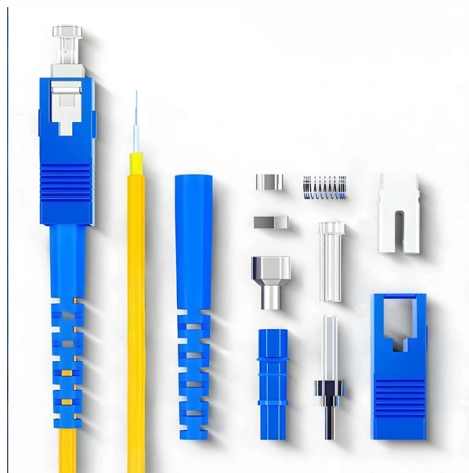


Why do relay protection devices oscillate



Overview

Protective relays and devices have been developed over 100 years ago to provide “last line” of defense for the electrical systems.

Key Takeaways

Relay protection devices can oscillate due to unstable input signals, insufficient smoothing of the supply voltage, or lack of hysteresis in the relay circuit. Causes of Oscillation

1. **Supply Voltage Fluctuations:** Protective relays rely on stable DC or AC inputs from instrument transformers and power supplies. If the supply voltage is noisy or poorly filtered, the relay may repeatedly trigger and reset, causing oscillation . Adding a smoothing capacitor across the DC output of the rectifier can stabilize the voltage and reduce oscillation .
2. **Lack of Hysteresis:** Hysteresis ensures that a relay does not switch on and off for minor deviations around the trip point. Without hysteresis, even small fluctuations or electrical noise near the threshold can cause the relay to oscillate . Implementing hysteresis, such as through a Schmitt trigger or built-in relay design, prevents repeated tripping.
3. **Noise and Signal Disturbances:** Electrical noise from nearby equipment, switching transients, or measurement errors in current and voltage transformers can induce unwanted relay operation. Relays are sensitive to these disturbances, especially when operating close to their setpoints .
4. **Coordination and Timing Issues:** Protective relays are part of a coordinated system with breakers and other relays. If the relay's time delay, pickup settings, or breaker clearing time are not properly coordinated, the relay may oscillate as it repeatedly attempts to trip without successful isolation of the fault .

Mitigation Strategies

- Add Smoothing Capacitors: Stabilizes DC supply to the relay and reduces voltage ripple .
- Introduce Hysteresis: Ensures the relay only trips when the input exceeds a defined margin above the setpoint .
- Check Relay Settings and Coordination: Verify pickup currents, time delays, and breaker operation to ensure proper system coordination .
- Minimize Electrical Noise: Use proper shielding, grounding, and filtering to reduce interference from external sources . By addressing these factors, oscillation in protective relays can be minimized, ensuring reliable operation and preventing unnecessary tripping of circuit breakers.

Article Content

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

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Relay failure to trip occurs when protection remains inactive during real faults, eventually resulting in equipment

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Learn about protective relays, their working principle, types, and applications in power systems. Discover how relays

Relays Part 4: The Protective Relay Basic Theory

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Protective Relays Monitoring Large AC Currents Protective relays can monitor large AC currents by means of current transformers

What causes abnormal sounds when a relay is in use?

Typical causes Countermeasure Replacement may be necessary. Consider a full-wave rectifier circuit by diode and a

oscillator

I have built the above circuit. The relay switches once, but then stops. Why does this not oscillate, as the current is

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A voltage protection relay is an essential device to keep electrical systems running efficiently and safely. These

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For more difficult relaying applications, such as EHV lines using series capacitors in the line, some companies always

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Protection relays can be either electromechanical or electronic/microprocessor-based. Protection relays can be either

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Relays are electrically controlled devices that use one signal to switch, isolate, interlock, or command another circuit.

How do relays work?

Differential protection relays: These trigger when there are current or voltage imbalances in two different parts of a

Protective Relays and Monitoring Relays Selection Guide: Types ...

This protection is required on all equipment transporting people, such as escalators or elevators. Phase-sequence - Phase-sequence

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Protective Relay Basics

Traditionally, protective relays were electromechanical devices that utilized induction disk, coils, contacts, and solenoid elements to

Adaptive Protective Relay Settings – A Vision to the Future

These protective relays must adaptively coordinate for multiple contingencies and configurations of the power system they are

Types and Revolution of Electrical Relays

Types and Revolution of Electrical Relays Introduction: Protective relays work in concert with sensing and control devices to

surge protection

There are 2 devices that can generate spikes. The relay coils. The diodes in anti-parallel will help suppress the spikes when the

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