



HIGH POWERBAR

COPPER EDITION POLYESTER



E+ ENGINEERING GROUP



POWERBAR

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INTRODUCTION

Powerbar is a patented range of busbar trunking that is utilised within building and industrial applications to deliver power to electrical loads. It is an alternative to traditional cabling and provides numerous advantages to the installer and client including savings on space, time and cost. There are also electrical savings due to reduced losses, reduced voltage drop and flexibility to reposition load centres using tap-off points.

Powerbar Overview

The Powerbar range of products is built with patented processes that make it the most reliable product of its type, providing peace of mind for your installation. This, together with unrivalled product support, means that the Powerbar range of products will provide the optimum solution to your distribution requirements.

Powerbar services the UK and European markets from our manufacturing plant in Donegal, Ireland and the Middle East from our plant in Ras Al Khaimah, U.A.E. We pride ourselves on meeting our client's deadlines and ensuring a quick turnaround on final make-up pieces.

From concept to commissioning we provide complete in-house engineering.

- Site surveys
- 3D - CAD Drawings
- Project Management
- Thermal Imaging

Our highly skilled team are experts at providing the client with exactly what they require and are experienced in producing bespoke parts to meet the client's unique demands.

High Powerbar

Powerbar's High Power (HPB) Copper range is a 1000 Volt, totally encased, non-ventilated, low impedance sandwich construction with copper conductors. The range is available from 1000A to 6300A available with multiple bar configurations to suit project requirements, including neutral, double neutral, earth and half earth.

The bar is housed in an aluminium casing which also acts as an earth and is available with a choice of ingress protection ratings from IP55 to IP67. The busbar is painted in grey (RAL 7035). Other colours can be accommodated on request.

High Powerbar Features

- Copper conductor's mill or tin coated-finish.
- Joint Pack construction with double headed shear nuts, for quick installation.
- Up to five tap off points per three metre length.
- All tap offs have mechanical/electrical interlocks with an earth first, break last safety feature.
- Pressed out tags for tap off connections – this is a patented process.

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 ISO 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 Verification of **Strength of materials and parts**
- 10.3 Verification of **Degree of protection of enclosures**
- 10.4 Verification of **Clearance and Creepage distances**
- 10.5 Verification of **Protection against electric shock and integrity of protective circuits**
- 10.9 Verification of **Dielectric properties**
- 10.10 Verification of **Temperature rise limits**
- 10.11 Verification of **Short-circuit withstand strength**

ASTA Certificates

Powerbar completed extensive testing at ASTA and KEMA accredited laboratories to ensure the product we supply meets the international requirements.

UL Classified

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

Seismic Compliance

The product has a qualification level - high in accordance to IEEE standard 693-2005.

All certificates available on request



OHSAS 18001:2007
OHS 533652



ISO 9001:2008
FM 12680



ISO 14001:2004
No: EMS 566536

TECHNICAL FEATURES

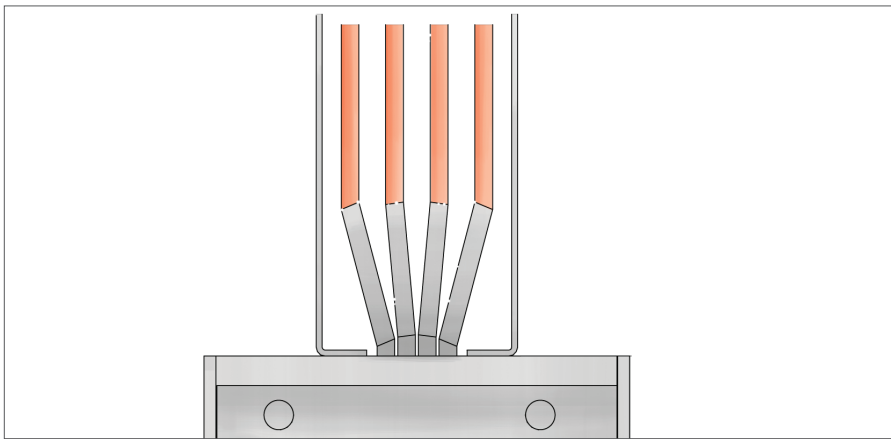
Conductor/Insulation System

High Powerbar is constructed from high density 99.99% conductivity copper insulated with Polyester.

The copper is also available with the option of tin plating.

The Low Impedance Sandwich Design:

- Improves heat dissipation.
- Improves short circuit rating.
- Reduces voltage drop/ impedance compared to cable.
- Removes potential pathways for the propagation of flame, smoke and gas through the busbar system.



Polyester Insulated Copper Conductors

The distribution busbar lengths have tabs pressed into the conductor to allow tap off units to be connected. This patented method for creating the tabs does not require any welding process, meaning the integrity of the conductor is not compromised.

The busbars are individually wrapped by means of CNC machinery in a double layer of Polyester insulation. Following this they are collectively grouped together then one final wrap of Polyester insulation is applied to the group of conductors before insertion into the Aluminium housing.

Housing Details

The Powerbar HPB range is constructed with an all-aluminium housing. Aluminium offers numerous advantages when compared to our competitors steel housings.

- Aluminium is a very light metal with a specific weight of 2.72g/cm^3 , about a third that of steel (7.85g/cm^3). This reduces transportation costs and makes the product much easier to install.
- Aluminium is non-magnetic and has a significant reduction in reactance when compared to steel.
- Unlike steel which rusts, aluminium naturally produces a protective oxide coating which makes it highly corrosion resistant. This means the product is more durable and requires less maintenance.
- Aluminium is excellent at conducting heat and electricity and in relation to its weight is almost twice as good a conductor as copper. This means that the housing can be used as an earth along the length of the busbar.

Isolated Earth Bar (50% or 100% Copper)

Powerbar offer a 50% or 100% fully isolated earth for systems where earth isolation is required such as systems with heavy microprocessors, based loads or large computer based installations. The continuity is maintained through the joint pack.

Double Neutral (200% Option)

Powerbar offer a fully rated 200% neutral option for busbar systems with non-linear loads. The additional neutral capacity prevents overloading caused by zero sequence harmonic currents.

TECHNICAL FEATURES

Phase Configurations

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 been used as an earth.

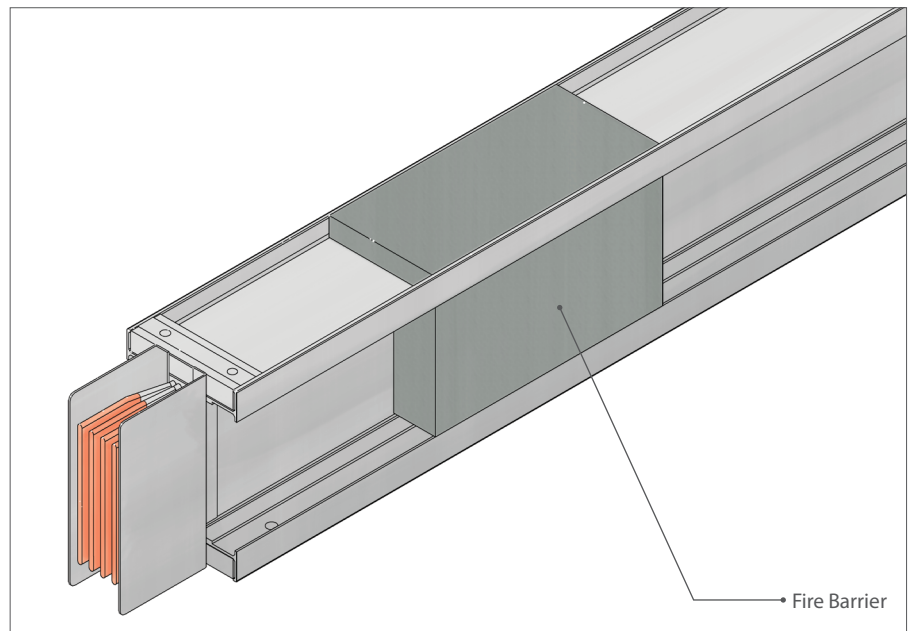
Fire Barrier System

Powerbar offer a fully certified fire wall penetration barrier. This fire barrier can be supplied with either a four hour or two hour rating.

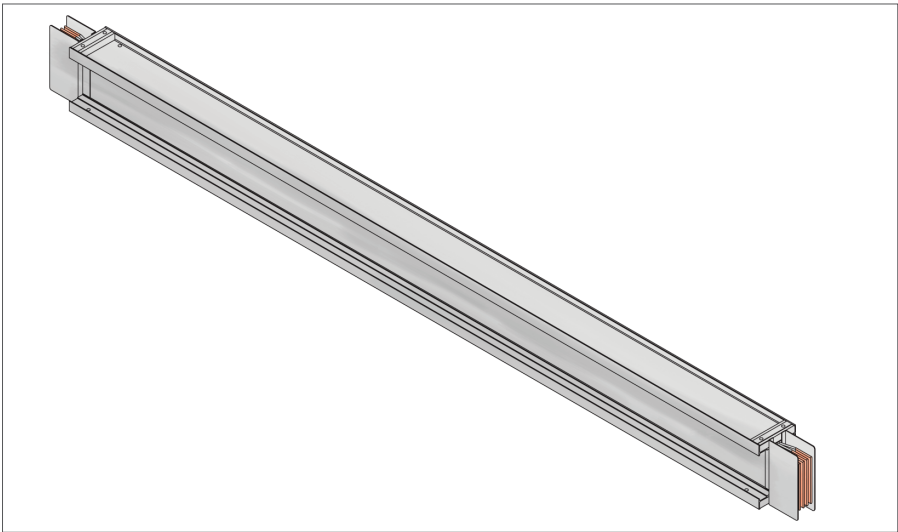
Key considerations for utilising fire barriers:

1. Life safety
2. Prevention of the passage of smoke or flames from one enclosed space to another.

If a fire barrier is not used then the busbar will simply melt when under fire load leaving a void in the wall allowing the passage of flames and smoke from one area to another.



STRAIGHT LENGTHS



Feeder length

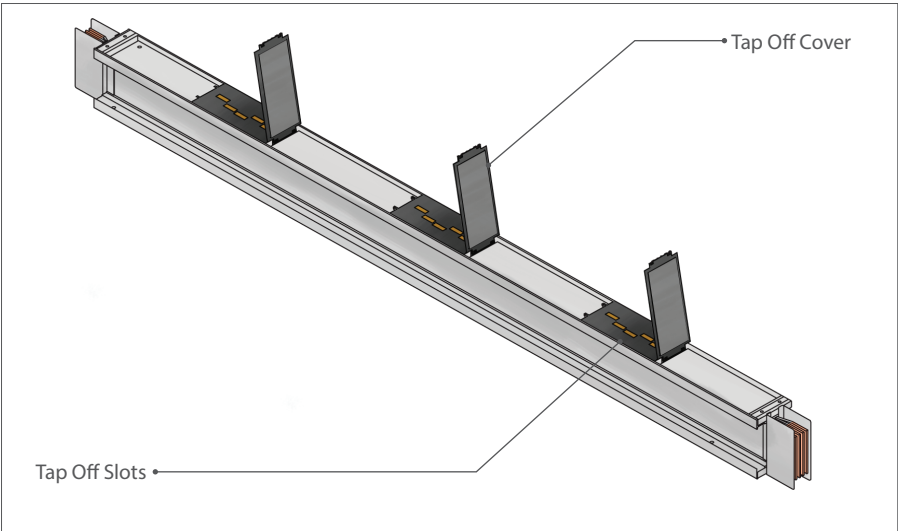
Straight Lengths

Feeder lengths account for the bulk of a busbar run. Distribution lengths are like feeder lengths but with tap off slots.

Tap off slots allow tap off units to be plugged into the busbar run. The tap off slot outlet and cover are made from a durable, high strength, Class B, 130°C insulation material.

The tap off slot cover is designed to prevent access to the contacts behind the cover and prevent the entry of dirt, dust or moisture. With a standard tap off unit or cover fitted the Ingress Protection (IP) level is at IP55 but higher levels, up to IP67, can be achieved upon request.

More information on the tap off units available from Powerbar can be found in our Tap Off Brochure.



Distribution length

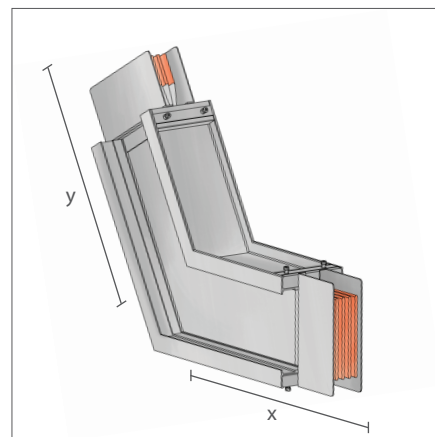
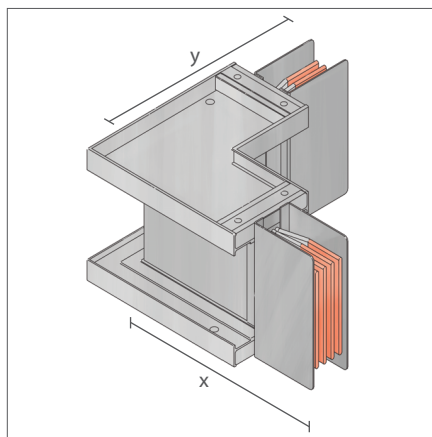
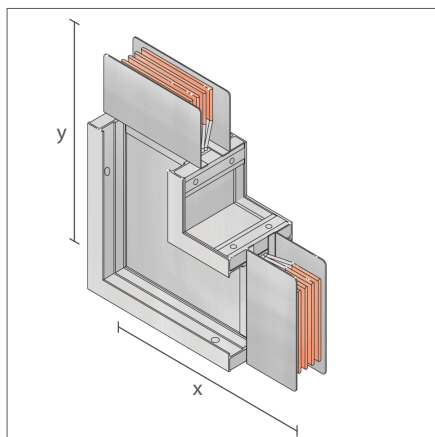
Straight lengths can be supplied at any length between a minimum of 600mm and a maximum of 3000mm.

The table below illustrates the different types of build arrangement used depending on the rating of busbar required for the application.

Busbar Rating (Amps)	Construction Type	Busbar Size (mm)	
		Height	Width
1000A	Single	130mm	145mm
1250A	Single	130mm	145mm
1350A	Single	130mm	145mm
1600A	Single	150mm	145mm
2000A	Single	185mm	145mm
2500A	Single	220mm	145mm
3200A	Single	290mm	145mm
4000A	Double	393mm	145mm
5000A	Double	463mm	145mm
6300A	Double	603mm	145mm

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

ELBOWS



Flatwise Elbows

Flatwise elbows are typically used to make 90° changes in the direction of the busbar system. There are two main kinds, flatwise up and flatwise down.

These can be used to turn the busbar route up or down if it is running on its edge, or to turn the busbar left and right if it is running on its flat.

Edgewise Elbows

Edgewise elbows are typically used to make 90° changes in the direction of the busbar system.

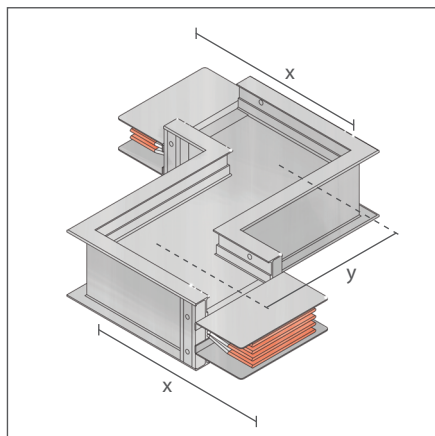
There are two main kinds, edgewise right and edgewise left. These can be used to turn the busbar route up or down if it is running on its flat, or to turn the busbar left and right if it is running on its edge.

Custom Elbows

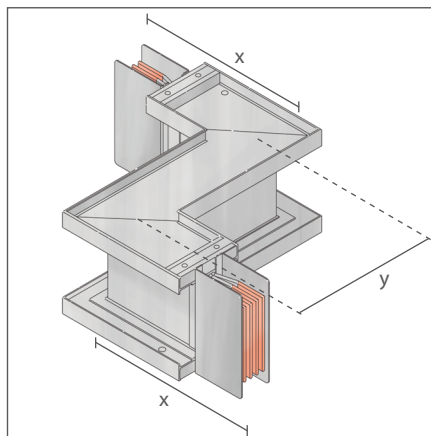
While elbows are typically 90° Powerbar can manufacture special angle elbows if necessary for both flatwise and edgewise products.

Flatwise Elbow (Up or Down)	Ratings (Amps)	Minimum Leg Size		Standard Leg Size		Maximum Leg Size	
		X	Y	X	Y	X	Y
	1000A	248mm	248mm	350mm	350mm	750mm	750mm
	1250A	248mm	248mm	350mm	350mm	750mm	750mm
	1350A	248mm	248mm	350mm	350mm	750mm	750mm
	1600A	258mm	258mm	350mm	350mm	750mm	750mm
	2000A	275mm	275mm	350mm	350mm	750mm	750mm
	2500A	293mm	293mm	350mm	350mm	750mm	750mm
	3200A	328mm	328mm	350mm	350mm	750mm	750mm
	4000A	379mm	379mm	500mm	500mm	750mm	750mm
Edgewise Elbow (Left or Right)	Ratings (Amps)	Minimum Leg Size		Standard Leg Size		Maximum Leg Size	
		X	Y	X	Y	X	Y
	1000A	255mm	255mm	350mm	350mm	600mm	600mm
	1250A	255mm	255mm	350mm	350mm	600mm	600mm
	1350A	255mm	255mm	350mm	350mm	600mm	600mm
	1600A	255mm	255mm	350mm	350mm	600mm	600mm
	2000A	255mm	255mm	350mm	350mm	600mm	600mm
	2500A	255mm	255mm	350mm	350mm	600mm	600mm
	3200A	255mm	255mm	350mm	350mm	600mm	600mm
	4000A	255mm	255mm	350mm	350mm	600mm	600mm
Flatwise Elbow (Up or Down)	Ratings (Amps)	Minimum Leg Size		Standard Leg Size		Maximum Leg Size	
		X	Y	X	Y	X	Y
	1000A	248mm	248mm	350mm	350mm	750mm	750mm
	1250A	248mm	248mm	350mm	350mm	750mm	750mm
	1350A	248mm	248mm	350mm	350mm	750mm	750mm
	1600A	258mm	258mm	350mm	350mm	750mm	750mm
	2000A	275mm	275mm	350mm	350mm	750mm	750mm
	2500A	293mm	293mm	350mm	350mm	750mm	750mm
	3200A	328mm	328mm	350mm	350mm	750mm	750mm
	4000A	379mm	379mm	500mm	500mm	750mm	750mm
Edgewise Elbow (Left or Right)	Ratings (Amps)	Minimum Leg Size		Standard Leg Size		Maximum Leg Size	
		X	Y	X	Y	X	Y
	1000A	255mm	255mm	350mm	350mm	600mm	600mm
	1250A	255mm	255mm	350mm	350mm	600mm	600mm
	1350A	255mm	255mm	350mm	350mm	600mm	600mm
	1600A	255mm	255mm	350mm	350mm	600mm	600mm
	2000A	255mm	255mm	350mm	350mm	600mm	600mm
	2500A	255mm	255mm	350mm	350mm	600mm	600mm
	3200A	255mm	255mm	350mm	350mm	600mm	600mm
	4000A	255mm	255mm	350mm	350mm	600mm	600mm

OFFSETS



Flatwise Offset



Edgewise Offset

Combination Possibilities

Flatwise Offset Up
Flatwise Offset Down
Edgewise Offset Right
Edgewise Offset Left

Offset Sections

An Offset is used to avoid obstacles such as pipes or steel columns and to conform to the structure of the building. It is basically two elbows fabricated into one single piece.

There are four types of offset section; flatwise offset up and down, and edgewise offset left and right.

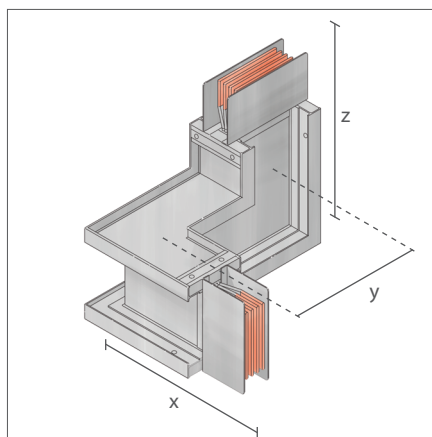
Flatwise Offset (Up or Down)	Ratings (Amps)	Minimum Leg Size		Maximum Leg Size	
		X	Y	X	Y
	1000A	248mm	50mm	650mm	496mm
	1250A	248mm	50mm	650mm	496mm
	1350A	248mm	50mm	650mm	496mm
	1600A	258mm	50mm	650mm	516mm
	2000A	275mm	50mm	650mm	550mm
	2500A	293mm	50mm	650mm	586mm
	3200A	328mm	50mm	650mm	656mm
	4000A	379mm	50mm	650mm	758mm
Edgewise Offset (Left or Right)	5000A	414mm	50mm	650mm	828mm
	6300A	484mm	50mm	650mm	968mm

Edgewise Offset (Left or Right)	Ratings (Amps)	Minimum Leg Size		Maximum Leg Size	
		X	Y	X	Y
	1000A	255mm	80mm	510mm	600mm
	1250A	255mm	80mm	510mm	600mm
	1350A	255mm	80mm	510mm	600mm
	1600A	255mm	80mm	510mm	600mm
	2000A	255mm	80mm	510mm	600mm
	2500A	255mm	80mm	510mm	600mm
	3200A	255mm	80mm	510mm	600mm
	4000A	255mm	80mm	510mm	600mm
Edgewise Offset (Left or Right)	5000A	255mm	80mm	510mm	600mm
	6300A	255mm	80mm	510mm	600mm

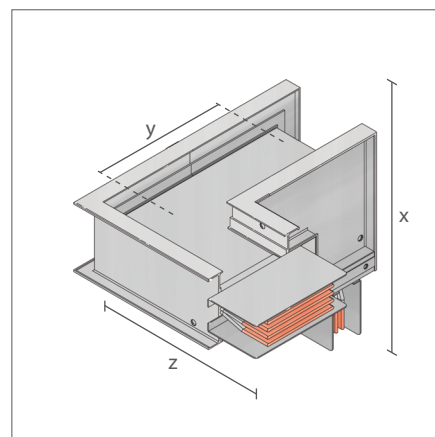
COMBINATIONS

Combination Possibilities

Edgewise Right/Flatwise Up
 Edgewise Right/Flatwise Down
 Edgewise Left/Flatwise Up
 Edgewise Left/Flatwise Down
 Flatwise Up/Edgewise Left
 Flatwise Up/Edgewise Right
 Flatwise Down/Edgewise Left
 Flatwise Down/Edgewise Right



Edge Right Flatwise Up



Flatwise Up Edgewise Right

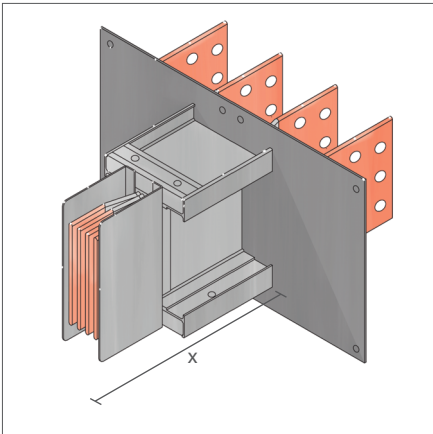
Combination Elbows

Combination elbows are used to conform to the buildings structure and to utilise a small amount of space to change direction by combining both flatwise and edgewise elbows.

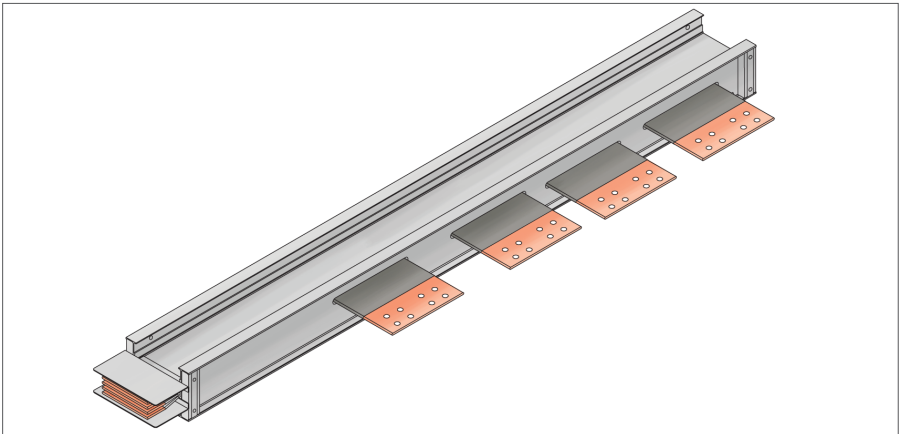
Combination Elbows	Ratings (Amps)	Minimum Leg Size		
		X (Edgewise side)	Y	Z (Flatwise side)
	1000A	255mm	188mm	248mm
	1250A	255mm	188mm	248mm
	1350A	255mm	188mm	248mm
	1600A	255mm	198mm	258mm
	2000A	255mm	215mm	275mm
	2500A	255mm	233mm	293mm
	3200A	255mm	268mm	328mm
	4000A	255mm	319mm	379mm
Combination Elbows	5000A	255mm	354mm	414mm
	6300A	255mm	424mm	484mm

Combination Elbows	Ratings (Amps)	Maximum Leg Size		
		X (Edgewise side)	Y	Z (Flatwise side)
	1000A	600mm	502mm	750mm
	1250A	600mm	502mm	750mm
	1350A	600mm	502mm	750mm
	1600A	600mm	512mm	750mm
	2000A	600mm	529mm	750mm
	2500A	600mm	547mm	750mm
	3200A	600mm	582mm	750mm
	4000A	600mm	633mm	750mm
Combination Elbows	5000A	600mm	668mm	750mm
	6300A	600mm	738mm	750mm

FLANGES



Panel Flange



Parallel Flange

Flange Connections

Flange connections provide a direct connection to low voltage switchgear, transformer enclosures and other electrical equipment. Cut out details, dimensions and drilling plans are provided with the customer drawings and it is the responsibility of the switchgear manufacturer to provide the opening, drill fixing holes, connecting hardware and busbar risers in their equipment.

Switchgear can be provided through our partners E&I Engineering. For more information use the contact details on the back cover of this brochure.

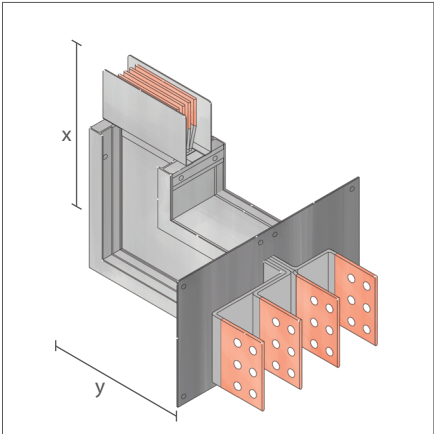
For proper coordination between the busbar system and the equipment, detailed drawings, including switchgear phase rotation, must accompany the order. Standard flanges can be offset to the left or right of the section as required.

Panel Flange	Ratings (Amps)	Minimum	Maximum
		X	X
	1000A	220mm	840mm
	1250A	220mm	840mm
	1350A	220mm	840mm
	1600A	220mm	840mm
	2000A	220mm	840mm
	2500A	220mm	840mm
	3200A	220mm	840mm
	4000A	220mm	840mm
	5000A	220mm	840mm
	6300A	220mm	840mm

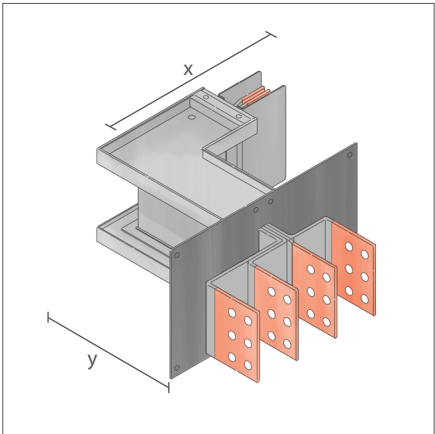
COMBINATION FLANGES

Combination Possibilities

- Panel Flange/Edgewise Left
- Panel Flange/Edgewise Right
- Panel Flange/Edgewise Up
- Panel Flange/Edgewise Down
- Edgewise Left/Panel Flange
- Edgewise Right/Panel Flange
- Flatwise Up/Panel Flange
- Flatwise Down/Panel Flange



Flatwise Elbow Flange



Edgewise Elbow Flange

Combination Flanges

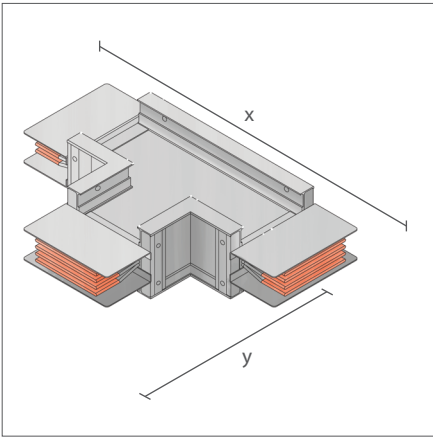
A flange combination elbow is a combination of a standard elbow and a standard flange. Flange combination elbows are typically used when the minimum leg lengths for either the standard elbow or the standard flange cannot be maintained.

A typical example would be when the busbar must lay close to the top of the switchboard, when avoiding other services or when there is reduced head height above the switchgear.

Flange/Elbows(Flatwise)	Ratings (Amps)	Minimum Leg Size		Maximum Leg Size	
		X	Y	X	Y
	1000A	248mm	115mm	750mm	488mm
	1250A	248mm	115mm	750mm	488mm
	1350A	248mm	115mm	750mm	488mm
	1600A	258mm	125mm	750mm	498mm
	2000A	275mm	143mm	750mm	515mm
	2500A	293mm	160mm	750mm	533mm
	3200A	328mm	195mm	750mm	568mm
	4000A	379mm	247mm	750mm	619mm
	5000A	414mm	282mm	750mm	654mm
	6300A	484mm	352mm	750mm	724mm

Flange/Elbows(Edgewise)	Ratings (Amps)	Minimum Leg Size		Maximum Leg Size	
		X	Y	X	Y
	1000A	255mm	123mm	600mm	495mm
	1250A	255mm	123mm	600mm	495mm
	1350A	255mm	123mm	600mm	495mm
	1600A	255mm	123mm	600mm	495mm
	2000A	255mm	123mm	600mm	495mm
	2500A	255mm	123mm	600mm	495mm
	3200A	255mm	123mm	600mm	495mm
	4000A	255mm	123mm	600mm	495mm
	5000A	255mm	123mm	600mm	495mm
	6300A	255mm	123mm	600mm	495mm

SPECIALS

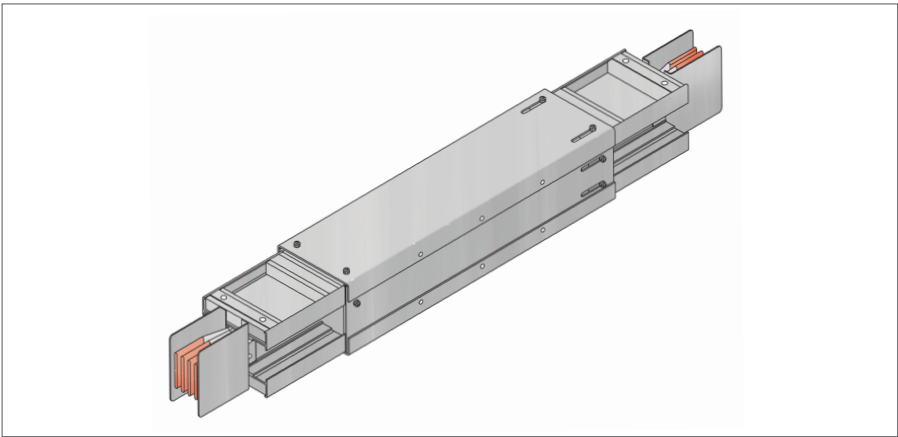


Flatwise Tee's

Flatwise Tee's are used to split one busbar run into two runs going in different directions. This can be very useful in utilising a small amount of space and supplying two different parts of a building with power.

They are a combination of a feeder length and a flatwise elbow.

Flatwise Tee	Ratings (Amps)	Minimum Leg Size		Standard Leg Size		Maximum Leg Size	
		X	Y	X	Y	X	Y
	1000A	496mm	248mm	700mm	350mm	1500mm	650mm
	1250A	496mm	248mm	700mm	350mm	1500mm	650mm
	1350A	496mm	248mm	700mm	350mm	1500mm	650mm
	1600A	516mm	258mm	700mm	350mm	1500mm	650mm
	2000A	550mm	275mm	700mm	350mm	1500mm	650mm
	2500A	586mm	293mm	700mm	350mm	1500mm	650mm
	3200A	656mm	328mm	700mm	350mm	1500mm	650mm
	4000A	758mm	379mm	1000mm	500mm	1500mm	650mm
	5000A	828mm	414mm	1000mm	500mm	1500mm	650mm
	6300A	968mm	484mm	1000mm	500mm	1500mm	650mm



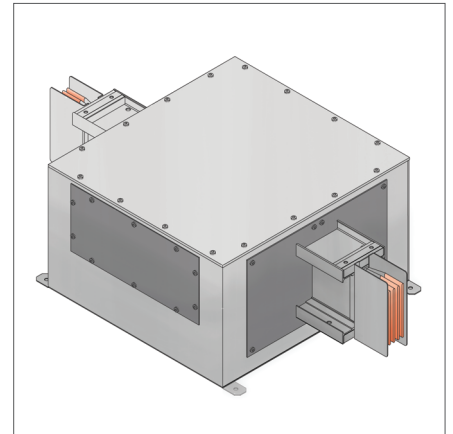
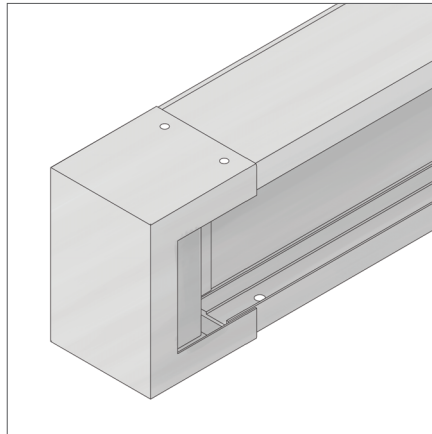
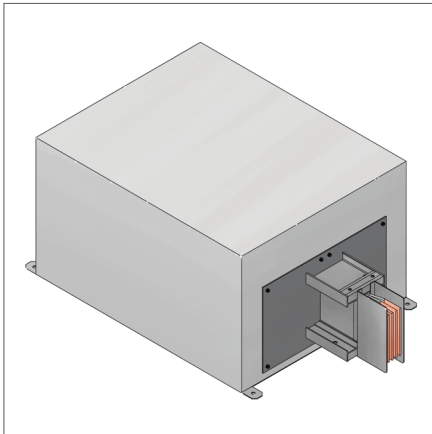
Expansion Units

Expansion units are a fitting used to accommodate the expansion and contraction of a busbar system and for building movement. Expansion Units are typically installed in the centre of long busbar runs, and might also be used at the beginning of riser runs to minimize the stress on the lower section of the busbar run. Another common use would be where a busbar crosses an expansion joint of a building.

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

Expansion Units allow for a 40mm movement along the length of the busbar.

END & CENTRE FEED UNITS



End Feed Units

Cable end feed units are used on the ends of busbar risers which are cable fed. They can be on the top of the busbar, feeding down through the building, or they can be located at the bottom of the busbar riser, feeding up through the building.

The size of the cable end feed unit depends on a number of factors:

- Rating of busbar
- Size of cable
- Number of cables
- Is a protective device or an isolator required

End Caps

End caps are used to safely cap off the end of a busbar run. The end cap units are factory fitted but they can be easily removed on site to allow for the extension of a busbar system. If the busbar run is bottom fed the end cap would be located at the top end of the busbar. If the system is top fed then the end cap would be located at the bottom. In the case of a centre fed system an end cap must be used at both end of the system, one at the top and one at the bottom.

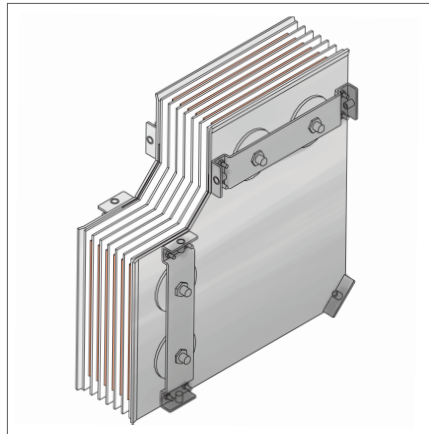
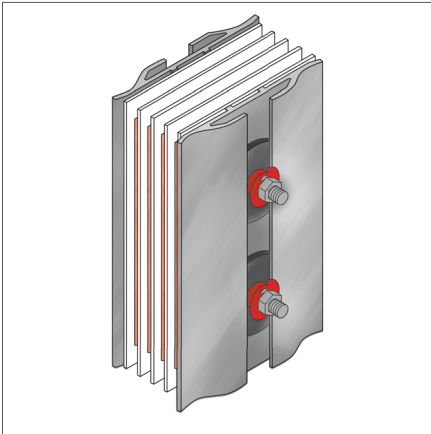
Centre Feed Units

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

The size of a centre feed unit depends on a number of factors:

- Rating of busbar
- Size of cable
- Number of cables
- Is a protective device or an isolator required

JOINT PACKS



Joint Packs

The Powerbar joint pack is a compression joint design which utilises a specially designed Belleville washer to distribute the pressure evenly over the joint pack.

Joint packs are used to connect all the components in a busbar system together, from feeder lengths to flatwise tee's.

The earth is maintained through the joint both by the joint pack cover and by the earth side plate. The joint pack is supplied in specific sizes depending on the rating of busbar required.

During installation, when the joint is torqued properly, the first head of the nut will break off and the red indicator disk will fall away.

If any red disks are still present after installation the joints have not been properly secured.

Flatwise Elbow Joint Packs

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

These can be used to turn the busbar route up or down if it is running on its edge, or to turn the busbar left and right if it is running on its flat.

INSTALLATION

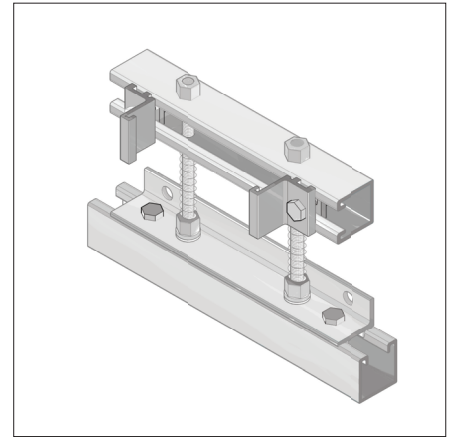
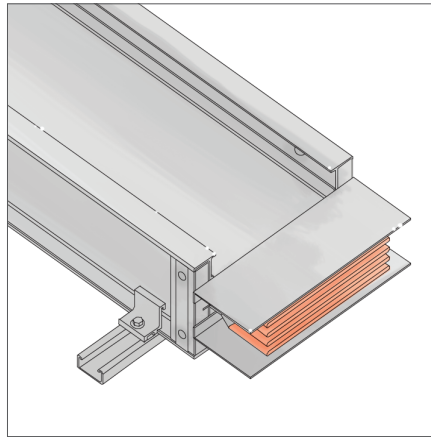
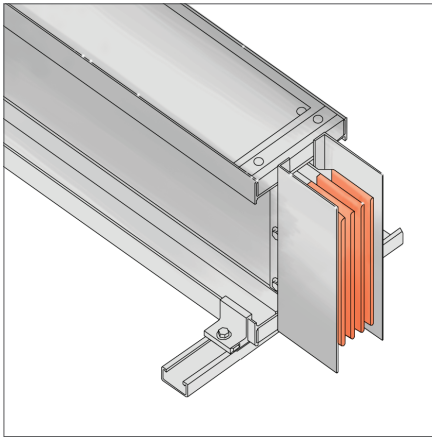
Installation

Busbar can either be installed to run on its "Flat" or on its "Edge." The decision of how to run the busbar is governed by a number of factors:

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

The modular design of the Powerbar Busbar System allows it to easily be installed in either position.

Note: The bar can be installed both on its edge and on its flat. This will not affect the bars performance.



Edge Installation

This is the preferred method of installation for the smaller rated busbar systems. It is also the main method used to install distribution busbar in building risers as it ensures tap off units can be connected easily.

Flat Installation

This is the preferred method of installation for the higher rated, multistack busbar systems. When coordinated through the building on its flat any busbar rating only has a height of 145mm.

Spring Hanger

Spring hangers are used to support vertical busbar runs. They are used to support the weight of the busbar system on each floor and they also compensate for minimal building movement and thermal expansion.

The standard spring bracket is designed to suit our single stack busbar system, for multistack arrangements please contact our engineering team for details.

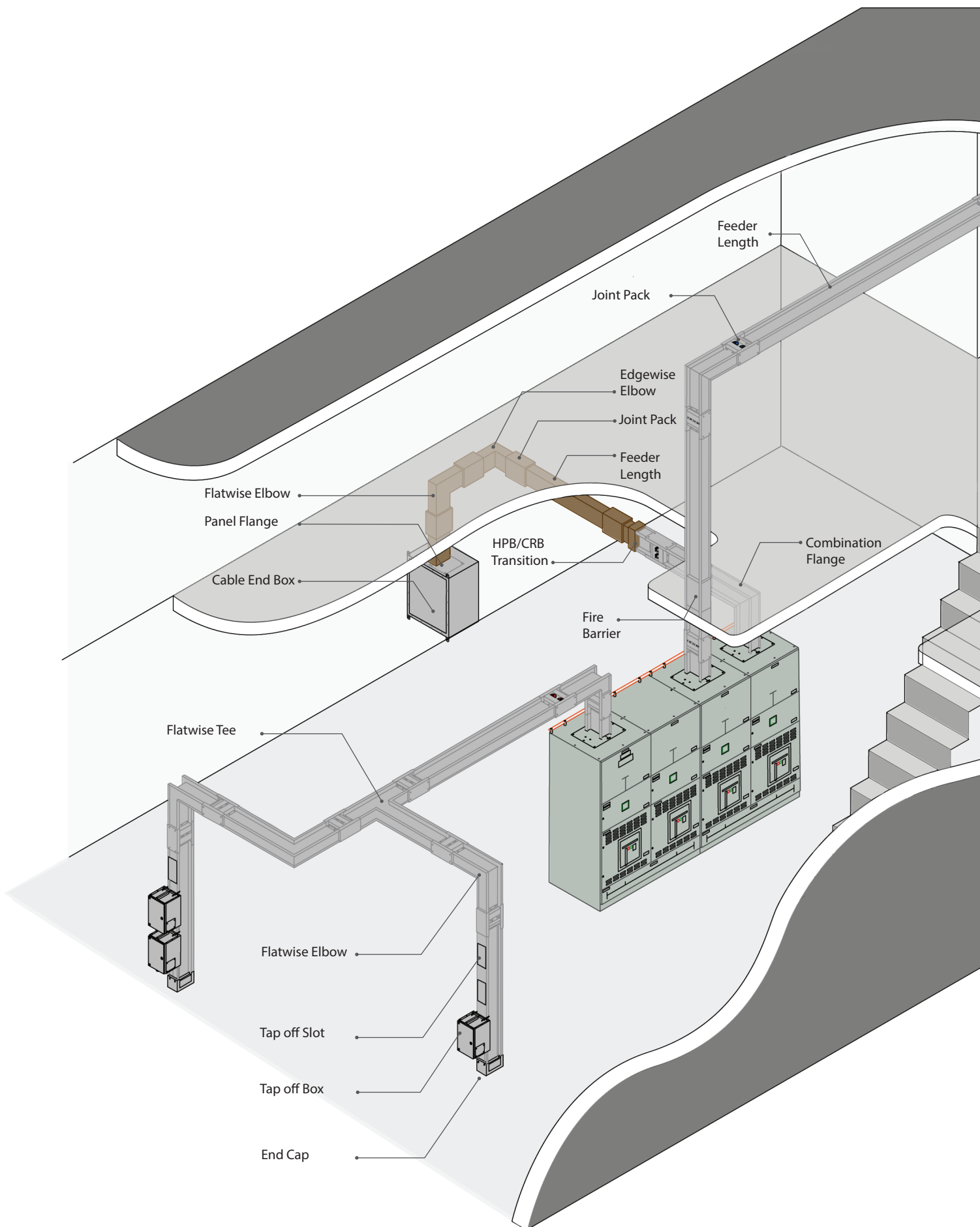
Special Sections

We manufacture a variety of more specialised units and components to meet unique system requirements. These range from edgewise tee's, flatwise crosses, step up/step down reducers, phase rotation units, in-line disconnect cubicles, in-line tap off units, custom built busbar connection units.

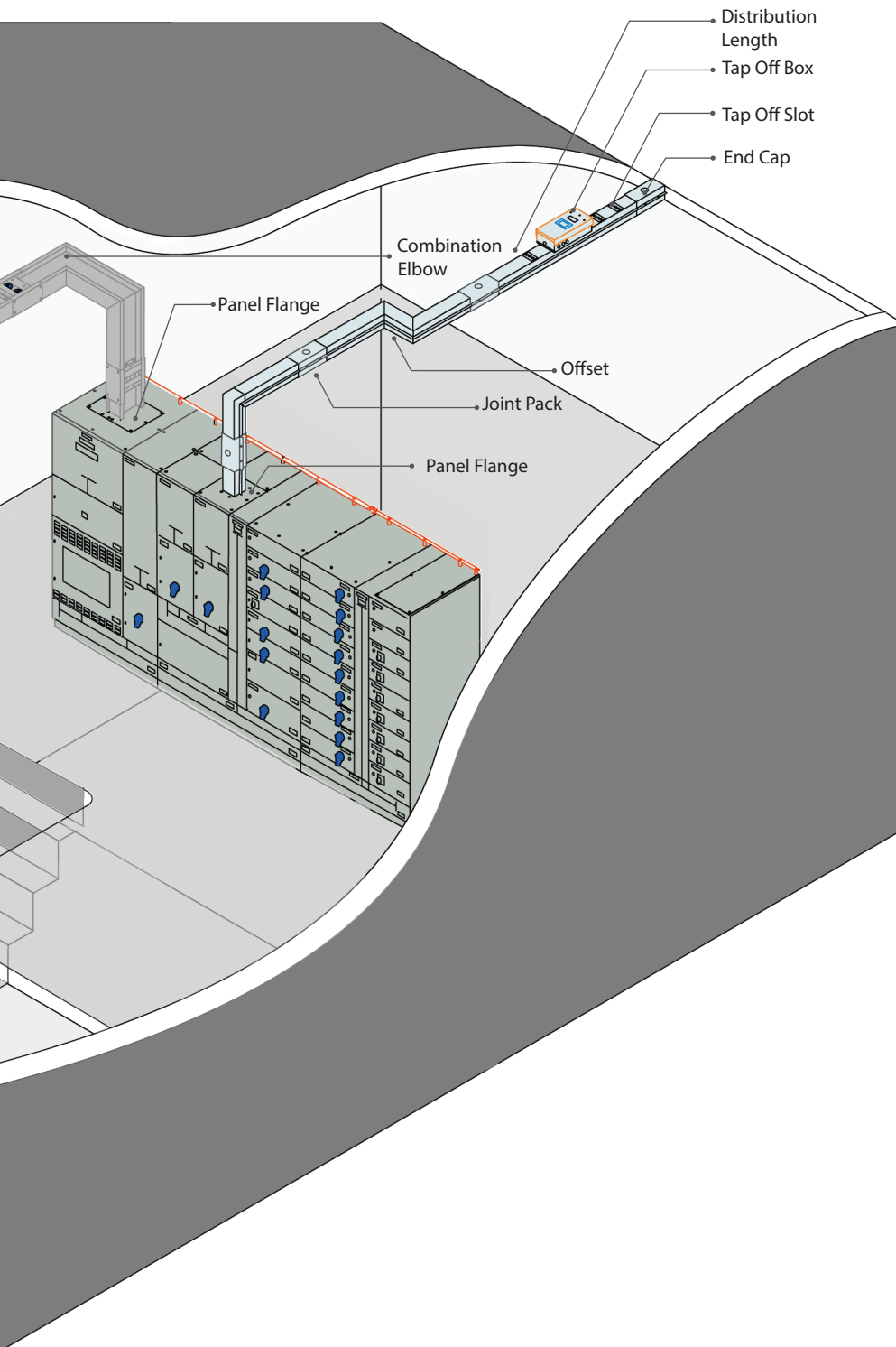
Powerbar can produce a wide range of special sections of busbar to suit a wide variety of applications and unusual issues that may arise.

Please contact Powerbar regarding any special requirements as we take pride in our ability to produce bespoke parts to meet our clients needs.

TYPICAL INSTALLATION



TYPICAL INSTALLATION



E&I Engineering provide high voltage and low voltage switchgear and Powerbar provides a range of busbar trunking for power distribution. Together we can provide complete power solutions for your project.




We have three ranges of Powerbar:

MPB - Medium Powerbar. Our air insulated range available with both copper and aluminium conductors. This range covers 160-800 Amps

HPB - High Powerbar. Our sandwich construction range available with both copper and aluminium conductors. This range covers 800-6600 Amps.

CRB - Cast Resin Bar. Our IP68 rated polymer concrete product for use in extreme conditions. This range is available with both copper and aluminium conductors. This range covers 800-6300 Amps.

Key.

	MPB
	HPB
	Cast Resin

TECHNICAL DATA

Rated Current (A)	800	1100	1250	1350	1600	2000
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)	25	50	50	50	65	80
Peak Value (kA)	52.5	105	105	105	143	176
Phase Conductor						
Cross Sectional Area (mm ²)	210	328	420	420	540	750
Neutral Conductor						
Cross Sectional Area (mm ²)	210	328	420	420	540	750
Isolated Earth Conductor						
100% Earth Cross Sectional Area (mm ²)	210	328	420	420	540	750
50% Earth Cross Sectional Area (mm ²)	105	164	210	210	270	375
Housing Earth Path						
Cross Sectional Area (mm ²)	1725	1444	1444	1444	1564	1774
Overall Dimensions						
Height x Width of 4 Bar System (mm)	95 x 148	130 x 145	130 x 145	130 x 145	150 x 145	185 x 145
Weight						
Weight of 4 Bar System (kg/m)	9.4	16.9	19.9	19.9	24.5	32.6
Resistance						
Resistance (mΩ/m) at 20°C	0.085	0.052	0.042	0.042	0.033	0.023
Resistance (mΩ/m) at 80°C	0.105	0.064	0.053	0.053	0.041	0.030
Reactance						
Reactance (mΩ/m) at 50Hz	0.032	0.017	0.016	0.016	0.013	0.010
Impedance						
Impedance (mΩ/m) at 80°C	0.110	0.066	0.055	0.055	0.043	0.031
Voltage Drop at Full Load 50Hz						
Power Factor = 0.7 (V/m) at 80°C	0.134	0.099	0.105	0.118	0.105	0.095
Power Factor = 0.8 (V/m) at 80°C	0.144	0.106	0.113	0.126	0.112	0.101
Power Factor = 0.9 (V/m) at 80°C	0.151	0.113	0.118	0.132	0.118	0.106
Power Factor = 1.0 (V/m) at 80°C	0.146	0.111	0.114	0.128	0.113	0.101
Voltage Drop Full Load 60Hz						
Power Factor = 0.7 (V/m) at 80°C	0.141	0.103	0.111	0.124	0.111	0.100
Power Factor = 0.8 (V/m) at 80°C	0.150	0.111	0.117	0.131	0.117	0.106
Power Factor = 0.9 (V/m) at 80°C	0.156	0.116	0.122	0.136	0.121	0.109
Power Factor = 1.0 (V/m) at 80°C	0.147	0.112	0.115	0.128	0.113	0.101

TECHNICAL DATA

Rated Current (A)	2500	3200	4000	5000	6300
Rated Operational Voltage (V)	1000	1000	1000	1000	1000
Rated Insulation Voltage (V)	1000	1000	1000	1000	1000
Short Circuit					
1 Second (kA rms)	80	100	120	120	120
Peak Value (kA)	176	220	264	264	264
Phase Conductor					
Cross Sectional Area (mm ²)	960	1380	1500	1920	2760
Neutral Conductor					
Cross Sectional Area (mm ²)	960	1380	1500	1920	2760
Isolated Earth Conductor					
100% Earth Cross Sectional Area (mm ²)	960	1380	1500	1920	2760
50% Earth Cross Sectional Area (mm ²)	480	690	750	960	1380
Housing Earth Path					
Cross Sectional Area (mm ²)	1984	2404	2464	2884	3724
Overall Dimensions					
Height x Width of 4 Bar System (mm)	220 x 145	290 x 145	393 x 145	463 x 145	603 x 145
Weight					
Weight of 4 Bar System (kg/m)	40.7	56.8	65.2	81.4	113.7
Resistance					
Resistance (mΩ/m) at 20°C	0.018	0.013	0.012	0.009	0.063
Resistance (mΩ/m) at 80°C	0.226	0.016	0.014	0.011	0.078
Reactance					
Reactance (mΩ/m) at 50Hz	0.008	0.006	0.005	0.004	0.029
Impedance					
Impedance (mΩ/m) at 80°C	0.024	0.017	0.015	0.012	0.083
Voltage Drop at Full Load 50Hz					
Power Factor = 0.7 (V/m) at 80°C	0.093	0.083	0.095	0.093	0.086
Power Factor = 0.8 (V/m) at 80°C	0.099	0.088	0.101	0.099	0.091
Power Factor = 0.9 (V/m) at 80°C	0.103	0.092	0.105	0.103	0.094
Power Factor = 1.0 (V/m) at 80°C	0.098	0.087	0.100	0.097	0.089
Voltage Drop Full Load 60Hz					
Power Factor = 0.7 (V/m) at 80°C	0.099	0.088	0.100	0.098	0.091
Power Factor = 0.8 (V/m) at 80°C	0.103	0.093	0.105	0.103	0.096
Power Factor = 0.9 (V/m) at 80°C	0.107	0.095	0.108	0.106	0.098
Power Factor = 1.0 (V/m) at 80°C	0.098	0.087	0.100	0.098	0.090

QUICK REFERENCE GUIDE

Critical Dimensions

Busbar passing through a wall, ceiling or floor:

- From the centre-line of a joint to the wall, ceiling or floor allow a minimum of 190mm.
- Joints cannot be positioned inside a wall, ceiling or floor – joints must be accessible for maintenance.

Busbar Clearances:

- From the top of the busbar to a wall, ceiling, floor or another busbar allow a minimum of 50mm.
- From the side of the busbar to a wall, ceiling, floor or other busbar minimum of 50mm.

Tap Off Clearances:

- Ensure adequate space is given to allow the tap off unit to be operated both easily and safely.

Feeder Busbar Length:

- Minimum length - 600mm
- Maximum length - 4000mm

Distribution Busbar Length:

- Minimum length - 600mm
- Maximum length - 4000mm

Flatwise Elbow Section:

- Minimum leg length – varies depending on the busbar.
- Maximum leg length – 750mm

Edgewise Elbow Section:

- Minimum leg length – 255mm
- Maximum leg length – 600mm

Critical Details

- Busbar drawing must have all relevant dimensions.
- Centre-line dimensions are expected, please highlight any dimensions that are not centre-line dimensions.
- Walls and floors must be located, shown and dimensioned.
- The front of all switchboards must be given and the phasing for any existing boards provided.
- Transformer connections require full details.
- When using rising busbar please note the phase orientation of the distribution sections.
- Horizontal distribution busbar positioned on its 'flat' must always be oriented with the Neutral phase to the top.

Operating Conditions:

- Ambient Temp : -5°C to +55°C
- Relative Humidity: 95% or below.
- Product designed for indoor use.

OTHER BROCHURES

[Product Overview](#)

[IMPB Copper](#)

[HPB Aluminium](#)

[HPB IEC Copper](#)

[HPB ADDC Copper](#)

[Cast Resin Bar](#)

[Busplug Units](#)

[MV Catalogue](#)

[Switchgear](#)



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