

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

IEEE Power and Energy Society

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of the
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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1.1 Scope

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2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used, so each referenced document is cited in text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.