



IEEE

IEC 62271-111

Edition 2.0 2012-09

INTERNATIONAL STANDARD

IEEE C37.60™



High-voltage switchgear and controlgear –
Part 111: Automatic circuit reclosers and fault interrupters for alternating current
systems up to 38 kV

IEC 62271-111:2012

<https://standards.ieh.ch/catalogue/standards/sst/9c6f072b-7f70-4a79-905b-1e5db16274ce/iec-62271-111-2012>



THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2012 IEEE

All rights reserved. IEEE is a registered trademark in the U.S. Patent & Trademark Office, owned by the Institute of Electrical and Electronics Engineers, Inc.

Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the IEC Central Office.

Any questions about IEEE copyright should be addressed to the IEEE. Enquiries about obtaining additional rights to this publication and other information requests should be addressed to the IEC or your local IEC member National Committee.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland
Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

Institute of Electrical and Electronics Engineers, Inc.
3 Park Avenue
New York, NY 10016-5997
United States of America
stds.info@ieee.org
www.ieee.org

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

Useful links:

IEC publications search - www.iec.ch/searchpub

The advanced search enables you to find IEC publications by a variety of criteria (reference number, text, technical committee,...).

It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available on-line and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary (IEV) on-line.

Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.



IEEE

IEC 62271-111

Edition 2.0 2012-09

INTERNATIONAL STANDARD

IEEE C37.60™



**High-voltage switchgear and controlgear –
Part 111: Automatic circuit reclosers and fault interrupters for alternating current
systems up to 38 kV**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.130.10

ISBN 978-2-83220-332-3

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	11
1 Overview.....	14
1.1 Scope.....	14
1.2 Normative references.....	14
2 Normal and special service conditions.....	15
2.101 General.....	15
2.102 Normal service conditions.....	16
2.102.1 Indoor switchgear and controlgear.....	16
2.102.2 Outdoor switchgear and controlgear.....	16
2.103 Special service conditions.....	17
2.103.1 General.....	17
2.103.2 Altitude.....	17
2.103.3 Pollution.....	17
2.103.4 Temperature and humidity.....	18
2.103.5 Vibrations, shock, or tilting.....	18
2.103.6 Wind speed.....	18
2.103.7 Other special (unusual) service conditions.....	18
3 Terms and definitions.....	18
3.1 General terms.....	19
3.2 Assemblies of switchgear and controlgear.....	21
3.3 Parts of assemblies.....	21
3.4 Switching devices.....	21
3.5 Parts of switchgear and controlgear.....	21
3.6 Operation.....	21
3.7 Characteristic quantities.....	22
3.8 Index of definitions.....	23
4 Ratings.....	23
4.1 Rated voltage (U_r).....	24
4.2 Rated insulation level.....	25
4.3 Rated frequency (f_r).....	26
4.4 Rated normal current and temperature rise.....	26
4.4.1 Rated normal current (I_r).....	26
4.4.2 Temperature rise.....	27
4.4.3 Particular points of Table 4.....	29
4.5 Rated short-time withstand current (I_k).....	30
4.6 Rated peak withstand current (I_p).....	31
4.7 Rated duration of short-circuit (t_k).....	31
4.8 Rated supply voltage of closing and opening devices and of auxiliary and control circuits (U_a).....	31
4.9 Rated supply frequency of closing and opening devices and of auxiliary circuits.....	31
4.10 Rated pressure of compressed gas supply for controlled pressure systems.....	31
4.11 Rated filling levels for insulation and/or operation.....	31
4.101 Rated minimum tripping current ($I_{>min}$).....	31
4.102 Rated symmetrical interrupting current (short-circuit breaking current).....	32

4.103	Transient recovery voltage related to rated symmetrical interrupting current	32
4.103.1	General.....	32
4.103.2	Representation of TRV waves	32
4.103.3	Representation of TRV	33
4.103.4	Standard values of TRV related to the rated short-circuit breaking current	34
4.103.4.1	General.....	34
4.103.4.2	First-pole-to-clear factor (k_{pp}).....	35
4.103.4.3	Rate of rise of recovery voltage (RRRV).....	36
4.104	Rated symmetrical making current (short-circuit making current).....	43
4.105	Rated operating sequence	45
4.106	Rated line and cable charging interrupting currents.....	45
5	Design and construction	45
5.1	Requirements for liquids in switchgear and controlgear	45
5.1.1	Liquid level.....	45
5.1.2	Liquid quality	46
5.1.3	Oil sampling provision (submersible reclosers/FIs).....	46
5.2	Requirements for gases in switchgear and controlgear.....	46
5.3	Earthing of switchgear and controlgear.....	46
5.4	Auxiliary and control equipment.....	46
5.5	Dependent power operation.....	46
5.6	Stored energy operation	46
5.7	Independent manual operation or power operation (independent unlatched operation).....	46
5.8	Operation of releases	47
5.8.1	Shunt closing release	47
5.8.2	Shunt opening release.....	47
5.8.3	Capacitor operation of shunt releases	47
5.8.4	Under-voltage release	47
5.9	Low- and high- pressure interlocking devices and monitoring devices	47
5.10	Nameplates.....	48
5.11	Interlocking devices.....	49
5.12	Position indication	50
5.13	Degrees of protection provided by enclosures	50
5.13.1	Protection of persons against access to hazardous parts and protection of the equipment against ingress of solid foreign objects (IP coding)	50
5.13.2	Protection against ingress of water (IP coding)	50
5.13.3	Protection of equipment against mechanical impact under normal service conditions (IK coding)	50
5.13.101	Enclosure design and coating system requirements	50
5.14	Creepage distances for outdoor insulators.....	50
5.15	Gas and vacuum tightness	51
5.15.1	Controlled pressure systems for gas	51
5.15.2	Closed pressure systems for gas	51
5.15.3	Sealed pressure systems	51
5.15.101	Design and withstand.....	51
5.15.102	Leak rate	51

5.16	Liquid tightness	52
5.17	Fire hazard (flammability)	52
5.18	Electromagnetic compatibility (EMC)	52
5.19	X-ray emission	52
5.101	Tank construction: submersible or dry vault reclosers/FIs	52
5.101.1	Tank material and finish	52
5.101.2	Water entrapment	52
5.101.3	Tank support	52
5.101.4	Lifting lugs	52
5.102	Counters	52
5.103	Conductor terminal sizes	52
5.104	Stored mechanism charge indicator	53
6	Type tests	53
6.1	General	53
6.1.1	Grouping of tests	53
6.1.2	Information for identification of specimens	54
6.1.3	Information to be included in type-test reports	54
6.1.101	Test conditions	55
6.2	Dielectric tests	56
6.2.1	Ambient air conditions during tests	56
6.2.2	Wet test procedure	56
6.2.3	Conditions of switchgear and controlgear during dielectric tests	56
6.2.4	Criteria to pass the test	57
6.2.5	Application of the test voltage and test conditions	57
6.2.6	Tests of switchgear and controlgear of $U_r \leq 245$ kV	57
6.2.7	Test of switchgear and controlgear of $U_r > 245$ kV	58
6.2.8	Artificial pollution tests for outdoor insulators	58
6.3	Radio interference voltage (r.i.v.) test	58
6.4	Measurement of the resistance of circuits	58
6.4.1	Main circuit	58
6.4.2	Auxiliary circuits	59
6.5	Temperature-rise tests	59
6.5.1	Condition of the switchgear and controlgear to be tested	59
6.5.2	Arrangement of the equipment	59
6.5.3	Measurement of the temperature and the temperature rise	60
6.5.4	Ambient air temperature	60
6.5.5	Temperature-rise test of the auxiliary and control equipment	60
6.5.6	Interpretation of the temperature-rise tests	61
6.6	Short time withstand current and peak withstand current tests	61
6.7	Verification of the protection	61
6.8	Tightness tests	61
6.8.1	Controlled pressure systems for gas	61
6.8.2	Closed pressure systems for gas	61
6.8.3	Sealed pressure systems	62
6.8.4	Liquid tightness tests	62
6.9	Electromagnetic compatibility tests (EMC)	62
6.10	Additional tests on auxiliary and control circuits	62

6.11	X-radiation test procedure for vacuum interrupters	62
6.101	Line charging current and cable charging current interruption tests.....	62
6.101.1	Applicability	62
6.101.2	General	63
6.101.3	Characteristics of supply circuits	63
6.101.4	Earthing (grounding) of the supply circuit.....	63
6.101.5	Characteristics of the capacitive circuit to be switched	64
6.101.6	Waveform of the current	64
6.101.7	Test voltage	64
6.101.8	Test current.....	65
6.101.9	Test-duties	65
6.101.10	Criteria to pass the test	67
6.102	Making current capability	67
6.102.1	Test procedure.....	67
6.102.2	Criteria for passing making current tests.....	67
6.103	Rated symmetrical interrupting current tests	67
6.103.1	General.....	67
6.103.2	Interrupting performance.....	69
6.103.3	Verification of rated symmetrical interrupting current.....	69
6.103.4	Standard operating duty test; automatic operation.....	70
6.103.5	Operating duty test; non-reclosing fault interrupters	71
6.103.6	Condition of recloser/FI after operating duty test.....	71
6.104	Critical current tests	71
6.104.1	Applicability	71
6.104.2	Test current.....	71
6.104.3	Critical current test-duty.....	71
6.105	Minimum tripping current tests	72
6.105.1	Test circuit.....	72
6.105.2	Test procedures.....	72
6.106	Partial discharge (corona) tests	72
6.106.1	Test voltages and limits	72
6.106.2	Conditioning of test sample	72
6.106.3	Test equipment and procedure.....	72
6.106.4	Partial discharge test report	73
6.107	Surge current test; series-trip reclosers/FIs	73
6.107.1	General.....	73
6.107.2	Test conditions	73
6.107.3	Test procedure.....	73
6.107.4	Condition after test.....	74
6.108	Time-current tests.....	74
6.108.1	Test conditions	74
6.108.2	Test procedure.....	74
6.108.3	Presentation of data standard time-current curves	74
6.109	Mechanical duty test.....	75
6.109.1	General.....	75
6.109.2	Mechanical duty test	75
6.109.3	Condition of recloser/FI following mechanical operation test	75

6.110	Ice loading test.....	76
6.110.1	General.....	76
6.110.2	Applicability.....	76
6.110.3	Ice formations.....	76
6.110.4	Test program.....	76
6.110.5	Acceptance criteria.....	78
6.111	Control electronic elements surge withstand capability (SWC) tests.....	79
6.111.1	General.....	79
6.111.2	Oscillatory and fast transient surge tests.....	79
6.111.3	Simulated surge arrester operation test.....	79
6.112	Condition of recloser/FI after each test of 6.101, 6.103 and 6.104.....	81
6.112.1	General requirements.....	81
6.112.2	Specific requirement for vacuum interrupters in SF ₆ insulated equipment.....	82
7	Routine tests.....	82
7.1	Dielectric test on the main circuit.....	83
7.2	Tests on auxiliary and control circuits.....	83
7.3	Measurement of the resistance of the main circuit.....	83
7.4	Tightness test.....	83
7.4.1	Sealed pressure systems.....	83
7.4.2	Liquid tightness tests.....	83
7.101	Reclosing and overcurrent trip calibration.....	84
7.102	Partial discharge test.....	84
7.103	Mechanical operations tests.....	84
8	Guide to the selection of switchgear and controlgear.....	84
9	Information to be given with enquiries, tenders and orders.....	85
10	Transport, storage, installation, operation and maintenance.....	85
11	Safety.....	85
12	Influence of the product on the environment.....	85
101	Additional application and test information.....	85
101.1	Field tests on units in-service, including d.c. withstand tests on cables.....	85
101.2	Internal arc classification.....	86
Annex A (informative)	X/R Ratios.....	87
A.1	General.....	87
A.2	Time constant τ and X/R ratio.....	87
A.3	Asymmetrical fault current.....	87
Annex B (informative)	Simulated surge arrester operation test.....	89
B.1	General.....	89
B.2	Simulated surge arrester operation testing.....	89
Annex C (normative)	Method of drawing the envelope of the prospective transient recovery voltage of a circuit and determining the representative parameters.....	93
C.1	General.....	93
C.2	Drawing the envelope.....	93
C.3	Determination of parameters.....	93
Annex D (informative)	Background basis of recloser TRV values.....	95
D.1	General.....	95

D.2	Two parameter TRV	95
D.3	u_c (TRV peak)	97
D.4	Rate of rise of recovery voltage (RRRV)	98
D.5	t_3 (time to reach u_c at the specified RRRV)	98
D.6	Multipliers for TRV values at currents less than the rated short-circuit current	98
Annex E	(normative) Tolerances for test values	100
E.1	General	100
E.2	Type test tolerances	100
Annex F	(informative) Definition for the automatic circuit recloser	103
F.1	Definition of a recloser	103
F.2	Background	103
F.3	Recloser classifications	103
F.4	Recloser operating characteristics	104
Annex G	(informative) Definition for the fault interrupter	105
G.1	Definition of a fault interrupter	105
G.2	Background	105
G.3	Fault interrupter application	105
Annex H	(informative) Basis of derivation of duty factors and standard operating duties	106
H.1	General	106
H.2	Standard operating duty	106
Annex I	(normative) Ratings for oil interrupting reclosers and hydraulically controlled reclosers	109
I.1	General	109
I.2	Rating structure for hydraulically controlled series-trip and oil interrupting reclosers	109
I.2.1	General	109
I.2.2	Rated maximum voltage	109
I.2.3	Rated continuous (normal) current (I_r)	109
I.2.4	Rated minimum tripping current for hydraulically controlled series-trip reclosers	110
I.2.5	Rated symmetrical interrupting current for hydraulically controlled series-trip reclosers and oil interrupting reclosers	110
I.2.6	Rated symmetrical making current	110
I.2.7	Rated operating sequence	110
I.3	Special test considerations for hydraulically controlled series-trip reclosers – Measurement of resistance of main circuit	111
Annex J	(normative) Standard methods for determining the values of a sinusoidal current wave and a power-frequency recovery voltage	115
J.1	General	115
J.2	Currents	115
J.2.1	Significance of r.m.s. values used in the standards on a.c. high-voltage reclosers/FIs	115
J.2.2	Classification of current wave	115
J.2.3	R.m.s. value of a symmetrical sinusoidal wave at a particular instant	115
J.2.4	R.m.s. value of an asymmetrical sinusoidal wave at a particular instant	116
J.2.5	Alternate methods of stating the making current	117

J.2.6	Measurement of the r.m.s. value of a current during a short circuit of several cycles duration	118
J.3	Power-frequency recovery voltage.....	120
Annex K (normative)	Altitude correction factors	121
K.1	General.....	121
K.2	Altitude correction factors.....	121
Annex L (informative)	Comparison of definitions related to the unit operation	123
L.1	General.....	123
L.2	Broader reclose operation	123
Annex M (informative)	Corrosion protection	126
M.1	General.....	126
M.2	Reference documents.....	126
M.3	Other considerations	126
Bibliography	127
Figure 1	– Unit operation	21
Figure 2	– Representation of the specified TRV as a two-parameter line and a delay line	34
Figure 3	– Test circuits for cable-charging or line-charging switching tests (see 6.101.5).....	66
Figure 4	– Three-phase short-circuit representation.....	68
Figure 5	– Surge test circuit.....	81
Figure B.1	– Surge test circuit.....	91
Figure B.2	– Typical surge voltage and current waves.....	92
Figure C.1	– Representation by two parameters of a prospective transient recovery voltage of a test circuit.....	94
Figure D.1	– A TRV waveform as a 1-cosine function of time	96
Figure D.2	– Representation of the specified TRV as a two-parameter line and a delay line.....	96
Figure D.3	– Representation of the specified TRV as a two-parameter line and a delay line compared to a 1-cosine TRV waveform	97
Figure H.1	– Recloser duty factors.....	108
Figure J.1	– Measurement of the r.m.s. value of a symmetrical wave.....	116
Figure J.2	– Measurement of the r.m.s. value of an asymmetrical wave.....	117
Figure J.3	– Determination of the equivalent r.m.s. value of a short-time current.....	119
Figure J.4	– Determination of the power-frequency pole unit recovery voltage	120
Figure K.1	– Altitude correction factors	121
Figure L.1	– Illustration of auto-reclose operation	125
Table 1	– Ratings for automatic circuit recloser, cutout mounted reclosers and fault interrupters	24
Table 2	– Preferred voltage ratings and related test requirements applied on overhead line distribution circuits ^a	25
Table 3	– Preferred voltage ratings and related test requirements for reclosers/FIs applied on cable connected distribution circuits ^a	26
Table 4	– Limits of temperature and temperature rise for various parts and materials of reclosers/FIs (1 of 2).....	28

Table 5 – Listing of tables describing TRV values under different rating conditions	35
Table 6 – Standard values of prospective transient recovery voltage representation by two parameters for three-phase reclosers with rated symmetrical interrupting currents > 4 000 A in overhead line connected circuits	37
Table 7 – Standard values of prospective transient recovery voltage representation by two parameters for single-phase reclosers with symmetrical interrupting currents > 4 000 A in overhead line connected circuit	38
Table 8 – Standard values of prospective transient recovery voltage representation by two parameters for three-phase reclosers with symmetrical interrupting currents > 4 000 A in cable connected systems	39
Table 9 – Standard values of prospective transient recovery voltage representation by two parameters for single-phase reclosers with symmetrical interrupting currents > 4 000 A in cable connected systems	40
Table 10 – Standard values of prospective transient recovery voltage representation by two parameters for three-phase reclosers with symmetrical interrupting currents \leq 4 000 A in both overhead and cable connected systems and three-phase fault interrupters of all interrupting ratings in cable connected systems	41
Table 11 – Standard values of prospective transient recovery voltage representation by two parameters for single-phase reclosers with symmetrical interrupting currents \leq 4 000 A in both overhead and cable connected systems and single-phase fault interrupters of all interrupting ratings in cable connected systems	42
Table 12 – Performance characteristics – Standard operating duty	44
Table 13 – Preferred line and cable charging interrupting current ratings	45
Table 14 – Nameplate markings	49
Table 15 – Example of grouping	54
Table 16 – Size of bare copper leads ^a	59
Table 17 – Size of bare aluminum leads ^a	60
Table 18 – Permissible temporary leakage rates for gas systems	61
Table 19 – Switching test duties	65
Table 20 – Characteristics for electrical disturbance tests	79
Table A.1 – X/R ratios: peak factors and r.m.s. factors	88
Table D.1 – TRV peak multiplier	98
Table D.2 – TRV multipliers for line-connected reclosers/FI	99
Table D.3 – TRV multipliers for cable-connected reclosers/FI	99
Table E.1 – Tolerances on test quantities for type tests	101
Table H.1 – Apportionment of operating duty	106
Table H.2 – Example of apportionment of operating duty factor	107
Table H.3 – Example – Operating duty per interruption	107
Table H.4 – Example – Unit operations at test current levels	107
Table H.5 – Example – Duty Factor	107
Table I.1 – Preferred continuous (normal) current ratings for hydraulically controlled series-trip and oil interrupting reclosers	110
Table I.2 – Preferred values for symmetrical interrupting current ratings of hydraulically controlled series-trip reclosers	112
Table I.3 – Preferred values for symmetrical rated interrupting current, and performance characteristics of single-phase oil interrupting reclosers	113

Table I.4 – Preferred values for rated symmetrical interrupting current, and performance characteristics of three-phase oil interrupting reclosers 114

Table J.1 – Asymmetrical currents tabulated values 118

Table L.1 – Comparison of terms 124

Withheld

iTeh STANDARD PREVIEW
(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/9c6072b-7f70-4a79-905b-1e5db16274ce/iec-62271-111-2012>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 111: Automatic circuit reclosers and fault interrupters for alternating current systems up to 38 kV

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation.

IEEE Standards documents are developed within IEEE Societies and Standards Coordinating Committees of the IEEE Standards Association (IEEE-SA) Standards Board. IEEE develops its standards through a consensus development process, which brings together volunteers representing varied viewpoints and interests to achieve the final product. Volunteers are not necessarily members of IEEE and serve without compensation. While IEEE administers the process and establishes rules to promote fairness in the consensus development process, IEEE does not independently evaluate, test, or verify the accuracy of any of the information contained in its standards. Use of IEEE Standards documents is wholly voluntary. IEEE documents are made available for use subject to important notices and legal disclaimers (see <http://standards.ieee.org/IPR/disclaimers.html> for more information).

IEC collaborates closely with IEEE in accordance with conditions determined by agreement between the two organizations.

- 2) The formal decisions of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees. The formal decisions of IEEE on technical matters, once consensus within IEEE Societies and Standards Coordinating Committees has been reached, is determined by a balanced ballot of materially interested parties who indicate interest in reviewing the proposed standard. Final approval of the IEEE standards document is given by the IEEE Standards Association (IEEE-SA) Standards Board.
- 3) IEC/IEEE Publications have the form of recommendations for international use and are accepted by IEC National Committees/IEEE Societies in that sense. While all reasonable efforts are made to ensure that the technical content of IEC/IEEE Publications is accurate, IEC or IEEE cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications (including IEC/IEEE Publications) transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC/IEEE Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC and IEEE do not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC and IEEE are not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or IEEE or their directors, employees, servants or agents including individual experts and members of technical committees and IEC National Committees, or volunteers of IEEE Societies and the Standards Coordinating Committees of the IEEE Standards Association (IEEE-SA) Standards Board, for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC/IEEE Publication or any other IEC or IEEE Publications.
- 8) Attention is drawn to the normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that implementation of this IEC/IEEE Publication may require use of material 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. IEC or IEEE shall not be held responsible for identifying Essential Patent Claims for which a license may be required, for conducting inquiries into the legal validity or scope of Patent Claims or determining whether any licensing terms or conditions provided in connection with submission of a Letter of Assurance, if any, or in any licensing agreements are reasonable or non-discriminatory. Users of this standard are expressly advised that determination of the validity of any patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

International Standard IEC 62271-111/IEEE Std C37.60 has been jointly revised by Switchgear Committee of the IEEE Power and Energy Society¹, in cooperation with subcommittee 17A: High-voltage switchgear and controlgear, of IEC technical committee 17: Switchgear and controlgear, under the IEC/IEEE Dual Logo Agreement.

This second edition cancels and replaces the first edition, published in 2005, and constitutes a technical revision. The main changes with respect to the previous edition are as follows:

- a) addition of exclusion of devices with dependent manual operation to 1.1;
- b) harmonization of the amplitude factor k_{af} used for calculating the TRV for cable connected systems consistent with recent harmonization of the circuit-breaker standards between IEEE and IEC;
- c) deletion of requirements for radio influence voltage (RIV) tests;
- d) addition of specifications and ratings to cover the cutout recloser and its special requirements.

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

FDIS	Report on voting
17A/1010/FDIS	17A/1020/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, Part 2.

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

This standard is to be read in conjunction with IEC 62271-1:2007, to which it refers and which is applicable unless otherwise specified in this standard. In order to simplify the indication of corresponding requirements, the same numbering of clauses and subclauses is used as in IEC 62271-1. Amendments to these clauses and subclauses are given under the same references whilst additional subclauses are numbered from 101.

¹A list of IEEE participants can be found at the following URL:
http://standards.ieee.org/downloads/C37/C37.60-2012/C37.60-2012_wg-participants.pdf.

The IEC Technical Committee and IEEE Technical Committee have decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

IEC 62271-111:2012

<https://standards.iteh.ai/catalog/standards/sist/9c6b72b-7f70-4a79-905b-1e5db16274ce/iec-62271-111-2012>