

What size cable can be used in a secondary distribution box



Overview

Transformer Cable size calculator: Enter the VA rating of the transformer, primary voltage in Volts and secondary voltage in volts.

Key Takeaways

The appropriate cable size for a secondary distribution box depends on the expected load, distance from the main panel, and conductor material, with common residential feeders ranging from #6 AWG to 1/0 AWG copper or #4 AWG to 2/0 AWG aluminum. Key Considerations



1. **Determine the Load:** Calculate the maximum current the subpanel will carry, including all branch circuits and appliances. Use demand factors to account for the fact that not all loads operate simultaneously. For continuous loads (lasting 3 hours or more), increase the calculated current by 25% to comply with NEC requirements .
2. **Choose Conductor Material:** Copper has higher conductivity and smaller voltage drop than aluminum, but aluminum is lighter and less expensive. The ampacity tables differ for each material, so the choice affects the wire gauge .
3. **Account for Distance and Voltage Drop:** Longer cable runs increase resistance and voltage drop. NEC recommends a maximum of 3% voltage drop for branch circuits and 5% for feeders. For runs over 50–75 feet, consider upsizing the wire by one or two gauges to maintain voltage stability .
4. **Select Wire Size:** Once the load and distance are known, select the wire size based on ampacity tables. For example, a 60A subpanel typically requires #6 AWG copper or #4 AWG aluminum, while a 100A subpanel may require #3 AWG copper or #1 AWG aluminum. Always verify against NEC tables and consider insulation type (THHN/THWN for conduit, SER cable for residential feeders), .
5. **Installation Requirements:** Ensure separate neutral and ground bars in the subpanel. Use proper conduit sizing and follow NEC Article 310 for conductor ampacity and Article 314 for conduit fill limits .

Practical Example

- 60A subpanel, 50 feet from main panel: #6 AWG copper or #4 AWG aluminum.
- 100A subpanel, 75 feet from main panel: #3 AWG copper or #1 AWG aluminum.
- Voltage drop consideration: If the run exceeds 100 feet, increase wire size by one gauge to maintain performance . Using a wire size calculator can simplify this process by inputting load, distance, voltage, and material to get a NEC-compliant recommendation . Always ensure the selected cable meets both ampacity and voltage drop requirements for safe and efficient operation.

Article Content

Table of Underground Electrical Service Cable Sizes & Amps

Buried or underground electrical service entry cable ampacity & underground electrical service ampacity ratings: what

Transformer Cable Size Calculations Calculator

Transformer Cable size calculator: Enter the VA rating of the transformer, primary voltage in Volts and secondary voltage in volts.

Docket No. 45524 HOW TO SIZE RESIDENTIAL

The tables above and on the preceding page show the maximum length of secondary cable (ft) for specific combinations of residence

Electrical wire size & Diameter Tables

Electrical wire sizes & gauges: Tables of Electrical Service Entry Cable Sizes, Electrical Circuit Wire Diameters, Circuit Ampacity,

How to Install a Cable Distribution Box Safely and Correctly?

A cable distribution box is an electrical device used to collect, distribute, and protect electrical power. It is usually

How to Choose the Optimal Electrical Cable Size

Navigate the intricacy of electrical cable size like a pro. Our comprehensive article guides you in choosing the right

Cable Size Calculator

Free wire and cable sizing calculator for DC, single-phase, and three-phase AC circuits. Covers AWG 14 through 4/0 copper and

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