

What are data center power distribution boxes made of



Overview

Data Center Power Infrastructure Guide: Distribution Cabinets, At the core of this infrastructure are three critical components: power distribution cabinet.

Key Takeaways

Data center power distribution boxes are typically made from robust metals like steel or aluminum, often with protective coatings for durability and safety. Core Construction Materials

Steel is the most common material for power distribution cabinets and rack-mounted PDUs due to its high strength, durability, and ability to support heavy electrical components and high-current busbars. Aluminum is sometimes used for lighter enclosures, offering corrosion resistance and easier handling while still providing structural integrity. These metals are often treated with powder coatings or paint to prevent corrosion, improve fire resistance, and enhance electrical safety.

Internal Components

Inside the distribution boxes, materials include:

- Copper or aluminum busbars for conducting electricity efficiently and safely to multiple circuits.
- Plastic or polymer insulation for circuit breakers, fuses, and wiring to prevent short circuits and ensure user safety.

- High-grade thermoplastics or composites for mounting brackets, cable organizers, and protective barriers within the enclosure .

Design Considerations

Data center PDUs and distribution cabinets are designed to handle high power densities, often in the range of several kilowatts per rack . The enclosures must provide:

- Mechanical strength to support heavy electrical components and withstand accidental impacts.
- Thermal management to dissipate heat generated by high-current circuits.
- Electrical safety to prevent accidental contact and contain faults, often achieved through grounded metal enclosures and insulated internal components .

Variants and Applications

- Rack-mounted PDUs: Slim, metal enclosures installed within server racks, typically steel with powder coating .
- Column header cabinets: Row-level distribution units made from steel or aluminum, housing high-capacity breakers and busbars .
- Power distribution cabinets: Facility-level enclosures that receive incoming power and distribute it safely, constructed from heavy-gauge steel for maximum durability and fault protection . In summary, data center power distribution boxes combine metals like steel or aluminum for structural integrity with copper busbars and insulated plastics for safe electrical distribution, ensuring reliability, safety, and long-term durability in high-density IT environments .

Article Content

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This equipment is used to distribute power to the downstream loads and to protect the power distribution system in the data center.

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Panelboards (typically rated from 1.5kVA to 75kVA) are basically metal cabinets that house the main electrical bussing

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Electrical Distribution Equipment in Data Center (1-5)

Figure 1 provides a block diagram of an electrical distribution system showing the name and the typical location of the

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Understanding Key Elements of Data Center Power Distribution

Generally, data center power distribution isn't an issue until a moment of crisis – a power outage, extreme weather, or

DC distribution

DC distribution - a fad of the 2010s? In the 2010s, a number of data centers were built

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