Intelligent Wiring Method for Distribution Boxes



Overview

WO2024255014A1 The present invention provides an intelligent distribution box and a signal transmission method. CN103199627A The intelligent wiring method.

Key Takeaways

Intelligent distribution boxes require precise wiring using modular, PCB-integrated, and sensor-enabled techniques to ensure safety, efficiency, and real-time monitoring. Key Wiring Principles1. Modular and Standardized Architecture Intelligent distribution boxes often use modular designs with standard guide rails and pre-defined slots for circuit breakers, relays, and sensors.

Each device is connected to a PCB circuit board with printed parallel wires, enabling parallel connections and data communication between devices. This modular approach simplifies installation, allows easy replacement, and ensures consistent electrical safety. 2.

PC

B and Parallel Wiring Integration Modern intelligent boxes embed PCB boards in grooves of the guide rail, with printed parallel wires connecting multiple circuits. Elastic contact pieces ensure secure communication between devices and the PCB, allowing each device to independently feed back data to the central processing unit. This reduces wiring complexity and enhances reliability.

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3. Sensor and Monitoring Connections For smart boards, voltage and current sensors are wired to the microcontroller or edge-computing unit. These sensors measure RMS values of line voltage and current, transmitting data via Wi-Fi or IoT protocols to a cloud platform for real-time monitoring and automated control.

Proper shielding and separation of power and data lines are critical to prevent interference. 4. Safety and Fault Protection Wiring Wiring must integrate overload protection, short-circuit protection, and surge protection.

Intelligent circuit breakers and solid-state relays are wired to allow rapid disconnection in case of faults. Pyro fuses or main fuses can be used for fast current cut-off, especially in automotive or high-risk applications. Wiring should maintain clear separation between high-current and low-voltage control circuits.

5. Professional Techniques and Tools High-quality connections require precise cutting, stripping, and crimping of wires. Heat shrink tubing, torque-controlled screwdrivers, and hydraulic pliers are recommended to ensure secure and durable connections.

Labeling and color-coding wires improve maintenance and troubleshooting. 6. Compliance and Documentation Wiring should follow ISO50001, LEED, or local electrical standards.

Using pre-defined reference architectures and detailed documentation from manufacturers like ABB or LEONI helps avoid errors and ensures compliance. Customization is possible for specific voltage levels (12V, 24V, 48V) and application requirements.

Practical Tips

Keep power and data lines separate to reduce electromagnetic interference. Use modular connectors for easy replacement and maintenance. Ensure secure grounding for all components.

Test each circuit individually before full system integration. Document all wiring paths and connections for future troubleshooting. By following these wiring techniques, intelligent distribution boxes can achieve efficient energy distribution, real-time monitoring, and enhanced safety, supporting both residential and industrial smart grid applications.

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Article Content

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The intelligent wiring method and device of the distribution box is capable of greatly simplifying wiring processes between an access device and the distribution box and achieving...

Intelligent wiring method and device of distribution box

The intelligent wiring method and device of the distribution box is capable of greatly simplifying wiring processes between an access device and the distribution box and achieving intelligent control of the

How to create an intelligent distribution architecture with ABB

In this session, we will show how ABB satisfies customer needs and supports them throughout the whole project journey, from the idea down to the detailed documentation and instructions to execute it.

Design and Construction of a 60a Smart Distribution Board with Real ...

Traditional distribution boards are limited in their capabilities and lack intelligent features, which makes them less efficient, less adaptable to modern energy demands and less safe.

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The installation requirements for the distribution box

Learn how to install a distribution box safely and correctly. Covers wiring, placement, standards, and expert tips for a compliant setup.

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The algorithm based on the priority of regional distribution lines is used to complete the non overlapping cross wiring of the main lines, and finally the electrical wiring diagram of the distribution network

Wire clamping method for intelligent distribution boxes

Allied Moulded Speed KlampsTM provide an innovative solution that allows for quick and easy wire insertion, securing clamping the wire to the box during construction.

How to create an intelligent distribution architecture with

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They can speed up the design of their projects leveraging ABB standardized and flexible intelligent distribution solutions. Thanks to the cooperation with EPLAN,

Distribution Boxes Explained: Types, Functions, and

Learn about distribution boxes, their types, functions, and safety features to ensure efficient and secure electrical power distribution in any building.

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Smart Electrical Distribution Boxes: Ushering in a New Era of ...

Traditional electrical distribution boxes mainly function to distribute electrical energy and protect circuits. Smart electrical distribution boxes, on the other hand, incorporate intelligent

New electronics solutions from Leoni: Intelligent Power Distribution in ...

Meeting these functional safety requirements will require an absolutely reliable power supply and a thoroughly optimized wiring system architecture. Leoni is contributing to this with a new

Analysis and Improvement of Intelligent Low-voltage Integrated Power ...

In view of the problem that the door of the low-voltage power distribution box is opened for no reason under the premise that the intelligent terminal has been installed in Power Internet of Things, an

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The present invention provides an intelligent distribution box and a signal transmission method. The intelligent distribution box comprises multiple electrical devices, the electrical devices at least

Size determination, installation method and wiring mode of distribution ...

The distribution box is the central hub of the home circuit and the general control of our daily power consumption. It is an indispensable electrical equipment. If there are some potential safety hazards,

Pathways for the development of future intelligent distribution grids ...

1. Introduction The next generation of electrical distribution grids will face several challenges on the technical, market, and regulatory level. New competitive services and technologies

Electrical Distribution Boxes for Power Distribution

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Electrical distribution boxes for modular power distribution and installation. Flexible distribution solutions for industrial and building electrical infrastructure.

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

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