

Switches for household and similar fixed electrical installations —

Part 2-1: Particular requirements — Electronic switches

The European Standard EN 60669-2-1:2000, with the incorporation of amendment A2:2001, has the status of a British Standard

ICS 29.120.40

National foreword

This British Standard is the official English language version of EN 60669-2-1:2000, including amendment A2:2001. It is derived from IEC 60669-2-1:1996, Edition 3.2:2000 which comprises Edition 3:1996 consolidated by the incorporation of amendments 1:1997 and 2:1999. It supersedes BS EN 60669-2-1:1998 which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags [A1] <A1>. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment 1 is indicated by [A1] <A1>.

The CENELEC common modifications have been implemented at the appropriate places in the text. The start and finish of each common modification is indicated in the text by tags [C] <C>. Where a common modification has been introduced by amendment, the tags carry the number of the amendment. For example, the common modifications introduced by CENELEC amendment A11 are indicated by [C11] <C11>.

The UK participation in its preparation was entrusted to Technical Committee PEL/23, Installed electrical accessories, which has the responsibility to:

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- monitor related international and European developments and promulgate them in the UK.

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Cross-references

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English version

**Switches for household and similar fixed electrical installations —
Part 2-1: Particular requirements —
Electronic switches
(includes amendment A2:2001)
(IEC 60669-2-1:1996 + A1:1997 + A2:1999, modified)**

Interrupteurs pour installations électriques
fixes domestiques et analogues —
Partie 2-1: Prescriptions particulières —
Interrupteurs électroniques
(inclut l'amendement A2:2001)
(CEI 60669-2-1:1996 + A1:1997
+ A2:1999, modifiée)

Schalter für Haushalt und ähnliche
ortsfixe elektrische Installationen —
Teil 2-1: Besondere Anforderungen —
Elektronische Schalter
(enthält Änderung A2:2001)
(IEC 60669-2-1:1996 + A1:1997
+ A2:1999, modifiziert)

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CENELEC

European Committee for Electrotechnical Standardization
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Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of the International Standard IEC 60669-2-1:1996 and its amendment 1:1997, prepared by IEC SC 23B, Plugs, socket-outlets and switches, of IEC TC 23, Electrical accessories, together with the common modifications prepared by the Technical Committee CENELEC TC 23B, Switches for household and similar fixed electrical installations, was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 60669-2-1 on 2000-04-01.

This European Standard replaces EN 60669-2-1:1996 and its amendment A11:1997.
It shall be used in conjunction with EN 60669-1:1999.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2001-04-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2005-10-01

Annexes designated "normative" are part of the body of this standard.

Annexes designated "informative" are given for information only.

In this standard, Annexes ZA and ZB are normative and Annex AA is informative.

Annexes ZA and ZB have been added by CENELEC.

Foreword to amendment A2

The text of amendment 2:1999 to the International Standard IEC 60669-2-1:1996, prepared by SC 23B, Plugs, socket-outlets and switches, of IEC TC 23, Electrical accessories, together with the common modifications prepared by the Technical Committee CENELEC TC 23B, Switches for household and similar fixed electrical installations, was submitted to the Unique Acceptance Procedure and was approved by CENELEC as amendment A2 to EN 60669-2-1:2000 on 2001-03-01.

There is no amendment A1 to EN 60669-2-1.

The present document shall be used in conjunction with EN 60669-1:1999.

The following dates were fixed:

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- latest date by which the national standards conflicting
with the amendment have to be withdrawn (dow) 2005-10-01

Annexes designated "normative" are part of the body of this standard.

Annexes designated "informative" are given for information only.

In this standard, Annex AA is informative and Annexes B and ZA are normative.

Annex ZA has been added by CENELEC.

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SWITCHES FOR HOUSEHOLD AND SIMILAR FIXED ELECTRICAL INSTALLATIONS –

Part 2-1: Particular requirements – Electronic switches

1 Scope

This clause of part 1 is replaced by the following:

This standard applies to electronic switches and to associated electronic extension units for household and similar fixed electrical installations either indoors or outdoors.

It applies to electronic switches for the operation of lamp circuits and the control of the brightness of lamps (dimmers) as well as the control of the speed of motors (e.g. those used in ventilating fans) and for other purposes (e.g. heating [C] controls [C]), with a working voltage not exceeding 250 V a.c. and a rated current up to and including 16 A.

The operation and control as mentioned above are performed [C] *Text deleted* [C] by a person via an actuating member, a sensing surface or a sensing unit, by means of touch, proximity, turn, optical, acoustic, thermal or any other influence. [C] This standard also applies to electronic switches where the operation or control is made by physical means, e.g. light, wind velocity, presence of persons, etc. [C]

NOTE 1 This standard is not intended to cover devices falling within the scope of IEC 60730 [C] or EN 61058-1. [C]

Examples of designs of electronic switches and functions are shown in annex AA.

NOTE 2 Electronic switches without a mechanical switch in the main circuit do not provide a "full off-state". Therefore, the circuit on the load side should be considered to be live.

2 Normative references

[C] NOTE Normative references to international publications are listed in Annex ZA (normative) [C]

3 Definitions

This clause of part 1 applies with the following additions:

After the first paragraph.

Addition:

The term "Electronic switch" is used as a general term to cover both switching and control devices.

Additional definitions:

3.101

rated load

load assigned to the electronic switch by the manufacturer

3.102

minimum load

minimum load at which the electronic switch still operates correctly

3.103

minimum current

permissible minimum current at which the electronic switch still operates correctly

3.104

electromechanically operated contact mechanism

component which operates the parts used to open and close the circuit electromechanically

3.105

semiconductor switching device

switching device designed to make or break the current in an electric circuit by means of the controlled conductivity of a semiconductor in that circuit

NOTE 1 In a circuit where the current passes through zero (periodically or otherwise) the effect of "not making" the current following such a zero value is equivalent to breaking the current.

NOTE 2 Typical examples of semiconductor switching devices are:

- electronic switching devices using the phase-cut-on principle to control the load by switching on the current at any phase angle at or after zero crossing in each half-wave, e.g. by a thyristor;
-  electronic switches using the phase-cut-off principles to control the load by switching off the current at any phase angle after zero crossing in each half-wave, e.g. by a transistor in a diode bridge. 

3.106

electronic momentary contact switch

electronic switch with an electromechanical switching mechanism or a semiconductor switching device which returns automatically to the initial state after operation

3.107

mechanical control unit

unit directly adjustable by mechanical means (e.g. potentiometer) which controls the output via electronic components

3.108

electronic output control unit

unit adjustable by other than mechanical means (e.g. sensing unit), containing electronic components and controlling the output C *Text deleted* C

3.109

electronic extension unit

unit permitting the control of an electronic switch from a distance

3.110

protective impedance

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, and which is so constructed that the reliability is maintained throughout the life of the electronic switch

A₁ 3.111

working voltage

highest r.m.s. value of the a.c. or d.c. voltage across any particular insulation which can occur when the switch is supplied at rated voltage

NOTE 1 Transients are disregarded.

NOTE 2 Both open-circuit conditions and normal operating conditions are taken into account A₁

A₂ 3.112

flexible cable

cable, a part of which is external to the electronic output control unit. Such cable may either be a supply cable or a connecting cable between separate parts of an accessory A₂

4 General requirements

This clause of part 1 applies.

5 General notes on tests

This clause of part 1 applies with the following C modifications C:

C 5.4 Additions

The number of test specimens is shown in table 101.

Three specimens are subjected to all the relevant tests, except for the tests of 18.2 and 19.1 where one further set of three specimens is used (or two further sets for switches of pattern number 2), and the tests of clause 24 where another three specimens are used.

For each test sequence of clause 26 and 101 three new specimens are used as shown in table 101.

Table 101

Type of switch	A₂ Number for general tests A₂	A₂ Additional specimens for clauses or subclauses A₂				
		18.2	19.1	24	26	101
Marked with one rated current and — one voltage	3	3 ¹⁾	3 ¹⁾	3	3	3
— two voltages	6	6 ¹⁾	6 ¹⁾	6	6	6

¹⁾ For electronic switches with mechanical and electromechanical switching devices, only the complete contact mechanism may be submitted.

NOTE 1 For checking compliance with the EMC requirements only the tests of clause 26 have to be carried out.

NOTE 2 The manufacturer may submit the same set of specimens to one or more test sequences as an alternative to the table, provided all the tests are carried out on one set of three specimens. C

Additional subclauses:

5.101 *All measurements shall be carried out by methods which are suitable for the purpose, which do not appreciably affect the values to be measured and which are not affected by factors such as waveform.*

NOTE Care should be taken to use instruments giving true r.m.s. indications.

5.102 *If the electronic circuitry is so enclosed that the short-circuiting or disconnecting of components is impossible or difficult, the manufacturer shall provide one additional test specimen with leads connected for measurements, short-circuiting, etc.*

It is not necessary to connect leads to the interior of hybrid and monolith integrated circuits.

5.103 *It may be necessary to disconnect electronic components for tests.*

5.104 *For electronic switches equipped with cut-outs, it may be necessary to provide three additional specimens for the test of 102.4.1.*

6 Rating

This clause of part 1 is replaced as follows:

6.1 Preferred rated a.c. voltages are 110 V, 120 V, 130 V, 220 V, 230 V and 240 V.

6.2  This subclause of part 1 does not apply. 

 **6.3** The preferred rated supply frequencies are 50 Hz and/or 60 Hz. 

7 Classification

This clause of part 1 applies with the following additions:

7.1.5 *Addition:*

- *touch;*
- *proximity;*
- *optical;*
- *acoustic;*
- *other external influences.*

NOTE Actuating the switch includes on/off operation, and/or regulating the brightness of lamps or speed of motors.

7.1.6 *Addition:*

- Switches only intended to be mounted at a height greater than 1,7 m.

7.1.9 According to the kind of load controlled by the switch:

- incandescent lamps;
- fluorescent lamps;
- motors;
- declared load. 

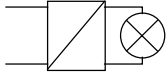
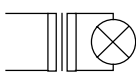
8 Marking

This clause of part 1 applies amended as follows:

8.1 Additions:

-  Note to the first dashed text: 
NOTE – As an alternative to the rated current, the rated load in volt-amperes or watts may be given.
- Minimum current in amperes, or minimum load in volt-amperes or watts.
- Rated frequency in hertz, unless the electronic switch is designed for both 50 Hz and 60 Hz.
- Rating and type of any fuse incorporated in the electronic switch.
- Symbols for kind of load (see 8.2).
- The term "extension unit", if applicable, or the relevant translation in the official language(s) of the country in which the product is to be sold, followed by an identifying reference.
- The minimum height for mounting the switch shall be indicated in the installation instructions of the manufacturer if there is a restriction (see 10.1).

8.2 Addition:

Volt-ampere.....	VA
Watt.....	W
Hertz.....	Hz
Transformer connection.....	
Terminal for regulated load.....	
Kind of load:	
Incandescent lamps.....	
Fluorescent lamps.....	
Motors.....	
Electronic step-down converter for low-voltage incandescent lamps (e.g. halogen)	
Iron core transformer for low-voltage incandescent lamps (e.g. halogen lamps).. ..	

NOTE The rating and type of any fuse may be marked with symbols (see IEC 60127).

If other particular symbols are used they shall be explained in the installation instructions.

8.3 *Replace the first line by:*

The following marking shall be placed on the main part of the electronic switch:

Replace the first dashed text by:

- the rated current and rated load, rated voltage, nature of supply, rated frequency, kind of load, the rating and type of any fuse.

Add the following before note 1:

The rating and type of fuse shall be marked on the fuse-holder or in proximity of the fuse.

The value for the minimum current may also be given in the installation instructions. 

8.4 *Addition:*

If there are more than two terminals, the load terminal shall be marked with an arrow pointing away from the terminal or with one of the symbols mentioned in 8.2 and any other terminals shall be marked corresponding to the installation instructions.

Unless the installation of the electronic switch is made clear by the markings of the terminals, a wiring diagram shall be provided with each switch.

8.6 *Addition:*

The off-state shall not be marked with an "O" if the circuit on the load side is considered as live, in accordance with clause 1.

*Additional subclauses***8.6.101** *Subclause deleted*

8.6.102 It is recommended that the actual state of the electronic switches intended to control the brightness of lamps be known when used as intended. This can be achieved either:

- with marking on the On/Off-state position, or
- with an indicator lamp, or
- by adjusting the lamp dimmer so that at the lowest control state and at rated voltage minus 10 %, the light is still visible.

NOTE A test to verify that the light is still visible is under consideration.

When the indication of the switch state is given only by the lamp, the adjusting of the lamp at the lowest control state is made as specified in the following:

For incandescent lamps, the adjusting of lamp dimmers shall be made by the manufacturer. It shall not be possible to reduce the lowest setting without a tool.

For fluorescent lamps, the adjusting of lamp dimmers shall be made by the manufacturer. It may, however, be possible for the installer to alter the lowest setting if such an adjustment is indicated in an installation instruction.

8.8 Addition:

If an electronic switch containing a viewing window (lens) for a sensing device is intended to be mounted at a height greater than 1,7 m, this information shall be stated in the instruction sheet.

☐₂ Add the following dashed text:

— information concerning external directly associated fuses/current limiting devices, where applicable. ☐₂

9 Checking of dimensions

This clause of part 1 applies with the following addition:

Electronic switches may be of dimensions other than those specified in the standard sheets (if any) provided they are supplied with suitable boxes.

10 Protection against electric shock

This clause of part 1 applies with the following additions and modifications:

10.1 Addition:

NOTE For the purpose of this standard, metal sensing surfaces which are connected to live parts by means of protective impedances (see 10.2) are not considered to be live parts.

Replace the 6th and 7th paragraphs of part 1 by:

During this additional test, the switches are subjected for 1 min to a force applied through the tip of a straight unjointed test finger, of the same dimensions as the standard test finger shown in figure ☐ 9 ☐.

This finger, with an electrical indicator as described above, is applied with a force of 75 N to all places where yielding of the insulating material could impair the safety of the switch, but is applied to thin-walled knock-outs with a force of 10 N.

Viewing windows or the like on electronic switches intended to be mounted at a height greater than 1,7 m are subjected to a force of 30 N.

The finger is not applied to membranes and the like. These parts are tested according to 13.15.1.

NOTE For the purpose of this standard, parts connected to a supply operating at SELV are not considered to be live parts.

10.2 Addition:

☐ For torch sensitive switches the associated protective impedance does not have to comply with the requirements of clauses 16 and 23. ☐

☐ The protective impedance shall consist of at least two resistors or independent capacitors in series of the same nominal value or a combination of both. These resistors ☐