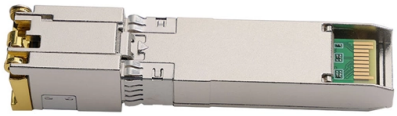
DANI ALONSO OPTICAL CONNECTIVITY

Parameters of the main busbar of the low-voltage switchgear



Overview

IEC 61439 Low Voltage Switchgear Design: Complete 2026 GuideMaster IEC 61439 low voltage switchgear design. Learn temperature limits, short-circuit verific.

Key Takeaways

The main busbar in low-voltage switchgear must be designed for rated current, short-circuit withstand, thermal stability, mechanical strength, and compliance with IEC 61439 standards.Key Electrical Parameters
• Rated Current (Ir): The continuous current the busbar can carry without exceeding permissible temperature rise. This is calculated considering the diversity factor of connected loads, e.g., a total equipment requirement of 2700 A with a diversity factor of 0.6 results in a main busbar current rating of 1620 A according to IEC 61439-1 .

• Short-Circuit Withstand Capacity (Icw): The busbar must withstand prospective short-circuit currents without mechanical or thermal damage. This depends on material, cross-sectional area, and busbar geometry .

• Voltage Rating: Typically up to 1000 V AC or 1500 V DC for low-voltage assemblies .

• Temperature Rise: IEC 61439-1 sets the maximum permissible busbar temperature at 140°C (105 K above ambient 35°C) under full load conditions .

Mechanical and Material Considerations

• Material: Copper or aluminum are commonly used. Copper offers higher conductivity and better thermal performance, while aluminum is lighter and cost-effective .

• Busbar Geometry: Width, thickness, layering, and spacing are optimized to balance current-carrying capacity, heat dissipation, and space efficiency. Thinner, wider bars can reduce AC resistance effects and improve thermal performance .

• Mechanical Strength: Busbars must resist short-circuit forces and maintain structural integrity. Proper support and joint quality are critical .

Thermal and Environmental Parameters

• Insulation Coordination: Busbars must be insulated to prevent electrical faults and ensure safety.

• Heat Dissipation: Arrangement of horizontal and vertical busbars affects airflow and temperature distribution within the switchgear .

• Corrosion Resistance and EMC: Busbars are tested for corrosion, electromagnetic compatibility, and degree of protection (IP rating) according to IEC 61439 .

Design and Verification

• Standards Compliance: IEC 61439-1 and IEC 61439-2 define construction, verification, and testing requirements for low-voltage switchgear busbars .

• Testing: Includes thermal tests, short-circuit tests, mechanical operation cycles, and verification of insulation and protection degrees .

• Optimization: Designers often standardize busbar families and adjust thickness or layering for different current ratings to balance cost, space, and performance .

Summary

The main busbar in low-voltage switchgear is a critical component that must be sized and designed to handle continuous current, short-circuit stresses, and thermal limits while maintaining mechanical integrity and compliance with IEC 61439 standards. Proper material selection, geometry, and verification ensure reliable, efficient, and safe power distribution within the switchgear assembly .

Article Content

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The horizontal busbar is the main distribution bus, with one set per phase running through every cubicle in the lineup,

Low-voltage switchgear fundamentals

This video will provide some basic knowledge on the composition of low-voltage switchgear and enable you to better identify

Busbar Presentation2.pdf

It covers topics such as busbar material selection criteria, sizing calculations, installation practices, and good practices for bending,

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Substation Components—Part 5: Busbar Configurations

Designing a substation involves not only the visible equipment and ratings but also the less apparent

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ANSI C37.51 – Conformance Testing of Metal-Enclosed Low Voltage AC Power Circuit Breaker Switchgear Assemblies UL 1558 –

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It may also be useful to others. It will help managers, engineers and others to understand their responsibilities and duties in the

MEDIUM VOLTAGE SWITCHGEAR SELECTION AND DESIGN

The busbar compartment houses the main busbar system, which is connected to the fixed upper isolating contacts of

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The busbar compartment is located in the middle section of the switchgear. Main busbars can be lo-cated at the top, in the centre or

IEC Standard for Busbar Sizing: IEC 61439 Requirements

For busbar sizing, the primary references are IEC 61439 (for low-voltage switchgear and controlgear assemblies) and

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The switchgear can have different depths. Selection mainly depends on the rated current of the main busbar system, on the short

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Low Voltage Bus Bars for Switchgear

Low Voltage Switchgear bus bar for panelboards, switchboards, switchgear, splitters, and all other electrical enclosures and cabinets.

Low Voltage Switchboard: Design, Ratings, and Selection Guide

Practical guide to low voltage switchboards—bus ratings, fault duty, protection, and applications—with a link to Enwei

MaxSG Switchgear Application guide

The bus bar system is installed in the middle compartment of the switchgear vertical section and it includes the main horizontal bus

IEC 61439 Standards-R1

Above 2000m, the properties of the atmosphere (composition of the air. dielectric strength, cooling power and pressure) change,

Installation and Low Voltage Switchgear Maintenance Manual

MaxSG Low Voltage Switchgear General Instructions on and use as a guide during installation and initial operation. File these

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Here we briefly discuss the types of metal-enclosed bus systems and their design parameters, to select the correct size and type of

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Busbar design within Medium Voltage (MV) switchgear is a critical aspect, fundamentally

Operation and Maintenance Manual MNS-SG Low Voltage, Metal

Vertical sections are composed of the following three main compartments: Device compartment: Composed of up to four vertical

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