

Article Overview

Protective relays typically operate on secondary voltages of 110V AC or 120V DC for voltage relays, and 1A or 5A for current relays, depending on the system and CT/VT ratings.

Voltage Relay Considerations

Voltage relays are designed to detect abnormal voltage conditions such as overvoltage, undervoltage, and voltage imbalance. The voltage applied to the relay is usually derived from a voltage transformer (VT), which steps down the high system voltage to a safe, standardized secondary voltage. Common secondary voltages for relays are 110V AC or 120V DC, which are compatible with most protective relay designs and ensure safe operation while maintaining accuracy .

Current Relay Considerations

Current relays receive input from current transformers (CTs), which reduce the line current to a manageable secondary current, typically 5A or 1A. The CT ratio is selected slightly higher than the maximum expected line current to ensure proper relay operation without saturation . The secondary current level must match the relay's rated input to maintain sensitivity and selectivity.

Key Factors Affecting Voltage Selection

- o System Voltage Level: High-voltage systems require VTs to step down to standard relay voltages, while low-voltage systems may connect directly to relays or use smaller VTs .
- o Relay Type: Numerical relays are more tolerant of voltage variations, whereas electromechanical relays may require precise secondary voltages to avoid misoperation .
- o Accuracy and Burden: The relay's burden and the CT/VT class (e.g., C-class for low leakage, T-class for high leakage) determine the maximum voltage that can be applied without affecting performance .
- o Protection Coordination: Voltage levels must ensure that relays operate correctly under all fault conditions, including minimum fault voltage scenarios, to maintain selectivity and prevent nuisance tripping .

Practical Guidelines

- o Use 110V AC or 120V DC for voltage relays in HV/MV substations.
- o Use 5A secondary for current relays in most applications; 1A may be used for compact or low-burden systems.
- o Ensure CT and VT ratings are compatible with relay input and system fault levels.
- o Verify relay operation under minimum and maximum voltage conditions to ensure reliable protection . By following these guidelines, protective relays can reliably detect abnormal conditions and coordinate with other relays to isolate faults efficiently, minimizing system disruption.

Relay protection by voltage level

A protective voltage relay is designed to monitor and control voltage levels within preset

Protect critical components in your power system with a wide range of SEL protective relays covering applications and use cases

Electromechanical protective relays operate by either magnetic attraction, or magnetic induction. : 14 Unlike switching type

Learn what is voltage protection relays, their functions, types, & applications in safeguarding

The SEL-751 Feeder Protection Relay is ideal for directional overcurrent, fault location, arc-flash detection, and high-impedance fault

When the protection is implemented using a voltage relay, the selected setting must be equal to or exceed the calculated stabilizing

Protective relays are set up with preset voltage values of minimum and maximum acceptable voltages, unique to each

Protection engineers calculate the maximum load current, the minimum fault current, and the

Good protection of MV networks This booklet aims at illustrating the basic criteria needed

Transformer Protection Application Guide This guide focuses primarily on application of protective relays for the protection of power

Overview The objective of this presentation is to convey a basic understanding of protective relays to an audience of engineers

Protective relays are arguably the least understood component of medium voltage (MV) circuit protection. In fact, some believe that

Voltage monitoring devices offer comprehensive protection against over-voltage, under-voltage, phase loss, phase sequence errors,

Circuit Breakers (CBs), as well as Voltage and Current Transformers (VTs and CTs), are modeled as ideal elements. Appropriate



Relay protection by voltage level

Introduction Relay protection is essential to ensure the stability, reliability, and safety of electrical power systems. In

Discover protection relays for generators, motors, transformers, feeders and busbars, designed for reliable and efficient power

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