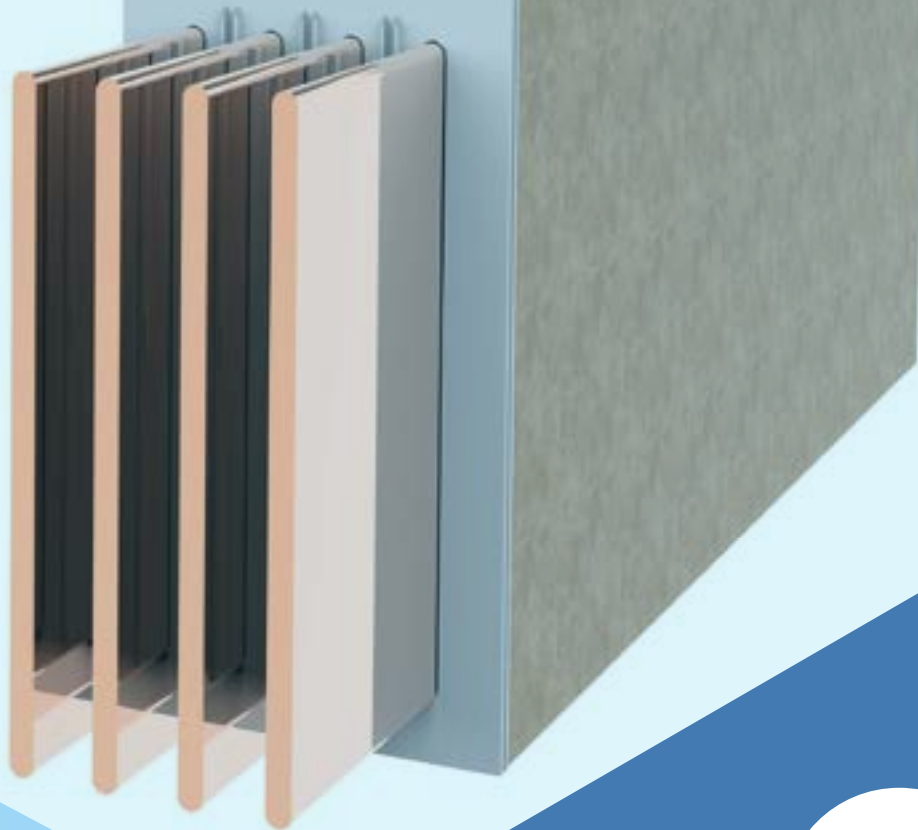




E+I ENGINEERING GROUP

# CAST RESIN POWERBAR

## IP68 BUSBAR SYSTEM



**PowerBar**

# CAST RESIN POWERBAR

IP68 BUSBAR SYSTEM

**E+I Engineering's Cast Resin Powerbar (CRB) is a 1000 Volt, IP68 rated maintenance free busbar system for use in outdoor, hazardous or life safety applications.**

The conductor is available in aluminium or copper and is totally encapsulated in a fire retardant, self-extinguishing and homogenous polymer concrete. CRB has been proven to guarantee high resistance to fire, water, moisture, mechanical loads, chemicals and extreme temperatures (-40°C to 60°C).

Cast Resin Powerbar ranges from 800A to 6300A and is available in multiple configurations including neutral, double neutral and earth.

# STANDARDS

## Standards

The Cast Resin Bar 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

Verification of:

- 10.2 Strength of Materials and Parts
- 10.3 Degree of Protection of Enclosures
- 10.4 Clearance and Creepage Distances
- 10.5 Protection Against Electric Shock and Integrity of Protective Circuits
- 10.9 Dielectric Properties
- 10.10 Temperature Rise Limits
- 10.11 Short-circuit Withstand Strength

## ASTA Certificates

E+I Engineering completed extensive testing at ASTA accredited laboratories to ensure the product we supply meets the international requirements.

## Ingress Protection

The product has been tested at IP68 in accordance with IEC 60529.

## Impact Resistance Test

The product has been rated at IK10 in accordance with IEC 62262.

## Seismic Compliance

The product has a Qualification Level – High in accordance to IEEE Standard 693-2005.

## Applicable standard and test that has been passed for Silicon Rubber Bellows

SN	Required Test Properties	Applicable Standard
1	Temperature Index	ASTM D 2863
2	Zero Halogen Test	IEC 60754-2
3	Flammability Test	UL 94 V0
4	Smoke Density	ASTM D 2843 or IEC 61034/1/2
5	Toxicity Test	NES 713

## Fire Resistance

The product has been rated at F 180 in accordance with IEC 60331-1 and meets ISO 834 standards.

## Damp Heat

The product is in accordance with IEC60068-2-78 (Damp Heat Steady State) and IEC 60068-2-3 (Damp Heat Cyclic).

## Explosive Atmosphere (ATEX)

The product has the following ATEX markings in accordance with IEC60079-0:2009 and IEC60079-18:2009:

## Ex m II C T5 Gb

All certificates available on request



OHSAS 18001:2007  
OHS 533652



ISO 9001:2015  
FM 12680

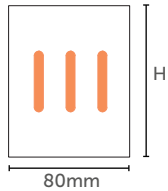


ISO 14001:2015  
No: EMS 566536

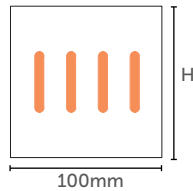


# BUSBAR DIMENSIONS

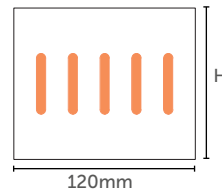
### Busbar Widths



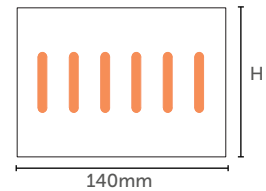
3 Pole System



4 Pole System



5 Pole System



6 Pole System

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

**Note:** If no earth bar is specified, earthing is to be provided by installation contractor.

### Busbar Heights

Copper Rating (A)	Construction Type	Busbar Height (H) (mm)
800	SS	100
1000	SS	130
1250	SS	105
1400	SS	120
1600	SS	145
2000	SS	175
2500	SS	210
3200	DS	310
4000	DS	360
5000	DS	460
6300	DS	560

Aluminium Rating (A)	Construction Type	Busbar Height (H) (mm)
1000	SS	110
1250	SS	130
1400	SS	150
1600	SS	180
2000	SS	230
2500	DS	300
3200	DS	380
4000	DS	540
5000	DS	620

**Key:** SS - Single Stack DS - Double Stack

# CHEMICAL RESISTANCE

**Key:**

- 1 Cast Resin is resistant to chemical
- 2 Chemical evaporated quickly from Cast Resin
- 3 Cast Resin is affected by chemical

Chemicals	Directly After Contact	After 24 hours	More Than 48 hours
Boric Acid	1	1	1
Hydrochloric Acid 10%	1	3	3
Sulfuric Acid 10%	1	1	1
Citric Acid	1	3	3
Lactic Acid 5%	1	3	3
Formic Acid 10%	3	3	3
Nitric Acid 10%	1	3	3
Acetic Acid 10%	3	3	3
Ethanol	1	1	1
Acetone	1	2	2
Calcium Chloride	1	1	1
Fuel (Diesel)	1	1	1
Ester	1	3	3
Ether	1	2	2
Formalin 37%	3	3	3
Glycerol	1	3	3
Ammonia 10%	1	1	1
Ammonia 30%	1	3	3
Sodium Hydroxide 10%	1	1	1
Sodium Hydroxide 50%	1	3	3
Lubricant	1	1	1
Engine Oil	1	1	1
Pentane	1	1	1
Toluene	1	3	3
Chlorinated Hydrocarbons	3	3	3
Javel Water	1	1	1

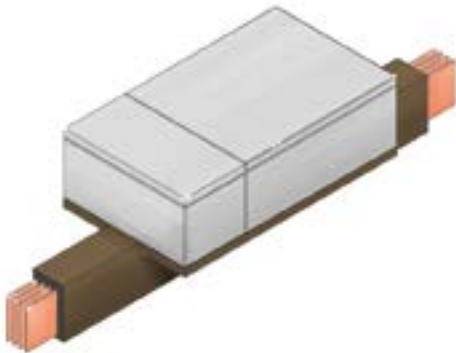
# STRAIGHT LENGTHS



Feeder Length

### Feeder Length

Feeder lengths can be supplied at any length from 700mm - 4000mm.



Distribution Length

### Distribution Length

Tap off units are plugged into the busbar run along distribution lengths. There are two types of tap off units available:

#### Option A

Glass reinforced polyester enclosure for standard IP68

#### Option B

Stainless steel housing for IP68; flame retardant and resistant to extreme environmental conditions



Transition Kit

### Transition Kit

IP68 - IP55 transition kit is used to connect Cast Resin Powerbar directly to E+I Engineerings High Powerbar range.

# ELBOWS

## Flatwise and Edgewise Elbows

Flatwise and edgewise elbows are used to make 90° changes in the direction of the busbar system.

### SS Length

300mm - 1000mm

### DS Length

300mm - 1000mm

### Total maximum length

2000mm

## Offset Sections

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

### Length per leg

350mm - 500mm

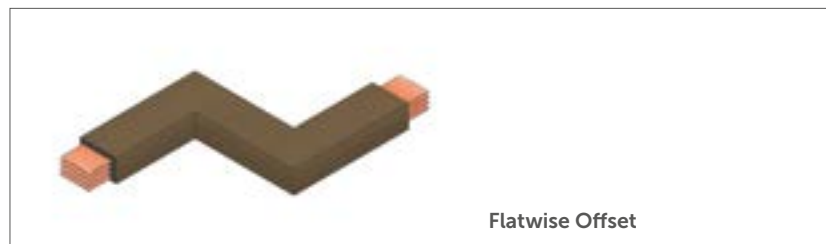
Max offset - 600mm

## Combination Elbows

Combination elbows are used to conform to the building structure and to utilise a small amount of space to change direction.

### Length per leg

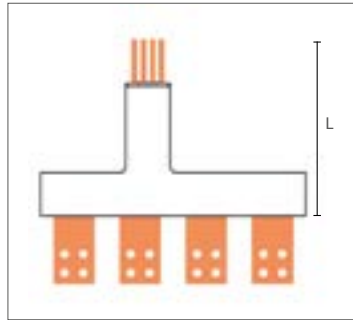
350mm - 500mm



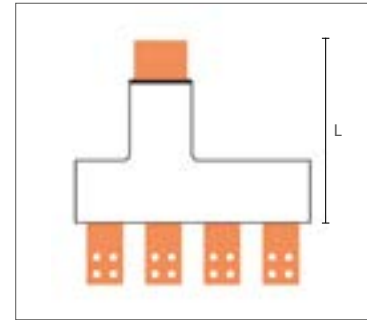
# FLANGES

### Flange Connections

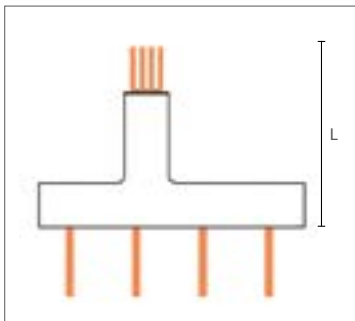
Flange connections provide a direct connection to low voltage switchgear, transformer enclosures and other electrical equipment.



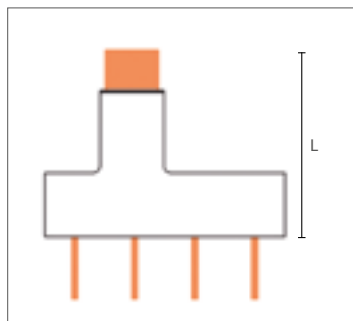
**Panel Flange T2**  
L - 500mm - 1000mm



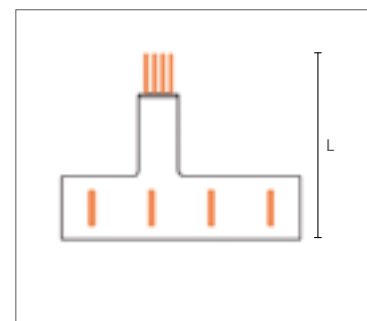
**Panel Flange T3**  
L - 500mm - 1000mm



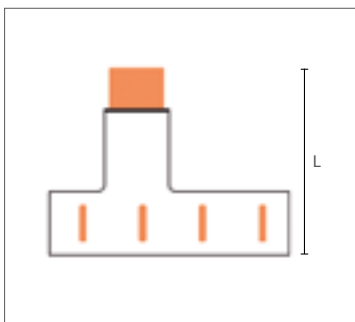
**Panel Flange T4**  
L - 500mm - 1000mm



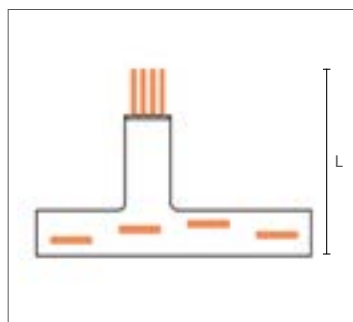
**Panel Flange T5**  
L - 500mm - 1000mm



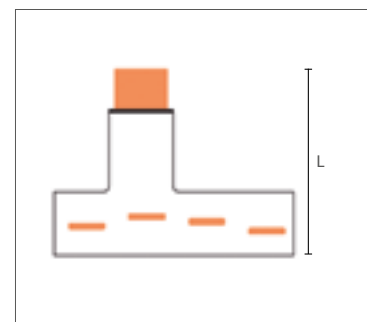
**Panel Flange T6**  
L - 500mm - 1000mm



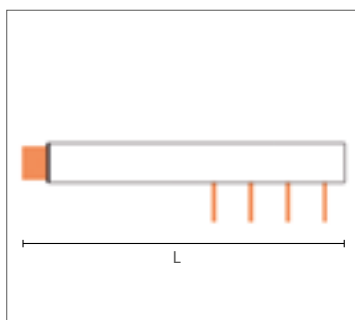
**Panel Flange T7**  
L - 500mm - 1000mm



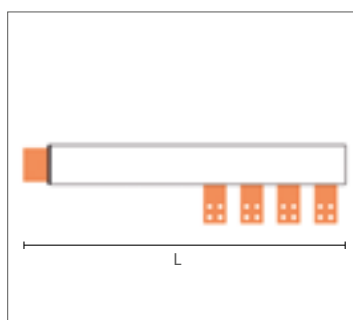
**Panel Flange T8**  
L - 300mm - 1000mm



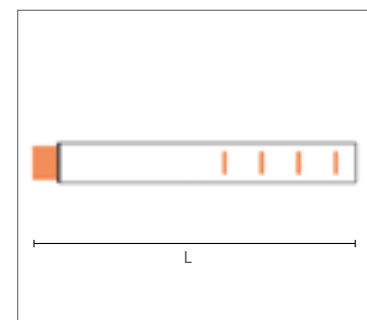
**Panel Flange T9**  
L - 300mm - 1000mm



**Panel Flange T10**  
L - 500mm - 1000mm



**Panel Flange T11**  
L - 500mm - 1000mm



**Panel Flange T12**  
L - 300mm - 1000mm



# SPECIALS

## Flatwise Tee

Flatwise tees are used to split one busbar run into two runs going in different directions. This reduces the amount of space needed when supplying two different parts of a building.

### SS length per leg

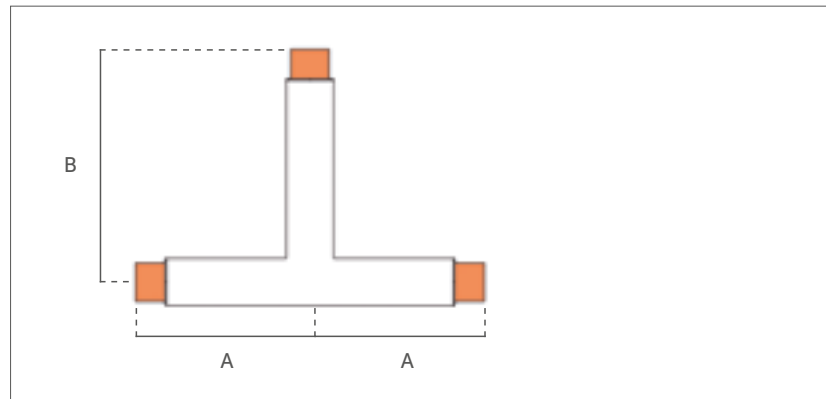
A 300mm - 1500mm

B 300mm - 1000mm

### DS length per leg

A 500mm - 1500mm

B 500mm - 1500mm



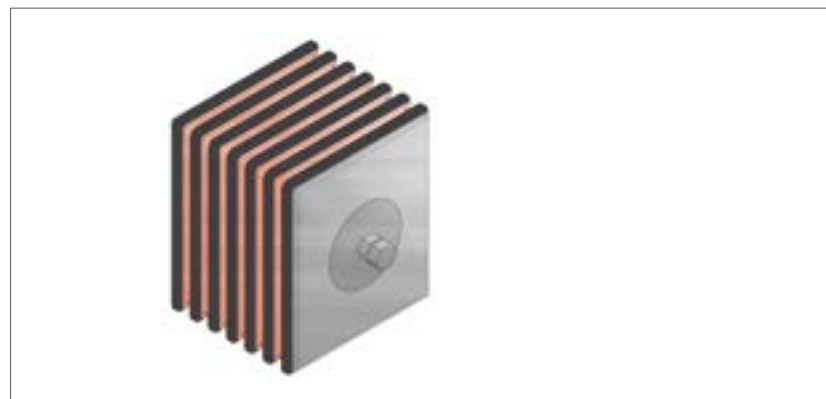
## Spring Hanger

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



## Joint Pack

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.

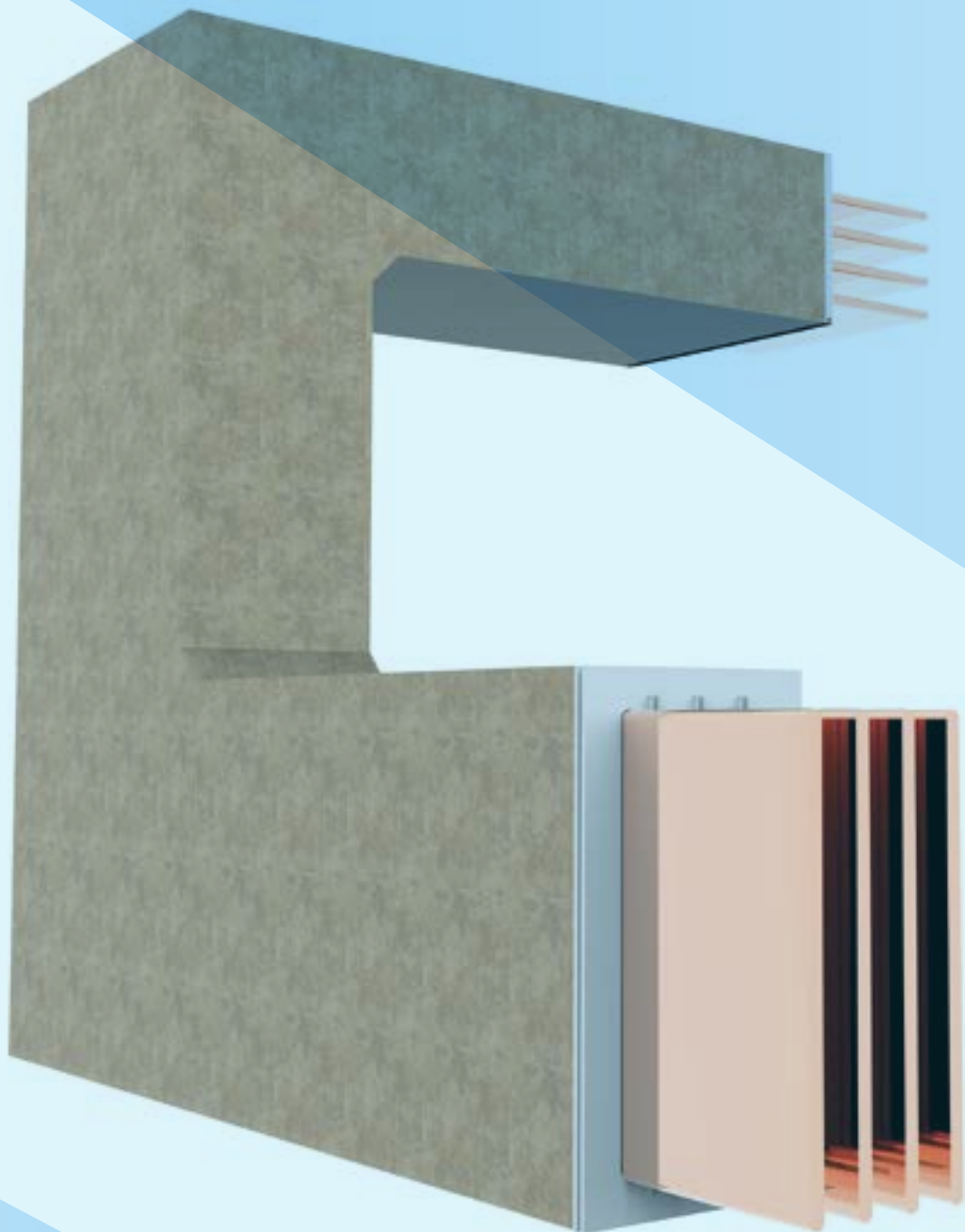


## Special Sections

E+I Engineering manufacture a variety of more specialised units and components to meet unique system requirements. These include: end feed units, centre feed units, expansions units, edgewise tees, flatwise crosses, step up/ step down reducers, phase rotation units, in-line disconnect cubicles, in-line tap off units and custom built busbar connection units.

# CAST RESIN POWERBAR

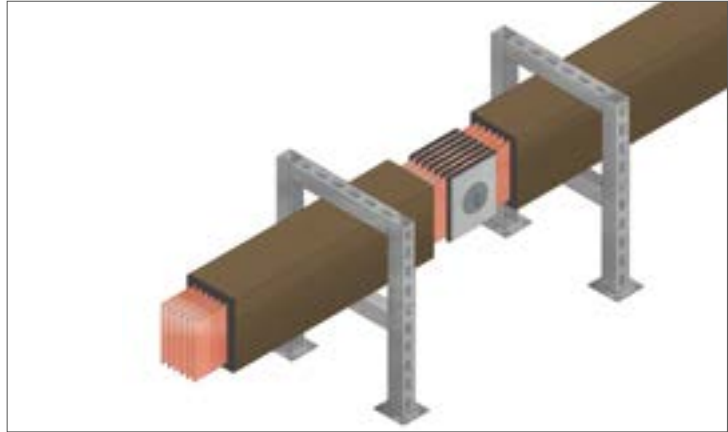
IP68 BUSBAR SYSTEM



# INSTALLATION

## Edge Installation

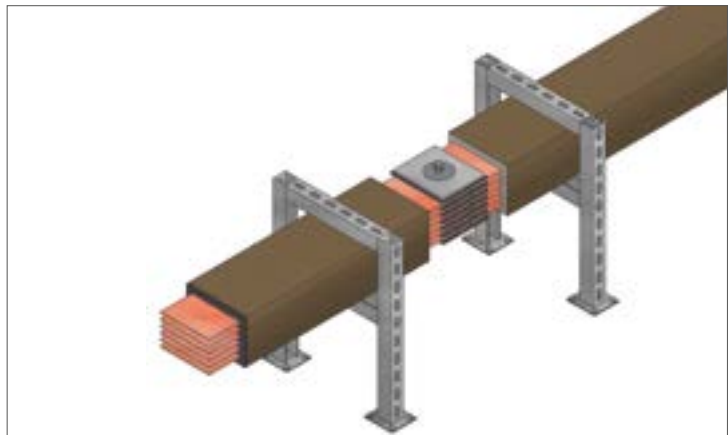
Edge installation is the preferred method of installation for a smaller rated busbar system. It is also the main method used to install distribution busbar in building risers as tap off units can be connected easily.



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 140mm.



Flat Installation

## Vertical Installation

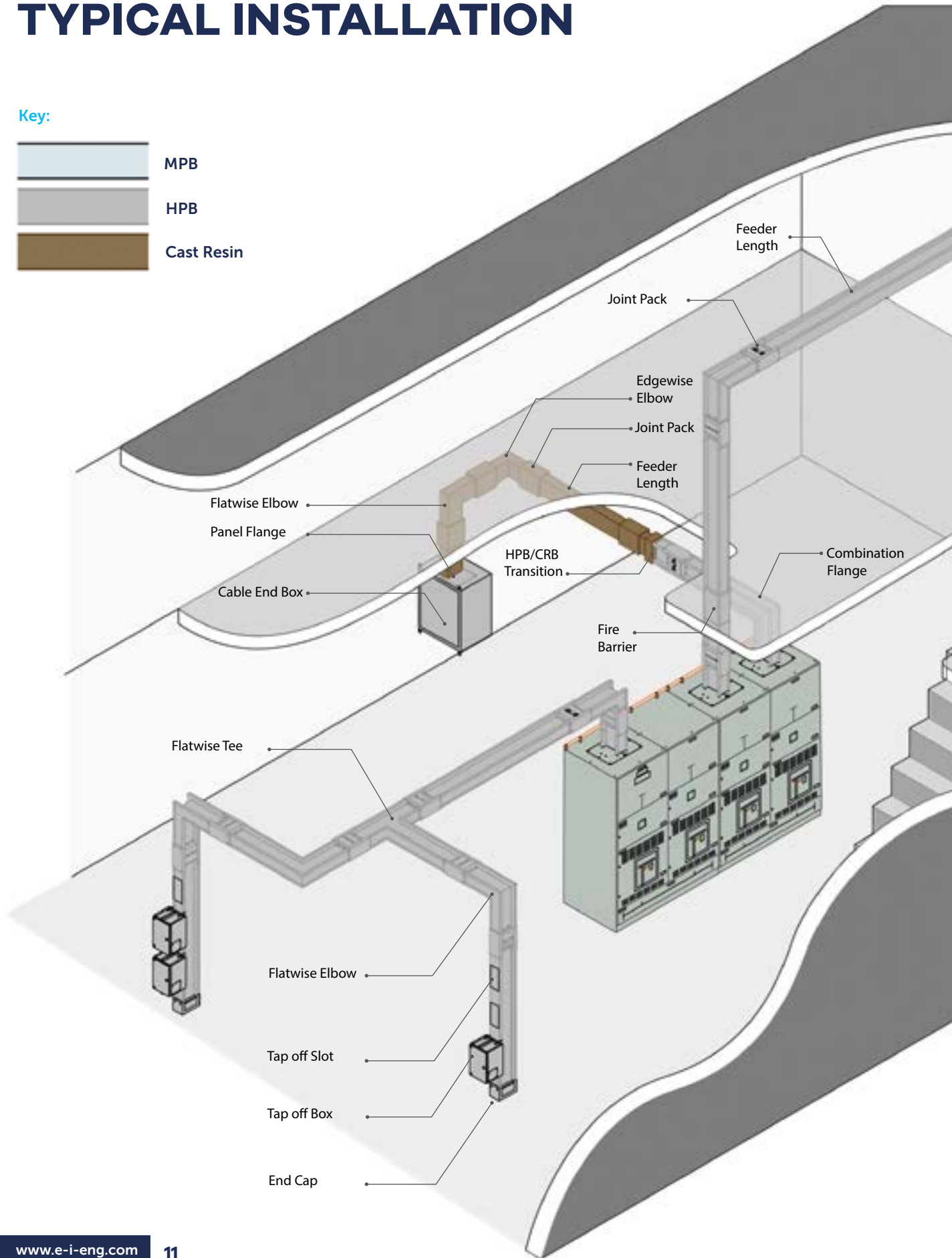
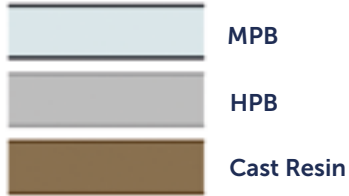
Vertical installation is the main method used to install distribution busbar in high-rise buildings. Tap off units can be connected easily and the busbar delivers to each floor.

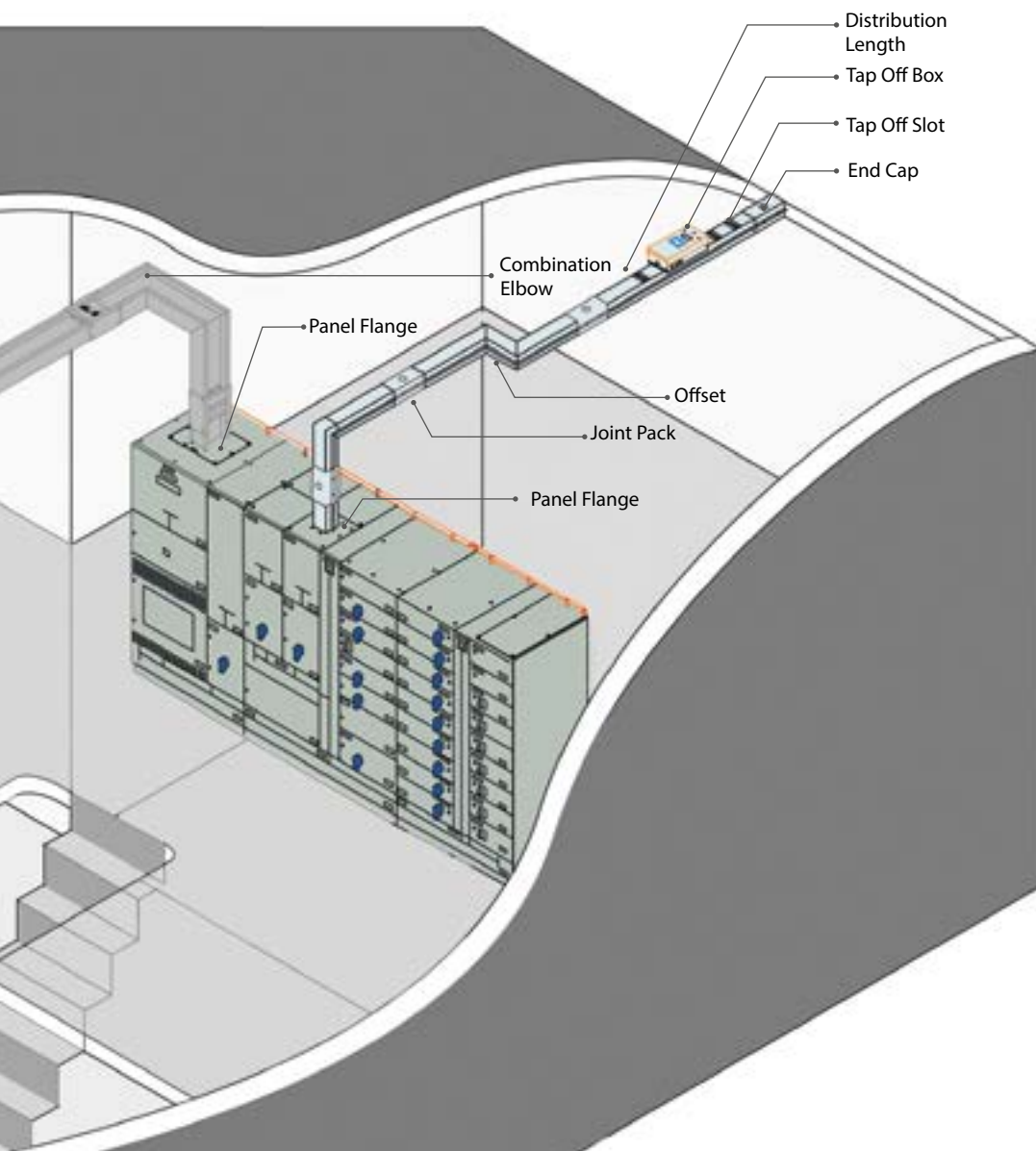


Vertical Installation

# TYPICAL INSTALLATION

Key:





**E+I Engineering provide a complete power distribution solution.**

The Powerbar range includes the following products:

**MPB - Medium Powerbar**

Air insulated range covering 160 - 1250 Amps

**HPB - High Powerbar**

Sandwich construction range covering 800 - 6600 Amps

**CRB - Cast Resin Powerbar**

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

All products are available with both copper and aluminium conductors.

# TECHNICAL DATA (COPPER)

Technical Data - Copper					
Rated Current (A)	800	1000	1250	1400	1600
Rated Operational Voltage (V)	1000	1000	1000	1000	1000
Rated Insulation Voltage (V)	1000	1000	1000	1000	1000
<b>Short Circuit</b>					
1 Second (kA rms)	36	40	50	50	65
Peak Value (kA)	756	84	105	105	143
<b>Phase Conductor</b>					
Cross Sectional Area (mm <sup>2</sup> )	240	420	450	540	690
<b>Neutral Conductor</b>					
Cross Sectional Area (mm <sup>2</sup> )	240	420	450	540	690
<b>Isolated Earth Conductor</b>					
100% Earth Cross Sectional Area (mm <sup>2</sup> )	240	420	450	540	690
50% Earth Cross Sectional Area (mm <sup>2</sup> )	120	210	225	270	345
<b>Overall Dimensions</b>					
Height x Width of 4 Bar System (mm)	100 x 100	130 x 100	105 x 100	120 x 100	145 x 100
<b>Weight</b>					
Weight of 4 Bar System (kg/m)	30.9	42.9	37.5	43.6	53.6
<b>Resistance</b>					
Resistance (mΩ/m) at 20°C	0.048	0.052	0.040	0.033	0.026
Resistance (mΩ/m) at 80°C	0.060	0.064	0.050	0.041	0.032
<b>Reactance</b>					
Reactance (mΩ/m) at 50Hz	0.051	0.047	0.045	0.040	0.033
<b>Impedance</b>					
Impedance (mΩ/m) at 80°C	0.079	0.080	0.067	0.057	0.046
<b>Voltage Drop at Full Load 50Hz</b>					
Power Factor = 0.7 (V/m) at 80°C	0.155	0.136	0.145	0.138	0.127
Power Factor = 0.8 (V/m) at 80°C	0.156	0.138	0.145	0.137	0.125
Power Factor = 0.9 (V/m) at 80°C	0.153	0.136	0.139	0.131	0.119
Power Factor = 1.0 (V/m) at 80°C	0.124	0.111	0.107	0.100	0.089
<b>Voltage Drop Full Load 60Hz</b>					
Power Factor = 0.7 (V/m) at 80°C	0.168	0.148	0.158	0.152	0.140
Power Factor = 0.8 (V/m) at 80°C	0.168	0.148	0.157	0.149	0.136
Power Factor = 0.9 (V/m) at 80°C	0.162	0.143	0.148	0.140	0.128
Power Factor = 1.0 (V/m) at 80°C	0.125	0.112	0.108	0.100	0.089

Technical Data - Copper						
Rated Current (A)	2000	2500	3200	4000	5000	6300
Rated Operational Voltage (V)	1000	1000	1000	1000	1000	1000
Rated Insulation Voltage (V)	1000	1000	1000	1000	1000	1000
<b>Short Circuit</b>						
1 Second (kA rms)	65	65	100	100	100	120
Peak Value (kA)	143	143	220	220	220	264
<b>Phase Conductor</b>						
Cross Sectional Area (mm <sup>2</sup> )	870	1080	1500	1800	2400	3000
<b>Neutral Conductor</b>						
Cross Sectional Area (mm <sup>2</sup> )	870	1080	1500	1800	2400	3000
<b>Isolated Earth Conductor</b>						
100% Earth Cross Sectional Area (mm <sup>2</sup> )	870	1080	1500	1800	2400	3000
50% Earth Cross Sectional Area (mm <sup>2</sup> )	435	540	750	900	1200	1500
<b>Overall Dimensions</b>						
Height x Width of 4 Bar System (mm)	175 x 100	210 x 100	310 x 100	360 x 100	460 x 100	560 x 100
<b>Weight</b>						
Weight of 4 Bar System (kg/m)	65.7	79.7	115.3	135.4	175.6	215.8
<b>Resistance</b>						
Resistance (mΩ/m) at 20°C	0.020	0.016	0.012	0.010	0.007	0.006
Resistance (mΩ/m) at 80°C	0.025	0.020	0.015	0.012	0.009	0.007
<b>Reactance</b>						
Reactance (mΩ/m) at 50Hz	0.027	0.021	0.016	0.014	0.011	0.009
<b>Impedance</b>						
Impedance (mΩ/m) at 80°C	0.037	0.029	0.022	0.018	0.014	0.011
<b>Voltage Drop at Full Load 50Hz</b>						
Power Factor = 0.7 (V/m) at 80°C	0.128	0.126	0.120	0.127	0.122	0.125
Power Factor = 0.8 (V/m) at 80°C	0.126	0.125	0.118	0.125	0.119	0.121
Power Factor = 0.9 (V/m) at 80°C	0.120	0.119	0.112	0.117	0.110	0.113
Power Factor = 1.0 (V/m) at 80°C	0.088	0.088	0.081	0.084	0.078	0.079
<b>Voltage Drop Full Load 60Hz</b>						
Power Factor = 0.7 (V/m) at 80°C	0.142	0.140	0.133	0.141	0.136	0.139
Power Factor = 0.8 (V/m) at 80°C	0.138	0.136	0.129	0.137	0.131	0.134
Power Factor = 0.9 (V/m) at 80°C	0.128	0.127	0.120	0.126	0.120	0.122
Power Factor = 1.0 (V/m) at 80°C	0.088	0.088	0.081	0.084	0.079	0.079

# TECHNICAL DATA (ALUMINIUM)

Technical Data - Aluminium					
Rated Current (A)	1000	1250	1400	1600	2000
Rated Operational Voltage (V)	1000	1000	1000	1000	1000
Rated Insulation Voltage (V)	1000	1000	1000	1000	1000
<b>Short Circuit</b>					
1 Second (kA rms)	25	36	36	50	50
Peak Value (kA)	52.5	75.6	75.6	105	105
<b>Phase Conductor</b>					
Cross Sectional Area (mm <sup>2</sup> )	480	600	720	900	1200
<b>Neutral Conductor</b>					
Cross Sectional Area (mm <sup>2</sup> )	480	600	720	900	1200
<b>Isolated Earth Conductor</b>					
100% Earth Cross Sectional Area (mm <sup>2</sup> )	480	600	720	900	1200
50% Earth Cross Sectional Area (mm <sup>2</sup> )	240	300	360	450	600
<b>Overall Dimensions</b>					
Height x Width of 4 Bar System (mm)	110 x 100	130 x 100	150 x 100	180 x 100	230 x 100
<b>Weight</b>					
Weight of 4 Bar System (kg/m)	27.6	32.6	37.7	45.2	57.8
<b>Resistance</b>					
Resistance (mΩ/m) at 20°C	0.066	0.053	0.025	0.020	0.015
Resistance (mΩ/m) at 80°C	0.082	0.065	0.054	0.043	0.032
<b>Reactance</b>					
Reactance (mΩ/m) at 50Hz	0.044	0.037	0.032	0.026	0.021
<b>Impedance</b>					
Impedance (mΩ/m) at 80°C	0.093	0.075	0.063	0.051	0.030
<b>Voltage Drop at Full Load 50Hz</b>					
Power Factor = 0.7 (V/m) at 80°C	0.153	0.156	0.148	0.136	0.130
Power Factor = 0.8 (V/m) at 80°C	0.158	0.161	0.152	0.140	0.134
Power Factor = 0.9 (V/m) at 80°C	0.162	0.162	0.152	0.140	0.133
Power Factor = 1.0 (V/m) at 80°C	0.141	0.141	0.132	0.120	0.112
<b>Voltage Drop Full Load 60Hz</b>					
Power Factor = 0.7 (V/m) at 80°C	0.164	0.167	0.159	0.147	0.141
Power Factor = 0.8 (V/m) at 80°C	0.168	0.171	0.161	0.149	0.143
Power Factor = 0.9 (V/m) at 80°C	0.167	0.169	0.159	0.147	0.140
Power Factor = 1.0 (V/m) at 80°C	0.142	0.142	0.132	0.121	0.113



Technical Data - Aluminium				
Rated Current (A)	2500	3200	4000	5000
Rated Operational Voltage (V)	1000	1000	1000	1000
Rated Insulation Voltage (V)	1000	1000	1000	1000
<b>Short Circuit</b>				
1 Second (kA rms)	80	80	100	100
Peak Value (kA)	176	176	220	220
<b>Phase Conductor</b>				
Cross Sectional Area (mm <sup>2</sup> )	1440	1920	2880	3360
<b>Neutral Conductor</b>				
Cross Sectional Area (mm <sup>2</sup> )	1440	1920	2880	3360
<b>Isolated Earth Conductor</b>				
100% Earth Cross Sectional Area (mm <sup>2</sup> )	1440	1920	2880	3360
50% Earth Cross Sectional Area (mm <sup>2</sup> )	720	960	1440	1680
<b>Overall Dimensions</b>				
Height x Width of 4 Bar System (mm)	300 x 100	380 x 100	540 x 100	620 x 100
<b>Weight</b>				
Weight of 4 Bar System (kg/m)	75.3	95.5	135.8	156.0
<b>Resistance</b>				
Resistance (mΩ/m) at 20°C	0.013	0.01	0.006	0.005
Resistance (mΩ/m) at 80°C	0.027	0.021	0.014	0.012
<b>Reactance</b>				
Reactance (mΩ/m) at 50Hz	0.017	0.013	0.009	0.008
<b>Impedance</b>				
Impedance (mΩ/m) at 80°C	0.032	0.025	0.017	0.014
<b>Voltage Drop at Full Load 50Hz</b>				
Power Factor = 0.7 (V/m) at 80°C	0.135	0.132	0.113	0.121
Power Factor = 0.8 (V/m) at 80°C	0.138	0.136	0.115	0.123
Power Factor = 0.9 (V/m) at 80°C	0.138	0.135	0.113	0.122
Power Factor = 1.0 (V/m) at 80°C	0.117	0.113	0.095	0.101
<b>Voltage Drop Full Load 60Hz</b>				
Power Factor = 0.7 (V/m) at 80°C	0.145	0.143	0.122	0.131
Power Factor = 0.8 (V/m) at 80°C	0.147	0.145	0.122	0.132
Power Factor = 0.9 (V/m) at 80°C	0.144	0.141	0.119	0.128
Power Factor = 1.0 (V/m) at 80°C	0.118	0.114	0.095	0.101

# BIM LIBRARY

**E+I Engineering are committed to supporting our clients by providing direct access to our comprehensive BIM library.**

Architects, contractors, engineering consultants and others are able to directly place specific items into a 3D BIM environment to produce accurate and efficient plans, containment drawings and bills of quantities to form a fully integrated overall project.

E+I Engineering provide high quality digitized data, available in a range of formats. Our intelligent BIM libraries are maintained and updated to reflect any changes in the products.

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# QUICK REFERENCE GUIDE

## Critical Dimensions

- The distance from the centre of a joint to the wall, ceiling or floor must be at least 190mm.
- 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 200mm between the busbar and any wall/ ceiling/ other busbar.
- Allow adequate space for tap off units to be installed easily and safely.
- Busbar lengths are available from 500mm - 4000mm.
- Distribution busbar lengths are available from 500mm - 4000mm.
- Edgewise elbow sections are available with leg lengths from 300mm - 1000mm. The total maximum length is 2000mm.
- Flatwise elbow sections are available with a maximum leg length of 1000mm. The minimum leg length is 300mm for a single stack busbar and 500mm for a double stack busbar. The total maximum length is 2000mm.

## Operating Conditions

- Ambient temperature from -40°C to +60°C
- Relative humidity of 100% or below.
- This product designed for both indoor and outdoor use.

## Critical Details

- Busbar 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 busbar must be installed with the neutral phase to the top. Please indicate the phase orientation for vertically installed busbar.



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