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High voltage switchgear and controlgear –

Part 111:
Overhead, pad-mounted, dry vault, and submersible automatic circuit reclosers and fault interrupters for alternating current systems up to 38 kV

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

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International Standard IEC/IEEE 62271-111 has been processed through IEC sub-committee 17A: High-voltage switchgear and controlgear, of IEC technical committee 17: Switchgear and controlgear.

The text of this standard is based on the following documents:

IEEE Std	FDIS	Report on voting
C37.60 (2003)	17A/737/FDIS	17A/746/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives.

The committee has decided that the contents of this publication will remain unchanged until 2008.

The list of all the parts of IEC 62271 series, under the general title *High-voltage switchgear and controlgear,* can be found on the IEC website.

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IEEE Standard for Overhead, Pad-Mounted, Dry Vault, and Submersible Automatic Circuit Reclosers and Fault Interrupters for Alternating Current Systems Up to 38 kV

Sponsor

Switchgear Committee
of the
IEEE Power Engineering Society

Approved 20 March 2003

IEEE-SA Standards Board

Abstract: Required definitions, ratings, procedures for performing design tests, production tests, and construction requirements for overhead, pad-mounted, dry vault, and submersible automatic circuit reclosers and fault interrupters for alternating systems up to 38 kV are specified.
Keywords: dry vault, fault interrupter, overhead, pad-mounted, recloser, submersible, standard operating duty, switchgear

IEEE Introduction

This standard has been revised from IEEE Std C37.60-1981, incorporating significant improvements that reflect the present state of the art in recloser technology. These include changes and additions in the following areas:

a) Expanded the standard to include gas-insulated reclosers.
b) Revised the title and scope to limit the standard to 38 kV; deleted ratings above 38 kV nominal.
c) Added voltage ratings commonly used outside of North America with related dielectric withstand capabilities taken from IEC 60694-2002.[a]
d) Added several new interrupting ratings in the 15.5 kV, 27 kV, and 38 kV ranges.
e) Revised limits of temperature and temperature rise to be consistent with circuit breaker standards.
f) Reorganized the switching tests into 6.3 following a format similar to IEEE Std 1247™-1998 and referenced IEEE Std 1247-1998 for switching test procedures.
g) Removed the requirement for transformer magnetizing tests; reference discussion in IEEE Std 1247-1998.
h) Clarified the intent of the switching tests as related required capabilities and prohibited the use of single-phase tests to qualify three-phase reclosers in the performance of the switching tests.
i) Removed the altitude correction factors. (Refer to the following paragraph and informative Annex E.)
j) Removed the X/R footnote and table of multiplication factors from old 5.6 to new informative Annex A with expanded information and data.
k) Added new informative Annex B.
l) Added transient recovery voltage (TRV) specifications and informative Annex C and Annex D.
m) Restricted the use of single-phase testing to verify three-phase performance.
n) Reduced radio influence voltage (RIV) limits.
o) Added Partial Discharge as a design and production test.
p) Reduced dc withstand voltage test time from 15 min. to 5 min.

Although this revised standard will be published before the work on IEEE PC37.100.1, Draft Standard Requirements for Power Switchgear [B13][b] is completed, it is the intention of the Recloser Working Group to issue supplements or revisions to adopt common requirements. There was considerable discussion in the Recloser Working Group regarding the addition of the partial discharge test requirements suggesting that this topic should be revisited at the next revision cycle to see if the data collected between now and then shall warrant any changes in the test procedure or test limits.

[a] Information on references can be found in Clause 2.
[b] The numbers in brackets correspond to the numbers of the bibliography in Annex F.

HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 111: Overhead, pad-mounted, dry vault, and submersible automatic circuit reclosers and fault interrupters for alternating current systems up to 38 kV

1. Scope

This standard applies to all overhead, pad-mounted, dry vault, and submersible single- or multipole alternating current automatic circuit reclosers and fault interrupters for rated maximum voltages above 1000 V and up to 38 kV.

In order to simplify this standard where possible, the term *recloser/FI* (*reclosers/FIs*) has been substituted for *automatic circuit recloser* or *fault interrupter* or both.

NOTE—When reclosers are applied in a substation, special considerations may apply, see 6.5.1.5.3.

2. References

This standard shall be used in conjunction with the following publications. When the following publications are superseded by an approved revision, the revision shall apply.

ANSI C37.06-2000, American National Standard for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis—Preferred Ratings and Related Required Capabilities.[1]

ANSI C37.06.1-2000, American National Standard Guide for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis—Designated "Definite Purpose for Fast Transient Recovery Voltage Rise Times."

[1]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).

ANSI C37.85-2002, American National Standard for Switchgear—Alternating-Current High-Voltage Power Vacuum Interrupters—Safety Requirements for X-Radiation Limits.

ANSI C57.12.28-1999, American National Standard for Pad-mounted Equipment—Enclosure Integrity.

ANSI C63.2-1996, American National Standard for Electromagnetic Noise and Field Strength Instrumentation, 10 kHz to 40 GHz—Specifications.

ASME BPVC-1998, Boilers and Pressure Vessels Code—Section VIII: Rules for Construction of Pressure Vessels—Division 1.[2]

IEC 60060-1-1989, High-Voltage Test Techniques—Part 1: General Definitions and Test Requirements.[3]

IEC 60270-2000, High-Voltage Test Techniques—Partial Discharge Measurements.

IEC 60502-1-2004, Power Cables with Extruded Insulation and Their Accessories for Rated Voltages from 1 kV ($U_m = 1,2$ kV) Up to 30 kV ($U_m = 36$ kV)—Part 1: Cables for Rated Voltages of 1 kV ($U_m = 1,2$ kV) and 3 kV ($U_m = 3,6$ kV).

IEC 60502-2-2005, Power Cables with Extruded Insulation and Their Accessories for Rated Voltages from 1 kV ($U_m = 1,2$ kV) Up to 30 kV ($U_m = 36$ kV)—Part 2: Cables for Rated Voltages from 6 kV ($U_m = 7,2$ kV) Up to 30 kV ($U_m = 36$ kV).

IEC 60694-2002, Common Specifications for High-Voltage Switchgear and Controlgear Standards.[6]

IEC 62271-100-2003, High-Voltage Switchgear and Controlgear—Part 100: High-Voltage Alternating-Current Circuit-Breakers.[7]

IEEE Std 4™-1995, IEEE Standard Techniques for High Voltage Testing.[4,5]

IEEE Std 4a™-2001, Amendment to IEEE Standard Techniques for High-Voltage Testing.

IEEE Std 386™-1995, IEEE Standard for Separable Insulated Connector Systems for Power Distribution Systems Above 600 V.

IEEE Std 1247™-1998, IEEE Standard for Interrupter Switches for Alternating Current Rated Above 1000 Volts.

IEEE Std 1291™-1993, IEEE Guide for Partial Discharge Measurement in Power Switchgear.

IEEE Std C37.04-1999, IEEE Standard Rating Structure for AC High-Voltage Circuit Breakers.

IEEE Std C37.09-1999, IEEE Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis.

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[2]ASME publications are available from the American Society of Mechanical Engineers, 3 Park Avenue, New York, NY 10016-5990, USA (http://www.asme.org).

[3]IEC publications are available from the Sales Department of the International Electrotechnical Commission, Case Postale 131, 3, rue de Varembé, CH-1211, Genève 20, Switzerland/Suisse (http://www.iec.ch/). IEC publications are also available in the United States from the Sales Department, American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036, USA (http://www.ansi.org).

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[6]Edition 2.2 Consolidated edition.

[7]Edition 1.1 Consolidated edition.

IEEE Std C37.41™-2000, IEEE Standard Design Tests for High-Voltage Fuses, Distribution Enclosed Single-Pole Air Switches, Fuse Disconnecting Switches, and Accessories.

IEEE Std C37.90.1™-2002, IEEE Standard for Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus.

IEEE Std C37.100™-1992 (Reaff 2001), IEEE Standard Definitions for Power Switchgear.

NEMA 107-1987 (Reaff 1993), Methods of Measurement of Radio Influence Voltage (RIV) of High-Voltage Apparatus.[6]

[6]NEMA publications are available from Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112-5704, USA (http://global.ihs.com/).

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