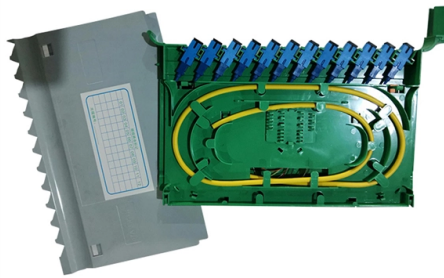


Calculation formula for relay protection



Article Overview

Relay protection calculations involve determining pickup current, plug setting multiplier (PSM), time multiplier setting (TMS), and operating time to ensure selective and reliable fault isolation.

Key Parameters and Formulas

1. Pickup Current (I_p): The pickup current is the minimum current at which the relay begins to operate. It is usually set as a percentage of the CT secondary rated current:
 $I_p = \text{Current Setting} \times \text{CT Secondary Rating}$ For example, if the CT secondary rating is 1 A and the relay is set to operate at 125% of rated current, then $I_p = 1 \times 1.25 = 1.25 \text{ A}$. 2. Plug Setting Multiplier (PSM): PSM represents how many times the actual fault current exceeds the relay pickup current: $\text{PSM} = \text{Fault Current} / \text{Pickup Current}$ This is critical for inverse time relays, as it determines the operating time from the relay's characteristic curve. 3. Time Multiplier Setting (TMS): TMS scales the base operating time obtained from the relay's inverse time-current characteristic:
 $\text{Operating Time (t)} = \text{TMS} \times \text{Base Time from IDMT Curve}$ The TMS allows coordination between upstream and downstream relays, ensuring selectivity. 4. Operating Time (t): For an inverse definite minimum time (IDMT) relay, the operating time can be calculated using standard IEC 60255 formulas:

- Standard Inverse: $t = \text{TMS} \times 0.14 / (\text{PSM}^{0.02} - 1)$
 - Very Inverse: $t = \text{TMS} \times 13.5 / (\text{PSM} - 1)$
 - Extremely Inverse: $t = \text{TMS} \times 80 / (\text{PSM}^2 - 1)$ These formulas vary depending on the relay type and curve selected.
5. Coordination Time Interval (CTI): CTI is the intentional time difference between the operation of downstream and upstream relays.

Article Content

Aug 10, 2025

1. Distance Protection

1. Distance Protection 1.1 Procedure for Relay setting Calculation for MiCOM P442
Distance Relay Data required

Jun 29, 2026

Relay Settings Calculations

Introduction This technical report refers to the electrical protections of all 132kV switchgear. All calculations are based on the

Jul 05, 2026

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

Sep 05, 2025

All about Electrical Engineering: Calculation of relay settings for ...

Calculation of relay settings for transmission lines - Distance protection Introduction: Electricity is transferred on higher

Sep 17, 2025

Protective Relay Basics

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

Sep 21, 2025

Relay Settings Calculations

Protection selectivity is partly considered in this report, and could be also reevaluated. Names of parameters in this calculation may

May 29, 2026

Basics of Protective Relaying and Design Principles

Particularly, the following issues are re-enforced: load flow and short-circuit calculations, selecting the protective equipment, setting

Dec 18, 2025

Welcome to Eastern Regional Power Committee ::

Hier sollte eine Beschreibung angezeigt werden, diese Seite lässt dies jedoch nicht zu.

Feb 17, 2026

Setting Calculation Method and Protection Coordination for Relay ...

In this paper, a relay protection method considering the influence of arc fault is proposed. Then, the electrical engineering software is

Nov 22, 2025

Time Overcurrent Relay Calculator

The Time Overcurrent Relay Calculator automates complex logarithmic formulas and reduces human error. To

Dec 07, 2025

Setting the generator protective relay functions

Protective relay functions and data This technical article will cover the gathering of information needed to calculate

Nov 22, 2025

Overload Relay Calculator – IEC: Accurate Motor Protection

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

Apr 23, 2026

Over Current Relay Setting Calculator

Our Overcurrent Relay Setting Calculator will accurately calculate your overcurrent relay settings. Enter rated current,

Jun 13, 2026

Distance Protection Relay Settings Guide

Distance Protection setting calculation.pdf - Free download as PDF File (.pdf), Text File (.txt) or view presentation slides online. This

Mar 04, 2026

Protection Relay Setting Interactive Calculator | FIRGELLI

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

Feb 16, 2026

Pick Up Current | Current Setting | Plug Setting Multiplier and Time ...

Plug setting multiplier of relay is referred as ratio of fault current in the relay to its pick up current. Suppose we have

Nov 24, 2025

Fundamentals of Modern Protective Relaying

A primary motor protective element of the motor protection relay is the thermal overload element and this is accomplished through

Dec 28, 2025

Distribution Automation Handbook

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

Jan 19, 2026

Relay Setting Calculation Overview | PDF | Volt | Relay

The calculations are performed to determine appropriate relay settings that ensure protection and coordination within the power

Sep 20, 2025

Distribution Automation Handbook

Time-graded protection is implemented using overcurrent relays with either definite time characteristic or inverse time characteristic.

Oct 10, 2025

Protection Relay Settings Calculations Made Easy

Power System Protection Setting Calculations The electrical grid is a vast and intricate system designed to ensure the

Jul 03, 2026

MODEL SETTING CALCULATIONS FOR TYPICAL IEDs LINE PROTECTION

SUBSTATIONS INTRODUCTION In addition to setting criteria guide lines prepared by Subcommittee on relay/protection under Task

Jul 28, 2025

PSM and TMS Settings Calculation of a Relay: Protection

PSM and TMS Settings are used to specify the tripping limits of a relay when a fault occurs. How to calculate the

May 23, 2026

CALCULATION AND SETTING OF RELAYS IN TRANSMISSION

Abstract. This article deals with the issue of protective relays in terms of protecting high voltage lines. At the beginning of the article it

Jul 10, 2026

Protection Relay Setting Interactive Calculator | FIRGELLI

Interactive calculator for power system protection relay settings. Determine optimal pickup current, time multiplier

Sep 24, 2025

Relay Protection Settings (PSM, TSM, EL, OL, MF)

Time Setting Multiplier (TSM) scales the base time calculated from the relay's characteristic curves. The curve

Dec 09, 2025

Power System Protective Relays: Principles & Practices

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

Jan 07, 2026

Over current/Earth fault Relays [50/51]: Numerical Relays

Over current/Earth fault relays offer the basic protection for any electrical circuit. Over current can be eliminated

Mar 15, 2026

Relay Impedance Optimization for Distance Protection

Explanation Calculation Example: This calculator provides the basic calculations for setting the impedance reach of a

Contact Us

For more information, pricing, or custom solutions, please contact us:

Website: <https://www.chromadecksigns-eastrand.co.za>

Email: sales@chromadecksigns-eastrand.co.za

Phone: +32 2 318 5792

Address: Avenue Louise 500, 1050 Brussels, Belgium

This document is for informational purposes only. Specifications subject to change without notice.

