



# TEST REPORT

**Reference No.** ..... : WTN22D04067830Z  
**Applicant** ..... : Ningbo Ehome Electronic Co.,Ltd  
**Address** ..... : Yonghe Road, Qiaotouhu Industrial Zone, Ninghai, Ningbo, China  
**Manufacturer** ..... : Ningbo Ehome Electronic Co.,Ltd  
**Address** ..... : Yonghe Road, Qiaotouhu Industrial Zone, Ninghai, Ningbo, China  
**Product Name** ..... : MICROWAVE SENSOR  
**Model No.** ..... : See model list of page 4  
**Total pages.** ..... : 66 pages and 5 pages of photo  
**Standards** ..... :  IEC 60669-1:2017/COR1:2020  
 EN 60669-1:2018/AC:2020-02  
Switches for household and similar fixed-electrical installations –Part 1: General requirements  
 IEC 60669-2-1:2002+A1:2008+A2:2015  
 EN 60669-2-1:2004+A1:2009+A12:2010  
Switches for household and similar fixed electrical installations –Part 2-1: Particular requirements – Electronic switches  
**Date of Receipt sample** ..... : 2022-04-15  
**Date of Test** ..... : 2022-04-15 to 2022-04-28  
**Date of Issue** ..... : 2022-06-23  
**Test Result** ..... : **Pass**

Remarks:  
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

**Prepared By:**

**Waltek Testing Group Co., Ltd.**

Address: No. 77, Houjie Section, Guantai Road, Houjie Town, Dongguan City,  
Guangdong, China  
Tel:+86-769-2267 6998  
Fax:+86-769-2267 6828

Compiled by:

Miffy Liu/ Project Engineer

Approved by:

Sam Qi / Designated Reviewer



|                                    |   |
|------------------------------------|---|
| <b>Test item description</b> ..... | MICROWAVE SENSOR  |
| <b>Trade Mark(s)</b> .....         |  |
| <b>Manufacturer</b> .....          | See page1 of report   |
| <b>Model/Type reference</b> .....  | See model list of page 4  |
| <b>Ratings</b> .....               | 220-240VAC, 50/60Hz, Max incandescent load:1200W; Max LED/energy saving lamp:300W |

**Remark:**

Whether parts of tests for the product have been subcontracted to other labs:

Yes                       No

If Yes, list the related test items and lab information:

Test items:

Lab information:

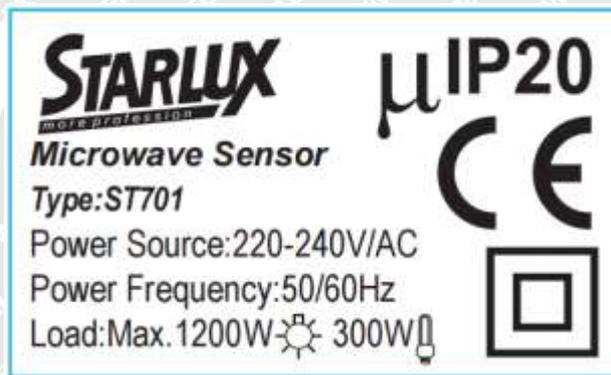
**Summary of testing:**

All tests had been assessed for safety with respect to the above test specifications and found to comply with the requirements of the standards.

Differences between EN 60669-1:2018/AC:2020-02 & EN 60669-2-1:2004+A1:2009+A12:2010 and IEC 60669-1:2017/COR1:2020 & IEC 60669-2-1:2002+A1:2008+A2:2015 have been considered and passed.

**Copy of marking plate:**

For model ST701:



**Remark:**

1. Above label for reference only, final label marking on product shall contain the information at least.
2. Name and address of the Importer and Manufacturer must be affixed on the product when the product placed on the EU market.
3. The height of CE mark shall be at least 5mm, the height of WEEE mark shall be at least 7mm.

**Test item particulars:**

|  |   |
|--|---|
| Type of electronic switch and its function (examples given in Annex AA) :  | Electronically operated switching device  |
| Pattern number .....   | 1   |
| Contact opening (gap) and switch performance .....   | 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  |
| Degree of protection against harmful effects due to the ingress of water .....   | N/A   |
| Method of actuating .....  | rotary / tumbler / rocker / push-button / cord-operated / momentary contact / touch / proximity / optical / acoustic / Electronic RCS / Electronic TDS / other external influences: |
| Method of mounting .....   | surface-type / flush-type / semi flush-type / panel-type / architrave-type / height > 1,7 m   |
| Method of installation .....   | design A / design B   |
| Type of terminals .....  | screw-type (rigid) / screw-type (rigid and flexible) / screwless (rigid) / screwless (rigid and flexible)   |
| Flexible cable outlet .....  | without / with  |
| Rated current (A) / Rated load (VA or W) .....   | 220-240VAC, 50/60Hz, Max incandescent load:1200W; Max LED/energy saving lamp:300W   |
| Minimum current (A) / Minimum load (VA or W) .....   | N/A   |
| Kind of load controlled by the switch .....  | Incandescent load, and LED load   |
| Type of switching mechanism .....  | N/A   |
| Kind of energization of the control circuit .....  | Electronic RCS energized by impulses / Electronics RCS permanently energized  |
| Type of control mechanism .....  | N/A   |
| Rated control voltage (V) .....  | a.c. / d.c.   |
| Rated control current (A) .....  | a.c. / d.c.   |
| Rated voltage (V) .....  | 220-240VAC  |
| Rated frequency (Hz) .....   | 50/60Hz   |
| Characteristic of fuses .....  | N/A   |
| Electronics RCS or TDS having .....  | SELV parts / PELV parts   |

**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 .....: 2022-04-15

Date (s) of performance of tests .....: 2022-04-15 to 2022-04-28

**General remarks:**

" (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:**

1. The equipment with model ST701 is MICROWAVE SENSOR.
2. The product Rating(s) : 220-240VAC, 50/60Hz, Max incandescent load:1200W; Max LED/energy saving lamp:300W.
3. The tests are conducted on model ST701 to represent the other model.
4. All models have the same copponents, internal construction, except for model name.

Model list :

| Product name     | Model name | Description  |
|------------------|------------|--|
| MICROWAVE SENSOR | ST701      | 220-240VAC, 50/60Hz, Max incandescent load:1200W; Max LED/energy saving lamp:300W. |
|                  | ST701E     |  |



| EN 60669-1& EN 60669-2-1 |   |   |         |
|--------------------------|---|---|---------|
| Clause                   | Requirement + Test  | Result - Remark   | Verdict |
| 8                        | MARKING   |   | P       |
| 8.1                      | General   |   | P       |
| <b>(8.1)</b>             | Switches marked with:   |   | P       |
|                          | - rated voltage (V) .....   | 220-240V  | P       |
|                          | - rated control voltage, if different from rated voltage (V) :  |  | N/A     |
|                          | - rated current (A) or rated load (VA or W) .....   | Max incandescent load:1200W; Max LED load:300W                                      | P       |
|                          | - symbol for nature of supply .....   |  | P       |
|                          | - manufacturer's or responsible vendor's name, trade  |   | P       |
|                          | - type reference .....  | See model list of page 4  | P       |
|                          | - symbol for mini-gap construction (m) .....  |   | N/A     |
|                          | - symbol for micro-gap construction (μ) .....   | μ   | P       |
|                          | - symbol for semiconductor switching device (ε) .....   |   | N/A     |
|                          | - first IP characteristic numeral, if declared higher than  | IP2X  | P       |
|                          | - second IP characteristic numeral, if declared higher than   | IPX0  | N/A     |
|                          | - rated frequency (Hz) .....  | 50/60Hz   | P       |
|                          | - rating and type of any fuse incorporated .....  |   | N/A     |
|                          | - symbol for kind of load (see 8.2)   |   | P       |
|                          | - the term "extension unit", if applicable, followed by the identifying reference .....   |   | N/A     |
|                          | - the minimum height for mounting the switch indicated  |   | P       |
|                          | Switches with screwless terminals: marked with an indication of the suitability to accept rigid conductors only (if any) .....  |   | N/A     |
|                          | For electronic switches with included automatic function, number of operations shall be stated in the accompanying instruction sheet when number of operation is higher than the indicated in sub clause 19.101, 19.102 and 19.104 and 19.109 |   | N/A     |
|                          | - symbol for the adjustment of the delay time, if applicable  |   | N/A     |
|                          | - symbol for the positions "Permanent on" and "Permanent off"   |   | N/A     |
|                          | - symbol for "Delay time" .....   |   | N/A     |
| <b>8.2 (8.2)</b>         | <b>Symbols</b>  |   | P       |
|                          | Symbols used: as required in the standard   |   | P       |
|                          | Marking for the nature of supply placed next to the marking for rated current and rated voltage   |   | P       |
|                          | Other particular symbols used are explained in the installation instructions  |   | P       |



| EN 60669-1& EN 60669-2-1 |   |                 |         |
|--------------------------|---|-----------------|---------|
| Clause                   | Requirement + Test  | Result - Remark | Verdict |
|                          | - for electronic RCS, Subclause 8.2 of IEC 60669-2-2 applies  |                 | N/A     |
|                          | - for electronic TDS, Subclause 8.2 of IEC 60669-2-3 applies  |                 | N/A     |
| <b>8.3 (8.3)</b>         | <b>Visibility of markings</b>   |                 | P       |
|                          | Markings are clearly visible with normal or corrected vision, without additional magnification  |                 | 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, if any  |                 | N/A     |
|                          | - symbol for mini-gap construction, micro-gap construction or semiconductor switching device, if applicable   |                 | P       |
|                          | - type reference  |                 | P       |
|                          | Information concerning more than one type of load not already marked on the electronic switch are stated in the accompanying instruction sheet  |                 | N/A     |
|                          | Minimum and maximum current/load are stated for each type of load   |                 | P       |
|                          | If a dimmer is intended to be used together with an iron core transformer, information shall be given in the manufacturer's instructions that only a transformer intended to be used with a dimmer shall be used.   |                 | N/A     |
|                          | Cover plates necessary for safety purposes and intended to be sold separately: marked with the manufacturer's or responsible vendor's name, trade mark or identification mark and type reference  |                 | N/A     |
|                          | IP code, when applicable, marked so as to be easily discernible when the switch is mounted and wired as in normal use   |                 | N/A     |
|                          | Marking clearly visible and easily legible  |                 | P       |
|                          | Markings are placed on parts which cannot be removed without the use of a tool  |                 | P       |
| <b>8.4 (8.4)</b>         | <b>Marking on terminals for phase conductors</b>  |                 | P       |
|                          | Terminals for phase conductors (supply conductors): identified unless method of connection is of no importance, self-evident or indicated on a wiring diagram   |                 | P       |



| EN 60669-1& EN 60669-2-1 |   |                 |         |
|--------------------------|---|-----------------|---------|
| Clause                   | Requirement + Test  | Result - Remark | Verdict |
|                          | Indications not placed on screws or other easily removable part   |                 | P       |
|                          | Terminals associated with any one pole for switches of pattern number 2, 3, 03 and 6/2: similar identification differing from that of terminals associated with other poles                             |                 | N/A     |
|                          | Switches with more than two terminals: load terminal marked with an arrow pointing away from the terminal or with one of the symbol mentioned in 8.2  |                 | P       |
|                          | Other terminals marked corresponding to the installation instructions   |                 | P       |
|                          | Installation not made clear by the markings: a wiring diagram is provided with each electronic switch   |                 | P       |
|                          | Terminals for the control circuit of a priority RCS with a current sensitive coil or voltage sensitive coil are marked with the appropriate symbol indicated in 8.2                                     |                 | N/A     |
|                          | Terminals for the control circuit: marked according to IEC 60445 and/or with the symbols according to 8.2   |                 | N/A     |
| <b>8.5</b>               | <b>Marking on terminals for neutral and earth conductors</b>  |                 | P       |
|                          | Neutral terminals: N .....  |                 | P       |
|                          | Earthing terminals: [earth symbol (IEC 60417-5019:2006-08)] .....   |                 | N/A     |
|                          | Markings not placed on screws or other easily removable parts   |                 | P       |
|                          | Terminals for conductors not forming part of the main function of the switch:   |                 | N/A     |
|                          | - clearly identified unless their purpose is self-evident, or   |                 | N/A     |
|                          | - indicated in a wiring diagram fixed to the accessory  |                 | N/A     |
|                          | Identification of switch terminals may be achieved by:  |                 | P       |
|                          | - their marking with graphical symbols according to IEC 60417 or colours and/or alphanumeric system, or   |                 | P       |
|                          | - their physical dimension or relative location   |                 | P       |
| <b>8.6 (8.6)</b>         | <b>Marking of the switch position</b>   |                 | N/A     |
|                          | Switches marked to indicate the switch position: they are so marked that the direction of movement of the actuating member to its different positions or the actual position is clearly indicated ..... |                 | N/A     |
|                          | Switches having more than one actuating member: marking indicates the effect achieved by the operation  |                 | N/A     |
|                          | Marking clearly visible on the front of the switch  |                 | N/A     |



| EN 60669-1& EN 60669-2-1 |   |                 |         |
|--------------------------|---|-----------------|---------|
| Clause                   | Requirement + Test  | Result - Remark | Verdict |
|                          | Not possible to fix cover, cover plate, or removable actuating members in an incorrect position   |                 | N/A     |
|                          | Symbols for "on" and "off" not used for indication of switch positions unless clearly indicate the direction of movement of the actuating members                       |                 | N/A     |
|                          | Off-state not marked with an "O" if the circuit on the load side is considered as live  |                 | N/A     |
| (8.6.101)                | Actual state of electronic switches intended to control the brightness of lamps is indicated  |                 | P       |
|                          | - marking on the on-/off-state position   |                 | N/A     |
|                          | - indicator lamp  |                 | P       |
|                          | - adjusting the lamp dimmer in the lowest control state and at rated voltage minus 10%: light still visible   |                 | N/A     |
|                          | 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: |                 | N/A     |
|                          | - for incandescent lamps:   |                 | N/A     |
|                          | the adjustment of lamp dimmers is made by the manufacturer  |                 | N/A     |
|                          | not possible to reduce the lowest setting without a tool  |                 | N/A     |
|                          | - for fluorescent lamps:  |                 | N/A     |
|                          | the adjustment of lamp dimmers is made by the manufacturer  |                 | N/A     |
|                          | it is possible for the installer to alter the lowest setting if indicated in an installation instruction  |                 | N/A     |
| <b>8.7</b>               | <b>Additional requirements for marking</b>  |                 | 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       |
|                          | Instruction sheets are written in the official language (s) of the country in which the switch is to be sold  |                 | P       |
| <b>8.8 (8.8)</b>         | <b>Durability</b>   |                 | P       |
|                          | Marking durable and easily legible. Test: 15 s with water and 15 s with 95 % n-hexane.  |                 | P       |
|                          | Electronic switch containing a viewing window (lens) intended to be mounted at a height greater 1,7 m: information stated in the instruction sheet                      |                 | N/A     |
| <b>9 (9)</b>             | <b>CHECKING OF DIMENSIONS</b>   |                 | P       |
|                          | Switches and boxes comply with the appropriate standard sheets, if any  |                 | N/A     |



| EN 60669-1& EN 60669-2-1 |  |                 |         |
|--------------------------|--|-----------------|---------|
| Clause                   | Requirement + Test   | Result - Remark | Verdict |
|                          | Electronic switches with dimensions other than those specified in the standard sheets (if any) if they are supplied with suitable boxes  |                 | P       |
| <b>10</b>                | <b>PROTECTION AGAINST ELECTRIC SHOCK</b>   |                 | P       |
| <b>10.1 (10.1)</b>       | <b>Prevention of access to live parts</b>  |                 | P       |
|                          | Switches: live parts not accessible  |                 | P       |
|                          | Switches designed to be fitted with pilot lights supplied at voltage other than ELV have means to prevent direct contact with the lamp   |                 | N/A     |
|                          | Specimen is mounted as in normal use and fitted with conductors as specified   |                 | P       |
|                          | Test probe B of IEC 61032 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: additional test carried out at 35 °C ± 2 °C. Switches are subjected for 1 min to a force of 75 N, applied through the tip of test probe 11 of IEC 61032 |                 | P       |
|                          | Test finger applied to thin-walled knock-outs with a force of 10 N   |                 | P       |
|                          | Viewing windows or the like on electronic switches intended to be mounted at a height greater than 1,7 m are subjected to a force of 30 N.   |                 | N/A     |
|                          | The test probe is not applied to membranes and the like. These parts are tested according to 13.15.1.  |                 | N/A     |
|                          | During the test: switches not deform and no live parts accessible with test probe 11 of IEC 61032  |                 | P       |
| <b>10.2 (10.2)</b>       | <b>Requirements for operating parts</b>  |                 | P       |
|                          | Knobs, operating levers, push buttons, rockers and the like: of insulating material, unless:   |                 | P       |
|                          | - accessible metal parts separated from metal parts of mechanism by double or reinforced insulation, or  |                 | N/A     |
|                          | - reliably connected to earth  |                 | N/A     |
|                          | Requirement does not apply to removable keys or intermediate parts, such as chains or rods   |                 | N/A     |
|                          | For touch sensitive electronic switches the associated protective impedance does not have to comply with the requirements of clauses 16 and 23   |                 | P       |
|                          | Accessible parts (for example, sensing surface) of electronic switches with IPX0 are connected to live parts by means of a protective impedance that:  |                 | N/A     |



| EN 60669-1& EN 60669-2-1 |  |                 |         |
|--------------------------|--|-----------------|---------|
| Clause                   | Requirement + Test   | Result - Remark | Verdict |
|                          | - consists of at least two independent resistors or independent capacitors in series of the same nominal value, or a combination of both   |                 | N/A     |
|                          | - resistors comply with 102.3  |                 | N/A     |
|                          | - capacitors comply with 102.2   |                 | N/A     |
|                          | The removal of protective impedance is only possible by destruction of the electronic switch or by rendering it unusable   |                 | N/A     |
|                          | Test carried out between accessible metal parts and earth, through a non-inductive resistor of 2 kΩ:   |                 | N/A     |
|                          | current measured: ≤ 0,7 mA (peak value), for a.c. up to 1 kHz .....  |                 | N/A     |
|                          | current measured: ≤ 0,7 mA multiplied by the value of frequency in kHz, but not exceed 70 mA, for a.c. above 1 kHz .....   |                 | N/A     |
|                          | current measured: ≤ 2 mA, for d.c. ....  |                 | N/A     |
| <b>10.3</b>              | <b>Requirements for accessible metal parts</b>   |                 | N/A     |
| 10.3.1                   | Accessible parts of switches when in normal use are made of insulating material as specified.  |                 | N/A     |
| 10.3.2                   | Metal covers or cover plates are protected by supplementary insulation made by insulating linings or insulating barriers.  |                 | N/A     |
|                          | Insulating linings or insulating barriers:   |                 | N/A     |
|                          | - cannot be removed without being permanently damaged, or designed that  |                 | N/A     |
|                          | - 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 |                 | N/A     |
|                          | Linings or barrier comply with the tests of clauses 16 and 23  |                 | N/A     |
| 10.3.3                   | Earthing of metal covers or cover plates: connection of low resistance   |                 | N/A     |
| <b>10.4</b>              | <b>Requirements for insulation of the mechanism</b>  |                 | N/A     |
|                          | Metal parts of the mechanism which are not insulated from live parts: not protrude from enclosure  |                 | N/A     |
|                          | Switches operated by means of a removable key or similar device: metal parts of mechanism insulated from live parts  |                 | N/A     |



| EN 60669-1& EN 60669-2-1 |  |                 |         |
|--------------------------|--|-----------------|---------|
| Clause                   | Requirement + Test   | Result - Remark | Verdict |
| <b>10.5</b>              | <b>Requirements for insulation of the mechanism with respect to the surrounding environment</b>  |                 | N/A     |
|                          | Metal parts of mechanism not accessible and insulated from accessible metal parts, unless  |                 | N/A     |
|                          | - separated from live parts (creepage distances and clearances have at least twice the value specified in clause 23), or   |                 | N/A     |
|                          | - reliably connected to earth  |                 | N/A     |
|                          | Unenclosed stack-type switches having a metal spindle pivoting in a metal base plate: creepage distances and clearances between live parts and the spindle, and between metal parts of the mechanism and base plate, have at least twice the values specified in clause 23   |                 | N/A     |
| <b>10.6</b>              | <b>Requirements for switches operated indirectly</b>   |                 | N/A     |
|                          | Switches operated by means of a removable key or an intermediate part: key or an intermediate part can only touch parts which are insulated from live parts  |                 | N/A     |
|                          | Key or intermediate part: insulated from metal parts of mechanism, unless  |                 | N/A     |
|                          | Creepage distances and clearances between live parts and metal parts of mechanism have at least twice the values specified in clause 23  |                 | N/A     |
| <b>10.7</b>              | <b>Requirements for switches with replaceable pull cord</b>  |                 | N/A     |
|                          | Cord-operated switches: impossible to touch live parts when fitting or replacing the pull cord   |                 | N/A     |
| <b>(10.101)</b>          | If a cover or cover-plate or a fuse can be removed without 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 is assured even after removal of cover or cover-plate (this requirement does not apply when the electronic switch must be dismantled from its supporting means for the replacement of the fuse-link) |                 | P       |
|                          | Compliance is checked with the test probe B of IEC 61032 (10 N); test probe does not touch live parts  |                 | P       |
| <b>(10.102)</b>          | <b>Hole in electronic switches for adjusting the setting:</b>  |                 | N/A     |
|                          | The adjustment does not involve the risk of an electric shock  |                 | N/A     |
|                          | Compliance is checked by applying a test pin according to figure 101 through the hole; test pin does not touch live parts  |                 | N/A     |
| <b>(10.103)</b>          | <b>Ventilation openings over live parts:</b>   |                 | N/A     |



| EN 60669-1& EN 60669-2-1 |   |                 |         |
|--------------------------|---|-----------------|---------|
| Clause                   | Requirement + Test  | Result - Remark | Verdict |
|                          | A foreign body introduced into these openings do not come into contact with any live parts  |                 | N/A     |
|                          | Compliance is checked by applying the test probe 13 of IEC 61032 through the openings; pin of test probe does not touch live parts  |                 | N/A     |
| <b>11 (11)</b>           | <b>PROVISION FOR EARTHING</b>   |                 | N/A     |
|                          | This clause does not apply to SELV electronic switches.   |                 | N/A     |
| <b>11.1</b>              | <b>General</b>  |                 | N/A     |
|                          | Accessible metal parts: provided with, or permanently and reliably connected to, an earthing terminal (does not apply to the metal cover plates mentioned in 10.3.2)  |                 | N/A     |
|                          | Small screws and the like, isolated from live parts, are not considered as accessible parts which can become live in the event of an insulation fault   |                 | N/A     |
| <b>11.2</b>              | <b>Earthing terminals</b>   |                 | N/A     |
|                          | Earthing terminals: with screw clamping or screwless terminals and comply with clause 12  |                 | N/A     |
| <b>11.3</b>              | <b>Requirements for surface-type switches</b>   |                 | N/A     |
|                          | Surface-type switches with an enclosure of insulating material, with IP > X0 and more than one cable inlet, are provided with:  |                 | N/A     |
|                          | - an internal fixed earthing terminal, or   |                 | N/A     |
|                          | - adequate space for a floating terminal allowing the connection of an incoming and outgoing conductor  |                 | N/A     |
| <b>11.4</b>              | <b>Test for earthing connection</b>   |                 | N/A     |
|                          | Connection between earthing terminal and accessible metal parts: of low resistance  |                 | N/A     |
|                          | Test current equal to 1,5 I <sub>n</sub> or 25 A (A) .....  |                 | --      |
|                          | Resistance ≤ 0,05 Ω (Ω) .....   |                 | N/A     |
| <b>(11.101)</b>          | Printed circuit of printed circuit boards board may be used to provide protective earthing continuity if:   |                 | N/A     |
|                          | - at least two tracks with independent soldering points which withstand a single short circuit test similar to 101.3 and immediately after the switch shall fulfil the requirements of 11.4, or                         |                 | N/A     |
|                          | - a single track is used with two independent means of connection on each end which will withstand a single short circuit test similar to 101.3 and immediately after the switch shall fulfil the requirements of 11.4, |                 | N/A     |
|                          | In addition:  |                 | N/A     |



| EN 60669-1& EN 60669-2-1 |  |                   |         |
|--------------------------|--|-------------------|---------|
| Clause                   | Requirement + Test   | Result - Remark   | Verdict |
|                          | - the laminated of the printed circuit board shall consist of epoxide glass fabric copper-clad laminated sheet, and  |                   | N/A     |
|                          | - the printed circuit boards shall comply with the overload test of 101.1.1.2.   |                   | N/A     |
| <b>12</b>                | <b>TERMINALS</b>   |                   | P       |
| <b>12.1 (12.1)</b>       | <b>General</b>   |                   | P       |
|                          | Switches provided with screw-type terminals or with screwless terminals .....  |                   | P       |
|                          | Clamping means of terminals: not serve to fix any other components   |                   | P       |
|                          | All the test on terminals, with the exception of the test of 12.3 11, made after the test of 15.1  |                   | P       |
|                          | Rigid solid conductors shall be of class 1, rigid stranded conductors shall be of class 2 and flexible conductors shall be of class 5 according to IEC 60228   |                   | 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 the tests of Subclause 12.2, except those of 12.2.6 and 12.2.7 and 12.2.8, provided they are chosen according Table 2. |                   | N/A     |
| <b>12.2</b>              | <b>Terminals with screw clamping for external copper conductors</b>  |                   | N/A     |
| 12.2.1                   | Terminals with screw clamping having cross-sectional areas as shown in Table 4   |                   | N/A     |
|                          | - for rigid copper conductors only, or   |                   | N/A     |
|                          | - for both rigid and flexible copper conductors (tests carried out with rigid and then repeated with flexible conductors)  |                   | N/A     |
|                          | Rated current (A) .....  |                   | --      |
|                          | Type of conductor (rigid / flexible) .....   |                   | --      |
|                          | Smallest / largest cross-sectional area (mm <sup>2</sup> ) .....   |                   | --      |
|                          | Diameter of largest conductor (mm) .....   |                   | --      |
|                          | Figure of terminal .....   | 1 / 2 / 3 / 4 / 5 | --      |
|                          | Minimum diameter D (minimum dimensions) of conductor space: required (mm); measured (mm) .....   |                   | N/A     |
| 12.2.2                   | Terminals allow the conductor to be connected without special preparation  |                   | N/A     |
| 12.2.3                   | Terminals with screw clamping have adequate mechanical strength  |                   | N/A     |



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|--------------------------|---|---------------------------|---------|
| Clause                   | Requirement + Test  | Result - Remark           | Verdict |
|                          | Screws and nut for clamping the conductors have metric ISO thread or a comparable thread  |                           | N/A     |
|                          | Screws not of soft metal such as zinc or aluminium  |                           | N/A     |
| 12.2.4                   | Terminals with screw clamping are resistant to corrosion  |                           | N/A     |
| 12.2.5                   | Terminals with screw clamping clamp the conductor (s) without undue damage to the conductor (s)   | See appended table 12.2.5 | N/A     |
|                          | For screws having a hexagonal head with slot for tightening, test shall be made twice, first the torque applying to the hexagonal head and then applying the torque by means of a screwdriver |                           | N/A     |
|                          | During the test: conductor not slip out, no break near clamping unit and no damage  |                           | N/A     |
| 12.2.6                   | Terminals with screw clamping clamp the conductor reliably between metal surfaces   |                           | N/A     |
|                          | During the test: conductor not move noticeably  |                           | N/A     |
| 12.2.7                   | Terminals with screw clamping are designed or placed that the conductor cannot slip out while the clamping screws or nuts are tightened   | See appended table 12.2.7 | N/A     |
|                          | After the test: no wire of the conductor escaped outside the clamping unit thus reducing creepage distances and clearances to values lower than those indicated in table 23                   |                           | N/A     |
| 12.2.8                   | Terminals not work loose from their fixing to the switch  |                           | N/A     |
|                          | Movement of the terminal is allowed as long as it is sufficiently limited so as to prevent noncompliance with this document   |                           | N/A     |
|                          | Use of sealing compound or resin is considered to be sufficient, provided that:   |                           | N/A     |
|                          | - the sealing compound or resin is not subject to stress during normal use, and   |                           | N/A     |
|                          | - the effectiveness of the sealing compound or resin is not impaired by temperatures attained by the terminal   |                           | N/A     |
|                          | Torque test:  |                           | N/A     |
|                          | - rated current (A).....:   |                           | N/A     |
|                          | - solid rigid copper conductor of the largest cross-section   |                           | N/A     |
|                          | - torque (Nm) (table 5 or appropriate figures 1, 2, 3, 4).....:   |                           | N/A     |
|                          | Screws and nuts tightened and loosened 5 times. During the test: terminals not work loose and show no damage  |                           | N/A     |



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|--------------------------|--|-----------------|---------|
| Clause                   | Requirement + Test   | Result - Remark | Verdict |
| 12.2.9                   | Clamping screws or nuts of earthing terminals: adequately locked against accidental loosening, not possible to loosen them without the aid of a tool                                     |                 | N/A     |
| 12.2.10                  | Earthing terminals: no risk of corrosion   |                 | N/A     |
|                          | Body of brass or other metal no less resistant to corrosion  |                 | N/A     |
|                          | If the body is a part of a frame or enclosure of aluminium alloy, precautions are taken to avoid the risk of corrosion   |                 | N/A     |
| 12.2.11                  | Pillar terminals: distance g no less than the value specified in figure 1: required (mm); measured (mm):   |                 | N/A     |
|                          | Mantle terminals: distance g no less than the value specified in figure 5: required (mm); measured (mm):   |                 | N/A     |
| 12.2.12                  | Lug terminals:   |                 | N/A     |
|                          | - used only for switches having rated current $\geq 40$ A  |                 | N/A     |
|                          | - fitted with spring washers or equally effective locking means  |                 | N/A     |
| <b>12.3</b>              | <b>Screwless terminals for external copper conductors</b>  |                 | P       |
| 12.3.1                   | Screwless terminals of the type suitable for:  |                 | P       |
|                          | - for rigid copper conductors only, or   |                 | P       |
|                          | - for both rigid and flexible copper conductors (tests carried out with rigid and then repeated with flexible conductors)  |                 | N/A     |
|                          | 12.3 is not applicable to switches provided with   |                 | N/A     |
|                          | - screwless terminals requiring the fixing of special devices to the conductors before clamping in the screwless terminal  |                 | N/A     |
|                          | - screwless terminals requiring twisting of the conductor  |                 | N/A     |
|                          | - screwless terminals providing direct contact to the conductors by means of edges or points penetrating the insulation  |                 | N/A     |
| 12.3.2                   | Screwless terminals provided with clamping units which allow the proper connection of rigid or of rigid and flexible conductors having nominal cross-sectional areas as shown in table 8 |                 | P       |
|                          | Rated current (A) .....  | 5               | --      |
|                          | Type of conductor (rigid / flexible) .....   | flexible        | --      |
|                          | Smallest / largest cross-sectional area (mm <sup>2</sup> ) .....   | 1.5             | --      |
|                          | Diameter of largest rigid conductor (mm).....  | 1.45            | --      |
|                          | Diameter of largest flexible conductor (mm) .....  | 1.73            | --      |
| 12.3.3                   | Screwless terminals allow the conductor to be connected without special preparation  |                 | N/A     |



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|--------------------------|---|----------------------------|---------|
| Clause                   | Requirement + Test  | Result - Remark            | Verdict |
| 12.3.4                   | Parts of screwless terminals intended for carrying current of materials as specified in 22.5  |                            | P       |
| 12.3.5                   | Screwless terminals clamp specified conductors with sufficient contact pressure without undue damage to the conductor   |                            | P       |
|                          | Conductor clamped between metal surfaces  |                            | N/A     |
| 12.3.6                   | It is clear how the connection and disconnection of the conductors is to be made  |                            | P       |
|                          | Disconnection of a conductor require an operation, other than a pull, so that can be made manually with or without a general-purpose tool   |                            | P       |
|                          | It is not possible to confuse the opening for the use of a tool with the opening intended for the conductor   |                            | P       |
| 12.3.7                   | Screwless terminals intended for the interconnection of two or more conductors:   |                            | P       |
|                          | - the clamping of one of the conductors is independent of the clamping of the other conductor (s)   |                            | P       |
|                          | - during the connection or disconnection the conductors can be connected or disconnected either at the same time or separately  |                            | P       |
|                          | - each conductor introduced in a separate clamping unit   |                            | N/A     |
|                          | It is possible clamp securely any number of conductors up to the maximum as designed. Number of conductors; Nominal cross-sectional area (mm <sup>2</sup> ) .....   |                            | N/A     |
| 12.3.8                   | Screwless terminals: adequate insertion obvious and over-insertion prevented  |                            | P       |
|                          | Screwless terminals of switches: undue insertion of the conductor prevented by a stop if further insertion is liable to reduce creepage distances and/or clearances required in table 23, or to influence the mechanism |                            | P       |
| 12.3.9                   | Screwless terminals properly fixed to the switch  |                            | P       |
|                          | Not work loose when conductors are connected or disconnected  |                            | P       |
|                          | Self-hardening resins used to fix terminals which are not subject to mechanical stress  |                            | P       |
| 12.3.10                  | Screwless terminals withstand mechanical stresses occurring in normal use   |                            | P       |
|                          | During application of the pull, conductor not come out of the terminal  |                            | P       |
|                          | Test with apparatus shown in figure 9   | See appended table 12.3.10 | P       |



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|--------------------------|--|-----------------|---------|
| Clause                   | Requirement + Test   | Result - Remark | Verdict |
|                          | During the test conductors not move noticeably in the clamping unit  |                 | P       |
|                          | After these tests: neither terminals nor clamping means have worked loose and conductors show no deterioration   |                 | P       |
| 12.3.11                  | Screwless terminals withstand electrical and thermal stresses occurring in normal use  |                 | P       |
|                          | After the test: inspection show no changes   |                 | P       |
|                          | Repetition of test according to 12.3.10: screwless terminals withstand mechanical stresses occurring in normal use   |                 | P       |
|                          | During application of the pull conductor not come out of the terminal  |                 | P       |
|                          | Test with apparatus shown in figure 10   |                 | P       |
|                          | - measured after 24 <sup>th</sup> and 192 <sup>th</sup> temperature cycle  |                 | P       |
|                          | - measured after any three of 48 <sup>th</sup> , 72 <sup>th</sup> , 96 <sup>th</sup> , 120 <sup>th</sup> , 144 <sup>th</sup> or 168 <sup>th</sup> temperature cycle              |                 | P       |
|                          | During the test conductors not move noticeably in the clamping unit  |                 | P       |
|                          | After these tests: neither terminals nor clamping means have worked loose and conductors show no deterioration   |                 | P       |
| 12.3.12                  | Screwless terminals: connected rigid solid conductor remains clamped, even when deflected during normal installation   |                 | P       |
| <b>13</b>                | <b>CONSTRUCTIONAL REQUIREMENTS</b>   |                 | P       |
| <b>13.1</b>              | <b>Mechanical requirements for insulating means</b>  |                 | P       |
|                          | Insulating lining, barriers and like: adequate mechanical strength and secured in a reliable manner  |                 | P       |
| <b>13.2</b>              | <b>Installation requirements</b>   |                 | P       |
|                          | Switches constructed so as to permit:  |                 | P       |
|                          | - easy introduction into the terminal and reliable connection of the conductors in the terminals, except for lead wires of pilot lights  |                 | 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 main part and the surface on which the main part is mounted or between the sides of the main part and the enclosure (cover or box) |                 | P       |
|                          | Surface-type switches: fixing means do not damage insulation of the cable  |                 | N/A     |



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|--------------------------|--|----------------------|---------|
| Clause                   | Requirement + Test   | Result - Remark      | Verdict |
|                          | Switches comprising screwless terminals: connecting and/or disconnecting means of the screwless terminals cannot be activated by the conductors during and after installation of the switch in a box or on a wall                                  |                      | P       |
|                          | Compliance is checked by inspection and in case of doubt by the following test   |                      | N/A     |
|                          | The test is carried out with a solid copper conductor having the smallest cross-sectional area, as specified in 12.3.2 (mm <sup>2</sup> ) .....  |                      | N/A     |
|                          | If it is not possible to exert a force onto the connecting / disconnecting means, the product is deemed to comply with the requirements of this sub clause without further tests   |                      | N/A     |
|                          | During the application of the pull, the conductor do not come out of the screwless terminal  |                      | N/A     |
|                          | Switches classified as design A: permit easy positioning and removal of the cover or cover plate, without displacing the conductors or activating the connecting and/or disconnecting means of screwless terminals                                 |                      | P       |
| <b>13.3</b>              | <b>Fixing of covers, cover plates and actuating members</b>  |                      | P       |
| 13.3.1                   | Covers, cover-plates and actuating members or parts of them intended to ensure protection against electric shock:  |                      | P       |
|                          | - held in place at two or more points by effective fixings   |                      | P       |
|                          | - fixed by means of a single fixing, e.g. by a screw, provided that they are located by another means (e.g. by a shoulder)   |                      | N/A     |
|                          | Where the fixing of covers, cover plates or actuating members of switches of design A serves to fix the main part there shall be means to maintain the main part in position, even after removal of the covers, cover plates or actuating members. |                      | P       |
| 13.3.2                   | Covers, cover plates or actuating members whose fixing is of the screw-type:   |                      | N/A     |
|                          | Compliance checked by inspection only  |                      | N/A     |
| 13.3.3                   | 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 (see table 12):                |                      | N/A     |
|                          | - when their removal may give access, with the test probe B of IEC 61032, to live parts:   | by the tests of 20.5 | N/A     |
|                          | - when their removal may give access, with the test probe B of IEC 61032, to non-earthed metal parts separated from live parts in such a way that creepage distances and clearances have the values at least equal to those shown in table 23:     | by the tests of 20.6 | N/A     |



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|--------------------------|---|----------------------|---------|
| Clause                   | Requirement + Test  | Result - Remark      | Verdict |
|                          | - when their removal may give access, with the test probe B of IEC 61032, only to   | by the tests of 20.7 | N/A     |
|                          | - insulating parts, or  |                      | N/A     |
|                          | - earthed metal parts, or   |                      | N/A     |
|                          | - metal parts separated from live parts in such a way that creepage distances and clearances have at least twice the values shown in table 23, or   |                      | N/A     |
|                          | - live parts of SELV circuits not greater than 25 V AC and 60 V DC:   |                      | N/A     |
| 13.3.4                   | 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/A     |
|                          | By the same tests of 13.3.3 except that the covers, cover plates, actuating members or parts of them need not come out when applying a force not exceeding 120 N in directions perpendicular to the mounting / supporting surface |                      | N/A     |
| <b>13.4</b>              | <b>Openings in normal use</b>   |                      | N/A     |
|                          | Switches: no free openings in their enclosures according to their IP classification   |                      | P       |
|                          | Free openings according to 10.102 and 10.103 are accepted.  |                      | N/A     |
| <b>(13.5)</b>            | Knobs of electronic switches are securely fixed in a reliable manner  |                      | N/A     |
|                          | knobs used to indicate the position of switches: not possible to fix them in a wrong position, if this may result in a hazard   |                      | N/A     |
|                          | Pull and push tests:  |                      | N/A     |
|                          | Where it is possible to apply an axial pull in normal use, an axial pull shall be applied for 1 min to try to pull off the knob:  |                      | N/A     |
|                          | - The pull force to be applied is normally 15 N   |                      | N/A     |
|                          | - if the knob is intended to be pulled in normal use this is increased to 30 N.   |                      | N/A     |
|                          | - An axial push of 30 N for 1 min is then applied to all knobs.   |                      | N/A     |
|                          | During and after these tests:   |                      | N/A     |
|                          | - the electronic switch shows no damage   |                      | N/A     |
|                          | - an knob have not moved so as to impair compliance with this standard  |                      | N/A     |
| <b>13.6</b>              | <b>Mounting means</b>   |                      | P       |



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|--------------------------|---|------------------------|---------|
| Clause                   | Requirement + Test  | Result - Remark        | Verdict |
|                          | Screws or other means for mounting the switch on a surface or in a box or enclosure: easily accessible from the front                                       |                        | P       |
|                          | Fixing means not serve any other fixing purpose   |                        | P       |
| <b>13.7</b>              | <b>Combination of switches</b>  |                        | N/A     |
|                          | Combinations of switches, or of switches and socket-outlets, comprising separate bases: correct position of each main part is ensured                       |                        | N/A     |
|                          | Fixing of each main part be independent of the fixing of the combination to the mounting surface  |                        | N/A     |
| <b>13.8</b>              | <b>Accessories combined with switches</b>   |                        | N/A     |
|                          | Accessories combined with switches: comply with their standard  |                        | N/A     |
| <b>13.9</b>              | <b>Surface-type switches having an IP code higher than IP20</b>   |                        | N/A     |
|                          | Surface-type switches with IP > 20 are in according to their classification when fitted with conduits or with sheathed cables                               |                        | N/A     |
|                          | Surface-type switches with IPX4, IPX5 and IPX6 have provisions for opening a drain hole   |                        | N/A     |
|                          | Switches provided with a drain hole: it is not less than 5 mm in diameter, or 20 mm <sup>2</sup> in area with a width and a length not less than 3 mm ..... | ∅ mm / mm <sup>2</sup> | N/A     |
|                          | Drain hole: effective   |                        | N/A     |
|                          | Lid springs (if any): of corrosion resistant material (bronze or stainless steel)   |                        | N/A     |
| <b>13.10</b>             | <b>Installation in a box</b>  |                        | P       |
|                          | Switches to be installed in a box: conductor ends can be prepared after the box is mounted in position, but before the switch is fitted in the box          |                        | P       |
|                          | Main part has adequate stability when mounted in the box  |                        | P       |
| <b>13.11</b>             | <b>Connection of a second current-carrying conductor</b>  |                        | N/A     |
|                          | Surface-type switches with IP > IPX0, pattern numbers 1, 5 and 6, with more than one inlet opening, provided with:  |                        | N/A     |
|                          | - fixed additional terminal complying with the requirements of clause 12, or  |                        | N/A     |
|                          | - adequate space for a floating terminal  |                        | N/A     |
| <b>13.12</b>             | <b>Inlet openings</b>   |                        | N/A     |
|                          | Inlet openings: allow the introduction of the conduit or the sheath of the cable  |                        | N/A     |
|                          | Surface-type switches: intended conduit or the sheath of the cable can enter at least 1 mm into the enclosure   |                        | N/A     |



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|--------------------------|--|-----------------|---------|
| Clause                   | Requirement + Test   | Result - Remark | Verdict |
|                          | Inlet openings for conduit entries of surface-type switches: capable of accepting conduit sizes of 16, 20, 25 or 32 or a combination of at least two of these sizes not excluding two of the same size.....:   |                 | N/A     |
|                          | Inlet openings for cable entries of surface-type switches: capable of accepting cables having the dimensions specified in table 13 or be as specified by the manufacturer: rated current (A); limits of external diameter of cables min/max (mm) ..... |                 | N/A     |
| <b>13.13</b>             | <b>Provision for back entry from a conduit</b>   |                 | N/A     |
|                          | Surface-type switches: provision for back entry (if are intended)  |                 | N/A     |
| <b>13.14</b>             | <b>Switch provided with membranes or the like for inlet openings</b>   |                 | N/A     |
|                          | Switch is provided with membranes or the like for inlet openings: replaceable  |                 | N/A     |
| <b>13.15</b>             | <b>Requirements for membranes in inlet openings</b>  |                 | N/A     |
| (13.15.1)                | Membranes, lenses and the like reliably fixed and not displaced by the mechanical and thermal stresses occurring in normal use   |                 | N/A     |
|                          | Test on electronic switches fitted with membranes, lenses and the like subjected to the ageing treatment specified in 15.1:  |                 | N/A     |
|                          | Electronic switches placed at 40 °C ± 2 °C for 2 h; force of 30 N applied for 5 s by means of the tip of test probe 11 of IEC 61032. During these tests: membranes, lenses and the like are not deformed, live parts not accessible                    |                 | N/A     |
|                          | Membranes, lenses and the like likely to be subjected to an axial pull:<br>- axial pull of 30 N applied for 5 s.<br>During this test:<br>membranes, lenses and the like not come out   |                 | N/A     |
|                          | Test repeated on membranes, lenses and the like not subjected to any treatment   |                 | N/A     |
| 13.15.2                  | Membranes be so designed and made of such material that:<br>Introduction of the cables into the switch is permitted when the ambient temperature is low.   |                 | N/A     |
|                          | Test on membranes not subjected to the ageing treatment, those without opening being suitably pierced:   |                 | N/A     |
|                          | Switches kept at a temperature of (-15 ± 2) °C for 2 h: possibility to introduce cables of the heaviest type through the membranes   |                 | N/A     |
|                          | After the test: no harmful deformation, cracks or similar damage   |                 | N/A     |
| <b>13.16</b>             | <b>Pilot light units</b>   |                 | N/A     |



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|--------------------------|---|---------------------------------|---------|
| Clause                   | Requirement + Test  | Result - Remark                 | Verdict |
|                          | Pilot light units comply with IEC 60669-2-1:2002, IEC 60669-2-1:2002/AMD1:2008 and IEC 60669-2-1:2002/AMD2:2015, 101.1.1.1 and Clause 102, as far as applicable   |                                 | N/A     |
| <b>(13.101)</b>          | Cut-outs in electronic switches for motor speed control circuits: non-self-resetting  |                                 | N/A     |
| <b>(13.102)</b>          | Electronic switches for the control of the voltage of iron core transformers for extra low-voltage incandescent lamps (for example, halogen): maximum tolerance of the phase-control angle between the positive and negative half-wave of $\pm 2^\circ$ : |                                 | N/A     |
| <b>(13.103)</b>          | TDS shall be of the resetting type  |                                 | N/A     |
| <b>14</b>                | <b>MECHANISM</b>  |                                 | P       |
|                          | Clause only applicable to electronic switches provided with mechanical switching devices  |                                 | P       |
| <b>14.1</b>              | <b>Indication of the position</b>   |                                 | P       |
|                          | Actuating member of a switch, when released, automatically take up the position corresponding to that of moving contacts  |                                 | P       |
| <b>14.2</b>              | <b>Rest and intermediate position</b>   |                                 | P       |
|                          | Moving contact of switches can come to rest only in "on" and "off" positions  |                                 | P       |
|                          | Intermediate position permissible if:   |                                 | N/A     |
|                          | - it corresponds to the intermediate position of the actuating member, and  |                                 | N/A     |
|                          | - the insulation between fixed and moving contacts is adequate. Electric strength test as specified in 16.3: test voltage a.c. for 1 min (V) .....  | 500 V / 750 V / 1250 V / 2000 V | N/A     |
| <b>14.3</b>              | <b>Undue arcing</b>   |                                 | N/A     |
|                          | No undue arcing in slowly operation   |                                 | N/A     |
|                          | Test carried out at the end of the test of clause 19.1: breaking of the circuit 10 times, actuating member moved over a period of 2 s. During the test: no sustained arcing   |                                 | N/A     |
| <b>14.4</b>              | <b>Making and breaking</b>  |                                 | N/A     |
|                          | Switches of pattern numbers 2, 3, 03 and 6/2 make and break all poles substantially simultaneously  |                                 | N/A     |
|                          | Neutral pole of switches of pattern number 03 not make after or break before the other poles  |                                 | N/A     |
| <b>14.5</b>              | <b>Action of the mechanism without cover or cover plate</b>   |                                 | N/A     |
|                          | Action of the mechanism: independent of the presence of cover or cover plate. Test: no flicker  |                                 | N/A     |
| <b>14.6</b>              | <b>Cord-operated switches: effecting a change by application and removal of a steady pull not exceeding:</b>  |                                 | N/A     |



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|--------------------------|--|-----------------|---------|
| Clause                   | Requirement + Test   | Result - Remark | Verdict |
|                          | - 45 N applied vertically, and   |                 | N/A     |
|                          | - 65 N applied at 45° ± 5°   |                 | N/A     |
| <b>(14.101)</b>          | Position indicator used in RCS equipped with an incorporated hand-operated device indicates the position of the switching circuit clearly and without ambiguity  |                 | N/A     |
|                          | TDS equipped with an incorporated hand-operated device and a position indicator is used indicates the position of the switching circuit clearly and without ambiguity  |                 | N/A     |
| <b>15</b>                | <b>RESISTANCE TO AGEING, PROTECTION PROVIDED BY ENCLOSURES OF SWITCHES, AND RESISTANCE TO HUMIDITY</b>   |                 | P       |
| <b>15.1</b>              | <b>Resistance to ageing</b>  |                 | P       |
|                          | Switches are resistant to ageing   |                 | P       |
|                          | Parts intended for decorative purposes only, such as certain lids, are removed   |                 | P       |
|                          | Switches and boxes placed for 7 days (168 h) in a heating cabinet at 70 °C ± 2 °C  | 70 °C, 168 h    | P       |
|                          | - no crack visible after test with normal or corrected vision without additional magnification   |                 | P       |
|                          | - no sticky or greasy material as a result of heat   |                 | P       |
|                          | - no trace of cloth (forefinger pressed with 5 N)  |                 | P       |
|                          | - no damage  |                 | P       |
| <b>15.2</b>              | <b>Protection provided by enclosures of switches</b>   |                 | P       |
| 15.2.1                   | General  |                 | P       |
|                          | Enclosure of the switch provides protection against access to hazardous parts, against harmful effect due to ingress of solid foreign objects and against effects due to ingress of water in accordance with the IP classification of the switch | IP20            | P       |
| 15.2.2                   | Protection against access to hazardous parts and against harmful effects due to ingress of solid foreign objects   |                 | P       |
| 15.2.2.1                 | General  |                 | P       |
|                          | Glands: torque (Nm) (2/3 of torque applied in 20.4) :  |                 | --      |
|                          | Screws of the enclosure: torque (Nm) (2/3 table 5) .....   |                 | --      |
|                          | Parts which can be removed without the aid of a tool are removed   |                 | N/A     |
|                          | Glands are not filled with sealing compound or the like  |                 | N/A     |
| 15.2.2.2                 | Protection against access to hazardous parts   |                 | N/A     |
|                          | Appropriate test according to IEC 60529 .....  | IP20            | N/A     |



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|--------------------------|---|-----------------|---------|
| Clause                   | Requirement + Test  | Result - Remark | Verdict |
| 15.2.2.3                 | Protection against harmful effects due to ingress of solid foreign objects  |                 | N/A     |
|                          | Appropriate test according to IEC 60529 .....   | IP20            | P       |
|                          | For the test of the first characteristic numeral 5, enclosures of switches are considered to be of category 2 (see IEC 60529:1989 and IEC 60529:1989/AMD1:1999, 13.4); dust not penetrate in a quantity to interfere with satisfactory operation or impair safety |                 | N/A     |
|                          | For the test of the first characteristic numeral 6, enclosures of switches are considered to be of category 1 (see IEC 60529:1989, 13.6); no dust penetrate   |                 | N/A     |
| 15.2.3                   | Protection against harmful effects due to ingress of water  |                 | N/A     |
|                          | Enclosure of switches provide a degree of protection against harmful effects due to ingress of water in accordance with their IP classification   |                 | N/A     |
|                          | Appropriate test according to IEC 60529 .....   | IP20            | N/A     |
|                          | Flush-type and semi-flush-type switches fixed:  |                 | N/A     |
|                          | - in a test wall using an appropriate box in accordance with the manufacturer's instructions  |                 | N/A     |
|                          | - in a test wall according to figure 21   |                 | N/A     |
|                          | Screws of the enclosure: torque (Nm) (2/3 table 5) .....  |                 | --      |
|                          | Glands: torque (Nm) (2/3 of torque applied in table 22) .....   |                 | --      |
|                          | Specimens withstand an electric strength test specified in 16.3 which is started within 5 min of completion of the test to 15.2   |                 | N/A     |
| <b>15.3</b>              | <b>Resistance to humidity</b>   |                 | P       |
|                          | Switches proof against humidity which may occur in normal use   |                 | P       |
|                          | Compliance checked by a humidity treatment described in 15.3, carried out in a humidity cabinet containing air with relative humidity maintained between 91 % and 95 %. Specimens kept in the cabinet for:  |                 | P       |
|                          | - 2 days (48 h) for switches with IPX0  | 93 %, 48 h      | P       |
|                          | - 7 days (168 h) for switches with IP>X0  |                 | N/A     |
|                          | After this treatment: specimens show no damage  |                 | P       |
| <b>16</b>                | <b>INSULATION RESISTANCE AND ELECTRIC STRENGTH</b>  |                 | P       |
| <b>16.1 (16)</b>         | <b>General</b>  |                 | P       |
|                          | One pole of any pilot lights (if available), are disconnected for this test   |                 | P       |
|                          | Insulation resistance and electric strength of switches be adequate   |                 | P       |



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|--------------------------|--|-------------------------|---------|
| Clause                   | Requirement + Test   | Result - Remark         | Verdict |
|                          | Insulation resistance and electric strength are measured with the protective impedances according to 10.2 disconnected.  |                         | P       |
| <b>16.2 (16.1)</b>       | <b>Test for measuring the insulation resistance</b>  |                         | P       |
|                          | The insulation resistance measured 1 min after application of 500 V <sub>DC</sub>  | See appended table 16.2 | P       |
|                          | In addition, if electrically independent pattern numbers are combined in a common base, additional tests for each combination performed                                |                         | P       |
| <b>16.3 (16.2)</b>       | <b>Electric strength test</b>  |                         | P       |
|                          | Electric strength: AC test voltage applied for 1 min   | See appended table 16.2 | P       |
|                          | In addition, if electrically independent pattern numbers are combined in a common base, additional tests for each combination performed                                |                         | P       |
| <b>17</b>                | <b>TEMPERATURE RISE</b>  |                         | P       |
| <b>17.1</b>              | <b>General</b>   |                         | P       |
| <b>(17)</b>              | Switches so constructed that the temperature rise in normal use is not excessive   |                         | P       |
|                          | No oxidation or any other deterioration of contacts, if any  |                         | P       |
|                          | Material and components of electronic switch are not adversely effected by the temperature rise in normal use  |                         | P       |
|                          | The electronic switches are loaded until steady-state temperature is reached at a voltage between 0,9 and 1,1 times rated voltage, whichever is the more unfavourable. |                         | P       |
|                          | Dimmers operating with leading and trailing edge shall be tested in both modes with the relevant load.   |                         | P       |
|                          | In lamp dimmers and speed controllers, the setting is adjusted such that the highest temperature rise will occur.  |                         | P       |
|                          | For electronic TDS, Subclause 17.1 of IEC 60669-2-3 is applicable.   |                         | N/A     |
|                          | During the test:   |                         | P       |
|                          | - electronic switch state not change   |                         | P       |
|                          | -fuses and other protective devices not operate  |                         | P       |
|                          | - permissible temperature rises determined in table 102, column concerning clause 17, not exceeded   | See appended table 17   | P       |
|                          | After the test, electronic switch is in operating condition  |                         | P       |
|                          | Sealing compounds, if any, have not flowed   |                         | N/A     |
| <b>18</b>                | <b>MAKING AND BREAKING CAPACITY</b>  |                         | P       |



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|--------------------------|--|--|---------|
| Clause                   | Requirement + Test   | Result - Remark                                | Verdict |
| <b>18.1</b>              | <b>General</b>   |  | P       |
| <b>(18)</b>              | Electronic switches have adequate making and breaking capacity   |  | P       |
|                          | Test carried out only on electronic switches provided with mechanically or electromechanically operated contact mechanisms                                     |  | P       |
|                          | Contact mechanisms have adequate making and breaking capacity  |  | P       |
|                          | Test made on three new specimens of the complete contact mechanism   |  | P       |
|                          | Model/type reference .....   | ST701  | --      |
|                          | Pattern number .....   | 1  | --      |
|                          | Rated current (A) / Rated load (W or VA) .....   | Max incandescent load:1200W; Max LED load:300W | --      |
|                          | Rated voltage (V) .....  | 220-240VAC                                     | --      |
|                          | Test for electronics switches for the control of:  |  | P       |
|                          | - fluorescent lamp loads, as specified in 18.2 (18.1) of part 1;   |  | N/A     |
|                          | - motor speed control circuits, as specified in 18.2 (18.1) of part 1 and, additionally, in 18.101;  |  | N/A     |
|                          | - voltage of iron core transformers for extra low-voltage incandescent lamps, as specified in 18.2 (18.1), 18.3 (18.2) of part 1 and, additionally, in 18.102; |  | N/A     |
|                          | - voltage of electronic step-down converters for extra low-voltage incandescent lamps, as specified in 18.3 (18.2) of part 1;                                  |  | N/A     |
|                          | - other types of load, as specified in 18.2 (18.1) and 18.3 (18.2) of part 1.  |  | P       |
|                          | - self-ballasted lamps, as specified in 18.2 (18.1) of part 1.   |  | P       |
|                          | Rate of operation (operation per minute) .....   | 30 operations per minute                       | --      |
|                          | Electronic switches whose cycle of operation limited by their application: rate of operation specified by the manufacturer (operation per minute) .....        |  | --      |
|                          | Electronic switches fitted with conductors having nominal cross-sectional area as for the test of clause 17 (mm <sup>2</sup> ) .....                           | 1.5  | --      |
| <b>18.2 (18.1)</b>       | <b>Overload</b>  |  | P       |
|                          | Test with cos φ 0,3 alternating current  |  | --      |
|                          | - test voltage (1,1 V <sub>n</sub> ) (V) .....   | 264V   | --      |
|                          | - test current (1,25 I <sub>n</sub> ) (cos φ 0,3) (A) .....  | 6.25A  | --      |



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|---------------------------|---|--------------------------|---------|
| Clause                    | Requirement + Test  | Result - Remark          | Verdict |
|                           | - 200 operations; rate (operations per minute) .....  |                          | --      |
| <b>(18.1)</b>             | - electronic switches whose rate of operation is limited  | 30 operations per minute | --      |
|                           | - samples number .....  | 1#, 2#, 3#               | --      |
|                           | During the test: copper wire F not melt, specimens function correctly, no sustained arcing or welding of contacts   |                          | P       |
|                           | After the test: specimens show no damage  |                          | P       |
|                           | During the test: specimens are not lubricated   |                          | P       |
| <b>(18.1)</b>             | Test with $\cos \phi$ 0,3 alternating current for electronics TDS   |                          | N/A     |
|                           | - test voltage (1,1 Vn) (V) .....   |                          | --      |
|                           | - test current (1,25 In) ( $\cos \phi$ 0,3) (A) .....   |                          | --      |
|                           | - 200 operations; rate (operations per minute) .....  |                          | --      |
|                           | - electronic TDS whose rate of operation is limited by their application (for example, heat and light sensors): electronic TDS is set to the shortest cycle time possible and re-activated at the end of each cycle |                          | --      |
|                           | - samples number .....  |                          | --      |
|                           | During the test: no sustained arcing  |                          | N/A     |
|                           | After the test: specimens show no damage  |                          | N/A     |
| <b>18.3 (18.2)</b>        | <b>Overload test with filament lamps</b>  |                          | P       |
|                           | Test with a number of tungsten filament lamps or a number of halogen filament lamps (switches with $I_n \leq 16$ A / $V_n \leq 250$ V and switches of pattern numbers 3 and 03 with $V_n > 250$ V)                  |                          | P       |
|                           | - test voltage (Vn) (V) .....   | 264                      | --      |
|                           | - test current ( $\geq 1,2$ In) (A) .....   | 6                        | --      |
|                           | - number of 200 W tungsten filament lamps .....   | 8                        | --      |
|                           | - 200 operations; rate (operations per minute) .....  | 30 operations per minute | --      |
|                           | - samples number .....  | 3                        | --      |
|                           | During the test: copper wire F not melt, specimens function correctly, no sustained arcing or welding of contacts   |                          | P       |
|                           | After the test: specimens show no damage  |                          | P       |
| <b>(18.101)</b>           | Additional test for electronic switches for the control of motor speed control circuits:  |                          | N/A     |
|                           | Rated current In (A) of electronic switch ( $\cos \phi$ 0.6):   |                          | --      |
|                           | Making: 50 cycles with: test current: 9 In (A); test voltage: Vn (V); $\cos \phi$ 0.8 $\pm$ 0.05 .....  |                          | N/A     |
|                           | Breaking: 50 cycles with: test current: 6 In (A); test voltage: Vn (V); $\cos \phi$ 0.6 $\pm$ 0.05 .....  |                          | N/A     |
|                           | During the test: no sustained arcing  |                          | N/A     |
|                           | After the test: specimens show no damage  |                          | N/A     |



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|--------------------------|---|--------------------------|---------|
| Clause                   | Requirement + Test  | Result - Remark          | Verdict |
| <b>(18.102)</b>          | Additional test for electronic switches for the control of the voltage of iron core transformers for extra low-voltage incandescent lamps (for example, halogen):   |                          | --      |
|                          | - test voltage (Vn) (V) .....   |                          | --      |
|                          | - 50 making operations in a test circuit adjusted to a test current 10 times In (A) for one half-cycle of the power supply frequency .....  |                          | --      |
|                          | During the test: no sustained arcing  |                          | N/A     |
|                          | After the test: specimens show no damage  |                          | N/A     |
| <b>19 (19)</b>           | <b>NORMAL OPERATION</b>   |                          | P       |
|                          | Electronic switches withstand the mechanical, electrical and thermal stresses occurring in normal use   |                          | P       |
|                          | Electronic switches whose cycle of operation is limited by their application: rate of operation specified by the manufacturer (operation per minute) .....  | 30 operations per minute | --      |
|                          | For electronic switches with included automatic function the number of operations for tests of sub-clauses 19.101, 19.102, 19.104, and 19.109 is that specified in the relevant sub-clause.                   |                          | --      |
|                          | If a manufacturer declares a number of operation higher than those indicated in the relevant sub-clause, the tests shall be made according to declared value.   |                          | --      |
|                          | Sticking of the contacts, which does not prevent the next operation, is not considered as welding.  |                          | --      |
|                          | Sticking of the contacts is permitted if the contacts can be separated with a force applied to the actuator of a value which does not damage the switch mechanically  |                          | --      |
|                          | Electronic switches including electronic circuits which close the contact of the contact mechanism always at zero-crossing $\pm 20^\circ$ phase angle, shall be tested together with their electronic circuit |                          | --      |
|                          | Electronic RCS withstand without excessive wear or other harmful effect, the mechanical, electrical and thermal stresses occurring in normal use  |                          | N/A     |
|                          | - model/type reference .....  | ST701                    | --      |
|                          | - pattern number .....  | 1                        | --      |
|                          | - nominal cross-sectional area per clause 18 (mm <sup>2</sup> ) .....   | 1.5                      | --      |
|                          | - test voltage (Vn) (V) .....   | 240V                     | --      |
|                          | - test current (In) (cos $\phi$ 0,6) (A) .....  | 5A                       | --      |



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|--------------------------|---|--------------------------|---------|
| Clause                   | Requirement + Test  | Result - Remark          | Verdict |
|                          | - number of operations per table 17 .....   | 40000                    | --      |
|                          | - rate (operations per minute) .....  | 30 operations per minute | --      |
|                          | - samples number .....  | 3                        | --      |
|                          | Reduced electric strength per clause 16   | See appended table 19.1  | P       |
|                          | Temperature rise test per clause 17 after normal operation  | See appended table 19.1  | P       |
|                          | After the tests the specimens not show:   |                          | P       |
|                          | - wear impairing their further use;   |                          | P       |
|                          | - discrepancy between the position of the actuating member (if indicated) and that of the moving contacts   |                          | N/A     |
|                          | - deterioration of enclosures, insulating lining or barriers;   |                          | P       |
|                          | - seepage of sealing compound   |                          | N/A     |
|                          | - loosening of electrical or mechanical connections;  |                          | P       |
|                          | - displacement of moving contacts of switches pattern number 2, 3, 03 or 6/2  |                          | N/A     |
|                          | No sustained arcing in slowly operation (sub-clause 14.3)   |                          | N/A     |
|                          | RCS equipped with an incorporated hand-operated device acting directly on the switching circuit:  |                          | N/A     |
|                          | - 10 % of operations indicated in table 17 made by h  |                          | N/A     |
|                          | - no sustained arcing in slowly operation (sub-clause   |                          | N/A     |
|                          | - control circuit supplied as specified in clause 18 fo   |                          | N/A     |
|                          | During normal operation test: failures allowed within 1 %; no more than three consecutive failures allowed  |                          | N/A     |
|                          | Electronics TDS withstand without excessive wear or other harmful effect, the mechanical, electrical and thermal stresses occurring in normal use |                          | N/A     |
|                          | - model/type reference .....  |                          | --      |
|                          | - pattern number .....  |                          | --      |
|                          | - nominal cross-sectional area per clause 18 (mm <sup>2</sup> ) .....   |                          | --      |
|                          | - test voltage (Vn) (V) .....   |                          | --      |
|                          | - test voltage applied to control circuit (rated control voltage) (V) .....   |                          | --      |
|                          | - test current (In) (cos φ 0,6) (A) .....   |                          | --      |
|                          | - adjustable TDS: adjusted delay time (s) .....   |                          | --      |
|                          | - adjusted switching time interval between off and on   |                          | --      |



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|--------------------------|---|------------------------------|---------|
| Clause                   | Requirement + Test  | Result - Remark              | Verdict |
|                          | - number of operations indicated in table 17 (maximum)  | 40000 / 20000 / 10000 / 5000 | N/A     |
|                          | TDS equipped with an incorporated hand-operated device acting directly on the switching circuit:  |                              | N/A     |
|                          | - 10 % of operations indicated in table 17 made by hand   |                              | N/A     |
|                          | - no sustained arcing in slowly operation (sub-clause 14.3)   |                              | N/A     |
|                          | During normal operation test: failures allowed within 1 %; no more than three consecutive failures allowed  |                              | N/A     |
|                          | - samples number .....  |                              | --      |
|                          | Reduced electric strength per clause 16   | See appended table 19.1      | N/A     |
|                          | Temperature rise test per clause 17 after normal operation  | See appended table 19.1      | N/A     |
|                          | After the tests the specimens not show:   |                              | N/A     |
|                          | - wear impairing their further use;   |                              | N/A     |
|                          | - discrepancy between the position of the actuating member (if indicated) and that of the moving contacts   |                              | N/A     |
|                          | - deterioration of enclosures, insulating lining or barriers;   |                              | N/A     |
|                          | - seepage of sealing compound   |                              | N/A     |
|                          | - loosening of electrical or mechanical connections;  |                              | N/A     |
|                          | - displacement of moving contacts of switches pattern number 2, 3, 03 or 6/2  |                              | N/A     |
|                          | No sustained arcing in slowly operation (sub-clause 14.3)   |                              | N/A     |
| <b>(19.101)</b>          | Contact mechanisms intended for incandescent lamp circuits with or without step down converters and dimmers for step-down converter; number of operations 40.000: |                              | P       |
|                          | Rate of operation (operation per minute) .....  | 30 operations per minute     | --      |
|                          | Rated current (A) / Rated load (W or VA) .....  | 5A                           | --      |
|                          | Rated voltage (V) .....   | 240V                         | --      |
|                          | During the test: specimens function correctly   |                              | P       |
|                          | No sustained arcing in slowly operation (sub-clause 14.3)   |                              | P       |
|                          | Contact mechanism intended for motor speed control circuits; number of operations 40000:  |                              | N/A     |
|                          | Making: test current: 6 I <sub>n</sub> (A); test voltage: V <sub>n</sub> (V); cosφ 0.65 ± 0.05 .....  |                              | N/A     |
|                          | Breaking: test current I <sub>n</sub> (A); test voltage V <sub>n</sub> (V); cosφ 0.65 ± 0.05 .....  |                              | N/A     |
|                          | During the test: specimens function correctly   |                              | N/A     |



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|--------------------------|--|----------------------------|---------|
| Clause                   | Requirement + Test   | Result - Remark            | Verdict |
| <b>19.102</b>            | Contact mechanisms incorporated in electronic switches, intended for externally ballasted lamps (e.g. fluorescent lamps, CFL, LED) are checked by the test circuit indicated in Figure 103 Load A. |                            | N/A     |
|                          | - rate of operation (operation per minute) .....   | 30 operations per minute   | --      |
|                          | - test voltage (Vn); test current (In) (cos φ 0,9); num  |                            | --      |
|                          | Rated voltage (V) .....  | 100 operations with load B | --      |
|                          | During the test: copper wire F not melt, specimens function correctly, no sustained arcing or welding of contacts  |                            | N/A     |
| <b>19.103</b>            | Semiconductor switching devices and/or electronic regulating units incorporated in electronic switches:  |                            | N/A     |
|                          | Rated current (A) / Rated load (W or VA) .....   |                            | --      |
|                          | Rated voltage (V) .....  |                            | --      |
|                          | Test voltage: 1.1 Vn (V) .....   |                            | --      |
|                          | Switch state changed 10 times by means of the sensing surface or unit, or/and  |                            | N/A     |
|                          | Setting value altered 10 times from min to max and back to min by means of the sensing surface or unit   |                            | N/A     |
|                          | Additional test, where appropriate:  |                            | N/A     |
|                          | Switch state changed 10 times by means of an electronic extension unit, and/or   |                            | N/A     |
|                          | Setting value altered 10 times from min to max and back to min by means of an electronic extension unit  |                            | N/A     |
|                          | During the test: specimens operate correctly   |                            | N/A     |
| <b>19.104</b>            | Mechanical control units incorporate in electronic switches:   |                            | --      |
|                          | Type of mechanical control unit .....  |                            | --      |
|                          | Rated current (A) / Rated load (W or VA) .....   |                            | --      |
|                          | Rated voltage (V) .....  |                            | --      |
|                          | Test voltage: 1.1 Vn (V) .....   |                            | --      |
|                          | Setting altered 10000 times from min to max and back to min by means of its control unit; rate of operation between 10 and 15 operations per minute .....  |                            | --      |
|                          | During the test: specimens function correctly  |                            | N/A     |
| <b>19.105</b>            | Electronic switches for which a minimum load or current is specified by the manufacturer:  |                            | N/A     |
|                          | Test current: rated minimum current (A) / rated minimum load (W or VA) .....   |                            | --      |
|                          | Test voltage: 0,9 Vn (V) .....   |                            | --      |



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|--------------------------|---|-----------------------|---------|
| Clause                   | Requirement + Test  | Result - Remark       | Verdict |
|                          | Switch state changed 10 times over the whole range from min to max and back to min, and/or  |                       | N/A     |
|                          | Setting value altered 10 times over the whole range from min to max and back to min   |                       | N/A     |
|                          | Additional test, where appropriate:   |                       | N/A     |
|                          | Switch state changed 10 times over the whole range from min to max and back to min by means of an electronic extension unit, and/or |                       | N/A     |
|                          | Setting value altered 10 times over the whole range from min to max and back to min by means of an electronic extension unit        |                       | N/A     |
|                          | During the test: electronic switch functions correctly  |                       | N/A     |
|                          | Reduced electric strength per clause 16   | See appended table 19 | N/A     |
|                          | Temperature rise test after normal operation per clause 17:   |                       | N/A     |
|                          | - electronic switch state not change  |                       | N/A     |
|                          | - fuses and other protective devices not operate  |                       | N/A     |
|                          | - permissible temperature rises determined in table 102, column concerning clause 17, not exceeded                                  | See appended table 19 | N/A     |
|                          | After the test, electronic switch is in operating condition   |                       | N/A     |
|                          | Sealing compounds, if any, have not flowed  |                       | N/A     |
|                          | Evaluation of compliance after the normal operation: after the tests the specimens shall not show:                                  |                       | N/A     |
|                          | - wear impairing their further use;   |                       | N/A     |
|                          | - discrepancy between the position of the actuating member (if indicated) and that of the moving contacts;                          |                       | N/A     |
|                          | - deterioration of enclosures, insulating lining or barriers;   |                       | N/A     |
|                          | - loosening of electrical or mechanical connections;  |                       | N/A     |
|                          | - seepage of sealing compound;  |                       | N/A     |
|                          | - displacement of the moving contacts of electronic switches of pattern number 2  |                       | N/A     |
| <b>19.106</b>            | Test for electronic RCS energized by impulses (under no-load conditions):   |                       | N/A     |
|                          | RCS operate as intended at a control voltage between 0,9 and 1,1 times the rated value  |                       | N/A     |
|                          | Electronic TDS operate as intended at the control voltage between 0,9 and 1,1 times the rated value                                 |                       | N/A     |
|                          | Test (under no-load conditions):  |                       | N/A     |
|                          | - rated control voltage (V) .....   |                       | --      |



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|--------------------------|---|-----------------|---------|
| Clause                   | Requirement + Test  | Result - Remark | Verdict |
|                          | - 20 operations with a control voltage of 0,9 times the   |                 | --      |
|                          | - 20 operations with a control voltage of 1,1 times the   |                 | --      |
|                          | TDS operated as intended (differences in delay time permitted according to 19.102)  |                 | P       |
| <b>19.107</b>            | Electronic TDS have an adequate repetitive accuracy of delay time   |                 | N/A     |
|                          | Test (under no-load conditions):  |                 | N/A     |
|                          | - rated control voltage (applied ten times) (V) .....   |                 | --      |
|                          | - adjustable TDS: delay time set 2,5 min approximat   |                 | --      |
|                          | Mean value of delay times measured (s) .....  | - s             | --      |
|                          | Maximum / minimum values of delay time measured (s) .....   | - s / - s       | --      |
|                          | Maximum / minimum values of delay time do not deviate by more than 15 % from the mean value ....  | - % / - %       | --      |
| <b>19.108</b>            | Electronic TDS revert to the full delay time when the operating means is actuated during the delay time period  |                 | N/A     |
|                          | Adjustable TDS: three specimens initiated at rated control voltage and after 1 min initiated again at rated control voltage:  |                 | N/A     |
|                          | - rated control voltage (V) .....   |                 | --      |
|                          | - delay time adjusted between 2 min and 3 min (s) .   |                 | --      |
|                          | Total delay time resulting for each specimens is between 3 min and 4 min (min) .....  |                 | N/A     |
|                          | Non-adjustable TDS: three specimens initiated at rated control voltage and after 1 min initiated again at rated control voltage:  |                 | N/A     |
|                          | - rated control voltage (V) .....   |                 | --      |
|                          | - delay time (declared by the manufacturer) (min) :   |                 | --      |
|                          | Total delay time is the delay time (declared by the manufacturer) $\pm 5\%$ plus 1 min (min) .....  |                 | N/A     |
|                          | Non-adjustable TDS when the delay time is less than 1 min: three specimens initiated at rated control voltage and after half the delay time declared by the manufacturer initiated again at rated control voltage:                              |                 | N/A     |
|                          | - rated control voltage (V) .....   |                 | --      |
|                          | - delay time (declared by the manufacturer) (min) :   |                 | --      |
|                          | Total delay time is 1,5 times the delay time (declared by the manufacturer) $\pm 5\%$ (min) .....   |                 | N/A     |
| <b>19.109</b>            | Contact mechanisms incorporated in electronic switches, intended for self-ballasted lamps (e.g. fluorescent lamps, CFL, LED) are tested as 19.102 except for the requirements related to the power supply which are given for information only. |                 | N/A     |



| EN 60669-1& EN 60669-2-1 |  |                          |         |
|--------------------------|--|--------------------------|---------|
| Clause                   | Requirement + Test   | Result - Remark          | Verdict |
|                          | Compliance is checked by connecting the load B as given in figure 103 via the electronic switch under test to a power supply.  |                          | --      |
|                          | Rated Power (W) .....  |                          | --      |
|                          | Rated voltage (V) .....  |                          | --      |
|                          | The values for the maximum peak value and the maximum I <sub>2t</sub> of the inrush current are given in Table 108 when the switching contact closes at (90± 5) <sup>o</sup> phase-angle |                          | --      |
|                          | Maximum peak of the inrush current I <sub>peak</sub> (A) .....   |                          | --      |
|                          | Maximum I <sup>2</sup> t of the inrush current (A <sup>2</sup> s).....   |                          | --      |
|                          | - rate of operation (operation per minute) .....   |                          | --      |
|                          | During the test: copper wire F not melt, specimens function correctly, no sustained arcing or welding of contacts  |                          | N/A     |
| <b>20</b>                | <b>MECHANICAL STRENGTH</b>   |                          | P       |
| <b>20.1</b>              | <b>General</b>   |                          | P       |
|                          | Accessories, surface mounting boxes, screwed glands and shrouds have adequate mechanical strength so as to withstand the stresses imposed during installation and use                    |                          | P       |
| <b>20.2</b>              | <b>Pendulum hammer test</b>  |                          | P       |
|                          | For all types of switches and for boxes: impact test (9 blows)   | See appended table 20.1  | P       |
|                          | After the test: no damage, live parts no become accessible   |                          | P       |
| <b>20.3</b>              | <b>Test on the main parts of surface-type switches</b>   |                          | N/A     |
|                          | Main parts of surface-type switches are first fixed to a cylinder of rigid steel sheet of radius equal to 4,5 times the distance between fixing holes (mm)....                           |                          | N/A     |
|                          | Main parts are then fixed in a similar manner to a flat steel sheet  |                          | N/A     |
|                          | Torque applied to fixing screws (Nm) .....   | 0,5 Nm / 1,2 Nm          | --      |
|                          | During and after the test: main parts show no damage   |                          | N/A     |
| <b>20.4</b>              | <b>Screwed glands</b>  |                          | N/A     |
|                          | Screwed glands of switches with that have IP code higher than IP20: torque test  |                          | N/A     |
|                          | - diameter of cylindrical metal test rod (mm) .....  |                          | --      |
|                          | - type of material.....  | metal / moulded material | --      |
|                          | - torque for 1 min (table 22) (Nm).....  |                          | --      |
|                          | After the test: no damage of glands and enclosure of the specimens   |                          | N/A     |
| <b>20.5</b>              | <b>Covers, cover plates or actuating members – accessibility to live parts</b>   |                          | P       |



| EN 60669-1& EN 60669-2-1 |  |                 |         |
|--------------------------|--|-----------------|---------|
| Clause                   | Requirement + Test   | Result - Remark | Verdict |
| 20.5.1                   | General  |                 | P       |
|                          | Force necessary for covers, cover-plates or actuating members to come off or not to come off (accessibility with the test finger to live parts)  |                 | P       |
| 20.5.2                   | Verification of the non-removal of covers, cover-plates or actuating member  |                 | P       |
|                          | Force applied for 1 min in direction perpendicular to the mounting surface .....: 40 N   |                 | --      |
|                          | Covers, cover-plates or actuating members not come off   |                 | P       |
|                          | Test repeated on new specimens with a sheet of hard material, 1 mm ± 0,1 mm thick, fitted around the supporting frame (fig. 13)  |                 | P       |
|                          | Covers, cover-plates or actuating members not come off   |                 | P       |
|                          | After the test: no damage  |                 | P       |
| 20.5.3                   | Verification of the removal of covers, cover plates or actuating members   |                 | P       |
|                          | Force not exceeding 120 N applied 10 times in direction perpendicular to the mounting / supporting surface: covers, cover-plates or actuating members come off   |                 | P       |
|                          | Test repeated on new specimens with a sheet of hard material, 1 mm ± 0,1 mm thick, fitted around the supporting frame (fig. 13)  |                 | P       |
|                          | Covers, cover-plates or actuating members come off   |                 | P       |
|                          | After the test: no damage  |                 | P       |
| 20.6                     | <b>Covers, cover plates or actuating members – accessibility to non-earthed metal parts separated from live parts</b>  |                 | N/A     |
|                          | Test is made as described in 20.5, but applying, for 20.5.2, the following forces:   | 10 N / 20 N     | --      |
| 20.7                     | <b>Covers, cover plates or actuating members – accessibility to insulating parts, earthed metal parts, the live parts of SELV ≤ 25 V AC or metal parts separated from live parts</b>   |                 | N/A     |
|                          | Test is made as described in 20.5, but applying, for 20.5.2, the force of 10 N for all covers, cover plates, or actuating members  |                 | N/A     |
| 20.8                     | <b>Covers, cover plates or actuating members – application of gauges</b>   |                 |         |
|                          | Test with gauge of figure 14 applied according to figure 15 for verification of the outline of covers, cover-plates or actuating members: distances between face C of gauge and outline of side under test, not decrease.....: complying / not complying |                 |         |
| 20.9                     | <b>Grooves, holes and reverse tapers</b>   |                 |         |



| EN 60669-1& EN 60669-2-1 |   |                          |         |
|--------------------------|---|--------------------------|---------|
| Clause                   | Requirement + Test  | Result - Remark          | Verdict |
|                          | Test with gauge according to figure 17 applied as shown in figure 18 (1 N): gauge not enter more than 1 mm.....   | complying /not complying |         |
| <b>20.10</b>             | <b>Additional test for cord-operated switch</b>   |                          | N/A     |
|                          | Operating members of cord-operated switch have adequate strength  |                          | N/A     |
|                          | Pull test: pull 100 N for 1 min (normal use); pull of 50 N for 1 min (unfavourable direction). After the test:  |                          | N/A     |
|                          | - switch show no damage   |                          | N/A     |
|                          | - operating member not broken and cord-operated switch still operate  |                          | N/A     |
| <b>21</b>                | <b>RESISTANCE TO HEAT</b>   |                          | P       |
| <b>21.1</b>              | <b>General</b>  |                          | P       |
|                          | Switches and boxes are sufficiently resistant to heat   |                          | P       |
|                          | Decorative parts are not subjected to the test  |                          | P       |
| <b>21.2</b>              | <b>Basic heating test</b>   |                          | P       |
|                          | Switches kept for 1 h in a heating cabinet at a temperature of 100 °C ± 2 °C  |                          | P       |
|                          | During the test: no change impairing their further use and sealing compound, if any, not flow   |                          | P       |
|                          | After the test: no access to live parts, markings still legible   |                          | P       |
| <b>21.3</b>              | <b>Ball-pressure test on parts of insulating material necessary to retain current-carrying parts and parts of the earthing circuit in position</b>                                    |                          | P       |
|                          | Parts of insulating material necessary to retain current-carrying parts and parts of the earthing circuit in position: ball-pressure test (1 h, 125 °C)                               | See appended table 21.2  | P       |
| <b>21.4</b>              | <b>Ball-pressure test on parts of insulating material not necessary to retain current-carrying parts and parts of the earthing circuit in position</b>                                |                          | P       |
|                          | Parts of insulating material not necessary to retain current-carrying parts and parts of the earthing circuit in position, even though in contact with them: ball-pressure test (1 h) | See appended table 21.3  | P       |
| <b>22</b>                | <b>SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS</b>   |                          | P       |
| <b>22.1</b>              | <b>General</b>  |                          | P       |
|                          | Connections withstand mechanical stresses   |                          | P       |
|                          | Thread-forming or thread-cutting screws used only if supplied together with the piece in which they are intended to be inserted   |                          | N/A     |
|                          | Thread-cutting screws intended to be used during installation are captive with the relevant part of the accessory   |                          | N/A     |



| EN 60669-1& EN 60669-2-1 |  |                         |         |
|--------------------------|--|-------------------------|---------|
| Clause                   | Requirement + Test   | Result - Remark         | Verdict |
|                          | Screws and nuts which transmit contact pressure are of metal and are in engagement with a metal thread   |                         | P       |
|                          | Threaded part torque test  | See appended table 22.1 | P       |
| <b>22.2</b>              | <b>Correct insertion of screws</b>   |                         | P       |
|                          | Screws in engagement with a thread of insulating material: correct introduction into the screw hole or nut ensured   |                         | P       |
| <b>22.3</b>              | <b>Contact pressure of electrical connections</b>  |                         | P       |
|                          | Contact pressure: not transmitted through insulating material other than ceramic, pure mica or other material no less suitable unless there is sufficient resiliency in metallic parts |                         | P       |
| <b>22.4</b>              | <b>Screws and rivets, used both as electrical and mechanical connections</b>   |                         | P       |
|                          | Screws and rivets which serve as electrical as well as mechanical connections shall be locked against loosening and/or turning   |                         | P       |
| <b>22.5</b>              | <b>Material of current-carrying parts</b>  |                         | P       |
|                          | Current-carrying parts of metal having mechanical strength, electrical conductivity and resistance to corrosion adequate:  |                         | P       |
|                          | Requirement of 22.5 does not apply to screws, nuts, washers, clamping plates and similar parts of terminals  |                         | P       |
|                          | - copper   |                         | P       |
|                          | - alloy with at least 58 % copper for parts made from cold-rolled sheet or with at least 50 % copper for other parts   |                         | P       |
|                          | - stainless steel with at least 13 % chromium and not more than 0,09 % carbon  |                         | N/A     |
|                          | - steel with electroplated coating of zinc (ISO 2081): service condition ISO no. (1/2/3); IP (X0/X4/X5/X6)   |                         | N/A     |
|                          | - steel with electroplated coating of nickel and chromium  |                         | N/A     |
|                          | - steel with electroplated coating of tin (ISO 2093): see  |                         | N/A     |
|                          | Current-carrying parts subjected to mechanical wear: not of steel with electroplated coating   |                         | N/A     |
|                          | Metals having a great difference of electrochemical potential: not used in contact with each other   |                         | N/A     |
| <b>22.6</b>              | <b>Contacts subjected to sliding actions</b>   |                         | N/A     |
|                          | Contacts subjected to sliding action: of metal resistant to corrosion  |                         | N/A     |
| <b>22.7</b>              | <b>Thread-forming and thread-cutting screws</b>  |                         | N/A     |
|                          | Thread-forming screws and thread-cutting screws not used for the connection of current-carrying parts  |                         | N/A     |



| EN 60669-1& EN 60669-2-1 |  |                         |         |
|--------------------------|--|-------------------------|---------|
| Clause                   | Requirement + Test   | Result - Remark         | Verdict |
|                          | Thread-forming screws and thread-cutting screws used to provide earthing continuity: not necessary to disturb the connection and at least two screws are used for each connection  |                         | N/A     |
| <b>23</b>                | <b>CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH SEALING COMPOUND</b>   |                         | P       |
| <b>(23)</b>              | Values of items 1, 2, 6 and 7 of table 20 applied to terminals for external wiring and not applied to other live parts which are protected by a directly associated fuse with adequate breaking capacity or other current-limiting means, under the provision that the requirements of 101 are fulfilled |                         | P       |
|                          | Electronic switches without directly associated fuse or other current-limiting means: comply with table 20   |                         | N/A     |
| <b>23.1</b>              | <b>General</b>   |                         | P       |
|                          | Creepage distances, clearances and distances through sealing compound no less than the values shown in table 23  | See appended table 23.1 | P       |
|                          | Sub clause 23.1 does not apply to pilot light units. Requirements for pilot light units are given in 13.16   |                         |         |
| <b>23.2</b>              | <b>Insulating compound</b>   |                         | P       |
|                          | Insulating compound: not protrude above the edge of the cavity in which it is contained  |                         | P       |
| <b>(23.101)</b>          | Electronic switches having 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 the control and switching circuits are not less than 5,5 mm (mm).....:                         |                         | P       |
|                          | In case of electronic RCS and electronic TDS classified according to 7.103, see the relevant requirements in IEC 60669-2-2 and IEC 60669-2-3 for clearance and creepage between SELV and mains. (mm) .....   |                         | N/A     |
| <b>(23.102)</b>          | Wire enamel at least grade 1 according to IEC 60317: clearances between the wire of the control coil, live parts of different polarity and exposed conductive parts may be reduced to a value equal to two-thirds the clearances required in absence of enamel   |                         | N/A     |
| <b>24</b>                | <b>RESISTANCE OF INSULATING MATERIAL TO ABNORMAL HEAT, TO FIRE AND TO TRACKING</b>   |                         | P       |
| <b>24.1</b>              | <b>Resistance to abnormal heat and to fire</b>   |                         | P       |
|                          | Parts of insulating material which might be exposed to thermal stresses due to electric effects and the deterioration of which might impair the safety are not unduly affected by abnormal heat and fire   |                         | P       |



| EN 60669-1& EN 60669-2-1 |  |   |          |
|--------------------------|--|---|----------|
| Clause                   | Requirement + Test   | Result - Remark   | Verdict  |
|                          | Glow-wire test according to IEC 60695-2-10 and IEC 60695-2-11  | See appended table 24.1                                     | P        |
| <b>24.2</b>              | <b>Resistance to abnormal heat and to fire</b>   |   | N/A      |
|                          | Parts of insulating material retaining live parts in position of switches with IP>X0: of material resistant to tracking  |   | N/A      |
|                          | Tracking test with solution A of IEC 60112   | See appended table 24.2                                     | N/A      |
| <b>25</b>                | <b>RESISTANCE TO RUSTING</b>   |   | <b>P</b> |
|                          | Ferrous parts protected against rusting  |   | P        |
|                          | Test: 10 min in a 10 % solution of ammonium chloride in water at a temperature of (+20 ± 5) °C., 10 min in a box containing air saturated with moisture at a temperature of (+20 ± 5) °C., 10 min in a heating cabinet at a temperature of (+100 ± 5) °C |   | P        |
|                          | No signs of rust   |   | P        |
| <b>(26)</b>              | <b>EMC REQUIREMENTS</b>  |   | <b>P</b> |
|                          | Electronic switches designed to operate correctly under the conditions of electromagnetic environment in which they are intended to be used  | See waltek EMC test report no. WTN22N04062655E for details. | P        |
| <b>(26.1)</b>            | <b>Immunity</b>  |   | <b>P</b> |
|                          | Electronic switches designed so that the switch state (ON or OFF) and/or the setting value are protected against interference  |   | P        |
|                          | Type of load .....   |   | --       |
|                          | Test current: In (A) / Rated load (W or VA) .....  |   | --       |
|                          | Test voltage: Vn (V) .....   |   | --       |
|                          | Variation of less than ± 10 % of the value of the output power (rms) is not considered to be a change of setting   |   | P        |
|                          | Electronic switches shall be tested according to Table 104 with or without operation as specified in the relevant paragraph.   |   | P        |
|                          | If the load connected to the electronic switch is controlled by mechanical switching devices and no semiconductor devices are present in the load circuit, test is conducted with resistive load only  |   | P        |
|                          | For test without operation the electronic switch is tested in the following states:  |   | P        |
|                          | a) in the ON state   |   | P        |
|                          | b) in the ON state   |   | P        |
|                          | For electronic switches whose cycle of operation is limited by their application, the rate of operation during the test shall be specified by the manufacturer.  |   | P        |
| <b>(26.1.1)</b>          | <b>Voltage dips and short interruptions</b>  |   | <b>P</b> |



| EN 60669-1& EN 60669-2-1 |  |                 |         |
|--------------------------|--|-----------------|---------|
| Clause                   | Requirement + Test   | Result - Remark | Verdict |
|                          | Electronic switch tested using the equipment specified in IEC 61000-4-11 in accordance with table 105: sequence: 3 dips/interruptions (duration: 10 cycles at rated frequency) with interval of 10 s minimum between each test event:                |                 | P       |
|                          | The test shall be done on the power supply lines of the electronic switch.   |                 | P       |
|                          | During the test, the electronic switch is not operated   |                 | P       |
|                          | During the test, the state and setting of electronic switch may alter, flickering is neglected.  |                 | P       |
|                          | Test level: 0 % $U_T$  |                 | P       |
|                          | Test level: 40 % $U_T$   |                 | P       |
|                          | Test level: 70 % $U_T$   |                 | P       |
|                          | After the test: electronic switch is in the original state and the setting is unchanged  |                 | P       |
|                          | After the test, the electronic switch shall be in the original state and setting and shall operate as intended.  |                 | P       |
| (26.1.2)                 | Surge immunity test for 1,2/50 $\mu$ s wave impulses   |                 | P       |
|                          | Test carried out according to IEC 61000-4-5 applying two positive discharges and two negative discharges at each of the following angles 0°, 90°, 270°, at a repetition rate of (60 $\pm$ 5) s, with an open-circuit test voltage of 1 kV (level 2). |                 | P       |
|                          | with an open-circuit test voltage of 1 kV (level 2).   |                 | P       |
|                          | If the product has a metallic mounting surface when mounted as in normal use, the test is repeated between line and earth with a test voltage of 2 kV.   |                 | P       |
|                          | During the test, the electronic switch is not operated   |                 | P       |
|                          | During the test, the state and setting of electronic switch may alter, flickering is neglected.  |                 | P       |
|                          | After the test, the electronic switch shall be in the original state and setting and shall operate as intended.  |                 | P       |
| (26.1.3)                 | Electrical fast transient/burst test   |                 | P       |
|                          | Test carried out according to IEC 61000-4-4 in accordance with table 106, duration of the test 1 min +5/0 s for each positive and negative polarities: open-circuit output test voltage ( $\pm$ 10 %):   |                 | P       |
|                          | During the test, the electronic switch is not operated   |                 | P       |
|                          | Supply terminals/terminations: 1 kV  |                 | P       |
|                          | Control terminals/terminations: 0,5 kV   |                 | P       |
|                          | During the test, the state and setting of the electronic switch may alter, flickering caused by the electronic switch is allowed.  |                 | P       |



| EN 60669-1& EN 60669-2-1 |  |                 |         |
|--------------------------|--|-----------------|---------|
| Clause                   | Requirement + Test   | Result - Remark | Verdict |
|                          | After the test: the electronic switch shall be in the original state and setting and shall operate as intended.  |                 | P       |
| (26.1.4)                 | Electrostatic discharge test   |                 | P       |
|                          | Electronic switch not intended to operate resistive load: test carried out with only one load of the loads specified within the manufacturer's instructions .....                          |                 | P       |
|                          | Test carried out according to EN 61000-4-2 applying 10 positive and 10 negative discharge:   |                 | P       |
|                          | A test with lower voltages is not required   |                 | P       |
|                          | During the test, the electronic switch is not operated   |                 | P       |
|                          | During the test, the state and setting of electronic switch may alter, flickering is neglected.  |                 | P       |
|                          | - contact discharge to the conductive surface and to coupling planes (test voltage: 4 kV)  |                 | P       |
|                          | - air discharge at insulating surfaces (test voltage: 8 kV)  |                 | P       |
|                          | After the test: the electronic switch shall be in the original state and setting and shall operate as intended.  |                 | P       |
|                          | Electronic switches with an adjustable time delay devices shall be adjusted in such way that the time delay is higher than the testing time  |                 | P       |
| (26.1.5)                 | Radiated electromagnetic field test  |                 | P       |
|                          | Test applicable only to electronic switches containing infra-red (IR) receivers, radio frequency receivers, passive infra-red (PIR) devices, devices containing microprocessors or similar |                 | P       |
|                          | Test carried out according to IEC 61000-4-3 applying a field strength of 3 V/m in the frequency range 80 MHz to 1000 MHz and 1400 MHz to 2000 MHz:   |                 | P       |
|                          | Electronic switch shall be loaded with resistive load only.  |                 | P       |
|                          | During the test, the electronic switch is operated, if it contains automatics functions or can be remotely controlled  |                 | P       |
|                          | During the test, the electronic switch shall operate as intended, flickering is not allowed.   |                 | P       |
|                          | Flickering of lamps or irregular running of motors due to the switching transient caused by frequency changes of the test equipment during the test procedure is neglected.                |                 | P       |
| (26.1.6)                 | Radio-frequency voltage test   |                 | P       |



| EN 60669-1& EN 60669-2-1 |  |                 |         |
|--------------------------|--|-----------------|---------|
| Clause                   | Requirement + Test   | Result - Remark | Verdict |
|                          | Test applicable only to electronic switches containing infra-red (IR) receivers, radio frequency receivers, passive infra-red (PIR) devices, devices containing microprocessors or similar |                 | P       |
|                          | Electronic switch shall be loaded with resistive load only.  |                 | P       |
|                          | Test carried out according to IEC 61000-4-6 applying a conducted radio-frequency voltage of 3 V rms on supply lines and control lines:   |                 | P       |
|                          | During the test, the electronic is operated, if it contains automatics functions or can be remotely controlled   |                 | P       |
|                          | During and after the test, the electronic switch shall operate as intended, flickering is not allowed.   |                 | P       |
|                          | Flickering of lamps or irregular running of motors due to the switching transient caused by frequency changes of the test equipment during the test procedure is neglected.                |                 | P       |
| (26.1.7)                 | Power-frequency magnetic field test  |                 | N/A     |
|                          | Test applicable only to electronic switches containing devices susceptible to magnetic fields, for example, Hall elements, electrodynamic microphones, etc.                                |                 | N/A     |
|                          | Test carried out according to IEC 61000-4-8 applying a magnetic field of 3 A/m, 50 Hz:   |                 | N/A     |
|                          | Electronic switch shall be loaded with resistive load only.  |                 | N/A     |
|                          | During the test, the electronic is operated, if it contains automatics functions or can be remotely controlled   |                 | N/A     |
|                          | During and after the test, the electronic switch shall operate as intended, flickering is not allowed.   |                 | N/A     |
|                          | Flickering of lamps or irregular running of motors due to the switching transient caused by frequency changes of the test equipment during the test procedure is neglected.                |                 | N/A     |
| (26.2)                   | Emission   |                 | P       |
| (26.2.1)                 | Low-frequency emission   |                 | P       |
|                          | Electronic switches designed that they do not cause excessive disturbances in the network  |                 | P       |
|                          | Electronic switch complies with IEC 61000-3-2 and IEC 61000-3-3  |                 | P       |
|                          | This requirements applies to each channel of a multichannel dimmer provided that the channel are independent from each other   |                 | P       |



| EN 60669-1& EN 60669-2-1 |  |                              |         |
|--------------------------|--|------------------------------|---------|
| Clause                   | Requirement + Test   | Result - Remark              | Verdict |
|                          | Load terminals/terminations of electronic switches with electromechanically operated contact mechanism (for example, a relay), do not cause harmonic current emissions and are deemed to meet the requirements of IEC 61000-3-2 without need for testing. Therefore only the mains supply terminal/terminations of those products shall be tested. |                              |         |
| (26.2.2)                 | Radio-frequency emission   |                              | P       |
|                          | Electronic switches designed that they do not cause excessive radio interference   |                              | P       |
|                          | The electronic switch shall comply with the requirements of EN 55014 or EN 55015 (CISPR 14 or CISPR 15)  |                              | P       |
|                          | For electronic switches used for electrical lighting application, EN 55015 (CISPR 15) applies.   |                              | P       |
|                          | Compliance is checked as follows:  |                              | P       |
|                          | a) At the main terminals (8.1.3.1 of CISPR 15)   |                              | P       |
|                          | b) At the load and/or control terminals (8.1.3.2 of CISPR 15).   |                              | P       |
| <b>(101)</b>             | <b>ABNORMAL CONDITIONS</b>   |                              | P       |
|                          | Electronic switches do not create hazard under abnormal conditions   |                              | P       |
|                          | If in case of failure the maximum power taken by the electronic switches is less than 0,5 W, the requirements of the abnormal condition are deemed to be met   |                              | P       |
| <b>(101.1)</b>           | electronic switches are operate under abnormal conditions no part reach such a temperature that there is danger of fire to the surroundings of the electronic switches.  |                              | P       |
|                          | Temperature rises not exceed the values given in table 102, column concerning clause 101   |                              | P       |
| (101.1.1)                | The tests are made on electronic switches while they are mounted, connected and loaded as specified in clause 17.<br>Each of the abnormal conditions indicated in 101.1.1.1 and 101. 1.1.2 is applied in turn.   |                              | P       |
| (101.1.1.1)              | The following fault conditions shall be simulated:   |                              | P       |
|                          | - short circuit across creepage distances and clearances, other than those complying with the requirements in clause 23, if they are less than the values given in Figure 10 of IEC 60065.   | See appended table 101.1.1.1 | P       |
|                          | - short circuit across insulating coating  | See appended table 101.1.1.1 | N/A     |
|                          | - short circuit or interruption of semiconductor devices;  | See appended table 101.1.1.1 | P       |
|                          | - short circuit of electrolytic capacitors;  | See appended table 101.1.1.1 | P       |



| EN 60669-1& EN 60669-2-1 |   |                              |         |
|--------------------------|---|------------------------------|---------|
| Clause                   | Requirement + Test  | Result - Remark              | Verdict |
|                          | - short circuit or interruption of capacitors or resistors which do not comply with the requirements of clause 102;   | See appended table 101.1.1.1 | N/A     |
|                          | - short circuit of the terminals on the load side.  | See appended table 101.1.1.1 | N/A     |
|                          | If the temperature is limited by the operation of automatic protective devices (including fuses), the temperature is measured 2 min after the operation of the device.  |                              | P       |
|                          | If no temperature-limiting device operates, the temperature is measured after a steady state or after 4 h, whichever is the shorter time.   |                              | N/A     |
|                          | If the temperature is limited by a fuse, in case of doubt, the following additional test is carried out: the fuse is short-circuited and the current under the relevant fault conditions is measured..... :   |                              | N/A     |
|                          | The electronic switch is then switched on for a duration corresponding to the maximum fusing time of the type of fuse as specified by IEC 60127 corresponding to the current measured above..... :  |                              | N/A     |
|                          | The temperature is measured 2 min after the end of the period.  |                              | N/A     |
| (101.1.1.2)              | The following overload tests are carried out, where applicable.   |                              | P       |
|                          | Electronic switches without incorporated temperature-limiting devices and without incorporated fuses are loaded for 1 h with the conventional tripping current for the fuse which, in the installation, will protect the electronic switch  |                              | N/A     |
|                          | The tripping current of the protective devices (e.g. fuses, automatic protective devices, etc.) to be used for the verification of electronic switches without incorporated temperature-limiting devices and without incorporated fuses shall be in relation with the rated current of protective device, specified by the manufacturer, intended to protect the electronic switch. |                              | N/A     |
|                          | Type of the protective device which protect the electronic switch..... :  |                              | --      |
|                          | Tripping current of the protective devices (A)..... :   |                              | --      |
|                          | Test current: (A)..... :  |                              | --      |
|                          | Temperature rise measured 1 h..... :  | See appended table 101.1.1.2 | N/A     |
|                          | Electronic switches protected by automatic protective devices (including fuses) are loaded in such a way that the current through the electronic switch is 0,95 times the current with which the protecting device releases after 1 h   |                              | P       |
|                          | Current with which the protecting device releases after 1 h (A)..... :  |                              | --      |
|                          | Test current: 0,95 In (A)..... :  | 12.63A*0.95=12A              | --      |
|                          | Temperature rise measured after steady state or after 4 h   | See appended table 101.1.1.2 | P       |



| EN 60669-1& EN 60669-2-1 |   |                              |         |
|--------------------------|---|------------------------------|---------|
| Clause                   | Requirement + Test  | Result - Remark              | Verdict |
|                          | Electronic switches protected by incorporated fuses complying with IEC 60127 shall have those fuses replaced by links of negligible impedance and shall be loaded in such a manner that the current through the links shall be 2,1 times the rated current of the fuse. |                              | N/A     |
|                          | Rated current of incorporated fuse (A) .....  |                              | --      |
|                          | Test current: 2,1 In (A) .....  |                              | --      |
|                          | Temperature rise measured after 30 min :  | See appended table 101.1.1.2 | N/A     |
|                          | Electronic switches protected both by enclosed fuses and by automatic protective devices are loaded either as described above with incorporated fuses or with another automatic protective device, choosing the test requiring the lower load.                          |                              | N/A     |
|                          | Test current: (A) .....   |                              | --      |
|                          | Temperature rise measured after ..... :__min  | See appended table 101.1.1.2 | N/A     |
|                          | Electronic switches protected by automatic protective devices which will short-circuit only in case of overload shall be tested both as electronic switches with automatic protective devices and as electronic switches without automatic protective devices.          |                              | N/A     |
|                          | Current with which the protecting device releases after 1 h (A) .....   |                              | --      |
|                          | Test current: 0,95 In (A) .....   |                              | --      |
|                          | Temperature rise measured after steady state or after 4 h   | See appended table 101.1.1.2 | N/A     |
|                          | Type of the protective device which protect the electronic switch.....  |                              | --      |
|                          | Tripping current of the protective devices (A) .....  |                              | --      |
|                          | Test current: (A) .....   |                              | --      |
|                          | Temperature rise measured 1 h .....   | See appended table 101.1.1.2 | N/A     |
|                          | Additional test on new set specimens shall be carried out, if in any of the previous test the electronic switch turn off before the temperature has been steady state:  |                              | N/A     |
|                          | The electronic switch shall be loaded to 1,1 times the rated current (A) .....  |                              | --      |
|                          | The current is then increased by 10 % and then the temperature is allowed to stabilize.....   |                              | --      |
|                          | The above test is repeated by 10 % until the conventional tripping current of the protective device is reached or the electronic switch is destroyed .....  |                              | --      |
|                          | This is repeated until the conventional tripping current of the protective device is reached (A) .....  |                              | N/A     |
|                          | or the electronic switch is destroyed .....   |                              | N/A     |
| <b>(101.2)</b>           | Protection against electric shock even during fault conditions  |                              | P       |
|                          | Electronic switches tested according to clause 10 immediately following the test of 101.1   |                              | P       |



| EN 60669-1& EN 60669-2-1 |   |   |         |
|--------------------------|---|---|---------|
| Clause                   | Requirement + Test  | Result - Remark   | Verdict |
| <b>(101.3)</b>           | Electronic switches shall, without endangering their surroundings, withstand the short circuit currents they may be subjected to in the load circuit.<br>- The electronic switch is mounted as in normal use.<br>- Tested in a substantially non-inductive circuit in series with a load impedance and a device for limiting the let-through $I^2t$ .<br>- The prospective short-circuit current of the supply shall be 1500 A (RMS) at a voltage equal to the rated voltage of the electronic switch under test.<br>- The prospective let-through $I^2t$ minimum value shall be 15000 A <sup>2</sup> s.<br>- The impedance $Z_1$ (short-circuit impedance) shall be adjusted to satisfy the specified prospective short-circuit current.<br>- The impedance $Z_2$ (load impedance) shall be adjusted that the electronic switch is loaded with its minimum load or with approximately 10 % of the rated load, whichever is the higher. |   | P       |
|                          | The automatic overcurrent protective device, incorporated or not incorporated in the electronic switch, is inserted into the circuit..... :   | Type C circuit breaker, according to IEC/EN 60898-1 shall be installed in the fixed wiring for protection | --      |
|                          | Test voltage $V_n$ (V) .....  | 240   | P       |
|                          | The variable control, if any, is set at the position of maximum output.   |   | P       |
|                          | The short circuit is applied six times without any synchronization with respect to the voltage.   | 6 Type c circuit breaker protection   | P       |
|                          | During the test, emission of flames or burning particles, if any, shall not be dangerous to the environment.<br>The above requirement is fulfilled if:  |   | P       |
|                          | - no emissions of flames  |   | P       |
|                          | - no burning particles visible with normal or corrected vision without additional magnification   |   | P       |
|                          | - If there is a visible emission of flames or burning particles, the test is repeated on new specimens with a clear polyethylene film in each direction than the area where the flames or burning particles were seen.  |   | P       |
|                          | After the test:   |   | P       |
|                          | - accessible metal parts shall not be live (Clause 10)  |   | P       |
|                          | - emissions of flames or burning particles have not visibly perforated the polyethylene film  |   | P       |
|                          | - The conductors, the flush mounting box and the mounting surface don't show traces of burns. Traces which do not prevent the further use of the cables or housing are ignored.   |   | P       |
|                          | - the contacts of any incorporated automatic protective device are not welded, unless the electronic switch is obviously useless.   |   | P       |
|                          | The specimen is re-energized in its normal operating position, for 4 hours.   |   | N/A     |



| EN 60669-1& EN 60669-2-1 |  |                          |         |
|--------------------------|--|--------------------------|---------|
| Clause                   | Requirement + Test   | Result - Remark          | Verdict |
|                          | - The specimen no shows dangerous behaviour during this period (smoke or excessive heat)   |                          | N/A     |
|                          | - In case of doubt the maximum temperature rise values given in table 102 shall not be exceeded  |                          | N/A     |
|                          | - Electronic switch shall withstand the dielectric strength test according to Clause 16 at the voltages prescribed in Clause 19 (item 3 of Table 14 not applied).                          | See appended table 101.3 | N/A     |
| <b>(101.4)</b>           | Abnormal operation of the control circuit (only for electronic RCS energized by impulses)  |                          | N/A     |
|                          | Behaviour of electronic RCS during abnormal operation of the control circuit is not dangerous  |                          | N/A     |
|                          | Test made on three additional specimens of electronic RCS meeting with requirements of clauses 15 and 16:  |                          | N/A     |
|                          | Control circuit continuously energized at its rated voltage (V) .....  |                          | --      |
|                          | Switching circuit loaded for 1 h with rated current (A) at rated voltage (V) .....   |                          | --      |
|                          | After this test:   |                          | N/A     |
|                          | - RCS still operate  |                          | N/A     |
|                          | - temperature rise of any part of the electronic RCS enclosure and plywood support, which may be touched by the standard test finger, test probe B of IEC 61032, $\leq 75$ K (K) .....     |                          | N/A     |
|                          | - temperature rise of the plywood support which can  |                          | N/A     |
|                          | - electronic RCS did not emit flames, melted material, glowing particles or burning drops of insulating material   |                          | N/A     |
|                          | After cooling down to ambient temperature:   |                          | --      |
|                          | Electronic RCS withstand a dielectric test (sub-clause 16.2), test voltage (a.c., for 1 min), between switching and control circuits:  |                          | N/A     |
|                          | - test voltage (V) .....   |                          | --      |
|                          | During the test: no flashover or breakdown   |                          | N/A     |
|                          | Electronic RCS still meet the requirements of 10.1   |                          | N/A     |
|                          | Electronic RCS coil is then intermittently energized for 1 h using a voltage equal to its rated control voltage, the switching circuit being supplied with rated current at rated voltage: |                          | N/A     |
|                          | class of insulating material .....   |                          | --      |
|                          | temperature-rise limit (IEC 60085) (K) .....   |                          | --      |
|                          | temperature-rise measured (K) .....  |                          | N/A     |
|                          | Behaviour of electronic TDS during abnormal operation of the control circuit is not dangerous  |                          | N/A     |



| EN 60669-1& EN 60669-2-1 |  |                              |         |
|--------------------------|--|------------------------------|---------|
| Clause                   | Requirement + Test   | Result - Remark              | Verdict |
|                          | Test made on three additional specimens of electronic TDS meeting with requirements of clauses 15 and 16:  |                              | N/A     |
|                          | Control circuit continuously energized at its rated voltage (V) .....  |                              | --      |
|                          | Switching circuit loaded for 6 h with rated current (A) at rated voltage (V) .....   | - A; - V                     | --      |
|                          | Adjustable electronic TDS: adjusted to the shortest delay time (s).....  |                              | --      |
|                          | After this test:   |                              | N/A     |
|                          | - electronic TDS still operate   |                              | N/A     |
|                          | - temperature rise of any part of the electronic TDS enclosure and plywood support, which may be touched by the standard test finger, test probe B of IEC 61032, $\leq 75$ K (K) .....   |                              | N/A     |
|                          | - temperature rise of the plywood support which can  |                              | N/A     |
|                          | - electronic TDS did not emit flames, melted material, glowing particles or burning drops of insulating material   |                              | N/A     |
|                          | After cooling down to ambient temperature:   |                              | N/A     |
|                          | Electronic TDS withstand a dielectric test (sub-clause 16.2), test voltage (a.c., for 1 min), between switching and control circuits:  |                              | N/A     |
|                          | - test voltage (V) .....   |                              | --      |
|                          | During the test: no flashover or breakdown   |                              | N/A     |
|                          | Electronic TDS still meet the requirements of 10.1   |                              | N/A     |
| <b>(101.5)</b>           | Dimmers for incandescent and/or self-ballasted lamps shall so designed that no part shall reach such a temperature that there is danger of fire to the surrounding of the dimmer when non-dimmable self-ballasted lamps are installed in the load circuit. |                              | N/A     |
|                          | Tests made on dimmers mounted and connected as specified in clause 17.   |                              | N/A     |
|                          | The dimmer is loaded with a number of lamp simulation circuit as Figure 103 Load B (25 W non dimmable self-ballasted lamp)   |                              | --      |
|                          | Dimmer not classified for self-ballasted lamps the dimmer is loaded with a number of lamp simulation circuit as Figure 103 Load B having a total power equivalent to 1/5 <sup>th</sup> of the declared incandescent lamp load (W) .....                    |                              | --      |
|                          | - test voltage (V) .....   |                              | N/A     |
|                          | During the test:   |                              | N/A     |
|                          | - emission of flames or burning particles shall not occur  |                              | N/A     |
|                          | - temperature rises shall not exceed the values in Table 102, column concerning Clause 101.  | See appended table 101.1.1.2 | N/A     |
|                          | After this test:   |                              | N/A     |



| EN 60669-1& EN 60669-2-1 |   |                        |         |
|--------------------------|---|------------------------|---------|
| Clause                   | Requirement + Test  | Result - Remark        | Verdict |
|                          | - accessible metal parts shall not be live  |                        | N/A     |
|                          | - contacts of any incorporated automatic protective device not welded, unless the electronic switch is obviously useless  |                        | N/A     |
| <b>(102)</b>             | <b>COMPONENTS</b>   |                        | P       |
|                          | Components which, if they fail, may impair the safety of the electronic switch comply with the relevant IEC standards, as far as applicable                     |                        | P       |
|                          | Components marked with their operating characteristics used in accordance with these markings   |                        | P       |
| <b>(102.1)</b>           | Fuses comply with:  |                        | P       |
|                          | - IEC 60127   |                        | P       |
|                          | - other relevant IEC publications   |                        | N/A     |
|                          | Rated breaking capacity (A): 1500 A or 35 A ..... : 1500A   |                        | P       |
| <b>(102.2)</b>           | Capacitors the short-circuiting or disconnection of which cause an infringement of the requirements under fault conditions with regard to shock or fire hazard: |                        | N/A     |
|                          | Capacitor complies with IEC 60384-14.....   |                        | N/A     |
|                          | Capacitor passing the damp heat steady-state test specified in 4.12 of IEC 60384-14 with a duration of not less than 21 days are considered acceptable...:      |                        | N/A     |
|                          | Capacitor in accordance with table 107  | See appended table 102 | N/A     |
|                          | Trade mark; article of capacitor .....  |                        | N/A     |
|                          | Capacitor marked with:  |                        | N/A     |
|                          | - rated voltage (V) .....   | See appended table 102 | N/A     |
|                          | - rated capacitance (μF) .....  | See appended table 102 | N/A     |
|                          | - reference temperature (°C) .....  | See appended table 102 | N/A     |
|                          | Capacitors the short-circuiting of which cause a current = 0,5 A through the terminals of the capacitor:  |                        | N/A     |
|                          | Capacitor complies with IEC 60384-14.....   |                        | N/A     |
|                          | Capacitor passing the damp heat steady-state test specified in 4.12 of IEC 60384-14 with a duration of not less than 21 days are considered acceptable...:      |                        | N/A     |
|                          | Capacitor in accordance with table 107  | See appended table 102 | N/A     |
|                          | Trade mark; article of capacitor .....  |                        | N/A     |
|                          | Capacitor marked with:  |                        | N/A     |
|                          | - rated voltage (V) .....   | See appended table 102 | N/A     |
|                          | - rated capacitance (μF) .....  | See appended table 102 | N/A     |
|                          | - reference temperature (°C) .....  | See appended table 102 | N/A     |
|                          | Capacitors for suppression of electromagnetic interference  |                        | N/A     |



| EN 60669-1& EN 60669-2-1 |   |                        |         |
|--------------------------|---|------------------------|---------|
| Clause                   | Requirement + Test  | Result - Remark        | Verdict |
|                          | Capacitor complies with IEC 60384-14.....:  |                        | N/A     |
|                          | Capacitor passing the damp heat steady-state test specified in 4.12 of IEC 60384-14 with a duration of not less than 21 days are considered acceptable...:                            |                        | N/A     |
|                          | Capacitor in accordance with table 107  | See appended table 102 | N/A     |
|                          | Trade mark; article of capacitor .....  |                        | N/A     |
|                          | Capacitor marked with:  |                        | N/A     |
|                          | - rated voltage (V) .....   | See appended table 102 | N/A     |
|                          | - rated capacitance ( $\mu$ F) .....  | See appended table 102 | N/A     |
|                          | - reference temperature ( $^{\circ}$ C) .....   | See appended table 102 | N/A     |
| <b>(102.3)</b>           | Resistors: the short-circuiting or interruption of which cause an infringement of the requirements with regard to the protection against fire and electric shock in case of a defect: |                        | N/A     |
|                          | Manufacturer / characteristics of resistor .....  | / $\Omega$             | --      |
|                          | - constant value under overload conditions  |                        | N/A     |
|                          | reference temperature of the resistor according to clause 17 ( $^{\circ}$ C) .....  |                        | --      |
|                          | - comply with sub-clause 14.1 of IEC 60065  |                        | N/A     |
| <b>(102.4)</b>           | Automatic protective devices (other than fuses)   |                        | N/A     |
|                          | Automatic protective devices comply with IEC 60730 as far as applicable   |                        | N/A     |
| <b>(102.4.1)</b>         | Automatic protective devices which switch off the current (cut-outs):   |                        | N/A     |
|                          | Adequate making and breaking capacity   |                        | N/A     |
|                          | Reference temperature above 55 $^{\circ}$ C: specimens tested at reference temperature according to clause 17 ( $^{\circ}$ C) .....   |                        | N/A     |
| <b>(102.4.1.1)</b>       | Non-self-resetting cut-outs in the load circuit of the electronic switch:   |                        | N/A     |
|                          | Test voltage: 1.1 V <sub>n</sub> (V) .....  |                        | --      |
|                          | Cut-outs in electronic switches for incandescent or fluorescent lamps:  |                        | N/A     |
|                          | 10 cycles; test current: 2,1 I <sub>n</sub> (A) of the protecting fuse (IEC 60127) or the conventional fusing current (other fuses) .....   |                        | --      |
|                          | During the test: no sustained arcing  |                        | N/A     |
|                          | After the test: specimens show no damage  |                        | N/A     |
|                          | Electric strength between open contacts: test voltage 500 V a.c. for 1 min  |                        | N/A     |
|                          | Cut-outs in electronic switches for speed control circuits:   |                        | N/A     |
|                          | I <sub>n</sub> (A) of electronic switch (cos $\phi$ 0.6) .....  |                        | --      |
|                          | Making: 10 operations with: test current: 9 I <sub>n</sub> (A); cos $\phi$ 0.8 $\pm$ 0.05 .....   |                        | --      |



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|------------------------------|--|----------------------------|---------|
| Clause                       | Requirement + Test   | Result - Remark            | Verdict |
|                              | Breaking: 10 operations with: test current: 6 In (A);<br>cosφ 0.6 ± 0.05 .....   |                            | --      |
|                              | During the test: no sustained arcing   |                            | N/A     |
|                              | After the test: specimens show no damage   |                            | N/A     |
|                              | Electric strength between open contacts: test<br>voltage (V): 1200 V a.c. (Vn ≤ 130 V) or 2000 V<br>(Vn > 130 V) for 1 min: .....                      |                            | N/A     |
| (102.4.1.2)                  | Self-resetting cut-outs in the load circuit of the electronic switch:  |                            | N/A     |
|                              | Test voltage: 1.1 Vn (V) .....   |                            | --      |
|                              | Cut-outs in electronic switches for incandescent<br>lamps:   |                            | N/A     |
|                              | 200 cycles; test current: 2.1 In (A) of the protecting<br>fuse (IEC 60127) or conventional fusing current<br>(other fuses) .....                       |                            | --      |
|                              | During the test: no sustained arcing   |                            | N/A     |
|                              | After the test: specimens show no damage   |                            | N/A     |
|                              | Test voltage (V) for cuts-out in electronic switches<br>for speed control circuit: 1200 V a.c. (Vn ≤ 130 V)<br>or 2000 V (Vn > 130 V) for 1 min: ..... |                            | N/A     |
|                              | Test voltage (V) for cuts-out in electronic switches<br>for lighting circuit: 500 V a.c. for 1 min.....  |                            | N/A     |
| (102.4.2)                    | Automatic protective devices which only decrease current to the electronic switch<br>(10 cycles):  |                            | N/A     |
|                              | Test current per clause 17 for 4 h (A) .....   |                            | --      |
|                              | Test current increased to 2.1 In (A) of the<br>protecting fuse (IEC 60127) or the conventional<br>fusing current (other fuses) for 30 min .....        |                            | --      |
|                              | After the test: specimens function correctly   |                            | N/A     |
|                              | Temperature rise test per clause 17:   |                            | N/A     |
|                              | - electronic switch state not change   |                            | N/A     |
|                              | - fuses and other protective devices not operate   |                            | N/A     |
|                              | - permissible temperature rises determined in table<br>102, column concerning clause 17, not exceeded  | See appended table 102.4.2 | N/A     |
|                              | After the test, electronic switch is in operating<br>condition   |                            | N/A     |
|                              | Sealing compounds, if any, have not flowed   |                            | N/A     |
| (102.5)                      | Transformer  |                            | N/A     |
|                              | Transformers intended for SELV circuits shall be of<br>the safety isolating type and shall comply with the<br>relevant requirements of IEC 61558-2-6.  |                            | N/A     |
| <b>ANNEX A<br/>(ANNEX B)</b> | <b>ADDITIONAL REQUIREMENTS FOR SWITCHES HAVING FACILITIES FOR THE<br/>OUTLET AND RETENTION OF FLEXIBLE CABLES</b>                                      |                            | N/A     |



| EN 60669-1& EN 60669-2-1 |  |                 |         |
|--------------------------|--|-----------------|---------|
| Clause                   | Requirement + Test   | Result - Remark | Verdict |
| <b>10.1</b>              | <b>Prevention of access to live parts</b>  |                 | N/A     |
|                          | For flexible cable outlet switches the test is carried out without the flexible cable fitted.  |                 | N/A     |
| <b>12</b>                | <b>Terminals</b>   |                 | N/A     |
| 12.2.5                   | For flexible cable outlet switches, the test is repeated with flexible cables of the appropriate size (see 13.15) following the same procedure.  |                 | N/A     |
| <b>13</b>                | <b>Constructional requirements</b>   |                 | N/A     |
| <b>13.17</b>             | Flexible cable outlet switches shall be so designed that an appropriate flexible cable, complying with IEC 60245-4, code designation 60245 IEC 66 or IEC 60227-5, code designation 60227 IEC 53, or as specified by the manufacturer, may enter the switch through a suitable hole, groove or gland .....  |                 | N/A     |
|                          | The entry shall accept the maximum dimensions (outer sheath) of the appropriate flexible cable, having conductors of the cross-sectional area specified in Table A.1, according to the current rating of the switch, but with a minimum of 1,5 mm <sup>2</sup> and the entry shall be so shaped as to prevent damage to the flexible cable.  |                 | N/A     |
| <b>(13.16)</b>           | The cross-sectional area of external flexible cables connected between electronic switches and its associated control units and the like can be less if the current in the unit is limited by current limiting means. The minimum cross-sectional area is shown in Table B.1. Flexible cables shall comply with IEC 60245-4, code designation 60245 IEC 66, or IEC 60227-5, code designation 60227 IEC 53 ...: |                 | N/A     |
| <b>13.17</b>             | A cable anchorage for the flexible cable shall be provided such that the conductors are relieved from strain, including twisting, where they are connected to the terminals or terminations.   |                 | N/A     |
|                          | The cable anchorage shall contain the sheath and shall be either of insulating material or, if of metal, shall be provided with an insulating lining fixed to the metal parts.   |                 | N/A     |
|                          | The design shall ensure that   |                 | N/A     |
|                          | - the cable anchorage cannot be released from the outside  |                 | N/A     |
|                          | - clamping the cable does not require the use of a special purpose tool.   |                 | N/A     |
|                          | Screws which are used when clamping the flexible cable shall not serve to fix any other component  |                 | N/A     |
|                          | Switches are fitted with a flexible cable complying with IEC 60227-5, code designation 60227 IEC 53, having a nominal conductor cross-sectional area of 1,5 mm <sup>2</sup> and the number of cores corresponding to the number of poles of the switch.  |                 | N/A     |
|                          | The flexible cable is then subjected 25 times to a pull force of 30 N  |                 | N/A     |



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|--------------------------|---|-----------------|---------|
| Clause                   | Requirement + Test  | Result - Remark | Verdict |
|                          | Immediately afterwards, the flexible cable is subjected for 1 min to a torque of 0,15 Nm  |                 | N/A     |
|                          | The above test is then repeated, the switch being fitted with the appropriate largest diameter flexible cable complying with IEC 60245-4, code designation 60245 IEC66.     |                 | N/A     |
|                          | The pull is increased to 60 N   |                 | N/A     |
|                          | The torque is increased to 0,35 Nm.   |                 | N/A     |
|                          | After the test the flexible cable not have displaced by more than 2 mm .....  |                 | N/A     |
|                          | AC voltage of 2000 V is applied for 1 min between the conductors and the cord anchorage.  |                 | N/A     |
|                          | During the test, the insulation of the flexible cable not damaged   |                 | N/A     |
| <b>(ANNEX CC)</b>        | <b>ADDITION REQUIREMENTS FOR ELECTRONIC SWITCHES USING DLT-TECNOLOGY ACCORDING TO IEC 62756-1</b>   |                 | N/A     |
| <b>(CC.8)</b>            | <b>MARKING</b>  |                 | N/A     |
| <b>(CC.8.1)</b>          | <b>Switches marked with:</b>  |                 | N/A     |
|                          | - the symbol for DLT control device .....(DLT):   |                 | N/A     |
| <b>(CC.8.2)</b>          | <b>Symbols used:</b>  |                 | N/A     |
|                          | DLT control device.....(DLT):   |                 | N/A     |
|                          | Supported telegram types for DLT control devices (TPX).....   |                 | N/A     |
|                          | DLT controlled load.....  |                 | N/A     |
|                          | The maximum cable length between DLT control device and DLT load shall also be given in the instruction sheet.  |                 | N/A     |
| <b>(CC.17)</b>           | <b>TEMPERATURE RISE</b>   |                 | N/A     |
|                          | In lamp dimmer, DLT control devices and speed controllers, the setting is adjusted such that the highest temperature will occur.  |                 | N/A     |
| <b>(CC.19)</b>           | <b>NORMAL OPERATION</b>   |                 | N/A     |
| <b>(CC.19.103)</b>       | Semiconductor switching devices and/or electronic regulating devices including DLT control devices incorporated in electronic switches are subjected to the following test. |                 | N/A     |
|                          | For DLT control devices, a cable , having the maximum cable length, as declared in 8.3, is installed between the control device and the loads.                              |                 | N/A     |
| <b>CC.26</b>             | <b>EMC REQUIREMENTS</b>   |                 | N/A     |
| <b>(CC.26.2)</b>         | <b>Emission</b>   |                 | N/A     |
| <b>(CC.26.2.1)</b>       | <b>Low-frequency emission</b>   |                 | N/A     |
|                          | DLT control devices shall be tested with maximum resistive load   |                 | N/A     |



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

| 12.2.5                                  | TABLE: Test with apparatus shown in figure 10 (screw terminals)           |                           |           | N/A     |
|---|---|---------------------------|-----------|---------|
|   | Rated current (A) .....   | --                        | --        | --      |
|   | Type of conductors .....  | --                        | --        | --      |
|   | Smallest/largest cross-sectional area per table 4 (mm <sup>2</sup> )..... | --                        | --        | --      |
|   | Number of conductors .....  | --                        | --        | --      |
|   | Nominal diameter of thread (mm); torque per table 5 (Nm) .....            | --                        | --        | --      |
| Cross-sectional area (mm <sup>2</sup> ) | Diameter of bushing hole per table 6 (mm)                                 | Height H per table 6 (mm) | Mass (kg) | Remarks |
| --                                      | --  | --                        | --        | --      |
| --                                      | --  | --                        | --        | --      |

| 12.2.6                                  | TABLE: Pull test (screw terminals)  |  |  | N/A     |
|---|---|--|--|---------|
|   | Rated current (A).....  | --   | --                                     | --      |
|   | Smallest/largest cross-sectional area per table 4 (mm <sup>2</sup> )..... | --   | --                                     | --      |
|   | Nominal diameter of thread (mm); torque 2/3 per table 5 (Nm).....         | --   | --                                     | --      |
| Cross-sectional area (mm <sup>2</sup> ) | Number of conductors  | Type of conductors (rigid solid / rigid stranded / flexible) | Pull per table 7 applied for 1 min (N) | Remarks |
| --                                      | --  | --   | --                                     | --      |
| --                                      | --  | --   | --                                     | --      |

Supplementary information:

| 12.2.7  | TABLE: Tightening test (screw terminals)                          |  |   | P       |
|---|---|--|---|---------|
|   | Rated current (A).....  | 5A   |   |         |
|   | Nominal diameter of thread (mm); torque 2/3 per table 5 (Nm)..... | 2.88mm / 0.5Nm   |   |         |
| Largest cross-sectional area per table 4 (mm <sup>2</sup> ) | Permissible number of conductors                                  | Type of conductors (rigid solid / rigid stranded / flexible) | Number of wires and nominal diameter of wires | Remarks |
| --  | --  | --   | --  | --      |
| --  | --  | --   | --  | --      |

Supplementary information:

| 12.3.10 | TABLE: Mechanical stresses occurring in normal use (screwless terminals)  |    |  | P |
|---------|---|----|--|---|
|         | Rated current (A).....  | -- |  |   |
|         | Largest/smallest cross-sectional area per table 8 (mm <sup>2</sup> )..... | -- |  |   |



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

| 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 <sup>2</sup> ) | Remarks |
|---|---|---|---------|
| --  | ---   | --                                      | --      |
| --  | ---   | --                                      | --      |

| TABLE: Test with apparatus shown in figure 9                              |   |   |           | --      |
|---|---|---|-----------|---------|
| Rated current (A) .....   |   | --                                      |           |         |
| Type of conductors .....  |   | rigid solid / rigid stranded / flexible |           |         |
| Smallest/largest cross-sectional area per table 8 (mm <sup>2</sup> )..... |   | --                                      |           |         |
| number of conductors.....   |   | --                                      |           |         |
| Cross-sectional area (mm <sup>2</sup> )                                   | Diameter of bushing hole per table 6 (mm) | Height H per table 6 (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 9 (A) .....                                      | --   |                       |
|         | nominal cross-sectional area (mm <sup>2</sup> ).....                    | --   |                       |
|         | 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 9 (A) .....                                      | --   |                       |
|         | nominal cross-sectional area (mm <sup>2</sup> ).....                    | --   |                       |
|         | allowed voltage drop (mV) .....   | ≤ 22,5 mV or 2 times 24 <sup>th</sup> cycle value (mV) |                       |



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

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

|                |   |     |
|----------------|---|-----|
| <b>12.3.10</b> | TABLE: mechanical stresses occurring in normal use                        | N/A |
|                | Rated current (A).....  | 5.0 |
|                | Largest/smallest cross-sectional area per table 8 (mm <sup>2</sup> )..... | 1.5 |

| 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 <sup>2</sup> ) | Remarks |
|---|---|---|---------|
| 5   | rigid solid   | 1.0                                     | P       |
| 5   | rigid solid   | 1.5                                     | P       |
| 5   | rigid stranded  | 1.0                                     | P       |
| 5   | rigid stranded  | 1.5                                     | P       |

|  |   |   |
|--|---|---|
|  | TABLE: Test with apparatus shown in figure 9                              |   |
|  | Rated current (A).....  | 5                                       |
|  | Type of conductors .....  | rigid solid / rigid stranded / flexible |
|  | Smallest/largest cross-sectional area per table 8 (mm <sup>2</sup> )..... | 1.5                                     |
|  | Number of conductors.....   | -                                       |

| Cross-sectional area (mm <sup>2</sup> ) | Diameter of bushing hole per table 6 (mm) | Height H per table 6 (mm) | Mass (kg) | Remarks |
|---|---|---------------------------|-----------|---------|
| 1.0                                     | 6.5                                       | 260                       | 0.4       | P       |
| 1.5                                     | 6.5                                       | 260                       | 0.4       | P       |

*Supplementary information:*



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

|  |   |         |       |         |       |       |         |
|--|---|---------|-------|---------|-------|-------|---------|
| <b>12.3.12</b>                                       | <b>TABLE: Deflection test (principle of test apparatus shown in figure 10a)</b> |         |       |         |       |       | P       |
|  | Test carried out for 1 h connecting rigid solid conductors:                     |         |       |         |       |       |         |
|  | test current (A) (equal rated current) .....                                    | 13.5    |       |         |       |       |         |
|  | required voltage drop (mV) .....  | ≤ 25 mV |       |         |       |       |         |
| Type of conductor                                    | Smallest  |         |       | Largest |       |       | Remarks |
| cross-sectional area per table 10 (mm <sup>2</sup> ) | 1.0   |         |       | 1.5     |       |       | --      |
| force per table 11 (N)                               | 0.25  |         |       | 0.5     |       |       | --      |
| 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 1 <sup>st</sup> deflection (mV)         | 9.3   | 9.2     | 9.2   | 9.2     | 9.5   | 9.3   | P       |
| voltage drop 2 <sup>nd</sup> deflection (mV)         | 8.6   | 9.0     | 8.9   | 8.9     | 9.4   | 8.6   | P       |
| voltage drop 3 <sup>rd</sup> deflection (mV)         | 9.1   | 9.0     | 9.1   | 9.0     | 9.5   | 9.1   | P       |
| voltage drop 4 <sup>th</sup> deflection (mV)         | 8.9   | 9.3     | 9.1   | 9.0     | 9.3   | 8.9   | P       |
| voltage drop 5 <sup>th</sup> deflection (mV)         | 9.0   | 9.0     | 9.3   | 9.1     | 9.3   | 9.0   | P       |
| voltage drop 6 <sup>th</sup> deflection (mV)         | 8.9   | 9.4     | 9.4   | 9.1     | 9.1   | 8.9   | P       |
| voltage drop 7 <sup>th</sup> deflection (mV)         | 9.2   | 10.0    | 9.2   | 9.0     | 9.1   | 9.2   | P       |
| voltage drop 8 <sup>th</sup> deflection (mV)         | 8.9   | 9.2     | 9.0   | 9.2     | 9.2   | 8.9   | P       |
| voltage drop 9 <sup>th</sup> deflection (mV)         | 9.3   | 9.2     | 9.2   | 9.2     | 9.5   | 9.3   | P       |
| voltage drop 10 <sup>th</sup> deflection (mV)        | 8.6   | 9.0     | 8.9   | 8.9     | 9.4   | 8.6   | P       |
| voltage drop 11 <sup>th</sup> deflection (mV)        | 9.1   | 9.0     | 9.1   | 9.0     | 9.5   | 9.1   | P       |
| voltage drop 12 <sup>th</sup> deflection (mV)        | 8.9   | 9.3     | 9.1   | 9.0     | 9.3   | 8.9   | P       |
| <i>Supplementary information:</i>                    |   |         |       |         |       |       |         |

|                              |   |               |               |   |
|------------------------------|---|---------------|---------------|---|
| <b>16.2</b>                  | <b>TABLE: insulation resistance</b>   |               |               | P |
| item per table 20            | test voltage applied between:   | measured (MΩ) | required (MΩ) |   |
| 1                            | all poles connected together and the body, with the switch in the "on" position   | > 500         | ≥5            |   |
| 2                            | each pole in turn and all other poles connected to the body, with the switch in the "on" position                                       | > 500         | ≥2            |   |
| 3                            | the terminals which are electrically connected together when the switch is in the "on" position, the switch being in the "off" position | > 500         | ≥2            |   |
| supplementary information:-- |   |               |               |   |

|                   |                                 |                  |                                |    |
|-------------------|---------------------------------|------------------|--------------------------------|----|
| <b>16.3</b>       | <b>TABLE: electric strength</b> |                  |                                | P  |
|                   | rated voltage (V) .....         | 240V             |                                | -- |
| item per table 20 | test voltage applied between:   | test voltage (V) | flashover / breakdown (Yes/No) |    |



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

|   |   |      |    |
|---|---|------|----|
| 1 | all poles connected together and the body, with the switch in the "on" position   | 2000 | No |
| 2 | each pole in turn and all other poles connected to the body, with the switch in the "on" position                                       | 2000 | No |
| 3 | the terminals which are electrically connected together when the switch is in the "on" position, the switch being in the "off" position | 1250 | No |

supplementary information:--

| 17                | TABLE: temperature rise measurements  |   | P                                |
|-------------------|---|---|----------------------------------|
|                   | cross-sectional area of conductor not less than 1,5 mm <sup>2</sup> (mm <sup>2</sup> ) (table 15) ..... | —   | —                                |
|                   | terminal screws: torque (Nm) (2/3 table 3 or appropriate figures 1, 2, 3, 4).....                       | --  | --                               |
|                   | type of load .....  | Resistive load, LED                       | --                               |
|                   | rated current (A) / rated load (W or VA) .....  | 1200W for incandescent load; 300W for LED | --                               |
|                   | rated voltage (V) .....   | 240V                                      | --                               |
|                   | test voltage between 0,9 and 1,1 Vn (V), whichever is the more unfavourable .....                       | 264V                                      | --                               |
|                   | parts of the electronic switch  | Max. measured temperature rise (K)        | permissible temperature rise (K) |
| incandescent load |   |   |                                  |
|                   | Terminal L  | 26.8                                      | 55                               |
|                   | Terminal N  | 23.0                                      | 55                               |
|                   | X capacitor   | 33.7                                      | 85                               |
|                   | Relay body 5mm  | 16.3                                      | 60                               |
|                   | Electrolytic Capacitor  | 36.6                                      | 85                               |
|                   | PCB near Rectifier bridge   | 43.8                                      | 95                               |
|                   | PCB near Relay pin  | 42.0                                      | 95                               |
|                   | Plastic enclosure inside  | 25.1                                      | Ref                              |
|                   | Plastic enclosure outside   | 20.7                                      | 70                               |
|                   | Ambient   | 24.9°C                                    | --                               |
| LED               |   |   |                                  |
|                   | Terminal L  | 16.8                                      | 55                               |
|                   | Terminal N  | 11.6                                      | 55                               |
|                   | X capacitor   | 27.0                                      | 85                               |
|                   | Relay body 5mm  | 5.8                                       | 60                               |
|                   | Electrolytic Capacitor  | 31.5                                      | 85                               |
|                   | PCB near Rectifier bridge   | 37.3                                      | 95                               |



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

|                              |        |     |
|------------------------------|--------|-----|
| PCB near Relay pin           | 23.5   | 95  |
| Plastic enclosure inside     | 15.3   | Ref |
| Plastic enclosure outside    | 11.2   | 70  |
| Ambient                      | 25.0°C | --  |
| supplementary information:-- |        |     |

| 19  | TABLE: reduced electric strength after normal operation   |                                    | P                                |
|---|---|------------------------------------|----------------------------------|
| item per table 20   | test voltage applied between:   | test voltage (V)                   | flashover / breakdown (Yes/No)   |
| 1   | all poles connected together and the body, with the switch in the "on" position   | 1500                               | No                               |
| 2   | each pole in turn and all other poles connected to the body, with the switch in the "on" position                                       | 1500                               | No                               |
| 3   | the terminals which are electrically connected together when the switch is in the "on" position, the switch being in the "off" position | 750                                | No                               |
| 8   | live parts and metal knobs, push-buttons and the like   | 3000                               | No                               |
| TABLE: temperature rise measurements after normal operation |   |                                    | P                                |
|   | cross-sectional area of conductor not less than 1,5 mm <sup>2</sup> (mm <sup>2</sup> ) (table 15)                                       | --                                 | --                               |
|   | terminal screws: torque (Nm) (2/3 table 3 or appropriate figures 1, 2, 3, 4)..... :   | --                                 | --                               |
|   | type of load .....  | 1200W for resistive load           | --                               |
|   | rated current (A) / rated load (W or VA) .....  | 1200W                              | --                               |
|   | rated voltage (V)   | 240V                               | --                               |
|   | test voltage between 0,9 and 1,1 Vn (V), whichever is the more unfavourable   | 264V                               | --                               |
| parts of the electronic switch                              |   | Max. measured temperature rise (K) | permissible temperature rise (K) |
| Terminal L  |   | 28.7                               | 55                               |
| Terminal N  |   | 24.8                               | 55                               |
| X capacitor   |   | 35.7                               | 85                               |
| Relay body 5mm  |   | 18.0                               | 60                               |
| Electrolytic Capacitor                                      |   | 38.8                               | 85                               |
| PCB near Rectifier bridge                                   |   | 46.0                               | 95                               |
| PCB near Relay pin  |   | 44.2                               | 95                               |
| Plastic enclosure inside                                    |   | 27.0                               | Ref                              |
| Plastic enclosure outside                                   |   | 22.5                               | 70                               |



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

|                              |  |        |     |
|------------------------------|--|--------|-----|
| Ambient                      |  | 24.4°C | --  |
| LED                          |  |        |     |
| Terminal L                   |  | 18.6   | 55  |
| Terminal N                   |  | 13.3   | 55  |
| X capacitor                  |  | 29.0   | 85  |
| Relay body 5mm               |  | 7.4    | 60  |
| Electrolytic Capacitor       |  | 33.6   | 85  |
| PCB near Rectifier bridge    |  | 39.5   | 95  |
| PCB near Relay pin           |  | 25.5   | 95  |
| Plastic enclosure inside     |  | 17.1   | Ref |
| Plastic enclosure outside    |  | 12.9   | 70  |
| Ambient                      |  | 24.5°C | --  |
| supplementary information:-- |  |        |     |

|  |                           |                     |           |   |
|--|---------------------------|---------------------|-----------|---|
| <b>20.2</b>  | <b>TABLE: impact test</b> |                     |           | P |
| part of enclosure tested per table 18 (A, B, C, D) | blows per part            | height of fall (mm) | comments  |   |
| A  | 5                         | 120                 | No damage |   |
| supplementary information:--                       |                           |                     |           |   |

|                            |   |                       |                          |    |
|----------------------------|---|-----------------------|--------------------------|----|
| <b>21.3</b>                | <b>TABLE: ball pressure test of thermoplastic materials</b> |                       |                          | P  |
|                            | allowed impression diameter (mm) ..... : ≤ 2 mm             |                       |                          | -- |
| part under test            | material designation / manufacturer                         | test temperature (°C) | impression diameter (mm) |    |
| PCB                        | WENZHOU BOXUN SCIENCE & TECHNOLOGY CO LTD                   | 125                   | 0.8                      |    |
| Plastic of enclosure       | SABIC JAPAN L L C   | 70                    | 0.7                      |    |
| Terminal block             | DongGuan Dieran Electronics Technology Co.,Ltd.             | 125                   | 1.0                      |    |
| supplementary information: |   |                       |                          |    |

|   |   |                                      |                          |     |
|---|---|--------------------------------------|--------------------------|-----|
| <b>21.4</b>   | <b>TABLE: ball pressure test of thermoplastic materials</b> |                                      |                          | N/A |
|   | allowed impression diameter (mm) ..... : ≤ 2 mm             |                                      |                          | --  |
| part under test   | material designation / manufacturer                         | test temperature (°C) <sup>(1)</sup> | impression diameter (mm) |     |
| --  | --  | --                                   | --                       |     |
| supplementary information:<br><sup>(1)</sup> 70 °C / 40 °C + highest temperature rise determined during the test of clause 17 |   |                                      |                          |     |

|             |   |  |  |   |
|-------------|---|--|--|---|
| <b>22.1</b> | <b>TABLE: threaded part torque test</b> |  |  | P |
|-------------|---|--|--|---|



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

|                              |                         |                               |                     |              |           |
|------------------------------|-------------------------|-------------------------------|---------------------|--------------|-----------|
| 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) ..... | 240 | -- |
|-------------------------|-----|----|

| 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) |
|-------------------|---|------------------|---------|-------------------|----------|--------------------|-----------|
| 1, 6              | Between live parts which are separated when the contacts are open(apply to terminals for external wiring) | ≥ 3              | 4.2     | ≥ 3               | 4.2      | --                 | --        |
| 2, 7              | Between live parts of different polarity  | ≥ 3              | 3.1     | ≥ 3               | 3.1      | --                 | --        |
| 3, 8              | Between live parts and accessible surfaces of parts of insulating material                                | ≥ 3              | >6.0    | ≥ 3               | >6.0     | --                 | --        |

supplementary information:

**24.1** **TABLE: glow-wire test** P

| part under test   | material designation / manufacturer               | test temperature (°C) | remarks               |
|-------------------|---|-----------------------|-----------------------|
| Plastic enclosure | SABIC JAPAN L L C                                 | 850                   | No flame and glowing. |
| PCB               | WENZHOU BOXUN SCIENCE & TECHNOLOGY CO LTD         | 850                   | No flame and glowing. |
| Relay             | Tianchang City Tianrui Precision Elect. Co., Ltd. | 850                   | No flame and glowing. |

supplementary information: --

**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: --



| EN 60669-1& EN 60669-2-1 |   |  |                                  |
|--------------------------|---|--|----------------------------------|
| Clause                   | Requirement + Test  | Result - Remark                              | Verdict                          |
| <b>(101.1.1.1)</b>       | <b>TABLE: fault conditions test</b>   |  | P                                |
|                          | cross-sectional area of conductor not less than 1,5 mm <sup>2</sup> (mm <sup>2</sup> ) (table 15) ..... | --   | --                               |
|                          | terminal screws: torque (Nm) (2/3 table 3 or appropriate figures 1, 2, 3, 4).....                       | --   | --                               |
|                          | type of load .....  | Resistive load                               | --                               |
|                          | rated current (A) / rated load (W or VA) .....  | 1200W  | --                               |
|                          | rated voltage (V) .....   | 240V   | --                               |
|                          | test voltage between 0,9 and 1,1 Vn (V), whichever is the more unfavourable .....                       | 264V   | --                               |
|                          | <b>fault conditions simulated</b>   | <b>remarks</b>                               | <b>verdict</b>                   |
|                          | BD1 Short Circuit   | Fuse resistor opened, No damage, no, hazard. | P                                |
|                          | C1 Short Circuit  | Fuse resistor opened, No damage, no, hazard. | P                                |
|                          | D1 Short Circuit  | Unit worked normally, No damage, no hazard   | P                                |
|                          | Q1 Pin1-2 Short Circuit   | Unit worked normally, No damage, no hazard   | P                                |
|                          | Q1 Pin1-3 Short Circuit   | Unit shutdown, No damage, no hazard          | P                                |
|                          | Q1 Pin2-3 Short Circuit   | Unit worked normally, No damage, no hazard   | P                                |
|                          | Load  | Air switch opened, No damage, no hazard      | P                                |
|                          | <b>TABLE: temperature rise measurements</b>   |  | P                                |
|                          | temperature measured after (min) .....  | 1h27min                                      | --                               |
|                          | parts of the electronic switch  | max. measured temperature rise (K)           | permissible temperature rise (K) |
|                          | Load: Resistive   |  |                                  |
|                          | Terminal L  | 27.9   | 110                              |
|                          | Terminal N  | 24.1   | 110                              |
|                          | PCB near Relay pin  | 43.0   | 120                              |
|                          | Plastic enclosure outside   | 21.8   | 75                               |
|                          | Ambient   | 24.7°C                                       | 75                               |
|                          | <b>TABLE: additional temperature rise measurements in case of temperature limited by a fuse</b>         |  | N/A                              |
|                          | current under the relevant fault conditions measured with the fuse short-circuited (A) .....            |  | --                               |
|                          | type of fuse as specified by IEC 60127 .....  |  | --                               |



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

|                              |  |                                    |                                  |
|------------------------------|--|------------------------------------|----------------------------------|
|                              | test duration corresponding to the maximum fusing time corresponding to the current measured (min) : |                                    | --                               |
|                              | parts of the electronic switch   | max. measured temperature rise (K) | permissible temperature rise (K) |
|                              | --   | --                                 | --                               |
| supplementary information:-- |  |                                    |                                  |

|   |   |                                    |                                  |
|---|---|------------------------------------|----------------------------------|
| 101.1.1.2   | <b>TABLE: temperature rise measurements during overload tests</b>                                       |                                    | P                                |
|   | cross-sectional area of conductor not less than 1,5 mm <sup>2</sup> (mm <sup>2</sup> ) (table 15) ..... | --                                 | --                               |
|   | terminal screws: torque (Nm) (2/3 table 3 or appropriate figures 1, 2, 3, 4) .....                      | --                                 | --                               |
|   | rated voltage (V) .....   | 240V                               | --                               |
|   | test voltage between 0,9 and 1,1 Vn (V), whichever is the more unfavourable .....                       | 264V                               | --                               |
|   | parts of the electronic switch  | Max. measured temperature rise (K) | permissible temperature rise (K) |
|   | Terminal L  | 59.7                               | 110                              |
|   | Terminal N  | 59.5                               | 110                              |
|   | PCB near Relay pin  | 111.9                              | 120                              |
|   | Plastic enclosure outside   | 45.5                               | 75                               |
|   | Ambient   | 24.5°C                             | 75                               |
| supplementary information: tested current: 12.63*0.95=12 A; |   |                                    |                                  |

|                            |   |                  |                                |
|----------------------------|---|------------------|--------------------------------|
| <b>(101.3)</b>             | <b>TABLE: electric strength</b>   |                  | P                              |
| Item per table 15          | Test voltage applied between:   | Test voltage (V) | Flashover / breakdown (Yes/No) |
| 1                          | all poles connected together and the body, with the switch in the "on" position                   | 1500             | No                             |
| 2                          | each pole in turn and all other poles connected to the body, with the switch in the "on" position | 1500             | No                             |
| supplementary information: |   |                  |                                |



EN 60669-1& EN 60669-2-1

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

| 102                 | TABLE: components  |                         |  |                           |  | P |
|---------------------|--|-------------------------|--|---------------------------|--|---|
| object/part No.     | manufacturer/<br>trademark                                 | type/model              | technical data                           | compliance to<br>standard | mark(s) of<br>conformity <sup>1)</sup> |   |
| Cover               | SABIC JAPAN L<br>L C                                       | 940(f1)                 | PC, V-0, Min<br>thickness<br>1.1mm, 80°C | UL 94, UL 746             | UL E207780                             |   |
| Enclosure<br>(base) | SABIC JAPAN L<br>L C                                       | 940(f1)                 | PC, V-0, Min<br>thickness<br>1.1mm, 80°C | UL 94, UL 746             | UL E207780                             |   |
| Relay               | Tianchang City<br>Tianrui Precision<br>Elect. Co., Ltd.    | HRW-124LM               | 10A, 250VAC                              | IEC/EN 61810-<br>1        | TUV<br>R50151826                       |   |
| Alternative         | Ningbo Lishun<br>Relay CO.LTD                              | SHD-24VDC-y-z<br>LS-T73 | 10A, 250VAC                              | IEC/EN 61810-<br>1        | TUV<br>R50131151                       |   |
| Alternative         | DONGGUAN<br>GOLDEN<br>ELECTRICAL<br>APPLIANCES<br>CO.,LTD  | GH-1A-24L               | 12A, 250VAC                              | IEC/EN 61810-<br>1        | TUV<br>R50158866                       |   |
| Alternative         | NINGBO HUI<br>LONG CANG<br>ELECTRONICS<br>Co., Ltd         | 973-24VDC-SL-<br>A      | 12A, 250VAC                              | IEC/EN 61810-<br>1        | TUV<br>R50332912                       |   |
| Alternative         | NINGBO TIANBO<br>GANGLIAN<br>ELECTRONICS<br>Co., Ltd       | HJR-3FF-S-H             | 12A, 250VAC                              | IEC/EN 61810-<br>1        | TUV<br>R50116163                       |   |
| Alternative         | SHENZHEN<br>GOLDEN<br>ELECTRICALAP<br>PLIANCES<br>CO.,LTD. | GN-1A-24                | 16A, 250V~                               | EN 61810-1                | TUV R<br>50158866                      |   |
| PCB                 | WENZHOU<br>BOXUN<br>SCIENCE &<br>TECHNOLOGY<br>CO LTD      | BOUNCE                  | V-0, 130°C                               | UL 94, UL 746             | UL E321346                             |   |
| Alternative         | WENZHOU JUYI<br>ELECTRONIC<br>TECHNOLOGY<br>CO., LTD.      | JY-D                    | V-0, 130°C                               | UL 94, UL 746             | UL E492597                             |   |
| Alternative         | GUANGDE<br>SANYANG<br>ELECTRONICS<br>CO LTD                | SY-S                    | V-0, 130°C                               | UL 94, UL 746             | UL E473856                             |   |
| Alternative         | Interchangeable  | Interchangeable         | V-0, 130°C                               | UL 94, UL 746             | UL                                     |   |
| X-capacitor         | NINGBO<br>JIANGBEI<br>ZHENHUA<br>ELECTRONIC<br>CO LTD      | CBB62                   | 0.33μF,<br>330Vac, X2<br>type, 40/100/21 | IEC/EN 60384-<br>14       | VDE<br>40006458                        |   |



## EN 60669-1&amp; EN 60669-2-1

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

|                |  |                   |  |                                |              |
|----------------|--|-------------------|--|--------------------------------|--------------|
| Alternative    | DAIN Electronics Co., Ltd.                     | MPX               | 0.33 $\mu$ F, 275Vac, X2 type, 40/100/21       | IEC/EN 60384-14                | VDE 40018798 |
| Alternative    | Jimson Electronics(Xiamen)Co.,Ltd.             | MKP - Radial Type | 0.33 $\mu$ F, 275Vac, X2 type, 40/100/21       | IEC/EN 60384-14                | VDE 40000463 |
| Alternative    | Tenta Electric Industrial Co. Ltd..            | MEX               | 0.33 $\mu$ F, 275Vac, X2 type, 40/100/21       | IEC/EN 60384-14                | VDE 119119   |
| Alternative    | Cixiyuandong electronics co.,ltd               | MPX               | 0.33 $\mu$ F, 275Vac, X2 type, 40/100/21       | IEC/EN 60384-14                | VDE 40009966 |
| Alternative    | NINGBO JIANGBEI ZHENHUA ELECTRONIC CO LTD      | CBB62             | 0.33 $\mu$ F, 330V~, 100 $^{\circ}$ C, X2 type | IEC/EN 60384-14                | VDE 40006458 |
| Terminal block | DongGuan Dieran Electronics Tecnology Co.,Ltd. | DA260             | 250V, 10A, T110                                | EN 60998-1, EN 60998-2-1       | VDE 40031801 |
| Alternative    | Dongguan Changhe Electronics Co., Ltd.         | CS350-00-500      | 250V, 10A, T110                                | EN 60998-1, EN 60998-2-1       | VDE 40022503 |
| Fuse resistor  | Yageo Components (Suzhou) Co. Ltd.             | FKN series        | 2W 100 $\Omega$                                | IEC/EN 60127-1, IEC/EN 60127-3 | UL E323780   |

<sup>(1)</sup> Provided evidence ensures the agreed level of compliance. See OD-CB2039.



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

|                                |  |                                    |                                  |
|--------------------------------|--|------------------------------------|----------------------------------|
| <b>(102.4.2)</b>               | <b>TABLE: temperature rise measurements after test for automatic protective devices which only decrease current to the electronic switch</b> |                                    | <b>N/A</b>                       |
|                                | Cross-sectional area of conductor not less than 1,5 mm <sup>2</sup> .....  | --                                 | --                               |
|                                | Terminal screws: torque (Nm) (2/3 table 5) .....   | --                                 | --                               |
|                                | Type of load .....   | --                                 | --                               |
|                                | Rated current (A) / rated load (W or VA) .....   | --                                 | --                               |
|                                | Rated voltage (V) .....  | --                                 | --                               |
|                                | Test voltage between 0,9 and 1,1 V <sub>n</sub> (V), whichever is the more unfavourable .....  | --                                 | --                               |
|                                | Samples number.....  | --                                 | --                               |
| Parts of the electronic switch |  | Max. Measured temperature rise (K) | Permissible temperature rise (K) |
| --                             |  | --                                 | --                               |
| --                             |  | --                                 | --                               |
| --                             |  | --                                 | --                               |
| --                             |  | --                                 | --                               |
| supplementary information:     |  |                                    |                                  |

|   |   |   |                                   |                                   |
|---|---|---|-----------------------------------|-----------------------------------|
| <b>(107)</b>  | <b>Table: Capacitors</b>  |   |                                   | <b>N/A</b>                        |
| <b>Application of capacitor</b>   |   | Approved type(s) of capacitor according to IEC 60384-14 |                                   |                                   |
|   |   | Un ≤ 125 V  | 125 V < U <sub>n</sub> ≤ 250 V    |                                   |
|   | Without overcurrent protection  |   | With overcurrent protection (a)   |                                   |
| Between live conductors (L or N) and earth (PE)   |   | <input type="checkbox"/> Y4                             | <input type="checkbox"/> Y2       | <input type="checkbox"/> Y2       |
| Between live conductors (L and N or L1 and L2):   | - without impedance in series   | <input type="checkbox"/> X2                             | <input type="checkbox"/> X1       | <input type="checkbox"/> X2       |
|   | - with impedance in series, which, when capacitor(s) is (are) short-circuited, limits the current to a value of | 0,5 A and higher  | <input type="checkbox"/> X3       | <input type="checkbox"/> X2       |
| below 0,5 A   |   | <input type="checkbox"/> Any type                       | <input type="checkbox"/> Any type | <input type="checkbox"/> Any type |
| (a) External to the capacitor or built into the capacitor (for example, a fusing resistor). |   |   |                                   |                                   |



**Photo Documentation**

Reference No.: WTN22D04067830Z

Model: ST701



Photo 1 External view



Photo 2 External view



### Photo Documentation

Reference No.: WTN22D04067830Z

Model: ST701



Photo 3 External view



Photo 4 External view



**Photo Documentation**

Reference No.: WTN22D04067830Z

Model: ST701

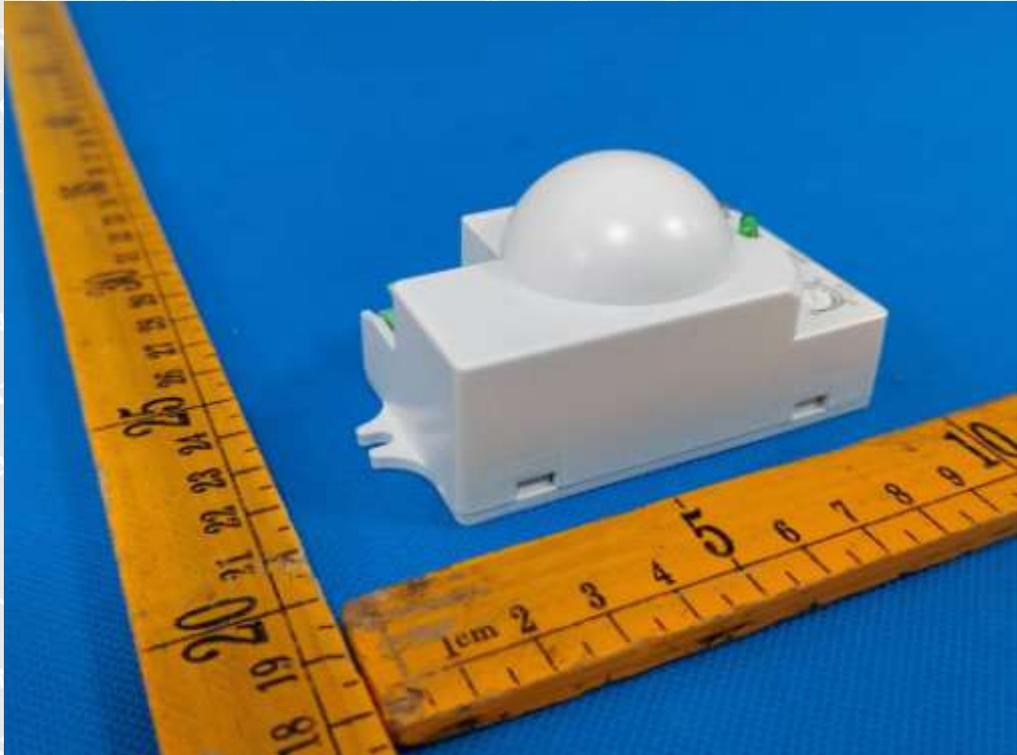


Photo 5 External view



Photo 6 Internal view



**Photo Documentation**

Reference No.: WTN22D04067830Z

Model: ST701



Photo 7 Internal view

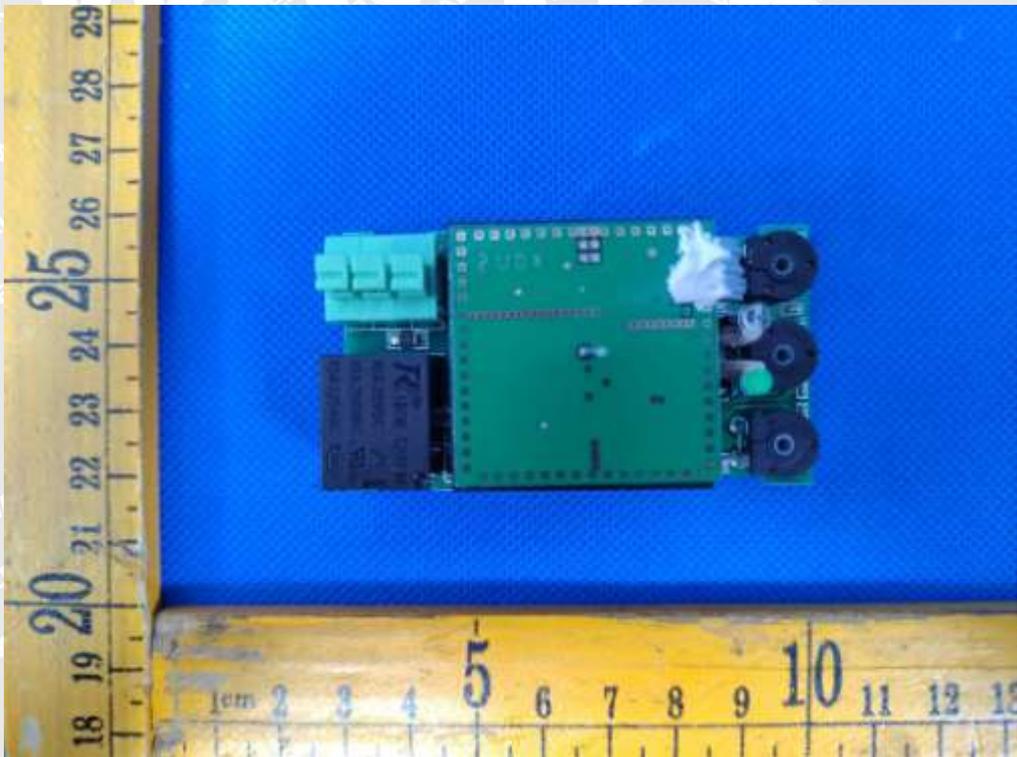


Photo 8 PCB view



**Photo Documentation**

Reference No.: WTN22D04067830Z

Model: ST701

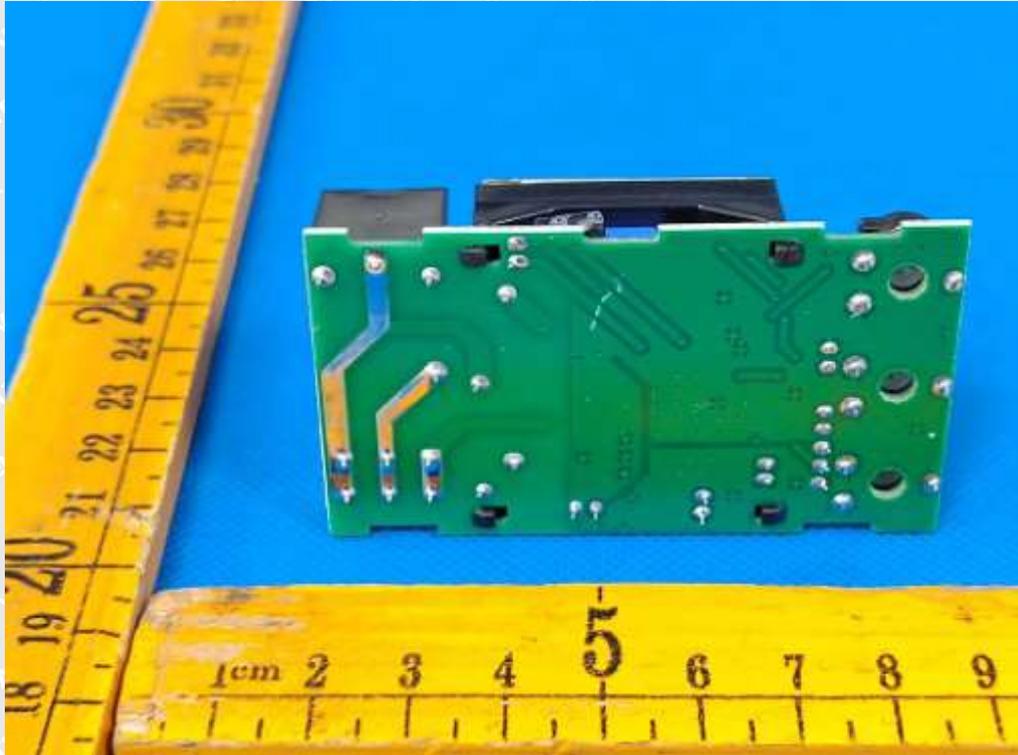


Photo 9 | PCB view



Photo 10 PCB view

===== End of Report =====