BS EN 62271-100:2009+A2:2017
Including corrigendum January 2018

BSI Standards Publication

# High-voltage switchgear and controlgear

Part 100: Alternating-current circuit-breakers (IEC 62271-100:2008)

bsi.

# National foreword

This British Standard is the UK implementation of EN 62271-100:2009, incorporating amendment A1:2012 and including amendment A2:2017. It is identical to IEC 62271-100:2008, incorporating amendment 1:2017 and including amendment 2:2017 and corrigendum January 2018. It supersedes BS EN 62271-100:2009+A1:2012, which is withdrawn.

The start and finish of text introduced or altered by corrigendum is indicated in the text by tags. Text altered by IEC corrigendum December 2012 is indicated in the text by ▌AC1〉 〈AC1▐.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment 1 is indicated by ▌A1〉 〈A1▐.

The text of IEC amendment 2:2017 and IEC corrigendum January 2018 have been provided in their entirety at the beginning of this document. BSI's policy of providing consolidated content remains unchanged; however, in the interest of expediency, in this instance BSI have chosen to collate the relevant content at the beginning of this document.

The UK participation in its preparation was entrusted to Technical Committee PEL/17/1, High-voltage switchgear and controlgear.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.


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**Compliance with a British Standard cannot confer immunity from legal obligations.**

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 July 2009.

**Amendments/corrigenda issued since publication**

| Date | Text affected |
|---|---|
| 30 April 2013 | Implementation of IEC corrigendum December 2012 |
| 30 April 2013 | Implementation of IEC amendment 1:2012 with CENELEC endorsement A1:2012 |
| 30 April 2018 | Implementation of IEC amendment 2:2017 with CENELEC endorsement A2:2017 |
| 30 April 2018 | Implementation of IEC corrigendum January 2018 |

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN 62271-100

April 2009

ICS 29.130.10

Supersedes EN 62271-100:2001 + A1:2002 + A2:2006

English version

## High-voltage switchgear and controlgear - Part 100: Alternating-current circuit-breakers

(IEC 62271-100:2008)

Appareillage à haute tension - Partie 100: Disjoncteurs à courant alternatif (CEI 62271-100:2008)

Hochspannungs-Schaltgeräte und -Schaltanlagen - Teil 100: Wechselstrom-Leistungsschalter (IEC 62271-100:2008)



CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

**Central Secretariat: avenue Marnix 17, B - 1000 Brussels**



Ref. No. EN 62271-100:2009 E

## Foreword

The text of document 17A/815/FDIS, future edition 2 of IEC 62271-100, prepared by SC 17A, High-voltage switchgear and controlgear, of IEC TC 17, Switchgear and controlgear, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62271-100 on 2009-03-01.

This European Standard supersedes EN 62271-100:2001 + A1:2002 + A2:2006 + A2:2006/corrigendum November 2006.

The main changes with respect to EN 62271-100:2001 are listed below:

– introduction of harmonised (IEC and IEEE) TRV waveshapes for rated voltages of 100 kV and above (amendment 1 to EN 62271-100:2001);

– introduction of cable and line systems with their associated TRVs for rated voltages below 100 kV (amendment 2 to EN 62271-100:2001);

– inclusion of IEC 61633 and IEC 62271-308.

This standard shall be read in conjunction with EN 62271-1:2008, 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 EN 62271-1. Amendments to these clauses and subclauses are given under the same references whilst additional subclauses are numbered from 101.

The following dates were fixed:

| | | |
|---|---|---|
| – latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2009-12-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn | (dow) | 2012-03-01 |

Annex ZA has been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 62271-100:2008 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

| | | |
|---|---|---|
| IEC 60044-1 | NOTE | Harmonized as EN 60044-1:1999 (modified). |
| IEC 60044-2 | NOTE | Harmonized as EN 60044-2:1999 (modified). |
| IEC 60077 | NOTE | Harmonized in EN 60077 series (modified). |
| IEC 60099-4 | NOTE | Harmonized as EN 60099-4:2004 (modified). |
| IEC 60143-2 | NOTE | Harmonized as EN 60143-2:1994 (not modified). |
| IEC 62271-109 | NOTE | Harmonized as EN 62271-109:2009 (not modified). |
| IEC 62271-200 | NOTE | Harmonized as EN 62271-200:2004 (not modified). |
| IEC 62271-203 | NOTE | Harmonized as EN 62271-203:2004 (not modified). |

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN 62271-100/A1

December 2012

ICS 29.130.10

English version

# High-voltage switchgear and controlgear - Part 100: Alternating-current circuit-breakers

(IEC 62271-100:2008/A1:2012)

Appareillage à haute tension - Partie 100: Disjoncteurs à courant alternatif (CEI 62271-100:2008/A1:2012)

Hochspannungs-Schaltgeräte und -Schaltanlagen - Teil 100: Wechselstrom-Leistungsschalter (IEC 62271-100:2008/A1:2012)

This amendment A1 modifies the European Standard EN 62271-100:2009; it was approved by CENELEC on 2012-11-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This amendment exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

**Management Centre: Avenue Marnix 17, B - 1000 Brussels**



Ref. No. EN 62271-100:2009/A1:2012 E

## Foreword

The text of document 17A/1009/FDIS, future edition 1 of IEC 62271-100:2008/A1, prepared by SC 17A, "High-voltage switchgear and controlgear", of IEC TC 17, "Switchgear and controlgear" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62271-100:2009/A1:2012.

The following dates are fixed:

| | | |
|---|---|---|
| • latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2013-08-01 |
| • latest date by which the national standards conflicting with the document have to be withdrawn | (dow) | 2015-11-01 |

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

## Endorsement notice

The text of the International Standard IEC 62271-100:2008/A1:2012 was approved by CENELEC as a European Standard without any modification.

In the Bibliography of EN 62271-100:2009:

- replace reference to EN 62271-203 by the following note:

| | | |
|---|---|---|
| IEC 62271-203:2011 | NOTE | Harmonized as EN 62271-203:2012 (not modified). |

- add the following note:

| | | |
|---|---|---|
| IEC 60071-1:2006 + A1:2010 | NOTE | Harmonized as EN 60071-1:2006 + A1:2010 (not modified). |

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

**EN 62271-100:2009/A2**

September 2017

ICS 29.130.10

English Version

# High-voltage switchgear and controlgear - Part 100: Alternating-current circuit-breakers (IEC 62271-100:2008/A2:2017)

Appareillage à haute tension - Partie 100: Disjoncteurs à courant alternatif (IEC 62271-100:2008/A2:2017)

Hochspannungs-Schaltgeräte und -Schaltanlagen - Teil 100: Wechselstrom-Leistungsschalter (IEC 62271-100:2008/A2:2017)

This amendment A2 modifies the European Standard EN 62271-100:2009; it was approved by CENELEC on 2017-07-20. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This amendment exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.


European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**



Ref. No. EN 62271-100:2009/A2:2017 E

## European foreword

The text of document 17A/1135/FDIS, future edition of IEC 62271-100:2009/A2, prepared by SC 17A "High-voltage switchgear and controlgear" of IEC/TC 17 "Switchgear and controlgear" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62271-100:2009/A2:2017.

The following dates are fixed:

| | | |
|---|---|---|
| • latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2018-04-20 |
| • latest date by which the national standards conflicting with the document have to be withdrawn | (dow) | 2020-07-20 |

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

## Endorsement notice

The text of the International Standard IEC 62271-100:2009/A2:2017 was approved by CENELEC as a European Standard without any modification.

# Annex ZA
(normative)

## Normative references to international publications with their corresponding European publications

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) applies.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| IEC 60050-151 | 2001 | International Electrotechnical Vocabulary (IEV) - Part 151: Electrical and magnetic devices | - | - |
| IEC 60050-441 | 1984 | International Electrotechnical Vocabulary (IEV) - Chapter 441: Switchgear, controlgear and fuses | - | - |
| IEC 60050-601 | 1985 | International Electrotechnical Vocabulary (IEV) - Chapter 601: Generation, transmission and distribution of electricity - General | - | - |
| IEC 60050-604 | 1987 | International Electrotechnical Vocabulary (IEV) - Chapter 604: Generation, transmission and distribution of electricity - Operation | - | - |
| IEC 60059 | - [1)] | IEC standard current ratings | EN 60059 | 1999 [2)] |
| IEC 60060-1<br>+ corr. March | 1989<br>1990 | High-voltage test techniques - Part 1: General definitions and test requirements | HD 588.1 S1 | 1991 |
| IEC 60071-2 | - [1)] | Insulation co-ordination - Part 2: Application guide | EN 60071-2 | 1997 [2)] |
| IEC 60137 | - [1)] | Insulated bushings for alternating voltages above 1 000 V | EN 60137 | 2008 [2)] |
| IEC 60255-3<br>(mod) | 1989 | Electrical relays - - Part 3: Single input energizing quantity measuring relays with dependent or independent time | EN 60255-3<br>+ corr. January | 1998<br>1998 |
| IEC 60296 | - [1)] | Fluids for electrotechnical applications - Unused mineral insulating oils for transformers and switchgear | EN 60296<br>+ corr. September | 2004 [2)]<br>2004 |
| IEC 60376 | - [1)] | Specification of technical grade sulfur hexafluoride ($SF_6$) for use in electrical equipment | EN 60376 | 2005 [2)] |
| IEC 60480 | - [1)] | Guidelines for the checking and treatment of sulphur hexafluoride ($SF_6$) taken from electrical equipment and specification for its re-use | EN 60480 | 2004 [2)] |

[1)] Undated reference.

[2)] Valid edition at date of issue.

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| IEC 60529 | - [1)] | Degrees of protection provided by enclosures (IP Code) | EN 60529<br>+ corr. May | 1991 [2)]<br>1993 |
| IEC/TS 61634 | - [1)] | High-voltage switchgear and controlgear - Use and handling of sulphur hexafluoride ($SF_6$) in high-voltage switchgear and controlgear | - | - |
| IEC 62271-1 | 2007 | High-voltage switchgear and controlgear - Part 1: Common specifications | EN 62271-1 | 2008 |
| IEC 62271-101 | 2006 | High-voltage switchgear and controlgear - Part 101: Synthetic testing | EN 62271-101 | 2006 |
| IEC 62271-102<br>+ corr. April<br>+ corr. May | 2001<br>2002<br>2003 | High-voltage switchgear and controlgear - Part 102: Alternating current disconnectors and earthing switches | EN 62271-102<br>+ corr. March | 2002<br>2005 |
| IEC 62271-110 | - [1)] | High-voltage switchgear and controlgear - Part 110: Inductive load switching | EN 62271-110 | 2005 [2)] |

## Annex ZA
(normative)
## Normative references to international publications with their corresponding European publications

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

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| IEC 60137 | 2008 | Insulated bushings for alternating voltages above 1 000 V | EN 60137 | 2008 |
| IEC 60270 | - | High-voltage test techniques - Partial discharge measurements | EN 60270 | - |

IEC 62271-100

Edition 2.0 2017-06

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

colour inside

AMENDMENT 2
AMENDEMENT 2

## High-voltage switchgear and controlgear – Part 100: Alternating-current circuit-breakers

## Appareillage à haute tension – Partie 100: Disjoncteurs à courant alternatif

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

ICS 29.130.10

ISBN 978-2-8322-4357-2

# FOREWORD

This amendment has been prepared by subcommittee 17A: Switching devices, of IEC technical committee 17: High-voltage switchgear and controlgear.

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

| FDIS | Report on voting |
|---|---|
| 17A/1135/FDIS | 17A/1139/RVD |

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

The committee has decided that the contents of this amendment and the base 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.

The contents of the corrigendum of January 2018 have been included in this copy.

**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.**

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# INTRODUCTION to the Amendment

This amendment includes the following significant technical changes:

– the rated TRV has been replaced by a rated first-pole-to-clear factor;

– the rated time quantities have been moved to Clause 5 (Design and construction) and are no longer ratings. The determination of the break time has been moved to IEC 62271-306;

– the number of test specimens has been removed;

– new test procedure for test-duty T100a;

– TRVs for circuit-breakers having a rated voltage of 52 kV and below used in effectively earthed neutral systems have been added;

– 6.111 (capacitive current switching) has been rewritten;

– a number of informative annexes have been moved to IEC TR 62271-306.

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### 1.1 Scope

*Add, after the third existing paragraph, the following paragraph:*

This standard only covers direct testing.

### 1.2 Normative references

*Replace, in the existing list, the reference to IEC 60137 by the following new reference:*

IEC 60137:2008, *Insulated bushings for alternating voltages above 1 000 V*

*Add, to the existing list, the following reference:*

IEC 60270, *High-voltage test techniques – Partial discharge measurements*

## 3 Terms and definitions

**3.1.132**
**cable system**

*Replace the existing references to "*Table 1*" (2 occurrences) to "*Tables 24 and 44*".*

**3.1.133**
**line system**
*Replace the existing definition by the following new definition, without modifying the notes.*

system in which the TRV during breaking of terminal fault at 100 % of short-circuit breaking current does not exceed the two-parameter envelope derived from Tables 25 and 45 of this standard

*Add, after the existing definition 3.1.133, the following new terms and definitions:*

**3.1.134**
**belted cable**
multi-conductor cable in which part of the insulation is applied to each conductor individually, and the remainder is applied over the assembled cores

[IEV 461-06-11]

**3.1.135**
**individually screened cable**
**radial field cable**
cable in which each core is covered with an individual screen

[IEV 461-06-12]

**3.4.120**
**circuit-breaker class S2**

*Replace the existing definition by the following new definition:*

circuit-breaker used in a line-system

*Add, after definition 3.4.120, the following new term and definition:*