Relay protection start value

Article Overview

Relay protection start values are defined by the pickup current, which is the minimum current at which the relay begins to operate, and are adjusted using plug setting multiplier (PSM) and time multiplier settings (TMS).

Pickup Current (Ipickup)

The pickup current is the minimum current required to overcome the relay's controlling force and initiate operation. It is determined by the relay coil and can be adjusted by changing the number of active turns in the coil. For example, if a CT has a ratio of 200/1 A and the relay current setting is 150%, the relay will start operating when the secondary current reaches 1.5 x 1 A = 1.5 A, corresponding to a primary fault current of 300 A .

Plug Setting Multiplier (PSM)

The Plug Setting Multiplier (PSM) is the ratio of the fault current to the relay's pickup current. It indicates how many times the relay's pickup current the fault current is. The PSM is critical for determining the relay's operating time because higher fault currents cause faster relay operation. It is calculated as:

PSM = Fault Current / Pickup Current

For instance, if the relay pickup current is 5 A and the fault current in the CT secondary is 10 A, the PSM = 10 / 5 = 2.0 .

Time Multiplier Setting (TMS)

The Time Multiplier Setting (TMS) adjusts the relay's operating time. It scales the time obtained from the relay's time-current characteristic curve. The actual operating time of the relay is calculated as:

Operating Time = Time from PSM Curve x TMS

Increasing the TMS increases the relay operating time, while decreasing it makes the relay faster. This allows coordination with upstream or downstream relays to ensure selectivity .

Example Calculation

Suppose a relay has a rated CT secondary current of 5 A, a pickup current set at 150% (7.5 A), and a fault current of 15 A in the CT secondary:

o PSM = 15 / 7.5 = 2
o If the time from the PSM curve at PSM = 2 is 0.5 seconds and TMS = 0.8, then Operating Time = 0.5 x 0.8 = 0.4 seconds .

Summary

o Pickup current sets the minimum current for relay operation.
o PSM determines how the relay responds to fault current magnitude.
o TMS adjusts the relay operating time for coordination.
o Proper selection of these values ensures selective, fast, and reliable protection of electrical networks, minimizing unnecessary outages while isolating faults effectively .

DIAL: o Defines the time curve at which the relay operates for any TAP value. Higher DIAL values represent higher operating times.

Relay protection calculations determine the threshold values and parameters for the protective relays based on the

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

When the protection is implemented using a current relay, the current value at which the relay should operate must be determined

Applying Motor Data to Setup Motor Protective Relay Craig Wester GE Multilin Craig.Wester@GE.com Setting of the motor

Among the various possible methods used to achieve correct relay co-ordination are those using either time or

The report contains the most important motor protection data, including motor data, relay switch positions, trip curves, thermal

2.2 115/13.8KV Transformer LV Restircted Earth Fault Protection Relay Setting Circuit Ref : Aux.

Name two protective devices For what purpose is IEEE device 52 is used? Why are seal-in and 52a contacts used in

Startup and control The relay shall include motor start-up supervision. The function shall offer protection in

case of an excessive start

Traditionally, protective relays were electromechanical devices utilizing induction disk, coils, contacts, and solenoid elements to

Relay protection circuitry This handbook covers the code of practice in protection circuitry including standard lead and

This document contains settings parameters for three-phase non-directional overcurrent protection functions for low and high

Maximum value on secondary is 15250 /250 = 61 Earth fault relay for the Transformer Neutral CT Ratio 250 / IA 100 to 2000ms Set

OVERCURRENT PROTECTION FUNDAMENTALS Relay protection against high current was the earliest relay protection

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

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