COETZER OPTICAL SYSTEMS (Pty) Ltd

Specifications of various levels of electrical distribution boxes at the construction site

Overview

Various cable types, cross sections, and lengths as well as other components, such as distribution blocks, can be used.

Key Takeaways

Construction sites typically use a three-level distribution system: primary (level I), secondary (level II), and tertiary (level III) distribution boxes, each with distinct components and protection features.Primary Distribution Box (Level I)

The primary distribution box receives three-phase power from the transformer, including ground and neutral wires, and serves as the main hub for distributing electricity to secondary boxes. It generally includes main circuit isolation switches, main circuit breakers, and main fuses, along with shunt isolation and leakage protection switches for safety. The box is often equipped with a metering system, copper busbars for reliable connections, and a rainproof top for outdoor use. It is designed for high-capacity three-phase power and does not directly supply electrical equipment .

Secondary Distribution Box (Level II)

The secondary distribution box receives power from the primary box and distributes it to temporary power points or tertiary boxes. It typically contains a large three-phase circuit breaker, main circuit fuse, and shunt isolation with additional fuses or breakers. The box often features an inner and outer door design, a plastic-sprayed exterior, and a rainproof top, making it suitable for outdoor construction environments. This level provides three-phase electricity for powering construction equipment .

Tertiary Distribution Box (Level III)

The tertiary distribution box is the final stage, supplying electricity directly to individual electrical appliances or units. It usually contains single-phase circuit breakers and leakage protection switches, ensuring safe operation for end-use equipment. These boxes can be movable or fixed, and they are installed under secondary boxes to form a three-level protection system. The tertiary box ensures two-level protection, primarily through leakage protection, and is configured according to the power consumption plan of the project .

Materials and Installation

Construction site distribution boxes are often made from technopolymer or high-quality plastic, providing durability, fire resistance, and reusability across multiple sites. They can be wall-mounted or free-standing, with modular designs for quick assembly and dismantling. IP ratings vary depending on exposure, with higher ratings (IP65–IP69) for outdoor or wet conditions. Components such as residual current devices, miniature circuit breakers, and master switches are harmonized to ensure safety and compliance with IEC standards .

Summary
• Level I (Primary): Main hub, three-phase, high-capacity, isolation and protection switches, metering system, rainproof.

• Level II (Secondary): Distributes power to equipment or tertiary boxes, three-phase, circuit breakers, fuses, rainproof, aesthetic design.

• Level III (Tertiary): Supplies end-use equipment, single-phase, leakage protection, movable or fixed, forms final stage of three-level protection. This hierarchical system ensures safe, reliable, and flexible power distribution on construction sites, meeting regulatory standards and accommodating varying load requirements .

Article Content

Temporary Power Distribution Boxes for Electrical Installation

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This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.