

INTERNATIONAL STANDARD

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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

Appareillage à haute tension –
Partie 200: Appareillage sous enveloppe métallique pour courant alternatif de
tensions assignées supérieures à 1 kV et inférieures ou égales à 52 kV



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**High-voltage switchgear and controlgear –
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above 1 kV and up to and including 52 kV**

[IEC 62271-200:2021](#)

**Appareillage à haute tension –
Partie 200: Appareillage sous enveloppe métallique pour courant alternatif de
tensions assignées supérieures à 1 kV et inférieures ou égales à 52 kV**

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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**

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

This third edition cancels and replaces the second edition published in 2011. This edition constitutes a technical revision.

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

- a) clause numbering aligned with IEC 62271-1:2017, including the adoption of the subclause names of Clause 3;
- b) in Clause 3 specific definitions are added for "in service", "normal operating condition" and "normal use";
- c) internal arc testing on pole-mounted switchgear is taken out of this document, as it is now covered by the specific standard IEC 62271-214:2019;

- d) a more precise description of earthing circuit is given with the inclusion of ratings and test requirements;
- e) number of mechanical tests on interlocks is reduced for type testing; a more precise description of forces to apply during type testing is given (refer to 7.102);
- f) resistance measuring on main circuit is only needed before continuous current tests (as reference for routine tests) and no longer needed after this continuous current test. Rationale for this deletion is that this measured resistance does not mean anything; as the temperature rise test was just finished, a new temperature rise test will not give new information;
- g) IEC 62271-100:2021, IEC 62271-103:2021, IEC 62271-105:2021 and IEC 62271-106:2021 are referred to in the document;
- h) IEC 62271-107:2019 and IEC IEEE 62271-37-013:2015 are also considered in 7.101.2;
- i) a more precise description of LSC category is given with the inclusion of an explanatory flowchart (Annex D);
- j) examples not covered by the IAC test are transferred from Clause 6 to 9.103;
- k) the term "assembly" is defined in Clause 3 and used as synonym for "metal-enclosed switchgear and controlgear" in this document;
- l) "metallic" is replaced by "metal" where applicable;
- m) 6.105 is now covered by 7.7;
- n) a 1 s rule was introduced for Criterion 4 during IAC tests regarding hot gases versus glowing particles as cause of ignition;
- o) a more precise description of internal arc tests for switchgear with protrusions is given in Annex A.

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

| IEC 62271-200:2021 | |
|---|------------------|
| https://standards.iteh.ai/catalog/standards/si/20245862818-47e2-adae-1d8a1c/iec-62271-200-2021 | Report on voting |
| 17C/782/FDIS | 17C/792/RVD |

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

This document should 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 62271-1:2017. Amendments to these clauses and subclauses are given under the same numbering, whilst additional subclauses, are numbered from 101.

The reader's attention is drawn to the fact that Annex C lists all of the "in-some-country" clauses on differing practices of a less permanent nature relating to the subject of this document.

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 webstore.iec.ch in the data related to the specific document. At this date, the document will be

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INTRODUCTION

High-voltage (IEC 60050-601:1985, 601-01-27) switchgear refers to rated voltages above 1 kV. However, medium-voltage is commonly used for distribution systems with rated voltages above 1 kV and generally applied up to and including 52 kV; refer to IEC 60050-601:1985, 601-01-28 [1]¹.

Although primarily dedicated to three-phase systems, this document can also be applied to single-phase and two-phase systems.

Switchgear and controlgear assemblies having a solid-insulation enclosure are covered by IEC 62271-201.

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<https://standards.iteh.ai/catalog/standards/sist/2e245f8f-25f4-47e2-adae-fe0cce1d8a1c/iec-62271-200-2021>

¹ Numbers in square brackets refer to the Bibliography.

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 Scope

This part of IEC 62271 is applicable to prefabricated metal-enclosed switchgear and controlgear assemblies designed for:

- alternating current;
- rated voltages above 1 kV and up to and including 52 kV;
- service frequencies up to and including 60 Hz;
- indoor and outdoor installation.

The assembly can include air-insulated and/or fluid-filled compartments.

For components installed in a metal-enclosed switchgear and controlgear, this document supplements or even replaces in some cases, the requirements as stated by the individual product standards.

The list of components which can be inside the metal-enclosed switchgear and controlgear is not limited to the ones explicitly cited in this document.

2 Normative references

[IEC 62271-200:2021](https://standards.iteh.ai/catalog/standards/sist/2e245f8f-25f4-47e2-adae-fe0cce1d8a1c/iec-62271-200-2021)

<https://standards.iteh.ai/catalog/standards/sist/2e245f8f-25f4-47e2-adae-fe0cce1d8a1c/iec-62271-200-2021>

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 60050-151, *International Electrotechnical Vocabulary (IEV) – Part 151: Electrical and magnetic devices* (available at <http://www.electropedia.org>)

IEC 60050-441, *International Electrotechnical Vocabulary (IEV) – Part 441: Switchgear, controlgear and fuses* (available at <http://www.electropedia.org>)

IEC 60060-1:2010, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60270:2000, *High-voltage test techniques – Partial discharge measurements*
IEC 60270:2000/AMD1:2015

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

IEC 60529:1989/AMD1:1999

IEC 60529:1989/AMD2:2013

IEC 62262:2002, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*

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

IEC 62271-100:2021, *High-voltage switchgear and controlgear – Part 100: Alternating-current circuit-breakers*

IEC 62271-102:2018, *High-voltage switchgear and controlgear – Part 102: Alternating current disconnectors and earthing switches*

IEC 62271-103:2021, *High-voltage switchgear and controlgear – Part 103: Switches for rated voltages above 1 kV up to and including 52 kV*

IEC 62271-105:2021, *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 62271-106:2021, *High-voltage switchgear and controlgear – Part 106: Alternating current contactors, contactor-based controllers and motor-starters*

IEC 62271-107:2019, *High-voltage switchgear and controlgear – Part 107: Alternating current fused circuit-switchers for rated voltages above 1 kV up to and including 52 kV*

IEC 62271-201:2014, *High-voltage switchgear and controlgear – Part 201: AC solid-insulation enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV*

IEC 62271-203:2011, *High-voltage switchgear and controlgear – Part 203: Gas-insulated metal-enclosed switchgear for rated voltages above 52 kV*

IEC 62271-213:2021, *High-voltage switchgear and controlgear – Part 213: Voltage detecting and indicating system*

IEC 62271-215:2021, *High-voltage switchgear and controlgear – Part 215: Phase comparator used with VDIS*

IEC IEEE 62271-37-013:2015, *High-voltage switchgear and controlgear – Part 37-013: Alternating-current generator circuit-breakers*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 62271-1, IEC 60050-151 and IEC 60050-441, and the following apply.

NOTE The classification system for definitions of IEC 62271-1:2017 is followed. Terms and definitions are referenced and prioritized in the following order:

- Clause 3 of this document;
- IEC 62271-1:2017;
- IEC 60050-441;
- IEC 60050-151.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 General terms and definitions

The definitions in 3.1 of IEC 62271-1:2017 are applicable, with the following additions and/or modifications:

3.1.101**ambient air temperature**

<of an assembly> temperature, determined under specified conditions, of the air surrounding the enclosure of an assembly

[SOURCE: IEC 60050-441:1984, 441-11-13, modified – "prescribed" has been replaced by "specified", "complete switching device or fuse" by "enclosure of an assembly" and the note has been removed.]

3.1.102**disruptive discharge**

phenomenon associated with the failure of insulation under electric stress, in which the discharge completely bridges the insulation under test, reducing the voltage between the electrodes to zero or nearly to zero

Note 1 to entry: The term is applicable to discharges in solid, liquid and gaseous dielectrics and to combinations of these.

Note 2 to entry: A disruptive discharge in a solid dielectric produces permanent loss of dielectric strength (non-self-restoring insulation); in a liquid or gaseous dielectric, the loss can be only temporary (self-restoring insulation).

Note 3 to entry: The term "sparkover" is used when a disruptive discharge occurs in a gaseous or liquid dielectric. The term "flashover" is used when a disruptive discharge occurs over the surface of a solid dielectric in gaseous or liquid medium. The term "puncture" is used when a disruptive discharge occurs through a solid dielectric.

3.1.103**relative pressure**

pressure that refers to the local atmospheric pressure

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Note 1 to entry: When defining a filling level it is in reference to the standard atmospheric pressure of 101,3 kPa, as defined in IEC 62271-1.

[IEC 62271-200:2021](https://standards.iteh.ai/catalog/standards/sist/2e245f8f-25f4-47e2-adae-fe0cce1d8a1c/iec-62271-200-2021)

3.1.104**segregation**

<of conductors> arrangement of conductors with earthed metal interposed between them in such a manner that disruptive discharges can only occur to earth

<https://standards.iteh.ai/catalog/standards/sist/2e245f8f-25f4-47e2-adae-fe0cce1d8a1c/iec-62271-200-2021>

Note 1 to entry: A segregation can be established between the conductors as well as between the open contacts of a switching device like a disconnecter.

Note 2 to entry: This definition does not specify any mechanical protection (IP and IK).

[SOURCE: IEC 60050-441:1984, 441-11-11, modified – Notes to entry have been added.]

3.1.105**in service**

<condition of an assembly> condition where at least one high voltage part in the assembly is energized

3.1.106**normal operating condition**

<of an assembly> in service condition with all doors and covers properly closed and secured

3.1.107**normal use**

<of an assembly> use of the assembly as defined by the manufacturer's instructions reference, corresponding to the conditions and operations in service

Note 1 to entry: "normal use" may include maintenance activities within an accessible high-voltage compartment.

3.2 Assemblies of switchgear and controlgear

The definitions in 3.2 of IEC 62271-1:2017 are applicable, with the following additions and/or modifications:

3.2.101

metal-enclosed switchgear and controlgear assembly

switchgear and controlgear assemblies with a metal enclosure intended to be earthed, and complete except for external connections

Note 1 to entry: This term generally is applicable to high-voltage switchgear and controlgear.

Note 2 to entry: The term "external connections" corresponds to "external conductors (cables or bars) connecting the assembly to the network or an external installation".

[SOURCE: IEC 60050-441:1984, 441-12-04, modified – The second preferred term "assembly" and Note 2 to entry have been added and in the definition "external" has been deleted.]

3.2.102

multi-tier design

design of an assembly in which the main switching devices of two or more functional units are arranged vertically (one above the other) within a common enclosure

3.3 Parts of assemblies

The definitions in 3.3 of IEC 62271-1:2017 are applicable.

3.4 Switching devices

The definitions in 3.4 of IEC 62271-1:2017 are applicable.

3.5 Parts of switchgear and controlgear

The definitions in 3.5 of IEC 62271-1:2017 are applicable, with the following additions and/or modifications:

3.5.101

enclosure

<of an assembly> part of an assembly 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

[SOURCE: IEC 60050-441:1984, 441-13-01]

3.5.102

metal enclosure

<of an assembly> outermost enclosure made of metal, which can be composed of several elements, enclosing all high-voltage parts

3.5.103

functional unit

<of an assembly> part of an assembly comprising the main circuits, earthing circuit and auxiliary circuits that contribute to the fulfilment of a single function

Note 1 to entry: Functional units can be distinguished according to the function for which they are intended, e.g., incoming unit, through which electrical energy is normally fed into the assembly, outgoing unit, through which electrical energy is normally supplied to one or more external circuits