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IEEE Guide and Tutorial for the Application of High-Voltage (> 1000 V) Fuses and Accessories

IEEE Power and Energy Society

Developed by the
Switchgear Committee

IEEE Std C37.48™-2020
(Revision of IEEE Std C37.48™-2005
and IEEE Std C37.48.1™-2011)

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IEEE SA Standards Board

Abstract: Information for understanding the construction, operation, and application of high-voltage (> 1000 V) fuses and accessories, intended for use on alternating current (ac) electrical distribution systems is provided. Current-limiting, expulsion, electronic, and other non-current-limiting fuses and accessories are covered, as are North American, European, and other application practices.

Keywords: current-limiting fuses, expulsion fuses, fuse application, fuse coordination, high-voltage fuses, IEEE C37.48™, IEEE C37.48.1™, TCC, time-current characteristics, rated maximum voltage

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Introduction

This introduction is not part of IEEE Std C37.48™-2020, IEEE Guide and Tutorial for the Application of High-Voltage (> 1000 V) Fuses and Accessories.

This guide was prepared by the Revision of Fuse Standards Working Group of the IEEE Subcommittee on High-Voltage Fuses, and replaces IEEE Std C37.48-2005 and IEEE Std C37.48.1™-2011. Most of the structure and material in this guide is based on IEC TR 62655:2013, reprinted with permission from IEC. The IEC technical report, in turn, contains significant portions excerpted and reprinted with permission from IEEE Std C37.48.1-2011, IEEE Guide for the Application, Operation, and Coordination of High-Voltage (> 1000 V) Current-Limiting Fuses. IEC TR 62655:2013 frequently compares and contrasts IEC and IEEE practices, but with the primary emphasis on IEC practice. While this guide also compares and contrasts practices, because it is an IEEE guide it primarily emphasizes IEEE practice (e.g., using IEEE terminology in the body of the document, but with Table 1 showing a comparison between IEEE and IEC terms). As with the IEC technical report, it is felt that including both sets of practices will particularly benefit users located in areas where both practices are used, and where fuses primarily tested to one or the other, or both, standards are available.

Acknowledgments

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1.1 Scope

This guide provides information for understanding the construction, operation, and application of high-voltage (> 1000 V) fuses and accessories, intended for use on alternating current (ac) electrical distribution systems. Current-limiting, expulsion, electronic, and other non-current-limiting fuses and accessories are covered, as are North American, European, and other application practices. As a guide, this document contains no requirements and is informative only.

1.2 Purpose

The purpose of this guide is:

a) To help prospective users and protection engineers understand the basics of high-voltage (> 1000 V ac) fuse technology and applications involving high-voltage (HV) fuses[1]

b) To illustrate the particular and unique advantages of fuse protection for most service applications

c) To reduce possible misapplications of fuses which could lead to problems in the field

d) To list and describe the many types of fuse in use today, and the international standards that apply to them, including fuse types not specifically included in IEC, IEEE, or other recognized standards

This guide gathers information previously published in IEC, IEEE, and other publications, as well as new material.

1.3 How to use this guide

1.3.1 General

If read from start to finish, this guide will provide an in-depth study of HV fuses and their applications. It is essentially a tutorial covering all common (and some not so common) types of fuses and most fuse applications.

[1]Excerpt from IEC TR 62655 ed 1.0 Copyright © 2013 IEC Geneva, Switzerland www.iec.ch.