



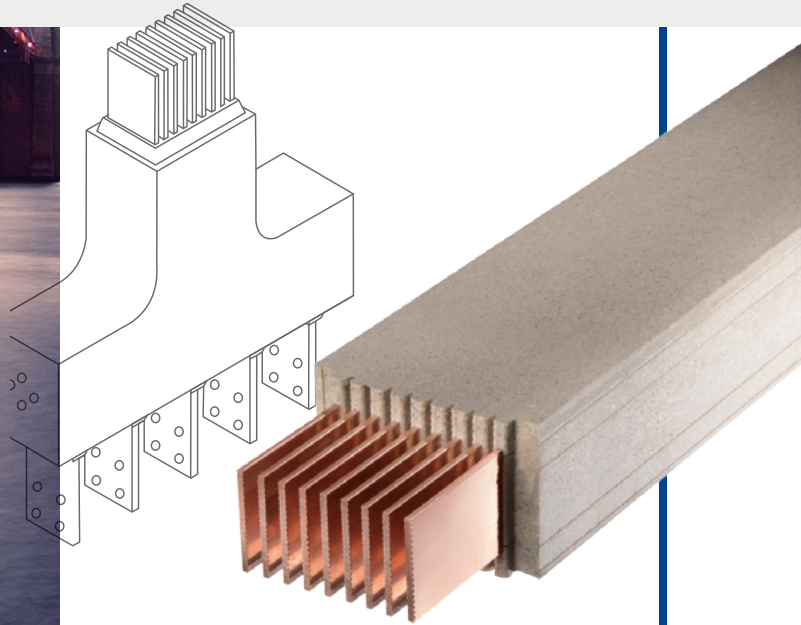
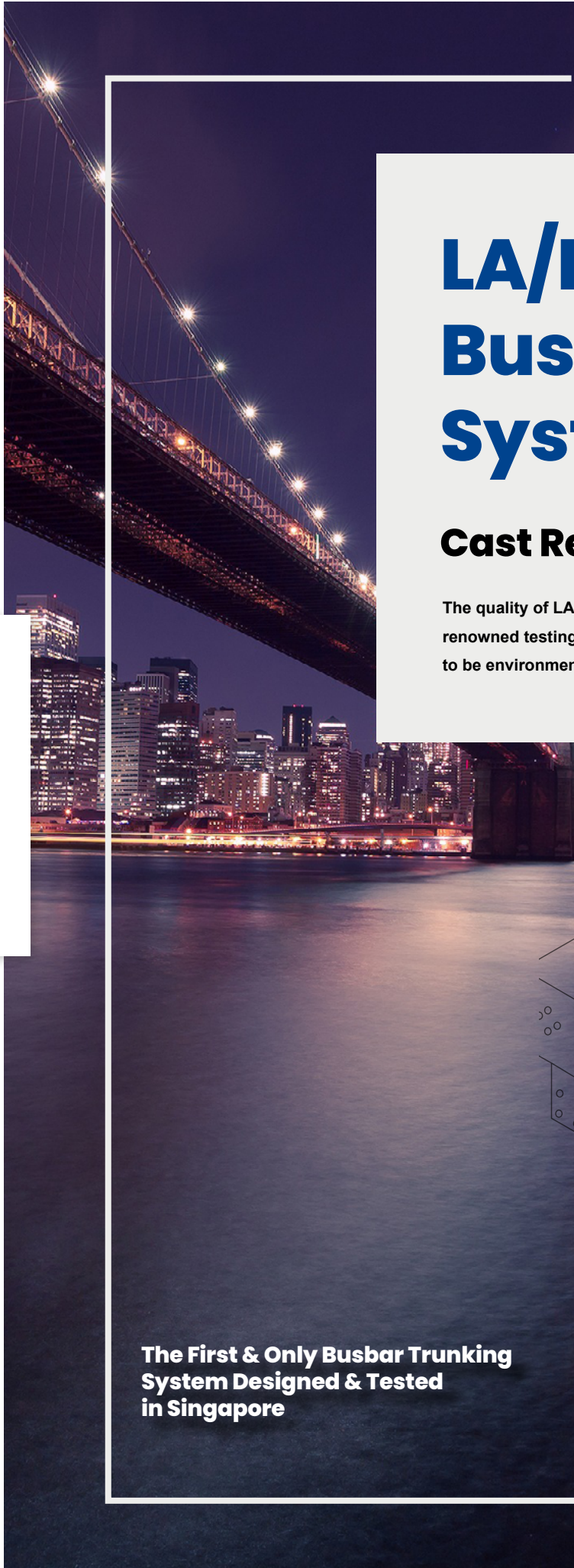
Tai Sin®

LA/LB TECO Busbar Trunking System

Cast Resin Insulated Systems

The quality of LA/LB TECO has been assured and certified by international renowned testing authorities including Dekra, KEMA, and has been approved to be environmental friendly.

Catalogue 2022



The First & Only Busbar Trunking System Designed & Tested in Singapore



WE'RE MORE THAN CABLES





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Company Profile

Powering up Singapore since 1980

Tai Sin Electric Limited was incorporated in 1980, having its main business in the design and manufacturing of Industrial Power Cable & Wire serving a diverse range of industries in all categories of infrastructure, industrial, commercial, residential, data center, and telecommunication sectors.

Tai Sin operates three cable manufacturing plants, which are located in Singapore, Malaysia, and Vietnam with Singapore being the Headquarter of the Cable & Wire business. In 1998, the company was listed on the Stock Exchange of Singapore, SESDAQ, and subsequently transferred to the SGX Main Board in 2005.

Our Busbar Trunking System with its sandwich construction offers you superior performance. It is safe and robust with high power efficiency, low voltage drop, and high tensile strength.

In 2020, after 40 years of cable manufacturing success, Tai Sin launches its new range of low voltage Busbar Trunking System.

Our system offers a full line of busbar trunking system to meet most requirements. Offering 3P3W, 3P4W, 3P5W, supply and distribution, with rated current from 400A to 6569A (for aluminium and copper conductor), rated operation and insulation voltage up to 1000V, IP degree up to IP68 and the frequency 50~60Hz.

Being the first locally tested busbar trunking system supplier, we are committed to helping you obtain a reliable power distribution solution that meets both your budget and project timeline.



International Certifications

Our products are certified for your peace of mind



Product quality and capability have been assured and certified by international renowned testing authorities including Dekra, KEMA, and has been approved to be environmental friendly.

- Whole Busbar Trunking System route cast-resin molded (including the junction part between elements)
- Full type tested by DEKRA, KEMA and China CQC certified
- Fireproof certified (CNS14286, IEC60331, BS 6387)
- Highest Protection Level (Waterproof/Dustproof) IP68 : LV /MV
- Best in Class of Mechanical Impact – IK10 (IEC 60068)
- Seismic Restraint certified including the junction – 0.8G passed Anti-Explosive certified
- Anti-Corrosive
- Electromagnetic Compatibility certified
- Compact design for easy installation and space-saving
- High flexibility and custom design to fit in any condition
- ISO 9001 / ISO 14001 certified

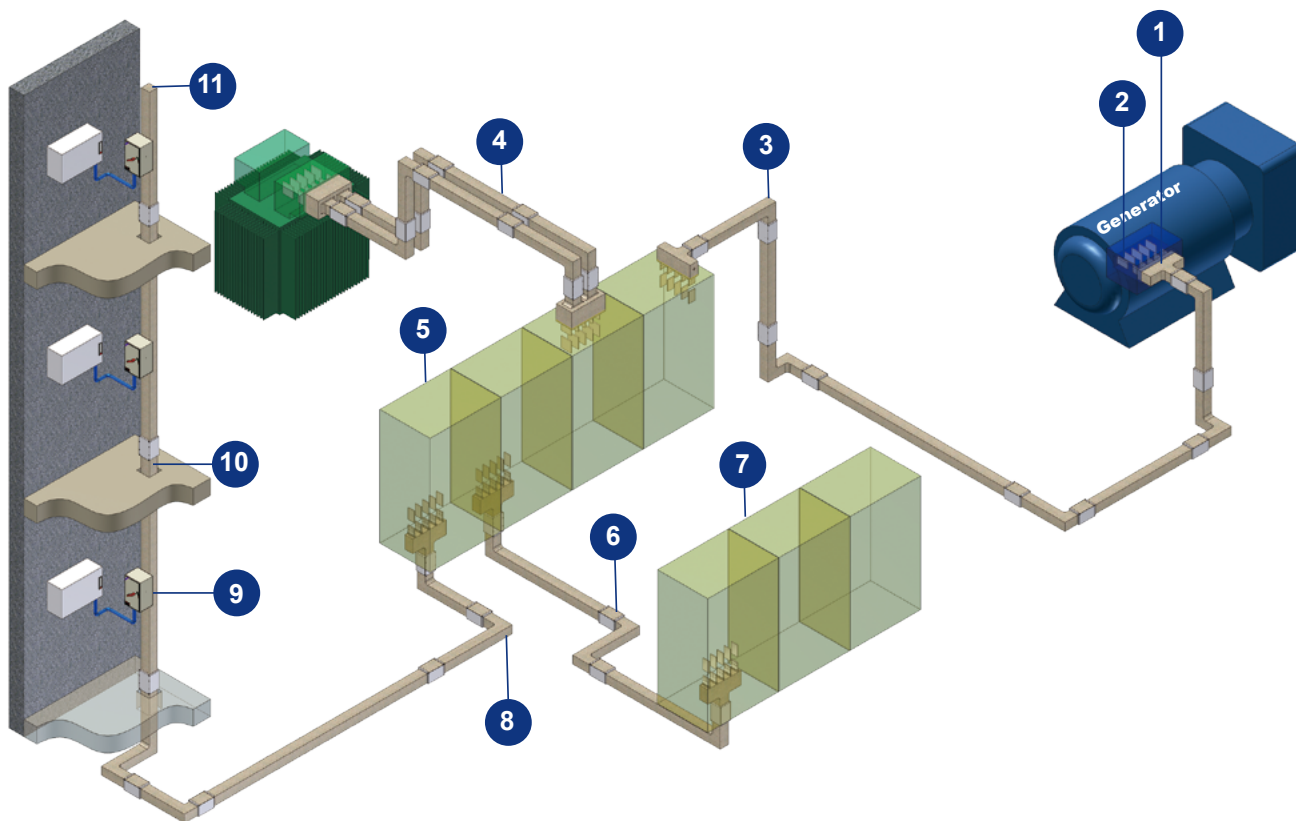


Product Features

Make the most of your energy

1. Low voltage products meet the standard of IEC 61439-6.
2. Compact, easy to install, no emission of toxic gas.
3. The purity of conductor is 99.9% for copper with conductivity above 98% IACS.
4. Low voltage drop / high short-circuit current withstand, carried out overload 20% for 2 hours.
5. Degree of protection tested in accordance with IEC 60529, IP68. Mechanical Impacts IK10.
6. Fire-proof property:
At 950°C for 3 hours tested in accordance with IEC 60331-21,BS 6387
At 840°C for 30 minutes tested in accordance with CNS 14286.

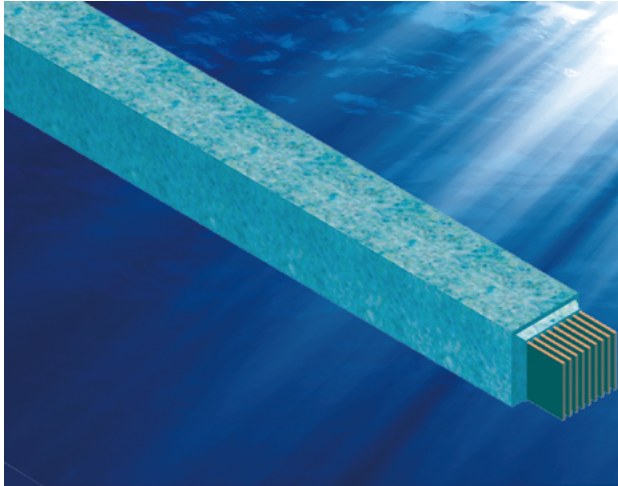
7. Anti-explosion certification meets EN 50028 no. EEx m II.
8. Mixing excellent material such as non-organic volcanic rock with small amount of resin made of busbar. With excellent insulation and heat dissipation properties. Temperature rise of busbar is no more than 55K at 40°C ambient.
9. Low EMC.
10. Insulation level of class B 130°C .
11. Products have shown excellent results for at least 40 years, and passed aging test with safety operation over 50 years .
12. Maintenance free.



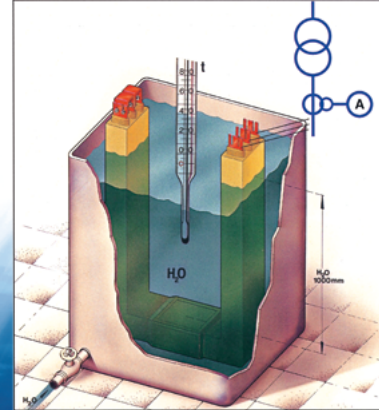
1. Flange End
2. Flexible Link
3. Edgewise Elbow
4. Straight Length
5. Main Switchboard
6. Joint
7. Switchboard/Distribution Board
8. Horizontal Elbow
9. Tap-Off Unit (Plug-in Unit)
10. Spring Hanger
11. End Cap

Product Features

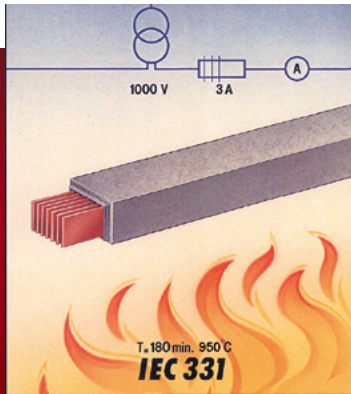
Make the most of your **energy**



Waterproof

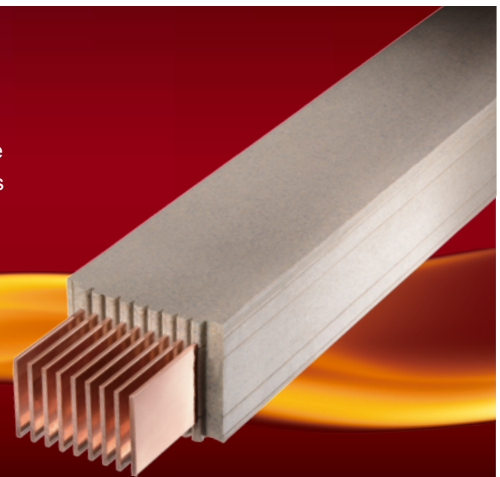


The water proof test of Busbar (with junction) meets the standard of IEC 60529 reaching IP68.



Fireproof

The fire proof test of Busbar meets the standard of BS 6387 950°C for 3 hours
IEC 60331-21 950°C for 3 hours
CNS 14286 840°C for 30 minutes.



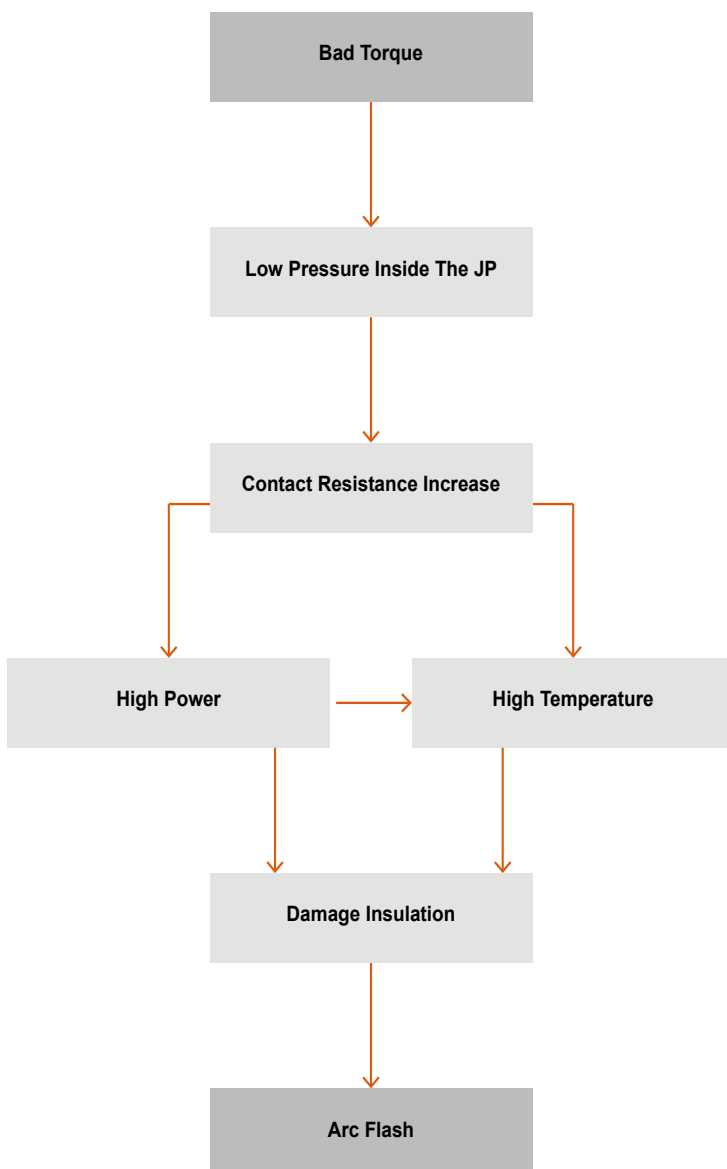
Add-On Feature (Optional)

Busbar Trunking System – Remote Conditional Monitoring

For an electrical system, one of the typical concerns is its electrical connection and abnormal heating may occur at the location of loose or improper connection due to an increase in the electrical resistance. The overheating further increases the electrical resistance and can lead to a burnout or even a fire. The burning out of an electrical system is a threat to plant safety and can lead to an unplanned shutdown of plant operations. To eliminate such risks and avoid the huge costs of lost production, it is vital to quickly detect and immediately respond to any indication of overheating in a power system (a.k.a Predictive Monitoring System).

Ways to Protect Busbar Trunking Systems

Continuously monitor busbar health, run time, and detect unexpected busbar failures such as early bearing failure, unbalance, misalignment, etc.



THERMAL AVALANCHE EFFECT

Your Challenges

In order to prevent overheating at any of the electrical connections, the connections should be inspected on a regular basis. However, there are a few obstacles:

- **Visual inspection:** Might not be feasible or accurate because the connections are often covered, and are often in difficult to access locations.
- **Thermal imaging cameras can be difficult due to complicated structure:** In some instances, electrical distribution connections can follow complicated paths through plant structures and buildings which may result in blind spots that might not be readily imaged using thermal imaging cameras.
- **Thermocouple thermometers are not suitable due to electromagnetic noise:** As electrical systems are surrounded by strong electric fields, conventional electric sensors such as thermocouple thermometers are not suitable for this purpose.

Add-On Feature (Optional)

Busbar Trunking System – Remote Conditional Monitoring

Our Solutions

- We provide a temperature sensor that is not affected by electromagnetic noise.
- By quickly detecting overheating and pinpointing the location of a hotspot remotely, our thermal sensor ensures that any problem can be responded to immediately, before it leads to a costly and expensive plant shutdown. Our thermal sensor can be installed directly on a busbar and on the surface of a busbar or cover.

Your Benefits

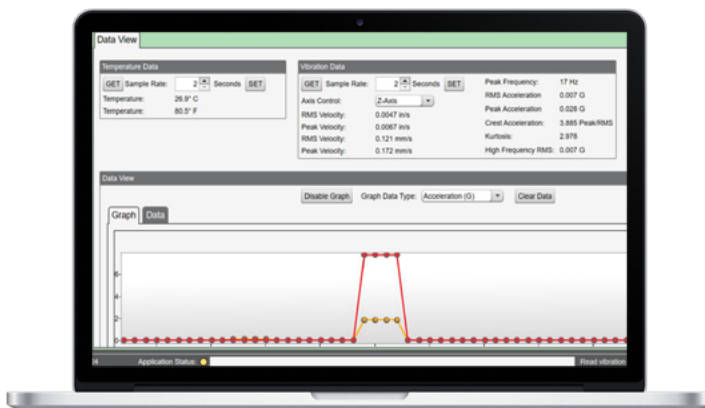
Provide the temperature report quickly and accurately of any joints at any time.

- Monitor busbar and alert maintenance teams when aging and over-used equipment are on the verge of failure resulting in flash over.
- Improve human safety, reliability, quality of service, and ensure that equipment keeps running.
- Pinpoint exact location of the busbar when temperature spikes flag pending components failures.
- Accurate temperature monitoring under a strong electric field.
- Quickly detects precise location of abnormalities to prevent burnout.
- Condition based inspection work by temperature changes.

TEMPERATURE TRENDING



VIBRATION TRENDING



Why are we a suitable partner as a power distribution supplier?

While being mindful of the technological development in the world, we ensure the availability of field experts with extensive knowledge on national construction standards, local provisioning, energy needs and business expectations. Our products are compliant to local as well as international standards. Tai Sin has a competent sales force across Southeast Asia and our local team will provide you with full assistance from project management support to logistics arrangement for a seamless delivery of your project. Our value propositions to you are as follows:

Regional Testing and Assembly Facility in Singapore

We have the capability to verify Busbar Trunking specifications according to IEC standard and other International standards upon request in Singapore. In addition, we are able to conduct Factory Acceptance Tests (FAT) for the final Busbar Trunking System in our Singapore facility.

We are able to support any urgent product customisation requests such as modifications, fault ratification and repair to help you achieve fast project turnaround time.

Southeast Asian (SEA) Expertise

We have achieved essential field experience by our successful participation in various market segments, including Airports, Wafer Fabrication Plants, Hospitals, Hospitalities and Data Centres. We are proficient in providing solutions far beyond busbar trunking systems through our valuable experience in office buildings. We support our projects with a Pan SEA approach based on best practices, to complement the evolving Data Center landscape.

Spare parts - Get the Right Parts At The Right Time

Don't run the risk of extended electrical downtime and take advantage of our local assembly facility for all your spare part needs.

Audit – Reduce risk And Improve Reliability

Our engineers help assess your sites, identify safety and efficient issues of your critical installations. We will help reduce risk and improve reliability for your electrical distribution needs and optimize your energy usage while pointing the way to your digital journey.

Maintenance – Ensure Equipment Peak Performance

Helping you keep mission-critical infrastructure operating at maximum efficiency and optimal performance is our main goal. Our support services provide flexibility for all aspects of your electrical distribution needs.

Training – Get Tailored Training Solutions

Our technical training solutions are capable of enhancing the technical competencies of your team in electrical safety and distribution.

Expertise & Skills Guide

We have acquired valuable experience and expertise in designing busbar trunking systems, materials, standards, and technology. We are confident in our offerings and evolving from being a mere product supplier to being a responsive provider of solutions and services.

Tai Sin Group is proficient in providing products and services including the support of a dedicated project team to help in the layout drafting, installation, testing and commissioning as well as provision of competent trainers for any operation and maintenance needs. The group has competent expertise in the power distribution industry across Southeast Asia. As energy is the foundation of our developments, we will continue to evolve and offer products with the latest design complying with the most current standards for our Cables, Branch Cables and Busbar Trunking Systems.

Electrical Characteristics

1. Title : LA/LB TECO Low Voltage Cast-Resin Insulated Non Segregated Phase Busbar Trunking System.

2. Product Description:

LA/LB TECO Low Voltage Cast-Resin Insulated Busbar Trunking System is developed for electrical systems below 1kV. The product has features of safety and compact. It is designed to use the insulation material to perform cast resin sealing to the copper (aluminium) conductor. The insulation material is cast resin which contains non-organic volcanic rock with the features of excellent insulation characteristics, mechanical strength, humidity-proof, non-combustible, and self-extinguishing .

3. Applicable Scope:

LA/LB TECO Busbar Trunking System is manufactured in accordance with IEC61439-1 and IEC 61439-6 and The elements include as listed below:

3.1 Straight element, elbow elements geometrical shape, phase-switch element, expansion element, transfer elements, split element and terminal elements.

3.2 Distribution boxes: There are fixed type tap-off box and draw-out type plug-in box.

Note: The plug-in leads shall be reserved in advance. Therefore, the number of plug-in units shall be confirmed while purchase.

4. Condition of Use:

LA/LB TECO Busbar Trunking System is composed of the elements listed in item 3.1. The element are connected through junction units on site before cast molding with insulation mix to complete the low voltage Busbar Trunking System.

Conditions for LA/LB TECO:

4.1 Altitude: below 2000m, indoor and outdoor site.

4.2 Ambient temperature: -45°C~65°C

4.3 Ambient humidity: 0%~100%

5. Technical Specifications:

5.1 Rated Voltage V: AC1000V.

5.2 Rated Current A: 400A~6569A.

5.3 Frequency Hz: 50/60.

5.4 System: 1P3W, 1P3W+50%E, 1P3W+E, 3P3W, 3P4W, 3P3W+50%E, 3P3W+E, 3P4W+50%E, 3P4W+E.

5.5 Conductor Material: Copper conductor (Purity: 99.9% Conductivity: Above 98% IACS) and Aluminium (Bi-metal).

According to standards: JIS H3140 , DIN1787, DIN1759, DIN40500.

5.6 Electrical characteristics of each LA/LB TECO element less than 4m

Insulation capabilities: AC voltage withstand phase to phase is AC 5kV/1min.

Insulation resistance phase to phase is $\geq 2G\Omega/DC 1KV$.

Temperature rise limit: At average ambient temperature of 35°C with daily peak 40°C, temperature rise of busbar is $\leq 55K$.

Fireproof: In accordance with CNS 14286 fire proof regulation of 840°C, 30 minutes for busbar.

In accordance with IEC-60331-21 at 950°C for 3 hours.

Protection degree: In accordance with IEC 60529 IP68.

Mechanical impacts: In accordance with IEC 60068-2-75 IK10.

Grounding: Internal grounding (Optional grounding phase with aluminium conductor)

Product Specifications LA

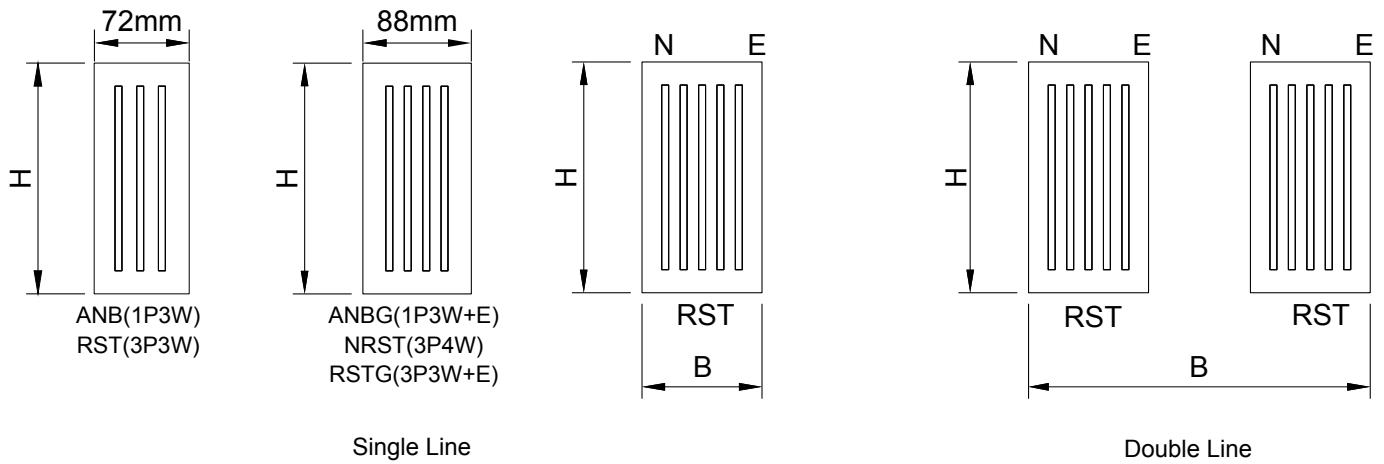
50/60Hz 1000V IP68 IK10

TYPE	B x H mm	I _n (A) norm	I _n (A) 35/40°C	Cond. mm ²	R ₂₀ μΩ/m	R ₆₀ μΩ/m	R ₉₀ μΩ/m	X μΩ/m	Low kA/1Sec	I _{peak}	P _{LOSS90} W/m	Total Weight kg/m
COPPER												
Single Lines												
LA02EC	104 x 60	400	400	80	158.0	182.2	201.5	147.0	10	22	97	13.8
LA04EC	104 x 80	630	630	160	106.0	122.7	135.2	70.2	15	30	161	20.3
		800	800	240	70.3	81.3	89.6	70.5	25	53	172	23.3
LA08EC	104 x 120	1000	1000	320	54.2	62.7	69.1	42.4	40	84	207	33.5
		1250	1250	400	42.4	49.1	54.1	41.8	50	105	253	35.7
LA12EC	104 x 160	1600	1600	600	28.0	32.4	35.7	32.7	65	143	274	50.2
LA16EC	104 x 200	2000	2000	800	18.4	21.3	23.5	20.8	80	176	282	64.4
			2221	960	18.8	21.8	24.0	45.7	80	176	288	71.5
LA20EC	104 x 240	2500	2500	1000	17.6	19.7	22.4	18.5	100	220	421	79.0
Double Lines												
LA08DC	404 x 120	2500	2500	2 x 480	19.9	23.0	25.4	25.6	80	176	476	78.6
LA12DC	404 x 160	3150	3200	2 x 600	13.2	15.3	16.8	18.2	85	187	501	111.0
LA16DC	404 x 200	4000	4000	2 x 800	13.2	15.3	16.8	14.8	100	220	808	128.8
			4202	2 x 960	10.2	11.8	13.0	28.2	120	264	624	143.0

50/60Hz 1000V IP68 IK10

TYPE	B x H mm	I _n (A) norm	I _n (A) 35/40°C	Cond. mm ²	R ₂₀ μΩ/m	R ₆₀ μΩ/m	R ₉₀ μΩ/m	X μΩ/m	Low kA/1Sec	I _{peak}	P _{LOSS90} W/m	Total Weight kg/m
ALUMINIUM												
Single Lines												
LA04EA	104 x 80	400	500	160	175.0	202.5	223.0	58.6	12	36	167	15.3
		630	630	240	115.0	133.0	146.6	59.2	18	36	174	15.8
LA08EA	104 x 120	800	810	320	85.7	99.2	109.3	35.2	22	70	215	23.3
		1000	1000	480	57.0	66.0	72.7	37.6	33	70	218	24.4
LA12EA	104 x 160	1250	1375	720	38.5	44.6	49.0	26.7	40	84	278	31.1
LA16EA	104 x 200	1600	1700	960	27.9	32.2	35.5	23.3	53	116	308	41.3
Double Lines												
LA12DA	404 X 160	2000	2380	2 x 600	23.2	26.8	29.5	14.0	67	147	502	48.8
		2500	2660	2 x 720	19.8	22.9	25.2	15.5	80	176	535	65.4
LA16DA	404 x 200	3150	3250	2 x 960	14.7	17.0	18.7	13.2	90	198	593	82.6

Product Specifications LA



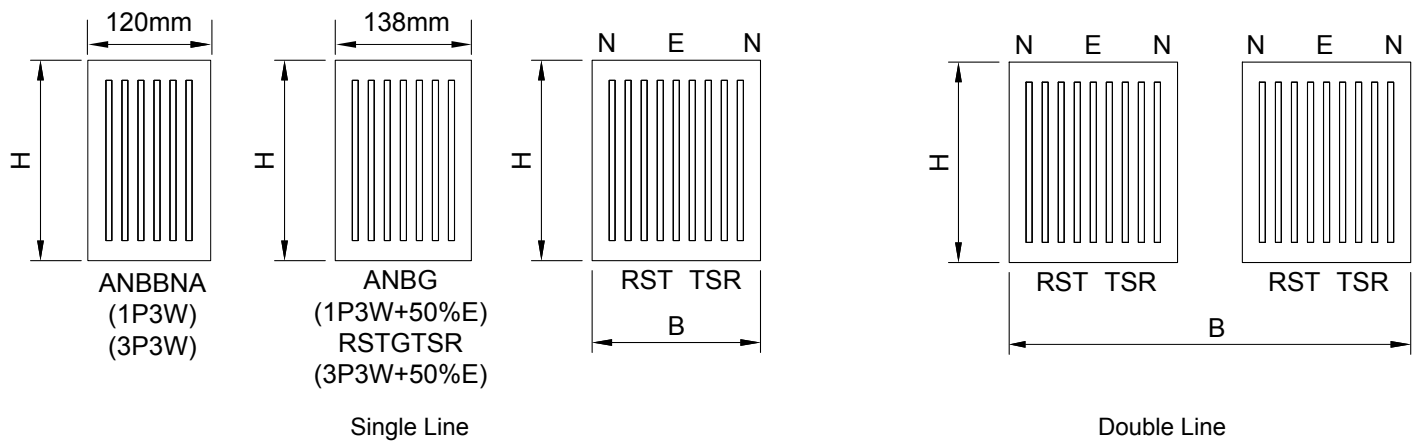
- Conductor: 1P3W represents single phase, three wires
 3P3W represents three phases, three wires
 3P4W represents three phases, four wires.
 E represents grounding phase 100% of rated current.
 200% N and aluminium grounding conductor optional
- Distance between the two elements among double lines remains 300mm center to center.
- Applicable to DC requirement.
- Please refer to the temperature correction coefficient of rated current on page 24 while ambient temperature exceeds 40°C

Product Specifications LB

TYPE	B x H mm	I _n (A) norm	I _n (A) 35/40°C	Cond. mm ²	R ₂₀ μΩ/m	R ₆₀ μΩ/m	R ₉₀ μΩ/m	X μΩ/m	Low kA/1Se c	I _{peak}	P _{Loss90} W/m	Total Weight kg/m
COPPER												
Single Lines												
LB08EC	168 X 120	2000	2000	2 X 400	19.2	22.2	24.5	23.3	65	143	293	55.1
LB12EC	168 X 160	2500	2500	2 X 600	17.4	20.1	22.2	19.6	85	187	416	86.5
LB16EC	168 x 200	3150	3200	2 x 800	10.2	11.8	13.0	17.6	100	220	387	111.5
			3443	2 x 960	9.0	10.4	11.5	20.8	100	220	341	122.0
Double Lines												
LB08DC	468 x 120	4000	4000	4 x 400	13.1	15.1	16.6	5.5	120	264	798	110.2
LB12DC	468 x 160	5000	5000	4 x 600	8.1	9.3	10.3	8.7	120	264	770	173.0
LB16DC	468 x 200	6300	6300	4 x 800	6.5	7.5	8.3	8.1	125	275	986	223.0
			6569	4 x 960	4.8	5.6	6.1	16.1	120	264	728	244.0

TYPE	B x H mm	I _n (A) norm	I _n (A) 35/40°C	Cond. mm ²	R ₂₀ μΩ/m	R ₆₀ μΩ/m	R ₉₀ μΩ/m	X μΩ/m	Low kA/1Se c	I _{peak}	P _{Loss90} W/m	Total Weight kg/m
ALUMINIUM												
Single Lines												
LB12EA	168 x 160	2000	2100	2 x 720	20.0	23.1	25.5	18.5	80	176	337.4	53.5
LB16EA	168 x 200	2500	2540	2 x 960	14.3	16.5	18.2	13.9	90	198	352.9	63.6
Double Lines												
LB08DA	468 x 120	3150	3200	4 x 480	14.6	16.9	18.6	13.6	100	220	571.9	79.0
LB12DA	468 x 160	4000	4250	4 x 720	10.0	11.6	12.8	10.4	120	264	690.9	101.1
LB16DA	468 x 200	5000	5400	4 x 960	7.9	9.1	10.1	10.2	130	286	881.2	135.0

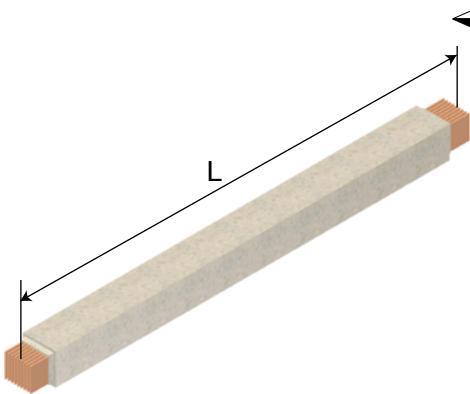
Product Specifications LB



- Conductor: 1P3W represents single phase, three wires
3P3W represents three phases, three wires
3P4W represents three phases, four wires.
50%E represents grounding phase 50% of rated current.
200% N and aluminium grounding conductor optional
- Distance between the two elements among double lines remains 300mm center to center.
- Applicable to DC requirement.
- Please refer to the temperature correction coefficient of rated current on page 24 while ambient temperature exceeds 40°C.

Selection of Standard Parts

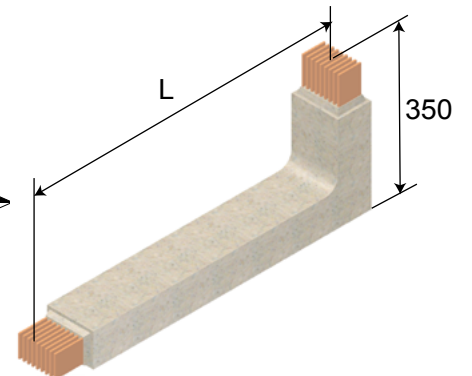
Straight Feeder



Straight Feeder

Model	Length (mm)
RE	L-1000~4000 (Max)

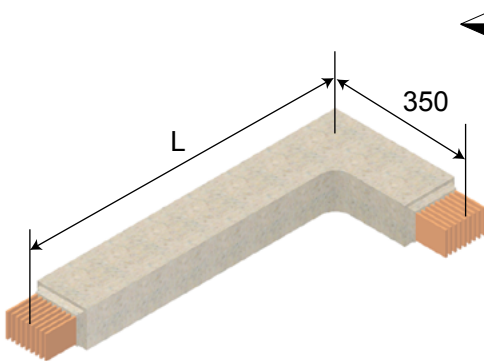
Vertical Elbow



Vertical Elbow

Model	Length (mm)
HL1	L=650 (Max)
HL2	L=1650 (Max)

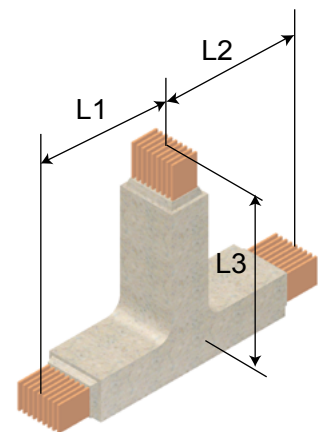
Horizontal Elbow



Horizontal Elbow

Model	Length (mm)
HB1	L=650 (Max)
HB2	L=1650 (Max)

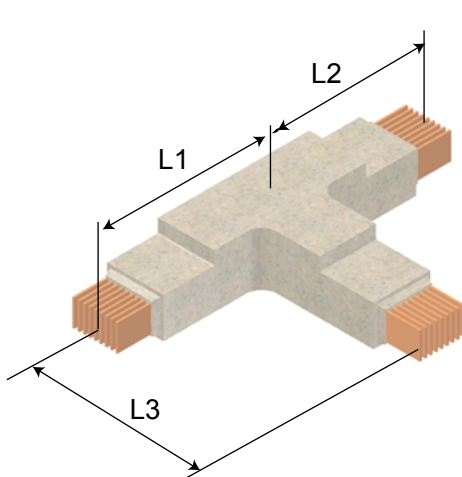
Tee Elbow (Vertical)



Tee Elbow (Vertical)

Model	Length (mm)
TL2	L1=L2=L3=350

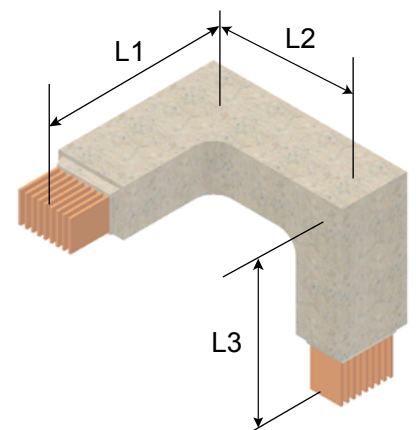
Tee Elbow (Horizontal)



Tee Elbow (Horizontal)

Model	Length (mm)
TB2	L1=L2=L3=500

Combination Elbow (Right)

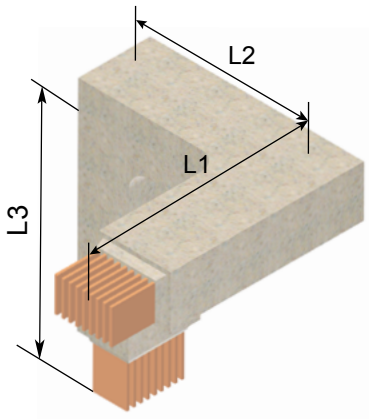


Combination Elbow (Right)

Model	Length (mm)
XR1	L1+L2+L3=1000 L1+L2+L3=2000
XR2	L2=250(Min) =600(Max) L3=350(Max)

Selection of Standard Parts

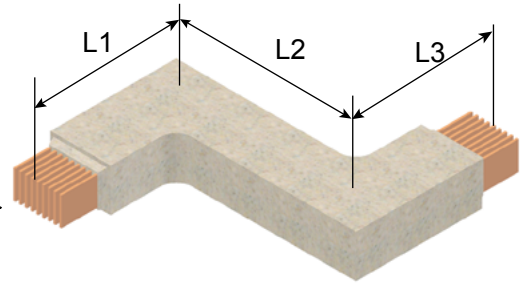
Combination Elbow (Left)



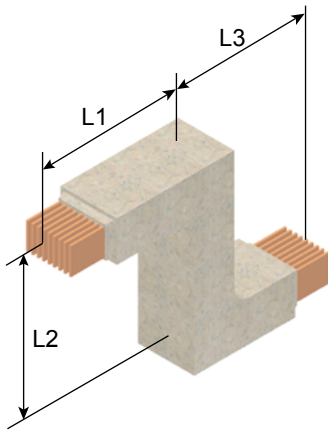
Combination Elbow (Left)

Model	Length (mm)
XL1	L1+L2+L3=1000
XL2	L1+L2+L3=2000 L2=250(Min) =600(Max) L3=350(Max)
Model	Length (mm)
ZB1	L1+L2+L3=1000
ZB2	L1+L2+L3=2000 L2=65(Min) =600(Max)

Horizontal Offset



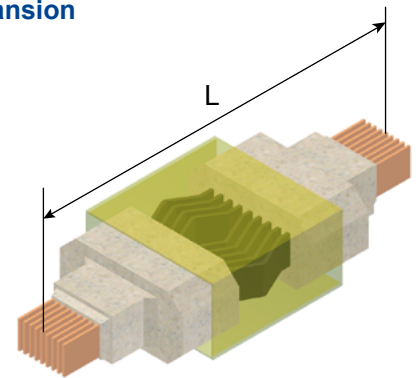
Vertical Offset



Vertical Offset

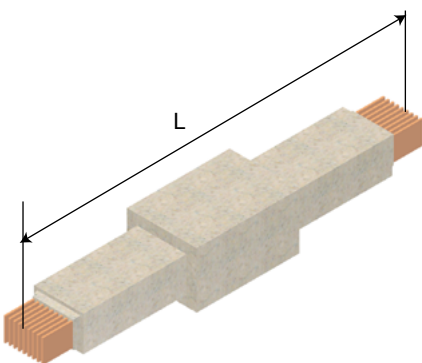
Model	Length (mm)
ZL1	L1+L2+L3=1000
ZL2	L1+L2+L3=2000 L2=250(Min) =600(Max) L3=350(Max)
Model	Length (mm)
EX	L1=1000

Expansion



(IP68 AND INSULATION TESTED)

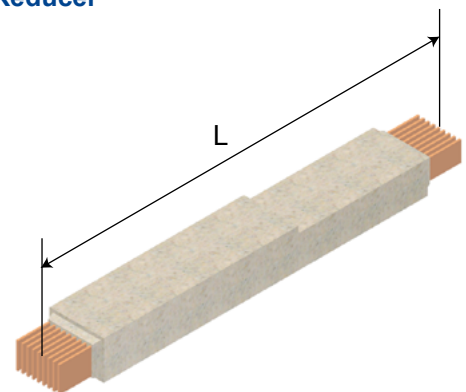
Phase Switch Feeder



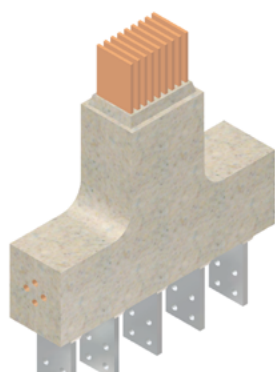
Phase Switch Feeder

Model	Length (mm)
PC1	L=1200
Model	Length (mm)
TF1	L=1200

Reducer



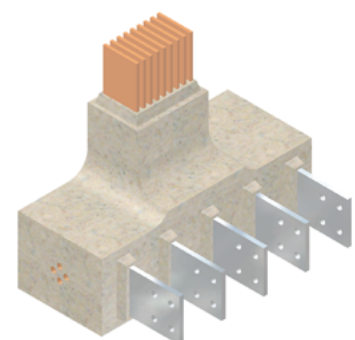
AG Type Terminal



AG Type Terminal

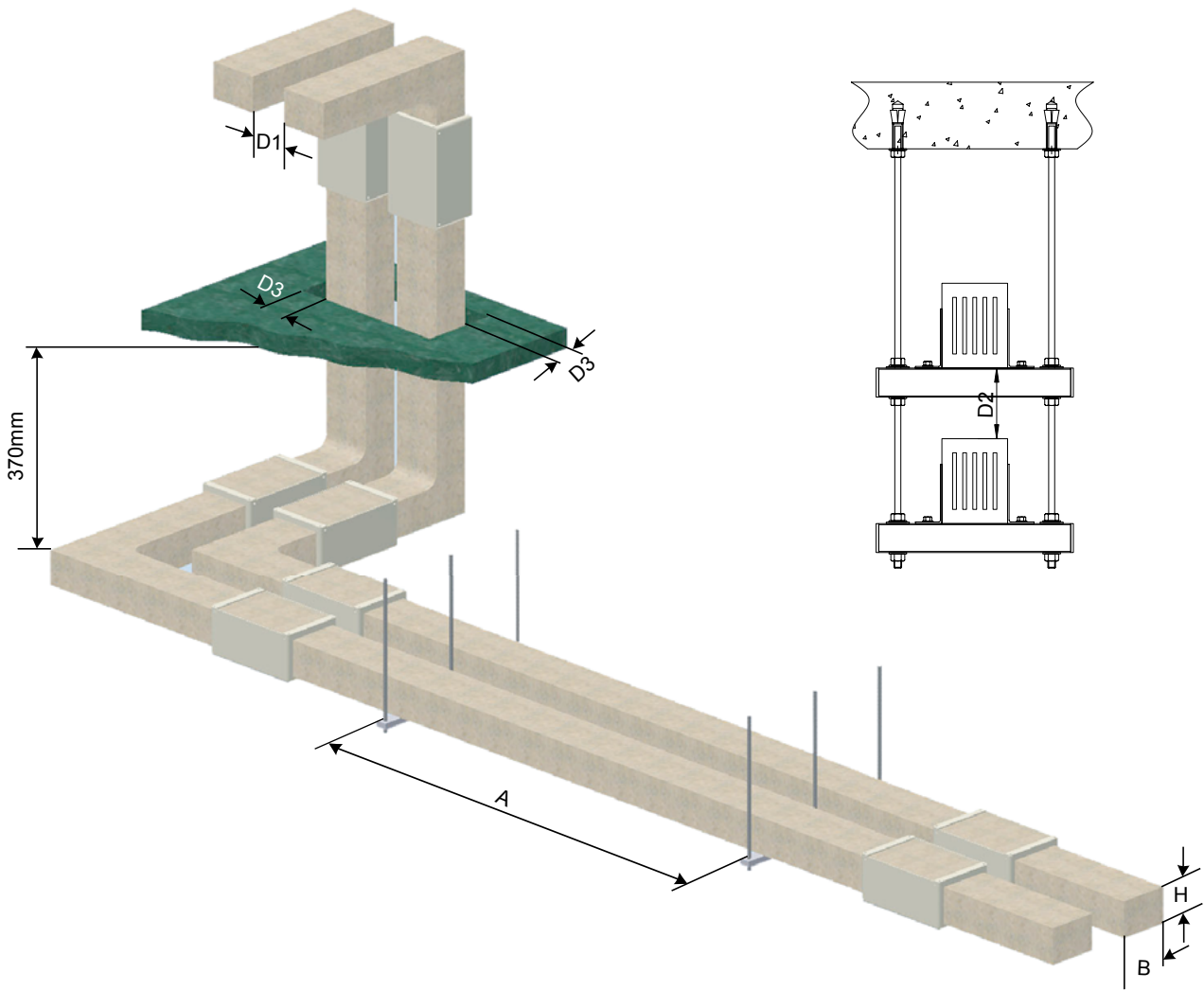
Model	Length (mm)
AG1	Refer to Page 22
Model	Length (mm)
AO1	Refer to Page 23

AO Type Terminal



* TERMINAL CONDUCTOR: TIN / SILVER PLATED

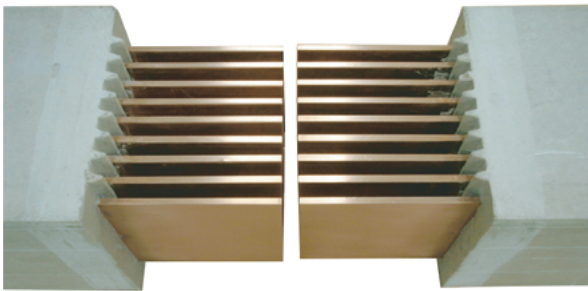
Product Installation



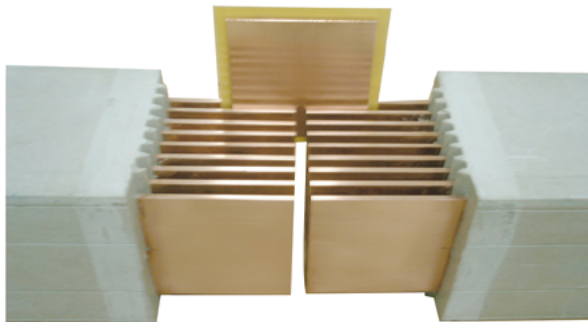
Type	External Size	Limit of Hanger Installation Pitch A		Minimum Pitch between Busbar		
	B x H	Horizontal Installation	Vertical Installation	Layout of Busbar Arrangement	Distance between Wall Opening and Busbar	
LA02	104 x 60	1500	4000	196	100	50
LA04	104 x 80					
LA08	104 x 120					
LA12	104 x 160					
LA16	104 x 200			132		
LB08	168 x 120					
LB12	168 x 160					
LB16	168 x 200					

Note: Distance between hangers and busbar are allowed to be adjusted on site while required.

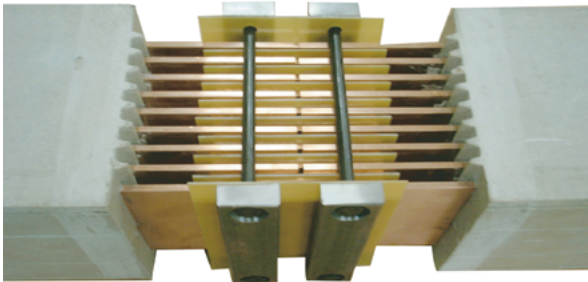
Assembly Diagrams of Low Voltage Busbar Trunking System Junction



▶ Distance between two elements are within $10\text{mm}\pm 10\text{mm}$ (inclusive). The distance can be flexibly adjusted on site by the requirement of construction.



▶ Illustration of JUNCTION assembly. (LB series)

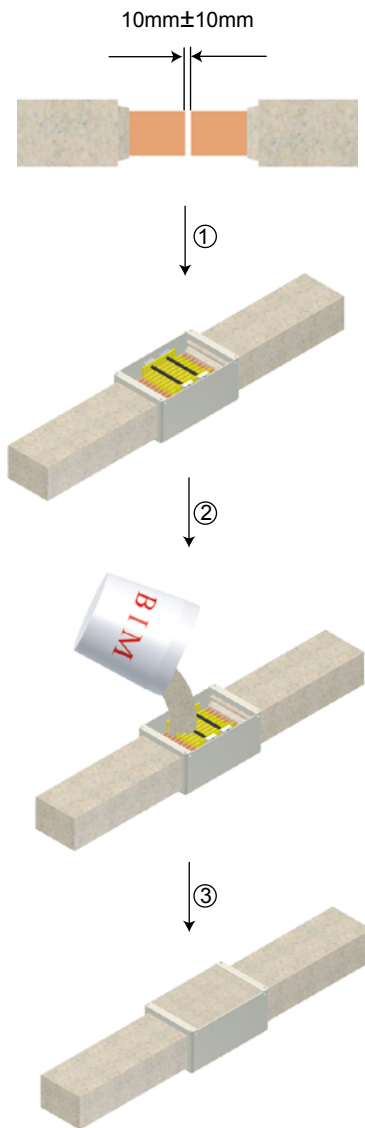


▶ The assembly bolt of Junction must be secured by torque wrench.

Illustration of cast-resin after completion

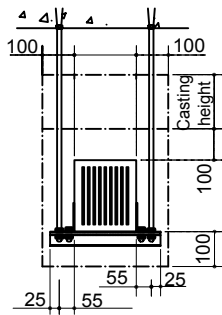


Refer to installation guide for casting method on site

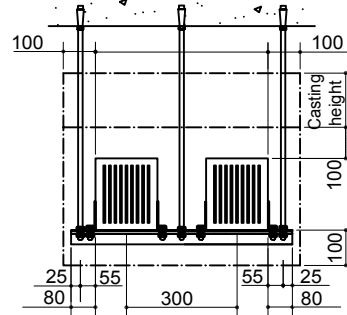


Torque of bolt during work	
Specs	M10
Torque value (N-m) for Cu	43
Torque value (N-m) for Al	30

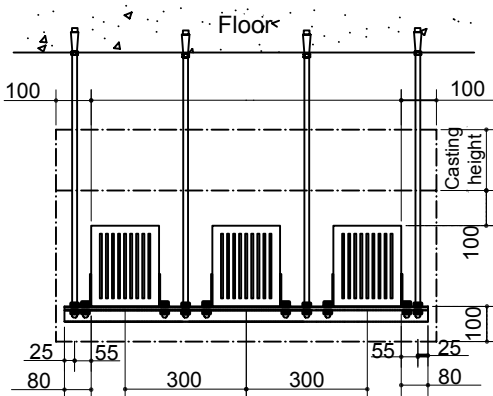
Low Voltage Busbar Trunking System Horizontal Hanger Standard



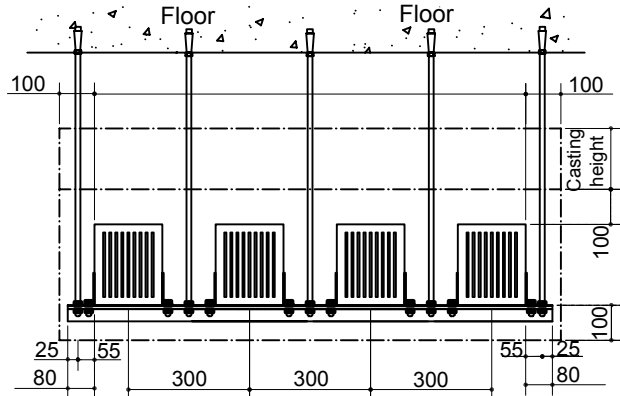
Cross-sectional Diagram of Single-Busbar (Unit: mm)



Cross-sectional Diagram of Dual-Busbar (Unit: mm)

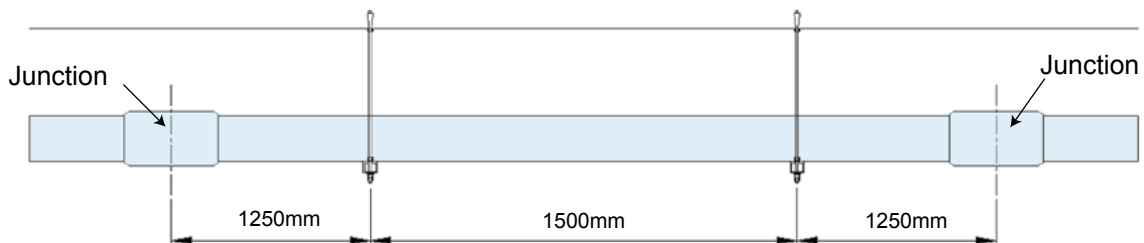


Cross-sectional Diagram of Triple-Busbar (Unit: mm)

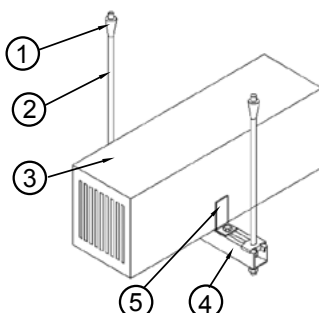


Cross-sectional Diagram of Quadruple-Busbar (Unit: mm)

SIDE VIEW

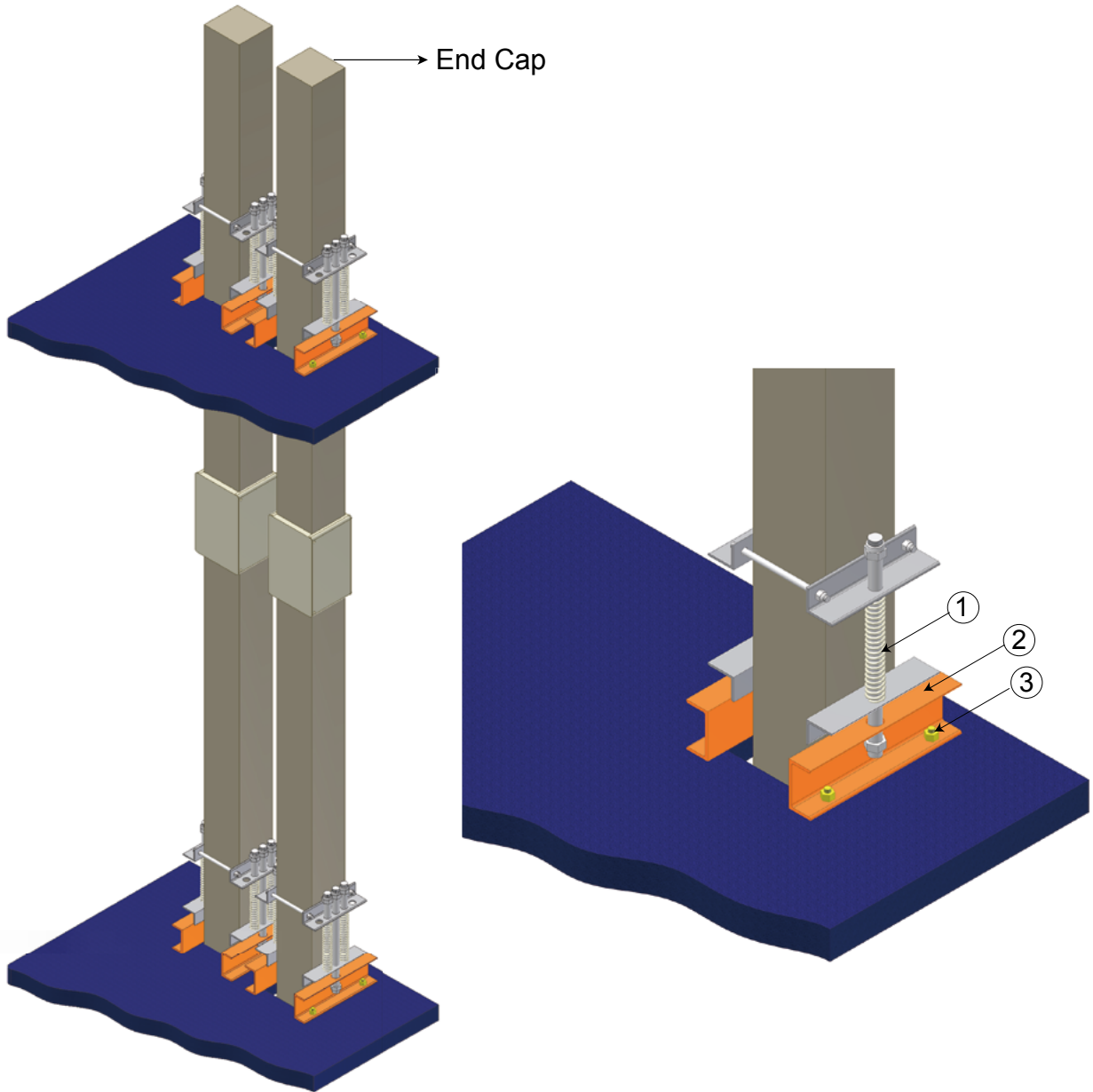


1. The installation pitch between each hanger has to comply with the standard as above. If the work condition can not meet the standard, it may be adjusted according to the condition on site. However, it must meet the requirement described in page 25 of the installation guide: minimum pitch requirement of the busbar.
2. The space required for installing busbar is shown in the diagram. The safety space above the busbar should have 100mm + casting height of 270mm = 370 mm for clearance standard of installation space. In addition, the height of the floor should be within 5m above the ground to allow expansion of bolts, full-thread bolts, and channel, etc. to install at the bottom of the floor.
3. One set of L-shape stopping plate part



No.	Name of Part	Specs	Remarks
1	Inner thread inflated screws	1/2**2"	Zinc-plated item (Included in installation work)
2	Full thread bolts	1/2"	Zinc-plated item. (Included in installation work)
3	Busbar	-	LA/LB TECO
4	Channel	2t*41*41mm	Zinc-plated item (Included in installation work)
5	L-shape stopping plate	2.3t*80*40	Zinc-plated item

Low Voltage Busbar Trunking System Vertical Hanger Standard



Vertical Hanger Units			
No.	Name of Part	Specs	Remarks
1	Spring Box Set	-	Zinc-plated item
2	Channel	75x50x5t	Zinc-plated item. (Included in installation work)
3	Inflated Screws	1/2"	Zinc-plated item. (Included in installation work)

*The selection of spring box is according to different busbar type

Dimensions of Standard Terminal Elements for Low Voltage Busbar Trunking System (Copper Conductor)

AG Type Terminal Elements

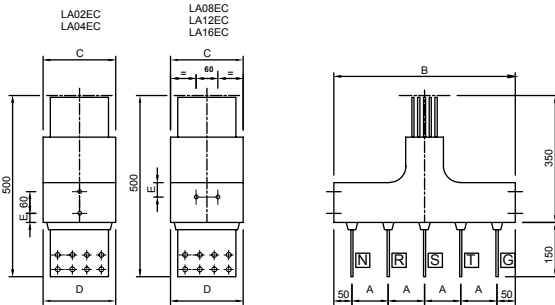


Figure 1

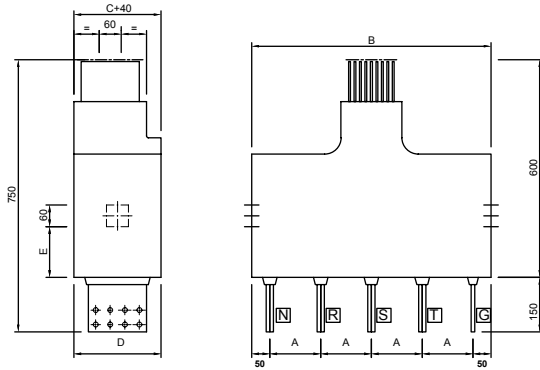


Figure 2

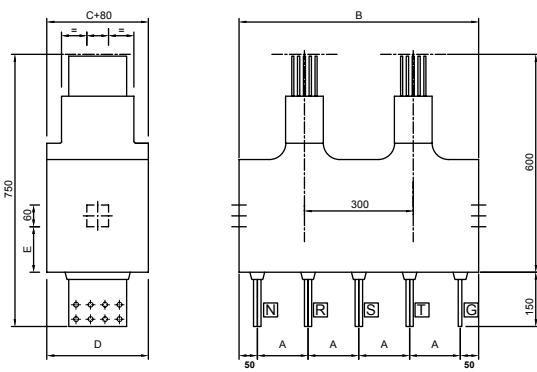


Figure 3

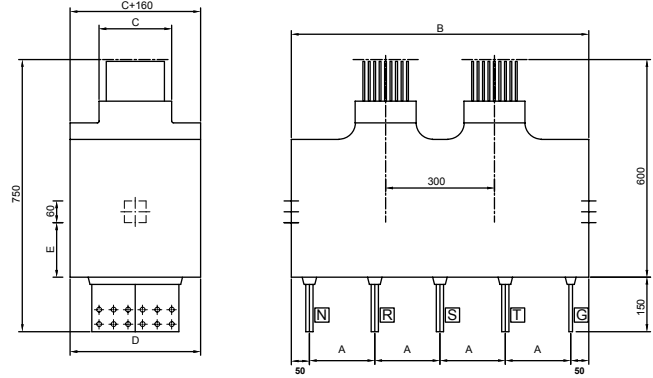


Figure 4

Unit: mm

Type	3P4W+E or 3P4W+50%E(NRSTG)					3P4W(NRST) or 3P3W+50%E(RSTG)					Figure No.
	A	B	C	D	E	A	B	C	D	E	
LA02EC	100	500	60	60	20	100	400	60	60	20	Figure 1
LA04EC	100	500	80	80	20	100	400	80	80	20	
LA08EC	100	500	120	120	40	100	400	120	120	40	
LA12EC	100	500	160	160	40	100	400	160	160	40	
LA16EC	100	500	200	200	40	100	400	200	200	40	
LB08EC	140	660	120	160	125	140	520	120	160	125	Figure 2
LB12EC	140	660	160	200	125	140	520	160	200	125	
LB16EC	140	660	200	240	140	140	520	200	240	140	
LA08DC	140	660	120	200	95	140	520	120	200	95	Figure 3
LA12DC	140	660	160	240	95	140	520	160	240	95	
LA16DC	140	660	200	280	95	140	520	200	280	95	
LB08DC	140	660	120	280	95	140	560	120	280	95	Figure 4
LB12DC	140	660	160	320	120	140	560	160	320	120	
LB16DC	180	820	200	360	150	180	640	200	360	150	

Note: 1. 1P3W*3P3W Single line: B=3P4W B-A (Figure 1, 2)

2. 1P3W*3P3W Double lines: B=3P4W B (Figure 3, 4)

Dimensions of Standard Terminal Elements for Low Voltage Busbar Trunking System (Copper Conductor)

AO Type Terminal Elements

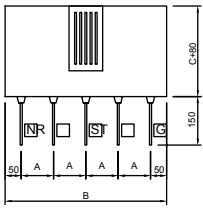


Figure 1

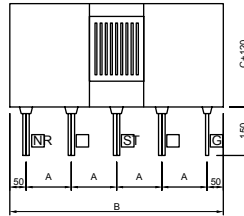
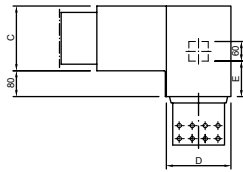


Figure 2

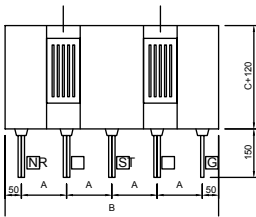
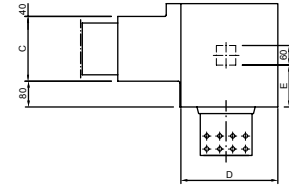


Figure 3

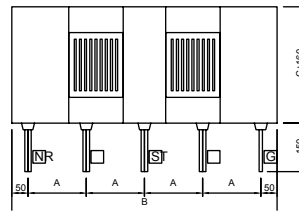
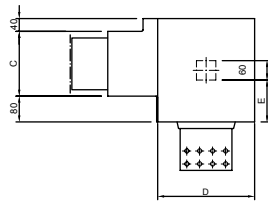
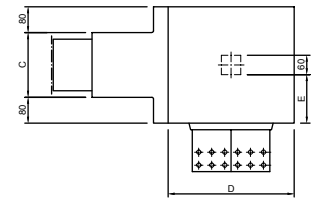


Figure 4



Unit: mm

Type	3P4W+E or 3P4W+50%E(NRSTG)					3P4W(NRST) or 3P3W+50%E(RSTG)					Figure No.
	A	B	C	D	E	A	B	C	D	E	
LA02EC	100	500	60	60	40	100	400	60	60	40	Figure 1
LA04EC	100	500	80	80	50	100	400	80	80	50	
LA08EC	100	500	120	120	115	100	400	120	120	115	
LA12EC	100	500	160	160	155	100	400	160	160	155	
LA16EC	100	500	200	200	195	100	400	200	200	195	
LB08EC	140	660	120	220	55	140	520	120	220	55	Figure 2
LB12EC	140	660	160	260	95	140	520	160	260	95	
LB16EC	140	660	200	300	135	140	520	200	300	135	
LA08DC	140	660	120	220	120	140	520	120	220	120	Figure 3
LA12DC	140	660	160	260	110	140	520	160	260	110	
LA16DC	140	660	200	300	130	140	520	200	330	130	
LB08DC	140	660	120	310	110	140	560	120	310	110	Figure 4
LB12DC	140	660	160	350	130	140	560	160	350	130	
LB16DC	180	820	200	390	150	180	640	200	390	150	

Note: 1. 1P3W'3P3W Single line: B=3P4W B-A (Figure 1, 2)

2. 1P3W'3P3W Double lines: B=3P4W B (Figure 3, 4)

Dimensions of Standard Terminal Elements for Low Voltage Busbar Trunking System (Aluminium Conductor)

AG Type Terminal Elements

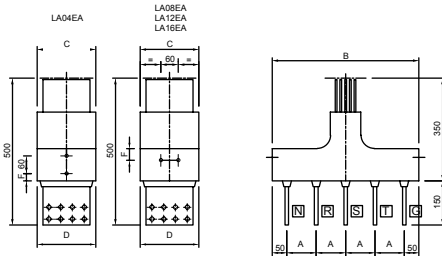


Figure 1

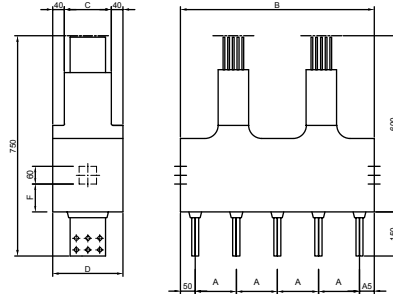


Figure 2

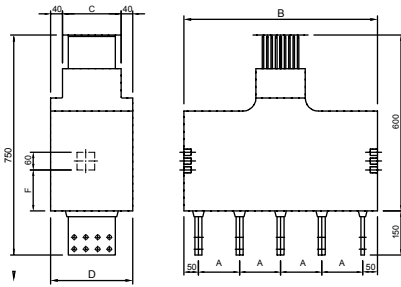


Figure 3

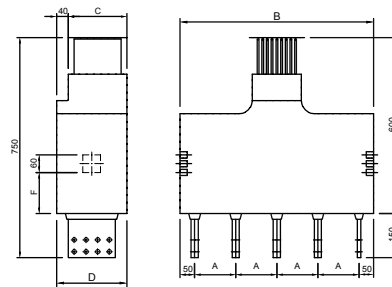


Figure 4

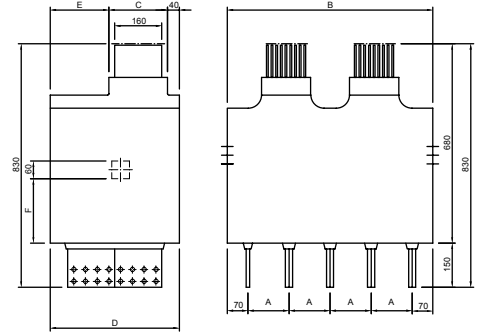


Figure 5

Unit: mm

Type	3P4W+E or 3P4W+50%E(NRSTG)						3P4W(NRST) or 3P3W+50%E(RSTG)						Figure No.
	A	B	C	D	E	F	A	B	C	D	E	F	
LA02EA	100	500	60	60	-	20	100	400	60	60	-	20	Figure 1
LA04EA	100	500	80	80	-	20	100	400	80	80	-	20	
LA08EA	100	500	120	120	-	40	100	400	120	120	-	40	
LA12EA	100	500	160	160	-	40	100	400	160	160	-	40	
LA16EA	100	500	200	200	-	40	100	400	200	200	-	40	
LB08DA	140	660	120	209	-	95	140	520	120	200	-	95	Figure 2
LB12DA	140	660	160	240	-	95	140	520	160	240	-	95	
LB16DA	140	660	200	280	-	95	140	520	200	280	-	95	
LA12EA	140	660	160	240	-	140	140	520	160	240	-	140	Figure 3
LB16EA	140	660	200	280	-	140	140	520	200	280	-	140	Figure 4
LB08DA	140	700	120	280	120	220	140	560	120	280	120	220	Figure 5
LB12DA	140	700	160	360	160	220	140	560	160	360	160	220	
LB16DA	140	700	200	440	200	220	140	640	200	440	200	220	

Note: 1. 1P3W*3P3W Single line: B=3P4W B-A (Figure 1, 3, 4)

2. 1P3W*3P3W Double lines: B=3P4W B (Figure 2, 5)

Dimensions of Standard Terminal Elements for Low Voltage Busbar Trunking System (Aluminium Conductor)

AO Type Terminal Elements

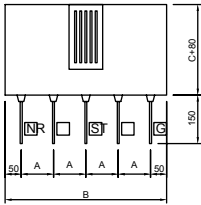


Figure 1

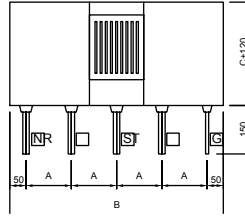
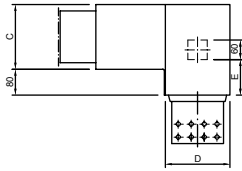


Figure 2

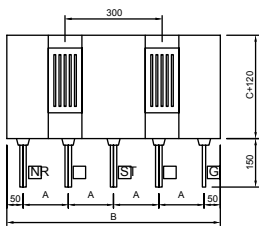
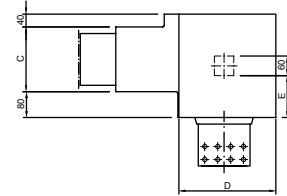


Figure 3

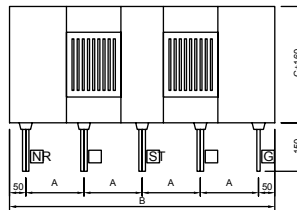
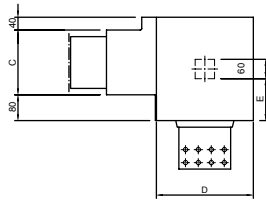
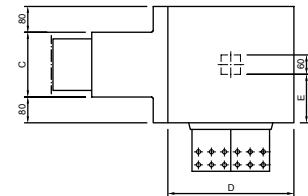


Figure 4



Unit: mm

Type	3P4W+E or 3P4W+ 50%E (NRSTG)					3P4W(NRST) or 3P3W+50%E(RSTG)					Figure No.
	A	B	C	D	E	A	B	C	D	E	
LA04EA	100	500	80	80	50	100	400	80	80	50	Figure 1
LA08EA	100	500	120	120	115	100	400	120	120	115	
LA12EA	100	500	160	160	155	100	400	160	160	155	
LA16EA	100	500	200	200	195	100	400	200	200	195	
LB12EA	140	660	160	280	95	140	520	160	280	95	Figure 2
LB16EA	140	660	200	320	135	140	520	200	320	135	
LA12DA	140	660	160	240	110	140	520	160	240	110	Figure 3
LA16DA	140	660	200	280	130	140	520	200	280	130	
LB08DA	140	660	120	320	110	140	560	120	320	110	Figure 4
LB12DA	140	660	160	400	130	140	560	160	400	130	
LB16DA	180	820	200	480	150	180	640	200	480	150	

Note: 1. 1P3W'3P3W Single line: B=3P4W B-A (Figure 1, 2)
 2. 1P3W'3P3W Double lines: B=3P4W B (Figure 3, 4)

Dimensions of Standard Terminal Elements Copper Plate for Low Voltage Busbar Trunking System

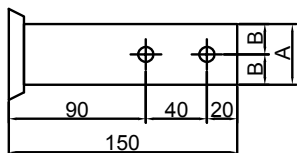


Figure 1

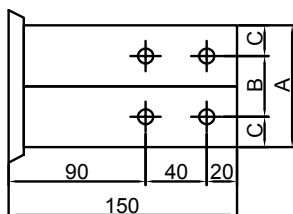


Figure 2

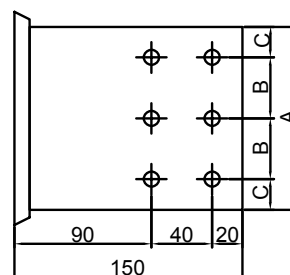


Figure 3

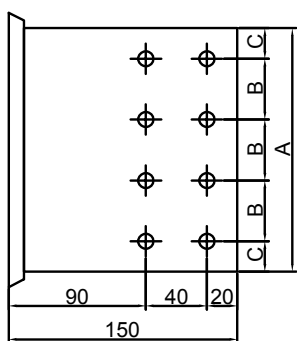


Figure 4

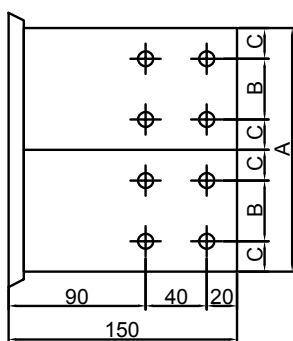


Figure 5

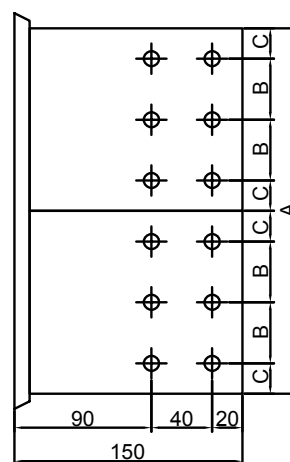


Figure 6

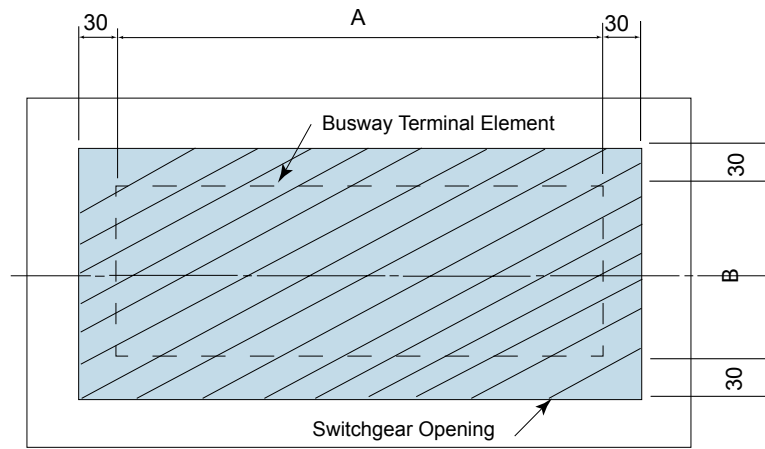
Unit: mm

Type	Type of Terminal Elements	Dimensions			Figure No.
		A	B	C	
LA02	AG/AO	20	10	-	Figure 1
LA04	AG/AO	40	20	-	
LA08	AG/AO	80	40	20	Figure 2
LB08	AG/AO	80	40	20	
LA08(D)	AG/AO	80	40	20	
LA12	AG/AO	120	40	20	Figure 3
LB12	AG/AO	120	40	20	
LA12	AG/AO	120	40	20	
LA16	AG/AO	160	40	20	Figure 4
LA16(D)	AG/AO	160	40	20	
LB16	AG/AO	160	40	20	Figure 5
LB08(D)	AG/AO	160	40	20	
LB12(D)	AG/AO	200	40	30	
LB16	AG/AO	240	40	20	Figure 6
Copper /Aluminium Conductor					

*(D)Double Lines

Opening Requirement of Standard Terminal Elements and Switchgear for Low Voltage Busbar Trunking System

Opening Dimensions of Switchgear Top, Bottom, and Rear Side



Busbar Trunking System Terminal Elements Opening Dimensions (Copper)

AG Model

No.	Type	3P3W		3P3W+E(50%E) or 3P4W		3P4W+E(50%E)	
		A(mm)	B(mm)	A(mm)	B(mm)	A(mm)	B(mm)
1	LA02EC	300	60	400	60	500	60
2	LA04EC	300	80	400	80	500	80
3	LA08EC	300	120	400	120	500	120
4	LA12EC	300	160	400	160	500	160
5	LA16EC	300	200	400	200	500	200
6	LA08DC	520	200	520	200	660	200
7	LA12DC	520	240	520	240	660	240
8	LA16DC	520	280	520	280	660	280
9	LB08EC	380	160	520	160	660	160
10	LB12EC	380	200	520	200	660	200
11	LB16EC	380	240	520	240	660	240
12	LB08DC	560	280	660	280	660	280
13	LB12DC	560	320	660	320	660	320
14	LB16DC	560	360	800	360	800	360

AO Model

Unit: mm

No.	Type	3P3W		3P3W+E(50%E) or 3P4W		3P4W+E(50%E)	
		A(mm)	B(mm)	A(mm)	B(mm)	A(mm)	B(mm)
1	LA02EC	300	60	400	80	500	80
2	LA04EC	300	80	400	80	500	80
3	LA08EC	300	120	400	120	500	120
4	LA12EC	300	160	400	160	500	160
5	LA16EC	300	200	400	200	500	200
6	LA08DC	520	220	520	220	660	220
7	LA12DC	520	260	520	260	660	260
8	LA16DC	520	300	520	300	660	300
9	LB08EC	380	220	520	220	660	220
10	LB12EC	380	260	520	260	660	260
11	LB16EC	380	300	520	300	660	300
12	LB08DC	600	310	660	310	660	310
13	LB12DC	600	350	660	350	660	350
14	LB16DC	600	390	800	390	800	390

Busbar Trunking System Terminal Elements Opening Dimensions (Aluminium)

AG Model

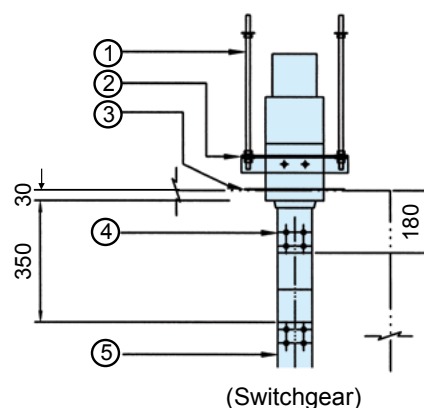
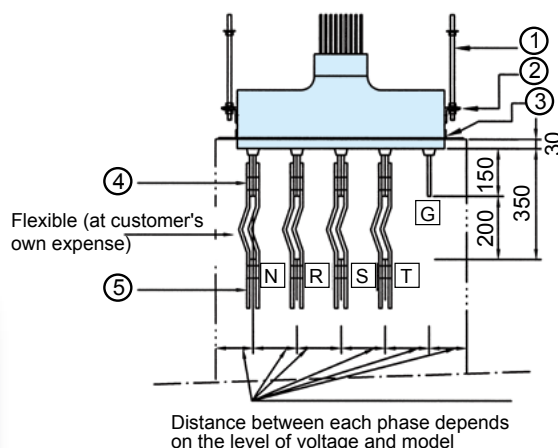
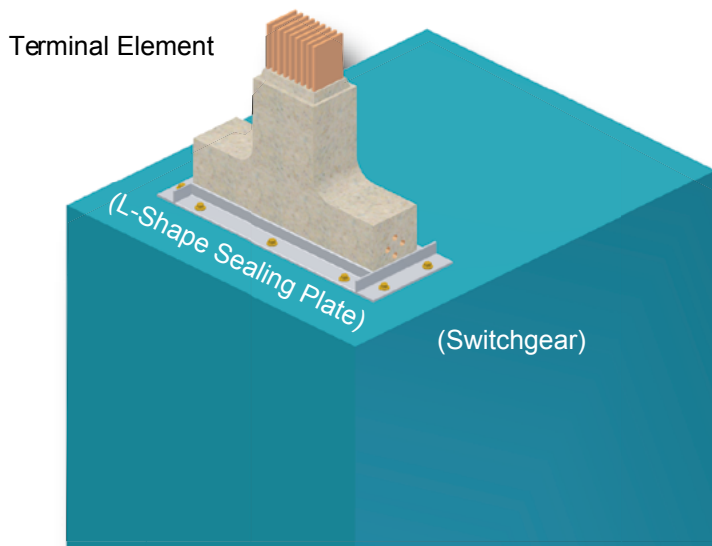
No.	Type	3P3W		3P3W+E(50%E) or 3P4W		3P4W+E(50%E)	
		A(mm)	B(mm)	A(mm)	B(mm)	A(mm)	B(mm)
1	LA04EA	300	80	400	80	500	80
2	LA08EA	300	120	400	120	500	120
3	LA12EA	300	160	400	160	500	160
4	LA16EA	300	200	400	200	500	200
5	LA12DA	520	240	520	240	700	240
6	LA16DA	520	280	520	280	700	280
7	LB12EA	380	240	580	240	720	240
8	LB16EA	380	280	580	280	720	280
9	LB08DA	600	280	700	280	700	280
10	LB12DA	600	360	700	360	700	360
11	LB16DA	600	440	700	440	700	440

AO Model

Unit: mm

No.	Type	3P3W		3P3W+E(50%E) or 3P4W		3P4W+E(50%E)	
		A(mm)	B(mm)	A(mm)	B(mm)	A(mm)	B(mm)
1	LA04EA	300	80	400	80	500	80
2	LA08EA	300	120	400	120	500	120
3	LA12EA	300	160	400	160	500	160
4	LA16EA	300	200	400	200	500	200
5	LA12DA	520	240	520	240	700	240
6	LA16DA	520	280	520	280	700	280
7	LB12EA	380	280	580	280	720	280
8	LB16EA	380	320	580	320	720	320
9	LB08DA	600	320	700	320	700	320
10	LB12DA	600	400	700	400	700	400
11	LB16DA	600	480	700	480	700	480

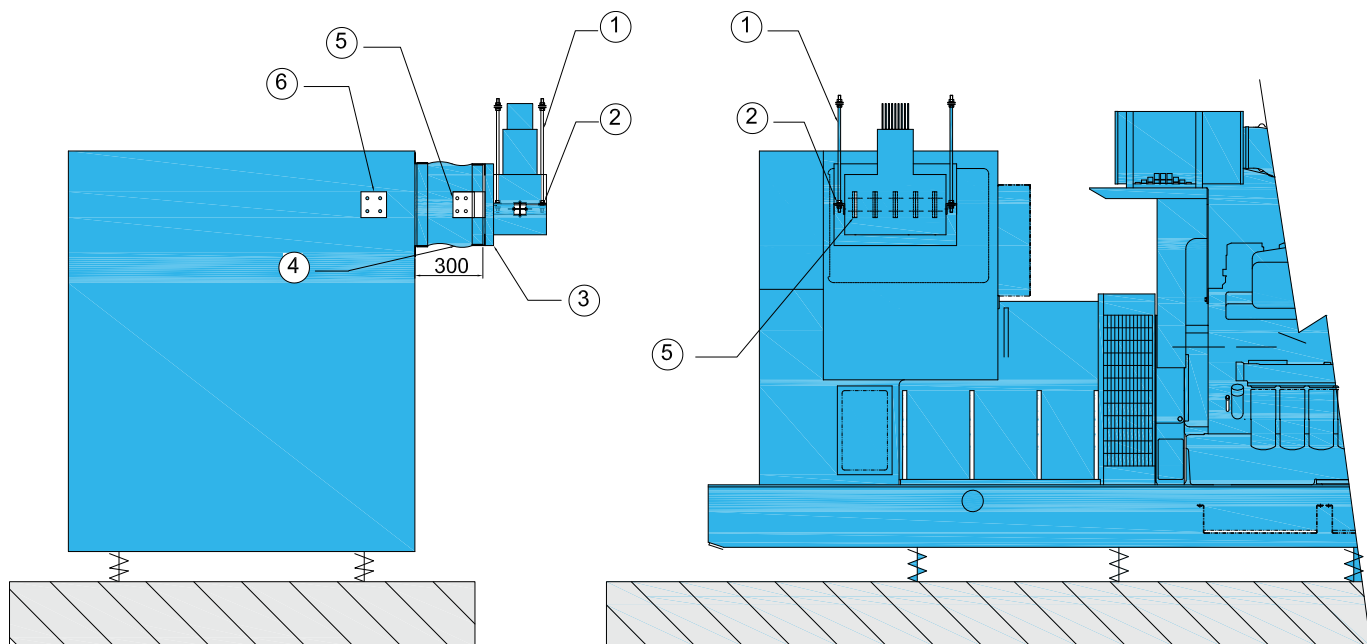
Low Voltage Busbar Trunking System Terminal Element and Switchgear Standard Guideline



No.	Name	Specs	Remark
1	Full threaded screw	1/2"	Zinc-plated product (Included in installation work)
2	Angel Steel	6t x 50 x 50mm	Zinc-plated product (Included in installation work)
3	Terminal element seal	Steel plate t=2mm	Painted
4	Flexibles	The 200mm reserved space between terminal element and switchgear and connected by flexibles.	Materials of this portion and connection work does not belong to the busbar trunking system contractor.
5	Connection copper plate of switchgear	According to Switchgear design.	The drillings on copper plate are designed, processed and connected by switchgear contractor.

Note: This diagram is the standard connection interface.
Actual location of connection is determined case by case

Low Voltage Busbar Trunking System Terminal Element and Generator Connection Standard Guideline



No.	Name	Specs	Remark
1	Full threaded screw	1/2"	Zinc-plated product (Included in installation work)
2	Angel Steel	6t x 50 x 50mm	Zinc-plated product (Included in installation work)
3	Terminal element seal	Steel plate t=2mm	Painted
4	Fire-resistant tarpaulin		Non-Combustion (included in installation of flange)
5	Flexibles		Materials of this portion and connection work does not belong to the busbar trunking system contractor.
6	Connection copper plate of generator/transformer	According to Switchgear Design	The drillings on copper plate are designed, processed and connected by switchgear contractor

Plug-in Unit (Tap-Off Unit)

A. The standard length of each section of plug-in unit type busbar is 3m and 4m. The plug-in points should be compared with the quantity and position of MCCB from customer's system drawing. Extra points need to be reserved by customer's actual requirement and the price is determined separately.

B. When the plug-in unit is taken off, the opening of the leads is sealed by the insulation cover with the protection level IP66 (IP68 Optional).

C. There is an interlock device between plug-in unit and busbar. In order to ensure the safety of operator, the plug-in unit can not be taken off from busbar unless MCCB is off.

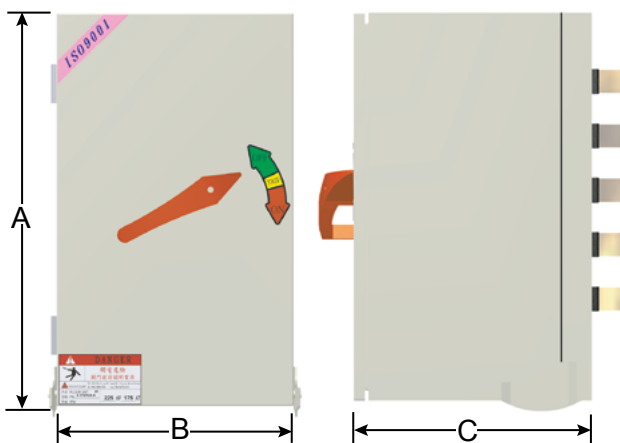
D. The "ON/OFF" indication is shown on the cover for operation of plug-in unit. There has an interlock between the cover of plug-in unit and MCCB to make sure when MCCB is turned ON that the cover of plug-in unit can not be opened. (Unlock the cover from outside when MCCB is turned ON, which is another option for customer. The price differs from general type.)

E. The design of plug-in unit meets the requirement of IEC60529 IP54/IP55/IP66. (IP55/IP66 is optional, the price is determined separately.)

F. For minimum distance between busbar, please refer to the horizontal/vertical pitch of "Product Installation Description". If the different rated current plug-in unit is installed, the maximum unit size should be used as basis.

G. The design of plug-in unit fingers and flange connection are patented with M328135, low contact resistance is the major advantage for the design.

H. The standard colour of plug-in unit is white N-9.5. (The colour is optional.)



Busbar Type	Current Rating (A)	Dimension (mm) (AxBxC)
3P4W+E(5P)	125AF, 15~125AT	350x260x282
3P4W+50%E(9P)	125AF, 15~125AT	500x300x302
3P4W+E 3P4W+50%E	250AF, 125~250AT	
3P4W+E 3P4W+50%E	400AF, 250~400AT	600x300x302
3P4W+E 3P4W+50%E	630AF, 500~630AT 800AF, 700~800AT	900x350x375
3P4W+E 3P4W+50%E	1000~1600AF 1000~1600AT	1350x500x495

Note: 1. Design is based on TO/TG series MCCB of TECO.

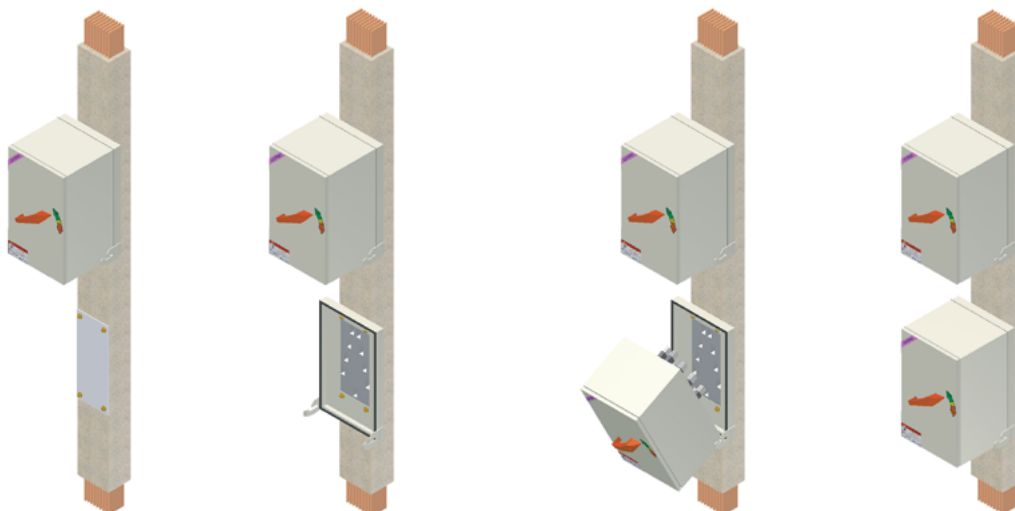
2. MCCB other than TECO is selected, the price is discussed separately

1. When the plug-in unit is taken off, the opening of the leads must be placed by the insulation cover.

2. Install the basement of plug-in unit.

3. Insert the plug-in unit onto the support plate of basement.

4. Installation completed.



Product Design Theory

1. Temperature Correction Coefficient for Rated Current

Maximum Ambient Temperature (°C)	20	25	30	35	40	45	50	55	60
Daily Average Ambient Temperature (°C)	15	20	25	30	35	40	45	50	55
Correction Coefficient	1.18	1.14	1.09	1.05	1.00	0.94	0.88	0.82	0.75

2. Voltage Drop Calculation

(1) 1P2W

$$\Delta U = 2 \times I_s \times L \times (R \cdot \cos\theta + X \cdot \sin\theta) \times 10^{-6}$$

(2) 1P3W / 3P4W (Line to neutral)

$$\Delta U = I_s \times L \times (R \cdot \cos\theta + X \cdot \sin\theta) \times 10^{-6}$$

(3) 3P3W

$$\Delta U = \sqrt{3} \times I_s \times L \times (R \cdot \cos\theta + X \cdot \sin\theta) \times 10^{-6}$$

▲U = Voltage drop (Line to line) (Volts)

I_s = Load current (Amps)

L = Line length (m)

R = Resistance (μΩ/m)

X = Reactance (μΩ/m)

cosθ = Power factor

sinθ = √(1-cos²θ)

Product Model Identification

LA	08	E	C	5	-	400
LA	Product series code	LA: LA Series 1kV		LB: LB Series 1kV		
08	Copper bar width	04 w=40mm , 08 w=80mm , 12 w=120mm , 16 w=160mm,				
E	Single/Double conductor of each phase	E: Single Line		D: Double Lines		
C	Conductor type	C: Copper conductor		A: Aluminium conductor		
5	No. of conductors	-				
400	Cross sectional area of conductor	400mm ²				

For calculation of general product data or technical information, please contact with manufacturer or local agency

Low Voltage Busbar Trunking System Routine Test Items

A. Low Voltage Busbar Trunking System dielectric tests: Insulation resistance test and power frequency voltage withstand test

Electrical tests	Insulation resistance test	Power frequency voltage withstand
Standards	LA/LB TECO	IEC 61439-6
U _r at 60Hz V	R at 1kV DC M Ω	U at 60 Hz 1min V
1000	2000	5000

B. Appearance inspection

The appearance of each element must be inspected. Result to be mentioned in final inspection report.

C. Dimension inspection

All dimensions are to be compared with customer's order sheet.

Result to be mentioned in final inspection report.

D. Outgoing test report

Low voltage parts shall be tested prior to shipment and attached with outgoing test report.

Catalogue serial number: TSPDLV_LA/LBTECO_V03-032022

Every possible effort has been made to ensure that the information contained in this publication is correct and current at the time of printing. Tai Sin reserves the right to change the information and/or specifications at an time without notice in light of technical improvement and continued development.

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