Parameter settings for relay protection devices



Overview

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

Key Takeaways

Relay protection devices are configured by calculating and setting key parameters such as current pickup, time delays, and coordination factors to ensure selective and reliable operation.

Key Parameters in Relay Protection

Plug Setting Multiplier (PSM): Defines how many times the actual current exceeds the relay's pickup current. It is essential for inverse definite minimum time (IDMT) relays to determine operating time and must comply with IEC 60255-151 standards for overcurrent relays. Time Setting Multiplier (TSM): Adjusts the relay operating time according to the system's coordination requirements.

It ensures that relays operate in the correct sequence to isolate faults without affecting healthy sections. Overload Setting (OL): Protects equipment from thermal overload by setting the maximum permissible current over a defined period. Earth Leakage / Earth Fault Setting (EL): Determines the current threshold for detecting ground faults, ensuring sensitive and selective operation for earth fault conditions.

Multiplying Factor (MF): Used for scaling or metering purposes, particularly when instrument transformers are involved, to ensure accurate relay response.

© 2026 FD SOLUCIONES OPTICAL SYSTEMS - All rights reserved

Steps to Provide Parameters

System Analysis: Calculate maximum load currents, minimum fault currents, and expected voltage levels. Perform fault level calculations for different fault types (single line-to-ground, line-to-line, three-phase) to determine relay sensitivity. Select Relay Type: Choose the appropriate relay (overcurrent, differential, distance, directional, or special protection) based on the equipment and protection scheme.

Determine Settings: Using the calculated currents and fault levels, set PSM, TSM, EL, OL, and MF values. For distance or differential relays, calculate impedance or differential current settings to define zone reach and sensitivity. Coordination: Ensure proper coordination with upstream and downstream relays to avoid unnecessary tripping.

Adjust time-dial settings and plug multipliers to maintain selectivity. Parameter Input: Enter the calculated values into the relay using the device interface, which may be digital (via HMI or software) or analog (via dials and switches). Modern digital relays often allow parameterization through software tools provided by the manufacturer.

Testing and Validation: Verify relay operation using secondary injection tests or simulation tools (e.g., Omicron testing) to ensure correct tripping under fault conditions and proper coordination with other relays.

Best Practices

Follow manufacturer manuals and IEC standards for relay settings. Document all parameter values and coordination studies. Periodically review and update settings to account for system changes or expansions.

Use simulation and testing to validate relay performance before commissioning. By carefully calculating, setting, and validating these parameters, relay protection devices can reliably isolate faults, protect equipment, and maintain system stability.

Article Content

Relay Protection Settings (PSM, TSM, EL, OL, MF)

Protection relays employ a wide range of configurable parameters to identify defects & trip the breaker in a controlled & selected manner. Understanding each setting facilitates proper relay

Relay Settings Calculations

During external faults, the relay changes to high-security mode and switches from Slope 1 to Slope 2 to avoid relay mal-operation resulting from CT saturation. In contrast to small CT errors for load current,

Relay Protection in HV/MV Substations: Calculations, Settings ...

© 2026 FD SOLUCIONES OPTICAL SYSTEMS - All rights reserved

Relay protection calculations determine the threshold values and parameters for the protective relays based on the substation''s operational and design requirements.

Practical handbook for relay protection engineers | EEP

This handbook covers the code of practice in protection circuitry including standard lead and device numbers, mode of connections at terminal strips, colour codes in multicore cables, dos

PARAMETERIZATION OF PROTECTION RELAYS IN POWER

The teaching text describes complex procedures for parameterization of overcurrent, differential, and distance protection relays from the company SEL, a theoretical basis for protection relays,

Protection Relay Setting Interactive Calculator | FIRGELLI

Use this Protection Relay Setting Calculator to calculate pickup current, time multiplier settings (TMS), operating time, coordination time interval (CTI), and plug setting multiplier (PSM)

CALCULATION AND SETTING OF RELAYS IN TRANSMISSION

The proposal itself and define the different protection zones should be based on impedance lines to be determined by the calculation referred to in the previous section of this article.

Distance Protection Relay Settings Guide

Describe the calculation process for resistive reach settings in distance protection relays for different types of faults. In distance protection, resistive reach settings vary for Phase-Phase and Phase-Earth

Line protection calculations and setting guidelines for relays ...

Protection Settings The documents presented should serve as a model to various utilities in preparing similar documents for setting protection relays installed installed at 220kV, 400kV and

Setting Relay Parameters

Set the COM port connected to Relay protection device based on the actual cable connections. Set the baud rate, parity, stop bit, and address of Relay protection device to be consistent with the

Relay Settings Calculations – Electrical Engineering

This technical report refers to the electrical protection of all 132kV switchgear. These settings may be re-evaluated during the commissioning, according to actual and measured values. Protection selectivity

© 2026 FD SOLUCIONES OPTICAL SYSTEMS - All rights reserved

Basics of Protective Relaying and Design Principles

Rules for protecting a network using overcurrent relays. Requirements for instrumentation (number and locations of instrument transformers) and switching apparatus (number and locations of circuit

A Guide for Calculating Step Distance Relay Settings

The relay setting development process should include a series of steps that guides the settings engineer to achieve reliable and properly coordinated relay settings. First, each utility must develop a solid

Five Steps to Set Up Protective Relays for Power Systems

Learn how to ensure proper set-up of protective relays for power systems by following these steps: identify the protection scheme, select the appropriate relays, configure the relay settings, test ...

Optimization of Multi level Relay Protection Adaptive Setting Strategy ...

To improve the reliability and sensitivity of multi-level relay protection in distribution networks with distributed power sources, this study designs an adaptive setting strategy optimization

Protection Basics

Protection System Elements Protective relays Circuit breakers CTs and VTs (instrument transformers) Communications channels

Overcurrent Protection Fundamentals R

On the contrary, overcurrent relay protection is completely directed to the clearance of short circuits, even though with the settings typically assumed some measure of overload relay protection may be

Protection Relay Settings Calculations Made Easy

Power System Protection Setting Calculations The electrical grid is a vast and intricate system designed to ensure the seamless flow of electricity from power generation facilities to end

Related Video Reference

This video was associated with the source search result. Verify technical details against current product documentation and project requirements.

© 2026 FD SOLUCIONES OPTICAL SYSTEMS - All rights reserved

Contact Us

Continue your research online:

Website: https://fdsoluciones.es
Technical inquiry: https://fdsoluciones.es/project-enquiry.html

This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

© 2026 FD SOLUCIONES OPTICAL SYSTEMS - All rights reserved