UL 61058-1

STANDARD FOR SAFETY

Switches for Appliances – Part 1: General Requirements

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UL Standard for Safety for Switches for Appliances – Part 1: General Requirements, UL 61058-1

Fifth Edition, Dated November 3, 2017

Summary of Topics

This revision of ANSI/UL 61058-1 dated June 30, 2021 includes a correction in Table 16 – Minimum requirements for capacitors, to correct the value of "X1" to "X2" in the column titled "Without overcurrent protection[1)]".

UL 61058-1 shall be used in conjunction with the First Edition of the Standard for Switches for Appliances – Part 1-1: Requirements for Mechanical Switches, UL 61058-1-1 and the First Edition of the Standard for Switches for Appliances – Part 1-2: Requirements for Electronic Switches, UL 61058-1-2. Please note that the National Difference document incorporates all of the U.S. national differences for UL 61058-1.

Text that has been changed in any manner or impacted by UL's electronic publishing system is marked with a vertical line in the margin.

The revised requirements are substantially in accordance with Proposal(s) on this subject dated March 12, 2021.

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CSA Group
CAN/CSA-C22.2 No. 61058-1:17
Third Edition
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Underwriters Laboratories Inc.
UL 61058-1
Fifth Edition

Switches for Appliances – Part 1: General Requirements

November 3, 2017

(Title Page Reprinted: June 30, 2021)

This national standard is based on publication IEC 61058-1, Fourth Edition (2016).

ANSI/UL 61058-1-2021

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Commitment for Amendments

This standard is issued jointly by the Canadian Standards Association (operating as “CSA Group”) and Underwriters Laboratories Inc. (UL). Comments or proposals for revisions on any part of the standard may be submitted to CSA Group or UL at anytime. Revisions to this standard will be made only after processing according to the standards development procedures of CSA Group and UL. CSA Group and UL will issue revisions to this standard by means of a new edition or revised or additional pages bearing their date of issue.

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This Standard is subject to review within five years from the date of publication, and suggestions for its improvement will be referred to the appropriate committee. The technical content of the IEC and ISO publications is kept under constant review by IEC and ISO. To submit a proposal for change, please send the following information to inquiries@csagroup.org and include "Proposal for change" in the subject line: Standard designation (number); relevant clause, table, and/or figure number; wording of the proposed change; and rationale for the change.

To purchase CSA Group Standards and related publications, visit CSA Group's Online Store at www.csagroup.org/store/ or call toll-free 1-800-463-6727 or 416-747-4044.

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This ANSI/UL Standard for Safety consists of the Fifth Edition including revisions through June 30, 2021. The most recent designation of ANSI/UL 61058-1 as an American National Standard (ANSI) occurred on May 3, 2021. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page (front and back), or the Preface. The National Difference Page and IEC Foreword are also excluded from the ANSI approval of IEC-based standards.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at https://csds.ul.com.

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PREFACE

This is the harmonized CSA Group and UL standard for Switches for Appliances – Part 1: General Requirements. It is the third edition of CAN/CSA-C22.2 No. 61058-1, and the fifth edition of UL 61058-1. This edition of CAN/CSA-C22.2 No. 61058-1 supersedes the previous edition published in 2009 as CAN/CSA-C22.2 No. 61058-1 (adopted IEC 61058-1:2000+A1:2001+A2:2007). This edition of UL 61058-1 supersedes the previous edition published on August 10, 2009. This harmonized standard has been jointly revised on June 30, 2021. For this purpose, CSA Group and UL are issuing revision pages dated June 30, 2021.

This harmonized standard is based on IEC Publication 61058-1: fourth edition Switches for Appliances – Part 1: General Requirements issued July 2016. IEC 61058-1 is copyrighted by the IEC.

This harmonized standard was prepared by CSA Group and Underwriters Laboratories Inc. (UL). The efforts and support of the International Harmonization Committee on Switches for Appliances are gratefully acknowledged.

This standard is considered suitable for use for conformity assessment within the stated scope of the standard.

This standard was reviewed by the CSA Integrated Committee on Wring Devices, under the jurisdiction of the CSA Technical Committee on Wiring Products and the CSA Strategic Steering Committee on Requirements for Electrical Safety, and has been formally approved by the CSA Technical Committee. This standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

Application of Standard

Where reference is made to a specific number of samples to be tested, the specified number is to be considered a minimum quantity.

Note: Although the intended primary application of this standard is stated in its scope, it is important to note that it remains the responsibility of the users of the standard to judge its suitability for their particular purpose.

This CAN/CSA-C22.2 No. 61058-1 Part 1 is to be used in conjunction with the appropriate CAN/CSA-C22.2 No. 61058-1-1 – Part 1-1 or CAN/CSA-C22.2 No. 61058-1-2 – Part 1-2, which contains clauses to supplement or modify the corresponding clauses in the Part 1, to provide relevant requirements for each type of product. This is the UL Standard for Safety for Switches for Appliances – Part 1: General Requirements. This UL Part 1 is to be used in conjunction with the appropriate UL 61058-1-1 Part 1-1 or UL 61058-1-2 Part 1-2, which contains clauses to supplement or modify the corresponding clauses in the Part 1, to provide relevant requirements for each type of product.

Level of Harmonization

This standard adopts the IEC text with national differences.

This standard is published as an identical standard for CSA Group and UL.

An identical standard is a standard that is exactly the same in technical content except for national differences resulting from conflicts in codes and governmental regulations and basic safety principles and requirements. Presentation is word for word except for editorial changes.

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All national differences from the IEC text are included in the CSA Group and UL versions of the standard. While the technical content is the same in each organization's version, the format and presentation may differ.

Reasons for Differences From IEC

National differences from the IEC are being added in order to address safety and regulatory situations present in the US and Canada.

Interpretations

The interpretation by the standards development organization of an identical or equivalent standard is based on the literal text to determine compliance with the standard in accordance with the procedural rules of the standards development organization. If more than one interpretation of the literal text has been identified, a revision is to be proposed as soon as possible to each of the standards development organizations to more accurately reflect the intent.

IEC Copyright

For CSA Group, the text, figures, and tables of International Electrotechnical Commission Publication 61058-1, Switches for Appliances – Part 1: General Requirements, copyright 2016, are used in this standard with the consent of the International Electrotechnical Commission. The IEC Foreword is not a part of the requirements of this standard but is included for information purposes only.

These materials are subject to copyright claims of IEC and UL. No part of this publication may be reproduced in any form, including an electronic retrieval system, without the prior written permission of UL. All requests pertaining to the Switches for Appliances – Part 1: General Requirements, UL 61058-1 Standard should be submitted to UL.

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NATIONAL DIFFERENCES

National Differences from the text of International Electrotechnical Commission (IEC) Publication 61058-1, Switches for Appliances – Part 1: General Requirements, copyright 2016, are indicated by notations (differences) and are presented in bold text. The national difference type is included in the body.

There are five types of National Differences as noted below. The difference type is noted on the first line of the National Difference in the standard. The standard may not include all types of these National Differences.

DR – These are National Differences based on the **national regulatory requirements**.

D1 – These are National Differences which are based on **basic safety principles and requirements**, elimination of which would compromise safety for consumers and users of products.

D2 – These are National Differences from IEC requirements based on existing **safety practices**. These requirements reflect national safety practices, where empirical substantiation (for the IEC or national requirement) is not available or the text has not been included in the IEC standard.

DC – These are National Differences based on the **component standards** and will not be deleted until a particular component standard is harmonized with the IEC component standard.

DE – These are National Differences based on **editorial comments or corrections**.

Each national difference contains a description of what the national difference entails. Typically one of the following words is used to explain how the text of the national difference is to be applied to the base IEC text:

Addition / Add - An addition entails adding a complete new numbered clause, subclause, table, figure, or annex. Addition is not meant to include adding select words to the base IEC text.

Modification / Modify - A modification is an altering of the existing base IEC text such as the addition, replacement or deletion of certain words or the replacement of an entire clause, subclause, table, figure, or annex of the base IEC text.

Deletion / Delete - A deletion entails complete deletion of an entire numbered clause, subclause, table, figure, or annex without any replacement text.

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FOREWORD

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SWITCHES FOR APPLIANCES – PART 1: GENERAL REQUIREMENTS

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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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) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61058-1 has been prepared by subcommittee 23J: Switches for appliances, of IEC technical committee 23: Electrical accessories.

This fourth edition cancels and replaces the third edition published in 2000, Amendment 1:2001 and Amendment 2:2007. This edition constitutes a technical revision.

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

a) Requirements for mechanical switches are now given in IEC 61058-1-1;

b) Requirements for electronic switches are now given in IEC 61058-1-2.

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

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FDIS	Report on voting
23J/401/FDIS	23J/405/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.

A list of all parts in the IEC 61058 series, published under the general title *Switches for appliances*, can be found on the IEC website.

In this part, the following print types are used:

- requirements proper: roman type;
- test specifications: *italic type*;
- notes: smaller roman type.

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

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

DV.1 D2 *Addition of the following:*

This nationally adopted Part 1 standard shall be used in conjunction with the nationally adopted IEC 61058-1-x Part 1 standards and any nationally adopted IEC 61058-2-x Part 2 standards. For references to IEC 61058, IEC 61058-1, IEC 61058-1-1, or IEC 61058-1-2, replace the reference with CAN/CSA-C22.2 No. 61058 / UL 61058, CAN/CSA-C22.2 No. 61058-1 / UL 61058-1, CAN/CSA-C22.2 No. 61058-1-1 / UL 61058-1-1, or CAN/CSA-C22.2 No. 61058-1-2 / UL 61058-1-2 accordingly.

DV.2 DE *Addition of the following:*

The numbering system in the standard uses a space instead of a comma to indicate thousands and uses a comma instead of a period to indicate a decimal point. For example, 1 000 means 1,000 and 1,01 means 1.01.

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SWITCHES FOR APPLIANCES – PART 1: GENERAL REQUIREMENTS

1 Scope

This part of IEC 61058 applies to switches for appliances. The switches are intended to control electrical appliances and other equipment for household or similar purposes with a rated voltage not exceeding 480 V and a rated current not exceeding 63 A.

Switches for appliances are intended to be operated by

– A person via an actuating member,

– Indirect actuation,

– An actuating sensing unit.

Transmission of a signal between the actuating member or sensing unit and the switch may be connected by optical, acoustic, thermal, electrical or other relevant connection and may include remote controlled units.

This part of IEC 61058 applies to switches for appliances provided with additional control functions governed by the switch provided with electronic circuits and devices that are necessary for the intended and/or correct operation of the switch.

This part of IEC 61058 applies to circuitry when evaluated with a switch and necessary for the switching function.

This part of IEC 61058 applies in general to switches for appliances in conjunction with the following parts:

– *Part 1-1: Requirements for mechanical switches*, and/or

– *Part 1-2: Requirements for electronic switches*.

This part of IEC 61058 does not apply to devices covered by:

– IEC 60669 (all parts), *Switches for household and similar fixed-electrical installations*, and

– IEC 60730 (all parts), *Automatic electrical controls*.

This part of IEC 61058 does not contain requirements for safety isolating switches (IEC 60050-811:1991, 811-29-17).

NOTE 1 For switches used in tropical climates, additional requirements may be necessary.

NOTE 2 Attention is drawn to the fact that the end product standards for appliances may contain additional or alternative requirements for switches.

NOTE 3 Throughout this part of IEC 61058, the word "appliance" means "appliance or equipment".

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1DV.1 D2 ***Modification of Clause 1 to add the following to indicate which switches do not apply:***

These requirements do not cover switches that are covered by an existing standard such as those constructed so that they can be installed readily in a flush-device box intended to be used in a wiring system that complies with CSA C22.1 and NFPA 70. This part does not apply to switches intended to be covered within the scope of CSA C22.2 No. 111, UL 20, CSA C22.2 No. 4, UL 98, CSA C22.2 No. 205, or UL 773A.

1DV.2 D2 ***Modification of Clause 1 to add the following note:***

NOTE 4 The term "earthing" as used in this standard relates to "bonding."

2 Normative References

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60038
IEC Standard Voltages

IEC 60060-1
High-Voltage Techniques – Part 1: General Definitions and Test Requirements

IEC 60065:2014
Audio, Video, and Similar Electronic Apparatus – Safety Requirements

IEC 60068-2-75
Environmental Testing – Part 2-75: Tests – Test Eh: Hammer Tests

IEC 60112:2003
Method for the Determination of the Proof and the Comparative Tracking Indices of Solid Insulating Materials
Amendment 1:2009

IEC 60127 (all parts)
Miniature Fuses

IEC 60127-2
Miniature Fuses – Part 2: Cartridge Fuse-Links

IEC 60269-3
Low-Voltage Fuses – Part 3: Supplementary Requirements for Fuses for Use By Unskilled Persons (Fuses Mainly for Household or Similar Applications) – Examples of Standardized Systems of Fuses A to F

IEC 60384-14
Fixed Capacitors for Use In Electronic Equipment – Part 14: Sectional Specification – Fixed Capacitors for Electromagnetic Interference Suppression and Connection to the Supply Mains

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IEC 60417
Graphical Symbols for Use on Equipment
(available at http://www.graphical-symbols.info/equipment)

IEC 60529:1989
Degree of Protection Provided by Enclosures (IP Code)
Amendment 1:1999, Amendment 2: 2013

IEC 60617
Graphical Symbols for Diagrams
(available at: http://std.iec.ch/iec60617)

IEC 60664-3:2003
Insulation Coordination for Equipment Within Low-Voltage Systems – Part 3: Use of Coating, Potting or Molding for Protection Against Pollution
Amendment 1:2010

IEC 60691
Thermal-Links – Requirements and Application Guide

IEC 60695-2-11
Fire Hazard Testing – Part 2-11: Glowing/Hot-Wire Based Test Methods – Glow-Wire Flammability Test Method for End-Products

IEC 60695-10-2
Fire Hazard Testing – Part 10-2: Abnormal Heat – Ball Pressure Test Method

IEC 60695-11-10
Fire Hazard Testing – Part 11-10: Test Flames – 50 W Horizontal and Vertical Flame Test Methods

IEC 60695-11-20
Fire Hazard Testing – Part 11-20: Test Flames – 500 W Flame Test Method

IEC 60730 (all parts)
Automatic Electrical Controls

IEC 60730-1:2013
Automatic Electrical Controls – Part 1: General Requirements

IEC 60730-2-9:2015
Automatic Electrical Controls – Part 2-9: Particular Requirements for Temperature Sensing Control

IEC 60738-1
Thermistors – Directly Heated Positive Temperature Coefficient – Part 1: Generic Specification

IEC 61000-3-2
Electromagnetic Compatibility (EMC) – Part 3.2: Limits – Limits for Harmonic Current Emissions (Equipment Input Current ≤ 16 A Per Phase)

IEC 61000-3-3
Electromagnetic Compatibility (EMC) – Part 3-3: Limits – Limitation of Voltage Changes, Voltage Fluctuations and Flicker in Public Low-Voltage Supply Systems, for Equipment With Rated Current ≤16 A Per Phase and Not Subject to Conditional Connection

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IEC TS 61000-3-5
Electromagnetic Compatibility (Emc) – Part 3-5: Limits – Limitation Of Voltage Fluctuations And Flicker In Low-Voltage Power Supply Systems For Equipment With Rated Current Greater Than 75

IEC 61000-4-2
Electromagnetic Compatibility (Emc) – Part 4-2: Testing And Measurement Techniques – Electrostatic Discharge Immunity Test

IEC 61000-4-3
Electromagnetic Compatibility (Emc) – Part 4-3: Testing And Measurement Techniques – Radiated, Radio-Frequency, Electromagnetic Field Immunity Test

IEC 61000-4-4
Electromagnetic Compatibility (Emc) – Part 4-4: Testing And Measurement Techniques – Electrical Fast Transient/Burst Immunity Test

IEC 61000-4-5
Electromagnetic Compatibility (Emc) – Part 4-5: Testing And Measurement Techniques – Surge Immunity Test

IEC 61000-4-8
Electromagnetic Compatibility (Emc) – Part 4-8: Testing And Measurement Techniques – Power Frequency Magnetic Field Immunity Test

IEC 61000-4-11
Electromagnetic Compatibility (Emc) – Part 4-11: Testing And Measurement Techniques – Voltage Dips, Short Interruptions And Voltage Variations Immunity

IEC 61032:1997
Protection Of Persons And Equipment By Enclosures – Probes For Verification

IEC 61058-1-1
Switches For Appliances – Part 1-1: Requirements For Mechanical Switches

IEC 61058-1-2
Switches for appliances – Part 1-2: Requirements for electronic switches

IEC 61210:2010
Connecting Devices – Flat Quick-Connect Terminations For Electrical Copper Conductors – Safety Requirements

CISPR 14-1
Electromagnetic Compatibility – Requirements For Household Appliances, Electric Tools And Similar Apparatus – Part 1: Emission

CISPR 15:2013
Limits And Methods Of Measurement Of Radio Disturbance Characteristics Of Electrical Lighting And Similar Equipment

2DV DE *Modification of Clause 2 to add the following:*

CSA Group

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C22.1
Canadian Electrical Code, Part I

C22.2 No. 4
Enclosed and Dead-Front Switches

C22.2 No. 111
General-Use Snap Switches

C22.2 No. 205
Signal Equipment

CAN/CSA-C22.2 No. 61058-1-1
Switches for Appliances – Part 1-1: Requirements for Mechanical Switches

CAN/CSA-C22.2 No. 61058-1-2
Switches for Appliances – Part 1-2: Requirements for Electronic Switches

NFPA (National Fire Protection Association)

NFPA 70
National Electrical Code

UL (Underwriters Laboratories Inc.)

UL 20
General-Use Snap Switches

UL 98
Enclosed and Dead-Front Switches

UL 773A
Nonindustrial Photoelectric Switches for Lighting Control

UL 61058-1-1
Switches for Appliances – Part 1-1: Requirements for Mechanical Switches

UL 61058-1-2
Switches for Appliances – Part 1-2: Requirements for Electronic Switches

3 Terms and Definitions

For the purposes of this document, the following terms and definitions apply.

3.1 General terms and definitions

3.1.1 mechanical switching device – Switching device designed to close and open one or more electric circuits by means of separable contacts

Note 1 to entry: In the IEC 61058 series the terms "switching devices" and "switches" are used interchangeably.

[SOURCE: IEC 60050-441:1984, 441-14-02]

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3.1.2 conductive part – Part which is capable of conducting current although it may not necessarily be used for carrying service current

[SOURCE: IEC 60050-441:1984, 441-11-09]

3.1.3 live part – Conductor or conductive part intended to be energized in normal operation, including a neutral conductor, but by convention not a PEN/PEM/PEL conductor

Note 1 to entry: For appliance switches, "live part" implies a risk of electric shock.

Note 2 to entry: Unless otherwise specified, parts connected to a SELV supply or equal to or less than 24 V are not considered to be live parts.

3.1.4 pole of a switch – Portion of a switching device associated exclusively with one electrically separated conducting path of its main circuit and excluding those portions which provide a means for mounting and operating all poles together

Note 1 to entry: A switch is called "single pole" if it has only one pole. If it has more than one pole, it may be called "multipole" (two-pole, three-pole, etc.) provided that the poles are coupled in such a manner as to operate together.

[SOURCE: IEC 60050-441:1984, 441-15-01, modified – Pole of a switching device replaced by pole of a switch]

3.1.5 detachable part – Part which is removable without the use of a tool when the switch is mounted as in normal use

3.1.6 tool – Screwdriver, coin, or any other object which may be used to operate a nut, a screw or a similar part

3.1.7 normal use – Use of the switch for the purpose for which it was made and declared

3.1.8 unique type reference UT – Identification marking on a switch such that by quoting it in full to the switch manufacturer a unique switch model can be identified

Note 1 to entry: This note applies to the French language only.

3.1.9 common type reference CT – Identification marking on a switch which does not require any further specific information additional to that provided by the marking requirements of this part of IEC 61058 for selection, installation and use in accordance with this part of IEC 61058

Note 1 to entry: This note applies to the French language only.

3.1.10 cover, cover plate, protective cover – Cover made of insulating material, used to cover live parts in order to avoid accidental electric contact and which is accessible when the switch is mounted as in normal use but which can be removed with the aid of a tool

3.1.11 signal indicator – Device associated with a switch to indicate the circuit state visually

Note 1 to entry: The device may or may not be controlled by the switch.

3.1.12 unprepared conductor – A conductor which has been cut and the insulation of which has been removed for insertion into a terminal.

[SOURCE: IEC 60050-442:1998, 442-01-26]

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3.1.13 prepared conductor – A conductor the end of which is fitted with an attachment such as eyelet, sleeve or cable lug

[SOURCE: IEC 60050-442:1998, 442-01-27]

3.1.14 polarity reversal – Change of the polarity on the terminals connected to the load by a switching action

3.1.15 semiconductor device SD – Device whose essential characteristics are due to the flow of charge carriers within a semiconductor

Note 1 to entry: Previous editions of IEC 61058-1 refer to a semiconductor device as a "semiconductor switching device or solid state device (SD)".

[SOURCE: IEC 60050-521:2002, 521-04-01]

3.1.16 semiconductor circuit – Circuit containing multiple components, where at least one is a semiconductor device

3.1.17 electronic switch – Switch for appliances provided with a semiconductor device or a semiconductor circuit in its intended load path

Note 1 to entry: The electronic switch may be provided with series and/or parallel mechanical contacts. See examples in Table 15 in IEC 61058-1-2:2016.

3.1.18 duty – Statement of the load to which the switch is subjected, including, if applicable, making, controlling and breaking and including their durations and sequence in time

3.1.19 duty-type – Continuous, short-time or periodic duty comprising one or more loads remaining constant for the duration specified, or a non-periodic duty in which generally the load varies within the permissible operating range

[SOURCE: IEC 60050-411:1996, 411-51-13, modified – "speed" is deleted]

3.1.20 protective impedance – Component or assembly of components whose impedance and construction are intended to limit steady-state touch current and electric charge to non-hazardous levels

3.2 Terms and definitions relating to voltage and current

3.2.1 rated voltage – Voltage assigned by the manufacturer for a specified operating condition

Note 1 to entry: It is measured in r.m.s. unless specifically indicated otherwise.

Note 2 to entry: This value is the maximum value and covers all lower values.

3.2.2 safety extra-low voltage SELV – Voltage which does not exceed 50 V AC r.m.s. or 120 V DC between conductors or between any conductor and earth in a circuit which is insulated from the supply mains

Note 1 to entry: SELV is an unearthed extra low voltage (see IEC 61140).

3.2.3 rated current – Current assigned by the manufacturer for a specified operating condition

Note 1 to entry: It is measured in r.m.s. unless specifically indicated otherwise.

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Note 2 to entry: This value is the maximum value and covers all lower values.

3.2.4 rated load – Type of load assigned by the manufacturer, according to classifications

3.2.5 over-current – Current exceeding the rated current

[SOURCE: IEC 60050-441:1984, 441-11-06]

3.2.6 overload – Operating conditions in an electrically undamaged circuit, which cause an over-current

[SOURCE: IEC60050-441:1984, 441-11-08]

3.2.7 working voltage – Highest r.m.s. value of the AC or DC voltage across any particular insulation which can occur when the switch is supplied at rated voltage

Note 1 to entry: Transients are disregarded.

Note 2 to entry: Both open-circuit conditions and normal operating conditions are taken into account.

3.2.8 overvoltage – Voltage having a peak value exceeding the corresponding peak value of maximum steady-state voltage at normal operating conditions

3.2.9 overvoltage category – Numeral defining a transient overvoltage condition

Note 1 to entry: See Annex E.

3.2.10 impulse withstand voltage – Highest peak value of impulse voltage of prescribed form and polarity which does not cause breakdown of insulation under specified conditions

3.2.11 minimum load – Load at which when declared, the electronic switch still operates correctly

3.2.12 thermal current – Continuous resistive current which, under the test conditions declared by the manufacturer (which may also include the ambient temperature), generates, without forced cooling, the same heating as when the electronic switch is operating under specified ambient conditions at rated load in the appliance with forced cooling present, if any

Note 1 to entry: The concept "thermal current" allows simplified testing of electronic switches, which in normal application have complex cooling conditions. The thermal current will always be determined by tests of the switch positioned on a table or in a simple test rig and comparative tests in the appliance in question. Consequently, the thermal current will normally be lower than the rated current. This necessitates additional tests of the terminals, contacts, etc., in order to verify that they will be able to carry the rated current, when the electronic switch is mounted in the appliance. These additional tests are specified in Clauses 16 and 17 in IEC 61058-1-1:2016 or IEC 61058-1-2:2016.

3.3 Terms and definitions relating to the different types of switches

3.3.1 incorporated switch – Switch intended for incorporation in or on an appliance, which however can be tested separately

[SOURCE: IEC 60050-442:1998, 442-04-01]

3.3.2 integrated switch – Switch, the function of which is depending on its correct mounting and fixing in an appliance, and which can be tested only in combination with the relevant parts of that appliance

[SOURCE: IEC 60050-442:1998, 442-04-02]

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3.3.3 rotary switch – Switch where the actuating member is a shaft or a spindle which has to be rotated to one or more indexed positions in order to achieve a change in contact state

Note 1 to entry: The rotation of the actuating member may be unlimited or restricted in either direction.

3.3.4 lever switch – Switch where the actuating member is a lever which has to be moved (tilted) to one or more indexed positions in order to achieve a change in contact state

3.3.5 rocker switch – Switch where the actuating member is a low profile lever (rocker) which has to be tilted to one or more indexed positions in order to achieve a change in contact state

3.3.6 push-button switch – Switch where the actuating member is a button which has to be pushed in order to achieve a change in contact state

Note 1 to entry: The switch may be provided with one or more actuating members.

3.3.7 cord-operated switch – Switch where the actuating member is a pull-cord which has to be pulled in order to achieve a change in contact state

[SOURCE: IEC 60050-442:1998, 442-04-08, modified – "operating means" changed to "actuating member"]

3.3.8 push-pull switch – Switch where the actuating member is a rod which has to be pulled or pushed to one or more indexed positions in order to achieve a change in contact state

3.3.9 biased switch – Switch where the contacts and actuating member return to a predetermined position when the actuating member is released from the actuated position

3.4 Terms and definitions relating to the operation of the switch

3.4.1 actuation – Movement of the actuating member of the switch by hand, by foot, or by any other human activity

3.4.2 indirect actuation – Movement of the actuating member of the switch indirectly by a part of an appliance into which the switch is incorporated or integrated

Note 1 to entry: For example, a switch can be incorporated or integrated in the door of an appliance.

3.4.3 actuating member – Part which is pulled, pushed, turned or otherwise influenced to cause an operation

3.4.4 actuating means – Part which may be interposed between the actuating member and the contact mechanism in order to achieve contact operation

3.4.5 disconnection – Interruption of an electrical circuit in a pole so as to provide insulation between the supply and those parts intended to be disconnected from the supply

3.4.6 micro-disconnection – Disconnection that provides correct functional performance by contact separation in the case of long-term temporary overvoltage

3.4.7 electronic-disconnection – Disconnection that provides a non-cycling correct functional performance by a semiconductor device (SD) in the case of long-term temporary overvoltage

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3.4.8 full-disconnection – Disconnection that provides correct functional performance by contact separation in the case of short-term and long-term temporary overvoltage and impulse withstand voltage equivalent to basic insulation

3.4.9 all-pole disconnection single-phase – Concurrent disconnection of all supply conductors, except the earthed conductor, by a single switching action for AC and DC appliances

3.4.10 operating cycle – Succession of operations from one position to another and back to the first position through all other positions, if any

[SOURCE: IEC 60050-441:1984, 441-16-02]

3.4.11 electronic actuating member – Part, component or component group which controls the actuating means or the switching device

Note 1 to entry: An optical or acoustic sensing unit is an example of a component group.

3.4.12 electronic actuating means – Part, component or component group which controls electronically the switching device

3.4.13 abnormal conditions – Conditions leading to reduced safety, which may occur in the appliance or in the switch during normal operation

Note 1 to entry: These conditions (e.g. rise in temperature, lack of protection against shock) may be the consequence of faults of the switch or related ambient conditions, which in case of defects or deteriorated operation of other components of the application are foreseeable. (Intended) misuse is not covered.

3.4.14 sensing unit – Unit adjustable by other than mechanical means containing electronic components and controlling the output via electronic components or unit that is activated by any physical phenomenon or combination of phenomena

3.4.15 fault conditions – Abnormal conditions which are caused by a failure within the switch, which can be simulated by modifications of the switch

3.5 Terms and definitions relating to connections to the switch

3.5.1 external conductor – Cable, cord or conductor which is external to a switch

3.5.2 integrated conductor – Conductor which is either inside a switch or is used to permanently interconnect terminals or terminations of a switch

3.6 Terms and definitions relating to terminals and terminations

3.6.1 terminal – Conductive part of a switch, provided for connecting the switch to one or more external conductors

3.6.2 screw type terminal – Terminal for the connection and/or interconnection and subsequent disconnection of one or more conductors, the connection being made directly or indirectly by means of screws or nuts of any kind

Note 1 to entry: Examples of screw type terminals include those in Figure 1 through Figure 5.

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3.6.3 screwless terminal – Terminal for the connection and/or interconnection and subsequent disconnection of one or more conductors, the connection being made, directly or indirectly, by means other than screws

Note 1 to entry: Examples of screwless type terminals are shown in Figure 6.

Note 2 to entry: Push-in terminals, which are wire terminals that lock a stripped conductor when inserted in the terminal, are covered by the definition of screwless terminals.

3.6.4 termination – Arrangement provided for making the connections between the switch internal leads and the external conductors

3.6.5 flat quick-connect termination – Electrical connection consisting of a male tab and a female connector which can be inserted and withdrawn with or without the use of a tool

[SOURCE: IEC 60050-442:1998, 442-06-07]

3.6.6 tab – Portion of a flat quick-connect termination which is inserted into the female connector and is a part integral with the switch

Note 1 to entry: Examples of tabs are shown in IEC 61210.

3.6.7 female connector – Portion of a flat quick-connect termination which is pushed onto the tab

Note 1 to entry: An example of a female connector is shown in Figure 7.

3.6.8 solder terminal – Conductive part of a switch provided to enable a termination to be made by means of solder

3.7 Terms and definitions relating to insulation

3.7.1 basic insulation – Insulation applied to live parts to provide basic protection against electric shock

3.7.2 supplementary insulation – Independent insulation applied in addition to the basic insulation in order to provide protection against electric shock in the event of a failure of the basic insulation

3.7.3 double insulation – Insulation comprising both basic insulation and supplementary insulation

3.7.4 reinforced insulation – Single insulation system applied to live parts which provides a degree of protection against electric shock equivalent to double insulation

Note 1 to entry: The term "insulation system" does not imply that the insulation is one homogeneous piece. It may consist of several layers which cannot be tested separately as supplementary or basic insulation.

3.7.5 functional insulation – Insulation between live parts which is necessary only for the proper functioning of the switch

3.7.6 coating – Solid insulating material laid on one or both sides of the surface of the printed board

Note 1 to entry: Coating can be varnish, a dry film applied to the printed board or can be achieved by thermal deposition.

Note 2 to entry: Coating and base material of the printed board form an insulating system that may have properties similar to solid insulation.

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3.7.7 solid insulation – Insulation material interposed between two conductive parts

Note 1 to entry: In the case of a printed board assembly with a coating, solid insulation consists of the printed board itself as well as the coating. In other cases, solid insulation consists of the encapsulating material.

3.7.8 class 0 appliance – Appliance in which protection against electric shock relies upon basic insulation, which implies that there are no means for the connection of accessible conductive parts, if any, to the protective conductor in the fixed wiring of the installation, reliance in the event of a failure of the basic insulation being placed upon the environment

3.7.9 class I appliance – Appliance in which protection against electric shock does not rely on basic insulation only, but which includes an additional safety precaution in such a way that means are provided for the connection of conductive parts (which are not live parts) to the protective (earthing) conductor in the fixed wiring in such a way that these parts cannot become live in the event of a failure of the basic insulation

3.7.10 class II appliance – Appliance in which protection against electric shock does not rely on basic insulation only, but in which additional safety precautions such as double insulation or reinforced insulation are provided, there being no provision for protective earthing or reliance upon installation conditions

Note 1 to entry: A class II appliance may be provided with means for maintaining the continuity of protective circuits, provided that such means are within the appliance and are insulated from accessible surfaces according to the requirements of class II.

3.7.11 class III appliance – Appliance in which protection against electric shock relies on supply at SELV and in which voltages higher than those of SELV are not generated

3.7.12 comparative tracking index CTI – Numerical value of the maximum voltage in volts which a material can withstand without tracking and without a persistent flame occurring under specified test conditions

[SOURCE: IEC 60050-212: 2010, 212-11-59]

3.8 Terms and definitions relating to pollution

3.8.1 pollution – Addition of solid, liquid, or gaseous foreign matter that can result in a reduction of dielectric strength or surface resistivity of the insulation

3.8.2 micro-environment – Immediate environment of the insulation which particularly influences the dimensioning of creepage distances

Note 1 to entry: For self-produced pollution in arc chambers of switches, see Annex F.

3.8.3 macro-environment – Environment of the room or other location in which the switch is installed or used

3.8.4 pollution degree – Numeral characterizing the expected pollution of the micro-environment

Note 1 to entry: Pollution degree 1, 2 and 3 are used (see 7.8, 7.9 and Annex F).

3.9 Terms and definitions relating to manufacturers' tests

3.9.1 routine test – Test to which each individual switch for appliances is subjected during and/or after manufacture to ascertain whether it complies with the relevant requirements of this part of IEC 61058 (see Annex K).

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3.9.2 sampling test – Test on a number of switches taken at random from a batch

Note 1 to entry: Sampling tests are specified in Annex L.

[SOURCE: IEC 60050-811:1991, 811-10-06, modified – "devices" replaced by "switches"]

3.9.3 type test – Test of one or more switches made to a certain design to show that the design meets certain specifications

[SOURCE: IEC 60050-811:1991, 811-10-04, modified – "devices" replaced by "switches"]

4 General Requirements

Switches shall be designed and constructed so that in normal use they function safely so as to cause no danger to persons or surroundings even in the event of such careless use as may occur in normal use, as specified in the IEC 61058-1 series.

Compliance is checked by carrying out all the relevant tests.

5 General Information on Tests

5.1 Testing shall be performed according to the general guideline information provided in Clause 5

5.1.1 *In general, the test conditions for higher ratings of a switch may represent test conditions for lower ratings. See 5.2.*

5.1.2 *In all tests, the measuring instruments or the measuring means shall be such as not to affect appreciably the quantity being measured.*

5.1.3 *If only one of the specimen does not satisfy the requirements of a test in Clauses 14, 15, 16 and 17 (Clause 17 in IEC 61058-1-1:2016 or IEC 61058-1-2:2016), that test and any preceding which may have influenced the results of the test shall be repeated and also the tests which follow shall be carried out in the required sequence with new specimens, all of which shall comply with the requirements.*

5.1.4 *Unless otherwise specified in this standard, the specimens are tested as delivered, at an ambient temperature of 25 °C ± 10 °C.*

5.1.5 *The specimens are mounted as declared by the manufacturer, but, if significant, using the most unfavourable method if more than one method is declared.*

5.1.6 *For the tests of this standard, actuation may be performed by test equipment. Actuation may be applied to either the actuating member or the actuating means. A switch is not required to provide the actuating member if it is declared to be detachable.*

5.1.7 *Switches to be used with a non-detachable conductor are tested with the appropriate conductor connected.*

5.1.8 *If the switches are provided with tabs, for the tests according to Clauses 16 (in IEC 61058-1) and 17 (in IEC 61058-1-1:2016 or IEC 61058-1-2:2016), new female connectors shall be used. The female connectors shall be of a type suitable for the rated ambient temperature of the switch, and the crimped conductors shall be soldered or welded to the crimping area of the female connector, if any.*

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5.1.9 *If it is necessary to have parts with double insulation or reinforced insulation in switches for class 0 or class I appliances, such parts are checked for compliance with the requirements specified for switches for class II appliances. Similarly if it is necessary to have parts in switches operating at SELV, such parts are also checked for compliance with the requirements specified for switches for class III appliances.*

5.1.10DV D2 *Addition of Clauses 5.1.10DV.1 – 5.1.10DV.3:*

5.1.10DV.1 During the endurance test of Clause 17 (Clause 17 in CAN/CSA-C22.2 No. 61058-1-1 / UL 61058-1-1 and CAN/CSA-C22.2 No. 61058-1-2 / UL 61058-1-2), all exposed dead metal parts shall be connected through a fuse to earth. Dead metal parts can include frame, enclosures, and actuators. The potential between live parts and dead metal parts shall be the full test potential. The purpose of the fuse is to detect hazardous earth arcs shorting from live parts to exposed dead metal.

5.1.10DV.2 The fuse amperage rating shall not be greater than 15 A, but shall be less than the available output amperage of the electrical supply source. The fuse voltage rating shall be equal to or greater than the maximum potential to earth.

5.1.10DV.3 *Compliance is checked by inspection of the fuse. During the test, the fuse shall remain intact and not open.*

5.2 Electrical information

5.2.1 *When more than one rating is combined or represented by testing as described below, the following applies to all testing.*

Dielectric strength test (Clause 15 and TE3) – based on the highest voltage.

Heating/temperature rise (Clause 16 and TE2) – based on the highest current rating.

5.2.2 *Representative endurance testing for the same classified load type (see 7.2) is allowed according to the following conditions:*

a) Voltage – Testing required for ratings at a higher voltage represents testing required for ratings at a lower voltage.

NOTE For example 5 A, 125 V AC and 5 A, 250 V AC is tested as 5 A, 250V AC.

b) Current – Testing at a higher current represent testing at a lower current.

NOTE For example 10 A, 250 V AC and 5 A, 250 V AC is tested as 10 A, 250 V AC.

5.2.3 *Switches with 2 or more ratings are endurance tested for each rating on an additional 3 specimens unless permitted to use representative testing.*

5.2.4 *DC polarity rated switches without polarity markings are endurance tested with 3 specimens with one polarity and an additional 3 specimens with the opposite polarity.*

5.2.5 *DC and AC rated switches are endurance tested with DC voltage to represent AC if the DC voltage and current ratings for the classified load type (see 7.2) are equal to or greater than the AC ratings.*

NOTE For example AC and DC rating 4 A 48 V AC as well as 4 A 48 V DC are endurance tested 4 A 48 V DC.

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5.2.6 *AC only rated switches for each type of load with 2 or more current ratings, rated nominal 100 – 480 V AC, at the same power, are tested at the highest voltage.*

NOTE For example AC rating 10 A 125 V AC as well as 5 A 250 V AC as well as 4,5 A 277 V AC are tested at 4,5 A 277 V AC.

5.2.7 *AC only rated switches for each type of load, with 2 or more current ratings, rated nominal 20 up to 100 V AC, at the same power, are endurance tested at the highest current.*

NOTE For example AC rating 10 A 24 V AC / 5 A 48 V AC is endurance tested at 10 A 24 V AC.

5.2.8 *Switches with a rated frequency are endurance tested at that frequency. Switches without a rated frequency are tested at 50 Hz. Switches with a rated frequency range are tested at the most unfavourable frequency within that range.*

NOTE For example a switch classified as 50 Hz to 60 Hz is tested at 50 Hz.

5.2.9 *Switches intended to be operated from a specific supply, are tested with that specific supply.*

5.3 Test loads on multiway switches

Multiway switches are loaded according to Table 1. The load for the other switch positions is that resulting from the loads necessary to achieve the conditions specified above.

Table 1
Test loads for multiway switches

Operating cycles	Switch position of	Load
First half	Highest load	I_R
	Next lower load	0,8 × I_R
	Further next lower load	0,533 × I_R
Second half	Highest load	I_R
	Next lower load	0,5 × I_R
	Further next lower load	0,333 × I_R

5.4 Test specimens

The minimum number of test specimens shall be according to IEC 61058-1-1 or IEC 61058-1-2. Unless otherwise stated testing may be carried out in any order.

6 Rating

6.1 The maximum rated voltage is 480 V.

6.2 The maximum rated current is 63 A.

6.3 Switches with signal indicators may have different rated voltages for the signal indicators.

Compliance with 6.1 to 6.3 is checked by inspection in conjunction with Clause 8.

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6.4 A switch having more than one circuit needs not have the same classification for each circuit. Annex D may be used for determining whether a particular switch rating is suitable for controlling the circuit in the actual application.

7 Classification

7.1 According to nature of supply

7.1.1 switches for AC only

7.1.2 switches for DC only;

7.1.3 switches for both AC and DC

7.2 According to type of load to be controlled by each circuit of the switch

7.2.1 circuit for a substantially resistive load with a power factor not less than 0,9;

7.2.2 circuit for either a resistive load, a motor load with a power factor not less than 0,6, or a combination of both;

7.2.3 circuit for a combination of resistive and capacitive loads;

7.2.4 circuit for ordinary tungsten filament lamp load;

7.2.5 circuit for a declared specific load;

7.2.6 circuit for a current not exceeding 20 mA.

7.2.7 circuit for specific lamp load;

7.2.8 circuit for an inductive load with a power factor of not less than 0,6;

7.2.9 circuit for specific load of motor with a locked rotor and with a power factor not less than 0,6.

7.2.10 general purpose load with a power factor of not less than 0,75;

7.3 According to ambient temperature

7.3.1 Switches with all parts intended to be used 0 °C ≤ T ≤ 55 °C.

7.3.2 Switches not classified as 7.3.1 and 7.3.3.

7.3.3 Switches with accessible parts in one ambient temperature and non-accessible parts in a different ambient temperature according to

– accessible member and parts 0 °C ≤ T ≤ 55 °C, and

– other parts of the switch not classified to the range of 0 °C ≤ T ≤ 55 °C.

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7.4 According to number of operating cycles

7.4.1 100 000 operating cycles;

7.4.2 50 000 operating cycles;

7.4.3 25 000 operating cycles;

7.4.4 10 000 operating cycles;

7.4.5 6 000 operating cycles;

7.4.6 3 000 operating cycles;

7.4.7 1 000 operating cycles;

7.4.8 300 operating cycles.

7.4.9 operating cycles – as declared for a specific application.

7.5 Degree of protection against solid foreign objects

NOTE Determined according to IEC 60529 with the switch mounted as declared.

7.5.1 if no declaration, the switch is non-protected against solid foreign objects (IP0X);

7.5.2 protected against solid foreign objects of 50 mm diameter and greater (IP1X);

7.5.3 protected against solid foreign objects of 12,5 mm diameter and greater (IP2X);

7.5.4 protected against solid foreign objects of 2,5 mm diameter and greater (IP3X);

7.5.5 protected against solid foreign objects of 1,0 mm diameter and greater (IP4X);

7.5.6 dust-protected (IP5X);

7.5.7 dust-tight (IP6X).

7.6 Degree of protection against ingress of water

NOTE Determined according to IEC 60529 with the switch mounted as declared.

7.6.1 if no declaration, the switch is non-protected against ingress of water (IPX0);

7.6.2 protected against vertically falling water drops (IPX1);

7.6.3 protected against vertically falling water drops when enclosure tilted up to 15° (IPX2);

7.6.4 protected against spraying water (IPX3);

7.6.5 protected against splashing water (IPX4);

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7.6.6 protected against water jets (IPX5);

7.6.7 protected against powerful water jets (IPX6);

7.6.8 protected against the effects of temporary immersion in water up to 1 m (IPX7).

7.6.9 protected against the effects of immersion in water greater than 1 m (IPX8).

7.6.10 protected against the effects of high pressure water (IPX9).

7.7 According to degree of protection against electric shock for an incorporated switch for use in

7.7.1 a class 0 appliance;

7.7.2 a class I appliance;

7.7.3 a class II appliance;

7.7.4 a class III appliance.

NOTE Explanations of classes are given in 3.7.8, 3.7.9, 3.7.10 and 3.7.11.

7.8 According to degree of pollution inside the switch

7.8.1 Micro-environment pollution degree 1

7.8.2 Micro-environment pollution degree 2

7.8.3 Micro-environment pollution degree 3

7.9 According to degree of pollution outside the switch

7.9.1 Macro-environment pollution degree 1

7.9.2 Macro-environment pollution degree 2

7.9.3 Macro-environment pollution degree 3

NOTE Details for the micro and macro pollution degrees are specified in 3.8 and Annex F.

7.10 According to marking

7.10.1 Switch with limited marking UT (unique type reference, UT);

7.10.2 Switch with full marking CT (common type reference, CT).

NOTE Explanations of type references are given in 3.1.8 and 3.1.9.

7.11 According to resistance to ignitability by the glow wire temperature

7.11.1 650 °C;

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7.11.2 750 °C;

7.11.3 850 °C;

7.11.4 960 °C.

The resistance to abnormal heat for the switch represents the lowest glow wire temperature of the materials of parts which are in contact with, maintain or retain in position electrical connections including those parts which maintain an electrical connection under spring force.

7.12 According to the rated impulse withstand voltage

7.12.1 330 V;

7.12.2 500 V;

7.12.3 800 V;

7.12.4 1 500 V;

7.12.5 2 500 V;

7.12.6 4 000 V.

NOTE The relation between rated impulse withstand voltage, rated voltage and overvoltage category is given in Annex E.

7.13 According to the rated overvoltage category

7.13.1 Category I

7.13.2 Category II

7.13.3 Category III

NOTE The relation between rated impulse withstand voltage, rated voltage and overvoltage category is given in Annex E.

7.14 According to type of disconnection

7.14.1 electronic disconnection;

7.14.2 micro disconnection;

7.14.3 full disconnection.

7.14.4 switches with a combination of disconnections shall be declared specifically depending on their construction.

NOTE Explanations of disconnections are given in 3.4.6, 3.4.7 and 3.4.8.

7.15 According to the type of coating for rigid printed board assemblies

7.15.1 type 1 coating;

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7.15.2 type 2 coating.

NOTE Explanations for type 1 and type 2 coating are given in Annex I.

7.16 According to type and/or connection of switches

7.16.1 number of poles

7.16.2 number of ways

7.16.3 polarity reversal

7.16.4 all-pole disconnection

7.16.5 number of non-switchable through connections

7.16.6 according to code of switch type given in Table 2

NOTE Details for types of switches and connections are specified in Table 2.

7.17 According to configuration of switching device

7.17.1 electronic switch with SD without mechanical switching device;

7.17.2 electronic switch with SD with series mechanical switching device;

7.17.3 electronic switch with SD with parallel mechanical switching device;

7.17.4 electronic switch with SD with series and parallel mechanical switching device;

7.17.5 electronic switch with only mechanical switching device without SD. SD to be provided in the end application;

7.17.6 mechanical switch with or without electronics, which does not impact the safety of the switch;

7.17.7 mechanical switch with electronics, which impacts the safety of the switch.

7.18 According to duty type

7.18.1 continuous duty – Duty type S1 (see Figure 12);

7.18.2 short-time duty – Duty type S2 with defined ON and OFF times (see Figure 13);

7.18.3 intermittent periodic duty – Duty type S3 with defined ON and OFF times (see Figure 14).

7.18.4 as declared for a specific application.

NOTE The concept duty-type is taken from IEC 60034-1.

7.19 According to linkage between contact and actuator speed

7.19.1 Speed of contact closure or opening is dependent on the actuator speed.

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7.19.2 Speed of contact closure and opening is independent of the actuator speed.

7.20 According to the type of terminals

7.20.1 Terminals intended for the connection of unprepared conductors,

7.20.2 Terminals intended for the connection of prepared conductors;

NOTE Twisting of a stranded conductor to consolidate the end is not considered as special preparation.

7.20.3 Terminals intended for the connection of flexible stranded conductors;

7.20.4 Terminals intended for the connection of rigid stranded conductors;

7.20.5 Terminals intended for the connection of solid conductors,

7.20.6 Terminals intended for conductor size range according to Table 4;

7.20.7 Terminals intended for a declared limited conductor size range;

7.20.8 Terminals intended for the connection of only one conductor;

7.20.9 Terminals intended for the interconnection of two or more conductors;

7.20.10 Terminals intended for assembling one time.

7.20.11 Terminals intended for assembling and disassembling more than one time.

NOTE A push-in terminal intended for only one insertion (no disconnection means) is considered to be intended for assembling one time. A push-in terminal with a disconnect means or screw terminal is considered to be intended for assembling and disassembling more than one time.

7.20.12 Screw terminals and connections;

7.20.13 Push-in terminals and connections;

7.20.14 Flat quick-connect termination;

NOTE Standard termination dimensions are found in IEC 61210.

7.20.15 Solder terminals

7.20.16 Welding or ridged terminals

7.20.17 Wires for connections;

7.20.18 Terminals for piercing conductors

7.20.19 Terminals as declared by the manufacturer.

NOTE Terminals may have multiple characteristics.

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7.21 According to the type of built in protection

7.21.1 Built in protection provided

7.21.2 None provided

NOTE Explanations of testing for Built in Protection are given in Clause 23.

7.22 According to the type of forced cooling

7.22.1 Not requiring forced cooling.

7.22.2 Forced cooling required, with description of forced cooling.

NOTE Explanations of testing for forced cooling are given in Clause 23.

7.23 According to the capacitor provided with the switch

7.23.1 Capacitor class X1,

7.23.2 Capacitor class X2,

7.23.3 Capacitor class X3,

7.23.4 Capacitor class Y2,

7.23.5 Capacitor class Y4.

NOTE 1 Capacitor class definitions are given in IEC 60384-14.

NOTE 2 Explanations of capacitor requirements are given in 24.3.

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Table 2

Type and connection of switches *(1 of 8)*

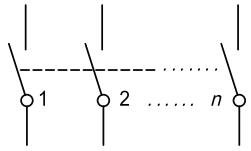
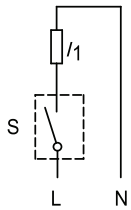
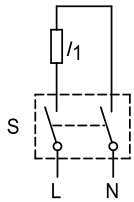
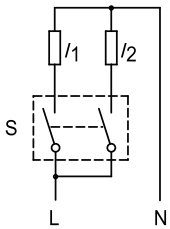
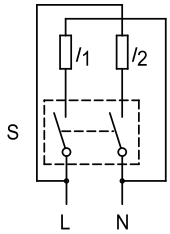
Code 1)	Type of switch	Type of connection	Test circuit 2)
One-way switch			
	Principle of one-way switches with one to *n* poles		
1.1	The number of poles, type of connection and load as declared		
1.2	Single pole	Single load (single-pole disconnection)	 S = Specimen
1.3	Double pole	Single load (all-pole disconnection)	 S = Specimen
1.4 [1.2]	Double pole	Double load (single-pole disconnection)	 S = Specimen
1.5 [1.2] [1.4]	Double pole	Double load (single-pole disconnection, load connected to opposite polarity)	 S = Specimen

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Table 2 *(2 of 8)*

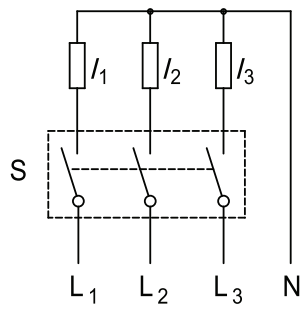
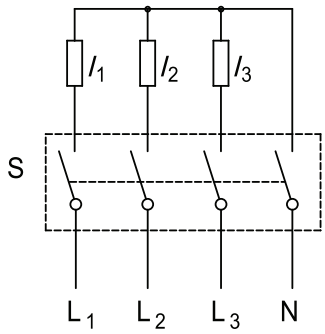
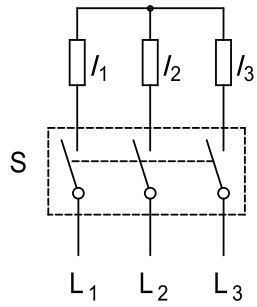
Code [1]	Type of switch	Type of connection	Test circuit [2]
1.6	Three pole	Three loads unswitched neutral. (three-pole disconnection)	 S = Specimen
1.7	Four pole	Three loads switched neutral. (four-pole disconnection)	 S = Specimen
1.8	Three pole	Three lods (three-pole disconnection)	 S = Specimen

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Table 2 *(3 of 8)*

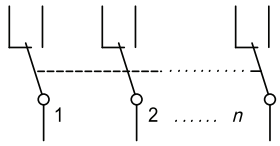
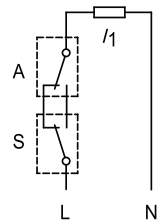
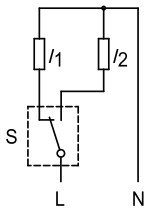
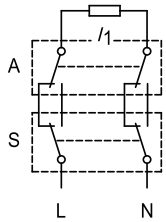
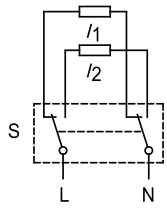
Code 1)	Type of switch	Type of connection	Test circuit 2)
One-way switch			
	Principle of One-way switches with one to n poles		
2.1	The number of poles, type of connection and load as declared		
2.2 [1.2]	Single pole	Single load (single-pole disconnection)	 S = Specimen A = Auxiliary switch
2.3	Single pole	Double load (single-pole disconnection)	 S = Specimen
2.4 [1.3]	Double pole	Single load (all-pole disconnection)	 S = Specimen A = Auxiliary switch
2.5	Double pole	Double load (all-pole disconnection)	 S = Specimen

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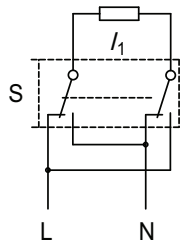
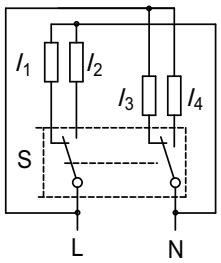
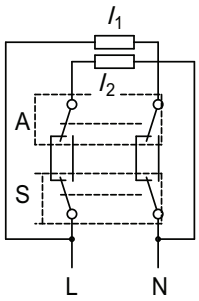
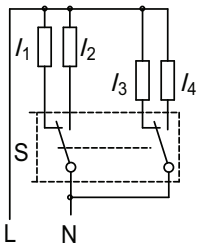
Table 2 *(4 of 8)*

Code [1]	Type of switch	Type of connection	Test circuit [2]
2.6	Double pole	Single load with polarity reversal	 S = Specimen
2.7	Double pole	Four load (single-pole disconnection, load connected to opposite polarity)	 S = Specimen
2.8	Double pole	Double load (single-pole disconnection, load connected to opposite polarity)	 S = Specimen A = Auxiliary switch
2.9	Double pole	Four load (single-pole disconnection)	 S = Specimen

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