

Best Practices & Options for Using Fasteners to Mount and Secure Busbars

No matter how perfect your busbar design is coming off the manufacturing floor, optimizing the details of how it will be integrated within the target system is critical to ensuring best performance.

One of the key elements for successful busbar integration involves the fastener strategy for mounting and securing it in place. When designing and implementing fastener methods for busbars, several key considerations are essential to ensure safety, efficiency, and reliability.

These include:

- 1. Mechanical strength:** Busbars often carry high electrical currents, so fasteners must provide sufficient mechanical strength to withstand the associated forces and vibrations without loosening or failing. This involves selecting materials and designs capable of withstanding the mechanical stresses encountered in operation.
- 2. Corrosion resistance:** Busbars may be exposed to various environmental conditions that can cause corrosion over time. Choosing fasteners made from corrosion-resistant materials or applying coatings can help mitigate this risk and ensure long-term reliability.
- 3. Thermal management:** Efficient heat dissipation is critical in high-current applications so fasteners should facilitate good contact between the busbars and cooling systems, or heat sinks to ensure effective heat transfer.
- 4. Insulation and isolation:** Fasteners should be designed with appropriate insulating materials or features to provide the necessary electrical isolation between different conductive elements.
- 5. Ease of installation and maintenance:** Fastener designs should consider ease of installation and maintenance to minimize downtime during assembly or repairs. Features such as captive hardware, tool-less installation, or quick-release mechanisms can streamline these processes.
- 6. Compliance with standards and regulations:** Ensure that the chosen fastener methods comply with relevant industry standards and regulations governing electrical installations, safety, and performance.
- 7. Cost-effectiveness:** Balancing performance requirements with cost considerations is essential in any design. Optimize fastener methods to achieve the necessary performance levels while remaining cost-effective for the specific application.
- 8. Compatibility with busbar design:** Fasteners should be compatible with the size, shape, plating, and configuration of the busbars being used. Custom fastener designs may be necessary for non-standard busbar configurations.
- 9. Environmental considerations:** Consider any environmental factors such as exposure to moisture, chemicals, or extreme temperatures that may affect the performance and longevity of the fastener method.

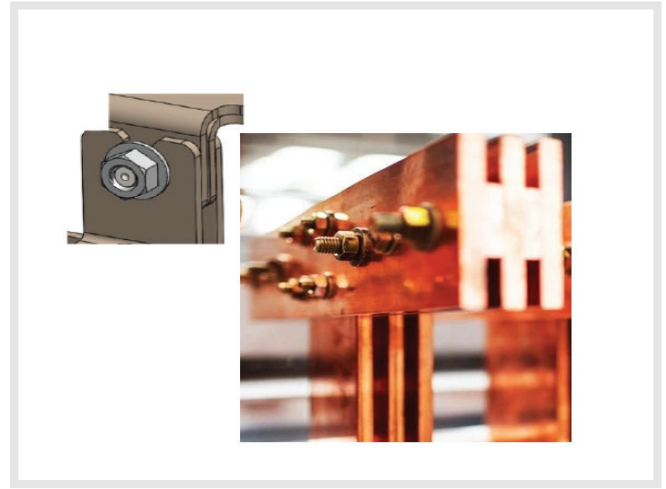
Fastener Methods and Approaches

The following sections provide examples of fastener approaches to address various design objectives

Screws and Bolts

Standard screws and bolts are versatile, low cost, and widely options that can be used for attaching busbars to mounting surfaces such as busbar supports, terminal blocks, or electrical enclosures. Screws and bolts come in a wide range of sizes, materials (e.g., stainless steel, brass), and head types (e.g., hex, Phillips) to accommodate different applications.

Although screws and bolts are appropriate for many busbar mounting requirements, they are not always the best choice, especially for custom busbars that are long or have multiple bends with multiple mounting points where handling lots of loose hardware can present hassles. Also, in cases where the mounting points are either in very tight spaces and/or blind points, trying to align and screw in loose hardware can be problematic.

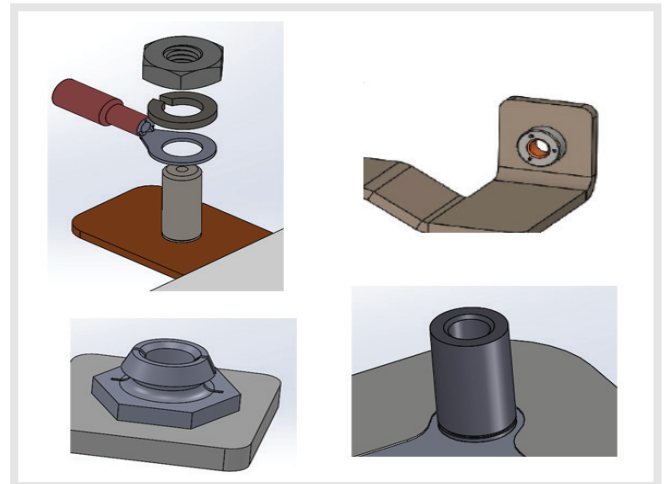


Screws and Bolts

Clinch Hardware

Self-Clinching Threaded hardware, commonly called clinch hardware, is a widely used fastener method for busbars. They address the ease-of-installation and cost-effectiveness issues primarily. For example, PEM® Fastening Solutions, including nuts, studs, and standoffs provide strong easy to use mounting points for attaching busbars to relatively thin materials such as sheet metal.

When pushed through the sheet metal, the studs provide stable mounting points that eliminate the hassles of juggling loose bolts and nuts on both sides. Instead, the busbar can simply be aligned on to the hardware and secured from one side.

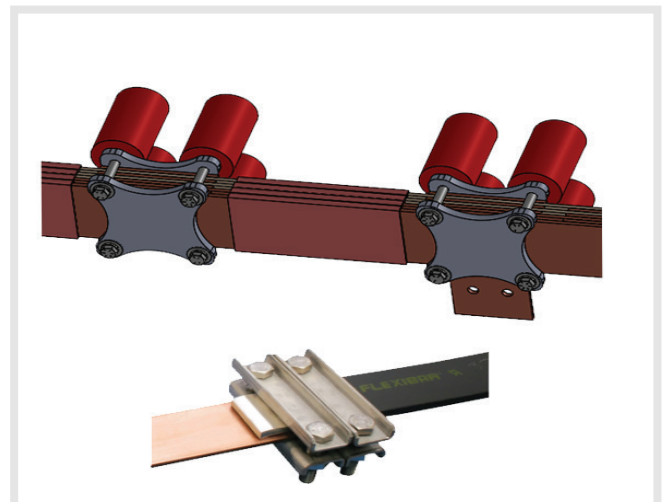


Clinch Hardware

Custom Supports and Clamps

These are specialized components, designed specifically for supporting and securing busbars within electrical enclosures or distribution panels. They often feature slots or channels for accommodating busbar profiles and provide a secure mounting interface. Specialized custom approaches may include mounting plates, brackets, clips, standoffs, etc.

Generally, specialized mounting solutions are only deployed when other more standardized hardware is insufficient for the specific busbar configuration and end-application requirements.



Custom Supports & Clamps

Applications Note: Best Practices & Options for Fasteners to Secure Busbars

Determining the Best Approach

As a highly experienced busbar manufacturer, with a comprehensive, end-to-end, application specific approach, Storm Power always takes installation issues into account for every custom project. When evaluating installation and fastener alternatives, we consider the whole range of cost, stability, environmental and special configuration issues outlined earlier. We also consider other important issues that can relate to mounting strategies, such as vibration and expansion issues.

[See this Applications Note for More Information on Vibration and Expansion.](#)

Storm Power also backs up our recommendations with a full-service approach that can include providing the standard fastener hardware or providing the custom-designed mounting solutions.

As part of our assembly and kitting processes, Storm Power routinely offers hardware insertion services for the installation of a variety of components, including PEM nuts, self-clinching fasteners, standoff insulators, and studs. Using automated CNC hardware machinery, we pierce precision holes for easy insertion of fastener hardware to assure proper position and alignment for busbar installation.

We also offer options for flexible busbar designs that can accommodate alignment for fasteners as well as helping mitigate vibration or movement during operation.

[See this Applications Note for More Information on Flexible Busbars.](#)

Summary

At Storm Power Components, our engineering teams have decades of experience with designing complex busbars that have proven reliable in the most demanding of deployments. This is because we always start with the end goal of the system in mind and then bring our knowledge, experience, and creativity together in a holistic manner to achieve those goals, including when it comes to integrating fasteners into busbar designs.

