

Busways Solutions

BMR Busbar

BAHIRA
TBS





Saudi Innovator & Specialist in Electrical

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Bahra Electric

Company Overview

Bahra Electric began in 2008 and it is a leading manufacturer of an extensive range of electricity distribution products. In 2015, Bahra Electric expanded its manufacturing facilities & product range by creating a new factory "Transformers and Busways Solutions Company" specialized in producing high efficiency transformers and busways in partnership with Legrand France as an initiative to localize the important industries in the kingdom of Saudi Arabia and to become market leader in its industry. In-line with Kingdom of Saudi vision 2030, Bahra Electric has acquired Transformers and Busways Solutions Company (TBS) in 2021 and has signed a license agreement with Legrand France SA permitting to use the existing designs and know-how. Bahra Electric has crafted the new brand of TBS to be a Bahra TBS.



Bahra TBS

Bahra TBS is spread across 50,000 sq m area equipped with state-of-the-art latest European & Italian technology with complete backward process integration including epoxy casting and tinning. The manufacturing facility have implemented the Integrated Management Systems: ISO 9001, ISO 14001 & OHSAS 18001 as well as SASO mark.

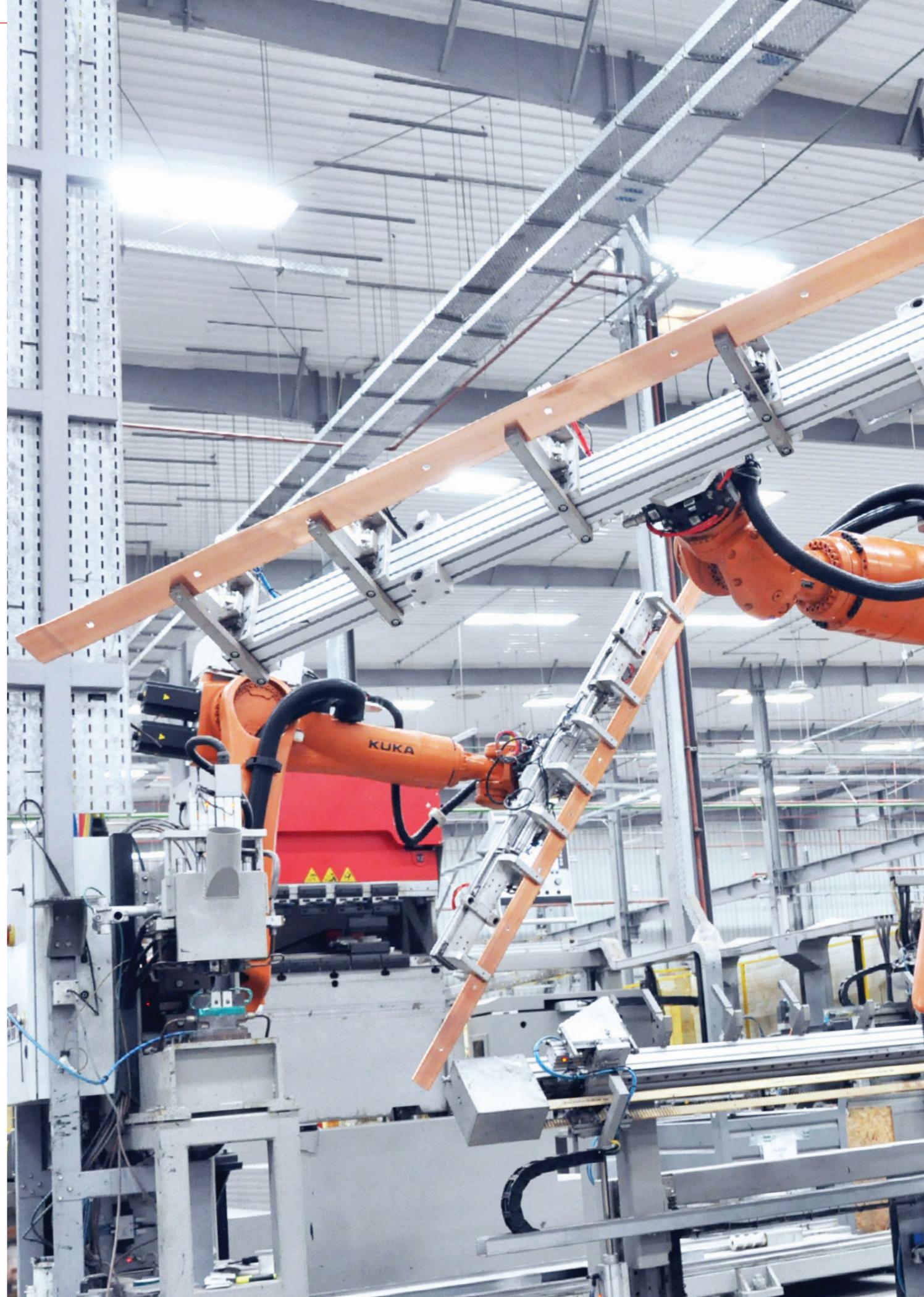
Details matter. At TBS you can rest assured that your project is managed and executed in a professional manner. Every single detail is important. A full-fledged team of experts overlook your projects from the very beginning of the design stage all the way to the testing and commissioning and even after the handing over of your project.

Support Service

We provide consultants a design support from the very beginning. Our design department is able to make solid electrical systems covering every detail of your requirements. Technical Support Our skilled technical expertise is at your disposal for consultation, training, orientation and support during the course of your project. We conduct regular training courses. Product Availability Our factory along with our wide network of partners and distributors in the Middle East region ensure a sustainable product availability to secure fast deliveries, efficient logistics Testing & Commissioning. We cover all preliminary tests and inspections, functional performance tests and the supervision of commissioning of busways & transformers. After Sales Service A vast team of technical experts within Bahra TBS and our partners teams are at your disposal for extending full After Sales Support meeting your expectations. Technical Support at your service Bahra TBS with its innovation and cutting-edge technology continue setting up latest trends in the market which enables us to meet the needs of our customers. You can be assured that your project is handled in the most efficient and professional manner meeting industry standards and specifications. We have all the necessary resources used to keep pace with market trends through our.

- Technical expertise - capable of providing the most practical and cost effective solutions for projects of any size.
- Bahra TBS Design office - supports customers throughout every step of their project providing a single contact, which is competent and easy to reach.
- Strong presence and experience of all our partners and distributors in the market.

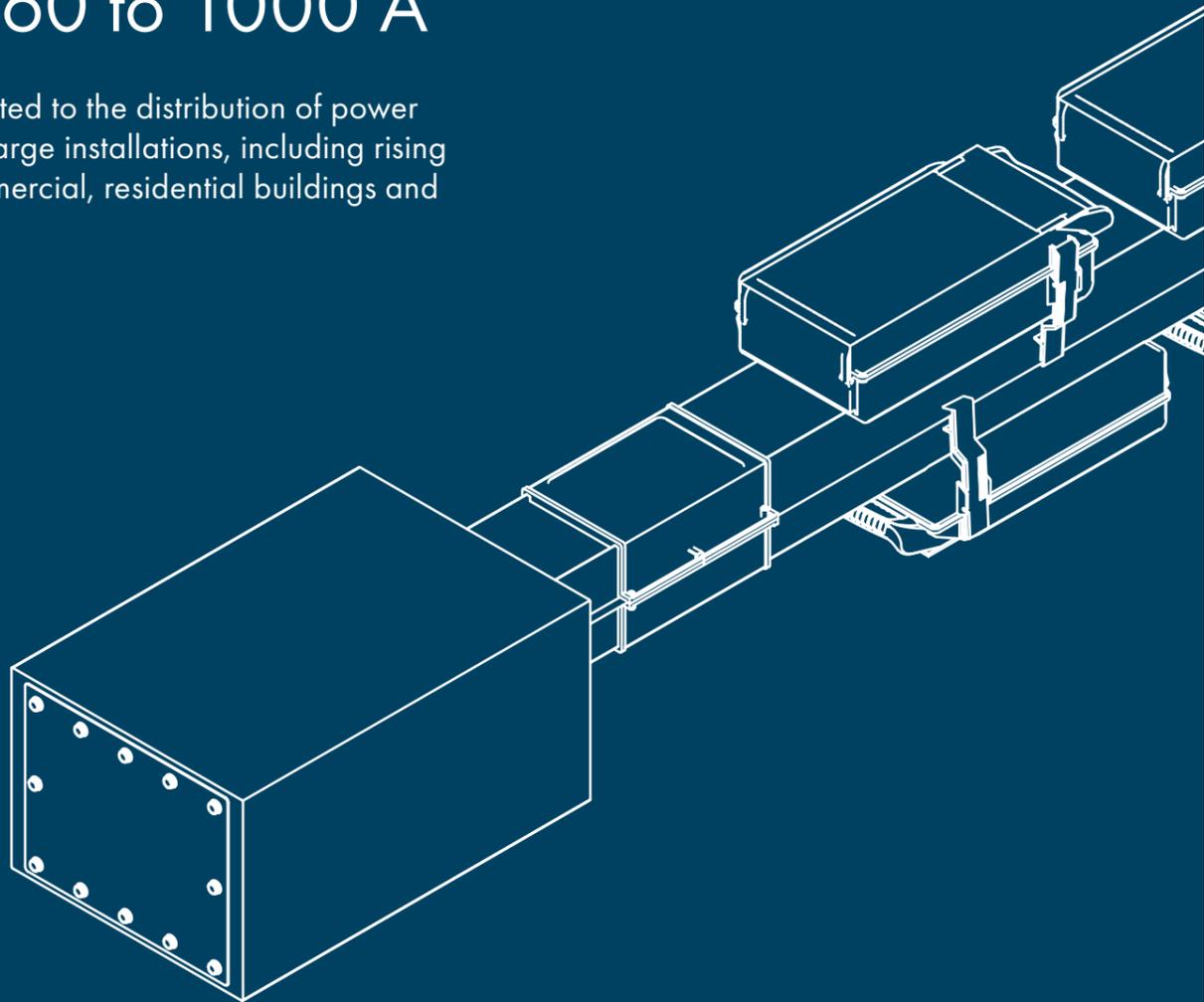
*with our proprietary software PSB.



BMR Busbar

Busbar From 160 to 1000 A

BMR is dedicated to the distribution of power in medium to large installations, including rising mains, in commercial, residential buildings and data centers.



Range

The main features of the BMR range are:

- speed, simplicity, and flexibility during the installation and design of busbar routings;
- available in various sizes: from 160 A up to 800 A with tinned aluminium alloy conductors, and from 250 A to 1000 A with 99.9% electrolytic copper conductors;
- compliance with the IEC 61439-1 and 6 standard;
- reference ambient temperature 40 °C, 60 Hz.

WIDE RANGE OF TAP-OFF BOXES

The range of tap-off boxes is capable fit all needs of the customers. Tap-off boxes from 16 A to 160 A are available, inside which it is possible to install protection devices, such as fuses, MCBs, MCCBs, Power meters and any kind of sockets.

QUALITY MATERIAL

Each component is made using high quality materials, in compliance with technical and safety requirements. During each stage of the manufacturing process, maximum attention is given to each and every element.

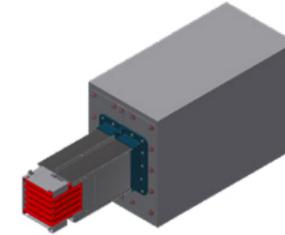
STURDINESS AND FUNCTIONALITY

BMR busbars guarantee maximum system functionality thanks to careful design of the components, easy installation, and the construction characteristics, which make BMR busbars the most evolved and simple solution on the market.

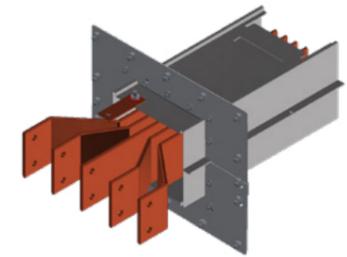
MAXIMUM ADVANTAGE IN DISTRIBUTION

The special design of the BMR monobloc compensates the thermal expansion of conductors. This is a key benefit for vertical (rising mains) applications as the system does not require busbar blocking elements, or thermal expansion elements.

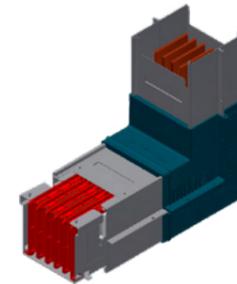
Installation Accessories



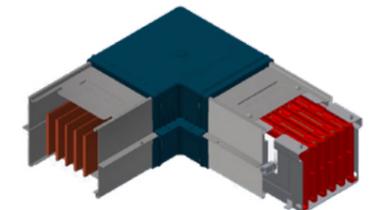
Feed unit



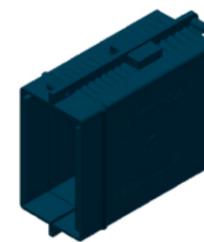
Feed Unit for switchboard and Transformers



Horizontal elbow



Vertical elbow



End cover

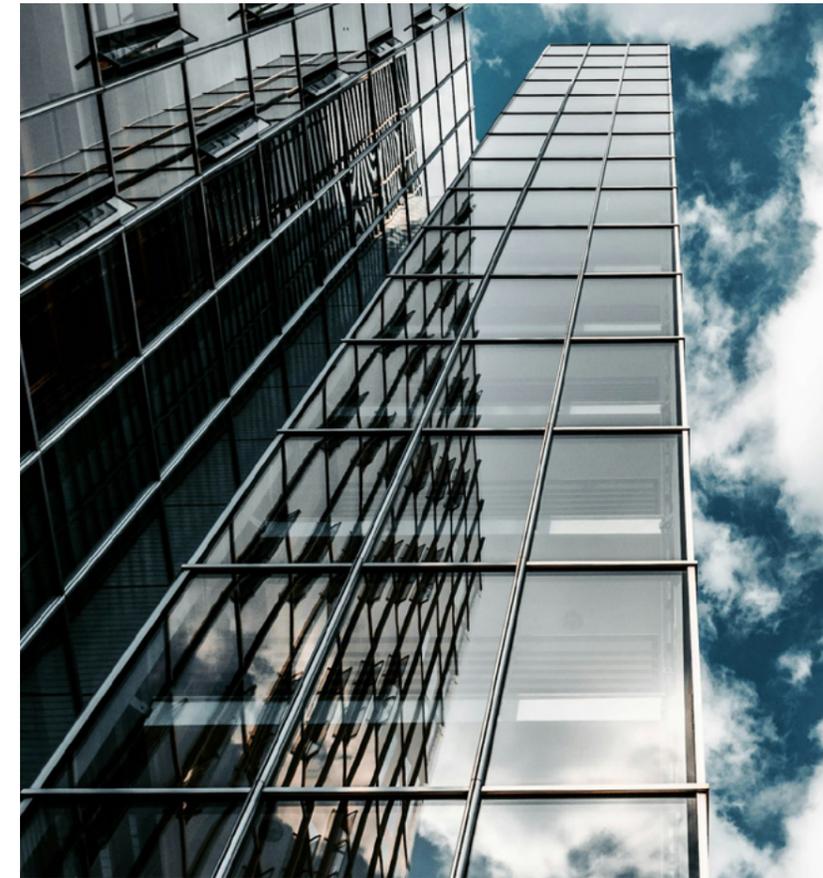


Plug-in Box

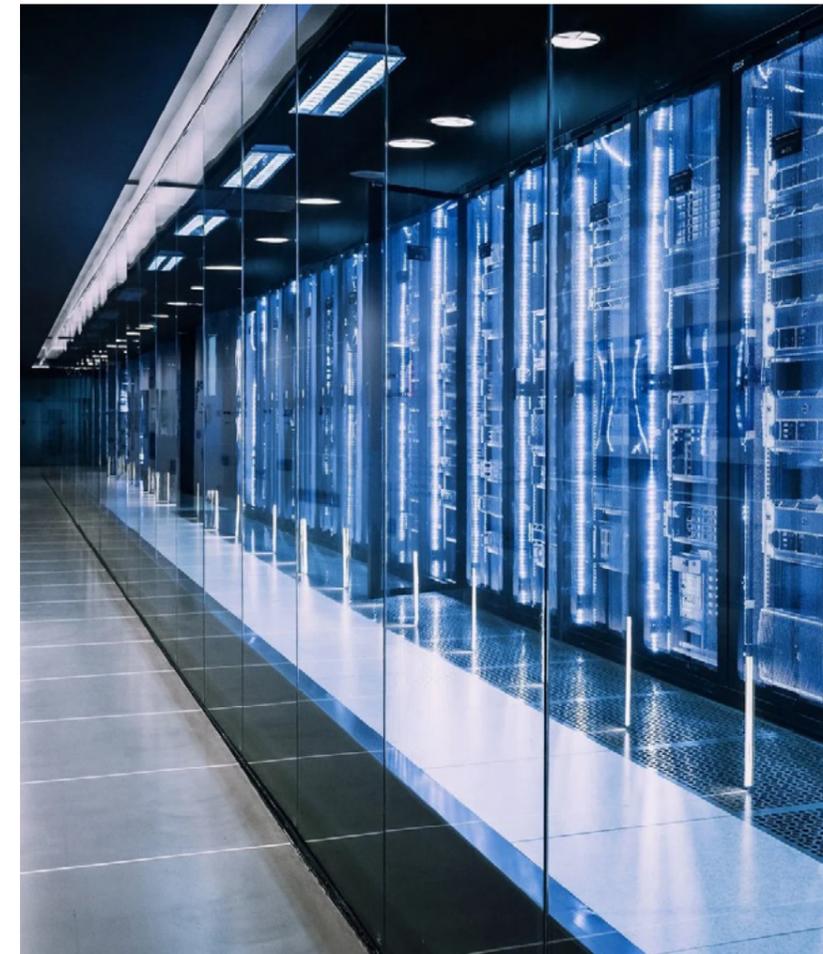
Installation Fields

The typical applications for BMR busbars are:
industry,
commercial and residential,
hospitals,
data centre,
shopping centres...
and everywhere there is the need for power
distribution
(up to 1000 A)

INDUSTRIAL



DATA CENTRE



Features



PRE-ASSEMBLED MONOBLOC

All trunking components (straight lengths, elbows, feeders etc.) are provided with a pre-assembled monobloc and junction covers which considerably speeds up the installation of the system and make transportation and storage operations easier.



EXTREMELY FAST INSTALLATION

The pre-installed monobloc and the self-breaking nut allow a very fast installation of the whole line



GLOW-WIRE TEST

All plastic materials are resistant and in compliance with the 'glow-wire' test (IEC EN61439-6).



VERSIONS

BMR is available in the following configurations:
3P + N + PE casing
3P + N + FE + PE casing
All versions are available in a painted version (RAL to be defined by the customer)



DYNAMOMETRIC MONOBLOC

Tighten the self-breaking nut of the monobloc until it breaks will ensure the correct and most efficient electrical connection the elements. The breakage of the self-breaking nut guarantees long-lasting reliability and safety. The connection is service free. In case of a future modification on the line, the monobloc must be retightened using the nut head with a torque wrench at the correct settings (see installation manual)



CONNECTION FLANGES

If the busways are connected improperly, the special design self-breaking nut and asymmetric casing design will prevent the mechanical coupling from closing. The connection flanges and the seals serve as a protection for the element during transportation and ensure their degree of protection as well as their mechanical rigidity when being installed.



SIMPLE AND RELIABLE

The monobloc connection of the BMR busway is able to compensate for any heat expansion affecting the conductors, thus avoiding the need to insert special expansion lengths even in considerably long systems. If the BMR line is installed vertically (riser main) there is no need to install busbar thrust units because the monobloc prevents the conductors from sliding.



MAXIMUM STRENGTH

The BMR range has been designed and manufactured with a strong casing. The degree of impact resistance of the casing which houses this line is the maximum stated in IEC EN60068-2-62: IK10.



PROTECTION DEGREE

The BMR system has a standard IP55 protection degree according IEC 60529.



EXCELLENT FIRE RESISTANCE

The BMR system has lengths provided with a fire barrier (EI according to EN 1366-3) and structures which guarantee a time resistance against propagation of flames, transmission of gases, and transmission of heat. The fire load of BMR is extremely low compared to the quantity of plastic materials needed to insulate cables with the same capacity.

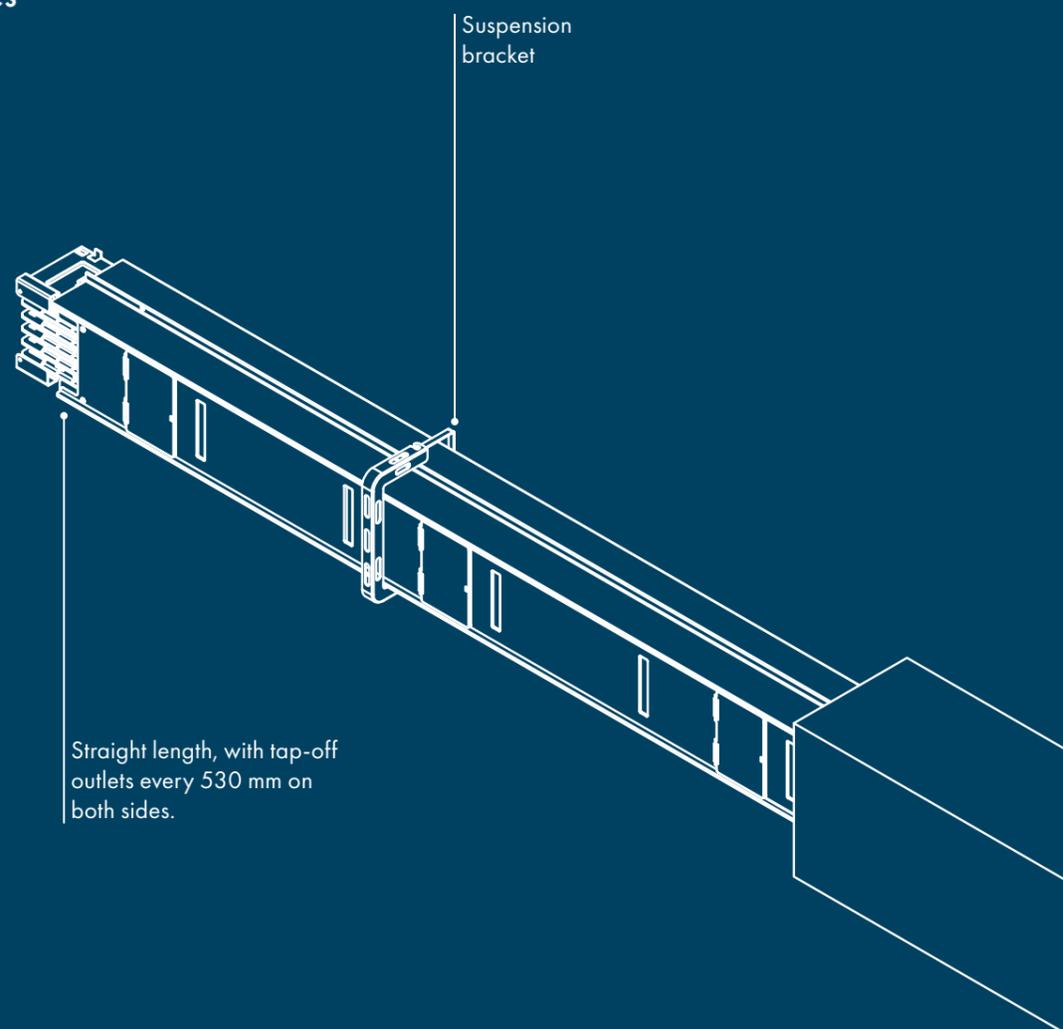


ALUMINIUM AND COPPER RATING

Al 160 250 400 500 630 800
Cu 250 400 500 630 800 1000

Trunking Components

& additional accessories



Technical Solutions

Depending on installation requirements Bahra TBS can provide various technical solutions:

a) 90° horizontal and vertical elbows: available for carrying out changes of direction both horizontally and vertically. There is a quick connection, as for the straight lengths. The standard degree of protection is IP55;

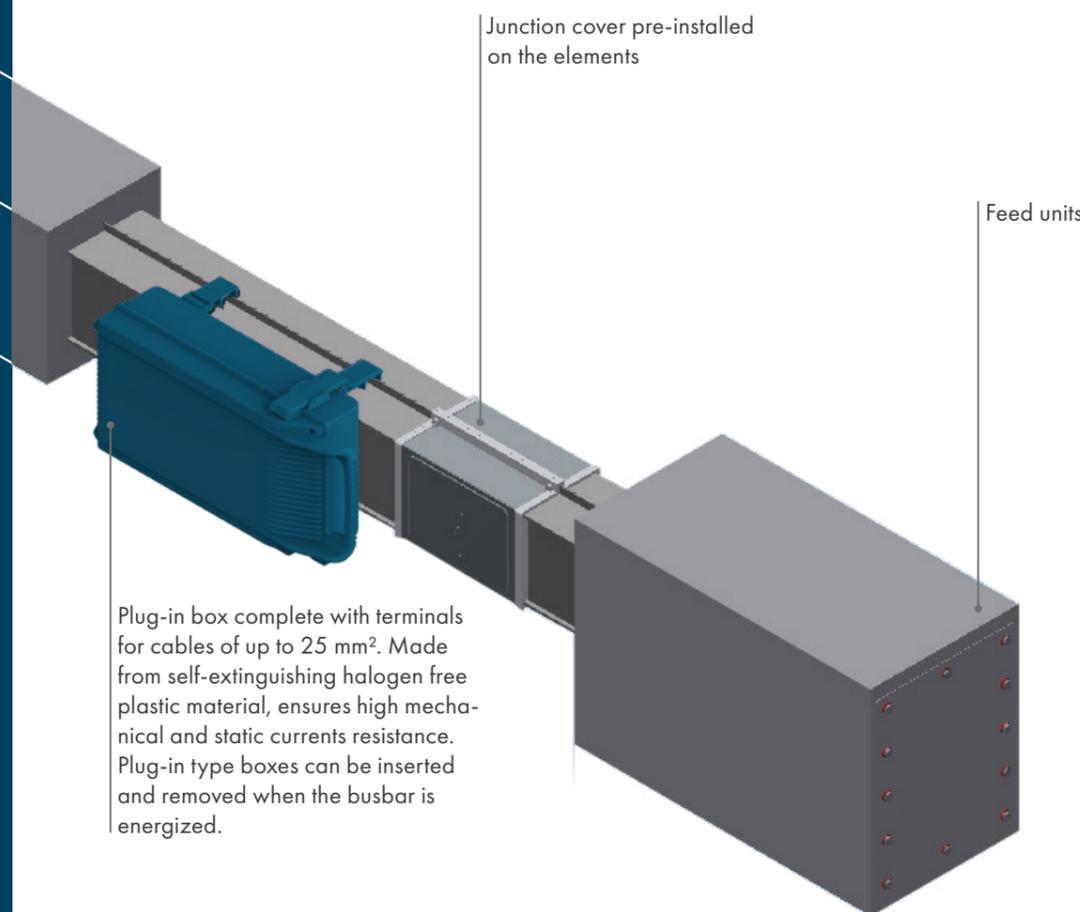
b) Tees, crossovers and double elbows available. The standard degree of protection is IP55;

c) Straight elements with fire barrier (internal + external) REI120.
Tested in laboratories (in compliance with Standards EN 1366-3)

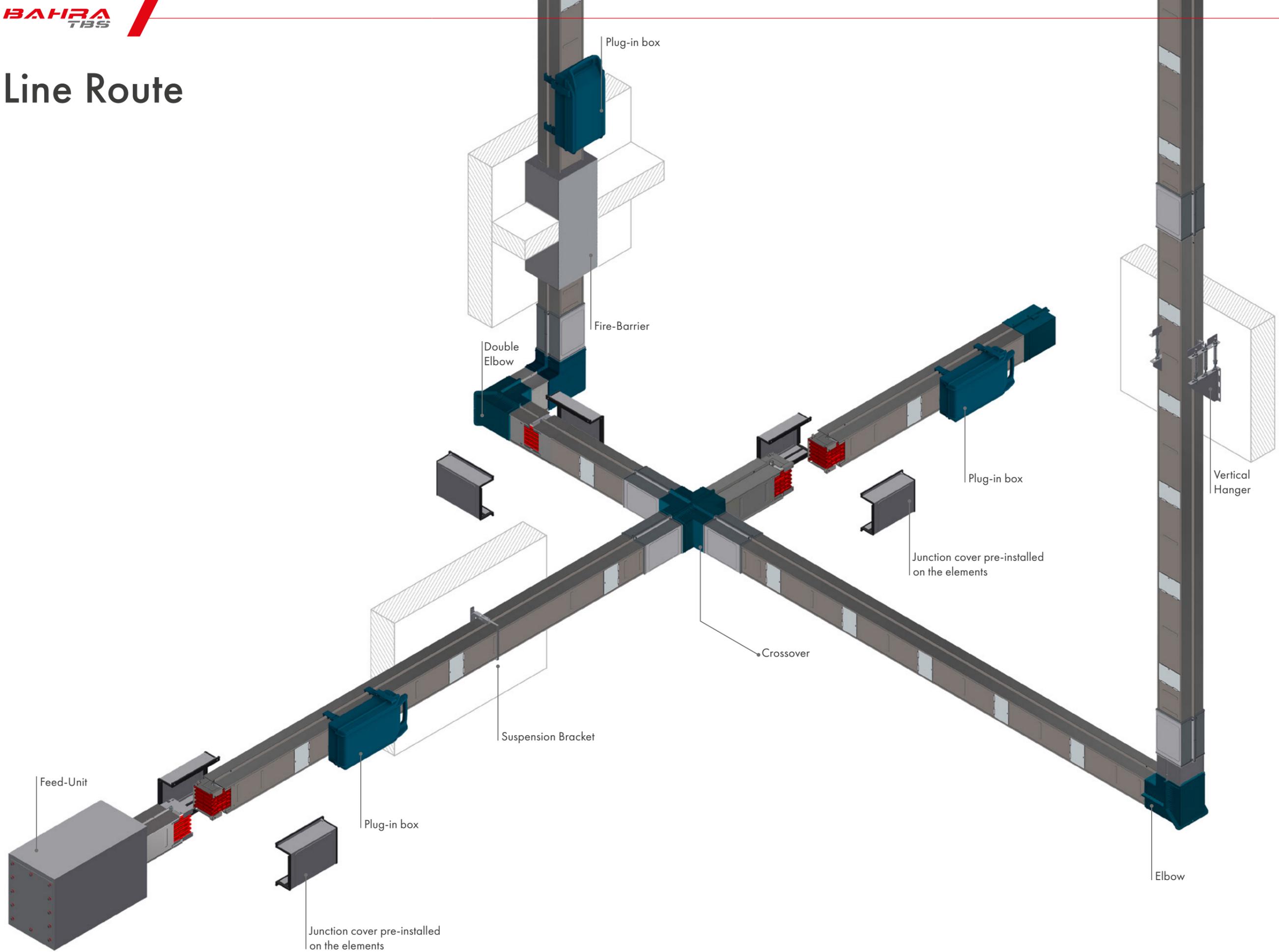
d) Straight 3m lengths with up to 5 on one side; ideal solution for riser mains;

e) Straight lengths 3m with 5 outlets both sides; ideal for data centre solutions;

f) Straight lengths with no outlets, used for energy transport only.



Line Route



Straight Element

BMR 160-1000A straight length without derivation

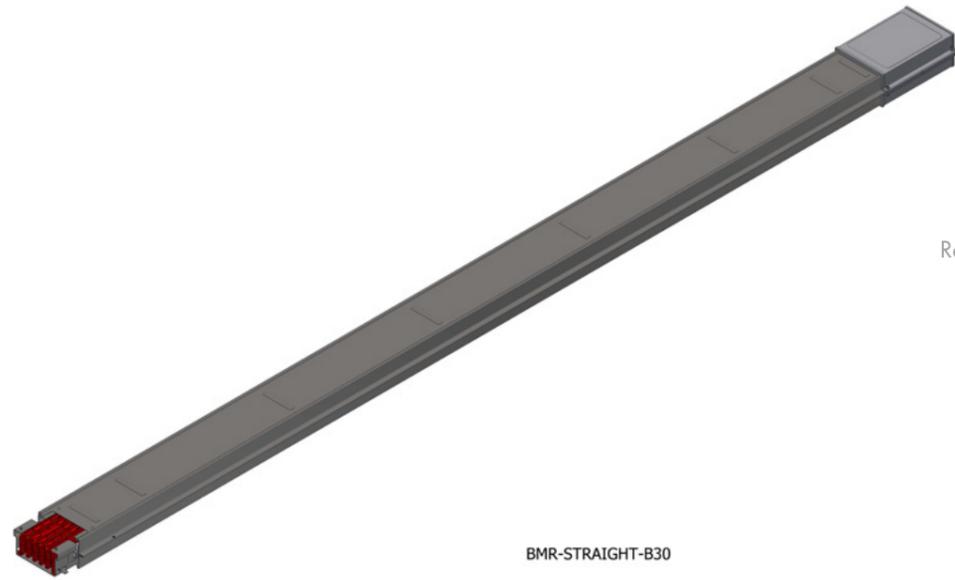
BMR 160-1000A straight length with derivation

Data Centre

Fire Barrier EI

BMR 160-1000A

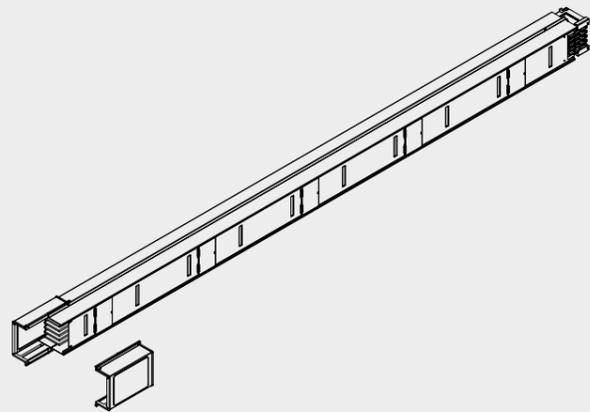
straight length without derivation



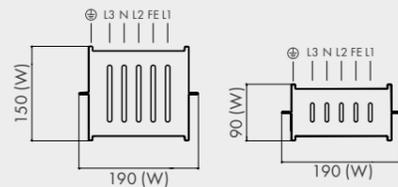
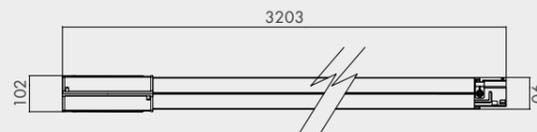
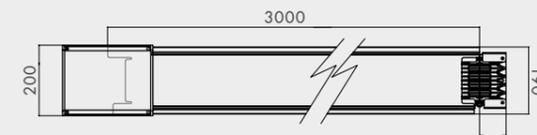
BMR-STRAIGHT-B30

Reference standard: IEC 61439-1 and 6
 Reference temperature: 40 °C
 Reference power frequency: 60Hz
 Protection degree: IP55
 Thickness: 0.8 mm;
 Dimension (HxW): 90-150x190 mm;
 N° of conductors: 4 with equal section
 3P+N or 5 (3P+N+PE)
 Conducting «flame retardant» in
 accordance with EN 60332-3
 Separation between the conductors
 by plastic insulators reinforced with
 fibreglass, guarantees a degree of VO
 self-extinguishing (according to UL94)
 and conform to the glow-wire test
 according to IEC 60695-2-10

Dimensions



For Straight Length = 3000 mm



Rating [A]	Al	Cu	L
160	50100110		
250	50100111	51100111	
400	50100112	51100112	
500	50100113	51100113	500-999
630	50100114	51100114	
800	50100115	51100115	
1000		51100116	
160	50100120		
250	50100121	51100121	
400	50100122	51100122	
500	50100123	51100123	1000-1500
630	50100124	51100124	
800	50100125	51100125	
1000		51100126	
160	50100130		
250	50100131	51100131	
400	50100132	51100132	
500	50100133	51100133	1501-2000
630	50100134	51100134	
800	50100135	51100135	
1000		51100136	
160	50100140		
250	50100141	51100141	
400	50100142	51100142	
500	50100143	51100143	2001-2500
630	50100144	51100144	
800	50100145	51100145	
1000		51100146	
160	50100150		
250	50100151	51100151	
400	50100152	51100152	
500	50100153	51100153	2501-2999
630	50100154	51100154	
800	50100155	51100155	
1000		51100156	
160	50100100		
250	50100101	51100101	
400	50100102	51100102	
500	50100103	51100103	3000
630	50100104	51100104	
800	50100105	51100105	
1000		51100106	

10 - 3P+N+PE casing
 11 - 3P+N+FE+PE casing
 20 - 3P+N+PE casing (painted version)*
 21 - 3P+N+FE+PE casing (painted version)*

*Color to be defined by customer

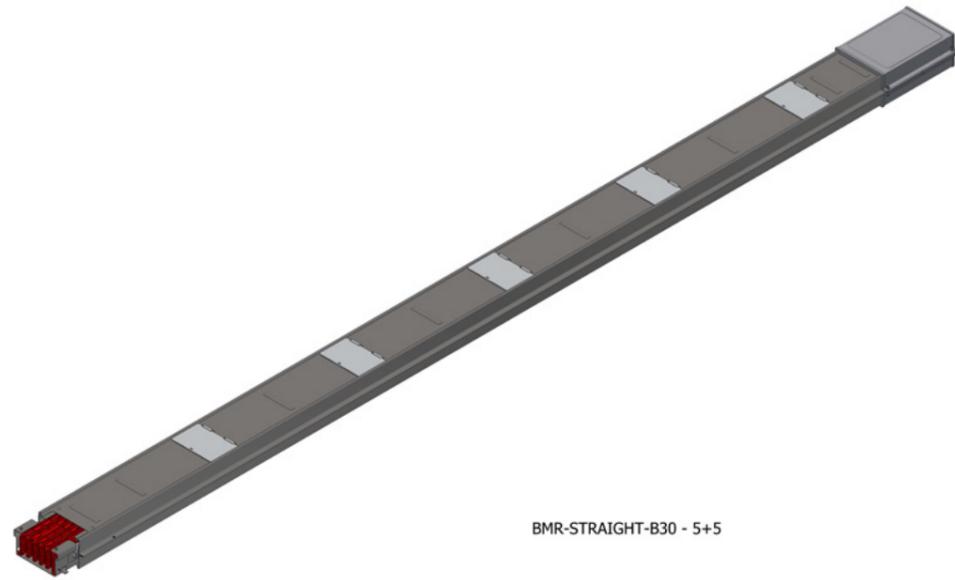
In your Purchase Order please specify the
 required length see page: (How to take
 measurements pag 56)

Busway length		1000mm		
Rating [A]	Al	Weight [kg]	Cu	Weight [kg]
160	50100110	6,0		0,0
250	50100111	6,6	51100111	8,0
400	50100112	8,7	51100112	11,2
500	50100113	9,6	51100113	14,2
630	50100114	11,7	51100114	15,8
800	50100115	13,8	51100115	21,4
1000			51100116	28,7
Busway length		1500mm		
160	50100120	9,0		
250	50100121	10,0	51100121	12,0
400	50100122	13,0	51100122	16,8
500	50100123	14,4	51100123	21,4
630	50100124	17,5	51100124	23,7
800	50100125	20,7	51100125	32,1
1000			51100126	43,1
Busway length		2000mm		
160	50100130	12,0		
250	50100131	13,3	51100131	16,0
400	50100132	17,3	51100132	22,4
500	50100133	19,1	51100133	28,5
630	50100134	23,3	51100134	31,6
800	50100135	27,5	51100135	42,7
1000			51100136	57,4
Busway length		2500mm		
160	50100140	15,0		
250	50100141	16,6	51100141	20,0
400	50100142	21,7	51100142	28,0
500	50100143	23,9	51100143	35,6
630	50100144	29,2	51100144	39,5
800	50100145	34,4	51100145	53,4
1000			51100146	86,1
Busway length		3000mm		
160	50100150	18,0		
250	50100151	19,9	51100151	24,0
400	50100152	26,0	51100152	33,6
500	50100153	28,7	51100153	42,7
630	50100154	35,0	51100154	47,4
800	50100155	41,3	51100155	64,1
1000			51100156	
Busway length		3000mm		
160	50100100	18,0		
250	50100101	19,9	51100101	24,0
400	50100102	26,0	51100102	33,6
500	50100103	28,7	51100103	42,7
630	50100104	35,0	51100104	47,4
800	50100105	41,3	51100105	64,1
1000			51100106	86,1

In the case of transport of electric energy is recommended to use
 BMR busbar duct

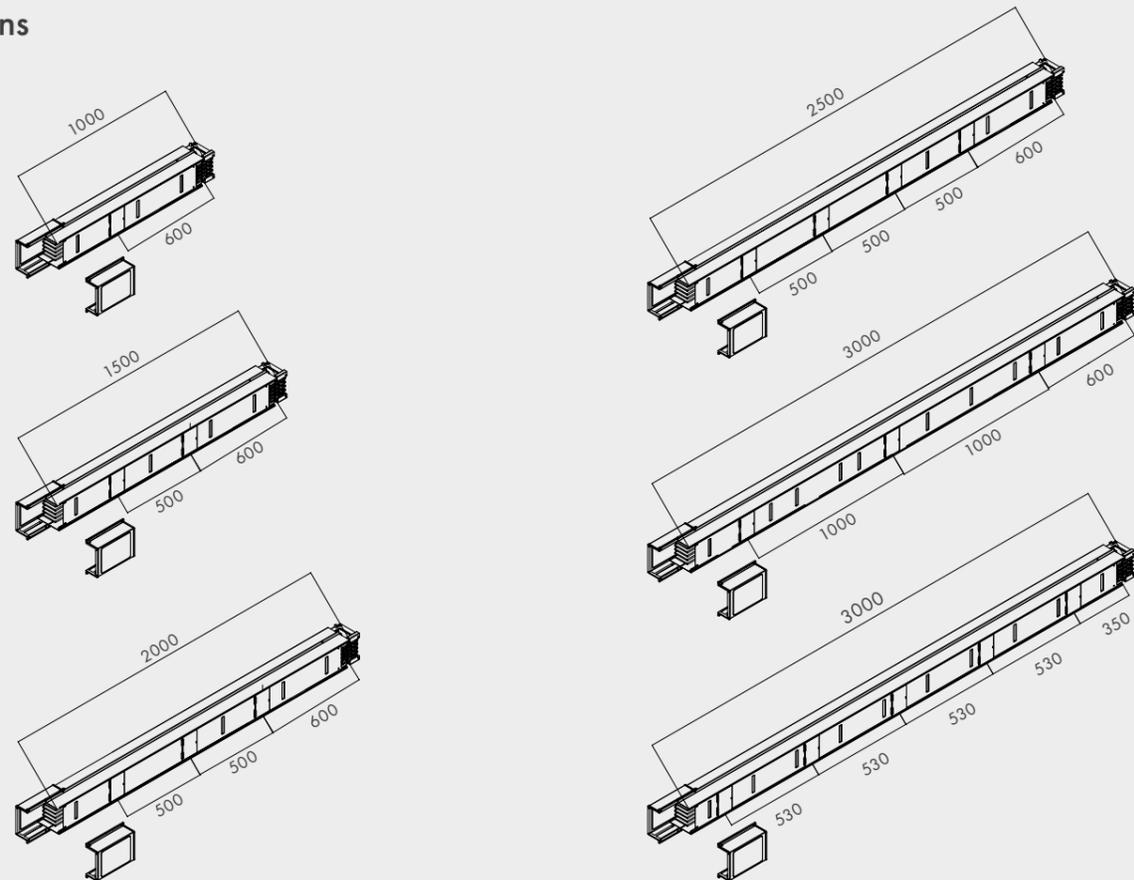
BMR 160-1000A

straight length with derivation



BMR-STRAIGHT-B30 - 5+5

Dimensions



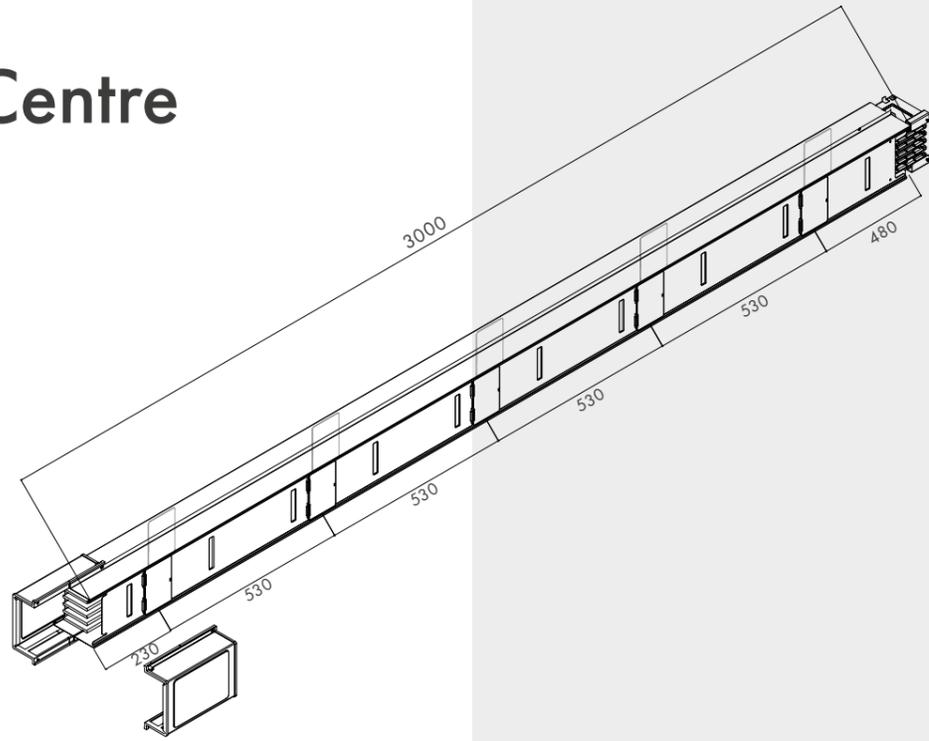
Rating [A]	Al	Cu	L	Number of outlets
160	50100200		3m	3+3 standard position
250	50100201	51100201		
400	50100202	51100202		
500	50100203	51100203		
630	50100204	51100204		
800	50100205	51100205		
1000		51100206		
160	50100210		3m	3+3 special position
250	50100211	51100211		
400	50100212	51100212		
500	50100213	51100213		
630	50100214	51100214		
800	50100215	51100215		
1000		51100216		
160	50100220		3m	5+5 standard position
250	50100221	51100221		
400	50100222	51100222		
500	50100223	51100223		
630	50100224	51100224		
800	50100225	51100225		
1000		51100226		
160	50100230		3m	5+5 special position
250	50100231	51100231		
400	50100232	51100232		
500	50100233	51100233		
630	50100234	51100234		
800	50100235	51100235		
1000		51100236		
160	50100240		1m	1+1
250	50100241	51100241		
400	50100242	51100242		
500	50100243	51100243		
630	50100244	51100244		
800	50100245	51100245		
1000		51100246		
160	50100250		1.5m	2+2
250	50100251	51100251		
400	50100252	51100252		
500	50100253	51100253		
630	50100254	51100254		
800	50100255	51100255		
1000		51100256		
160	50100260		2m	3+3
250	50100261	51100261		
400	50100262	51100262		
500	50100263	51100263		
630	50100264	51100264		
800	50100265	51100265		
1000		51100266		
160	50100270		2.5m	4+4
250	50100271	51100271		
400	50100272	51100272		
500	50100273	51100273		
630	50100274	51100274		
800	50100275	51100275		
1000		51100276		
160	50100280		1000-1500	1+1
250	50100281	51100281		
400	50100282	51100282		
500	50100283	51100283		
630	50100284	51100284		
800	50100285	51100285		
1000		51100286		
160	50100290		1501-2000	2+2
250	50100291	51100291		
400	50100292	51100292		
500	50100293	51100293		
630	50100294	51100294		
800	50100295	51100295		
1000		51100296		
160	50101200		2001-2500	3+3
250	50101201	51101201		
400	50101202	51101202		
500	50101203	51101203		
630	50101204	51101204		
800	50101205	51101205		
1000		51101206		
160	50101210		2501-3000	4+4
250	50101211	51101211		
400	50101212	51101212		
500	50101213	51101213		
630	50101214	51101214		
800	50101215	51101215		
1000		51101216		

- 10 - 3P+N+PE casing
- 11 - 3P+N+FE+PE casing
- 20 - 3P+N+PE casing (painted version)*
- 21 - 3P+N+FE+PE casing (painted version)*

*Color to be defined by customer

Version	1000mm 1+1			
Rating [A]	Al	Weight [kg]	Cu	Weight [kg]
160	50100240	6,0		
250	50100241	6,6	51100241	8,0
400	50100242	8,7	51100242	11,2
500	50100243	9,6	51100243	14,2
630	50100244	11,7	51100244	15,8
800	50100245	13,8	51100245	21,4
1000			51100246	28,7
Version	1500mm 2+2			
160	50100250	9,0		
250	50100251	10,0	51100251	12,0
400	50100252	13,0	51100252	16,8
500	50100253	14,4	51100253	21,4
630	50100254	17,5	51100254	23,7
800	50100255	20,7	51100255	32,1
1000			51100256	43,1
Version	2000mm 3+3			
160	50100260	12,0		
250	50100261	13,3	51100261	16,0
400	50100262	17,3	51100262	22,4
500	50100263	19,1	51100263	28,5
630	50100264	23,3	51100264	31,6
800	50100265	27,5	51100265	42,7
1000			51100266	57,4
Version	2500mm 4+4			
160	50100270	15,0		
250	50100271	16,6	51100271	20,0
400	50100272	21,7	51100272	28,0
500	50100273	23,9	51100273	35,6
630	50100274	29,2	51100274	39,5
800	50100275	34,4	51100275	53,4
1000			51100276	86,1
Version	3000mm 5+5			
160	50100220	18,0		
250	50100221	19,9	51100221	24,0
400	50100222	26,0	51100222	33,6
500	50100223	28,7	51100223	42,7
630	50100224	35,0	51100224	47,4
800	50100225	41,3	51100225	64,1
1000		0,0	51100226	86,1

Data Centre



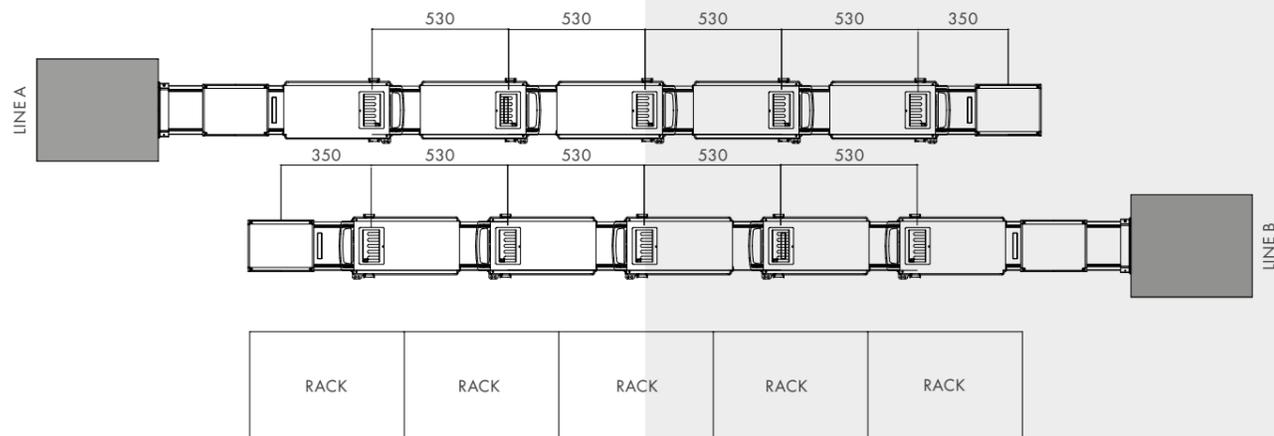
Dimensions

Standard lengths with 5+5 outlets center 530 mm (on both sides) 3 m

Standard lengths with 3+3 outlets center 800 mm (on both sides) 3 m

Example of connection between the cabinet containing rack and busbar

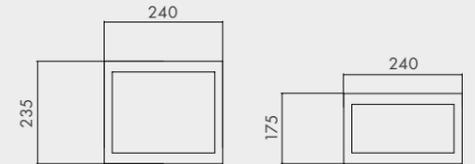
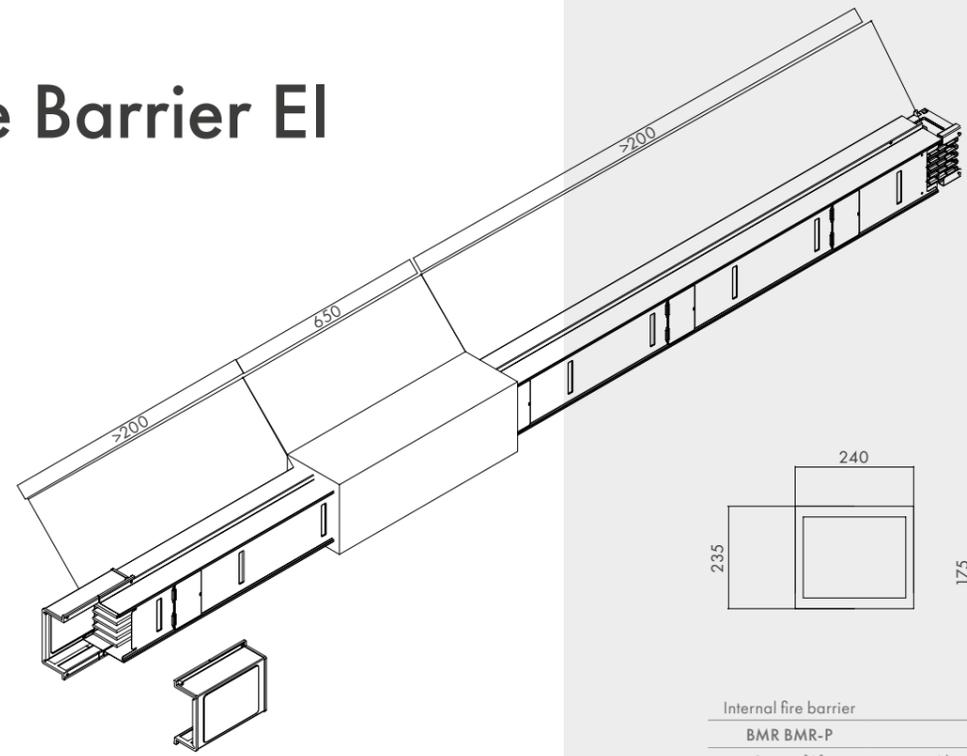
Straight lengths 3 m with 5 + 5 outlets centers 530 mm
Line 1: FRONT side is dedicated to supply of power, BACK side for the backup.
Line 2: FRONT and BACK side are dedicated for backup.



- 10 - 3P+N+PE casing
- 11 - 3P+N+FE+PE casing
- 20 - 3P+N+PE casing (painted version)*
- 21 - 3P+N+FE+PE casing (painted version)*

*Color to be defined by customer

Fire Barrier EI



When ordering fire barrier, specify if only internal or complete
Provide dimension A = mm of the element that will be equipped with the fire barrier

In your Purchase Order please specify the required position of the fire barrier.

Take the measurement as shown in the Figure.

Both internal and external fire barrier are 650 mm long.
External fire barrier must be installed on busway by customers on site, detailed instructions are provided by Bahra TBS.

Internal fire barrier		
BMR BMR-P		
Rating [A]	Al	Cu
160	50103500	
250	50103501	51103501
400	50103502	51103502
500	50103503	51103503
630	50103504	51103504
800	50103505	51103505
1000		51103506
BMR-FE BMR FE-P		
Rating [A]	Al	Cu
160	50113500	
250	50113501	51203501
400	50113502	51203502
500	50113503	51203503
630	50113504	51203504
800	50113505	51203505
1000		51203506

Complete fire barrier REI 120		
BMR BMR-P		
Rating [A]	Al	Cu
160	50103510	
250	50103511	51103511
400	50103512	51103512
500	50103513	51103513
630	50103514	51103514
800	50103515	51103515
1000		51103516
BMR-FE BMR FE-P		
Rating [A]	Al	Cu
160	50113510	
250	50113511	51203511
400	50113512	51203512
500	50113513	51203513
630	50113514	51203514
800	50113515	51203515
1000		51203516

- 10 - 3P+N+PE casing
- 11 - 3P+N+FE+PE casing
- 20 - 3P+N+PE casing (painted version)*
- 21 - 3P+N+FE+PE casing (painted version)*

*Color to be defined by customer

Elbow Element

Horizontal Elbow & Vertical Elbow

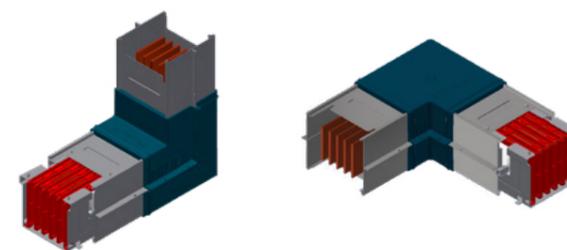
Double Horizontal & Double Vertical

Double Horizontal + Vertical Double Vertical + Horizontal

Horizontal T Element

Crossovers

Horizontal elbow & Vertical elbow



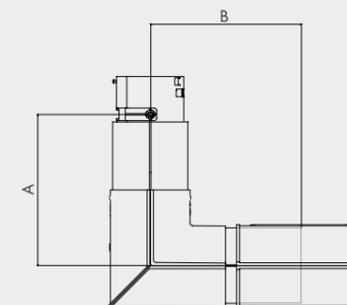
	Al	Cu	Al	Cu	
Rating [A]	Standard 300x300		Special AxB		Horizontal Elbow Right (Type 1)
160	50100300		50100320		
250	50100301	51100301	50100321	51100321	
400	50100302	51100302	50100322	51100322	
500	50100303	51100303	50100323	51100323	
630	50100304	51100304	50100324	51100324	
800	50100305	51100305	50100325	51100325	
1000		51100306		51100326	
Rating [A]	Standard 300x300		Special AxB		
160	50100310		50100330		
250	50100311	51100311	50100331	51100331	
400	50100312	51100312	50100332	51100332	
500	50100313	51100313	50100333	51100333	
630	50100314	51100314	50100334	51100334	
800	50100315	51100315	50100335	51100335	
1000		51100316		51100336	
Rating [A]	Standard 300x300		Special AxB		
160	50100400		50100420		
250	50100401	51100401	50100421	51100421	
400	50100402	51100402	50100422	51100422	
500	50100403	51100403	50100423	51100423	
630	50100404	51100404	50100424	51100424	
800	50100405	51100405	50100425	51100425	
1000		51100406		51100426	
Rating [A]	Standard 300x300		Special AxB		
160	50100410		50100430		
250	50100411	51100411	50100431	51100431	
400	50100412	51100412	50100432	51100432	
500	50100413	51100413	50100433	51100433	
630	50100414	51100414	50100434	51100434	
800	50100415	51100415	50100435	51100435	
1000		51100416		51100436	

10 - 3P+N+PE casing
 11 - 3P+N+FE+PE casing
 20 - 3P+N+PE casing (painted version)*
 21 - 3P+N+FE+PE casing (painted version)*

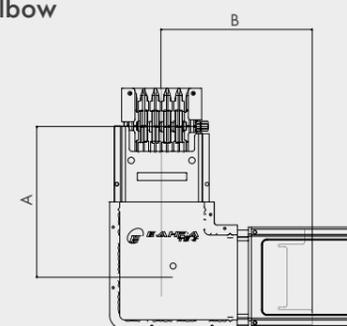
*Color to be defined by customer

Dimensions

Horizontal elbow
Left



Vertical elbow
Right



The weights indicated in the table refer to the standard elements (300 + 300 mm)

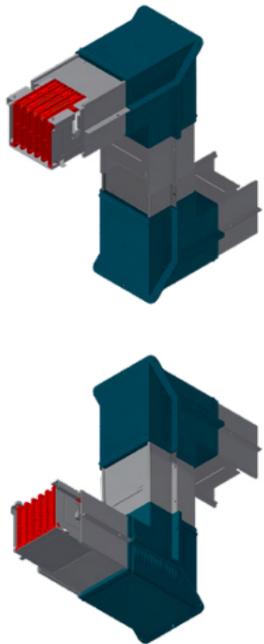
* For all the non standard elbows, only one of the two sides can exceed 600 mm. For example, when ordering a horizontal elbow with size A=650 mm, the B size must be ≤ 600 mm

In your purchase order please specify the required length (see catalogue page: How to take measurements).

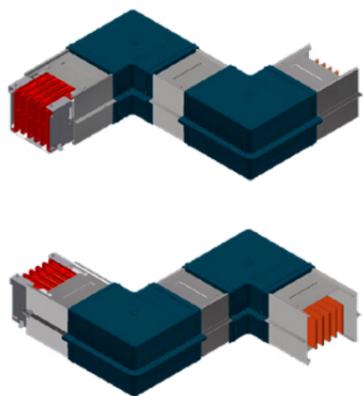
Rating [A]	Weight [kg]	
	Al	Cu
160	4,3	
250	4,8	5,8
400	6,2	8,1
500	6,9	10,2
630	8,4	11,4
800	9,9	15,4
1000		20,7

Double Horizontal Double Vertical

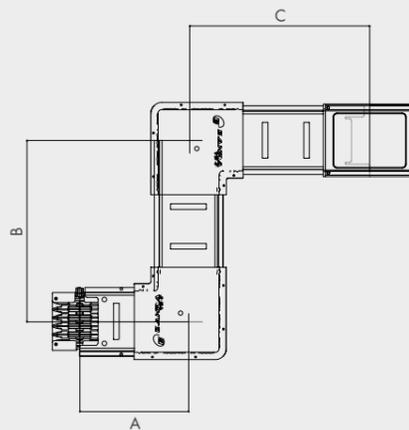
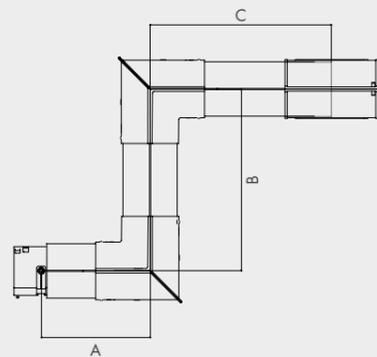
Double Horizontal



Double Vertical



Dimensions



Weight (kg) for
Double Horizontal
Double Vertical

Rating [A]	Al	Cu
160	6,5	
250	7,2	8,6
400	9,4	12,1
500	10,3	15,4
630	12,6	17,1
800	14,9	23,1
1000		31,0

*For double elbows' codes, contact Bahra TBS or your local agent.

The weights indicated in the table refer to the standard elements (300 + 300 + 300 mm)

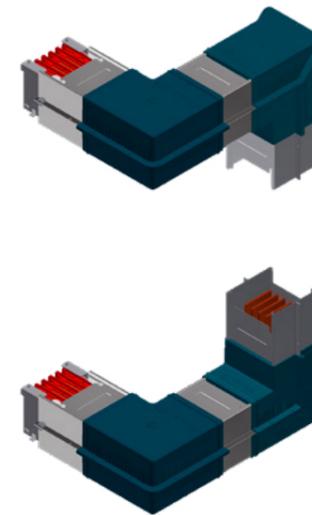
* For all the non standard elbows, only one of the two sides can exceed 600 mm. For example, when ordering a horizontal elbow with size A=650 mm, the B size must be ≤ 600 mm

In your purchase order please specify the required length (see catalogue page: How to take measurements).

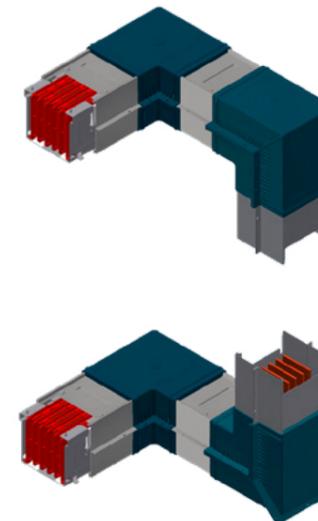
*For double elbows' codes, contact Bahra TBS or your local agent.

Double Horizontal + Vertical Double Vertical + Horizontal

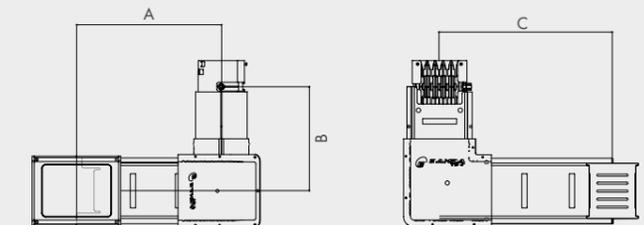
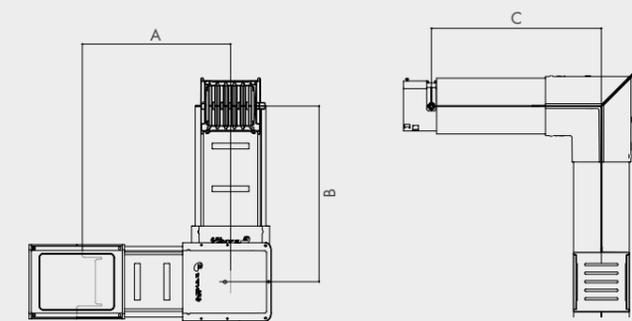
Double Vertical + Horizontal



Double Horizontal +Vertical



Dimensions



Weight (kg)
for Double Horizontal+Vertical
and Double Vertical+Horizontal

Rating [A]	Al	Cu
160	6,5	
250	7,2	8,6
400	9,4	12,1
500	10,3	15,4
630	12,6	17,1
800	14,9	23,1
1000		31,0

*For double elbows' codes, contact Bahra TBS or your local agent.

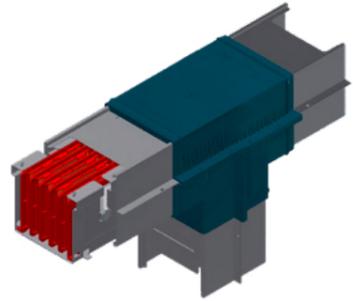
The weights indicated in the table refer to the standard elements (300 + 300 + 300 mm)

* For all the non standard elbows, only one of the three sides can exceed 600 mm. For example, when ordering a double horizontal elbow with size A=650 mm, the B and C sizes must be ≤ 600 mm

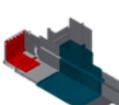
In your purchase order please specify the required length (see catalogue page: How to take measurements).

*For double elbows' codes, contact Bahra TBS or your local agent.

Horizontal T Element

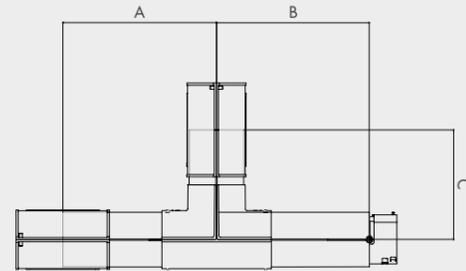


Horizontal standard T elements (300+300+300 mm)

Rating [A]	Weight (kg)		
	Al	Cu	
	Standard 300x300x300		
160	50100500		T Elbow Right 1 (Type 1)
250	50100501	51100501	
400	50100502	51100502	
500	50100503	51100503	
630	50100504	51100504	
800	50100505	51100505	
1000		51100506	
	Standard 300x300x300		
160	50100510		T Elbow Right 2 (Type 2)
250	50100511	51100511	
400	50100512	51100512	
500	50100513	51100513	
630	50100514	51100514	
800	50100515	51100515	
1000		51100516	
	Standard 300x300x300		
160	50100520		T Elbow Left 1 (Type 3)
250	50100521	51100521	
400	50100522	51100522	
500	50100523	51100523	
630	50100524	51100524	
800	50100525	51100525	
1000		51100526	
	Standard 300x300x300		
160	50100530		T Elbow Left 2 (Type 4)
250	50100531	51100531	
400	50100532	51100532	
500	50100533	51100533	
630	50100534	51100534	
800	50100535	51100535	
1000		51100536	

10 - 3P+N+PE casing
11 - 3P+N+FE+PE casing
20 - 3P+N+PE casing (painted version)*
21 - 3P+N+FE+PE casing (painted version)*

Dimensions

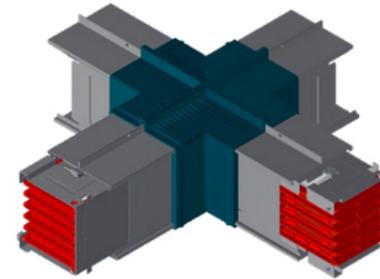


Rating [A]	Weight (kg)	
	Al	Cu
160	7,1	
250	7,9	9,5
400	10,3	13,3
500	11,4	16,9
630	13,9	18,8
800	16,4	25,4
1000		34,1

The weights indicated in the tables refer to the standard elements (300 + 300 + 300 mm)

For non standard T elements, only one of the three sides can exceed 600 mm. For example, when ordering a horizontal T element with size A=650 mm, B and C sizes must be ≤ 600 mm. In your purchase order please specify the required length (see catalogue page: How to take measurements).

Crossovers

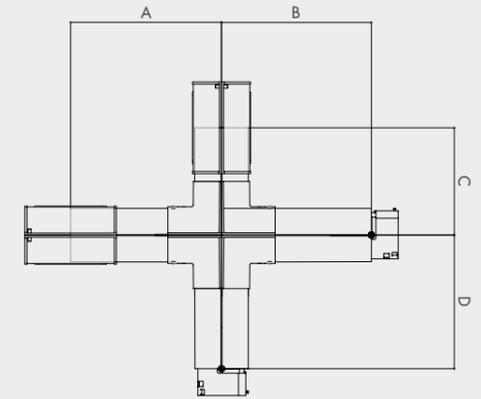


Cross standard elements (300+300+300+300 mm)

Rating [A]	Weight (kg)	
	Al	Cu
	Standard 300x300x300	
160	50100540	
250	50100541	51100541
400	50100542	51100542
500	50100543	51100543
630	50100544	51100544
800	50100545	51100545
1000		51100546

10 - 3P+N+PE casing
11 - 3P+N+FE+PE casing
20 - 3P+N+PE casing (painted version)*
21 - 3P+N+FE+PE casing (painted version)*

Dimensions



Rating [A]	Weight (kg)	
	Al	Cu
160	9,5	
250	10,5	12,7
400	13,7	17,7
500	15,2	22,5
630	18,5	25,0
800	21,8	33,8
1000		45,5

The weights indicated in the tables refer to the standard elements (300 + 300 + 300 + 300 mm)

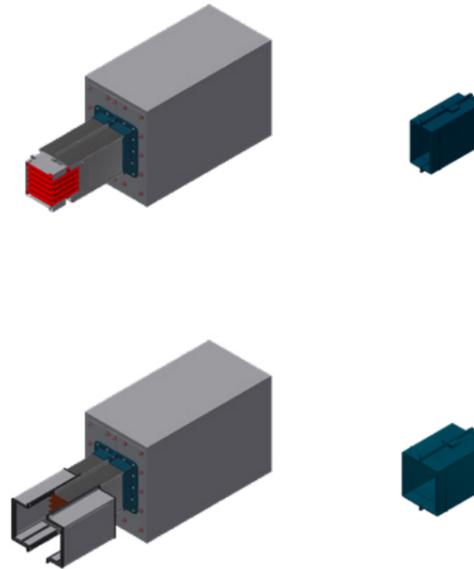
Special dimensions (not standard) are available on request, please contact Bahra TBS. The weights indicated in the tables refer to the standard elements (300 + 300 + 300 + 300 mm)

Feed Unit

Exit bar with metal box elements

Feeder elements for Panel board and transformers

Exit bar with metal box elements



Exit Bar

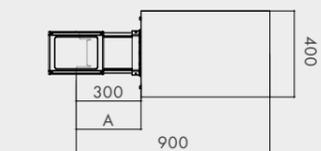
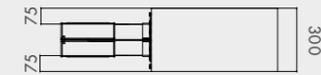
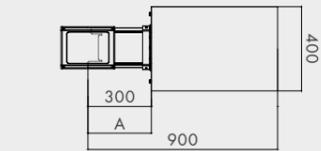
End Cover

Rating [A]	Standard 300		Special A			
	Al	Cu	Al	Cu		
160	50101540		50101550		EXIT BARS WITH METAL BOX RIGHT (TYPE 1)	
250	50101541	51101541	50101551	51101551		
400	50101542	51101542	50101552	51101552		
500	50101543	51101543	50101553	51101553		
630	50101544	51101544	50101554	51101554		
800	50101545	51101545	50101555	51101555		
1000		51101546		51101556		
Rating [A]	Standard 300		Special A			EXIT BARS WITH METAL BOX LEFT (TYPE 2)
160	50101560		50101570			
250	50101561	51101561	50101571	51101571		
400	50101562	51101562	50101572	51101572		
500	50101563	51101563	50101573	51101573		
630	50101564	51101564	50101574	51101574		
800	50101565	51101565	50101575	51101575		
1000		51101566		51101576		

10 - 3P+N+PE casing
 11 - 3P+N+FE+PE casing
 20 - 3P+N+PE casing (painted version)*
 21 - 3P+N+FE+PE casing (painted version)*

Dimensions

Type 1 Right



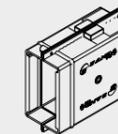
Type 2 Left



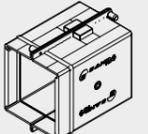
End cover IP55 (EN 60529)

For the following ratings: 160 -250A Al and 250-400A Cu

For the following ratings: 400-800A Al and 500-1000A Cu



cod. 50102500



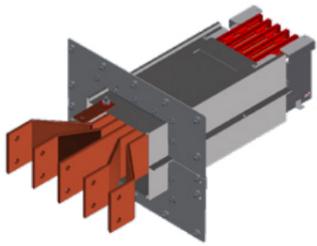
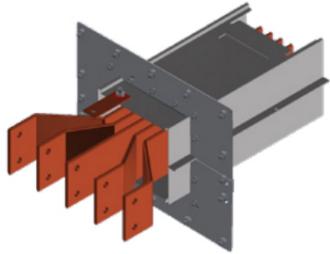
cod. 501025001

Rating [A]	Al	Cu	
160	14,8		EXIT BARS WITH METAL BOX RIGHT (TYPE 1)
250	14,9	15,0	
400	15,1	15,2	
500	15,2	15,6	
630	15,3	15,7	
800	15,5	16,2	
1000		16,9	

Rating [A]	Al	Cu	
160	16,8		EXIT BARS WITH METAL BOX LEFT (TYPE 2)
250	16,8	16,9	
400	18,3	17,8	
500	18,8	19,2	
630	19,7	19,4	
800	19,7	20,6	
1000		21,9	

The box is shipped with its body part positioned inside to reduce its overall dimensions. Take it out and screw it into the position shown here. The dimensions of the bars and holes are described in the corresponding rating of the next page

Feeder elements for Panel board and transformers



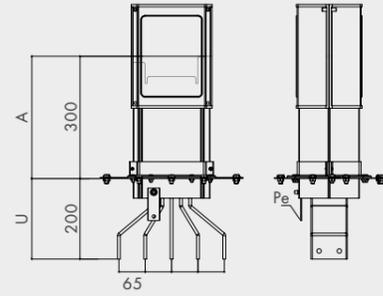
Feeder element is the best solution for direct connection of the busbar to a switchboard or to the LV terminals of a distribution transformer.

Rating [A]	Standard 300x200		Special AxU		
	Al	Cu	Al	Cu	
160	50101500		50101510		Feeder Right (Type 1)
250	50101501	51101501	50101511	51101511	
400	50101502	51101502	50101512	51101512	
500	50101503	51101503	50101513	51101513	
630	50101504	51101504	50101514	51101514	
800	50101505	51101505	50101515	51101515	
1000		51101506		51101516	
Rating [A]	Standard 300x200		Special AxU		Feeder Left (Type 2)
160	50101520		50101530		
250	50101521	51101521	50101531	51101531	
400	50101522	51101522	50101532	51101532	
500	50101523	51101523	50101533	51101533	
630	50101524	51101524	50101534	51101534	
800	50101525	51101525	50101535	51101535	
1000		51101526		51101536	

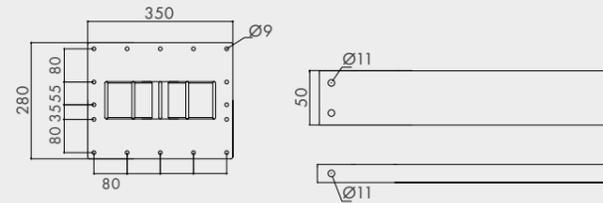
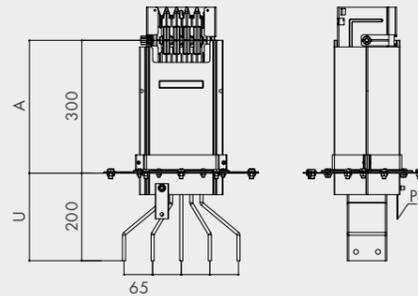
10 - 3P+N+PE casing
11 - 3P+N+FE+PE casing
20 - 3P+N+PE casing (painted version)*
21 - 3P+N+FE+PE casing (painted version)*

Dimensions

Type 1 Right



Type 2 Left



Rating [A]	Al	Cu	Reference holes	Al	Cu	
160	3,1			Type 1	160	250
250	3,1	3,2		250	400	
400	3,4	3,5		400	500	
500	3,4	3,9	Feeder Element Right (Type 1)	500	630	
630	3,6	4,0		Type 2	630	800
800	3,8	4,5			800	1000
1000		5,1				

Rating [A]	Al	Cu	Feeder Element Left (Type 2)
160	5,0		
250	5,0	5,2	
400	6,6	6,0	
500	7,1	7,5	
630	7,9	7,6	
800	7,9	8,8	
1000		10,1	

The weights indicated in the tables refer to the standard elements (300 + 200 mm)

Special dimensions (not standard) are available on request, please contact Bahra TBS
The weights indicated in the tables refer to the standard elements (300 + 200 mm)

Plug-in Boxes

Plug-in boxes From 16A to 160A

Plug-in box Type 1

Plug-in box Type 2

Plug-in box Type 3

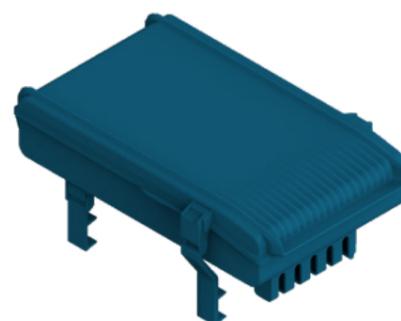
Plug-in box Mounting

Plug-in boxes From 16A to 160A

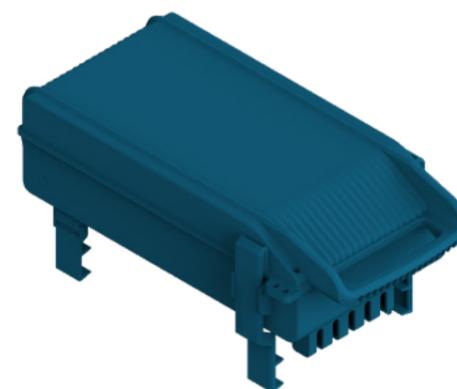
Type 1



Type 2



Type 3

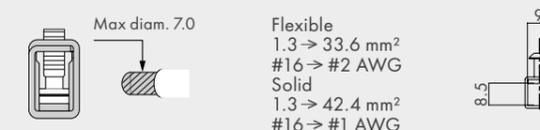


10 - 3P + N + PE casing
11 - 3P + N + FE + PE casing

Specifically designed with high tech insulating structural polymers characterized by simple installation and fast connection thanks to special design of the hooks and outlet's plug that offer safety and speed of installation. Designed according to IEC 61439-1 and 6, IP55 can be installed and removed also when busway is energized. All plug-in boxes can be installed in all outlets in any position and any combination up to 5+5 each 3m

Type 1 & 2

Terminal dimension for L1, L2, L3, N, Fe



Max diam. 5.0

Terminal dimension for Pe

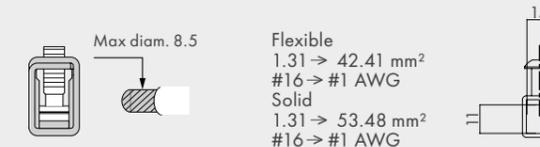


Type 3

Terminal dimension for L1, L2, L3, N, Fe



Terminal dimension for Pe

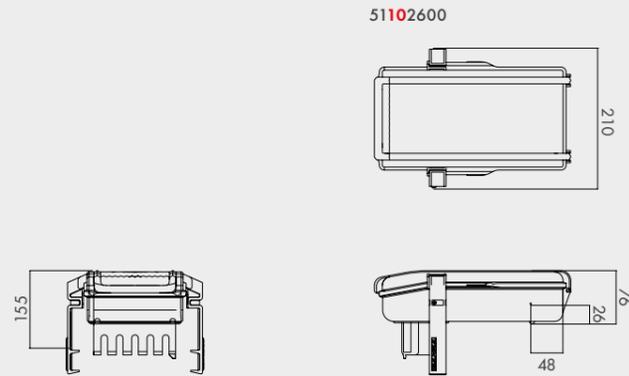


AWG	Diameter (mm)	Area (mm²)
4/0	11.684	107,2
3/0	10.404	85,03
2/0	9.266	67,43
1/0	8.252	53,48
1	7.348	42,41
2	6.544	33,63
4	5.189	21,15
6	4.115	13,30
8	3.264	8,37
10	2.588	5,26
12	2.053	3,31
14	1.628	2,08
16	1.291	1,31
18	1.024	0,823

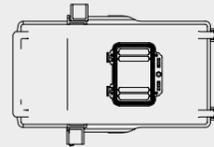
Plug-in box Type 1



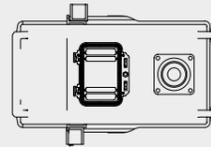
Dimensions



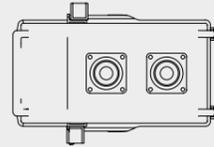
51102601



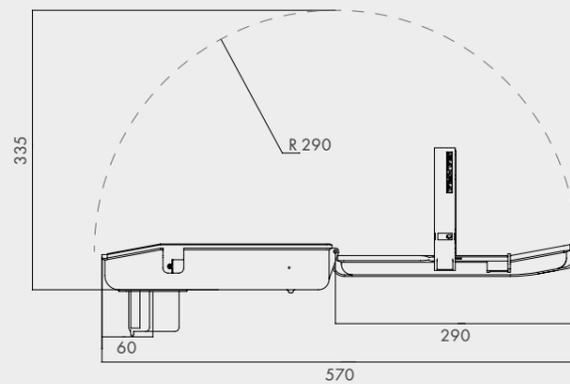
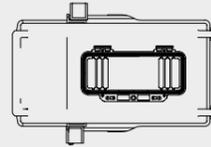
51102603



51102602



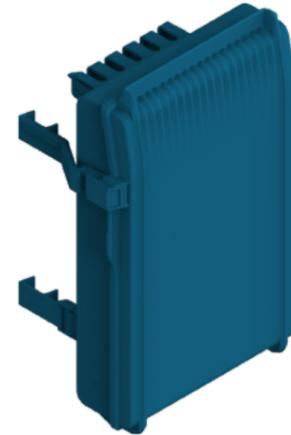
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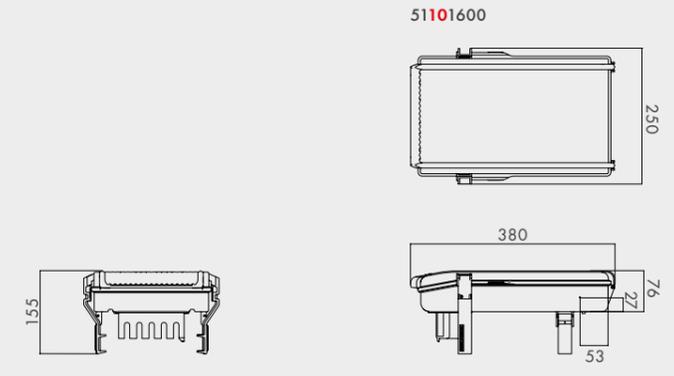
Version	Code	Description
	51100600	BMR - Plug-in box 16A empty
	51100601	BMR - Plug-in box 16A 4 modules window
Type 1	51100602	BMR - Plug-in box 16A with 2 socket 220V
	51100603	BMR - Plug-in box 16A with 4 modules window and socket 220V
	51100604	BMR - Plug-in box 16A 7 1/2 modules window

10 - 3P + N + PE casing
11 - 3P + N + FE + PE casing

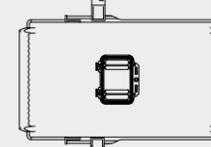
Plug-in box Type 2



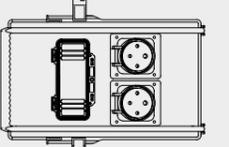
Dimensions



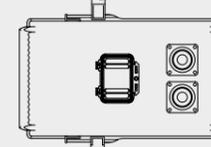
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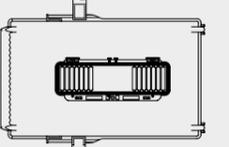
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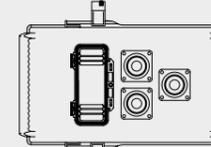
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51101605

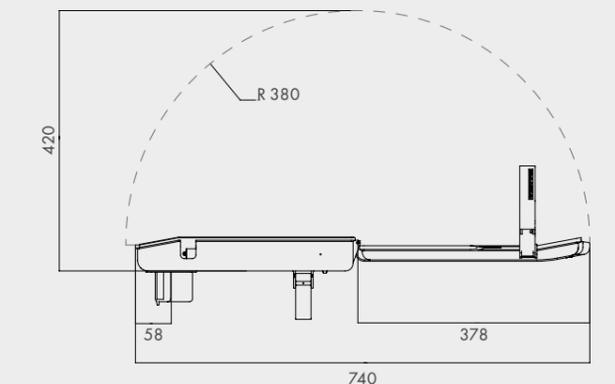


51101603



Version	Code	Description
	51101600	BMR - Plug-in box 32A empty
	51101601	BMR - Plug-in box 32A 4 modules window
	51101602	BMR - Plug-in box 32A with 4 modules window and 2 sockets 220V
Type 2	51101603	BMR - Plug-in box 32A with 7 1/2 modules window and 3 sockets 220V
	51101604	BMR - Plug-in box 32A with 7 1/2 modules window and 2 industrial sockets
	51101605	BMR - Plug-in box 32A with 11 modules window and 2 industrial sockets

10 - 3P + N + PE casing
11 - 3P + N + FE + PE casing



Plug-in box Type 3

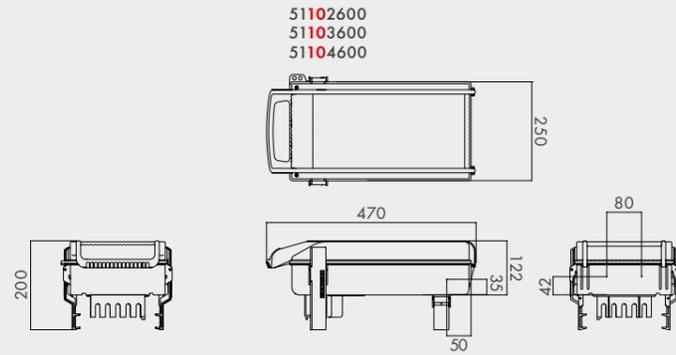


Version	Code	Description
	51102600	BMR - Plug-in box 63A empty
	51103600	BMR - Plug-in box 125A empty
	51104600	BMR - Plug-in box 160A empty
	51102601	BMR - Plug-in box 63A 4 modules window
	51102602	BMR - Plug-in box 63A 7 1/2 modules window
	51102603	BMR - Plug-in box 63A 9 modules window
	51102604	BMR - Plug-in box 63A with 7 1/2 modules window and 3 sockets 220V
	51102605	BMR - Plug-in box 63A with 7 1/2 modules window and 2 industrial sockets
	51102606	BMR - Plug-in box 63A 9 modules window and 2 sockets 220V
	51103601	BMR - Plug-in box 125A 4 modules window
	51103602	BMR - Plug-in box 125A 7 1/2 modules window
Type 3	51103603	BMR - Plug-in box 125A 9 modules window
	51103604	BMR - Plug-in box 125A with 7 1/2 modules window and 3 sockets 220V
	51103605	BMR - Plug-in box 125A with 7 1/2 modules window and 2 industrial sockets
	51103606	BMR - Plug-in box 125A 9 modules window and 2 sockets 220V
	51104601	BMR - Plug-in box 160A 4 modules window
	51104602	BMR - Plug-in box 160A 7 1/2 modules window
	51104603	BMR - Plug-in box 160A 9 modules window
	51104604	BMR - Plug-in box 160A with 7 1/2 modules window and 3 sockets 220V
	51104605	BMR - Plug-in box 160A with 7 1/2 modules window and 2 industrial sockets
	51104606	BMR - Plug-in box 160A 9 modules window and 2 sockets 220V

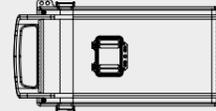
Select the correct amperage

10 - 3P + N + PE casing
11 - 3P + N + FE + PE casing

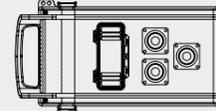
Dimensions



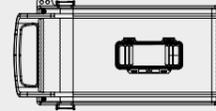
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51104601



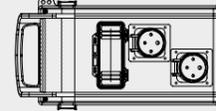
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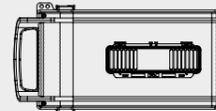
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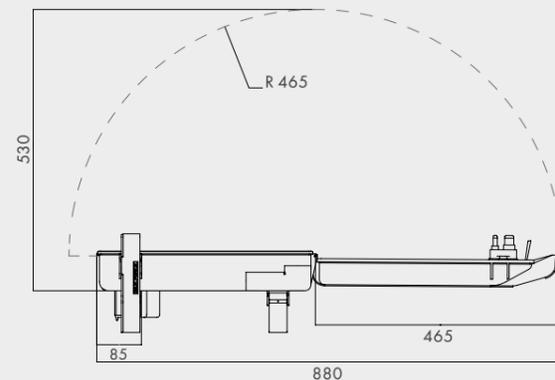
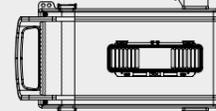
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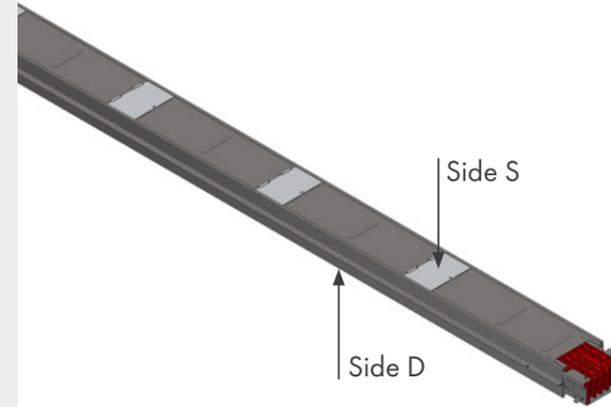
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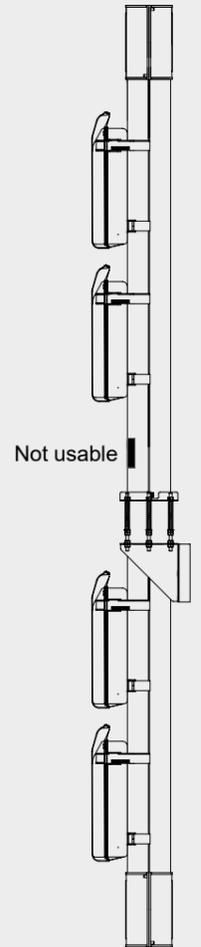
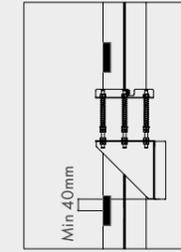
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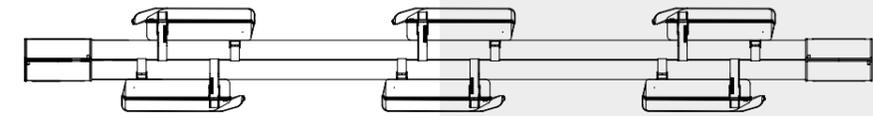
Plug-in box Mounting



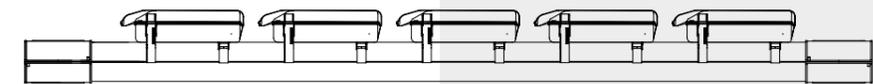
Rising mains



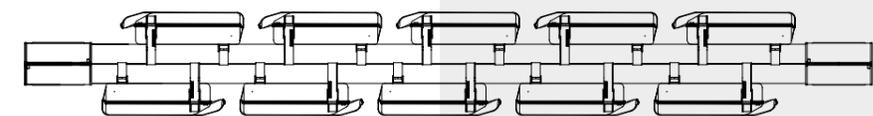
3+3 OUTLET WINDOWS IP55 JUNCTION COVER



5 OUTLET WINDOWS IP55 JUNCTION COVER



5+5 OUTLET WINDOWS IP55 JUNCTION COVER



Support Solution

BMR Bracket

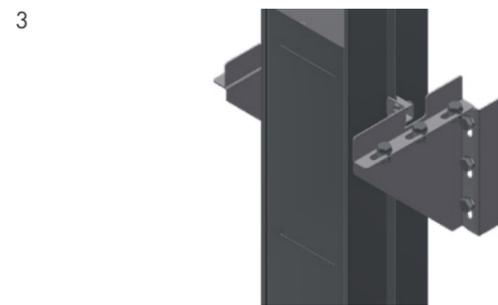
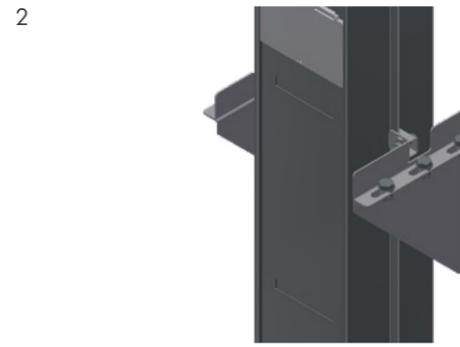
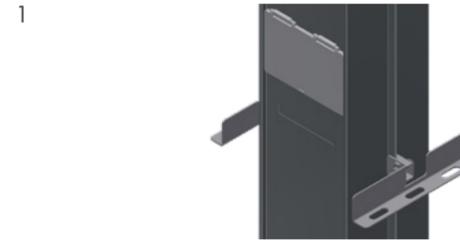
BMR Bracket with springs

BMR Pavement Bracket

BMR Horizontal Bracket

BMR Wall Bracket

BMR Bracket

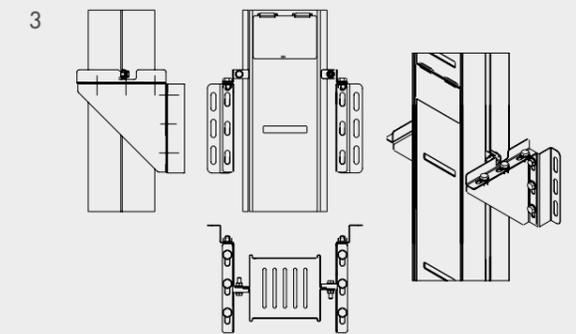
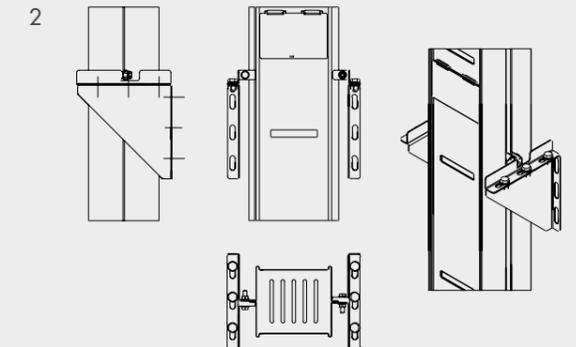
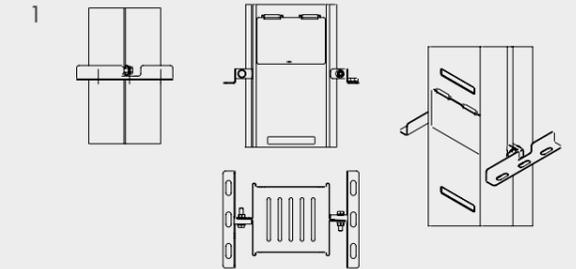


Suspension brackets			
N. dwg	Code	Description	Q.ty
1	50102520	BMR RISING MAINS BRACKETS	10
2	50102522	BMR VERTICAL WALL BRACKETS	10
3	50102524	BMR VERTICAL WALL BRACKETS WITH SPACER	10

1 bracket for every 1.5 m of line
For more detail see page: How to take measurements

Brackets for vertical elements

Type 1, 2, 3
1 each 2m

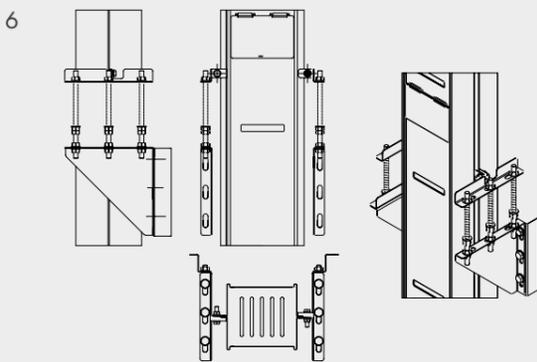
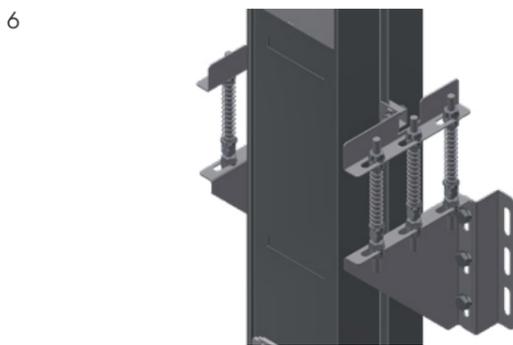
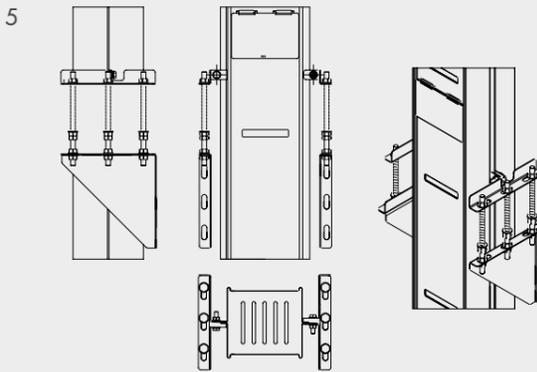
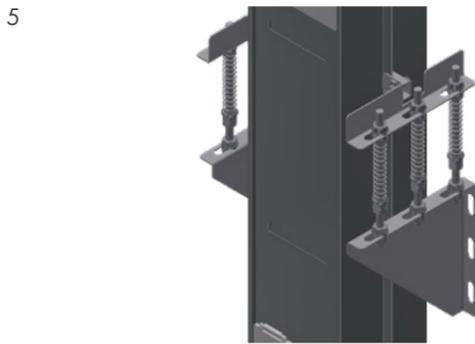
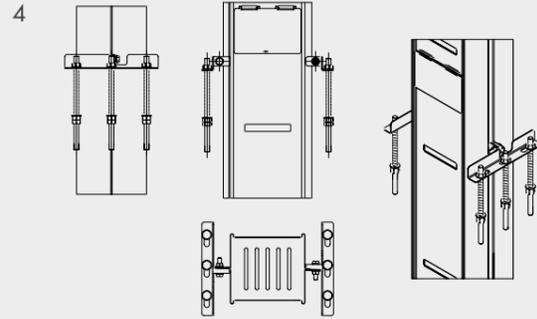


	BMR		BMR-F	
	Distance between two spring hangers (m)			
	Al	Cu	Al	Cu
160	21		17	
250	20	18	17	15
400	18	15	15	13
500	17	13	14	11
630	15	12	13	10
800	14	10	11	8
1000		8		7

BMR Brackets with Springs

Brackets for vertical elements

Type 4, 5, 6
1 bracket every 300kg



Suspension brackets

N. dwg	Code	Description	Q.ty
4	50102521	BMR RISING MAINS BRACKETS WITH SPRINGS	5
5	50102523	BMR VERTICAL WALL BRACKETS WITH SPRINGS	5
6	50102525	BMR VERTICAL WALL BRACKETS WITH SPRINGS AND SPACER	5

1 bracket for every 1.5 m of line
For more detail see page: How to take measurements

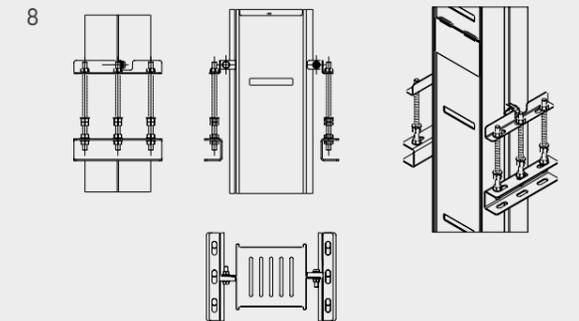
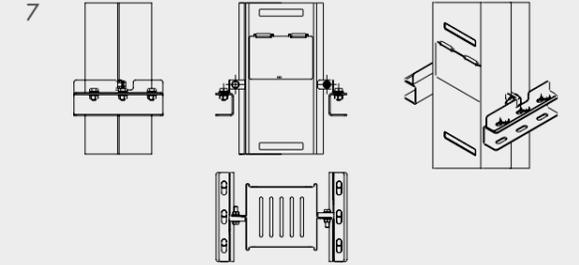
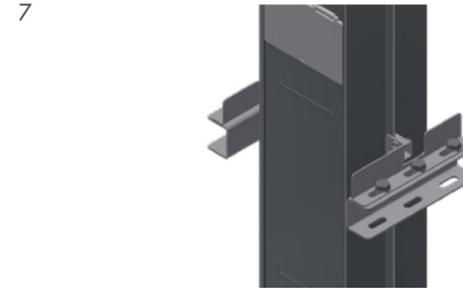
Number of springs

Rating [A]	Al	Cu
160	4	
250	4	4
400	4	6
500	4	6
630	6	6
800	6	6
1000		6

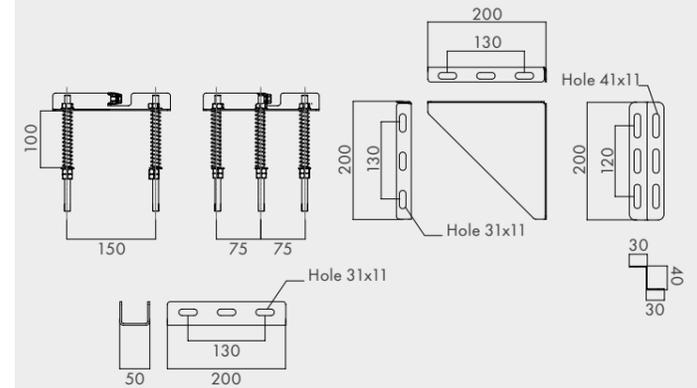
BMR Pavement Brackets

Brackets for Pavement

Type 7, 8
Dedicated to support busway from pavement



Dimensions



Suspension brackets

N. dwg	Code	Description	Q.ty
7	50102526	BMR PAVEMENT BRACKETS	5
8	50102527	BMR PAVEMENT BRACKETS WITH SPRINGS	5

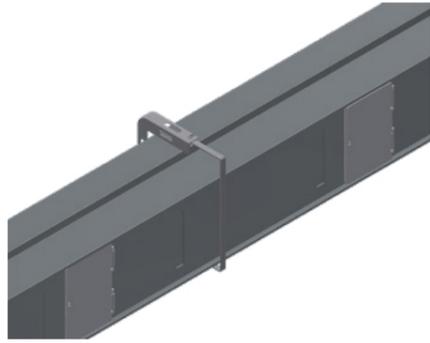
1 bracket for every 1.5 m of line
For more detail see page: How to take measurements

Number of springs

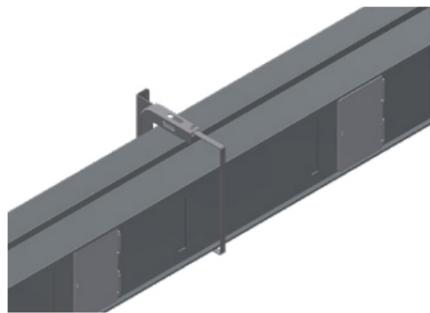
Rating [A]	Al	Cu
160	4	
250	4	4
400	4	6
500	4	6
630	6	6
800	6	6
1000		6

BMR Horizontal Brackets

9, 10



11, 12

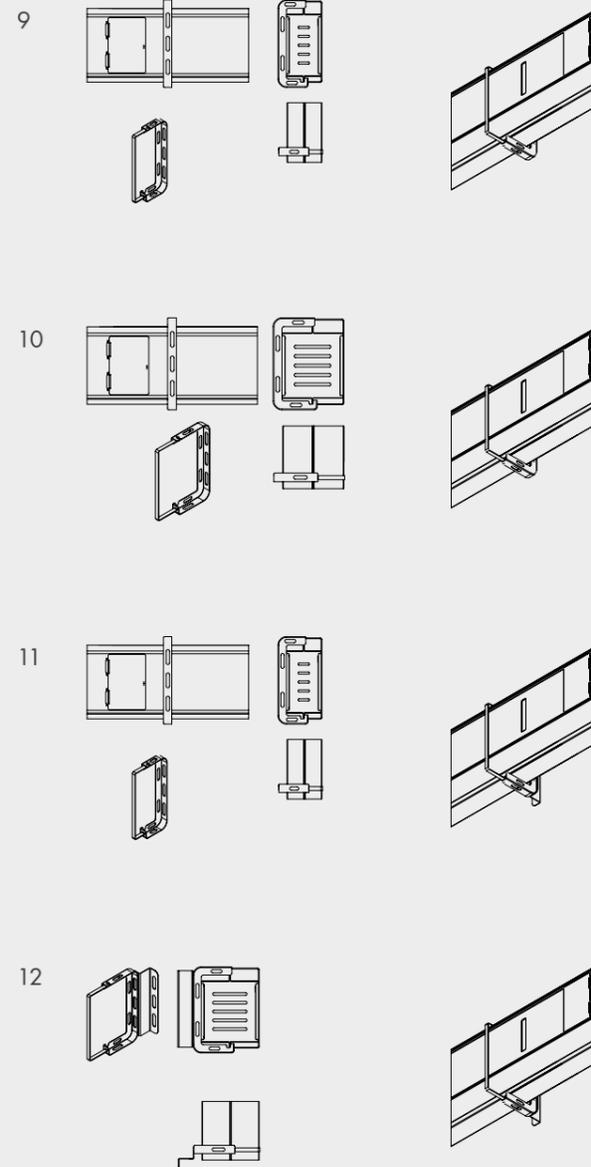


Suspension brackets			
N. dwg	Code	Description	Q.ty
9	50102528	BMR HORIZONTAL BRACKETS B30	10
10	50102529	BMR HORIZONTAL BRACKETS B90	10
11	50102530	BMR HORIZONTAL BRACKETS WITH SPACER B30	5
12	50102531	BMR HORIZONTAL BRACKETS WITH SPACER B90	5

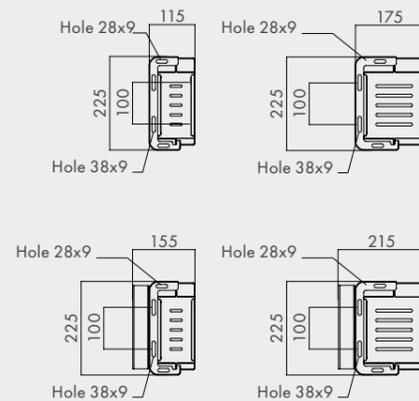
1 bracket for every 1.5 m of line
For more detail see page: How to take measurements

Brackets for Horizontal Elements

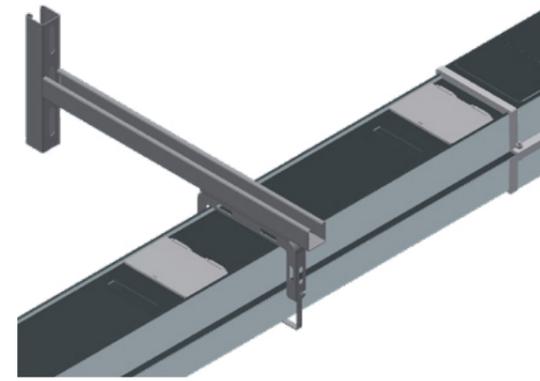
Type 9, 10, 11, 12



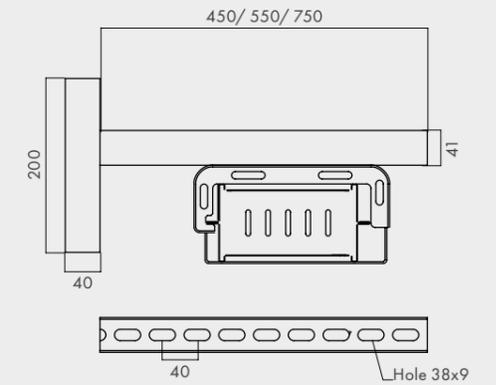
Dimensions



BMR Wall Brackets



Dimension



Code	WALL FIXING C-CHANNEL	Q.ty
50102532	BMR WALL FIXING C-CHANNEL 450mm	5
50102533	BMR WALL FIXING C-CHANNEL 550mm	5
50102534	BMR WALL FIXING C-CHANNEL 750mm	5
50102535	BMR BRACKETS SPACER	10

Code	WALL FIXING C-CHANNEL	MAX ALLOWABLE WEIGHT (kg)
1	BMR WALL FIXING C-CHANNEL 450mm	80
2	BMR WALL FIXING C-CHANNEL 550mm	68
3	BMR WALL FIXING C-CHANNEL 750mm	50

Technical data sheet BMR - 60Hz

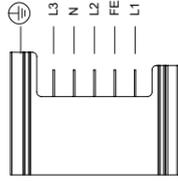
Updated on 02/09/2025

	Aluminium					Copper						
	160	250	400	500	630	800	250	400	500	630	800	1000
Rated current	In [A]	160	250	400	500	630	800	250	400	500	630	1000
Overall dimension of the busbars	L x H [mm]	90x190	90x190	150x190	150x190	150x190	150x190	90x190	90x190	150x190	150x190	150x190
Rated operational voltage	Ue [V]	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Rated insulation voltage	Ui [V]	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Frequency	f [Hz]	60	60	60	60	60	60	60	60	60	60	60
Rated short-time current (1 s)	ICW [kA]rms	15.0*	25.0*	30.0	30.0	36.0	36.0	25.0*	30.0	30.0	36.0	36.0
Peak current	Ip [kA]	30.0	50.0	63.0	63.0	75.6	75.6	52.5	63.0	63.0	75.6	75.6
Rated short-time current of the neutral bar (1 s)	ICW [kA]rms	9.0	15.0	18.0	18.0	21.6	21.6	15.0	18.0	18.0	21.6	21.6
Peak current of the neutral bar	Ip [kA]	15.3	30.0	36.0	36.0	45.4	45.4	30.0	36.0	36.0	45.4	45.4
Rated short-time current of the protective circuit (1 s)	ICW [kA]rms	9.0	15.0	18.0	18.0	21.6	21.6	15.0	18.0	18.0	21.6	21.6
Peak current of the protective circuit	Ip [kA]	15.3	30.0	36.0	36.0	45.4	45.4	30.0	36.0	36.0	45.4	45.4
Average phase resistance at 20 °C	R20 [mΩ/m]	0.487	0.301	0.145	0.075	0.073	0.057	0.245	0.122	0.075	0.068	0.044
Average phase reactance	X [mΩ/m]	0.198	0.197	0.108	0.111	0.108	0.111	0.201	0.200	0.111	0.114	0.104
Average phase impedance	Z [mΩ/m]	0.526	0.360	0.181	0.134	0.130	0.125	0.317	0.234	0.134	0.133	0.113
Average phase resistance at thermal conditions	R [mΩ/m]	0.627	0.416	0.196	0.097	0.102	0.080	0.333	0.171	0.097	0.095	0.061
Average phase impedance at thermal conditions	Z [mΩ/m]	0.657	0.460	0.224	0.148	0.149	0.137	0.389	0.263	0.148	0.149	0.121
Average Neutral resistance	R20 [mΩ/m]	0.487	0.301	0.145	0.075	0.073	0.057	0.245	0.122	0.075	0.068	0.044
Average Resistance of the protective bar	RPE [mΩ/m]	0.585	0.872	0.665	0.764	0.383	0.266	0.569	0.655	0.540	0.399	0.379
Average reactance of the protective bar	XPE [mΩ/m]	0.174	0.139	0.190	0.169	0.173	0.079	0.191	0.233	0.149	0.184	0.232
Average resistance of the Ph to PE fault loop	Ro [mΩ/m]	1.212	1.288	0.861	0.861	0.485	0.346	0.902	0.826	0.637	0.494	0.452
Average reactance of the Ph to PE fault loop	Xo [mΩ/m]	0.372	0.336	0.298	0.280	0.281	0.190	0.392	0.433	0.260	0.298	0.331
Average impedance of the Ph to PE fault loop	Zo [mΩ/m]	1.268	1.331	0.911	0.905	0.561	0.395	0.983	0.933	0.688	0.577	0.539
Zero-sequence short-circuit average resistance phase - N	Ro [mΩ/m]	0.696	0.440	0.210	0.107	0.107	0.084	0.356	0.179	0.107	0.100	0.064
Zero-sequence short-circuit average reactance phase - N	Xo [mΩ/m]	0.264	0.263	0.144	0.148	0.144	0.148	0.268	0.267	0.148	0.152	0.139
Zero-sequence short-circuit average impedance phase - N	Zo [mΩ/m]	0.744	0.512	0.255	0.183	0.179	0.170	0.446	0.321	0.183	0.182	0.153
Zero-sequence short-circuit average resistance phase - PE	Ro [mΩ/m]	1.421	1.427	0.926	0.893	0.519	0.373	1.013	0.883	0.669	0.526	0.442
Zero-sequence short-circuit average reactance phase - PE	Xo [mΩ/m]	0.240	0.205	0.226	0.206	0.209	0.116	0.258	0.300	0.186	0.222	0.262
Zero-sequence short-circuit average impedance phase - PE	Zo [mΩ/m]	1.441	1.441	0.954	0.917	0.560	0.390	1.045	0.933	0.695	0.571	0.514
cos = 0.70		502.3	374.1	185.6	127.6	128.9	117.4	326.2	227.6	127.6	128.2	101.5
cos = 0.75		520.4	383.1	189.2	126.8	128.4	115.8	331.4	225.9	126.8	127.1	99.4
cos = 0.80		537.0	390.7	191.9	125.1	127.1	113.4	335.1	222.6	125.1	125.2	96.5
cos = 0.85		551.5	396.2	193.6	122.2	124.7	109.9	336.8	217.4	122.3	122.1	92.6
cos = 0.90		563.1	398.7	193.6	117.7	120.6	104.6	335.4	209.1	117.7	117.2	87.1
cos = 0.95		569.0	395.6	190.5	110.0	113.5	96.2	328.3	195.1	110.1	109.1	78.6
cos = 1.00		542.6	360.4	169.8	84.2	88.7	69.7	288.3	148.4	84.3	82.4	53.1
Total conductors' sizes	[mm²]	59	117	233	304	480	680	74	159	241	268	418
Weight	P [kg/m]	6.0	6.6	9.6	8.7	11.7	13.8	8.0	11.2	14.2	15.8	21.4
Degree of protection	IP	55	55	55	55	55	55	55	55	55	55	55
Insulation material thermal resistance class		B	B	B	B	B	B	B	B	B	B	B
Losses for the Joule effect at nominal current	P [W/m]	48.1	78.0	94.1	72.9	122.0	154.4	62.4	82.3	73.0	113.3	141.7
Ambient temperature min/MAX	[°C]	-5/40	-5/40	-5/40	-5/40	-5/40	-5/40	-5/40	-5/40	-5/40	-5/40	-5/40

*Voltage drop with distributed load
 $\Delta V [V/(m \cdot A)]^{10}$

Ambient temperature (°C)	10	15	20	25	30	35	40	45	50	55	60
Factor Kt	1,19	1,16	1,13	1,10	1,07	1,03	1,00	0,97	0,93	0,89	0,86

* Values referred to 0.1s



Technical Info

Straight lengths

The components and the features of the BMR busway are:

- a casing made of galvanized steel used as protective earth (PE);
- overall busbar dimensions: 90x190 and 150x190;
- painted casing available on request (color to be defined by the customer)
- number of conductors: 4 same section (3P+N) with PE casing or 5 same cross section (3P+N+FE) with PE casing, busbars available in tinned aluminum or copper ETP;
- conductors insulators are made by fiberglass reinforced plastic material, VO class self-extinguishing degree (according to UL94), in compliance with the glow-wire test according to IEC 60695-2-10;
- tap-off outlets with a constant center distance of 1 m on both sides of the busbar (3+3 outlets every 3m) or 530mm on both sides of the busbar (5+5 outlets every 3m), set up for being connected to plug-in type tap-off boxes; These outlets open and close automatically when inserting or pulling out a tap-off box;
- monobloc electric junction system made with copper to connect conductors and PE in a fast and reliable way. The monobloc has self breaking nut with a preset torque setting which ensure good, long lasting electrical continuity
- all components and accessories are IP55
- the whole busbar is fire retardant in compliance with the IEC 60332-3 standard

Feed units

Allows you to electrically power the BMR line through a cable line or directly connected to a distribution panel board. The 160 and 250A feed units have terminals for cables up to 150mm²; for higher ratings, the cable connection to the feed unit requires cable lugs to be fastened to the provided spreaders.

End cover

The end cover ensures the IP55 protection degree at the end of the line

Fixing supports

Installation of the busways to the structure of the building, directly or with wall / ceiling / beam supports can be made in an easy and reliable way with a complete range of solutions provided by Bahra TBS. For any special need contact Bahra TBS technical department.

Tap-off boxes

Used for energizing three-phase loads from 16A up to 160A Plug-in type tap-off boxes (from 16A up to 160A) with the following features:

- insertion and disconnection of the device only when cover is closed for the boxes from 16A to 32A
- insertion and disconnection of the device integrated into the cover of the boxes from 63A to 160A, ensuring automatic absence of electric current when the cover is open;
- the supplied PE contact (protective conductor) is the first to make the electrical connection when inserting the box into the outlet and it is the last to disconnect when removing the device;
- all insulating plastic components are in compliance with the IEC 60695-2-1 glow-wire test and rated V2 self-extinguishing according to the UL94;
- standard IP55 degree of protection without using additional accessories.

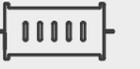
Product fully in compliance with the following Standards: IEC 61439-1 and 6.
The busbar trunking systems are fire retardant in compliance with IEC 20-22 (IEC 332-3: 1992).

Conductors Case Item code

10 - 3P+N+PE casing



11 - 3P+N+FE+PE casing



20 - 3P+N+PE casing (painted version)*



21 - 3P+N+FE+PE casing (painted version)*



Installation Guidelines

Rising Mains

How to take measurement

Technical Information

Table of comparison between boxes and cable glands (Bahra TBS)

Joule effect losses in busbars

Overload Protection

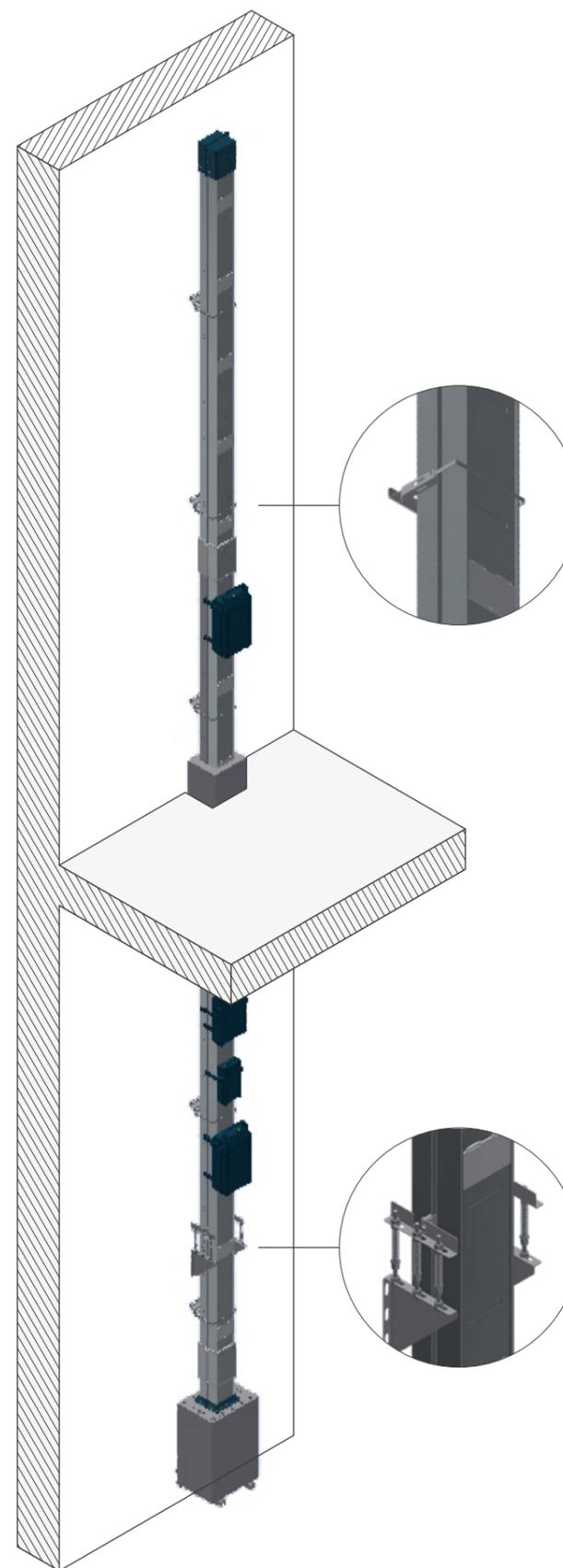
Selection of the busbar trunking system based on voltage drop

Short circuit withstand (continued)

Harmonics

Degree of protection

Rising Mains



General rules for design of rising mains

1 - Use a RH end feed unit. This allows the Neutral bar to be positioned on the left side of the busbar, hence the cable exit of the tap-off boxes is located downwards

2 - Use straight lengths with 5 outlets on one side

3 - Use a straight element with fire barrier for each compartment floor. It is necessary to specify the position of the internal fire barrier before placing an order

4 - The tap-off boxes can be installed in all outlets and near the connection between two elements

5 - At the end of the riser mains, position the IP55 end cover.

A - Use one or more suspension brackets for the vertical elements, according to the weight of the whole rising mains. For risers that are shorter than 4 meters, fix to the base with code 50102520; when longer, use a suspension bracket type 2, 4 or 6 every 300 kg of rising main. Brackets for pavement installation are also available, see corresponding chapter in the catalogue.

B - Use a standard suspension bracket with a 40 mm spacer every 2 meters of rising mains

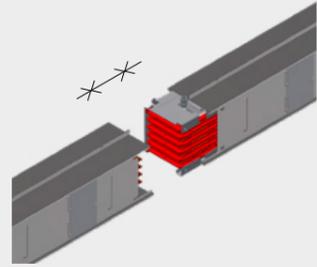
For any special need contact Bahra TBS technical department.

How to take measurements

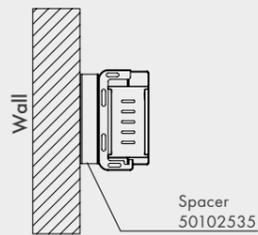
Straight lengths

Always take measurements on the long side on the metal casing as shown in the figure.

The dimension of the straight lengths can range from 600 mm to 3000 mm



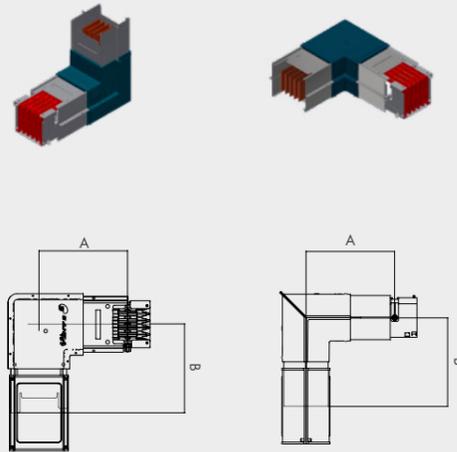
Minimum fixing distances



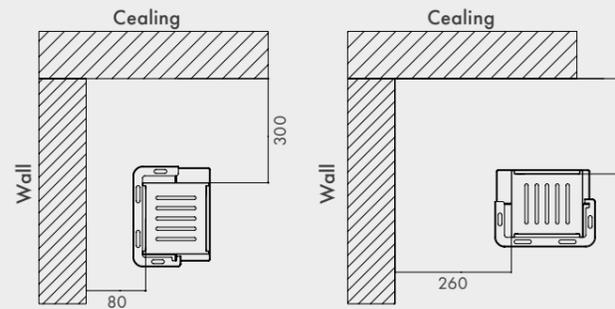
Do not fix the bracket directly on the wall.
Use the special spacer 50102535

Elbows

When using elbows, the dimension should be measured from the long casing to the axis of the element



Minimum installation distance with plug-in boxes



* When there is a plug-in box installed above the busbar, check the overall dimension of the open cover of the plug-in unit used in the specific section.

Technical Information

Thanks to the flexibility of BMR busway is possible and simple to customize the solution according to customers' and designers' requirements.
It is therefore possible to request special products such as AC current or any particular frequency.

Possible special requirements:

- 5 conductor version with separate FE
- 3 conductor version
- painting in any customised colour

Route not completely defined

If the route cannot be defined with sufficient degree of precision, some parts may be left out and ordered at a later stage

In order to simplify the process of taking the necessary measurements for the definition of the completion items, it is recommended that the supply of all sections with direction changes is defined from the start, leaving the completion of straight section to a later stage

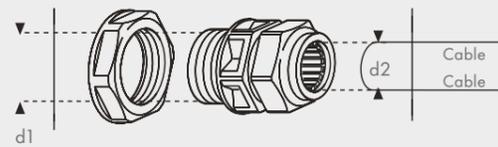
Table of comparison between boxes and cable glands (Bahra TBS)

The following table shows the maximum number of Bahra TBS cable glands that can be installed on Plug-in boxes using the appropriate flanges

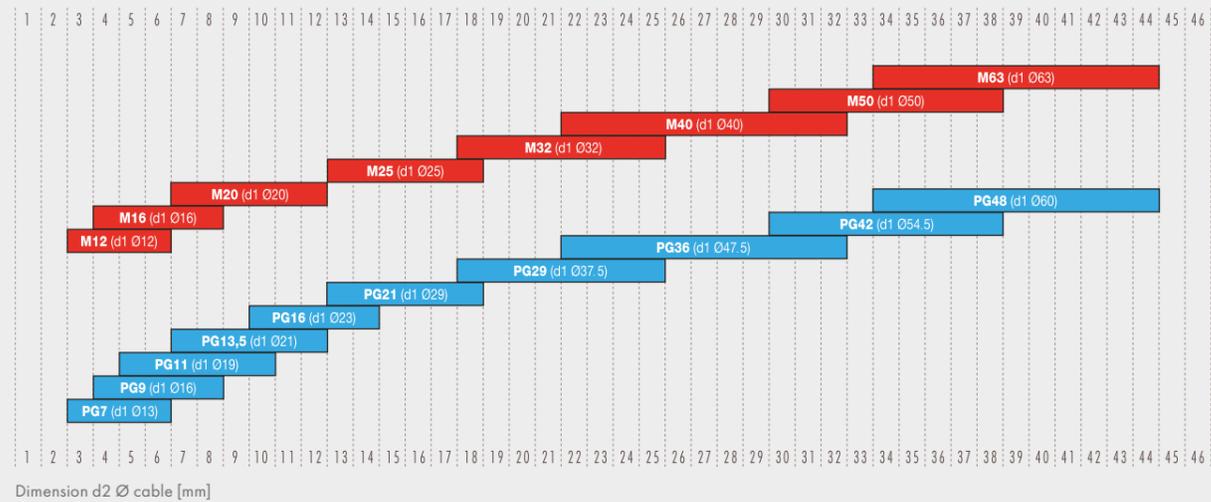
COMPARISON TABLE BETWEEN Plug-in boxes AND CABLE GLANDS (Bahra TBS)						
Useful dimension for the passage of the cables and flange size	M16-PG9 (63 A cable) 10 mm ² section PVC insulated one-pole cable	M20-PG13.5 (63 A cable) 10 mm ² section PVC insulated one-pole cable	M25-PG21 (250 A cable) 70 mm ² section PVC insulated one-pole cable	M32-PG29 (400 A cable) 150 mm ² section PVC insulated one-pole cable	M40-PG36 (630 A cable) 300 mm ² section PVC insulated one-pole cable	
63/160 A Plug-in box with section cover (Type 1) FL 110 x 100	No. 10	No. 5	-	-	-	
250/630 A Plug-in box with section cover (Type 2) FL 235x 180	No. 66	No. 36	No. 20	No. 13	No. 8	
125/400 A Plug-in box on the junction (Type 3/4) FL 180 x 230	-	No. 30	No. 16	No. 9		
630 A Plug-in box on the junction (Type 3/4) FL 340 x 230	-	-	No. 28	No. 15	No. 10	
800/1250 A Plug-in box on the junction (Type 3/4) FL 430 x 260	-	-	No. 57	No. 32	No. 18	

Note: The value shown on the table is the max no. of PG that may be installed in the cable flange
For boxes with section cover the most demanding condition is considered, which means that only one of the two cable flanges is used

Cable glands table



When choosing the cable glands, please refer to the Bahra TBS catalogue

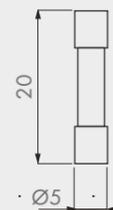


Cable glands table

Operating features

In = 6.3	1.5	In 2.1 In	2.75 In	4 In	10 In
Operating time >	1 h	< 30 min	10 ms - 3 s	3 ms - 30 ms	< 20 ms

When choosing all fuses, please refer to the general Bahra TBS catalogue



- In = 6.3A
- One 250V ceramic fuse IEC 127
- Breaking capacity H 1500A
- Voltage drop ΔV = 150 mV
- I 2t = 48A 2s

Joule effect losses in busbars

Technical information

Losses due to the Joule effect are essentially caused by the electrical resistance of the busbar
Lost energy is transformed into heat and contributes to the heating of the conduit of the environment
The calculation of power loss is a useful data for correct sizing of the building air conditioning system

Three-phase regime losses are:

$$P_j = \frac{3R_b I_b^2 L}{1000}$$

In one-phase regime:

$$P_j = \frac{2R_b I_b^2 L}{1000}$$

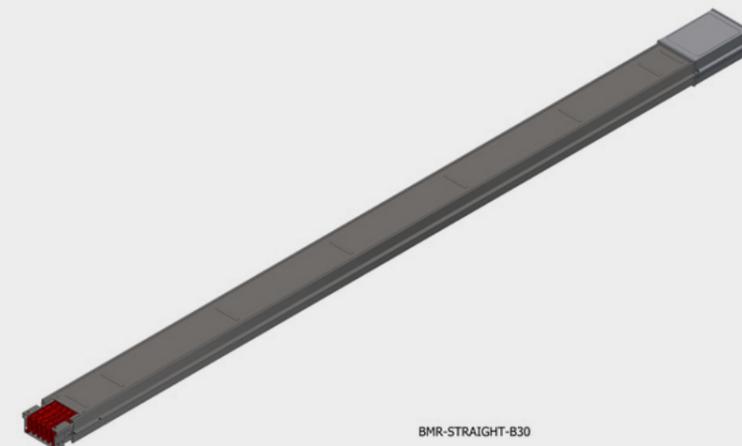
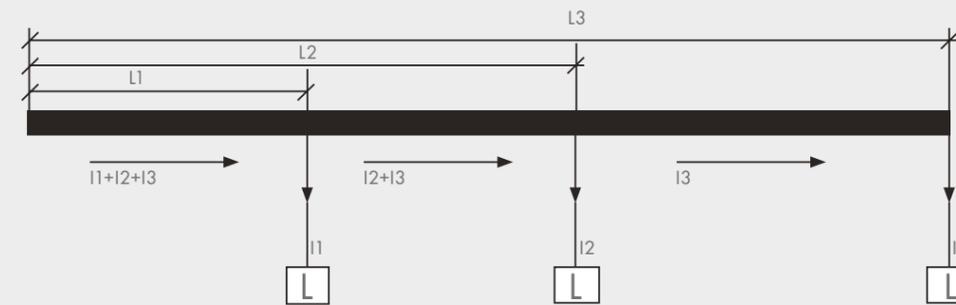
Where:

- I_b = Actual current (A)
- R_b = Phase resistance for unit of length of the busbar trunking system, measured at thermal regime (m Ω/m)
- L = Busbar length (m)
- P_j = Power losses (kW)

For accurate calculation, losses must be assessed trunk by trunk taking into account the transiting currents; for example, in the case of the distribution of the loads represented in the figure one has:

	Length	Transiting current	Losses
1st trunk	L_1	$I_1 + I_2 + I_3$	$P_1 = 3R_b I_b (I_1 + I_2 + I_3)^2$
2nd trunk	$L_2 - L_1$	$I_2 + I_3$	$P_2 = 3R_b (L_2 - L_1) (I_2 + I_3)^2$
3rd trunk	$L_3 - L_2$	I_3	$P_3 = 3R_b (L_3 - L_2) I_3^2$

Total losses in the busbar trunking system $P_t = P_1 + P_2 + P_3$



BMR-STRAIGHT-B30

Overload Protection

Technical information

Busbar overload protection is ensured following the same criteria used for cables. It will be necessary to check the relationship:

$$I_b \leq I_n \leq I_z$$

Where:

I_b = Circuit utilisation current

I_n = Switch rated current

I_z = Rating at permanent cable regime

The I_b utilisation current in a three-phase system is calculated based on the following formula:

$$I_b = \frac{P_t \alpha \beta d}{\sqrt{3} U_e \cos \varphi} [A]$$

Where:

P_t = Sum of the active powers of the loads installed [W]

d = Power supply factor equal to: 1 if the trunking is only powered from one side; if the trunking is powered from the centre or from both ends at the same time

U_e = Operating voltage in [V]

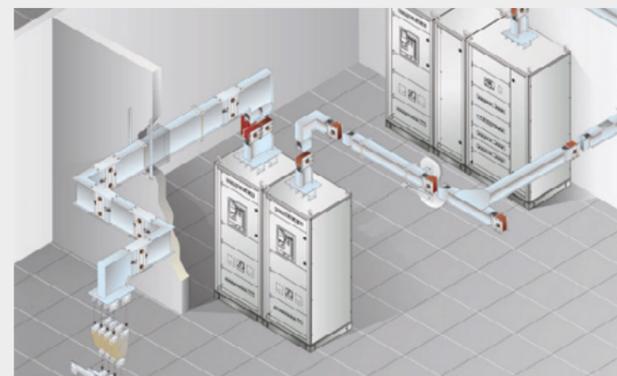
$\cos \varphi$ = Average power factor of the loads

I_b = Operating current [A]

α = Diversity coefficient of the loads [.]

β = Coefficient of utilisation of the loads [.]

OVERLOAD PROTECTION CONDITIONS



The ambient temperature where the busbar trunking system is installed impacts on its rating. During the design stages, it will be necessary to multiply the rating value at the reference temperature by a correction coefficient referred to the final operating temperature.

All Bahra TBS products have been sized and tested for an average ambient temperature of 40 °C. For installation in environments with average daily temperatures lower than 35 °C, the rated current of the busbar must be multiplied by a k_t factor, which is higher than the unit for temperatures lower than 35 °C, and lower than the unit if the ambient temperature is higher than 35 °C:

$$I_z = I_{z0} k_t$$

Where:

- I_{z0} is the current that the busbar trunking system can carry for an indefinite time at its reference temperature (40 °C)
- k_t is the correction coefficient for ambient temperature values other than the reference temperature, as shown in the following table

Ambient temperature (°C)	10	15	20	25	30	35	40	45	50	55	60
Factor k_t	1,19	1,16	1,13	1,10	1,07	1,03	1,00	0,97	0,93	0,89	0,86

Selection of the busbar trunking system based on voltage drop

Technical information

If the line is particularly long (> 100 m), it will be necessary to check the value of the voltage drop. For systems with power factor ($\cos \varphi$) not lower than 0.7 the voltage loss can be calculated using the following formulas:

THREE PHASE SYSTEM

$$\Delta V = \frac{b \sqrt{3} I_b L (R_t \cos \varphi + \chi \sin \varphi)}{1000}$$

THREE PHASE SYSTEM

$$\Delta V = \frac{2 b I_b L (R_t \cos \varphi + \chi \sin \varphi)}{1000}$$

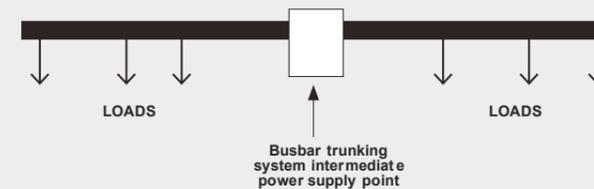
The percentage voltage drop can be obtained from:

$$\Delta v \% = \frac{\Delta v}{V_r} \cdot 100$$

$$\sin \varphi = \sqrt{1 - \cos^2 \varphi}$$

Where V_r is the system rated voltage

In order to limit the voltage drop in case of very long busbar trunking systems, it is possible to allow for a power supply at an intermediate position, rather than at the terminal point



Calculation of the voltage drop with loads not evenly distributed

In case the load cannot be considered evenly distributed, the voltage drop may be determined more accurately using the relationships shown below. For the distribution of three-phase loads, the voltage drop can be calculated using the following formula, on the assumption (generally verified) that the section of the busbar trunking system is consistent:

$$\Delta V = \sqrt{3} \frac{\left[R_t \sum_{i=1}^n I_i L_i \cos \varphi_i \right] + \left[\chi \sum_{i=1}^n I_i L_i \sin \varphi_i \right]}{1000}$$

If the three-phase system and the power factor are not lower than $\cos \phi = 0.7$, the voltage loss may be calculated using the voltage drop coefficient shown in Table 1

$$\Delta V \% = b \cdot \frac{k \cdot I_b \cdot L}{V_n} \cdot 100$$

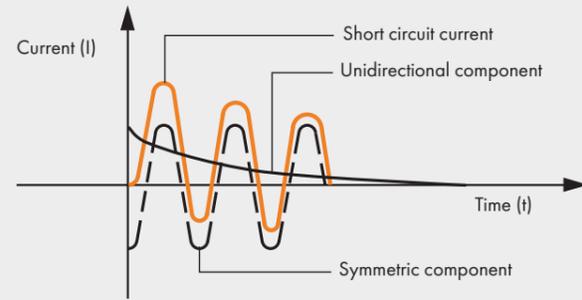
The current distribution factor "b" depends on how the circuit is fed and on the distribution of the electric loads along the busbar:

Table 1 - The distribution factor of the current "b"

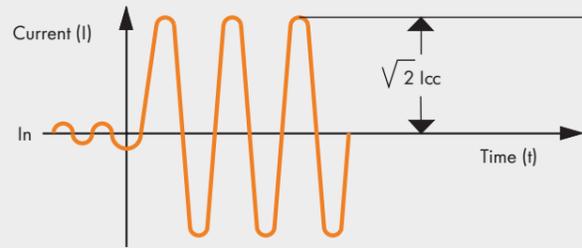
b = 1	Supplies at one end and load at the end of the line	
b = 1/2	Supplies at one end and with load evenly distributed	
b = 1/4	Supplies at both ends and with load evenly distributed	
b = 1/4	Central supply with loads at both ends	
b = 1/8	Central supply with load distributed evenly	

Short circuit withstand

Technical information
The CEI 64-8 standard indicates that, for the protection of the circuits of the system, it is necessary to allow for devices aimed at interrupting short circuit currents before these become dangerous due to the thermal and mechanical effects generated in the conductors and the connections. In order to size the electric system and the protection devices correctly, it is necessary to know the value of the estimated short circuit current at the point where this is to be created. This value enables in fact to correctly select protection devices based on their own tripping and closing powers, and to check the resistance to electro-dynamic stress of the busbar supports installed in control panels, or/and of the busbar trunking systems.



Characterisation of short circuit current
The estimated short circuit current at a point of the user system is the current that would occur if in the considered point a connection of negligible resistance was created between conductors under voltage.



The magnitude of this current is an estimated value that represents the worst possible condition (null fault impedance, tripping time long enough to enable the current to reach the maximum theoretical values). In reality, the short circuit always occurs with significantly lower effective current values.

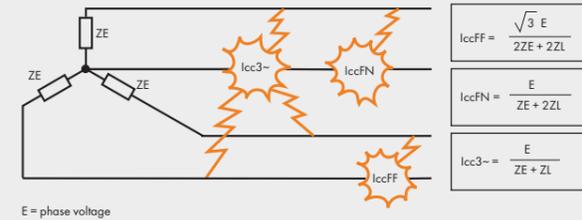
The intensity of the estimated short circuit current essentially depends on the following factors:

- Power of the cabin Transformer, meaning that the higher is the power, the higher is the current;
- length of the line upstream

In three-phase circuits with Neutral it is possible to have three different types of short circuit:

- phase-phase;
- phase-Neutral;
- balanced three-phase (most demanding condition)

The formula for the calculation of the symmetric component is:



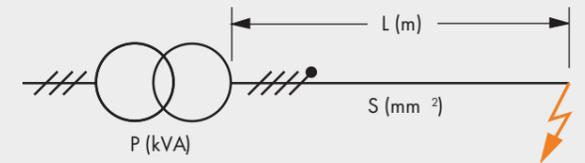
$$\overline{I_{cc}} = \frac{\overline{E}}{\overline{ZE + ZL}}$$

Where:

- E is the phase voltage;
- ZE is the secondary equivalent impedance of the TRANSFORMER measured between the phase and the Neutral;
- ZL is the impedance of the phase conductor only

Short circuit withstand (continued)

Analytical determination of short circuit currents
In order to calculate the value of the estimated short circuit current at any point of the circuit, it is sufficient to apply the formulas shown below, knowing the impedance calculated at the origin of the system up to the point being assessed. In the formulas shown below, the value of the short circuit power is considered infinite and the short circuit impedance is equal to 0. This makes it possible to define short circuit current values higher than the actual ones, but generally acceptable.



Line resistance
 $RL = r \cdot L$

RL = resistance of the line upstream (m)
r = specific line resistance (m/m)
L = upstream line length (m)

Line reactance
 $XL = x \cdot L$

XL = upstream line reactance (m)
x = specific line reactance (m/m)

TRANSFORMER resistance
 $RE = \frac{1000 P_{cu}}{3 I_n^2}$

RE = transformer secondary equivalent resistance (m)
Pcu = transformer COPPER losses (W)
In = transformer Rated current (A)

TRANSFORMER impedance
 $ZE = \frac{V_{cc}\% V_c^2}{100 P}$

ZE = transformer secondary equivalent impedance (m)
Vc = phase voltage (V)
Vcc% = percentage short circuit voltage
P = transformer power (kVA)

TRANSFORMER reactance
 $XE = \sqrt{ZE^2 - RE^2}$

XE = transformer secondary equivalent reactance (m)

Short circuit impedance
 $Z_{cc} = \sqrt{(RL + RE)^2 + (XL + XE)^2}$

Zcc = total short circuit impedance (m)

Estimated short circuit current
 $I_{cc} = \frac{V_c}{\sqrt{3}} \cdot Z_{cc}$

Icc = symmetric component of the short circuit current (kA)

	Rating [A]	kA three-phases Icw	kA three-phases Ipk	kA one-phases Icw	kA one-phases Ipk
Aluminium	160	15,0*	30,0	9,0	15,3
	250	25,0*	52,5	15,0	30,0
	400	30,0	63,0	18,0	36,0
	500	30,0	63,0	18,0	36,0
	630	36,0	75,6	21,6	45,4
Copper	800	36,0	75,6	21,6	45,4
	250	25,0*	52,5	15,0	30,0
	400	30,0	63,0	18,0	36,0
	500	30,0	63,0	18,0	36,0
	630	36,0	75,6	21,6	45,4
	800	36,0	75,6	21,6	45,4
	1000	36,0	75,6	21,6	45,4

* Values referred to 0.1s

Harmonics

Technical information

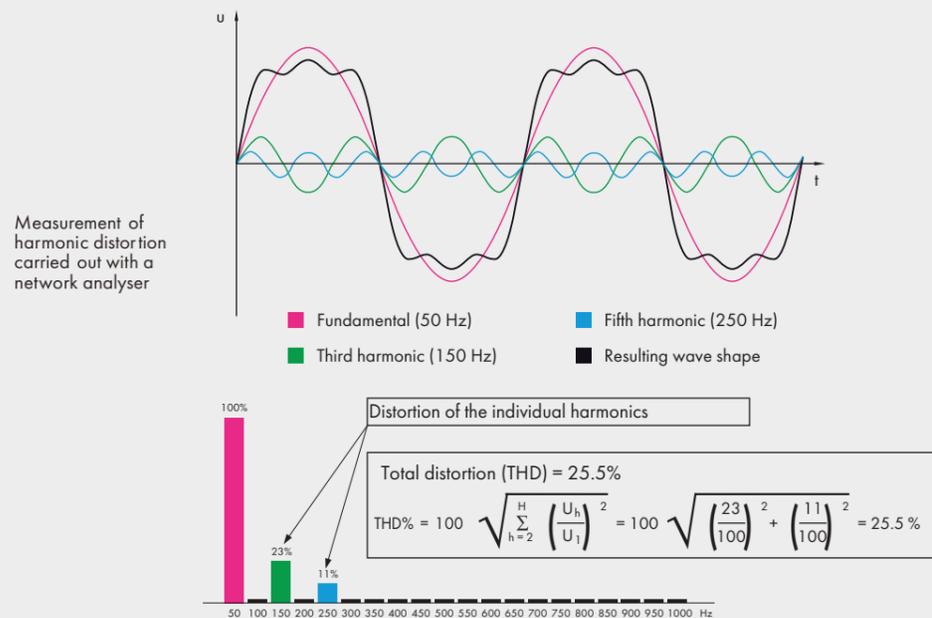
In a distribution system, currents and voltages should have a perfectly sinusoidal shape. However, in practice the equipment contains electric devices such as changeover devices or dimmers that make the load not linear

The currents absorbed, although at regular intervals and with frequencies equal to that of the rated voltage, sometime have a non-sinusoidal wave form, which has the following negative effects:

- worsening of the power factor;
- heating of the Neutral;
- additional losses in electric machinery (transformers and motors);
- instable operation of the protection elements (thermal magnetic and earth leakage circuit breakers)

In industrial plants these conditions have been occurring for a long time, However, they are now occurring more and more in service sector distribution systems, where, from backbone distribution (which uses three-phase lines), one-phase loads are often distributed, which contributes to increasing the unbalance of the electric system. Each type of non-sinusoidal periodical wave may be split into a more or less large number of sinusoids (called harmonic components), which frequency a whole multiple of the frequency of the wave shape observed.

A deformed current at a frequency of 50 Hz, like for example that represented by the red line on the figure, consists of many sinusoidal currents with frequency of 50 Hz (fundamental), 100 Hz (second harmonic components), 150 Hz (third harmonics), and so on. The presence of current harmonics represents an important problem, causing overload conditions both on phase conductors, and on any Neutral conductor, and results in the reduction of the conductor permitted load.



Degrees of protection

IP: degree of protection provided against intrusion

The protection enclosures are classified (IEC 60529) in according to their degree of protection against weather conditions and external agents. The degree of protection is indicated by two digits (protection against solid bodies and liquids) following the symbol IP

To increase the ease of choice of the most suitable busbar, in according to installation requirements, below there is a summary of their performance, based on the IP degree of protection according to the IEC 60529 standard

IK: degree of protection of equipment to mechanical impact

Standard IEC 62262 defines an IK code that characterises the aptitude of equipment to resist mechanical impacts on all sides

1 st digit IP	
Protection against penetration of solid bodies	
0	No protection
1	Protection against solid bodies larger than 50 mm (e.g.: accidental contact)
2	Protection against solid bodies larger than 12 mm (e.g.: finger)
3	Protection against solid bodies larger than 2.5 mm
4	Protection against solid bodies than 1 mm
5	Protection against dust
6	Complete protection against dust

2 nd digit IP	
Protection against penetration of liquids	
2	Protection against drops of water falling up to 15° from the vertical
3	Protection against drops of water up to 60° from the vertical
4	Protection against sprays of water from all directions
5	Protection against jets of water from all directions
6	Protection against jets of water (similar force to heavy seas)
7	Protection against the effects of immersion
8	Protection against effects of immersion under pressure

IK	Test	Impact energy (In joules)
IK 00		0
IK 01	0.2 kg, 75 mm	0.15
IK 02	0.2 kg, 100 mm	0.2
IK 03	0.2 kg, 175 mm	0.35
IK 04	0.2 kg, 250 mm	0.5
IK 05	0.2 kg, 350 mm	0.7
IK 06	0.5 kg, 200 mm	1
IK 07	0.5 kg, 400 mm	2
IK 08	1.7 kg, 295 mm	5
IK 09	5 kg, 200 mm	10
IK 10	5 kg, 400 mm	20



Note

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