Cable busbar tray fabrication method

Overview

The document outlines procedures for cable tray fabrication and installation for the HA MBD project.

Key Takeaways

Cable busbar trays are fabricated by cutting, punching, bending, and assembling copper or aluminum busbars within structural cable trays, following precise measurements and electrical standards.Material Selection

The fabrication process begins with selecting the appropriate conductive material. Copper busbars typically use electrolytic tough pitch (ETP) copper with 99.9% purity, while aluminum busbars use 6101-T6 or 6063-T6 alloys. The choice depends on current-carrying requirements, mechanical strength, and environmental conditions .

Cutting and Straightening

Raw busbar stock is cut to the required lengths using CNC cutting machines to ensure tolerances within ±0.1mm. After cutting, busbars are straightened using a busbar straightening machine to remove any bends or warping, ensuring a flat surface for assembly .

Punching and Drilling

Holes for bolted connections are created using automatic punching machines or CNC drilling machines. The punching process requires precise calculation of force based on the material thickness and shear strength. Burrs are removed to maintain smooth edges and prevent electrical faults .

Bending and Shaping

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Busbars are bent according to the design layout using busbar bending machines. Bends can be flat, vertical, or twisted, and must be executed carefully to avoid stress fractures or deformation that could reduce current capacity. The spacing between multiple busbars is maintained at least equal to the busbar thickness, with a minimum 5mm gap between adjacent spacers .

Anti-Oxidation Treatment

To prevent corrosion and ensure reliable electrical contact, busbar surfaces are treated with tin or silver plating at overlap points. This step enhances conductivity and longevity of the busbar system .

Assembly in Cable Trays

Once fabricated, busbars are installed within cable trays, which provide structural support and protection. Cable trays are measured, cut, and bent to accommodate the busbar layout, ensuring proper alignment, symmetry, and clearance for electrical safety. Supports and fasteners are used to secure the busbars and trays, taking into account floor and ceiling irregularities .

Quality Control

Throughout fabrication, inspection of dimensions, surface finish, hole alignment, and bend accuracy is critical. Proper spacing, alignment, and anti-oxidation treatment are verified to meet electrical and mechanical standards .

Summary

The cable busbar tray fabrication method involves a sequence of material selection, cutting, straightening, punching, bending, anti-oxidation treatment, and assembly within cable trays, ensuring high current capacity, safety, and durability. This method integrates both mechanical precision and electrical compliance, making it suitable for industrial and commercial power distribution systems .

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