# TEST REPORT
## IEC/EN 60669-1
## Switches for household and similar fixed-electrical installations
## Part 1: General requirements
## IEC/EN 60669-2-1
## Switches for household and similar fixed electrical installations – Part 2-1: Particular requirements – Electronic switches

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|---|---|
| **Report Reference No**.....: | 25ZCTB0812002SP |
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| **Testing Laboratory**.....: | Shenzhen ZCT Technology Co., Ltd. |
| Address.....: | 3/F., Building 5, Hongsheng Industrial Zone, Bao'an Road, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China. |
| Applicant's name.....: | **Wenzhou Yijie Electric Co., Ltd** |
| Address.....: | 4th Floor, No. 3808 Binhai 3rd Road, Tianhe Street, Longwan District, Wenzhou City, Zhejiang Province, China |
| **Test specification:** | |
| Standard.....: | EN 60669-1:2018+AC:2020<br>EN 60669-2-1:2004+A1:2009 +A12:2010 |
| Test procedure.....: | LVD |
| Non-standard test method……..: | N/A |
| **Test Report Form No**.....: | IEC60669_1&IEC60669_2_1F |
| Test Report Form(s) Originator.....: | IMQ S.p.A. |
| Master TRF.....: | Dated 2017-04 |

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|---|---|
| **Test item description**.....: | Switch |
| Trade Mark.....: | ETTROIT |
| Manufacturer.....: | Same as applicant |

| | |
|---|---|
| Model/Type reference..... : | **MT0401**<br>MT0402,MT0501,MT0601,MT0701,MT0801,MT0901,MT1001,MT1101,MT1202,MT1301,MT1401,MT1701,MT1801,MT1901,MT1501,MT1601,LB0401,LB0402,LB0501,LB0601,LB0701,LB0801,LB0901,LB1001,LB1101,LB1202,LB1301,LB1401,LB1701,LB1801,LB1901,LB1501,LB1601,LN0401,LN0402,LN0501,LN0601,LN0701,LN0801,LN0901,LN1001,LN1101,LN1202,LN1301,LN1401,LN1701,LN1801,LN1901,LN1501,LN1601,LG0401,LG0402,LG0501,LG0601,LG0701,LG0801,LG0901,LG1001,LG1101,LG1202,LG1301,LG1401,LG1701,LG1801,LG1901,LG1501,LG1601,EV0401,EV0402,EV3202,EV0801,EV0901,EV1001,EV1101,EV1202,EV1301,EV1401,EV1701,EV1801,EV1901,EV1501,EV1601,AB0401,AB0402,AB3302,AB3402,AB3202,AB0501,AB0601,AB0701,AB0801,AB0901,AB1001,AB1101,AB1202,AB1301,AB1401,AB1701,AB1801,AB1901,AB1501,AB1601,AN0401,AN0402,AN3302,AN3402,AN3202,AN0501,AN0601,AN0701,AN0801,AN0901,AN1001,AN1101,AN1202,AN1301,AN1401,AN1701,AN1801,AN1901,AN1501,AN1601,AG0401,AG0402,AG3302,AG3402,AG3202,AG0501,AG0601,AG0701,AG0801,AG0901,AG1001,AG1101,AG1202,AG1301,AG1401,AG1701,AG1801,AG1901,AG1501,AG1601 |
| Ratings.....: | 250VAC 50/60Hz 16A |

**Testing procedure and testing location:**

☒ **Testing Laboratory**: Shenzhen ZCT Technology Co., Ltd.

Testing location/ address..... : 3/F., Building 5, Hongsheng Industrial Zone, Bao'an Road, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China.

☐ **Associated CB Test Laboratory:**

Testing location/ address..... :

Tested by (name + signature)..... :

Approved by (+ signature)..... :

☐ **Testing procedure: TMP**

Tested by(name+signature)..... **Wilson Wei**

Approved by (+ signature)..... **Jack Yang**

Testing location/ address..... :

☐ **Testing procedure: WMT**

Tested by (name + signature)..... :

Witnessed by (+ signature)..... :

Approved by (+ signature)..... :

Testing location/ address..... :

☐ **Testing procedure: SMT**

Tested by (name + signature)..... :

Approved by (+ signature).....:

Supervised by (+ signature).....:

Testing location/ address..... :

☐ **Testing procedure: RMT**

Tested by (name + signature)..... :

Approved by (+ signature).....:

Supervised by (+ signature).....:

Testing location/ address..... :

| **Summary of testing:** | |
|---|---|
| **Tests performed (name of test and test clause):**<br>All clauses. | **Testing location:**<br>3/F., Building 5, Hongsheng Industrial Zone, Bao'an Road, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China. |
| **Summary of compliance with National Differences:**<br>**1, European group national differences.** | |
| **Copy of marking plate** | |

**Switch**
Model:MT0401
Input:250VAC 50/60Hz 16A

**Wenzhou Yijie Electric Co., Ltd**
**MADE IN CHINA.**

| | |
|---|---|
| **Test item particulars**..... : | |
| Pattern number .....: | 1 |
| Contact opening (gap) .....: | ~~normal gap /~~ mini-gap / ~~micro-gap / without contact gap (semiconductor switching device)~~ |
| Degree of protection against access to hazardous parts and against harmful effects due to the ingress of solid foreign objects .....: | IP2X ~~/ IP4X / IP5X~~ |
| Degree of protection against harmful effects due to the ingress of water .....: | IPX0 ~~/ IPX4 / IPX5~~ |
| Method of actuating .....: | ~~rotary / tumbler / rocker / push-button / cord-operated~~ / momentary contact |
| Method of application .....: | surface-type ~~/ flush-type / semi flush-type / panel-type / architrave-type~~ |
| Method of installation .....: | design A ~~/ design B~~ |
| Type of terminals .....: | screw-type / ~~screwless (rigid) / screwless (rigid and flexible)~~ |
| Flexible cable outlet .....: | without / ~~with~~ |
| Rated voltage (V).....: | -- |
| Rated current (A).....: | -- |
| **Possible test case verdicts:** | |
| - test case does not apply to the test object.....: | N/A |
| - test object does meet the requirement.....: | P (Pass) |
| - test object does not meet the requirement.....: | F (Fail) |
| **Testing**..... : | |
| Date of receipt of test item.....: | 2025-11-11 |
| Date (s) of performance of tests.....: | 2025-11-11 to 2025-11-26 |

**General remarks:**

The test results presented in this report relate only to the object tested.

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"(see Enclosure #)" refers to additional information appended to the report.

"(see appended table)" refers to a table appended to the report.

Throughout this report a comma (~~point~~) is used as the decimal separator.

**General product information:**

All mode are identical only difference in model name, all tests are on model MT0401

| EN 60669-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |
| 8 | MARKING | | P |
| 8.1 | Switches shall be marked with | | P |
| | rated voltage in volts; | 250V | P |
| | rated current in amperes or rated load in volt-amperes or watts: | 16A | P |
| | symbol for nature of supply; | ~ | P |
| | manufacturer's or responsible vendor's name, trade mark or identification mark; | Wenzhou Yijie Electric Co., Ltd | P |
| | type reference, which may be a catalogue number; | | P |
| | symbol for mini-gap construction, if applicable; | | P |
| | symbol for micro-gap construction, if applicable; | | N |
| | symbol for semiconductor switching device, if applicable; | | N |
| | first characteristic numeral for the degree of protection against access to hazardous parts and against harmful effects due to ingress of solid objects, if declared higher than 2, in which case the second characteristic numeral shall also be marked; | | P |
| | second characteristic numeral for the degree of protection against harmful effects due to ingress of water, if declared higher than 0, in which case the first characteristic numeral shall also be marked. | | P |
| | In addition, electronic switches shall be marked with | | P |
| | -rated frequency in hertz, unless the electronic switch is designed for both 50 Hz and 60 Hz; | | P |
| | -rating and type of any fuse incorporated in the electronic switch; | | N |
| | -symbols for the kind of load (see 8.2); | | P |
| | -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 the identifying reference; | | P |
| | -the minimum height for mounting the electronic switch shall be indicated in the installation instruction of the manufacturer if there is a restriction (see 10.1). | | P |

| EN 60669-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |
| | In addition, electronic switches with screwless terminals shall be marked with an indication of the suitability to accept rigid conductors only, for those electronic switches having this restriction. This information may be put on the electronic switch and/or on the packaging unit. | | N |
| | For general purpose electronic switches with included automatic function the number of operations shall be stated in the accompanying instruction sheet when the manufacturer declares the number of operations is higher than indicated in Subclauses 19.101, 19.102 and 19.104. | | N |
| 8.3 | The following marking shall be placed on the main part of the electronic switch: | | P |
| | the rated current or rated load, rated voltage, symbol for nature of supply, rated frequency (if required by 8.1), at least one type of load, the rating and type of any incorporated fuse (this shall be marked on the fuse-holder or in the proximity of the fuse), | | P |
| | either the name, trade mark or identification mark of the manufacturer or of the responsible vendor, | | P |
| | length of insulation to be removed before the insertion of the conductor into the screwless terminal, if any, | | N |
| | symbol for mini-gap construction, micro-gap construction or semiconductor device, if applicable, | | N |
| | the type reference. | | P |
| | Parts such as cover-plates, which are necessary for safety purposes and are intended to be sold separately, shall be marked with the manufacturer's or responsible vendor's name, trade mark or identification mark and type reference. | | N |
| | The IP code, when applicable, shall be marked so as to be easily discernible when the switch is mounted and wired as in normal use. | | N |
| | The marking shall be clearly visible with normal or corrected vision, without additional magnification, marked either on the front of the switch or on the inner part of its associated enclosure, or on the main part of the switch so that it is easily legible during installation. These markings shall be placed on parts which cannot be removed without the use of a tool. | | P |

| EN 60669-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |
| 8.4 | Terminals intended for the connection of phase conductors (supply conductors) shall be identified unless the method of connection is of no importance, is self-evident or is indicated on a wiring diagram. Such identification may take the form of a letter L or in the case of more than one of such terminals, the letters L1, L2, L3, etc. which may be accompanied by an arrow or arrows pointing to the relevant terminal or terminals. | | P |
| | 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. | See the instruction manual | P |
| | Unless the installation of the electronic switch is made clear by the markings of the terminals, a wiring diagram shall be provided with each electronic switch. | | P |
| | In addition, | | N |
| | – for electronic RCS, Subclause 8.4 of IEC 60669-2-2 applies; | | N |
| | – for electronic TDS, Subclause 8.4 of IEC 60669-2-3 applies. | | N |
| 8.5 | Terminals intended exclusively for the neutral conductor shall be indicated by the letter N. | | P |
| 8.6 | If switches of pattern numbers 2, 3, 03 and switches having a rated voltage exceeding 250 V and rated current exceeding 16 A are marked to indicate the switch position, they shall be so marked that the direction of the movement of the actuating member to its different positions or the actual switch position is clearly indicated. | | N |
| | 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 10. | | N |
| 8.6.101 | It is recommended that the actual state of the electronic switch intended to control the brightness of lamps be indicated when used as intended. This can be achieved either | | P |
| | – with marking on the on-/off-state position, or | | P |
| | – with an indicator lamp, or | | P |
| | – by adjusting the lamp dimmer so that at the lowest control state and at rated voltage minus 10 %, the light is still visible. | | N |

| EN 60669-2-1 | | | |
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| Clause | Requirement + Test | Result – Remark | Verdict |
| | When the indication of the electronic switch state is given only by the lamp, adjustment of the lamp at the lowest control state is made as specified in the following: | | P |
| | for incandescent lamps, the adjustment of lamp dimmers shall be made by the manufacturer. It shall not be possible to reduce the lowest setting without a tool; | | N |
| | for fluorescent lamps, the adjustment of lamp dimmers shall be made by the manufacturer.<br>It may, however, be possible for the installer to alter the lowest setting if such an adjustment is indicated in an installation instruction. | | N |
| 8.7 | A push-button shall be coloured red only if it serves to open the circuit to be controlled. In addition, it may serve to close auxiliary contacts for control circuits, pilot lamps, etc. | | N |
| 8.8 | If it is necessary to take special precautions when installing the switch, details of these shall be given in an instruction sheet which accompanies the switch. | | P |
| | Instruction sheets shall be written in the official language(s) of the country in which the switch is to be sold. | | P |
| | 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. | >1,7m | P |
| 8.9 | Marking shall be durable and easily legible. | Marking legible. | P |
| | The marking is rubbed by hand for 15 s with a piece of cloth soaked with water and again for 15 s with a piece of cloth soaked with petroleum spirit. | Marking legible. | P |
| 9 | CHECKING OF DIMENSIONS | | P |
| | The manufacturer of the switch shall specify in his catalogue the type of boxes (flush or surface, etc.) in which his switches are to be mounted. | | P |
| | Electronic switches may be of dimensions other than those specified in the standard sheets (if any) provided they are supplied with suitable boxes. | | N |

| EN 60669-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |
| 10 | PROTECTION AGAINST ELECTRIC SHOCK | | P |
| | 10.1 Switches shall be so designed that when they are mounted and wired as in normal use, live parts are not accessible even after removal of parts which can be removed without the use of a tool. | | P |
| | The specimen is mounted as in normal use and fitted with conductors of the smallest cross- sectional area specified in clause 12; the test is repeated using conductors of the largest cross- sectional area specified in clause 12. | | P |
| | The standard test finger shown in figure 1 of IEC 60529 is applied in every possible position, an electrical indicator with a voltage between 40 V and 50 V being used to show contact with the relevant part. | | P |
| | Switches, having enclosures or covers in thermoplastic or elastomeric material, are subjected to the following additional test, which is carried out at an ambient temperature of 35 °C ± 2 °C, the switches being at this temperature. | | P |
| | During this additional test, the electronic switches are subjected for 1 min to a force applied through the tip of test probe 11 of IEC 61032. | | P |
| | This probe, 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 electronic switch, but is applied to thin-walled knock-outs with a force of 10 N. | | P |
| | 10.2 Knobs, operating levers, push-buttons, rockers and the like shall be of insulating material, unless their accessible metal parts are separated from the metal parts of the mechanism by double insulation or reinforced insulation, or as an alternative, they are reliably connected to earth. | | N |
| | For electronic switches classified according to 7.1.4, first dash, accessible parts which are needed for the operation of electronic switches (for example, sensing surfaces) may be connected to live parts. If they are connected to live parts, it shall be by means of a protective impedance. | | N |
| | 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. The resistors shall comply with the requirements given in 102.3, and the capacitors shall comply with the requirements given in 102.2. | | N |

| EN 60669-2-1 | | | |
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| Clause | Requirement + Test | Result – Remark | Verdict |
| | The removal of protective impedance shall only be possible by destruction of the electronic switch or by rendering it unusable. | | N |
| | The measurements are carried out between either a single accessible metal part or any combination of accessible metal parts and earth, through a non-inductive resistor of 2k | | P |
| | at rated voltage (and rated load in on-state), in on- and off-state, and/or at lowest and highest setting values. During the measurements, each one of the resistors and all other components, if any, in the protective impedance, are alternatively short-circuited. | | P |
| 10.101 | If a cover or cover-plate, or a fuse can be removed without the use of a tool, or if the installation instructions for the user indicate that, for the purpose of maintenance, when replacing the fuse, covers and cover-plates fastened by means of a tool have to be removed, the protection against contact with live parts shall be assured even after removal of the cover or cover-plate. | | P |
| | This requirement does not apply when the electronic switch must be dismounted from its supporting means for the replacement of the fuse-link. | | P |
| 10.102 | If an electronic switch is provided with a hole for adjusting the setting of the electronic and this hole is indicated as such, the adjustment shall not involve the risk of an electric shock. | | P |
| 10.103 | Ventilation openings over live parts shall be so designed that a foreign body introduced into these openings shall not come into contact with any live parts with the electronic switch installed as in normal use. | | N |

| | | | |
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| 11 | PROVISION FOR EARTHING | | N |
| 11.1 | Accessible metal parts, which can become live in the event of an insulation fault, shall be provided with, or permanently and reliably connected to, an earthing terminal. | | N |
| 11.2 | Earthing terminals shall be terminals with screw clamping !or screwless terminals"<br>and shall comply with the appropriate requirements of clause 12. | | N |

| EN 60669-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |
| 11.3 | Surface-type switches with an enclosure of insulating material, having an IP code higher than IPX0 and more than one cable inlet, shall be provided with either an internal fixed earthing terminal or adequate space for a floating terminal allowing the connection of an incoming and outgoing conductor for the continuity of the earthing circuit. | | N |
| 11.4 | The connection between the earthing terminal and accessible metal parts to be connected thereto shall be of low resistance. | | N |
| 12 | TERMINALS | | P |
| 12.1 | General | | --- |
| | Switches shall be provided with terminals having screw clamping or with screwless terminals. | | P |
| | The means for clamping the conductors in the terminals shall not serve to fix any other component, although they may hold the terminals in place or prevent them from turning. | | P |
| | All the tests on terminals, with the exception of 12.3.11, shall be carried out after the test of 15.1. | | P |
| | Terminals having screw clamping which are in compliance with IEC 60998-2-1 can be used. | | P |
| | Terminals having screw clamping complying with IEC 60998-2-1 are considered to be in compliance with the requirements and tests of Subclause 12.2, except those of 12.2.6 and 12.2.7 and 12.2.8, provided they are chosen according to Table 2. | | P |
| 12.2 | Terminals with screw clamping for external copper conductors | | P |
| 12.2.1 | Switches shall be provided with terminals which shall allow the proper connection of copper conductors having cross-sectional areas as shown in table 2. | | P |
| 12.2.2 | Terminals with screw clamping shall allow the conductor to be connected without special preparation. | | P |
| 12.2.3 | Terminals with screw clamping shall have adequate mechanical strength. | | P |
| 12.2.4 | Terminals with screw clamping shall be resistant to corrosion. | | P |

| EN 60669-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |
| 12.2.5 | Screw-type terminals shall be so designed and constructed that they clamp the conductor(s) without undue damage to the conductor(s). | | N |
| 12.2.6 | Terminals with screw clamping shall be so designed that they clamp the conductor reliably between metal surfaces. | | N |
| 12.2.7 | Terminals with screw clamping shall be so designed or placed that neither a rigid solid conductor nor a wire of a stranded conductor can slip out while the clamping screws or nuts are tightened. | | N |
| 12.2.8 | Terminals with screw clamping shall be so fixed or located within the switch that, when the clamping screws or nuts are tightened or loosened, the terminals shall not work loose from their fixing to the switch. | | P |
| 12.2.9 | Clamping screws or nuts of earthing terminals with screw clamping shall be adequately locked against accidental loosening and it shall not be possible to loosen them without the aid of a tool. | | P |
| 12.2.10 | Earthing terminals with screw clamping shall be such that there is no risk of corrosion resulting from contact between these parts and the copper of the earthing conductor, or any other metal that is in contact with these parts. | | N |
| 12.2.11 | For pillar terminals, the distance between the clamping screw and the end of the conductor, when fully inserted, shall be at least that specified in figure 1. | | P |
| 12.2.12 | Lug terminals shall be used only for switches having a rated current of 40 A or greater; if such terminals are provided, they shall be fitted with spring washers or equally effective locking means. | | N |
| 12.3 | Screwless terminals for external copper conductors | | N |
| 12.3.1 | Screwless terminals may be of the type suitable for rigid copper conductors only or of the type suitable for both rigid and flexible copper conductors. | | N |
| 12.3.2 | Screwless terminals shall be provided with clamping units which allow the proper connection of rigid or of rigid and flexible copper conductors having nominal cross-sectional areas as shown in table 7. | | N |
| 12.3.3 | Screwless terminals shall allow the conductor to be connected without special preparation. | | N |

| EN 60669-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |
| 12.3.4 | Parts of screwless terminals mainly intended for carrying current shall be of materials as specified in 22.5. | | N |
| 12.3.5 | Screwless terminals shall be so designed that they clamp the specified conductors with sufficient contact pressure and without undue damage to the conductor. | | N |
| 12.3.6 | It shall be clear how the connection and disconnection of the conductors is to be made. | | N |
| 12.3.7 | Screwless terminals which are intended to be used for the interconnection of two or more conductors shall be so designed that: | | N |
| | during the insertion the operation of the clamping means of one of the conductors is independent of the operation of that of the other conductor(s); | | N |
| | during the disconnecting, the conductors can be disconnected either at the same time or separately; | | N |
| | each conductor is introduced in a separate clamping unit (not necessarily in separate holes). | | N |
| 12.3.8 | Screwless terminals shall be so des | | N |
| | Screwless terminals of switches shall be so designed that undue insertion of the conductor is prevented by a stop if further insertion is liable to reduce the creepage distances and/or clearances required in table 20, or to influence the mechanism of the switch. | | N |
| 12.3.9 | Screwless terminals shall be properly fixed to the switch. | | N |
| 12.3.10 | Screwless terminals shall withstand the mechanical stresses occurring in normal use. | | N |
| 12.3.11 | Screwless terminals shall withstand the electrical and thermal stresses occurring in normal use. | | N |
| 12.3.12 | Screwless terminals shall be so designed that the connected rigid solid conductor remains clamped, even when it has been deflected during normal installation, for example during mounting in a box, and the deflecting stress is transferred to the clamping unit. | | N |
| 13 | CONSTRUCTIONAL REQUIREMENTS | | P |
| 13.1 | Insulating linings, barriers and the like, shall have adequate mechanical strength and shall be secured in a reliable manner. | | P |

| EN 60669-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |
| 13.2 | Switches shall be constructed so as to permit: | | P |
| | easy introduction and connection of the conductors in the terminals; | | P |
| | correct positioning of the conductors; | | P |
| | easy fixing of the switch to a wall or in a box; | | P |
| | adequate space between the underside of the base and the surface on which the base is mounted or between the sides of the base and the enclosure (cover or box) so that, after installation of the switch, the insulation of the conductors is not necessarily pressed against live parts of different polarity or against moving parts of the mechanism, such as the spindle of a rotary switch. | | P |
| | Surface-type switches shall be constructed so that the fixing means do not damage the insulation of the cables during the installation. | | N |
| 13.3 | Covers, cover-plates and actuating members or parts of them, which are intended to ensure protection against electric shock, shall be held in place at two or more points by effective fixing. | | P |
| 13.3.1 | For covers, cover-plates or actuating members whose fixing is of the screw-type: | | P |
| 13.3.2 | For covers, cover-plates or actuating members whose fixing is not dependent on screws and whose removal is obtained by applying a force in a direction approximately perpendicular to the mounting/supporting surface | | P |
| 13.3.3 | For covers, cover-plates or actuating members whose fixing is not dependent on screws and whose removal is obtained by using a tool, in accordance with the manufacturer's instructions given in an instruction sheet or catalogue: | | N |
| 13.4 | Switches shall be so constructed that, when they are fixed and wired as in normal use, there are no free openings in their enclosures according to their IP classification. | | P |
| | Free openings according to 10.102 and 10.103 are accepted. | | P |
| 13.5 | Knobs of electronic switches shall be securely fixed in a reliable manner so that they will not work loose in normal use, if loosening may result in a hazard. | | N |
| | If knobs are used to indicate the position of electronic switches, it shall not be possible to fix them in a wrong position, if this may result in a hazard. | | N |

| EN 60669-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |
| 13.15.1 | Membranes, lenses and the like shall be reliably fixed and shall not be displaced by the mechanical and thermal stresses occurring in normal use. | | N |
| 13.6 | Screws or other means for mounting the switch on a surface or in a box or enclosure shall be easily accessible from the front. These means shall not serve any other fixing purpose. | | P |
| 13.7 | Combinations of switches, or of switches and socket-outlets, comprising separate bases shall be so designed that the correct position of each base is ensured. The fixing of each base shall be independent of the fixing of the combination to the mounting surface. | | P |
| 13.8 | Accessories combined with switches shall comply with their standard, if any, unless a standard exists for the combination. | | P |
| 13.9 | Surface-type switches that have an IP code higher than IP20 shall be according to their IP classification when fitted with conduits or with sheathed cables as for normal use. | | P |
| 13.10 | Switches to be installed in a box shall be so designed that the conductor ends can be prepared after the box is mounted in position, but before the switch is fitted in the box. | | P |
| 13.11 | Surface-type switches, that have an IP code higher than IPX0", of pattern numbers 1, 5 and 6 with an enclosure having more than one inlet opening shall be provided for maintaining the continuity of a second current-carrying conductor either with a fixed additional terminal complying with the requirements of clause 12 or with adequate space for a floating terminal. | | N |
| 13.12 | Inlet openings shall allow the introduction of the conduit or the sheath of the cable so as to afford complete mechanical protection. | | P |
| 13.13 | If surface-type switches are intended for back entry from a conduit, they shall be so designed that they have provision for back entry from a conduit perpendicular to the mounting surface of the switch. | | N |
| 13.14 | If the switch is provided with membranes or the like for inlet openings they shall be replaceable. | | P |
| 13.15 | Requirements for membranes in inlet openings | | P |
| 13.15.1 | Membranes shall be reliably fixed and shall not be displaced by the mechanical and thermal stresses occurring in normal use. | | P |

| EN 60669-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |
| 13.15.2 | It is recommended that membranes be so designed and made of such material that the introduction of the cables into the switch is permitted when the ambient temperature is low. | | P |
| 13.101 | Automatic protective devices incorporated in electronic switches for lamp circuits shall have at least micro-disconnection. | | P |
| 13.102 | Electronic switches for the control of the voltage of iron core transformers for extra low- voltage incandescent lamps (for example, halogen) shall have a maximum tolerance of the phase-control angle between the positive and negative half- wave of ⍰°. | | P |
| 13.103 | For electronic TDS, Subclause 13.101 of IEC 60669-2-3 applies. | | N |

| | | | |
|---|---|---|---|
| 14 | MECHANISM | | P |
| | This clause of part 1 only applies to electronic switches provided with mechanical switching devices. | | N |
| 14.1 | The actuating member of a switch, when released, shall automatically take up the position corresponding to that of the moving contacts, except that for cord-operated switches and for those with a single push-button, the actuating member may take up a single rest position. | | N |
| 14.2 | Switches shall be so constructed that the moving contacts can come to rest only in the "on" and "off" positions, an intermediate position being, however, permissible if it corresponds to the intermediate position of the actuating member, and if the insulation between the fixed and the moving contacts is then adequate. | | N |
| 14.3 | Switches shall be so constructed that undue arcing cannot occur when the switch is operated slowly. | | P |
| 14.4 | Switches of pattern numbers 2, 3, 03 and 6/2 shall make and break all poles substantially simultaneously except that for switches of pattern number 03, the neutral shall not make after or break before the other poles. | | P |

| EN 60669-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |
| 14.5 | The action of the mechanism if the covers or cover-plates are removable for installation purposes shall be independent of the presence of the cover or cover plate. | | P |
| 14.6 | Cord-operated switches shall be capable of effecting a change from the "off" to the "on" position, and from the "on" to the "off" position by application and removal of a steady pull not exceeding 45 N applied vertically and 65 N applied at 45° ± 5° to the vertical and in a plane perpendicular to the mounting surface when the switches are mounted as in normal use. | | N |
| 14.101 | For electronic RCS, Subclause 14.101 of IEC 60669-2-2 applies. | | N |
| | For electronic TDS, Subclause 14.101 of IEC 60669-2-3 applies. | | N |
| 15 | RESISTANCE TO AGEING, PROTECTION PROVIDED BY ENCLOSURES OF SWITCHES, AND RESISTANCE TO HUMIDITY | | N |
| 15.1 | Resistance to ageing | | N |
| 15.2 | Protection provided by enclosures of switches | | P |
| 15.2.1 | Protection against access to hazardous parts and against harmful effects due to ingress of solid foreign objects. | | N |
| 15.2.1.1 | Protection against access to hazardous parts | | N |
| 15.2.1.2 | Protection against harmful effects due to ingress of solid foreign bodies | | N |
| 15.2.2 | Protection against harmful effects due to ingress of water | | N |
| 15.3 | Resistance to humidity | 25℃, 93%RH | P |
| 16 | INSULATION RESISTANCE AND ELECTRIC STRENGTH | | P |
| 16.1 | The insulation resistance is measured with d.c. voltage of approximately 500 V, the measurement being made 1 min after application of the voltage. | | P |
| | Insulation resistance and electric strength are measured with the protective impedances according to 10.2 disconnected. | | P |

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|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |
| 16.2 | The insulation is subjected for 1 min to a voltage of substantially sinewave form, having a frequency of 50 Hz or 60 Hz. The value of the test voltage and the points of application are shown in table 14. | | P |
| 17 | TEMPERATURE RISE | | N |
| 17.1 | Switches shall be so constructed that the temperature rise in normal use is not excessive. | | P |
| 17.2 | Switches incorporating pilot lights or intended to incorporate pilot lights shall be so designed that in normal use the temperature of the accessible surface is not excessive. | | P |
| 18 | MAKING AND BREAKING CAPACITY | | P |
| | For the purpose of this test, pilot lights are disconnected. | | P |
| 18.1 | Switches are tested at 1,1 times the rated voltage and 1,25 times the rated current. | | P |
| | This test is carried out only on electronic switches provided with mechanically or electromechanically operated contact mechanisms. | | P |
| | The test is made on three separate specimens of the complete contact mechanism. | | P |
| | Compliance is checked by the following tests: | | P |
| | – for electronic switches for the control of fluorescent lamps loads, as specified in 18.1 of part 1; | | P |
| | – for electronic switches for the control of motor speed control circuits, as specified in 18.1 of part 1 and, additionally, in 18.101; | | P |
| | – for electronic switches for the control of the voltage of iron core transformers for extra lowvoltage incandescent lamps, as specified in 18.1, 18.2 of part 1 and 18.102; | | N |
| | – for electronic switches for the control of the voltage of electronic step-down converters for extra low-voltage incandescent lamps, as specified in 18.2 of part 1. | | N |
| | – for electronic switches for the control of other types of loads, as specified in 18.1 and 18.2 of part 1. | | P |

| EN 60669-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |
| 18.2 | Switches are normally tested at the rated voltage and at 1,2 times the rated current. | | P |
| | For electronic switches whose rate of operation is limited by their application (for example, heat or light sensors), the rate of operation is as follows. The electronic switch is set to the shortest cycle time possible. The electronic switch is re-activated at the end of each cycle within a time of (2 ± 0,5) s. | | P |
| 18.101 | The contact mechanism is subjected to tests of 50 cycles of operation, each at rated voltage and at the rate of operations specified in 18.1 of part 1: | | P |
| | – the contact mechanism closes a circuit through which a current of $9\ I_n\ (\cos\ \varphi = 0{,}8 \pm 0{,}05)$ passes, this current being interrupted by means of an auxiliary switch 50 ms to 100 ms after each closure; | | P |
| | – the circuit through which a current of $I_n\ (\cos\ \varphi = 0{,}6 \pm 0{,}05)$ passes is closed by an auxiliary switch and opened by the contact mechanism 300 ms to 500 ms after each closure. | | N |
| | During the tests, no sustained arcing shall occur. | | P |
| | After these tests, the specimens shall show no damage impairing their further use. | | P |
| 18.102 | Electronic switches for control of the voltage of iron core transformers for extra lowvoltage incandescent lamps (for example, halogen) shall be subjected to the following test. | | N |
| | The test is made on three specimens. | | N |
| | The contact mechanism is subjected to 50 making operations, each at rated voltage and at the rate of operation as specified in 18.1 of part 1. | | N |
| | To simulate making, the test circuit shall be adjusted to a test current 10 times the rated current of the electronic switch for one half-cycle of the power supply frequency. | | N |
| | During the tests, no sustained arcing shall occur. | | N |
| | After the tests, the specimens shall show no damage impairing their further use. | | N |

| | | | |
|---|---|---|---|
| 19 | NORMAL OPERATION | | P |
| 19.1 | Electronic switches shall withstand, without excessive wear or other harmful effect, themechanical, electrical and thermal stresses occurring in normal use. | | P |

| EN 60669-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |
| | For general purpose electronic switches with included automatic function the number of operations for tests of Subclauses 19.101, 19.102 and 19.104 is that specified in the relevant subclause. If a manufacturer declares a number of operations higher than those indicated in the relevant subclause, the tests shall be made | | P |
| | Electronic switches which are provided with connecting means for one or more electronic extension units are tested with one electronic extension unit connected, the connecting conductors being (1 ± 0,1) m long. | | P |
| 19.2 | Switches intended for flourescent lamp loads shall withstand, without excessive wear or other harmful effect, the elctrical and thermal stresses occuring when controlling flourescent lamp circuits. | | N |
| 19.101 | Contact mechanisms incorporated in electronic switches intended for incandescent lamp circuits are subjected to the following test. | | N |
| | The circuit details and the manner of operation of the selector switch S are as described in 18.1, unless otherwise specified. | | N |
| 19.102 | Contact mechanisms incorporated in electronic switches, intended for fluorescent lamp circuits or other capacitive loads (for example, electronic ballasts) are tested as in 19.2 of part 1 with the following modification. | | N |
| 19.103 | Semiconductor switching devices and/or electronic regulating units incorporated in electronic switches are subjected to the following tests. | | P |
| | The electronic switch is loaded with rated load until steady-state temperature at 1,1 times rated voltage is reached. | | P |
| | The switch state of the electronic switch is changed 10 times and/or the setting value is altered 10 times over the whole range from minimum to maximum and back to minimum by means of the sensing surface or unit. | | P |
| | Additionally, where appropriate, the switch state of the electronic switch is changed 10 times and/or the setting value is altered 10 times over the whole range from minimum to maximum and back to minimum by means of an electronic extension unit. | | N |
| 19.104 | The electronic switch is loaded with its rated load and the voltage is then increased to 1,1 times the rated voltage, the setting is altered 10 000 times over the whole range from minimum to maximum and back to minimum by means of its control unit, the rate of operation being between 10 and 15 operations per minute. | | N |

| EN 60669-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |
| 19.105 | For electronic switches for which a minimum load or current is specified by the manufacturer, the characteristic is additionally tested with the specified minimum load or current at 0,9 times rated voltage. | | N |
| | The switch state of the electronic switch is changed 10 times and/or the setting value is altered 10 times over the whole range from minimum to maximum and back to minimum. | | N |
| | In addition, where appropriate, the switch state of the electronic switch is changed 10 times and/or the setting value is altered 10 times over the whole range from minimum to maximum and back to minimum by means of an electronic extension unit. | | N |
| 20 | MECHANICAL STRENGTH | | P |
| | Switches, boxes and screwed glands of switches other than ordinary shall have adequate mechanical strength so as to withstand the stresses imposed during installation and use. | | P |
| 20.1 | The specimens are subjected to blows by means of an impact-test apparatus as shown in figures 15, 16, 17 and 18. | | P |
| 20.2 | The bases of surface-type switches are first fixed to a cylinder of rigid steel sheet, which has a radius equal to 4,5 times the distance between fixing holes but in any case no less than 200 mm. The axes of the holes are in a plane perpendicular to the axis of the cylinder and parallel to the radius through the centre of the distance between the holes. | | P |
| 20.3 | Screwed glands are fitted with a cylindrical metal rod having a diameter, in millimetres, equal to the nearest whole number below the internal diameter, in millimetres, of the packing. | | N |

| EN 60669-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |
| 20.4 | When testing the force necessary for covers, cover-plates or actuating members to come off or not come off, the switches are mounted as for normal use. Flush-type switches are fixed in appropriate mounting boxes, which are installed as for normal use so that the rims of the boxes are flush with the walls, and the covers, cover- plates or actuating members are fitted. If they are provided with locking means which can be operated without the aid of a tool, these means are unlocked. | | P |
| 20.4.1 | Verification of the non-removal of covers, cover-plates or actuating members | | P |
| | Forces are gradually applied in directions perpendicular to the mounting surfaces, in such a way that the resulting force acting on the centre of the covers, cover-plates, actuating members or parts of them is respectively: | | P |
| 20.4.2 | Verification of the removal of covers, cover- plates or actuating members | | P |
| | A force not exceeding 120 N is gradually applied, in directions perpendicular to the mounting/supporting surfaces, to covers, cover- plates, actuating members or parts of them by means of a hook placed in turn in each of the grooves, holes, spaces or the like, provided for removing them. | | P |
| 20.5 | The test is made as described in 20.4, but applying, for 20.4.1, the following forces: | | P |
| 20.6 | The test is made as described in 20.4, but applying, for 20.4.1, the force of 10 N for all covers, cover-plates, or actuating members. | | P |
| 20.7 | The gauge shown in figure 20 is pushed toward each side of each cover, cover plate or actuating member which is fixed without screws on a mounting or supporting surface, as shown in figure 21. The face B resting on the mounting/supporting surface, with the face A perpendicular to it, the gauge is applied at right angles to each side under test. | | P |

| EN 60669-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |
| 20.8 | A gauge according to figure 23, applied with a force of 1 N, shall not enter more than 1,0 mm from the upper part of any groove, hole or reverse taper or the like when the gauge is applied parallel to the mounting/supporting surface and at right angles to the part under test, as shown in figure 24. | | P |
| 20.9 | The operating member of a cord-operated switch shall have adequate strength. | | P |
| 21 | RESISTANCE TO HEAT | | P |
| | Switches and boxes shall be sufficiently resistant to heat. | | P |
| 21.1 | The specimens are kept for 1 h in a heating cabinet at a temperature of 100 °C ± 2 °C. | | P |
| 21.2 | Parts of insulating material necessary to retain current-carrying parts and parts of the earthing circuit in position are subjected to a ball-pressure test by means of the apparatus shown in figure 25, except the insulating parts necessary to retain the earthing terminals in a box shall be tested as specified in 21.3. | | P |
| 21.3 | Parts of insulating material not necessary to retain current-carrying parts and parts of the earthing circuit in position, even though they are in contact with them, are subjected to a ball pressure test in accordance with 21.2, but the test is made at a temperature of 70 °C ± 2 °C or 40 °C ± 2 °C plus the highest temperature rise determined for the relevant part during the test of clause 17, whichever is the higher. | | P |
| 22 | SCREWS, CURRENT CARRYING PARTS AND CONNECTIONS | | N |
| 22.1 | Connections, electrical or mechanical, shall withstand the mechanical stresses occurring in normal use. | | N |
| 22.2 | For screws in engagement with a thread of insulating material which are operated when mounting the switch during installation, their correct introduction into the screw hole or nut shall<br>be ensured. | | N |

| EN 60669-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |
| 22.3 | Electrical connections shall be so designed that contact pressure is not transmitted through insulating material other than ceramic, pure mica or other material with characteristics no less suitable, unless there is sufficient resiliency in the metallic parts to compensate for any possible shrinkage or yielding of the insulating material. | | N |
| 22.4 | Screws and rivets, which serve as electrical as well as mechanical connections, shall be locked against loosening or turning. | | N |
| 22.5 | Current-carrying parts, including those of terminals (also earthing terminals), shall be of a metal having, under the conditions occurring in the equipment, mechanical strength, electrical conductivity and resistance to corrosion adequate for their intended use. | | N |
| 22.6 | Contacts which are subjected to a sliding action in normal use shall be of a metal resistant to corrosion. | | N |
| 22.7 | Thread-forming screws and thread-cutting screws shall not be used for the connection of current-carrying parts. Thread-forming screws and thread-cutting screws may be used to provide earthing continuity, provided that it is not necessary to disturb the connection in normal use and at least two screws are used for each connection. | | N |
| 23 | Creepage distances, clearances and distances through sealing compound | | N |
| 23.1 | Creepage distances, clearances and distances through sealing compound shall be not less than the values shown in table 20. | | P |
| 23.2 | Insulating compound shall not protrude above the edge of the cavity in which it is contained. | | P |
| 23.3 | Ordinary surface-type switches shall not have bare current-carrying strips at the back. | | N |
| 23.101 | For electronic switches having a control circuit suitable for connection to a SELV supply, the switching circuit being supplied with a voltage greater than the SELV, creepage distances and clearances between control and switching circuits shall not be less than 5,5 mm. | | P |
| 24 | RESISTANCE OF INSULATING MATERIAL TO ABNORMAL HEAT, TO FIRE AND TO TRACKING | | P |
| 24.1 | Resistance to abnormal heat and to fire | | P |

| EN 60669-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |
| 24.1.1 | Glow-wire test | Enclosure: 650℃ | P |
| 24.2 | Resistance to tracking | | P |
| 25 | RESISTANCE TO RUSTING | | P |
| 26 | EMC REQUIREMENTS | | N |
| 26.1 | Immunity | | N |
| 26.1.1 | Voltage dips and short interruptions | | N |
| 26.1.2 | Surge immunity test for 1,2/50 wave impulses | | N |
| 26.1.3 | Electrical fast transient/burst test | | N |
| 26.1.4 | Electrostatic discharge test | | N |
| 26.1.5 | Radiated electromagnetic field test | | N |
| 26.1.6 | Radio-frequency voltage test | | N |
| 26.1.7 | Power-frequency magnetic field test | | N |
| 26.2 | Emission | | N |
| 26.2.1 | Low-frequency emission | | N |
| 26.2.2 | Conducted radio-frequency emission | | N |
| 101 | Abnormal conditions | | P |
| 101.1 | When electronic switches are operated under abnormal conditions no part shall reach such a temperature that there is danger of fire to the surroundings of the electronic switches. | | P |
| 101.1.1 | Unless otherwise specified, the tests are made on electronic switches while they are mounted, connected and loaded as specified in clause 17. | | P |
| 101.1.1.2 | overload tests are carried out, if it is applicable. | | P |
| 101.2 | Protection against electric shock is required, even though an electronic switch is being used or has been used during fault conditions. | | P |
| 101.3 | Electronic switches shall, without endangering their surroundings, withstand the short circuits they may be subjected to in the load circuit. | | P |
| 101.4 | For electronic RCS, Clause 101 of IEC 60669-2-2 applies. | | N |
| | For electronic TDS, Clause 101 of IEC 60669-2-3 applies. | | N |
| 102 | Components<br>Components which, if they | | N |

| EN 60669-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |
| 102.1 | Fuses, if any, shall comply with IEC 60127 or other relevant IEC publications and have a rated breaking capacity of 1 500 A, unless any fault current through the fuse is limited to 35 A. | | P |
| 102.2 | Capacitors | | N |
| | the short-circuiting or disconnection of which would cause an infringement of the requirements under fault conditions with regard to shock or fire hazard, | | N |
| | the short-circuiting of which would cause a current of 0,5 A or more through the terminals of the capacitor, | | N |
| | for suppression of electromagnetic interference, | | N |
| 102.3 | Resistors | | P |
| 102.4 | Automatic protective devices (other than fuses) | | N |
| 102.4.1 | Cut-outs shall have adequate making and breaking capacity. | | N |
| 102.4.1.1 | Non-self-resetting cut-outs in the load circuit of the electronic switch are tested at 1,1 times the rated voltage of the electronic switch and with loads | | N |
| 102.4.1.2 | Self-resetting cut-outs in the load circuit of the electronic switch are tested at 1,1 times the rated voltage of the electronic switch and with loads | | N |
| 102.4.2 | Automatic protective devices which only decrease current to the electronic switch are tested as follows. | | N |
| | The electronic switch is loaded for 4 h with a current as given in clause 17. At the end of this period, the load is increased by closing an auxiliary switch which increases the load so that the prospective current through the electronic switch will be 2,1 times the rated current of the protective fuse (if the fuse is in accordance with IEC 60127) or the relevant conventional tripping current for other fuses. | | N |
| 102.5 | Transformers | | P |
| | Transformers intended for SELV circuits shall be of the safety isolating type and shall comply with the relevant requirements of IEC 61558-2-6. | | P |

| | | | |
|---|---|---|---|
| Annex A | Survey of specimens needed for tests | | P |
| Annex B | Additional requirements for switches having facilities for the outlet and retention of flexible cables | | N |
| Annex ZA | Normative references to international publications with their corresponding European publications | | N |
| Annex ZB | Special national condition | | N |

| EN 60669-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |

| | | | |
|---|---|---|---|
| Annex ZC | A-Deviations | | N |

| | | | |
|---|---|---|---|
| 12.2.5 | **TABLE: test with apparatus shown in figure 10 (screw terminals)** | | N |
| | rated current (A) .....: | 16A | — |
| | type of conductors .....: | rigid solid | — |
| | smallest/largest cross-sectional area per table 2 ($mm^2$) .....: | 0,75/1,5$mm^2$ | — |
| | number of conductors.....: | 2 | — |
| | nominal diameter of thread (mm); torque per table 3 (Nm) .....: | | — |

| Cross-sectional area ($mm^2$) | Diameter of bushing hole per table 4 (mm) | Height H per table 4 (mm) | Mass (kg) | Remarks |
|---|---|---|---|---|
| 0,75 | 5,5 | 67,00 | 0,08 | |
| supplementary information: | | | | |

| | | | |
|---|---|---|---|
| 12.2.6 | **TABLE: pull test (screw terminals)** | | N |
| | rated current (A) .....: | 50/60Hz | — |
| | smallest/largest cross-sectional area per table 2 ($mm^2$) .....: | 0,75/1,5$mm^2$ | — |
| | nominal diameter of thread (mm); torque 2/3 per table 3 (Nm) .....: | | — |

| Cross-sectional area ($mm^2$) | Number of conductors | Type of conductors (rigid solid / rigid stranded) | Pull per table 5 applied for 1 min (N) | Remarks |
|---|---|---|---|---|
| 1,5 | 2 | rigid solid | 40 | |
| supplementary information: | | | | |

| | | | |
|---|---|---|---|
| 12.2.7 | **TABLE: tightening test (screw terminals)** | | N |
| | rated current (A) .....: | | — |
| | nominal diameter of thread (mm); torque 2/3 per table 3 (Nm) .....: | | — |

| Largest cross-sectional area per table 2 ($mm^2$) | Permissible number of conductors | Type of conductors (rigid solid / rigid stranded) | Number of wires and nominal diameter of wires per table 6 | Remarks |
|---|---|---|---|---|
| 1,5 | 1 | rigid solid | 1×1,25 | |
| supplementary information: | | | | |

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|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |

| | | | |
|---|---|---|---|
| 12.3.10 | **TABLE: mechanical stresses occurring in normal use (screwless terminals)** | | N/A |
| | rated current (A) ..... : | | — |
| | largest/smallest cross-sectional area per table 7 ($mm^2$) ..... : | | — |

| Number of connection (after that conductor subjected to a pull of 30 N for 1 min) / disconnection | Type of conductor (solid / rigid stranded / flexible | Cross-sectional area ($mm^2$) | Remarks |
|---|---|---|---|
| | | | |
| | | | |

| | | | |
|---|---|---|---|
| | **TABLE: test with apparatus shown in figure 10** | | N/A |
| | rated current (A) ..... : | | — |
| | type of conductors ..... : | rigid solid / rigid stranded | — |
| | smallest/largest cross-sectional area per table 7 ($mm^2$) ..... : | | — |
| | number of conductors..... : | | — |

| Cross-sectional area ($mm^2$) | Diameter of bushing hole per table 4 (mm) | Height H per table 4 (mm) | Mass (kg) | Remarks |
|---|---|---|---|---|
| | | | | |
| | | | | |

supplementary information:

| | | | |
|---|---|---|---|
| 12.3.11 | **TABLE: electrical and thermal stresses occurring in normal use** | | N/A |
| Test a) | Test carried out for 1 h connecting rigid solid conductors: | | |
| | test current per table 8 (A) ..... : | | — |
| | nominal cross-sectional area ($mm^2$) ..... : | | — |

| Screwless terminal number | Voltage drop (mV) | Required voltage drop |
|---|---|---|
| 1 | | ≤ 15 mV |
| 2 | | ≤ 15 mV |
| 3 | | ≤ 15 mV |
| 4 | | ≤ 15 mV |
| 5 | | ≤ 15 mV |

| | | | |
|---|---|---|---|
| Test b) | Temperature cycles test) carried out on terminals subjected to Test a): | | |
| | test current per table 8 (A) ..... : | | — |
| | nominal cross-sectional area ($mm^2$) ..... : | | — |
| | allowed voltage drop (mV) ..... : | | — |

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|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |

| Screwless terminal number | 1 | 2 | 3 | 4 | 5 | Remarks |
|---|---|---|---|---|---|---|
| voltage drop after 24th cycle | | | | | | |
| voltage drop after 48th cycle | | | | | | |
| voltage drop after 72th cycle | | | | | | |
| voltage drop after 96th cycle | | | | | | |
| voltage drop after 120th cycle | | | | | | |
| voltage drop after 144th cycle | | | | | | |
| voltage drop after 168th cycle | | | | | | |
| voltage drop after 192th cycle | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 12.3.12 | **TABLE: deflection test (principle of test apparatus shown in figure 11a)** | | | | | | N/A |
| | Test carried out for 1 h connecting rigid solid conductors: | | | | | | |
| | test current (A) (equal rated current) ..... : | | | | | | — |
| | required voltage drop (mV) ..... : | | | ≤ 25 mV | | | — |
| Type of conductor | | Smallest | | | Largest | | Remarks |
| cross-sectional area per table 9 ($mm^2$) | | | | | | | |
| force per table 10 (N) | | | | | | | |
| screwless terminal number | | 1 | 2 | 3 | 1 | 2 | 3 |
| starting point (X = deflection original point) | | X | X+10° | X+20° | X | X+10° | X+20° |
| voltage drop 1st deflection (mV) | | | | | | | |
| voltage drop 2nd deflection (mV) | | | | | | | |
| voltage drop 3rd deflection (mV) | | | | | | | |
| voltage drop 4th deflection (mV) | | | | | | | |
| voltage drop 5th deflection (mV) | | | | | | | |
| voltage drop 6th deflection (mV) | | | | | | | |
| voltage drop 7th deflection (mV) | | | | | | | |
| voltage drop 8th deflection (mV) | | | | | | | |
| voltage drop 9th deflection (mV) | | | | | | | |
| voltage drop 10th deflection (mV) | | | | | | | |
| voltage drop 11th deflection (mV) | | | | | | | |
| voltage drop 12th deflection (mV) | | | | | | | |
| supplementary information: | | | | | | | |

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|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |

| | | | |
|---|---|---|---|
| 16.1 | **TABLE: insulation resistance** | | P |
| Item per table 20 | test voltage applied between: | measured (MΩ) | required (MΩ) |
| | L to N | >2 | 2 |
| | L/N to enclosure | >5 | 5 |
| | | | |
| | | | |
| supplementary information: | | | |

| | | | |
|---|---|---|---|
| 16.2 | **TABLE: electric strength** | | P |
| | rated voltage (V) .....: | | — |
| item per table 20 | test voltage applied between: | test voltage (V) | flashover / breakdown (Yes/No) |
| | L/N to enclosure | 4000 | No |
| | L-N | 2000 | No |
| | | | |
| supplementary information: | | | |

| | | | |
|---|---|---|---|
| 17 | **TABLE: temperature rise measurements** | | N/A |
| | rated current (A) ..... : | | — |
| | nominal cross-sectional area ($mm^2$) .....: | | — |
| | terminal screws: torque (Nm) (2/3 table 3) ..... : | | — |
| | test current per table 15 passed for 1 h (A) .....: | | — |
| | rated voltage of pilot light (V) .....: | | — |
| | samples number .....: | | — |
| thermocouple locations | | max. measured temperature rise (K) | allowed temperature rise (K) |
| | | | |
| | | | |
| | | | |
| supplementary information: | | | |

| | | |
|---|---|---|
| 19.1 | **TABLE: reduced electric strength after normal operation (clause 19.1)** | N/A |

| EN 60669-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |

| item per table 20 | test voltage applied between: | test voltage (V) | flashover / breakdown (Yes/No) |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | **TABLE: temperature rise measurements at terminals after normal operation (clause 19.1)** | | |
| | test current (In) passed for 1 h (A) .....: | | — |
| thermocouple locations | | max. measured temperature rise (K) | allowed temperature rise (K) |
| | | | 45 |
| | | | 45 |
| supplementary information: | | | |

| 19.2 | **TABLE: temperature rise measurements at terminals after test with fluorescent lamp load (clause 19.2)** | | N/A |
|---|---|---|---|
| | test current (In) passed for 1 h (A) .....: | | — |
| thermocouple locations | | max. measured temperature rise (K) | allowed temperature rise (K) |
| | | | 45 |
| | | | 45 |
| supplementary information: | | | |

| 20.1 | **TABLE: impact test** | | | P |
|---|---|---|---|---|
| part of enclosure tested per table 18 (A, B, C, D) | blows per part | height of fall (mm) | comments | |
| B | 4 | 95 | | |
| | | | | |
| supplementary information: | | | | |

| 21.2 | **TABLE: ball pressure test of thermoplastic materials** | P |
|---|---|---|

| EN 60669-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |

| | | | | |
|---|---|---|---|---|
| | allowed impression diameter (mm) ..... : | ≤ 2 mm | | — |
| part under test | material designation / manufacturer | test temperature (°C) | impression diameter (mm) | |
| Enclosure | Plastic | 125 | 0,85 | |
| supplementary information: | | | | |

| | | | | |
|---|---|---|---|---|
| 21.3 | **TABLE: ball pressure test of thermoplastic materials** | | | N/A |
| | allowed impression diameter (mm) ..... : | ≤ 2 mm | | — |
| part under test | material designation / manufacturer | test temperature (°C) (1) | impression diameter (mm) | |
| | | | | |
| supplementary information:<br>(1) 70 °C / 40 °C + highest temperature rise determined during the test of clause 17 | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 22.1 | **TABLE: threaded part torque test** | | | | | N/A |
| threaded part identification | diameter of thread (mm) | column number (I, II, or III) | applied torque (Nm) | times (5/10) | no damage | |
| | | | | | | |
| supplementary information: | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 23.1 | **TABLE: creepage distances, clearances and distances through sealing compound** | | | | | | P |
| | rated voltage (V) .....: | | | | | | — |
| item per table 20 | creepage distance dcr, clearance cl and distance through sealing compound dtsc at/of: | required cl (mm) | cl (mm) | required dcr (mm) | dcr (mm) | required dtsc (mm) | dtsc (mm) |
| | L-N | 3,0 | ＞3,0 | 3,0 | ＞3,0 | --- | --- |
| | L/N-enclosure | 3,0 | ＞3,0 | 3,0 | ＞3,0 | --- | --- |
| supplementary information: | | | | | | | |

| | | | |
|---|---|---|---|
| 24.1.1 | **TABLE: glow-wire test** | | P |
| part under test | material designation / manufacturer | test temperature (°C) | remarks |
| Plastic part | | 650 | |
| supplementary information: | | | |

| EN 60669-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result – Remark | Verdict |

| | | | | |
|---|---|---|---|---|
| 24.2 | **TABLE: resistance to tracking** | | | N/A |
| | number of drops .....: | 50 | | — |
| part under test | material designation / manufacturer | test voltage (V) | flashover / breakdown (Yes/No) | |
| | | 175 | | |
| supplementary information: | | | | |

**ATTACHMENT TO TEST REPORT IEC 60669-1**
**EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES**
SWITCHES FOR HOUSEHOLD AND SIMILAR FIXED-ELECTRICAL INSTALLATIONS
PART 1: GENERAL REQUIREMENTS

| | |
|---|---|
| **Differences according**.....: | EN 60669-1:2018+AC:2020<br>EN 60669-2-1:2004+A1:2009 +A12:2010 |
| **Attachment Form No**..... : | EU_GD_IEC60669_1&IEC60669_2_1F |
| Attachment Form Originator.....: | IMQ S.p.A. |
| Master Attachment Form..... : | 2017-04 |

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| Clause | Requirement + Test | Result - Remark | Verdict |
|---|---|---|---|
| | **CENELEC COMMON MODIFICATIONS (EN)** | | P |
| **8** | **MARKING** | | P |
| 8.1 (Annex B) | Paragraph added at the end of this subclause: | | P |
| | Flexible cable outlet switches: information of minimum and maximum sizes for which the anchorage is provided put on the switch and/or the packaging unit | | P |
| 8.3 | First sentence of last paragraph before note 2 replaced by: | | P |
| | Marking is clearly visible with normal or corrected vision, without additional magnification, marked either on the front of the switch or on the inner part of its associated enclosure, or on the main part of the switch so that it is easy legible during installation | | P |
| 8.6 | First sentence of the first paragraph replaced by: | | P |
| | Switches of pattern numbers 2, 3, 03 and switches with Vn > 250 V and In > 16 A if marked to indicate the switch position: direction of movement of the actuating member to its different positions or the actual switch position, clearly indicated .....: | | P |
| 8.8 | Note 2 changed into a requirement and its first sentence replaced by: | | P |
| | Special precautions necessary to take when installing the switch: details of these and clear information given in an instruction sheet which accompanies the switch | | P |
| **9** | **CHECKING OF DIMENSIONS** | | P |
| | Paragraph added after the first paragraph: | | P |
| | Type of boxes in which switches are to be mounted: specified in the manufacturer's catalogue | | P |
| **10** | **PROTECTION AGAINST ELECTRIC SHOCK** | | **P** |
| 10.1 | Additional requirement (IEC 60669-1/A1) concerning switches designed to be fitted with pilot lights supplied at voltage other than ELV is deleted | | P |
| 10.3 | First two line replaced by the following: | | P |
| | Accessible parts of switches are made of insulating material | | P |
| | "cover or cover plates" replaced by "cover, cover plates and other parts of the enclosure" | | P |
| 10.3.1 | Replaced by: | | P |

| | | | |
|---|---|---|---|
| | Metal covers, cover plates or other parts of enclosure protected by supplementary insulation made by insulating linings or insulating barriers | | P |
| | Insulating linings or insulating barriers: | | P |
| | - cannot be removed without being permanently damaged, or designed that | | P |
| | - cannot be replaced in an incorrect position; if they are omitted, accessories are rendered inoperable or manifestly incomplete; there is no risk of accidental contact between live parts and metal covers or cover plates; precautions are taken to prevent creepage distances or clearances becoming less than the values specified in clause 23 | | P |
| 10.3.2 | Replaced by: | | P |
| | Earthing of metal covers, cover plates or other parts of enclosure: connection of low resistance | | P |
| **11** | **PROVISION FOR EARTHING** | | P |
| 11.1 | Notes 1 and 2 changed into requirements: | | P |
| | Requirement did not apply to the metal cover plates mentioned in 10.3.1 | | P |
| | Small screws and the like, isolated from live parts, for fixing bases, covers or cover plates, were not considered as accessible parts which can become live in the event of an insulation fault | | P |
| 11.2 | Second paragraph replaced by: | | P |
| | Earthing terminals have a capacity not less than that of the corresponding terminals for the supply conductors | | P |
| **12** | **TERMINALS** | | P |
| 12.2.4 | Second paragraph replaced by: | | P |
| | Terminals the body of which is made of materials as detailed in 22.5 considered as complying with the requirement | | P |
| 12.2.5 | Paragraph before note 4 deleted | | P |
| 12.2.6 | “in case where they exist in the relevant IEC standard” in the last paragraph replaced by “if any, according to HD 21.3 | | P |
| 12.3.1 | Present note numbered as note 1 and added new note 2: | | P |
| | Tests of 12.3.12 carried out using rigid solid conductors only | | P |
| **13** | **CONSTRUCTIONAL REQUIREMENTS** | | P |
| 13.16 (Annex B) | First paragraph replaced by: | | P |
| | Flexible cable outlet switches: flexible cable (60245 IEC 66, 60227 IEC 52 or 60227 IEC 53, or as specified by the manufacturer) enter the switch through a suitable hole, groove or gland .....: | | P |
| | Last but one paragraph replaced: | | P |
| | An a.c. voltage of 2000 V applied for 1 min between the conductors and any metal clamp of the cord anchorage | | P |
| | During the test: insulation of flexible cable not damaged (no breakdown or flashover) | | P |
| | Subclause added at the end: | | P |
| | Flexible cable outlet switches: | | P |
| | - clear how relief from strain and prevention of twisting is intended to be effected | | P |

| | | | |
|---|---|---|---|
| | - cord anchorage, or at least part of it, integral with or permanently fixed to one of the component parts of the switch | | P |
| | - makeshift methods not used | | P |
| | - cord anchorages suitable for different type of flexible cables | | P |
| | Rewirable switches with earthing connection are designed with ample space for slack of the earthing conductor | | P |
| **22** | **SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS** | | P |
| 22.1 | Second sentence of the second paragraph deleted | | P |
| **23** | **CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH SEALING COMPOUND** | | P |
| 23.3 | Subclause added: | | P |
| | Ordinary surface-type switches do not have bare current-carrying strips at the back | | P |
| **24** | **RESISTANCE OF INSULATING MATERIAL TO ABNORMAL HEAT, TO FIRE AND TO TRACKING** | | P |
| 24.1.1 | Item b) replaced by: | | P |
| | Parts of insulating material not necessary to retain current-carrying parts and parts of the earthing circuit in position, even though they are in contact with them, and parts of insulating materials necessary to hold in position the earthing terminal in an enclosure, by the test made at a temperature of 650 °C | | P |

| | | | |
|---|---|---|---|
| **ZB** | **ANNEX ZB, SPECIAL NATIONAL CONDITIONS** | | P |
| 7.1.7 | BELGIUM, CZECH REPUBLIC, FINLAND, GERMANY, NETHERLANDS, NORWAY, SWEDEN: design B not used due to installation practice | | P |
| 8.1 | DENMARK: symbol for earth for any space provided for an earthing terminal | | P |
| | UNITED KINGDOM: marking of type reference not used | | P |
| 8.3 | UNITED KINGDOM: marking of type reference not used | | P |
| 10.2 | DENMARK, NORWAY: accessories requiring earth connection cannot normally be used due to the lack of an earthing conductor in many existing old buildings | | P |
| 10.3 | DENMARK: enclosures, including covers and cover plates, may be made of metal: | | P |
| | - for ordinary switches which comply with 10.3.1 | | P |
| | - for switches with IP>X0 which fulfil with 10.3.1 or 10.3.2 | | P |
| 10.3.2 | DENMARK, NORWAY: accessories requiring earth connection cannot normally be used due to the lack of an earthing conductor in many existing old buildings | | P |
| 10.5 | DENMARK, NORWAY: accessories requiring earth connection cannot normally be used due to the lack of an earthing conductor in many existing old buildings | | P |

| | | | |
|---|---|---|---|
| 12.2.5 | DENMARK, FINLAND, NORWAY, SWEDEN:<br>- additional test with rigid solid conductors (if exist in relevant IEC standard), if the first test has been made with rigid stranded conductors | | P |
| | - in the case rigid stranded conductors do not exist, the test may be made with rigid solid conductors only | | P |
| 12.2.6 | DENMARK, FINLAND, NORWAY, SWEDEN: additional test with one rigid solid conductor and one rigid stranded conductor with same cross-sectional areas connected at same time is required for terminals allowing the connection of two conductors | | P |
| 13.15.2 | DENMARK, FINLAND, NORWAY, SWEDEN, SWITZERLAND: sub-clause mandatory | | P |

| | | | |
|---|---|---|---|
| **ZC** | **ANNEX ZC, A-DEVIATIONS** | | P |
| 11.2 | BELGIUM: earthing terminals have a capacity not less than that of corresponding terminals for the supply conductors except that any additional external earthing terminal shall be of a size suitable for conductors of at least 4 $mm^2$ | | P |

**Attachment: Photos of the product:**

Photo 1

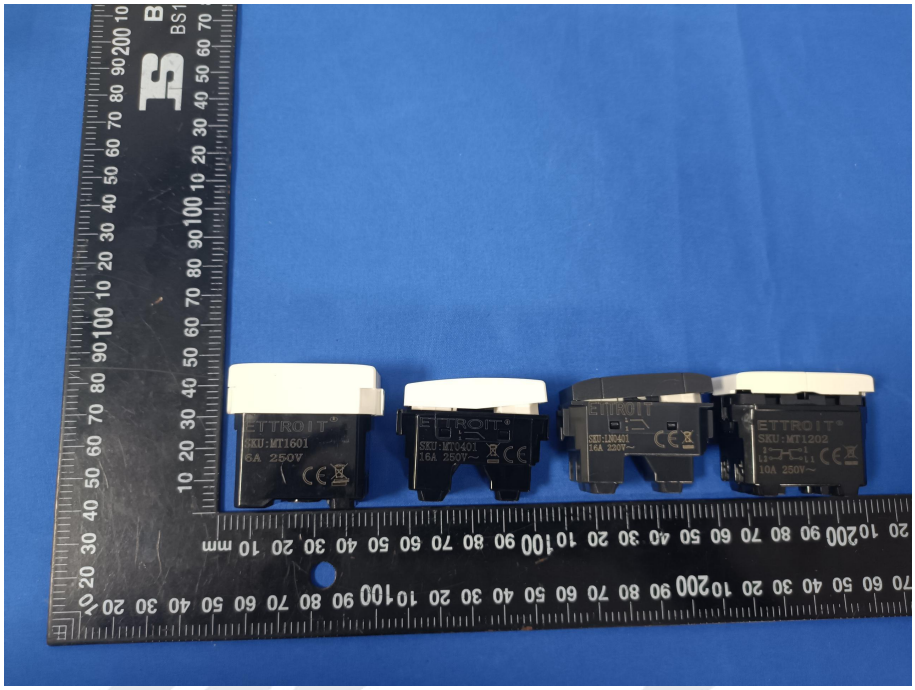



Photo 2

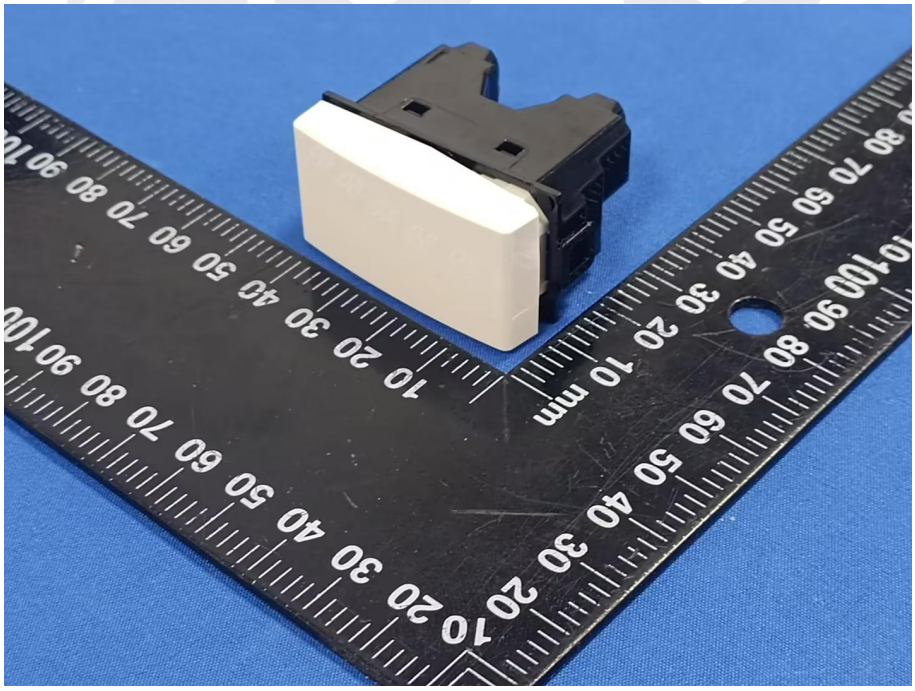
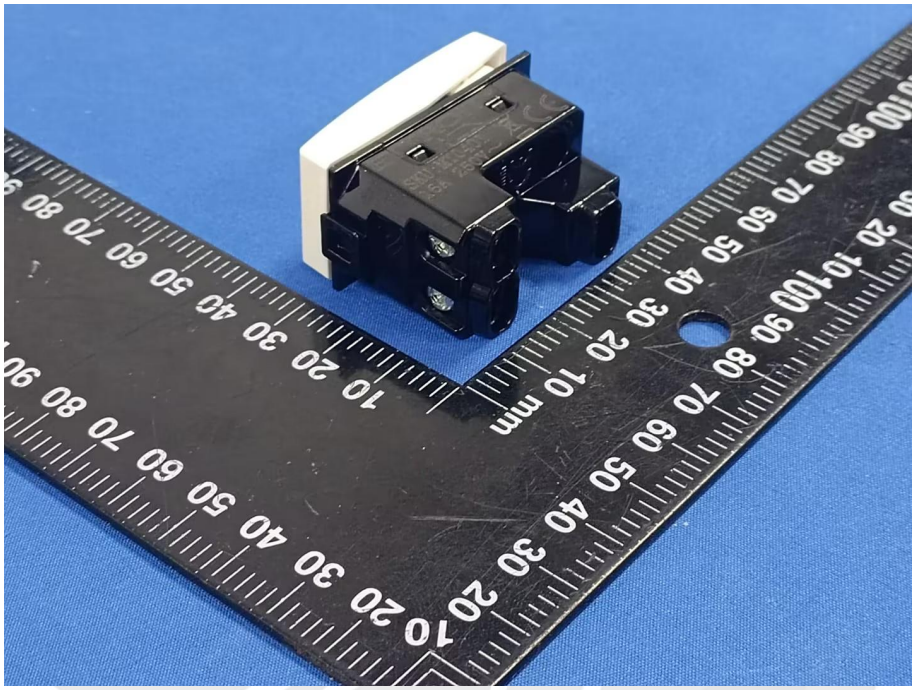


Photo 3



**-- The End of Report--**