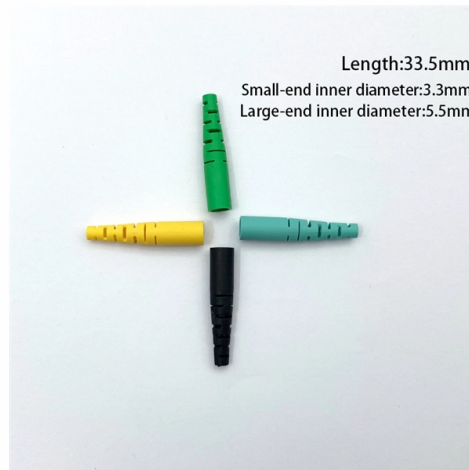


High-voltage busbar without rounded corners



Overview

Busbar Corner Rounding: Four Key Advantages for Busbar corner rounding refers to machining sharp or right-angle edges of busbars into High Voltage Busbars.

Key Takeaways

High-voltage busbars can be manufactured with sharp corners, but careful design is required to prevent electrical stress and insulation breakdown. Electrical Considerations

Busbars with sharp corners create localized electric field intensification, which can increase the risk of partial discharge and insulation failure, especially at voltages above 1,000 V DC . Rounded corners are typically used to reduce these stress concentrations, but if sharp corners are necessary, designers must compensate with enhanced insulation, such as thicker laminated layers or high-dielectric materials like FR4, G10, or flame-retardant coatings . Laminated busbars, which sandwich copper conductors between insulation films, can be customized to handle high voltages even with non-standard geometries .

Mechanical and Thermal Considerations



Sharp corners can also introduce mechanical stress points during bending or assembly, potentially leading to cracks in the conductor or insulation over time . Thermal management is critical in high-current applications; sharp corners may slightly increase local heating due to current crowding, so careful current density analysis and simulation are recommended . Liquid-cooled or multi-layer laminated busbars can mitigate thermal issues while maintaining compact designs .

Design and Manufacturing Solutions

- **Insulation enhancement:** Use thicker or higher-grade insulation at corners to prevent breakdown .
- **Laminated busbars:** Multi-layer designs allow precise control of conductor spacing and insulation, reducing stray inductance and improving reliability .
- **Simulation and testing:** 3D modeling and high-precision impedance analysis can predict hotspots and field concentrations, ensuring safe operation .
- **Custom fabrication:** CNC cutting and lamination allow sharp-cornered busbars to be produced with consistent quality and insulation coverage .

Applications

Busbars with sharp corners are feasible in power electronics, renewable energy systems, aerospace, and automotive high-voltage applications, provided that insulation and field stress are carefully managed . TE Connectivity and Molex offer customizable high-voltage busbars with various insulation and plating options to accommodate non-standard geometries .

Key Takeaway

While rounded corners are preferred for high-voltage busbars to minimize electric field stress, sharp-cornered busbars can be safely used if designers implement enhanced insulation, laminated structures, and thorough simulation/testing. Proper material selection and manufacturing precision are essential to maintain electrical, thermal, and mechanical reliability in high-voltage systems.

Article Content

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Wired busbars are flexible and used in the connection of terminals of equipment subjected to vibration, and shocks,

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A busbar is a solid metallic strip, typically made of copper or aluminium, used for distributing

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The temperature rise curves of the heat pipe busbar and the busbar under different plating conditions are shown in Fig.

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