IEC 61058-2-6

Edition 2.0 2018-11

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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

Interrupteurs pour appareils – Partie 2-6: Exigences particulières pour les interrupteurs utilisés sur les outils électroportatifs à moteur, les outils portables et les machines pour jardins et pelouses

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

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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

FOREWORD

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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.

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.

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 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 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.

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

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

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

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 (UT) 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 UT (7.10.1)
Manufacturer's name or trade mark	Marking
Type reference (model or catalogue number)	Marking
Identification that the switch is in compliance with this document (8.101)	Marking
Type of appliance for which a switch shall be used (hand-held tools, transportable tools, or lawn and garden machinery)	Documentation
Number of operating cycles (7.4)	Documentation
Degree of protection against electric shock, from outside an appliance (7.7)	Documentation
Number of cycles with switching device only (TC 7) (17.5.7)	Documentation
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
Ambient temperature limits if different from 0 °C to 55 °C	Documentation
Duty-type and relevant information (e.g. ON/OFF-time) (7.18)	Documentation

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 are covered in the end-product standard.

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.

12 Construction

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

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

17 Endurance – Mechanical switches

Clause 17 of IEC 61058-1:2016 is replaced by the following.

Clause 17 of IEC 61058-1-1 is applicable, except as follows.

NOTE The requirements for mechanical switches (IEC 61058-1-1) are followed by the requirements specific to electronic switches (IEC 61058-1-2). As a result, some subclause numbers are repeated.

17.1.2 *Replacement:*

The sequence of tests to be completed on the same 3 samples is as follows:

- *a test at accelerated speed as specified in 17.5.4 (TC4);*
- *a functional compliance test in accordance with 17.6.1 (TE1);*
- *a dielectric strength test in accordance with 17.6.3 (TE3).*

17.1.3 IEC 61058-1-1:2016, 17.1.3 is not applicable.

17.2 Electrical endurance tests

Replacement:

The switch shall be loaded as specified in Table 201 and/or Table 202 and connected in accordance with the circuit as given in IEC 61058-1:2016, Table 2.

a) *Where, in IEC 61058-1:2016, Table 2, an auxiliary switch (A) is symbolized in the test circuit, the tests for the two ON-positions of the specimen (S) are performed on two separate sets of test samples. The connection to the test load to be performed for the two tests is symbolized in IEC 61058-1:2016, Table 2 by an auxiliary switch A.*

b) *Multiway switches are loaded according to IEC 61058-1:2016, Table 1. The load for the other switch positions is that resulting from the loads necessary to achieve the conditions specified above.*

c) *No electrical load is applied during the endurance tests for switches classified according to 7.2.6 with a rating of 20 mA or less.*

Replacement:

Table 102 (IEC 61058-1-1:2016) with Table 201 (IEC 61058-2-6:2018)

Table 103 (IEC 61058-1-1:2016) with Table 202 (IEC 61058-2-6:2018)

17.3 Thermal conditions

IEC 61058-1-1:2016, 17.3 is not applicable.

17.4 Actuating conditions

IEC 61058-1-1:2016, 17.4 is applicable except as follows.

17.4.1 *Replacement:*

The switches are operated by means of their actuating member either manually or by an appropriate apparatus which is arranged to simulate normal actuation.

The operating speed for the operating cycles shall be as follows:

- *for linear actions, the switch actuation speed shall be approximately 80 mm/s (mechanical);*
- *for rotary actions, the switch actuation speed shall be approximately 90°/s (mechanical).*

17.4.3 IEC 61058-1-1:2016, 17.4.3 is not applicable.

17.5 Type of test condition (TC)

IEC 61058-1-1:2016, 17.5 is applicable except as follows.

17.5.1 Increased-voltage test at accelerated speed (TC1)

IEC 61058-1-1:2016, 17.5.1 is not applicable.

17.5.2 Test at slow speed (TC2)

IEC 61058-1-1:2016, 17.5.2 is not applicable.

17.5.3 Test at high speed (TC3)

IEC 61058-1-1:2016, 17.5.3 is not applicable.

17.5.4 Test at accelerated speed (TC4)

Replacement:

The electrical conditions are those specified in 17.2.

The thermal conditions are as follows: Tests are carried out at 25 °C ± 10 °C. The total number of operations shall be declared by the manufacturer.

NOTE Typically the total number of operations is 50 000 for hand-held tools, 10 000 for transportable tools and 10 000 for lawn and garden machinery.

The method of operation is that specified for accelerated speed in 17.4.

17.5.5 Locked-rotor test (TC9)

IEC 61058-1-1:2016, 17.5.5 is not applicable.

17.5.6 Test at very slow speed (TC10)

IEC 61058-1-1:2016, 17.5.6 is not applicable.

17.6 Evaluation of compliance

IEC 61058-1-1:2016, 17.6 is applicable, except as follows.

17.6.2 Thermal compliance (TE2)

IEC 61058-1-1:2016, 17.6.2 is not applicable.

17 Endurance – Electronic switches

Clause 17 of IEC 61058-1-2:2016 is applicable, except as follows.

17.1.2 *Replacement:*

For electronic switches (complete switch) the sequence of tests to be completed on the same 3 samples is as follows:

- *a test at accelerated speed as specified in 17.5.4 (TC4);*
- *when declared for locked rotor, a test at accelerated speed as specified in 17.5.9 (TC9);*
- *a functional compliance test in accordance with 17.6.1 (TE1);*
- *a dielectric strength test in accordance with 17.6.3 (TE3).*

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

- *the SD (semiconductor device and assembly) in series with contact(s) is short circuited and/or the SD in parallel with contact(s) is disconnected;*
- *a test at accelerated speed as specified in 17.5.7 (TC7).*

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

17.2 Electrical conditions

Replacement:

The switch shall be loaded and tested as specified in Table 201 and/or Table 202, and connected in accordance with the circuit in IEC 61058-1:2016, Table 2.

a) Where, in IEC 61058-1:2016, Table 2, an auxiliary switch (A) is symbolized in the test circuit, the tests for the two ON-positions of the specimen (S) are performed on two separate sets of test samples. The connection to the test load to be performed for the two tests is symbolized in IEC 61058-1:2016, Table 2 by an auxiliary switch A.

b) Multiway switches are loaded according to IEC 61058-1:2016, Table 1. The load for the other switch positions is that resulting from the loads necessary to achieve the conditions specified above.

c) No electrical load is applied during the endurance tests for switches classified according to 7.2.6 with a rating of 20 mA or less.

d) *For electronic switches, the test circuit shall be as shown in IEC 61058-1:2016, Figure 16. The declared load shall be set at rated voltage before the electronic switch is inserted into the circuit (the load is not readjusted).*

Replacement:

Table 104 (IEC 61058-1-2) with Table 201 (IEC 61058-2-6:2018)

Table 105 (IEC 61058-1-2) with Table 202 (IEC 61058-2-6:2018)