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High-voltage switchgear and controlgear – Part 107: Alternating current fused circuit-switchers for rated voltages above 1 kV up to and including 52 kV

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 107: Alternating current fused circuit-switchers for rated voltages above 1 kV up to and including 52 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. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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This Redline version is not an official Standard and is intended to provide the user with an indication of what changes have been made to the previous version. Only the IEC International Standard provided in this package is to be considered the official Standard.

This Redline version provides you with a quick and easy way to compare all the changes between this standard and its previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 62271-107 has been prepared by subcommittee 17A: Switching devices, of IEC technical committee 17: High-voltage switchgear and controlgear

This third edition cancels and replaces the second edition published in 2012. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) technical changes introduced by the second edition of IEC 62271-1 are applied, where relevant;
b) rated TRV is removed and TRV is now treated as a test parameter, as in IEC 62271-100;
c) the term "thermal current" is no longer used; the rated continuous current is linked to the installed fuse-links, and values shall be provided by the manufacturer together with the list of the acceptable fuse-links; for tests purpose, the highest rated continuous current listed is referred, where previously the wording was "rated maximum thermal current", for consistency with IEC 62271-105;
d) making and breaking test duties are independent type tests (as some may be omitted if the switching device has been validated as a load-break switch). However, TD_{It0} and TD_{Ilow} are kept as a sequence as they are linked to the same rated value (I_{t0});
e) differentiation has been introduced between requirements expressed for fulfilling the function expected from a fused circuit-switcher, from requirements only relevant when the function is performed by a stand-alone device. The goal is to avoid duplication or conflicts of requirements with a standard dealing with assemblies, when the function is implemented within such an assembly.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
17A/1216/FDIS	17A/1227/RVD

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

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

This International Standard is to be read in conjunction with IEC 62271-1:2017, to which it refers and which is applicable unless otherwise specified. 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 numbering, whilst additional subclauses, are numbered from 101.

Particular conditions existing in certain countries are listed in Annex B.

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

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
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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 publication using a colour printer.

INTRODUCTION

Earthing switches forming an integral part of a circuit-switcher are covered by IEC 62271-102 [1][1].

Installation in enclosure, if any, is covered either by IEC 62271-200 [2] or by IEC 62271-201 [3].

1 Numbers in square brackets refer to the Bibliography.

HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 107: Alternating current fused circuit-switchers for rated voltages above 1 kV up to and including 52 kV

~~1 General~~

1 Scope

~~Subclause 1.1 of IEC 62271-1:2007 is not applicable, and is replaced as follows.~~

~~This part of IEC 62271 applies to three-pole operated units for distribution systems that are functional assemblies of a circuit-switcher and current-limiting fuses designed so as to be capable of:~~

~~– breaking, at the rated recovery voltage, any load or fault current up to and including the rated short-circuit breaking current;~~

~~– making, at the rated voltage, circuits to which the rated short-circuit breaking current applies.~~

This part of IEC 62271 applies to three-pole-operated fused circuit-switchers designed with rated voltages above 1 kV up to and including 52 kV for use on three-phase alternating current systems of either 50 Hz or 60 Hz.

They can be designed either as stand-alone devices, or be embedded in a switchgear and controlgear assembly.

They are intended to be used for circuits or applications requiring only a normal mechanical and electrical endurance capability. Such applications cover protection of HV/LV transformers for instance, but exclude distribution lines or cables, as well as motor circuits and capacitor bank circuits.

Short-circuit conditions with low currents, up to the fused circuit-switcher rated take-over current, are dealt with by supplementary devices (strikers, relays, etc.), properly arranged, tripping the circuit-switcher. Current-limiting fuses are incorporated in order to ensure that the short-circuit breaking capacity of the device is above that of the circuit-switcher alone.

NOTE 1 In this document, the term "fuse" is used to designate either the fuse or the fuse-link where the general meaning of the text does not result in ambiguity.

~~This standard applies to fused circuit-switchers designed with rated voltages above 1 kV up to and including 52 kV for use on three-phase alternating current systems of either 50 Hz or 60 Hz. Comparison with other existing switching devices is provided in Clause 8.~~

NOTE 2 Other circuit-switchers exist; see reference [4].

Devices that require a dependent manual operation are not covered by this document.

~~Fuses are covered by IEC 60282-1.~~

~~Earthing switches forming an integral part of a circuit-switcher are covered by IEC 62271-102.~~

~~Installation in enclosure, if any, is covered either by IEC 62271-200 or by IEC 62271-201.~~

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 60282-1:2009, *High-voltage fuses – Part 1: Current-limiting fuses*
IEC 60282-1:2009/AMD1:2014

IEC 62271-1:~~2007~~2017, *High-voltage switchgear and controlgear – Part 1: Common specifications*

IEC 62271-100:2008, *High-voltage switchgear and controlgear – Part 100: Alternating-current circuit-breakers*
IEC 62271-100:2008/AMD1:2012
IEC 62271-100:2008/AMD2:2017

~~IEC 62271-102:2001, *High-voltage switchgear and controlgear – Part 102: Alternating current disconnectors and earthing switches*~~

IEC 62271-103:2011, *High-voltage switchgear and controlgear – Part 103: Switches for rated voltages above 1 kV up to and including 52 kV*

IEC 62271-105:2012, *High-voltage switchgear and controlgear – Part 105: Alternating current switch-fuse combinations for rated voltages above 1 kV up to and including 52 kV*

~~IEC 62271-200, *High-voltage switchgear and controlgear – Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV*~~

~~IEC 62271-201, *High-voltage switchgear and controlgear – Part 201: AC insulation-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV*~~

IEC 62271-107

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INTERNATIONAL STANDARD

NORME INTERNATIONALE

High-voltage switchgear and controlgear –
Part 107: Alternating current fused circuit-switchers for rated voltages above 1 kV up to and including 52 kV

Appareillage à haute tension –
Partie 107: Circuits-switchers à fusibles pour courant alternatif de tension assignée supérieure à 1 kV et jusqu'à 52 kV inclus



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Part 107: Alternating current fused circuit-switchers for rated voltages above 1 kV up to and including 52 kV

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International Standard IEC 62271-107 has been prepared by subcommittee 17A: Switching devices, of IEC technical committee 17: High-voltage switchgear and controlgear

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a) technical changes introduced by the second edition of IEC 62271-1 are applied, where relevant;
b) rated TRV is removed and TRV is now treated as a test parameter, as in IEC 62271-100;
c) the term "thermal current" is no longer used; the rated continuous current is linked to the installed fuse-links, and values shall be provided by the manufacturer together with the list of the acceptable fuse-links; for tests purpose, the highest rated continuous current listed

is referred, where previously the wording was "rated maximum thermal current", for consistency with IEC 62271-105;

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- amended.

INTRODUCTION

Earthing switches forming an integral part of a circuit-switcher are covered by IEC 62271-102 [1][1].

Installation in enclosure, if any, is covered either by IEC 62271-200 [2] or by IEC 62271-201 [3].

1 Numbers in square brackets refer to the Bibliography.

HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 107: Alternating current fused circuit-switchers for rated voltages above 1 kV up to and including 52 kV

1 Scope

This part of IEC 62271 applies to three-pole-operated fused circuit-switchers designed with rated voltages above 1 kV up to and including 52 kV for use on three-phase alternating current systems of either 50 Hz or 60 Hz.

They can be designed either as stand-alone devices, or be embedded in a switchgear and controlgear assembly.

They are intended to be used for circuits or applications requiring only a normal mechanical and electrical endurance capability. Such applications cover protection of HV/LV transformers for instance, but exclude distribution lines or cables, as well as motor circuits and capacitor bank circuits.

Short-circuit conditions with low currents, up to the fused circuit-switcher rated take-over current, are dealt with by supplementary devices (strikers, relays, etc.), properly arranged, tripping the circuit-switcher. Current-limiting fuses are incorporated in order to ensure that the short-circuit breaking capacity of the device is above that of the circuit-switcher alone.

NOTE 1 In this document, the term "fuse" is used to designate either the fuse or the fuse-link where the general meaning of the text does not result in ambiguity.

NOTE 2 Other circuit-switchers exist; see reference [4].

Devices that require a dependent manual operation are not covered by this document.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 60282-1:2009, *High-voltage fuses – Part 1: Current-limiting fuses*
IEC 60282-1:2009/AMD1:2014

IEC 62271-1:2017, *High-voltage switchgear and controlgear – Part 1: Common specifications*

IEC 62271-100:2008, *High-voltage switchgear and controlgear – Part 100: Alternating-current circuit-breakers*
IEC 62271-100:2008/AMD1:2012
IEC 62271-100:2008/AMD2:2017

IEC 62271-103:2011, *High-voltage switchgear and controlgear – Part 103: Switches for rated voltages above 1 kV up to and including 52 kV*

IEC 62271-105:2012, *High-voltage switchgear and controlgear – Part 105: Alternating current switch-fuse combinations for rated voltages above 1 kV up to and including 52 kV*

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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APPAREILLAGE À HAUTE TENSION –

Partie 107: Circuits-switchers à fusibles pour courant alternatif de tension assignée supérieure à 1 kV et jusqu'à 52 kV inclus

AVANT-PROPOS

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La Norme internationale IEC 62271-107 a été établie par le sous-comité 17A: Appareils de connexion, du comité d'études 17 de l'IEC: Appareillage haute tension.

Cette troisième édition annule et remplace la deuxième édition parue en 2012. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

a) les modifications techniques introduites par la deuxième édition de l'IEC 62271-1 sont appliquées, lorsqu'elles sont pertinentes;
b) la TTR assignée est supprimée et la TTR est maintenant traitée comme un paramètre d'essai, comme dans l'IEC 62271-100;

c) le terme "courant thermique" n'est plus employé; le courant permanent assigné est lié aux éléments de remplacement installés, et les valeurs doivent être fournies par le constructeur ainsi que la liste des éléments de remplacement acceptables; pour les besoins des essais, le courant continu assigné le plus élevé est indiqué dans la liste, en lieu et place du terme "valeur de courant thermique maximal assignée" à des fins de cohérence avec l'IEC 62271-105;

d) les séries d'essais d'établissement et de coupure sont des essais de type indépendants (certains peuvent être omis si l'appareil de coupure a été validé en tant qu'interrupteur de charge). Cependant, TD_{lt0} et TD_{llow} sont conservés sous forme de séquence car ils sont liés à la même valeur assignée (I_{t0});

e) une distinction est désormais faite entre les exigences formulées pour remplir la fonction attendue d'un circuit-switcher à fusibles, et celles uniquement pertinentes lorsque la fonction est assurée par un appareil autonome. L'objectif est d'éviter la duplication ou les conflits d'exigences avec une norme traitant des ensembles, lorsque la fonction est mise en œuvre au sein d'un tel ensemble.

Le texte de cette Norme internationale est issu des documents suivants:

FDIS	Rapport de vote
17A/1216/FDIS	17A/1227/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

Cette norme doit être lue conjointement avec l'IEC 62271-1:2017, à laquelle elle se réfère et qui est applicable sauf indication contraire. Afin de simplifier l'indication des exigences correspondantes, la numérotation des articles et paragraphes utilisée est la même que celle de l'IEC 62271-1. Les amendements à ces articles et paragraphes reprennent la même numérotation, et les paragraphes supplémentaires sont numérotés à partir de 101.

Une liste des conditions particulières existant dans certains pays est donnée à l'Annexe B.

Une liste de toutes les parties de la série IEC 62271, publiées sous le titre général *Appareillage à haute tension*, peut être consultée sur le site web de l'IEC.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "http://webstore.iec.ch" dans les données relatives au document recherché. A cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

INTRODUCTION

Les sectionneurs de terre faisant partie intégrale d'un circuit-switcher sont couverts par l'IEC 62271-102 [1][1].

L'installation sous enveloppe, le cas échéant, est couverte soit par l'IEC 62271-200 [2], soit par l'IEC 62271-201 [3].

1 Les nombres entre crochets se réfèrent à la Bibliographie.

APPAREILLAGE À HAUTE TENSION –

Partie 107: Circuits-switchers à fusibles pour courant alternatif de tension assignée supérieure à 1 kV et jusqu'à 52 kV inclus

1 Domaine d'application

La présente partie de l'IEC 62271 s'applique aux circuits-switchers à fusibles à manœuvre tripolaire conçus avec des tensions assignées supérieures à 1 kV et inférieures ou égales à 52 kV, pour utilisation sur des réseaux alternatifs triphasés de fréquence 50 Hz ou 60 Hz.

Ils peuvent être soit conçus sous forme d'appareils autonomes, soit intégrés dans un ensemble d'appareillage.

Ils sont destinés à être utilisés dans des circuits ou des applications qui ne nécessitent qu'une endurance mécanique et électrique normale. De telles applications couvrent, par exemple, la protection des transformateurs HT/BT, mais excluent les circuits de distribution en lignes ou en câbles ainsi que les circuits de moteurs et de bancs de condensateurs.

Les conditions de défaut de court-circuit avec de faibles courants, jusqu'au courant d'intersection assigné du circuit-switcher à fusibles, sont gérées par des dispositifs complémentaires (percuteurs, relais, etc.), correctement mis en œuvre, déclenchant le circuit-switcher. Les fusibles limiteurs de courant sont intégrés de manière à assurer que le pouvoir de coupure en court-circuit du dispositif est supérieur à celui du circuit-switcher seul.

NOTE 1 Dans le présent document, le mot "fusible" est utilisé pour désigner soit le fusible, soit l'élément de remplacement, quand le sens général du texte ne comporte aucune ambiguïté.

NOTE 2 Il existe d'autres circuits-switchers; voir référence [4].

Les dispositifs qui exigent une manœuvre manuelle dépendante ne sont pas couverts par le présent document.

2 Références normatives

Les documents suivants sont cités dans le texte de sorte qu'ils constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60282-1:2009, *Fusibles à haute tension – Partie 1: Fusibles limiteurs de courant*
IEC 60282-1:2009/AMD1:2014

IEC 62271-1:2017, *Appareillage à haute tension – Partie 1: Spécifications communes pour appareillage à courant alternatif*

IEC 62271-100:2008, *Appareillage à haute tension – Partie 100: Disjoncteurs à courant alternatif*
IEC 62271-100:2008/AMD1:2012
IEC 62271-100:2008/AMD2:2017

IEC 62271-103:2011, *Appareillage à haute tension – Partie 103: Interrupteurs pour tensions assignées supérieures à 1 kV et inférieures ou égales à 52 kV*

IEC 62271-105:2012, *Appareillage à haute tension – Partie 105: Combinés interrupteurs-fusibles pour courant alternatif de tensions assignées supérieures à 1 kV et jusqu'à 52 kV inclus*