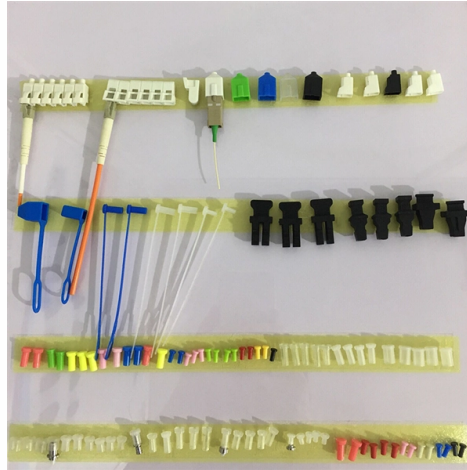


Standard distance between circuit breakers in distribution boxes



Overview

The number of circuits or circuit breakers in a panel must not exceed the panel's rated and listed capacity (NEC 408.54).

Key Takeaways

The spacing between circuit breakers in distribution boxes is determined by DIN rail mounting, clearance, and creepage requirements, typically ranging from 18 mm to 36 mm between adjacent breakers depending on the standard and voltage rating.

DIN Rail and Breaker Spacing

Most miniature circuit breakers (MCBs) and residual-current devices (RCCBs/RCBOs) are mounted on DIN rails, which provide a standardized method for installation. The center-to-center spacing of breakers is generally 18 mm for single-pole devices and 36 mm for double-pole devices, following IEC 60898 and IEC 60947 standards. This spacing ensures proper mechanical fit, allows for wiring, and provides sufficient air gaps for heat dissipation and safe operation .

Clearance and Creepage Distances

IEC 61439 specifies two critical distances for safety:

- **Clearance:** the shortest distance through air between two conductive parts. This prevents arcing and short circuits. Typical clearance for low-voltage panels is $\geq 3\text{--}6$ mm for 230–400 V systems, depending on insulation and IP rating .

- Creepage: the shortest distance along the surface of an insulating material between two conductive parts. This is usually $\geq 4\text{--}8$ mm for standard residential and commercial panels .

These distances influence how closely breakers can be installed side by side, especially in high-humidity or industrial environments where higher creepage is required.

Layout Considerations

- Heat dissipation: Adequate spacing prevents overheating of adjacent breakers.
- Wiring access: Space must allow for safe connection of live, neutral, and earth conductors.
- Future expansion: Some distribution boxes include spare ways to accommodate additional breakers without violating spacing requirements .
- Standards compliance: BS 7671 and NEC codes require sufficient working space around the panel and proper separation of live parts to ensure safety .

Practical Recommendation

For typical residential or commercial distribution boards:

- Single-pole breakers: 18 mm center-to-center spacing.
- Double-pole breakers: 36 mm center-to-center spacing.
- Maintain minimum clearance of 3–6 mm between live parts and adjacent conductive components.
- Ensure creepage distances of 4–8 mm along insulating surfaces.
- Follow manufacturer specifications, as some breakers may require slightly larger spacing due to design or IP rating .

By adhering to these spacing guidelines, distribution boxes remain safe, compliant, and maintainable while minimizing the risk of electrical faults.

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A circuit breaker with a straight voltage rating, such as 240 V or 480 V, may only be installed in a circuit in which the nominal voltage

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