

# INTERNATIONAL STANDARD

# IEC 60669-1

Edition 3.2  
2007-01

Edition 3:1998 consolidated with amendments 1:1999 and 2:2006

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## Switches for household and similar fixed-electrical installations –

### Part 1: General requirements

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This **English-language** version is derived from the original **bilingual** publication by leaving out all French-language pages. Missing page numbers correspond to the French-language pages.



Reference number  
IEC 60669-1:1998+A1:1999+A2:2006(E)

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International Electrotechnical Commission, 3, rue de Varembe, PO Box 131, CH-1211 Geneva 20, Switzerland  
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: [inmail@iec.ch](mailto:inmail@iec.ch) Web: [www.iec.ch](http://www.iec.ch)

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International Electrotechnical Commission  
Международная Электротехническая Комиссия

## CONTENTS

FOREWORD.....	9
1 Scope.....	13
2 Normative references.....	15
3 Definitions.....	17
4 General requirements.....	23
5 General notes on tests.....	23
6 Ratings.....	25
7 Classification.....	27
8 Marking.....	31
9 Checking of dimensions.....	39
10 Protection against electric shock.....	39
11 Provision for earthing.....	45
12 Terminals.....	45
13 Constructional requirements.....	69
14 Mechanism.....	81
15 Resistance to ageing, protection provided by enclosures of switches, and resistance to humidity.....	83
16 Insulation resistance and electric strength.....	89
17 Temperature rise.....	97
18 Making and breaking capacity.....	101
19 Normal operation.....	105
20 Mechanical strength.....	113
21 Resistance to heat.....	125
22 Screws, current carrying parts and connections.....	127
23 Creepage distances, clearances and distances through sealing compound.....	131
24 Resistance of insulating material to abnormal heat, to fire and to tracking.....	135
25 Resistance to rusting.....	139
26 EMC requirements.....	139
Annex A (normative) Survey of specimens needed for tests.....	183
Annex B (normative) Additional requirements for switches having facilities for the outlet and retention of flexible cables.....	185
Table 1 – Preferred combinations of numbers of poles and ratings.....	31
Table 2 – Relationship between rated currents and connectable cross-sectional areas of copper conductors.....	47
Table 3 – Tightening torque for the verification of the mechanical strength of screw-type terminals.....	49
Table 4 – Test values for flexion and pull out for copper conductors.....	51
Table 5 – Test values for pulling out test.....	53

Table 6 – Composition of conductors.....	53
Table 7 – Relationship between rated currents and connectable cross-sectional areas of copper conductors for screwless terminals .....	59
Table 8 – Test current for the verification of electrical and thermal stresses in normal use of screwless terminals .....	63
Table 9 – Cross-sectional areas of rigid copper conductors for deflection test of screwless terminals.....	67
Table 10 – Deflection test forces .....	67
Table 11 – Forces to be applied to covers, cover-plates or actuating members whose fixing is not dependent on screws .....	71
Table 12 – External cable diameter limits for surface type switches .....	77
Table 12a – Limits of external dimensions of flexible cables .....	187
Table 13 – Points of application of the test voltage for the verification of insulation resistance.....	91
Table 14 – Test voltage, points of application and minimum values of insulating resistance for the verification of dielectric strength.....	95
Table 15 – Temperature-rise test currents and cross-sectional areas of copper conductors.....	97
Table 16 – Fractions of total number of operations.....	103
Table 17 – Number of operations for normal operation test.....	105
Table 18 – Height of fall for impact test .....	117
Table 19 – Torque for the verification of the mechanical strength of glands.....	121
Table 20 – Creepage distances, clearances and distances through insulating sealing compound.....	133
Figure 1 – Pillar terminals.....	141
Figure 2 – Screw terminals and stud terminals.....	145
Figure 3 – Saddle terminals.....	147
Figure 4 – Lug terminals.....	149
Figure 5 – Mantle terminals.....	151
Figure 6 – Thread-forming screw.....	153
Figure 7 – Thread-cutting screw .....	153
Figure 8 – Classification according to connections.....	155
Figure 9 – Void .....	157
Figure 10 – Test apparatus for checking damage to conductors.....	159
Figure 11a – Principle of the test apparatus for deflecting test on screwless terminal.....	161
Figure 11b – Example of test arrangement to measure the voltage drop during deflecting test on screwless terminal.....	161
Figure 12 – Apparatus for making and breaking capacity and normal operation tests .....	163
Figure 13 – Circuit diagrams for making and breaking capacity and normal operation .....	165
Figure 14 – Circuit diagrams for testing switches for use on fluorescent lamp loads.....	165
Figure 15 – Impact test apparatus .....	167

Figure 16 – Pendulum impact test apparatus (striking element) .....	167
Figure 17 – Mounting support for sample.....	169
Figure 18 – Mounting block for flush-type switches .....	169
Figure 19 – Arrangement for test on cover-plates .....	171
Figure 20 – Gauge (thickness: about 2 mm) for the verification of the outline of covers, cover-plates or actuating members.....	171
Figure 21 – Example of application of the gauge of figure 20 on covers fixed without screws on a mounting surface or supporting surface.....	173
Figure 22 – Examples of applications of the gauge of figure 20 in according with the requirements of 20.7 .....	175
Figure 23 – Gauge for verification of grooves, holes and reverse tapers.....	177
Figure 24 – Sketch showing the direction of application of the gauge of figure 23.....	177
Figure 25 – Ball-pressure apparatus .....	179
Figure 26 – Diagrammatic representation (24.1.1) .....	179
Figure 27 – Test wall in accordance with the requirements of 15.2.2 .....	181

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### SWITCHES FOR HOUSEHOLD AND SIMILAR FIXED-ELECTRICAL INSTALLATIONS –

#### Part 1: General requirements

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International Standard IEC 60669-1 has been prepared by subcommittee 23B: Plugs, socket-outlets and switches, of IEC technical committee 23: Electrical accessories.

This consolidated version of IEC 60669-1 consists of the third edition (1998) [documents 23B/535/FDIS and 23B/539/RVD], its amendment 1 (1999) [documents 23B/580/FDIS and 23B/590/RVD] and its amendment 2 (2006) [documents 23B/828/FDIS and 23B/845/RVD].

The technical content is therefore identical to the base edition and its amendments and has been prepared for user convenience.

It bears the edition number 3.2.

A vertical line in the margin shows where the base publication has been modified by amendments 1 and 2.

Annexes A and B form an integral part of this standard.

In this standard the following print types are used:

- requirements proper: in roman type;
- *test specifications: in italic type;*
- explanatory matter: in smaller roman type.

The committee has decided that the contents of the base publication and its amendments will remain unchanged until the maintenance result date indicated on the IEC web site 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 HOUSEHOLD AND SIMILAR FIXED-ELECTRICAL INSTALLATIONS –

## Part 1: General requirements

### 1 Scope

This part of IEC 60669 applies to manually operated general purpose switches, for a.c. only with a rated voltage not exceeding 440 V and a rated current not exceeding 63 A, intended for household and similar fixed electrical installations, either indoors or outdoors.

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

Switches covered by this standard are intended for the control in normal use of:

- a circuit for a tungsten filament lamp load; or
- a circuit for a fluorescent lamp load (including electronic ballast); or
- a circuit for a substantially resistive load with a power factor not less than 0,95; or
- a monophasic circuit for motor load with a rated current up to 10 A and a power factor not less than 0,6; or
- a combination of these.

NOTE 1 An extension of the scope to switches for rated voltages higher than 440 V is under consideration.

NOTE 2 An increase of the rated current of 10 A for motor load is under consideration.

NOTE 3 For the time being, switches with a rated current more than 10 A are considered as a 10 A current for motor load switch.

The standard also applies to boxes for switches, with the exception of mounting boxes for flush type switches.

NOTE 4 General requirements for boxes for flush-type switches are given in IEC 60670.

It also applies to switches such as:

- switches incorporating pilot lights;
- electromagnetic remote control switches (particular requirements are given in the relevant part 2);
- switches incorporating a time-delay device (particular requirements are given in the relevant part 2);
- combinations of switches and other functions (with the exception of switches combined with fuses);
- electronic switches (particular requirements are given in the relevant part 2);
- switches having facilities for the outlet and retention of flexible cables (see annex B);
- isolating switches (particular requirements are given in the relevant Part 2).

NOTE 5 The minimum length of the flexible cable used with these switches may be governed by National Wiring Rules.

Switches complying with this standard are suitable for use at ambient temperatures not normally exceeding 25 °C, but occasionally reaching 35 °C.

NOTE 6 Switches complying with this standard are suitable only for incorporation in equipment in such a way and in such a place that it is unlikely that the surrounding ambient temperature exceeds 35 °C.

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

## 2 Normative references

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

IEC 60050-442:1998, *International Electrotechnical Vocabulary – Part 442: Electrical accessories*

IEC 60112: 1979, *Method for determining the comparative and the proof tracking indices of solid insulating materials under moist conditions*

IEC 60212: 1971, *Standard conditions for use prior to and during the testing of solid electrical insulation materials*

IEC 60227-1: 1993, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V – Part 1: General requirements*

IEC 60227-3: 1993, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V – Part 3: Non-sheathed cables for fixed wiring*

IEC 60227-4: 1992, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V – Part 4: Sheathed cables for fixed wiring*

IEC 60227-5: 1979, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V – Part 5: Flexible cables (cords)*  
Amendment 1 (1987)

IEC 60245-1: 1994, *Rubber insulated cables – Rated voltages up to and including 450/750 V – Part 1: General requirements*

IEC 60245-4: 1994, *Rubber insulated cables – Rated voltages up to and including 450/750 V – Part 4: Cords and flexible cables*

IEC 60364-4-46: 1981, *Electrical installations of buildings – Part 4: Protection for safety – Chapter 46: Isolation and switching*

IEC 60417: 1973, *Graphical symbols for use on equipment. Index, survey and compilation of the single sheets*

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

IEC 60670: 1989, *General requirements for enclosures for accessories for household and similar fixed-electrical installations*

IEC 60695-2-1: 1991, *Fire hazard testing – Part 2: Test methods – Section 1: Glow-wire test and guidance*

IEC 60998: *Connecting devices for low voltage circuits for household and similar purposes*

IEC 60998-1: 1990, *Connecting devices for low voltage circuits for household and similar purposes – Part 1: General requirements*

IEC 60998-2-1: 1990, *Connecting devices for low voltage circuits for household and similar purposes – Part 2-1: Particular requirements for connecting devices as separate entities with screw-type clamping units*

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

IEC 60999-1: 1990, *Connecting devices – Safety requirements for screw type and screwless-type clamping units for electrical copper conductors – Part 1: General requirements and particular requirements for conductors from 0,5 mm<sup>2</sup> up to 35 mm<sup>2</sup> (included)*

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

ISO 2039-2: 1987, *Plastics – Determination of hardness – Part 2: Rockwell hardness*

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

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

### 3 Definitions

For the purpose of this part of IEC 60669 the following definitions apply.

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

#### 3.1

##### **switch**

device designed to make or break the current in one or more electric circuits

##### 3.1.1

##### **push-button switch**

control switch having one actuator intended to be operated by force exerted by a part of human body, usually the finger or the palm of the hand, having stored energy return, for instance a spring

##### 3.1.2

##### **momentary contact switch**

switching device which returns automatically to the initial state after operation

NOTE Momentary contact switches are intended to operate bells, electromagnetic remote control switches or time-delay switches.

##### 3.1.3

##### **momentary push-button switch**

push-button switch which returns automatically to the initial state after operation

### 3.1.4

#### **cord-operated switch**

switch the operating means of which is a cord which has to be pulled in order to change its contact state

### 3.1.5

#### **switch of normal (gap) construction**

switch construction having a clearance between the open contacts which is 3 mm or greater and meeting the performance requirements for normal-gap construction

### 3.1.6

#### **switch of mini-gap construction**

switch construction having a clearance between the open contacts which is 1,2 mm or greater and meeting the performance requirements for mini-gap construction

### 3.1.7

#### **switch of micro-gap construction**

switch construction without specified clearance between the open contacts and meeting the performance requirements for micro-gap construction

### 3.2

#### **one operation**

the transfer of the moving contacts from one operating position to another

### 3.3

#### **terminal**

the conductive part of one pole, composed of one or more clamping unit(s) and insulation if necessary

### 3.4

#### **clamping unit**

part or parts of a terminal necessary for the mechanical clamping and the electrical connection of the conductor(s)

### 3.5

#### **terminal with screw clamping**

terminal intended for the connection, by clamping only, of (an) external rigid or flexible conductor(s)

### 3.6

#### **pillar terminal**

terminal with screw clamping in which the conductor is inserted into the hole or cavity, where it is clamped under the end of the screw or screws. The clamping pressure may be applied directly by the end of the screw or through an intermediate clamping member to which pressure is applied by the end of the screw

NOTE Examples of pillar terminals are shown in figure 1.

### 3.7

#### **screw terminal**

terminal with screw clamping in which the conductor is 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

NOTE Examples of screw terminals are shown in figure 2.

### 3.8

#### **stud terminal**

terminal with screw clamping in which the conductor is 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

NOTE Examples of stud terminals are shown in figure 2.

### 3.9

#### **saddle terminal**

terminal with screw clamping in which the conductor is clamped under a saddle by means of two or more screws or nuts

NOTE Examples of saddle terminals are shown in figure 3.

### 3.10

#### **lug terminal**

screw terminal or stud terminal, designed for clamping a cable lug or bar by means of a screw or nut

NOTE Examples of lug terminals are shown in figure 4.

### 3.11

#### **mantle terminal**

terminal with screw clamping in which the conductor is clamped against the base of a slot in a threaded stud by means of a nut. The conductor is clamped against the base 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

NOTE Examples of mantle terminals are shown in figure 5.

### 3.12

#### **screwless terminal**

connecting device for the connection and subsequent disconnection of a rigid (solid or stranded) or flexible conductor or the interconnection of two conductors capable of being dismantled, the connection being made, directly or indirectly, by means of springs, parts of angled, eccentric or conical form, etc., without special preparation of the conductor concerned, other than removal of insulation

### 3.13

#### **thread-forming screw**

screw having an uninterrupted thread which, by screwing in, forms a thread by displacing material

NOTE An example of a thread-forming screw is shown in figure 6.

### 3.14

#### **thread-cutting screw**

screw having an interrupted thread which, by screwing in, forms a thread by removing material

NOTE An example of a thread-cutting screw is shown in figure 7.

### 3.15

#### **mechanical time-delay device**

device which, through a mechanical auxiliary, operates some time after the instant at which the conditions which cause it to operate are established

### 3.16

#### **base**

part of the switch retaining current-carrying parts and, in general, the mechanism in position

### 3.17

#### **rated voltage**

voltage assigned to the switch by the manufacturer

### 3.18

#### **rated current**

current assigned to the switch by the manufacturer

### 3.19

#### **operating member**

part of a cord-operated switch which connects the internal mechanism with a pull cord. It is usually attached to the actuating member of the switch

### 3.20

#### **pole (of a switch)**

part of a switch associated with one conductive path (way) of its circuit(s) provided with contacts intended to connect and disconnect the circuit itself and excluding those portions which provide a means for connecting and operating the poles together

A conducting path may be constituted by portions common to other conducting paths of the switch.

### 3.21

#### **actuating member**

a part which is pulled, pushed, turned or otherwise moved to cause an operation of the switch [IEV 442-04-14]

### 3.22

#### **pilot light**

device incorporating a light source either integral or designed to be installed with the switch and intended to give for example an indication of the switch state or to indicate the switch location

## **4 General requirements**

Switches and boxes shall be so designed and constructed that, in normal use, their performance is reliable and without danger to the user or the surroundings.

*Compliance is checked by meeting all the relevant requirements and tests specified.*

## **5 General notes on tests**

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

**5.2** *Unless otherwise specified, the specimens are tested as delivered and under normal conditions of use.*

Switches having provision for pilot lights shall be tested with pilot lights fitted, unless otherwise stated. The results of the tests shall be considered to apply to switches of the same type which do not have this facility.

*Flush-type switches which do not comply with any accepted standard sheet are tested together with the corresponding boxes.*

**5.3** *Unless otherwise specified, the tests are carried out in the order of the clauses, at an ambient temperature between 15 °C and 35 °C.*

*In case of doubt, the tests are made at an ambient temperature of 20 °C ± 5 °C.*