Standard values â€‹â€‹for relay protection

Article Overview

Relay protection settings are typically defined using parameters such as Plug Setting Multiplier (PSM), Time Setting Multiplier (TSM), overload (OL), earth leakage (EL), and coordination with system fault currents.

Key Relay Settings

1. Plug Setting Multiplier (PSM) PSM determines how many times the actual current exceeds the relay's pickup current. It is crucial for inverse definite minimum time (IDMT) relays, affecting the operating speed: higher PSM values result in faster tripping. Typical PSM values are set based on the maximum load current and expected fault currents, often ranging from 1.0 to 2.0 times the rated current for overcurrent relays, depending on system coordination requirements and IEC 60255-151 standards . 2. Time Setting Multiplier (TSM) TSM scales the relay's base operating time. It is used to achieve proper coordination between upstream and downstream relays. Lower TSM values result in faster tripping. In practice, TSM is selected to provide adequate grading time, often 0.5 to 1.5 seconds for definite time relays or adjusted according to the inverse time curve for IDMT relays . 3. Overload Setting (OL) Overload protection is typically set slightly above the maximum continuous load current to prevent nuisance tripping. Commonly, OL settings are 110-125% of the rated load current, depending on the thermal capacity of the protected equipment . 4. Earth Leakage / Earth Fault Setting (EL) Earth fault relays are set to detect ground faults while avoiding false trips from normal leakage currents. Typical EL settings are 10-30% of the phase current, depending on system grounding and sensitivity requirements . 5. Multiplying Factor (MF) MF or metering factor adjusts the relay input to account for current transformer ratios. It ensures that relay pickup corresponds to actual primary currents. MF is calculated based on CT ratios and is usually 1.0 for direct secondary connections or adjusted proportionally for scaled measurements .

Coordination and Time Grading

o Time-graded protection ensures the relay closest to the fault operates first. In radial networks, inverse time relays are preferred, with operating times decreasing as fault current increases .
o Definite time relays operate at a fixed delay, typically 0.8-1.0 seconds for backup overcurrent protection .
o Distance relays for transmission lines often set Zone 1 reach to 80-90% of line impedance, with Zone 2 and 3 providing backup coverage .

Practical Considerations

o Relay settings must consider maximum load current, minimum fault current, and system voltage levels to ensure sensitivity and selectivity .
o Coordination with downstream relays prevents unnecessary tripping and ensures reliable backup protection.

o Settings are validated during commissioning and may be adjusted based on measured system parameters . In summary, typical relay protection values are carefully calculated to balance speed, selectivity, and reliability, using PSM, TSM, OL, EL, and MF, along with proper time grading and coordination across the network .

Understand Relay Specifications to Get the Most Out of Your Switching System Relay specifications aren"t simply numbers on a data

Relay setting plays an important role in maintaining the reliability of a Power System. Read this blog to find out more

Information on the concepts of protection of ac transmission lines is presented in this guide. Applications of the

Abstract: Service conditions, electrical ratings, thermal ratings, and testing requirements are defined for relays and relay systems

The impact of different electrical parameters and system performance considerations on the selection of relays and protection

Introduction to Protective Relaying What are Protective Relays, or Protection Relays? Protective relays are used in industrial power

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

The widely used United Sates standard ANSI/IEEE C37.2 "Electrical Power System Device Function Numbers,

To meet this need, the IEC is currently working on the IEC 60255-1xx series of functional standards dedicated to

? Key learnings: Protective Relay Definition: A protective relay is an automatic device that senses abnormal conditions

The relay setting development process should include a series of steps that guides the settings engineer to achieve reliable and

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

controlled

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

The handbook for protection engineers includes guidelines on protective circuitry, protective relay principles, and testing procedures

This standard specifies standard service conditions, standard ratings, performance requirements, and testing requirements for relays

The protection and control devices in electrical equipment can be referred to by numbers, with appropriate suffix letters when

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