

How to determine the rated current of relay protection

Article Overview

The rated current of a protective relay is calculated by multiplying the relay's rated current by the plug setting multiplier (PSM) and adjusting for time dial settings (TDS) and system conditions.

Key Concepts

Rated Current (I_{rated}): The nominal current of the equipment or circuit being protected, often based on the motor or line full-load current. **Pickup Current:** The current at which the relay begins to operate. It is typically expressed as a percentage of the relay's rated current and is adjusted using the Plug Setting Multiplier (PSM). **Plug Setting Multiplier (PSM):** Ratio of actual fault current in the relay coil to the relay's pickup current. Common values range from 50% to 200% depending on the relay type and protection requirements. **Time Dial Setting (TDS) or Time Multiplier Setting (TMS):** Adjusts the relay operating time to coordinate with upstream and downstream protection devices.

Calculation Formula

For an overcurrent or overload relay, the relay setting can be calculated using: $\text{Relay Setting (A)} = (\text{PSM} \times \text{Rated Current}) / \text{TDS}$ Where:

- o PSM = Plug Setting Multiplier
- o Rated Current = Full-load current of the protected device
- o TDS = Time Dial Setting, which adjusts the relay's operating time

Example

Suppose a motor has a rated current of 1250 A, the relay PSM is 150%, and TDS is 0.25: $\text{Relay Setting} = (1.5 \times 1250) / 0.25 = 7500 \text{ A}$ This ensures the relay trips appropriately during overcurrent conditions without unnecessary tripping during normal operation.

Additional Considerations

- o **Motor Characteristics:** Include service factor, starting current, and ambient temperature when setting overload relays to prevent nuisance tripping.
- o **Relay Curve Selection:** Choose the appropriate inverse-time characteristic (Standard Inverse, Very Inverse, Extremely Inverse, or Long Time Inverse) according to IEC 60255 standards to coordinate with other relays.
- o **Coordination:** Ensure downstream relays operate first for faults in their zone, while upstream relays provide backup protection.
- o **Ambient Temperature Compensation:** Adjust settings for high ambient temperatures to account for reduced

How to determine the rated current of relay protection

cooling of motors .

o Relay Type: Thermal, electronic, or electromagnetic relays have different response characteristics; settings must match the relay type and application . By following these steps and using the formula above, engineers can accurately calculate the rated current and settings for relay protection, ensuring reliable operation and equipment safety.

The document discusses overcurrent protection calculations and settings for a power system network. It provides a single line

It is important to understand that a relay's current rating depends on the switching voltage and the type of load. For example, a relay

Transformer Protection Application Guide This guide focuses primarily on application of protective relays for the protection of power

This document provides guidelines for performing fault current calculations and relay coordination studies. It begins with an

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

This online calculator tool allows you to quickly and accurately identify overload protection devices based on the full

If the relay is rated with 1 A, the normal pick up current of the relay is 1 A and it should be equal to secondary rated

Enter rated current, Plug Setting Multiplier (PSM), and Time Dial Setting (TDS) to calculate relay pickup current and

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

It helps determine proper relay operation for overcurrent (50/51), differential (87), distance (21), and directional (67)

Motor Protection Refer to NEC Article 430.52, "Rating or Setting for Individual Motor Circuit" and manufacturer recommendations for

How to determine the rated current of relay protection

Calculate IEC-compliant overload relay settings quickly and accurately with our easy-to-use Overload Relay Calculator. Ensure

The operating time of definite time relays does not depend on the magnitude of the fault current, while the operating time of inverse

This secondary current is then utilized for measurements by protective relays, meters, and

The relay calculator determines the correct coil current, and protective components needed for a relay in a circuit.

General Applications of Electrical Relays Basics Technology Applications Standards Glossary Relay Glossary Search by alphabetical

Web: <https://www.in-au.co.za>

