

Relay protection low voltage protection value setting

Article Overview

Low voltage relay protection settings are typically defined using voltage thresholds, plug setting multipliers (PSM), and time setting multipliers (TSM) to ensure selective and reliable tripping.

Key Parameters for Low Voltage Relays

1. Undervoltage (UV) Relays

- o Voltage Setting (V_{set}): Usually set around 0.8 to 0.9 of nominal voltage (V_n) for motor protection, depending on the sensitivity required and the type of load .
- o Time Delay: Short delays (e.g., 100-500 ms) are used to avoid nuisance tripping during transient dips. For loss-of-phase protection, faster and lower settings are recommended.
- o Application Considerations: UV relays at incomer levels (e.g., 400V or 6.6kV) may coordinate with generator backup or grid supply changeover .
- 2. Overcurrent Relays (IDMT Relays)
 - o Plug Setting Multiplier (PSM): Indicates how many times the relay secondary current exceeds the relay pickup current. Higher PSM results in faster tripping .
 - o Time Setting Multiplier (TSM): Scales the base operating time from the relay's characteristic curve. Lower TSM = faster trip; higher TSM = slower trip for upstream relays to provide backup .
 - o Coordination: Downstream relays are set with lower TSM for faster operation, while upstream relays have higher TSM to maintain selectivity .
- 3. Grading and Coordination
 - o Time Grading: The difference in operating times between consecutive relays ensures selective tripping. Inverse time relays require longer grading times due to measurement inaccuracies .
 - o Backup Protection: If a downstream relay or breaker fails, the upstream relay operates after the grading time to clear the fault .
- 4. Current Transformer (CT) Considerations
 - o CT ratios are selected to match the relay input, typically 5A secondary, e.g., 600:5, ensuring the relay receives the correct signal for accurate operation .
 - o Multiple relays can share the same CT, but the total burden must not exceed the CT rating .

Practical Example of Settings

- o Motor feeder UV relay: $V_{set} = 0.85 V_n$, Time delay = 200 ms
- o Downstream overcurrent relay: PSM = 1.2-1.5, TSM = 0.8
- o Upstream overcurrent relay: PSM = 1.2-1.5, TSM = 1.2-1.5
- o Grading time between relays: 0.3-0.5 s for low voltage feeders

Summary

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Low voltage relay protection settings are a balance between sensitivity, selectivity, and coordination. Undervoltage relays protect motors and busbars from voltage dips, while overcurrent relays with PSM and TSM ensure selective tripping. Proper grading times and CT selection are essential to avoid nuisance trips and provide reliable backup protection. These settings should always be verified against the network configuration, load characteristics, and applicable standards (IEC 60255 series).

The protection relay must remain stable under maximum through fault conditions, when a voltage is developed across the protection

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

Explore the voltage protection relay: Its working principle, functions, and how this vital component safeguards your

This guidance document provides examples of how NERC Registered Entities can project their generator voltage

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

Learn about Undervoltage Protection (ANSI Device 27), its Working Principle, Types, Relay Settings, & applications in

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

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

Perform power system simulations of selected faults and observe how a given protection principle (overcurrent, impedance, and

In this article, we will discuss the working principle and configuration of under voltage (ANSI 27) protection relay.

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

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With this Protection Relay Setting Calculator, you'll be able to work out pickup current, time multiplier settings (TMS),

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

Instrument Transformers o Supply accurately scaled current and voltage quantities for measurement while insulating the relay from

The pickup point is the current or voltage at which the plunger or armature begins to move and, in a switchgear relay, the pickup

To determine stability voltage for through fault V_s " Voltage across the relay at IFS (VS) CT Resistance (RCT)

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