

Low-voltage cast resin busbar trunking system



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About OPTIMUS

PRO OPTIMUS busway trunking systems possess strong R&D resource, perfect quality and satisfactory service, which have successfully completed many projects to overseas and local market. With the continuing product research and development process carried out by Mega Technology(Zhenjiang) Co., Ltd. We are able to provide uniquely designed and highly reliable products. This is achieved by adopting sophisticated thermodynamic design applications and quality manufacturing methods to deliver high performance products to our customers.



PRODUCT FEATURES

- ◆ High mechanical strength
- ◆ Small volume
- ◆ Resistant to chemicals, animals, insects, gnawing bodies
- ◆ Anti-UV
- ◆ Automatic flameout isolation
- ◆ Good flame retardancy
- ◆ EX-Explosion-proof maintenance conforms to EN50028 No.: EEXmII
- ◆ Extreme heat resistance
- ◆ Easy installation
- ◆ No maintenance
- ◆ Temperature rise is not exceeding 55°C
- ◆ Low voltage drop
- ◆ Less impedance
- ◆ Impact resistance test (IEC60068-2-75) IK10
- ◆ Earthquake test AC156, IBC2006, ASCE 7-05 grade 7, Taiwan Meteorological Bureau in 2021 the latest 7.0 earthquake, can also be specially designed to meet more than 2.2g, earthquake resistance and three axes are greater than 0.8G seismic hanger design
- ◆ Fire resistance test - Compliance with Department of Interior Fire Safety equipment available standard CNS14286, or meets, IEC60331, IEC60332, BS6387 standards
- ◆ Waterproof and dustproof IEC60529-IP68 rating
- ◆ Low electromagnetic compatibility (EMC)
- ◆ Mold cast resin materials meet the requirements of 5000 hours of aging
- ◆ Volcanic rocks are mineral-free

Applicable environment

- ◆ Altitude: indoor or outdoor below 2500M
- ◆ Humidity: less than 98% indoor or outdoor
- ◆ Ambient temperature: -45°C-65°C indoor or outdoor
- ◆ Frequency: 60Hz

- ◆ Rated voltage: below 1000V
- ◆ Extremely dangerous and contaminated chemical plant
- ◆ Salty zone and port
- ◆ Underground pines and tunnels
- ◆ Basement and pipeline room
- ◆ Hospitals and ammunition rooms
- ◆ Information Technology and Information Center
- ◆ Clean room

Reference standard

The full series of PRO OPTIMUS products is approved by KEMA KEUR, CB certification, reference standard:

- ◆ IEC61439-1/IEC 61439-6
- ◆ IEC 60439-1/IEC60439-2
- ◆ IEC 60331/IEC 60332
- ◆ CNS14286/CNS12514
- ◆ JISC8364/JISA1304
- ◆ IEC60529
- ◆ GB 7251.1/GB 7251.2/GB 7251.6
- ◆ UL857/UL1709
- ◆ ANSI
- ◆ IEE/IEEE
- ◆ NFPA70
- ◆ NEMA BU1
- ◆ BS6387
- ◆ IEC60216-1
- ◆ CNS 14957

Harmonic suppression

The harm of system harmonics to the bus bar is mainly the neutral overload caused by the third harmonic, Depending on the content of the third harmonic I_{h3} , different solutions can be taken:

- ◆ $I_{h3} < 15\%$: at least half of the phase cross-section should be selected for the neutral cross-section
- ◆ $I_{h3} \leq 33\%$: Neutral cross-section should be the same as phase cross-section
- ◆ $I_{h3} > 33\%$: It should be considered to install a passive or passive filtering device on the branch where harmonics are concentrated.

Name

Low Voltage Cast-Resin Insulated Busway

Product description

Pro Optimus low-voltage busway is positioned as a fully cast resin busbar for power systems below 1KV, It has the characteristics of electrical safety and space saving, and its design adopts insulating materials is directly cast and molded for copper (aluminum) conductor. The insulating material is made of inorganic mineral and other excellent materials and molded with epoxy resin., with good insulation characteristics of Class F 155° above and mechanical strength resistance, moisture-proof, not suitable for burning and self-extinguishing properties.

Scope of application

Fully cast resin low-voltage busbar is designed and manufactured according to relevant standards such as IEC 61439-1, IEC 61439-6, CNS 14268, including the following components.

- ◆ Straight element, elbow element, geometric shape element, phase transposition element, expansion joint element, reducer element, tap off unit element, with flange end element.

- ◆ Electricity box: It can be divided into fixed-type box (Tap-off box) and plug-in box (Plug-in box).

- ◆ Note: The components of the electricity box need to be preset by the production factory on the standard components of the bus bar at one or more points to install the components of the electricity box. When ordering, you must determine the number of reserved tap off boxes and NFB Brand and specification requirements.

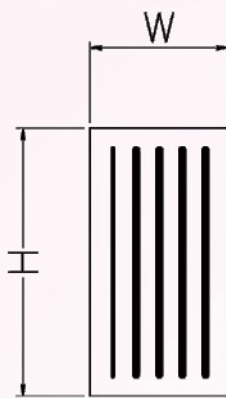
Conditions of Use

The full cast resin low-voltage busway system is composed of the above-mentioned components. After the Junction unit is connected, the low voltage busway is completed by the molding of the insulating material. The use conditions of this product.

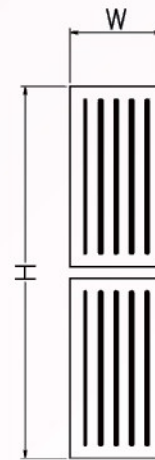
Technical specifications

- ◆ Rated voltage: V: AC1000V.
- ◆ Rated current: A: 400A~6300A.
- ◆ Use frequency Hz: 60.
- ◆ System type: 3P3W + 1/2G, 3P3W + G, 3P4W+1/2G, 3P4W+G.
- ◆ Conductor material: copper conductor (purity:99.9%, conductivity: 98%~100% IACS or above) and aluminum conductor:57%~60% or above.
- ◆ Conductor contact area: adopt bare copper with silver plating or tin plating or aluminum conductor with double deck copper and tin plating (in accordance with customer standards)
- ◆ The electrical characteristics of each single component :
 - Insulation withstand voltage characteristics: AC5KV/1min can be tolerated between each phase conductor.
 - The insulation resistance value between each phase conductor is \geq DC1KV 2GΩ.
 - Temperature rise characteristics: when the average ambient temperature is 35°C and the maximum temperature is 40°C, the temperature rise of the busbar is less than or equal to 55K.
 - Fireproof characteristics: meet the requirements of CNS 14286 fireproof busbar at 840°C for 30 minutes. Comply with IEC 60331-21 950°C for 3 hours. Comply with BS 6387 950°C for 3 hours.
 - Protection level characteristics: meet the requirements of IEC 60529, IP67, IP68.
 - Mechanical strength characteristics: meet the requirements of IEC 60068-2-75 IK10 level.
 - Join set: Bridge-type fixed-weight bolts are used for connection. The bolts are made of heat-treated steel and plated to prevent corrosion. The joints are connected to the expansion joints and the end is fixed with bolts.
 - Grounding characteristics: the low-voltage busway system uses copper(aluminum) conductors for 50% internal grounding , or 100% housing ground(Customized products), and is connected by non-welded fixing clips. It belongs to the system grounding. Its advantages can stabilize the voltage to the ground to reach more than 60% of the equivalent short-circuit capacity to the ground and reduce work safety accidents.

Cross-sectional view



CU:400A~2000A
AL:400A~1600A



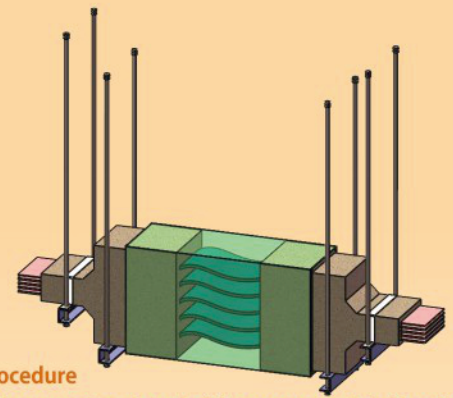
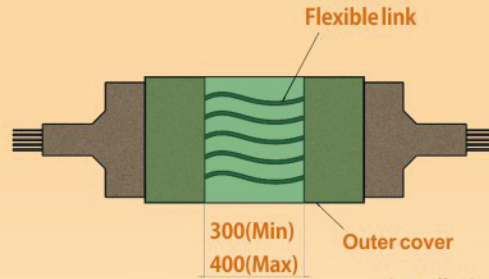
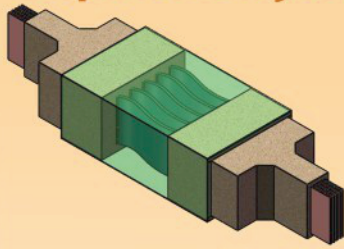
CU:2500A~6000A
AL:2000A~5000A

Product parameters

	Nominal capacity (A)	Conductor size			Cross-sectional area (mm ²)	Width W		Height H (mm)	Short circuit 1 sec (KA)	Short circuit 3 sec (KA)	Weight 4W+1/2E (kg/m)	R 20°C (10 ⁻⁶ Ω/m)	X (60HZ) (10 ⁻⁶ Ω/m)
						3W+1/2E	4W+1/2E						
Copper conductor	400	1	4	20	80	81	96	70	10	5.8	14.5	158.6	146.7
	630	1	4	40	160	81	96	70	15	8.7	17.6	106.2	70.0
	800	1	6	40	240	81	96	70	25	14.4	20.6	70.3	70.4
	1000	1	4	80	320	81	96	110	36	20.0	30.2	54.3	52.2
	1250	1	4	100	400	81	96	130	50	28.8	36.6	42.4	50.2
	1520	1	6	100	600	81	96	130	50	28.8	44.2	30.6	46.7
	1600	1	6	105	630	81	96	135	65	37.5	46.2	28.2	39.3
	1750	1	6	120	720	81	96	150	70	40.4	52.1	24.1	34.7
	2000	1	5	160	800	81	96	190	80	46.1	61.7	18.5	25.2
	2500	2	6	80	960	81	96	230	80	46.1	74.4	17.6	23.4
	3200	2	6	100	1200	81	96	270	85	49.0	90.1	13.3	21.8
	3800	2	6	160	1920	81	96	390	85	49.0	137.3	9.62	15.1
	4000	2	6	170	2040	81	96	410	100	57.6	145.1	8.45	13.9
	5000	2	6	200	2400	81	96	470	110	63.4	168.7	7.2	10.4
	5700	2	6	250	3000	81	96	570	110	63.4	208.1	6.34	12.0
Aluminum conductor	6000	2	6	260	3120	81	96	590	110	63.4	215.9	6.6	12.7
	6300	2	6	270	3240	81	96	610	125	70.0	223	5.32	11.9
	400	1	4	40	160	81	96	70	12	7.0	13.1	176	58.4
	630	1	6	40	240	81	96	70	18	10.4	14.0	115.2	59.0
	800	1	4	80	320	81	96	110	22.5	13.0	21.4	85.8	35.1
	1000	1	6	80	480	81	96	110	33.5	19.3	23.1	57.2	37.5
	1250	1	6	120	720	81	96	150	40	23.1	32.2	38.5	26.6
	1600	1	6	160	960	81	96	190	53	30.6	41.3	27.9	23.2
	2000	2	6	100	1200	81	96	270	60	34.0	56.9	28.8	21.9
	2350	2	6	120	1440	81	96	310	70	40.0	66.0	24.1	21.0
	2500	2	6	125	1500	81	96	320	80	46.1	68.2	18.8	20.6
	3200	2	6	160	1920	81	96	390	90	51.9	84.1	14.8	15.8
	4000	2	6	240	2880	81	96	550	120	69.2	120.5	9.8	12.5
	5000	2	6	320	3840	81	96	710	130	74.9	156.9	7.7	12.2

Note: Voltage drop=load current x $\sqrt{3 \times (\text{resistance} \times \cos \theta + \text{impedance} \times \sin \theta)}$, $\cos \theta$ = power factor

Stereo diagram of expansion joint



Installation procedure

Install a pair of hanger at each end of the expansion joint bus bar.

Lift the bus bar to the desired location

Flange end

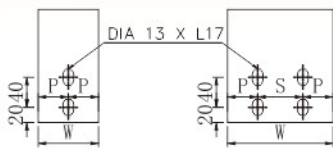
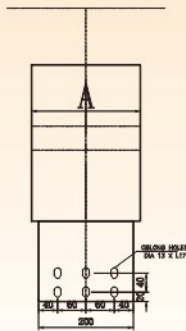
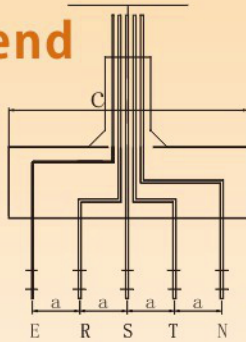


Figure 1

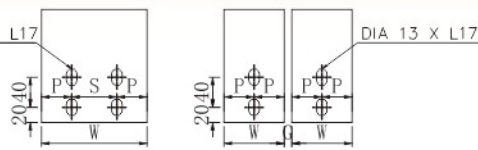


Figure 2

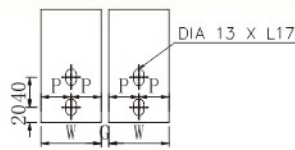


Figure 3

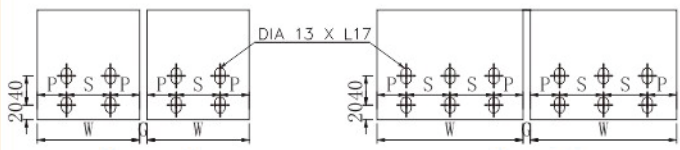


Figure 4

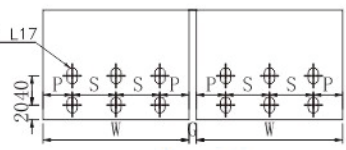
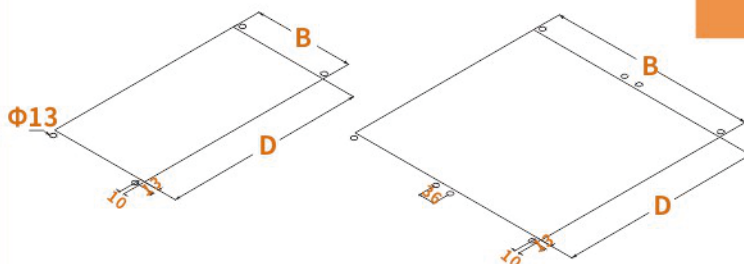


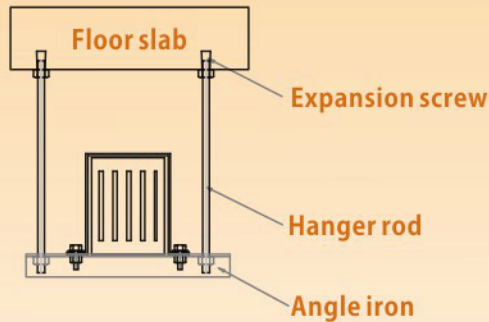
Figure 5



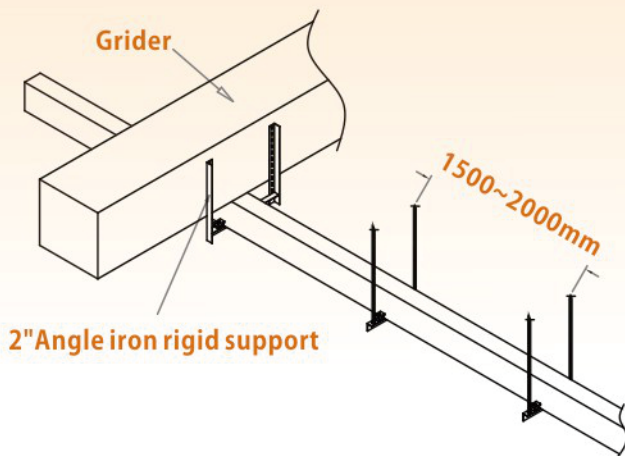
Conductor material	Nominal capacity (A)	Standard length (mm)						Figure
		W	S	P	G	A	B	
Copper conductor	400	20	—	20	—	70	64	1
	630	40	—	20	—	70	64	
	800	40	—	20	—	70	64	
	1000	80	—	40	—	110	104	
	1250	100	50	25	—	130	124	2
	1520	100	50	25	—	130	124	
	1600	105	50	27.5	—	135	129	
	1750	120	50	35	—	150	144	
	2000	160	80	40	—	190	184	3
	2500	(2)80	—	40	10	230	224	
	3200	(2)100	50	25	10	270	264	
	3800	(2)160	80	40	10	390	384	4
	4000	(2)170	80	45	10	410	404	
	5000	(2)200	60	40	10	470	464	
	5700	(2)250	80	45	10	570	564	5
	6000	(2)260	80	50	10	590	584	
	6300	(2)270	80	55	10	610	604	
Aluminum conductor	400	40	—	20	—	70	64	1
	630	40	—	20	—	70	64	
	800	80	—	40	—	110	104	
	1000	80	—	40	—	110	104	
	1250	120	60	30	—	150	144	2
	1600	160	80	40	—	190	184	
	2000	(2)100	50	25	10	270	264	4
	2350	(2)120	60	30	10	310	304	
	2500	(2)125	60	32.5	10	320	314	
	3200	(2)160	80	40	10	390	384	
	4000	(2)240	80	40	10	550	544	5
	5000	(2)320	100	60	10	710	704	

Wire no.	Phase space (mm)	Forming width (mm)	Hole opening size of switchboard (mm)
	a	C	D
5W	80	426	362
	100	506	442
	128	618	554

Item	Spec.	Remark
Expansion screw	1/2"(4分) Inner expansion screws	Zinc-plating
Hanger rod	1/2"(4分) Whole tooth screw	Zinc-plating
Angle iron	2"Porous Angle iron	Zinc-plating



Schematic diagram of hanger



Schematic diagram of the busbar horizontal hanger

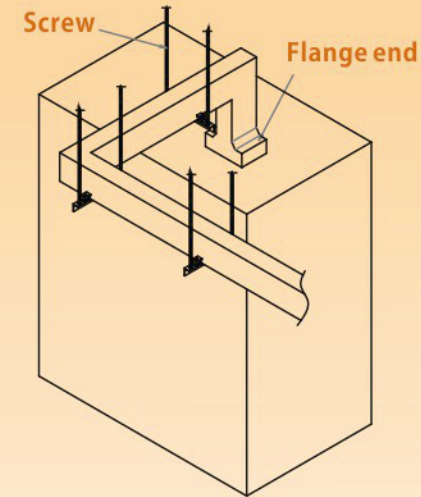
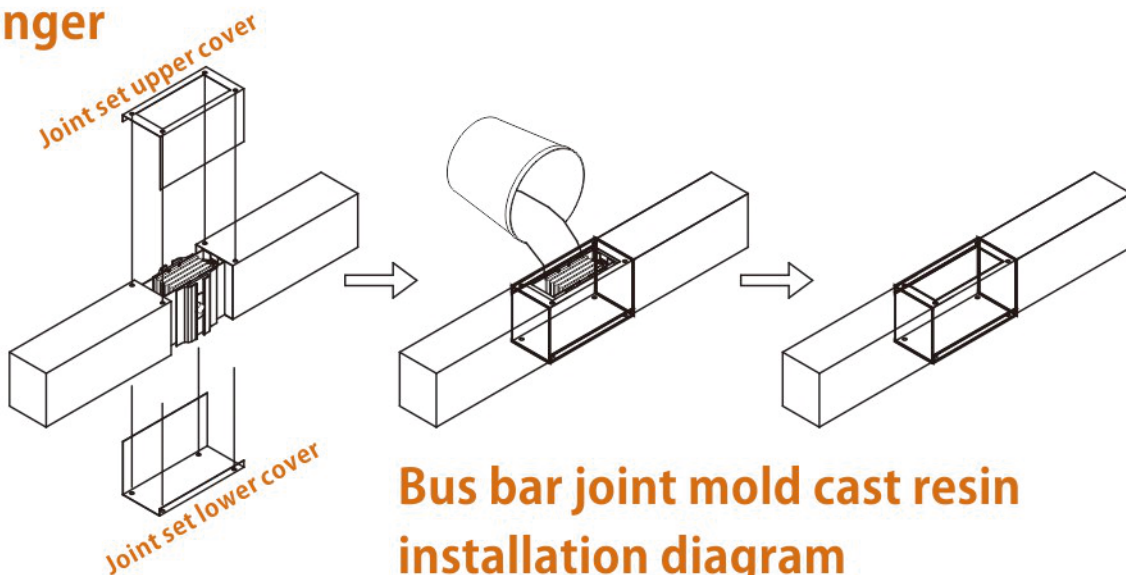
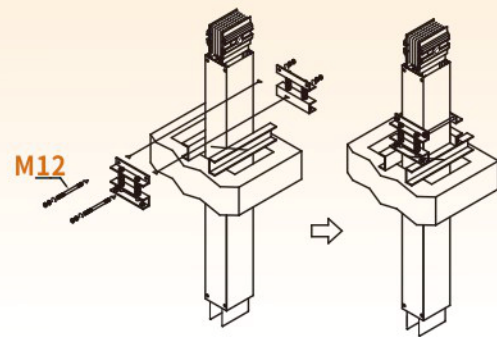
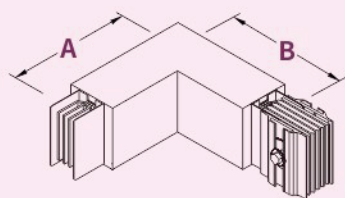


Diagram of connecting the busbar to the switchboard



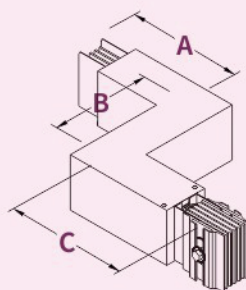
3D diagram of vertical spring hanger

Bus bar joint mold cast resin installation diagram



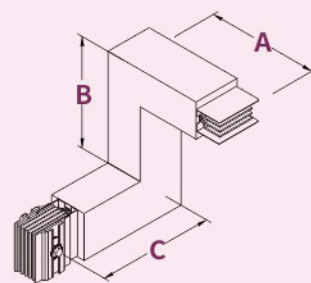
Edgewise elbow

Material	Rated current (A)	Standard length (mm)
Cu	400~6300	A/B=300
Al	400~5000	



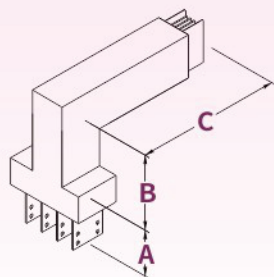
Edgewise offset

Material	Rated current (A)	Standard length (mm)
Cu	400~6300	A/C=300, B=150
Al	400~5000	



Combination Elbow

Material	Rated current (A)	Standard length (mm)
Cu	400~2000	A=300, B=250, C=300
	2500~3200	A=300, B=300, C=350
	3800~4000	A=300, B=350, C=400
	5000	A=300, B=400, C=450
	5700~6300	A=300, B=450, C=500
Al	400~1600	A=300, B=250, C=300
	2000~2500	A=300, B=350, C=350
	3200	A=300, B=350, C=400
	4000	A=300, B=450, C=500
	5000	A=300, B=550, C=550

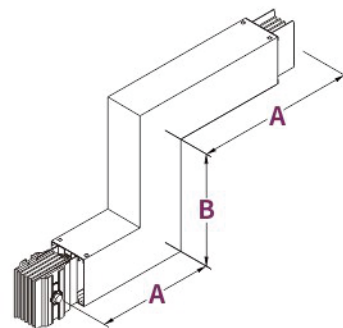


Flange End+ Flatwise Elbow

Material	Rated current (A)	Standard length (mm)
Cu	400~2000	A=170, B=350, C=300
	2500~3200	A=170, B=400, C=350
	3800~4000	A=170, B=450, C=400
	5000	A=170, B=500, C=450
	5700~6300	A=170, B=550, C=500
Al	400~1600	A=170, B=350, C=300
	2000~2500	A=170, B=400, C=350
	3200	A=170, B=450, C=400
	4000	A=170, B=550, C=500
	5000	A=170, B=600, C=550

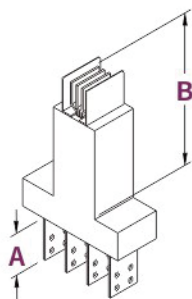
Flatwise Elbow

Material	Rated current (A)	Standard length (mm)
Cu	400~2000	A/B=300
	2500~3200	A/B=350
	3800~4000	A/B=400
	5000	A/B=450
Al	5700~6300	A/B=500
	400~1600	A/B=300
	2000~2500	A/B=350
	3200	A/B=400
	4000	A/B=500
	5000	A/B=550



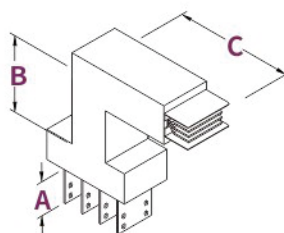
Flatwise Offset

Material	Rated current (A)	Standard length (mm)
Cu	400~2000	A/C=300, B=200
	2500~3200	A/C=350, B=100
	3800~4000	A/C=400, B=200
	5000	A/C=450, B=200
	5700~6300	A/C=500, B=300
Al	400~1600	A/C=300, B=200
	2000~2500	A/C=350, B=150
	3200	A/C=400, B=200
	4000	A/C=500, B=250
	5000	A/C=550, B=350



Flange end

Material	Rated current (A)	Standard length (mm)
Cu	400~6300	A=170, B=350
Al	400~5000	



Flange end+ Edgewise elbow

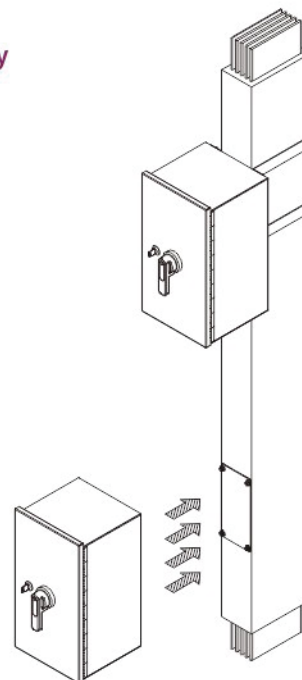
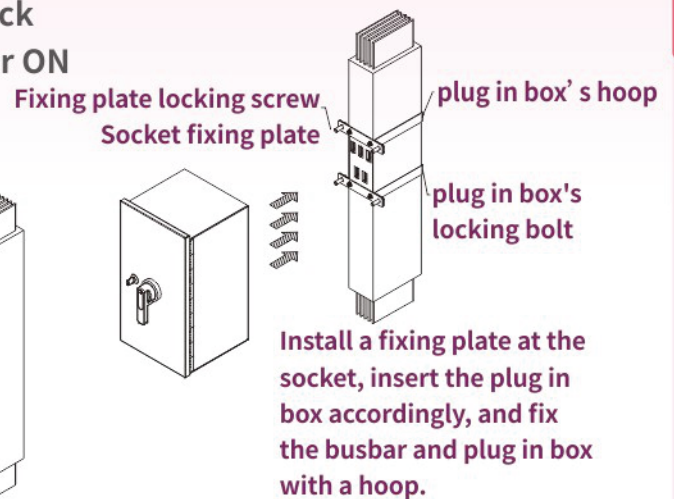
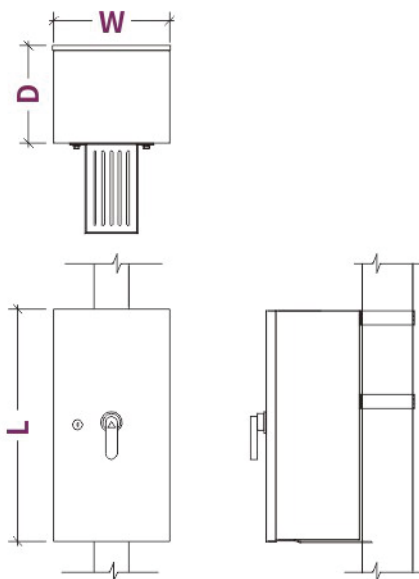
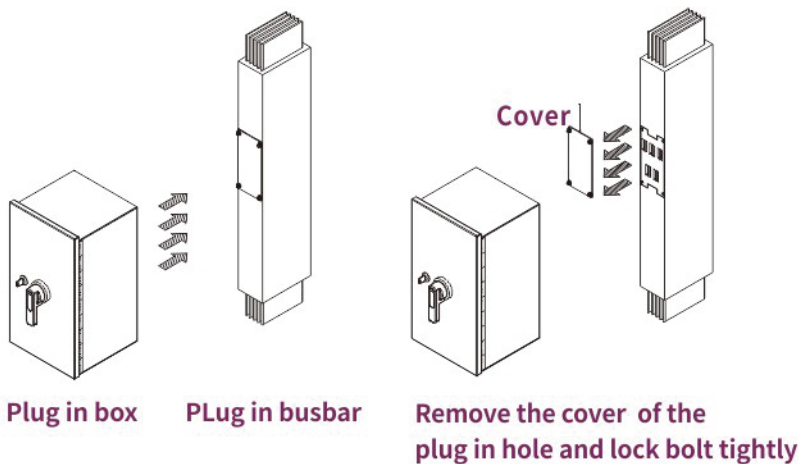
Material	Rated current (A)	Standard length (mm)
Cu	400~6300	A=170, B/C=300
Al	400~5000	

Plug in busbar and plug in box

- ◆ Plug in box (plug-in type) dustproof and waterproof protection grade: IP2X/IP40/IP42 / IP54 or IP55
- ◆ The contact surface between the plug terminal and the plug in box pin is plated with tin or silver.
- ◆ Fuse free circuit breakers or fuse circuit breakers in the insertion bar can protect and effectively apply to a variety of devices during current flow.
- ◆ Each 3m plug in bar allows a maximum of 5 plug in boxes and 10 plug in holes.
- ◆ Plug in box and busbar shell has a mechanical interlock device, when the circuit breaker is placed ON, plug in box can not be inserted or removed, to prevent improper operation and ensure the safety of personnel and equipment.
- ◆ Plug in box and circuit breaker have interlock device, to avoid the non-fuse circuit breaker ON position, box door is open.

TAP-OFF UNIT

Current rating (A)	Dimension (mm)		
	L	W	D
100A以下	400	250	250
250A	400	250	250
400A	550	320	350
630A	680	420	360
800A	900	420	300
1000A	1050	450	300
1250A	1050	450	300
1600A	1150	500	300





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