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IEEE Guide for Application of Digital Line Current Differential Relays Using Digital Communication

IEEE Power and Energy Society

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Power System Relaying Committee

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IEEE Guide for Application of Digital Line Current Differential Relays Using Digital Communication

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IEEE Power and Energy Society

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Abstract: A comprehensive guide to practical line current differential schemes using digital communications. Operating principles, synchronization methods, channel requirements, current transformer requirements, external time reference requirements, backup considerations, testing considerations, and troubleshooting are included. This guide also provides specific guidelines for various application aspects including multi-terminal lines, series compensated lines, mutually coupled lines, line charging current, in-zone transformers and reactors, single-phase tripping and reclosing, as well as communications channel requirements.

Keywords: alpha plane, charge comparison, current differential line protection, current differential operating methods, current ration plane, IEEE C37.243™, percentage differential, ping-pong methods, time synchronization

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Introduction

This introduction is not part of IEEE Std C37.243™-2015, IEEE Guide for Application of Digital Line Current Differential Relays Using Digital Communication.

This guide is intended to assist protection engineers and technologists in effectively applying digital current differential relays using digital communications channels and protection systems to protect transmission lines.

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IEEE Guide for Application of Digital Line Current Differential Relays Using Digital Communication

1. Overview

1.1 Scope

This guide presents practical line current differential schemes using digital communications. Operating principles, synchronization methods, channel requirements, current transformer (CT) requirements, external time reference requirements, backup considerations, testing considerations, and troubleshooting are included. It also provides specific guidelines for various application aspects including multi-terminal lines, series compensated lines, mutually coupled lines, line charging current, in-zone transformers and reactors, single-phase tripping and reclosing, as well as communications channel requirements.

2. Normative references

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