

Relay protection voltage differential protection

Article Overview

Differential protection relays operate by comparing currents entering and leaving a protected zone, with voltage and current thresholds set to detect internal faults while remaining secure for external disturbances.

Core Principle of Differential Protection

Differential protection relies on Kirchhoff's Current Law, which states that the algebraic sum of currents entering and leaving a node must be zero. In practice, current transformers (CTs) are installed at the boundaries of the protected equipment (transformers, generators, buses, or feeders). The relay measures the incoming and outgoing currents, and if the difference exceeds a preset threshold, it interprets this as an internal fault and trips the associated breaker ().

Voltage and Current Settings

- **Differential Voltage/Current Thresholds:** The relay is set to operate when the differential current or voltage exceeds a specific pick-up value. This threshold is carefully calculated to avoid false tripping during normal load conditions or external faults ().
- **Restraint and Compensation:** To prevent tripping due to CT saturation, inrush currents, or wiring errors, differential relays include restraint logic and ratio/phase compensation. This ensures that only genuine internal faults trigger the relay ().
- **CT Ratio and Polarity:** Correct CT ratio selection and polarity alignment are critical...

Article Content

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Transformer Differential Protection Overview | PDF | Relay

Differential relays operate based on the difference between two or more similar electrical quantities exceeding a predetermined

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Differential Relay – Definition, Theory, Diagram & Types

Depending upon the operative principle the differential relays are categorized as follows : Current differential relay. Biased or

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Differential Relay

Types and Configurations: Differential relays vary mainly into current and voltage balance types, each tailored for

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Differential Relay & Its Types

A differential relay is a relay that operates when the vector difference of two or more similar

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How Differential Protection Works And ANSI Code

How Differential Protection Works The core of the system is the differential relay (ANSI device 87), which compares

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Differential Protection: How It Works

Learn differential protection, ANSI 87 relays, protected zones, internal vs external faults, percentage restraint,

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Chapter 8: Differential Protection

The majority of the applications of differential relays are of the current-differential type, but they can also be of the voltage-differential

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How Differential Protection Works And ANSI Code

A differential protection scheme (using a differential relay) is a highly sensitive and selective

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Relays Part 7: Differential Relays

Differential relays find use in the protection of transformers and f] generators, protection against internal faults within

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Differential (87) Current Protection

PDF file

Basic protection relay knowledge - ABB

A fast and selective arc fault mitigation for air-insulated LV & MV switchgear and Relion protection and control relays and sensor

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Line Differential Protection

SEL line differential protection provides robust, configurable high-speed protection for transmission line systems where distance

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Protection relays

Protection relays Numerical relays are based on the use of microprocessors. The first numerical relays were released in 1985. A big

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Differential protection - Proven technique for more than 50 years

The voltage differential system is similar and not discussed here. For normal operation and all external faults (the

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Differential Protection Applied to Motors & Transformers

Electromechanical Principle ANSI Function 60 - Voltage or Current Balance Relay ANSI Function 87 - Differential Protective Relay

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Differential Protection

Learn about the foundations of differential protection in power systems. Investigate the operating principle, types,

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Differential Protection: How It Works

Differential protection is a power system relay method that compares current entering and

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Transformer Differential Protection□ANSI 87T□: Working Principle ...

The protection system consists of Current Transformers installed on all sides of the transformer (e.g., High Voltage

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Line differential protection and control RED615 ANSI

RED615 is a phase-segregated, two-end, line differential protection and control relay for protection, control, measurement and

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Differential protection | Protection of Electricity Distribution Networks

Differential protection functions when the vector difference of two or more similar electrical magnitudes exceeds a

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Voltage Balance Differential Relay

In this voltage balance differential relay arrangement, two similar current transformers are connected at either end of the system

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Fundamental overcurrent, distance and differential

Important principles of fundamental relay protections: overcurrent, directional overcurrent,

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Transformer Differential Protection Scheme

Percentage restraint differential protective relays have been in service for many years. Figure 1 shows a typical

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Three basic principles of differential protection you SHOULD properly ...

The three basic principles of differential protection explained in this article, which has been known for decades, are

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The principles of differential protection you MUST

Differential protection Although nowadays differential protection is achieved numerically, in

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A comprehensive guide to correct calculation for transformer ...

The differential protection relays are responsible for ensuring that the current levels on both the high voltage and low

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What is Differential Protection Relay: Principles and Practical Tips

Master differential relay protection with this guide, covering KCL principles, high-sensitivity benefits, and essential tips

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Transformer Differential Protection Principles

Figure 1 – Transformer Differential Protection Transformer differential relays have restraint coils as indicated in Figure

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