

How many watts is the secondary distribution box

Article Overview

The suitable wattage for a secondary distribution box depends on the total connected load, typically calculated from the sum of all branch circuits with a safety margin, often ranging from a few kilowatts for small residential setups to tens of kilowatts for commercial applications.

Determining the Load

A secondary distribution box, or subpanel, distributes power from the main service panel to a specific area, such as a garage, workshop, or office space. To determine the suitable wattage:

- o List all circuits: Include lighting, outlets, and heavy equipment. Each circuit's power is calculated as $\text{Watts} = \text{Volts} \times \text{Amps}$ for single-phase systems, or $\text{Watts} = \sqrt{3} \times \text{Volts} \times \text{Amps}$ for three-phase systems .
- o Classify loads: Continuous loads (operating ≥ 3 hours) require a 125% safety factor on the breaker rating, while non-continuous loads do not .
- o Sum the total load: Add all circuit wattages to get the total expected load.

Typical Ratings

- o Residential subpanels: Often rated 100-200A, which translates to roughly 12 kW-48 kW at 120/240V single-phase systems .
- o Small commercial or workshop subpanels: May require 200-400A, corresponding to 48 kW-96 kW at 240V single-phase or higher for three-phase systems .
- o Future expansion: Include 20-25% extra capacity to accommodate additional circuits or equipment .

Safety and Compliance

- o Ensure the subpanel's ampacity matches or exceeds the calculated load.
- o Use appropriately sized wires and breakers to prevent overheating and fire hazards.
- o Follow local electrical codes (NEC in the US, IEC in Europe) for continuous load calculations and breaker sizing .

Practical Example

For a workshop with ten 120V circuits (lighting and tools) and three 240V circuits (heavy machinery):

- o Calculate each circuit's wattage.
- o Sum all wattages.
- o Add 25% for future expansion.



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o Select a subpanel rated slightly above this total, e.g., a 200A panel for a total load of ~40 kW. By following this method, the secondary distribution box will safely handle the load while allowing room for growth and minimizing the risk of overloads .

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The secondary distribution voltage is typically less than 2,000 volts. It is from these distribution transformers that electricity is

To find the appropriate subpanel rating, we must first calculate the total wattage of the appliances that will be connected to the

The Secondary Distribution Box (SDB) receives power from Main Power Distribution box via an extender cable and provides a

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Fig. 12.3 shows a typical secondary distribution system. The primary distribution circuit delivers power to various substations, called

Generally, primary distribution should not directly supply power to electrical devices. Secondary distribution often supplies three

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