	30	762	30	762
2500A	12.64	321	12.64	321	14	355	14	355	30	762	30	762
3000A	14.45	367	14.45	367	20	508	20	508	30	762	30	762
3200A	14.84	377	14.84	377	20	508	20	508	30	762	30	762
4000A	17.48	444	17.48	444	26	660	26	660	30	762	30	762
5000A	19.53	496	19.53	496	26	660	26	660	30	762	30	762
6000A	21.61	549	21.61	549	26	660	26	660	30	762	30	762

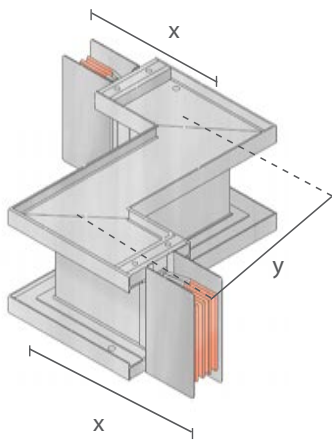
Edgewise Elbow (Left or Right)

Ratings (Amps)	Minimum Leg Size				Standard Leg Size				Maximum Leg Size			
	X		Y		X		Y		X		Y	
	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm
600A,800A,1000A, 1200A, 1350A, 1600A, 2000A, 2500A, 3000A, 3200A, 4000A, 5000A, 6000A	12	305	12	305	14	355	14	355	24	610	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
600A	9.57	243	2	51	26	660	19.13	486
800A	9.76	248	2	51	26	660	19.53	496
1000A	9.88	251	2	51	26	660	19.72	501
1200A	10.08	256	2	51	26	660	20.12	511
1350A	10.35	263	2	51	26	660	20.71	526
1600A	10.87	276	2	51	26	660	21.69	551
2000A	11.65	296	2	51	26	660	23.27	591
2500A	12.64	321	2	51	26	660	25.24	641
3000A	14.45	367	2	51	26	660	28.90	734
3200A	14.84	377	2	51	26	660	29.69	754
4000A	17.48	444	2	51	26	660	34.92	887
5000A	19.53	496	2	51	26	660	39.06	992
6000A	21.61	549	2	51	26	660	43.19	1097

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
600A, 800A, 1000A, 1200A, 1350A, 1600A, 2000A, 2500A, 3000A, 3200A, 4000A, 5000A, 6000A	12	305	3	76	24	610	22	569

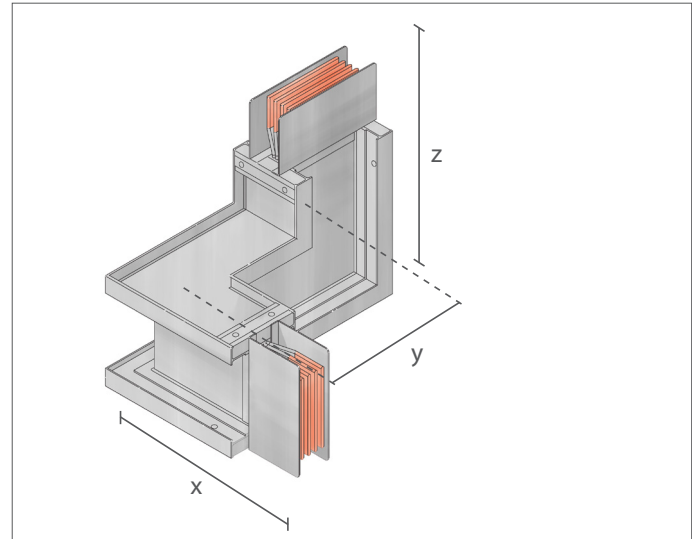
COMBINATIONS

Combination Elbows

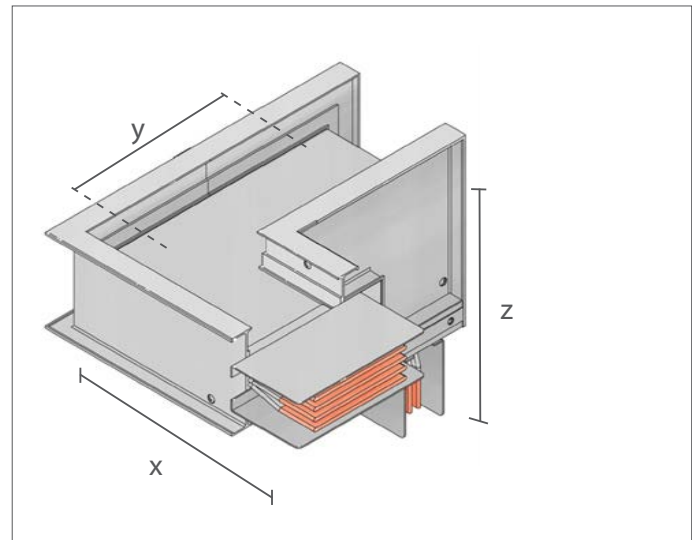
Combination elbows are used to conform to the building's structure and to change the direction of the busduct within a confined space.

Ratings (Amps)	Minimum Leg Size					
	X (Edgewise side)		Y		Z (Flatwise side)	
	in	mm	in	mm	in	mm
600A	12	305	7.17	182	9.57	243
800A	12	305	7.36	187	9.76	248
1000A	12	305	7.44	189	9.88	251
1200A	12	305	7.64	194	10.08	256
1350A	12	305	7.95	202	10.35	263
1600A	12	305	8.43	214	10.87	276
2000A	12	305	9.21	234	11.65	296
2500A	12	305	10.20	259	12.64	321
3000A	12	305	12.05	306	14.45	367
3200A	12	305	12.44	316	14.84	377
4000A	12	305	15.04	382	17.48	444
5000A	12	305	17.13	435	19.53	496
6000A	12	305	19.17	487	21.61	549

Ratings (Amps)	Maximum Leg Size					
	X (Edgewise side)		Y		Z (Flatwise side)	
	in	mm	in	mm	in	mm
600A	24	610	20.79	528	30	762
800A	24	610	20.98	533	30	762
1000A	24	610	21.06	535	30	762
1200A	24	610	21.26	540	30	762
1350A	24	610	21.57	548	30	762
1600A	24	610	22.05	560	30	762
2000A	24	610	22.83	580	30	762
2500A	24	610	23.82	605	30	762
3000A	24	610	25.67	652	30	762
3200A	24	610	26.06	662	30	762
4000A	24	610	28.66	728	30	762
5000A	24	610	30.75	781	30	762
6000A	24	610	32.80	833	30	762

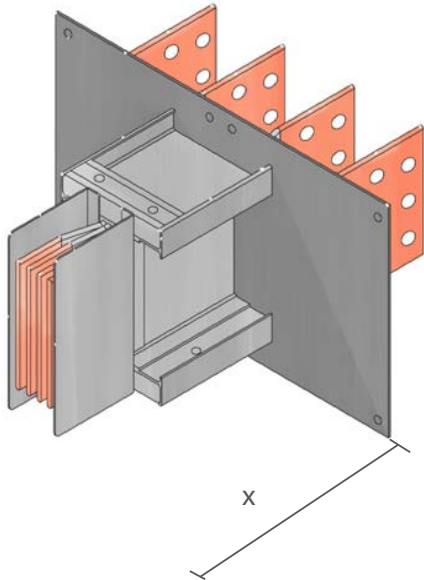


Edge Right Flatwise Up



Flatwise Up Edgewise Right

FLANGES



Panel Flange

Flange Connections

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

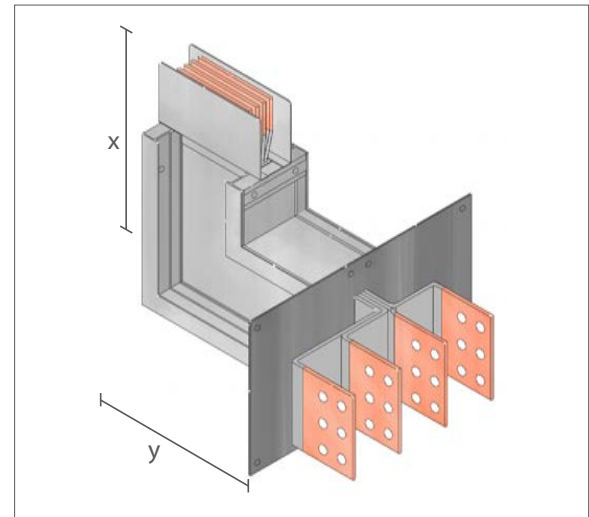
Ratings (Amps)	Width		Height	
	in	mm	in	mm
600A, 800A, 1000A, 1200A, 1350A, 1600A, 2000A, 2500A, 3000A, 3200A, 4000A, 5000A, 6000A	11	279	33	838

Combination Flange

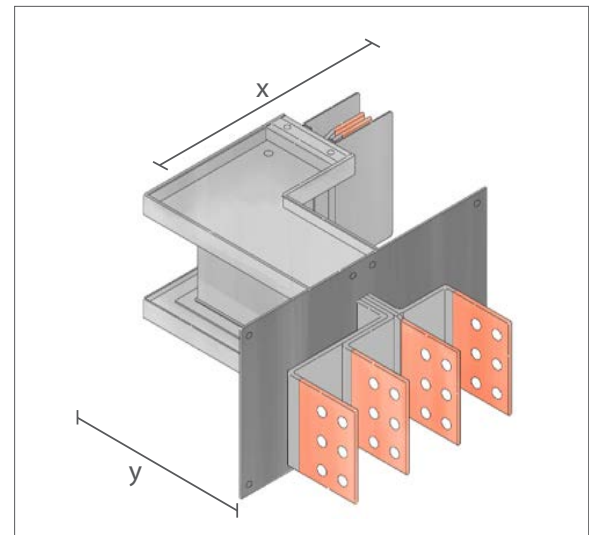
A combination flange is used when the minimum leg lengths for either the standard elbow or the standard flange cannot be met.

Flange/Elbows (Flatwise)

Ratings (Amps)	Minimum Leg Size				Maximum Leg Size			
	X		Y		X		Y	
	in	mm	in	mm	in	mm	in	mm
600A	9.57	243	5.94	151	30	762	20.55	522
800A	9.76	248	6.14	156	30	762	20.75	527
1000A	9.88	251	6.22	158	30	762	20.87	530
1200A	10.08	256	6.42	163	30	762	21.06	535
1350A	10.35	263	6.73	171	30	762	21.34	542
1600A	10.87	276	7.20	183	30	762	21.85	555
2000A	11.65	296	7.99	203	30	762	22.64	575
2500A	12.64	321	8.98	228	30	762	23.62	600
3000A	14.45	367	10.83	275	30	762	25.43	646
3200A	14.84	377	11.22	285	30	762	25.83	656
4000A	17.48	444	13.82	351	30	762	28.46	723
5000A	19.53	496	15.91	404	30	762	30.51	775
6000A	21.61	549	17.95	456	30	762	32.60	828



Flatwise Elbow Flange

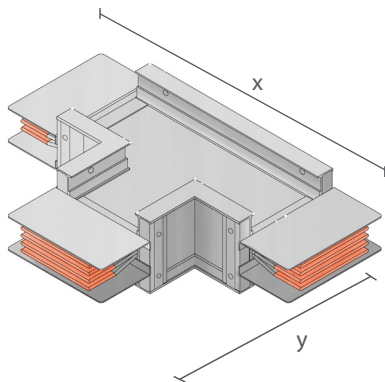


Edgewise Elbow Flange

Flange/Elbows (Edgewise)

Ratings (Amps)	Minimum Leg Size				Maximum Leg Size			
	X		Y		X		Y	
	in	mm	in	mm	in	mm	in	mm
600A, 800A, 1000A, 1200A, 1350A, 1600A, 2000A, 2500A, 3000A, 3200A, 4000A, 5000A, 6000A	12	305	7	178	24	610	23	585

SPECIALS



Flatwise Tee

Flatwise Tee

Flatwise tee's are used to split one busduct run into two runs going in different 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
600A	19.13	486	9.57	243	28	711	14	355	60	1524	26	660
800A	19.53	496	9.76	248	28	711	14	355	60	1524	26	660
1000A	19.76	502	9.88	251	28	711	14	355	60	1524	26	660
1200A	20.16	512	10.08	256	28	711	14	355	60	1524	26	660
1350A	20.71	526	10.35	263	28	711	14	355	60	1524	26	660
1600A	21.73	552	10.87	276	28	711	14	355	60	1524	26	660
2000A	23.31	592	11.65	296	28	711	14	355	60	1524	26	660
2500A	25.28	642	12.64	321	28	711	14	355	60	1524	26	660
3000A	28.90	734	14.45	367	40	1016	20	508	60	1524	26	660
3200A	29.69	754	14.84	377	40	1016	20	508	60	1524	26	660
4000A	34.96	888	17.48	444	52	1321	26	660	60	1524	30	762
5000A	39.06	992	19.53	496	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 1.57" movement along the length of the busduct.

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

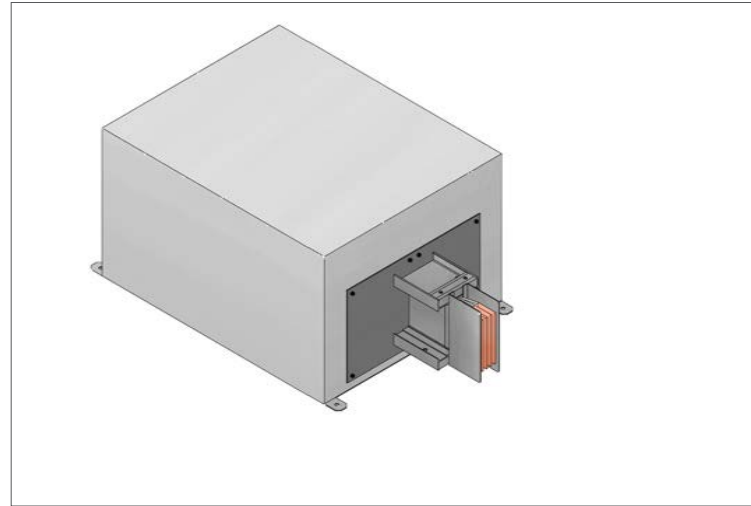
FEED UNITS & CAPS

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:

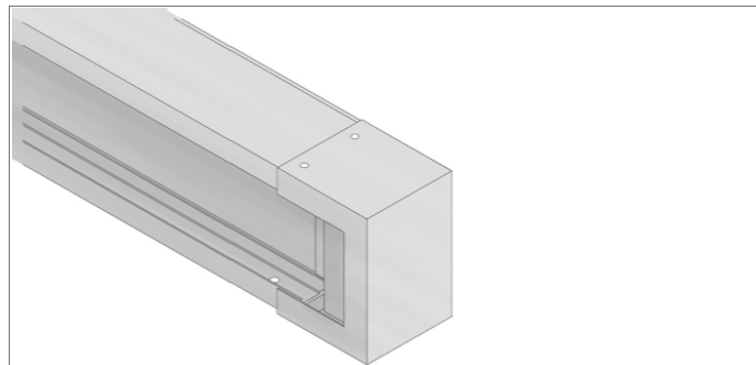
- rating of busduct
- size of cable
- number of cables
- use of a protective device or isolator



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

Splice

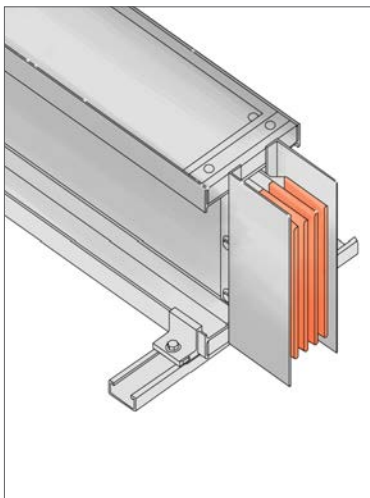
E+I Engineering's splice is a compression joint design utilising a specially designed Belleville washer to distribute the pressure evenly over the splice. The splice is supplied in specific sizes depending on the rating of busduct required.

INSTALLATION

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

Edge Installation

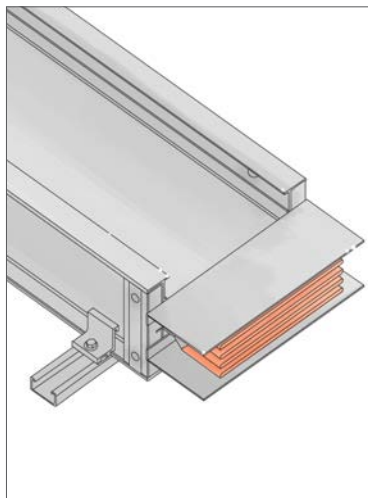
Edge installation is the preferred method of installation for a smaller rated busbar system.



Edge Installation

Flat Installation

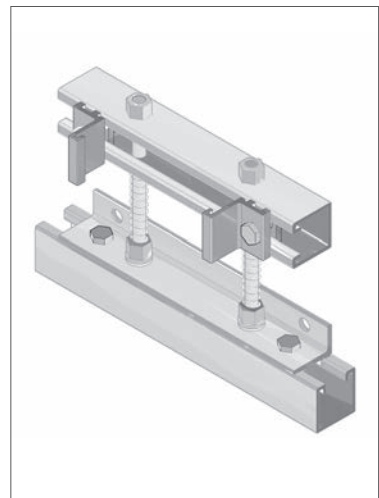
Flat installation is the preferred method of installation for a higher rated, multistack busbar system. When installed on its flat all busbar rating has a height of 148 mm.



Flat Installation

Spring Hanger

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



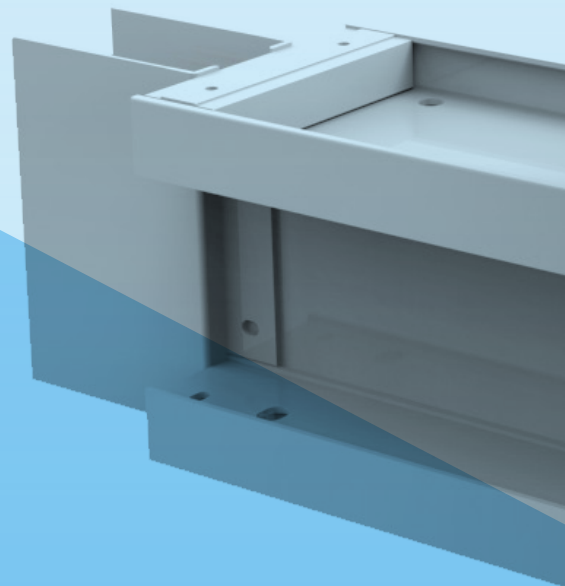
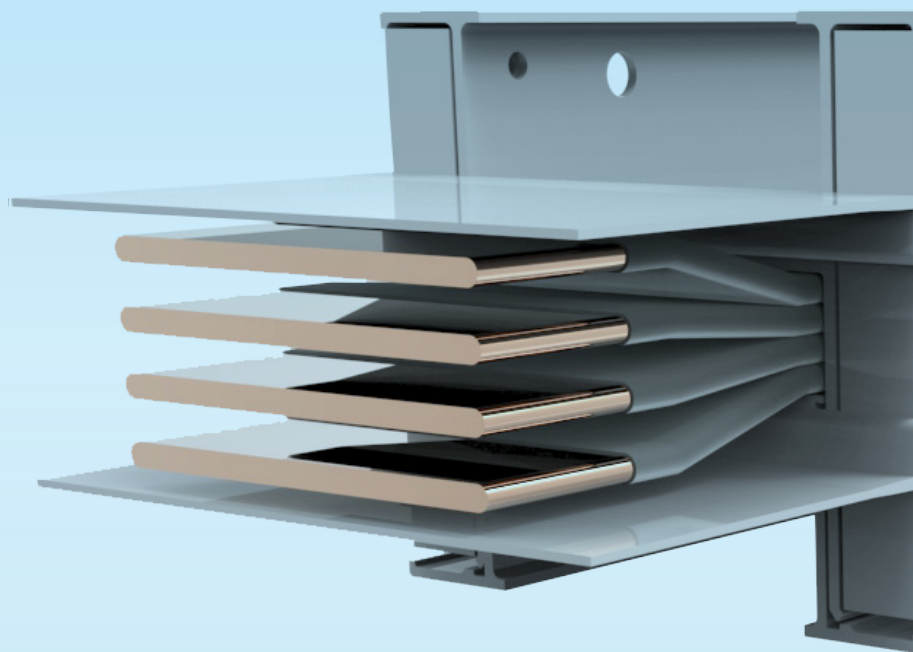
Spring Hanger

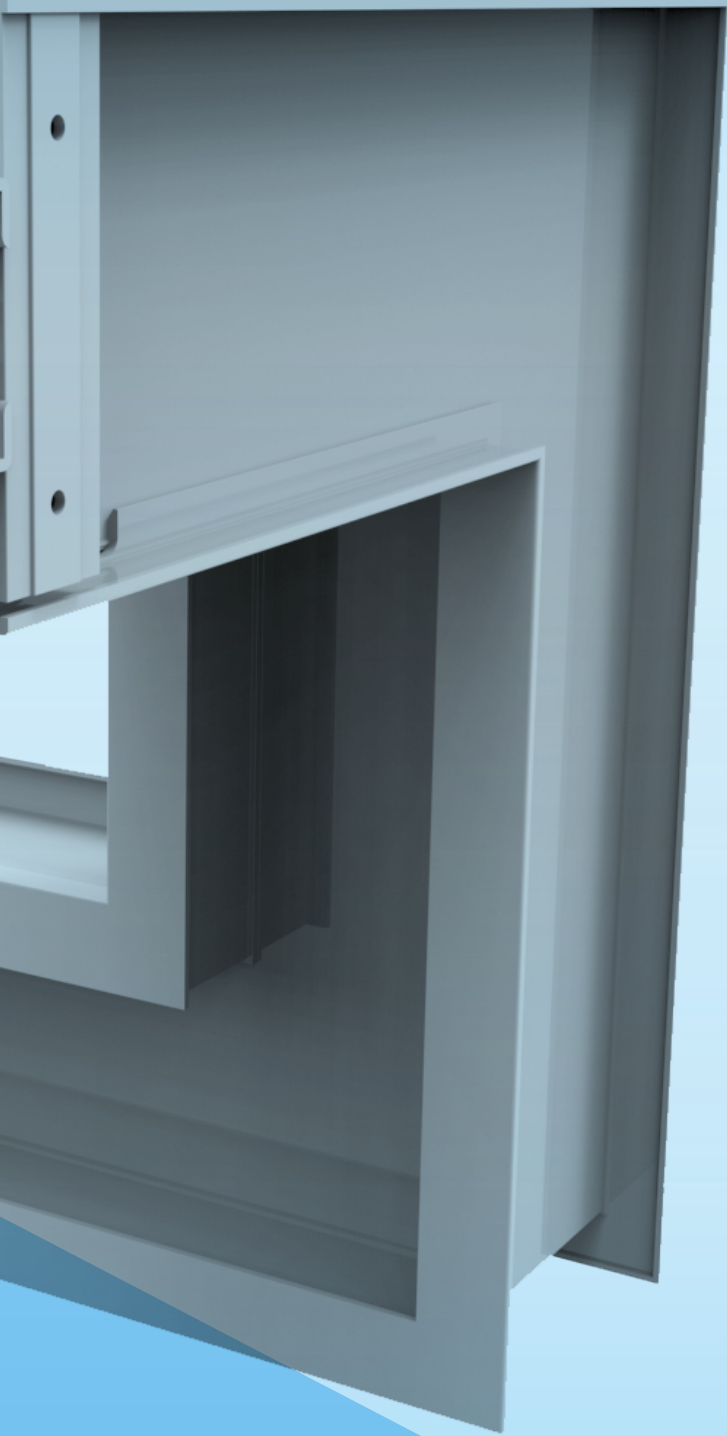
Special Pieces

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 tap off units, custom built busbar connection units.

HIGH POWERBAR

COPPER UL857





TECHNICAL DATA

Technical Data							
Rated Current (A)	600	800	1000	1200	1350	1600	2000
Rated Operational Voltage (V)	600	600	600	600	600	600	600
Rated Insulation Voltage (V)	600	600	600	600	600	600	600
Short Circuit							
6 Cycle RMS Symmetrical Short circuit rating (kA)	*50	*65	75	100	100	150	150
Phase Conductor Cross Sectional Area							
inches ²	0.33	0.42	0.47	0.56	0.70	0.93	1.30
millimeters ²	210	270	300	360	450	600	840
Neutral Conductor Cross Sectional Area							
inches ²	0.33	0.42	0.47	0.56	0.70	0.93	1.30
millimeters ²	210	270	300	360	450	600	840
Isolated 100% Ground Conductor Cross Sectional Area							
inches ²	0.33	0.42	0.47	0.56	0.70	0.93	1.30
millimeters ²	210	270	300	360	450	600	840
50% Ground Cross Sectional Area							
inches ²	0.16	0.21	0.23	0.28	0.35	0.46	0.65
millimeters ²	105	135	150	180	225	300	420
Housing Ground Path Cross Sectional Area							
inches ²	3.64	3.71	3.74	3.80	3.90	4.06	4.32
millimeters ²	2349	2391	2412	2454	2517	2622	2790
Overall Dimensions							
Height x Width (in)	3.74x5.83	4.13 x 5.83	4.33 x 5.83	4.72 x 5.83	5.32 x 5.83	6.30 x 5.83	7.87 x 5.83
Height x Width (mm)	95x148	105 x 148	110 x 148	120 x 148	135 x 148	160 x 148	200 x 148
Weight							
Weight of 4 Bar System (lbs/ft)	9.69	9.69	12.89	14.57	17.09	21.29	28.01
Weight of 5 Bar System (lbs/ft)	10.12	11.16	14.80	16.87	20.33	25.12	33.37
Resistance							
Resistance (mΩ/100ft) at 68.5 ^o F	2.32	1.930	1.450	1.098	0.838	0.561	0.480
Resistance (mΩ/100ft) at 176 ^o F	2.78	2.316	1.785	1.385	1.042	0.732	0.587
Reactance							
Reactance (mΩ/100ft) at 60Hz	0.67	0.6059	0.558	0.497	0.406	0.293	0.267
Impedance							
Impedance (mΩ/m) at 176 ^o F	2.86	2.4	1.840	1.437	1.092	0.756	0.640
Voltage Drop Full Load 60Hz per 100ft							
Power Factor = 0.7 (V/100ft) at 176 ^o F	3.74	3.34	2.853	2.752	2.384	1.998	2.083
Power Factor = 0.8 (V/100ft) at 176 ^o F	4.00	3.57	3.052	2.922	2.519	2.109	2.181
Power Factor = 0.9 (V/100ft) at 176 ^o F	4.19	3.74	3.203	3.041	2.606	2.179	2.233
Power Factor = 1.0 (V/100ft) at 176 ^o F	4.04	3.61	3.091	2.879	2.436	2.018	2.033

*3 cycle RMS Symmetrical short circuit rating (kA)

Technical Data						
Rated Current (A)	2500	3000	3200	4000	5000	6000
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	1.77	1.86	2.04	2.51	3.49	4.46
millimeters ²	1140	1200	1320	1620	2250	2880
Neutral Conductor Cross Sectional Area						
inches ²	1.77	1.86	2.04	2.51	3.49	4.46
millimeters ²	1140	1200	1320	1620	2250	2880
Isolated 100% Ground Conductor Cross Sectional Area						
inches ²	1.77	1.86	2.04	2.51	3.49	4.46
millimeters ²	1140	1200	1320	1620	2250	2880
50% Ground Cross Sectional Area						
inches ²	0.88	0.93	1.02	1.25	1.74	2.23
millimeters ²	570	600	660	810	1125	1440
Housing Ground Path Cross Sectional Area						
inches ²	4.65	4.64	4.77	5.01	5.70	6.38
millimeters ²	3000	2991	3075	3235	3676	4117
Overall Dimensions						
Height x Width (in)	9.84 x 5.83	13.50 x 5.83	14.29 x 5.83	19.52 x 5.83	23.66 x 5.83	27.80 x 5.83
Height x Width (mm)	250 x 148	343 x 148	363 x 148	496 x 148	601 x 148	706 x 148
Weight						
Weight of 4 Bar System (lbs/ft)	36.42	43.17	47.03	58.37	59.95	81.31
Weight of 5 Bar System (lbs/ft)	43.69	50.97	55.10	68.59	70.17	97.43
Resistance						
Resistance (mΩ/100ft) at 68 ^o F	0.327	0.293	0.290	0.232	0.149	0.146
Resistance (mΩ/100ft) at 176 ^o F	0.403	0.341	0.335	0.283	0.199	0.195
Reactance						
Reactance (mΩ/100ft) at 60Hz	0.176	0.146	0.144	0.128	0.075	0.073
Impedance						
Impedance (mΩ/m) at 176 ^o F	0.428	0.366	0.359	0.039	0.199	0.195
Voltage Drop Full Load 60Hz						
Power Factor = 0.7 (V/100ft) at 176 ^o F	1.766	1.785	1.870	2.008	0.167	1.962
Power Factor = 0.8 (V/100ft) at 176 ^o F	1.854	1.879	1.965	2.103	1.765	2.078
Power Factor = 0.9 (V/100ft) at 176 ^o F	1.903	1.928	2.020	2.153	1.831	2.156
Power Factor = 1.0 (V/100ft) at 176 ^o F	1.745	1.774	1.859	1.960	1.721	2.028

HIGH POWERBAR

COPPER UL857



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