Relay Protection Parameter Setting Standards

Article Overview

Relay protection parameters are set using PSM, TSM, OL, EL, and MF to ensure selective, fast, and reliable operation of protective relays.

Key Relay Protection Parameters

1. Plug Setting Multiplier (PSM) PSM represents how many times the actual current exceeds the relay's pickup current. It is crucial for determining the operating time of inverse definite minimum time (IDMT) relays. The formula is: PSM = Fault Current / Pickup Current, where Pickup Current = Current Setting x CT Secondary Rating. A higher PSM results in faster relay operation, and settings must comply with IEC 60255-151 standards for overcurrent relays . 2. Time Setting Multiplier (TSM) TSM scales the base operating time derived from the relay's characteristic curve. It adjusts the relay's trip time to coordinate with upstream or downstream protection. The actual trip time is: Operating Time = Base Time x TSM. TSM selection follows IEC 60255-3, which defines standard inverse, very inverse, and extremely inverse time-current characteristics . 3. Overload Setting (OL) OL protects equipment from thermal overload. It is set based on the rated current and thermal capacity of the protected device. The relay trips if the current exceeds the OL setting for a specified duration . 4. Earth Leakage / Earth Fault Setting (EL) EL detects ground faults. The pickup value is set as a percentage of the system's rated current, ensuring sensitive detection of earth faults without nuisance tripping . 5. Multiplying Factor (MF) MF, also called the metering or scaling factor, adjusts the relay reading to match the actual system current or voltage. It ensures accurate relay operation when CTs or PTs are used .

Distance Protection and Zone Settings

For transmission lines, distance relays are configured with multiple zones:

o Zone 1: Typically 80-90% of line impedance, instantaneous operation.
o Zone 2: Covers the protected line plus 50% of the adjacent line, with a time delay to coordinate with Zone 1.
o Zone 3: Extends to 100% of the protected line plus 120% of the adjacent longest line, with additional time delay for coordination . Impedance characteristics can be Mho (preferred for EHV systems) or Quadrilateral (for phase-to-ground faults). Zero-sequence compensation factors may be applied to account for line impedance variations .

Practical Considerations

o Coordination: Ensure upstream and downstream relays are coordinated to avoid unnecessary tripping.
o CT and PT Ratios: Correctly account for CT secondary ratings and scaling factors.
o Safety Margins: Include breaker operating times and relay reset times in calculations.

o Commissioning: Settings may be re-evaluated based on measured system parameters during commissioning . By carefully calculating and setting PSM, TSM, OL, EL, MF, and distance protection zones, relays can provide selective, fast, and reliable protection for electrical systems.

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

Relay protection circuitry This handbook covers the code of practice in protection circuitry

In the design of electrical power systems, the ANSI Standard Device Numbers denote what features a protective

Protective Relay Settings - Free download as PDF File (.pdf), Text File (.txt) or read online for free. 1) The document discusses how

Learn about the best methods and tools to choose the right settings for power system protection relays, and improve your network

Abstract. This article deals with the issue of protective relays in terms of protecting high voltage lines. At the beginning of the article it

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

On the other hand, unselective protection operation in the extra high voltage network - i.e. at the national grid level- may endanger

The IEEE standard for protection relays refers to a collection of guidelines developed by the Institute of Electrical and

SUBSTATIONS INTRODUCTION In addition to setting criteria guide lines prepared by Subcommittee on relay/protection under Task

Conclusion Relay coordination and settings lie at the heart of ensuring a stable and reliable electric power generation system. For the

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

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The relay setting parameters are used by the microprocessor protective relay to perform the devices intended application use

Protection relays employ a wide range of configurable parameters to identify defects & trip the breaker in a controlled

IEEE-SA Standards Board Abstract: Information on the concepts of protection of ac transmission lines is presented in this guide.

To avoid relay mal-operation, set Slope 2 as high as possible. Normally, a high Slope 2 setting causes slow tripping for evolving

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