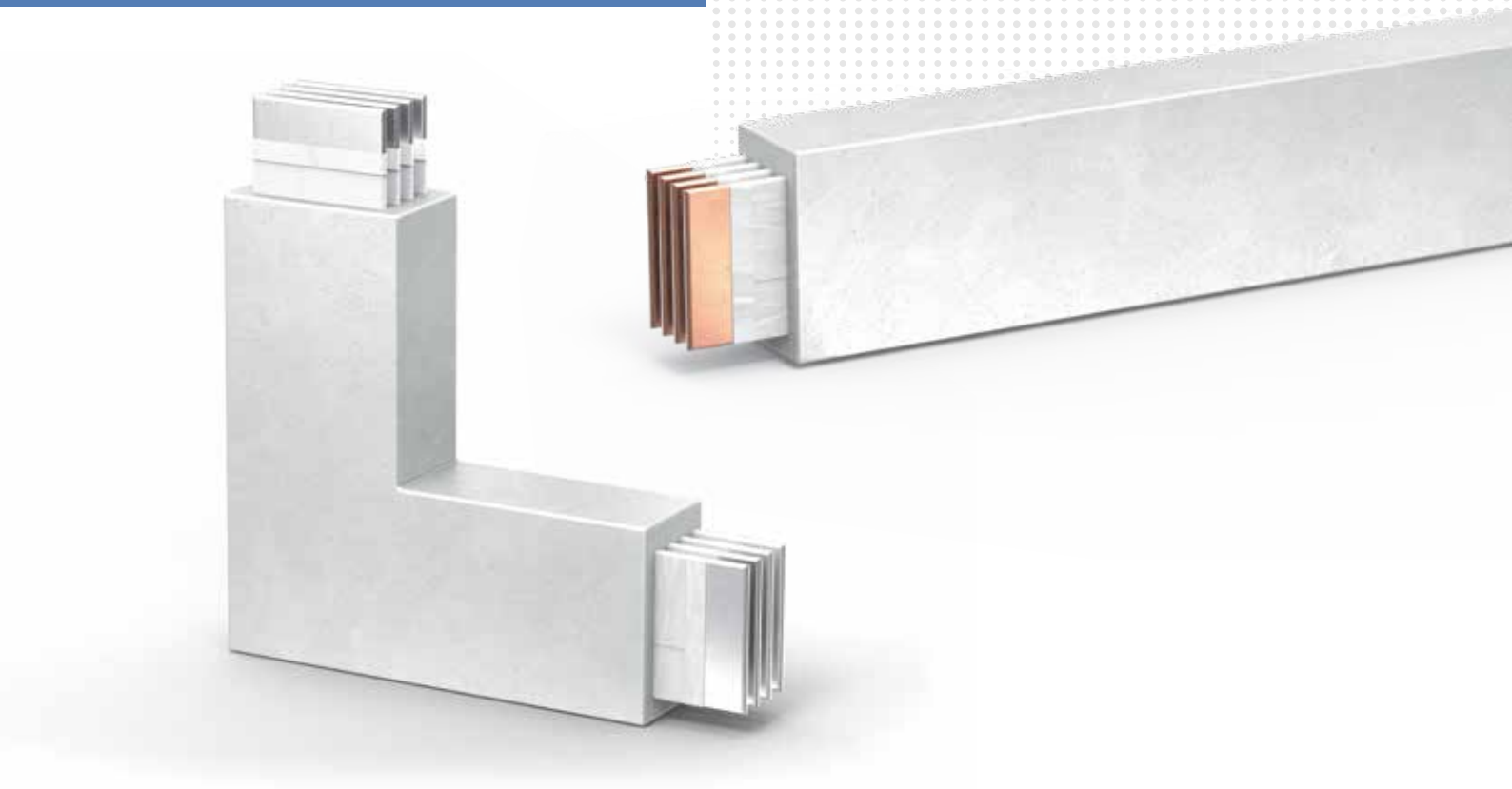
IP68 RCP

RESIN BUSBAR SOLUTIONS FOR ELECTRIC DISTRIBUTION



GLOBAL SPECIALIST IN ELECTRICAL
AND DIGITAL BUILDING INFRASTRUCTURE

legrand®

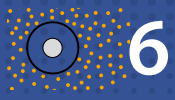
IP68 RCP RESIN busbar trunkings

RCP IP68 RESIN BUSBAR

New resin busbar RCP with range from 630 A to 6300 A and IP68 degree of protection represents the completion of the solution for the **transport** of high-power energy.
This new product is made with internal conductors in aluminium or copper and completly embedded **in a epoxy resin**, which provides mechanical strength and electrical insulation. With RCP is possible to provide specific solutions in different environments (outdoor and indoor) where it isn't possible to reach with busbar IP55.

DEGREE OF PROTECTION
IP68

1ST DIGIT IP
Protection against penetration of solid bodies



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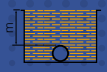
Complete protection against dust

2ND DIGIT IP
Protection against penetration of liquids



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Protection against effects of immersion under pressure

(At maximum of 1m, as comply by standard EN 61439-6)

BUSBAR TRUNKING

- Resin built-in conductors.
- Insulations of single conductors in polyester film.
- Fully insulated with epoxy resin.
- Rated current between 630 - 6300 A.
- Insulation voltage up to 1000 V.
- Small dimensions.
- Maintenance free.
- Only for Transport of energy.

CONDUCTOR MATERIAL

- Copper: copper busbars with a purity greater than 99.9% .
- Aluminium: aluminium alloy busbars, with entire surface treated with different galvanic processes.
- Degree of protection: IP68 according to the EN 61439-6.

A SOLUTION ADAPTS TO INDOOR AND OUTDOOR INSTALLATIONS

The **RPC IP68** resin busbar trunking system is a solution mainly for outdoor in extreme conditions such as humidity, corrosion or saline mist environments and temporary immersion risks.

Typical applications

The typical applications of IP68 busbar trunkings are:

- outdoor (in different extreme conditions).
- industrial plants.
- petrochemical plants.
- chemical plants (*).
- in areas with risk of flooding.

(*) attention at chemical components which are not compatible with the busbar's resin (look the table on page 14).

RANGE features

Main features of the busbar trunking

The main features of these busbar trunkings are:

- IP68 degree of protection
- Mechanical Impact: IK10
- Temporary immersion conditions up to 1 meter
- Excellent resistance to chemicals (mainly used in petrochemical and chemical industry)
- Compliance with the IEC 61439-6 standard
- Continuity of service in the case of fire, IEC 60331-1:2009 (min 830°C – 120 min. operating continuity requested) Aluminium = 150 min. Copper = 240 min.
- Resistant against fungi, animals, insects,rodents
- UV-resistance
- No chimney effect
- Tropical and sea climate resistant

CERTIFICATIONS AND TESTS

The IP68 busbar trunkings have been tested and approved according to IEC 61439-6 Low voltage switchgear and controlgear assemblies.
Part 6 is refer to Busbar trunking systems (busways)

CONSTRUCTION features

COMPLETE AND INTEGRABLE SOLUTION

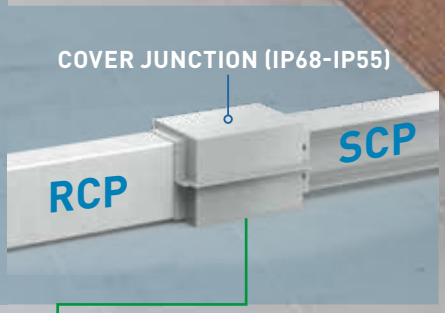
RCP IP68 is a complete product that includes the most useful shapes to adapt to the clients and projects requirements. What is more RCP IP68 is completely compatible with the SCP IP55 product.

FAST AND SIMPLE CONNECTION

The junction between the various system components is made by a monobloc which is inserted between the phases of the components to be connected. To guarantee electrical insulation, the mechanical installation rigidity and the IP68 degree of protection, the connection is immersed in a epoxy resin which hardens to offer the correct robustness.

IP55 - IP68 INTEGRATION

The IP68 busbar trunkings can be used in hybrid systems where different degree of protection are required. It is possible to connect the IP68 RCP resin busbar trunkings with IP55 SCP busbar trunkings using a specific adjustment accessory called cover junction.

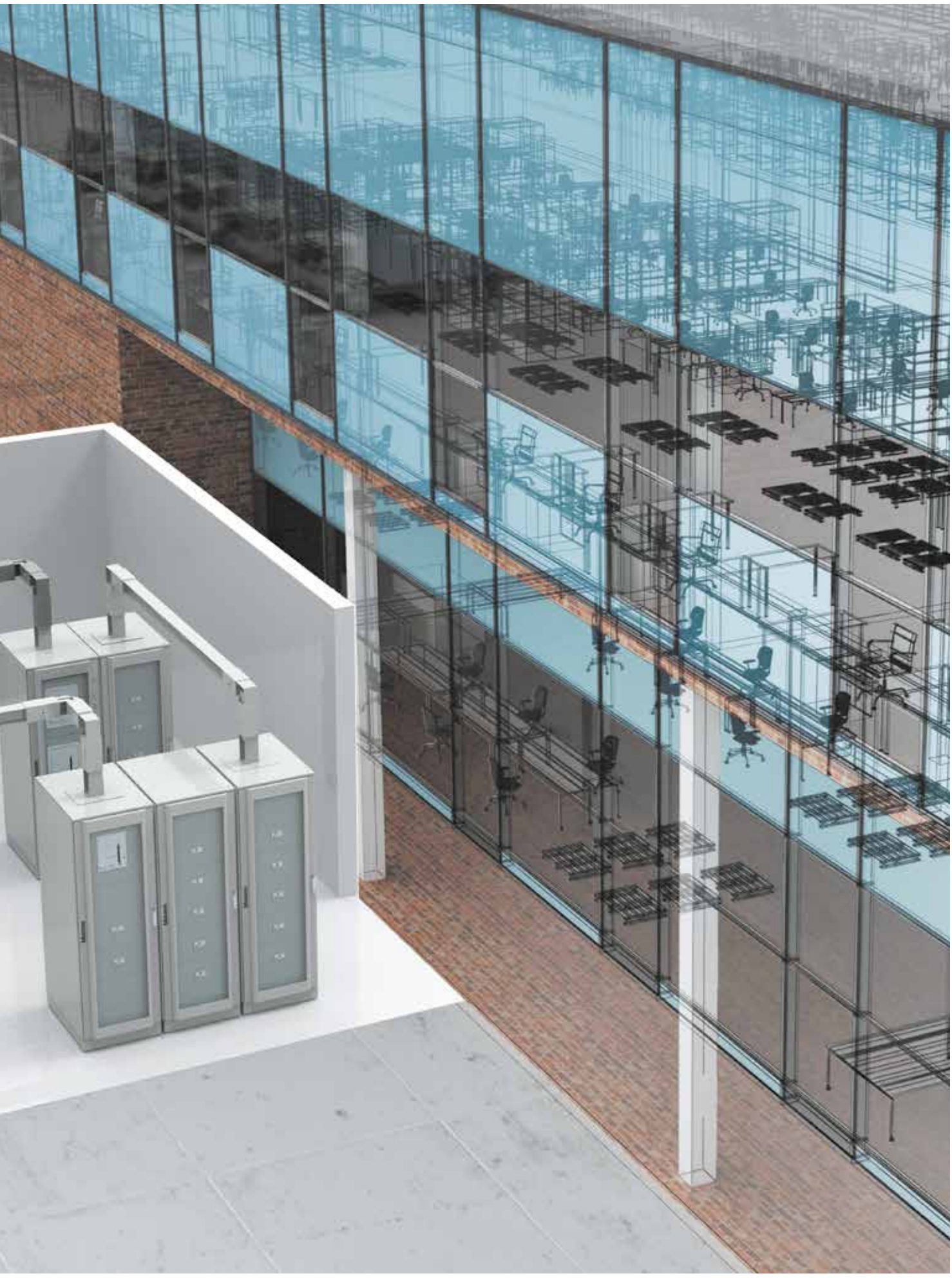


Outdoor: IP68 RCP resin busbar trunking

Indoor: IP55 SCP busbar trunking

Fire barrier

Note:
How to close a junction between two elements of RCP and the necessary accessories, please contact Legrand.



RANGE COMPOSITION

STRAIGHT ELEMENT

VERTICAL ELBOW

HORIZONTAL ELBOW

CONNECTION INTERFACE

COVER JUNCTION IP68-IP55

DOUBLE VERTICAL ELBOW

DOUBLE HORIZONTAL ELBOW

DOUBLE ELBOW
HORIZONTAL + VERTICAL

CONNECTION INTERFACE
+ HORIZONTAL ELBOW

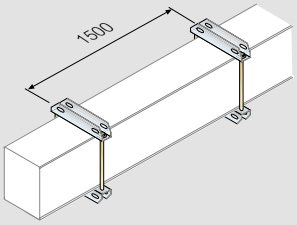
Others elements on request

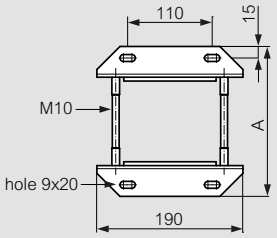
FIXING ACCESSORIES

HORIZONTAL SUSPENSION BRACKET

The brackets enable sturdy installation of the busbar
to the system support structures
The recommended installation distance between brackets is 1.5 metres

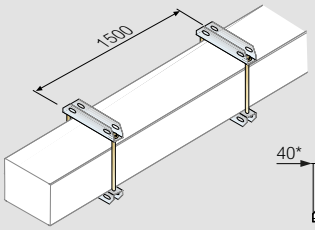
Edgewise installation

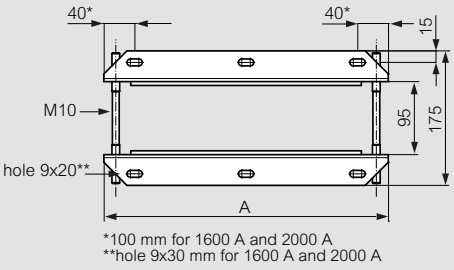




In (A)	A (mm)	
	Al	Cu
630	195	-
800	230	195
1000	230	230
1250	240	230
1600	280	270
2000	325	280
2500	380	320
3200	460	440
4000	550	460
5000	-	540

Flat installation



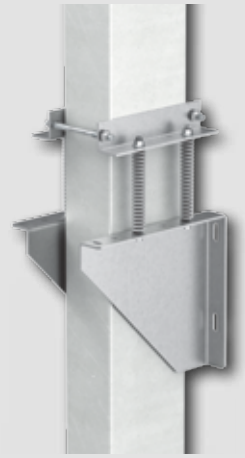


*100 mm for 1600 A and 2000 A
**hole 9x30 mm for 1600 A and 2000 A

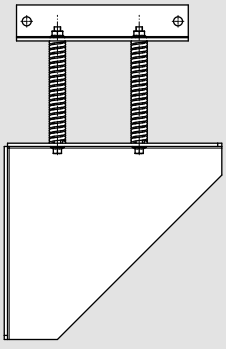
In (A)	A (mm)	
	Al	Cu
630	190	-
800	315	190
1000	315	315
1250	315	315
1600	315	315
2000	315	315
2500	370	315
3200	430	430
4000	530	430
5000	-	530

VERTICAL SUSPENSION BRACKET

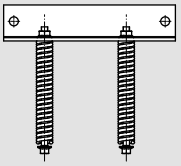
In case of rising mains, thanks to pre-loaded springs, these brackets absorb the forces pressing on the busbar and direct any expansion in a precise direction. They therefore operate as a limitation, and support the traction and compression forces of the busbar trunking system



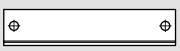
3 types of vertical brackets



1. with shelf and springs



2. with springs



3. bracket only

TECHNICAL DATA

RCP IP68 - version 4 conductors (Aluminium)

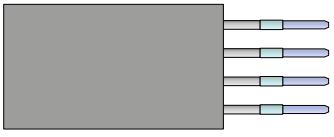
		SINGLE BAR						DOUBLE BAR			2 x 2500 DOUBLE BARS
Rated current of the BTS (ASSEMBLY as stated in 61439-1)	InA [A]	**630**	**800**	**1000**	**1250**	**1600**	**2000**	**2500**	**3200**	**4000**	**5000**
Overall dimension of the busbars	L x H [mm]	95x115	95x150	95x150	95x160	95x200	95x245	95x300	95x380	95x470	2x95x300
Overall dimension of the junction	L x H [mm]	160x180	160x180	160x180	160x180	160x220	160x270	160x350	160x430	160x490	2x160x350
Rated operational voltage	U_e [V]	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Rated insulation voltage	U_i [V]	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Frequency	f [Hz]	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60
Rated short-time current (1 s)	I_{CW} [kA]$_{rms}$	30	36	36	50	50	60	80	100	100	100
Peak current	I_{pk} [kA]	63	76	76	105	105	132	176	220	220	220
Rated short-time current of the neutral bar (1 s)	I_{CW} [kA]$_{rms}$	18	22	22	30	30	36	48	60	60	60
Peak current of the neutral bar	I_{pk} [kA]	36	45	45	63	63	76	101	132	132	132
Rated short-time current of the protective circuit (1 s)	I_{CW} [kA]$_{rms}$	18	22	22	30	30	36	48	60	60	60
Peak current of the protective circuit	I_{pk} [kA]	36	45	45	63	63	76	101	132	132	132
Average phase resistance at 20°C	R_{20} [mΩ/m]	0,082	0,061	0,061	0,049	0,035	0,027	0,024	0,017	0,013	0,012
Average phase reactance	X [mΩ/m]	0,055	0,049	0,049	0,031	0,037	0,030	0,023	0,017	0,010	0,007
Average phase impedance	Z [mΩ/m]	0,098	0,078	0,078	0,058	0,051	0,040	0,033	0,024	0,017	0,014
Average phase resistance at thermal conditions	R [mΩ/m]	0,093	0,070	0,076	0,062	0,043	0,034	0,029	0,022	0,018	0,017
Average phase impedance at thermal conditions	Z [mΩ/m]	0,108	0,086	0,091	0,069	0,057	0,046	0,037	0,028	0,021	0,018
Average Neutral resistance	R_{20} [mΩ/m]	0,082	0,061	0,061	0,049	0,035	0,027	0,024	0,017	0,013	0,012
Average Resistance of the protective bar (PE 1)	R_{PE} [mΩ/m]	0,124	0,105	0,105	0,105	0,105	0,105	0,052	0,052	0,052	0,026
Average reactance of the protective bar	X_{PE} [mΩ/m]	0,080	0,078	0,078	0,048	0,039	0,028	0,020	0,015	0,016	0,013
Average resistance of the fault loop (PE 1)	R_o [mΩ/m]	0,205	0,165	0,165	0,153	0,139	0,132	0,077	0,070	0,066	0,038
Average reactance of the fault loop	X_o [mΩ/m]	0,14	0,13	0,13	0,08	0,08	0,06	0,04	0,03	0,03	0,02
Average impedance of the fault loop (PE 1)	Z_o [mΩ/m]	0,246	0,209	0,209	0,173	0,159	0,144	0,088	0,077	0,071	0,043
Zero-sequence short-circuit average resistance phase - N	R_o [mΩ/m]	0,306	0,257	0,257	0,238	0,172	0,140	0,107	0,080	0,070	0,060
Zero-sequence short-circuit average reactance phase - N	X_o [mΩ/m]	0,174	0,160	0,160	0,128	0,106	0,108	0,083	0,073	0,060	0,056
Zero-sequence short-circuit average impedance phase - N	Z_o [mΩ/m]	0,352	0,303	0,303	0,270	0,202	0,177	0,135	0,108	0,092	0,082
Zero-sequence short-circuit average resistance phase - PE	R_o [mΩ/m]	0,581	0,519	0,519	0,369	0,321	0,270	0,217	0,196	0,164	0,149
Zero-sequence short-circuit average reactance phase - PE	X_o [mΩ/m]	0,263	0,229	0,229	0,191	0,175	0,212	0,155	0,148	0,146	0,142
Zero-sequence short-circuit average impedance phase - PE	Z_o [mΩ/m]	0,638	0,567	0,567	0,416	0,366	0,343	0,267	0,246	0,220	0,206
Voltage drop with load at the end of the line (b=1) ΔV [V/m/A]10^{-6}	cosφ = 0,70	183,2	147,5	154,6	114,9	98,8	79,4	64,7	48,1	34,5	29,0
	cosφ = 0,75	186,4	149,2	156,8	117,5	99,2	79,6	65,2	48,4	35,2	29,8
	cosφ = 0,80	188,7	150,2	158,3	119,7	99,1	79,5	65,4	48,6	35,7	30,5
	cosφ = 0,85	190,0	150,2	158,8	121,3	98,2	78,7	65,0	48,3	36,0	31,1
	cosφ = 0,90	189,5	148,7	157,8	121,8	96,1	77,0	64,0	47,6	36,1	31,4
	cosφ = 0,95	186,0	144,4	154,0	120,7	92,0	73,6	61,7	45,9	35,5	31,4
	cosφ = 1,00	164,5	124,1	134,2	109,4	75,8	60,4	51,8	38,6	31,7	29,0
Weight (RCP Standard)	p [kg/m]	29,2	35,4	35,4	37,5	46,9	57,6	72,7	91,2	110,3	2x72,7
Weight (PE 1)	p [kg/m]	29,9	36,3	36,3	38,4	47,8	58,5	74,5	93,0	112,1	2x74,5
Fire load	[kWh/m]	4,5	5,5	5,5	6,0	8,5	10,5	16,0	19,0	21,0	22,0
Degree of protection	IP	68	68	68	68	68	68	68	68	68	68
Insulation material thermal resistance class		B/F*	B/F*	B/F*	B/F*	B/F*	B/F*	B/F*	B/F*	B/F*	B/F*
Losses for the Joule effect at nominal current	P [W/m]	111	135	229	291	331	412	552	674	865	1239
Ambient temperature min/MAX	[°C]	-5/35**	-5/35**	-5/35**	-5/35**	-5/35**	-5/35**	-5/35**	-5/35**	-5/35**	-5/35**

* Class F available under request
** From 35°C it might be necessary to derate the busbar and for ambient temperatures under -5°C contact the tecnical support.

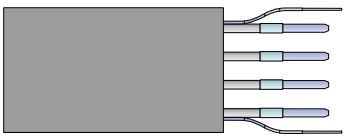
General correction factor for amb. temperatures different from 40°C (kt)							
Ambient temperature	**15°C**	**20°C**	**25°C**	**30°C**	**35°C**	**40°C**	**45°C**	**50°C**
kt factor	1,15	1,12	1,08	1,05	1,025	1	0,975	0,95

4P - (3P+N) without earth
4P - (3P+N)+Pe1

Available on request, versions with internal conductors:
- 3P / 3P+(Pe1)
- 5P / 5P+(Pe1)
- 2N / 2N+(Pe1)



RCP 4P - (3P+N) without earth (standard version)



RCP 4P+Pe - (3P+N)+Pe1

RCP IP68 - version 4 conductors (Copper)

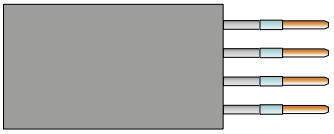
		SINGLE BAR						DOUBLE BAR			2 x 2500 DOUBLE BARS
Rated current	In [A]	**800**	**1000**	**1250**	**1600**	**2000**	**2500**	**3200**	**4000**	**5000**	**6300**
Overall dimension of the busbars	L x H [mm]	95x115	95x150	95x150	95x190	95x200	95x240	95x360	95x380	95x460	2x95x360
Overall dimension of the junction	L x H [mm]	160x180	160x180	160x180	160x220	160x220	160x270	160x430	160x430	160x490	2x160x430
Rated operational voltage	U_e [V]	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Rated insulation voltage	U_i [V]	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Frequency	f [Hz]	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/60	50/61
Rated short-time current (1 s)	I_{CW} [kA]$_{rms}$	45	45	45	65	65	80	100	100	100	100
Peak current	I_{pk} [kA]	95	95	95	143	143	176	220	220	220	220
Rated short-time current of the neutral bar (1 s)	I_{CW} [kA]$_{rms}$	27	27	27	39	39	48	60	60	60	60
Peak current of the neutral bar	I_{pk} [kA]	57	57	57	82	82	101	132	132	132	132
Rated short-time current of the protective circuit (1 s)	I_{CW} [kA]$_{rms}$	27	27	27	39	39	48	60	60	60	60
Peak current of the protective circuit	I_{pk} [kA]	57	57	57	82	82	101	132	132	132	132
Average phase resistance at 20°C	R_{20} [mΩ/m]	0,040	0,031	0,031	0,023	0,018	0,014	0,011	0,009	0,007	0,006
Average phase reactance	X [mΩ/m]	0,055	0,049	0,049	0,045	0,037	0,030	0,023	0,017	0,010	0,007
Average phase impedance	Z [mΩ/m]	0,068	0,058	0,058	0,050	0,041	0,033	0,026	0,019	0,012	0,009
Average phase resistance at thermal conditions	R [mΩ/m]	0,045	0,037	0,039	0,028	0,023	0,018	0,014	0,012	0,009	0,007
Average phase impedance at thermal conditions	Z [mΩ/m]	0,071	0,061	0,063	0,053	0,044	0,035	0,027	0,021	0,013	0,010
Average Neutral resistance	R_{20} [mΩ/m]	0,040	0,031	0,031	0,023	0,018	0,014	0,011	0,009	0,007	0,006
Average Resistance of the protective bar (PE 1)	R_{PE} [mΩ/m]	0,124	0,105	0,105	0,105	0,105	0,105	0,052	0,052	0,052	0,026
Average reactance of the protective bar	X_{PE} [mΩ/m]	0,054	0,054	0,054	0,044	0,044	0,032	0,022	0,017	0,016	0,014
Average resistance of the fault loop (PE 1)	R_o [mΩ/m]	0,163	0,136	0,136	0,127	0,123	0,119	0,064	0,062	0,059	0,032
Average reactance of the fault loop	X_o [mΩ/m]	0,11	0,10	0,10	0,09	0,08	0,06	0,05	0,03	0,03	0,02
Average impedance of the fault loop (PE 1)	Z_o [mΩ/m]	0,196	0,170	0,170	0,155	0,148	0,134	0,078	0,070	0,065	0,038
Zero-sequence short-circuit average resistance phase - N	R_o [mΩ/m]	0,170	0,155	0,155	0,115	0,120	0,098	0,083	0,071	0,062	0,054
Zero-sequence short-circuit average reactance phase - N	X_o [mΩ/m]	0,159	0,151	0,151	0,114	0,098	0,065	0,056	0,055	0,042	0,038
Zero-sequence short-circuit average impedance phase - N	Z_o [mΩ/m]	0,233	0,216	0,216	0,162	0,155	0,118	0,100	0,090	0,075	0,066
Zero-sequence short-circuit average resistance phase - PE	R_o [mΩ/m]	0,507	0,429	0,429	0,331	0,283	0,221	0,177	0,178	0,144	0,132
Zero-sequence short-circuit average reactance phase - PE	X_o [mΩ/m]	0,201	0,177	0,177	0,143	0,150	0,124	0,111	0,094	0,086	0,075
Zero-sequence short-circuit average impedance phase - PE	Z_o [mΩ/m]	0,545	0,464	0,464	0,361	0,320	0,253	0,209	0,201	0,168	0,152
Voltage drop with load at the end of the line ΔV [V/m/A]10^{-6}	cosφ = 0,70	123,4	105,7	108,8	90,7	74,6	59,3	45,4	35,6	23,5	17,9
	cosφ = 0,75	122,4	104,5	107,8	89,1	73,3	58,2	44,5	35,1	23,3	17,9
	cosφ = 0,80	120,5	102,5	106,0	86,8	71,4	56,6	43,2	34,4	23,1	17,8
	cosφ = 0,85	117,4	99,5	103,3	83,6	68,8	54,4	41,5	33,3	22,6	17,6
	cosφ = 0,90	112,7	95,0	99,0	79,0	65,0	51,2	39,1	31,6	21,8	17,1
	cosφ = 0,95	104,9	87,7	92,0	71,9	59,2	46,4	35,4	29,0	20,4	16,3
	cosφ = 1,00	79,1	64,4	68,9	50,1	41,2	31,8	24,2	20,9	15,8	13,1
Weight (RCP Standard)	p [kg/m]	41,1	50,4	50,4	65,1	71,4	89,0	127,0	141,0	173,6	2x127
Weight (PE 1)	p [kg/m]	41,9	51,3	51,3	66,0	72,3	89,9	128,8	142,8	175,4	2x128,8
Fire load	[kWh/m]	4,5	5,5	5,5	8,0	8,2	10,5	16,0	19,0	21,0	24,0
Degree of protection	IP	68	68	68	68	68	68	68	68	68	68
Insulation material thermal resistance class		B/F*	B/F*	B/F*	B/F*	B/F*	B/F*	B/F*	B/F*	B/F*	B/F*
Losses for the Joule effect at nominal current	P [W/m]	86	110	184	219	281	339	422	570	675	890
Ambient temperature min/MAX	[°C]	-5/35**	-5/35**	-5/35**	-5/35**	-5/35**	-5/35**	-5/35**	-5/35**	-5/35**	-5/35**

* Class F available under request
** From 35°C it might be necessary to derate the busbar and for ambient temperatures under -5°C contact the tecnical support.

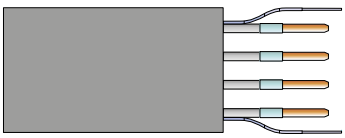
General correction factor for amb. temperatures different from 40°C (kt)							
Ambient temperature	**15°C**	**20°C**	**25°C**	**30°C**	**35°C**	**40°C**	**45°C**	**50°C**
kt factor	1,15	1,12	1,08	1,05	1,025	1	0,975	0,95

4P - (3P+N) without earth
4P - (3P+N)+Pe1

Available on request, versions with internal conductors:
- 3P / 3P+(Pe1)
- 5P / 5P+(Pe1)
- 2N / 2N+(Pe1)



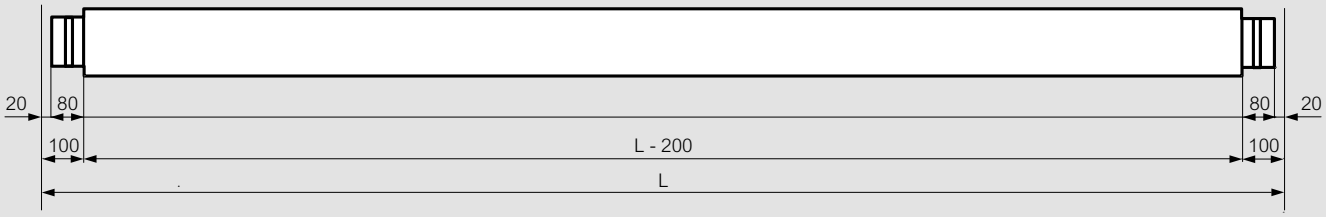
RCP 4P - (3P+N) without earth (standard version)



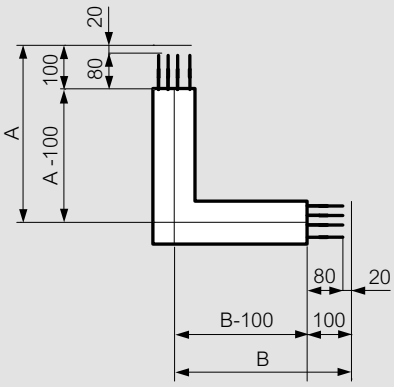
RCP 4P+Pe - (3P+N)+Pe1

DIMENSIONAL DATA

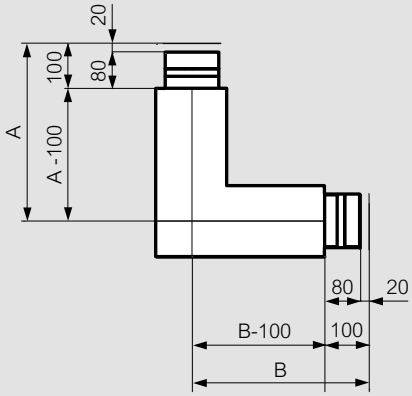
STRAIGHT ELEMENT



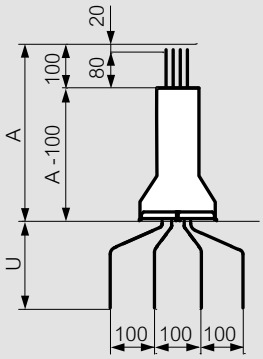
HORIZONTAL ELBOW



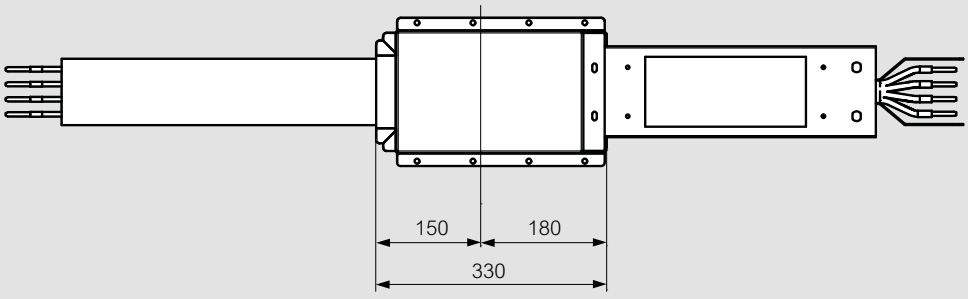
VERTICAL ELBOW

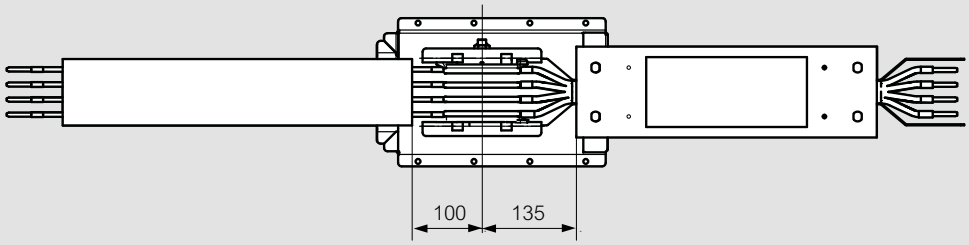


CONNECTION INTERFACE



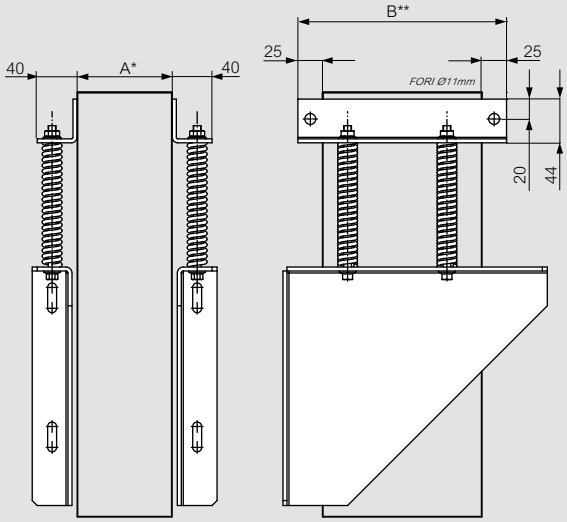
COVER JUNCTION IP68-IP55



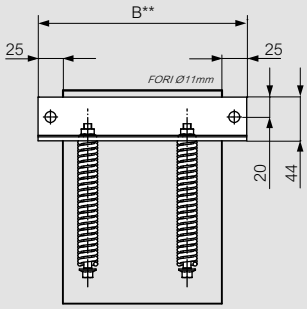


DIMENSIONAL DATA

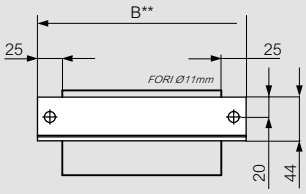
VERTICAL SUSPENSION BRACKET



1. with shelf and springs



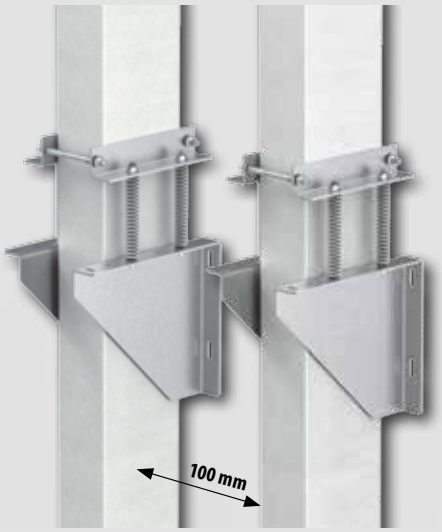
2. with springs



3. bracket only

A*: Depending of the quantity of requested conductors
B:** Depending of the rating of busbar

MATERIAL	RATING (A)	QUANTITY OF SPRINGS	WEIGHT HOLDING CAPACITY (KG)
AL	630	4	300
	800	4	300
	1000	4	300
	1250	4	300
	1600	6	300
	2000	8	600
	2500	8	600
	3200	12	600
	4000	12	600
CU	800	4	300
	1000	4	300
	1250	4	300
	1600	6	300
	2000	6	300
	2500	8	600
	3200	8	600
	4000	12	600
	5000	12	600



For the case of 5000 A (Al) and 6300 A (Cu), please, consider the following indications:

- Vertical solution (only one)
in the picture is shown how is possibile to realize the vertical solution for these two ranges 5000 A (Al) and 6300 A (Cu);
Respect the distance of 100 mm between two busbars;

- Necessary brackets
RCP 5000 A (Al) = consider 2 brackets of 2500 A (Al)
RCP 6300 A (Cu) = consider 2 brackets of 3200 A (Cu)

TABLE OF CHEMICAL RESISTANCE OF RCP RESIN

Chemical	Resistance		Resistance
Boric Acid	(+)	Glycerol	(+)
Hydrochloric Acid 10%	(-)	Greases and Lubrificating Oils	(+)
Citric Acid	(+)	Greases and Oils	(+)
Lactic Acid	(+)	Vegetal Oils	(+)
Ethly Alcohol	(0)	Aliphatic Hydrocarbons	(+)
Beer	(+)	Aromatics Hydrocarbons	(-)
Acotone	(-)	Carbon Tetrachloride	(-)
Calcium Chloride	(+)	Ammonia	(+)
Combustible Liquid	(+)	Milk	(+)
Water	(+)	Sodium Hydroxide 10%	(+)
Ester	(+) / (0)	Soap	(+)
Ether	(-)	Sugar	(+)
Formalian 30%-40%	(+)	Urine	(+)

SPECIFIC TEST OF PROLONGED IMMERSION IN DIFFERENT CHEMICAL AGENT AT AMBIENT TEMPERATURE

Chemical agent	After 15 days	After 30 days
Solution Hydrochloric Acid 10%	(-)	(-)
Solution NaOH 10%	(+)	(+) / (0)
Gasoline	(+)	(+)
Fuel (Diesel)	(+)	(+)
Antifreeze	(+) / (0)	(+) / (0)
DBE (Di Basic Esther)	(0)	(0) / (-)

(+) - Cast Resin is resistant to chemical

(0) - Cast Resin is partially resistant to chemical

(-) - Cast Resin is not much resistant or for nothing resistant to chemical

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