Switchgear busbar fabrication method



Overview

Busbar design in switchgear ensures safe, reliable power distribution by balancing current capacity, thermal performance, mechanical strength, insulation, and standards compliance.

Key Takeaways

Busbar fabrication for switchgear involves precise cutting, bending, punching, surface treatment, and assembly to ensure electrical, mechanical, and thermal reliability.

Material Selection

Busbars are typically made from copper (ETP C11000, 99. 9% purity) or aluminum (6101-T6 or 6063-T6 alloys), chosen based on current-carrying requirements, space constraints, and cost considerations. Aluminum busbars require approximately 1.

6 times the width of copper for the same current capacity due to lower conductivity.

Fabrication Steps

Straightening and Cutting Raw busbar stock is first straightened using a busbar straightening machine to remove bends or warps. It is then cut to precise lengths using CNC cutting machines, ensuring tolerances within ±0. 1 mm.

Accurate cutting prevents scrap and ensures proper assembly. Punching and Drilling Holes for bolted connections are created using automatic punching machines or CNC drilling machines. Proper hole placement is critical for mechanical stability and electrical conductivity.

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Burrs are removed to maintain a smooth surface. Bending Busbars are bent according to the design layout using busbar bending machines. Bends can be flat, vertical, or twisted, and must avoid stress fractures or deformation that could reduce current capacity or cause installation issues.

Surface Treatment Overlap surfaces and connection points are treated with tin or silver plating to prevent oxidation and improve conductivity. The busbar surface should remain clean, flat, and free of cracks, scratches, or impurities. Assembly and Spacing Busbars are assembled in the switchgear with proper spacing: gaps between double or multiple busbars should be at least equal to the busbar thickness, and adjacent spacers should be more than 5 mm apart.

Layouts must be symmetrical, horizontal, and vertical for mechanical stability and aesthetic alignment.

Equipment and Tools

Key equipment includes straightening machines, cutting machines, bending machines, punching machines, polishing machines, and tin plating furnaces. Hand tools like files, hammers, torque wrenches, and measuring instruments are also used for finishing and quality checks.

Standards and Compliance

Busbar fabrication must comply with standards such as GB/T 17467, GB/T 11022, GB 7251, IEC, and ANSI/IEEE. These standards ensure proper thermal performance, mechanical strength, insulation, and short-circuit withstand capability. Adherence guarantees safe, reliable, and efficient operation of switchgear under normal and fault conditions.

Design Considerations

Current Carrying Capacity: Determined by cross-sectional area, material, and installation method. Temperature Rise: Controlled through proper spacing, plating, and ventilation.

Short-

Circuit Strength: Busbar supports and bracing must withstand electrodynamic forces during faults. By following these fabrication methods, switchgear busbars achieve high electrical efficiency, mechanical stability, and long-term reliability, ensuring safe power distribution in both low and medium voltage systems.

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Article Content

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Busbar Joint Surface Preparation Field Guide for 2026

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Busbar joint surface preparation for low-resistance connections is the controlled removal of oxides, contaminants, and surface irregularities from mating conductor faces, combined with the

Switchgear

A switchgear assembly has two types of components: Power-conducting components, such as switches, circuit breakers, fuses, and lightning arrestors,

Rigid Busbar vs Flexible Copper Connector for Dry Transformer | TikTok

48 Likes, TikTok video from Switchgear Sophia (@switchgearsupply): “Compare rigid busbar joints and flexible copper connectors for box substation dry transformer assembly to choose the best

IEC 61439 Low Voltage Switchgear Design: Complete 2026 Guide

Figure 1: High-performance VIOX industrial low voltage switchgear assembly, demonstrating modern compartment design, reliable circuit protection, and clear busbar phase

Copper Busbar Current Carrying Capacity: Complete

Following ANSI C119.2 and IEC 60364 standards ensures copper busbar current carrying capacity meets industrial safety requirements, avoiding

What is the function of the busbar in a switchgear, and how to select ...

Current - carrying capacity Select busbars according to the rated current of the switchgear to ensure that the busbars will not be damaged by overheating when operating at the rated current. Generally, refer

What is Busbar? Types, Advantages (2026 Updated

Busbar is a metal strip or rod, usually made of copper, brass or aluminum, used for grounding and conducting electricity. It is divided into flat

Technical Application Papers No.11 Guidelines to the construction

In each test, the incoming circuit and the busbars are lo-aded to their rated current and as many outgoing circuits in a group are loaded to their rated current as necessary to distribute the incoming

Copper Busbar Selection and Fabrication: Expert Guide

Ever wondered how to choose the right copper busbar for your electrical systems? This article breaks down the essentials of copper busbar

Supercharged Sheet Metal Busbar Skills (Updated for 2025) | ASM

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Last updated on March 7th, 2025 at 09:05 am Busbars aren''t particularly complex or glamorous, but these simple metal bars are a powerhouse (quite literally) in electrical systems. From

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