State Grid Relay Protection No 21

Overview

Testing and commissioning a distance or impedance protection relay (21) involves ensuring the relay accurately measures the impedance to a fault and operates correctly to isolate the faulted section of the power system. A form of protection against faults on long-distance power lines is called distance. The global energy transition is ushering in a new era of power electronic-dominated grids (PEDGs), to complement the increase in the widespread integration of renewable sources like wind and solar. It is reshaping traditional grid architecture and making way for more flexible, efficient and. “21” is the ANSI/IEEE device number for the distance protection in a protective relaying methods. The relay measures V and I and calculates impedance Z as V/I. If Z falls within the zone setting, the relay conducts a trip (instant or. cteristic supervision: Add a reactance supervision. Members share and learn making Eng-Tips Forums the best source of engineering information on the Internet! Congratulations TugboatEng on being selected by the Eng-Tips community for having the most helpful posts in the.

Article Content

Jun 14, 2026

Distance or Impedance Protection (21) Video

This is an excellent introduction to distance or impedance protection and you are guaranteed to learn something new while watching it!

Oct 15, 2025

Distance Protection (21)

Distance protection (21) (IEC Definition) A non-unit protection whose operation and selectivity depend on local measurement of electrical quantities

Dec 02, 2025

ANSI (IEEE) Protective Device Numbering

The widely used United Sates standard ANSI/IEEE C37.2 ''Electrical Power System Device Function Numbers, Acronyms, and Contact Designations'' deals with protective device

Jul 07, 2025

Distance Protection Relay 21 Overview

The document describes how distance protection relays 21 are classified and calibrated in different cases. They are classified into impedance, directional,

Oct 16, 2025

Relay protection of the main grid and customer connections

Main principles of the main grid relay protection In accordance with the N-1 redundancy rule used in the main grid, no single network fault may trigger an expanding disturbance or loss of stability. Stability

Apr 22, 2026

New development in relay protection for smart grid

Abstract This series of papers report on relay protection strategies that satisfy the demands of a strong smart grid. These strategies include ultra-high-speed transient-based fault discrimination, new co

Aug 18, 2025

Section G2: Protection and Control Requirements for Transmission

Purpose This section specifies the requirements for protective relays and control devices for Generation Entities interconnecting to the PG& E Power System.

Oct 06, 2025

Societal and technology trend report

The crisis of traditional relay protection: A disruption of the technological paradigm Using the high short-circuit currents and system inertia provided by synchronous generators, traditional relay protection

Feb 01, 2026

Distance or Impedance Protection Relay (21) Test

Testing and commissioning a distance or impedance protection relay (21) involves ensuring the relay accurately measures the impedance to a fault and operates

Jun 27, 2025

Protective Relays

Protect critical components in your power system with a wide range of SEL protective relays covering applications and use cases from low to high-voltage protection.

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Comparison of Protection Relay Types

This comparison summarize characteristics of all protection relay types described in previously published technical articles:

Sep 13, 2025

Relay protection for power-electronics-dominated power grids:

Recognizing the dire need for advanced relay protection, this report presents a comprehensive analysis of the evolving landscape. It outlines technical challenges, potential innovative solutions, equipment

Jul 19, 2025

Principles and Characteristics of Distance Protection

Distance protection, in its basic form, is a non-unit system of protection offering considerable economic and technical advantages. Unlike

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Understanding Distance Protection Relay 21

Understanding Distance Protection Relay 21 Distance relaying is a form of protection for long transmission power lines that can estimate the location of a fault by

Dec 02, 2025

Power System Protective Relays: Principles & Practices

As the protected components of the electrical systems have changed in size, configuration and their critical roles in the power system supply, some protection aspects need to be revisited (i.e. the use of

Dec 05, 2025

Protection Relay Types and Testing Procedures

Discover the types of protection relays, their applications, and essential testing procedures to ensure grid reliability and safety. Learn about

Feb 08, 2026

Approved Grid Protection Relays

This document provides a list of Approved Grid Protection Relays (GPR) for embedded generation systems to comply with the IEC Standards and ANSI/IEC device functions as outlined in STNW1174,

Jan 14, 2026

Basic protection relay knowledge

A fast and selective arc fault mitigation for air-insulated LV & MV switchgear and Relion protection and control relays and sensor technology protect staff and plant facilities for many years.

Jul 17, 2025

U 39Oakland, California Revised Cal. P.U.C. Sheet No. 60050-E (T

Single Line Diagram; Single Line Drawing: A schematic drawing, showing the major electric switchgear, Protective Function devices (including relays, current transformer and potential transformer

May 23, 2026

Phase/Ground Polarized Distance Characteristics 21G

The protection functions are updated automatically. For example, for memory usage and computational speed considerations, if an entire element is disabled, the subcircuits associated to its functions are

Oct 01, 2025

Watch the Understanding Distance Protection (21) Video

It is important to know how a regular distance protection (21) scheme will react to different faults around the relays, and how those reactions are different from

Jan 14, 2026

ANSI Standard Device Numbers & Common Acronyms

ANSI Standard Device Numbers & Common Acronyms ANSI Standard Device Numbers & Common Acronyms

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Protection, Control & Metering

GE Vernova''s Protection, Control, and Metering solutions deliver precise, high-performance automation for today''s evolving grid. From advanced relays to

May 17, 2026

Distance relay (ANSI 21) in Generators | Eng-Tips

Hi everyone, I have been doing some research on generator protection and I have found that in some protection schemes the distance function (ANSI 21) is used as a backup protection. I am

May 23, 2026

Types of Electrical Protection Relays or Protective Relays

□□ Key learnings: Protective Relay Definition: A protective relay is an automatic device that senses abnormal conditions in electrical circuits and

Nov 07, 2025

Distance relay (ANSI 21) in Generators | Eng-Tips

CT''s on neutral allow the 21 function to protect the generator prior to breaker closure if the settings can be configured to allow normal energization current without tripping. CT''s on the

Feb 04, 2026

Protection Relays

Technical resources and thought leadership for protection and control P& C relays for transmission, transformer, distribution feeders, bus, motors, generators, IEC 61850 process bus and digital meters.

Aug 09, 2025

Protecting the Core: Securing Protection Relays in

Introduction — Why Securing Protection Relays Matters More Than Ever Substations are critical nexus points in the power grid, transforming high

Jun 01, 2026

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

Mar 15, 2026

21 Distance Relay T (2024)

Understanding the 21 Distance Relay: A Comprehensive Guide Distance relays, crucial components of power system protection, are designed to detect faults along transmission lines. Among various

Contact Us

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