IEC 61058-2-6

Edition 2.0 2018-11
REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

Switches for appliances –
Part 2-6: Particular requirements for switches used in electric motor-operated hand-held tools, transportable tools and lawn and garden machinery

IEC 61058-2-6:2018-11 RLV(en)

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

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FOREWORD

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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 61058-2-6 has been prepared by subcommittee 23J: Switches for appliances, of IEC technical committee 23: Electrical accessories.

This second edition cancels and replaces the first edition published in 2016. It constitutes a technical revision.

This edition includes the following significant change with respect to the previous edition:

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

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

FDIS	Report on voting
3J/450/FDIS	23J/452/RVD

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 document has been drafted in accordance with the ISO/IEC Directives, Part 2.

This document is to be used 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 switches used in electric motor-operated hand-held tools, transportable tools and lawn and garden machinery*.

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;*
   - notes/explanatory matter: in small 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 the parts in the IEC 61058 series, 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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

SWITCHES FOR APPLIANCES –

Part 2-6: Particular requirements for switches used in electric motor-operated hand-held tools, transportable tools and lawn and garden machinery

1 Scope

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

~~1.1~~ *Addition:*

This part of IEC 61058 is a subset based on IEC 61058-1. The clauses outlined below are intended to address the specific requirements for switches incorporated into or integrated with electric motor-operated hand-held tools, transportable tools and lawn and garden machinery.

This document is intended for switches with an ambient temperature up to and including 55 °C. Switches tested according to IEC 61058-1 are considered to comply with this document and additional testing is not required provided ratings, loads, and endurance are correct.

NOTE This document takes into account the fact that tests are conducted as part of the end-product evaluation (e.g. products tested according to the IEC 60745 and IEC 62841 series, and lawn and gardening equipment tested according to the IEC 60335 series), and ~~need not be~~ that tests are not conducted on the component switch.

2 Normative references

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

Addition:

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

3 Terms and definitions

Clause 3 of IEC 61058-1:2016 is applicable.

4 General requirements

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

5 General ~~notes~~ information on tests

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

6 Rating

Clause 6 of IEC 61058-1:2016 is applicable.

7 Classification

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

7.~~1~~.3.2 IEC 61058-1:2016, 7.3.2 is not applicable.

7.~~1~~.3.3 IEC 61058-1:2016, 7.3.3 is not applicable.

~~**7.1.5.3.1**~~ **7.7.1** IEC 61058-1:2016, 7.7.1 is not applicable.

~~**7.1.5.3.2**~~ **7.7.2** IEC 61058-1:2016, 7.7.2 is not applicable.

8 Marking and documentation

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

8.1.1 General

Addition:

Switches declared for use in appliances such as power tools are considered unique type (U~~-~~T) when referencing Table 3.

8.1.3 By documentation

Replacement of Table 3:

Table 3 – Switch information

Characteristic	Means of information
SWITCH IDENTIFICATION – UNIQUE TYPE REFERENCE U~~-~~T~~-~~ (7.10.1)	
Manufacturer's name or trade mark	Marking ~~(Ma)~~
Type reference (model or catalogue number)	Marking ~~(Ma)~~
Identification that the switch is in compliance with this document (8.101)	Marking ~~(Ma)~~
Type of appliance for which a switch shall be used (hand-held tools, transportable tools, or lawn and garden machinery)	Documentation ~~(Do)~~
Number of operating cycles (7.~~1~~.4)	Documentation ~~(Do)~~
Degree of protection against electric shock, from outside an appliance (~~7.1.5.3~~ 7.7)	Documentation
~~Number of contact only cycles (TC 7 for electronic switches) (17.2.4.7)~~ Number of cycles with switching device only (TC 7) (17.5.7)	Documentation ~~(Do)~~
All terminals shall be suitably identified, or their purpose self-evident, or the switch circuitry visually apparent. For terminals intended for the connection of supply conductors, the identification may take the form of a letter L, a number or an arrow	Marking
The rated current and electrical load type	Documentation ~~(Do)~~
Ambient temperature limits if different from 0 °C to 55 °C	Documentation ~~(Do)~~
~~Duty-type and relevant information (e.g. ON/OFF-time) (7.18)~~	~~Documentation (Do)~~
For electronic switches, the duty-type S1 (7.1.16)	Documentation (Do)

8.3 Load rating

IEC 61058-1:2016, 8.3 is applicable except as follows.

8.3.2 Substantially restive load

IEC 61058-1:2016, 8.3.2 is not applicable.

8.3.4 Resistive load and capacitive load

IEC 61058-1:2016, 8.3.4 is not applicable.

8.3.5 Resistive load and tungsten filament lamp load

IEC 61058-1:2016, 8.3.5 is not applicable.

8.3.6 Declared specific load

IEC 61058-1:2016, 8.3.6 is not applicable.

8.3.8 General purpose loads

IEC 61058-1:2016, 8.3.8 is not applicable.

Addition:

8.101 Switch compliance with IEC 61058-2-6

The marking to indicate compliance with IEC 61058-2-6 shall be "PT".

Compliance is checked by inspection.

9 Protection against electric shock

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

9.1 IEC 61058-1:2016, 9.1 is not applicable.

NOTE The requirements of this subclause ~~is~~ are covered in the end-product standard.

~~**9.2 This subclause is not applicable.**~~

~~NOTE This subclause is covered in the end.~~

10 Provision for earthing

Clause 10 of IEC 61058-1:2016 is not applicable.

11 Terminals and terminations

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

~~**11.1.1.2 This subclause is not applicable.**~~

~~NOTE This subclause is covered in the end product standard.~~

11.1.1.3 This subclause is not applicable except Table 4.

NOTE This subclause is covered in the end product standard.

11.1.1.4 This subclause is not applicable.

NOTE This subclause is covered in the end product standard.

11.1.1.5 This subclause is not applicable.

11.1.1.6 *Replacement:*

Terminals shall be designed so that the end of a conductor introduced into the hole is visible or that the insertion of the conductor is prevented by a stop if further insertion may reduce creepage distances and/or clearances or influence the mechanism of the switch.

Compliance is checked by inspection.

11.1.2 Screw-type terminals for unprepared conductors

Addition:

Screw type terminals for unprepared conductors are permitted but tested as part of the end product evaluation.

11.1.2.1 This subclause is not applicable.

11.1.2.2 This subclause is not applicable.

11.1.2.3 This subclause is not applicable.

11.1.3.1 *Replacement:*

Screwless terminals shall allow, according to their classification, the proper connection of conductors having cross-sectional areas as declared.

The intended disconnection of a conductor shall require an operation other than a pull at the conductor, such that it can be effected manually with or without the help of a tool in normal use.

11.1.3.2 *Replacement:*

Screwless terminals shall withstand the mechanical stress occurring in normal use. The conductor shall be clamped reliably and between metal surfaces, except that, for screwless terminals intended to be used in circuits carrying a current not exceeding 0,2 A, one of the surfaces may be non-metallic.

Compliance is checked by the following test, which is carried out with uninsulated copper conductors, first having the largest declared cross-sectional area, and then having the smallest declared cross-sectional area:

a) either rigid: five insertions and disconnections for solid conductors and one insertion and disconnection for stranded conductors; or

b) flexible: five insertions and disconnections; or

c) rigid and flexible: if the terminal can accept both types of conductors, the tests are carried out with rigid and flexible conductors for the number of times indicated above.

The conductors are inserted and disconnected for the number of times indicated above using new conductors each time, except for the last time, when the conductors used for the last but one insertion are clamped at the same place.

For each insertion, the conductors shall be either pushed as far as possible into the terminal or shall be inserted to ensure that the connection is adequate. After each insertion, the conductor is twisted through 90° in an axial direction and then subjected to a pull force of 35 N; the pull force is applied without jerks, for 1 min, in the direction of the axis of the conductor space.

If the terminal is declared as suitable for two or more conductors, the appropriate pull force is applied consecutively to each conductor. During the application of the pull force, the conductor shall not come out of the terminal. After these tests, neither the screwless terminals nor the clamping means shall have become loose.

11.1.3.4 This subclause of Part 1 is not applicable.

11.2 Terminals for prepared copper conductors and/or terminals requiring the use of a special purpose tool

This subclause of Part 1 is applicable, except as follows:

11.2.1 Common requirements

This subclause is not applicable.

11.2.3.2 This subclause is not applicable.

11.2.4 Non-disconnectable screwless terminations

Addition:

Non-disconnectable screwless terminations are permitted but tested as part of the end product evaluation.

11.2.4.1 This subclause is not applicable.

11.2.4.2 This subclause is not applicable.

11.2.4.3 This subclause is not applicable.

11.2.5.1 This subclause is not applicable.

11.2.5.2 This subclause is not applicable.

11.2.5.3 *Replacement:*

Tabs shall allow the application and withdrawal of female connectors without damage to the switch so as not to impair compliance with this standard.

Compliance is checked by applying a 10 N axial pull force without jerks. No damage or disengagement shall occur.

11.2.5.4 This subclause is not applicable.

~~**11.2.7 Solder terminations**~~

~~*Addition:*~~

~~Solder terminations are permitted but tested as part of the end product evaluation.~~

~~**11.2.7.1 This subclause is not applicable.**~~

~~**11.2.7.2 This subclause is not applicable.**~~

~~**11.2.7.3 This subclause is not applicable.**~~

12 Construction

Clause 12 of IEC 61058-1:2016 is not applicable.

NOTE The requirements of this clause ~~is~~ are covered in the end-product standard.

13 Mechanism

Clause 13 of IEC 61058-1:2016 is not applicable.

NOTE The requirements of this clause ~~is~~ are covered in the end-product standard.

14 Protection against ingress of solid foreign objects, ingress of water and humid conditions

Clause 14 of IEC 61058-1:2016 is applicable except as follows.

14.3 Protection against humid conditions

Replacement of the second paragraph:

Compliance is checked by the humidity treatment described in IEC 61058-1:2016, 14.3, followed by the test of 15.1. Cable inlet openings, if any, and drain-holes are left open. If a drain-hole is provided for a water-tight switch, it is opened.

15 Insulation resistance and dielectric strength

Clause 15 of IEC 61058-1:2016 is applicable except as follows.

15.1 General requirements

Replacement:

The dielectric strength of switches shall be adequate.

Compliance is checked by the test of 15.3, the test being made immediately after the test of 14.3.

The test voltage according to Table ~~12~~ 8 is applied in the case of:

- *functional insulation: between the different poles of a switch. For the purpose of the test, all the parts of each pole are connected together;*

- *basic insulation: between all live parts connected together and a metal foil covering the outer accessible surface of the basic insulation and accessible metal parts in contact with the basic insulation;*
- *double insulation: between all live parts connected together and a metal foil covering the outer, normally not accessible, surface of basic insulation and non-accessible metal parts; then: between two metal foils covering separately the inner, normally not accessible, surface of supplementary insulation and connected to non-accessible metal parts, and the outer accessible surface of supplementary insulation and connected to accessible metal parts;*
- *reinforced insulation: between all live parts connected together and a metal foil covering the outer accessible surface of reinforced insulation and accessible metal parts;*
- *contacts: between the open contacts of each pole of a switch at the test voltages for "across electronic disconnection".*

The foils are not pressed into openings but are pushed into corners and the like by means of the standard test finger.

In cases where basic insulation and supplementary insulation cannot be tested separately, the insulation provided is subjected to the test voltages specified for reinforced insulation.

For electronic switches, the test is carried out at the test voltages for "across full disconnection" and "across micro-disconnection" only on electronic switches with mechanical switching devices connected in series with the semiconductor switching device. ~~For electronic switches,~~ The tests are not carried out across protective impedances and poles interconnected by components.

15.2 Measurement of insulation resistance

IEC 61058-1:2016, 15.2 is not applicable.

16 Heating

Clause 16 of IEC 61058-1:2016 is not applicable.

NOTE The requirements of this clause ~~is~~ are covered in the end-product standard.

17 Endurance – Mechanical switches

~~This clause of Part 1 is applicable, except as follows:~~

~~**17.1.2** *Replacement:*~~

~~The sequence of tests for all switches except electronic switches is as follows:~~

- ~~when declared for locked rotor, a test at accelerated speed as specified in 17.2.4.9 (TC9);~~
- ~~a test at accelerated speed as specified in 17.2.4.4 (TC4);~~
- ~~a functional compliance test in accordance with 17.2.5.1 (TE1);~~
- ~~a dielectric strength test in accordance with 17.2.5.3 (TE3).~~

~~**17.1.3** *Replacement:*~~

~~For electronic switches (complete switch) the sequence of tests is as follows:~~

- ~~a test at accelerated speed as specified in 17.2.4.4 (TC4);~~
- ~~when declared for locked rotor, a test at accelerated speed as specified in 17.2.4.9 (TC9);~~

- a functional compliance test in accordance with 17.2.5.1 (TE1);
- a dielectric strength test in accordance with 17.2.5.3 (TE3).

Additionally 3 new specimens shall be prepared and tested as follows:

- the SSD (solid state switching device and assembly) in series with contact(s) is short circuited and/or the SSD in parallel with contact(s) is disconnected;
- a test at accelerated speed as specified in 17.2.4.7 (TC7).

The number of operating cycles is 1 000 or the declared number (if different).

17.1.4 *Replacement:*

After all the tests specified, the specimens shall meet the requirements of 17.2.5.1 (TE1) and 17.2.5.3 (TE3).

17.2.1.2 This subclause is applicable, except as follows:

Replacement of Table 17 and Table 18: