INTERNATIONAL STANDARD

IEC 62271-200

First edition
2003-11

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

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International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

FOREWORD

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International Standard IEC 62271-200 has been prepared by subcommittee 17C: High-voltage switchgear and controlgear assemblies, of IEC technical committee 17: Switchgear and controlgear.

This first edition of IEC 62271-200 cancels and replaces the third edition of IEC 60298, published in 1990, and constitutes a technical revision.

Significant technical changes from the third edition of IEC 60298 are as follows:

This revised document has been basically changed to be updated to today's use of high-voltage switchgear and controlgear up to 52 kV. The main changes are: new definitions and classification of equipment, introduction of internal arc classes (IAC) and its testing.

This standard is to be read in conjunction with IEC 60694[1] published in 1996. Clause numbering follows the clause numbering of that standard. Additional subclauses, as they relate to a particular clause or subclause from IEC 60694, are numbered 101, 102, etc.

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

FDIS	Report on voting
17C/311/FDIS	17C/315/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.

The committee has decided that the contents of this publication will remain unchanged until 2009. At this date, the publication will be

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- withdrawn;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

[1] IEC 60694 (1996) will be replaced by IEC 62271-1 as soon as available.

COMMON NUMBERING OF IEC 62271 PUBLICATIONS FALLING UNDER THE RESPONSIBILITY OF SUBCOMMITTEES SC 17A AND SC 17C

In accordance with the decision taken at the joint SC 17A/SC 17C meeting in Frankfurt, June 1998 (item 20.7 of 17A/535/RM), a common numbering system has been established for the publications falling under the responsibility of SC 17A and SC 17C. IEC 62271 – *High-voltage switchgear and controlgear* is the publication number and main title element for the common publications.

The numbering of these publications will apply the following principle.

a) Common standards prepared by SC 17A and SC 17C will start with IEC 62271-1.

b) Standards of SC 17A will start with IEC 62271-100.

c) Standards of SC 17C will start with number IEC 62271-200.

d) Publications prepared by SC 17A and SC 17C will start with number IEC 62271-300.

The table below relates the new numbers to the old numbers. The parts numbered (xxx) will be given a final number pending the decision to publish the revised publication as standard or technical report.

Common numbering of IEC 62271 publications falling under the responsibility of subcommittees SC 17A and SC 17C

IEC 62271 series	HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR	Old IEC number, if any
Part	New title	
1	Common specifications	IEC 60694
2	Seismic qualification for rated voltages of 72,5 kV and above	-
100	High-voltage alternating current circuit-breakers	IEC 60056
101	Synthetic testing	IEC 60427
102	High-voltage alternating current disconnectors and earthing switches	IEC 60129
103	Switches for rated voltages above 1 kV and less than 52 kV	IEC 60265-1
104	Switches for rated voltages of 52 kV and above	IEC 60265-2
105	Alternating current switch-fuse combinations	IEC 60420
106	Alternating current contactors and contactor-based motor-starters	IEC 60470
107	Alternating current switchgear-fuse combinations	-
108	Switchgear having combined functions	-
109	Series capacitor by-pass switches	-
200	AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV	IEC 60298
201	Insulation-enclosed switchgear and controlgear for rated voltages up to and including 52 kV	IEC 60466
202	High-voltage/low-voltage prefabricated substations	IEC 61330
203	Gas-insulated metal-enclosed switchgear for rated voltages above 52 kV	IEC 60517
204	High-voltage gas-insulated transmission lines for rated voltages of 72,5 kV and above	IEC 61640
(300)	Guide for seismic qualification of high-voltage alternating current circuit-breakers	IEC 61166
(301)	Guide for inductive load switching	IEC 61233
(302)	Guide for short-circuit and switching test procedures for metal-enclosed and dead tank circuit-breakers	IEC 61633
(303)	Use and handling of sulphur hexafluoride (SF_6) in high-voltage switchgear and controlgear	IEC 61634
(304)	Additional requirements for enclosed switchgear and controlgear from 1 kV to 72,5 kV to be used in severe climatic conditions	IEC 60932
(305)	Cable connections for gas-insulated metal-enclosed switchgear for rated voltages above 52 kV	IEC 60859
(306)	Direct connection between power transformers and gas-insulated metal-enclosed switchgear for rated voltages above 52 kV	IEC 61639
(307)	Use of electronic and associated technologies in auxiliary equipment of switchgear and controlgear	IEC 62063
308	Guide for asymmetrical short-circuit breaking test duty T100a	–
309	TRV parameters for high-voltage switchgear and controlgear for rated voltages above 1 kV and less than 100 kV	-
310	Electrical endurance testing for circuit-breakers rated 72,5 kV and above	-

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

1 General

1.1 Scope

This part of IEC 62271 specifies requirements for factory-assembled, metal-enclosed switchgear and controlgear for alternating current of rated voltages above 1 kV and up to and including 52 kV for indoor and outdoor installation, and for service frequencies up to and including 60 Hz. Enclosures may include fixed and removable components and may be filled with fluid (liquid or gas) to provide insulation.

NOTE 1 Although primarily dedicated to three-phase systems, this standard can also be applied to single-phase or two-phase systems.

This standard defines several types of metal enclosed switchgear and controlgear which differ due to

– the consequences on network service continuity in case of maintenance on the switchgear and controlgear;

– the need and convenience of maintenance of the equipment.

NOTE 2 Safety of an installation results from the design, implementation and coordination of products, installations and operations.

For metal-enclosed switchgear and controlgear containing gas-filled compartments, the design pressure is limited to a maximum of 300 kPa (relative pressure).

NOTE 3 Gas-filled compartments having a design pressure exceeding 300 kPa (relative pressure) should be designed and tested in accordance with IEC 60517.

Metal-enclosed switchgear and controlgear for special use, for example, in flammable atmospheres, in mines or on board ships, may be subject to additional requirements.

Components contained in metal-enclosed switchgear and controlgear are to be designed and tested in accordance with their various relevant standards. This standard supplements the standards for the individual components regarding their installation in switchgear and controlgear assemblies.

This standard does not preclude that other equipment may be included in the same enclosure. In such a case, any possible influence of that equipment on the switchgear and controlgear is to be taken into account.

NOTE 4 Switchgear and controlgear assemblies having an insulation enclosure are covered by IEC 60466.

NOTE 5 Metal-enclosed switchgear and controlgear for rated voltages above 52 kV insulated by ambient air may be covered by this standard taking into account the insulation levels of IEC 60694.

1.2 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) applies.

IEC 60050(151):2001, *International Electrotechnical Vocabulary – Chapter 151: Electrical and magnetic devices*

IEC 60050(441):1984, *International Electrotechnical Vocabulary – Chapter 441: Switchgear, controlgear and fuses*

IEC 60060-1:1989, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60243-1:1998, *Electrical strength of insulating materials – Test methods – Part 1: Tests at power frequencies*

IEC 60265-1:1998, *High-voltage switches – Part 1: Switches for rated voltages above 1 kV and less than 52 kV*

IEC 60270:2000, *High-voltage test techniques – Partial discharge measurements*

IEC 60466:1987, *AC insulation-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 38 kV*

IEC 60470:2000, *High-voltage alternating current contactors and contactor-based motor-starters*

IEC 60480:1974, *Guide to the checking of sulphur hexafluoride (SF_6) taken from electrical equipment*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60694:1996, *Common specifications for high-voltage switchgear and controlgear standards*

IEC 60909-0:2001, *Short-circuit currents in three-phase a.c. systems – Part 0: Calculation of currents*

IEC 60932:1988, *Additional requirements for enclosed switchgear and controlgear from 1 kV to 72,5 kV to be used in severe climatic conditions*

IEC 61634:1995, *High-voltage switchgear and controlgear – Use and handling of sulphur hexafluoride (SF_6) in high-voltage switchgear and controlgear*

IEC 62271-100:2001, *High-voltage alternating-current circuit-breakers*

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

IEC 62271-105:2002, *High-voltage switchgear and controlgear – Part 105: Alternating current switch-fuse combinations*

ISO/IEC Guide 51:1999, *Safety aspects – Guidelines for their inclusion in standards*

2 Normal and special service conditions

Clause 2 of IEC 60694 is applicable with the following addition:

Unless otherwise specified in this standard, the metal-enclosed switchgear and controlgear is designed to be used under normal service conditions.

3 Terms and definitions

For the purposes of this document, the following definitions as well as the definitions of IEC 60050(441), IEC 60050(151) and IEC 60694 apply, except where indicated. Some standard definitions are recalled here for ease of reference.

Additional definitions are classified so as to be aligned with the classification system used in IEC 60050(441).

3.101
switchgear and controlgear
general term covering switching devices and their combination with associated control, measuring, protective and regulating equipment, also assemblies of such devices and equipment with associated interconnections, accessories, enclosures and supporting structures

[IEV 441-11-01]

3.102
metal-enclosed switchgear and controlgear
switchgear and controlgear assemblies with an external metal enclosure intended to be earthed and completely assembled, except for external connections

[IEV 441-12-04, modified]

3.103
functional unit (of an assembly)
part of metal-enclosed switchgear and controlgear comprising all the components of the main circuits and auxiliary circuits that contribute to the fulfilment of a single function

[IEV 441-13-04, modified]

NOTE Functional units may be distinguished according to the function for which they are intended, for example, incoming unit, outgoing unit, etc.

3.104
multi-tier
two or more functional units arranged vertically within a single enclosure

3.105
transport unit
part of metal-enclosed switchgear and controlgear suitable for shipment without being dismantled

3.106
enclosure
part of metal-enclosed switchgear and controlgear providing a specified degree of protection of equipment against external influences and a specified degree of protection against approach to or contact with live parts and against contact with moving parts

[IEV 441-13-01 modified]

3.107
compartment
part of metal-enclosed switchgear and controlgear enclosed except for openings necessary for interconnection, control or ventilation

[IEV 441-13-05, modified]

Four types of compartments are distinguished, three that can be opened, called accessible (see 3.107.1 to 3.107.3) and one that cannot be opened, called non-accessible (see 3.107.4)

NOTE Compartments are identified according to the main component(s) contained therein (refer to 5.103.1).

3.107.1
interlock-controlled accessible compartment
compartment containing high-voltage parts, intended to be opened for normal operation and/or normal maintenance as stated by the manufacturer, in which access is controlled by integral design of the switchgear and controlgear

NOTE Installation, extension, repairing, etc. are not considered as normal maintenance.

3.107.2
procedure-based accessible compartment
compartment containing high-voltage parts, intended to be opened for normal operation and/or normal maintenance as stated by the manufacturer, in which access is controlled by a suitable procedure combined with locking

NOTE Installation, extension, repairing, etc. are not considered as normal maintenance.

3.107.3
tool-based accessible compartment
compartment containing high-voltage parts, that may be opened, but not for normal operation and maintenance. Special procedures are required. Tools are necessary for opening

3.107.4
non-accessible compartment
compartment containing high-voltage parts that must not be opened. Opening may destroy the integrity of the compartment. Clear indication not to open is provided on/by the compartment

3.108
partition
part of metal-enclosed switchgear and controlgear separating one compartment from other compartments

[IEV 441-13-06, modified]

3.109
partition class
class defining whether metallic or non-metallic material for separation to live parts is used

3.109.1
partition class PM
metal-enclosed switchgear and controlgear providing continuous metallic partitions and/or shutters (if applicable), intended to be earthed, between opened accessible compartments and live parts of the main circuit