



Tai Sin®

# LT Line I Busbar Trunking System

**Our products are certified  
for your peace of mind**

Tai Sin LT Line I series Busbar Trunking System conforms to  
100% IEC 61439-6, certified by KEMA KEUR.

Current Rating: Al: 250A-4000A  
Cu: 400A-5000A

IP Rating: IP54 / IP65 / IP66



The First & Only Busbar Trunking System  
Test and Assembly Line in Singapore



**WE'RE MORE THAN CABLES**

# 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 centre, 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.

LT Line I busbar trunking system offers a full line of Busbar Trunking System to meet the world market: suitable for 3P3W, 3P4W, 3P5W, supply and distribution, with rated current from 250A to 4000A (for aluminium conductor) & 400A to 5000A (for copper conductor), rated operation voltage up to 690V(rated insulation voltage up to 1000V), IP degree up to IP66 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.



# Content

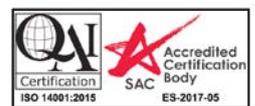
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# International Certification

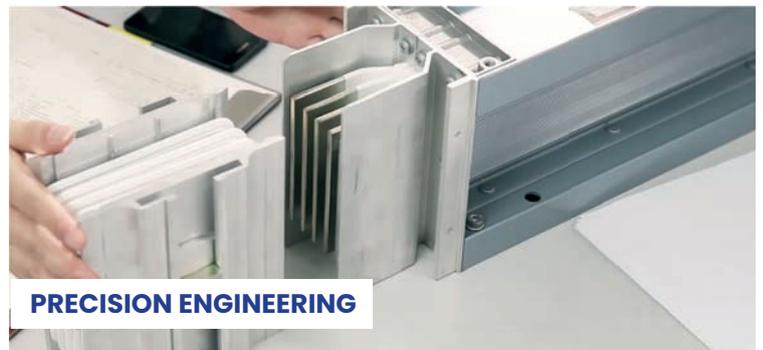
Our products are certified for your peace of mind

Tai Sin LT Line I series Busbar Trunking System conforms to IEC 61439-6\*, certified by KEMA KEUR.



*\*Full type test certification (IEC61439) for each and every ampere rating of busbar trunking system*

The first & only Busbar Trunking System designed and tested in Singapore



# Applications

Designed to make your facility **simpler, more efficient and flexible**

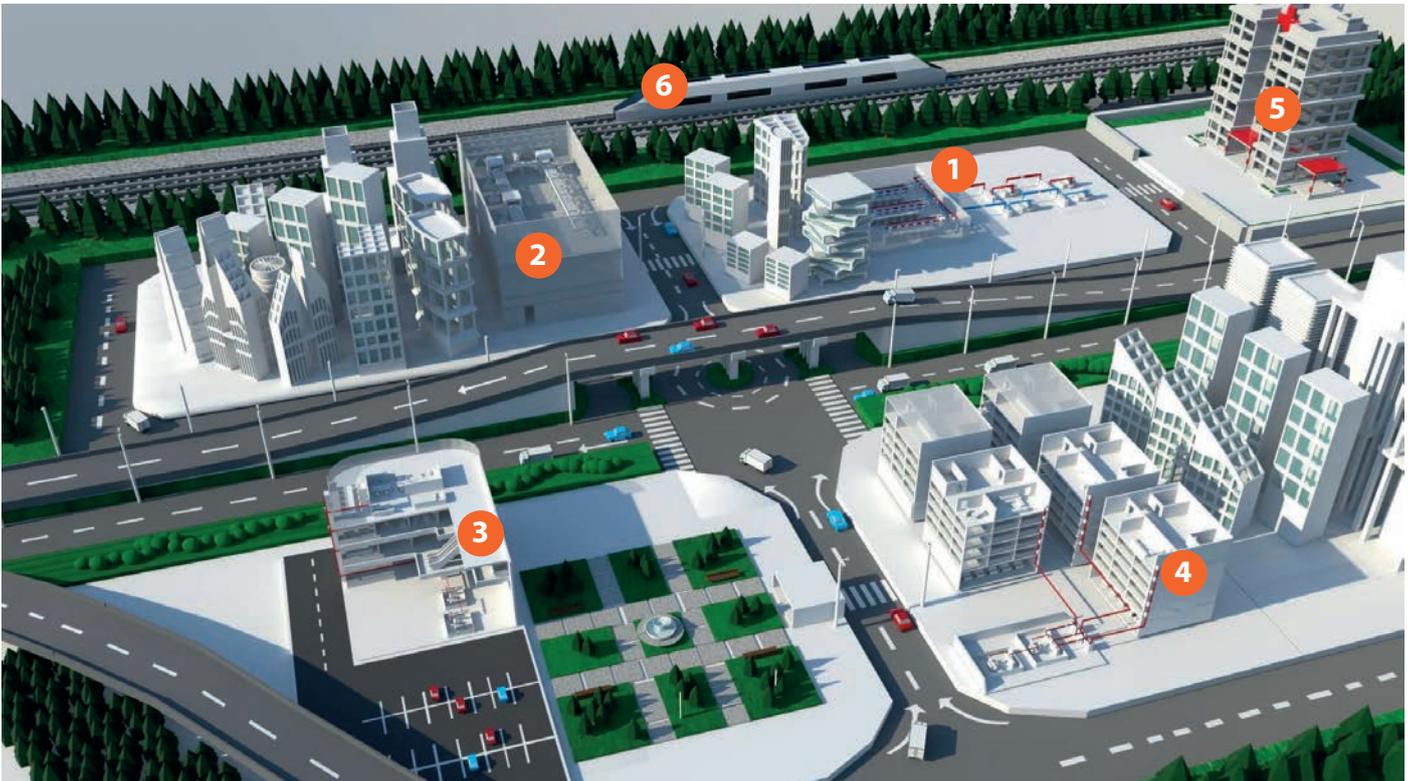
Busbar Trunking System, first introduced in 1932, solving the automation industries needs for flexible power distribution system.

Since then, Busbar Trunking System had evolved from Air Insulated design to today compact series “Sandwich design” and incorporating monitoring & control system in load distribution. The versatility of Busbar Trunking System design not only serves high-amperage application efficiently in terms of energy loss, it also provides high productivity in the implementation on site.

Today, Busbar Trunking System is widely used in all segments of development:

- 1 Data Centre
- 2 Industrial
- 3 Commercial
- 4 Residential
- 5 Healthcare
- 6 Infrastructure

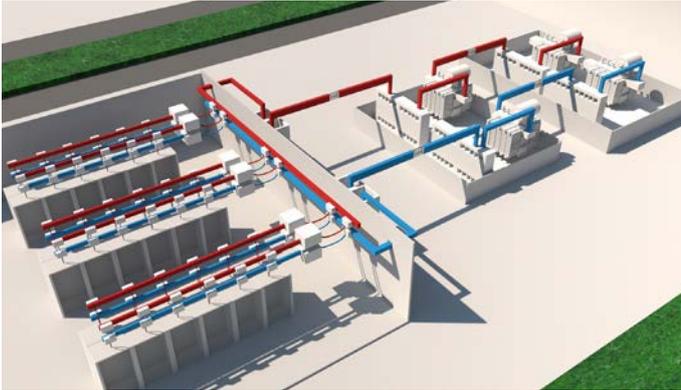
Recognizing the needs for more efficient & flexible solution, Tai Sin Electric Limited, a renowned Cable & Wire manufacturer & specialist in Electrical & Power distribution system, developed a new range of Low Voltage Busbar Trunking System which is designed and tested in Singapore.



# Applications

## Key Considerations

Our Busbar Trunking Systems are designed for further performance enhancement of our cables, as both products are complementary to each other. Busbar Trunking Systems are essential for achieving highly desirable features like compactness, robustness, 90deg bending, fire-resistance and functional integrity. They promote aestheticism by connecting two installations (e.g transformer and switchgear) via rigid copper bars and eliminating the need for traditional and complex wiring; whereby conductors with several insulation methods that can be customized based on the complex requirements in nowday's context.



### Data Centres

- Service Continuity
- Halogen-free
- Flexibility To Evolve/Expand
- Customizable Colour



### Industrial Areas

- Service Continuity
- Flexibility To Evolve/Expand
- Halogen-free
- Low Voltage Drop
- Low Maintenance Frequency



### Commercial Areas

- Service Continuity
- Flexibility To Evolve/Expand
- Halogen-free
- Low Voltage Drop
- Low Maintenance Frequency

# Applications

## Key Considerations

Our offers include both Low Voltage Aluminum and Low Voltage Copper Busbar Trunking Systems which gives you the flexibility to choose the most suitable solution for your application.



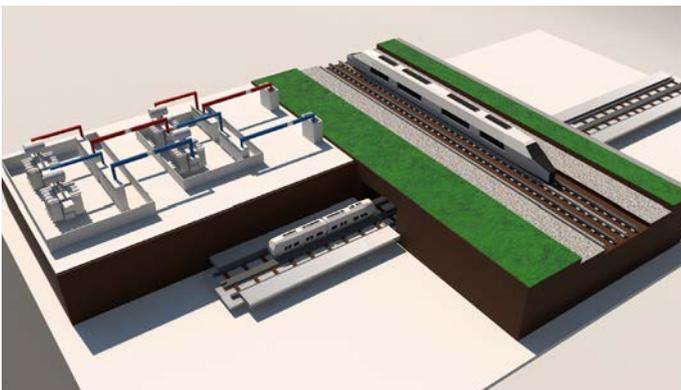
### Residential Areas

- Service Continuity
- Halogen-free
- Low Maintenance Frequency



### Healthcare Sectors

- Service Continuity
- Low Electromagnetic Field Emission
- Halogen Free
- Low Voltage Drop



### Infrastructure

- Service Continuity
- Model Availability
- Halogen-free
- Low Voltage Drop
- Low Maintenance Frequency
- Low Electromagnetic Field Emission

# 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 centre 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.

# System Overview

Make the most of your energy

Tai Sin LT Line I Busbar Trunking System is a reliable and efficient electrical distribution system with sandwich construction and superior performance. It is a safe and robust power distribution system with high electrical efficiency, low voltage drop, high mechanical strength.

The system offers a full line of Busbar Trunking System to meet the world market: suitable for 3P3W, 3P4W, 3P5W, supply and distribution, with rated current from 250A to 4000A (for aluminium conductor) & 400A to 5000A (for copper conductor), rated operation voltage up to 690V (rated insulation voltage up to 1000V), IP degree up to IP66 and the frequency 50~60Hz.

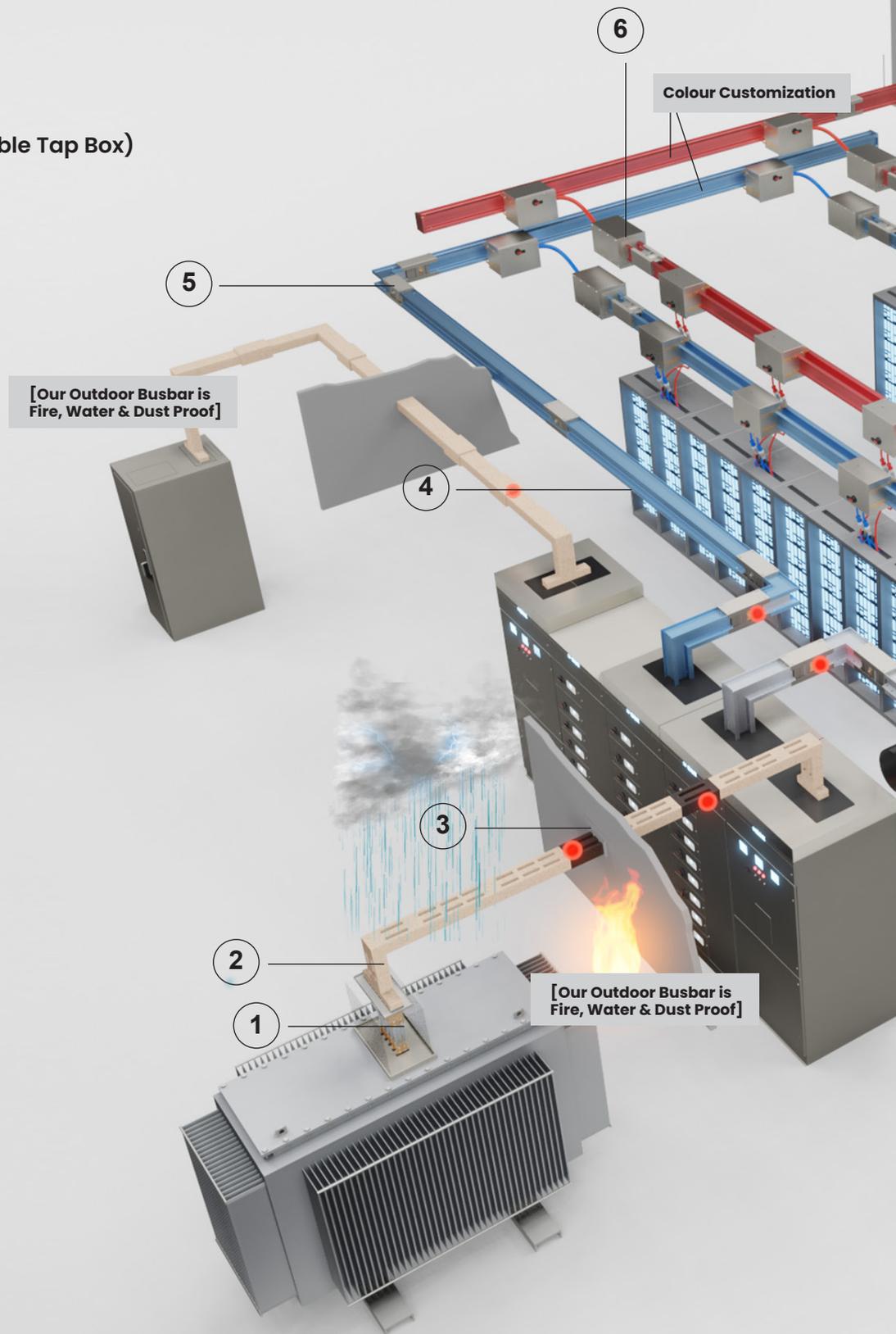
Constructed with two-piece of extruded aluminium housing, Tai Sin LT Line I Busbar Trunking System breaks the barrier of weight as one of the lightest systems in the business and offers you maximum flexibility. The full aluminium alloy housing, a low magnetic material, avoids hysteresis loss on the distribution system.

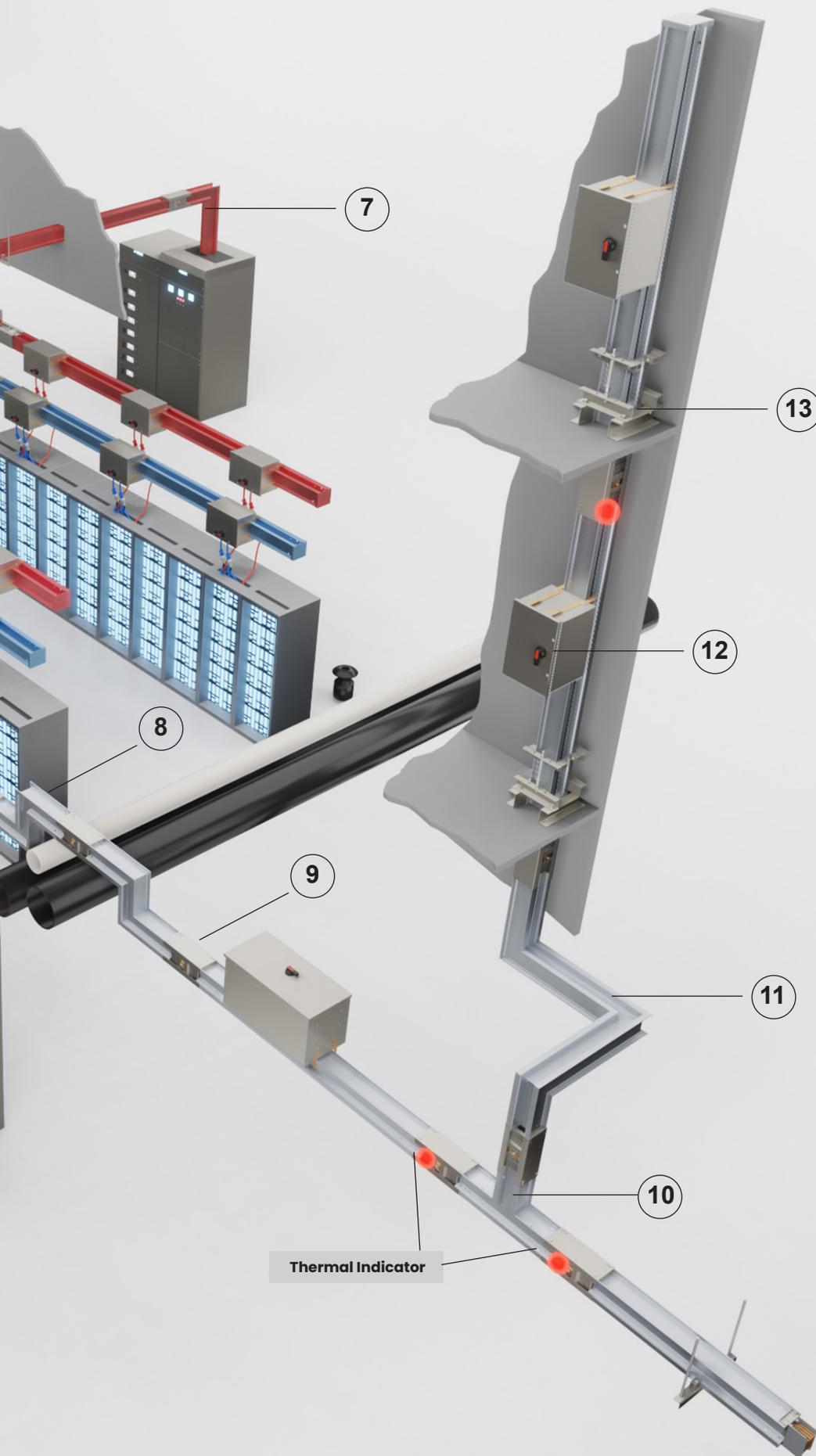
Tai Sin LT Line I Busbar Trunking System provides longer life epoxy insulation as an option to polyester insulation.

Tai Sin Low Voltage Busbar Trunking System is an ideal choice for various applications including commercial, industrial electrical distribution, and other verticals.

From every aspect—performance, flexibility, quality, and customer value, LT Line I Busbar Trunking System is a superior choice for your next installation.

1. Flexible Link
2. Flanged End
3. Wall Flange
4. Straight Length
5. Flatwise Elbow
6. End Tap Box (Cable Tap Box)





- 7. Edgewise Elbow
- 8. Edgewise Offset
- 9. Joint
- 10. Tee Elbow
- 11. Non-standard Elbow
- 12. Tap-off Unit (Plug-in Unit)
- 13. Spring Hanger

## System Overview

With Tai Sin Busbar Trunking System, you can always find the optimal solution to **meet the challenges ahead**

Description	Specification & Standards
Model	LT Line I
Type	Sandwich
Compliance Standard	IEC 61439-6 Kema Keur
Current Rating	CU: 400A-5000A Al: 250A-4000A
Rated Insulation Voltage (Ui)	690V/1000V
Rated Frequency (Fn)	50Hz/60Hz
Conductor Material	Copper/ Aluminium
TOU Rating	Copper: 16A~630A plug-in type   800A~1250A bolt-on type Aluminum: 16A~400A plug-in type   630A~800A bolt-on type
Operation Temperature	Avg: 35°C, Max: 55°C
System Configuration	3P3W 3P3W+50%E 3P4W 3P4W+50%E 3P4W+100%E 3P4W(200%N) 3P4W(200%N)+50%E 3P4W(50%N) 3P4W(50%N)+50%E
IP Rating	Up to IP54 / IP65 / IP66
Insulation Material	2 layers of Mylar (Polyester Film) or 1 layer of Mica
Housing	2 pieces of housing (Aluminium Housing)
Insulation class	130°C - Class B

# Product Features

Safet & Efficiency at every level

## Predictive Temperature Rise Indicator

- Joint insulator with a convex-concave groove edge provides an increased creepage distance.
- Color-coded-temperature indicator applied at busbar joint to give an early warning when high temperature occurs at the joint.

## Superior & Reliable Insulation

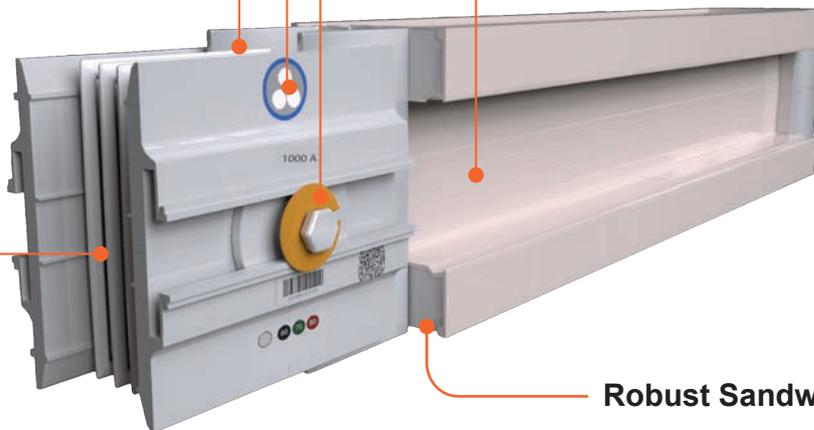
- Both polyester film insulation and epoxy insulation (Class B) are available with exceptional electrical performance and superior mechanical strength.
- Materials are environmentally friendly and certified by a reputable international laboratory. The busbar trunking system is halogen-free with no toxicity emission in the case of fire.

## Unique Joint Design

- Single bolt joint design to shorten the time of connection by 50% compared to the traditional design.
- Double-headed "break off" joint bolt is applied to tighten the busbar with just a common 16mm socket wrench. Belleville spring washers are adopted to ensure pressure evenly applied across the joint. The tightening and re-tightening torque value for the double-headed joint bolt is 70~80N.

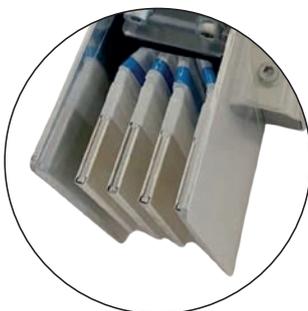
## Unique Structure Design

- The unique "serrated surface" design of extruded >3mm thickness aluminum housing greatly improves the heat dissipation for the whole busbar trunking system.
- By the design of two-piece housing, Tai Sin Low Voltage Busbar Trunking System provides more reliable IP protection for the field application than traditional design, including IP54, IP65, IP66.



## 99.9% Purity Copper Conductor or Aluminium Conductor\* (option - copper contact)

High-speed sawing for a high sawing accuracy and smooth cut to reduce temperature rise at the busbar joint.



\*Aluminium Conductor (option - copper contact)

## Robust Sandwich Structure

Densely arranged conductors in the housing to achieve superior heat dissipation, lower temperature rise and eliminate the "chimney effect".

## Other Features:

- Novel Conductor Structure
- Compact Design
- Unique error-proof device (Bridge Type Joint)
- Plug outlet and busbar plug

For more details: <https://www.taisin.com.sg/our-products/busbar-trunking-system/>

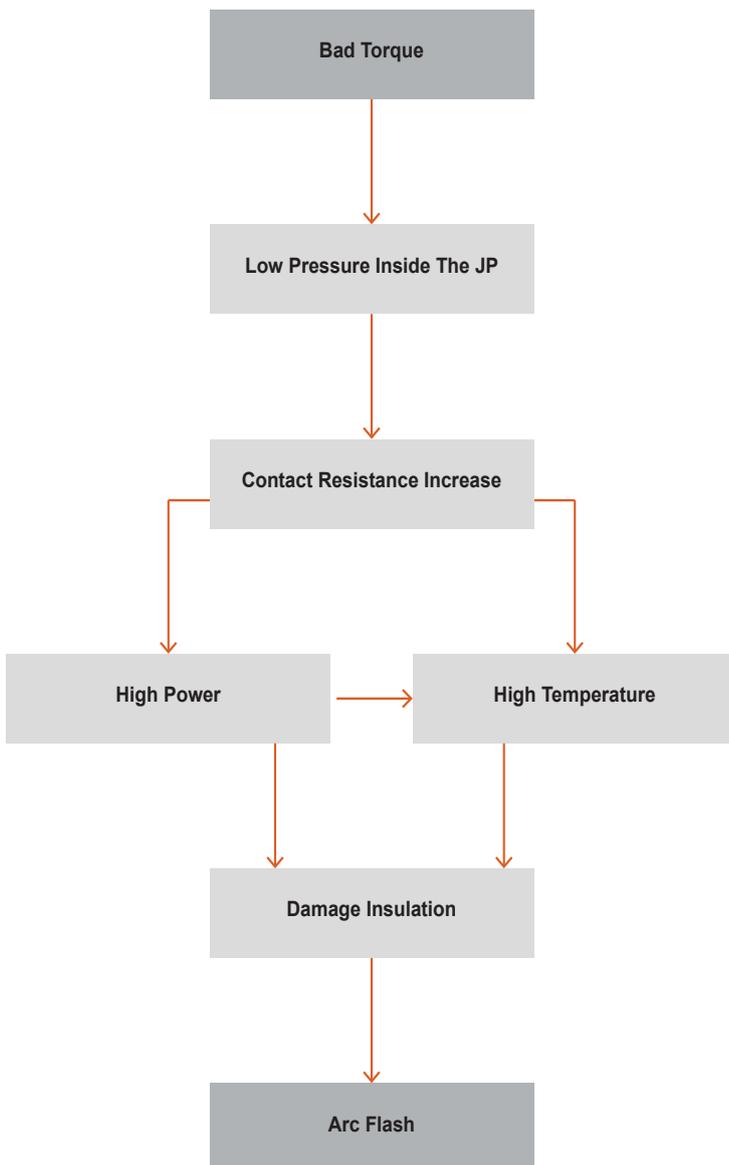
# Add-On Feature (Optional)

## 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



# Electrical Specifications

Aluminium alloy housing with internal separate ground bar (aluminium or copper) of LT Line I Busbar provides an extremely low impedance ground path with small resistance for both copper and aluminium systems. Plug-in outlet grounding is supplied with tin-plated copper tabs bolted to the plug-in box housing for superior continuity through standard bus plug ground stabs.

Grounding resistance of LT Line I Busbar Trunking System (temperature=20°C):

Copper		Aluminium	
Current Rating (A)	Internal 50% Ground Bus Resistance ( $\mu\Omega/m$ )	Current Rating (A)	Internal 50% Ground Bus Resistance ( $\mu\Omega/m$ )
400	197.4	250	291.7
630	148.1	400	233.3
800	107.7	630	179.5
1000	91.1	800	147.7
1250	66.6	1000	112.2
1600	47.4	1250	83.9
2000	37.3	1350	83.9
2500	28.3	1600	61.7
3200	24.9	2000	56.1
4000	18.6	2500	42.0
5000	14.2	3200	30.9
		4000	25.5

Grounding capacity of LT Line I Busbar Trunking System:

Copper				Aluminium			
SN	Current Rating (A)	Deck	Internal Ground ( $mm^2$ )	SN	Current Rating (A)	Deck	Internal Ground ( $mm^2$ )
1	400	1	90	1	250	1	120
2	630	1	120	2	400	1	150
3	800	1	150	3	630	1	195
4	1000	1	195	4	800	1	240
5	1250	1	270	5	1000	1	315
6	1600	1	360	6	1250	1	420
7	2000	1	480	7	1350	1	420
8	2500	1	630	8	1600	1	570
9	3200	2	720	9	2000	2	630
10	4000	2	960	10	2500	2	840
11	5000	2	1260	11	3200	2	1140
				12	4000	2	1380

## Short-Circuit Ratings

The ratings shown below are UL recognized RMS symmetrical amps. Tests were run as per UL 857 standards. The system can comply with IEC61439 for short circuit withstand test at 1 Second.

Rated short circuit withstand current

Copper (Current Rating, A)	(RMS Symmetrical, KA) (1 Sec.)
400	30
630	30
800	50
1000	50
1250	50
1600	65
2000	65
2500	65
3200	120
4000	120
5000	120

Rated short circuit withstand current

Aluminium (Current Rating, A)	(RMS Symmetrical, KA) (1 Sec.)
250	30
400	30
630	30
800	30
1000	50
1250	50
1350	50
1600	65
2000	80
2500	80
3200	120
4000	120

## Resistance, Reactance, Impedance and Voltage Drop

Copper conductor: Frequency-50Hz

Current Rating (A)	Resistance $R^{20}$ (mΩ/m)	Resistance $R^{Full Load}$ (mΩ/m)	Resistance X (mΩ/m)	Voltage Drop per meter at Full Load Condition (V/m)				
				Power Factor $\cos\phi$				
				0.6	0.7	0.8	0.9	1
400	0.102	0.126	0.041	0.075	0.081	0.087	0.091	0.087
630	0.090	0.112	0.037	0.106	0.114	0.122	0.128	0.122
800	0.066	0.077	0.032	0.099	0.106	0.112	0.115	0.107
1000	0.055	0.071	0.026	0.110	0.118	0.125	0.130	0.123
1250	0.040	0.050	0.019	0.098	0.105	0.111	0.115	0.108
1600	0.029	0.034	0.015	0.090	0.096	0.100	0.103	0.094
2000	0.023	0.028	0.012	0.091	0.098	0.104	0.105	0.097
2500	0.017	0.022	0.011	0.095	0.101	0.105	0.106	0.095
3200	0.015	0.024	0.006	0.106	0.117	0.126	0.134	0.133
4000	0.011	0.015	0.003	0.079	0.088	0.096	0.101	0.104
5000	0.009	0.011	0.002	0.071	0.079	0.087	0.093	0.095

In the table above, the load distribution coefficient  $k=1$ . In specific project, the  $k$  value varies with the branch number of the Busbar Trunking System.

Aluminium conductor: Frequency-50Hz

Current Rating (A)	Resistance $R^{20}$ (mΩ/m)	Resistance $R^{Full Load}$ (mΩ/m)	Resistance X (mΩ/m)	Voltage Drop per meter at Full Load Condition (V/m)				
				Power Factor $\cos\phi$				
				0.6	0.7	0.8	0.9	1
250	0.151	0.185	0.073	0.073	0.079	0.083	0.086	0.080
400	0.121	0.155	0.061	0.098	0.105	0.111	0.115	0.107
630	0.093	0.120	0.052	0.124	0.132	0.139	0.143	0.131
800	0.077	0.105	0.027	0.117	0.129	0.139	0.147	0.145
1000	0.058	0.072	0.046	0.139	0.144	0.148	0.147	0.125
1250	0.044	0.061	0.012	0.100	0.111	0.121	0.130	0.132
1350	0.040	0.055	0.013	0.101	0.112	0.121	0.129	0.129
1600	0.032	0.046	0.015	0.110	0.119	0.127	0.133	0.127
2000	0.029	0.041	0.019	0.138	0.146	0.153	0.157	0.142
2500	0.022	0.029	0.010	0.110	0.119	0.126	0.132	0.126
3200	0.016	0.023	0.007	0.108	0.117	0.125	0.132	0.127
4000	0.013	0.015	0.005	0.090	0.097	0.104	0.109	0.104

In the table above, the load distribution coefficient  $k=1$ . In specific project, the  $k$  value varies with the branch number of the Busbar Trunking System.



Voltage Drop Calculator

<https://www.taisin.com.sg/our-products/busbar-trunking-system/voltage-drop-calculator>

## Resistance, Reactance, Impedance and Voltage Drop

Copper conductor: Frequency-60Hz

Current Rating (A)	Resistance $R_{20}$ (mΩ/m)	Resistance $R_{Full\ Load}$ (mΩ/m)	Resistance X (mΩ/m)	Voltage Drop per meter at Full Load Condition (V/m)				
				Power Factor $\cos\phi$				
				0.6	0.7	0.8	0.9	1
400	0.102	0.126	0.049	0.080	0.085	0.090	0.093	0.087
630	0.090	0.112	0.045	0.112	0.120	0.127	0.131	0.122
800	0.066	0.077	0.039	0.107	0.113	0.117	0.119	0.107
1000	0.055	0.071	0.031	0.117	0.125	0.131	0.134	0.123
1250	0.040	0.050	0.023	0.105	0.111	0.116	0.119	0.108
1600	0.029	0.034	0.018	0.097	0.102	0.105	0.107	0.094
2000	0.023	0.028	0.014	0.098	0.104	0.108	0.109	0.097
2500	0.017	0.022	0.013	0.103	0.108	0.111	0.111	0.095
3200	0.015	0.024	0.007	0.112	0.122	0.130	0.137	0.133
4000	0.010	0.013	0.007	0.093	0.098	0.101	0.102	0.090
5000	0.008	0.010	0.004	0.080	0.085	0.090	0.093	0.087

In the table above, the load distribution coefficient  $k=1$ . In specific project, the  $k$  value varies with the branch number of the Busbar Trunking System.

Aluminium conductor: Frequency-60Hz

Current Rating (A)	Resistance $R_{20}$ (mΩ/m)	Resistance $R_{Full\ Load}$ (mΩ/m)	Resistance X (mΩ/m)	Voltage Drop per meter at Full Load Condition (V/m)				
				Power Factor $\cos\phi$				
				0.6	0.7	0.8	0.9	1
250	0.151	0.185	0.088	0.079	0.083	0.087	0.089	0.080
400	0.121	0.155	0.073	0.105	0.111	0.116	0.119	0.107
630	0.093	0.120	0.063	0.133	0.140	0.146	0.148	0.131
800	0.077	0.105	0.033	0.123	0.134	0.143	0.151	0.145
1000	0.058	0.072	0.055	0.152	0.156	0.157	0.154	0.125
1250	0.044	0.061	0.014	0.104	0.115	0.124	0.133	0.132
1350	0.040	0.055	0.015	0.105	0.115	0.124	0.131	0.129
1600	0.032	0.046	0.018	0.117	0.125	0.132	0.137	0.127
2000	0.029	0.041	0.023	0.149	0.156	0.161	0.162	0.142
2500	0.022	0.029	0.012	0.117	0.125	0.132	0.136	0.126
3200	0.016	0.023	0.008	0.114	0.123	0.130	0.135	0.127
4000	0.013	0.015	0.006	0.096	0.103	0.108	0.112	0.104

In the table above, the load distribution coefficient  $k=1$ . In specific project, the  $k$  value varies with the branch number of the Busbar Trunking System.



Voltage Drop Calculator

<https://www.taisin.com.sg/our-products/busbar-trunking-system/voltage-drop-calculator>

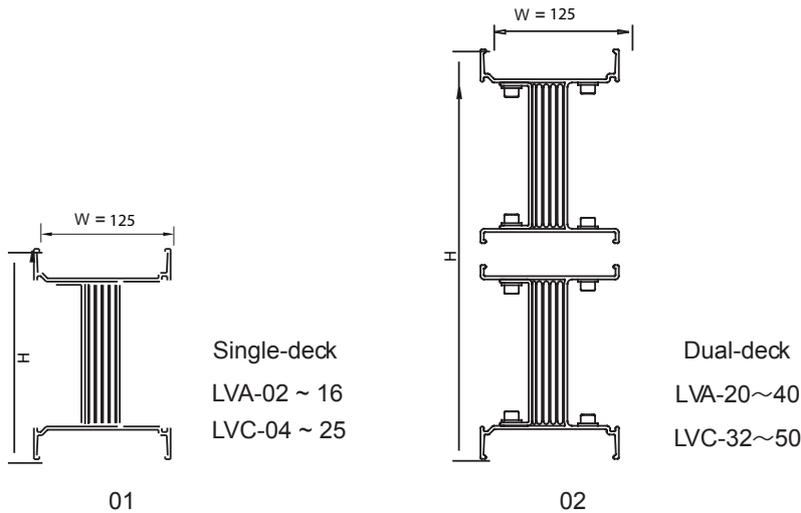
# Physical Data

## Straight Length

Feeder, the straight length without outlets, can be installed either horizontally or vertically.

The standard length is either 3000mm or 4000mm.

The minimum length is 460mm.



### Copper conductor

Current Rating (A)	Dimension (mm)		Weight per meter (kg/m)		Fig.
	Width (W)	Height (H)	4wire 100%N	5wire 100%N, 50%PE	
400	125	103	11.3	12.4	01
630	125	103	12.5	13.6	
800	125	118	15.4	17.1	
1000	125	128	18.1	19.9	
1250	125	153	22.8	25.4	
1600	125	188	30.7	34.3	
2000	125	223	38.2	42.8	
2500	125	273	52.8	59.4	
3200	125	352	59.5	66.5	02
4000	125	432	76.9	86.3	
5000	125	532	97.3	108.9	

### Aluminium conductor

Current Rating (A)	Dimension (mm)		Weight per meter (kg/m)		Fig.
	Width (W)	Height (H)	4wire 100%N	5wire 100%N, 50%PE	
250	125	103	6.8	7.2	01
400	125	113	7.5	7.9	
630	125	128	8.8	9.3	
800	125	143	9.8	10.4	
1000	125	168	11.8	12.7	
1250	125	203	14.6	15.7	
1350	125	203	14.6	15.7	
1600	125	253	18.3	19.8	
2000	125	322	22.6	24.3	
2500	125	392	28.7	31	
3200	125	492	36.2	39.4	
4000	125	572	44.7	48.9	

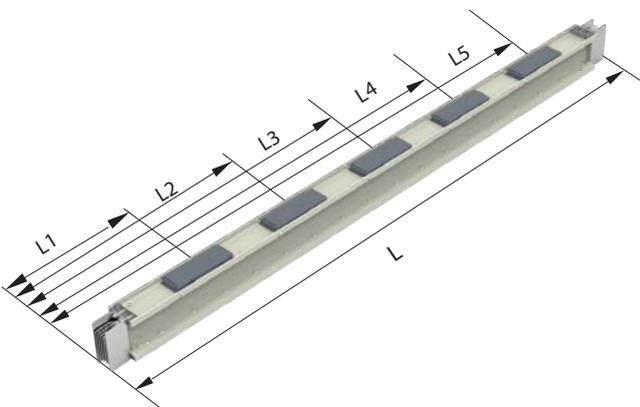
# Fittings

## Plug-in Straight Length



The plug-in busbar has a flexible design with optional plug outlets on both sides. A maximum of 5 outlets can be fixed on each side of 3m standard length. The customer may reserve plug outlets for extension in the future when changes occur in terms of the equipment load or busbar run. Both base plate and socket cover are set for each plug outlet. Base plate helps to prevent fingers from contacting live conductors (IP2X) by accident, on which the phase sequences of conductors are identified. Socket cover prevents the conductive contacting surface from being contaminated. A pad may be used to keep off dust or moisture.

Standard length is 3000mm or 4000mm. The minimum length is 720mm. The minimum length of L1 (distance from the center of plug outlet to standard end) is 360mm. The minimum length of L2 (distance between the centers of two adjacent plug outlets) is 570mm.



L1=0.36

L2=0.93

L3=1.50

L4=2.07

L5=2.64

Standard length:

LVC: L=1、2、3m

LVA: L=1、2、3m

Optional length:

LVC: L=0.72 ~ 4m

LVA: L=0.72 ~ 4m

## L Flatwise Elbow

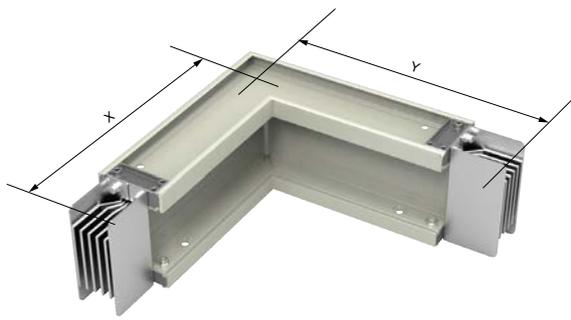


Fig 13.1

## L Edgewise Elbow

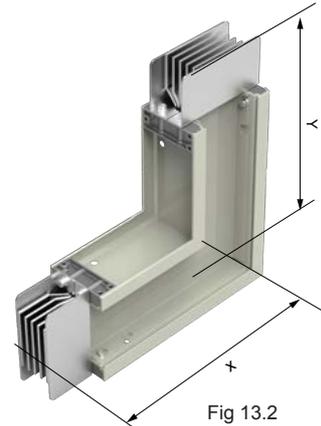


Fig 13.2

L flatwise elbow - Fig 13.1

Current Rating (A)	Copper Busbar Size (mm)				Aluminium Busbar Size (mm)			
	Minimum		Standard		Minimum		Standard	
	X	Y	X	Y	X	Y	X	Y
250	-	-	-	-	268.5	268.5	348.5	348.5
400	268.5	268.5	348.5	348.5	273.5	273.5	343.5	343.5
630	268.5	268.5	348.5	348.5	286	286	336	336
800	273.5	273.5	343.5	343.5	288.5	288.5	328.5	328.5
1000	286	286	336	336	306	306	316	316
1250	293.5	293.5	323.5	323.5	318.5	318.5	398.5	398.5
1350	-	-	-	-	318.5	318.5	398.5	398.5
1600	308.5	308.5	408.5	408.5	343.5	343.5	373.5	373.5
2000	328.5	328.5	388.5	388.5	379	379	539	539
2500	353.5	353.5	363.5	363.5	414	414	504	504
3200	394	394	524	524	464	464	554	554
4000	434	434	484	484	504	504	514	514
5000	484	484	534	534	-	-	-	-
Max Length: X≤1000mm ,Y≤1000mm								

L edgewise elbow - Fig 13.2

Current Rating (A)	Copper Busbar Size (mm)				Aluminium Busbar Size (mm)			
	Minimum		Standard		Minimum		Standard	
	X	Y	X	Y	X	Y	X	Y
250	-	-	-	-	277.5	277.5	337.5	337.5
400	277.5	277.5	337.5	337.5	277.5	277.5	337.5	337.5
630	277.5	277.5	337.5	337.5	277.5	277.5	337.5	337.5
800	277.5	277.5	337.5	337.5	277.5	277.5	337.5	337.5
1000	277.5	277.5	337.5	337.5	277.5	277.5	337.5	337.5
1250	277.5	277.5	337.5	337.5	277.5	277.5	337.5	337.5
1350	-	-	-	-	277.5	277.5	337.5	337.5
1600	277.5	277.5	337.5	337.5	277.5	277.5	337.5	337.5
2000	277.5	277.5	337.5	337.5	277.5	277.5	337.5	337.5
2500	277.5	277.5	337.5	337.5	277.5	277.5	337.5	337.5
3200	277.5	277.5	337.5	337.5	277.5	277.5	337.5	337.5
4000	277.5	277.5	337.5	337.5	277.5	277.5	337.5	337.5
5000	277.5	277.5	337.5	337.5	-	-	-	-
Max Length: X≤1000mm ,Y≤1000mm								

## Flatwise Z

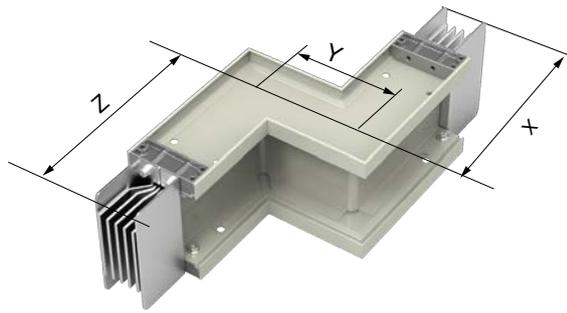


Fig 13.3

## Edgewise Z

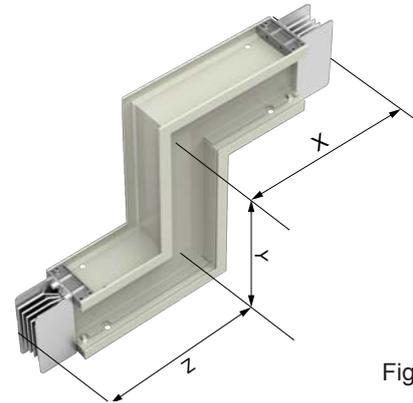


Fig 13.4

Flatwise Z - Fig 13.3

Current Rating (A)	Copper Busbar Size (mm)						Aluminium Busbar Size (mm)					
	Minimum			Standard			Minimum			Standard		
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z
250	-	-	-	-	-	-	277.5	75	277.5	337.5	75~545	337.5
400	277.5	75	277.5	337.5	75~545	337.5	277.5	75	277.5	337.5	75~545	337.5
630	277.5	75	277.5	337.5	75~545	337.5	277.5	75	277.5	337.5	75~545	337.5
800	277.5	75	277.5	337.5	75~545	337.5	277.5	75	277.5	337.5	75~545	337.5
1000	277.5	75	277.5	337.5	75~545	337.5	277.5	75	277.5	337.5	75~545	337.5
1250	277.5	75	277.5	337.5	75~545	337.5	277.5	75	277.5	337.5	75~545	337.5
1350	-	-	-	-	-	-	277.5	75	277.5	337.5	75~545	337.5
1600	277.5	75	277.5	337.5	75~545	337.5	277.5	75	277.5	337.5	75~545	337.5
2000	277.5	75	277.5	337.5	75~545	337.5	277.5	75	277.5	337.5	75~545	337.5
2500	277.5	75	277.5	337.5	75~545	337.5	277.5	75	277.5	337.5	75~545	337.5
3200	277.5	75	277.5	337.5	75~545	337.5	277.5	75	277.5	337.5	75~545	337.5
4000	277.5	75	277.5	337.5	75~545	337.5	277.5	75	277.5	337.5	75~545	337.5
5000	277.5	75	277.5	337.5	75~545	337.5	-	-	-	-	-	-

Max length: X,Y,Z ≤2 times minimum size value

Edgewise Z - Fig 13.4

Current Rating (A)	Copper Busbar Size (mm)						Aluminium Busbar Size (mm)					
	Minimum			Standard			Minimum			Standard		
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z
250	-	-	-	-	-	-	51.5	87	51.5	348.5	87~527	348.5
400	268.5	87	268.5	348.5	87~527	348.5	56.5	77	56.5	343.5	77~537	343.5
630	268.5	87	268.5	348.5	87~527	348.5	64	82	64	336	82~562	336
800	273.5	77	273.5	343.5	77~537	343.5	71.5	77	71.5	328.5	77~567	328.5
1000	286	82	286	336	82~562	336	84	82	84	316	82~602	316
1250	293.5	77	293.5	323.5	77~577	323.5	101.5	77	101.5	398.5	77~627	398.5
1350	-	-	-	-	-	-	101.5	77	101.5	398.5	77~627	398.5
1600	308.5	77	308.5	408.5	77~607	408.5	126.5	77	126.5	373.5	77~677	373.5
2000	328.5	77	328.5	388.5	77~607	388.5	161	78	161	539	78~748	539
2500	353.5	77	353.5	363.5	77~697	363.5	196	78	196	504	78~818	504
3200	394	78	394	524	78~778	524	246	78	246	554	78~918	554
4000	434	78	434	484	78~858	484	286	78	286	514	78~998	514
5000	484	78	484	534	78~958	534	-	-	-	-	-	-

Max length: X,Y,Z ≤2 times minimum size value

## Flatwise Tee

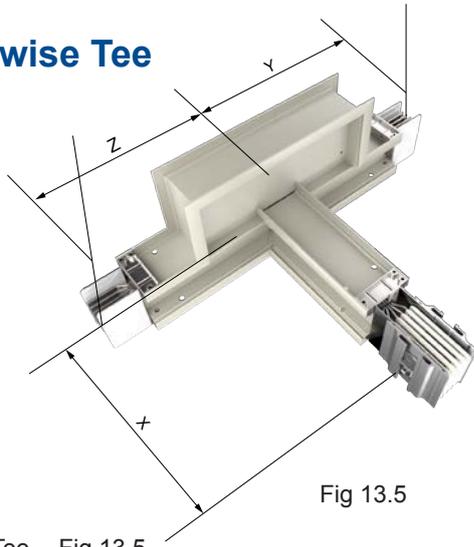


Fig 13.5

## Edgewise Tee

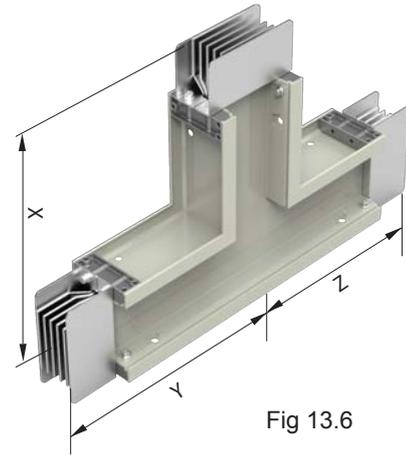


Fig 13.6

Flatwise Tee - Fig 13.5

Current Rating (A)	Copper Busbar Size (mm)						Aluminium Busbar Size (mm)					
	Minimum			Standard			Minimum			Standard		
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z
250	-	-	-	-	-	-	277.5	400	400	337.5	500	500
400	277.5	400	400	337.5	500	500	277.5	400	400	337.5	500	500
630	277.5	400	400	337.5	500	500	277.5	400	400	337.5	500	500
800	277.5	400	400	337.5	500	500	277.5	400	400	337.5	500	500
1000	277.5	400	400	337.5	500	500	277.5	450	450	337.5	500	500
1250	277.5	400	400	337.5	500	500	277.5	480	480	337.5	600	600
1350	-	-	-	-	-	-	277.5	480	480	337.5	600	600
1600	277.5	450	450	337.5	500	500	277.5	530	530	337.5	600	600
2000	277.5	500	500	337.5	600	600	277.5	450	450	337.5	500	500
2500	277.5	550	550	337.5	600	600	277.5	480	480	337.5	600	600
3200	277.5	450	450	337.5	500	500	277.5	530	530	337.5	600	600
4000	277.5	500	500	337.5	600	600	277.5	570	570	337.5	600	600
5000	277.5	550	550	337.5	600	600	-	-	-	-	-	-

Max length: X,Y,Z ≤ 2 times minimum size value

Edgewise Tee - Fig 13.6

Current Rating (A)	Copper Busbar Size (mm)						Aluminium Busbar Size (mm)					
	Minimum			Standard			Minimum			Standard		
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z
250	-	-	-	-	-	-	298.5	350	350	394.85	400	400
400	298.5	350	350	348.5	400	400	293.5	350	350	394.35	400	400
630	298.5	350	350	348.5	400	400	286	350	350	393.6	400	400
800	293.5	350	350	343.5	400	400	288.5	360	360	328.5	400	400
1000	286	350	350	336	400	400	306	390	390	316	400	400
1250	293.5	370	370	323.5	400	400	318.5	420	420	398.5	500	500
1350	-	-	-	-	-	-	318.5	420	420	398.5	500	500
1600	308.5	400	400	408.5	500	500	343.5	470	470	373.5	500	500
2000	328.5	440	440	388.5	500	500	379	540	540	539	700	700
2500	353.5	490	490	363.5	500	500	414	610	610	504	700	700
3200	394	570	570	524	700	700	464	710	710	554	800	800
4000	434	650	650	484	700	700	504	790	790	514	800	800
5000	484	750	750	534	800	800	-	-	-	-	-	-

Max length: X,Y,Z ≤ 2 times minimum size value

## Combination Elbow

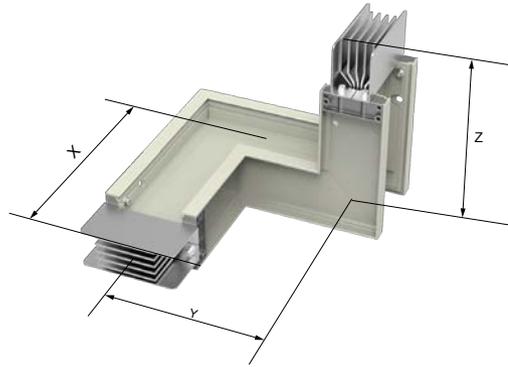


Fig 13.7

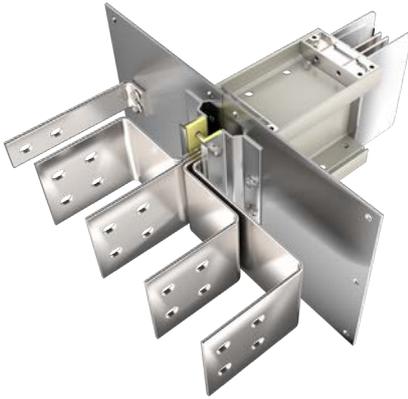
Combination Elbow - Fig 13.7

Current Rating (A)	Copper Busbar Size (mm)						Aluminium Busbar Size (mm)					
	Minimum			Standard			Minimum			Standard		
	X	Y	Z	X	Y	Z	X	Y	Z	X	Y	Z
250	-	-	-	-	-	-	277.5	196	268.5	337.5	86~526	348.5
400	277.5	196	268.5	337.5	86~526	348.5	277.5	201	273.5	337.5	81~531	343.5
630	277.5	196	268.5	337.5	86~526	348.5	277.5	213.5	286	337.5	73.5~533.5	336
800	277.5	201	273.5	337.5	81~531	343.5	277.5	216	288.5	337.5	86~546	328.5
1000	277.5	213.5	286	337.5	73.5~533.5	336	277.5	233.5	306	337.5	83.5~553.5	316
1250	277.5	221	293.5	337.5	81~414.5	323.5	277.5	246	318.5	337.5	86~576	398.5
1350	-	-	-	-	-	-	277.5	246	318.5	337.5	86~576	398.5
1600	277.5	236	308.5	337.5	86~566	408.5	277.5	271	343.5	337.5	81~601	373.5
2000	277.5	256	328.5	337.5	86~586	388.5	277.5	306.5	379	337.5	76.5~636.5	539
2500	277.5	281	353.5	337.5	81~611	363.5	277.5	341.5	414	337.5	81.5~671.5	504
3200	277.5	321.5	394	337.5	81.5~651.5	524	277.5	391.5	464	337.5	91.5~721.5	554
4000	277.5	361.5	434	337.5	81.5~691.5	484	277.5	431.5	504	337.5	81.5~761.5	514
5000	277.5	411.5	484	337.5	71.5~671.5	534	-	-	-	-	-	-

## Flanged End

Standard length: L=0.56m

Nonstandard length: L=0.56 ~ 2.00m



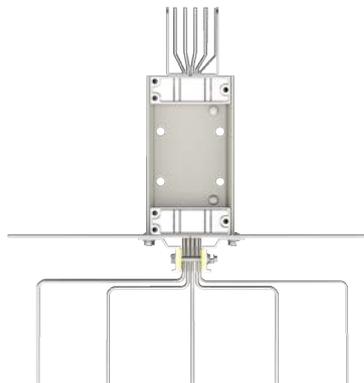
3P+100%N+50% integral housing as PE



3P+100%N+50% internal bar as PE



Top view



Section view



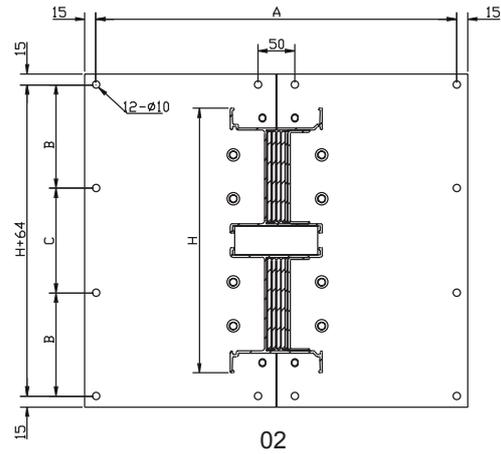
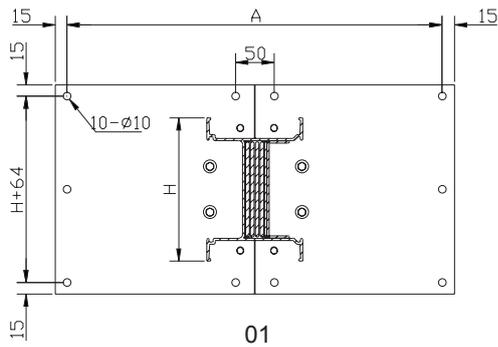
Section view

Flanged end and end tap box can be used in connection with any type of switchgear cabinets and transformers. Flanged end busbar spacing can be customized on specific application.

Note:

All the dimensions provided are for standard products. Please contact our engineers for customized dimensions.

## Flanged End Cut Out and Drilling Pattern



Copper conductor

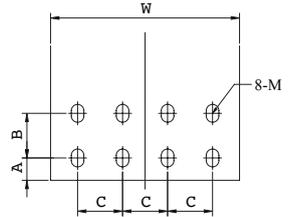
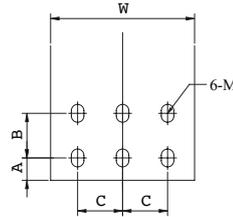
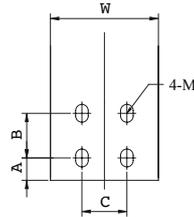
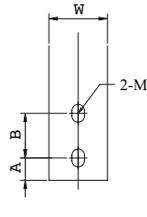
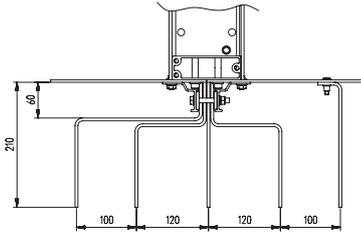
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	H	A	B	C	A	B	C	
400	103	490	-	-	370	-	-	01
630	103	490	-	-	370	-	-	
800	118	490	-	-	370	-	-	
1000	128	490	-	-	370	-	-	
1250	153	490	-	-	370	-	-	
1350			-	-		-	-	
1600	188	490	-	-	370	-	-	
2000	223	490	-	-	370	-	-	
2500	273	490	-	-	370	-	-	
3200	352	490	140	136	370	140	136	
4000	432	490	165	166	370	165	166	02
5000	532	490	200	196	370	200	196	

Aluminium conductor

Current Rating (A)	3L+N+PE Size (mm)				3L+N Size (mm)			Fig
	H	A	B	C	A	B	C	
250	103	490	-	-	370	-	-	01
400	113	490	-	-	370	-	-	
630	128	490	-	-	370	-	-	
800	143	490	-	-	370	-	-	
1000	168	490	-	-	370	-	-	
1250	203	490	-	-	370	-	-	
1350	203	490	-	-	370	-	-	
1600	253	490	-	-	370	-	-	
2000	322	490	130	126	370	130	126	
2500	392	490	150	156	370	150	156	
3200	492	490	185	186	370	185	186	02
4000	572	490	210	216	370	210	216	

# Flanged End Bar Hole Pattern

## Integral Housing Flanged End



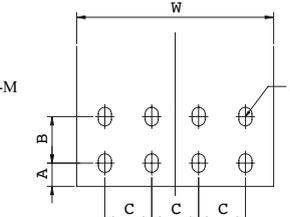
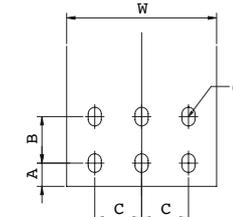
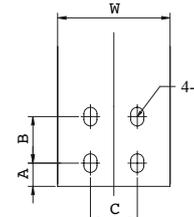
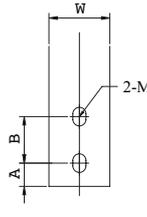
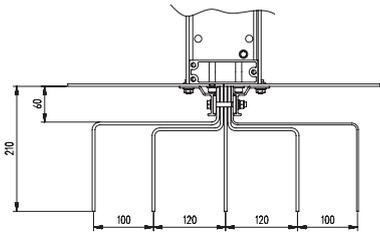
A

B

C

D

## Internal Flanged End



A

B

C

D

## Copper conductor

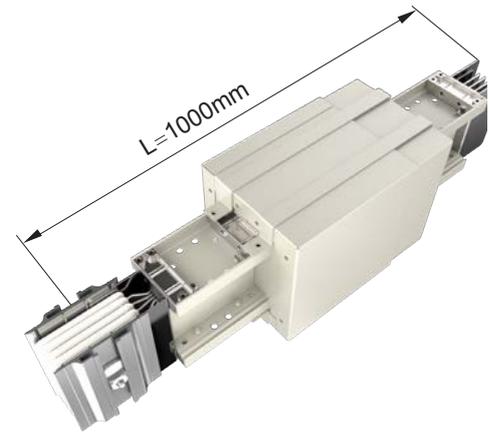
## Aluminium conductor

Current Rating (A)	A	B	C	M	W	Type
400	25	50	-	Φ12	30	A
630	25	50	-	Φ14×20	40	A
800	25	50	-	Φ14×20	50	A
1000	25	50	-	Φ14×20	65	A
1250	25	50	50	Φ14×20	89	B
1350	-	-	-	-	-	-
1600	25	50	50	Φ14×20	125	B
2000	25	50	50	Φ14×20	159	C
2500	25	50	50	Φ14×20	209	D
3200	25	50	50	Φ14×20	119	B
4000	25	50	50	Φ14×20	159	C
5000	25	50	50	Φ14×20	209	D

Current Rating (A)	A	B	C	M	W	Type
250	25	50	-	Φ14×20	40	A
400	25	50	-	Φ14×20	50	A
630	25	50	-	Φ14×20	65	A
800	25	50	-	Φ14×20	79	A
1000	25	50	50	Φ14×20	104	B
1250	25	50	50	Φ14×20	139	C
1350	25	50	50	Φ14×20	139	C
1600	25	50	50	Φ14×20	189	C
2000	25	50	50	Φ14×20	104	D
2500	25	50	50	Φ14×20	139	C
3200	25	50	50	Φ14×20	189	C
4000	25	50	50	Φ14×20	229	D

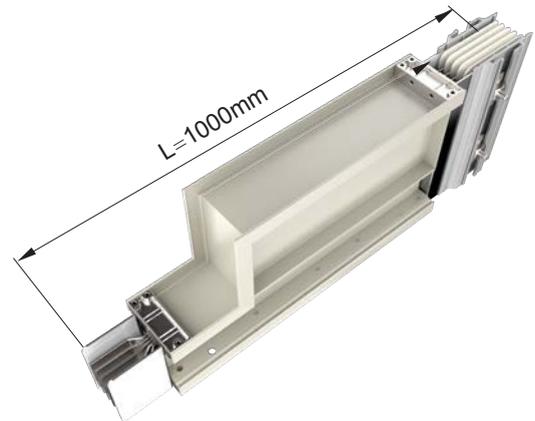
## Expansion Joint

Expansion length is the transition section compensating for thermal expansion, one is normally set for each 60m in linear distance.



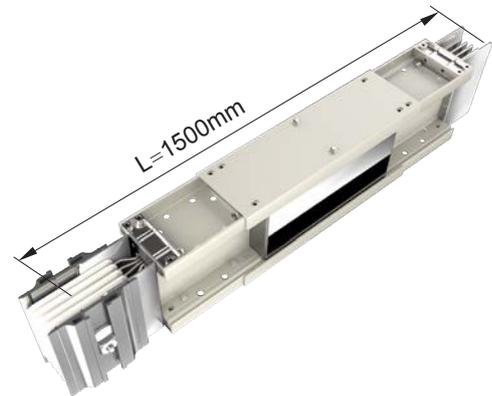
## Reducer

This reducer section is used for reducing busbar size to the final load, it provides users with more economic power transmission and distribution method.



## Transposition Joint

Transposition section is the transition parts used for changing phase sequence of the busbar; its minimum size is 1500mm. The phase sequence of both sides can be customized by the customer.



## Terminal Cover

Protection for the busbar terminal to avoid being damage.



## Tap-off Unit (Plug-in Unit)

LV tap-off unit is adopted to apply electrical power directly to the load from the Busbar Trunking System. Fully considering customer's requirements, LV tap-off unit offers the options of circuit breaker or fuse.

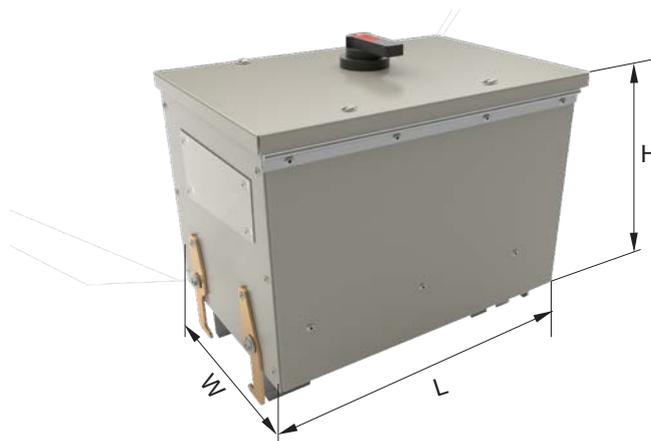
### Tap-off Unit with Circuit Breaker

- Circuit breaker protection can be available with a current range from 16A-1000A.
- Load protection in the plug can be 3-Pole or 4-Pole circuit breakers, including accessories of breakers such as rotary handles, shunt release, thermal magnetic release and leakage-current protection module.

### Plug with Fuse

- Tap-off unit with fuses can be produced according to customer specifications.
- Unique fail-safe base pins the plug is equipped with a positioning device that prevents incorrect phase installations.
- Plug Pins: All pins are silver-plated to improve the electrical conductivity.

Protection Class up to IP54 with IEC 60529



### Tap-off Unit Dimensions (L×W×H)mm

- For non-standard dimension, please contact the manufacturer.

Current Rating (A)	Plug-in Box Dimensions		
	L(mm) Length	W(mm) Width	H(mm) Height
100	360	250	250
160	400	250	250
250	500	270	270
400	650	310	310
630	750	340	340
800-1000	1200	420	350

### Note:

The data above is based on the size of common circuit breaker 3P/4P.

## End Tap Box (Cable Tap Box)

Tai Sin LV Series Busbar Trunking System tap boxes are used where a run of the busbar is fed by a cable. We supply customised tap box sizes according to the on-site measurement.



### Flanged End with End Tap Box Connection

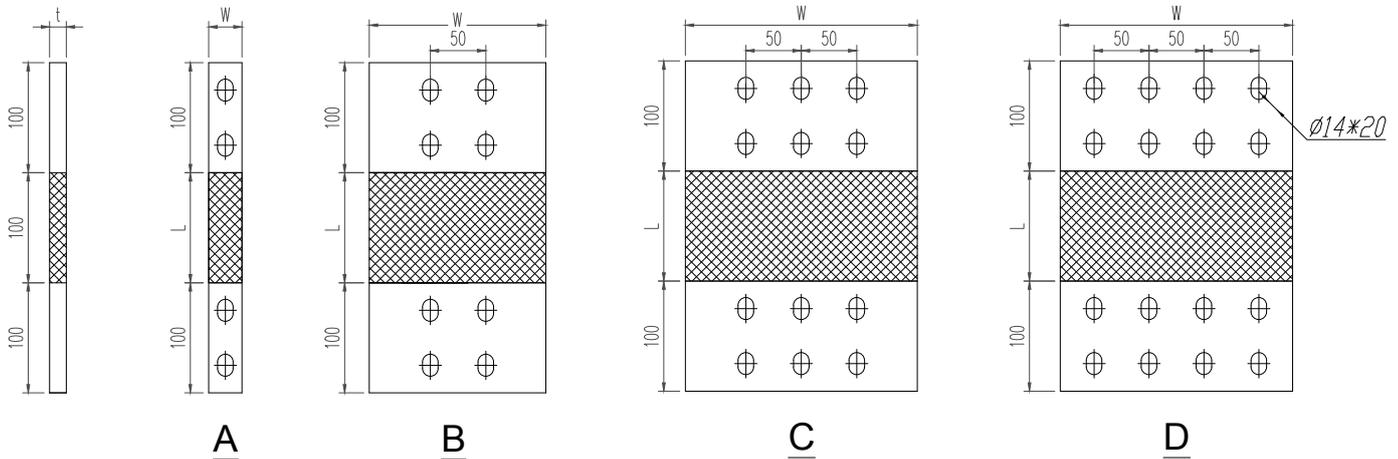
The flange plate can be manufactured according to the size of the end tap box, it can be connected directly with end tap box.



## Flexible Link

L - 100mm to 500mm.

Note: All the dimensions provided are for standard products. Please contact our engineers for customized dimensions.



Current Rating (A)	Copper Busbar				Aluminium Busbar			
	Bar Dimensions W (mm)	Thickness t (mm)	No. of Flexible Link per Phase (N, L1, L2 & L3)	Type	Bar Dimensions W (mm)	Thickness t (mm)	No. of Flexible Link per Phase (N, L1, L2 & L3)	Type
250	-	-	-	-	40	5	1	A
400	30	9	1	A	50	7	1	A
630	40	10	1	A	65	7	1	A
800	50	12	1	A	79	9	1	A
1000	65	11	1	A	104	9	1	B
1250	89	11	1	B	139	8	1	B
1350	-	-	-	-	139	8	1	B
1600	125	12	1	B	189	9	1	C
2000	159	12	1	B	104	10	2	B
2500	209	13	1	C	139	9	2	B
3200	119	14	2	B	189	11	2	C
4000	159	13	2	C	229	11	2	D
5000	209	14	2	D	-	-	-	-

\*Designs are for reference only, customisation is available to suit onsite requirements



Busbar Trunking System Accessories / Flexible Link

<https://www.taisn.com.sg/our-products/busbar-trunking-system/accessories/>

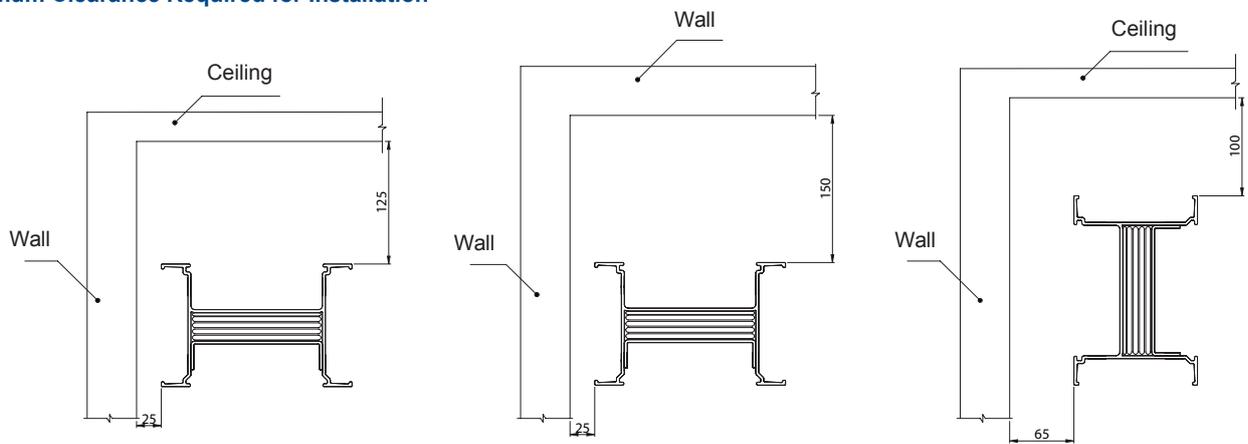
# Installation

LT Line I Busbar Trunking System protection class can be up to IP66 according to different applications.

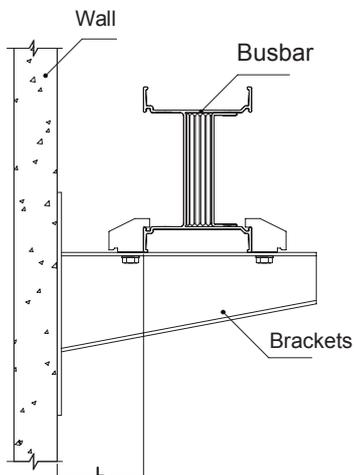
## Notes:

- IP40---"4" indicates that solid objects greater than 1mm in diameter will not penetrate the housing."0" denotes no protection.
- IP42---"4" indicates that solid objects greater than 1mm in diameter will not penetrate the housing."2" denotes prevention of water dripping inside by an angle of up to 15°.
- IP54---"5" for dust, "4" indicates splashes of water.
- IP65---"6" for dust density, "5" indicates protection from water spray.
- IP66---"6" for dust density, "6" for protection of stronger water spray.

## Minimum Clearance Required for Installation

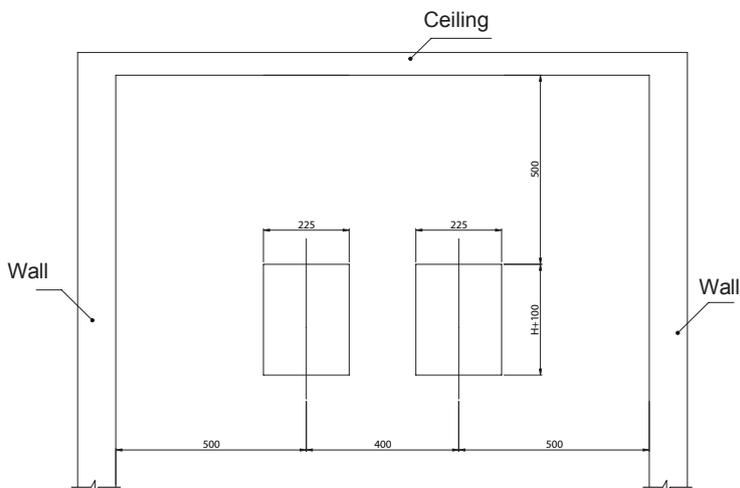


## Minimum Clearance Required for Plug-in Box Installation



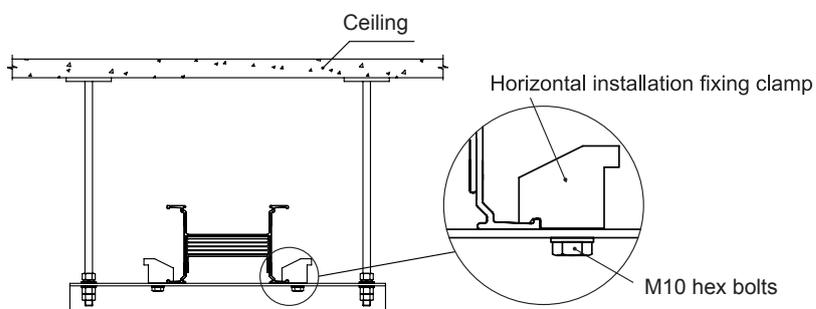
Current Rating for Plug-in Box (A)	L(mm)
100	150
160	175
250	195
400	210
630	230
800	260
1000	300

## Horizontal Wall-through Installation

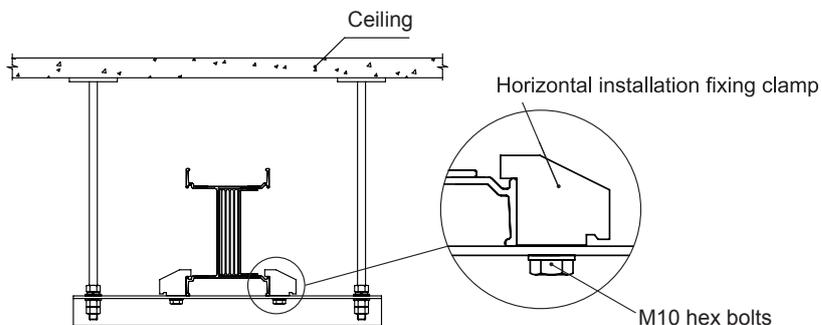


### Horizontal installation-trapeze hangers overhead support

Holes should be first drilled in the floor so as to inlay steel expansion bolts (holes may also be drilled on site for flexible installation) or pre-bury steel U-channel for welding with hangers. The distance between two adjacent hangers shall not exceed 2m. Please specify any special requirements when placing your order.

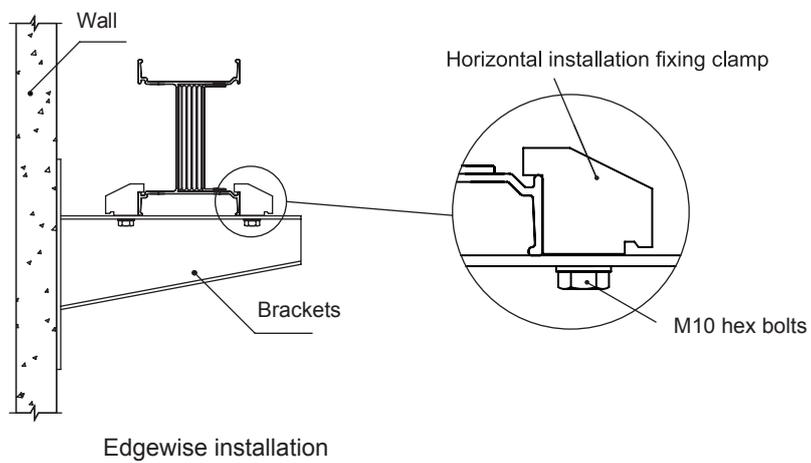
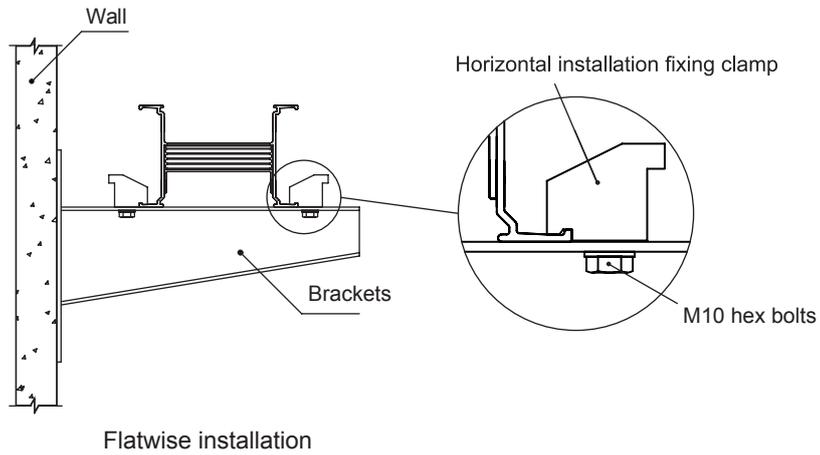


Flatwise installation



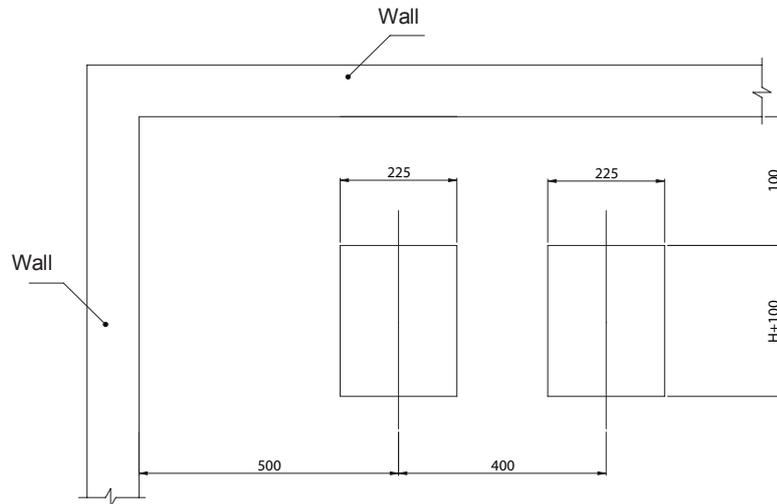
Edgewise installation

## Horizontal Installation-wall Support

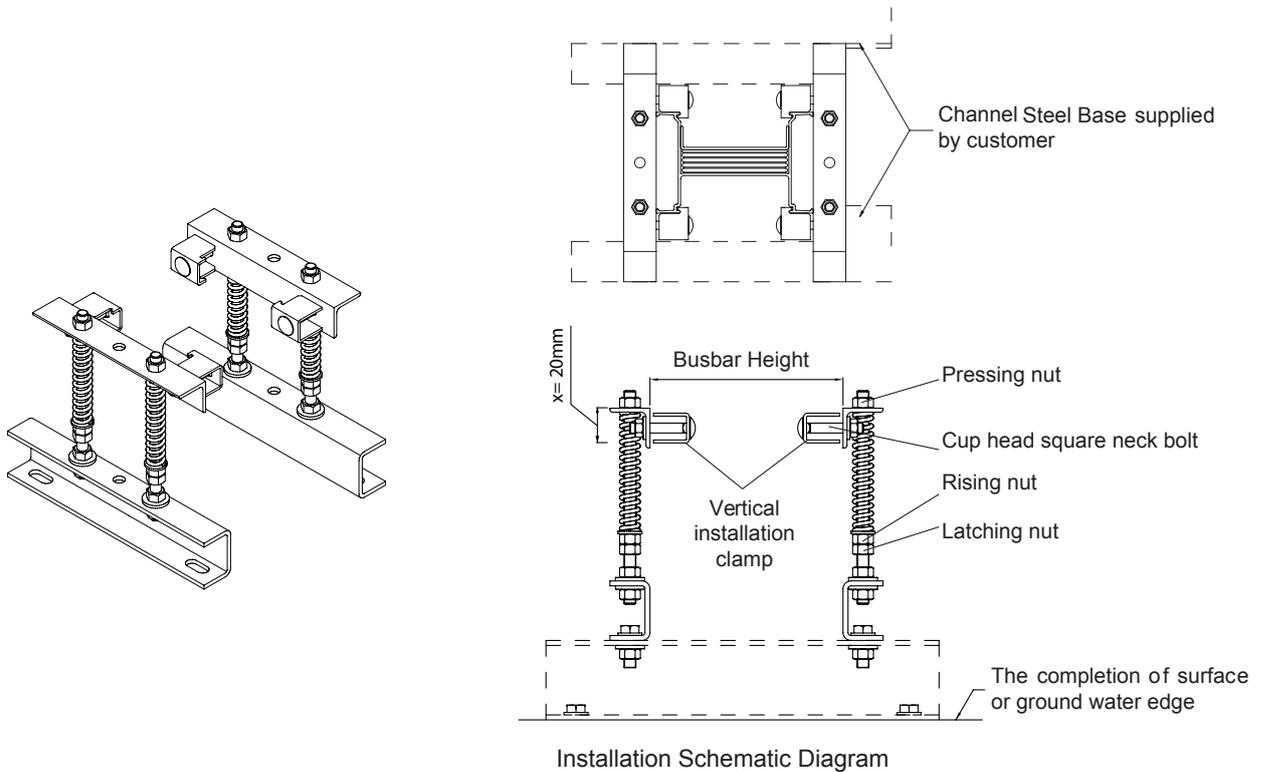


## Vertical Installation

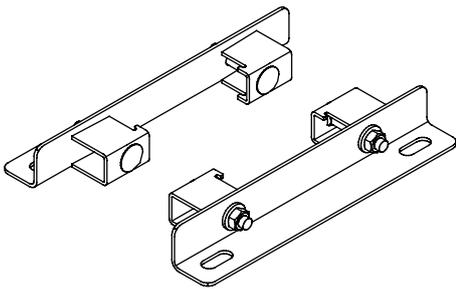
When installing a vertical bus run, please refer to the figure for the dimension of the access holes. Please ensure that the spacing between every two runs of busbar exceeds 350mm, especially if there are two or more vertical runs of busbar installed in the same riser. Please refer to the figure below:



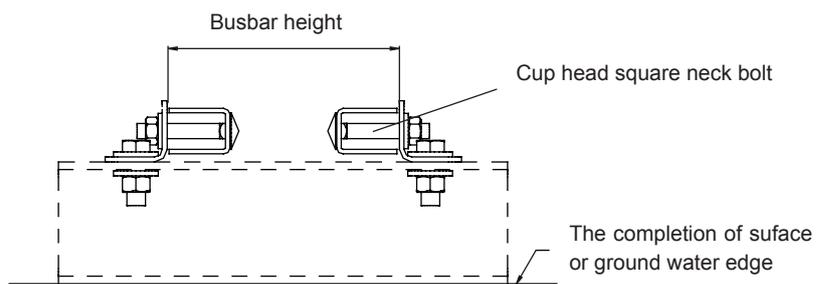
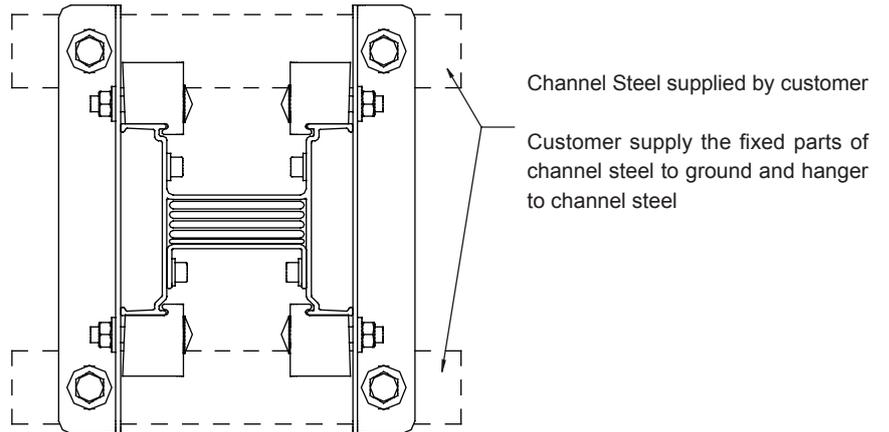
## Installation for Vertical Spring Hanger



## Installation for Vertical Fixed Hanger



Vertical Fixed Hanger



Installation Schematic Diagram

# Reference for Busbar Trunking System Specifications

## Products

### 1. General

1.1 The Busbar Trunking System (250A and above), both feeder and plug-in, shall be sandwich construction. All busbar trunking products and fittings (straight length, elbow, tees, flanged ends, cable tap box and circuit breaker, etc.) shall be in accordance with IEC 61439:2012 and from the same manufacturer as the Busbar Trunking System. The degree of protection of the Busbar Trunking System should be minimum IP54 in accordance to IEC 60529 for indoor application & minimum IP68 for outdoor application.

1.2 For Outdoor application, in addition it shall be tested & comply to IEC 61439-6 Clause 10.2.4 – Resistance to ultra-violet (UV) radiation.

1.3 Rated operation voltage of the busbar trunking is 690V, 3 – Phase, full neutral with 50% capacity continual internal earth busbar. The neutral conductor should have the same cross-sectional area as the phase conductor. The earth busbar must be one continuous piece without bolting on housing.

### 2. Certificate and Quality Assurance

2.1 The manufacturer shall be ISO 9001, ISO 14001 and OHSAS 18001 certified by an international certification organization.

2.2 The busbar of full range should pass full type tests specified in IEC 61439:2012 or UL857, and achieve KEMA KEUR or ASTA Diamond or UL CLASSIFIED certificate. The production line of plant shall be periodically inspected by the above mentioned testing authorities in order to guarantee final product quality and certification shall be traceable for validity.

2.3 A product safety mark (e.g. KEMA-KEUR, ASTA DIAMOND, UL CLASSIFIED) should be on the product offering a visible assurance to all of full product safety testing, factory inspection and ongoing surveillance under an independent authority to ensure the ongoing safety of product.

2.4 The Busbar Trunking System should be fully recyclable.

2.5 Apart from the standard Factory Routine Test, additional Factory acceptance test shall be perform in Singapore prior to delivery to site so to ensure integrity of the busbar & accessories are not affected during shipment.

### 3. Short Circuit Ratings and Dielectric Test

3.1 The whole Busbar Trunking System shall be capable of withstanding the short circuit of the electrical installation without damaging the electrical, mechanical and thermal stress under fault condition at a service voltage of 690V 50Hz. The minimum rated insulation voltage shall be 1000V.

3.2 Each piece of busbar shall be tested dielectric performance in the factory & Singapore test facility under 3.5KV AC for 1 second as per IEC or 7.5KV DC for 10 second before dispatch.

#### **4. Housing**

- 4.1 The busbar trunking housing should be constructed of serrated surface design of extruded aluminium housing of >2mm thickness to improve heat dissipation & reduce hysteresis & eddy current loss and the radiated magnetic field around busbar. The electromagnetic radiation should be less than 500 $\mu$ T for long time exposure and 100 $\mu$ T for short time exposure respectively.
- 4.2 The busbar trunking housing shall be totally enclosed non-ventilated for protection against mechanical damage and dust accumulation. The mechanical withstand external impact ability should reach IK10.
- 4.3 The busbar trunking housing should be provided with a suitable protective finish & pass at least 500 hours salt spray test to ensure the anticorrosion ability.
- 4.4 The housing shall be of not more than two-piece housing construction.

#### **5. Busbars and Insulation**

- 5.1 Conductors shall be 99.9% high purity copper with silver/ tinned plated for all contact surface. The conductivity shall be not less than 98% IACS.
- 5.2 There shall be no bolts passing through the busbars of the Busbar Trunking System.
- 5.3 Busbar shall be insulated with Class B Insulation rated at 130°C (Class B). Insulation shall be of hygroscopicity of <1% with test report & in addition it shall be self-extinguishing in accordance to IEC 61439-6.

#### **6. Joint**

- 6.1 The busbar trunking joint shall be of the one-bolt type which utilizes a high strength steel bolt(s) and Belleville washers to maintain proper pressure over a large contact surface area.
- 6.2 The bolt shall be two-headed design to indicate when proper torque has been applied and require only a standard long handle wrench to be properly activated.
- 6.3 It shall be possible to remove any joint connection assembly to allow electrical isolation or physical removal of a busbar trunking length without disturbing adjacent busbar trunking lengths.
- 6.4 It shall have double contact surface for phase and neutral conductors inside joint pack to enlarge the contact area by 50%, ensure lower resistance, low temperature rise and higher safety application.
- 6.5 Each busbar joint shall allow for a length adjustment of +/- 6mm.
- 6.6 Each Joint shall come with Colour-coded temperature indicator to give an early warning when high temperature occurs at the joint. In addition, the adhesiveness of the indicator shall be tested to ASTM D 1000.

#### **7. Voltage Drop and Temperature Rise**

- 7.1 The voltage drop (input voltage minus output voltage) specified shall be based on the busbar operating at full rated current and at stabilized operating temperature.
- 7.2 The three-phase line-to-line voltage drop shall not exceed 4% at full connected load
- 7.3 The temperature rise at any point of the busbar trunking enclosure shall not exceed 55°C rise above ambient temperature (35°C) when operation at rated current.
- 7.4 The Busbar Trunking System shall be designed for horizontal edge, horizontal flat and vertical mounting without de-rating of the current carrying capacity.

## **8. Fire Resistance**

8.1 The busbar shall be fire resistant as per IEC 61439-6 in the event of fire.

8.1.1 The busbar should resist the smoke to spread and prevent further penetration of fire as per IEC61439-6 clause 10.102.

8.1.2 The Busbar Trunking System shall be resistant to flame propagation as per IEC61439-6 clause 10.101.

8.1.3 All plastic materials of busbar shall not burn or cause burning when affected by abnormal heat or by fire, it should be self-extinguish materials as per IEC61439-6 clause 10.2.3.2.

8.2 The Busbar Trunking System shall be zero halogen, not generate any toxic emission and ensure very low smoke in the event of fire.

8.3 For essential /emergency life safety circuits, which supply power to firefighting equipment, the circuit integrity shall be maintained in the event of fire. The fire rated Busbar Trunking System shall be verified & tested to BS6387:2013 in Singapore.

## **9. Plug-in Opening**

9.1 The connecting jaw of the plug-in unit shall plug directly onto the full thickness of the busbar and have full contact with busbar itself.

9.2 All contact on joint and plug-in opening should be silver/tinned plated copper.

9.3 It shall be possible to inspect the plug-in opening and busbars prior to the installation of the plug-in units.

9.4 Plug-in Opening shall be of hot plug design (up to 600A rated) that allows plug-in Units to be installed & removed during "LIVE" condition & shut down is not required to ensure continuity of supply is not disrupted.

## **10. Plug-in Units**

10.1 Complete plug-in units with MCCB should be tested separately as per IEC61439-6 and achieve the certificate issued by an international independent testing authority (e.g. ASTA, KEMA or UL). The brand and type of MCCB shall be indicated on the certificate and be supplied by the same manufacturer of busbar.

10.2 The earthing contact of the plug-in unit shall always be made before that of the live conductors and the last to break during removal. And it must connect to the earth bar of busbar to ensure the safety. The earth connecting bar of plug-in units shall be silver/tinned-plated.

10.3 All plug-in units should be compatible for full range of busbar trunking system and the same plug-in opening. All plug-in units shall be interchangeable without alteration or modification of plug-in duct.

10.4 Covers of all plug-in units must have interlocks to prevent the cover from being opened when the switch is in the ON position.

10.5 The plug-in units shall be equipped with internal barriers to prevent accidental contact of fish tape and conductors with live parts on the line side of the protective device during time of wire pulling.

10.6 The measurement and communication of plug-in unit should be provided as standard functions.

## 11. Site Acceptance Test

11.1 The contractor shall be trained & certified by Manufacturer to provide the listed site test against the submitted check list or factory test report.

The site acceptance test shall include the following;

Visual & Test inspection

- i) Trunking alignment
- ii) Support spaced as recommended by manufacturer
- iii) Tap-off unit & component check
- iv) Joint alignment & tightening torque
- v) Phase check
- vi) Continuity test
- vii) Insulation resistance test

## 1/ What is the typical warranty coverage of Busbar Trunking System?

Typical warranty coverage is 12 months, coverage on manufacturer defects.

## 2/ What is the typical Life Span of Busbar Trunking System?

20 years

## 3/ What is the maintenance frequency of Busbar Trunking System?

Busbar Trunking System is designed to be maintenance-free. As a recommendation, the maintenance frequency will be once a year or after any fault occurrence

## 4/ What is the solution for Outdoor Busbar Trunking System installation?

Cast resin type Busbar Trunking System with IP68 rating is recommended for Outdoor Application

## 5/ Can Busbar Trunking System be installed underground?

No, due to maintenance requirement

## 6/ What is typical leadtime of Busbar Trunking System?

10-12 weeks upon approval & confirmation of shop drawings, Factory Routine Test Conducted in Singapore

## 7/ How fast can we receive the add on items as the project is closing soon?

Typical short length or accessories, leadtime is 5 to 14 working days  
(Exclude freight logistics lead time)

## 8/ Is Tai Sin Busbar able to integrate with other Busbar Trunking Systems?

No, Busbar Trunking System is a proprietary design system, hence integration will have to be of the same make & model in order to be compatible.

## 9/ Is the certification validity & range traceable?

Cerification is only traceable for full type test under Kema with Kema Keur, Asta with Asta Diamond or UL with UL Classified.

## 10/ What is the critical test to ensure Busbar Trunking System complied ?

There are 3 level of test to ensure integrity of the Busbar Trunking System:

- Level 1 - Type Test by accredited test laboratories (One time type test to ensure compliance to guideline standards - IEC 61439-6)
- Level 2 - Factory Acceptance / Routine Test (Factory internal quality routine test)
- Level 3 - Site Acceptance Test (Conducted during installation phase)



Updated Busbar FAQs

<https://www.taisin.com.sg/our-products/busbar-trunking-system/#busbar-faqs>

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# Notes

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## Catalogue Serial Number: TSPDLV\_LTLINEI\_V01-102022

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.

*(Updated as at October 2022)*



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