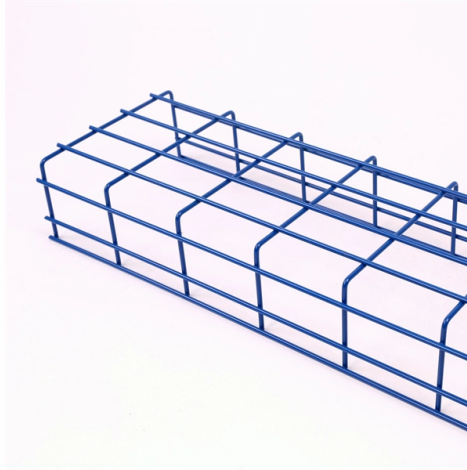


Dense Busbar Connector Concept



Overview

Maximizing Efficiency with Dense Busbar Connectors from RutongThe compact design of our dense busbar connectors is an outstanding feature and allows seamless integration into high-density power distribution systems.

Key Takeaways

A Dense Busbar Connector is a compact, high-current connection system designed to efficiently distribute power while minimizing parasitic effects and enabling high power density layouts.

Overview
A Dense Busbar Connector is used to interconnect busbars with electrical components such as circuit breakers, switches, or cables in high-current systems. Its primary goal is to provide a secure, low-resistance, and reliable connection while supporting compact layouts where space is limited and current density is high. These connectors are critical in applications like high-power inverters, DC distribution systems, and SiC-based converters, where fast switching and high currents demand careful management of parasitic inductance and resistance.

Design Principles

- **Material Selection:** Copper is commonly used for its high conductivity, while aluminum may be chosen for lighter-duty applications. Copper alloys can also be employed to balance mechanical strength and electrical performance.
- **Connector Types:** Dense busbar connectors can be bolted, compression, clamp, or spring-based, each offering trade-offs between installation speed, mechanical stability, and current-handling capability.

- **Thermal Management:** High current densities generate heat, so connectors and busbars are often designed with low-profile laminations, ventilation, or integrated heat sinks to dissipate heat efficiently .
- **Parasitic Minimization:** In high-frequency applications, such as SiC converters, dense connectors reduce loop inductance and stray capacitance, improving switching performance and reducing EMI .

Advantages

- **High Current Density:** Supports large currents in a compact footprint, reducing the need for bulky cabling .
- **Reduced Parasitics:** Optimized geometry and material selection minimize inductance and resistance, critical for high-speed switching devices .
- **Integration Capability:** PCB-based or laminated busbars can integrate sensors, capacitors, or resistors directly into the connector assembly, enhancing system performance .
- **Reliability and Serviceability:** Symmetrical layouts and robust connection mechanisms ensure even current distribution and reduce hotspots at terminations .

Applications

Dense busbar connectors are widely used in:

- High-power inverters for renewable energy systems and electric vehicles.
- DC distribution systems in industrial and utility-scale applications.
- High-frequency SiC converters, where minimizing parasitic effects is essential for efficiency and thermal management .

Summary

The Dense Busbar Connector concept focuses on compact, high-performance electrical interconnections that handle high currents efficiently while reducing parasitic effects and supporting modular, scalable system designs. By combining careful material selection, connector type optimization, and thermal management, these connectors enable high power density and reliable operation in modern electrical systems .

Article Content

Flexible Busbar Solution for High Current Density Applications

This paper discusses the advantages and limitations of cable connections, rigid bus bar connection and flexible bus bar connections

Maximize Space with Rutong's Dense Busbar Connector Solutions

Dense busbar connectors are a powerful solution to modern electrical connection challenges. Their high-strength structure, compact

(PDF) Busbar Design for High-Power SiC Converters

This paper also presents optimized busbar designs for both module-based and discrete device-based SiC high-power

Maximize Space with Rutong's Dense Busbar Connector Solutions

The construction of our dense busbar connectors is a testament to their quality and reliability. Made from high-strength copper alloy

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