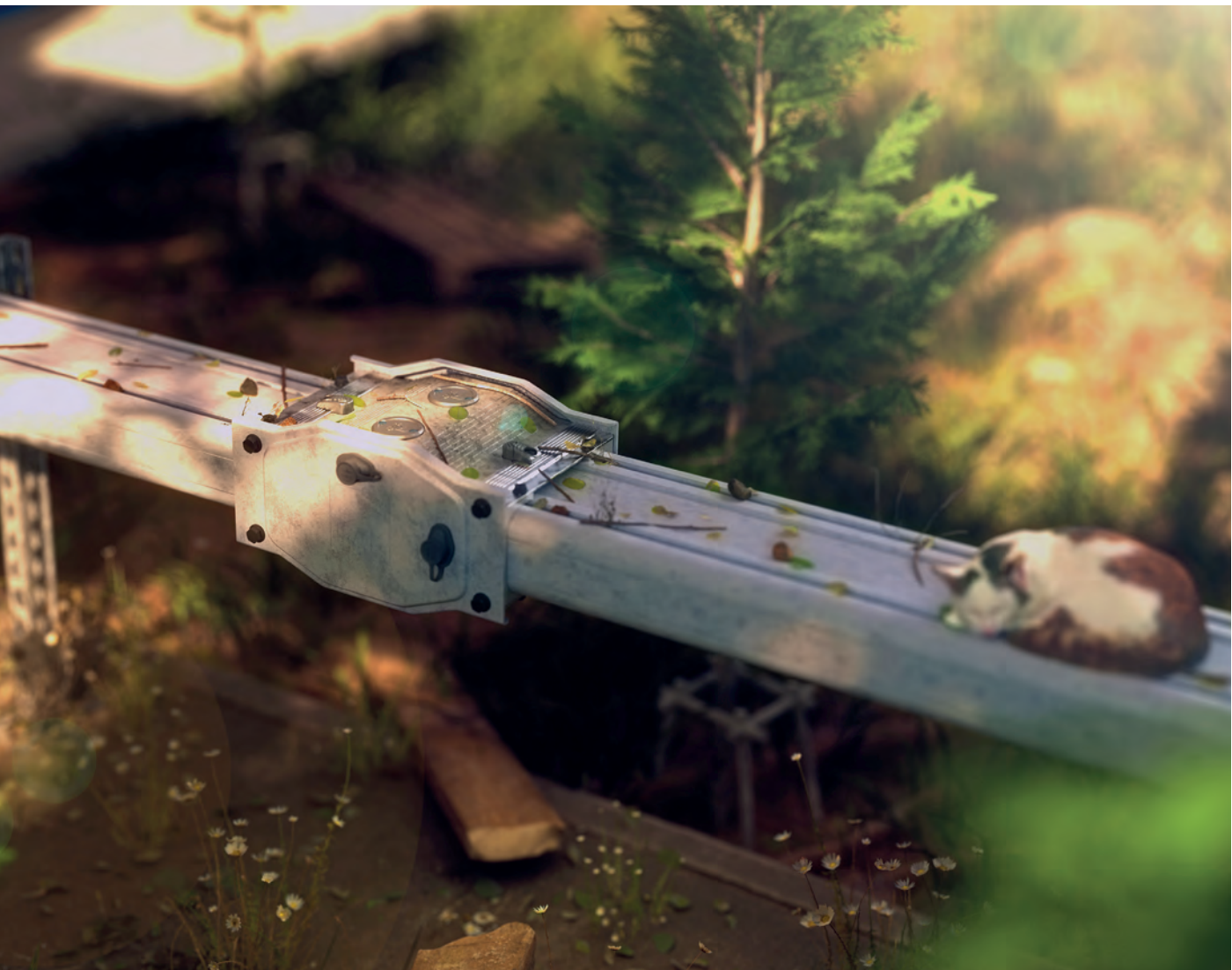




E-LINE CCR

Busbar Systems 600A...6300A



E-LINE CCR

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www.eaelectric.com



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E-LINE CCR

►► Introduction



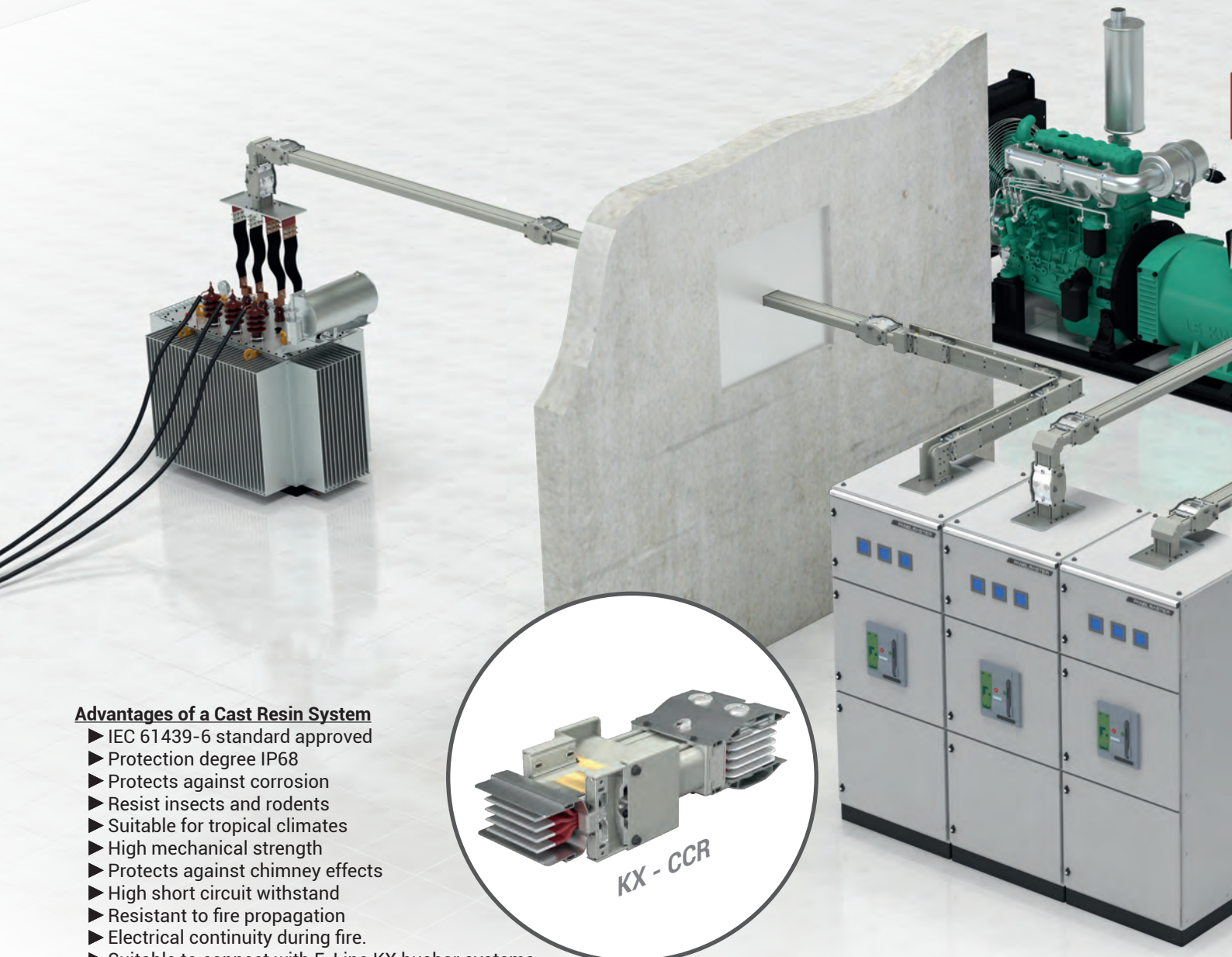
Traditionally, carrying high currents (transformer to switchboards, main distribution lines, power distribution for factories) was achieved using multiples of large cross-section cables in parallel. In order to support these cables in the buildings, there were used a lot of cable trays, cable ladders, under-floor cable channels, etc.

Using "Cast Resin Busbars" in outdoor environments, gallery transitions, chemical plants, harbour applications, tunnels instead of cables that are applied as mandatory offers many advantages.

Safe and Easy Installation

Detachable IP 68 Ext.

Due to alignment piece on the joint point, block joint element and busbar tray are aligned. This makes installation easier and correct on the right axes.



Advantages of a Cast Resin System

- IEC 61439-6 standard approved
- Protection degree IP68
- Protects against corrosion
- Resist insects and rodents
- Suitable for tropical climates
- High mechanical strength
- Protects against chimney effects
- High short circuit withstand
- Resistant to fire propagation
- Electrical continuity during fire.
- Suitable to connect with E-Line KX busbar systems.
- Voltage layout advantage thanks to its compact structure

**Special components can be manufactured quickly.*

E-LINE CCR

High IP Isolation

Aluminium body over the IP 68 "DUROCOMP" composite material that is made by specially selected pure silicium minerals and epoxy resin and has high temperature and mechanical operation features protects E-LINE CCR busbar from external elements.

Effective Heat Dissipation

Heat accumulated in conductors are transferred into the environment through the aluminium body thanks to the additives with high heat transfer rate used in the system. (Figure 1)

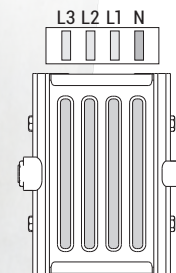
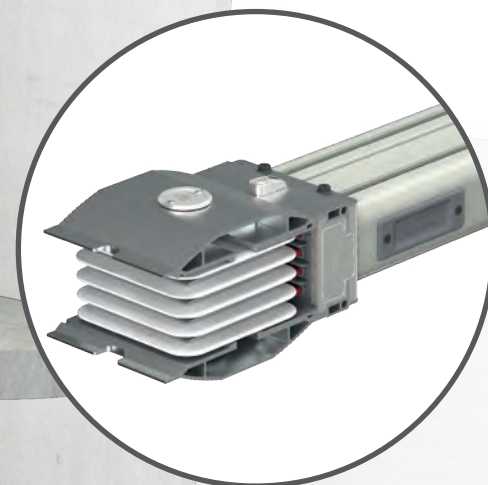


Figure 1



Short Circuit Withstand

High mechanical and thermal resistance within aluminium body thanks to DUROCOMP material.

One Bolt Joint Ensures Safety and Easy Installation

E-Line CRR Busbars are installed by tightening the "one bolt joint". Belleville spring washers on both ends of the bolt retains the original contact pressure, ensuring a more secure, reliable and maintenance - free joint.

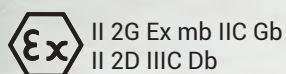
*The bolt is tightened to 83Nm (60 lbft)

Fire and Earthquake Resistance

- ▶ 3 hours Electrical Continuity under Fire as per IEC 60331-1
- ▶ 2 hours current continuity according to BS 8602 standard
- ▶ Seismic Resistance as per IEC 60068-3-3 / 60068-2-57 and IEEE 693.

EX - Protected

- ▶ ATEX as per EN 60079-0:2009, EN 60079-18:2009, EN60079-31:2009



E-LINE CCR

►► Distribution & Horizontal Applications



When using the E-Line CCR to create an electrical distribution system, the following criteria should be taken into consideration.

- The Power of the load to be connected to the system and their locations.
- Utilisation factor (diversity) assay,
- Power and short circuit currents of transformers, System coordination with other distribution systems (heat, steam, water, etc.),
- Determining a route of the E-Line CCR on layout of the designed system,
- Determination of the types of supports according to plan,
- If necessary, the system can be integrated with E-Line KX busbar system.

Rated Current

The rating of the busbar current required is calculated using the formula shown below.

$$I_B = \frac{P \cdot \alpha}{\sqrt{3} \cdot U \cdot \cos \varphi}$$

- I_B = Operation current (A)
- P = Total power load (W)
- α = Utilisation factor (diversity)
- U = Supply voltage (V)

- The busbar current rating is chosen as being equal to, or greater than the calculated current (I_B).
- After calculating the volt drop, if the current rating is not adequate, then a higher rating should be chosen.

Utilisation Factor (Diversity)

The utilisation factor (α) depends on the type and number of loads. Most are 0.7 or less. Intense Lighting and Motor Fed Lines "0,6" is quite difficult to rise above. Even at automobile welding plants it could fall down to "0,30". With only one single and large load can it go up to "1".

Voltage Drop

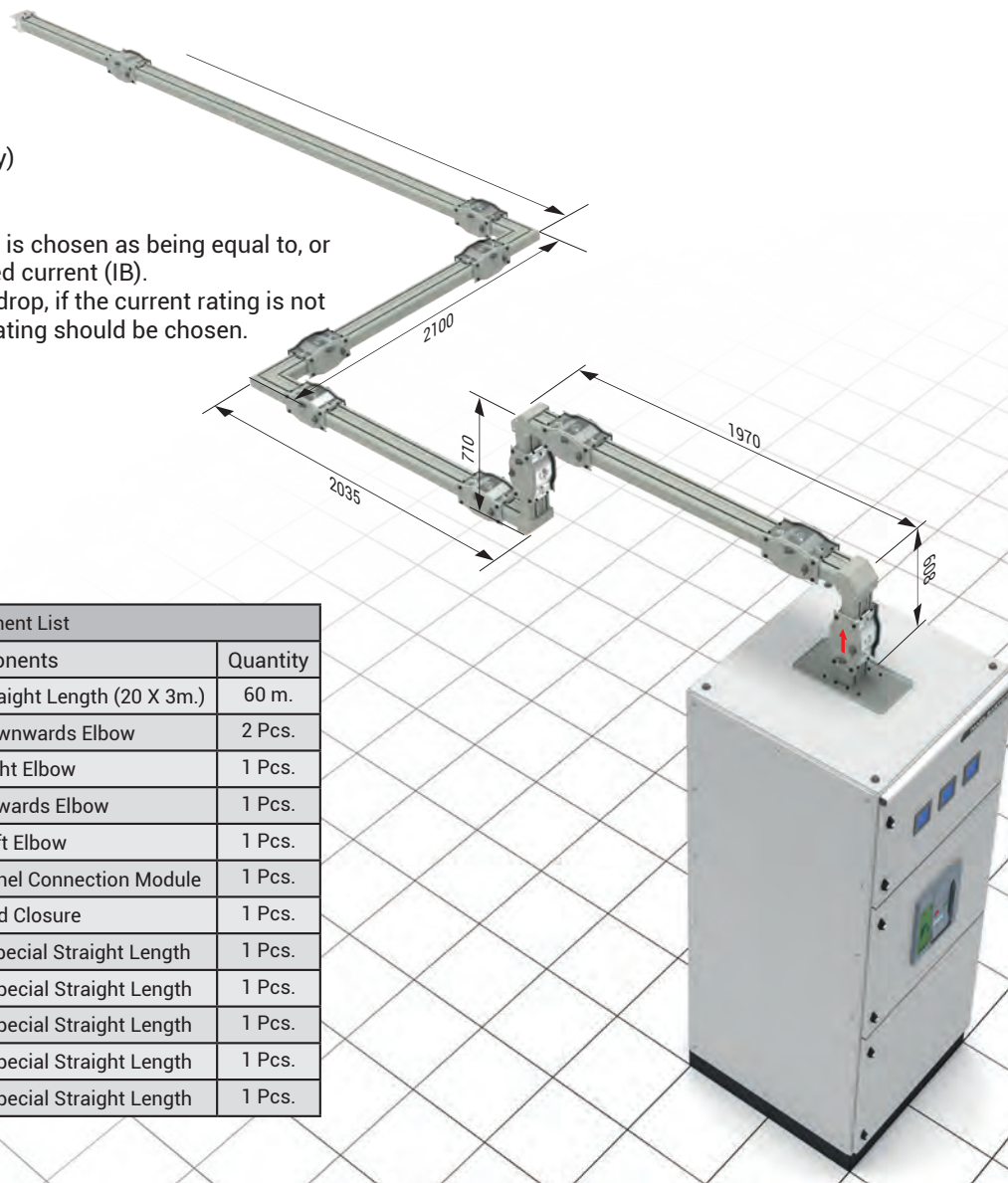
All the required values for voltage Drop Calculations, formulas, basic calculations for simple cases the tables are given on pages 6-9. Further support can be obtained from our Design Department.

Short Circuit Values

Short circuit test values are given on the tables on pages 6-9. The short circuit values high-light the high short circuit withstand characteristic of the E-Line CCR.

Busbar Installation Plan

Shown below is an example of an E-Line CCR busbar system. On request, our distributors' project and design departments will be pleased to help you in preparing your project.



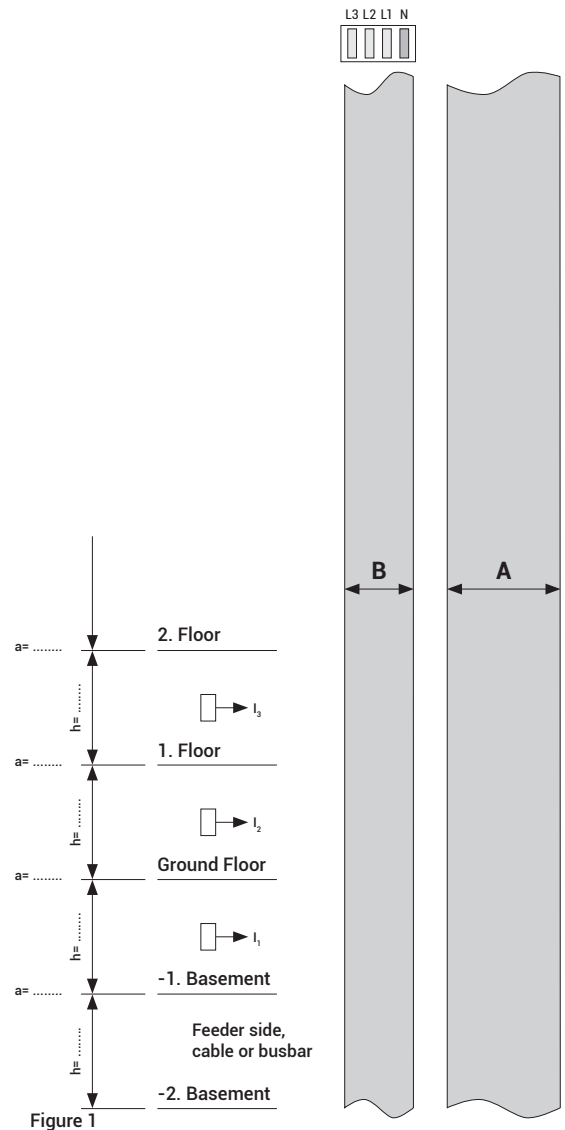
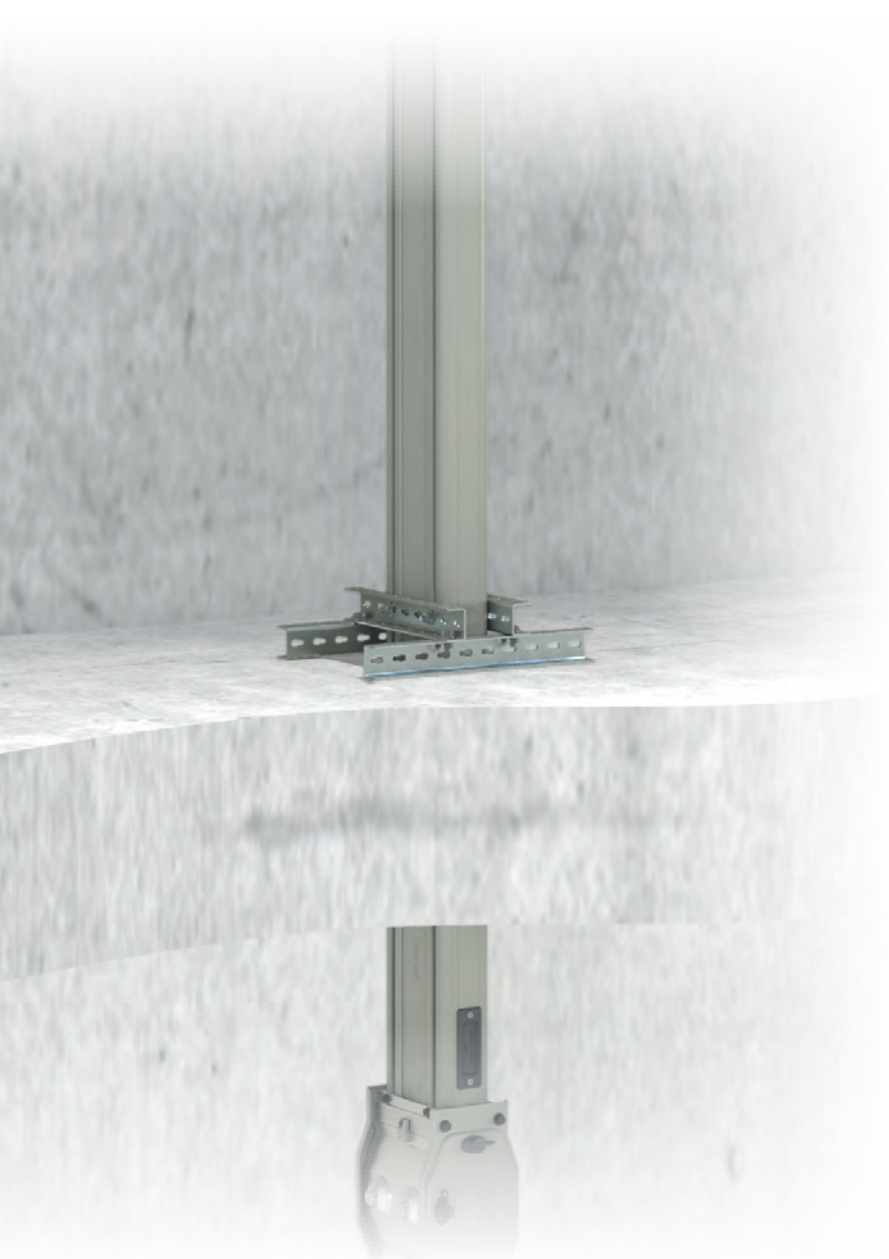
Component List		
Item No	Components	Quantity
1	CCRC 20804 - STD Straight Length (20 X 3m.)	60 m.
2	CCRC 20804 - D Downwards Elbow	2 Pcs.
3	CCRC 20804 - R Right Elbow	1 Pcs.
4	CCRC 20804 - U Upwards Elbow	1 Pcs.
5	CCRC 20804 - L Left Elbow	1 Pcs.
6	CCRC 20804 - P10 Panel Connection Module	1 Pcs.
7	CCRC 20804 - S End Closure	1 Pcs.
8	CCRC 20804 - X95 Special Straight Length	1 Pcs.
9	CCRC 20804 - X120 Special Straight Length	1 Pcs.
10	CCRC 20804 - X122 Special Straight Length	1 Pcs.
11	CCRC 20804 - X200 Special Straight Length	1 Pcs.
12	CCRC 20804 - X174 Special Straight Length	1 Pcs.

E-LINE CCR

►► Riser & Vertical Applications

As each building's structure is different, each of the E-Line CCR projects has to be specially designed.

The details on this page briefly explain the information necessary for designing the vertical installation project.



Pre-Project Design and cost Analysis

Before design and cost analysis can be made, please submit the following information to our Design Department.

- Location and Dimensions of the floor penetration where the busbar line will be installed.
- Floor height and Floor thickness (h=... a=...)
- Vertical line feeding method (by busbar or by cable)

By supplying the above information of the dimensions on a drawing similar to the example in Figure 1 and by faxing or emailing it to us we will be able to produce a quotation.

Please refer to table on page 11 for "A" size.

Number of Conductors	B (mm)
3 Conductors	73
4 Conductors	80
4 ½ Conductors	87
5 Conductors	87

E-LINE CCR

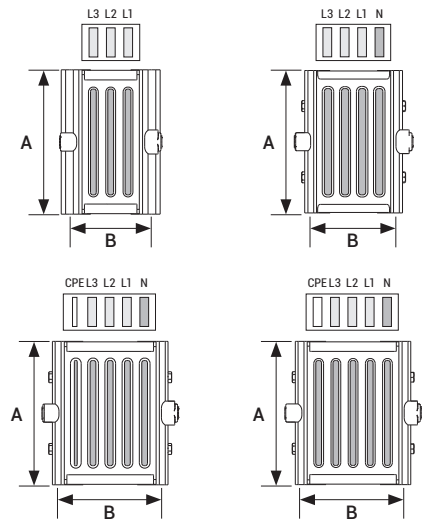
►► Technical Characteristics

Aluminium Conductor (Al)

Rated Current	I_n	A	600	800	1250	1600	2000
Busbar Code			06	09	12	16	23
Standards	IEC 61439-6:2012 Ed.1 IEC 61439-1 Ed.2:2011, TS EN 61439-1: 2011						
Rated Operational Voltage	U_e	V	1000	1000	1000	1000	1000
Rated Isolation Voltage	U_i	V_{ac}	1000	1000	1000	1000	1000
Rated Impulse Withstand Voltage	U_{imp}	kV	12	12	12	12	12
Rated Frequency	f	Hz	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60
Pollution Degree			III	III	III	III	III
Protection Degree	IP 68		IP 68	IP 68	IP 68	IP 68	IP 68
External Mechanical Impacts (IK Code)*	50J, >IK10		50J, >IK10	50J, >IK10	50J, >IK10	50J, >IK10	50J, >IK10
Rated Short-time Withstand Current (1s - 3 phase)	I_{cw}	kA	25	35	35	60	80
Rated Peak Withstand Current	I_{pk}	kA	52.5	73.5	73.5	132	176
Rated Short-time Withstand Current for Neutral Conductor (1s) (Single phase)	I_{cw}	kA	15	21	21	36	48
Rated Peak Withstand Current for Neutral Conductor (Phase-Neutral)	I_{pk}	kA	31.5	44.1	44.1	75.6	100.8
Rated Short-time Withstand Current for PE (Housing-Phase) Conductor	I_{cw}	kA	15	21	21	36	48
Rated Peak Withstand Current for PE (Housing-Phase) Conductor	I_{pk}	kA	31.5	44.1	44.1	75.6	100.8
PHASE CONDUCTOR CHARACTERISTICS (I_n)							
Resistance at a conductor temperature of 20°C	R_{20}	mΩ/m	0.1219	0.0613	0.0439	0.0294	0.0186
Resistance at an ambient air temperature of 35°C	R	mΩ/m	0.1689	0.0807	0.0569	0.0392	0.0249
Reactance (Independent from Temperature)	X	mΩ/m	0.032	0.0175	0.0131	0.0095	0.0063
Positive and negative sequence impedances at an ambient air temperature of 35°C	Z	mΩ/m	0.1719	0.0825	0.0584	0.0403	0.0257
Positive and negative sequence impedances at an ambient air temperature of 20°C	Z_{20}	mΩ/m	0.1261	0.0637	0.0458	0.0309	0.0196
Rated Power Loss at 35°C		W/m	173.4	192.6	255.9	294.1	384.4
DC Resistance at a conductor temperature of 20°C for Phases	$R_{ph(dc)}$	mΩ/m	0.113	0.059	0.043	0.031	0.018
DC Resistance at a conductor temperature of 20°C for Neutral	$R_{N(dc)}$	mΩ/m	0.113	0.059	0.043	0.031	0.018
DC Resistance at a conductor temperature of 20°C for PE	$R_{PE(dc)}$	mΩ/m	0.122	0.063	0.035	0.026	0.016
SECTIONS							
L1, L2, L3 (Phase Conductor)		mm ²	240	480	660	960	1500
Neutral		mm ²	240	480	660	960	1500
PE (Aluminium Housing)		mm ²	1179	1784	1984	2379	3052
Conductor Dimensions		mmxmm	6x40	6x80	6x110	6x160	6x250
Busbar Weight (4 conductors)		kg/m	12	17	22	30	44
MEAN FAULT-LOOP CHARACTERISTICS							
Zero-sequence Impedance							
Zero-sequence impedance at a conductor temperature of 20°C (Phase-Neutral)	$Z_{(0)b20phN}$	mΩ/m	0.532	0.293	0.207	0.144	0.092
Zero-sequence impedance at a conductor temperature of 20°C (Phase-Housing)	$Z_{(0)b20phPE}$	mΩ/m	0.301	0.214	0.162	0.147	0.132
Zero-sequence impedance at an ambient temperature of 35°C (Phase-Neutral)	$Z_{(0)bphN}$	mΩ/m	0.717	0.376	0.261	0.187	0.119
Zero-sequence impedance at an ambient temperature of 35°C (Phase-Housing)	$Z_{(0)bphPE}$	mΩ/m	0.376	0.258	0.191	0.183	0.169
Mean Resistances and Reactances							
Resistance at a conductor temperature of 20°C	$R_{b20phph}$	mΩ/m	0.241	0.128	0.088	0.061	0.038
Resistance at a conductor temperature of 20°C	R_{b20phN}	mΩ/m	0.246	0.132	0.091	0.063	0.040
Resistance at a conductor temperature of 20°C	$R_{b20phPE}$	mΩ/m	0.159	0.098	0.069	0.062	0.051
Resistance at an ambient air temperature of 35°C	R_{bphph}	mΩ/m	0.333	0.168	0.114	0.081	0.051
Resistance at an ambient air temperature of 35°C	R_{bphN}	mΩ/m	0.341	0.173	0.118	0.084	0.053
Resistance at an ambient air temperature of 35°C	R_{bphPE}	mΩ/m	0.221	0.129	0.090	0.082	0.068
Reactance (Independent from temperature)	X_{bphph}	mΩ/m	0.060	0.033	0.024	0.019	0.011
Reactance (Independent from temperature)	X_{bphN}	mΩ/m	0.084	0.047	0.035	0.027	0.017
Reactance (Independent from temperature)	X_{bphPE}	mΩ/m	0.083	0.054	0.043	0.033	0.024

Attention! The standard mounting of the Cast Resin busbar is with the conductors on edge. This allows for the easy application of the resin at the joint.

2500	3000	3300	3600	4000	4500	5000	5400
29	31	33	37	40	45	50	54
1000	1000	1000	1000	1000	1000	1000	1000
1000	1000	1000	1000	1000	1000	1000	1000
12	12	12	12	12	12	12	12
50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60
III	III	III	III	III	III	III	III
IP 68	IP 68	IP 68	IP 68	IP 68	IP 68	IP 68	IP 68
50J, >IK10	50J, >IK10	50J, >IK10	50J, >IK10	50J, >IK10	50J, >IK10	50J, >IK10	50J, >IK10
100	100	100	100	100	100	100	100
220	220	220	220	220	220	220	220
60	60	60	60	60	60	60	60
132	132	132	132	132	132	132	132
60	60	60	60	60	60	60	60
132	132	132	132	132	132	132	132
0.0165	0.0155	0.0138	0.0125	0.0116	0.0102	0.0090	0.0080
0.0222	0.0208	0.0186	0.0168	0.0152	0.0135	0.0120	0.0110
0.0053	0.0051	0.0044	0.0041	0.0037	0.0034	0.0029	0.0030
0.0228	0.0214	0.0191	0.0173	0.0157	0.0139	0.0124	0.0110
0.0173	0.0164	0.0145	0.0131	0.0122	0.0107	0.0095	0.0090
545.6	574.4	594.8	658.2	720.3	802.5	880.7	939.8
0.016	0.015	0.013	0.011	0.011	0.009	0.009	0.008
0.016	0.015	0.013	0.011	0.011	0.009	0.009	0.008
0.016	0.022	0.021	0.009	0.011	0.010	0.008	0.015
1680	1920	2160	2400	2520	2880	3240	3600
1680	1920	2160	2400	2520	2880	3240	3600
4569	4758	5010	5133	6854	7137	7515	7699
2x6x140	2x6x160	2x6x180	2x6x200	3x6x140	3x6x160	3x6x180	3x6x200
54	62	67	74	81	92	104	110
0.080	0.075	0.066	0.061	0.059	0.051	0.043	0.042
0.069	0.077	0.065	0.069	0.050	0.049	0.041	0.041
0.105	0.097	0.086	0.080	0.075	0.066	0.056	0.054
0.086	0.095	0.082	0.086	0.059	0.059	0.049	0.049
0.034	0.031	0.028	0.026	0.024	0.021	0.012	0.017
0.036	0.032	0.026	0.027	0.025	0.022	0.020	0.018
0.030	0.031	0.024	0.027	0.020	0.019	0.016	0.016
0.046	0.042	0.038	0.034	0.031	0.028	0.017	0.022
0.048	0.043	0.035	0.036	0.033	0.029	0.026	0.023
0.041	0.042	0.032	0.037	0.026	0.025	0.022	0.021
0.010	0.009	0.008	0.007	0.007	0.006	0.010	0.005
0.014	0.013	0.011	0.011	0.010	0.009	0.008	0.007
0.018	0.017	0.013	0.015	0.012	0.012	0.010	0.010

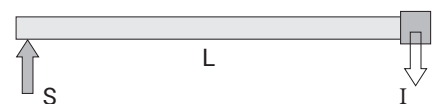


Voltage Drop Calculation

Generally Voltage drop of a busbar system can be calculated with the following formula.

$$\Delta U = \sqrt{3} \cdot L \cdot I \cdot (R_1 \cdot \cos\phi + X_1 \cdot \sin\phi) \cdot 10^{-3} \text{ [V]}$$

- ΔU = Voltage Drop (V)
- L = Line Length (m)
- I = Line Current or Load (A)
- R_1 = Resistance (m Ω /m)
- X_1 = Reactance (m Ω /m)
- $\cos\phi$ = Power Factor



S = Supply Point

- (1) All phase conductor characteristics have been determined according to Annex BB of IEC 61439-6.
- (2) Fault-loop zero-sequences impedances have been determined according to Annex CC of IEC 61439-6.
- (3) Fault-loop resistances and reactances have been determined according to Annex DD of IEC 61439-6.

*IK10 corresponds to impact energy of 50J according to IEC 62262.

** Cast Resin Busbars are produced with a minimum of 3 conductors.

E-LINE CCR

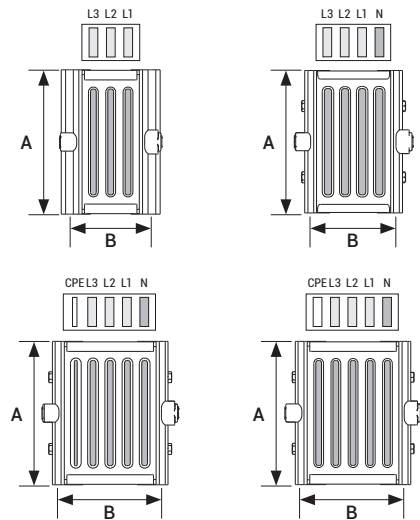
►► Technical Characteristics

Copper Conductor (Cu)

Rated Current	I_n	A	650	850	1000	1250	1600	2000
Busbar Code			06	08	10	12	16	20
Standards	IEC 61439-6:2012 Ed.1 IEC 61439-1 Ed.2:2011, TS EN 61439-1: 2011							
Rated Operational Voltage	U_e	V	1000	1000	1000	1000	1000	1000
Rated Isolation Voltage	U_i	V_{ac}	1000	1000	1000	1000	1000	1000
Rated Impulse Withstand Voltage	U_{imp}	kV	12	12	12	12	12	12
Rated Frequency	f	Hz	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60
Pollution Degree			III	III	III	III	III	III
Protection Degree	IP 68		IP 68	IP 68	IP 68	IP 68	IP 68	IP 68
External Mechanical Impacts (IK Code)*	50J, >IK10		50J, >IK10	50J, >IK10	50J, >IK10	50J, >IK10	50J, >IK10	50J, >IK10
Rated Short-time Withstand Current (1s - 3 phase)	I_{cw}	kA	35	35	50	80	80	80
Rated Peak Withstand Current	I_{pk}	kA	73,5	73,5	105	176	176	176
Rated Short-time Withstand Current for Neutral Conductor (1s) (Single phase)	I_{cw}	kA	21	13,8	30	48	48	48
Rated Peak Withstand Current for Neutral Conductor (Phase-Neutral)	I_{pk}	kA	44,1	27,6	63	100,8	100,8	100,8
Rated Short-time Withstand Current for PE (Housing-Phase) Conductor	I_{cw}	kA	21	13,8	30	48	48	48
Rated Peak Withstand Current for PE (Housing-Phase) Conductor	I_{pk}	kA	44,1	27,6	63	100,8	100,8	100,8
PHASE CONDUCTOR CHARACTERISTICS (I_n)								
Resistance at a conductor temperature of 20 °C	R_{20}	mΩ/m	0,0755	0,0648	0,0534	0,0358	0,0256	0,0198
Resistance at an ambient air temperature of 35 °C	R	mΩ/m	0,1055	0,0890	0,0727	0,0473	0,0345	0,0263
Reactance (Independent from Temperature)	X	mΩ/m	0,313	0,0281	0,0246	0,0180	0,0132	0,0097
Positive and negative sequence impedances at an ambient air temperature of 35°C	Z	mΩ/m	0,1101	0,0934	0,0768	0,0506	0,0369	0,0281
Positive and negative sequence impedances at an ambient air temperature of 20°C	Z_{20}	mΩ/m	0,0817	0,0706	0,0588	0,0401	0,0288	0,0221
Rated Power Loss at 35°C		W/m	149,8	190,8	212,3	219,5	269,7	304,9
DC Resistance at a conductor temperature of 20°C for Phases	$R_{ph(dc)}$	mΩ/m	0,072	0,065	0,053	0,035	0,026	0,019
DC Resistance at a conductor temperature of 20°C for Neutral	$R_{N(dc)}$	mΩ/m	0,072	0,065	0,053	0,035	0,026	0,019
DC Resistance at a conductor temperature of 20°C for PE	$R_{PE(dc)}$	mΩ/m	0,095	0,068	0,053	0,040	0,031	0,033
SECTIONS								
L1, L2, L3 (Phase Conductor)		mm ²	240	270	330	480	660	900
Neutral		mm ²	240	270	330	480	660	900
PE (Aluminium Housing)		mm ²	1179	1261	1261	1784	1984	2379
Conductor Dimensions		mmxmm	6x40	6x45	6x55	6x80	6x110	6x150
Busbar Weight (4 conductors)		kg/m	21	23,5	23,5	31	41	54,75
MEAN FAULT-LOOP CHARACTERISTICS								
Zero-sequence Impedance								
Zero-sequence impedance at a conductor temperature of 20°C (Phase-Neutral)	$Z_{(0)b20phN}$	mΩ/m	0,381	0,336	0,280	0,194	0,146	0,108
Zero-sequence impedance at a conductor temperature of 20°C (Phase-Housing)	$Z_{(0)b20phPE}$	mΩ/m	0,272	0,279	0,267	0,196	0,155	0,122
Zero-sequence impedance at an ambient temperature of 35°C (Phase-Neutral)	$Z_{(0)bphN}$	mΩ/m	0,507	0,439	0,360	0,243	0,186	0,136
Zero-sequence impedance at an ambient temperature of 35°C (Phase-Housing)	$Z_{(0)bphPE}$	mΩ/m	0,335	0,337	0,329	0,232	0,187	0,145
Mean Resistances and Reactances								
Resistance at a conductor temperature of 20°C	$R_{b20phph}$	mΩ/m	0,157	0,136	0,110	0,074	0,055	0,041
Resistance at a conductor temperature of 20°C	R_{b20phN}	mΩ/m	0,163	0,141	0,114	0,078	0,059	0,043
Resistance at a conductor temperature of 20°C	$R_{b20phPE}$	mΩ/m	0,119	0,111	0,107	0,072	0,056	0,043
Resistance at an ambient air temperature of 35°C	R_{bphph}	mΩ/m	0,220	0,187	0,150	0,098	0,075	0,055
Resistance at an ambient air temperature of 35°C	R_{bphN}	mΩ/m	0,227	0,194	0,156	0,103	0,079	0,057
Resistance at an ambient air temperature of 35°C	R_{bphPE}	mΩ/m	0,167	0,153	0,145	0,095	0,076	0,057
Reactance (Independent from temperature)	X_{bphph}	mΩ/m	0,058	0,053	0,046	0,033	0,025	0,019
Reactance (Independent from temperature)	X_{bphN}	mΩ/m	0,081	0,075	0,065	0,048	0,036	0,026
Reactance (Independent from temperature)	X_{bphPE}	mΩ/m	0,081	0,083	0,070	0,054	0,043	0,034

Attention! The standard mounting of the Cast Resin busbar is with the conductors on edge. This allows for the easy application of the resin at the joint.

2500	3200	3400	4000	4500	5000	5750	6300
25	32	34	40	45	50	57	63
1000	1000	1000	1000	1000	1000	1000	1000
1000	1000	1000	1000	1000	1000	1000	1000
12	12	12	12	12	12	12	12
50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60	50 / 60
III	III	III	III	III	III	III	III
IP 68	IP 68	IP 68	IP 68	IP 68	IP 68	IP 68	IP 68
50J, >IK10	50J, >IK10	50J, >IK10	50J, >IK10	50J, >IK10	50J, >IK10	50J, >IK10	50J, >IK10
100	100	120	120	120	120	120	120
220	220	264	264	264	264	264	264
60	60	72	72	72	72	72	72
132	132	158,4	158,4	158,4	158,4	158,4	158,4
60	60	72	72	72	72	72	72
132	132	158,4	158,4	158,4	158,4	158,4	158,4
0,0181	0,0133	0,0120	0,0107	0,0086	0,0080	0,0063	0,0057
0,0242	0,0180	0,0160	0,0145	0,0112	0,0106	0,0082	0,0075
0,0084	0,0066	0,0057	0,0053	0,0044	0,0038	0,0030	0,0028
0,0256	0,0192	0,0169	0,0154	0,0120	0,0112	0,0088	0,0080
0,0200	0,0148	0,0132	0,0119	0,0097	0,0088	0,0070	0,0063
447,9	538	543,1	674,3	648	782,6	776,2	843,9
0,018	0,013	0,011	0,010	0,007	0,007	0,006	0,005
0,018	0,013	0,011	0,010	0,007	0,007	0,006	0,005
0,022	0,018	0,017	0,017	0,017	0,016	0,016	0,013
960	1320	1500	1680	2160	2250	2880	3240
960	1320	1500	1680	2160	2250	2880	3240
3568	3698	4430	4569	5010	6645	7137	7515
2(6x80)	2(6x110)	2(6x125)	2(6x140)	2(6x180)	3(6x125)	3(6x160)	3(6x180)
61,25	82	92,5	102	140	138	166,38	211
0,100	0,074	0,067	0,059	0,049	0,040	0,035	0,031
0,102	0,081	0,085	0,064	0,069	0,044	0,040	0,038
0,127	0,094	0,084	0,075	0,060	0,051	0,043	0,040
0,121	0,096	0,103	0,076	0,082	0,052	0,047	0,044
0,038	0,027	0,025	0,021	0,018	0,017	0,013	0,012
0,041	0,029	0,026	0,023	0,019	0,018	0,014	0,012
0,037	0,028	0,029	0,022	0,024	0,016	0,014	0,013
0,051	0,037	0,033	0,029	0,023	0,022	0,017	0,015
0,054	0,039	0,035	0,031	0,025	0,023	0,018	0,016
0,049	0,037	0,039	0,030	0,031	0,022	0,018	0,017
0,016	0,012	0,011	0,010	0,008	0,007	0,006	0,005
0,024	0,018	0,016	0,015	0,012	0,011	0,008	0,008
0,027	0,022	0,021	0,017	0,016	0,013	0,011	0,010

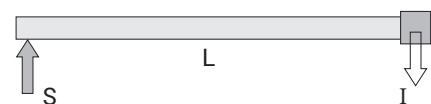


Voltage Drop Calculation

Generally Voltage drop of a busbar system can be calculated with the following formula.

$$\Delta U = \sqrt{3} \cdot L \cdot I \cdot (R_1 \cdot \cos\varphi + X_1 \cdot \sin\varphi) \cdot 10^{-3} \text{ [V]}$$

- ΔU = Voltage Drop (V)
- L = Line Length (m)
- I = Line Current or Load (A)
- R_1 = Resistance (m Ω /m)
- X_1 = Reactance (m Ω /m)
- $\cos\varphi$ = Power Factor



S = Supply Point

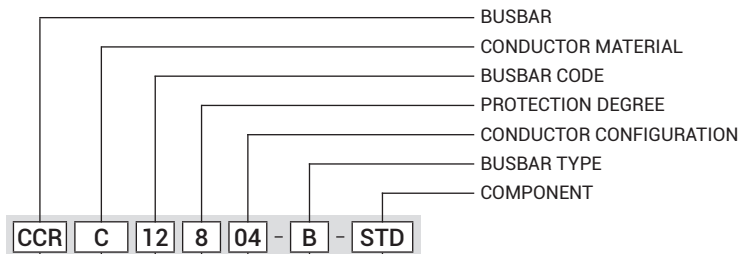
- (1) All phase conductor characteristics have been determined according to Annex BB of IEC 61439-6.
- (2) Fault-loop zero-sequences impedances have been determined according to Annex CC of IEC 61439-6.
- (3) Fault-loop resistances and reactances have been determined according to Annex DD of IEC 61439-6.

*IK10 corresponds to impact energy of 50J according to IEC 62262.

** Cast Resin Busbars are produced with a minimum of 3 conductors.

E-LINE CCR

►► Order Code System



Busbar Type	BUSBAR TYPE
Aluminium (Al) A Copper (Cu) C	CONDUCTOR MATERIAL

CCRA - Al Conductor		CCRC - Cu Conductor		Conductor Cross Section
Anma Akımı	Busbar Kodu	Anma Akımı	Busbar Kodu	
600	06	650	06	6x40
-	-	850	08	6x45
-	-	1000	10	6x55
800	09	1250	12	6x80
1250	12	1600	16	6x110
-	-	2000	20	6x150
1600	16	-	-	6x160
2000	23	-	-	6x250
-	-	2500	25	2(6x80)
-	-	3200	32	2(6x110)
-	-	3400	34	2(6x125)
2500	29	4000	40	2(6x140)
3000	31	-	-	2(6x160)
3300	33	4500	45	2(6x180)
3600	37	-	-	2(6x200)
-	-	5000	50	3(6x125)
4000	40	-	-	3(6x140)
4500	45	5750	57	3(6x160)
5000	50	6300	63	3(6x180)
5400	54	-	-	3(6x200)

IP68	8	PROTECTION DEGREE
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Number of Conductors	Code	Conductor Configuration								
		L1	L2	L3	N	Earth	½ Earth	Clean Earth	½ Clean Earth	Earth (Hosing)
3 Conductor	03	✓	✓	✓	✓	✓	✓	✓	✓	✓
4 Conductor	04	✓	✓	✓	✓	✓	✓	✓	✓	✓
4 ½ Conductor	08	✓	✓	✓	✓	✓	✓	✓	✓	✓
5 Conductor	09	✓	✓	✓	✓	✓	✓	✓	✓	✓

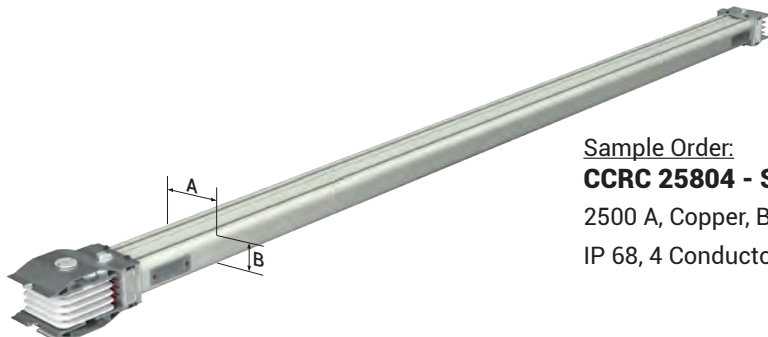
* TYPE	Utilisation Type
(B) Bolt-on	Where there is no need for tap off boxes, power is supplied from one point to the other end point of the line.

COMPONENT	
Standard Straight Length	STD
Special Straight Length	X
Upwards Elbow	U
Downwards Elbow	D
Left Elbow	L
Right Elbow	R
Left Horizontal Offset	LH
Right Horizontal Offset	RH
Upwards Vertical Offset	UV
Downwards Vertical Offset	DV
Upwards Left Combined Offset	KUL
Upwards Right Combined Offset	KUR
Downwards Left Combined Offset	KDL
Downwards Right Combined Offset	KDR
Left Upwards Combined Offset	KLU
Right Upwards Combined Offset	KRU
Left Downwards Combined Offset	KLD
Right Downwards Combined Offset	KRD
End Closure	S10
End Closure	S11
Reduction	RD
Crossing Module	CCRKX
Right Side Feeder "T"	TYR
Left Side Feeder "T"	TYL
Central Feeder "T" Module	TO
Horizontal Expansion	YDT
Vertical Expansion	DDT
Phase Transposition Module	FDM
Panel/Transformer Con.	P10 / TR10
Panel/Transformer Con.	P11 / TR11
Upwards Panel/Transformer Con.	PU20 / TU20
Upwards Panel/Transformer Con.	PU21 / TU21
Downwards Panel/Transformer Con.	PD20 / TD20
Downwards Panel/Transformer Con.	PD21 / TD21
Right Panel/Transformer Con.	PR30 / TR30
Right Panel/Transformer Con.	PR31 / TR31
Left Panel/Transformer Con.	PL30 / TL30
Left Panel/Transformer Con.	PL31 / TL31
Horizontal Panel/Transformer Con.	P40 / TR40
Horizontal Panel/Transformer Con.	P41 / TR41
Transformer Connection	TR61

E-LINE CCR

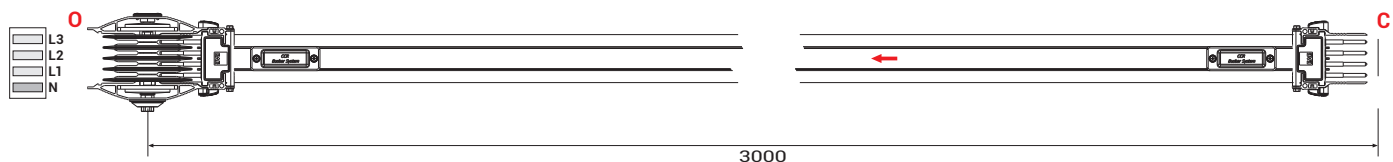
►► Standard Straight Length

Standard Feeder Straight Length - STD



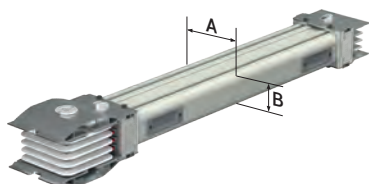
Sample Order:
CCRC 25804 - STD
 2500 A, Copper, Bolt-on,
 IP 68, 4 Conductor

- Application Areas:
- Between Transformer - Panel Applications
 - Between Panel to Panel Applications
 - Generator and Compensation
 - Panels Feeding



Special Straight Length - X

Special Straight Length in (mm)



Sample Order:
CCRC 25804 - X - 147
 2500 A, Copper, Bolt-on,
 IP 68, 4 Conductor, 1470 mm
 Special Straight Length

- Application Areas:
- Between Transformer - Panel Applications
 - Between Panel to Panel Applications
 - Generator and Compensation
 - Panels Feeding

information:
 Feeder Minimum Midsize = 450 mm

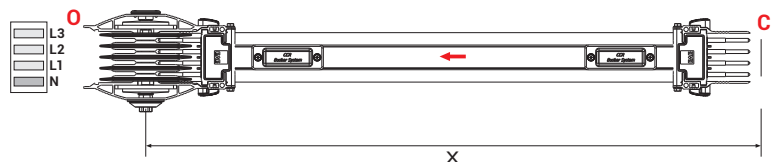


Table For Outer Dimension of Busbars

CCRA - Al Conductor	Rated Current	600	-	-	800	1250	-	1600	2000	-	-	-	2500	3000	3300	3600	-	4000	4500	5000	5400
	Busbar Code	06	-	-	09	12	-	16	23	-	-	-	29	31	33	37	-	40	45	50	54
CCRC - Cu Conductor	Rated Current	650	850	1000	1250	1600	2000	-	-	2500	3200	3400	4000	-	4500	-	5000	-	5750	6300	-
	Busbar Code	06	08	10	12	16	20	-	-	25	32	34	40	-	45	-	50	-	57	63	-
A	(mm)	70	75	85	110	140	180	190	280	230	290	320	350	390	430	470	485	530	590	650	710

Number of Conductors	3 Conductor	4 Conductor	4 ½ Conductor	5 Conductor
B (mm)	73	80	87	87



Attention ! The standard mounting of the Cast Resin busbar is with the conductors on edge. This allows for the easy application of the resin at the joint.

■ The dimensions given above are minimum values. ■ Please call us for non-standard components.

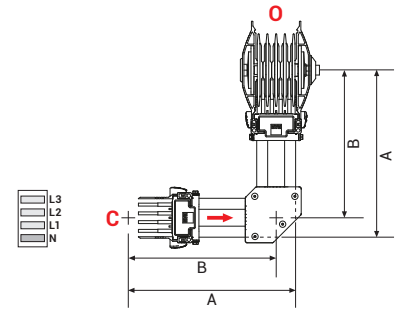
E-LINE CCR

►► Elbows



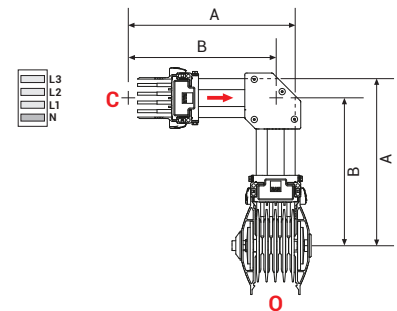
Upwards Elbow - U

Sample Order:
CCRC 32804 - B - U
 3200 A, Copper, Bolt-on,
 IP 68, 4 Conductor



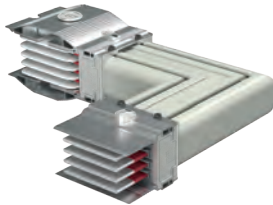
Downwards Elbow - D

Sample Order:
CCRC 32804 - B - D
 3200 A, Copper, Bolt-on,
 IP 68, 4 Conductor



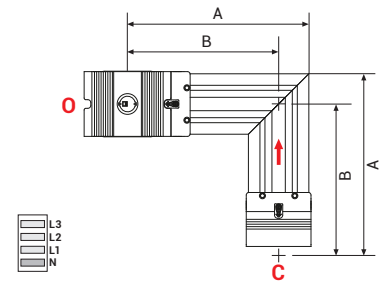
Conductor Dimension Table

Number of Conductors	3	4	4½	5
A (mm)	337	344	351	351
B (mm)	300	304	307	307



Left Elbow - L

Sample Order:
CCRC 32804 - B - L
 3200 A, Copper, Bolt-on,
 IP 68, 4 Conductor



Right Elbow - R

Sample Order:
CCRC 32804 - B - R
 3200 A, Copper, Bolt-on,
 IP 68, 4 Conductor

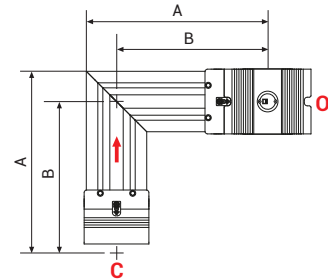


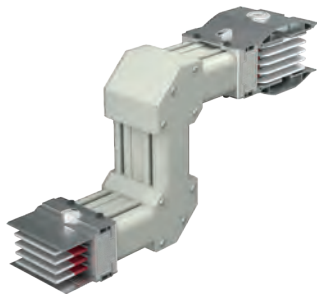
Table For Outer Dimension of Busbars

CCRA - Al Conductor	Rated Current	600	-	-	800	1250	-	1600	2000	-	-	-	2500	3000	3300	3600	-	4000	4500	5000	5400
	Busbar Code	06	-	-	09	12	-	16	23	-	-	-	29	31	33	37	-	40	45	50	54
CCRC - Cu Conductor	Rated Current	650	850	1000	1250	1600	2000	-	-	2500	3200	3400	4000	-	4500	-	5000	-	5750	6300	-
	Busbar Code	06	08	10	12	16	20	-	-	25	32	34	40	-	45	-	50	-	57	63	-
A	(mm)	310	315	325	350	380	420	430	520	470	530	560	590	630	670	710	725	770	830	890	950
B	(mm)	275	278	283	295	310	330	335	380	355	385	400	415	435	455	475	483	505	535	565	595

■ The dimensions given above are minimum values. ■ Please call us for non-standard components.

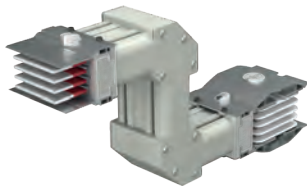
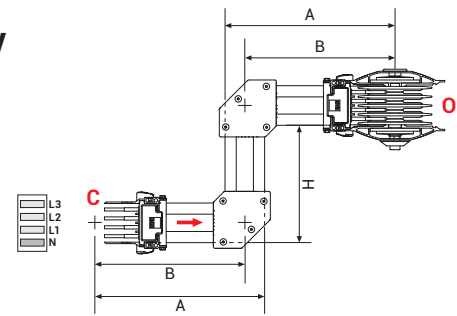
E-LINE CCR

►► Elbows



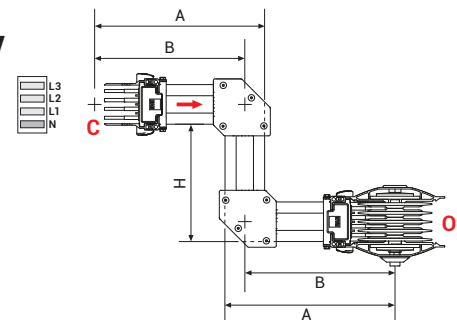
Upwards Vertical Offset - UV

Sample Order:
CCRC 32804 - B - UV
 H= 60cm, 3200 A, Copper,
 Bolt-on, IP 68, 4 Conductor



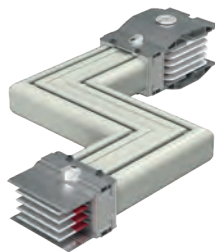
Downwards Vertical Offset - DV

Sample Order:
CCRC 32804 - B - DV
 H= 60cm, 3200 A, Copper,
 Bolt-on, IP 68, 4 Conductor



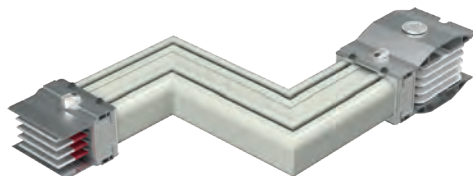
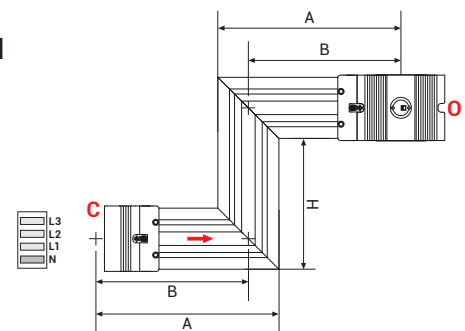
Conductor Dimension Table

Number of Conductors	3	4	4½	5
A (mm)	337	344	351	351
B (mm)	300	304	307	307
H (mm)	231	238	245	245
H max.	601	608	615	615



Left Horizontal Offset - LH

Sample Order:
CCRC 32804 - B - LH
 H= 60cm, 3200 A, Copper,
 Bolt-on, IP 68, 4 Conductor
 H min= 280mm



Right Horizontal Offset - RH

Sample Order:
CCRC 32804 - B - RH
 H= 60cm, 3200 A, Copper,
 Bolt-on, IP 68, 4 Conductor
 H min= 280mm

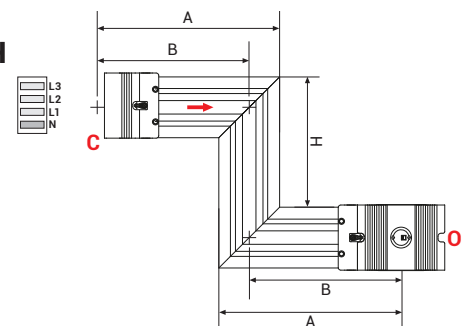


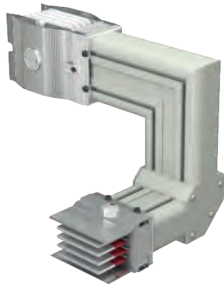
Table For Outer Dimension of Busbars

CCRA - Al Conductor	Rated Current	600	-	-	800	1250	-	1600	2000	-	-	-	2500	3000	3300	3600	-	4000	4500	5000	5400
	Busbar Code	06	-	-	09	12	-	16	23	-	-	-	29	31	33	37	-	40	45	50	54
CCRC - Cu Conductor	Rated Current	650	850	1000	1250	1600	2000	-	-	2500	3200	3400	4000	-	4500	-	5000	-	5750	6300	-
	Busbar Code	06	08	10	12	16	20	-	-	25	32	34	40	-	45	-	50	-	57	63	-
A	(mm)	310	315	325	350	380	420	430	520	470	530	560	590	630	670	710	725	770	830	890	950
B	(mm)	275	278	283	295	310	330	335	380	355	385	400	415	435	455	475	483	505	535	565	595
H max.	(mm)	550	555	565	590	620	660	670	760	710	770	800	830	870	910	950	965	1010	1070	1130	1190

■ The dimensions given above are minimum values. ■ Please call us for non-standard components.

E-LINE CCR

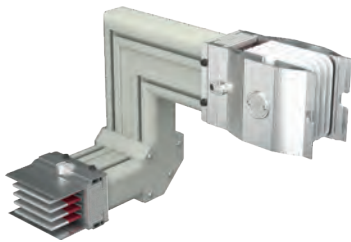
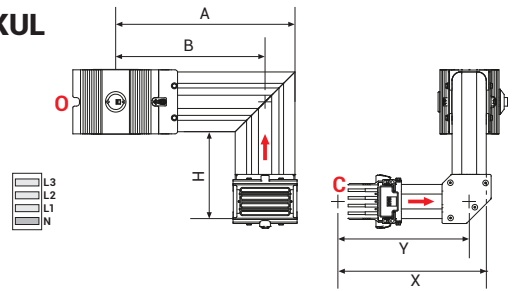
►► Elbows



**Upwards Left
Combined Offset**

Sample Order:
CCRC 32804 - B - KUL
3200 A, Copper, Bolt-on,
IP 68, 4 Conductor

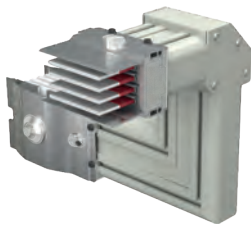
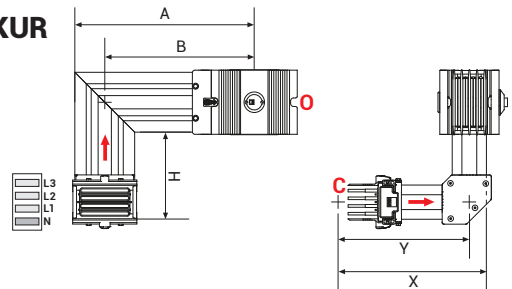
- KUL



**Upwards Right
Combined Offset**

Sample Order:
CCRC 32804 - B - KUR
3200 A, Copper, Bolt-on,
IP 68, 4 Conductor

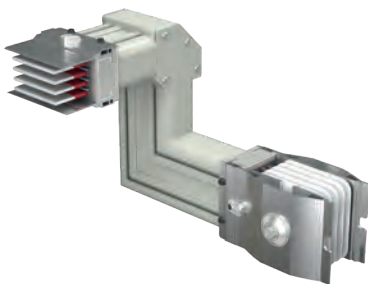
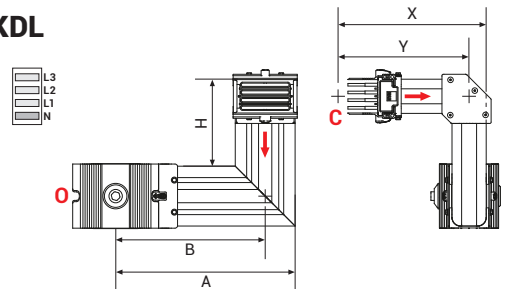
- KUR



**Downwards Left
Combined Offset**

Sample Order:
CCRC 32804 - B - KDL
3200 A, Copper, Bolt-on,
IP 68, 4 Conductor

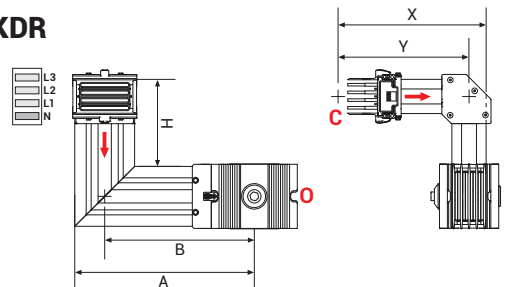
- KDL



**Downwards Right
Combined Offset**

Sample Order:
CCRC 32804 - B - KDR
3200 A, Copper, Bolt-on,
IP 68, 4 Conductor

- KDR



Conductor Dimension Table

Number of Conductors	3	4	4½	5
X (mm)	337	344	351	351
Y (mm)	300	304	307	307
H (mm)	207	214	221	221
H max.	577	584	591	591

Table For Outer Dimension of Busbars

CCRA - Al Conductor	Rated Current	600	-	-	800	1250	-	1600	2000	-	-	-	2500	3000	3300	3600	-	4000	4500	5000	5400
	Busbar Code	06	-	-	09	12	-	16	23	-	-	-	29	31	33	37	-	40	45	50	54
CCRC - Cu Conductor	Rated Current	650	850	1000	1250	1600	2000	-	-	2500	3200	3400	4000	-	4500	-	5000	-	5750	6300	-
	Busbar Code	06	08	10	12	16	20	-	-	25	32	34	40	-	45	-	50	-	57	63	-
A	(mm)	310	315	325	350	380	420	430	520	470	530	560	590	630	670	710	725	770	830	890	950
B	(mm)	275	278	283	295	310	330	335	380	355	385	400	415	435	455	475	483	505	535	565	595

■ The dimensions given above are minimum values. ■ Please call us for non-standard components.

E-LINE CCR

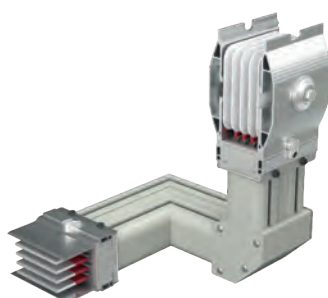
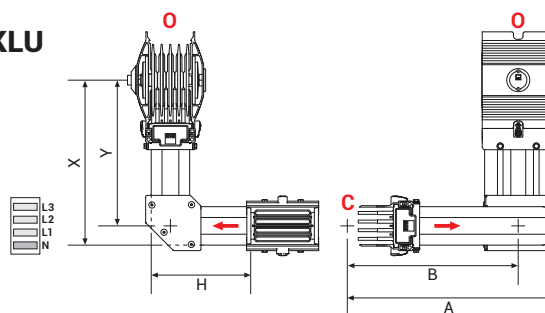
►► Elbows



**Left Upwards
Combined Offset**

- KLU

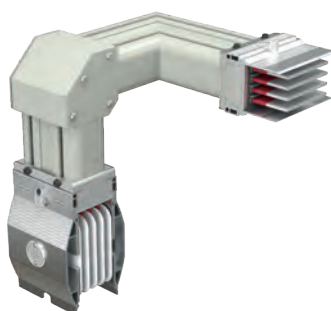
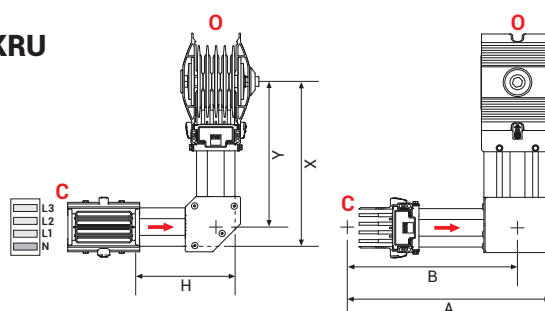
Sample Order:
CCRC 32804 - B - KLU
3200 A, Copper, Bolt-on, IP
68, 4 Conductor



**Right Upwards
Combined Offset**

- KRU

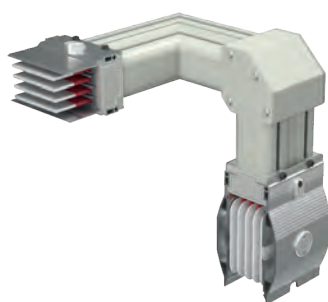
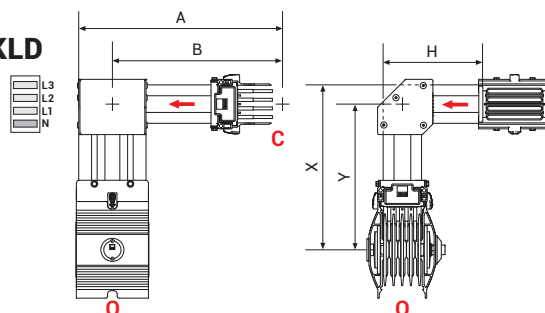
Sample Order:
CCRC 32804 - B - KRU
3200 A, Copper, Bolt-on, IP
68, 4 Conductor



**Left Downwards
Combined Offset**

- KLD

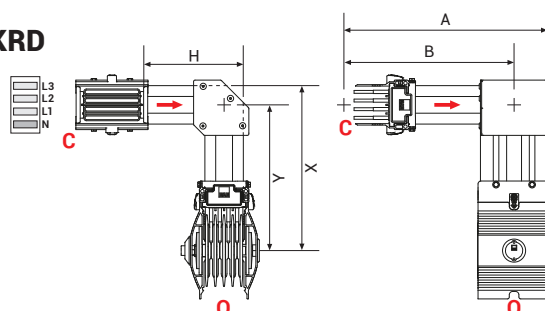
Sample Order:
CCRC 32804 - B - KLD
3200 A, Copper, Bolt-on,
IP 68, 4 Conductor



**Right Downwards
Combined Offset**

- KRD

Sample Order:
CCRC 32804 - B - KRD
3200 A, Copper, Bolt-on,
IP 68, 4 Conductor



Conductor Dimension Table

Number of Conductors	3	4	4½	5
X (mm)	337	344	351	351
Y (mm)	300	304	307	307
H (mm)	207	214	221	221
H max.	577	584	591	591

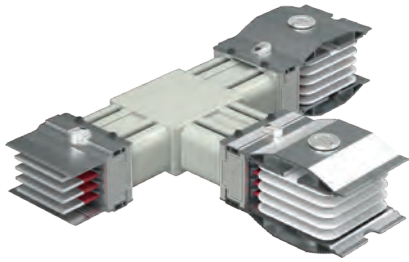
Table For Outer Dimension of Busbars

CCRA - Al Conductor	Rated Current	600	-	-	800	1250	-	1600	2000	-	-	-	2500	3000	3300	3600	-	4000	4500	5000	5400
	Busbar Code	06	-	-	09	12	-	16	23	-	-	-	29	31	33	37	-	40	45	50	54
CCRC - Cu Conductor	Rated Current	650	850	1000	1250	1600	2000	-	-	2500	3200	3400	4000	-	4500	-	5000	-	5750	6300	-
	Busbar Code	06	08	10	12	16	20	-	-	25	32	34	40	-	45	-	50	-	57	63	-
A	(mm)	310	315	325	350	380	420	430	520	470	530	560	590	630	670	710	725	770	830	890	950
B	(mm)	275	278	283	295	310	330	335	380	355	385	400	415	435	455	475	483	505	535	565	595

■ The dimensions given above are minimum values. ■ Please call us for non-standard components.

E-LINE CCR

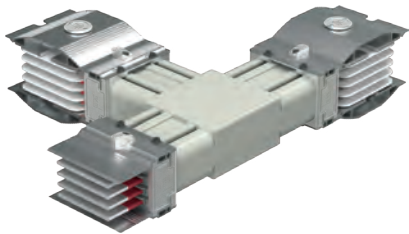
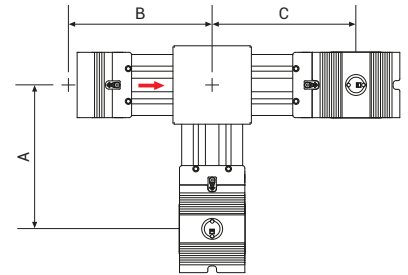
►► Elbows



Right "T" Module

- TYR

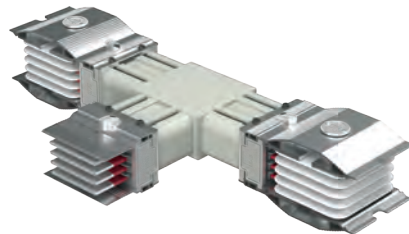
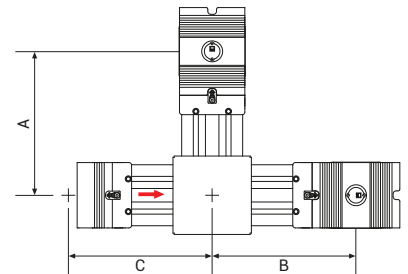
Sample Order:
CCRC 32804 - B - TYR
 3200 A, Copper, Bolt-on,
 IP 68, 4 Conductor



Left "T" Module

- TYL

Sample Order:
CCRC 32804 - B - TYL
 3200 A, Copper, Bolt-on,
 IP 68, 4 Conductor



Central Feeder "T" Module

- TO

Sample Order:
CCRC 32804 - B - TO
 3200 A, Copper, Bolt-on,
 IP 68, 4 Conductor

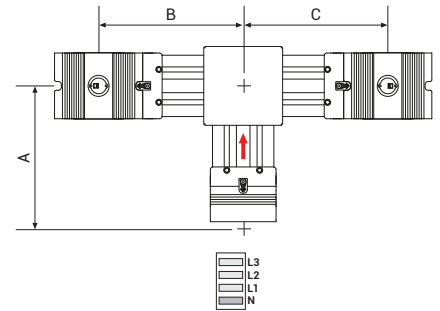
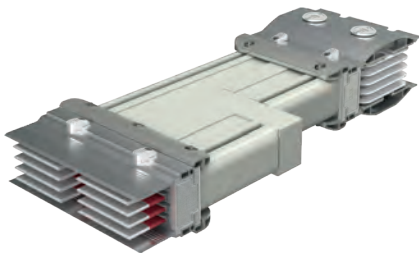


Table For Outer Dimension of Busbars

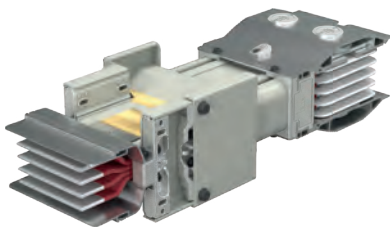
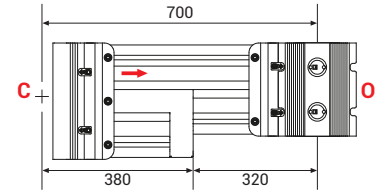
CCRA - Al Conductor	Rated Current	600	-	-	800	1250	-	1600	2000	-	-	-	2500	3000	3300	3600	-	4000	4500	5000	5400
	Busbar Code	06	-	-	09	12	-	16	23	-	-	-	29	31	33	37	-	40	45	50	54
CCRC - Cu Conductor	Rated Current	650	850	1000	1250	1600	2000	-	-	2500	3200	3400	4000	-	4500	-	5000	-	5750	6300	-
	Busbar Code	06	08	10	12	16	20	-	-	25	32	34	40	-	45	-	50	-	57	63	-
A	(mm)	275	278	283	295	310	330	335	380	355	385	400	415	435	455	475	483	505	535	565	595
B	(mm)	275	278	283	295	310	330	335	380	355	385	400	415	435	455	475	483	505	535	565	595
C	(mm)	275	278	283	295	310	330	335	380	355	385	400	415	435	455	475	483	505	535	565	595

■ The dimensions given above are minimum values. ■ Please call us for non-standard components.



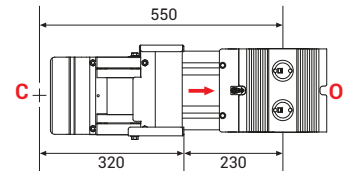
Reduction Modules - RD

Sample Order:
CCRC 32804 - B - RD
 3200 A, Copper, Bolt-on,
 IP 68, 4 Conductor



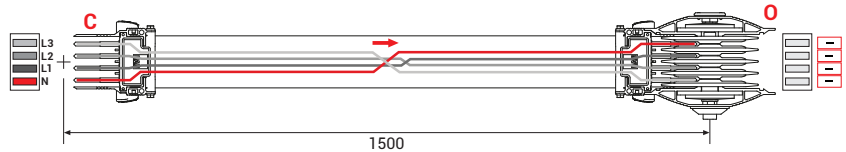
KX - CCR Crossing Module - CCRKX

Sample Order:
CCRC 32804- B - CCRKX
 3200 A, Copper, Bolt-on,
 IP 68, 4 Conductor



Phase Transposition Module - FDM

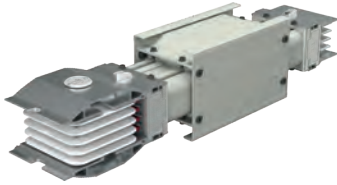
Sample Order:
CCRC 32804- B - FDM
 3200 A, Copper, Bolt-on,
 IP 68, 4 Conductor



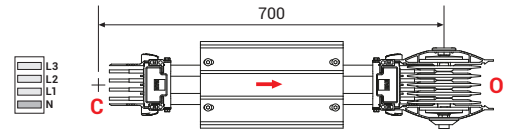
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►► Standard Modules

Vertical Expansion Module - DDT



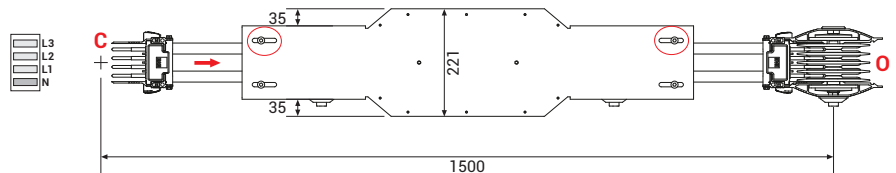
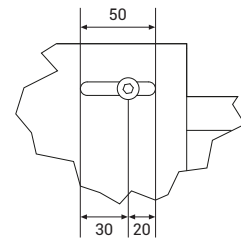
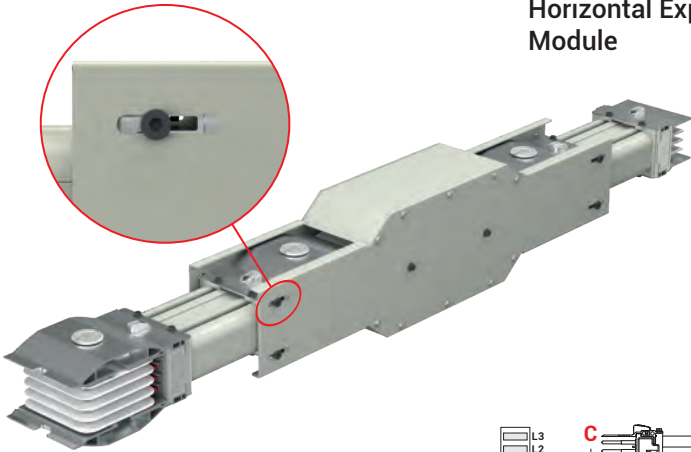
Sample Order:
CCRC 32804 - B - DDT
3200 A, Copper, Bolt-on,
IP 68, 4 Conductor



DDT Expansion

- Used for vertical applications in multi storey buildings. One vertical expansion unit is advised to be used at every floor between fixed support points.

Horizontal Expansion Module - YDT



YDT Horizontal Expansion Module

- It is used as a horizontal expansion element every 40m on a long straight run.

Note:

- If the busbar run passes through a horizontal expansion of building, a Dilation Module has to be used.
- Dilation Modules must be used for very long free lines (>75m) that are closed with an end closer and not fixed on the hanger.
- The movement span of Dilation Module is 50mm.

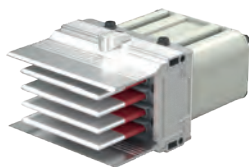
We recommend consulting our company during the project phase.

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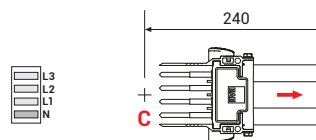
►► End Closers

End Closer

- S 10



Sample Order:
CCRC 32804 - B - S10
3200 A, Copper, Bolt-on,
IP 68, 4 Conductor

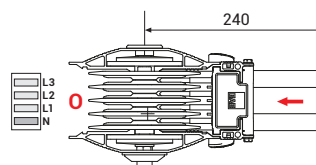


End Closer

- S 11

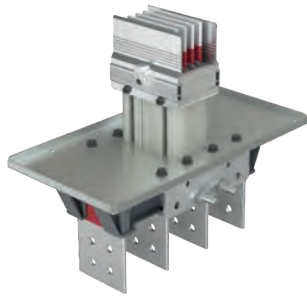


Sample Order:
CCRC 32804 - B - S11
3200 A, Copper, Bolt-on,
IP 68, 4 Conductor



E-LINE CCR

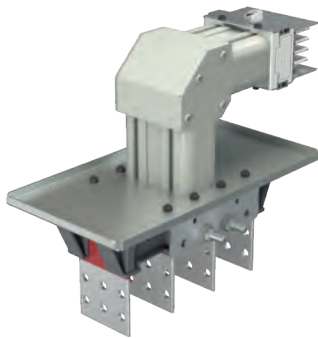
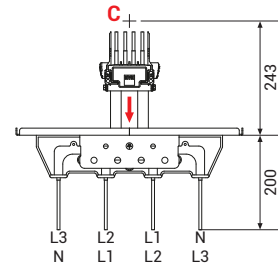
►► Panel / Transformer Connections



Panel / Transformer Connection - **P 10**
- **TR 10**

Panel/Transformer Feeder

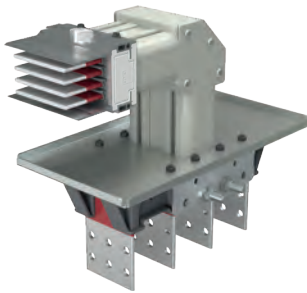
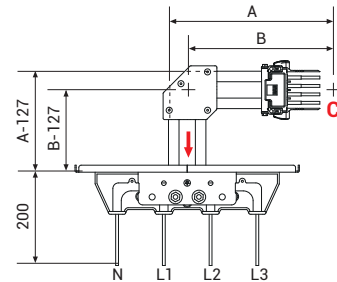
Sample Order:
CCRC 32804 - B - P10
3200 A, Copper, Bolt-on,
IP 68, 4 Conductor



Upwards Panel / Transformer Connection - **PU 20**
- **TU 20**

Panel/Transformer Feeder

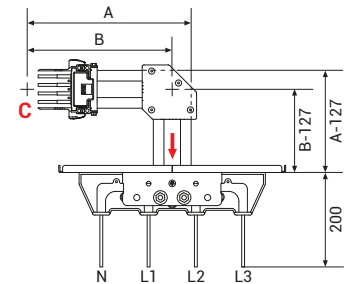
Sample Order:
CCRC 32804 - B - PU20
3200 A, Copper, Bolt-on,
IP 68, 4 Conductor



Downwards Panel / Transformer Connection - **PD 20**
- **TD 20**

Panel/Transformer Feeder

Sample Order:
CCRC 32804 - B - PD20
3200 A, Copper, Bolt-on,
IP 68, 4 Conductor



Conductor Dimension Table

Number of Conductors	3	4	4½	5
A (mm)	337	344	351	351
B (mm)	300	304	307	307



Right Panel / Transformer Connection - **PL 30**
- **TL 30**

Panel/Transformer Feeder

Sample Order:
CCRC 32804 - B - PL30
3200 A, Copper, Bolt-on,
IP 68, 4 Conductor

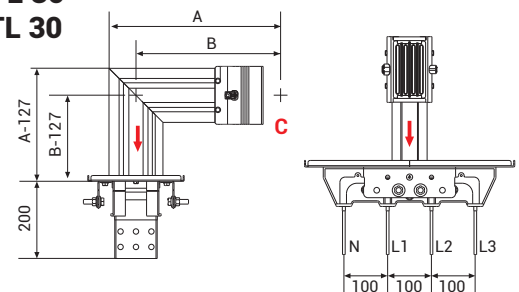


Table For Outer Dimension of Busbars

CCRA - Al Conductor	Rated Current	600	-	-	800	1250	-	1600	2000	-	-	-	2500	3000	3300	3600	-	4000	4500	5000	5400
	Busbar Code	06	-	-	09	12	-	16	23	-	-	-	29	31	33	37	-	40	45	50	54
CCRC - Cu Conductor	Rated Current	650	850	1000	1250	1600	2000	-	-	2500	3200	3400	4000	-	4500	-	5000	-	5750	6300	-
	Busbar Code	06	08	10	12	16	20	-	-	25	32	34	40	-	45	-	50	-	57	63	-
A	(mm)	310	315	325	350	380	420	430	520	470	530	560	590	630	670	710	725	770	830	890	950
B	(mm)	275	278	283	295	310	330	335	380	355	385	400	415	435	455	475	483	505	535	565	595

■ The dimensions given above are minimum values. ■ Please call us for non-standard components.

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►► Panel / Transformer Connections

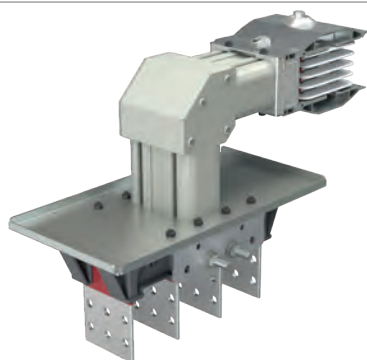
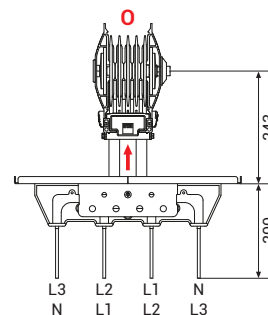


Panel / Transformer Connection

- P 11
- TR 11

Panel/Transformer Output

Sample Order:
CCRC 32804 - B - TR11
3200 A, Copper, Bolt-on,
IP 68, 4 Conductor

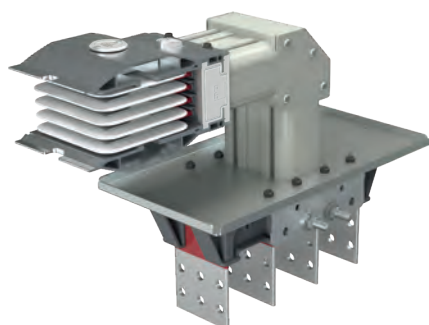
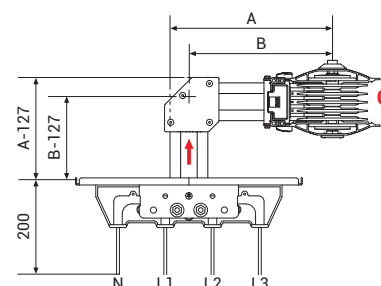


Upwards Panel / Transformer Connection

- PU 21
- TU 21

Panel/Transformer Output

Sample Order:
CCRC 32804 - B - TU21
3200 A, Copper, Bolt-on,
IP 68, 4 Conductor

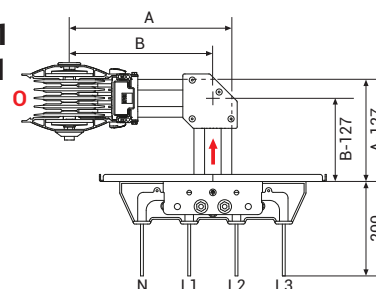


Downwards Panel / Transformer Connection

- PD 21
- TD 21

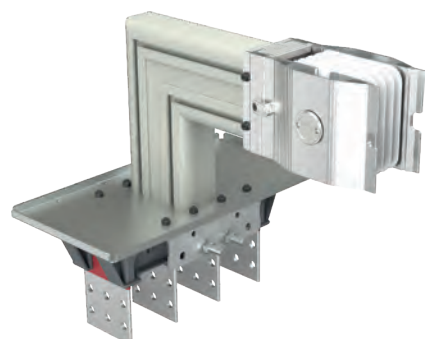
Panel/Transformer Output

Sample Order:
CCRC 32804 - B - TD21
3200 A, Copper, Bolt-on,
IP 68, 4 Conductor



Conductor Dimension Table

Number of Conductors	3	4	4½	5
A (mm)	337	344	351	351
B (mm)	300	304	307	307



Right Panel / Transformer Connection

- PR 31
- TR 31

Panel/Transformer Output

Sample Order:
CCRC 32804 - B - TR31
3200 A, Copper, Bolt-on,
IP 68, 4 Conductor

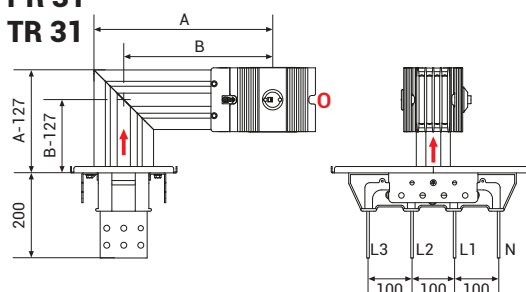


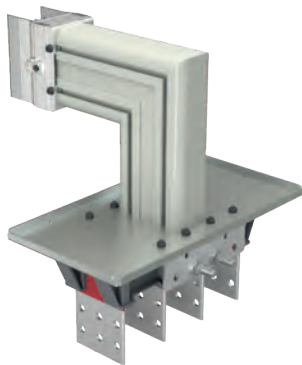
Table For Outer Dimension of Busbars

CCRA - Al Conductor	Rated Current	600	-	-	800	1250	-	1600	2000	-	-	-	2500	3000	3300	3600	-	4000	4500	5000	5400
	Busbar Code	06	-	-	09	12	-	16	23	-	-	-	29	31	33	37	-	40	45	50	54
CCRC - Cu Conductor	Rated Current	650	850	1000	1250	1600	2000	-	-	2500	3200	3400	4000	-	4500	-	5000	-	5750	6300	-
	Busbar Code	06	08	10	12	16	20	-	-	25	32	34	40	-	45	-	50	-	57	63	-
A	(mm)	310	315	325	350	380	420	430	520	470	530	560	590	630	670	710	725	770	830	890	950
B	(mm)	275	278	283	295	310	330	335	380	355	385	400	415	435	455	475	483	505	535	565	595

■ The dimensions given above are minimum values. ■ Please call us for non-standard components.

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►► Panel / Transformer Connections

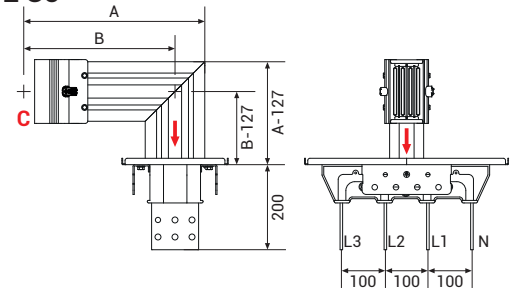


Left Panel / Transformer Connection

Panel/Transformer Feeder

Sample Order:
CCRC 32804 - B - PL30
 3200 A, Copper, Bolt-on,
 IP 68, 4 Conductor

- PL 30 - TL 30



Horizontal Panel / Transformer Connection

Panel/Transformer Feeder

Sample Order:
CCRC 32804 - B - P40
 3200 A, Copper, Bolt-on,
 IP 68, 4 Conductor

- P 40 - TR 40

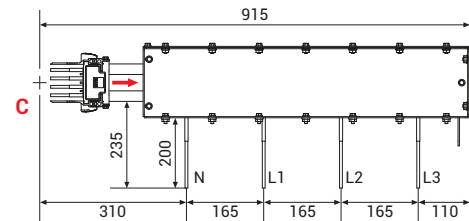
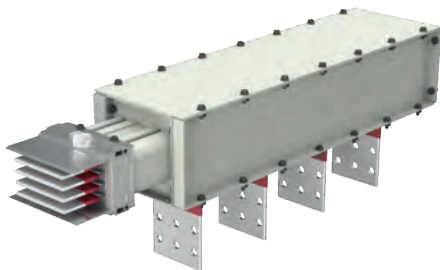


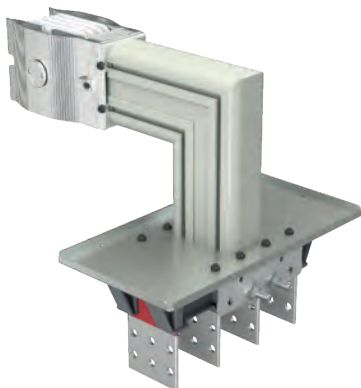
Table For Outer Dimension of Busbars

CCRA - Al Conductor	Rated Current	600	-	-	800	1250	-	1600	2000	-	-	-	2500	3000	3300	3600	-	4000	4500	5000	5400
	Busbar Code	06	-	-	09	12	-	16	23	-	-	-	29	31	33	37	-	40	45	50	54
CCRC - Cu Conductor	Rated Current	650	850	1000	1250	1600	2000	-	-	2500	3200	3400	4000	-	4500	-	5000	-	5750	6300	-
	Busbar Code	06	08	10	12	16	20	-	-	25	32	34	40	-	45	-	50	-	57	63	-
A	(mm)	310	315	325	350	380	420	430	520	470	530	560	590	630	670	710	725	770	830	890	950
B	(mm)	275	278	283	295	310	330	335	380	355	385	400	415	435	455	475	483	505	535	565	595

■ The dimensions given above are minimum values. ■ Please call us for non-standard components.

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►► Panel / Transformer Connections

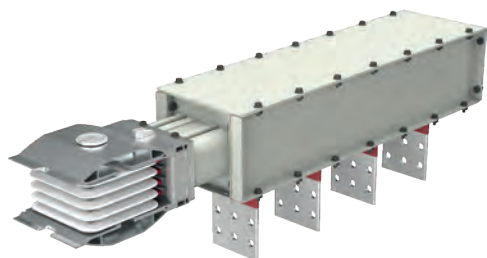
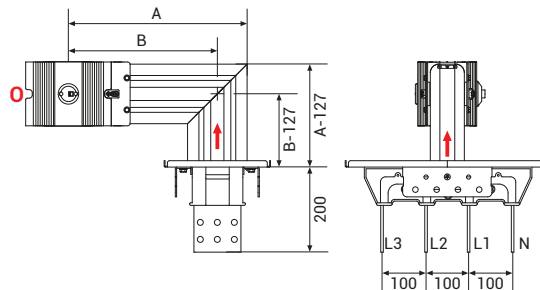


Left Panel / Transformer Connection

- PL 31
- TL 31

Pano/Transformer Output

Sample Order:
CCRC 32804 - B - TL31
3200 A, Copper, Bolt-on,
IP 68, 4 Conductor

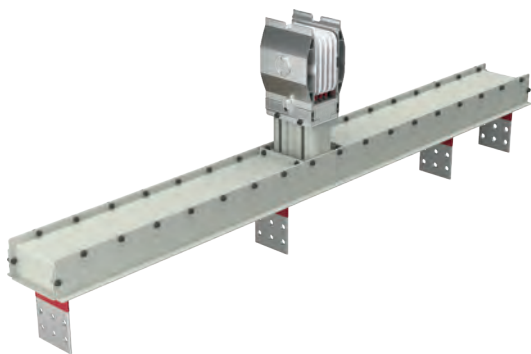
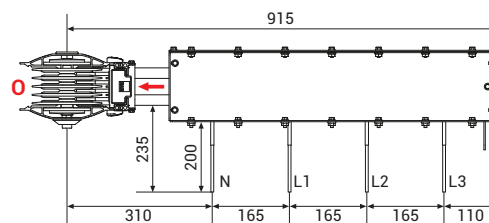


Horizontal Panel / Transformer Connection

- P 41
- TR 41

Pano/Transformer Output

Sample Order:
CCRC 32804 - B - TR41
3200 A, Copper, Bolt-on,
IP 68, 4 Conductor



Transformer Connection - TR 61

Transformer Output

Sample Order:
CCRC 32804 - B - TR61
3200 A, Copper, Bolt-on,
IP 68, 4 Conductor

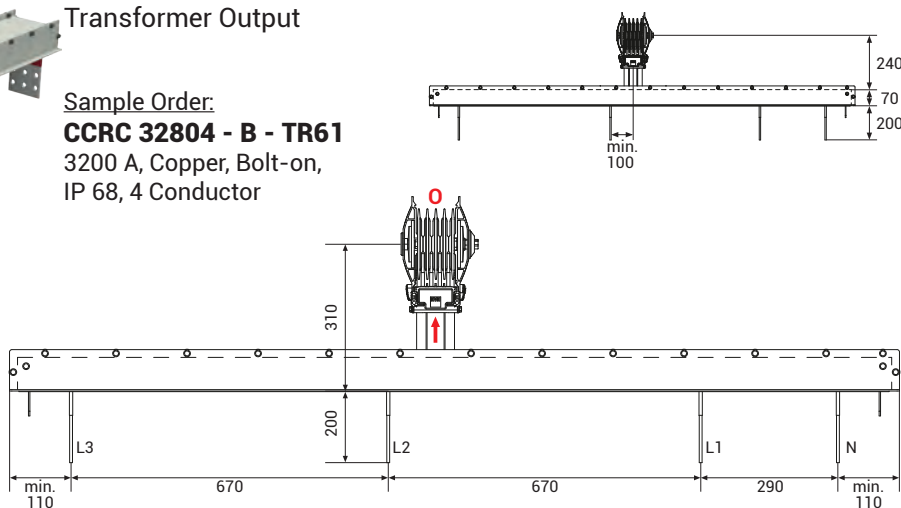


Table For Outer Dimension of Busbars

CCRA - Al Conductor	Rated Current	600	-	-	800	1250	-	1600	2000	-	-	-	2500	3000	3300	3600	-	4000	4500	5000	5400
	Busbar Code	06	-	-	09	12	-	16	23	-	-	-	29	31	33	37	-	40	45	50	54
CCRC - Cu Conductor	Rated Current	650	850	1000	1250	1600	2000	-	-	2500	3200	3400	4000	-	4500	-	5000	-	5750	6300	-
	Busbar Code	06	08	10	12	16	20	-	-	25	32	34	40	-	45	-	50	-	57	63	-
A	(mm)	310	315	325	350	380	420	430	520	470	530	560	590	630	670	710	725	770	830	890	950
B	(mm)	275	278	283	295	310	330	335	380	355	385	400	415	435	455	475	483	505	535	565	595

■ The dimensions given above are minimum values. ■ Please call us for non-standard components.

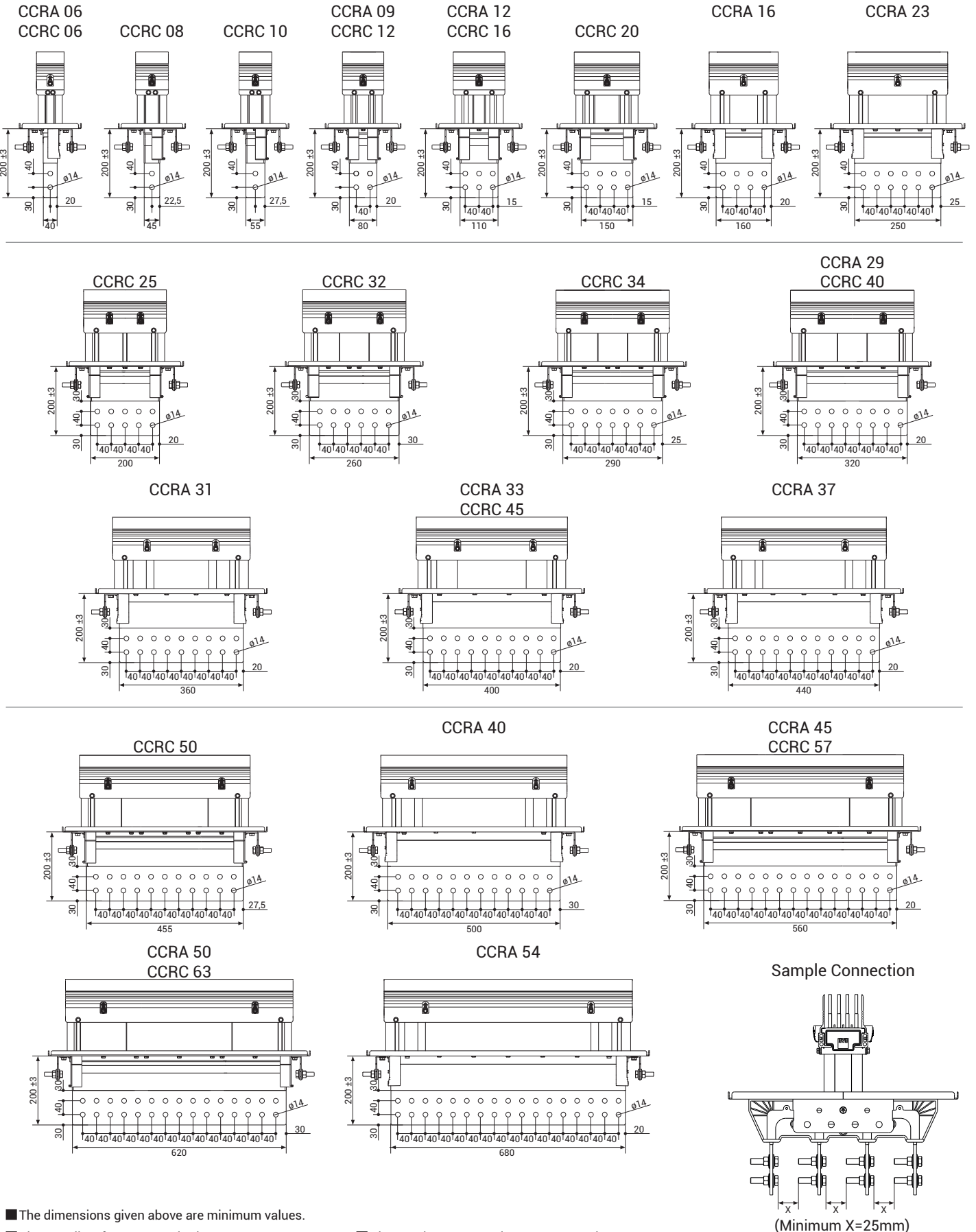
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►► Panel / Transformer Connections



Panel Connection Units

Panel Connection Units (P10, TR11, PU20, TU21, PD20, TD21, PR30, TR31, PL30, TL31, P40, TR41, TR61)



■ The dimensions given above are minimum values.

■ Please call us for non-standard components.

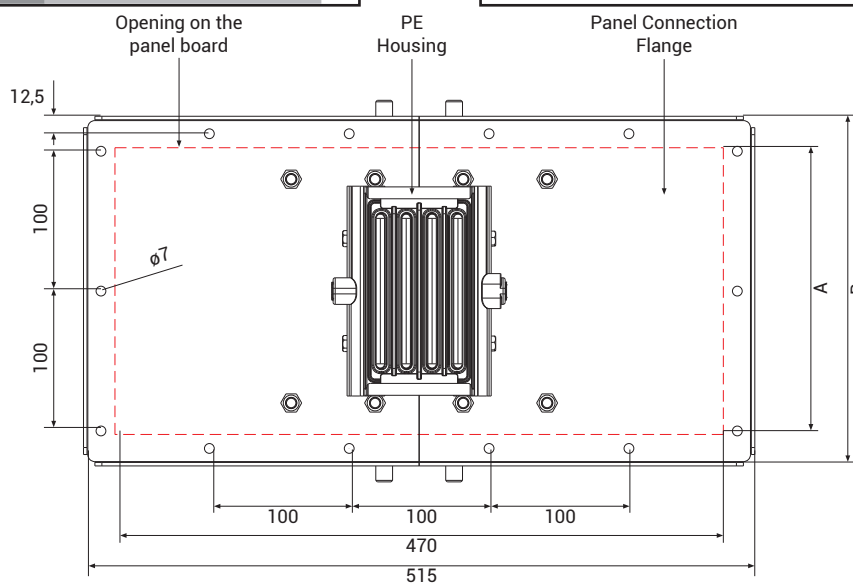
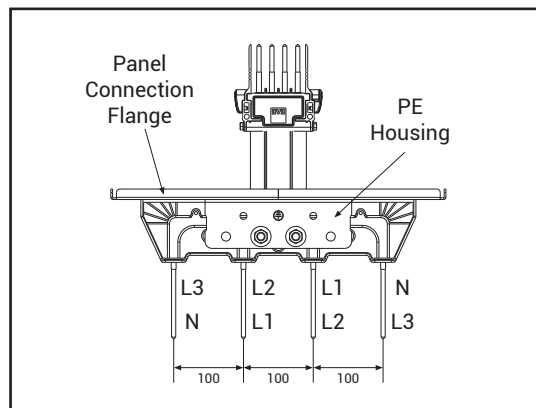
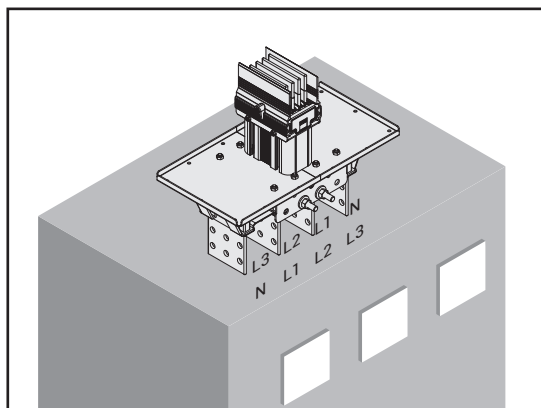
■ Distance between conductors can vary in ± 5 mm.

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►► Panel / Transformer Connections

Panel Modules Flange Dimensions

Panel Connection Units are supplied with suitable flange as standard.



Panel Modules Flange Dimensions

Aluminium (Al)		Copper (Cu)		Conductor	A (mm)	B (mm)	Number of the holes along "B" length	* M6 Bolt/Nut Set (Pcs.)
Rated Current	Busbar Code	Rated Current	Busbar Code					
600	06	650	06	6x40	135	180	2	12
-	-	850	08	6x45	150	195	2	12
-	-	1000	10	6x55	150	195	2	12
800	09	1250	12	6x80	175	220	2	12
1250	12	1600	16	6x110	205	250	3	14
-	-	2000	20	6x150	245	290	3	14
1600	16	-	-	6x160	255	300	3	14
2000	23	-	-	6x250	345	390	4	16
-	-	2500	25	2(6x80)	295	340	4	16
-	-	3200	32	2(6x110)	355	400	4	16
-	-	3400	34	2(6x125)	385	430	5	18
2500	29	4000	40	2(6x140)	415	460	5	18
3000	31	-	-	2(6x160)	455	500	5	18
3300	33	4500	45	2(6x180)	495	540	6	20
3600	37	-	-	2(6x200)	535	580	6	20
-	-	5000	50	3(6x125)	550	595	6	20
4000	40	-	-	3(6x140)	595	640	7	22
4500	45	5750	57	3(6x160)	655	700	7	22
5000	50	6300	63	3(6x180)	715	760	8	24
5400	54	-	-	3(6x200)	775	820	8	24

* Bolt and nut sets are supplied together with related product as per the quantities below.

E-LINE CCR

►► Edgewise and Flatwise CCR Applications

Figure 1 - Edgewise Application

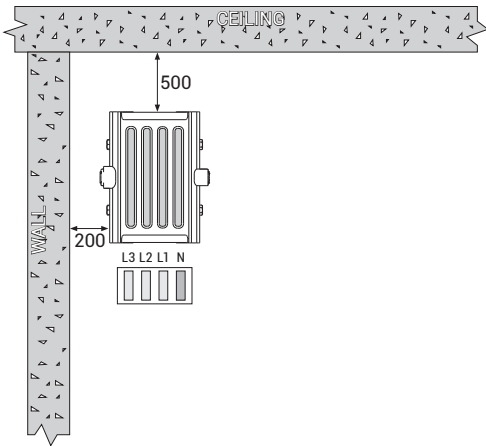
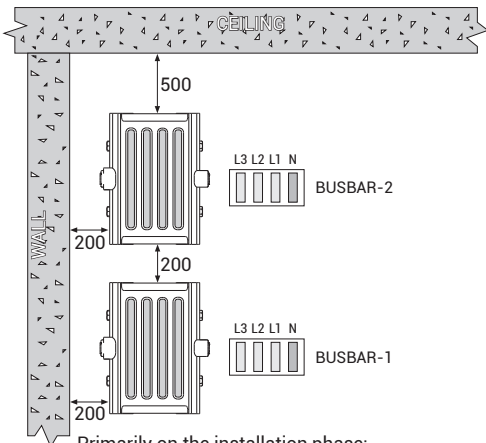
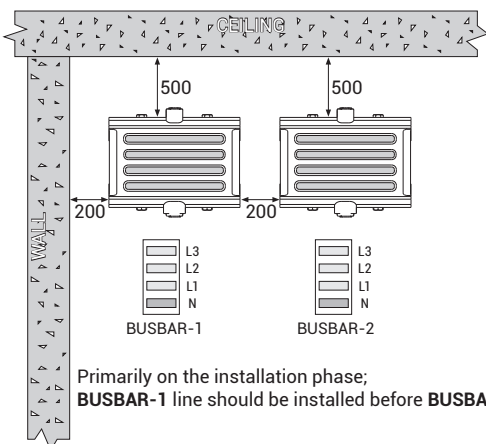


Figure 2 - Edgewise Application



Primarily on the installation phase;
BUSBAR-1 line should be installed before BUSBAR-2 line.

Figure 3 - Flatwise Application



Primarily on the installation phase;
BUSBAR-1 line should be installed before BUSBAR-2 line.

Figure 4 - Crossing Under A Beam On Edgewise Application

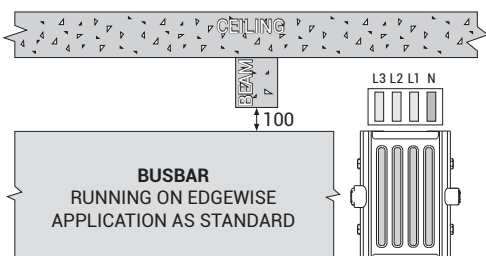


Figure 5 - Crossing Under A Beam On Flatwise Application

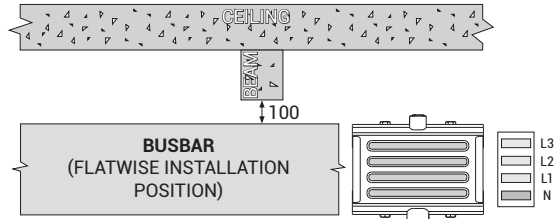


Figure 6 - Sample Wall Crossing With Fire Barrier

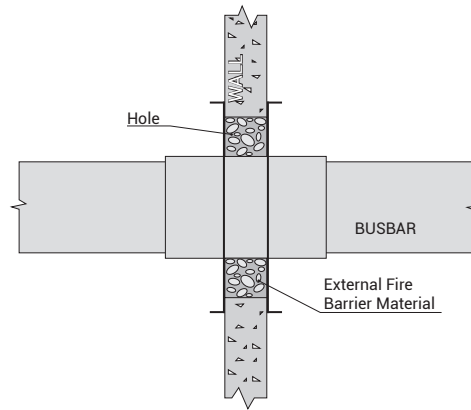
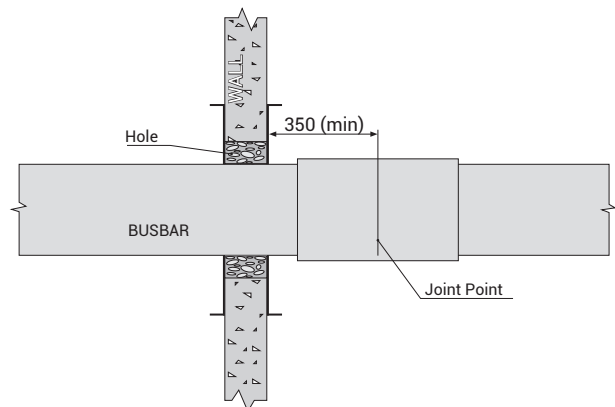


Figure 7 - Standard Wall Crossing



Attention!

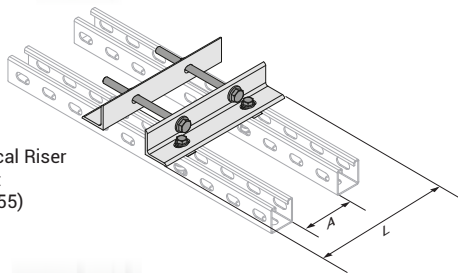
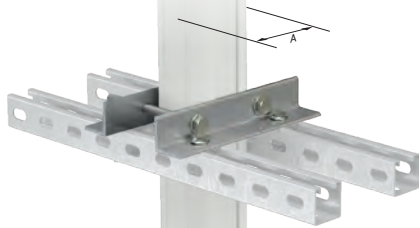
- For correct installation, the dimension from the busbar to the ceiling should not be less than 500mm.
- The joint should not come across to Beams.
- The dimensions given above are minimum values.
- All dimensions are given in mm.

E-LINE CCR

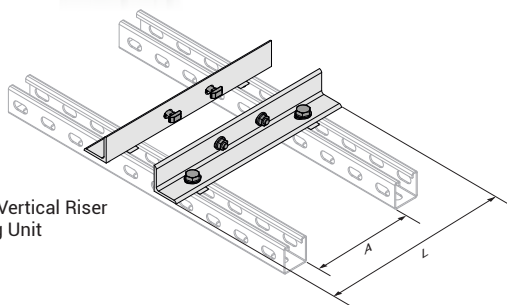
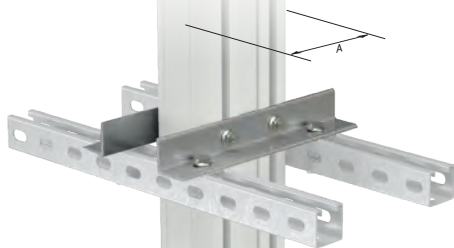
►► Fixing Elements

Vertical Shaft Type Carriers

CCR Vertical Riser Fixing Unit

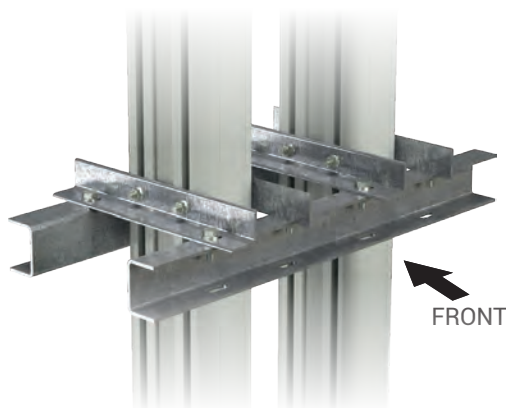
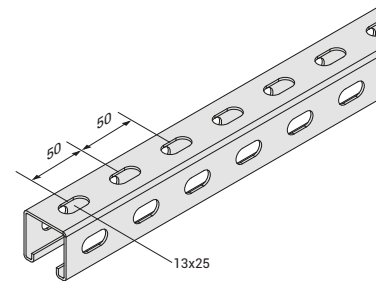
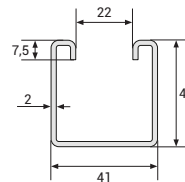
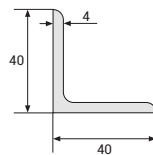


CCR-Vertical Riser Fixing Unit (6x45 - 6x55)



CCR-Vertical Riser Fixing Unit

CCRA - Al Conductor		CCRC - Cu Conductor		Conductor	A (mm)	L (mm)	Order Code
Rated Current	Busbar Code	Rated Current	Busbar Code				
600	06	650	06	6x40	70	225	3266297
-	-	850	08	6x45	75	225	3266297
-	-	1000	10	6x55	85	225	3266297
800	09	1250	12	6x80	110	250	3257224
1250	12	1600	16	6x110	140	280	3257225
-	-	2000	20	6x150	180	320	3257226
1600	16	-	-	6x160	190	330	3290768
2000	23	-	-	6x250	280	420	3290769
-	-	2500	25	2(6x80)	230	370	3257228
-	-	3200	32	2(6x110)	290	430	3257229
-	-	3400	34	2(6x125)	320	460	3257230
2500	29	4000	40	2(6x140)	350	490	3257231
3000	31	-	-	2(6x160)	390	530	3290770
3300	33	4500	45	2(6x180)	430	570	3290771
3600	37	-	-	2(6x200)	470	610	3290772
-	-	5000	50	3(6x125)	485	625	3257232
4000	40	-	-	3(6x140)	530	670	3290773
4500	45	5750	57	3(6x160)	590	730	3257233
5000	50	6300	63	3(6x180)	650	790	3257234
5400	54	-	-	3(6x200)	710	850	3290774



Vertical Riser Application Sample Order Hanging (Special to project)

E-LINE CCR

►► Fixing Elements

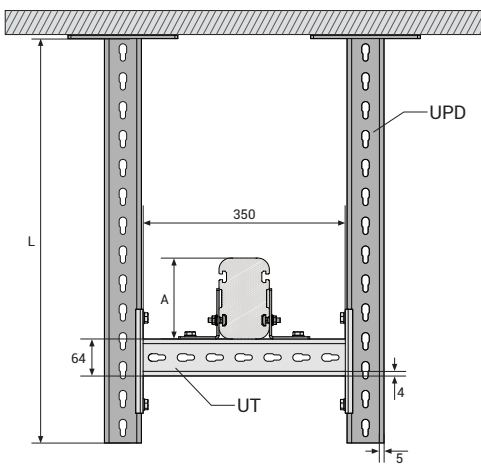
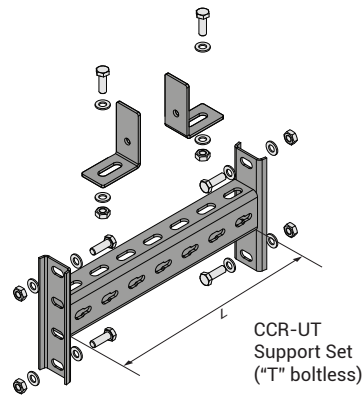
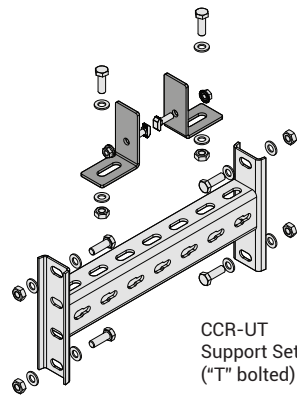
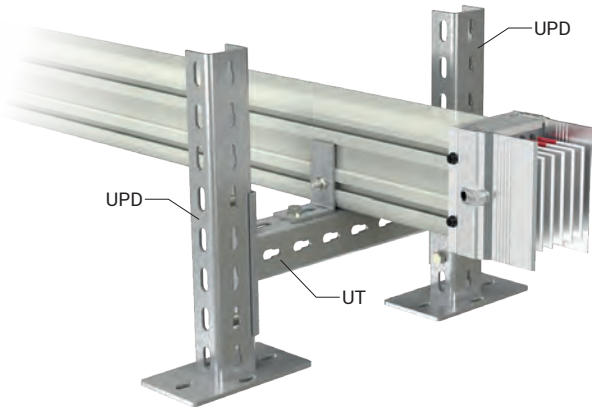
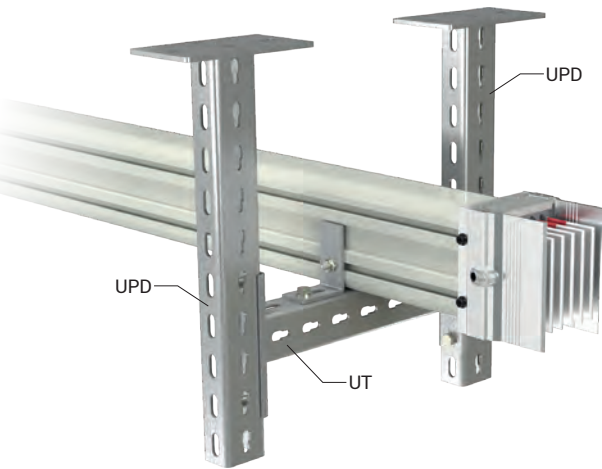


Ceiling Type Supports

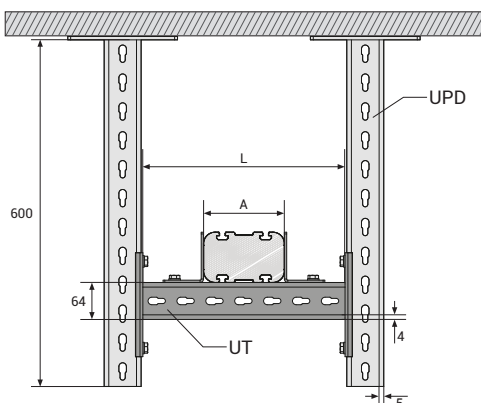
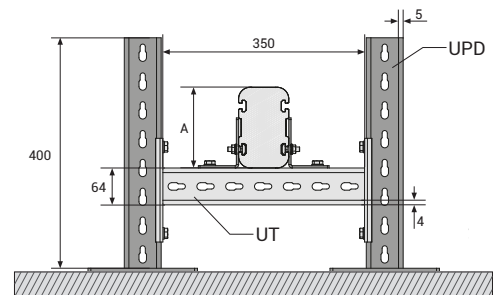
CCR-UT Two-Way For Edgewise Application To NPI Channel

Floor Type Supports

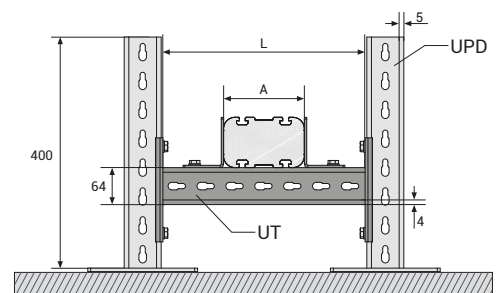
CCR-UT Two-Way For Edgewise Application To NPI Channel



⚠ When selecting an UPD product, please keep in mind to select the UPD product suitable to the Busbar A dimension.



⚠ When choosing CCR-UT Suspension Set, appropriate CCR-UT Suspension Set should be selected according to Busbar size.



■ The dimensions given above are minimum values.

■ Please call us for non-standard components.

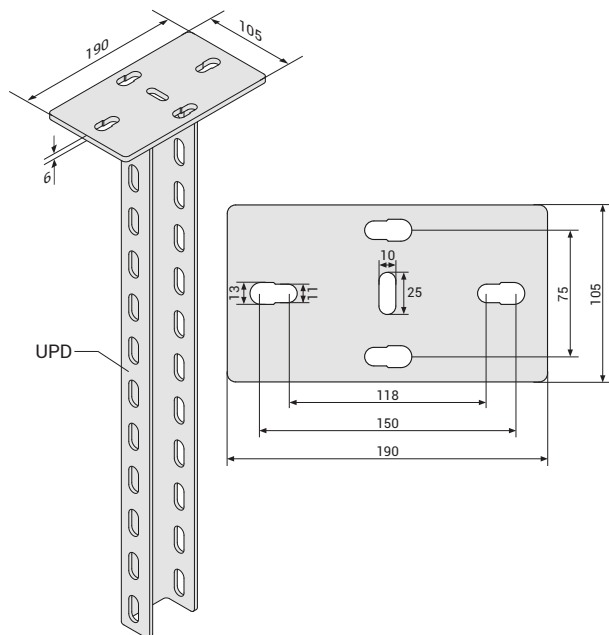
■ All measures are given in mm.

E-LINE CCR

►► Fixing Elements

Heavy Duty Supports (U)

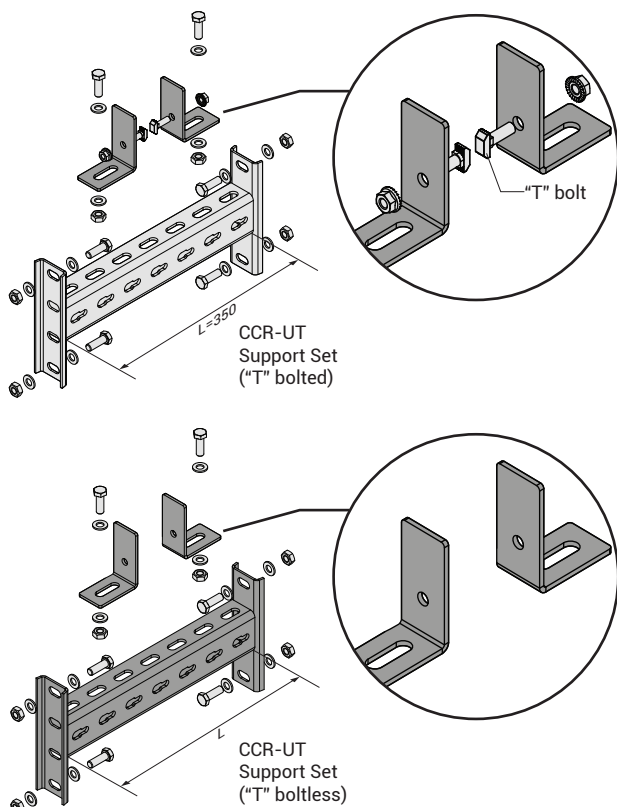
Hot Dip Galvanized After Fabrication (TS EN ISO 1461)



! When selecting an UPD product, please keep in mind to select the UPD product suitable to the Busbar A dimension.

CCRA - Al Conductor		CCRC - Cu Conductor		Conductor	A (mm)	UPD L (mm)	Order Code
Rated Current	Busbar Code	Rated Current	Busbar Code				
Floor Type Supports CCR-UPD Suspension Assembly						400	3004512
600	06	650	06	6x40	70	700	3004518
-	-	850	08	6x45	75	700	3004518
-	-	1000	10	6x55	85	700	3004518
800	09	1250	12	6x80	110	700	3004518
1250	12	1600	16	6x110	140	800	3004519
-	-	2000	20	6x150	180	800	3004519
1600	16	-	-	6x160	190	800	3004519
2000	23	-	-	6x250	280	800	3004519
-	-	2500	25	2(6x80)	230	800	3004519
-	-	3200	32	2(6x110)	290	800	3004519
-	-	3400	34	2(6x125)	320	900	3004520
2500	29	4000	40	2(6x140)	350	1000	3004521
3000	31	-	-	2(6x160)	390	1000	3004521
3300	33	4500	45	2(6x180)	430	1100	3004522
3600	37	-	-	2(6x200)	470	1100	3004522
-	-	5000	50	3(6x125)	485	1100	3004522
4000	40	-	-	3(6x140)	530	1200	3004523
4500	45	5750	57	3(6x160)	590	1200	3004523
5000	50	6300	63	3(6x180)	650	1200	3004523
5400	54	-	-	3(6x200)	710	1300	3004524

CCR-UT Suspension Assembly



CCRA - Al Conductor		CCRC - Cu Conductor		Conductor	A (mm)	UT L (mm)	Order Code
Rated Current	Busbar Code	Rated Current	Busbar Code				
CCR-UT Suspension Assembly ("T" bolted)						350	3257217
600	06	650	06	6x40	70	350	3108705
-	-	850	08	6x45	75	350	3108705
-	-	1000	10	6x55	85	350	3108705
800	09	1250	12	6x80	110	350	3108705
1250	12	1600	16	6x110	140	350	3108705
-	-	2000	20	6x150	180	450	3108707
1600	16	-	-	6x160	190	450	3108707
2000	23	-	-	6x250	280	450	3108707
-	-	2500	25	2(6x80)	230	450	3108707
-	-	3200	32	2(6x110)	290	550	3108708
-	-	3400	34	2(6x125)	320	550	3108708
2500	29	4000	40	2(6x140)	350	650	3108709
3000	31	-	-	2(6x160)	390	750	3108710
3300	33	4500	45	2(6x180)	430	750	3108710
3600	37	-	-	2(6x200)	470	750	3108710
-	-	5000	50	3(6x125)	485	750	3108710
4000	40	-	-	3(6x140)	530	850	3108711
4500	45	5750	57	3(6x160)	590	850	3108711
5000	50	6300	63	3(6x180)	650	950	3108712
5400	54	-	-	3(6x200)	710	1050	3290778

! When choosing CCR-UT Suspension Set, appropriate CCR-UT Suspension Set should be selected according to Busbar size.

■ The dimensions given above are minimum values.

■ Please call us for non-standard components.

■ Please check our Suspension Systems (A-A) Catalogue to see our alternative solutions for suspension types.

■ All measures are given in mm.

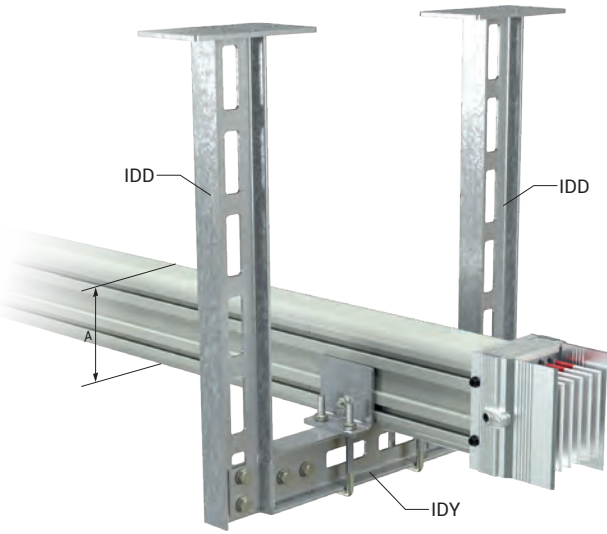
E-LINE CCR

►► Fixing Elements



Ceiling Type Supports

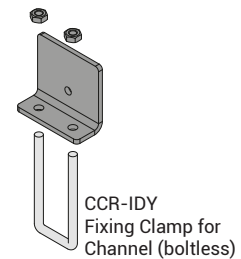
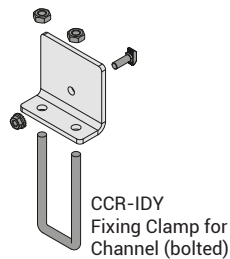
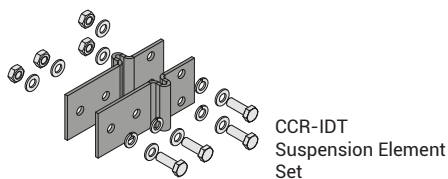
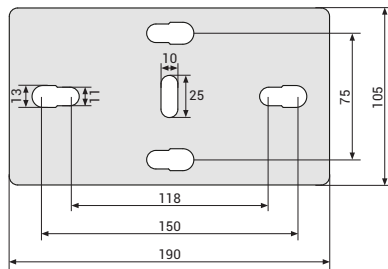
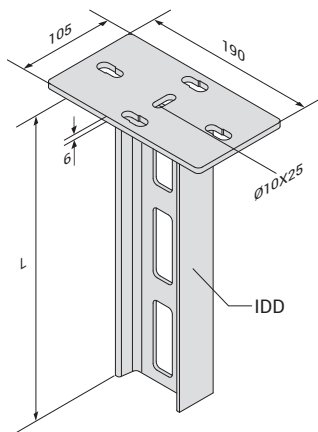
CCR-UT Two-Way For Edgewise Application To NPI Channel



CCRA - Al Conductor		CCRC - Cu Conductor		Conductor	A (mm)	Description	IDD L (mm)	Order Code
Rated Current	Busbar Code	Rated Current	Busbar Code					
600	06	650	06	6x40	70	IDD 500	500	3008312
-	-	850	08	6x45	75	IDD 500	500	3008312
-	-	1000	10	6x55	85	IDD 500	500	3008312
800	09	1250	12	6x80	110	IDD 500	500	3008312
1250	12	1600	16	6x110	140	IDD 600	600	3008311
-	-	2000	20	6x150	180	IDD 700	700	3008310
1600	16	-	-	6x160	190	IDD 700	700	3008310
2000	23	-	-	6x250	280	IDD 700	700	3008310
-	-	2500	25	2(6x80)	230	IDD 700	700	3108707
-	-	3200	32	2(6x110)	290	IDD 800	800	3008309
-	-	3400	34	2(6x125)	320	IDD 800	800	3008309
2500	29	4000	40	2(6x140)	350	IDD 800	800	3008309
3000	31	-	-	2(6x160)	390	IDD 900	900	3008308
3300	33	4500	45	2(6x180)	430	IDD 1000	1000	3008307
3600	37	-	-	2(6x200)	470	IDD 1000	1000	3008307
-	-	5000	50	3(6x125)	485	IDD 1000	1000	3008307
4000	40	-	-	3(6x140)	530	IDD 1100	1100	3008306
4500	45	5750	57	3(6x160)	590	IDD 1100	1100	3008306
5000	50	6300	63	3(6x180)	650	IDD 1100	1100	3008306
5400	54	-	-	3(6x200)	710	IDD 1200	1200	3008305

Supports

CCR-IDT Suspension Element Set	3008279
CCR-IDY Fixing Clamp for Channel (bolted)	3265712
CCR-IDY Fixing Clamp for Channel (boltless)	3265713



■ The dimensions given above are minimum values.

■ Please call us for non-standard components.

■ Please check our Suspension Systems (A-A) Catalogue to see our alternative solutions for suspension types.

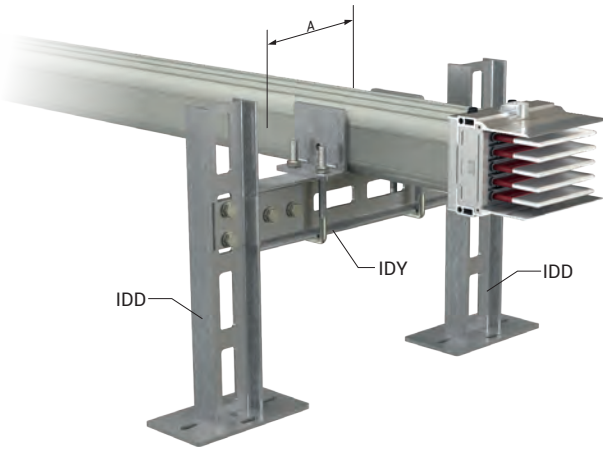
■ All measures are given in mm.

E-LINE CCR

►► Fixing Elements

Floor Type Supports

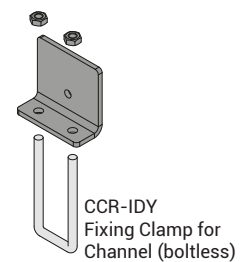
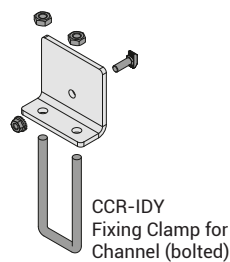
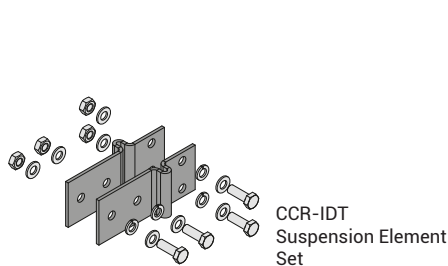
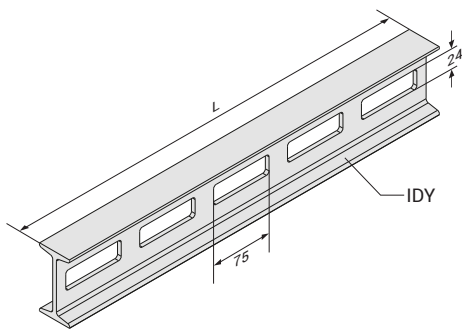
CCR-IDY Two-Way For Edgewise Application To NPI Channel



CCRA - Al Conductor		CCRC - Cu Conductor		Conductor	A (mm)	Description	IDY L (mm)	Order Code
Rated Current	Busbar Code	Rated Current	Busbar Code					
600	06	650	06	6x40	70	IDY 400	400	3008290
-	-	850	08	6x45	75	IDY 400	400	3008290
-	-	1000	10	6x55	85	IDY 400	400	3008290
800	09	1250	12	6x80	110	IDY 400	400	3008290
1250	12	1600	16	6x110	140	IDY 400	400	3008290
-	-	2000	20	6x150	180	IDY 400	400	3008290
1600	16	-	-	6x160	190	IDY 500	500	3008289
2000	23	-	-	6x250	280	IDY 500	500	3008289
-	-	2500	25	2(6x80)	230	IDY 500	500	3008289
-	-	3200	32	2(6x110)	290	IDY 500	500	3008289
-	-	3400	34	2(6x125)	320	IDY 600	600	3008288
2500	29	4000	40	2(6x140)	350	IDY 600	600	3008288
3000	31	-	-	2(6x160)	390	IDY 700	700	3008287
3300	33	4500	45	2(6x180)	430	IDY 700	700	3008287
3600	37	-	-	2(6x200)	470	IDY 700	700	3008287
-	-	5000	50	3(6x125)	485	IDY 700	700	3008287
4000	40	-	-	3(6x140)	530	IDY 800	800	3008286
4500	45	5750	57	3(6x160)	590	IDY 800	800	3008286
5000	50	6300	63	3(6x180)	650	IDY 900	900	3008285
5400	54	-	-	3(6x200)	710	IDY 1000	1000	3008284

Supports

CCR-IDT Suspension Element Set	3008279
CCR-IDY Fixing Clamp for Channel (bolted)	3265712
CCR-IDY Fixing Clamp for Channel (boltless)	3265713



■ The dimensions given above are minimum values.

■ Please call us for non-standard components.

■ Please check our Suspension Systems (A-A) Catalogue to see our alternative solutions for suspension types.

■ All measures are given in mm.

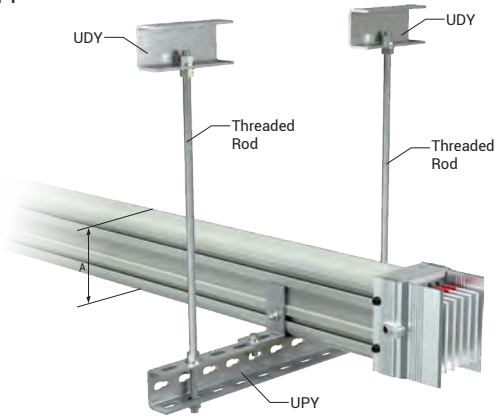
E-LINE CCR

►► Fixing Elements

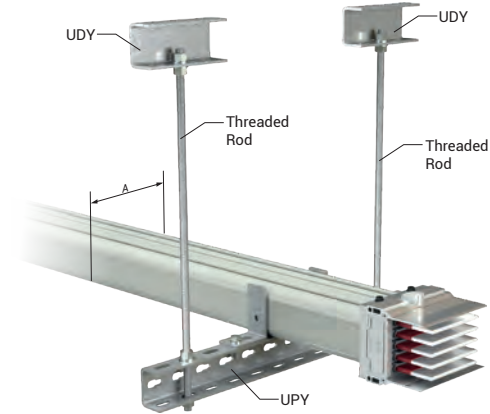


Ceiling Type Supports

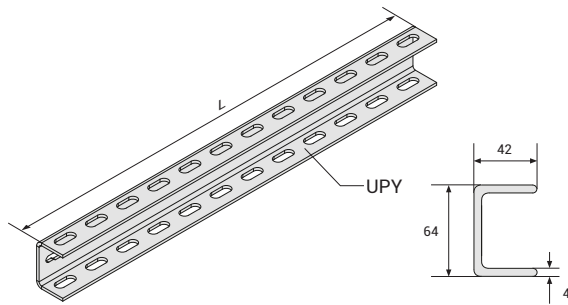
CCR-Threaded Rod Two-Way For Edgewise Application To NPI Channel



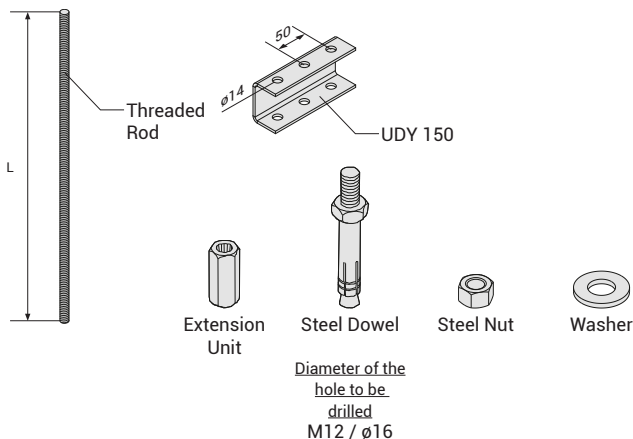
CCR-Threaded Rod Two-Way For Flatwise Application To NPI Channel



Supports



Fixing Elements

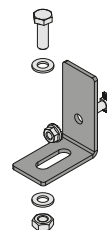


CCRA - Al Conductor		CCRC - Cu Conductor		Conductor	A (mm)	Description	UPY L (mm)	Order Code
Rated Current	Busbar Code	Rated Current	Busbar Code					
600	06	650	06	6x40	70	UPY 600	600	3004493
-	-	850	08	6x45	75	UPY 600	600	3004493
-	-	1000	10	6x55	85	UPY 600	600	3004493
800	09	1250	12	6x80	110	UPY 600	600	3004493
1250	12	1600	16	6x110	140	UPY 600	600	3004493
-	-	2000	20	6x150	180	UPY 700	700	3004495
1600	16	-	-	6x160	190	UPY 700	700	3004495
2000	23	-	-	6x250	280	UPY 800	800	3004496
-	-	2500	25	2(6x80)	230	UPY 700	700	3004495
-	-	3200	32	2(6x110)	290	UPY 800	800	3004496
-	-	3400	34	2(6x125)	320	UPY 800	800	3004496
2500	29	4000	40	2(6x140)	350	UPY 900	900	3004497
3000	31	-	-	2(6x160)	390	UPY 900	900	3004497
3300	33	4500	45	2(6x180)	430	UPY 1000	1000	3004498
3600	37	-	-	2(6x200)	470	UPY 1000	1000	3004498
-	-	5000	50	3(6x125)	485	UPY 1000	1000	3004498
4000	40	-	-	3(6x140)	530	UPY 1100	1100	3004499
4500	45	5750	57	3(6x160)	590	UPY 1100	1100	3004499
5000	50	6300	63	3(6x180)	650	UPY 1100	1100	3004499
5400	54	-	-	3(6x200)	710	UPY 1200	1200	3004500

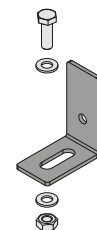
UDY 150							150	3008376
BRA 14-05 Threaded Rod (M12)							500	5000026

CCR-L Support Set ("T" bolted)							2118621	
CR-L Suspension Connection Kit("T" boltless)							2054886	
BRA 13 Extension Unit (M12)							1004282	
BRA 9 Steel Dowel (M12)							5000022	
M12 Steel Nut							1000964	
M12 Washer							1000505	

CCR-L Suspension Set



CR-L Suspension Connection Set



■ Please check our Suspension Systems (A-A) Catalogue to see our alternative solutions for suspension types.

■ All measures are given in mm.

■ The dimensions given above are minimum values.

■ Please call us for non-standard components.

E-LINE CCR

▶▶ Measuring a Special Length

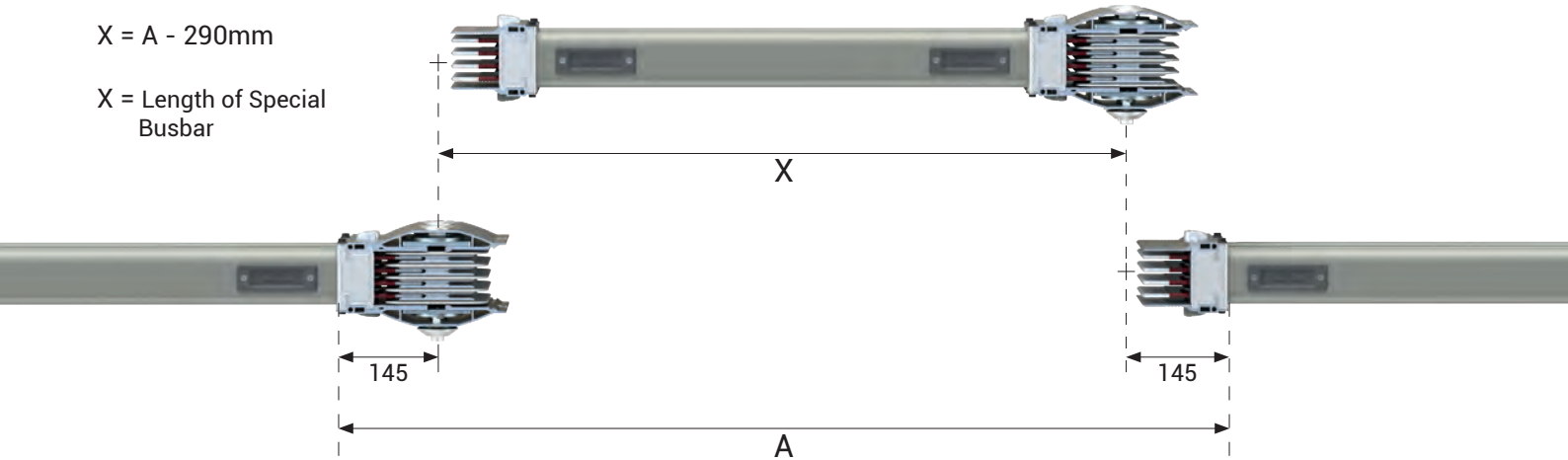


After installation of standard busbar 3m lengths, you will be in need of special lengths which are smaller than 3m. The minimum length for these special elements can be 450mm. Please measure the lengths of these modules as shown below.

Length A is measured between housing of 2 busbars in mm. A. The special length is calculated by deducting 290mm from this measured length.

$$X = A - 290\text{mm}$$

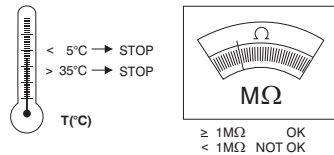
X = Length of Special Busbar



▶▶ Preparation of Joint Resin 4

The meger test must be carried out before casting. If Resin 4 (A) and Resin 4 (B) are stored in a cold environment, they should be kept in a warm environment one day before casting (> 20 °C). Ambient temperature during casting should be 5 °C < T casting < 35 °C.

Preparation of Resin 4



Amount of Resin to be Used

Aluminium (Al)		Copper (Cu)		Conductor	3 Conductor (kg)	4 Conductor (kg)	4½ - 5 Conductor (kg)
Rated Current	Busbar Code	Rated Current	Busbar Code				
600	06	650	06	6x40	1,1	1,3	1,4
-	-	850	08	6x45	1,2	1,4	1,7
-	-	1000	10	6x55	1,2	1,5	1,5
800	09	1250	12	6x80	1,4	1,6	1,8
1250	12	1600	16	6x110	1,6	1,9	2,1
-	-	2000	20	6x150	1,9	2,3	2,6
1600	16	-	-	6x160	2,0	2,4	2,7
2000	23	-	-	6x250	2,6	3,0	3,5
-	-	2500	25	2(6x80)	2,3	2,7	3,0
-	-	3200	32	2(6x110)	2,8	3,3	3,5
-	-	3400	34	2(6x125)	3,1	3,6	4,0
2500	29	4000	40	2(6x140)	3,3	3,9	4,2
3000	31	-	-	2(6x160)	3,7	4,3	4,9
3300	33	4500	45	2(6x180)	4,2	4,7	5,3
3600	37	-	-	2(6x200)	4,4	5,1	5,7
-	-	5000	50	3(6x125)	4,5	5,2	5,7
4000	40	-	-	3(6x140)	5,0	5,7	6,5
4500	45	5750	57	3(6x160)	5,4	6,2	6,9
5000	50	6300	63	3(6x180)	6,1	7,0	7,6
5400	54	-	-	3(6x200)	6,7	7,6	7,8

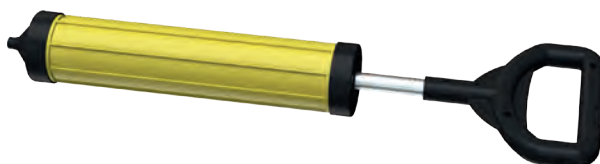
Based on the joint, find the total mixture from the table values on the side.

Mix the mixture with a beater at low speed for at least 30sec - 1 minutes until it is homogeneous.

CCR Transparent Pipe (Level Check)



CCR Injection pump

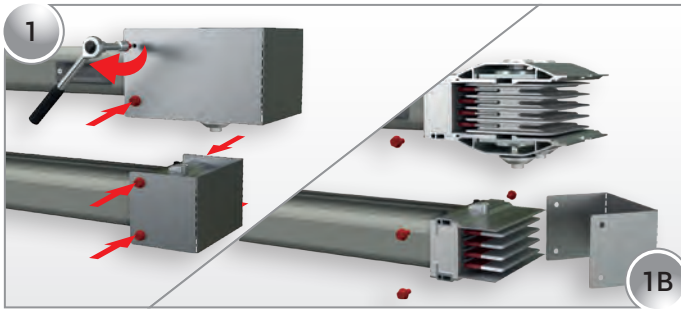


Casting Materials

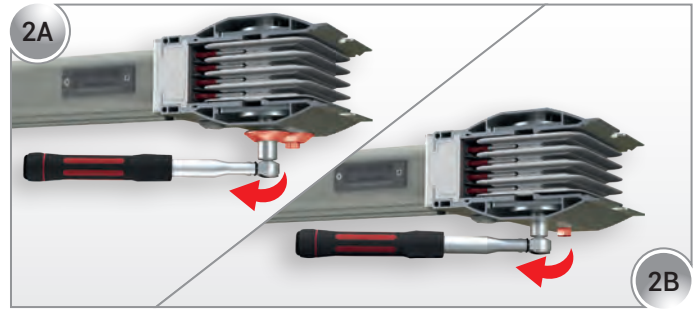
Description	Order Code
CCR Transparent Pipe (Level Check)	3271279
CCR Injection pump	3254100

E-LINE CCR

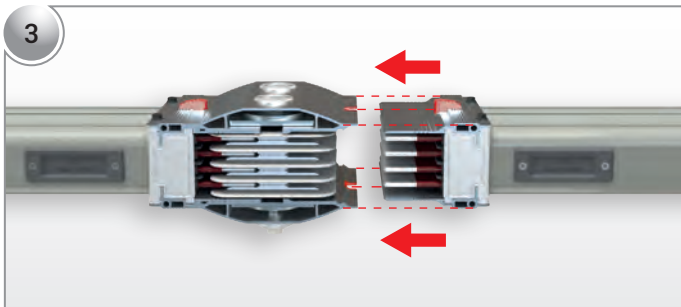
►► Installation / Flatwise



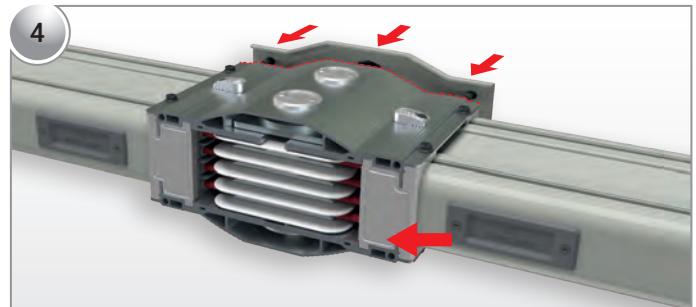
Unscrew the bolts and remove the busbar protection cover.



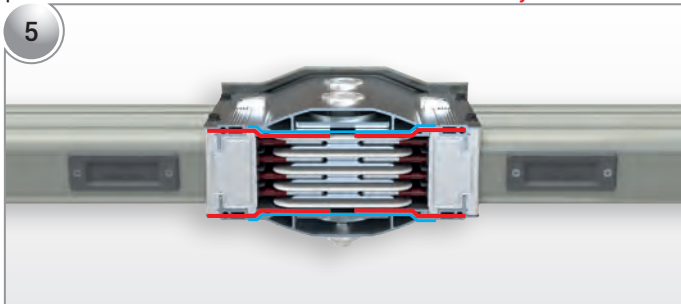
First busbar hanging is performed and conformity is controlled from each direction. Adjunct bolts are lightly loosened.



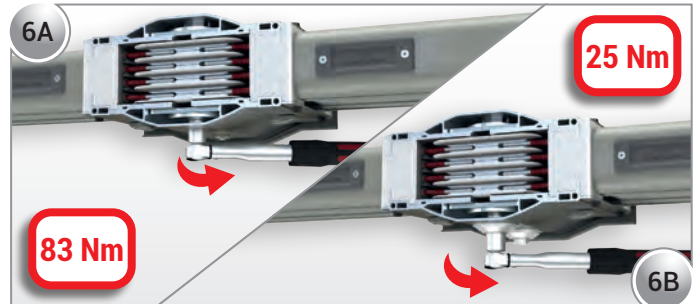
Direction of adjunct busbar and conformity of alignment parts are controlled. Busbar is assembled in a way to overlap small alignment parts. **Attention! Make sure that the conductors are dry and clean!**



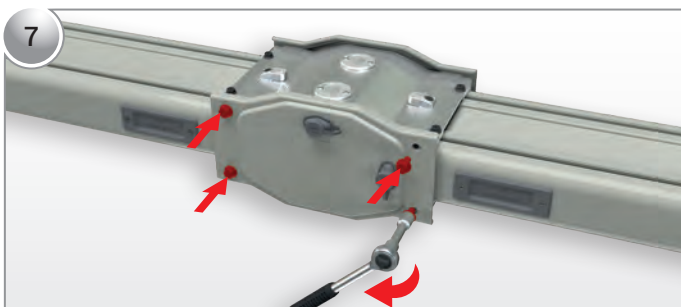
The joint block cover is attached to align the block joint and the bolts are tightened not too strong.



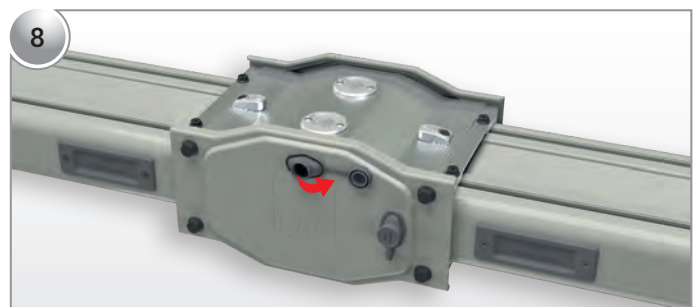
Busbar is approached to alignment slots until it is perfectly seated. Adjunct bolts are tightened after checking alignments.



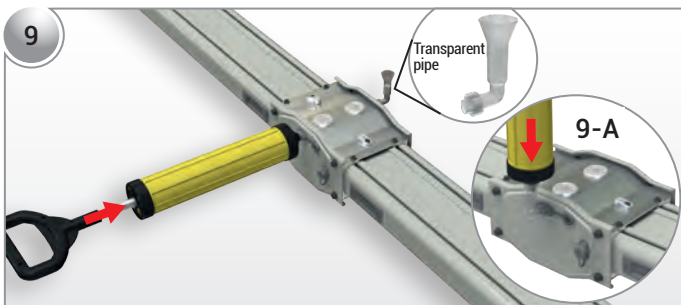
Joint bolts are tightened after checking alignments. Joint covers are placed.



Adjunct lids are placed.



Plastic lid of the pouring area is removed. **Attention! Pouring is done through the lid that is positioned on the upper side according to the busbar position direction.**



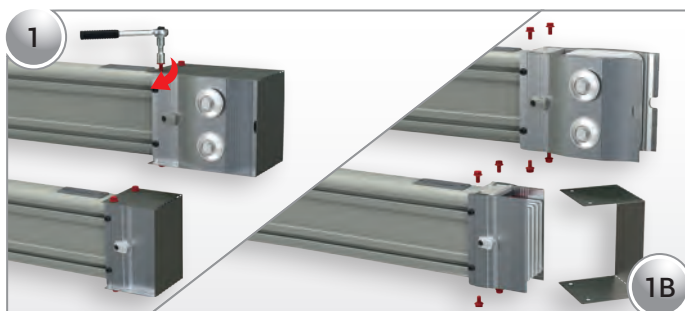
Apply injection from the filler hole and use transparent pipe for behind hole. Continue the filling process until you see silicon inside the transparent pipe. (If you don't have enough space for injection, use transparent pipe for both sides)



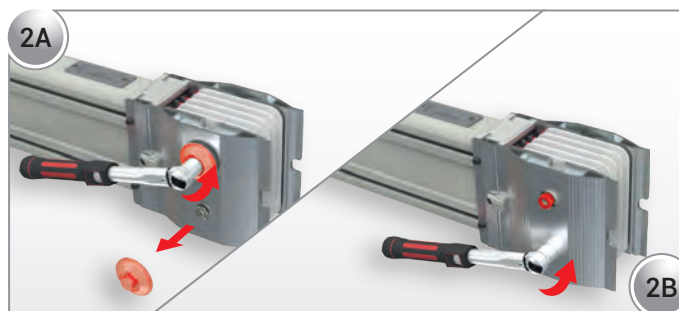
Once the injection is done, plastic lid is placed and installation is completed.

E-LINE CCR

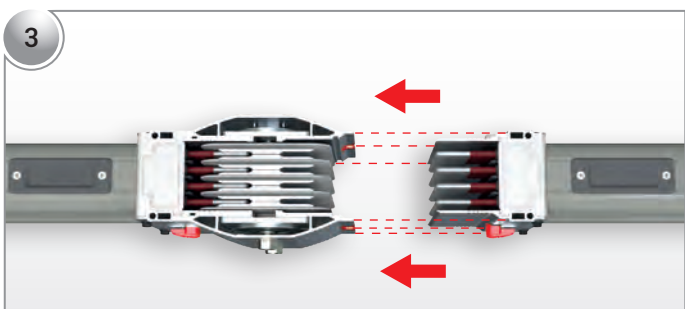
►► Installation / Edgewise



Unscrew the bolts and remove the busbar protection cover.



First busbar hanging is performed and conformity is controlled from each direction. Adjunct bolts are lightly loosened after removing the bolt protection lids.

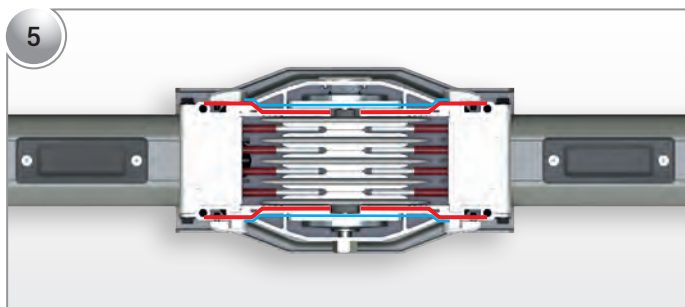


Direction of adjunct busbar and conformity of alignment parts are controlled. Busbar is assembled, aligning big alignment part to big, small part to small.

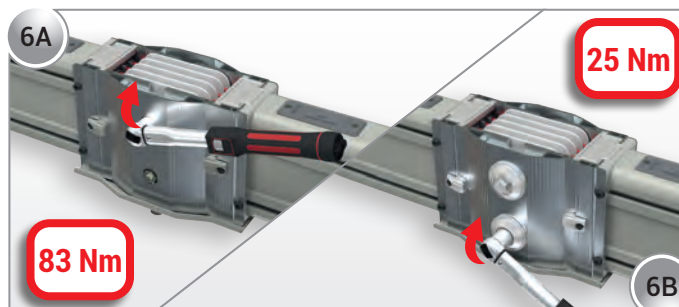
Attention! Make sure that the conductors are dry and clean!



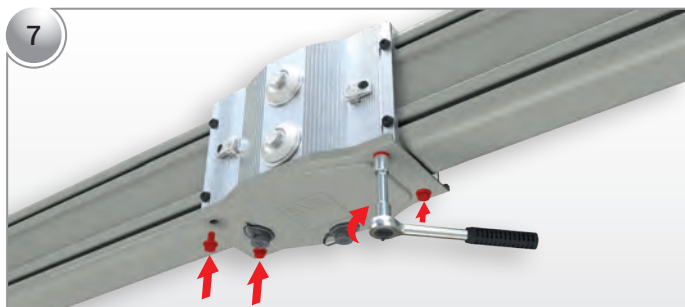
The joint block cover is attached to align the block joint and the bolts are tightened not too strong.



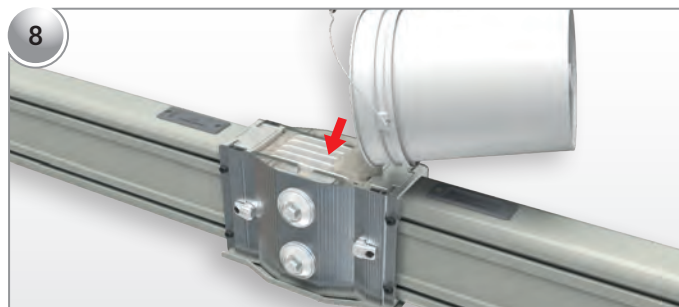
Busbar is approached to alignment sockets until it is perfectly seated.



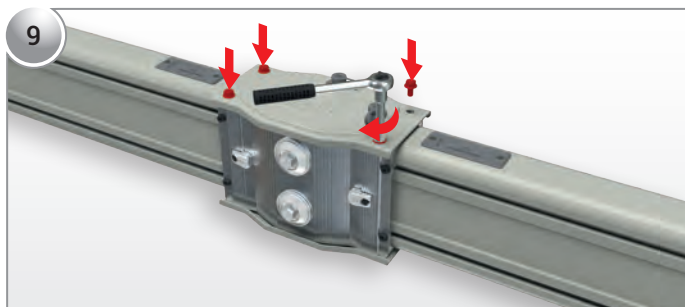
Adjunct bolts are tightened with a moment of 83Nm after checking alignments. Bolt protection lids are attached.



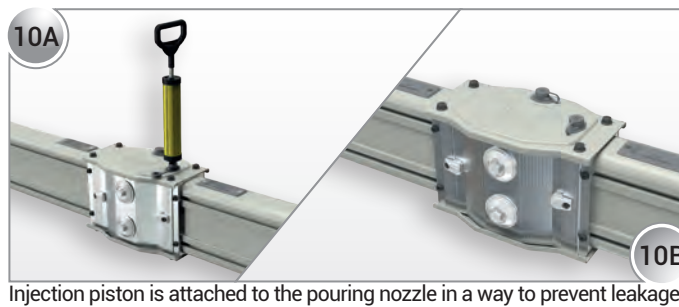
Only the lower lid of the adjunct is attached. Bolts are tightened.



Mixture is poured in a single point over the conductors in the aligned adjunct with the lower-lid capped. It is poured until the maximum level.



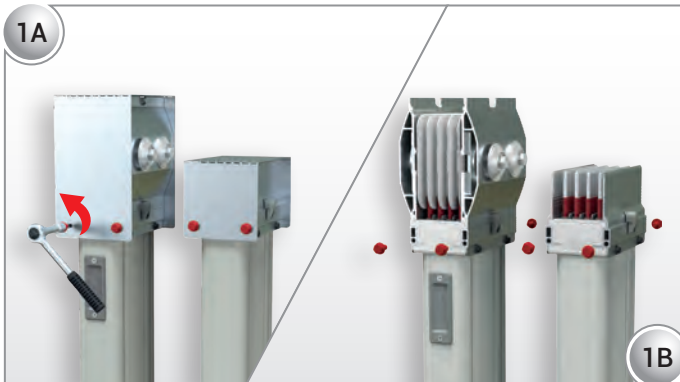
Upper adjunct lid is attached. Bolts are tightened.



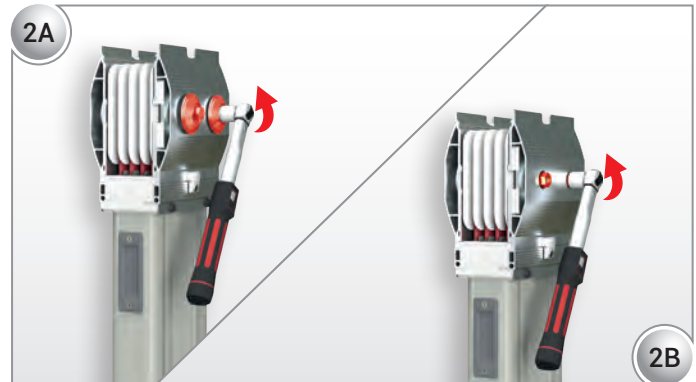
Injection piston is attached to the pouring nozzle in a way to prevent leakage, and "Resin 4" material injected inside the adjunct with the help of the handle. Once the injection is done, plastic lid is placed and installation is completed.

E-LINE CCR

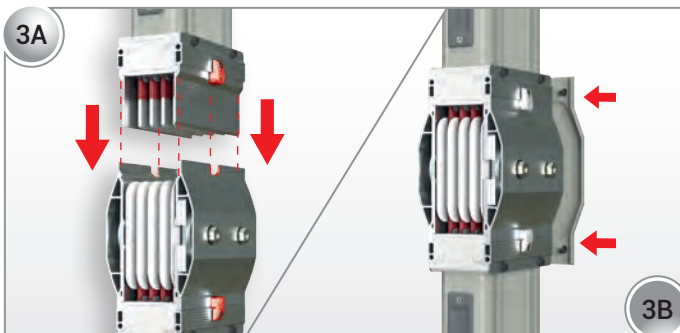
►► Installation / Vertical



Unscrew the bolts and remove the busbar protection cover.

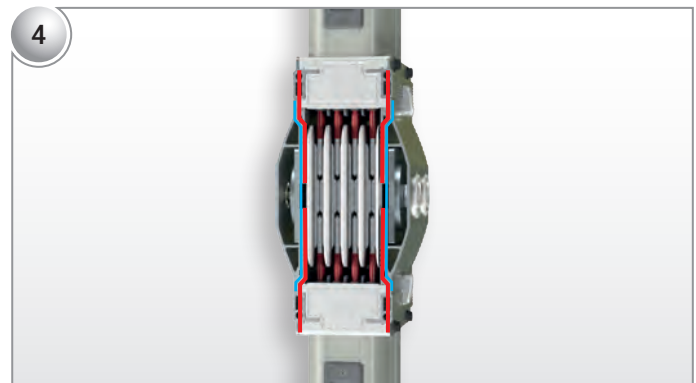


First busbar hanging is performed and conformity is controlled from each direction. Adjunct bolts are lightly loosened after removing the bolt protection lids.

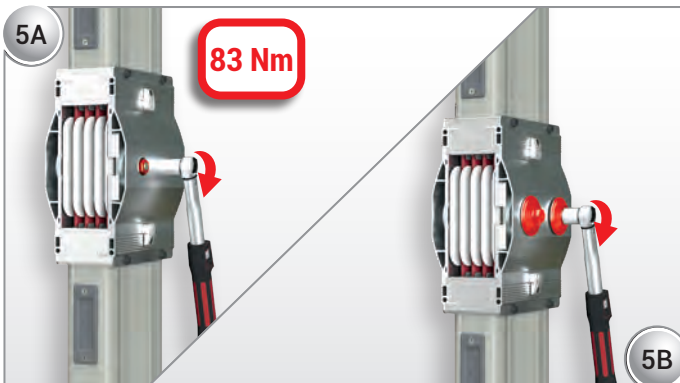


Direction of adjunct busbar and conformity of alignment parts are controlled. Busbar is assembled, aligning big alignment part to big, small part to small. The joint block cover is attached to align the block joint and the bolts are tightened not too strong.

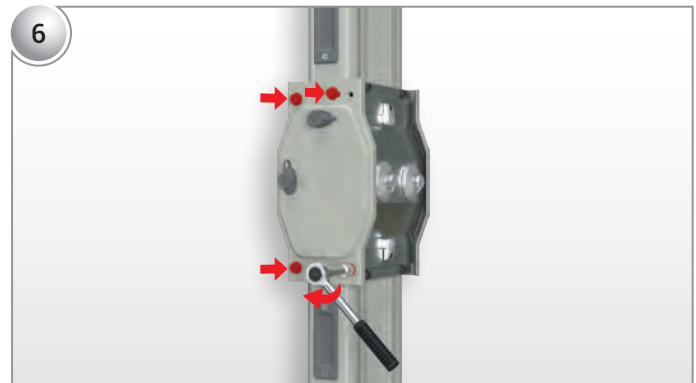
Attention! Make sure that the conductors are dry and clean!



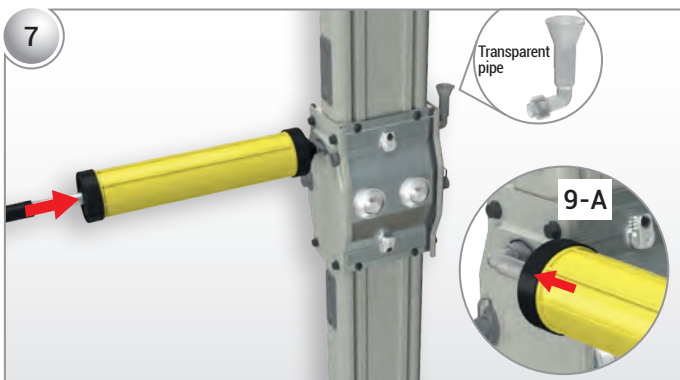
Busbar is approached to alignment sockets until it is perfectly seated.



Adjunct bolts are tightened with a moment of 83Nm after checking alignments. Bolt protection lids are attached.



Adjunct lids are placed. Bolts are tightened.



Apply injection from the filler hole and use transparent pipe for behind hole. Continue the filling process until you see silicon inside the transparent pipe. (If you don't have enough space for injection, use transparent pipe for both sides)



Once the injection is done, plastic lid is placed and installation is completed.

CE DECLARATION OF CONFORMITY

Product Group E-Line CCR Busbar Energy Distribution System

Manufacturer EAE Elektrik Asansor End. Insaat San. ve Tic. A.S.
Akcaburgaz Mahallesi, 3114. Sokak,
No:10, 34522 Esenyurt - Istanbul

The objects of the declaration described below is in conformity with the relevant Union harmonisation legislation. This declaration of conformity is issued under the sole responsibility of the manufacturer.

Standard:

TS EN 61439-6

Low-voltage switchgear and controlgear assemblies - Part 6: Busbar trunking systems (busways)

CE - Directive:

2014/35/EU "The Low Voltage Directive"

2014/30/EU "Electromagnetic Compatibility (EMC) Directive"

2011/65/EU "Restriction of the use of certain hazardous substances (RoHS)"

Technical Document Preparation Official ;

EAE Elektrik Asansor End. Insaat San. ve Tic. A.S.
Akcaburgaz Mahallesi, 3114. Sokak, No:10 34522 Esenyurt-Istanbul

Emre GÜRLEYEN

Date

09.11.2022

Document Authorized Signatory

Elif Gamze KAYA OK
Deputy General Manager



<p>TEST CERTIFICATE</p> <p>Product: Low-voltage busbar trunking system</p> <p>Manufacturer: EAE ELEKTRİK</p> <p>Model: ...</p> <p>Standard: IEC 61439-6:2012</p> <p>Number: 210491-01</p>	<p>TEST CERTIFICATE</p> <p>Product: Low-voltage busbar trunking system</p> <p>Manufacturer: EAE ELEKTRİK</p> <p>Model: ...</p> <p>Standard: IEC 61439-6:2012</p> <p>Number: 210491-01</p>	<p>EAE Energy Petroleum Institute Certificate</p> <p>Product: Low-voltage busbar trunking system</p> <p>Manufacturer: EAE ELEKTRİK</p> <p>Model: ...</p> <p>Standard: IEC 61439-6:2012</p> <p>Number: 210491-01</p>	<p>TEST CERTIFICATE</p> <p>Product: Low-voltage busbar trunking system</p> <p>Manufacturer: EAE ELEKTRİK</p> <p>Model: ...</p> <p>Standard: IEC 61439-6:2012</p> <p>Number: 210491-01</p>
<p>For the product: Low-voltage busbar trunking system</p>			
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<p>Requirements: IEC 61439-6: 2012; Clauses: 10.2.3, 10.2.6, 10.2.7, 10.2.101, 10.3, 10.4, 10.5, 10.9, 10.10, 10.11 and Annex BB, CC, and DD</p>			
<p>TEST CERTIFICATE</p> <p>Product: Low-voltage busbar trunking system</p> <p>Manufacturer: EAE ELEKTRİK</p> <p>Model: ...</p> <p>Standard: IEC 61439-6:2012</p> <p>Number: 210491-01</p>	<p>TEST CERTIFICATE</p> <p>Product: Low-voltage busbar trunking system</p> <p>Manufacturer: EAE ELEKTRİK</p> <p>Model: ...</p> <p>Standard: IEC 61439-6:2012</p> <p>Number: 210491-01</p>	<p>TEST CERTIFICATE</p> <p>Product: Low-voltage busbar trunking system</p> <p>Manufacturer: EAE ELEKTRİK</p> <p>Model: ...</p> <p>Standard: IEC 61439-6:2012</p> <p>Number: 210491-01</p>	<p>TEST CERTIFICATE</p> <p>Product: Low-voltage busbar trunking system</p> <p>Manufacturer: EAE ELEKTRİK</p> <p>Model: ...</p> <p>Standard: IEC 61439-6:2012</p> <p>Number: 210491-01</p>
<p>Requirements: IEC 61439-6: 2012; Clauses: 10.2.3, 10.2.6, 10.2.7, 10.2.101, 10.3, 10.4, 10.5, 10.9, 10.10, 10.11 and Annex BB, CC, and DD</p>			
<p>ПромМаш Тест</p> <p>PROMMASH TESTED COMPANY</p> <p>Test Report</p> <p>Low Voltage Equipment Test Laboratory</p> <p>2811SVOK issue number and dated 28.11.2019</p> <p>TEST REPORT</p>	<p style="text-align: center;">DEKRA Certification B.V.</p> <p style="text-align: center;">F. S. Strikwerda Certification Manager</p> <p style="text-align: center;">this certificate and adjoining reports is allowed</p> <p style="text-align: center;">DEKRA Certification B.V. Utrechtseweg 310, 6812 AR Arnhem P.O. Box 5185, 6802 ED Arnhem, The Netherlands T +31 88 96 83000 F +31 88 96 83100 www.dekra-certification.com Company registration 09085396</p>		

600A...6300A COMPACT BUSBAR PRODUCT OVERVIEW (E-LINE CCR)

1- Standards & Certification:

-Busbar trunking system shall be designed, type tested and, manufactured in accordance with the International standard IEC 61439-6. Type test shall be documented by independent and internationally accredited testing and certification bodies. Short circuit type tests shall be conducted by independent and accredited testing and certification bodies. Short circuit type tests and the following 3 main type tests shall be conducted for each current rating of the busbar system and conformity to the standards certificates obtained.

2- General Structure Of The System

-The busbar system should be low impedance in accordance with the following characteristics. The tin coated conductors are arranged as a sandwich construction inside the resin body without any air gaps.

2.1- Electrical Characteristics

-Busbar systems nominal insulation voltage shall be 1000V

-As per ampere rates, minimum short circuit values shall be as given below;

For Aluminium Conductors;

600A	: 1 sec/rms	25kA, peak	52,5kA
800-1250A	: 1 sec/rms	35kA, peak	73,5kA
1600A	: 1 sec/rms	60kA, peak	132kA
2000A	: 1 sec/rms	80kA, peak	176kA
2500A and above	: 1 sec/rms	100kA, peak	220kA

For Copper Conductors;

650-850A	: 1 sec/rms	35kA, peak	73,5kA
1000A	: 1 sec/rms	50kA, peak	105kA
1250-1600-2000A	: 1 sec/rms	80kA, peak	176kA
2500-3200A	: 1 sec/rms	100kA, peak	220kA
3400A and above	: 1 sec/rms	120kA, peak	264kA

2.2- Housing

-The housing of the busbar system shall be manufactured with specially developed cast material.

-The structure of the busbar lengths shall have conductors tin plated along their complete length within the housing.

-Multi-path busbars should be combined in a single body so that they are not separated from each other.

-Up and down, right-left turn elements, "T" and offset elements, panel, transformer and cable connectors, termination, horizontal and vertical expansion elements should be standard in the Busbar trunking system. Special modules and different lengths busbar ducts that may be required during the application of the project must be manufactured in a short time in accordance with standard specifications and technology.

-If busbar runs pass through the building expansion joint a horizontal expansion element shall be used in the run. In addition horizontal expansion elements should be used every 40 m along a horizontal run.

2.3- Conductors and Phase Configuration

-Compact busbar system shall have aluminium conductors between 600A – 5400A.

-Compact busbar system shall have copper conductors between 650A – 6300A.

-Busbar system shall have the following number of conductors and wire configuration.

- a) 3 Conductors
- b) 4 Conductors
- c) 4 ½ Conductors
- d) 5 Conductors

-Neutral conductor shall have the same cross section as the phase conductor cross section.

-Aluminium conductors shall be of EC grade aluminium. Minimum conductivity shall be 34m/mm².Ω. All surfaces of aluminium conductors shall be tin plated.

-Copper conductors shall be minimum 99,95% electrolytic copper. Minimum conductivity shall be 56m/mm².Ω. all surfaces of electrolytic copper conductors shall be tin plated.

2.4- Insulation

-Busbars shall be insulated using a mixture of specially selected silica and calcite mixed with an electrical grade epoxy resin to make a superior composite material. This insulation material must have a high impact resistance against external impacts.

2.5- Modular Joint Construction

-The busbar lengths must be joined together with the joint's point drawer type modular block joint system by placing the conductors in the conductive socket in the block insert. Joint block insulators should be high strength CTP insulators. The joint block's centre bolt should be tightened with a torque wrench set to 83 Nm (60 lb ft) after installation

2.6- Protection

-Protection degree of the housing and joints shall be IP68.

3- Installation and Commissioning

-The installation of the busbar system should be done in accordance with the type and current values shown in these plans in accordance with the electrical project, electrical single line schemes, layout plans and detailed busbar application projects, the manufacturer's installation instructions must be observed carefully during the assembly process. The central joint's bolts must be tightened with the appropriate torque wrench and the nut side of the bolt must be secured with the nut locking cap.

-After installation of the busbar system the installation should be checked for compliance with the manufacturer's instructions and the requirements of the project, an insulation test should be done. Insulation resistance between all conductors and body has to be bigger than 1 megaohm.

PRODUCT TYPES



BUSBAR ENERGY DISTRIBUTION SYSTEMS



CABLE TRAYS



TROLLEY BUSBAR ENERGY DISTRIBUTION SYSTEMS



INDOOR SOLUTIONS



SUPPORT SYSTEMS



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