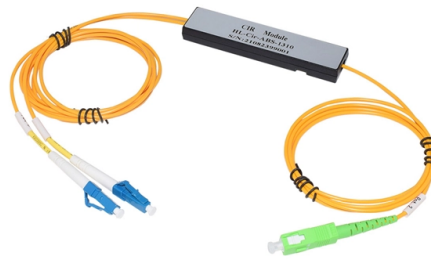


What is impedance measurement in relay protection



Overview

, V/I ratio) is the impedance between fault location on the line and relay location. The relays whose operation is governed by the ratio of the applied voltage to current in the protected circuit is known as impedance relay. It is a distance relay that measures the distance by equating the fault current with voltage (which equates to impedance) across the fault loop and thus trips. Impedance Relay Definition: An impedance relay, also known as a distance relay, is defined as a device that triggers based on the electrical impedance measured from a fault's location to the relay. When the impedance at a fault point on the line drops below a preset value. Unlike traditional overcurrent relays which trip in any condition resulting in excessive current, offering no speed or accuracy, distance relays measure the impedance between the relay and the fault point, thus giving both speed and accuracy to the protection scheme.



Article Content

Jul 09, 2025

Distance Relay: Types, Diagrams, and Working Principles

A distance relay is a protective device that measures line impedance to detect and isolate faults in high-voltage transmission systems with speed and precision.

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Impedance at the Relay | part of Power System Protection | Wiley

A great deal can be learned about protective system behavior by considering the impedance seen by the relay in the direction of the protected component. The protected component can be simple or

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Fundamentals of Distance Protection

Other types of impedance relays are e.g. loss of synchronism protection, loss of excitation protection, or impedance automatics like fault locator. Impedance

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Distance Protection Impedance Measurement

Therefore, distance relays compensate the measured fault current (I_a''), so the compensated ground loop impedance is equal to the phase loop

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NETA World Winter 2024: Relay Column: Distance Protection Impedance ...

Therefore, distance relays compensate the measured fault current (I_a''), so the compensated ground loop impedance is equal to the phase loop impedance. This allows the same

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Distance Relay – Definition, Working Principle, Formula,

A distance relay (or impedance relay) is a protection device used on power transmission lines that estimates the distance to a fault by measuring the

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Distance Relay or Impedance Relay Working Principle

Impedance Relay Definition: An impedance relay, also known as a distance relay, is defined as a device that triggers based on the electrical

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Distance Protection Working Principle & Fault Location

Distance Protection Relay Working When the fault occurs at point X in the protected zone then the voltage drops while current increases. Thus the ratio of V/I the

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Impedance Relay

The operating time of these relays is constant, irrespective of the fault location within the protected zone. The impedance relays can be used for phase

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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 motor thermal image modeling. This model must account for thermal

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Defining and Measuring the Performance of Line Protective Relays

We provide guidance regarding test signals, propose a number of ways to measure and compare relay performance, discuss the issue of type testing, and review requirements for transient simulation and

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Fundamentals of Distance Protection

Distance protection The principle of distance protection is based on the determination of the fault impedance from the measured short-circuit voltage and

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The Interactive Relay Protection Reference

Browser-based relay protection tools, learning modules, and technical references for protection engineers. Analyze COMTRADE, coordinate relays, test directional trip logic, and visualize phasors.

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Impedance Type Distance Relay

Definition and Principle of Impedance Relay (Distance Relay) An impedance relay, also known as a distance relay, is a voltage-controlled protective device whose

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Power System Protective Relays: Principles & Practices

Protective relays and devices have been developed over 100 years ago to provide “lastline” of defense for the electrical systems. They are intended to quickly identify a fault and isolate it so the balance of

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What is Impedance Types Distance Relay?

Definition: The relay whose working depends on the distance between the impedance of the faulty section and the position on which relay installed is known

Mar 06, 2026

doi: 10.1007/978-3-319-20919-7_3

The impedance measured by an impedance relay is proportional (at least in an ideal situation) to the distance between the relay location and the fault. Therefore, the value of the impedance indicates the

Oct 11, 2025

Distance Relay | How it works, Application & Advantages

Impedance Relay (Z Relay): This is the most basic type of distance relay that operates when the measured impedance falls below a predetermined

Jun 08, 2026

Protective relay

Distance relays, also known as impedance relay, differ in principle from other forms of protection in that their performance is not governed by the magnitude of the

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Eight most important distance relay characteristics

Distance relay impedance Some numerical relays measure the absolute fault impedance and then determine whether operation is required

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Why Impedance-Based Protection Is No Longer Enough in IBR

For decades, impedance-based protection—especially distance relays—has been the backbone of transmission line safety in traditional power grids dominated by synchronous machines. But with the ...

Sep 11, 2025

Principles and Characteristics of Distance Protection

Principles of Distance Relays Since the impedance of a transmission line is proportional to its length, for distance measurement it is appropriate to use

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Line Protection Using Impedance (Distance) Relays

To understand the working of distance relays and many other relays, the concept of impedance diagram needs to be understood. Impedance diagram

Apr 04, 2026

Relays Part 6: Distance Relays Important Theory

Distance relays are designed to detect faulty points in electric circuits. Its operation depends on a measured impedance value. The relay will trip the

Feb 09, 2026

Distance Protection Relay Settings Guide

Distance protection relays measure impedance to detect faults by comparing the measured impedance to a set value. They are used to protect transmission lines

Dec 20, 2025

What Is Impedance Relay

Definition and Working Principle An impedance relay measures the impedance between the relay location and the fault location. The working principle involves comparing the measured impedance

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