

Power factor of relay protection



Article Overview

The power factor affects the operation and accuracy of protective relays by influencing the phase relationship between voltage and current, which is critical for relays that rely on impedance, directional, or phase-sensitive measurements.

Understanding Power Factor in Relay Protection

Power factor (PF) is the cosine of the phase angle between voltage and current in an AC system. In relay protection, the PF is important because many relays, such as impedance, distance, and directional relays, operate based on the magnitude and phase relationship of voltage and current. A low or lagging power factor can cause the relay to see a different apparent impedance, potentially affecting its pickup and tripping accuracy .

Impact on Different Relay Types

- **Overcurrent Relays:** These relays are primarily sensitive to current magnitude. While PF has minimal direct effect, the phase angle can influence time-current characteristics in inverse-time relays .
- **Distance/Impedance Relays:** These relays calculate the apparent impedance to detect faults. A low PF (high reactive component) can shift the impedance locus, potentially causing overreach or underreach if not properly compensated .
- **Directional Relays:** These relays use the phase angle between voltage and current to determine fault direction. Variations in PF can affect the polarization voltage and the relay's directional decision

Article Content

Apr 29, 2026

Protective Relays: Types, Working Principle & Uses

Protective relays are power system protection devices that monitor current, voltage,

Nov 27, 2025

Differential (87) Current Protection | Electric Power Measurement and ...

The details of pilot systems in protection schemes is complex and will not be treated in any detail here. An interesting caveat when

Apr 23, 2026

Basic protection relay knowledge

The components used in the power system are usually dimensioned to withstand a short circuit current for one or three seconds but

Aug 06, 2025

Power factor

Linear loads with a low power factor (such as induction motors) can be corrected with a passive network of

Sep 16, 2025

Protection Relays | Medium & high voltage power system protection

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

May 22, 2026

Distribution Automation Handbook

For this reason, underimpedance relays are frequently used as feeder protection relays in networks with low short-circuit power.

May 23, 2026

APFC-Automatic Power Factor Relay

The APFC relay is used for controlling to the capacitors which is installed in capacitor bank panel for improving power factor.

Jan 31, 2026

What is Protection Relay?

What is Protection Relay? Protection relays have a crucial role in maintaining the safety, reliability, and integrity of

Jun 02, 2026

Transformer protection and control

Transformer protection relays are used for protection, control, measurement and supervision of power transformers.

Jun 04, 2026

Protective Relays: Types, Working Principle & Uses

Protective Relays A practical guide to how protective relays detect faults, trip circuit

Jun 18, 2026

4 essential implementations of protective relays in power systems

Protective relays in power systems In this technical article, protective relays are categorized depending on the

Jun 27, 2026

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

Dec 11, 2025

POWER SYSTEM PROTECTION

These are just a few examples of primary protection relays, and many more specialized relays exist to address specific protection

May 28, 2026

Types of Electrical Protection Relays or Protective Relays

Types of Protective Relays: Protective relays are categorized by their mechanism (electromagnetic, static,

Jul 02, 2026

Basic Theories of Power System Relay Protection

This chapter first introduces the basic theories of power system relay protection, summarizes the functions and basic requirements of

Jun 01, 2026

Basics of Protective Relaying and Design Principles

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

Sep 14, 2025

The Role of Protection Relays in Power Systems and an

Protective relays are critical in power systems because they serve as decision-making devices that ensure the safe

Jun 28, 2026

Basic protection relay knowledge

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

Nov 19, 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

Aug 11, 2025

Protective Relay Basics

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

Sep 20, 2025

Protective Relay: Working, Types, and Applications

Learn about protective relays, their working principle, types, and applications in power

Apr 30, 2026

Protection relays

Scope Modern protection relays Multifunctional protection Product benefits Provide continuity of power to consumers Protection of

Nov 05, 2025

Feeder protection and control REF615 IEC

REF615 is a dedicated feeder IED aligned for the protection, control, measurement and supervision of utility and industrial power

Feb 17, 2026

What is a Power Factor Relay?

What is a Power Factor Relay? A Power Factor Relay is a control device that constantly detects a system's power

Oct 02, 2025

Setting Zero-Sequence Compensation Factor in Distance Relays Protecting ...

However, as distance relays are mainly designed for transmission networks, there are several issues to deal with in

Apr 12, 2026

Fundamentals of Modern Protective Relaying

Why the power system needs to be protected? All current and voltage vectors have 120 degrees phase shifts and a sum of 0. Under

Jun 06, 2026

Mastering Distance Protection and Calculations: Never Mess Up ...

Deep understanding of the nuanced factors that influence distance protection accuracy, contributing to reliable power

Contact Us

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

Website: <https://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.

