E+I ENGINEERING GROUP

HIGH POWERBAR

COPPER

PowerBar

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COPPER

E+I Engineering's High Powerbar (HPB) is a 1000 Volt totally encased, non-ventilated, low impedance busbar. The range is available from 1000A - 6600A with multiple bar configurations to suit project requirements.

The busbar is housed in an aluminium casing which acts as an earth. Ingress protection ratings are available from IP55 - IP67.

Features:

- Copper conductor, with tin or silver coated finish
- Joint pack construction with double headed shear nuts for quick installation
- Up to 5 tap off points per 3m length
- All tap offs have mechanical/electrical interlocks with an 'earth first, break last' safety feature
- Pressed out tags for tap off connections

STANDARDS

Standards

The HPB range is fully ASTA Tested Certified. It is manufactured in a certified management system environment where Quality ISO 9001, Safety OHSAS 18001 and Environmental IS0 14001 standards are applied to all aspects of the manufacturing and installation processes.

It is manufactured in accordance with IEC61439-1 and IEC61439-6.

Type Tests

10.2.2	Resistance to Corrosion
10.2.3.2	Resistance to Abnormal Heat and Fire Due to Internal Electric Effects
10.2.4	Resistance to Ultraviolet (UV) Radiation
10.2.5	Lifting
10.2.6	Mechanical Impact Test
10.2.7	Marking
10.2.101	Ability to Withstand Heavy Mechanical Loads
10.2.102	Thermal Cycling Test
10.3	Degree of Protection of Enclosures
10.4	Clearances and Creepage Distances
10.5.2	Effective Continuity Between the Exposed Conductive Parts of the BTS and Protective Circuit
10.5.3	Effectiveness of the Assembly for External Faults
10.9.2	Power Frequency Withstand Voltage
10.9.3	Impulse Withstand Voltage
10.10	Temperature Rise Limits (Indoor Horizontal & Vertical Installation Type Tested)
10.11	Short Circuit Withstand Strength
10.13	Mechanical Operation
10.101	Resistance to Flame Propagation
10.102	Fire Resistance in Building Penetration as per ISO-834

ASTA Certificates

E+I Engineering have completed extensive testing at ASTA and KEMA accredited laboratories to ensure the products supplied meet the international requirements.

ASTA Diamond Licence No. 1191

The ASTA Diamond Mark is a symbol of electrical safety. It provides evidence for customers and authorities that Intertek has independently tested and certified the product's compliance to applicable safety standards.

UL Classified

E+I Engineering completed extensive testing at UL accredited laboratories to ensure the products supplied meet UL requirements.

Seismic Compliance

The HPB Product range (800A - 6600A) has a qualification level - high (Zone-4&5) in accordance to IEEE standard 693-2005.60068-2-3 (Damp Heat Cyclic).

All certificates available on request

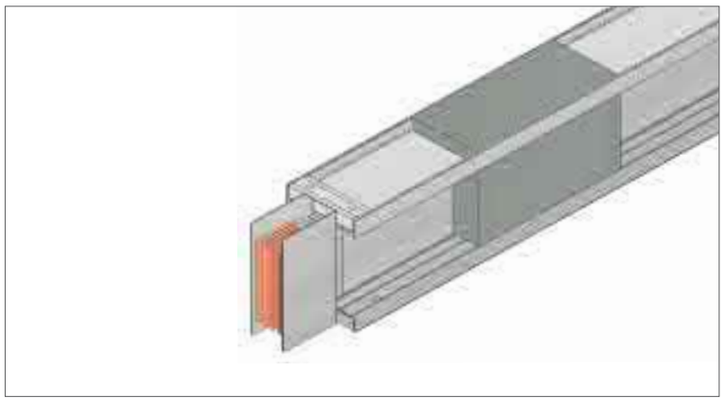
OHSAS 18001:2007
OHS 533652

ISO 9001:2008
FM 12680

ISO 14001:2004
No: EMS 566536

TECHNICAL FEATURES

- High Powerbar is constructed from high density 99.99% conductivity copper
- The conductors are insulated with a Class B or Class F 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 tap off units protects the integrity of the conductor
- HPB is constructed with an all-aluminium housing. Aluminium is an extremely light metal and is cheaper and easier to install than steel. Aluminium is much less reactive than steel so it is more durable and easier to maintain.
- Powerbar offers a 50% or 100% fully isolated earth for systems where earth isolation is required.
- A fully rated 200% neutral option is available for busbar systems with non-linear loads. The additional neutral capacity prevents overloading caused by zero sequence harmonic currents
- Powerbar offer a fully certified fire wall penetration barrier for either a four hour or two hour rating

Configuration	Phases	Neutral	Earth
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 aluminium casing being used as an earth.

STRAIGHT LENGTHS

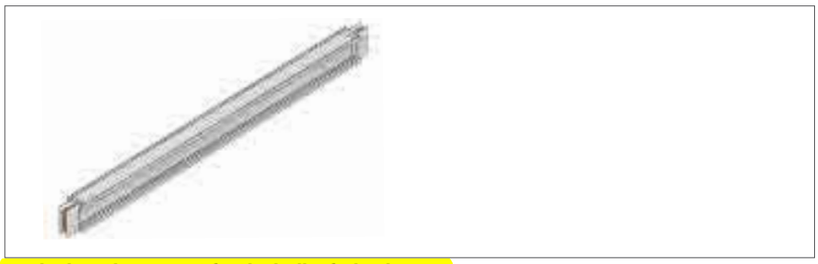
Straight Lengths

Straight lengths can be supplied at any length from 600mm - 4000mm.

The tap off slot outlet and cover are made from a durable, high strength, Class B, 130°C or Class F, 155°C insulation material.

The tap off slot cover prevents access to the contacts behind the cover and protects it from the entry of dirt, dust or moisture.

Tap off units are IP55 as standard.



Feeder lengths account for the bulk of a busbar run

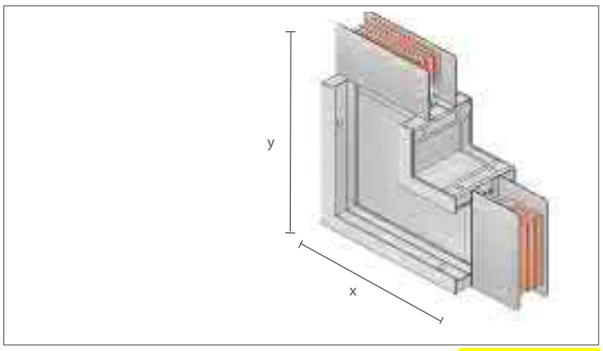
Distribution lengths allow tap off units to be plugged into the busbar run

The different types of build arrangement depending on rating of the required busbar

Busbar Rating (Amps)	Construction Type	Busbar Size (mm)	
		Height	Width
800A	Single	93mm	148mm
1000A	Single	103mm	148mm
1250A	Single	118mm	148mm
1400A	Single	128mm	148mm
1500A	Single	133mm	148mm
1600A	Single	148mm	148mm
1750A	Single	170mm	148mm
2000A	Single	185mm	148mm
2000A-D45	Double	231mm	148mm
2250A	Single	198mm	148mm
2500A-S160	Single	220mm	148mm
2500A-S150	Single	208mm	148mm
2500A-D60	Double	261mm	148mm
2500A-S175	Single	233mm	148mm
2500A-S200	Single	258mm	148mm
3200A-S230	Single	288mm	148mm
3200A-D90	Double	321mm	148mm
3500A	Double	363mm	148mm
4000A	Double	391mm	148mm
4500A	Double	421mm	148mm
4850A	Double	441mm	148mm
5000A	Double	461mm	148mm
5500A	Double	491mm	148mm
6600A	Double	601mm	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

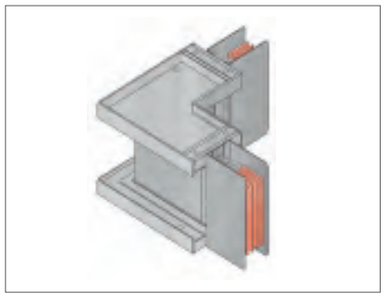
Flatwise and Edgewise Elbows

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

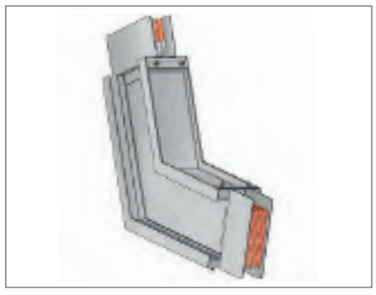
Flatwise Elbow (Up or Down)

Ratings (Amps)	Minimum Leg Size		Standard Leg Size		Maximum Leg Size	
	X	Y	X	Y	X	Y
800A	230mm	230mm	350mm	350mm	750mm	750mm
1000A	235mm	235mm	350mm	350mm	750mm	750mm
1250A	243mm	243mm	350mm	350mm	750mm	750mm
1400A	248mm	248mm	350mm	350mm	750mm	750mm
1500A	250mm	250mm	350mm	350mm	750mm	750mm
1600A	258mm	258mm	350mm	350mm	750mm	750mm
1750A	268mm	268mm	350mm	350mm	750mm	750mm
2000A	275mm	275mm	350mm	350mm	750mm	750mm
2000A-D45	299mm	299mm	350mm	350mm	750mm	750mm
2250A	283mm	283mm	350mm	350mm	750mm	750mm
2500A-S160	293mm	293mm	350mm	350mm	750mm	750mm
2500A-S150	288mm	288mm	350mm	350mm	750mm	750mm
2500A-D60	314mm	314mm	350mm	350mm	750mm	750mm
2500A-S175	300mm	300mm	350mm	350mm	750mm	750mm
2500A-S200	313mm	313mm	350mm	350mm	750mm	750mm
3200A-S230	328mm	328mm	350mm	500mm	750mm	750mm
3200A-D90	344mm	344mm	500mm	500mm	750mm	750mm
3500A	364mm	364mm	500mm	500mm	750mm	750mm
4000A	379mm	379mm	500mm	500mm	750mm	750mm
4500A	394mm	394mm	500mm	500mm	750mm	750mm
4850A	404mm	404mm	500mm	500mm	750mm	750mm
5000A	414mm	414mm	500mm	500mm	750mm	750mm
5500A	430mm	430mm	500mm	500mm	750mm	750mm
6600A	484mm	484mm	650mm	650mm	750mm	750mm

ELBOWS



Edgewise Elbows

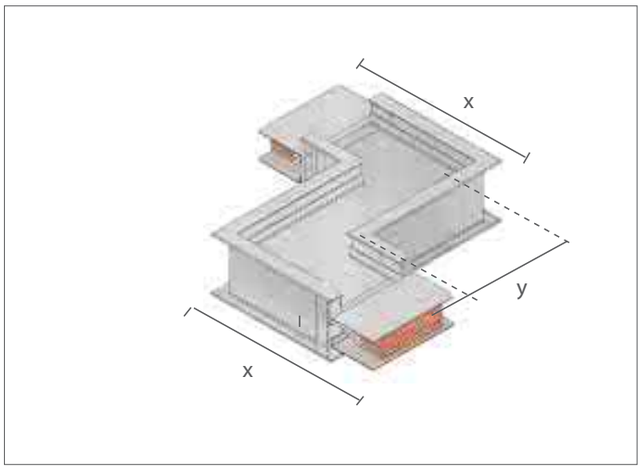


Custom Elbows

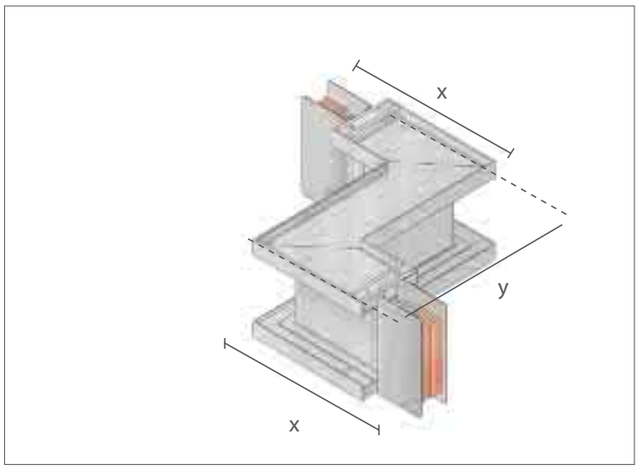
Edgewise Elbow (Left or Right)

Ratings (Amps)	Minimum Leg Size		Standard Leg Size		Maximum Leg Size	
	X	Y	X	Y	X	Y
800A	257mm	257mm	350mm	350mm	600mm	600mm
1000A	257mm	257mm	350mm	350mm	600mm	600mm
1250A	257mm	257mm	350mm	350mm	600mm	600mm
1400A	257mm	257mm	350mm	350mm	600mm	600mm
1500A	257mm	257mm	350mm	350mm	600mm	600mm
1600A	257mm	257mm	350mm	350mm	600mm	600mm
1750A	257mm	257mm	350mm	350mm	600mm	600mm
2000A	257mm	257mm	350mm	350mm	600mm	600mm
2000A-D45	257mm	257mm	350mm	350mm	600mm	600mm
2250A	257mm	257mm	350mm	350mm	600mm	600mm
2500A-S160	257mm	257mm	350mm	350mm	600mm	600mm
2500A-S150	257mm	257mm	350mm	350mm	600mm	600mm
2500A-D60	257mm	257mm	350mm	350mm	600mm	600mm
2500A-S175	257mm	257mm	350mm	350mm	600mm	600mm
2500A-S200	257mm	257mm	350mm	350mm	600mm	600mm
3200A-S230	257mm	257mm	350mm	350mm	600mm	600mm
3200A-D90	257mm	257mm	350mm	350mm	600mm	600mm
3500A	257mm	257mm	350mm	350mm	600mm	600mm
4000A	257mm	257mm	350mm	350mm	600mm	600mm
4500A	257mm	257mm	350mm	350mm	600mm	600mm
4850A	257mm	257mm	350mm	350mm	600mm	600mm
5000A	257mm	257mm	350mm	350mm	600mm	600mm
5500A	257mm	257mm	350mm	350mm	600mm	600mm
6600A	257mm	257mm	350mm	350mm	600mm	600mm

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
800A	230mm	50mm	650mm	461mm
1000A	235mm	50mm	650mm	471mm
1250A	243mm	50mm	650mm	486mm
1400A	248mm	50mm	650mm	496mm
1500A	250mm	50mm	650mm	501mm
1600A	258mm	50mm	650mm	516mm
1750A	268mm	50mm	650mm	536mm
2000A	275mm	50mm	650mm	550mm
2000A-D45	299mm	50mm	650mm	599mm
2250A	283mm	50mm	650mm	566mm
2500A-S160	293mm	50mm	650mm	586mm
2500A-S150	288mm	50mm	650mm	576mm
2500A-D60	300mm	50mm	650mm	601mm
2500A-S175	313mm	50mm	650mm	626mm
2500A-S200	328mm	50mm	650mm	656mm
3200A-S230	344mm	50mm	650mm	688mm
3200A-D90	344mm	50mm	650mm	688mm
3500A	364mm	50mm	650mm	728mm
4000A	379mm	50mm	650mm	758mm
4500A	394mm	50mm	650mm	789mm
4850A	404mm	50mm	650mm	809mm
5000A	414mm	50mm	650mm	828mm
5500A	430mm	50mm	650mm	844mm
6600A	484mm	50mm	650mm	968mm

Edgewise Offset (Left or Right)

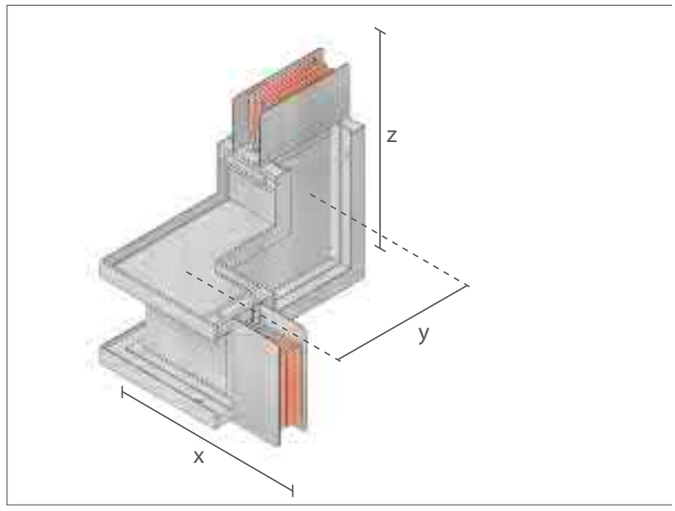
Ratings (Amps)	Minimum Leg Size		Maximum Leg Size	
	X	Y	X	Y
800A, 1000A, 1250A, 1400A, 1500A, 1600A, 1750A, 2000A 2000A-D45, 2250A, 2500A-S160, 2500A-S150, 2500A-D60, 2500A-S175, 2500A-S200, 3200A-S230, 3200A-D90, 3500A, 4000A, 4500A, 4850A, 5000A, 5500A, 6600A	257mm	80mm	600mm	513mm

COMBINATIONS

Combination Elbows

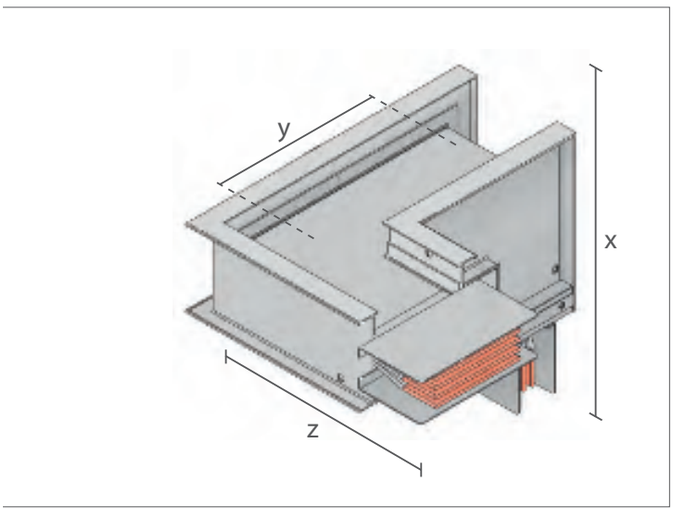
Combination elbows are used to conform to the building's structure and to change the direction of the busbar within a confined space.

Ratings (Amps)	Minimum Leg Size		
	X (Edgewise side)	Y	Z (Flatwise side)
800A	257mm	172mm	230mm
1000A	257mm	177mm	235mm
1250A	257mm	183mm	243mm
1400A	257mm	188mm	248mm
1500A	257mm	190mm	250mm
1600A	257mm	198mm	258mm
1750A	257mm	208mm	268mm
2000A	257mm	215mm	275mm
2000A-D45	257mm	239mm	282mm
2250A	257mm	223mm	283mm
2500A-S160	257mm	233mm	293mm
2500A-S150	257mm	228mm	288mm
2500A-D60	257mm	254mm	314mm
2500A-S175	257mm	240mm	300mm
2500A-S200	257mm	253mm	313mm
3200A-S230	257mm	258mm	328mm
3200A-D90	257mm	268mm	344mm
3500A	257mm	304mm	364mm
4000A	257mm	319mm	379mm
4500A	257mm	334mm	394mm
4850A	257mm	344mm	404mm
5000A	257mm	354mm	414mm
5500A	257mm	370mm	430mm
6600A	257mm	424mm	484mm



Edge Right Flatwise Up

COMBINATIONS



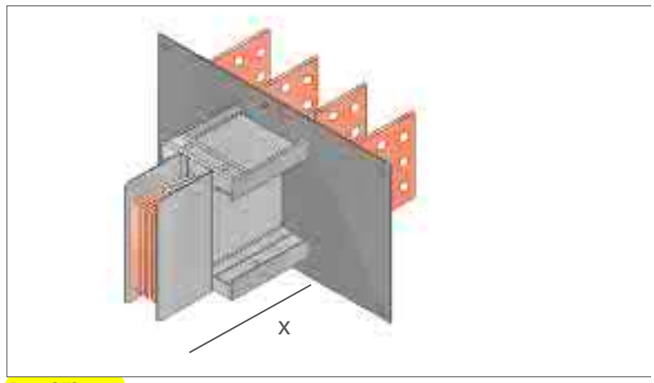
Flatwise Up Edgewise Right

Rating (Amps)	Maximum Leg size		
	X (Edgewise Side)	Y	Z (Flatwise side)
800A	600mm	486mm	750mm
1000A	600mm	491mm	750mm
1250A	600mm	497mm	750mm
1400A	600mm	502mm	750mm
1500A	600mm	504mm	750mm
1600A	600mm	512mm	750mm
1750A	600mm	523mm	750mm
2000A	600mm	529mm	750mm
2000A-D45	600mm	554mm	750mm
2250A	600mm	538mm	750mm
2500A-S160	600mm	547mm	750mm
2500A-S150	600mm	543mm	750mm
2500A-D60	600mm	569mm	750mm
2500A-S175	600mm	555mm	750mm
2500A-S200	600mm	568mm	750mm
3200A-S230	600mm	582mm	750mm
3200A-D90	600mm	599mm	750mm
3500A	600mm	618mm	750mm
4000A	600mm	633mm	750mm
4500A	600mm	649mm	750mm
4850A	600mm	659mm	750mm
5000A	600mm	668mm	750mm
5500A	600mm	684mm	750mm
6600A	600mm	738mm	750mm

FLANGES

Flange Connections

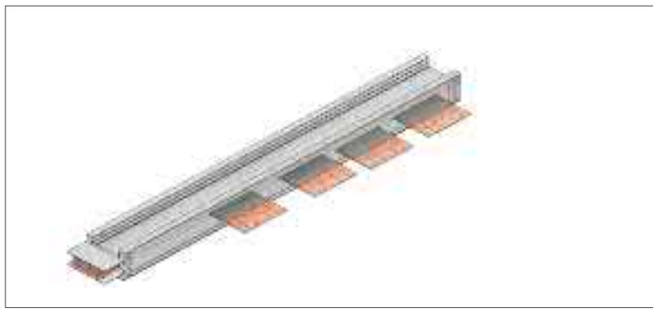
Flange connections provide a direct connection to low voltage switchgear, transformer enclosures and other electrical equipment. Standard flanges can be offset to the left or right of the section as required.



Panel Flange

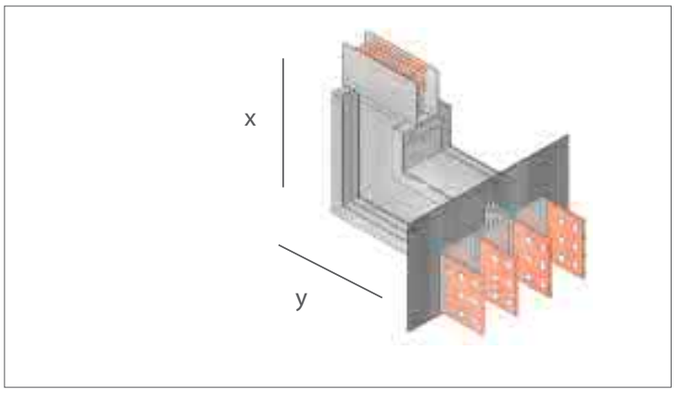
Panel Flange

Ratings (Amps)	Minimum Leg Size	
	X	Y
800A, 1000A, 1250A, 1400A, 1500A, 1600A, 1750A, 2000A 2000A-D45, 2250A, 2500A-S160, 2500A-S150, 2500A-D60, 2500A-S175, 2500A-S200, 3200A-S230, 3200A-D90, 3500A, 4000A, 4500A, 4850A, 5000A, 5500A, 6600A	220mm	840mm



Parallel Flange

FLANGES



Flatwise Elbow Flange

Combination Flange

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

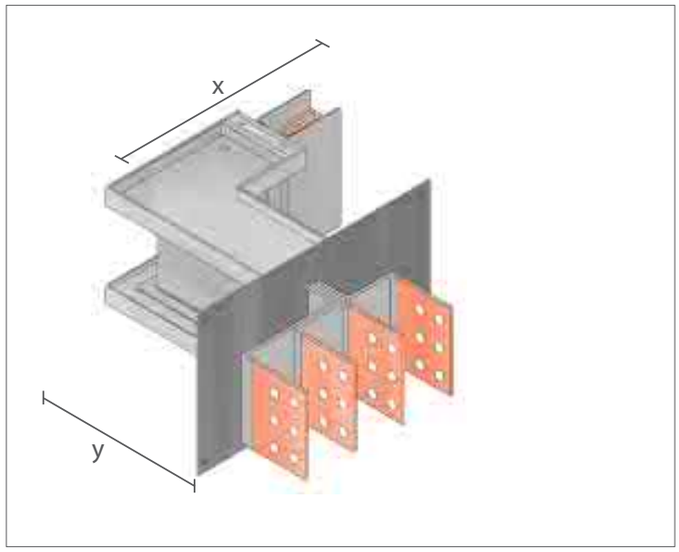
Flange/Elbows (Flatwise)

Ratings (Amps)	Minimum Leg Size		Maximum Leg Size	
	X	Y	X	Y
800A	230mm	98mm	750mm	470mm
1000A	235mm	103mm	750mm	475mm
1250A	243mm	110mm	750mm	483mm
1400A	248mm	115mm	750mm	488mm
1500A	250mm	118mm	750mm	490mm
1600A	258mm	125mm	750mm	498mm
1750A	268mm	135mm	750mm	508mm
2000A	275mm	143mm	750mm	515mm
2000A-D45	299mm	167mm	750mm	539mm
2250A	283mm	150mm	750mm	523mm
2500A-S160	293mm	160mm	750mm	533mm
2500A-S150	288mm	155mm	750mm	528mm
2500A-D60	314mm	182mm	750mm	554mm
2500A-S175	300mm	168mm	750mm	540mm
2500A-S200	313mm	180mm	750mm	553mm
3200A-S230	328mm	195mm	750mm	568mm
3200A-D90	344mm	212mm	750mm	584mm
3500A	364mm	232mm	750mm	604mm
4000A	379mm	247mm	750mm	619mm
4500A	394mm	262mm	750mm	634mm
4850A	404mm	272mm	750mm	644mm
5000A	414mm	282mm	750mm	654mm
5500A	430mm	298mm	750mm	654mm
6600A	484mm	352mm	750mm	724mm

FLANGES

Flange/Elbows (Edgewise)

Ratings (Amps)	Minimum Leg Size		Maximum Leg Size	
	X	Y	X	Y
800A, 1000A, 1250A, 1400A, 1500A, 1600A, 1750A, 2000A 2000A-D45, 2250A, 2500A-S160, 2500A-S150, 2500A-D60, 2500A-S175, 2500A-S200, 3200A-S230, 3200A-D90, 3500A, 4000A, 4500A, 4850A, 5000A, 5500A, 6600A	257mm	124mm	600mm	495mm

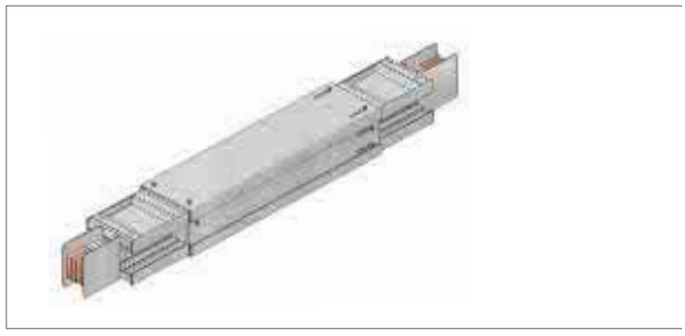


Edgewise Elbow Flange

Expansion Units

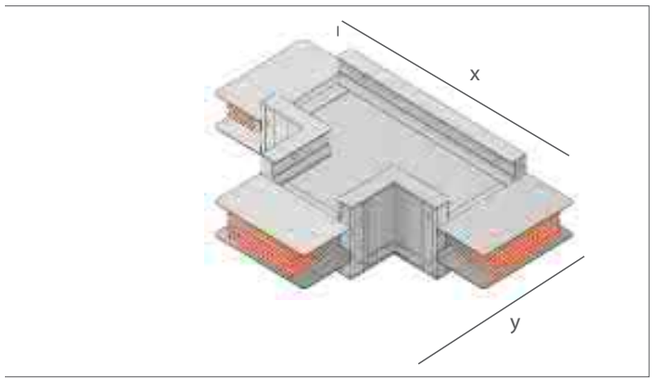
Expansion units are used to accommodate the expansion and contraction of a busbar system as well as allow for building movement. They allow for a 40mm movement along the length of the busbar.

Expansion units are recommended when a straight busbar run exceeds 60m.



Expansion Unit

SPECIALS



Flatwise Tee

Flatwise Tee

Flatwise tee's are used to split one busbar 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
800A	461mm	230mm	700mm	350mm	1500mm	650mm
1000A	471mm	235mm	700mm	350mm	1500mm	650mm
1250A	486mm	243mm	700mm	350mm	1500mm	650mm
1400A	496mm	248mm	700mm	350mm	1500mm	650mm
1500A	500mm	250mm	700mm	350mm	1500mm	650mm
1600A	516mm	258mm	700mm	350mm	1500mm	650mm
1750A	535mm	268mm	700mm	350mm	1500mm	650mm
2000A	550mm	275mm	700mm	350mm	1500mm	650mm
2000A-D45	598mm	299mm	1000mm	500mm	1500mm	650mm
2250A	565mm	283mm	700mm	350mm	1500mm	650mm
2500A-S160	586mm	293mm	700mm	350mm	1500mm	650mm
2500A-S150	575mm	288mm	700mm	350mm	1500mm	650mm
2500A-D60	628mm	314mm	700mm	500mm	1500mm	650mm
2500A-S175	600mm	300mm	700mm	500mm	1500mm	650mm
2500A-S200	626mm	313mm	700mm	500mm	1500mm	650mm
3200A-S230	656mm	328mm	1000mm	500mm	1500mm	650mm
3200A-D90	688mm	344mm	1000mm	500mm	1500mm	650mm
3500A	728mm	364mm	1000mm	500mm	1500mm	650mm
4000A	758mm	379mm	1000mm	500mm	1500mm	650mm
4500A	788mm	394mm	1000mm	500mm	1500mm	650mm
4850A	808mm	404mm	1000mm	500mm	1500mm	650mm
5000A	828mm	414mm	1000mm	500mm	1500mm	650mm
5500A	844mm	430mm	1000mm	500mm	1500mm	650mm
6600A	968mm	484mm	1000mm	500mm	1500mm	650mm

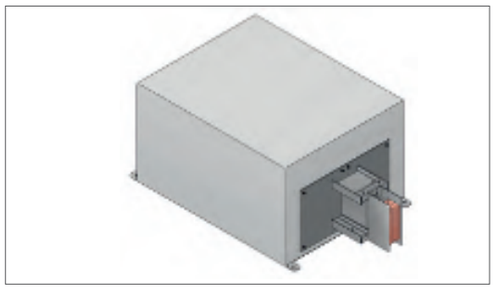
FEED UNITS & CAPS

Cable Feed Units

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

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

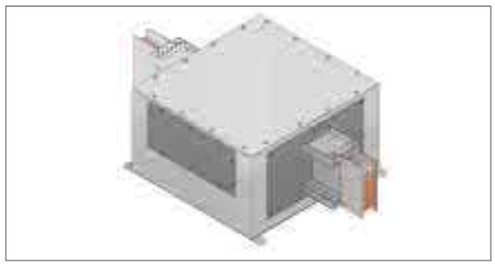
- rating of busbar
- size of cable
- number of cables
- use of a protective device or isolator



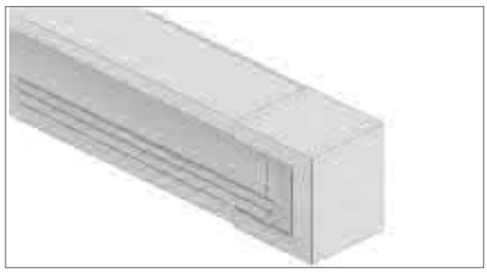
End Feed Units

End Caps

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



Centre Feed Units



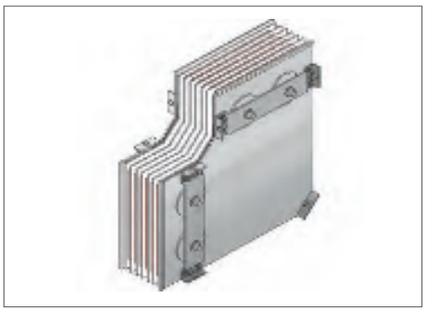
End Caps

JOINT PACKS

Joint Packs

Joint Packs

The joint pack is a compression joint design utilising a specially designed Belleville washer to distribute the pressure evenly over the joint pack. The joint pack is supplied in specific sizes depending on the rating of busbar required.



Flatwise Elbow Joint Packs

Flatwise Elbow Joint Packs

Flatwise elbow joint packs can be used to make 90° changes in the direction of the busbar system.

INSTALLATION

The modular design of HPB allows it to be installed flat or on its edge. The installation is determined by:

- Busbar route
- Type of installation
- Available space
- Size of busbar

Edge Installation

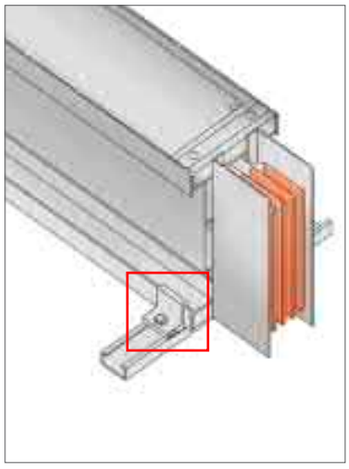
Edge installation is the preferred method of installation for a smaller rated busbar system.

Flat Installation

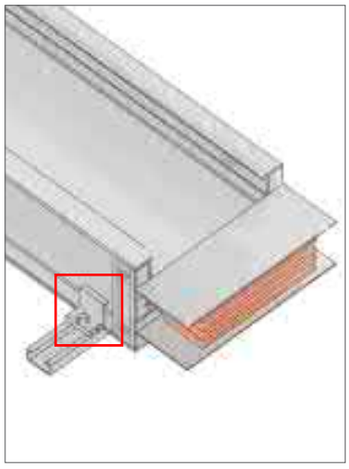
Flat installation is the preferred method of installation for a higher rated, multistack busbar system. When installed on its flat all busbar rating has a height of 145mm.

Spring Hanger

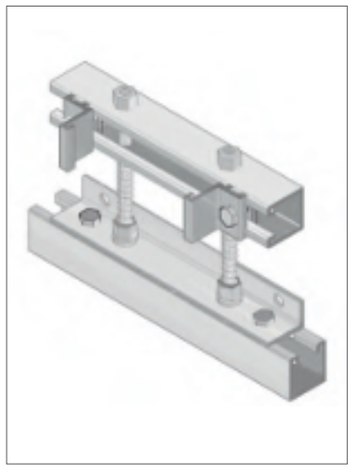
Spring hangers are used to support vertical busbar runs on each floor. They compensate for building movement and thermal expansion.



Edge Installation



Flat Installation

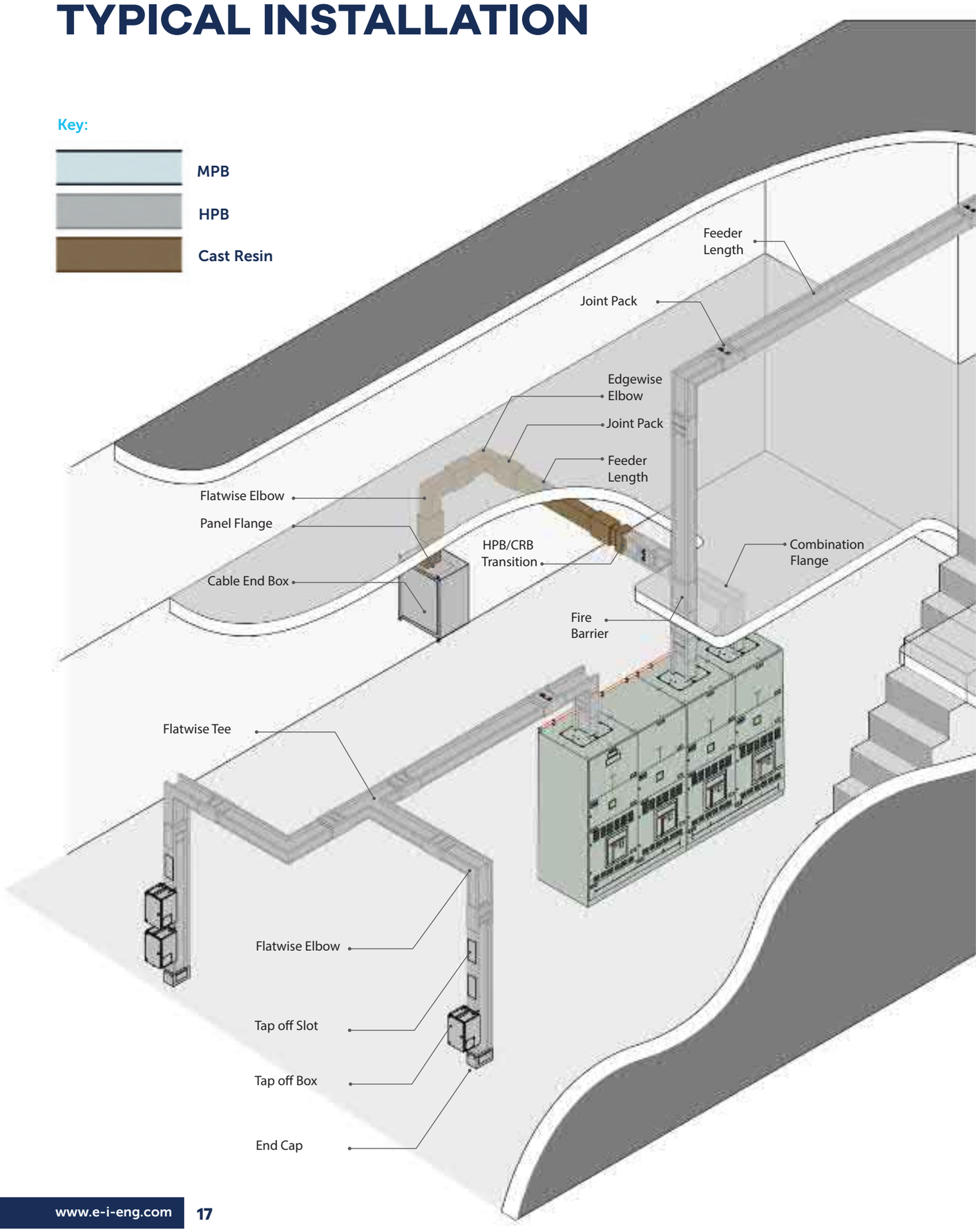


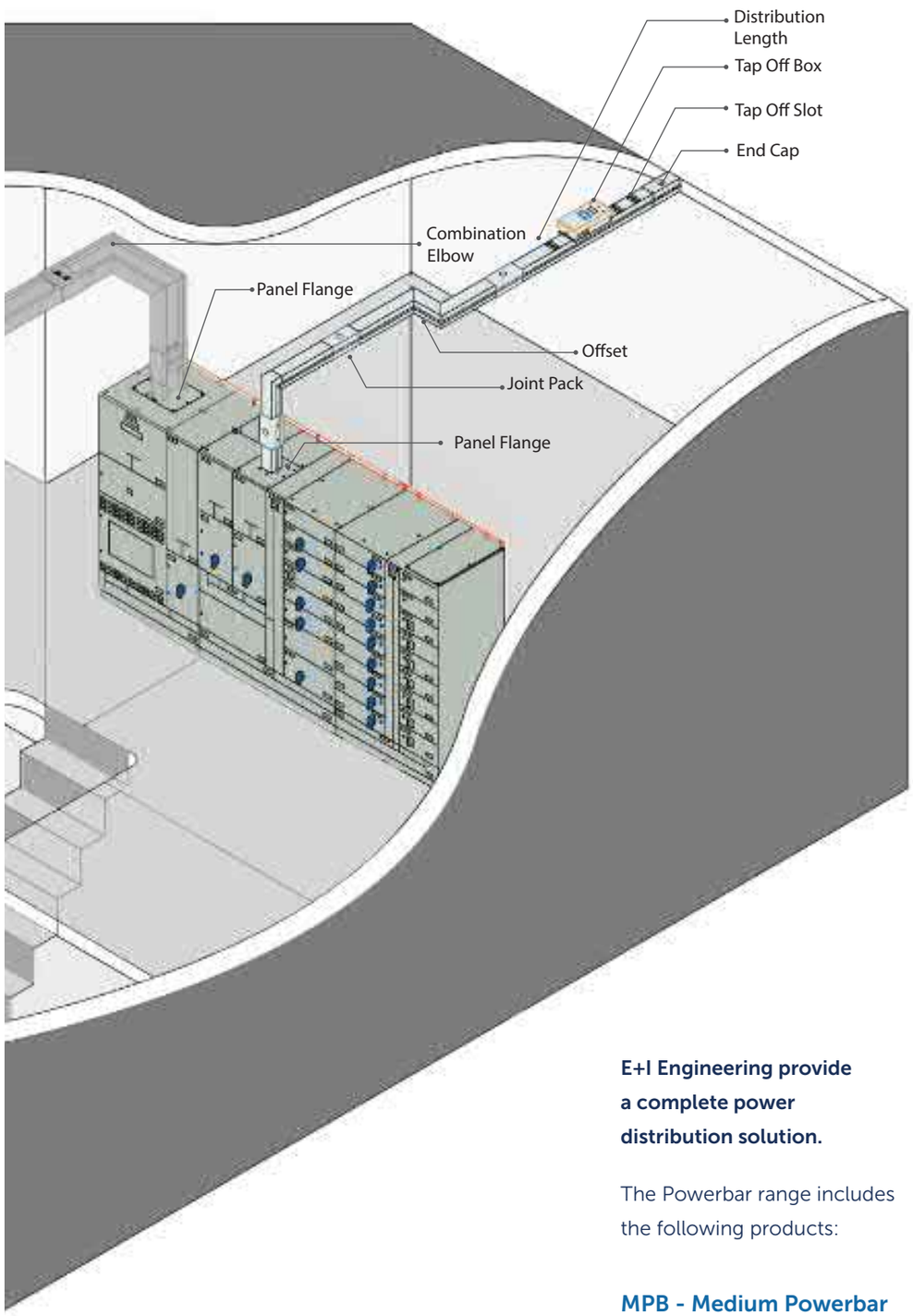
Spring Hanger

Special Sections

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.

TYPICAL INSTALLATION





E+I Engineering provide a complete power distribution solution.

The Powerbar range includes the following products:

MPB - Medium Powerbar

Air insulated range covering 160 - 800 Amps

HPB - High Powerbar

Sandwich construction range covering 800 - 6600A Amps

CRB - Cast Resin Powerbar

IP68 rate polymer concrete product for use in extreme conditions covering 800 - 6300 Amps. CRPB can be directly connected to HPB through a special jointing system.

All products are available with both copper and aluminium conductors.

TECHNICAL DATA

Technical Data						
Rated Current (A)	**800**	**1000**	**1250**	**1400**	**1500**	1600
Rated Operational Voltage (V)	1000	1000	1000	1000	1000	1000
Rated Insulation Voltage (V)	1000	1000	1000	1000	1000	1000
Short Circuit						
1 Second (kA rms)	36	50	65	70	70	70
Peak Value (kA)	76	105	143	154	154	154
Phase Conductor						
Cross Sectional Area (mm2)	210	270	360	420	450	540
Neutral Conductor						
Cross Sectional Area (mm2)	210	270	360	420	450	540
Isolated Earth Conductor						
100% Earth Cross Sectional Area (mm2)	210	270	360	420	450	540
50% Earth Cross Sectional Area (mm2)	105	135	180	210	225	270
Housing Earth Path						
Cross Sectional Area (mm2)	1725	1785	1169	1169	1622	1229
Overall Dimensions						
Height x Width of 4 Bar System (mm)	95 x 148	105 x 148	120 x 148	130 x 148	133 x 148	150 x 148
Weight						
Weight of 4 Bar System (kg/m)	9.4	11.2	19.9	19.9	18.7	24.5
Resistance						
Resistance (mΩ/m) at 20°C	0.085	0.065	0.046	0.042	0.037	0.033
Resistance (mΩ/m) at 80°C	0.105	0.081	0.072	0.053	0.046	0.041
Reactance						
Reactance (mΩ/m) at 50 Hz	0.032	0.026	0.035	0.016	0.014	0.013
Reactance (mΩ/m) at 60 Hz	0.039	0.032	0.040	0.019	0.018	0.016
Impedance						
Impedance (mΩ/m) at 80°C	0.110	0.086	0.080	0.055	0.045	0.043
Voltage Drop at Full Load 50Hz						
Power Factor = 0.7 (V/m) at 80°C	0.134	0.131	0.164	0.118	0.110	0.105
Power Factor = 0.8 (V/m) at 80°C	0.144	0.140	0.171	0.126	0.117	0.112
Power Factor = 0.9 (V/m) at 80°C	0.151	0.147	0.175	0.132	0.123	0.118
Power Factor = 1.0 (V/m) at 80°C	0.146	0.141	0.157	0.128	0.125	0.113
Voltage Drop at Full Load 60Hz						
Power Factor = 0.7 (V/m) at 80°C	0.141	0.138	0.172	0.124	0.110	0.111
Power Factor = 0.8 (V/m) at 80°C	0.150	0.146	0.177	0.131	0.117	0.117
Power Factor = 0.9 (V/m) at 80°C	0.156	0.151	0.179	0.136	0.123	0.121
Power Factor = 1.0 (V/m) at 80°C	0.147	0.142	0.157	0.128	0.125	0.113

TECHNICAL DATA

Technical Data						
Rated Current (A)	**1750**	**2000-S125**	**2000-D45**	**2250**	**2500-S160**	**2500-S150**
Rated Operational Voltage (V)	1000	1000	1000	1000	1000	1000
Rated Insulation Voltage (V)	1000	1000	1000	1000	1000	1000
Short Circuit						
1 Second (kA rms)	100	100	85	85	100	85
Peak Value (kA)	220	220	187	187	220	187
Phase Conductor						
Cross Sectional Area (mm^2)	660	750	540	840	960	900
Neutral Conductor						
Cross Sectional Area (mm^2)	660	750	540	840	960	900
Isolated Earth Conductor						
100% Earth Cross Sectional Area (mm^2)	660	750	540	840	960	900
50% Earth Cross Sectional Area (mm^2)	330	375	270	420	480	450
Housing Earth Path						
Cross Sectional Area (mm^2)	1722	1334	1334	1882	1559	1922
Overall Dimensions						
Height x Width of 4 Bar System (mm)	170 x 148	185 x 148	231 x 148	198 x 148	220 x 148	208 x 148
Weight						
Weight of 4 Bar System (kg/m)	25.6	32.6	22.5	35.2	40.3	37.7
Resistance						
Resistance (mΩ/m) at 20^0C	0.023	0.023	0.023	0.021	0.018	0.018
Resistance (mΩ/m) at 80^0C	0.033	0.030	0.028	0.026	0.022	0.022
Reactance						
Reactance (mΩ/m) at 50Hz	0.014	0.010	0.010	0.007	0.008	0.0086
Reactance (mΩ/m) at 60Hz	0.018	0.012	0.012	0.009	0.010	0.0096
Impedance						
Impedance (mΩ/m) at 80^0C	0.014	0.031	0.031	0.027	0.024	0.025
Voltage Drop at Full Load 50Hz						
Power Factor = 0.7 (V/m) at 80^0C	0.099	0.095	0.095	0.093	0.093	0.095
Power Factor = 0.8 (V/m) at 80^0C	0.094	0.101	0.101	0.095	0.099	0.100
Power Factor = 0.9 (V/m) at 80^0C	0.096	0.104	0.106	0.101	0.103	0.103
Power Factor = 1.0 (V/m) at 80^0C	0.106	0.101	0.101	0.100	0.098	0.099
Voltage Drop Full Load 60Hz						
Power Factor = 0.7 (V/m) at 80^0C	0.105	0.100	0.100	0.095	0.099	0.099
Power Factor = 0.8 (V/m) at 80^0C	0.096	0.105	0.106	0.097	0.103	0.100
Power Factor = 0.9 (V/m) at 80^0C	0.098	0.107	0.109	0.107	0.107	0.105
Power Factor = 1.0 (V/m) at 80^0C	0.106	0.101	0.101	0.100	0.098	0.099

TECHNICAL DATA

Technical Data						
Rated Current (A)	**2500-D60**	**2500-S175**	**2500-S200**	**3200-S230**	**3200-D90**	**3500**
Rated Operational Voltage (V)	1000	1000	1000	1000	1000	1000
Rated Insulation Voltage (V)	1000	1000	1000	1000	1000	1000
Short Circuit						
1 Second (kA rms)	100	100	100	100	120	120
Peak Value (kA)	220	220	220	220	264	264
Phase Conductor						
Cross Sectional Area (mm2)	720	1050	1200	1380	1080	1200
Neutral Conductor						
Cross Sectional Area (mm2)	720	1050	1200	1380	1080	1200
Isolated Earth Conductor						
100% Earth Cross Sectional Area (mm2)	720	1050	1200	1380	1080	1200
50% Earth Cross Sectional Area (mm2)	360	525	600	690	540	600
Housing Earth Path						
Cross Sectional Area (mm2)	1559	2655	2680	2568	2458	2402
Overall Dimensions						
Height x Width of 4 Bar System (mm)	261 x 148	233 x 148	258 x 148	288 x 148	323 x 148	363 x 148
Weight						
Weight of 4 Bar System (kg/m)	29.9	50.4	44.4	56.8	49.0	58.7
Resistance						
Resistance (mΩ/m) at 20°C	0.023	0.018	0.017	0.013	0.016	0.014
Resistance (mΩ/m) at 80°C	0.029	0.022	0.021	0.016	0.025	0.019
Reactance						
Reactance (mΩ/m) at 50 Hz	0.008	0.008	0.007	0.0060	0.0077	0.055
Reactance (mΩ/m) at 60 Hz	0.010	0.010	0.008	0.0070	0.0094	0.0086
Impedance						
Impedance (mΩ/m) at 80°C	0.024	0.024	0.020	0.017	0.026	0.0178
Voltage Drop at Full Load 50Hz						
Power Factor = 0.7 (V/m) at 80°C	0.112	0.093	0.090	0.083	0.128	0.098
Power Factor = 0.8 (V/m) at 80°C	0.125	0.099	0.091	0.088	0.137	0.104
Power Factor = 0.9 (V/m) at 80°C	0.130	0.103	0.095	0.092	0.144	0.109
Power Factor = 1.0 (V/m) at 80°C	0.143	0.098	0.096	0.087	0.139	0.114
Voltage Drop at Full Load 60Hz						
Power Factor = 0.7 (V/m) at 80°C	0.117	0.099	0.097	0.088	0.135	0.099
Power Factor = 0.8 (V/m) at 80°C	0.129	0.103	0.100	0.093	0.143	0.103
Power Factor = 0.9 (V/m) at 80°C	0.134	0.107	0.104	0.095	0.148	0.110
Power Factor = 1.0 (V/m) at 80°C	0.144	0.098	0.096	0.087	0.139	0.115

TECHNICAL DATA

Technical Data						
Rated Current (A)	**4000**	**4500**	**4850**	**5000**	**5500**	**6600**
Rated Operational Voltage (V)	1000	1000	1000	1000	1000	1000
Rated Insulation Voltage (V)	1000	1000	1000	1000	1000	1000
Short Circuit						
1 Second (kA rms)	120	120	120	120	120	100
Peak Value (kA)	264	264	264	264	264	220
Phase Conductor						
Cross Sectional Area (mm^2)	1500	1680	1800	1920	2100	2760
Neutral Conductor						
Cross Sectional Area (mm^2)	1500	1680	1800	1920	2100	2760
Isolated Earth Conductor						
100% Earth Cross Sectional Area (mm^2)	1500	1680	1800	1920	2100	2760
50% Earth Cross Sectional Area (mm^2)	750	840	900	960	1050	1380
Housing Earth Path						
Cross Sectional Area (mm^2)	2668	2402	2822	2878	2954	3118
Overall Dimensions						
Height x Width of 4 Bar System (mm)	393 x 148	421 x 148	441 x 148	463 x 148	493 x 148	603 x 148
Weight						
Weight of 4 Bar System (kg/m)	65.2	70.3	75.5	81.4	86.5	113.7
Resistance						
Resistance (mΩ/m) at 20^0C	0.012	0.011	0.011	0.009	0.007	0.006
Resistance (mΩ/m) at 80^0C	0.014	0.012	0.012	0.011	0.009	0.008
Reactance						
Reactance (mΩ/m) at 50Hz	0.005	0.004	0.003	0.004	0.0035	0.003
Reactance (mΩ/m) at 60Hz	0.006	0.006	0.005	0.005	0.004	0.003
Impedance						
Impedance (mΩ/m) at 80^0C	0.015	0.013	0.0125	0.012	0.011	0.008
Voltage Drop at Full Load 50Hz						
Power Factor = 0.7 (V/m) at 80^0C	0.095	0.096	0.095	0.093	0.091	0.086
Power Factor = 0.8 (V/m) at 80^0C	0.101	0.100	0.0995	0.099	0.097	0.091
Power Factor = 0.9 (V/m) at 80^0C	0.105	0.104	0.104	0.103	0.101	0.094
Power Factor = 1.0 (V/m) at 80^0C	0.100	0.100	0.100	0.097	0.095	0.089
Voltage Drop Full Load 60Hz						
Power Factor = 0.7 (V/m) at 80^0C	0.100	0.100	0.100	0.098	0.096	0.091
Power Factor = 0.8 (V/m) at 80^0C	0.105	0.105	0.104	0.103	0.101	0.096
Power Factor = 0.9 (V/m) at 80^0C	0.108	0.108	0.108	0.106	0.104	0.098
Power Factor = 1.0 (V/m) at 80^0C	0.100	0.100	0.100	0.098	0.095	0.090