Tai Sin®

Power Distribution Solution for Data Centers

Busbar Trunking System

First & Only Busbar Trunking System's Test & Assembly Line in Singapore

Content

Introduction

Rapid Growth of Data Center Technology

With our ever-increasing dependence on data, connectivity, and computing power, Data Centers are inevitable for our connected world. Experts estimated that a huge amount of data, approximately 5 quintillion bytes is being generated daily. Thus, the optimal existence and efficient operation of Data Centers in tackling such humongous amounts of data have great significance.

Data Centers are enormous energy consumers and were accountable for around 1.1% to 1.5% of overall world's energy consumption in 2010. Some oft-cited extrapolations have suggested that global Data Center's energy consumptions have doubled since 2010, and by extending this historical trend, it will continue rising swiftly in the future. Today, their contribution to the world's total energy consumption is more than 3% (around 420 terawatts) and it can be forecasted that Data Centers would be using 20% of all available electricity in the world by 2025. They are the virtual brains and power backbones of the digital global economy, while they process, store, and communicate data on a daily basis behind the myriad information services.

A recent survey report has indicated that only a minor proportion namely 26% of companies could manage to emerge with successful IoT initiatives. To amplify their success chances, IoT companies will surely acquire more data and more devices. Between 2010 and 2018, global IP traffic namely the quantity of data traversing the internet had increased more than ten-fold, while global data center storage capacity increased by a factor of 25 in parallel. Analysts have approximated as many as 50 billion devices have been connected by 2020 and projecting to more than 100 billion devices further five years down the line. Hence, it is not an exaggeration that data centers would be one of the biggest energy consumers in near future, surpassing energy utilization levels of many countries.

INCREASING DEMAND IN 2025

20% Data Center would be using 20% of all available electricity in the world

100B 100 Billion devices would be connected

Conclusively, energy efficiency will be decisive for bringing data to life in future. As Data Center infrastructures with Big Data, Cloud Computing, and the Internet of Things, have already conquered the businesses and their economic expansion.

Irrespective of their physical size, the development and maintenance cost of Data Centers is exorbitant. It must fulfill some essential requirements, which are most of the times associated with data and power cabling. Large data centers possess high power densities, which can be elevated up to 100 times of a typical building. The performance metrics for Data Centers include efficiency, service continuity, security, flexibility and adaptability to technological advancements.

The subject of 'Fire Protection' has its own criticality as halogen-generated corrosive gases could be irremediably destructive to electronic equipment. Improvements in 'Energy Efficiency' are highly commendable as Data Centers impose a great economic burden to their operators as well as an acute environmental impact to global carbon footprints.

Business-critical terminologies like speed-to-market, flexibility, scalability, reliability, and predictability are highly desirable success factors for hyperscalers, cloud and platform providers, who are willing to expand into new or existing markets. These organizations, along with enterprises deploying high-density computers, repeatedly look for large-scale infrastructure deployments delivered against rigorous and exacting timelines.

Highly sophisticated customers who are coping with an unprecedented demand curve, while maintaining their focus on cost-effectiveness, sustainability and scalability without straining capital, they are often longing for a partnership which is efficient in providing efficient solutions and supports against an accelerated timeline while sharing their corporate ethos wholeheartedly.

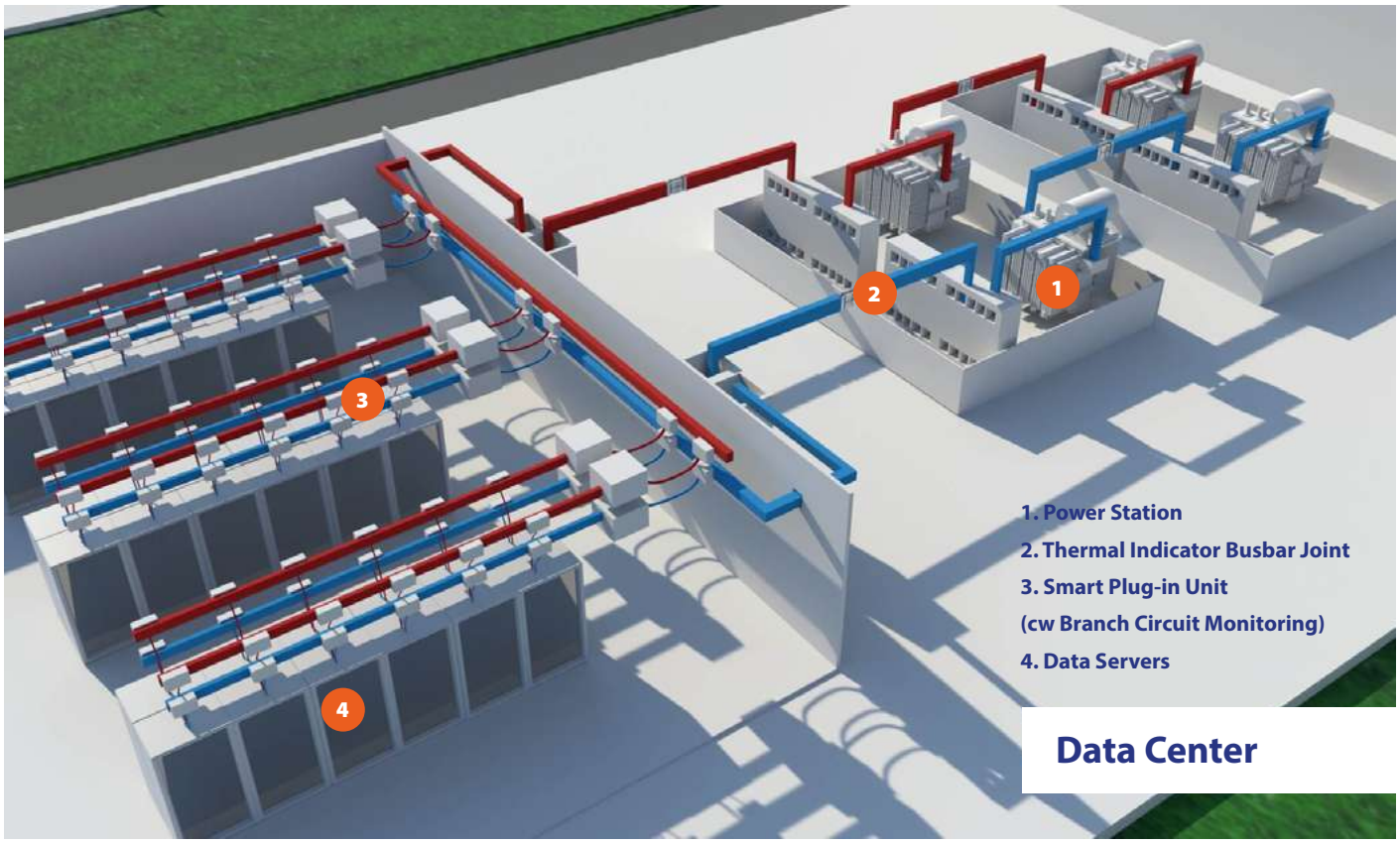
Being a Data Center owner, operator, installer, consultant or architect, optimization of data and energy infrastructure would be your highest priority to bolster your operational efficiency, security reinforcement and future advancements.

What do you expect from us as a Power Distribution System Supplier?

Elevated floors and overhead pathways of a building often accommodate and conceal thousands of kilometers of cable and hundreds of meters of Busbar trunking. As a company's information system is highly significant for business progression, Data Center's reliability and security promises cannot be compromised at any cost. Furthermore, an uncomplicated installation with minimum downtime and preservation of the building's existing architecture and constraints is also a prerequisite.

As a supplier and partner in Data Center developments, we must guarantee the following achievements:

- Innovation capability of being customized and provision of integrated energy solutions
- Solutions that promote quick deployment with minimum manpower
- Facilitate pre-engineering and designing for optimal power and network architecture
- Product solutions that promulgate cooling, fire suppression and protection
- Product solutions that bolster energy-efficiency in power-dense installations
- Provide products with rigorous quality assurance, accompanied by globally recognized third party independent surveillance certifications



What do we have?

Full Range of Busbar Trunking System

Unremitting supply through high quality Busbar Trunkings is vital for business progression of Data Center's operators. Operational continuity of the Data Center with nearly zero unexpected downtime is a highest priority. A trustworthy energy system and related components are a prerequisite for achieving relentless performance standards.

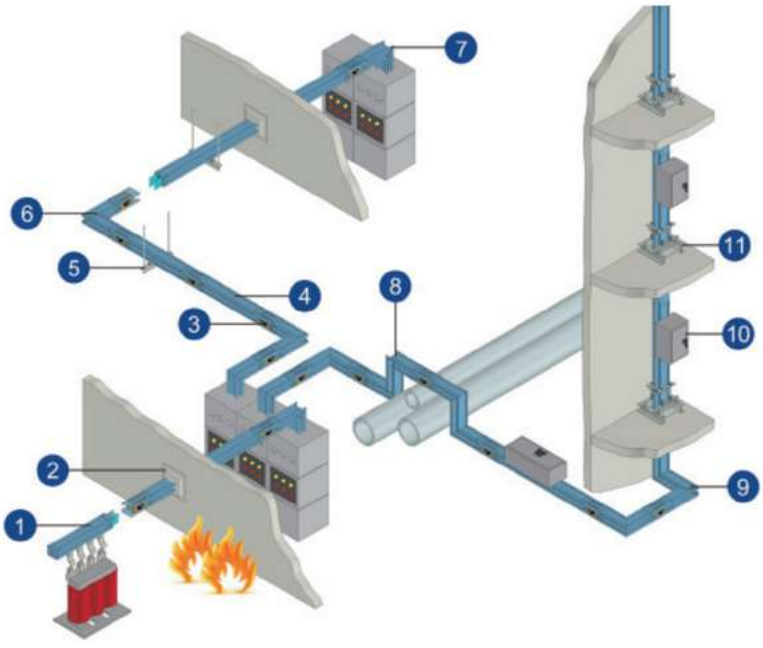
Scalability is indispensable to accommodate next-generation developments. Provision of a sufficient infrastructure to fulfill escalating demands of the IT industry is becoming challenging for Data Center operators. Reliability and infrastructure uptime is an uttermost demand of data-rich companies, while any outage can have an deteriorating impact on business revenue and daily lives.

Compactness, robustness, 90deg bending, fire-resistance and functional integrity are highly desirable features in most cases of Data Center solutions and Tai Sin's Busbar Trunkings are well-designed to accommodate these valuable characteristics. We made our variety of Busbar Trunkings more aesthetically appealing by utilizing rigid copper bar connections between two installations (e.g transformer and switchgear), which eliminate the need for traditional and complex wiring. As a partner, Tai Sin is capable of providing a suite of reliable Low Voltage (LV) and Medium Voltage (MV) power distribution systems products, which can be connected from the grid right down to the rack PDU.

We possess a variety of both Low Voltage Aluminum and Low Voltage Copper Busbar Trunking Systems, which provides you a flexibility to choose the most suitable solution for your customized application.

Although the selection criteria of an appropriate solution is subjective to individual specifications and project limitations, we hope to facilitate your future decision-making process by enlightening some of the benefits and drawbacks of both copper and aluminum busbar trunking conductors.

1. Transformer Connection Unit
2. Wall Flange
3. Joint
4. Straight Length
5. Hanger
6. Flatwise Elbow
7. Edgewise Elbow
8. Edgewise Offset
9. Nonstandard Elbow
10. Plug-in Box
11. Spring Hanger



Full Range of Busbar Trunking System

Low Voltage Copper Busbar

From Engineering perspective, these three parameters are important considerations while selecting a conductor:
1) Electrical Conductivity
2) Thermal Conductivity
3) Tensile Strength

Naturally, copper metal is superior to Aluminum in all these three aspects. When Opex is the key consideration factor, we recommend copper busbars as a preferred choice for electrical systems. As higher electrical conductivity of copper metal improves energy losses, its higher thermal conductivity facilitates to lower operating temperature which consequently increases the system's lifespan and lastly, its higher Tensile strength provides robustness to minimize risks of damage during termination work.

However, the scarcity of copper commodity may result in drastic price fluctuations, which impose a rising concern to developers. Consequently, copper metal may not be counted as the most favorite option when Capex is the key consideration.

Copper metal undoubtedly outperforms aluminum as far as electrical behavior is concerned, featuring lower electrical resistance, lower power loss, lower voltage drop and higher ampacity. If the installation requires high current carrying capacity within a restricted space, copper busbar would be the preferable choice.

Low Voltage Aluminum Busbar

Aluminum is a second favorite conductor for an electrical system after copper. Naturally aluminum is inferior to copper in electrical properties, but it's varsity, cost and stable commodity rates nominate it as an attractive choice for a conductor.

However, electrical performance of aluminum can also be enhanced to become comparable with copper's electrical properties by increasing its cross-sectional area. Availability of electrons for current conduction improves with increased cross-sectional area of conductor, which eventually ameliorates its conductivity.
Hence for identical current carrying capability, aluminum conductors must have a bigger cross-sectional area than copper, but still surpasses copper in terms of cost-effectiveness because of its varsity.

Aluminum metal possessing a density 70% lesser than copper is more electrically efficient with respect to weight considerations. Being 50% more conductive per kg, aluminum outshines as a preferable choice in applications where busbar sizing is extraneous.

The larger overall dimensions of an aluminum busbar system may appear unbefitting in certain area-constraint applications like small buildings or underfloor. However, if dimensions are irrelevant while weight is an important consideration, aluminum would be a superior choice to maximize conductivity with cost-efficiency. The lightweight aluminum conductor provides cost benefits in various aspects like fewer security support requirements, lesser manpower requirement for installation and transportation cost.

Tai Sin Busbar Trunking Systems make the most of your energy

Reliability

Design to eliminate human errors

- Unique error-proof design that prevents installation error. Our bridge type joint prevents potential damage on the busbar due to incorrect connection.
- Our single bolt joint design shortens the time of connection by 50% as compared to the traditional types. Our double headed "break off" joint bolt tightens the busbar with just a common 16mm socket wrench.
- Belleville spring washers are adopted to ensure pressure is evenly applied across the joint.

Safety

- Compliant to Electromagnetic compatibility (EMC) standards with low Electromagnetic Field emission resulting in minimum interference to the data servers.
- Halogen-free with no toxicity emission in case of fire.
- Certified by International certification bodies
- Thermal monitoring features to allow early warning indication during abnormal temporal spike. Our color-coded-temperature indicator applied at the busway joint gives an early warning when high temperature occurs at the joint.
- Joint insulator with a convex-concave groove edge provides an increased creepage distance.
- 99.9% copper purity for our Low Voltage Copper range of busbar.
- All of our copper busbars are high-speed sawed for precision and smooth finishing to eliminate any potential temperature rise at the busbar joint.
- Sandwiched conductors within the housing to achieve superior heat dissipation, lower temperature rise thus eliminating the "chimney effect".
- Both outlet phase and plug-in stab are fully silver-plated. The busbar plug-in unit has a complete safety interlock mechanism to ensure electrical safety. The plug outlet module is embedded with waterproof silicone rubber for protection up to IP54.

Flexibility & Customizable

- Our busbar plug-in outlet and plug-in unit is able to equip the tap-off unit with various switching and monitoring devices. These can be plugged into any tap off points along the busbar making it possible to modify the power distribution system quickly and easily at any time. Up to 10 plug-in outlets can be installed at every 3m of straight length busbar.
- Our system offers a full line of busbar to meet most requirements: suitable for 3P3W, 3P4W, 3P5W, supply and distribution, with rated current from 250A to 5000A (for aluminum conductor) 250A to 6300A (for copper conductor), rated operation voltage up to 690V (rated insulation voltage up to 1000V), IP degree up to IP66 and at frequency 50~60Hz.
- Customized color coding for easy installation and maintenance.

Simple & Efficient

- Our busbar trunkings give your installation compactness and aestheticism
- As every watt counts, our uniquely designed "serrated surface" of extruded aluminum housing greatly improves the heat dissipation of the whole busbar system thus reducing power loss.

Infrastructure Cost Savings

- State-of-the-art welding and compact arrangement creates a true sandwich structure for our busbar trunkings. This compact design is space spacing, reduces installation costs and maintenance frequency.
- The dimension of our LV busbar trunkings begin at 125x103mm for 400-630A ratings. Busbar plug-in unit is also compact and its dimension begins at 360×250×255mm for 100A, giving more space for other equipment.

Tai Sin Busbar Trunking System Unique Features

Predictive Temperature Rise Indicator

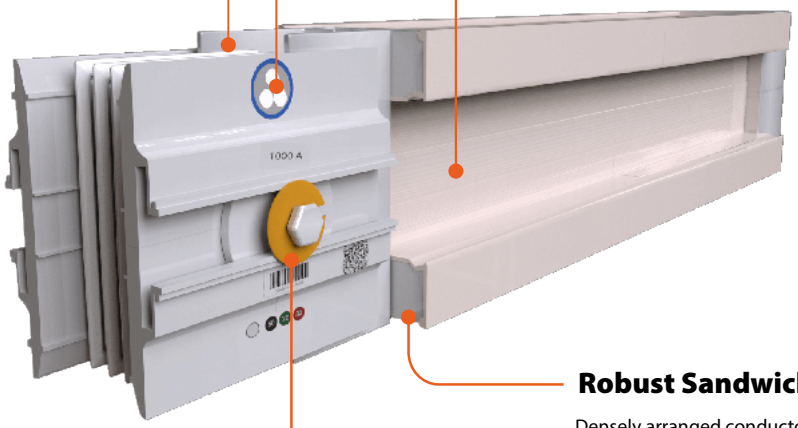
Joint insulator with a convex-concave groove edge provides an increased creepage distance.
Color-coded-temperature indicator applied at busway joint is to give an early warning when high temperature occurs at the joint.

99.9% Purity Copper Conductor

Single bolt joint design to shorten the time of connection by 50% compared to the traditional design.
Double headed "break off" joint bolt to tighten the busway with just a common 16mm socket wrench. Belleville spring washers are adopted to ensure pressure evenly applied across the joint.

Unique "serrated surface" design

Unique "serrated surface" design of extruded aluminum housing greatly improves the heat dissipation for the whole busway system.



Robust Sandwich Structure

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

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 to tighten the busway with just a common 16mm socket wrench. Belleville spring washers are adopted to ensure pressure evenly applied across the joint.

- **Novel Conductor Structure**
- **Superior & Reliable Insutation**
- **Compact Design**
- **Unique Error-proof Device**
- **Safe Plug outlet and busway plug**

View all feature details at: https://www.taisin.com.sg/our-products/busbar-trunking-system/

Why are we a suitable partner for your Data Center.

While we are entirely mindful of the international nature of Data Center technology and development, we ensure the availability of field experts with extensive knowledge of national construction standards, local provisioning, energy needs and business expectations. Our products are compliant to local as well as international standards and are available for each territory and region. Tai Sin has a competent sales force in many countries of Southeast Asia and our local team will provide you full assistance for every single logistics and project management issue. 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.

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.

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.

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.

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.

Tai Sin Busbar Trunking System is designed to eliminate human errors

Tai Sin®

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