

INTERNATIONAL STANDARD



This extended version of IEC 60669-2-4:2024 includes the content of the references made to IEC 60669-1:2017

**Switches for household and similar fixed electrical installations –
Part 2-4: Particular requirements – Isolating switches**

Document Preview

[IEC 60669-2-4:2024](https://standards.iteh.ai/catalog/standards/iec/67d2b624-df9c-4e52-b0e1-11756beaf536/iec-60669-2-4-2024)

<https://standards.iteh.ai/catalog/standards/iec/67d2b624-df9c-4e52-b0e1-11756beaf536/iec-60669-2-4-2024>



THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2024 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

International Standards
Document Preview

[IEC 60669-2-4:2024](https://standards.iteh.ai/catalog/standards/iec/67d2b624-df9c-4e52-b0e1-11756beaf536/iec-60669-2-4-2024)

<https://standards.iteh.ai/catalog/standards/iec/67d2b624-df9c-4e52-b0e1-11756beaf536/iec-60669-2-4-2024>



IEC 60669-2-4

Edition 2.0 2024-03
EXTENDED VERSION

INTERNATIONAL STANDARD



This extended version of IEC 60669-2-4:2024 includes the content of the references made to IEC 60669-1:2017

**Switches for household and similar fixed electrical installations –
Part 2-4: Particular requirements – Isolating switches**

Document Preview

[IEC 60669-2-4:2024](https://standards.iteh.ai/catalog/standards/iec/67d2b624-df9c-4e52-b0e1-11756beaf536/iec-60669-2-4-2024)

<https://standards.iteh.ai/catalog/standards/iec/67d2b624-df9c-4e52-b0e1-11756beaf536/iec-60669-2-4-2024>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.120.40

ISBN 978-2-8322-8543-5

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	8
1 Scope.....	11
2 Normative references	12
3 Terms and definitions	13
4 General requirements	18
5 General remarks on tests	18
6 Ratings.....	21
6.1 Rated voltage	21
6.2 Rated current.....	21
6.3 Preferred combinations of number of poles and ratings.....	21
6.101 Standard and preferred values of the rated conditional short-circuit current (I_{nc}).....	22
6.101.1 Values up to and including 10 000 A.....	22
6.101.2 Values above 10 000 A.....	22
7 Classification.....	22
8 Marking	24
8.1 General.....	24
8.2 Symbols.....	25
8.3 Visibility of markings	26
8.4 Marking on terminals for phase conductors	26
8.5 Marking on terminals for neutral and earth conductors	27
8.6 Marking of the switch position	27
8.7 Additional requirements for marking.....	28
8.8 Durability	28
9 Checking of dimensions.....	28
10 Protection against electric shock	28
10.1 Prevention of access to live parts.....	28
10.2 Requirements for operating parts.....	29
10.3 Requirements for accessible metal parts.....	29
10.4 Requirements for insulation of the mechanism	30
10.5 Requirements for insulation of the mechanism with respect to the surrounding environment	30
10.6 Requirements for switches operated indirectly	30
10.7 Requirements for switches with replaceable pull cord	31
11 Provision for earthing	31
11.1 General.....	31
11.2 Earthing terminals.....	31
11.3 Requirements for surface-type switches.....	31
11.4 Test for earthing connection.....	31
12 Terminals	32
12.1 General.....	32
12.2 Terminals with screw clamping for external copper conductors	32
12.3 Screwless terminals for external copper conductors.....	38
13 Constructional requirements	43
13.1 Mechanical requirements for insulating means.....	43
13.2 Installation requirements.....	44

13.3	Fixing of covers, cover plates and actuating members	45
13.4	Openings in normal use	46
13.5	Attachment of knobs	46
13.6	Mounting means	47
13.7	Combination of switches	47
13.8	Accessories combined with switches	47
13.9	Surface-type switches having an IP code higher than IP20	47
13.10	Installation in a box	48
13.11	Connection of a second current-carrying conductor	48
13.12	Inlet openings	48
13.13	Provision for back entry from a conduit	50
13.14	Switch provided with membranes or the like for inlet openings	50
13.15	Requirements for membranes in inlet openings	50
13.16	Pilot light units	51
13.101	Indication of the contact position	51
14	Mechanism	51
14.1	Indication of the position	51
14.2	Rest and intermediate position	51
14.3	Undue arcing	52
14.4	Making and breaking	52
14.5	Action of the mechanism without cover or cover plate	52
14.6	Pull force for cord-operated switches	52
15	Resistance to ageing, protection provided by enclosures of switches and resistance to humidity	52
15.1	Resistance to ageing	52
15.2	Protection provided by enclosures of switches	53
15.2.1	General	53
15.2.2	Protection against access to hazardous parts and against harmful effects due to ingress of solid foreign objects	53
15.2.3	Protection against harmful effects due to ingress of water	54
15.3	Resistance to humidity	55
16	Insulation resistance and electric strength	56
16.1	General	56
16.2	Test for measuring the insulation resistance	56
16.3	Electric strength test	58
16.101	Impulse voltage test	59
17	Temperature rise	60
17.1	General	60
17.2	Switches incorporating pilot lights	62
18	Making and breaking capacity	62
18.1	General	62
18.2	Overload	63
18.3	Overload test with filament lamps	64
18.101	Short-circuit withstand capability tests	65
18.101.1	General	65
18.101.2	General conditions for test	65
18.101.3	Verification of the co-ordination between the isolating switch and the SCPD	68
19	Normal operation	69

19.1	Test for switches intended for inductive loads	69
19.2	Test for switches intended for externally ballasted lamp loads	71
19.3	Test for switches intended for self ballasted lamp loads	74
20	Mechanical strength	77
20.1	General.....	77
20.2	Pendulum hammer test	77
20.3	Test on the main parts of surface-type switches.....	79
20.4	Screwed glands	80
20.5	Covers, cover plates or actuating members – accessibility to live parts.....	80
20.5.1	General	80
20.5.2	Verification of the non-removal of covers, cover plates or actuating members	80
20.5.3	Verification of the removal of covers, cover plates or actuating members.....	81
20.6	Covers, cover plates or actuating members – accessibility to non-earthed metal parts separated from live parts	81
20.7	Covers, cover plates or actuating members – accessibility to insulating parts, earthed metal parts, the live parts of SELV ≤ 25 V AC and 60 V DC or metal parts separated from live parts	81
20.8	Covers, cover plates or actuating members – application of gauges.....	81
20.9	Grooves, holes and reverse tapers	81
20.10	Additional test for cord-operated switch	82
21	Resistance to heat.....	82
21.1	General.....	82
21.2	Basic heating test	82
21.3	Ball-pressure test on parts of insulating material necessary to retain current-carrying parts and parts of the earthing circuit in position.....	83
21.4	Ball-pressure test on parts of insulating material not necessary to retain current-carrying parts and parts of the earthing circuit in position.....	83
22	Screws, current-carrying parts and connections.....	83
22.1	General.....	83
22.2	Correct insertion of screws	84
22.3	Contact pressure of electrical connections	84
22.4	Screws and rivets used both as electrical and mechanical connections.....	84
22.5	Material of current-carrying parts	85
22.6	Contacts subjected to sliding actions	85
22.7	Thread-forming and thread-cutting screws	86
23	Creepage distances, clearances and distances through sealing compound.....	86
23.1	General.....	86
23.2	Insulating compound.....	88
24	Resistance of insulating material to abnormal heat, to fire and to tracking	88
24.1	Resistance to abnormal heat and to fire	88
24.2	Resistance to tracking.....	89
25	Resistance to rusting	90
26	EMC requirements	90
26.1	Immunity	90
26.2	Emission	90
Annex A (normative)	Additional requirements for switches having facilities for the outlet and retention of flexible cables	116

Annex B (informative) Changes planned for the future in order to align IEC 60669-1 with the requirements of IEC 60998 (all parts), IEC 60999 (all parts) and IEC 60228	119
Annex C (informative) Circuit development (19.3)	120
C.1 Rationale	120
C.2 I_{peak} and I^2t for normal operation tests	120
C.2.1 General	120
C.2.2 Switching a single lamp	120
C.2.3 Switching multiple lamps	122
Annex D (informative) Additional requirements for insulation-piercing terminals	124
Annex E (informative) Additional requirements and tests for switches intended to be used at a temperature lower than -5 °C	134
Annex AA (informative) Determination of short-circuit power factor	136
AA.1 General	136
AA.2 Method I – Determination from DC component	136
AA.3 Method II – Determination with pilot generator	136
Annex BB (informative) SCPDs for short-circuit tests	137
BB.1 General	137
BB.2 Silver wires	137
BB.3 Fuses	137
BB.4 Other means	137
Bibliography	138
Figure 1 – Pillar terminals	91
Figure 2 – Screw head terminals and stud terminals	93
Figure 3 – Saddle terminals	94
Figure 4 – Lug terminals	95
Figure 5 – Mantle terminals	96
Figure 6 – Thread-forming screw	96
Figure 7 – Thread-cutting screw	96
Figure 8 – Classification according to connections	97
Figure 9 – Test apparatus for checking damage to conductors	98
Figure 10 – Information for deflection test	99
Figure 11 – Circuit diagrams for making and breaking capacity and normal operation	100
Figure 12 – Circuit diagrams for testing switches	101
Figure 13 – Arrangement for test on cover-plates	101
Figure 14 – Gauge (thickness: about 2 mm) for the verification of the outline of covers, cover-plates or actuating members	102
Figure 15 – Example of application of the gauge of Figure 14 on covers fixed without screws on a mounting surface or supporting surface	103
Figure 16 – Examples of applications of the gauge of Figure 14 in accordance with the requirements of 20.8	104
Figure 17 – Gauge for verification of grooves, holes and reverse tapers	105
Figure 18 – Sketch showing the direction of application of the gauge of Figure 17	105
Figure 19 – Ball-pressure apparatus	106
Figure 20 – Determining parts of insulating material to be tested – Diagrammatic representation (see 24.1)	106

Figure 21 – Test wall in accordance with the requirements of 15.2.3.....	107
Figure 22 – Direction for the conductor pull of 30 N for 1 min.....	109
Figure 23 – Examples of membranes and grommets.....	110
Figure 101 – Test circuit for verification of the short-circuit withstand capability with an SCPD of one-pole isolating switch.....	111
Figure 102 – Test circuit for verification of the short-circuit withstand capability with an SCPD of a two-pole isolating switch.....	112
Figure 103 – Test circuit for verification of the short-circuit withstand capability with an SCPD of a three-pole isolating switch.....	113
Figure 104 – Test circuit for verification of the short-circuit withstand capability with an SCPD of a four-pole isolating switch.....	114
Figure 105 – Test apparatus for verification of the minimum I^2t and I_n values to be withstood by the isolating switch.....	115
Figure C.1 – 120 V 15 W (LT spice model).....	121
Figure C.2 – 230 V 15 W (LT spice model).....	122
Figure C.3 – Model for multiple lamp loads.....	123
Figure C.4 – I_{peak} and I^2t for multiple lamp loads.....	123
Figure D.1 – Example of insulation-piercing terminals.....	132
Figure D.2 – Example of test-points.....	132
Figure D.3 – Temperature cycle for the voltage drop test of 12.4.11.....	133
Table 1 – Number of specimens needed for the tests.....	19
Table 2 – Relationship between rated current of the switch and rated power of the SBL circuit.....	21
Table 3 – Preferred combinations of numbers of poles and ratings.....	22
Table 4 – Relationship between rated currents and connectable cross-sectional areas of copper conductors.....	32
Table 5 – Tightening torque for the verification of the mechanical strength of screw-type terminals.....	34
Table 6 – Test values for flexion and pull out for copper conductors.....	35
Table 7 – Test values for pulling out test.....	36
Table 8 – Relationship between rated currents and connectable cross-sectional areas of copper conductors for screwless terminals.....	38
Table 9 – Test current for the verification of electrical and thermal stresses in normal use of screwless terminals.....	41
Table 10 – Cross-sectional areas of rigid copper conductors for deflection test of screwless terminals.....	43
Table 11 – Deflection test forces.....	43
Table 12 – Forces to be applied to covers, cover-plates or actuating members whose fixing is not dependent on screws.....	46
Table 13 – External cable diameter limits for surface type switches.....	49
Table 14 – Points of application of the test voltage for the verification of insulation resistance and electric strength.....	56
Table 15 – Test voltage, points of application and minimum values of insulating resistance for the verification of electric strength.....	59
Table 101 – Test voltage and corresponding altitudes.....	60
Table 16 – Temperature-rise test currents and cross-sectional areas of copper conductors.....	61

Table 17 – Fractions of total number of operations.....	64
Table 102 – Minimum values of I^2t and I_p	66
Table 103 – Power factors for short-circuit tests	67
Table 18 – Number of operations for normal operation test.....	69
Table 19 – Values for I_{peak} and I^2t depending on the type of distribution system	74
Table 20 – Calculated circuit parameters	75
Table 21 – Height of fall for impact test.....	78
Table 22 – Torque for the verification of the mechanical strength of glands	80
Table 23 – Creepage distances, clearances and distances through insulating sealing compound.....	86
Table A.1 – Limits of external dimensions of flexible cables.....	117
Table C.1 – Lamp	120
Table D.1 – Specimens needed for Clause 12 for insulation-piercing terminals (IPTs)	125
Table D.2 – Relationship between rated currents and connectable cross-sectional areas of copper conductors for insulation-piercing terminals	127
Table D.3 – Test current for the verification of electrical and thermal stresses in normal use of insulation-piercing terminals	131
Table BB.1 – Indication of silver wire diameters as a function of rated currents and short-circuit currents	137

iteh Standards
(<https://standards.iteh.ai>)
Document Preview

[IEC 60669-2-4:2024](https://standards.iteh.ai/catalog/standards/iec/67d2b624-df9c-4e52-b0e1-11756beaf536/iec-60669-2-4-2024)

<https://standards.iteh.ai/catalog/standards/iec/67d2b624-df9c-4e52-b0e1-11756beaf536/iec-60669-2-4-2024>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SWITCHES FOR HOUSEHOLD AND SIMILAR
FIXED ELECTRICAL INSTALLATIONS –****Part 2-4: Particular requirements –
Isolating switches**

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.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

This extended version (EXV) of the official IEC Standard provides the user with the comprehensive content of the Standard.

IEC 60669-2-4:2024 EXV includes the content of IEC 60669-2-4:2024, and the references made to IEC 60669-1:2017.

The specific content of IEC 60669-2-4:2024 is displayed on a blue background.

IEC 60669-2-4 has been prepared by subcommittee 23B: Plugs, socket-outlets and switches, of IEC technical committee 23: Electrical accessories. It is an International Standard.

This second edition cancels and replaces the first edition published in 2004. This edition constitutes a technical revision.

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

- a) revision of the present edition with reference to the published IEC 60669-1:2017 Edition 4 with its amendments and references to clauses and tables;
- b) introducing the values for isolating switches with ratings from 6 A to 13 A;
- c) introducing a circuit motor load with a rated current not exceeding 10 A and a power factor not less than 0,6 in the scope;
- d) modification of Table 1 and Table 5.

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

Draft	Report on voting
23B/1460/CDV	23B/1480A/RVC

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/publications.

This part of IEC 60669 is to be used in conjunction with IEC 60669-1:2017. It lists the changes necessary to convert that standard into a specific standard for isolating switches.

When a particular subclause of IEC 60669-1:2017 is not mentioned in this document, that subclause applies as far as reasonable.

In this document,

- the following print types are used:
 - requirements proper: in roman type;
 - *test specifications: in italic type;*
 - notes: in smaller roman type;
- subclauses, figures, tables or notes which are additional to those in IEC 60669-1:2017 are numbered starting from 101. Annexes additional to those in IEC 60669-1:2017 are lettered AA, BB, etc.

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

- reconfirmed,
- withdrawn, or
- revised.

IMPORTANT – The "colour inside" logo on the cover page of this document 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.

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[IEC 60669-2-4:2024](https://standards.iteh.ai/catalog/standards/iec/67d2b624-df9c-4e52-b0e1-11756beaf536/iec-60669-2-4-2024)

<https://standards.iteh.ai/catalog/standards/iec/67d2b624-df9c-4e52-b0e1-11756beaf536/iec-60669-2-4-2024>

SWITCHES FOR HOUSEHOLD AND SIMILAR FIXED ELECTRICAL INSTALLATIONS –

Part 2-4: Particular requirements – Isolating switches

1 Scope

This part of IEC 60669 applies to manually operated general purpose isolating switches with a rated voltage not exceeding 440 V and a rated current not exceeding 125 A, intended for household and similar fixed electrical installations, either indoors or outdoors.

For switches provided with screwless terminals, the rated current is limited to 16 A.

NOTE 1 The rated current is limited to 16 A for switches provided with insulation piercing terminals (IPT's) according to Annex D.

Switches covered by this document are, where applicable, intended for the control in normal use of all of the following loads:

- a circuit for a tungsten filament lamp load;
- a circuit for an externally ballasted lamp load (for example LED, CFL, fluorescent lamp load);
- a circuit for a self ballasted lamp load (for example LEDi or CFLi);
- a circuit for a substantially resistive load with a power factor not less than 0,95;
- a monophasic circuit for motor load with a rated current up to 10 A and a power factor not less than 0,6.

NOTE 2 In the following country the suitability of a switch intended to control the inrush current of a motor shall be tested: AU.

This document also applies to boxes for switches, with the exception of mounting boxes for flush-type switches.

NOTE 3 General requirements for boxes for flush-type switches are given in IEC 60670-1.

It also applies to switches such as

- switches incorporating pilot lights;
- electromagnetic remote control switches (particular requirements are given in IEC 60669-2-2);
- switches incorporating a time-delay device (particular requirements are given in IEC 60669-2-3);
- combinations of switches and other functions (with the exception of switches combined with fuses);
- electronic switches (particular requirements are given in IEC 60669-2-1);
- switches having facilities for the outlet and retention of flexible cables (see Annex A);
- isolating switches (particular requirements are given in IEC 60669-2-4);
- switches and related accessories for use in home and building electronic systems (particular requirements are given in IEC 60669-2-5);
- firemen's switches (particular requirements are given in IEC 60669-2-6).

Switches complying with this document are suitable for use at ambient temperatures not normally exceeding +40 °C, but their average over a period of 24 h does not exceed +35 °C, with a lower limit of the ambient air temperature of –5 °C.

NOTE 4 For lower temperatures see Annex E.

Switches complying with this document are suitable only for incorporation in equipment in such a way and in such a place that it is unlikely that the surrounding ambient temperature exceeds +35 °C.

In locations where special conditions prevail, such as in ships, vehicles and the like and in hazardous locations, for example where explosions are liable to occur, special construction and/or additional requirements may be required.

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 60038:2009, *IEC standard voltages*

IEC 60068-2-75:2014, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC 60112:2009, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60212:2010, *Standard conditions for use prior to and during the testing of solid electrical insulation materials*

IEC 60227-5:2011, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V – Part 5: Flexible cables (cords)*

IEC 60228:2004, *Conductors of insulated cables*

<https://standards.iteh.ai/catalog/standards/iec/67d2b624-df9c-4e52-b0e1-11756beaf536/iec-60669-2-4-2024>

IEC 60245-4:2011, *Rubber insulated cables – Rated voltages up to and including 450/750 V – Part 4: Cords and flexible cables*

IEC 60417, *Graphical symbols for use on equipment* (available from: <http://www.graphical-symbols.info/equipment>)

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

IEC 60529:1989/AMD1:1999

IEC 60529:1989/AMD2:2013

IEC 60669-1:2017, *Switches for household and similar fixed electrical installations – Part 1: General requirements*

IEC 60669-2-1:2002, *Switches for household and similar fixed electrical installations – Part 2-1: Particular requirements – Electronic switches*

IEC 60669-2-1:2002/AMD1:2008

IEC 60669-2-1:2002/AMD2:2015

IEC 60695-2-10:2000, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC 60695-2-11:2014, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products (GWEPT)*