

How much current is the ground wire in the distribution box



Overview

Ground Wire Size Chart – NEC 250.122 & 250.66 Ground wire sizes for every circuit and service: equipment grounding conductors by breaker rating per NEC Table.

Key Takeaways

The ground wire in a distribution box normally carries no current under standard operation; it only conducts current during a fault condition. Role of the Ground Wire

The ground wire, also called the Equipment Grounding Conductor (EGC), provides a low-impedance path for fault current to return to the source, ensuring that protective devices like circuit breakers trip quickly during a short circuit or other fault. It is not designed to carry continuous current like the hot or neutral wires.

Fault Current Flow

When a fault occurs, such as a hot wire contacting a metal enclosure, the ground wire momentarily carries a high surge of current, known as fault current. This surge is typically very brief, lasting only milliseconds, but it must be sufficient to trip the overcurrent protection device. The actual current depends on the system voltage, impedance of the fault path, and the rating of the breaker or fuse protecting the circuit.

Sizing Considerations



The size of the ground wire is determined by the rating of the overcurrent protection device rather than the continuous load of the circuit. For example, in residential wiring:

- 15–20 A circuits: 14 AWG copper EGC
- 30 A circuits: 12 AWG copper EGC
- 40–60 A circuits: 10 AWG copper EGC
- 100 A circuits: 8 AWG copper EGC This ensures the wire can safely carry the fault current without overheating before the breaker trips. The NEC Table 250.122 provides the minimum sizes for EGCs based on the breaker rating .

Summary

- Normal operation: Ground wire carries no current.
- During a fault: Ground wire carries a high, brief surge of current to trip protective devices.
- Sizing: Determined by breaker rating, not continuous load, to ensure safety and compliance with NEC standards . Proper installation and sizing of the ground wire are critical for preventing electric shock, equipment damage, and fire hazards.

Article Content

Sizing Electrical Wire for Underground Circuit Cable

With a long run of underground wiring, you'll need to consider wire size to account for voltage drop and ensure plenty

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