Tunisian Relay Protection Experiment Report

Article Overview

The Tunisian relay protection experiment demonstrates the setup, coordination, and testing of overcurrent and distance relays in medium voltage distribution networks to ensure selectivity and system reliability.

Overview of Tunisian MV Protection Systems

In Tunisia, medium voltage (MV) distribution networks, such as those in Gabes, are protected using a combination of overcurrent relays, reclosers, sectionalisers, and fuses to maintain service continuity and safeguard equipment . The MV network is connected to high voltage (HV) buses via transformers, typically 150/33 kV, with grounding systems influencing relay coordination and fault detection . Transformers are equipped with internal protections like Buchholz relays, differential protection, and tank-ground protection to prevent thermal overloads .

Experimental Setup

A practical experiment for relay protection involves a radial feeder system where students can observe the operation of electromechanical relays . The setup includes:

o Generators, transformers, circuit breakers, and transmission lines to simulate a real power system.
o Overcurrent and earth fault relays with adjustable Time Setting Multiplier (TSM) and Plug Setting Multiplier (PSM).
o Fault simulation to test relay response to short circuits, overloads, and ground faults.
o Observation of relay coordination and backup protection to ensure selectivity and minimize outage impact .

Relay Protection Settings

Relay settings in Tunisian substations are based on short-circuit calculations and time-current coordination:

o Definite time overcurrent relays trip after a preset current threshold and time delay.
o Inverse time overcurrent relays operate faster for higher fault currents, following CEI standards .
o Time grading ensures upstream and downstream relays coordinate to isolate only the faulted section, maintaining service continuity .
o Backup protection is provided by upstream relays in case downstream devices fail .

Distance Protection

For transmission lines, distance relays are used to detect faults based on impedance measurement, dividing the

line into zones:

o Zone 1 trips instantaneously for faults within 80% of the line.
o Zone 2 trips with a short delay for faults extending into adjacent lines.
o Zone 3 provides backup protection for remote faults .

Educational and Practical Benefits

The experiment allows students and engineers to:

o Understand relay wiring and operation in real power systems.
o Analyze fault detection, relay coordination, and selectivity.
o Learn the impact of earthing methods on protection schemes.
o Gain hands-on experience with overcurrent and distance relays, preparing for real-world MV network operations .

Conclusion

The Tunisian relay protection experiment provides a comprehensive understanding of MV network protection, combining theoretical calculations with practical testing. It emphasizes relay coordination, fault detection, and system reliability, ensuring that protective devices operate efficiently to minimize outages and equipment damage in Tunisian distribution networks .

2Content of experiment: 1. Measurement of the pickup and reset voltages of the overvoltage relay. 2. Measurement of

We can conclude that the dysfunction of transformer relay is due to an overload condition that causes an overheating in the power

Power System Protection List of Experiments Sr.No Name of Experiments Page No 1 Study of characteristics of type

It describes 3 experiments conducted on a simulator to set different relays for faults. In experiment 1, an overcurrent relay was set to

The document is a laboratory report that investigates the behavior of two inverse definite minimum time (IDMT) relays on a radial

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The lab manual contains 14 experiments on studying the characteristics and coordination of various types of power system protection

This document outlines laboratory experiments focused on various electrical protection relays, including IDMT Over Current,

The tests conducted include: Overcurrent Relay (OCP) Testing Differential Relay Testing Distance Relay Testing The repository

EEN445: Lab Report 1 Overcurrent Protection of a power transformer using a numerical protective relay Ali Shahzad

The site test report summarizes testing of protection relay and current transformer equipment at plant XACW067. Key details tested

Instruction: Refer Chapter-5 (Section 5.4) of Power System Relaying Book (4th Edition) by S. H. Horowitz and A. G. Phadke to study

1. Introduction Why do we use protective relays? Relays are frequently found device in high voltage or medium voltage power

This report discusses issues and provides solutions for dealing with fault current contributions from inverter-based distributed energy

This document provides the laboratory experiment sheet for Experiment 1 in the Power Systems Protection Laboratory course. The

A reliable protection relay testing device plays a vital role in both providing a stimulus and monitoring the relay"s response. Relays

Three power systems analysis lecture courses and one power systems protection lecture course currently exist in conjunction with

Web: https://www.supremeacademicresearch.co.za