

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

Switches for appliances – **STANDARD PREVIEW**  
Part 2-1: Particular requirements for cord switches  
(standards.iteh.ai)

Interrupteurs pour appareils – **IEC 61058-2-1:2018**  
Partie 2-1: Exigences particulières pour les interrupteurs pour câbles souples  
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## SWITCHES FOR APPLIANCES –

## Part 2-1: Particular requirements for cord switches

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International Standard IEC 61058-2-1 has been prepared by subcommittee 23J: Switches for appliances, of IEC technical committee 23: Electrical accessories.

This third edition cancels and replaces the second edition published in 2010 and constitutes a technical revision.

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

Overall format to support IEC 61058-1, IEC 61058-1-1, IEC 61058-1-2, and the heating tests.

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

CDV	Report on voting
23J/432/CDV	23J/439/RVC

Full information on the voting for the approval of this International 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.

This document is to be read in conjunction with IEC 61058-1:2016.

This document supplements or modifies the corresponding clauses in IEC 61058-1, so as to convert that publication into the IEC standard: *Particular requirements for cord switches*.

When a particular subclause of IEC 61058-1 is not mentioned in this document, that subclause applies as far as reasonable. Where this document states "addition", "modification" or "replacement", the relevant text of IEC 61058-1 is to be adapted accordingly.

In this standard:

1) the following print types are used:

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

2) subclauses, notes, figures and tables which are additional to those in IEC 61058-1 are numbered starting from 101.

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.

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

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- withdrawn,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

## SWITCHES FOR APPLIANCES –

### Part 2-1: Particular requirements for cord switches

#### 1 Scope

Clause 1 of IEC 61058-1:2016 is applicable except as follows:

*Addition:*

This document applies to cord switches (mechanical or electronic) for appliances actuated by hand, by foot or by other human activity, to operate or control electrical appliances and other equipment for household or similar purposes with a rated voltage not exceeding 250 V and a rated current not exceeding 16 A.

Throughout this document, the word "appliance" means "appliance or equipment".

These switches are intended to be operated by a person, via an actuating member or by actuating a sensing unit. The actuating member or sensing unit can be integral or arranged separately from the switch. The transmission of a signal between the actuating member or sensing unit and the switch can be made either physically or electrically (for example, electrical, optical, acoustic or thermal).

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

This document 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 such as a door.

NOTE 1 Electronic switches can 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 can apply.

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

#### 2 Normative references

Clause 2 of IEC 61058-1:2016 is applicable except as follows:

*Addition:*

IEC 60227 (all parts), *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V*

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

IEC 60245 (all parts), *Rubber insulated cables – Rated voltages up to and including 450/750 V*

IEC 60335-2-17, *Household and similar electrical appliances – Safety – Part 2-17: Particular requirements for blankets, pads, clothing and similar flexible heating appliances*

IEC 61032, *Protection of persons and equipment by enclosures – Probes for verification*

IEC 61058-1:2016, *Switches for appliances – Part 1: General requirements*

IEC 61058-1-2:2016, *Switches for appliances – Part 1-2: Requirements for electronic switches*

### 3 Terms and definitions

Clause 2 of IEC 61058-1:2016 is applicable except as follows:

#### 3.3 Terms and definitions relating to the different types of switches

*Addition:*

##### 3.3.101 cord switch

separately enclosed switch intended to be connected to a supply and/or to an appliance by means of a flexible cable(s)

Note 1 to entry: The flexible cable(s) may enter the switch enclosure in any direction and may be in line with the enclosure.

#### 3.5 Terms and definitions relating to connections to the switch

*Addition:*

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##### 3.5.101 rewirable switch

switch in which the opening of the enclosure provides access to the terminals of the switch and external conductors can be replaced

##### 3.5.102 non-rewirable switch

switch being so constructed that it forms a constructional unit with the flexible cable after connection and assembly, and such that the external conductors cannot be replaced without making the switch permanently inoperable

### 4 General requirements

Clause 4 of IEC 61058-1:2016 is applicable.

### 5 General information on tests

Clause 5 of IEC 61058-1:2016 is applicable.

### 6 Rating

Clause 6 of IEC 61058-1:2016 is applicable except as follows:

#### 6.1 Replacement:



The maximum rated voltage is 250 V.

Preferred values are 50 V, 130 V and 250 V. Rated voltages differing from the preferred values are allowed.

## **6.2 Replacement:**

The maximum rated current is 16 A.

NOTE Preferred values are 1 A; 2 A; 2,5 A; 4 A; 6 A; 10 A; 16 A.

## **7 Classification**

Clause 7 of IEC 61058-1:2016 is applicable except as follows:

*Addition:*

### **7.101 According to the connection to the switch**

**7.101.1** rewirable switch;

**7.101.2** non-rewirable switch.

### **7.102 According to the means of suspension**

**7.102.1** with means of suspension;

**7.102.2** without means of suspension.

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### **7.103 According to the type of cord for which the switch is suitable**

**7.103.1** switches suitable for the connection of round cords;

**7.103.2** switches suitable for the connection of flat cords only;

**7.103.3** switches suitable for the connection of both round and flat cords.

### **7.22 According to the type of forced cooling**

Subclause 7.22.2 of IEC 61058-1:2016 does not apply.

## 8 Marking and documentation

Clause 8 of IEC 61058-1:2016 is applicable except as follows:

**Table 3 – Switch information and loads placed in groups**

*Addition:*

No	Characteristic	Subclause	Means of information	
			Common type reference CT	Unique type reference UT
<b>5</b>	<b>TERMINALS/CONDUCTORS</b>			
5.101	If a cord switch is non-rewirable, this shall be documented.	7.101.2	Documentat ion	Documenta tion
5.102	If a cord switch is suitable for use with flat cords only, this shall be documented.	7.103.2	Documentat ion	Documenta tion
<b>101</b>	<b>CATEGORY OR TYPE OF APPLIANCE WITH WHICH THE SWITCH MAY BE USED</b>			
101.1	Cord switch intended exclusively for controlling luminaries.		Documentati on	Documenta tion
101.2	Category or type of appliance according to IEC 60335-2-17 with which the switch may be used.		Documentati on	Documenta tion

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*Addition:*

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**8.101** For cord switches intended exclusively for controlling luminaires, no "OFF" marking is required.

## 9 Protection against electric shock

Clause 9 of IEC 61058-1:2016 is applicable except as follows:

### 9.1 Addition at the end of the subclause:

*For cord switches, the test is made when the switch is fitted with cords either of the smallest or of the largest nominal cross-sectional area specified in Table 4, whichever is more unfavourable.*

### 9.1.2 Replacement:

**9.1.2** If a cover or cover plate or a fuse can be removed without the use of a tool, the protection against contact with live parts shall be assured even after removal of the cover or cover plate.

If there is a marking on the outside of the switch showing that a fuse is inside and the cover or cover plate has to be removed with a tool, the protection against contact with live parts shall be assured even after removal of the cover or cover plate.

If there is no marking on the outside of the switch but the instruction sheet shows that a fuse is inside and the cover or cover plate has to be removed with a tool, either the protection against contact with live parts shall be assured even after removal of the cover or cover plate, or the instruction sheet shall state that the disconnection from the supply before opening shall be performed.

Compliance is checked with the standard test finger, test probe B according to IEC 61032.

*Addition:*

**9.101** Non-rewirable switches are tested with the cords as fitted by the manufacturer.

## 10 Provision for earthing

Clause 10 of IEC 61058-1:2016 is applicable except as follows:

**10.1** *Addition:*

Terminals provided for earthing continuity are permitted if they are separated from live parts by basic insulation and from accessible parts by supplementary insulation. An example of the insulation system for earthing continuity is given in Figure 105.

**10.3** Subclause 10.3 of IEC 61058-1:2016 does not apply.

*Additional subclause:*

**10.101** The printed conductors of printed circuit boards may be used to provide earthing continuity under the following conditions:

- at least two tracks are used with independent soldering points and the switch complies with 10.4 for each track;
- the material of the printed circuit board consists of epoxide woven glass fabric copper-clad laminated sheet;
- the printed conductors withstand the short circuit test according to Clause 23 of IEC 61058-1-2:2016.

## 11 Terminals and terminations

Clause 11 of IEC 61058-1:2016 is applicable except as follows:

*Replacement:*

**Table 4 – Resistive current carried by the terminal and related cross-sectional areas of terminals for unprepared conductors**

Resistive current carried by the terminal A	Flexible conductors			
	Cross-sectional areas mm <sup>2</sup>			Terminal size
	Minimum	Medium	Maximum	
Over 0 up to and including 3	–	0,5	0,75	–
Over 3 up to and including 6	0,5	0,75	1,0	0
Over 6 up to and including 16	0,75	1,0	1,5	1

## 12 Construction

Clause 12 of IEC 61058-1:2016 is applicable except as follows:

## 12.1 Constructional requirements relating to protection against electric shock

### 12.1.2 Addition:

- *short rigid wires are not regarded as liable to come away from a terminal if they remain in position when the terminal screw is loosened.*

*Additional subclause:*

**12.1.101** If solder terminals are classified according to 7.20.15, additional provisions for securing the conductors shall be provided.

## 12.3 Constructional requirements relating to the mounting of switches and to the attachment of cords

*Additional subclauses:*

**12.3.101** Cord switches shall have cord anchorages such that the conductors are relieved from strain, including twisting, where they are connected to the terminals, and such that the sheath of the cord is protected from abrasion and kept in position.

**12.3.102** It shall be clear how the relief from strain and the prevention of twisting is intended to be effected.

**12.3.103** Makeshift methods such as tying the cord into a knot, or tying the ends with string shall not be used.

**12.3.104** Cord anchorages of cord switches shall be of insulating material, or, if of metal, shall be insulated from accessible metal parts or accessible insulating surfaces by insulation complying with the requirements for supplementary insulation.

**12.3.105** For rewirable cord switches, the cord anchorages shall be so designed that their parts do not fall out when the cover of the switch is removed even if the switches are not fitted with their cords.

**12.3.106** Cord anchorages shall be so designed that:

- for any attachment method, the cord is not fixed by penetration of its insulation in such a way that the insulation of the cord is cut or otherwise significantly damaged;
- a soft deformation of the insulation in such a way that the insulation of the cord is not cut or otherwise significantly damaged is allowed;
- the cord cannot touch clamping screws of the cord anchorage if these screws are accessible or electrically connected to accessible metal parts;
- the cord is not clamped by a screw which bears directly on the cord, except where the screw is made of insulating material;
- for rewirable switches, at least one part is securely fixed to the switch;
- for rewirable switches, replacement of the cord does not require the use of a special purpose tool;
- for rewirable switches, they are suitable for the different types of cords which may be connected.

**12.3.107** Cord anchorages for rewirable switches shall be so designed and located that replacement of the cord is easy.

Compliance with the requirements of 12.3.101 to 12.3.107 is checked by inspection and by a pull test in an apparatus similar to that shown in Figure 101, followed by a torque test in an apparatus similar to that shown in Figure 104:

- non-rewirable switches are tested with the cord as delivered and three new test specimens shall be used for each of the tests (pull and torque);
- three new rewirable switches are tested with PVC sheathed cords having the smallest and largest cross-sectional area as shown in Table 101. Before the test, the free length of the cord shall be cut to 150 mm ± 5 mm;
- rewirable switches provided with entries specially designed for the connection of PVC insulated flat cords – IEC 60227(all parts) – are tested with flat cords only.

**Table 101 – Rated currents for resistor loads and related type of cords**

Rated current for resistor load A	Number of cores	Nominal cross-section mm <sup>2</sup>	Types of cord according to IEC 60227 (all parts) fl = flat
Over 0,2 up to and including 3	2	0,5	52 52 (fl)
		0,75	52 52 (fl)
	3	0,5	52
		0,75	52
Over 3 up to and including 6	2	0,75	52 52 (fl) 53 53 (fl)
		1	53 53 (fl)
	3	0,75	52 53
	4	0,75	53
		1,0	53
	Over 6 up to and including 16	2	0,75
1,0			53
1,5			53
3		0,75	52 53
		1,0	53
		1,5	53
4		1,0	53
		1,5	53

Conductors of the cord are introduced into the terminals of rewirable switches, and the terminal metal screws are tightened just sufficiently to prevent the conductors from easily changing their position.

The cord anchorage is used in the normal way, clamping screws being tightened with two-thirds of the torque specified in 19.2 and insulating material screws with two-thirds of the torque specified in Table 103. After reassembly of the switch, its component parts shall fit snugly and it shall not be possible to push the cord into the switch to any appreciable extent.

The switch is first fixed in the test apparatus according to Figure 101 so that the axis of the cord is vertical where it enters the specimen. The cord is then subjected 100 times to a pull of 60 N. The pulls are applied without jerks, each time for 1 s.

Immediately after this test, the cord is subjected for 1 min to a torque with an apparatus similar to that shown in Figure 104 of:

- 0,15 Nm for cords having a nominal cross-sectional area of up to and including 0,75 mm<sup>2</sup>;
- 0,25 Nm for cords having a nominal cross-sectional area of 1 mm<sup>2</sup> and 1,5 mm<sup>2</sup>.

The torque is applied as near as possible to the switch.

For switches for blankets, pads and similar flexible heating appliances according to IEC 60335-2-17, the pull and torque tests are performed with a pull force of 100 N and a torque of 0,15 Nm.

During the tests, the cord shall not be damaged. After the tests, the cord shall not have been displaced longitudinally by more than 2 mm, and there shall be no appreciable strain at the connection. Creepage distances and clearances shall not have been reduced below the value specified in Clause 20. For non-rewirable switches, there shall be no break in the electrical connections.

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For the measurement of the longitudinal displacement, a mark is made on the cord while it is subjected to the first pull. After the tests, the displacement of the mark on the cord in relation to the specimen is measured while the cord is subjected to an additional pull.

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**12.3.108** Non-rewirable switches shall be provided with a cord complying with either IEC 60227-5 or IEC 60245 (all parts).

*Compliance is checked by inspection.*

**12.3.109** Screws, if any, which have to be operated when replacing the cord, shall not serve to fix any other component unless either the switch is rendered inoperable or manifestly incomplete if such screws are omitted or incorrectly replaced, or if the component intended to be fixed cannot be removed without the aid of a tool when replacing the cord.

NOTE This does not exclude that the cover can serve as a cord anchorage or as a part of a cord anchorage.

*Compliance is checked by inspection.*

**12.3.110** Cord switches shall be designed so that the cords are capable of withstanding the bending likely to occur in normal use. The inlet or bushing shall have no sharp edges.

If a cord guard is provided to meet this requirement, it shall not be integral to the cord except for switches with terminals classified according to 7.20.2 where special cords with, for example, moulded-on cord guards can be fixed, but where it is not possible to fit a standard cord without a cord guard during servicing.

*Compliance is checked by subjecting the switch, fitted with the cord or range of cords for which it is designed, to the following tests.*

*The switch is mounted in the flexing apparatus shown in Figure 102. For the purpose of the test, the following conditions apply:*

- a) *the test is performed only once with a cord of the maximum dimension attached;*
- b) *for switches having a rated current over 3 A, a cord of type IEC 60227-5 shall be used;*
- c) *if the switch is classified according to 7.103.3, the test shall be done with both types of cords;*
- d) *if the switch is classified according to 7.103.2, then the flat type shall be used;*
- e) *for non-rewirable switches, further test specimens shall be used.*

*The axis of oscillation is so chosen that the weight attached to the cord, and the cord itself, make the minimum lateral movement during the test. Specimens with flat cords are mounted so that the major axis of the cross-section is parallel to the axis of oscillation.*

*Each cord passing through the inlet opening is loaded with a weight having a mass of 1 kg. A current equal to the rated current passing through that particular core when the switch is operated at rated voltage is passed through each core, the voltage between the cores being maximum rated voltage. The oscillating member is moved backwards and forwards through an angle of 22,5° (on either side of the vertical), the number of flexings (that is 1 movement through 45°) being 5 000, and the rate of the flexing being 60 flexings per minute.*

*For switches for blankets, pads and similar flexible heating appliances according to IEC 60335-2-17, the movement of the oscillating member is through an angle of 45° (on either side of the vertical) and the load on the cord is 0,5 kg.*

*Rewirable switches are subjected to 10 000 flexings and non-rewirable switches to 20 000 flexings.*

*During the test there shall be no interruption of the test current and no short circuit between conductors.*

*After the test, the specimens shall show no damage within the meaning of this document.*

**12.3.111** For rewirable cord switches, the space for the external conductors inside the switch shall be adequate to allow the conductors to be easily introduced and connected, and the cover, if any, to be fitted without risk of damage to the conductors or their insulation.

It shall be possible to check that the conductors are correctly connected and positioned before the cover is fitted.

*Compliance is checked by inspection and by connecting cords of the maximum cross-sectional area according to Table 4.*

**12.3.112** Rewirable single-pole cord switches shall be provided with an additional terminal or terminals which will allow the connection of the non switched conductor or conductors.

This terminal or terminals shall allow the connection of both the incoming and the outgoing ends of the non-switched conductor or conductors.

**12.3.113** Non-rewirable cord switches shall be provided with soldered, welded, crimped or equally effective permanent connections.

The construction of the switch is such that:

- the cord cannot be separated from the switch,
  - the switch cannot be opened by hand or by using a tool,
- without making the switch permanently inoperative.