How to assign switches in a three-level distribution box



Overview

Each switch box shall connect to and control only one associated piece of electrical equipment (including sockets).

Key Takeaways

In a three-level distribution system, each switch in the switch box must control only one piece of electrical equipment, following the “one machine, one switch” principle.

Understanding the Three-

Level Distribution Structure

A three-level distribution system consists of: Main Distribution Box: The top-level unit that receives power from the source and provides protection against short circuits, overloads, and leakage. It contains main circuit breakers, surge protectors, voltage and current meters, and other protective devices.

Sub-

Distribution Box: The intermediate level that distributes power to multiple circuits. It includes circuit breakers for individual circuits and may have additional protective devices. Switch Box (Tertiary Level): The final junction box that directly controls individual electrical equipment.

Each switch here is responsible for connecting, disconnecting, and protecting a single device or socket.

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Assigning Switches

One Machine, One Switch: Each switch in the switch box must control only one electrical device. No branching or bypassing of levels is allowed. Leakage Protection: Install leakage protection switches at the switch box level.

Additionally, a first-level leakage protector should be installed in the main or sub-distribution box to form two-level protection. Separate Circuits: Power and lighting circuits should be separated. Switch boxes for lighting and power must not share enclosures, and each should have its own branch circuits.

Minimize Distances: Keep the distance between the distribution board and switch box under 30 meters, and the distance from the switch box to the controlled equipment preferably under 3 meters.

Wiring Considerations

Circuit Breakers: Use appropriate MCBs or MCCBs for the switch box depending on the load. The main switch in the switch box should be capable of disconnecting the circuit quickly in case of overload or short circuit. Busbars and Links: For three-phase systems, use busbars to connect MCBs to the main MCCB.

Ensure proper neutral and earth links are established to distribute connections safely. Hierarchical Connection: Connect the main distribution box to the sub-distribution box, and then to the switch box. Do not connect electrical equipment directly to the main or sub-distribution box.

Practical Tips

Label each switch clearly to indicate the equipment it controls. Verify load ratings before assigning switches to ensure the circuit breaker matches the device's power requirements. Follow local electrical codes and safety standards during installation.

By following these principles, you ensure safe, organized, and compliant operation of a three-level distribution system, with each switch properly assigned to its respective electrical equipment.

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Each switch box shall connect to and control only one associated piece of electrical equipment (including sockets). According to the hierarchical and branch circuit principle, in a three-level

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- **Selection of Electrical Equipment**: According to the power consumption load and equipment types at the construction site, reasonably select the electrical equipment in the distribution

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Below is a simplified internal structure diagram for a typical single-phase AC distribution box using an incoming main switch, SPD, MCBs, neutral bar, and earth bar.

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The three-level distribution system refers to a system that distributes electric power through three levels of distribution devices from the incoming power line at the construction site to

The difference between the first,second,and third levels of ...

Third level distribution box: refers to the final junction box of each electrical appliance, which can be movable and fixed. Remember that the leakage protection switch is the last one, and

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The Ultimate Guide to Distribution Box Types

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