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Circuit diagram without relay protection



Overview

SCHEMATIC REPRESENTATION OF POWER SYSTEM Prepared by Working Group I5 Working Group Assignment presentation of protection and control relaying. The report.

Key Takeaways

A circuit without relay protection uses solid-state components like transistors or op-amps to provide short-circuit or overload protection without mechanical relays.Overview

Circuits without relay protection replace electromechanical relays with fully electronic components to detect faults and control outputs. These designs are faster, more compact, and more reliable because they avoid mechanical wear and contact bounce. Common applications include bench power supplies, transformerless power supplies, and low-current electronic devices.

Key Components and Operation
• Transistor-Based Protection
• Two transistors can be connected in an anti-parallel configuration to act as switches.

• Under normal operation, one transistor conducts, allowing the green LED to indicate normal status.

• During a short circuit, the conduction state switches, activating a red LED and buzzer to alert the user ( ).

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• Op-Amp Comparator Circuits
• An operational amplifier (op-amp) like the LM358 can be configured as a comparator.

• A low-value series resistor senses the output current.

• When the voltage drop across the resistor exceeds a threshold, the op-amp output changes state, signaling an overload or short circuit ( ).

• This method allows precise electronic control without mechanical relays.

• Transformerless Power Supplies
• Capacitive reactance is used to drop AC mains voltage without a transformer.

• A high-voltage capacitor limits current, and a zener diode stabilizes the output voltage.

• While this design does not include relay protection, it can be combined with transistor or op-amp circuits for electronic fault detection ( ).

Advantages
• Faster response to faults compared to mechanical relays.

• Compact and lightweight, suitable for small electronic devices.

• No mechanical wear, increasing reliability and lifespan.

• Visual and audible alerts can be integrated easily using LEDs and buzzers.
Example Applications
• Bench power supplies with short-circuit detection.

• Low-power transformerless DC supplies.

• Electronic devices requiring overload or fault indication without bulky relays. By using transistors, op-amps, and resistive sensing, circuits can safely detect and respond to faults without relying on relays, making them ideal for modern compact electronics ( ).

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Article Content

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Schematic diagrams of protection relays are essential tools for power engineers in the power generation,

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Snubber Circuits for Protecting Relay Contacts from Arcing

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When you have an unknown circuit a relay is the best solution because a relay is an electrically-isolated, electrically

Understanding the Differences Between Protection Relays vs Control ...

Understanding the Differences Between Protection Relays vs Control Relays Protection systems are critical in today''s

Protection Basics

Protection System Elements Protective relays Circuit breakers CTs and VTs (instrument transformers)

Electrical Relay Basic: Working Operation, Types and Uses

Relays are devices that bridge the gap between low-power control signals & high-power electrical circuits. This article

Relays vs. Circuit Breakers For Circuit Protection

In high voltage and high current systems, circuit protection is usually provided by relays or circuit breakers.

SCHEMATIC REPRESENTATION OF POWER SYSTEM

1. Scope This paper addresses the schematic representation of the protection and control systems used on power

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doi: 10.1007/978-3-319-20919-7_3

Perform power system simulations of selected faults and observe how a given protection principle (overcurrent, impedance, and

Overvoltage Protection Circuit

Protection circuits, like reverse polarity protection, short-circuit protection, and over/under voltage protection, are used

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In this post I have explained 4 easy to build, compact simple transformerless power supply circuits. All the circuits

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Short Circuit Protection for (almost) Any Power Supply: Hello, everyone! This instructable is about a universal short circuit protection

Protective Relay Basics

Virtually any manufacturer / model relay can be used with any manufacturer / model circuit breaker. It is the responsibility of the

Simple Overload and Short Circuit Protection Circuit Diagram

Basically, we have built this circuit using a Relay with some components. Overload and short circuit protection circuits

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