What is In current in relay protection

Overview

Protective relays are used in industrial power generation and supply systems to open and isolate branch circuits in the case of excessive current.

Key Takeaways

The current used for relay protection is primarily defined by the relay's pickup current, which is the minimum current at which the relay begins to operate, typically set as a percentage of the current transformer's rated secondary current.

Pickup Current and Current Setting

The pickup current is the threshold at which a protective relay starts to operate, overcoming the controlling force that holds its contacts in the normal position. In normal conditions, the deflecting force generated by the relay coil is weaker than the controlling force, so the relay does not operate. When the current through the relay coil exceeds the pickup current, the deflecting force surpasses the controlling force, causing the relay to actuate and send a trip signal to the circuit breaker ( ).

The current setting of a relay allows adjustment of the pickup current to match system requirements. This is done by changing the number of active turns in the relay coil using a plug bridge, effectively modifying the current required to actuate the relay. For example, an overcurrent relay may be set to operate at 125% of the rated current of the system.

© 2026 ROGER FIBRE ATELIER - All rights reserved

Current settings are typically expressed as a percentage of the current transformer's secondary rated current, ranging from 50% to 200% for overcurrent relays and 10% to 70% for earth fault relays ( ). Plug Setting Multiplier (PSM) and Time SettingThe Plug Setting Multiplier (PSM) is the ratio of the fault current to the relay's pickup current. It determines how quickly the relay will operate under fault conditions.

The Time Setting Multiplier (TSM) adjusts the relay's operating time, allowing coordination with other protective devices to ensure selective tripping ( ).

Types of Relays and Current Application

Common overcurrent relays include: 50 (Instantaneous Overcurrent Relay): Trips immediately when the current exceeds the pickup value, typically used for short-circuit protection ( ). 51 (Inverse Time Overcurrent Relay): Operates with a time delay inversely proportional to the magnitude of the overcurrent, providing coordination with downstream devices ( ). 50N/51N (Earth Fault Relays): Detect ground faults using residual or zero-sequence currents ( ).

Relays are powered by the secondary current of current transformers (CTs), which step down high primary currents to safe levels for relay operation. Direct connection to high primary currents is not feasible due to the large magnitude of the current ( ).

Practical Considerations

The pickup current must be carefully set to avoid nuisance tripping during normal load conditions while ensuring rapid response to faults. Coordination with other relays and breakers is essential to maintain system reliability and selectivity. Modern microprocessor-based relays allow precise digital settings for pickup current, time delays, and multiple protection functions in a single device ( ).

In summary, the current used for relay protection is defined by the relay's pickup current, adjusted through current settings and plug settings, and coordinated with system CTs and other protective devices to ensure safe and selective operation of the electrical system.

Article Content

Protective Relays: Types, Working Principle & Uses

Protective relays do not normally interrupt current directly. They receive measurements from instrument transformers, decide whether a fault condition exists, and send a trip signal to a

Pick Up Current | Current Setting | Plug Setting ...

© 2026 ROGER FIBRE ATELIER - All rights reserved

Pick Up Current of RelayCurrent Setting of RelayPlug Setting Multiplier of RelayTime Setting Multiplier of RelayTime vs. PSM Curve of RelayCalculation of Relay Operation TimeThe minimum pick up the value of the deflecting force of an electrical relay is constant. Again the deflecting force of the coil is proportional to its number of turns and the current flowing through the coil. Now, if we can change the number of active turns of any coil, the required current to reach at minimum pick value of the deflecting force, i...See more on electrical4u Control

Introduction to Protective Relaying | Electric Power

Protective relays are used in industrial power generation and supply systems to open and isolate branch circuits in the case of excessive current. They are

Protective Relay: Working, Types, and Applications

The working of a protective relay is based on continuous monitoring of electrical quantities such as current, voltage, frequency, and power. A typical protective relay circuit is shown

Understanding Protection Relays

In overcurrent, the four most used common types of protection relays are 50, 50N, 51, and 51N. In this post, we will understand these types of protection relays.

Protective relay

An overcurrent relay is a type of protective relay which operates when the load current exceeds a pickup value. It is of two types: instantaneous over current (IOC) relay and definite time overcurrent (DTOC)

What is a Relay? Working Principle, Types, and Applications

Understand what a relay is, how it works, and its various types such as electromagnetic, solid-state, thermal, and more. Learn relay applications in automation, electrical protection, and

Over Current Relay Working Principle Types

Working Principle: When the current in an overcurrent relay exceeds a critical level, the magnetic effect of the coil activates the moving element, altering the relay''s contact position.

What Is Current Relay? | Function of Current Relays

A current relay is a protective device used to monitor the current flow in electrical systems, like transformers and motors. It serves to guard against issues such as voltage drops, short circuits, and

Protective Relay Basics

© 2026 ROGER FIBRE ATELIER - All rights reserved

The objective of this presentation is to convey a basic understanding of protective relays to an audience of engineers already familiar with low voltage protective device coordination.

Protection relay testing and diagnostic solutions

Verify protection schemes during commissioning and maintenance to ensure reliable system operation. Megger''s relay testing solutions help prevent

Protection Relays | Medium & high voltage power system protection

Discover protection relays for generators, motors, transformers, feeders and busbars, designed for reliable and efficient power system protection.

Types of Protective Relays

This article covers various types of protective relays, such as overcurrent, directional, and differential relays, highlighting their operating characteristics and applications in electrical systems.

Principles and schemes of busbar and breaker protection in MV/HV

Switching in current circuits Protection of MV busbars in distribution networks Application of busbar protection Breaker failure relays Pole discordance (discrepancy) relays 1. Busbar

Inverse Time Over Current (TOC/IDMT) relay trip time calculator.

The Inverse Time Over Current (TOC/IDMT) relay trip time calculator calculates the protection trip time according to IEC 60255 and IEEE C37.112-1996 protection curves.

The fundamentals of protection relay co-ordination and time/current ...

Among the various possible methods used to achieve correct relay co-ordination are those using either time or overcurrent, or a combination of both.

Electrical Substation Design Course from Basic to Advanced

What you''ll learn Introduction to Substations: Components, applications, Installations, Design basis, SLD, symbols, Review Major equipment & ancillaries: Power transformers, Circuit breaker, Voltage

Industrial Control Wiring, AC Drives, and 3 Phase Motors — TW

Power Up Your Career: Essential Industrial Wiring & Motor Control Expertise! Ready to command the electrical heart of industrial systems? Dive into the vital world of industrial control wiring, AC drives,

6 Types of Over Current Relay Used in Power System Protection

© 2026 ROGER FIBRE ATELIER - All rights reserved

The relay trips the associated circuit breaker. Overcurrent relay protection protects the power systems and its equipments such as transmission lines, transformers, generators, or motors against short

Contact Us

Continue your research online:

Website: https://artduferoger.fr
Technical inquiry: https://artduferoger.fr/contact.html

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

© 2026 ROGER FIBRE ATELIER - All rights reserved