

Article Overview

A double-layer small busbar structure consists of two stacked conductive layers separated by insulation, designed to optimize current distribution, reduce stray inductance, and improve cable management in compact electrical systems.

Structural Design

A typical double-layer busbar in a switch cabinet includes a first shell and a fourth shell, with the first shell positioned on the front surface of the fourth shell. The fourth shell contains symmetrically arranged grooves that connect to pipe bodies, while the first shell has top and bottom grooves that interface with these pipe bodies. Additional third shells and clamping blocks are used to secure cables and maintain mechanical stability, preventing twisting or displacement of conductors inside the cabinet (CN212380761U) .

Laminated Busbar Concept

In power electronics, double-layer busbars are often implemented as laminated busbars, where copper or aluminum layers are separated by thin dielectric materials and laminated into a single structure. This design reduces stray inductance, improves current sharing, and enhances mechanical integrity compared to traditional wiring methods (Mersen, ROLINX) . Laminated busbars are particularly useful in high-current applications, such as IGBT modules in inverters, where precise current distribution is critical to prevent device aging or failure (Springer, 2026) .

Electrical Performance

The double-layer configuration allows for low inductance loops, which is essential in high-speed switching circuits. Proper alignment of the layers ensures mutual coupling and minimizes loop impedance. In cases where layers are not perfectly overlapped, the loop inductance increases, potentially affecting current distribution among parallel devices (Kaizer Power Electronics) . The thickness of conductors, insulating layers, and the geometric layout directly influence stray inductance and current sharing.

Advantages

- o Compact design: Saves space in switch cabinets or power modules.
- o Improved current distribution: Reduces hotspots and ensures uniform load sharing.
- o Reduced stray inductance: Enhances switching performance in high-frequency circuits.
- o Enhanced mechanical stability: Clamping blocks and grooves prevent cable twisting and displacement.
- o Scalability: Can be adapted for multiple layers or high-current applications.

Double-layer small busbar structure

Applications

Double-layer small busbars are widely used in:

- o Switch cabinets for industrial power distribution.
- o Power electronic converters with paralleled IGBT modules.
- o Electric vehicles and renewable energy systems requiring compact, low-inductance busbars.
- o High-current industrial drives where reliability and precise current sharing are critical. In summary, a double-layer small busbar structure combines mechanical organization, electrical efficiency, and compactness, making it ideal for modern high-power and high-density electrical systems. Proper design of grooves, clamping mechanisms, and laminated layers ensures both electrical performance and operational reliability.

This paper discussed behaviors of the gap mode in I.H.P. SAW resonators with double

As a key component of a large-capacity converter, the laminated busbar can improve the

The double busbar system is a crucial component in modern electrical engineering, particularly in substations and power distribution

Typical Busbar Sizes If this program recommends sizes that do not fit into the ranges below, change either the number of conductors

In electric power distribution, a busbar (also bus bar) is a metallic strip or bar, typically housed inside

8US busbar systems are used for mounting current-limiting devices (protective devices), such as fuse switch disconnectors, circuit

This work focused on eliminating the spurious modes in the $\text{YX-LiNbO}_3/\text{SiO}_2/\text{Si}$ heterostructure using the double

Learn how to design efficient substation busbar systems with calculations, examples, and best practices.

The utility model relates to an upper and lower double-layer bus bar, which comprises an upper copper bar and a lower copper bar;

Eaton

This article describes a new transverse edge structure with double busbar for surface acoustic wave (SAW) devices

Double-layer small busbar structure

Learn different types of bus bar arrangement in substations, such as single bus with bus

Abstract--This paper presents a comprehensive analysis about bus bar design procedure. Some applications in terms of rated

Bus bars use many different types of adhesive-coated insulation materials to permit structure layers to be laminated together. There

In this case, bus bar configuration might be low in profile, thereby changing the orientation of the bus structure and the airflow. Bus

Explore single and double busbar switchgear systems: advantages, disadvantages, and selection considerations for electrical

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