Connection method of grounding busbar of switchgear



Overview

Learn how to ground a busbar system with NEC requirements. Step-by-step guide covering grounding conductors, bonding, and common mistakes to avoid.

Key Takeaways

Proper grounding busbar connections in switchgear ensure personnel safety, equipment protection, and reliable fault current dissipation.

Grounding Busbar Overview

A grounding busbar is a conductive bar, typically made of copper or aluminum, that serves as a central point for connecting all grounding conductors within a switchgear or electrical panel. It provides a low-impedance path for fault currents, ensuring that any electrical surge or short circuit is safely directed to earth, reducing the risk of electric shock, equipment damage, or fire.

Connection Principles

Material and Size: Copper is preferred for its superior conductivity, while aluminum is a cost-effective alternative. The busbar size should accommodate all grounding conductors and the expected fault current. Torque and Contact Pressure: For copper busbars, the clamping force under bolts or pressure washers is critical.



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Current flows primarily under the highest pressure points, so proper torque is more important than full overlap of busbar surfaces. Busbar Types: Rigid solid bars are common for main connections, while flexible or laminated busbars may be used for connections to breakers or where vibration exists. Earthing Conductor Sizing: Conductor size is calculated based on fault current (I), duration (t), and material constant (k).

For example, a 10,000 A fault for 0. 2 s may require a 95 mm^2 copper conductor.

Installation Best Practices

Centralized Connection: All grounding conductors from circuits, equipment, and protective devices should terminate at the busbar to maintain a uniform reference potential. Separation of Functions: Lightning protection, neutral earthing, and surge protection devices should have dedicated connections to the busbar to safely dissipate high-voltage surges. Compliance with Standards: Follow IEC 60364, IEEE 80, NEC 250, and IEC 62271-301 for grounding, busbar design, and connection torque specifications.

Mechanical Support: Ensure busbars are properly supported to withstand electrodynamic forces during short-circuit events, preventing bending or deformation.

Summary

A well-designed switchgear grounding busbar connection combines correct material selection, proper torque application, adequate conductor sizing, and adherence to international standards. This ensures safe, reliable, and efficient grounding, protecting both personnel and equipment while maintaining system stability during normal operation and fault conditions.

Article Content

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METHOD OF STATEMENT FOR INSTALLATION OF POWER

3.1 Grounding: 3.1.1 Grounding Bus Bar: Establish a proper grounding connection for the bus bar to dissipate fault currents and protect against electrical shocks.

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