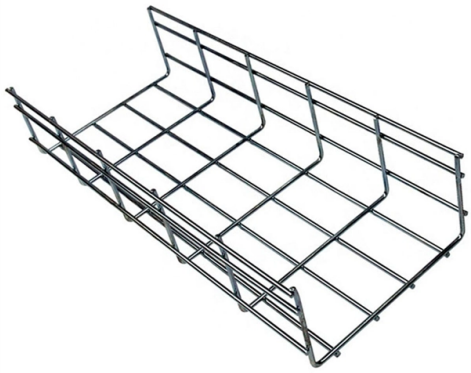
Electrical components in the distribution box to the edge of the board



Overview

Distribution Box and Selection Guide: Internal Structure, Components. Learn how to choose a distribution box and understand its internal structure, inclu.

Key Takeaways

A distribution box contains busbars, circuit breakers, RCDs, neutral and earth bars, and wiring that safely routes electricity from the main supply to individual circuits at the board edge.Key Components

1. Main Incoming Supply and Busbars The main power enters the distribution box through the main switch or isolator. From there, busbars—metallic strips made of copper or aluminum—distribute electricity to the individual protective devices. Busbars ensure a consistent and low-resistance path for current to flow to all circuits . 2. Protective Devices

• MCBs (Miniature Circuit Breakers): Protect individual circuits from overloads and short circuits.

• RCCBs/RCDs (Residual Current Devices): Detect leakage currents and prevent electric shocks.

• RCBOs: Combine MCB and RCD functions for both overload and leakage protection.

• Fuses: Provide simple overcurrent protection in some setups . 3. Neutral and Earth Bars

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• Neutral bar: Collects all neutral wires from outgoing circuits and connects them back to the supply neutral.

• Earth bar: Connects protective earth wires from circuits to the grounding system, ensuring safety . 4. DIN Rails These horizontal metal rails hold modular devices like MCBs, RCDs, and relays in place, keeping the layout organized and preventing cable crossovers . 5. Wiring to the Edge of the Board Outgoing circuits are connected from the protective devices to the edge of the board via color-coded wires:

• Live (phase) wires connect from the MCBs to the load.

• Neutral wires connect from the neutral bar to the load.

• Earth wires connect from the earth bar to the load. The edge of the board typically has cable entry points or terminal blocks where these wires exit the distribution box to feed lighting, sockets, or appliances . Proper spacing, labeling, and routing are essential to maintain safety, prevent overheating, and allow easy maintenance. Additional Considerations
• Surge Protection Devices (SPDs) can be installed to protect sensitive equipment from voltage spikes.

• Heat dissipation and cable management are critical to prevent overheating and ensure long-term reliability.

• Compliance with local standards (IEC, UL, NEC, or BS 7671) ensures safety and proper operation . In summary, a distribution box organizes and protects electrical circuits by combining busbars, protective devices, neutral and earth bars, and structured wiring, with connections routed neatly to the board edge for safe distribution to all loads.

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