

Australian Standard<sup>®</sup>

**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**



This Australian Standard® was prepared by Committee EL-007, Power Switchgear. It was approved on behalf of the Council of Standards Australia on 8 November 2007. This Standard was published on 31 January 2008.

---

The following are represented on Committee EL-007:

- Australian British Chamber of Commerce
  - Australian Electrical and Electronic Manufacturers Association
  - Australian Railway Association
  - Energy Networks Association
  - Engineers Australia
  - Testing interests
- 

This Standard was issued in draft form for comment as DR 07145.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

---

### **Keeping Standards up-to-date**

Australian Standards® are living documents that reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued.

Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments that may have been published since the Standard was published.

Detailed information about Australian Standards, drafts, amendments and new projects can be found by visiting [www.standards.org.au](http://www.standards.org.au)

Standards Australia welcomes suggestions for improvements, and encourages readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact us via email at [mail@standards.org.au](mailto:mail@standards.org.au), or write to Standards Australia, GPO Box 476, Sydney, NSW 2001.

---

Australian Standard<sup>®</sup>

**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**

Originated as AS 2264—1979.  
Previous edition 1995.  
Revised and redesignated as AS 62271.201—2008.

**COPYRIGHT**

© Standards Australia

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher.

Published by Standards Australia GPO Box 476, Sydney, NSW 2001, Australia

ISBN 0 7337 8520 4

## PREFACE

This Standard was prepared by the Standards Australia Committee EL-007, Power Switchgear to supersede AS 2264—1995, *A.C. insulation-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 38 kV*.

The objective of this Standard is to provide requirements for alternating current insulation-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV.

This Standard is identical with, and has been reproduced from IEC 62271-201, Ed. 1.0 (2006), *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*.

### Common numbering of Standards falling under the responsibility of EL-007

In accordance with the decision taken by Committee EL-007, a common numbering system will be established in order to align the numbering of Australian Standards falling under the responsibility of EL-007 with IEC Standards. All high-voltage switchgear and controlgear Standards will, at their next revision (or as equivalent Standards become available in IEC), become parts of the AS 62271 (*High-voltage switchgear and controlgear*) series. The table below gives the relationship between future numbering and existing Standard numbers. Standards current at the time of publication of this Standard are marked with an asterisk (\*).

AS 62271 Series	High-voltage switchgear and controlgear	Previous AS Number
1	Common specifications	*AS 2650
100*	High-voltage alternating-current circuit-breakers	AS 2006
102*	Alternating current disconnectors and earthing switches	AS 1306
103	Switches for rated voltages above 1 kV and less than 52 kV	*AS/NZS 60265.1
104	Switches for rated voltages of 52 kV and above	*AS 60265.2
105	Alternating current switch-fuse combinations	*AS 2024
106	Alternating current contactors and contactor-based motor-starters	*AS 60470
110*	Inductive load switching	AS 4372
200*	AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV	AS 2086
201*	AC insulation-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV	AS 2264
202*	High-voltage/low voltage prefabricated substations	AS 61330
203*	Gas-insulated metal-enclosed switchgear for rated voltages above 52 kV	AS 2263
301*	Dimensional standardization of terminals	AS 2395
303	Use and handling of sulphur hexafluoride (SF <sub>6</sub> ) in high-voltage switchgear and controlgear	*AS 2791
304	Additional requirements for enclosed switchgear and controlgear from 1 kV to 72.5 kV to be used in severe climatic conditions	*AS 4243
308*	Guide for asymmetrical short-circuit breaking test duty T100a	—

As this Standard is reproduced from an International Standard, the following applies:

- (a) Its number does not appear on each page of text and its identity is shown only on the cover and title page.
- (b) In the source text 'IEC 62271-201' should read 'AS 62271.201'.
- (c) A full point should be substituted for a comma when referring to a decimal marker.

The terms 'normative' and 'informative' are used to define the application of the annex to which they apply. A normative annex is an integral part of a standard, whereas an informative annex is only for information and guidance.

## CONTENTS

	<i>Page</i>
1 General.....	1
1.1 Scope .....	1
1.2 Normative references.....	1
2 Normal and special service conditions .....	3
3 Terms and definitions.....	3
4 Ratings .....	9
4.1 Rated voltage ( $U_r$ ).....	9
4.2 Rated insulation level.....	10
4.3 Rated frequency ( $f_r$ ) .....	10
4.4 Rated normal current and temperature rise .....	10
4.5 Rated short-time withstand current ( $I_k$ ).....	10
4.6 Rated peak withstand current ( $I_p$ ).....	10
4.7 Rated duration of short circuit ( $t_k$ ) .....	10
4.8 Rated supply voltage of closing and opening devices and of auxiliary and control circuits ( $U_a$ ) .....	11
4.9 Rated supply frequency of operating devices and of auxiliary and control circuits .....	11
4.10 Rated pressure of compressed gas supply for insulation and/or operation .....	11
5 Design and construction.....	11
5.1 Requirements for liquids in switchgear and controlgear.....	11
5.2 Requirements for gases in switchgear and controlgear .....	11
5.3 Earthing of switchgear and controlgear .....	12
5.4 Auxiliary and control equipment .....	13
5.5 Dependent power closing.....	13
5.6 Stored energy closing .....	13
5.7 Independent manual operation .....	13
5.8 Operation of releases.....	13
5.9 Low- and high-pressure interlocking and monitoring devices.....	13
5.10 Nameplates.....	13
5.11 Interlocking devices .....	15
5.12 Position indication.....	15
5.13 Degrees of protection by enclosures .....	15
5.14 Creepage distances .....	16
5.15 Gas and vacuum tightness.....	16
5.16 Liquid tightness.....	16
5.17 Flammability .....	16
5.18 Electromagnetic compatibility (EMC).....	16
5.101 Internal fault .....	16
5.102 Insulation enclosure.....	17
5.103 Compartments .....	20
5.104 Removable parts.....	22
5.105 Provisions for dielectric tests on cables .....	22
6 Type tests .....	23
6.1 General.....	23
6.2 Dielectric tests .....	24
6.3 Radio interference voltage (r.i.v.) test .....	28
6.4 Measurement of the resistance of circuits .....	28
6.5 Temperature-rise tests.....	29

	<i>Page</i>
6.6	Short-time withstand current and peak withstand current tests ..... 30
6.7	Verification of the protection ..... 31
6.8	Tightness tests ..... 32
6.9	Electromagnetic compatibility tests (EMC) ..... 32
6.10	Additional tests on auxiliary and control circuits ..... 32
6.102	Mechanical operation tests ..... 33
6.103	Pressure withstand test for gas-filled compartments..... 33
6.104	Tests to prove the protection of persons against electric shock..... 34
6.105	Internal arcing test..... 35
6.106	Thermal stability test..... 36
6.107	Humidity test..... 36
7	Routine tests..... 37
7.1	Dielectric tests on the main circuit..... 37
7.2	Tests on auxiliary and control circuits ..... 37
7.3	Measurement of the resistance of the main circuit..... 38
7.4	Tightness test ..... 38
7.5	Design and visual checks..... 38
7.101	Partial discharge measurement..... 38
7.102	Mechanical operation tests ..... 38
7.103	Pressure tests of gas-filled compartments..... 38
7.104	Tests of auxiliary electrical, pneumatic and hydraulic devices ..... 38
7.105	Tests after erection on site..... 39
7.106	Measurement of fluid condition after filling on site..... 39
8	Guide to the selection of insulation-enclosed switchgear and controlgear for service..... 39
8.1	Selection of rated values..... 40
8.2	Selection of design and construction..... 40
8.3	Internal arc classification ..... 42
9	Information to be given with enquiries, tenders and orders..... 47
9.101	Information to be given with enquiries and orders ..... 47
9.102	Information to be given with tenders..... 48
10	Rules for transport, storage, erection and maintenance..... 48
10.1	Conditions during transport, storage and erection ..... 48
10.2	Installation ..... 48
10.3	Operation..... 49
10.4	Maintenance ..... 49
11	Safety ..... 49
11.101	Procedures ..... 49
11.102	Internal arc aspects ..... 49
12	Influence of the product on the environment..... 49
Annex A (normative)	Internal fault – Method for testing the insulation-enclosed switchgear and controlgear under conditions of arcing due to an internal fault ..... 51
Annex B (normative)	Partial discharge measurement..... 65
Annex C (normative)	Humidity test ..... 70
Annex D (informative)	Protection grades ..... 74
Bibliography	..... 76

## STANDARDS AUSTRALIA

---

**Australian Standard****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**

---

**1 General****1.1 Scope**

This part of IEC 62271 specifies requirements for factory-assembled insulation-enclosed switchgear and controlgear for alternating current of rated voltages above 1 kV and up to and including 52 kV for indoor installation and for service frequencies up to and including 60 Hz.

Insulation-enclosed switchgear and controlgear complying with this standard can, in principle, be safely touched.

Insulation-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 insulation-enclosed switchgear and controlgear should 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 should be taken into account.

NOTE Switchgear and controlgear assemblies having a metal enclosure are covered by IEC 62271-200.

**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.

References to international standards that are struck through in this clause are replaced by references to Australian or Australian/New Zealand Standards that are listed immediately thereafter and identified by shading. Any Australian or Australian/New Zealand Standard that is identical to the International Standard it replaces is identified as such.

~~IEC 60050-151:1978, International Electrotechnical Vocabulary (IEV)—Electrical and magnetic devices~~

AS 1852.151, *International electrotechnical vocabulary—Electric and magnetic devices* (identical to IEC 60050-151:1978)

~~IEC 60050-441:1984, International Electrotechnical Vocabulary (IEV)—Switchgear, controlgear and fuses~~

AS 1852.441, *International electrotechnical vocabulary—Switchgear, controlgear and fuses* (identical to IEC 60050-441:1984)