

Article Overview

RC snubber circuits, diode protection, varistors, and EMC-hardened relays are commonly used to protect relays from interference and contact damage.

RC Snubber Circuits

RC snubber circuits are widely used to protect relay contacts from arcing and voltage spikes, especially when switching inductive loads such as motors or solenoids. The capacitor absorbs the discharge when contacts open, while the resistor limits current when contacts close. For DC circuits, a diode snubber is generally preferred, whereas for AC circuits, an RC network or varistor is more effective. Capacitors should have a dielectric strength of 200-300 V, and AC capacitors must be non-polarized. Proper selection of R and C values depends on load characteristics and can be verified experimentally .

Diode and Varistor Protection

For DC relays, a diode connected in parallel with the inductive load channels the energy from the load safely, preventing contact damage. In AC circuits, varistors can suppress excessive voltage fluctuations, reducing the risk of relay contact adhesion and improving anti-interference performance .

EMC-Hardened Relays

In systems with long signal cables, electromagnetic interference (EMI) can cause nuisance operations or false relay triggering. EMC-hardened auxiliary relays provide galvanic isolation and signal restoration, suppressing conducted and radiated interference while maintaining signal integrity. These relays are designed to meet IEC 60255 and ANSI/IEEE standards for immunity against electrostatic discharge, RF radiation, fast transients, and surge disturbances .

Commercial Modules

RC absorption or snubber modules are available for both AC and DC inductive loads (5-400 V,

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

This paper analyzes the main sources of interference of relay protection equipment in high altitude areas and

This paper divides the interference sources into different categories, lists and analyzes the anti-interference measures of substation

The relay protection devices are a critical element of the power system and is regularly subjected to high temperatures, high

In order to simulate the working status of relay protection devices in substations, this paper constructs an analogue

Learn how protective relays detect faults, trip breakers, coordinate protection zones, and protect feeders,

A fast and selective arc fault mitigation for air-insulated LV & MV switchgear and Relion protection and control relays and sensor

The types of protective relays that exist are overcurrent, electromechanical, directional, distance, pilot, and differential

This chapter first introduces the basic theories of power system relay protection, summarizes the functions and basic requirements of

Protective relays: are intelligent electronic devices (IEDs) which receive measured signals from the secondary side of CTs and VTs

The relay protection device undergoes testing after the construction of the relay protection state algorithm model and

Key learnings: Protective Relay Definition: A protective relay is an automatic device that senses abnormal conditions

Protective Relays A practical guide to how protective relays detect faults, trip circuit breakers, coordinate protection

Relays detect and locate faults by measuring electrical quantities in the power system which are different during normal and

Introduction to Protective Relaying What are Protective Relays, or Protection Relays? Protective relays are used in industrial power

IEEE-SA Standards Board Abstract: Information on the concepts of protection of ac transmission lines is

presented in this guide.

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