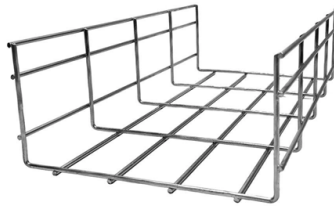


## How to arrange the small busbars on the top of the cabinet



### Overview

Busbars are the unsung heroes of electrical panels, ensuring reliable power distribution and minimizing clutter.

### Key Takeaways

Small busbars on the top of a cabinet should follow the ABCN phase sequence, maintain proper spacing, and be securely supported to ensure safety, reliability, and compliance with IEC standards.

Phase Sequence and Positioning

For a three-phase system, busbars should be arranged according to the ABCN sequence:

- A-phase closest to the operator
  - B-phase next
  - C-phase following
  - N (Neutral) at the inner side or farthest from the operator
- This sequence ensures consistent phase identification, prevents motor reverse rotation, avoids VFD alarms, and simplifies maintenance and troubleshooting. Color coding (e.g., red, yellow, blue for phases and black or blue for neutral) is recommended for quick recognition.
- Spacing and Clearance

Busbars must maintain adequate clearance to prevent arcing and short circuits. The IEC 61439-1 standard specifies minimum distances based on voltage, insulation, and pollution degree . Insulated busbars can be placed closer together, while bare busbars require larger gaps. Thermal expansion should also be considered to avoid reduced spacing over time .

#### Support and Mounting

- Use rigid supports to prevent sagging or vibration, especially during short-circuit events .
- Ensure busbars are securely bolted or clamped to maintain mechanical stability.
- Avoid ad hoc drilling or field modifications, as these can compromise safety and compliance .

#### Material and Insulation

- Copper busbars are preferred for high conductivity and mechanical strength, while aluminum may be used for cost or weight considerations .
- Consider tin or silver plating for improved contact resistance and durability .
- Use insulating barriers, heat-shrink sleeves, or modular enclosures to enhance safety and prevent accidental contact .

#### Layout Tips

- Keep busbars parallel and aligned for a neat, professional appearance.
  - Allow enough space for downstream connections and future expansion.
  - Modular busbar systems can simplify installation and reduce wiring clutter .
  - Ensure the layout allows easy access for inspection, maintenance, and fault repair .
- By following these principles, small busbars on the top of a cabinet will be safe, reliable, and compliant with international standards, while also facilitating efficient installation and maintenance.

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