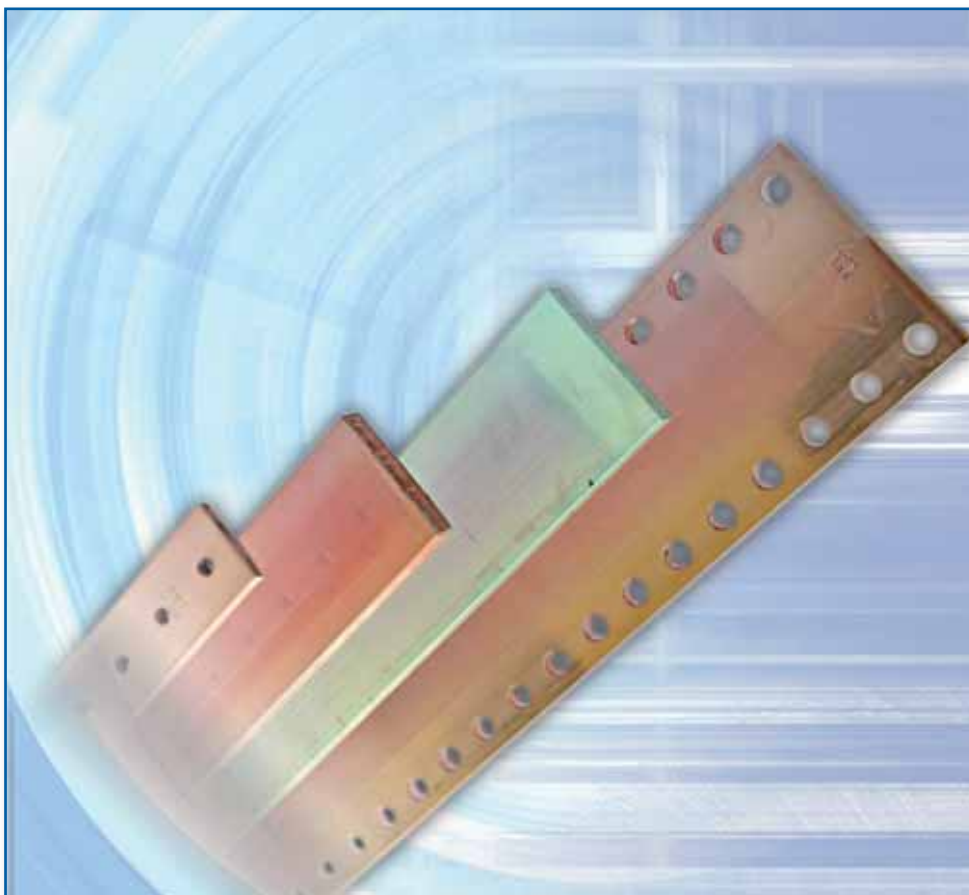




Copper and Aluminum busbars

Two metals are currently used as conductors in electric panel boards: copper and aluminum

In particular, when in need to define a power distribution inside an electric panel board, one mainly chooses to use drawn bars, using both the above-mentioned metals.

In configuring a bar distribution system, one must consider some parameters, both electrical and mechanical, such as, for example:

electrical parameters: rated intensity value to carry based on the conductor cross-section and number, and the resulting voltage loss.

mechanical parameters: bar size and number, based on panel board dimensions and on their mechanical resistance. Other factors to consider, which might limit the passage of current through the selected conductors, are linked to the working temperature of the conductor and to its capability to dissipate heat.

In electricity, there is also a phenomenon called "skin effect" which determines the concentration of current on the conductors surface. The best conductor is therefore a flat one, such as drawn bars, in which the bar length and thickness ratio is the highest possible.

E.g. for the same cross-section in sq. mm and working temperature, a 100x5 mm bar carries 1.431 Ampere, whereas the same cross-section, with a 50 x 10 mm bar carries 1.129 Amp (cf. ampacity values on page 16, table for solid copper bars, referred to a ΔT 50°C).

ADVANTAGES

Prepunched and threaded copper bars

ready to use
no need of punching tools
wiring time savings

Solid aluminum bars

For the same cross-section with copper bar, a significant weight saving, up to 70% less, with an ampacity reduction of about 30%.
Significant economic advantage due to the different cost of the raw material and, especially, the great difference in the weight/volume ratio.

TECHNICAL FEATURES

Copper bars

Electrolytic copper Cu-ETP 99.90%
Rounded corners
tensile strength: 250 N / sq.mm
resistivity: 0,0172 Ω / mm² x meter
density: 8.9 kg/cu.dm

Aluminum bars

Aluminum type EN-AW 1350 A
Rounded corners
tensile strength: 80 N/sq.mm
resistivity: 0.0286 Ω / mm² x meter
density: 2.7 kg/cu.dm

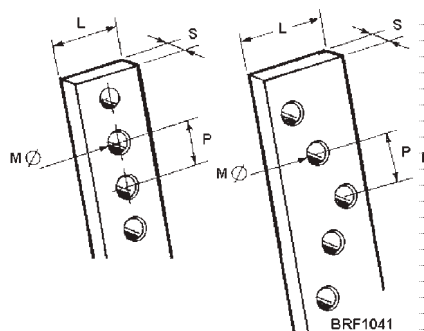
Copper and Aluminum busbars



THREADED COPPER BARS

Thickness 2 - 3 - 4 - 5 - 10 mm

Length 1000 and 2000 mm

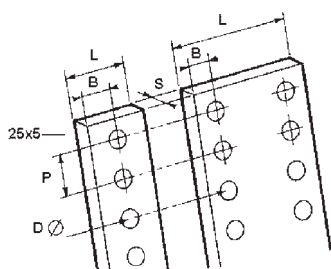


Code	Reference		Weight Kg	L	S	P	M Ø
BRF0990	BRF 12X2X1000	10	0.22	12	2	18	M5
BRF0995	BRF 12X3X1000	10	0.32	12	3	18	M5
BRF1000	BRF 12X4X1000	10	0.42	12	4	18	M5
BRF1005	BRF 12X5X1000	10	0.49	12	5	18	M5
BRF1010	BRF 15X5X1000	4	0.64	15	5	25	M6
BRF1015	BRF 20X5X1000	4	0.84	20	5	25	M6
BRF1016	BRF 25X4X1000	4	0.80	25	4	25	M6
BRF1020	BRF 32X5X1000	4	1.35	32	5	25	M6
BRF1025	BRF 12X4X2000	10	0.84	12	4	18	M5
BRF1030	BRF 15X5X2000	4	1.18	15	5	25	M6
BRF1031	BRF 15X5X2000 PC	4	1.16	15	5	18	M6
BRF1035	BRF 20X5X2000	4	1.66	20	5	25	M6
BRF1040	BRF 30X5X2000	4	2.49	30	5	25	M6
BRF1041	BRF 32x5x2000 W	4	2.65	32	5	18	M6
BRF1045	BRF 30X10X1000	4	2.49	30	10	25	M8

PREPUNCHED COPPER BARS

Thickness 5 - 10 mm

Length 1750 mm

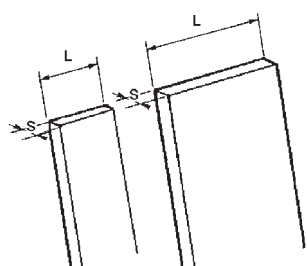


Code	Reference		Weight Kg	L	S	P	D Ø	B
BRP1000	BRP 25X5	2	1.39	25	5	25	10.5	12.5
BRP1005	BRP 50X5	2	3.39	50	5	25	10.5	12.5
BRP1010	BRP 63X5	2	4.39	63	5	25	10.5	12.5
BRP1015	BRP 80X5	2	5.69	80	5	25	10.5	12.5
BRP1020	BRP 100X5	2	7.24	100	5	25	10.5	12.5
BRP1025	BRP 125X5	2	9.19	125	5	25	10.5	12.5
BRP1030	BRP 50X10	2	6.70	50	10	25	10.5	12.5
BRP1035	BRP 60X10	2	8.79	60	10	25	10.5	12.5
BRP1040	BRP 80X10	2	11.30	80	10	25	10.5	12.5
BRP1045	BRP 100X10	2	14.40	100	10	25	10.5	12.5
BRP1050	BRP 120X10	2	18.30	120	10	25	10.5	12.5

SOLID COPPER BARS

Thickness 5 - 10 mm

Length about 4200 mm

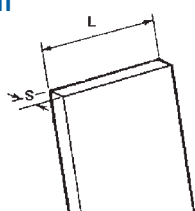


Code	Reference		Weight Kg	L	S
PRP0990	PRP 12X4	1	0.43	12	4
PRP1000	PRP 20x5	1	0.89	20	5
PRP1005	PRP 25x5	1	1.11	25	5
PRP1010	PRP 30x5	1	1.33	30	5
PRP1015	PRP 40x5	1	1.78	40	5
PRP1020	PRP 50x5	1	2.23	50	5
PRP1025	PRP 60x5	1	2.67	60	5
PRP1030	PRP 80x5	1	3.56	80	5
PRP1035	PRP 100x5	1	4.45	100	5
PRP1040	PRP 125x5	1	5.56	125	5
PRP1045	PRP 30x10	1	2.67	30	10
PRP1050	PRP 40x10	1	3.56	40	10
PRP1055	PRP 50x10	1	4.45	50	10
PRP1060	PRP 60x10	1	5.34	60	10
PRP1065	PRP 80x10	1	7.12	80	10
PRP1070	PRP 100x10	1	8.90	100	10
PRP1075	PRP 120x10	1	10.70	120	10
PRP1080	PRP 160x10	1	14.25	160	10
PRP1085	PRP 200x10	1	17.80	200	10

SOLID ALUMINUM BARS

Thickness 10 mm

Length 4000 mm



Code	Reference		Weight Kg/mt	L	S
BAP4000	BAP 20x10x4000	1	0.54	20	10
BAP4005	BAP 30x10x4000	1	0.81	30	10
BAP4010	BAP 40x10x4000	1	1.08	40	10
BAP4015	BAP 50x10x4000	1	1.35	50	10
BAP4020	BAP 60x10x4000	1	1.62	60	10
BAP4025	BAP 80x10x4000	1	2.16	80	10
BAP4030	BAP 100x10x4000	1	2.70	100	10
BAP4035	BAP 120x10x4000	1	3.24	120	10

Copper and Aluminum busbars - Ampacities table

Ampacity table Copper bar based on the ΔT temperature increase as per standard DIN 43671
Reference room temperature 35°C

THREADED COPPER BARS



Dimensions	Cross-section mm²	ΔT 30°C	ΔT 50°C
12 x 2	24	108	143
12 x 3	36	120	160
12 x 4	48	160	212
12 x 5	60	183	241
15 x 5	75	218	289
20 x 5	100	274	363
25 x 4	100	288	380
30 x 5	150	379	502
32 x 5	160	400	530
30 x 10	300	573	756

PREPUNCHED COPPER BARS



Dimensions	Cross-section mm²	Number of bars in parallel							
		ΔT 30°C				ΔT 50°C			
25X5	125	327	586	795	890	433	776	1053	1179
50X5	250	583	940	1260	1411	772	1317	1669	1870
63X5	315	718	1197	1494	1673	951	1586	1980	2217
80X5	400	885	1450	1750	1960	1173	1921	2319	2597
100X5	500	1080	1730	2050	2296	1431	2292	2716	3042
125X5	625	1300	2022	2380	2666	1722	2679	3153	3532
50X10	500	792	1404	1897		1050	1861	2514	
60X10	600	916	1600	2139		1214	2119	2834	
80X10	800	1153	1962	2595		1528	2600	3438	
100X10	1000	1386	2306	3032		1836	3056	4017	
120X10	1200	1618	2660	3478		2144	3524	4609	

SOLID COPPER BARS

Example of bar choice

for $I_n = 800$ A

for $T_{max} = 85^\circ C$

with copper prepunched bar

63 x 5 $I_n = 951$ Amp

with solid copper bar

63 x 5 $I_n = 951$ Amp

40 x 10 $I_n = 944$ Amp

with solid aluminum bar

50 x 10 $I_n = 874$ Amp

cf. tables with

$\Delta T = 50^\circ C$

where:

T_{max} = max. considered working temperature

T_a = reference room temperature

ΔT = temperature increase in $^\circ C$

$T_{max} = 50^\circ + 35^\circ = 85^\circ C$

Dimensions	Cross-section mm²	Kg/mt	Number of bars in parallel							
			ΔT 30°C				ΔT 50°C			
12 x 4	48	0.43	160	292	403	451	212	387	534	598
12 x 5	60	0.53	183	334	460	514	241	440	607	679
15 x 5	75	0.67	218	405	567	635	289	537	751	841
20 x 5	100	0.89	274	500	690	772	363	663	914	1023
25 x 5	125	1.11	327	586	795	890	433	776	1053	1179
30 x 5	150	1.33	379	672	896	1003	502	890	1187	1329
32 x 5	160	1.42	400	494	931	1043	530	920	1234	1382
40 x 5	200	1.78	482	836	1090	1220	639	1108	1444	1617
50 x 5	250	2.23	583	994	1260	1411	772	1317	1670	1870
60 x 5	300	2.67	688	1150	1440	1613	912	1524	1908	2137
63 x 5	315	2.80	718	1197	1494	1673	951	1586	1980	2217
80 x 5	400	3.56	885	1450	1750	1960	1173	1921	2319	2597
100 x 5	500	4.45	1080	1730	2050	2296	1431	2292	2716	3042
125 x 5	625	5.56	1300	2022	2381	2666	1723	2679	3155	3532
20 x 10	200	1.78	427	734	959	1151	564	970	1269	1522
30 x 10	300	2.67	573	986	1289	1547	756	1300	1701	2041
40 x 10	400	3.56	715	1230	1609	1931	944	1624	2124	2549
50 x 10	500	4.45	852	1510	2040	2448	1129	2001	2703	3243
60 x 10	600	5.34	985	1720	2300	2760	1305	2279	3048	3658
80 x 10	800	7.12	1240	2110	2790	3124	1643	2796	3697	4140
100 x 10	1000	8.90	1490	2480	3260	3651	1974	3286	4320	4838
120 x 10	1200	10.70	1740	2860	3740	4188	2306	3790	4956	5550
160 x 10	1600	14.25	2220	3590	4680	2942	4757	6201		
200 x 10	2000	17.80	2690	4310	5610	3564	5711	7433		

Ampacity table Aluminum bar based on the ΔT temperature increase as per standard DIN 43670
Reference room temperature 35°C

SOLID ALUMINUM BARS



Dimensions	Cross-section mm²	Kg/mt	Number of bars in parallel					
			ΔT 30°C			ΔT 50°C		
20 x 10	200	0.54	331	643	942	434	842	1234
30 x 10	300	0.81	445	832	1200	583	1090	1572
40 x 10	400	1.08	557	1030	1460	730	1349	1913
50 x 10	500	1.35	667	1210	1710	874	1585	2240
60 x 10	600	1.62	774	1390	1940	1006	1807	2522
80 x 10	800	2.16	983	1720	2380	1278	2236	3094
100 x 10	1000	2.7	1190	2050	2790	1547	2665	3627
120 x 10	1200	3.24	1390	2360	3200	1807	3068	4160

BOC - Direct hook-up distribution block on copper busbars



Brass distribution block for 5- and 10-mm thick copper bars.

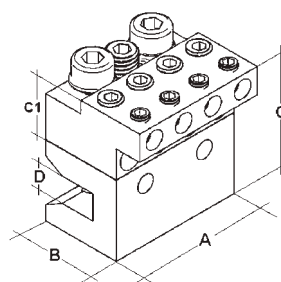
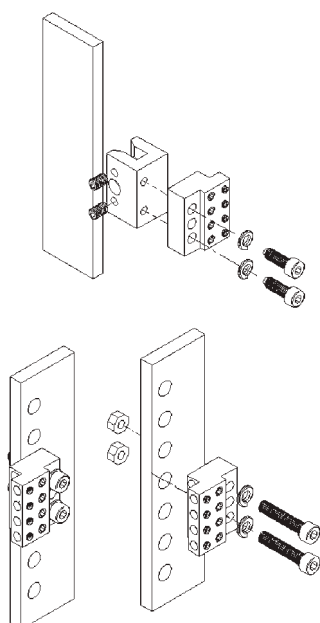
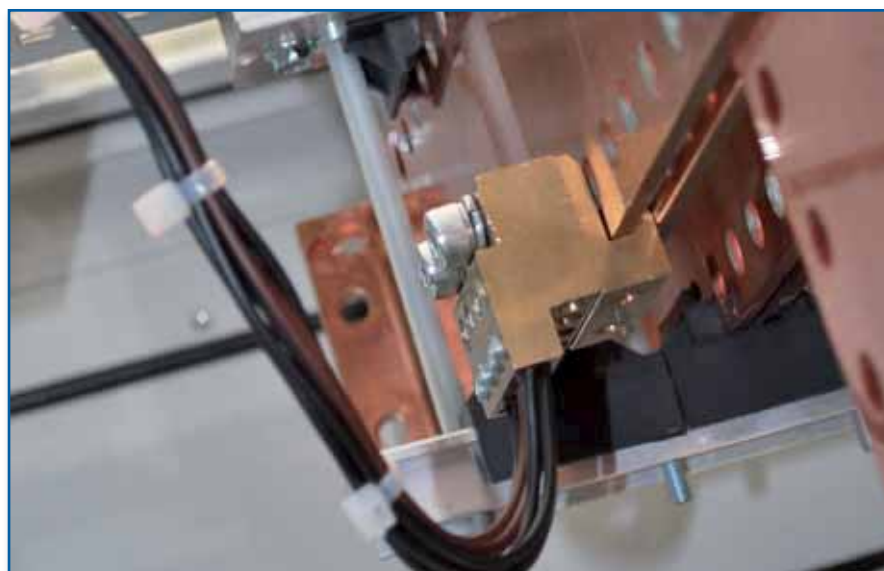
Made of:

- 1) no-punching connection unit on solid copper bar
- 2) 8-output distribution block unit 2.5 to 25 sq.mm cable sect. (direct connection on 25-mm pitch prepunched bars) made of brass with hexagonal tightening screws

ADVANTAGES

The connection unit can be used as a guide to make punching the 5- and 10-mm thick bars easier.

Spacing two or three prepunched bars becomes simple using the connection unit as a guide. Simple and quick derivations with cables up to 16 and/or 25 sq.mm (terminal lug) which can be used up to 400 A.



Use with solid bar:

Use both the units; no punching needed to fit the connection unit directly on the bar side.

Use with prepunched bar:

Use only the distribution block unit on single bar phase systems.

Use both units on multi bar phase systems.

Code	Reference		Weight Kg	A	B	C	D	Nm
BOC1000	BOC RIP 8 *	12	0.22	50	30	12.5-C1	-	
BOC1005	BOC KIT 8 - 5 **	12	0.39	50	30	37	5	10
BOC1010	BOC KIT 8 - 10 **	12	0.51	50	30	52	10	10

* BOC RIP 8

8-output distribution block unit

** BOC KIT 8 - 5

8-output distribution block unit + connection unit on 5-mm thick bar

** BOC KIT 8 - 10

8-output distribution block unit + connection unit on 10-mm thick bar

Code	Outputs	Stripped cable sect. mm²	Cable sect. with ferrule mm²	Nr. outputs	Nm
BOC1000	← OUT	2.5 ÷ 25	2.5 ÷ 16	4	3
	← OUT	4 ÷ 35	4 ÷ 25	4	3.5

Connectors for busbars

Terminals for cable

These allow direct connection of a flexible cable, previously stripped, up to the 120 sq.mm cross-section on 5- and 10-mm thick solid copper bars without having to punch them and to use the relevant lug on the cable. The stripped cable is fitted and tightened on the bar by a metal plate, thus preventing the wires to break. Easy and quick to use, they allow interventions on already fitted bar systems without having to dismantle them to perform the relevant punching.

Compliant with standard EN 60998-1:2004 European directive 2006/95/EC Low Voltage equipment Directive RoHS.

TECHNICAL FEATURES

Terminals

Passivated galvanized steel

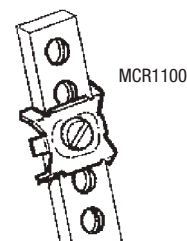
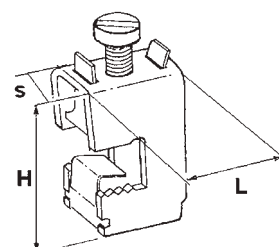
Connections on copper bars 5 and 10 mm thick

Used cable cross-sections: from 1.5 to 120 sq.mm

Screwdriver head for sect. 16 and 35 sq.mm



Code	Reference		H mm	L mm	S mm	Cable cross- section mm²	 Nm	
Terminals for 5-mm thick bars								
MCR1000	MCR 5x16		10	26	22	12	1,5 ÷ 16	3
MCR1005	MCR 5x35		10	31	29	16	16 ÷ 35	6 ÷ 8
MCR1010	MCR 5x70		10	39	31	21	35 ÷ 70	10 ÷ 12
MCR1015	MCR 5x120		10	44	34	24	70 ÷ 120	12 ÷ 15
Terminals for 10-mm thick bars								
MCR1020	MCR 10x16		10	31	22	12	1,5 ÷ 16	3
MCR1025	MCR 10x35		10	37	29	16	16 ÷ 35	6 ÷ 8
MCR1030	MCR 10x70		10	43	31	21	35 ÷ 70	10 ÷ 12
MCR1035	MCR 10x120		10	48	34	24	70 ÷ 120	12 ÷ 15
Spider connector for threaded bars								
MCR1100	MCR 4xM5		100	for 12x4 and 12x5 mm threaded bars				



Busbar clamps for solid and flexible bars

These allow direct connection, without punching and bolting, between rigid copper bar systems or with insulated flexible bars. Easy and quick to use, they allow interventions on already fitted bar systems without having to dismantle them to perform the relevant punching.

Busbar clamps

Electrolytic galvanized steel

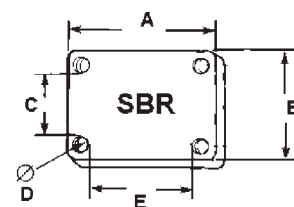
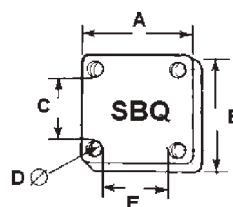
Max. tightening thickness 20 mm

(with supplied screws)

Plate thickness 5 mm



Code	Reference		E mm	C mm	A mm	B mm	Ø / D mm	 Nm	
SBR1000	SBR 50x24		4	52	26	77	51	8.5-M8	1 ÷ 2
SBR1005	SBR 50x32		4	52	34	77	59	8.5-M8	1 ÷ 2
SBR1010	SBR 50x40		4	52	42	77	67	8.5-M8	1 ÷ 2
SBR1015	SBR 80x24		4	82	26	107	51	8.5-M8	1 ÷ 2
SBR1020	SBR 80x32		4	82	34	107	59	8.5-M8	1 ÷ 2
SBR1025	SBR 80x50		4	82	52	107	77	8.5-M8	1 ÷ 2
SBQ1000	SBQ 30x30		4	32	32	53	53	6.5-M6	1 ÷ 2
SBQ1005	SBQ 40x40		4	42	42	63	63	6.5-M6	1 ÷ 2
SBQ1010	SBQ 50x50		4	52	52	77	77	8.5-M8	1 ÷ 2
SBQ1015	SBQ 63x63		4	65	65	90	90	8.5-M8	1 ÷ 2
SBQ1020	SBQ 80x80		4	82	82	115	115	10.5-M10	1 ÷ 2
SBQ1025	SBQ 100x100		4	102	102	135	135	10.5-M10	1 ÷ 2



Bimetallic (CU-AL) sheets and washers

SHEET

Code	Reference		A mm	B mm	Thickness mm	
PBM1000	PBM 100x100		10	100	100	1.0



WASHERS

Code	Reference		ØD1 mm	ØD2 mm	Thickness mm
PBM2000	RBM M6	100	15	6.5	1.0
PBM2005	RBM M8	100	18	8.5	1.0
PBM2010	RBM M10	50	22	10.5	1.5
PBM2015	RBM M12	50	25	12.5	2.0

For connections between Copper and Aluminum

