

INTERNATIONAL STANDARD



Switches for appliances – Part 1: General requirements



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

SWITCHES FOR APPLIANCES –

Part 1: General requirements

FOREWORD

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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:

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- withdrawn,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
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SWITCHES FOR APPLIANCES –

Part 1: General requirements

1 Scope

~~1.1~~ This part of IEC 61058 applies to switches ~~(mechanical or electronic)~~ for appliances ~~actuated by hand, by foot or by other human activity~~. ~~The switches are intended to operate or~~ control electrical appliances and other equipment for household or similar purposes with a rated voltage not exceeding ~~440~~ 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 ~~or by~~,
- indirect actuation,
- an actuating sensing unit.

~~The actuating member or sensing unit can be integral with or arranged separately, either physically or electrically, from the switch and may involve transmission of a signal, for example electrical, optical, acoustic or thermal, between the actuating member or sensing unit and the switch.~~

~~Switches which incorporate additional control functions governed by the switch function are within the scope of this standard.~~

~~This standard also covers the indirect actuation of the switch when the operation of the actuating member or sensing unit is provided by a remote control or a part of an appliance or equipment such as a door.~~

~~NOTE 1 Electronic switches may be combined with mechanical switches giving full disconnection or micro-disconnection.~~

~~NOTE 2 Electronic switches without a mechanical switch in the supply circuit provide only electronic disconnection. Therefore, the circuit on the load side is always considered to be live.~~

~~NOTE 3 For switches used in tropical climates, additional requirements may be necessary.~~

~~NOTE 4 Attention is drawn to the fact that the standards for appliances may contain additional or alternative requirements for switches.~~

~~NOTE 5 Throughout this standard, the word "appliance" means "appliance or equipment".~~

~~NOTE 6 This part of IEC 61058 is applicable when testing incorporated switches. When other types of switches for appliances are tested, this part is applicable together with the relevant IEC 61058-2.~~

~~This part may, however, be applied for other types of switches which are not mentioned in IEC 61058-2, provided that the electrical safety is not disregarded.~~

~~1.2 This standard applies to switches intended to be incorporated in, on or with an appliance.~~

~~1.3 This standard also applies to switches incorporating electronic devices.~~

~~1.4 This standard also applies to switches for appliances such as~~

~~— switches intended to be connected to a flexible cable (cord switches);~~

~~— NOTE In this document, the word "cable" means "cable or cord".~~

- ~~— switches integrated in an appliance (integrated switches);~~
- ~~— switches intended to be mounted apart from the appliance (independently mounted switches) other than those within the scope of IEC 60669-1;~~
- ~~— change-over selectors for which, however, particular requirements are given in IEC 61058-2.~~

~~1.5 This standard does not contain requirements for isolating switches.~~

~~NOTE Requirements for isolating switches are under consideration.~~

~~1.6 This standard does not apply to devices which control appliances and equipment not actuated intentionally by a person. These are covered by IEC 60730.~~

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".

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 60034-1:1996, *Rotating electrical machines – Part 1: Rating and performance*¹⁾
Amendment 1 (1997)
Amendment 2 (1999)~~

¹⁾ ~~There is a consolidated edition 10.2 (1999) that includes IEC 60034-1 and its amendments 1 (1997) and 2 (1999).~~

IEC 60038:~~1983~~, *IEC standard voltages*

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

~~IEC 60050(411):1973, International Electrotechnical Vocabulary (IEV) — Chapter 411: Rotating machinery~~

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

~~IEC 60050(826):1982, International Electrotechnical Vocabulary (IEV) — Chapter 826: Electrical installations of buildings —
Amendment 1 (1990)
Amendment 2 (1995)~~

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

IEC 60065:2014, *Audio, video and similar electronic apparatus – Safety requirements*

~~IEC 60068-2-20:1979, Environmental testing — Part 2-20: Tests — Test T: Soldering~~

IEC 60068-2-75:~~1997~~, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

~~IEC 60085:1984, Thermal evaluation and classification of electrical insulation~~

IEC 60112:~~1979~~ 2003, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials — under moist conditions*
Amendment 1:2009

IEC 60127 (all parts), *Miniature fuses*

IEC 60127-2:~~1989~~, *Miniature fuses – Part 2: Cartridge fuse-links*

~~IEC 60228:1978, Conductors of insulated cables~~

~~IEC 60228A:1982, Conductors of insulated cables — First supplement: Guide to the dimensional limits of circular conductors~~

~~IEC 60269-1:1998, Low-voltage fuses — Part 1: General requirements~~

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 60269-3-1:1994, Low-voltage fuses — Part 3-1: Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household and similar applications) — Sections I to IV~~

~~IEC 60335-1:1991, Safety of household and similar electrical appliances — Part 1: General requirements~~
Amendment 1 (1994)

~~IEC 60335 (all parts 2), Safety for household and similar electrical appliances~~

~~IEC 60364-4-41:1992, Electrical installations of buildings — Part 4: Protection for safety — Chapter 41: Protection against electric shock²⁾~~
~~Amendment 1 (1996)~~
~~Amendment 2 (1999)~~

~~IEC 60364-4-442:1993, Electrical installations of buildings — Part 4: Protection for safety — Chapter 44: Protection against overvoltage — Section 442: Protection of low-voltage installations against faults between high-voltage systems and earth³⁾~~
~~Amendment 1 (1995)~~
~~Amendment 2 (1999)~~

~~IEC 60364-4-443:1995, Electrical installations of buildings — Part 4: Protection for safety — Chapter 44: Protection against overvoltages — Section 443: Protection against overvoltages of atmospheric origin or due to switching⁴⁾~~
~~Amendment 1 (1998)~~

IEC 60384-14:1993, Fixed capacitors for use in electronic equipment – Part 14: Sectional specification – Fixed capacitors for electromagnetic *interference* suppression and connection to the supply mains

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

~~IEC 60417-1:1998, Graphical symbols for use on equipment — Part 1: Overview and application~~

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 60617-2:1996, Graphical symbols for diagrams — Part 2: Symbol elements, qualifying symbols and other symbols having general application~~

~~IEC 60664-1:1992, Insulation coordination for equipment within low-voltage systems — Part 1: Principles, requirements and tests~~

IEC 60664-3:1992 2003, Insulation coordination for equipment within low-voltage systems – Part 3: Use of coatings ~~to achieve insulation coordination of printed board assemblies~~, *potting or molding for protection against pollution*
 Amendment 1:2010

~~IEC 60669-1:1998, Switches for household and similar fixed electrical installations — Part 1: General requirements~~

IEC 60691:1993, Thermal-links – Requirements and application guide

~~IEC 60695-2-1 (all sheets), Fire hazard testing — Part 2-1: Test methods~~

²⁾ There is a consolidated edition 3.2 (1999) that includes IEC 60364-4-41 and its amendments 1 (1996) and 2 (1999).

³⁾ There is a consolidated edition 1.2 (1999) that includes IEC 60364-4-442 and its amendments 1 (1995) and 2 (1999).

⁴⁾ There is a consolidated edition 3.2 (1999) that includes IEC 60364-4-443 and its amendment 1 (1998).

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 60707:1999, Flammability of solid non-metallic materials when exposed to flame sources – List of methods~~

IEC 60730 (all parts), *Automatic electrical controls* ~~for household and similar use~~

IEC 60730-1: ~~1999~~ 2013, *Automatic electrical controls* ~~for household and similar use~~ – Part 1: *General requirements*

IEC 60730-2-9: ~~2000~~ 2015, *Automatic electrical controls* ~~for household and similar use~~ – Part 2-9: *Particular requirements for temperature sensing controls*

IEC 60738-1: ~~1998~~, *Thermistors – Directly heated positive* ~~step-function~~ *temperature* ~~efficient~~ *thermistors* ~~coefficient~~ – Part 1: *Generic specification*

~~IEC 60760:1989, Flat, quick-connect terminations~~

~~IEC 60893-1:1987, Specification for industrial rigid laminated sheets based on thermosetting resins for electrical purposes – Part 1: Definitions, designations and general requirements~~

~~IEC 60998-2-3:1991, Connecting devices for low-voltage circuits for household and similar purposes – Part 2-3: Particular requirements for connecting devices as separate entities with insulation piercing clamping units~~

~~IEC 61000 (all parts), Electromagnetic compatibility (EMC)~~

IEC 61000-3-2: ~~1995~~, *Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)* ⁵⁾
~~Amendment 1 (1997)~~
~~Amendment 2 (1998)~~

IEC 61000-3-3: ~~1994~~, *Electromagnetic compatibility (EMC) – Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage power supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection*

IEC/TR2 TS 61000-3-5: ~~1994~~, *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 16 75 A*

~~IEC 61000-4-1:1992, Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 1: Overview of immunity tests. Basic EMC publication~~

⁵⁾ ~~There is a consolidated edition 1.2 (1998) that includes IEC 61000-3-2 and its amendments 1 (1997) and 2 (1998).~~

IEC 61000-4-2:~~1995~~, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*:~~Basic EMC publication 6)~~
~~Amendment 1 (1998)~~

IEC 61000-4-3:~~1995~~, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*:~~7)~~
~~Amendment 1 (1998)~~

IEC 61000-4-4:~~1995~~, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*:~~Basic EMC publication~~

IEC 61000-4-5, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

~~IEC 61000-4-6:1996, Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 6: Immunity to conducted disturbances, induced by radio-frequency fields~~

IEC 61000-4-8, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test*

IEC 61000-4-11:~~1994~~, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

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*

~~ISO 1456:1988, Metallic coatings – Electrodeposited coatings of nickel plus chromium and of copper plus nickel plus chromium~~

~~ISO 2081:1986, Metallic coatings – Electroplated coatings of zinc of iron or steel~~

~~ISO 2093:1986, Electroplated coatings of tin – Specification and test methods~~

~~ISO 4046:1978, Paper, board, pulp and related terms – Vocabulary~~

⁶⁾ ~~There is a consolidated edition 1.1 (1999) that includes IEC 61000-4-2 and its amendment 1 (1998).~~

⁷⁾ ~~There is a consolidated edition 1.1 (1998) that includes IEC 61000-4-3 and its amendment 1 (1998).~~

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]

~~3.1.2~~

~~**switch (mechanical)**~~

~~a mechanical switching device capable of making, carrying and breaking currents under normal circuit conditions which may include specified operating overload conditions and also carrying for a specified time currents under specified abnormal circuit conditions such as those of short circuit~~

~~NOTE A switch may be capable of making but not breaking short circuit currents.~~

~~[IEV 441-14-10]~~

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 ~~use~~ operation, including a neutral conductor, but by convention not a PEN/PEM/PEL conductor

~~[IEV 826-03-01]~~

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

~~the part of the~~ portion of a switching device associated exclusively with one electrically separated conducting path of ~~the switch~~ its main circuit and excluding those portions which provide a means for mounting and operating all poles together

~~NOTE 1 Those parts that provide a means for mounting and operating all poles together are excluded from the definition of a pole.~~

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]

3.1.6

clearance

~~the shortest distance in air between two conductive parts~~

3.1.7

creepage distance

~~the shortest distance along the surface of the insulation material between two conductive parts~~

~~[IEV 151-03-37]~~

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

3.1.10

special purpose tool

~~tool which is unlikely to be readily available in a normal household, for example, a key for a three-angle headed screw~~

~~NOTE Tools such as coins, screwdrivers and spanners designed to operate square or hexagonal nuts are not special purpose tools.~~

3.1.7

normal use

use of the switch for the purpose for which it was made and declared

3.1.12

ambient air temperature

~~the temperature or temperatures, determined under prescribed conditions, of the air surrounding the switch when mounted as declared by the manufacturer~~

3.1.13

proof tracking index (PTI)

~~the numerical value of the proof voltage in volts, at which a material withstands 50 drops of test solution without tracking~~

3.1.8

unique type reference

UT

identification marking on a switch such that by quoting it in full to the switch manufacturer ~~the electrical, mechanical, dimensional and functional parameters of the original switch can be unequivocally specified~~ 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**

~~part~~ 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 ~~clamping unit~~ terminal

~~NOTE — A conductor the shape of which is arranged for introduction into a clamping unit or the strands of which are twisted to consolidate the end, is considered to be an unprepared conductor.~~

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

3.1.13**prepared conductor**

a conductor the ~~stripped~~ end of which is fitted with an attachment such as eyelet, ~~a terminal end, sleeve or a cable lug, etc.~~

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

3.1.20**~~base material~~**

~~insulating material, supporting electronic circuits~~

3.1.21**~~printed board~~**

~~a sized base material including holes, if any, and bearing at least one conductive pattern~~

3.1.22**~~printed board assembly~~**

~~printed board with electrical and mechanical components and/or other printed boards attached to it, with all manufacturing processes, soldering, coating etc. completed~~

3.1.23**~~insulation distance~~**

~~the shortest distance of a coated printed board between conductive parts located on the base material.~~

~~See figure Q.1.~~

3.1.14**polarity reversal**

change of the polarity on the terminals connected to the load by a switching action

3.1.25**semiconductor switching device**

~~a switching device designed to make, carry, break and/or control the current in an electric circuit by means of the controlled conductivity of a semiconductor~~

3.1.26

electronic step-down convertor (convertor)

~~unit inserted between the supply and one or more tungsten-halogen or other filament lamps which serves to supply the lamp(s) with its (their) rated voltage, generally at high frequency. The unit may consist of one or more separate components~~

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

~~a device capable of making, carrying, breaking and/or controlling currents under normal circuit conditions which may include specified operating overload conditions and also carrying for a specified time currents under specified abnormal circuit conditions such as those of a short circuit. The device contains actuating members, actuating means and switching devices which may be mechanical or electronic. At least one of these must be electronic~~
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(s) to which the ~~electronic~~ switch is subjected, including, if applicable, making, controlling and breaking and including their durations and sequence in time

[IEV 411-21-07, modified]

3.1.19

duty-type

a 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]

3.1.30

cyclic duration factor

~~the ratio between the period of loading, including making and breaking, and the duration of the duty cycle, expressed as a percentage~~

[IEV 411-21-10, modified]

3.1.20

protective impedance

~~an impedance connected between live parts and accessible conductive parts, of such value that the current, in normal use and under likely fault conditions in the electronic switch, is limited to a safe value; it is so constructed that the reliability is maintained throughout the life of the electronic switch~~

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

~~NOTE Details of the likely fault conditions, the safe current and the requirements for reliability are as given in this IEC standard.~~

3.2 Terms and definitions relating to voltages, and currents and wattage

~~NOTE Where the terms "voltage" and "current" are used, they imply the r.m.s. values unless otherwise specified.~~

3.2.1

rated voltage, current, frequency, wattage etc.

~~voltage, current, frequency, wattage etc. assigned to a switch by the manufacturer and to which operation and performance characteristics are referred~~ 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 ~~60364-4-41~~ 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.

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

3.2.4

rated load

type of load assigned ~~to the switch~~ by the manufacturer, according to classifications

3.2.5

over-current

a 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]

3.2.5

short-circuit current

~~an over-current resulting from a short circuit due to a fault or an incorrect connection in an electric circuit~~

~~[IEV 441-11-07]~~

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**

~~any~~ voltage having a peak value exceeding the corresponding peak value of maximum steady-state voltage at normal operating conditions

3.2.8**recurring peak voltage (U_{rp})**

~~maximum peak value of periodic excursions of the voltage waveform resulting from distortion of an a.c. voltage or from a.c. components superimposed on a d.c. voltage~~

~~NOTE Random overvoltages, for example due to occasional switching, are not considered to be recurring peak voltages.~~

3.2.9**temporary overvoltage**

~~overvoltage at a power frequency of relatively long duration~~

3.2.9.1**short-term temporary overvoltage**

~~temporary overvoltage with a duration not exceeding 5 s~~

~~NOTE The voltage values for short term temporary overvoltage are higher than the voltage value for long term temporary overvoltage (see 3.3.3.2.2 of IEC 60664-1).~~

3.2.9.2**long-term temporary overvoltage**

~~temporary overvoltage with duration exceeding 5 s~~

3.2.9**overvoltage category**

numeral defining a transient overvoltage condition

Note 1 to entry: ~~Overvoltage categories I, II and III are used~~ (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, ~~and/or duty type~~ 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 ~~to be incorporated~~ for incorporation in or ~~fixed to~~ 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]

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 ~~provided~~ 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 ~~moved~~ **influenced** to cause an operation

3.4.4

actuating means

~~any~~ 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 ~~switching~~ device (SD) in the case of long-term temporary overvoltage

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

~~for single phase a.c. appliances and for d.c. appliances, a disconnection of both supply conductors substantially at the same time by a single switching action or, for appliances to be connected to more than two supply conductors, a disconnection of all supply conductors, except the earthed conductor substantially at the same time by a single switching action~~
concurrent disconnection of all supply conductors, except the earthed conductor, by a single switching action for AC and DC appliances

3.4.10**operation**

~~transfer of the moving contact(s) from one position to an adjacent position~~

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 ~~these~~ 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**

~~any cable, cord, core or conductor, a part of which is external to a switch, or to an appliance in or on which the switch is mounted. Such a conductor may be a supply lead or interconnecting cord between separate parts of an appliance or it may form part of the fixed wiring~~

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

3.5.3

internal conductor

~~any cable, cord, core or conductor which is internal to an appliance, but is neither an external conductor nor an integrated conductor~~

~~3.5.4 Methods of attachment for cords~~

~~3.5.4.1~~

~~type X attachment~~

~~method of attachment such that the cord can be replaced without the aid of special purpose tools by a cord not requiring special preparation~~

~~3.5.4.2~~

~~type Y attachment~~

~~method of attachment such that the cord can only be replaced with the aid of special purpose tools normally available to the manufacturer or his agent~~

~~NOTE Such a method of attachment may be used either with common cords or with special cords.~~

~~3.5.4.3~~

~~type Z attachment~~

~~method of attachment such that the cord cannot be replaced without destroying the integrity of the switch~~

3.6 Terms and definitions relating to terminals and terminations

3.6.1

terminal

conductive part of a switch, provided for ~~reusable electrical connections without the use of a special purpose tool or a special process~~ 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 Figures 1 through 5.

~~3.6.3~~

~~**pillar terminal**~~

~~screw type terminal in which the conductor(s) is (are) inserted into a hole or cavity, where it is (they are) clamped under the shank of the screw. The clamping pressure may be applied directly by the shank of the screw, or through an intermediate clamping member to which pressure is applied by the shank of the screw~~

~~Examples of pillar terminals are shown in figure 1~~

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 The following terminals are not regarded as screwless terminals:~~

- ~~— terminals requiring fixing of special devices to the conductors before clamping them into the terminal, for example flat quick-connect terminations;~~
- ~~— terminals requiring wrapping of the conductors, for example those with wrapped joints;~~

~~— terminals providing direct contact to the conductors by means of edges or points penetrating the insulation.~~

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

screw terminal

~~screw-type terminal in which the conductor(s) is (are) clamped under the head of the screw. The clamping pressure may be applied directly by the head of the screw or through an intermediate part, such as a washer, clamping plate or anti-spread device~~

~~Examples of screw terminals are shown in figure 2~~

3.6.5

stud terminal

~~screw-type terminal in which the conductor(s) is (are) clamped under a nut. The clamping pressure may be applied directly by a suitably shaped nut or through an intermediate part, such as a washer, clamping plate or anti-spread device~~

~~Examples of stud terminals are shown in figure 2~~

3.6.6

saddle terminal

~~screw-type terminal in which the conductor(s) is (are) clamped under a saddle by means of two or more screws or nuts~~

~~Examples of saddle terminals are shown in figure 3~~

3.6.7

lug terminal

~~screw-type terminal designed for clamping a cable lug or bar directly or indirectly by means of a screw or nut~~

~~Examples of lug terminals are shown in figure 4~~

3.6.8

mantle terminal

~~screw-type terminal in which the conductor(s) is (are) clamped against the base of a slot in a threaded stud by means of a nut. The conductor is clamped against the bottom of the slot by a suitably shaped washer under the nut, by a central peg if the nut is a cap nut, or by equally effective means for transmitting the pressure from the nut to the conductor within the slot~~

~~Examples of mantle terminals are shown in figure 5~~

3.6.4

termination

~~connection between two or more conductive parts which can only be made or replaced by either a special purpose tool or a special process~~

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 readily inserted and withdrawn with or without the use of a tool~~s~~

[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 ~~figure 7~~ 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 ~~must be~~ is one homogeneous piece. It may ~~comprise~~ 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.

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**

~~any~~ 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).

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 ~~and any appropriate part 2~~.

~~In general,~~ Compliance is checked by carrying out all the relevant tests.

5 General ~~notes~~ information on tests

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

~~5.1 Tests according to this standard are type tests.~~

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 $25\text{ °C} \pm 10\text{ °C}$.

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.

~~NOTE In case of doubt, the tests are made at an ambient temperature of $20\text{ °C} \pm 5\text{ °C}$.~~

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.

~~The envelope dimensions of female connectors for flat quick-connect terminations used for tests shall be in accordance with figure 8.~~

~~NOTE A method of selection of female test connectors for flat quick-connect terminations is given in annex H.~~

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.

~~5.5 Unless otherwise specified the tests are carried out in the order of the clauses of this standard.~~

~~The number of test specimens required and the relevant clauses are as follows.~~

~~NOTE A survey of test specimens and related clauses is given in table 1.~~

5.5.1 Switches with the following ratings:

- ~~— d.c. only;~~
- ~~— both a.c. and d.c.;~~

~~the tests being carried out on d.c., provided that the d.c. voltage and current ratings are equal to, or greater than, the a.c. ratings.~~

~~For these ratings, the following specimens are used:~~

- ~~— clauses 6 to 12 and 23: specimen No. 1;~~
- ~~— clauses 19 to 22: specimen No. 2; where clearances according to 20.1 are tested in accordance with annex M, three additional specimens are used;~~
- ~~— clauses 13 to 18:~~
 - ~~• with polarity marking: specimens Nos. 3 to 5;~~
 - ~~• without polarity marking: specimens Nos. 3 to 5 with one polarity and specimens Nos. 6 to 8 with the opposite polarity;~~
- ~~— clause 25: three additional specimens.~~

5.5.2 Switches with the following ratings:

- ~~— a.c. only;~~
- ~~— both a.c. and d.c., but not meeting the provisions of 5.5.1.~~

~~For these ratings, the following specimens are used:~~

- ~~— clauses 6 to 12 and 23: specimen No. 1;~~
- ~~— clauses 19 to 22: specimen No. 2; where clearances according to 20.1 are tested in accordance with annex M, three additional specimens are used;~~
- ~~— clauses 13 to 18:~~
 - ~~• for a.c. rating: specimens Nos. 3 to 5;~~
 - ~~• for d.c. rating with marked polarity: specimens Nos. 6 to 8;~~
 - ~~• for d.c. rating without marked polarity: specimens Nos. 6 to 8 with one polarity and specimens Nos. 9 to 11 with the opposite polarity;~~
- ~~— clause 25: three additional specimens.~~

~~5.5.3 Switches with more than one rated voltage and/or rated current combination within one nature of supply~~

~~For these ratings, the following specimens are used:~~

- ~~— clauses 6 to 12 and 23: specimen No. 1;~~
- ~~— clauses 19 to 22: specimen No. 2; where clearances according to 20.1 are tested in accordance with annex M, three additional specimens are used;~~
- ~~— clauses 13 to 18:~~
 - ~~• for the combination with the highest current rating: specimens Nos. 3 to 5;~~
 - ~~• for the second combination: specimens Nos. 6 to 8;~~
 - ~~• for further combinations: specimens Nos. 9 to 11, etc.~~

~~NOTE For switches having one rated current for more than one voltage rating, the switch shall be tested at the highest voltage rating for each type of load.~~

- ~~— clause 25: three additional specimens.~~

Table 1 – Test specimens

Clause		Specimens to be tested ¹⁾	Notes
6	Rating	4	
7	Classification	4	
8	Marking and documentation	4	
9	Protection against electric shock	4	
10	Provision for earthing	4	
11	Terminals and terminations	4	2)
12	Construction	4	
13	Mechanism	— 3 4 5 6 7 8	3)
14	Protection against solid foreign objects, ingress of dust, water and humid conditions	— 3 4 5 6 7 8	3)
15	Insulation resistance and dielectric strength	— 3 4 5 6 7 8	2)-3)
16	Heating	— 3 4 5 6 7 8	
17	Endurance	— 3 4 5 6 7 8	3)
18	Mechanical strength	— 3 4 5	
19	Screws, current carrying parts and connections	—2	
20	Clearances, creepage distances solid, insulation and coatings of rigid printed board assemblies	—2	4)-5)
21	Resistance to heat and fire	—2	
22	Resistance to rusting	—2	
23	Abnormal operation and fault conditions for electronic switches	4	

25	EMC requirements	three additional samples	
1)	~~For the purpose of selection of female test connectors according to annex H, additional specimens may be necessary.~~		
2)	~~Three additional new specimens may be required according to 11.1.1.3.4 or table 12, note 2).~~		
3)	~~The further specimens 9 to 11, etc., are tested in the same combination of clauses as specimens 6 to 8.~~		
4)	~~Three additional new specimens may be required according to 20.1 for the test according to annex M.~~		
5)	~~For testing coatings on printed boards according to 20.4, the following number of printed boards are needed:-~~		
	~~— 13 specimens for type A coating;~~		
	~~— 17 specimens for type B coating.~~		

~~5.6 Switches with a rated frequency are 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.~~

~~5.7 If not more than one specimen fails during the tests of clauses 13 to 18 inclusive such as to cause non-compliance with the appropriate clause, the tests which caused the failure, and those preceding, which may have influenced the result of that test, are repeated on another set of identical specimens, all of which shall then comply with the repeated tests. No failure shall occur during the tests of clauses 6 to 12 inclusive and 19 to 22 inclusive.~~

~~NOTE The applicant may submit, together with the first set of specimens, an additional set of specimens which may be needed in case one specimen fails.~~

~~The testing authorities will then, without further request, test the additional specimens and will only reject if a further failure occurs.~~

~~If the additional set of specimens is not submitted at the same time, a failure of one specimen will entail a rejection.~~

~~5.8 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.~~

~~5.9 For the tests of this standard, actuation may be performed by test equipment. Tests at high speed, however, have to be performed according to 17.2.4.~~

~~For switches with electronic actuating members, actuation shall be performed according to the manufacturer's declarations.~~

~~5.10 As far as possible, signal indicators shall be tested together with the switches.~~

~~With the exception of the luminosity which can be disregarded, the lamp shall function unless otherwise specified. The test may be performed with test samples simulating the electrical, mechanical and thermal influences of the original indicator lamp. Replaceable indicator lamps may be replaced during the tests. Signal indicators, the function of which is independent from the function of the switch, are operated continuously.~~

~~The results of the tests for switches with indicator lamps shall be considered to apply to switches of equivalent construction without indicator lamps, or to indicator lamps of equivalent construction without the switching mechanism.~~

~~5.11 Switches intended to be operated from a specific supply, are tested with that specific supply.~~

~~5.12 In all tests, the measuring instruments or the measuring means shall be such as not to affect appreciably the quantity being measured.~~

~~5.13 For electronic switches, it may be necessary to disconnect or short-circuit electronic components for the purpose of the tests.~~

~~5.14 For the tests of 23.1.1.1, additional specimens may be necessary.~~

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, 250 V 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.

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	$0,8 \times I_R$
	Further next lower load	$0,533 \times I_R$
Second half	Highest load	I_R
	Next lower load	$0,5 \times I_R$
	Further next lower load	$0,333 \times I_R$

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 ~~440~~ 480 V.

~~NOTE Preferred values are 50 V, 125 V, 230 V, 250 V, 400 V, 440 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 ~~of marking and documentation in conjunction with Clause 8.~~

~~NOTE Preferred values are 1 A, 2 A, 4 A, 6 A, 10 A, 16 A, 20 A, 25 A, 40 A and 63 A.~~

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 Classification of switches~~

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

~~NOTE 1 A switch having more than one circuit need not have the same classification for each circuit.~~

~~NOTE 2 Annex F, may be used for determining whether a particular switch rating is suitable for controlling the circuit in the actual application.~~

- 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 ~~a.c.~~ 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.

~~7.1.2.10 — minimum load for electronic switches.~~

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

7.3 According to ambient temperature

~~7.1.3.1 — switches at which the complete switch, including the actuating member, is intended to be used in an ambient temperature between a minimum value of 0 °C and a maximum value of 55 °C;~~

~~7.1.3.2 — switches at which the complete switch, including the actuating member, is intended to be used in an ambient temperature higher than 55 °C or lower than 0 °C, or both;~~

~~7.1.3.3 — switches intended to be used with the actuating member and other accessible parts in an ambient temperature between 0 °C and 55 °C, and the remainder of the switch in an ambient temperature higher than 55 °C;~~

~~— preferred values of maximum ambient temperature are 85 °C, 100 °C, 125 °C and 150 °C;~~

~~— preferred values of minimum ambient air temperature are 10 °C, 25 °C and 40 °C;~~

~~— values differing from these preferred values are allowed, as long as the values are multiples of 5 °C.~~

~~7.1.3.4 Electronic cord switches and electronic independently mounted switches are classified for a maximum ambient temperature of 35 °C.~~

~~NOTE The classification using the ambient air temperature 35 °C may also be used for other electronic switches under the provision that they are properly marked according to No. 3.2 in table 3.~~

~~7.1.3.4.1 — electronic cord switches and electronic independently mounted switches, in which the complete switch, including the actuating member, is intended to be used in an ambient air temperature between a minimum value of 0 °C and a maximum value of 35 °C.~~

~~NOTE The decrease of ambient temperature from 55 °C to 35 °C is caused by the fact that components of electronic switches have a larger heat dissipation than components of mechanical switches.~~

~~7.1.3.4.2 — electronic cord switches and electronic independently mounted switches, in which the complete switch including the actuating member is intended to be used in an ambient air temperature higher than 35 °C, or a minimum value lower than 0 °C, or both:~~

- ~~— preferred values of maximum ambient air temperature are 55 °C, 85 °C, 100 °C and 125 °C;~~
- ~~— preferred values of minimum ambient air temperature are 10 °C, 25 °C and 40 °C;~~
- ~~— values differing from these preferred values are allowed, as long as the values are multiples of 5 °C.~~

7.3.1 Switches with all parts intended to be used $0\text{ °C} \leq T \leq 55\text{ °C}$.

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 $0\text{ °C} \leq T \leq 55\text{ °C}$, and
- other parts of the switch not classified to the range of $0\text{ °C} \leq T \leq 55\text{ °C}$.

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.

~~7.1.5 According to degree of protection provided by the switch, when mounted as declared, as part of an appliance enclosure~~

7.5 Degree of protection against solid foreign objects (according to IEC 60529)

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 ~~(according to IEC 60529)~~

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);

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** Switches for use in Class II appliances may be used without additional protection in all other appliances, independently of class.~~

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

~~**NOTE 1** Details for the pollution degrees are specified in annex L.~~

~~**NOTE 2** A switch suitable for use in a particular situation may be used in a less polluted situation.~~



~~NOTE 3 A switch may be used in a more polluted situation than that for which it is designed if the appropriate additional protection is applied by the appliance.~~

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.

~~7.1.7 According to the method of actuating the switch:~~

~~NOTE This classification is not restrictive. Push button switches may have more than one push button.~~

~~7.1.7.1 rotary switch;~~

~~7.1.7.2 lever switch;~~

~~7.1.7.3 rocker switch;~~

~~7.1.7.4 push button switch;~~

~~7.1.7.5 cord operated switch;~~

~~7.1.7.6 push pull switch;~~

~~7.1.7.7 electronic switches operated via a sensing unit (for example touching, approaching, turning, optical, acoustic, thermal or any other influences).~~

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.

~~7.1.9 According to application level for resistance to heat and fire:~~

~~7.1.9.1 level 1 switch;~~

~~7.1.9.2 level 2 switch;~~

~~7.1.9.3 level 3 switch.~~

~~NOTE For guidance concerning the levels, see clause 21.~~

7.11 According to resistance to ignitability by the glow wire temperature

7.11.1 650 °C;

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;

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

~~Details for types of switches and connections are specified in table 2.~~

~~7.1.13.1 One-way switches:~~

~~7.1.13.1.1 — declared specific type and/or connection;~~

~~7.1.13.1.2 — single pole, single load (single pole disconnection);~~

~~7.1.13.1.3 — double pole, single load (all pole disconnection);~~

~~7.1.13.1.4 — double pole, double load (single pole disconnection);~~

~~7.1.13.1.5 — double pole, double load (single pole disconnection, load connected to opposite polarity);~~

~~7.1.13.1.6 — three pole, three loads, unswitched neutral (three pole disconnection);~~

~~7.1.13.1.7 — four pole, three load switched neutral (four pole disconnection);~~

~~7.1.13.1.8 — three pole, three load (three pole disconnection).~~

~~7.1.13.2 Two-way switches:~~

~~7.1.13.2.1 — declared specific type and/or connection;~~

~~7.1.13.2.2 — single pole, single load (single pole disconnection);~~

~~7.1.13.2.3 — single pole, double load (single pole disconnection, for specific circuits and loads only);~~

~~7.1.13.2.4 — double pole, single load (all pole disconnection);~~

~~7.1.13.2.5 — double pole, double load (all pole disconnection, for specific circuits and loads only);~~

~~7.1.13.2.6 — double pole, single load with polarity reversal;~~

~~7.1.13.2.7 — double pole, four load (single pole disconnection, load connected to opposite polarity, for specific circuits and loads only);~~

~~7.1.13.2.8 — double pole, double load (single pole disconnection, load connected to opposite polarity);~~

~~7.1.13.2.9 — double pole, four load (single pole disconnection for specific circuits and loads only).~~

~~7.1.13.3 Two-way switches with centre position for disconnection:~~

~~7.1.13.3.1 — declared specific type and/or connection;~~

~~7.1.13.3.2 — single pole, single load (single pole disconnection);~~

~~7.1.13.3.3 — single pole, double load (single pole disconnection);~~

~~7.1.13.3.4 — double pole, single load (all pole disconnection);~~

~~7.1.13.3.5 — double pole, double load (all pole disconnection);~~

~~7.1.13.3.6 — double pole, single load with polarity reversal (all pole disconnection);~~

~~7.1.13.3.7 — double pole, four load (single pole disconnection, load connected to opposite polarity);~~

~~7.1.13.3.8 — double pole, double load (single pole disconnection, load connected to opposite polarity);~~

~~7.1.13.3.9 — double pole, four load (single pole disconnection).~~

~~7.1.13.4 Multiway switches:~~

~~7.1.13.4.1 — the number of poles, type of connection and load as declared;~~

~~7.1.13.4.2 — single pole, four positions with polarity reversal (single pole disconnection, for resistive load according to 7.1.2.1);~~

~~7.1.13.4.3 — double pole, four positions with polarity reversal (all pole disconnection, for resistive load according to 7.1.2.1);~~

~~7.1.13.4.4 — double pole, five positions with polarity reversal (all pole disconnection, for resistive load according to 7.1.2.1);~~

~~7.1.13.4.5 — double pole, seven positions with polarity reversal (all pole disconnection, for resistive load according to 7.1.2.1).~~

~~NOTE Switches classified in 7.1.13.4.2 to 7.1.13.4.5 are designed for the step wise increase or decrease of the resulting wattage of a combination of resistors (R_1 to R_3) according to table 2.~~

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.

~~7.1.14 According to switching device for electronic switches:~~

~~7.1.14.1 — with semiconductor switching device;~~

~~7.1.14.2 — with mechanical switching device.~~

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 ~~for electronic switches~~

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).

~~NOTE 1 The different types of duty type are illustrated in figures 14 to 16.~~

7.18.4 as declared for a specific application.

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

~~7.1.17 According to test conditions for electronic switches:~~

~~7.1.17.1 functional test conditions with thermal current or maximum rated resistive current;~~

~~NOTE This test condition reflects the proper functioning of the switch. This test does not simulate the actual load of the end application.~~

~~7.1.17.2 simulated test conditions with type of load as classified in 7.1.2;~~

~~NOTE This test condition reflects the proper functioning of the switch. It also simulates all conditions of the end application.~~

~~7.1.17.3 specific test conditions of end application, i.e. in or together with the appliance and under the cooling conditions of the appliance;~~

~~7.1.17.4 test conditions according to duty type.~~

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.

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

7.20 Classification According to the type of terminals

7.20.1 Terminals intended for the connection of unprepared conductors ~~and not requiring the use of any special purpose tool;~~

7.20.2 Terminals intended for the connection of prepared conductors ~~and/or requiring the use of a special purpose tool;~~

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

~~7.2.3 terminals suitable for the connection of supply cables or cords with unprepared conductors and not requiring the use of any special purpose tool;~~

~~7.2.4 terminals suitable for the connection of supply cables or cords with prepared conductors and/or requiring the use of a special purpose tool;~~

~~7.2.5 terminals suitable for the interconnection of two or more conductors;~~

~~7.2.6 terminals intended for the connection of rigid, solid conductors;~~

~~7.2.7 terminals intended for the connection of rigid, solid and stranded conductors;~~

~~7.2.8 terminals intended for the connection of flexible conductors;~~

~~7.2.9 — terminals suitable for the connection of both flexible and rigid (solid and stranded) conductors;~~

~~7.2.10 — solder terminals intended for soldering by hand with a soldering iron;~~

~~7.2.11 — solder terminals intended for soldering with a solder bath;~~

~~7.2.12 — solder terminals with provisions for securing the conductor by mechanical means and providing circuit continuity by soldering;~~

~~7.2.13 — solder terminals without provisions for securing the conductor by mechanical means. The circuit continuity is ensured by soldering solely.~~

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.

~~7.2.14 — According to the resistance to soldering heat:~~

~~7.2.14.1 — solder terminals type 1;~~

~~7.2.14.2 solder terminals type 2.~~**7.21 According to the type of built in protection ~~for electronic switches~~****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 ~~condition of cooling for electronic switches~~ 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.

Table 2 – Type and connection of switches (1 of 8)

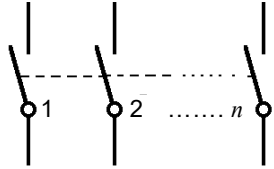
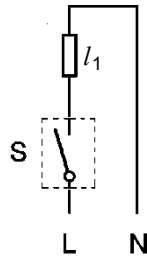
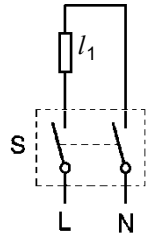
Classification	Code ¹⁾	Type of switch	Type of connection	Test circuit ²⁾
		One-way switch		
7.1.13.1		Principle of one-way switches with one to n poles		
7.1.13.1.1	1.1	The number of poles, type of connection and load as declared		
7.1.13.1.2	1.2	Single pole	Single load (single-pole disconnection)	 S = Specimen
7.1.13.1.3	1.3	Double pole	Single load (all-pole disconnection)	 S = Specimen

Table 2 (2 of 8)

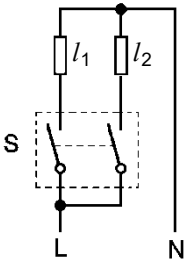
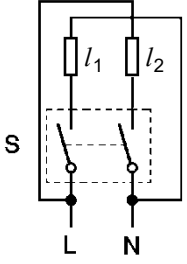
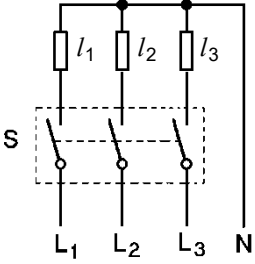
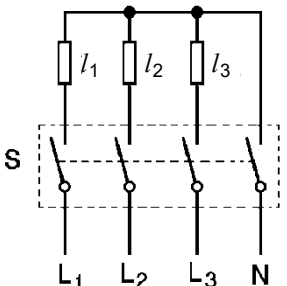
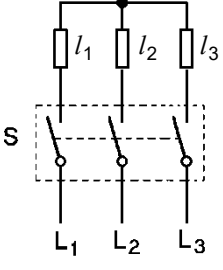
Classification	Code ¹⁾	Type of switch	Type of connection	Test circuit ²⁾
7.1.13.1.4	1.4 [1.2]	Double pole	Double load (single-pole disconnection)	 S = Specimen
7.1.13.1.5	1.5 [1.2] [1.4]	Double pole	Double load (single-pole disconnection, load connected to opposite polarity)	 S = Specimen
7.1.13.1.6	1.6	Three pole	Three loads unswitched neutral. (three-pole disconnection)	 S = Specimen
7.1.13.1.7	1.7	Four pole	Three loads switched neutral. (four-pole disconnection)	 S = Specimen
7.1.13.1.8	1.8	Three pole	Three loads (three-pole disconnection)	 S = Spécimen

Table 2 (3 of 8)

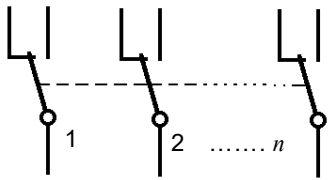
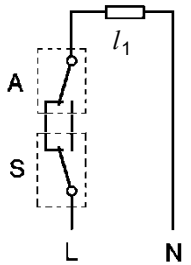
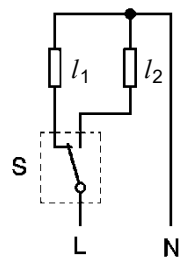
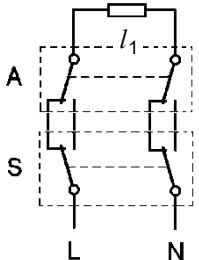
Classification	Code ¹⁾	Type of switch	Type of connection	Test circuit ²⁾
		~~Two~~ One-way switch		
7.1.13.2		Principle of ~~two~~ one-way switches with one to n poles		
7.1.13.2.1	2.1	The number of poles, type of connection and load as declared		
7.1.13.2.2	2.2 [1.2]	Single pole	Single load (single-pole disconnection)	 S = Specimen A = Auxiliary switch
7.1.13.2.3 ²⁾	2.3	Single pole	Double load (single-pole disconnection)	 S = Specimen
7.1.13.2.4	2.4 [1.3]	Double pole	Single load (all-pole disconnection)	 S = Specimen A = Auxiliary switch

Table 2 (4 of 8)

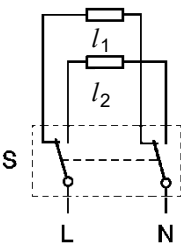
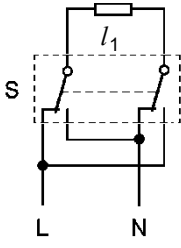
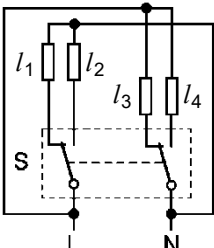
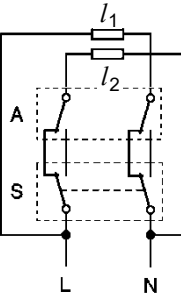
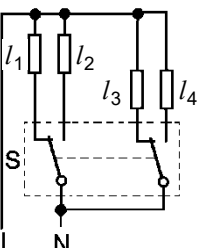
Classification	Code ¹⁾	Type of switch	Type of connection	Test circuit ²⁾
7.1.13.2.5 ²⁾	2.5	Double pole	Double load (all-pole disconnection)	 S = Specimen
7.1.13.2.6 ²⁾	2.6	Double pole	Single load with polarity reversal	 S = Specimen
7.1.13.2.7 ²⁾	2.7	Double pole	Four load (single-pole disconnection, load connected to opposite polarity)	 S = Specimen
7.1.13.2.8	2.8	Double pole	Double load (single-pole disconnection, load connected to opposite polarity)	 S = Specimen A = Auxiliary switch
7.1.13.2.9 ²⁾	2.9	Double pole	Four load (single-pole disconnection)	 S = Specimen

Table 2 (5 of 8)

Classification	Code ¹⁾	Type of switch	Type of connection	Test circuit ²⁾
		Two-way switch with centre position for disconnection		
~~7.1.13.3~~		Principle of two-way switches with center position and one to n poles		
~~7.1.13.3.1~~	3.1	The number of poles, type of connection and load as declared		
~~7.1.13.3.2~~	3.2	Single pole	Single load (single-pole disconnection)	S = Specimen A = Auxiliary switch
~~7.1.13.3.3~~	3.3	Single pole	Double load (single-pole disconnection)	S = Specimen
~~7.1.13.3.4~~	3.4	Double pole	Single load (all-pole disconnection)	S = Specimen A = Auxiliary switch
~~7.1.13.3.5~~	3.5	Double pole	Double load (all-pole disconnection)	S = Specimen