

Grounding of the metal casing of the distribution box



Overview

Construction Guidelines For Grounding Systems Of The equipotential bonding of its metal casing is the underlying logic that ensures the reliable operation.

Key Takeaways

The metal casing of a distribution box must be securely connected to the main grounding system using dedicated grounding points, low-resistance conductors, and proper bonding techniques to ensure electrical safety.

Purpose of Grounding

Grounding the metal enclosure is essential to protect people and equipment from electrical faults. If a live wire contacts the metal casing, the enclosure can become energized, creating a shock hazard. A properly grounded box provides a low-resistance path for fault current, causing the circuit breaker to trip and de-energizing the enclosure almost instantly, in compliance with safety standards such as the NEC .

Connection Points and Methods

- **Factory-Reserved Studs:** Stainless steel distribution boxes often have pre-welded studs or threaded points on the base plate, side walls, or door panels for grounding. These provide strong mechanical and electrical connections without damaging the anti-corrosion coating .
- **Flexible Connections:** For moving parts like hinged doors, braided copper tape is used to maintain continuity and reduce contact resistance .



- **Anti-Loosening Hardware:** Use serrated or anti-loosening washers to pierce oxide layers and prevent loosening over time .

Grounding Conductors

- **Wire Size:** In the US, a 10 AWG (5.26 mm²) ground wire is standard, while in other markets, a 6 mm² wire is recommended .

- **Connection Path:** Typically, a wire is connected from the enclosure stud to a mounting plate, and then from the plate to the central grounding point. Additional wires may be used to connect other components like spindle plates, ensuring total resistance remains below 0.1 Ohm .

- **Material Compatibility:** Use copper or tin-plated terminals, and apply a small amount of conductive grease to prevent electrochemical corrosion when connecting to stainless steel .

Installation and Verification

- **Clean Contact Surfaces:** Remove coatings or oxide layers to expose bare metal for low-resistance contact .

- **Secure Connections:** Tighten grounding screws or bolts to the recommended torque.

- **Measure Resistance:** After installation, use a multimeter to verify the resistance from any point on the enclosure to the main grounding electrode. High resistance may indicate poor contact or insufficient cleaning .

- **Environmental Considerations:** In outdoor or high-humidity environments, ensure grounding points are protected from condensation and oxidation .

Summary

Proper grounding of a distribution box involves using factory-designated grounding points, flexible connections for moving parts, appropriately sized conductors, and verification of low-resistance paths. Following these practices ensures compliance with electrical safety standards, reduces the risk of electric shock, and maintains reliable operation of the electrical system .

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