

Article Overview

PSTMS parameters in relay protection define the settings and operational characteristics of protective relays to ensure fast, selective, and coordinated fault isolation in power systems.

Key Parameters in PSTMS for Protective Relays

1. Relay Type and Function

- o Overcurrent Relays (OCR): Protect lines and equipment from excessive current; settings include pickup current and time dial.
- o Distance/Impedance Relays: Protect transmission lines by measuring line impedance; parameters include reach, zone settings, and characteristic type (mho, quadrilateral, or polygonal).
- o Differential Relays: Protect transformers, generators, and busbars; parameters include restraint settings, bias, and operating current thresholds.
- o Directional Relays: Used for directional overcurrent or power flow protection; parameters include polarizing voltage/current and directional sensitivity.

2. Pickup and Threshold Settings

- o Current or Voltage Pickup: Defines the minimum fault current or voltage that will trigger the relay.
- o Time Delay Settings: Includes instantaneous, short-time, and long-time delays to coordinate with upstream and downstream relays.

3. Time-Current Characteristics

- o Defines how the relay responds to varying fault currents.
- o Includes inverse, very inverse, extremely inverse, or definite time characteristics to ensure proper coordination with other relays in the system.

4. Zone and Reach Settings

- o For distance relays, zone 1, zone 2, and zone 3 settings determine the portion of the line or adjacent lines the relay protects.
- o Reach settings are critical for multi-terminal lines and series-compensated lines to avoid overreach or underreach.

5. Communication and Coordination Parameters

- o Pilot Protection Settings: For line-to-line or multi-terminal protection, relays may communicate via fiber optics or power line carrier.
- o Trip Logic and Blocking: Defines how relays interact with other relays to prevent unnecessary tripping.

6. Instrument Transformer Ratios

- o CT and VT Ratios: Ensure accurate measurement of current and voltage for relay operation.
- o Saturation and Burden Considerations: Affect relay accuracy and response time.

7. Testing and Simulation Parameters

- o Relays are tested using secondary injection or digital simulation to verify settings.
- o PSTMS often includes simulation of faults to validate relay coordination and backup protection.

Practical Considerations

Relay protection PSTMS parameters

- o Coordination: Ensure primary and backup relays operate in sequence to isolate faults without affecting the entire system.
- o Security vs. Dependability: Settings must balance fast fault clearance with avoiding false trips.
- o Adaptive Settings: Modern numerical relays allow multiple setting groups for different system conditions, such as maintenance or load variations.

References

- o IEEE Guide for Protective Relay Applications to Transmission Lines ()
- o Power System Protective Relays: Principles & Practices ()
- o Protective relay theory and numerical relay applications () These parameters collectively define the PSTMS configuration for protective relays, ensuring reliable, secure, and fast fault detection and isolation in transmission systems.

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

Overcurrent Relay Setting Calculator based on IEC 60255 and IEEE C37.112 standards. Calculate pickup current, time

This chapter focuses on the basics of power system relaying with special attention paid to the overcurrent, impedance, and

Protective relay functions and data This technical article will cover the gathering of information needed to calculate

Power System Protection Setting Calculations The electrical grid is a vast and intricate system designed to ensure the

This technical report refers to the electrical protection of all 132kV switchgear. These settings may be re-evaluated during the

Abstract: Protective relays and devices have been developed over 100 years ago to provide "last line" of defense for the electrical

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A comprehensive testing program should simulate fault and normal operating conditions of the relay. Acceptance testing,

Relay protection PSTMS parameters

The teaching text describes complex procedures for parameterization of overcurrent, differential, and distance protection relays from

? Video Walkthrough -- How to Use This Calculator Protection Relay Setting Interactive Calculator Visualize how pickup

Relay Settings in Real Power System: Requirements And Consideration This blog consists of a discussion on the

This comparison summarize characteristics of all protection relay types described in previously published technical

The document also discusses calculating relay pickup current and provides examples of setting calculations for distance protection

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

Introduction This technical report refers to the electrical protections of all 132kV switchgear. All calculations are based on the

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