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IEEE Guide for Protective Relay Applications to Distribution Lines

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IEEE Power and Energy Society

Developed by the
Power System Relaying Committee

IEEE Std C37.230™-2020
(Revision ofIEEE Std C37.230-2007)

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Abstract: A review of generally accepted applications and coordination of protection for power system distribution lines is presented. The advantages and disadvantages of schemes presently being used in protecting distribution lines are examined in this guide. Identification of problems with the methods used in distribution line protection and the solutions for those problems is included.

Keywords: coordination, distribution, faults, IEEE C37.230™, protection, reclosing, sensitivity

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Introduction

This introduction is not part of IEEE Std C37.230-2020, IEEE Guide for Protective Relay Applications to Distribution Lines.

This guide compiles information on the application considerations of protective relays to power distribution lines. This guide presents a review of generally accepted distribution line protection schemes. Its purpose is to describe various schemes to assist relay engineers in selecting the most appropriate scheme for a particular installation. It is intended for engineers who have a basic knowledge of power system protection. This is an application guide and does not cover all of the protective requirements of all distribution line configurations in every situation. Additional reading material is suggested so the reader can evaluate the protection for the individual application.

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1. Overview

This guide is divided into seven clauses. Clause 1 provides the scope and purpose of this guide. Clause 2 provides definitions that are not found in other standards. Clause 3 gives an explanation of distribution fundamentals. Clause 4 discusses system configuration and components. Clause 5 explains the characteristics of protective schemes. Criteria and examples are discussed in Clause 6, including margins and common considerations. Clause 7 has several special applications and considerations for distribution line protection.

This guide also contains two annexes. Annex A provides the bibliography, and Annex B contains a glossary of terms defined in other IEEE standards.

1.1 Scope

This guide discusses the application and coordination of protection of power-system distribution lines. It includes the descriptions of the fundamentals, line configurations, and schemes. In addition to these, this guide identifies problems with the methods used in distribution line protection and the solutions to those problems.

1.2 Purpose

This guide educates and provides information on distribution protection schemes to utility engineers, consultants, educators, and manufacturers. The guide examines the advantages and disadvantages of schemes presently used in protecting distribution lines. This provides the user with the rationale for determining the best approach for protecting an electric power distribution system.

1.3 Word usage

The word *shall* indicates mandatory requirements strictly to be followed in order to conform to the standard and from which no deviation is permitted (shall equals is required to).[1,2]

The word *should* indicates that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required (should equals is recommended that).

[1]The use of the word *must* is deprecated and shall not be used when stating mandatory requirements, *must* is used only to describe unavoidable situations.
[2]The use of *will* is deprecated and shall not be used when stating mandatory requirements, *will* is only used in statements of fact.