IEEE Standard for Interrupter Switches for Alternating Current, Rated Above 1000 V

IEEE Power Engineering Society

Sponsored by the
Switchgear Committee

1247™

IEEE
3 Park Avenue
New York, NY 10016-5997, USA

6 June 2006

IEEE Std 1247™-2005
(Revision of IEEE Std 1247-1998)

Recognized as an
American National Standard (ANSI)

IEEE Std 1247™-2005
(Revision of
IEEE Std 1247-1998)

IEEE Standard for Interrupter Switches for Alternating Current, Rated Above 1000 Volts

Sponsor

Switchgear Committee
of the
IEEE Power Engineering Society

Approved 28 March 2006

American National Standards Institute

Approved 7 December 2005

IEEE-SA Standards Board

Abstract: The basic requirements of interrupter switches used indoors, outdoors, and in enclosures are covered. This standard does not apply to load-break separable insulated connectors.
Keywords: enclosed switch, indoor switch, interrupter switch, outdoor switch, switching ability, switching current, switching rating

The Institute of Electrical and Electronics Engineers, Inc.
3 Park Avenue, New York, NY 10016-5997, USA

Print: ISBN 0-7381-4864-4 SH95503
PDF: ISBN 0-7381-4865-2 SS95503

IEEE Standards documents are developed within the IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Association (IEEE-SA) Standards Board. The IEEE develops its standards through a consensus development process, approved by the American National Standards Institute, which brings together volunteers representing varied viewpoints and interests to achieve the final product. Volunteers are not necessarily members of the Institute and serve without compensation. While the IEEE administers the process and establishes rules to promote fairness in the consensus development process, the IEEE does not independently evaluate, test, or verify the accuracy of any of the information contained in its standards.

Use of an IEEE Standard is wholly voluntary. The IEEE disclaims liability for any personal injury, property or other damage, of any nature whatsoever, whether special, indirect, consequential, or compensatory, directly or indirectly resulting from the publication, use of, or reliance upon this, or any other IEEE Standard document.

The IEEE does not warrant or represent the accuracy or content of the material contained herein, and expressly disclaims any express or implied warranty, including any implied warranty of merchantability or fitness for a specific purpose, or that the use of the material contained herein is free from patent infringement. IEEE Standards documents are supplied "**AS IS**."

The existence of an IEEE Standard does not imply that there are no other ways to produce, test, measure, purchase, market, or provide other goods and services related to the scope of the IEEE Standard. Furthermore, the viewpoint expressed at the time a standard is approved and issued is subject to change brought about through developments in the state of the art and comments received from users of the standard. Every IEEE Standard is subjected to review at least every five years for revision or reaffirmation. When a document is more than five years old and has not been reaffirmed, it is reasonable to conclude that its contents, although still of some value, do not wholly reflect the present state of the art. Users are cautioned to check to determine that they have the latest edition of any IEEE Standard.

In publishing and making this document available, the IEEE is not suggesting or rendering professional or other services for, or on behalf of, any person or entity. Nor is the IEEE undertaking to perform any duty owed by any other person or entity to another. Any person utilizing this, and any other IEEE Standards document, should rely upon the advice of a competent professional in determining the exercise of reasonable care in any given circumstances.

Interpretations: Occasionally questions may arise regarding the meaning of portions of standards as they relate to specific applications. When the need for interpretations is brought to the attention of IEEE, the Institute will initiate action to prepare appropriate responses. Since IEEE Standards represent a consensus of concerned interests, it is important to ensure that any interpretation has also received the concurrence of a balance of interests. For this reason, IEEE and the members of its societies and Standards Coordinating Committees are not able to provide an instant response to interpretation requests except in those cases where the matter has previously received formal consideration. At lectures, symposia, seminars, or educational courses, an individual presenting information on IEEE standards shall make it clear that his or her views should be considered the personal views of that individual rather than the formal position, explanation, or interpretation of the IEEE.

Comments for revision of IEEE Standards are welcome from any interested party, regardless of membership affiliation with IEEE. Suggestions for changes in documents should be in the form of a proposed change of text, together with appropriate supporting comments. Comments on standards and requests for interpretations should be addressed to:

Secretary, IEEE-SA Standards Board
445 Hoes Lane
Piscataway, NJ 08854
USA

NOTE—Attention is called to the possibility that implementation of this standard may require use of subject matter covered by patent rights. By publication of this standard, no position is taken with respect to the existence or validity of any patent rights in connection therewith. The IEEE shall not be responsible for identifying patents for which a license may be required by an IEEE standard or for conducting inquiries into the legal validity or scope of those patents that are brought to its attention.

Introduction

This introduction is not part of IEEE Std 1247-2005, IEEE Standard for Interrupter Switches for Alternating Current, Rated Above 1000 Volts.

Over many years, standards covering interrupter switches have been developed in subcommittees other than the High Voltage Switch Subcommittee. As a result, different and sometimes conflicting requirements for interrupter switches have been developed. Where there is a clear need for different requirements in different applications, diverging standards are appropriate. However, where application requirements are similar, the body of standards should treat the requirements uniformly. As a result of this philosophy, the Switchgear Administrative Subcommittee passed the following motion at the May 1991 meeting in Fort Lauderdale.

> *In an effort to promote a uniform approach to standards, the following policy is set:*
>
> *Future standards and revisions to standards that incorporate fuses, switches, circuit breakers, and/or reclosers and sectionalizers shall reference the basic fuse, switch, circuit breaker, and/or recloser and sectionalizer standard wherever possible and treat material differently only when there are unique application requirements.*

This standard was written to provide the basic standard for interrupter switches. As such, an attempt was made to encompass as many different types of interrupter switches as practical. This standard has also provided the opportunity to update and revise the general treatment of interrupter switches, and address newer technologies that are being used to provide switching functions.

Part of the heritage of this document comes from the treatment of interrupter switches in other IEEE C37 standards. It is anticipated that material relating to interrupter switches, currently in the IEEE C37.30 series, will be removed from those documents when this document is published. Further, when this document is published, it is anticipated that other standards, not in the IEEE C37.30 series, will begin to reference this document, as outlined in the above AdsCom motion.

Although this standard does not apply to circuit-breakers, circuit-switchers, or reclosers, standards for circuit-breakers, circuit-switchers, and reclosers should reference this document for their load-interrupting requirements. A further intent of this document is to provide test circuits to be used to establish ratings for common applications of switching devices not generally covered by standards.

Although this document will be published before the work on IEEE Std C37.100.1™ (Common Clauses) is finished, it is the intention of the Interrupter Switch Working Group to adopt or reference common clauses as they become available. Specifically the treatment of:

- Altitude correction factors, and
- Total temperature limits for contacts, connections, and insulation

will conform to the Common Clauses Document.

Conformance and field testing are not covered in this document. The user is referred to apparatus-specific test documents such as IEEE Std C37.41™, ANSI C37.57, and ANSI C37.58.

This standard has adopted the approach of many other standards in avoiding asymmetrical current ratings. For example, the traditional momentary (asymmetrical) current rating is now covered in the peak current withstand. Because of the lack of a need to calculate asymmetrical currents, and the common use of data

acquisition systems (which automatically calculate rms currents), IEEE Std C37.09™ is not referenced as a means to determine symmetrical or asymmetrical values.

The actual revision is limited to the correction of technical errors that have been identified in subclauses 8.3.1.3, 8.3.2.1, 8.3.2.2.1, 8.3.2.5 and 8.2.2.6, 8.3.2.3, and 8.3.2.6; Figures 1, 2, 3, 4, 7, 8, 9, 10, and 11; and Tables 6, 7, and 9.

Notice to users

Errata

Errata, if any, for this and all other standards can be accessed at the following URL: http://standards.ieee.org/reading/ieee/updates/errata/index.html. Users are encouraged to check this URL for errata periodically.

Interpretations

Current interpretations can be accessed at the following URL: http://standards.ieee.org/reading/ieee/interp/index.html.

Patents

Attention is called to the possibility that implementation of this standard may require use of subject matter covered by patent rights. By publication of this standard, no position is taken with respect to the existence or validity of any patent rights in connection therewith. The IEEE shall not be responsible for identifying patents or patent applications for which a license may be required to implement an IEEE standard or for conducting inquiries into the legal validity or scope of those patents that are brought to its attention.

Participants

At the time this standard was completed, the working group had the following membership:

Lyne Brisson, *Co-Chair*
Marcel Fortin, *Co-Chair*

John Angelis
Charles Ball
Frank DeCesaro
Jim Domo
Erik M. Guillot
Ronald Lavorin
Peter Meyer
Radakrishna Ranjan
David Stone
Jan Zawadzki

The following members of the individual balloting committee voted on this standard. Balloters may have voted for approval, disapproval, or abstention.

Roy Alexander
Chris Ambrose
Edwin Averill
Charles Ball
W. J. (Bill) Bergman
Edward Bertolini
Behdad Biglar
Lyne Brisson
Robert Brown
Ted Burse
Eldridge R. Byron
Raymond Capra
Tommy Cooper
Ronald Daubert
Alexander Dixon
Randall Dotson
Denis Dufournet
Doug Edwards
Marcel Fortin
Kenneth Gettman
David Gilmer
Mietek Glinkowski
Randall Groves
Erik M. Guillot
Ian Harvey
Luther Holloman
Edward Horgan Jr.
George House
William Hurst
David Jackson
Edward Jankowich
Joseph L. Koepfinger
Thomas LaRose
Stephen R. Lambert
Ward E. Laubach
John Leach
George Lester
Jason Lin
Albert Livshitz
Gregory Luri
William Majeski
Neil McCord
Nigel McQuin
Bryan Melville
Peter Meyer
Gary Michel
Alec Monroe
Georges Montillet
Anne Morgan
Peter Morgan
Frank Muench
Yasin Musa
Jeffrey Nelson
Paul Notarian
Ray O'Leary
T. W. Olsen
Paulette Payne
Anthony Picagli
Jackson Richard
Hugh Ross
Timothy Royster
James Ruggieri
E. William Schmunk
Devki Sharma
R. Kirkland Smith
David Stone
Chand Tailor
Stanton Telander
Jane Ann Verner
Charles Wagner
Steve Whalen
James Wilson
John Wood
Elbert Worland
Zhenxue Xu
Larry Yonce
Jan Zawadzki

When the IEEE-SA Standards Board approved this standard on 7 December 2005, it had the following membership:

Steve M. Mills, *Chair*
Richard H. Hulett, *Vice Chair*
Don Wright, *Past Chair*
Judith Gorman, *Secretary*

Mark D. Bowman
Dennis B. Brophy
Joseph Bruder
Richard Cox
Bob Davis
Julian Forster*
Joanna N. Guenin
Mark S. Halpin
Raymond Hapeman
William B. Hopf
Lowell G. Johnson
Herman Koch
Joseph L. Koepfinger*
David J. Law
Daleep C. Mohla
Paul Nikolich
T. W. Olsen
Glenn Parsons
Ronald C. Petersen
Gary S. Robinson
Frank Stone
Malcolm V. Thaden
Richard L. Townsend
Joe D. Watson
Howard L. Wolfman

*Member Emeritus

Also included are the following nonvoting IEEE-SA Standards Board liaisons:

Satish K. Aggarwal, *NRC Representative*
Richard DeBlasio, *DOE Representative*
Alan H. Cookson, *NIST Representative*

Michael D. Fisher
IEEE Standards Program Manager, Document Development

Contents

IEEE Standard for Interrupter Switches for Alternating Current, Rated Above 1000 V

1. Overview

1.1 Scope

This standard applies to switching devices, interrupters, and interrupter switches (as defined in IEEE Std C37.100™) for alternating current, rated above 1000 V and used indoors, outdoors, or in enclosures for which a switching rating is to be assigned. While this standard covers the basic requirements of interrupter switches used indoors, outdoors, and in enclosures, other standards such as IEEE Std C37.20.2™, IEEE Std C37.20.3™, IEEE Std C37.20.4™, and IEEE Std C37.74™ also contain requirements for switches used in enclosures. This standard does not apply to load-break separable insulated connectors, which are covered by IEEE Std 386™-1995 [B8].[1] This standard also does not apply to circuit-breakers, circuit-switchers, or reclosers.

1.2 Purpose

The purpose of this standard is to provide a basic standard for switches as defined in 3.5. The broad definition of a switch, given in 3.5, encompasses devices that meet the strict definition of an interrupter switch in IEEE Std C37.100, and also encompass devices that utilize insulating media other than air.

2. Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

ANSI C2-2002, National Electrical Safety Code ® (NESC®).[2]

ANSI C29.1-2002, Test Methods for Electrical Power Insulators.

ANSI C37.22-1997 (Reaff 2003), American National Standard Preferred Ratings and Related Required Capabilities for Indoor AC Medium-Voltage Switches Used in Metal-Enclosed Switchgear.

[1] The numbers in brackets preceded by the letter B correspond to those of the bibliography in Annex E.

[2] ANSI publications are available from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA (http://www.ansi.org/).