Test Report issued under the responsibility of:

TEST REPORT
IEC 60669-2-1
Switches for household and similar fixed electrical installations – Part 2-1: Particular requirements – Electronic control devices

Report Number. .....:	2409B1003SHA-001
Date of issue .....:	2024-12-31
Total number of pages .....:	125 (110 pages test report + 15 pages photos)
Name of Testing Laboratory preparing the Report.....:	Intertek Testing Services (Shanghai FTZ) Co., Ltd Building No.86, 1198 Qinzhou Road (North), Shanghai 200233, China
Applicant's name .....:	Taili Industrial Co., Ltd.
Address .....:	No.1, North Juguangyuan Road, high-tech industrial Park, Wenzhou City, Zhejiang, China, 325027
Test specification:	
Standard .....:	IEC 60669-2-1:2021 used in conjunction with IEC 60669-1:2017
Test procedure .....:	CB Scheme
Non-standard test method .....:	N/A
TRF template used .....:	IECEE OD-2020-F1:2023, Ed.1.6
Test Report Form No. .....:	IEC60669_2_1K
Test Report Form(s) Originator ....:	IMQ S.p.A.
Master TRF.....:	Dated 2024-04-18

This report is not valid as a CB Test Report unless signed by an approved IECEE Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
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Test item description .....:	Smart switch
Trade Mark(s).....:	TAILI
Manufacturer .....:	Same as applicant
Model/Type reference .....:	AS6A-01W, AS6A-02W, AS6A-03W, AS7A-10W, AS7A-11W, AS7A-12W, AS7A-20W, AS7A-21W, AS7A-22W, AS6A-04Ze, AS6A-05Ze, AS6A-06Ze, AS7A-13Ze, AS7A-14Ze, AS7A-15Ze, AS7A-23Ze, AS7A-24Ze, AS7A-25Ze
Ratings .....:	Input: 100-240V~ 50/60Hz μ Max. Load: 1000W Output: incandescent lamps max. 1000W/gang Fluorescent lamps max. 200W/gang LED lamp max. 200W/gang

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**CB Testing Laboratory:**	Intertek Testing Services (Shanghai FTZ) Co., Ltd	
Testing location/ address.....:		Building No.86, 1198 Qinzhou Road (North), Shanghai 200233, China	
Tested by (name, function, signature).....:		Lorry Tan (Project Engineer)	Lorry Tan
Approved by (name, function, signature)...:		Kent Wu (Mandated Reviewer)	Kent Wu
☐	**Testing procedure: CTF Stage 1:**		
Testing location/ address.....:			
Tested by (name, function, signature).....:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 2:**		
Testing location/ address.....:			
Tested by (name + signature) .....:			
Witnessed by (name, function, signature)..:			
Approved by (name, function, signature)...:			
☐	**Testing procedure: CTF Stage 3:**		
☐	**Testing procedure: CTF Stage 4:**		

List of Attachments (including a total number of pages in each attachment):

EU national differences (15 pages): page 96 to 110.

Photo attachment (15 pages): page 111 to 125

Summary of testing:

Tests performed (name of test and test clause):

1. AS7A-15Ze: Full tests.
   AS6A-06Ze, AS7A-25Ze: additional tests of clause 8, 13, 19, 20, 21, 24.
   AS7A-22W: additional tests of clause 23 & 26.
   Additional test of clause 24.1 are performed on insulating cover with different colour.
   For temperature rise test, only the highest values are recorded.
2. 10A circuit breaker shall be used in the upstream to protect this product and 10x1,45=14,5A is conducted for the overload test in clause 101.2, as declared by client.
3. Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.
4. We conclude that the product(s) presented in this report complies (comply) with the standard according to the test results on the submitted samples.

Testing location:

Intertek Testing Services (Shanghai FTZ) Co., Ltd

Building No.86, 1198 Qinzhou Road (North), Shanghai 200233, China

Summary of compliance with National Differences (List of countries addressed):

The product fulfils the requirements of BS EN IEC 60669-2-1:2022+A11:2022 (used in conjunction with BS EN 60669-1:2018) and EN IEC 60669-2-1:2022+A11:2022 (used in conjunction with EN 60669-1:2018).

Use of uncertainty of measurement for decisions on conformity (decision rule) :

☒ No decision rule is specified by the IEC standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty ("simple acceptance" decision rule, previously known as "accuracy method").

☐ Other: … (to be specified, for example when required by the standard or client, or if national accreditation requirements apply)

Information on uncertainty of measurement:

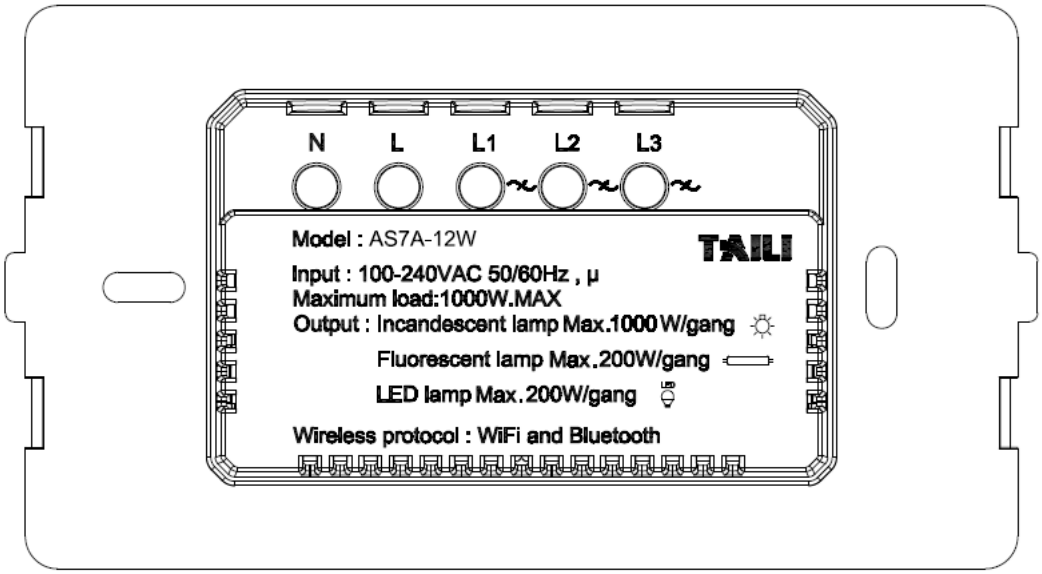
The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE.

IEC Guide 115 provides guidance on the application of measurement uncertainty principles and applying the decision rule when reporting test results within IECEE scheme, noting that the reporting of the measurement uncertainty for measurements is not necessary unless required by the test standard or customer.

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.



Note: the marking of other models is same as above except of model no., the number of output and the wireless protocol.

Test item particulars.....:	
Type of electronic switch and its function (examples given in Annex AA) .....:	Smart switch
Pattern number .....:	1 (1gang switches) 1+1 (2gang switches) 1+1+1 (3gang switches)
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 as described in IEC 60529. .....: Degree of protection against harmful effects due to the ingress of water as described in IEC 60529.....:	IP2X / ~~IP4X / IP5X~~ IPX0 / ~~IPX4 / IPX5~~
Method of actuating the switch: .....:	☐ rotary ☒ touch ☐ tumbler ☐ proximity ☐ rocker ☐ optical ☒ push-button ☐ acoustic ☐ cord-operated ☒ other external influences: Wifi, Bluetooth, Zigbee
Method of mounting .....:	☐ surface-type ☐ architrave-type. ☒ flush-type ☐ to be mounted at a height greater than 1,7 m. ☐ semi flush-type ☐ panel-type
Method of installation .....:	☒ design A ☐ design B
Type of terminals .....:	☒ screw-type ☐ screwless-type ☐ for rigid conductors only ☒ for rigid and flexible conductors ☐ electronic control devices without terminals equipped with connecting leads.
Flexible cable outlet .....:	☒ without ☐ with
Rated current (A) / Rated load (VA or W) .....:	See page 2
Minimum current (A) / Minimum load (VA or W) .....:	N/A
Type of electronic control devices.....:	☒ classified as an electronic switch ☐ classified as an HBES/BACS switch ☐ classified as an electronic extension unit
kind of load controlled by the electronic switch or HBES/BACS switch: .....:	☐ for general purpose use according to Part 1 up to and including 16 A ☒ incandescent lamps ☒ externally ballasted light sources (fluorescent lamps, CFL, LED lamps, LED modules) ☐ motors ☒ self-ballasted lamps (CFLi, LEDi) ☐ load for heating installations ☐ declared load.

Test item particulars ..... :	
Presence of SELV, PELV or FELV parts in the electronic control devices .....:	☐ with SELV, PELV or FELV parts only ☒ without SELV, PELV or FELV parts ☐ having a combination of parts connected to the mains and SELV, PELV or FELV parts.
Electronic control devices installation environment:	☐ to be used in a SELV/PELV environment only ☐ to be used in a FELV environment only ☒ to be used in a SELV/PELV, FELV and/or mains environment
Kind of connection to the network port based on SELV/PELV .....:	☐ 7.105 a) connected to a network which is installed wholly within the same equipotential earthing system ☐ 7.105 b) connected to a network which is not installed wholly within the same equipotential earthing system
Kind of energization of the control circuit .....:	~~Electronic RCS energized by impulses / Electronics RCS permanently energized~~
Type of control mechanism .....:	**mechanical** / ~~thermal / pneumatic / hydraulic~~ / **electrical / combination (s) of the previous (only TDS)**
Rated voltage (V) .....:	100 - 240V
Rated frequency (Hz) .....:	50/60
Characteristic of fuses .....:	-
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 ..... :	2024-09-11
Date (s) of performance of tests ..... :	2024-09-11 to 2024-12-10
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.** This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.	

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....:	☐ **Yes** ☒ **Not applicable**
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies).....:	Same as applicant

General product information and other remarks:

The devices under evaluation are smart switches. All of them share the similar switch structure, the difference among them is listed as below:

Model no.	Description
AS6A-01W	4X2 1gang smart touch switch, AG, WIFI & Bluetooth, L&N
AS6A-02W	4X2 2gang smart touch switch, AG, WIFI & Bluetooth, L&N
AS6A-03W	4X2 3gang smart touch switch, AG, WIFI & Bluetooth, L&N
AS7A-10W	4X2 1gang smart push-button switch, PC, WIFI & Bluetooth, L&N
AS7A-11W	4X2 2gang smart push-button switch, PC, WIFI & Bluetooth, L&N
AS7A-12W	4X2 3gang smart push-button switch, PC, WIFI & Bluetooth, L&N
AS7A-20W	4X2 1gang smart full touch controls switch, PC, WIFI & Bluetooth, L&N
AS7A-21W	4X2 2gang smart full touch controls switch, PC, WIFI & Bluetooth, L&N
AS7A-22W	4X2 3gang smart full touch controls switch, PC, WIFI & Bluetooth, L&N
AS6A-04Ze	4X2 1gang smart touch switch, AG, Zigbee, L&N
AS6A-05Ze	4X2 2gang smart touch switch, AG, Zigbee, L&N
AS6A-06Ze	4X2 3gang smart touch switch, AG, Zigbee, L&N
AS7A-13Ze	4X2 1gang smart push-button switch, PC, Zigbee, L&N
AS7A-14Ze	4X2 2gang smart push-button switch, PC, Zigbee, L&N
AS7A-15Ze	4X2 3gang smart push-button switch, PC, Zigbee, L&N
AS7A-23Ze	4X2 1gang smart full touch controls switch, PC, Zigbee, L&N
AS7A-24Ze	4X2 2gang smart full touch controls switch, PC, Zigbee, L&N
AS7A-25Ze	4X2 3gang smart full touch controls switch, PC, Zigbee, L&N

Note 1: the explanation for the code:
AG: with Anti-glare glass cover plate
PC: with Polycarbonate cover plate
WIFI & Bluetooth: with WIFI & Bluetooth remote control
Zigbee: with Zigbee remote control
L&N: with L&N power supplied

Note 2: smart full touch controls switch is symmetrical push-button actuated.

Note 3: there are five different colour for cover plate and actuating member.
WHI: white; GRY: gray; GLD: gold; BLK: black, BLU: blue

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
8	**MARKING**		
8.1	**General**		P
	Electronic switches and HBES/BACS switches marked with:		P
	- rated voltage(s) in volts ..... :	100-240	P
	for switches classified according to 7.102.1, the rated current(s):		
	- in amperes (A) if according to 19.1 of Part 1 only . :		N/A
	- in amperes (A) if according to 19.1 and 19.3 of Part 1 only..... :		N/A
	- in amperes (AX) if according to 19.1, 19.2 and 19.3 of Part 1, when currents (A) and (AX) are equal..... :		N/A
	- in amperes (A and AX) if according to 19.1, 19.2 and 19.3 of Part 1 when currents (A) and (AX) are not equal ..... :		N/A
	for switches classified according to 7.102.2:		
	- rated current(s) in amperes or ..... :	See page 4	P
	- rated load(s) in volt-amperes or watts..... :	See page 4	P
	- symbol for nature of supply ..... :	AC	P
	- manufacturer's or responsible vendor's name, trade mark or identification mark..... :	See page 4	P
	- type reference..... :	See page 4	P
	- symbol for mini-gap construction ..... :		N/A
	- symbol for micro-gap construction..... :	μ	P
	- symbol for semiconductor switching device ..... :		N/A
	- first IP characteristic numeral, if declared higher than 4, in which case the second characteristic numeral is also marked; ..... :	IP2X	N/A
	- second IP characteristic numeral, if declared higher than 2, in which case the first characteristic numeral is also marked; ..... :	IPX0	N/A
	- length of insulation to be removed before the insertion of the conductor into the screwless type terminal. ..... :		N/A
	Marking of the pattern number given in 7.1 It's recommended if the connections are not clear ... :	Wiring diagram provided in manual	N/A
	If a base carries two or more electronic switches and HBES/BACS switches with separate operating devices, marking with the pattern numbers is recommended, for example 1 + 6 or 1 + 1 + 1 ..... :		N/A
	In addition, electronic switches and HBES/BACS switches are marked with		P
	- rated frequency (Hz)..... :	50/60	P

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- rating and type of any fuse incorporated if intended to be replaceable .....:		N/A
	- symbols for the kind of load (see 8.2) .....:	See page 4	P
	- except for electronic switch and the HBES/BACS according to 7.102.1 for general purpose use for which Part 1 applies.....:		N/A
	- the minimum height for mounting the electronic switch and the HBES/BACS indicated in the installation instruction of the manufacturer if there is a restriction (see 10.1). .....:		N/A
	Electronic switches and HBES/BACS switches with screwless terminals marked with an indication of the suitability to accept rigid conductors only, (if any) ....:		N/A
	For electronic switches and HBES/BACS switches with included automatic function and with manufacturer's declared number of operations higher than that indicated in 19.101, 19.102, 19.104, 19.106 and 19.107 then this stated in the accompanying instruction sheet.		N/A
	Electronic extension units are marked as for electronic switches and HBES/BACS switches		N/A
	but electronic extension units which are supplied by the network do not need to be marked with: - rated voltage in volts - rated current in amperes or rated load in volt-amperes or watts; - symbol for nature of supply		N/A
	The method for the correct installation of the product is provided in the manufacturer's instructions.....:	Flush type mounting	P
8.2	**Symbols**		P
	Symbols used: as required in the standard		P
	The symbol "AX" may be replaced by the symbol "X"		N/A
	For the marking with rated current and rated voltage the figures may be used alone		N/A
	The marking for the nature of supply placed next to the marking for rated current and rated voltage.		P
	For electronic switches or HBES/BACS switches intended for heating installations suitable for resistive load and for motor load, the rated current for motor load is placed between round brackets and immediately follows the rated current for resistive load - Example: 16(3)		N/A
	Other symbols used are explained in the installation instructions.		P

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Additional markings according to IEC 61140 only used if the protected class is not dependent on the installation conditions		N/A
8.3	**Visibility of markings**		P
	Markings are clearly visible with normal or corrected vision, without additional magnification.		P
	Marking of the electronic switch and HBES/BACS placed on the main part:		
	- the rated current or rated load, rated voltage, symbol for nature of supply, rated frequency (if any), at least one type of load (if the electronic switch and HBES/BACS switch is not classified for general purpose use), the rating and type of any incorporated fuse (this is 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 (screwless terminal), if any,		N/A
	- symbol for mini-gap construction, micro-gap construction or semiconductor device, if applicable	µ	P
	- the type reference		P
	information concerning more than one type of load not already marked on the electronic switch or HBES/BACS are stated in the accompanying instruction sheet.		P
	Minimum and maximum current/load are stated for each type of load		N/A
	If a phase-cut dimmer is intended to be used together with an iron core transformer, information is given in the manufacturer's instructions that only a transformer intended to be used with a phase-cut dimmer is used.		N/A
8.4	**Marking on terminals for phase conductors**		P
	Terminals intended for the connection of phase conductors (supply conductors) are identified unless the method of connection is of no importance, is self-evident or is indicated on a wiring diagram		P
	Indications not placed on screws or other easily removable part		P
	Alternatively, the surface of such terminals are bare brass or copper, other terminals being covered with a metallic layer of another colour		N/A

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	For switches of pattern numbers 2, 3, 03 and 6/2, terminals associated with any one pole have similar identification, differing from that of the terminals associated with the other poles, unless the relationship is self-evident		N/A
	Electronic switch or HBES/BACS with more than two terminals: the load terminals are marked with an arrow pointing away from the terminal or with one of the symbols mentioned in 8.2	See page 4	P
	Any other terminals are marked in accordance with the installation instructions		P
	Installation not made clear by the markings: a wiring diagram is provided with each electronic switch or HBES/BACS switch	Wiring diagram marked on switch module	P
	If switched circuits cannot be used in SELV/PELV circuits, the relevant information is provided in the manufacturer's instructions		P
	If a product is classified according to 7.105 a), this is stated in the manufacturer's instructions		N/A
8.5	**Marking on terminals for neutral and earth conductors**		P
	Terminals intended exclusively for the neutral conductor are indicated by the letter N..... :	N	P
	Earthing terminal for the connection of the protective conductor is indicated by the symbol ⏚ (IEC 60417-5019:2006-08).		N/A
	Markings not be placed on screws or any other easily removable part		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
	The identification of electronic switch or HBES/BACS terminals may be achieved by		N/A
	- their marking with graphical symbols according to IEC 60417 or colours and/or alphanumeric system		N/A
	- their physical dimension or relative location.		N/A
	Leads of pilot lights are not considered to be conductors for the purpose of 8.5.		N/A
8.6	**Marking of the switch position**		N/A

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	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
	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
	The off-state is not marked with an "O" if the circuit on the load side is considered as live		N/A
8.6.101	It is recommended that the actual state of the electronic switch and HBES/BACS switch intended to control the brightness of lighting products is indicated when used as intended. This can be achieved by one of the following:		N/A
	- with marking of the on-/off-state position, or		N/A
	- with an indicator lamp, or		N/A
	- by adjusting the lamp dimmer so that at the lowest control state and at rated voltage minus 10 %, the light is still visible.		N/A
	Adjustment is to be made by the installer using an appropriate load specified by the manufacturer		N/A
8.7	**Additional requirements for marking**		P
	If it is necessary to take special precautions when installing the switch, details of these are given in an instruction sheet which accompanies the switch.	Instruction sheet provided	P
	Instruction sheets are written in the official language(s) of the country in which the switch is to be sold.		P
	Electronic control device containing a viewing window (lens) for a sensing device is intended to be mounted at a height greater than 1,7 m, this information are stated in the instruction sheet..... :		N/A
	If the electronic control device provides a looping through function on the input terminals through other components inside the electronic switch, such as PCBs, then the maximum rated current of the upstream fuse/circuit breaker to be installed is declared by the manufacturer in the instruction sheets. ..... :		N/A
	Marking is durable and easily legible. Test: 15 s with water and 15 s with 95 % n-hexane.		P

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
9	**CHECKING OF DIMENSIONS**		
	Switches and boxes comply with the appropriate standard sheets, if any		N/A
	Electronic control devices may be of dimensions other than those specified in the standard sheets (if any) provided they are supplied with suitable boxes		N/A
10	**PROTECTION AGAINST ELECTRICAL SHOCK**		
10.1	**Prevention of access to live parts**		P
	Electronic control devices : live parts not accessible		P
	Electronic control devices 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
	Electronic control devices 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		N/A
	During the test: switches not deform and no live parts accessible with test probe 11 of IEC 61032		P
	Viewing windows or the like on electronic control devices intended to be mounted at a height greater than 1,7 m are subjected to a force of 30 N.		N/A
10.2	**Requirements for operating parts**		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	No accessible metal part	N/A
	- reliably connected to earth		N/A
	This requirement does not apply to removable keys or intermediate parts, such as chains or rods.		N/A
	For touch sensitive electronic control devices, the associated protective impedance does not have to comply with the requirements of Clause 16 and 23		N/A

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	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
	- consist of at least two resistors or independent capacitors in series, of the same nominal value or a combination of both.		N/A
	- the resistors comply with 102.4		N/A
	- the capacitors comply with 102.3		N/A
	The removal of protective impedance is possible by destruction of the electronic control device or by rendering it unusable.		N/A
	The measurements are carried out between accessible metal part or any combination of accessible metal parts and earth, through a non-inductive resistor of 2 kΩ at rated voltage (and rated load in on-state), in on- and off-state, and/or at lowest and highest setting values.		N/A
	The current not exceed, in any measurement, 0,7 mA (peak value) for AC up to 1 kHz or 2 mA for DC.:		N/A
	For frequencies above 1 kHz, the limit of 0,7 mA is multiplied by the value of the frequency in kHz, but not exceed 70 mA. .....:		N/A
10.3	**Requirements for accessible metal parts**		P
10.3.1	Accessible parts of switches when in normal use are made of insulating material		P
	with the exception of the following:		
	- small screws and the like which are isolated from live parts and which are used for the fixing of the base and of covers, cover plates and other parts of the enclosure		N/A
	- actuating members complying with 10.2		N/A
	- the covers, cover plates and other parts of the enclosure made of metal which comply with the requirements of 10.3.2 or 10.3.3.		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:		
	- cannot be removed without being permanently damaged,		N/A
	or designed that		
	• cannot be replaced in an incorrect position		N/A
	• if they are omitted, accessories are rendered inoperable or manifestly incomplete		N/A

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	• there is no risk of accidental contact between live parts and metal covers or cover plates		N/A
	• 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
10.4	**Requirements for insulation of the mechanism**		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
10.5	**Requirements for insulation of the mechanism with respect to the surrounding environment**		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
10.6	**Requirements for switches operated indirectly**		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
10.7	**Requirements for switches with replaceable pull cord**		N/A
	Cord-operated switches: impossible to touch live parts when fitting or replacing the pull cord		N/A
10.101	**Requirements for fuse replacement or adjustment of control setting**		N/A
	Replacement of fuses or adjustment of control not involve risk of electric shock.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	If a cover or cover-plate or a fuse can be removed without the use of a tool, or if the manufacturer's instructions indicate that for the purpose of maintenance, fuse replacement or adjustment of control settings, covers and cover-plates fastened by means of a tool have to be removed, the protection against contact with hazardous live parts is assured even after removal of the covers or cover-plates. (this requirement does not apply when the electronic control device is to be dismounted from its supporting means for the replacement of the fuse-link and adjustment)		N/A
	The conditions for the safe replacement of the fuse and the safe adjustment of the setting(s) is specified in the manufacturer's instructions, (if any)		N/A
	Compliance is checked with the test probe B of IEC 61032 (10 N); test probe does not touch live parts		N/A
	electronic control device provided with a hole for setting adjusting, the adjustment doesn't involve the risk of an electric shock		N/A
	Compliance is checked by applying a test pin according to Figure 106 through that hole only. The pin not touch hazardous live parts.		N/A
10.102	**Ventilation openings**		N/A
	Ventilation openings over hazardous live parts are designed that a foreign body introduced into these openings not come into contact with any hazardous live parts with the electronic control device installed as in normal use.		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
10.103	**SELV, PELV or FELV circuits**		N/A
	Live parts of SELV, PELV or FELV circuits are electrically separated from each other and from other circuits by simple or protective separation as given in Clause 23.		N/A
	If the SELV / PELV is higher than 25 V AC or 60 V DC in dry conditions or 12 V AC or 30 V DC in wet conditions, protection against direct contact is provided by:		N/A
	- barriers or enclosures giving at least the degree of protection IP2X or IPXXB		N/A
	- insulation capable of withstanding a test voltage of 500 V AC for 1 min		N/A
10.104	**Protection from touch current**		N/A
10.104.1	**General**		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
10.104.2	**Permissible touch current when touching accessible parts of HBES/BACS switches**		N/A
	The touch current of HBES/BACS switches not higher than 0,5 mA RMS (0,7 mA peak) even during single fault condition.		N/A
10.104.3	**Limitation of the touch current from the device to the dedicated HBES/BACS network**		N/A
	The touch current to the HBES/BACS network from HBES/BACS switches supplied from the mains supply, or from interfaces to other networks, is limited to 0,25 mA RMS.		N/A
11	**PROVISION FOR EARTHING**		
	Clause 11 not applicable to SELV electronic switches or to SELV HBES/BACS switches.		N/A
11.1	**General**		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
11.2	**Earthing terminals**		N/A
	Earthing terminals: with screw clamping or screwless terminals and comply with clause 12		N/A
11.3	**Requirements for surface-type switches**		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
	Clause 12 does not apply to floating terminals which are comply with IEC 60998-1 and the relevant sub-part of IEC 60998-2.		N/A
11.4	**Test for earthing connection**		N/A
	The connection between the earthing terminal and accessible metal parts to be connected thereto are of low resistance.		N/A
	Test current equal to 1,5 In or 25 A (A) ..... :		N/A
	Resistance ≤ 0,05 Ω (Ω) ..... :		N/A
11.101	**Protective earthing continuity via printed circuit boards**		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The printed conductors of printed circuit boards may be used to provide protective earthing continuity under the following conditions only:		N/A
	- at least two tracks with independent soldering points which withstand a single short circuit test according to 101.4 ensuring that the current goes through the track and immediately after the switch is 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 according to 101.4 ensuring that the current goes through the track and immediately after the switch is fulfil the requirements of 11.4.		N/A
	In addition:		N/A
	- the material of the printed circuit board consist of epoxide woven glass fabric copper clad laminated sheet and		N/A
	- the printed circuit board comply with the overload test according to 101.2.4.		N/A
12	**TERMINALS**		
12.1	**General**		P
	Switches provided with screw-type terminals or with screwless terminals..... :	Screw-type	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 are of class 1, rigid stranded conductors are of class 2 and flexible conductors are of class 5 according to IEC 60228		P
	Terminals having screw clamping complying with IEC 60998-2-1 are considered to be in compliance with the requirements and tests of 12.2, except those of 12.2.6 and 12.2.7 and 12.2.8, provided they are chosen according to Table 4.		N/A
	Terminals for other than the main circuit (load circuit) may have different connecting capability in relation to this circuit.		N/A
	Terminals for conductors smaller than 0,5 mm² fulfil the requirements of IEC 60999-1		N/A
	Terminals having screwless clamping complying with IEC 60998-2-2 are considered to be in compliance with the requirements and tests of 12.3 provided they are chosen according to Table 8, except for the requirements of 12.3.7 and 12.3.9		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The tests of 12.3.7 and 12.3.9 are carried out in addition		N/A
12.2	**Terminals with screw clamping for external copper conductors**		P
	Terminals with screw clamping having cross-sectional areas as shown in Table 4		P
	- 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)		P
	Rated current .....(A):	Max. 10A	P
	Type of conductor (rigid / flexible) ..... :	Rigid / flexible	P
	Smallest / largest cross-sectional area (mm^2) ..... :	1,0 / 2,5	P
	Diameter of largest conductor (mm)..... :	2,13	P
	Figure of terminal ..... :	**1** / 2 / 3 / 4 / 5	P
	Minimum diameter D (minimum dimensions) of conductor space: required (mm); measured (mm) ... :	3,0; 4,0	P
12.2.2	Terminals allow the conductor to be connected without special preparation		P
12.2.3	Terminals with screw clamping have adequate mechanical strength		P
	Screws and nut for clamping the conductors have metric ISO thread or a comparable thread		P
	Screws not of soft metal such as zinc or aluminium		P
12.2.4	Terminals with screw clamping are resistant to corrosion		P
12.2.5	Terminals with screw clamping clamp the conductor(s) without undue damage to the conductor(s)	See appended table 12.2.5	P
	For screws having a hexagonal head with slot for tightening, test is 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		P
12.2.6	Terminals with screw clamping clamp the conductor reliably between metal surfaces	See appended table 12.2.6	P
	During the test: conductor not move noticeably		P
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	P

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Clause	Requirement + Test	Result - Remark	Verdict
	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		P
12.2.8	Terminals not work loose from their fixing to the switch		P
	Movement of the terminal is allowed as long as it is sufficiently limited so as to prevent noncompliance with this document		P
	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:		P
	- rated current .....(A):	10	P
	- solid rigid copper conductor of the largest cross-sectional area (mm²) (table 4) ..... :	2,5	P
	- torque (Nm) (table 5 or appropriate figures 1, 2, 3, 4) ..... :	0,8	P
	Screws and nuts tightened and loosened 5 times. During the test: terminals not work loose and show no damage		P
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):	1,5; >1,8	P
	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 ≥ 40 A		N/A
	- fitted with spring washers or equally effective locking means		N/A
12.3	**Screwless terminals for external copper conductors**		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
12.3.1	Screwless terminals of the type suitable for:		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
	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 conductors		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		N/A
	Rated current .....(A):		
	Type of conductor (rigid / flexible) ..... :		
	Smallest / largest cross-sectional area (mm^2) ..... :		
	Diameter of largest rigid conductor .....(mm):		
	Diameter of largest flexible conductor .....(mm):		
12.3.3	Screwless terminals allow the conductor to be connected without special preparation		N/A
12.3.4	Parts of screwless terminals intended for carrying current of materials as specified in 22.5		N/A
12.3.5	Screwless terminals clamp specified conductors with sufficient contact pressure without undue damage to the conductor		N/A
	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		N/A
	Disconnection of a conductor require an operation, other than a pull, so that can be made manually with or without a general-purpose tool		N/A
	It is not possible to confuse the opening for the use of a tool with the opening intended for the conductor		N/A
12.3.7	Screwless terminals intended for the interconnection of two or more conductors:		N/A
	- the clamping of one of the conductors is independent of the clamping of the other conductor(s)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- during the connection or disconnection the conductors can be connected or disconnected either at the same time or separately		N/A
	- 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^2) ..... :		N/A
12.3.8	Screwless terminals: adequate insertion obvious and over-insertion prevented		N/A
	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		N/A
12.3.9	Screwless terminals properly fixed to the switch		N/A
	Not work loose when conductors are connected or disconnected		N/A
	Self-hardening resins used to fix terminals which are not subject to mechanical stress		N/A
12.3.10	Screwless terminals withstand mechanical stresses occurring in normal use	See appended table 12.3.10	N/A
	During application of the pull, conductor not come out of the terminal		N/A
	Test with apparatus shown in figure 9	See appended table 12.3.10	N/A
	During the test conductors not move noticeably in the clamping unit		N/A
	After these tests: neither terminals nor clamping means have worked loose and conductors show no deterioration		N/A
12.3.11	Screwless terminals withstand electrical and thermal stresses occurring in normal use	See appended table 12.3.11	N/A
	After the test: inspection show no changes		N/A
	Repetition of test according to 12.3.10: screwless terminals withstand mechanical stresses occurring in normal use	See appended table 12.3.11	N/A
	During application of the pull conductor not come out of the terminal		N/A
	Test with apparatus shown in figure 10	See appended table 12.3.11	N/A
	- measured after 24^{th} and 192^{nd} temperature cycle		N/A
	- measured after any three of 48^{th}, 72^{nd}, 96^{th}, 120^{th}, 144^{th} or 168^{th} temperature cycle		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	After this test, an inspection by normal or corrected vision without additional magnification show no changes evidently impairing further use such as cracks, deformation or the like.		N/A
	In addition, the mechanical strength test to 12.3.10 is repeated and all specimens are withstand this test.	See appended table 12.3.10b	N/A
12.3.12	Screwless terminals: connected rigid solid conductor remains clamped, even when deflected during normal installation	See appended table 12.3.12	N/A
13	**CONSTRUCTIONAL REQUIREMENTS**		
13.1	**Mechanical requirements for insulating means**		P
	Insulating lining, barriers and like: adequate mechanical strength and secured in a reliable manner		P
13.2	**Installation requirements**		P
	Electronic control devices 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
	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		N/A
	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^2) ..... :		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

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Clause	Requirement + Test	Result - Remark	Verdict
	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
13.3	**Fixing of covers, cover plates and actuating members**		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	Snap-in structure for cover plate	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 are 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:		P
	Compliance checked by inspection only	Mounting plate	P
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
	- when their removal may give access, with the test probe B of IEC 61032, only to		N/A
	• insulating parts, or	by the tests of 20.7	P
	• earthed metal parts, or	by the tests of 20.7	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	by the tests of 20.7	N/A
	• live parts of SELV circuits not greater than 25 V AC and 60 V DC:	by the tests of 20.7	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
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: 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	Cover plate	P
13.4	**Openings in normal use**		P
	Switches: no free openings in their enclosures according to their IP classification		P
	Free openings according to 10.101 and 10.102 are accepted.		N/A
13.5	**Attachment of knobs**		N/A
	Knobs of electronic control devices are securely fixed in a reliable manner so that they will not work loose in normal use, if loosening may result in a hazard.		N/A
	If knobs are used to indicate the position of electronic control devices, it is 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 is 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
13.6	**Mounting means**		P
	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
13.7	**Combination of switches**		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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
13.8	**Accessories combined with switches**		P
	Accessories combined with electronic control devices : comply with their standard		P
13.9	**Surface-type switches having an IP code higher than IP20**		N/A
	Surface-type switches with IP > 20 are in according to their classification when fitted with conduits or with sheathed cables		N/A
	Wall mounted surface-type switches that have degrees of protection 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^2 in area with a width and a length not less than 3 mm ..... :	Ø mm / mm^2	N/A
	Drain hole: effective		N/A
	Lid springs (if any): of corrosion resistant material (bronze or stainless steel)		N/A
13.10	**Installation in a box**		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
13.11	**Connection of a second current-carrying conductor**		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
13.12	**Inlet openings**		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
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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
13.13	**Provision for back entry from a conduit**		N/A
	Surface-type switches: provision for back entry (if are intended)		N/A
13.14	**Switch provided with membranes or the like for inlet openings**		N/A
	Switch is provided with membranes or the like for inlet openings: replaceable		N/A
13.15	**Requirements for membranes in inlet opening and lenses**		N/A
13.15.1	Membranes, lenses and the like are reliably fixed and not be displaced by the mechanical and thermal stresses occurring in normal use.		N/A
	Membranes, lenses and the like are subjected to the ageing treatment specified in 15.1 and fitted with the switches		N/A
	- electronic control devices placed at 40 °C for 2 h. Force of 30 N applied for 5 s by means of the tip of test probe 11 of IEC 61032.		N/A
	During the test: no deformation, live parts not accessible		N/A
	- membranes, lenses and the like likely to be subjected to an axial pull in normal use, an axial pull of 30 N is applied for 5 s		N/A
	During the test: membranes not come out		N/A
	The test is then repeated with membranes, lenses and the like which have not been subjected to any treatment.		N/A
13.15.2	Membranes be so designed and made of such material that: 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
13.16	**Pilot light units**		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
13.101	**Cut-outs**		N/A
	Cut-outs in electronic switches and HBES/BACS switches for motor control circuits are non-self-resetting.		N/A
13.102	**Electronic switches and HBES/BACS switches for the control of the voltage of iron core transformers for extra-low-voltage incandescent lamps**		N/A
	Electronic switches and HBES/BACS switches for the control of the voltage of iron core transformers for extra-low-voltage incandescent lamps (for example, halogen) have the maximum tolerance of the phase-control angle between the positive and negative half-wave of ±2°.		N/A
13.103	**Free ends of leads**		N/A
	Free ends of leads of electronic switches and HBES/BACS switches, if any, may be prepared but pre-soldering are not used.		N/A
14	**Mechanism**		P
	This clause of Part 1 only applies to electronic switches and HBES/BACS switches provided with mechanical switching devices.		P
14.1	**Indication of the position**		P
	The actuating member of a switch, when released, automatically take up the position corresponding to that of the moving contacts		P
	except that for cord-operated switches and for those with a single push-button, the actuating member may take up a single rest position		N/A
14.2	**Rest and intermediate position**		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 ☐ 1250 V ☐ 750 V ☐ 2000 V	N/A
14.3	**Undue arcing**		P
	No undue arcing in slowly operation		P

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Clause	Requirement + Test	Result - Remark	Verdict
	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		P
14.4	**Making and breaking**		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
14.5	**Action of the mechanism without cover or cover plate**		P
	Action of the mechanism: independent of the presence of cover or cover plate. Test: no flicker		P
14.6	**Pull force for cord-operated switches**		N/A
	Cord-operated switches are capable of effecting a change from the "off" to the "on" position, and from the "on" to the "off" position by application and removal of a steady pull not exceeding to		N/A
	- 45 N applied vertically		N/A
	- 65 N applied at 45°±5°		N/A
15	**RESISTANCE TO AGEING, PROTECTION PROVIDED BY ENCLOSURES OF SWITCHES AND RESISTANCE TO HUMIDITY**		
15.1	**Resistance to ageing**		P
	Switches are resistant to ageing		P
	Parts intended for decorative purposes only, such as certain lids, are removed		P
	Switches and boxes, mounted as for normal use, placed for 7 days (168 h) in a heating cabinet at 70 °C ± 2 °C		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
15.2	**Protection provided by enclosures of switches**		P
15.2.1	**General**		P
	The 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

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Clause	Requirement + Test	Result - Remark	Verdict
	Enclosures of switches provides a degree of protection against access to hazardous parts and against harmful effects due to ingress of solid foreign objects in accordance with the IP classification of the switch.	IP20	P
	The switches are mounted as in normal use.		P
	Glands: torque (Nm) (2/3 of torque applied in 20.4) :	No glands used	N/A
	Screws of the enclosure: torque (Nm) (2/3 table 5) ..... :	No glands used	N/A
	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**		P
	Appropriate test according to IEC 60529 ..... :	IP2X	P
15.2.2.3	**Protection against harmful effects due to ingress of solid foreign bodies**		N/A
	Appropriate test according to IEC 60529..... :	IP2X	N/A
	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..... :	IPX0	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) ..... :		N/A
	Glands: torque (Nm) (2/3 of torque applied in table 22) ..... :		N/A
	The specimens withstand an electric strength test as specified in 16.3, which is started within 5 min of completion of the tests according to 15.2		N/A
15.3	**Resistance to humidity**		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Compliance is checked by the humidity treatment described in 15.3, followed immediately by the measurement of the insulation resistance and by the electric strength test specified in Clause 16.		P
	Inlet openings, if any, are left open; if knock-outs are provided, one of them is opened.		N/A
	The humidity treatment is carried out in a humidity cabinet containing air with the		P
	- relative humidity between 91 % and 95 %.....:	93%	P
	- temperature t between 20 °C and 30 °C.....:	25°C	P
	The specimens are kept in the cabinet for		P
	- 2 days (48 h) for switches with IP code IPX0 .....:	48h	P
	- 7 (168 h) for switches with IP code > IPX0.....:		N/A
	After this treatment: specimens show no damage		P
16	**INSULATION RESISTANCE AND ELECTRIC STRENGTH**		
16.1	**General**		P
	Insulation resistance and electric strength of switches be adequate		P
	One pole of any pilot lights (if available), are disconnected for this test		N/A
	Insulation resistance and electric strength are measured with the protective impedances disconnected as described in 10.2.		P
16.2	**Test for measuring the insulation resistance**		P
	The insulation resistance measured 1 min after application of 500 V DC	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		N/A
16.3	**Electric strength test**		P
	Electric strength: AC test voltage applied for 1 min	See appended table 16.3	P
	In addition, if electrically independent pattern numbers are combined in a common base, additional tests for each combination performed		N/A
17	**TEMPERATURE RISE**		
17.1	**General**		P
	Electronic switches and HBES/BACS switches are constructed that the temperature rise in normal use is not excessive		P
	No oxidation or any other deterioration of contacts, if any		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Material and components of electronic switch are not adversely effected by the temperature rise in normal use		P
	The electronic switches and HBES/BACS switches:		P
	- connected as for normal use with the fuses, circuit breakers or other current-limiting means, if any, as specified by the manufacturers .....:		N/A
	- fitted with the conductors as specified in Table 16, cross-sectional area not less than 1,5 mm².....:	1,5 mm²	P
	- terminal screws or nuts, if any, torque 2/3 of that specified in 12.2.8.:.....:	0,53	P
	Electronic switches and HBES/BACS switches with mechanical switching mechanism, are loaded with the maximum rated current.....:	10A (100V@1000W)	P
	For other electronic switches and other HBES/BACS switches which can be loaded with incandescent lamps (lamps rated for the supply voltage, including halogen lamps) the following applies:		N/A
	• rated power of the loads expressed in W ≥ of the rated power of other loads expressed in VA: electronic switches and HBES/BACS switches loaded at the rated load with halogen lamps or tungsten filament lamps .....:		N/A
	• rated power of the loads is expressed in W < of the other loads expressed in VA: electronic switches and HBES/BACS switches loaded with all types of load in accordance with the manufacturer's instructions.....:		N/A
	• rated power of the self-ballasted lamps, or externally ballasted lamps, expressed in W > 25 % of the rated power of the incandescent lamps: the test is done with all types of load. .....:		N/A
	For electronic switches and HBES/BACS switches which are designed for lamps other than incandescent lamps the following applies:		N/A
	• Electronic switches and HBES/BACS switches for self-ballasted lamps (LEDi, CFLi) are loaded with the rated load as specified by the manufacturer ...:		N/A
	Dimmers are loaded with dimmable self-ballasted lamps as specified by the manufacturer .....:		N/A
	If the maximum number of self-ballasted lamps and the rating of the lamp are given by the manufacturer, the electronic switch and HBES/BACS switch is loaded accordingly. .....:		N/A
	• Electronic switches and HBES/BACS switches for other types of lamp are tested in accordance with the manufacturer's instructions. .....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Other electronic switches and HBES/BACS switches are loaded with the type of load as stated in the manufacturer's instructions.....:		N/A
	If the electronic switch provides a looping through function to power other devices in the circuit via the input terminals and through other components inside the electronic switch: - looping through circuit is loaded, in addition, with the rated current of the upstream fuse/circuit breaker (declared by the manufacturer) minus the rated load already connected to the switch .....:		N/A
	The electronic switches and HBES/BACS switches are loaded until steady-state temperature at a voltage between 0,9 and 1,1 times rated voltage, whichever is the more unfavourable. .....:	110V	P
	Phase-cut dimmers operating with leading and trailing edge are tested in both modes with the relevant load.....:		N/A
	In lamp phase-cut dimmers and speed controllers, the setting is adjusted such that the highest temperature rise will occur		N/A
	During the test:		P
	- electronic switches and HBES/BACS switches state not change		P
	- fuses and other protective devices not operate		P
	- permissible temperature rises in Table 101, column concerning Clause 17, not are exceeded	See appended table 17	P
	After this test, the electronic switches and HBES/BACS switches are in operating condition		P
	Sealing compounds, if any, have not flowed		N/A
17.101	**Looping through circuit**		N/A
	Electronic control devices connected to the mains providing means for the continuation of the circuit current and where the circuit current is transferred through components inside the electronic switch, such as PCBs, are submitted to the following test:		N/A
	The electronic switch and the HBES/BACS switch are mounted according to Clause 17 and connected with conductors with the maximum accepted cross-sectional area being not less than 1,5 mm² .....:		N/A
	The looping through function of the electronic switch is loaded for 1 h with the rated current of the upstream fuse/circuit breaker declared by the manufacturer .....:		N/A
	During this test no current is transferred through the switch contacts as given in Figure 102		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The temperature rise of the terminals doesn't exceed 55 K.. .....:		N/A
	The temperature rise of the PCB not exceed the maximum operational temperature (MOT) of the printed circuit board as given in the data sheets of this component.....:	MOT = Δt observed =	N/A
	After the test the looping through circuit in addition is tested according to 101.4 with the following modifications		N/A
	The short circuit is applied one time by the auxiliary switch A without any synchronization with respect to the voltage as given in Figure 103. .....:		N/A
18	**MAKING AND BREAKING CAPACITY**		
18.1	**General**		P
	Electronic switches and HBES/BACS switches have adequate making and breaking capacity		P
	This test is carried out only on electronic switches and HBES/BACS switches provided with mechanically or electro-mechanically operated contact mechanisms		P
	Model/type reference .....:	See page 3	
	Pattern number .....:	1	
	Rated current (A) / Rated load (W or VA) .....:	See page 4	
	Rated voltage .....(V):	100-240	
	Electronic switches and HBES/BACS switches classified for general purpose use according to 7.102.1, tested according to Clause 18 of Part 1 . :		N/A
	Electronic switches and HBES/BACS switches classified for dedicated loads according to 7.102.2 tested according to Part 1 as follows. .....:		P
	- incandescent lamp loads, as specified in 18.2 and 18.3 of part 1		P
	- fluorescent lamp loads, as specified in 18.2 of part 1		P
	- Voltage of iron core transformers for extra-low-voltage incandescent lamps, as specified in 18.2 – 18.3 and 18.102		N/A
	- Voltage of electronic step-down converters for extra-low-voltage incandescent lamps, as specified in 18.3		N/A
	- Self-ballasted lamps, as specified in 18.2		P
	- Motor control circuits, as specified in 18.2 – 18.101		N/A
	- Heating installations, as specified in 18.2 – 18.101:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
18.2	**Overload**		P
	Test with cos φ 0,3 alternating current		P
	- test voltage (1,1 Vn) ..... (V):	110 / 264	P
	- test current (1,25 In) (cos φ 0,3) ..... (A):	12,5 / 5,25	P
	- 200 operations; rate (operations per minute) .....:	30 operations per minute	P
	- ON period 25 % and OFF period 75 % of the total cycle		P
	- electronic switches and HBES/BACS switches whose rate of operation is limited by their application (for example, heat or light sensors): electronic switch is set to the shortest cycle time possible and re-activated at the end of each cycle within a time of (2 ± 0,5) s .....:		N/A
	- samples number .....:	A, B, C	P
	During the test:		P
	- no sustained arcing nor welding of the contacts occur.		P
	- no sticking of the contacts which does prevent further operation of the switch occur		P
	- no Sticking of contacts that cannot be separated with a normal actuation occur		P
	After the test, the specimens show no damage which may impair their use.		P
18.3	**Overload test with filament lamps**		P
	- test voltage is the rated voltage electronic switches and HBES/BACS switches or rated voltage of the lamps ..... (V):	100 / 240	P
	- test current 1,2 times the rated current ..... (A):	12 / 5	P
	- number of 200 W tungsten filament lamps or a number of halogen filament lamps.....:	6 / 6	P
	- 200 operations; rate (operations per minute) .....:	30 operations per minute	P
	- samples number .....:	A, B, C	P
	During the test:		P
	- no sustained arcing nor welding of the contacts occur.		P
	- no sticking of the contacts which does prevent further operation of the switch occur		P
	- no Sticking of contacts that cannot be separated with a normal actuation occur		P
	After the test, the specimens show no damage which may impair their use.		P

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Clause	Requirement + Test	Result - Remark	Verdict
18.101	**Contact mechanism for motor control circuits**		N/A
	The contact mechanism is subjected to tests of 50 cycles of operation, each at rated voltage and at the rate of operations specified in 18.1		N/A
	Rated voltage Vn of electronic switch or HBES/BACS switch .....(V):		N/A
	Rated current In of electronic switch or HBES/BACS switch .....(A):		N/A
	Making: 50 cycles with test current: 9 In (cosφ 0.8 ± 0.05) .....(A):		N/A
	Breaking: 50 cycles with test current: 6 In cosφ 0.6 ± 0.05 .....(A):		N/A
	operations per minute ..... :		N/A
	- samples number .....:		N/A
	During the tests, no sustained arcing occur.		N/A
	After these tests, the specimens show no damage impairing their further use.		N/A
18.102	**Electronic switches and HBES/BACS switches for control of the voltage of iron core transformers for extra-low-voltage incandescent lamps**		N/A
	The contact mechanism is subjected to 50 making operations, each at rated voltage and at the rate of operation as specified in 18.1.		N/A
	Rated voltage Vn of electronic switch or HBES/BACS switch .....(V):		N/A
	Rated current In of electronic switch or HBES/BACS switch .....(A):		N/A
	Making test current 10 times the rated current of the electronic switch for one half-cycle of the power supply frequency		N/A
	Making current .....(A):		N/A
	half-cycle of the power supply frequency .....(ms):		N/A
	- samples number .....:		N/A
	During the tests, no sustained arcing occur.		N/A
	After these tests, the specimens show no damage impairing their further use.		N/A
19	**NORMAL OPERATION**		
19.1	**General**		P
	Electronic switches and HBES/BACS switches classified for general purpose use according to 7.102.1, are tested according to Clause 19 of Part 1.		N/A
19.1	**Test for switches intended for inductive loads (of IEC 60669-1:2017)**		N/A
	Switches withstand, without excessive wear or other harmful effect, the mechanical, electrical and thermal stresses occurring in normal use		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	For the purpose of this test, pilot lights are disconnected		N/A
	- model / type reference .....:		N/A
	- pattern number .....:		N/A
	- nominal cross-sectional area clause 18 (mm^2) .....:		N/A
	- test voltage (Vn) .....(V):		N/A
	- test current (In) (cos φ 0,6) ..... (A):		N/A
	- number of operations per table 18 .....:		N/A
	- rate (operations per minute) .....:		N/A
	- ON period 25 % and OFF period 75 % of the total cycle		N/A
	- samples number .....:		N/A
	During the test:		N/A
	- the specimens function correctly		N/A
	- no sustained arcing nor welding of the contacts occur.		N/A
	- no sticking of the contacts which does prevent further operation of the switch occur		N/A
	- no Sticking of contacts that cannot be separated with a normal actuation occur		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
	Reduced electric strength per clause 16	See appended table 19.1	N/A
	Reduced temperature rise test per clause 17	See appended table 19.1	N/A
	No sustained arcing in slowly operation (clause 14.3)		N/A
19.2	**Test for switches intended for externally ballasted lamp loads (of IEC 60669-1:2017)**		N/A
	Switches intended for externally ballasted lamp loads withstand, without excessive wear or other harmful effect, the electrical and thermal stresses occurring when controlling externally ballasted lamp circuits		N/A
	- model / type reference .....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- pattern number .....:		N/A
	- nominal cross-sectional area clause 18 (mm^2) .....:		N/A
	- rate (operations per minute) .....:		N/A
	- ON period 25 % and OFF period 75 % of the total cycle		N/A
	- test voltage is the rated voltage (V) .....:		N/A
	- test current is the rated current (cos φ 0,9) .... (A):		N/A
	- capacitor value load A (µF) .....:	☐ 70 µF N/A	
	- number of operations .....:		N/A
	- samples number .....:		N/A
	During the test:		N/A
	- the specimens function correctly		N/A
	- no sustained arcing nor welding of the contacts occur.		N/A
	- no sticking of the contacts which does prevent further operation of the switch occur		N/A
	- no Sticking of contacts that cannot be separated with a normal actuation occur		N/A
	After the tests it is possible to make and break the switch by hand, and specimen 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 moving contacts of switches pattern number 2, 3 or 6/2		N/A
	Reduced electric strength per clause 16	See appended table 19.1	N/A
	Reduced temperature rise test per clause 17	See appended table 19.1	N/A
19.3	**Test for switches intended for self-ballasted lamp loads (of IEC 60669-1:2017)**		N/A
	Switches intended for self-ballasted lamp (SBL) loads withstand, without excessive wear or other harmful effect, the electrical and thermal stresses occurring when controlling self-ballasted lamp circuits		N/A
	- model / type reference .....:		N/A
	- pattern number .....:		N/A
	- nominal cross-sectional area clause 18 (mm^2) .....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- test voltage is the rated voltage .....(V):		N/A
	- rated power (W) .....:		N/A
	The load is in accordance with Figure 12b. The values for the maximum peak value and the maximum I²t of the inrush current are given in Table 19, when the switching contact closes at 90°±5° phase-angle		N/A
	- maximum peak value of the inrush current (A).....:		N/A
	- maximum I²t of the inrush current (A^2s) .....:		N/A
	- number of operations per table 18 .....:		N/A
	- rate (operations per minute) .....:		N/A
	- ON period 25 % and OFF period 75 % of the total cycle		N/A
	- samples number .....:		N/A
	During the test: copper wire F not melt, specimens function correctly, no sustained arcing or welding of contacts		N/A
	During the test:		N/A
	- the specimens function correctly		N/A
	- no sustained arcing nor welding of the contacts occur.		N/A
	- no sticking of the contacts which does prevent further operation of the switch occur		N/A
	- no Sticking of contacts that cannot be separated with a normal actuation occur		N/A
	After the tests it is possible to make and break the switch by hand, and specimen 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 moving contacts of switches pattern number 2, 3 or 6/2		N/A
	Reduced electric strength per clause 16	See appended table 19.1	N/A
	Reduced temperature rise test per clause 17	See appended table 19.1	N/A
	Electronic switches and HBES/BACS switches classified for dedicated loads according to 7.102.2 are tested as follows.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Compliance is checked by the tests of 19.101, 19.102, 19.103, 19.104, 19.105, 19.106, 19.107 and 19.108, during which the electronic switches and HBES/BACS switches are tested at their rated voltage and loaded as specified in Clause 17, unless otherwise specified.		P
	For HBES/BACS switches, the tests according to 19.101 and 19.108 are conducted on the complete HBES/BACS switch which are controlled by the electronic extension units as described by the manufacturer of the system		N/A
	The electronic extension units are tested when installed according to the manufacturer's instructions so as to verify that they are capable of controlling the electronic switch or the HBES/BACS switch in accordance with this Clause 19.		N/A
	If a manufacturer declares a number of operations higher than those indicated in the relevant subclause, the tests is made according to the declared value ..... :		N/A
	Electronic switches and HBES/BACS switches including electronic circuits which close the contact of the contact mechanism always at zero-crossing ±20° phase angle, are tested together with their electronic circuit. ..... :		N/A
19.101	**Contact mechanisms incorporated in electronic switches and HBES/BACS switches intended for incandescent lamp circuits**		P
	Contact mechanisms incorporated in electronic switches and HBES/BACS switches intended for incandescent lamp circuits with or without step-down converters are subjected to the following test.		P
	- The test voltage is rated voltage ..... :	100 / 240	P
	Type of load:		P
	- incandescent lamp		P
	- incandescent lamp load with step-down converters		N/A
	- samples number ..... :	A, B, C, D, E, F	P
	- Power of the test load is the rated power (W) ..... :	1000W	P
	- The number of operations is 40 000		P
	- Rate of operation is as specified in 18 ..... :	30 operations per minute	P
	During the test:		P
	- the specimens function correctly. ..... :		P
	- no sticking of the contacts which does prevent further operation of the switch occur		P
	- Sticking of contacts is permitted for maximum 5 times if the contacts is separated with a force applied to the actuator of a value which does not damage the switch mechanically. ..... :	No sticking	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	After the tests the specimens then not show:		P
	- wear impairing their further use		P
	- discrepancy between the position of the actuating member and that of the moving contacts, if any, if the position of the actuating member is indicated:		P
	- deterioration of enclosures, insulating lining or barriers		P
	- loosening of electrical or mechanical connections		P
	- seepage of sealing compound		N/A
	- relative displacement of the moving contacts of electronic switches of pattern number 2		N/A
	Reduced electric strength per clause 16	See appended table 19.1	P
	Reduced temperature rise test per clause 17	See appended table 19.1	P
19.102	**Contact mechanisms for externally ballasted lamps**		P
	Contact mechanisms incorporated in electronic switches and HBES/BACS switches, intended for externally ballasted lamps (e.g. fluorescent lamps, CFL, LED) are checked by the test circuit indicated in Figure 12 Load A with the following test conditions.		P
	- The test voltage is rated voltage .....:	100 / 240	P
	The load consist of::		P
	- capacitor C1, giving a capacitance according to Table 103 (µF) .....:	24 / 12	P
	- L1 and R2, adjusted to give the test current (cosφ 0,9) as the value of the rated current declared.....:	2A / 0,83A	P
	- samples number .....:	A, B, C, D, E, F	P
	- Power of the test load is the rated power (W) .....:	200W	P
	The number of operations is:		P
	- 10000 operations for electronic control devices with a rated current up to and including 10 A .....:	10000	P
	- 5000 operations for electronic control devices with rated current above 10 A up to and including 16 A:		N/A
	- Rate of operation is as specified in 18.....:	30 operations per minute	P
	- ON period 25 % and OFF period 75 % of the total cycle		P
	During the test:		P
	- the specimens function correctly.....:		P
	- no sticking of the contacts which does prevent further operation of the switch occur		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- Sticking of contacts is permitted for maximum 5 times if the contacts is separated with a force applied to the actuator of a value which does not damage the switch mechanically. .....:	No sticking	P
	After the tests the specimens then not show:		P
	- wear impairing their further use		P
	- discrepancy between the position of the actuating member and that of the moving contacts, if any, if the position of the actuating member is indicated:		P
	- deterioration of enclosures, insulating lining or barriers		P
	- loosening of electrical or mechanical connections		P
	- seepage of sealing compound		N/A
	- relative displacement of the moving contacts of electronic switches of pattern number 2		N/A
	Reduced electric strength per clause 16	See appended table 19.1	P
	Reduced temperature rise test per clause 17	See appended table 19.1	P
19.103	**Semiconductor switching devices and/or electronic regulating units incorporated in electronic switches and HBES/BACS switches**		N/A
	Semiconductor switching devices and/or electronic regulating units incorporated in electronic switches and HBES/BACS switches are subjected to the following tests.		N/A
	Rated current (A) / Rated load (W or VA) .....:		N/A
	Rated voltage .....(V):		N/A
	- samples number .....:		N/A
	The electronic switches and HBES/BACS switches are loaded with rated load until steady-state temperature at 1,1 times rated voltage is reached. ..:		N/A
	The switch state of the electronic switches and HBES/BACS switches is changed 10 times, and/or		N/A
	the setting value is altered 10 times over the whole range from minimum to maximum and back to minimum by means of the sensing surface or unit.		N/A
	Additional test, where appropriate:		N/A
	Additionally, where appropriate, the switch state of the electronic switches and HBES/BACS switches is changed 10 times, and/or		N/A
	the setting value is altered 10 times over the whole range from minimum to maximum and back to minimum by means of an electronic extension unit.		N/A
	During the test: specimens operate correctly		N/A
19.104	**Mechanical control units incorporated in electronic switches and HBES/BACS switches**		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Mechanical control units are push buttons, potentiometers, etc, requiring a manual operation.		P
	Mechanical control units incorporated in electronic switches and HBES/BACS switches are subjected to the following test.		P
	Rated current (A) / Rated load (W or VA) .....:	Incandescent lamps: 1000W Externally ballasted lamps: 200W LED: 200W	P
	Rated voltage .....(V):	100 – 240	P
	Samples number.....:	A, B, C, D, E, F	P
	The electronic switches and HBES/BACS switches are loaded with their rated load and the voltage is then increased to 1,1 times the rated voltage.....:	110 / 264	P
	the setting is altered 10 000 times over the whole range from minimum to maximum and back to minimum by means of its control unit		P
	the rate of operation being between 10 and 15 operations per minute .....:	10 operations per minute	P
	During the test:		P
	- the specimens function correctly.....:		P
	- no sticking of the contacts which does prevent further operation of the switch occur		P
	- Sticking of contacts is permitted for maximum 5 times if the contacts is separated with a force applied to the actuator of a value which does not damage the switch mechanically. .....:	No sticking	N/A
	After the tests the specimens then not show:		P
	- wear impairing their further use		P
	- discrepancy between the position of the actuating member and that of the moving contacts, if any, if the position of the actuating member is indicated:		P
	- deterioration of enclosures, insulating lining or barriers		P
	- loosening of electrical or mechanical connections		P
	- seepage of sealing compound		N/A
	- relative displacement of the moving contacts of electronic switches of pattern number 2		N/A
	Reduced electric strength per clause 16	See appended table 19.1	P
	Reduced temperature rise test per clause 17	See appended table 19.1	P
19.105	**Electronic switches and HBES/BACS switches for which a minimum load or current is specified by the manufacturer**		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	For electronic switches and HBES/BACS switches for which a minimum load or current is specified by the manufacturer, the characteristic is additionally tested with the specified minimum load or current at 0,9 times rated voltage.		N/A
	Minimum rated current (A) / Minimum Rated load (W or VA) .....:		N/A
	Rated voltage .....(V):		N/A
	Samples number.....:		N/A
	The electronic switches and HBES/BACS switches are loaded with rated load until steady-state temperature at 0,9 times rated voltage is reached		N/A
	The switch state of the electronic switches and HBES/BACS switches is changed 10 times, and/or		N/A
	the setting value is altered 10 times over the whole range from minimum to maximum and back to minimum by means of the sensing surface or unit.		N/A
	Additional test, where appropriate:		N/A
	Additionally, where appropriate, the switch state of the electronic switches and HBES/BACS switches is changed 10 times, and/or		N/A
	the setting value is altered 10 times over the whole range from minimum to maximum and back to minimum by means of an electronic extension unit.		N/A
	During the test:		N/A
	- the specimens function correctly.....:		N/A
	- no sticking of the contacts which does prevent further operation of the switch occur		N/A
	- Sticking of contacts is permitted for maximum 5 times if the contacts is separated with a force applied to the actuator of a value which does not damage the switch mechanically. .....:		N/A
	After the tests the specimens then not show:		N/A
	- wear impairing their further use		N/A
	- discrepancy between the position of the actuating member and that of the moving contacts, if any, if the position of the actuating member is indicated:		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
	- relative displacement of the moving contacts of electronic switches of pattern number 2		N/A
	Reduced electric strength per clause 16	See appended table 19.1	N/A
	Reduced temperature rise test per clause 17	See appended table 19.1	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
19.106	**Contact mechanisms incorporated in electronic switches and HBES/BACS switches intended for self-ballasted lamps**		P
	Contact mechanisms incorporated in electronic switches and HBES/BACS switches intended for self-ballasted lamps withstand, without excessive wear or other harmful effect, the electrical and thermal stresses occurring when controlling self-ballasted lamps circuits.		P
	Compliance is checked by connecting the test circuit, including Load B, as given in Figure 12b via the electronic switches and HBES/BACS switches under test to a power supply with the following test conditions:		P
	The test circuit, including the cables for connecting the test specimen and the Load B, is adjusted to reach, downstream the switch under test, the Ipeak and I^2t values of Table 104		P
	Rated load (W) .....:	200W	P
	Rated voltage .....(V):	100-240	P
	Test voltage .....(V):	100 / 240	P
	Samples number.....:	A, B, C, D, E, F	P
	Calibration value of the load connecting downstream the electronic switch or HBES/BACS switch, when the switching contact closes at (90 ± 5)° phase-angle:		P
	Ipeak as given in table 104 .....(A):	248 / 170	P
	I^2t as given in table 104 .....(A^2s):	24,5 / 9	P
	40000 operations with 30 operations per minute for electronic switches and HBES/BACS switches with rated power up to and including 250 W		P
	40 000 operations with 15 operations per minute for electronic switches and HBES/BACS switches with rated power higher than 250 W		N/A
	- ON period 25 % and OFF period 75 % of the total cycle		P
	During the test:		P
	- the specimens function correctly.....:		P
	- no sticking of the contacts which does prevent further operation of the switch occur		P
	- Sticking of contacts is permitted for maximum 5 times if the contacts is separated with a force applied to the actuator of a value which does not damage the switch mechanically. .....:	No sticking	N/A
	After the tests the specimens then not show:		P
	- wear impairing their further use		P
	- discrepancy between the position of the actuating member and that of the moving contacts, if any, if the position of the actuating member is indicated:		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- deterioration of enclosures, insulating lining or barriers		P
	- loosening of electrical or mechanical connections		P
	- seepage of sealing compound		N/A
	- relative displacement of the moving contacts of electronic switches of pattern number 2		N/A
	Reduced electric strength per clause 16	See appended table 19.1	P
	Reduced temperature rise test per clause 17	See appended table 19.1	P
19.107	**Electronic switches and HBES/BACS switches designed for heating installations**		N/A
	For electronic switches and HBES/BACS switches designed for heating installations the number of operations is 200 000.		N/A
	Contact mechanisms incorporated in electronic switches and HBES/BACS switches intended for heating installations are subjected to the test described in 19.101 but with the electrical conditions specified in Table 106.		N/A
	Type of load as classified in 7.1.101		N/A
	Current declared for heating installations suitable for resistive load and for motor load .....:		N/A
	The test voltage is rated voltage .....:		N/A
	Test current RMS:		N/A
	Making: 6 × I-M or I-R Whichever is arithmetically greater or whichever is the most unfavourable value in case of equal values.....(A):	☐ 6 × I-M = cosφ 0,6 ☐ I-R = cosφ 0,9	N/A
	Breaking: I-R or I-M Whichever is arithmetically greater or whichever is the most unfavourable value in case of equal values.....(A):	☐ I-M = cosφ 0,9 ☐ I-R = cosφ 0,9	N/A
	- The number of operations is 200000		N/A
	- Rate of operation is as specified in 18.....:		N/A
	During the test:		N/A
	- the specimens function correctly.....:		N/A
	- no sticking of the contacts which does prevent further operation of the switch occur		N/A
	- Sticking of contacts is permitted for maximum 5 times if the contacts is separated with a force applied to the actuator of a value which does not damage the switch mechanically. .....:		N/A
	After the tests the specimens then not show:		N/A
	- wear impairing their further use		N/A
	- discrepancy between the position of the actuating member and that of the moving contacts, if any, if the position of the actuating member is indicated:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- deterioration of enclosures, insulating lining or barriers		N/A
	- loosening of electrical or mechanical connections		N/A
	- seepage of sealing compound		N/A
	- relative displacement of the moving contacts of electronic switches of pattern number 2		N/A
	Reduced electric strength per clause 16	See appended table 19.1	N/A
	Reduced temperature rise test per clause 17	See appended table 19.1	N/A
19.108	**Contact mechanisms for motor control circuits**		N/A
	Contact mechanisms incorporated in electronic switches and HBES/BACS switches intended for motor control circuits are tested as in 19.101, but they close a circuit through which a current of 6 × In (cos ϕ = 0,65 ± 0,05) passes and open a circuit through which a current of In (cos ϕ = 0,65 ± 0,05) passes, the ratio of recovery voltage Us and rated operational voltage Ue being 1,00 (±10 %).		N/A
	Rated voltage Vn of electronic switch or HBES/BACS switch .....(V):		N/A
	Rated current In of electronic switch or HBES/BACS switch .....(A):		N/A
	- Rated current In .....(A):		N/A
	- The test voltage is rated voltage .....(V):		N/A
	- The number of operations is 40 000		N/A
	The test current is calibrate as follow:		N/A
	- Making: 6 In (cosφ 0,65 ± 0.05) .....(A):		N/A
	- Breaking: In cosφ 0,6 ± 0.05 .....(A):		N/A
	- operations per minute..... :		N/A
	- samples number .....:		N/A
	During the test:		N/A
	- the specimens function correctly.....:		N/A
	- no sticking of the contacts which does prevent further operation of the switch occur		N/A
	- Sticking of contacts is permitted for maximum 5 times if the contacts is separated with a force applied to the actuator of a value which does not damage the switch mechanically. .....:		N/A
	After the tests the specimens then not show:		N/A
	- wear impairing their further use		N/A
	- discrepancy between the position of the actuating member and that of the moving contacts, if any, if the position of the actuating member is indicated:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- deterioration of enclosures, insulating lining or barriers		N/A
	- loosening of electrical or mechanical connections		N/A
	- seepage of sealing compound		N/A
	- relative displacement of the moving contacts of electronic switches of pattern number 2		N/A
	Reduced electric strength per clause 16	See appended table 19.1	N/A
	Reduced temperature rise test per clause 17	See appended table 19.1	N/A
20	**MECHANICAL STRENGTH**		
20.1	**General**		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
20.2	**Pendulum hammer test**		P
	For all types of switches and for boxes: impact test (9 blows)	See appended table 20.2	P
	After the test:		P
	- no damage, live parts no become accessible		P
	on a lens (window for pilot lights or a viewing window for a sensing device) is not possible to touch hazardous live parts with		N/A
	- the test probe 11 of IEC 61032 under the conditions stated in 10.1, but with a force of 10 N. :		N/A
	- the test probe B of IEC 61032 under the conditions stated in 10.1 ..... :		N/A
20.3	**Test on the main parts of surface-type switches**		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	N/A
	During and after the test: main parts show no damage		N/A
20.4	**Screwed glands**		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)		N/A
	- type of material	metal / moulded material	N/A
	- torque for 1 min (table 22) (Nm)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	After the test: no damage of glands and enclosure of the specimens		N/A
20.5	**Covers, cover plates or actuating members – accessibility to live parts**		N/A
20.5.1	**General**		N/A
	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)		N/A
20.5.2	**Verification of the non-removal of covers, cover-plates or actuating member**		N/A
	Forces are gradually applied in directions perpendicular to the mounting surfaces, in such a way that the resulting force acting on the centre of the covers, cover plates, actuating members or parts of them is		N/A
	- for covers, cover plates, actuating members or parts of them complying with the tests of 20.8 and 20.9; or	☐ 40 N	N/A
	- for other covers, cover plates, actuating members or parts of them.	☐ 80 N	N/A
	The force is applied for 1 min. The covers, cover plates, or actuating members shall not come off.		N/A
	The test is then repeated on new specimens, the cover, cover plate, or actuating member being fitted on the wall after a sheet of hard material, (1 ± 0,1) mm thick has been fitted around the supporting frame, as shown in Figure 13.		N/A
	Covers, cover-plates or actuating members not come off		N/A
	After the test the specimens shall show no damage within the meaning of this document.		N/A
20.5.3	**Verification of the removal of covers, cover plates or actuating members**		N/A
	A force not exceeding 120 N is gradually applied, in directions perpendicular to the mounting/supporting surfaces, to covers, cover plates, actuating members or parts of them by means of a hook placed in turn in each of the grooves, holes, spaces or the like provided for removing them.		N/A
	For covers, cover plates or actuating members whose fixing is not dependent on screws and whose removal is obtained by applying a force in a direction approximately perpendicular to the mounting/supporting surface (13.3.3):		N/A
	The covers, cover plates or actuating members come off.		N/A
	For covers, cover plates or actuating members whose fixing is not dependent on screws and whose removal is obtained by using a tool, in accordance with the manufacturer's instructions given in an instruction sheet or catalogue (13.3.4):		N/A
	The covers, cover plates or actuating members not come off.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The test is made 10 times on each separable part the fixing of which is not dependent on screws (the application points being equally distributed as far as practicable). The removal force is applied each time to the different grooves, holes or the like provided for removing the separable part.		N/A
	The test is then repeated on new specimens, the cover, cover plate, or actuating member being fitted on the wall after a sheet of hard material, (1 ± 0,1) mm thick has been fitted around the supporting frame, as shown in Figure 13.		N/A
	For covers, cover plates or actuating members whose fixing is not dependent on screws and whose removal is obtained by applying a force in a direction approximately perpendicular to the mounting/supporting surface (13.3.3):		N/A
	The covers, cover plates or actuating members come off.		N/A
	For covers, cover plates or actuating members whose fixing is not dependent on screws and whose removal is obtained by using a tool, in accordance with the manufacturer's instructions given in an instruction sheet or catalogue (13.3.4):		N/A
	The covers, cover plates or actuating members not come off.		N/A
	After the test, the specimens show no damage within the meaning of this document.		N/A
20.6	**Covers, cover plates or actuating members – accessibility to non-earthed metal parts separated from live parts**		N/A
	Test is made as described in 20.5, but applying, for 20.5.2, the following forces:		N/A
	- for covers, cover plates, actuating members or parts of them complying with the tests of 20.8 and 20.9; or	☐ 10 N	N/A
	- for other covers, cover plates, actuating members or parts of them.	☐ 20 N	N/A
	The force is applied for 1 min. The covers, cover plates, or actuating members shall not come off.		N/A
	The test is then repeated on new specimens, the cover, cover plate, or actuating member being fitted on the wall after a sheet of hard material, (1 ± 0,1) mm thick has been fitted around the supporting frame, as shown in Figure 13.		N/A
	Covers, cover-plates or actuating members not come off		N/A
	After the test the specimens shall show no damage within the meaning of this document.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Verification of the removal of covers, cover plates or actuating members		N/A
	A force not exceeding 120 N is gradually applied, in directions perpendicular to the mounting/supporting surfaces, to covers, cover plates, actuating members or parts of them by means of a hook placed in turn in each of the grooves, holes, spaces or the like provided for removing them.		N/A
	For covers, cover plates or actuating members whose fixing is not dependent on screws and whose removal is obtained by applying a force in a direction approximately perpendicular to the mounting/supporting surface (13.3.3):		N/A
	The covers, cover plates or actuating members come off.		N/A
	For covers, cover plates or actuating members whose fixing is not dependent on screws and whose removal is obtained by using a tool, in accordance with the manufacturer's instructions given in an instruction sheet or catalogue (13.3.4):		N/A
	The covers, cover plates or actuating members not come off.		N/A
	The test is made 10 times on each separable part the fixing of which is not dependent on screws (the application points being equally distributed as far as practicable). The removal force is applied each time to the different grooves, holes or the like provided for removing the separable part.		N/A
	The test is then repeated on new specimens, the cover, cover plate, or actuating member being fitted on the wall after a sheet of hard material, (1 ± 0,1) mm thick has been fitted around the supporting frame, as shown in Figure 13.		N/A
	For covers, cover plates or actuating members whose fixing is not dependent on screws and whose removal is obtained by applying a force in a direction approximately perpendicular to the mounting/supporting surface (13.3.3):		N/A
	The covers, cover plates or actuating members come off.		N/A
	For covers, cover plates or actuating members whose fixing is not dependent on screws and whose removal is obtained by using a tool, in accordance with the manufacturer's instructions given in an instruction sheet or catalogue (13.3.4):		N/A
	The covers, cover plates or actuating members not come off.		N/A
	After the test, the specimens show no damage within the meaning of this document.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
20.7	**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**		P
	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	Cover plate	P
	The force is applied for 1 min. The covers, cover plates, or actuating members shall not come off.		P
	The test is then repeated on new specimens, the cover, cover plate, or actuating member being fitted on the wall after a sheet of hard material, (1 ± 0,1) mm thick has been fitted around the supporting frame, as shown in Figure 13.		P
	Covers, cover-plates or actuating members not come off		P
	After the test the specimens shall show no damage within the meaning of this document.		P
	Verification of the removal of covers, cover plates or actuating members		N/A
	A force not exceeding 120 N is gradually applied, in directions perpendicular to the mounting/supporting surfaces, to covers, cover plates, actuating members or parts of them by means of a hook placed in turn in each of the grooves, holes, spaces or the like provided for removing them.		N/A
	For covers, cover plates or actuating members whose fixing is not dependent on screws and whose removal is obtained by applying a force in a direction approximately perpendicular to the mounting/supporting surface (13.3.3):		N/A
	The covers, cover plates or actuating members come off.		N/A
	For covers, cover plates or actuating members whose fixing is not dependent on screws and whose removal is obtained by using a tool, in accordance with the manufacturer's instructions given in an instruction sheet or catalogue (13.3.4):		N/A
	The covers, cover plates or actuating members not come off.		N/A
	The test is made 10 times on each separable part the fixing of which is not dependent on screws (the application points being equally distributed as far as practicable). The removal force is applied each time to the different grooves, holes or the like provided for removing the separable part.		N/A
	The test is then repeated on new specimens, the cover, cover plate, or actuating member being fitted on the wall after a sheet of hard material, (1 ± 0,1) mm thick has been fitted around the supporting frame, as shown in Figure 13.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	For covers, cover plates or actuating members whose fixing is not dependent on screws and whose removal is obtained by applying a force in a direction approximately perpendicular to the mounting/supporting surface (13.3.3):		N/A
	The covers, cover plates or actuating members come off.		N/A
	For covers, cover plates or actuating members whose fixing is not dependent on screws and whose removal is obtained by using a tool, in accordance with the manufacturer's instructions given in an instruction sheet or catalogue (13.3.4):		N/A
	The covers, cover plates or actuating members not come off.		N/A
	After the test, the specimens show no damage within the meaning of this document.		N/A
20.8	**Covers, cover plates or actuating members – application of gauges**		P
	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	P
20.9	**Grooves, holes and reverse tapers**		P
	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	P
20.10	**Additional test for cord-operated switch**		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
21	**RESISTANCE TO HEAT**		
21.1	**General**		P
	Switches and boxes are sufficiently resistant to heat		P
	Decorative parts are not subjected to the test		N/A
21.2	**Basic heating test**		P
	Switches kept for 1 h in a heating cabinet at a temperature of 100 °C ± 2 °C		P

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Clause	Requirement + Test	Result - Remark	Verdict
	During the test, the mechanical parts of the specimens don't undergo any change impairing their further use, and sealing compound, if any, not flow to such an extent that hazardous live parts are exposed.		P
	After the test: no access to live parts, markings still legible		P
21.3	**Ball-pressure test on parts of insulating material necessary to retain current-carrying parts and parts of the earthing circuit in position**		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 21.3	P
21.4	**Ball-pressure test on parts of insulating material not necessary to retain current-carrying parts and parts of the earthing circuit in position**		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 21.4	P
22	**SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS**		
22.1	**General**		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
	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
22.2	**Correct insertion of screws**		P
	Screws in engagement with a thread of insulating material: correct introduction into the screw hole or nut ensured		N/A
22.3	**Contact pressure of electrical connections**		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	PCB	P
22.4	**Screws and rivets, used both as electrical and mechanical connections**		P
	Screws and rivets which serve as electrical as well as mechanical connections is locked against loosening and/or turning		P

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Clause	Requirement + Test	Result - Remark	Verdict
22.5	**Material of current-carrying parts**		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		N/A
	- alloy with at least 58 % copper for parts made from cold-rolled sheet or with at least 50 % copper for other parts	>58%	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); thickness (µm)..... :		N/A
	- steel with electroplated coating of nickel and chromium (ISO 1456): service condition ISO no. (2/3/4); IP (X0/X4/X5/X6); thickness (µm)..... :		N/A
	- steel with electroplated coating of tin (ISO 2093): service condition ISO no. (2/3/4); IP (X0/X4/X5/X6); thickness (µm) ..... :		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
22.6	**Contacts subjected to sliding actions**		N/A
	Contacts subjected to sliding action: of metal resistant to corrosion		N/A
22.7	**Thread-forming and thread-cutting screws**		P
	Thread-forming screws and thread-cutting screws not used for the connection of current-carrying parts	Not used	P
	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
23	**CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH SEALING COMPOUND**		
	Creepage distances, clearances and distances through sealing compound are not less than the values shown in Table 23.	See appended table 23.1	P
	Subclause 23.1 does not apply to pilot light units. Requirements for pilot light units are given in 13.16.		N/A
23.2	**Insulating compound**		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Insulating compound not protrude above the edge of the cavity in which it is contained.		N/A
23.101	**Use of enamel wires**		N/A
	If the enamel of the wire is at least grade 1 in accordance with IEC 60317 (all parts), the clearances between the wire of the control coil, the hazardous live parts of different polarity and exposed conductive parts may be reduced to a value equal to two-thirds of the clearances required in the absence of enamel.		N/A
23.102	**Separation between circuits**		N/A
23.102.1	**General**		N/A
	Arrangements ensure protective separation between mains (and other hazardous voltages) and SELV/PELV circuit.		N/A
	For this separation, creepage and clearance distance can be split in 2 parts with intermediate conductive part (e.g. metallic shielding). In this case each separate creepage and clearance distance is not less than 3,0 mm.		N/A
	The protective separation can be achieved by one of the methods given in Figure 101:		N/A
	☐ a) addresses the SELV/PELV part within HBES switches which are intended to be used either in SELV/PELV installations or in mains installations where basic insulation of mains hazardous live parts can be expected.		N/A
	☐ b) addresses the SELV/PELV part within single mains HBES switches which are intended to be used in installations where hazardous voltages appear (including mains installations).		N/A
	☐ c) addresses SELV/PELV control devices which are intended to be used in installations where hazardous voltages appear (including mains installations).		N/A
	☐ d) addresses SELV/PELV control devices which are intended to be used as standalone in SELV/PELV installations.		N/A
	☐ e) addresses SELV/PELV control devices which are intended to be used as standalone in mains installation where basic insulation of mains hazardous live parts can be expected.		N/A
	☐ f) • SELV circuits shall be insulated from FELV circuits by simple separation • FELV circuits shall be insulated from the mains by at least basic insulation (based upon a working voltage equal to mains voltage)		N/A
	Control devices containing hazardous voltages and SELV/PELV circuits provide double or reinforced insulation for the rated insulation voltage and the rated impulse withstand voltage:		N/A
	- externally (between control devices and other circuits outside the control device) .....:		N/A
	- internally (between the different circuits inside the control device). .....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	• SELV HBES/BACS switch circuit and a SELV network circuit can be considered as the same circuit and therefore no separation is needed.		N/A
	• A PELV HBES/BACS switch circuit and a PELV network circuit can be considered as the same circuit and therefore no separation is needed.		N/A
	• Control devices containing only SELV/PELV circuits provide double or reinforced insulation for the rated insulation voltage and the rated impulse withstand voltage (between SELV/PELV circuit of the control device and other circuits outside the control device (see Figure 101 c)) according to the 230/400 V mains environment		N/A
	unless the usage in another environment is made clearly visible either by marking, an instruction sheet or similar means see Figure 101 d). .....:		N/A
	• When connecting a control device based on SELV/PELV circuits to a network based on SELV/PELV circuits the simple separation is required based on the rated insulation voltage of 50 V and the highest rated impulse withstand voltage of the circuits.		N/A
	• SELV circuits are insulated from FELV circuits by simple separation (see Figure 101 f)).		N/A
	• FELV circuits are insulated from the mains by at least basic insulation (based upon a working voltage equal to mains voltage) (see Fig. 101 f)).		N/A
	• FELV circuits are insulated from other FELV circuits only for functional purpose.		N/A
	• FELV circuits are insulated from the protective earth circuit only for functional purpose.		N/A
	• FELV circuits are insulated from non-earthed accessible metal parts by simple separation (based upon a working voltage equal to mains voltage).		N/A
23.102.2	**Specifications of insulation**		N/A
	a) Overvoltage category: III f) Pollution degree: 2 g) Material class: min. IIIa Rated impulse voltage applied (acc. Table 107) . (V):		N/A
23.102.3	**Dimensioning of clearances of basic, double or reinforced insulation between circuits**		N/A
	If no verification test is carried out, clearances of basic insulation are dimensioned as specified in Table 107	See appended table 23.102.3	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Clearances through openings in enclosures of insulating material are not less than those specified for inhomogeneous field conditions since the configuration is not controlled, which may have an adverse effect on the homogeneity of the electric field (5.2.3.2 of IEC 60664-1:2020).		N/A
	Double insulation consists of basic insulation and supplementary insulation. Each are dimensioned as specified in Table 108 if no verification test is carried out.	See appended table 23.102.3	N/A
	For control devices provided with double insulation where basic insulation and supplementary insulation cannot be tested separately, the insulation system is considered as reinforced insulation.		N/A
	Clearances of reinforced insulation are dimensioned as specified in Table 108 (one step higher than the rated impulse withstand voltage of the control device) .	See appended table 23.102.3	N/A
23.102.4	**Dimensioning of creepage distances of basic, double or reinforced insulation between circuits**		N/A
	In accordance with 5.3.2.5 of IEC 60664-1:2020, a creepage distance cannot be less than the associated clearance		N/A
	If no verification test is carried out for the clearances, creepage distances of basic, supplementary and reinforced insulation are selected from Table 111.	See appended table 23.102.4	N/A
	Creepage distances of double insulation are the sum of the values of the basic and supplementary insulation		N/A
	Creepage distances (for rated insulation voltage up to and including 50 V) are not less than the values given in Table 111.	See appended table 23.102.4	N/A
	Creepage distances (for rated insulation voltage above 50 V up to and including 250 V) smaller than the values specified in Table 111 are not less than the values given in Table 112.	See appended table 23.102.4	N/A
	The creepage distance between SELV and earth not be less than 0,2 mm.		N/A
23.102.5	**Solid insulation**		N/A
	The dielectric strength of the solid insulation (if any) of the simple and protective separation between circuits is covered by Clause 16.		N/A
23.102.6	**Protective separation of the supply for the SELV/PELV circuit**		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	According to IEC 60364-4-41, the protective separation of the supply for the SELV/PELV circuit is at least as good as for safety transformers in accordance with IEC 61558-2-6 or IEC 61558-2-16 for frequencies higher than 500 Hz.		N/A
23.102.7	**External creepage and clearance distance between clamping units**		N/A
	Terminals for SELV circuits and main circuits intended for external wiring are so located that the external creepage and clearance distance between these clamping units is not less than 10 mm..... :		N/A
	Barrier, if any, of insulating material and permanently fixed to the switch or only removable with the aid of a tool for the wiring of the accessory		N/A
	HBES/BACS switch is rendered inoperable or manifestly incomplete in case of omission of barrier ..... :		N/A
24	**RESISTANCE OF INSULATING MATERIAL TO ABNORMAL HEAT, TO FIRE AND TO TRACKING**		
24.1	**Glow-wire test**		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 of the accessory, not be unduly affected by abnormal heat and by fire.		P
	For insulating material necessary to retain current-carrying parts with a current less than 0,2 A in position, a test temperature of 650 °C is used		P
	Glow-wire test according to IEC 60695-2-10 and IEC 60695-2-11	See appended table 24.1	P
24.2	**Resistance to tracking**		N/A
	For switches that have an IP code higher than IPX0, parts of insulating material retaining live parts in position are of material resistant to tracking ..... :	IPX0	N/A
	Compliance is checked according to IEC 60112. - Ceramic parts are not tested. - at least 15 mm × 15 mm flat surface tested - proof tracking test index of 175 V using solution A		N/A
	No flashover or breakdown between electrodes occur before a total of 50 drops have fallen..... :		N/A
25	**RESISTANCE TO RUSTING**		
	Ferrous parts, including covers and boxes, are adequately protected against rusting		P

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Clause	Requirement + Test	Result - Remark	Verdict
	TEST: - All grease is removed using a suitable degreasing agent. - The parts are then immersed for 10 min in a 10 % solution of ammonium chloride in water at a temperature of (+20 ± 5) °C. - Without drying, but after shaking off any drops, the parts are placed for 10 min in a box containing air saturated with moisture at a temperature of (+20 ± 5) °C. - After the parts have been dried for 10 min in a heating cabinet at a temperature of (+100 ± 5) °C,		P
	surfaces show no signs of rust. ..... :		P
26	**EMC REQUIREMENTS**		
26.1	**General**		P
	Electronic control devices are designed to operate correctly under the conditions of the electromagnetic environment in which they are intended to be used. This applies particularly for electronic control devices intended to be connected to AC low-voltage public supply systems where the design take into account the normal disturbances on the supply system, as defined by the compatibility levels given in IEC 61000-2-2.		P
26.2	**Immunity**		P
26.2.1	**General**		P
	Electronic control devices are designed so that the switch state (on or off) and/or the setting value are protected against interference		P
	The electronic control device is loaded at 100 % of the rated load for dimming devices and with a functional load for other electronic control devices.		P
	The electronic control device is tested according to Table 113 with or without operation as specified in the relevant paragraph of Clause 26		P
	If the load connected to the electronic control device is controlled by electromechanical switching devices (e.g. relays), and no semiconductor devices are present in the load circuit, the test is conducted with a resistive load only.		P
	For the tests without operation, the electronic control device is tested in the following states:		P
	a) In the ON-state For electronic switches where the setting can alter (e.g. dimming devices) the conduction angle is set at (100 ± 5)° which results in an output power (RMS) of P_0. A variation of P_0 less than ±10 % is not considered to be a change of the setting.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	b) In the OFF-state. For the tests with operation, the electronic control device is switched ON/OFF with a minimum operating rate of 1 operation/second. As an alternative, where the setting can alter (e.g. dimming devices), the setting value may be changed for example from minimum to maximum:		P
	For electronic control devices whose cycle of operation is limited by their application (for example, passive infrared, time delay electronic switches, etc.), the rate of operation during the tests is specified by the manufacturer.		P
26.2.2	**Voltage dips and short interruptions**		P
	The electronic switch and HBES/BACS switch tested with the test equipment specified in IEC 61000-4-11 as specified in 26.2, in accordance with Table 114, with a sequence of three dips/interruptions with intervals of 10 s minimum between each test event.		P
	The test is done on the power supply lines of the electronic switch and HBES/BACS switch.		P
	During the test, the electronic switch is not operated		P
	During the test, the state and setting of the electronic switch and HBES/BACS 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, the electronic switch and HBES/BACS switch is in the original state and setting and operate as intended.		P
	After the test, the electronic switch and HBES/BACS switch with included automatic functions operate as intended.		P
26.2.3	**Surge immunity test for 1,2/50 wave impulses**		P
	The test is carried out according to IEC 61000-4-5 by applying two positive discharges and two negative discharges at each of the following angles 0°, 90°, 180° and 270°, at a repetition rate of (60 ± 5) s with an open-circuit test voltage according to Table 115.		P
	If the EUT has an earthing terminal or is connected to a load, the test is to be performed between line and earth with the test voltage according to Table 115.		P
	Mains		P

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Clause	Requirement + Test	Result - Remark	Verdict
	TP media, Signal and control Lines		P
	DC - Power Ports		P
	During the test, the state and setting of the electronic control device may alter, flickering is neglected.		P
	After the test, the electronic control device is in the original state and setting and operate as intended.		P
	After the test, the electronic control device with included automatic functions operate as intended.		P
26.2.4	**Electrical fast transient/burst test**		P
	Test carried out according to IEC 61000-4-4 with the levels of the repetitive fast transients consisting of bursts coupled into the supply and control terminals/terminations of the electronic control device are specified in Table 116. Duration of the test (60 +5 -0) s for each positive and negative polarity, open-circuit output test voltage ± 10 %:		P
	Level 2:		P
	Supply terminals/terminations – TP terminals – DC power terminals ..... ± 1 kV		P
	Control terminals/terminations – TP terminals – DC power terminals ..... ± 0,5 kV		P
	During the test, the state and setting of the electronic control device may alter,		P
	During the test, the state and setting HBES/BACS switches and their extension units may not alter		P
	After the test the electronic control device is in the original state and setting and operate as intended.		P
	Level 3:		P
	Supply terminals/terminations – TP terminals – DC power terminals ..... ± 2 kV		P
	Control terminals/terminations – TP terminals – DC power terminals ..... ± 1 kV		P
	After the test: HBES switch is in the original state and setting and operates as intended		P
	During the test the state and setting may alter, and flickering is neglected.		P
	After the test the HBES/BACS switch and their extension unit is in the original state and setting and operate as intended.		P
26.2.5	**Electrostatic discharge test**		P
	Electronic control devices mounted as in normal use withstand electrostatic contact and air discharges.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The test is carried out with resistive load. If the electronic control device is not intended to operate incandescent lamps, the test is carried out with only one load of the loads specified within the manufacturer's instructions.....:	Test with incandescent lamp load	P
	The test is carried out according to IEC 61000-4-2 by applying 10 positive and 10 negative discharges in the following manner:		P
	1) contact discharge to the conductive surfaces and to coupling planes.....4 kV		P
	2) air discharge at insulating surfaces.....8kV		P
	After the test, the electronic control device is in its original state and setting and operate as intended.		P
26.2.6	**Radiated electromagnetic field test**		P
	This test is applicable to electronic control devices containing active electronic components.		P
	The test is carried out according to IEC 61000-4-3 by applying requirements in Table 117 with the exception of the exclusion band as defined in the relevant product standard for transmitters, receivers and duplex transceivers, if the device contains such transmitters, receivers and duplex transceivers.		P
	During and after the test, the electronic control device operate as intended, flickering is not allowed.		P
	After the test, the electronic control device with included automatic functions operate as intended.		P
26.2.7	**Radio-frequency voltage test**		P
	This test is applicable to electronic control devices containing active electronic components.		P
	The test is carried out according to IEC 61000-4-6 by applying a conducted radio-frequency voltage of 3 V RMS on supply lines and control lines longer than 3 m as declared by the manufacturer.		P
	During the test, the electronic control device is operated if it contains automatic functions or can be remotely controlled.		P
	During and after the test, the electronic control device operate as intended, flickering is not allowed.		P
	After the test, the electronic control device with included automatic functions operate as intended		P
	For HBES/BACS switches and their extension unit in addition, the test is carried out according to IEC 61000-4-6 by applying a conducted radio-frequency voltage of 10 V RMS on TP media, supply lines and control lines longer than 3 m as declared by the manufacturer except for the ITU broadcast frequency band 47 MHz to 68 MHz, where the level is 3 V RMS.		P
	During the test the HBES/BACS switch and their extension unit is not operated.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	After the test the HBES/BACS switch and their extension unit operate as intended.		P
26.2.8	**Power-frequency magnetic field test**		N/A
	This test is applicable only to electronic control devices containing devices susceptible to magnetic fields, for example, Hall elements, electrodynamic microphones, etc.		N/A
	The test is carried out according to IEC 61000-4-8 by applying a magnetic field of 3 A/m, 50 Hz.		N/A
	During the test, the electronic control device is operated if it contains automatic functions or can be remotely controlled.....:		N/A
	During and after the test, the electronic control devices operate as intended, flickering is not allowed .....:		N/A
	After the test, the electronic control devices with included automatic functions operate as intended. ..:		N/A
26.3	**Emission**		P
26.3.1	**Low-frequency emission**		P
	Electronic control devices are so designed that they do not cause excessive disturbances in the network.		P
	Requirements are deemed to be met if the electronic control devices comply with IEC 61000-3-2:2018 and with IEC 61000-3-3:2013 and IEC 61000-3-3:2013/AMD1:2017.		P
	Load terminals/terminations of electronic switches and HBES/BACS 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 61000-3-2:2018 without need for testing.		P
	Therefore only the mains supply terminals/terminations of those products are tested		P
26.3.2	**Conducted radio-frequency emission on main, load/or control terminal**		P
	Electronic control devices are so designed that they do not cause excessive radio interference		P
	The electronic control device comply with the requirements of CISPR 14-1:2016 or CISPR 15:2018. For electronic control devices used for electrical lighting application, CISPR 15:2018 applies.		P
	CISPR 15:2018 is applicable with the following modifications:		P

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Clause	Requirement + Test	Result - Remark	Verdict
	a) At the main terminals An initial survey or scan of the complete frequency range 9 kHz to 30 MHz made in on-state at the highest setting. In addition, the following frequencies and at all frequencies at which there is a local maximum disturbance found in the original survey above the predetermined level of 6 dB and below the limits given in CISPR 15, the control setting is varied for maximum disturbance while connected to the maximum load: 9 kHz, 50 kHz, 100 kHz, 160 kHz, 240 kHz, 550 kHz, 1 MHz, 1,4 MHz, 2 MHz, 3,5 MHz, 6 MHz, 10 MHz, 22 MHz and 30 MHz		P
	b) At the load and/or control terminals An initial survey or scan of the complete frequency range 150 kHz to 30 MHz is made in on-state at the highest setting. In addition, the following frequencies and at all frequencies at which there is a local maximum disturbance above the predetermined level of 6 dB below the limits given in CISPR 15, the control setting is varied for maximum disturbance while connected to the maximum load: 160 kHz, 240 kHz, 550 kHz, 1 MHz, 1,4 MHz, 2 MHz, 3,5 MHz, 6 MHz, 10 MHz, 22 MHz and 30 MHz		P
26.3.3	**Conducted radio frequency emission 0,15 MHz to 30 MHz on TP media and communications terminals**		N/A
	Electronic control devices with communications terminals and HBES/BACS switches and their extension unit based on TP media is so designed that they do not cause excessive common mode noise current on the on the bus cable and communications line.		N/A
	Electronic control devices with communications terminals and HBES/BACS switches and their extension unit based on TP cable is in accordance with class B of CISPR 32, as shown in Table 118.		N/A
	Tests are performed on TP cable only according to the method defined in CISPR 32:2015 and CISPR 32:2015/AMD1:2019, as shown in Table 118.		N/A
26.3.4	**Radiated radio frequency emission above 30 MHz**		N/A
	Electronic control devices based on TP media is designed that they do not cause excessive disturbances.		N/A
	The electronic control devices and network is in accordance with class B of CISPR 32.		N/A
	Tests performed according to the method defined in CISPR 32:2015 and CISPR 32:2015/AMD1:2019		N/A
101	**ABNORMAL CONDITIONS**		
101.1	**General**		P
	Electronic control devices not create any hazard under abnormal conditions		P

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Clause	Requirement + Test	Result - Remark	Verdict
	If, in case of failure, the maximum power taken by the electronic control devices is less than 0,5 W, the requirements of the abnormal conditions are deemed to be met.		P
101.2	**Temperature rise under abnormal conditions**		P
101.2.1	When electronic control devices are operated under abnormal conditions no part reach such a temperature that there is danger of fire to the surroundings of the electronic switches.		P
	Compliance is checked by subjecting the electronic control devices to a temperature rise test under fault conditions, as described in 101.2.2.		P
	During the test, the temperature rises not exceed the values given in Table 101, column concerning Clause 101		P
101.2.2	Unless otherwise specified, the tests are made on electronic control devices while they are mounted, connected and loaded as specified in Clause 17 Each of the abnormal conditions indicated in 101.2.3 and 101.2.4 is applied in turn:		N/A
101.2.3	The following fault conditions are simulated:		P
	- short circuit across creepage distances and clearances less than the values given in items 1, 2, 6, 7 of Table 23 if they are less than the values given in Figure 104 .....:		N/A
	- short circuit across insulating coating consisting, for example, of lacquer or enamel .....:		N/A
	- short circuit or interruption of semiconductor devices .....:	D1, D2, D3, Q1, Q2, Q3	P
	- short circuit of electrolytic capacitors; .....:	C2, C3, C5	P
	- Short circuit or interruption of capacitors or resistors which do not comply with the requirements of Clause 102 .....:		N/A
	- short circuit of the terminals on the load side. .....:		P
	If the temperature of the electronic control device is limited by the operation of automatic protective devices (including fuses), the temperature is measured 2 min after the operation of the device. ...:	See appended table 101.2.3	N/A
	If no temperature-limiting device operates, the temperature is measured after a steady state has been reached or after 4 h, whichever is the shorter time. .....:	See appended table 101.2.3	P
	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 .....(A):		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The electronic control device is then switched on for a duration corresponding to the maximum fusing time of the type of fuse as specified by IEC 60127 (all parts) corresponding to the current measured above		N/A
	The temperature is measured 2 min after the end of the period ..... :	See appended table 101.2.3	N/A
101.2.4	The following overload tests are carried out on electronic switches and HBES/BACS switches according to Table 119.		
	case A Without incorporated temperature-limiting devices and without incorporated fuses		P
	Loaded for 1 h with the conventional tripping current for the fuse which, in the installation, will protect the electronic switch and the HBES/BACS switch..... :	See appended table 101.2.4	P
	case B Protected by automatic protective devices (including fuses)		N/A
	Loaded in such a way that the current through the electronic switch and the HBES/BACS switch is 0,95 times the current with which the protecting device releases after 1 h. The temperature rise is measured after a steady state has been reached or after 4 h, whichever is the shorter time..... :	See appended table 101.2.4	N/A
	case C Protected by incorporated fuses complying with IEC 60127 (all parts)		N/A
	Replace fuses by links of negligible impedance. Loaded in such a manner that the current through the links is 2,1 times the rated current of the fuse. The temperature rise is measured after the electronic switch and the HBES/BACS switch has been loaded for 30 min..... :	See appended table 101.2.4	N/A
	case D Protected both by enclosed fuses and by automatic protective devices		N/A
	Loaded either as described above with incorporated fuses or with another automatic protective device (Cases A or C), choosing the test requiring the lower load..... :	See appended table 101.2.4	N/A
	case E Protected by automatic protective devices which will short-circuit only in case of overload		N/A
	Tested both as electronic switches and the HBES/BACS switch with automatic protective devices (Cases A and B) and as electronic switches without automatic protective devices ..... :	See appended table 101.2.4	N/A
	If any of the tests specified above do not allow to reach the steady state condition, the following additional test performed on a new set of specimens		N/A
	The electronic switch or the HBES/BACS switch is loaded with a resistive load to 1,1 times the rated current ..... (A):		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The current is then increased by 10 % and then the temperature is allowed to stabilize ..... (A):		
	current increase (+ 10 %) ..... (A):		N/A
	current increase (+ 10 %) ..... (A):		N/A
	This is repeated until the conventional tripping current of the protective device is reached ..... :		N/A
	or the electronic switch or the HBES/BACS switch is destroyed ..... :		N/A
101.3	**Protection against electric shock after fault conditions**		P
	Protection against electric shock is required, even though an electronic control device is being used or has been used during fault conditions Compliance is checked by carrying out the tests of Clause 10 immediately following the test of 101.2.		P
101.4	**Short circuit in the load circuit**		P
	Electronic switches and HBES/BACS switches withstands, without endangering their surroundings, the short circuit currents they may be subjected to in the load circuit. - The electronic switch and HBES/BACS switch are tested in a substantially non-inductive circuit in series with a load impedance and a device for limiting the let-through I^2t - The prospective short-circuit current of the supply is 1500 A RMS at a voltage equal to the rated voltage of the electronic switch under test. - The prospective let-through I^2t minimum value is 15000 A^2s - The circuit is calibrated with the following tolerances: current 0/±5 %, voltage 0/±10 %, frequency ±5 %.		P
	The short circuit is applied six times by the auxiliary switch A without any synchronization with respect to the voltage		P
	During the test, emission of flames or burning particles, if any, not be dangerous to the environment		P
	The above requirement is fulfilled if during the test there are no emissions of flames or burning particles visible with normal or corrected vision without additional magnification. ..... :		P
	If there is visible emission of flames or burning particles, the test is repeated on new specimens, With a clear polyethylene film placed approximately a distance of 10 mm from the surface of the product where the flame was emitted..... :		N/A
	After the short circuit test the specimen is re-energized in its normal operating position, incorporated fuses if any being replaced, and its behaviour is monitored for 4 h.		P
	The specimen show no dangerous behaviour during this period such as smoke or excessive heat.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	In case of doubt the maximum temperature rise values given in Table 101 not be exceeded .....:	See appended table 101.4	N/A
	Moreover, the electronic switch and HBES/BACS switch shall withstand the dielectric strength test according to Clause 16 with the voltages specified in Clause 19. This test shall not be applied according to item 3 of Table 15.	See appended table 101.4	N/A
101.5	**Particular requirements for dimmers**		N/A
	Dimmers classified for incandescent and/or self-ballasted lamps are so designed that no part reach such a temperature that there is danger of fire to the surroundings of the dimmer when non-dimmable self-ballasted lamps are installed in the load circuit.		N/A
	The tests are made on dimmers mounted and connected as specified in Clause 17		N/A
	The dimmer is loaded with a number of lamp simulation circuits as given in Figure 12, Load B providing the rated self-ballasted lamp load of the dimmer.		N/A
	The simulation circuit represents a 25 W non-dimmable self-ballasted lamp		N/A
	In the case of dimmers not classified for self-ballasted lamps, the dimmer is loaded with a number of lamp simulation circuits as given in Load B of Figure 12 having a total power equivalent to 1/5 of the declared incandescent lamp load.....:		N/A
	The setting is adjusted to a stable condition so that the maximum current peaks occur		N/A
	During the test, emission of flames or burning particles not occur and the temperature rises not exceed the values given in Table 101, column concerning Clause 101.....:	See appended table 101.5	N/A
	After the test, accessible metal parts not live.		N/A
	It is not necessary for the specimens to remain in operating condition		N/A
	the contacts of any incorporated automatic protective device not be welded, unless the electronic switch and the HBES/BACS switch is obviously useless		N/A
102	**COMPONENTS**		
	Components which, if they fail, may impair the safety of the electronic control device comply with the safety requirements specified in the relevant IEC International Standards as far as applicable.	See appended table 102	P
	if components are marked with their operating characteristics, the conditions under which they are used in the electronic control device are in accordance with these markings, unless a specific exception is made in this document.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	The testing of components which have to comply with other standards is, in general, carried out separately, according to the relevant standard, as follows:		P
	• component is marked and used in accordance with its marking		P
	• Where no IEC International Standard exists, or where the component is not marked or is not used in accordance with its marking, the component is tested under the conditions occurring in the electronic control device ..... :		N/A
	Components incorporated in the electronic control device are subjected to all the tests of this document		P
102.2	**Fuses**		N/A
	Fuses, if any, comply		N/A
	with IEC 60127 (all parts)		N/A
	or other relevant IEC documents..... :		N/A
	rated breaking capacity of 1500 A, unless any fault current through the fuse is limited to 35 A. ..... :		N/A
102.3	**Capacitors**		P
	• the short circuiting or disconnection of which would cause an infringement of the requirements under fault conditions with regard to shock or fire hazard:		P
	- comply with IEC 60384-14 ..... :		P
	- are in accordance with Table 120. ..... :	See appended table 120	P
	Trade mark; article of capacitor ..... :	Approved CX1	P
	- marked with rated voltage in volts (V): ..... : capacitance in microfarads (µF): ..... : reference temperature in degrees Celsius (°C). .... :	 310 V 0,1 40/110/56	P
	Capacitors passing the damp heat steady-state test specified in IEC 60384-14:2013, 4.12 and in IEC 60384-14:2013/AMD1:2016, 4.12 with a duration of not less than 21 days are considered acceptable .... :		N/A
	• the short circuiting of which would cause a current of 0,5 A or more through the terminals of the capacitor:		P
	- comply with IEC 60384-14 ..... :		P
	- are in accordance with Table 120. ..... :	See appended table 120	P
	Trade mark; article of capacitor ..... :	Approved CX1	P
	- marked with rated voltage in volts..... (V): capacitance in microfarads ..... (µF): reference temperature in degrees Celsius .... (°C):	 310 V 0,1 40/110/56	P

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Capacitors passing the damp heat steady-state test specified in IEC 60384-14:2013, 4.12 and in IEC 60384-14:2013/AMD1:2016, 4.12 with a duration of not less than 21 days are considered acceptable ....:		N/A
	• for suppression of electromagnetic interference:		P
	- comply with IEC 60384-14 .....:		P
	- are in accordance with Table 120. .....:	See appended table 120	P
	Trade mark; article of capacitor .....:	Approved CX1	P
	- marked with rated voltage in volts ..... (V): capacitance in microfarads ..... (µF): reference temperature in degrees Celsius .... (°C):	 310 V 0,1 40/110/56	P
	Capacitors passing the damp heat steady-state test specified in IEC 60384-14:2013, 4.12 and in IEC 60384-14:2013/AMD1:2016, 4.12 with a duration of not less than 21 days are considered acceptable ....:		N/A
102.4	**Resistors**		N/A
	Resistors, the short circuiting or interruption of which would cause an infringement of the requirements with regard to the protection against fire and electric shock in case of a defect, have an adequately constant value under the overload conditions prevailing in the electronic control device		N/A
	The resistors are positioned inside the enclosure of the apparatus		N/A
	Compliance is checked by test a) or test b), carried out on a sample of 10 specimens		N/A
	Before test a) or b), the resistance of each sample is measured, and the sample is then subjected to the damp heat test according to IEC 60068-2-78 with the following severity parameters: - Temperature: (40 ± 2) °C - Humidity: (93 ± 3) % RH - Test duration: 21 days		N/A
	resistance values measured.....:		N/A
	a) For resistors connected between hazardous live parts and accessible conductive parts and for resistors bridging contact gaps of electronic switches and HBES/BACS switches, the 10 specimens are each subjected to 50 discharges at a maximum rate of 12/min, from a 1 nF capacitor charged to 10 kV in a test circuit as shown in Figure 105 a)		N/A
	After this test, the value of resistance not differ more than 20 % from the value measured before the damp heat test.....:		N/A
	No failure is allowed.....:		N/A

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	b) For other resistors, the 10 specimens are each subjected to a voltage of such a value that the current through it is 1,5 times the value measured through a resistor, having a resistance equal to the specified rated value, which is fitted to the apparatus, when operated under fault conditions. During the test the voltage is kept constant		N/A
	The value of resistance is measured when steady state is attained and not differ more than 20 % from the value measured before the damp heat test. ..... :		N/A
	No failure is allowed..... :		N/A
102.5	**Automatic protective devices other than fuses**		N/A
102.5.1	**General**		N/A
	Automatic protective devices other than fuses are in compliance with IEC 60730 (all parts), as far as that standard is applicable and with additional requirements specified in 102.5.2 for automatic protective devices which switch off the current (hereinafter called cut-outs) and in 102.5.3 for automatic protective devices which only decrease the current:		N/A
102.5.2	**Cut-outs**		N/A
102.5.2.1	Cut-outs have adequate making and breaking capacity, three specimens are subjecting to the tests of 102.5.2.2 or 102.5.2.3.		N/A
102.5.2.2	Non-self-resetting cut-outs in the load circuit of the electronic control device are tested at 1,1 times the rated voltage of the electronic control device and with loads as specified below. ..... (V):		N/A
	The cut-outs are reset after each operation and thus caused to operate 10 times successively		N/A
	Cut-outs in electronic control devices for incandescent lamps are tested in a non-inductive circuit and are loaded with 2,1 times the rated current of the protecting fuse or with the relevant conventional fusing current for other fuses. ..... (A):		N/A
	For cut-outs in electronic control devices for fluorescent lamps, tests are carried out in the same way as for electronic control devices for incandescent lamps. ..... (A):		N/A
	Cut-outs in electronic control devices for speed control circuits are subjected to two series of 10 operations		N/A
	In the first series, the cut-out under test closes a circuit through which a current of 9 In (cos ϕ = 0,8 ± 0,05) ..... (A):		N/A
	In the second series, the circuit through which a current of 6 In (cos ϕ = 0,6 ± 0,05) ..... (A):		N/A
	During the test, no sustained arcing occur.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	After the test, the specimens show no damage impairing their further use or the safety of the electronic control device.		N/A
	The cut-outs withstand for 1 min a test voltage between the open contacts, the voltage being		N/A
	- for cut-outs in electronic control devices for lighting circuits: 500 V .....:		N/A
	- for cut-outs in electronic control devices for speed control circuits: 1200 V for rated voltages up to 130 V and 2000 V for rated voltages above 130 V.....:		N/A
102.5.2.3	Self-resetting cut-outs in the load circuit of the electronic control device are tested at 1,1 times the rated voltage of the electronic control device and with loads as specified below: ..... (V):		N/A
	- cut-outs in electronic control devices for incandescent lamps and fluorescent lamps are operated automatically for 200 cycles in a non-inductive circuit and are loaded with 2,1 times the rated current of the protective fuse or ..... (A):		N/A
	- with the relevant conventional fusing current for other fuses. ..... (A):		N/A
	During the test, no sustained arcing occur.		N/A
	After the test, the specimens show no damage impairing their further use or the safety of the electronic control device.		N/A
	The cut-outs withstand for 1 min a test voltage between the open contacts, the voltage being		N/A
	- for cut-outs in electronic control devices for lighting circuits: 500 V .....:		N/A
	- for cut-outs in electronic control devices for speed control circuits: 1200 V for rated voltages up to 130 V and 2000 V for rated voltages above 130 V.....:		N/A
102.5.3	**Current reducing automatic protective devices**		N/A
	Automatic protective devices which only decrease current to the electronic control devices are tested as follows.		N/A
	The electronic control device is loaded for 4 h with a current as given in Clause 17. ..... (A):		N/A
	.At the end of this period, the load is increased by closing an auxiliary switch which increases the load so that the prospective current through the electronic control device will be 2,1 times the rated current of the protective fuse or the relevant conventional tripping current for other fuses..... (A):		N/A

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	The auxiliary switch is closed for 30 min and then opened until the current through the electronic control device is stabilized to the original value, after which the auxiliary switch is closed again		N/A
	This procedure is repeated 10 times		N/A
	After this test, the device function correctly		N/A
	Compliance is checked by an additional test according to Clause 17 ..... :	See appended table 102.5.3	N/A
102.6	**Transformers**		N/A
	Transformers intended for SELV circuits are of the safety isolating type and are complying with the relevant requirements of IEC 61558-2-6 or IEC 61558-2-16. ..... :		N/A
103	**ELECTROMAGNETIC FIELDS (EMF)**		
	Electronic control devices are deemed to comply with the requirements for low power electronic equipment as given in IEC 62479 without need for testing		P

ANNEX A	**ADDITIONAL REQUIREMENTS FOR ELECTRONIC CONTROL DEVICES HAVING FACILITIES FOR THE OUTLET AND RETENTION OF FLEXIBLE CABLES**		
10	**PROTECTION AGAINST ELECTRIC SHOCK**		
10.1	**Prevention of access to live parts**		N/A
	For flexible cable outlet switches the test is carried out without the flexible cable fitted		N/A
12	**TERMINALS**		
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
13	**CONSTRUCTIONAL REQUIREMENTS**		
	Flexible cable outlet switches are 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 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 mm² and the entry is so shaped as to prevent damage to the flexible cable. ..... :		N/A

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	The cross-sectional area of external flexible cables connected between electronic control devices can be less if the current in the unit is limited by current limiting means. The minimum cross-sectional area is shown in Table A.101 ..... :		N/A
	Flexible cables comply with IEC 60245-4, code designation 60245 IEC 66, or IEC 60227-5, code designation 60227 IEC 53. ..... :		N/A
	A cable anchorage for the flexible cable ise provided such that the conductors are relieved from strain, including twisting, where they are connected to the terminals or terminations:		N/A
	Cable anchorages are anchor the flexible cable securely to the switch:		N/A
	The design 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
	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 mm² 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 of 30 N		N/A
	Immediately afterwards, the flexible cable is subjected for 1 min to a torque of 0,15 Nm as near as practicable to the cable entry:		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 IEC 66.		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 is not displaced by more than 2 mm:..... :		N/A
	An AC voltage of 2 000 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 be damaged. Breakdown or flashover is considered to indicate damage to the flexible cable..... :		N/A

ANNEX CC	**ADDITIONAL REQUIREMENTS FOR ELECTRONIC CONTROL DEVICES USING DLT-TECHNOLOGY IN ACCORDANCE WITH IEC 62756-1**		
CC.8	**MARKING**		
CC.8.1	In addition, the telegram types supported by DLT control units are marked on the control device..... :		N/A

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	A complete explanation of the telegram types in accordance with IEC 62756-1 is stated in the accompanying instruction sheet. ..... :		N/A
CC.8.2	DLT control device with the letters DLT ..... :		N/A
	Supported telegram types for DLT control devices ..... (TPx):		N/A
	DLT controlled load .....(DLT):		N/A
CC.8.3	The following marking are placed on the main part of the electronic switch and HBES/BACS switch:		N/A
	- 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 except for DLT devices if the electronic switch and HBES/BACS switch is not classified for general purpose use, the rating and type of any incorporated fuse (this is marked on the fuse-holder or in the proximity of the fuse)		N/A
CC.17	**TEMPERATURE RISE**		
	In lamp dimmers, DLT control devices and speed controllers, the setting is adjusted such that the highest temperature rise will occur		N/A
CC.19	**NORMAL OPERATION**		
CC.19.103	Semiconductor switching devices and/or electronic regulating devices including DLT control devices incorporated in electronic switches are subjected to the following tests		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
CC.26	**EMC REQUIREMENTS**		
CC.26.2	**Emission**		N/A
CC.26.2.1	**Low-frequency emission**		N/A
	DLT control devices are tested with maximum resistive load ..... :		N/A

ANNEX FF	**REQUIREMENTS FOR ELECTRONIC RCS AND ELECTRONIC TDS THAT PROVIDE THE FUNCTION, MARKINGS AND CONNECTION CONFIGURATION IN ACCORDANCE WITH IEC 60669-2-2 AND IEC 60669-2-3**		
8	**MARKING**		
FF.8.1	**General**		N/A
	For electronic RCS, 8.1 of IEC 60669-2-2:2006 applies		N/A
FF.8.2	**Symbols**		N/A

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	for electronic RCS, 8.2 of IEC 60669-2-2:2006 applies		N/A
	for electronic TDS, 8.2 of IEC 60669-2-3:2006 applies		N/A
FF.8.3	**Marking on terminals for phase conductors**		N/A
	for electronic RCS, 8.4 of IEC 60669-2-2:2006 applies		N/A
	for electronic TDS, 8.4 of IEC 60669-2-3:2006 applies		N/A
9	**CONSTRUCTIONAL REQUIREMENTS**		
FF.9.1	**Electronic TDS**		N/A
	For electronic TDS, 13.101 of IEC 60669-2-3:2006 applies		N/A
10	**MECHANISM**		
FF.10.1	**Electronic RCS and electronic TDS**		N/A
	for electronic RCS, 14.101 of IEC 60669-2-2:2006 applies.		N/A
	for electronic TDS, 14.101 of IEC 60669-2-3:2006 applies.		N/A
17	**TEMPERATURE RISE**		
	For electronic TDS, 17.1 of IEC 60669-2-3:2006 is applicable.		N/A
18	**MAKING AND BREAKING CAPACITY**		
FF.18.1	**General:**		N/A
	For electronic RCS, Clause 18 of IEC 60669-2-2:2006 applies		N/A
	For electronic TCS, Clause 18 of IEC 60669-2-3:2006 applies		N/A
FF.18.2	For electronic TDS, 18.1, second paragraph (dashed list) of IEC 60669-2-3:2006 applies with the following conditions:		N/A
	For electronic TDS whose rate of operation is limited by their application (for example, heat or light sensors), the rate of operation is as follows.		N/A
	The electronic TDS is set to the shortest cycle time possible. The electronic switch is re-activated at the end of each cycle within a time of (2 ± 0,5) s. ..... :		N/A
	All other electronic TDS are subjected to 200 operations at a uniform rate of		N/A
	- 30 operations per minute if the rated current does not exceed 10 - 15 operations per minute if the rated current exceeds 10 A but is less than 25 A - 7,5 operations per minute if the rated current is 25 A		N/A
	operations per minute ..... :		N/A
19	**NORMAL OPERATION**		

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
FF.19.1	**General**		N/A
	For electronic RCS, 19.1 and 19.101 of IEC 60669-2-2:2006 apply		N/A
	For electronic TDS, 19.1, 19.101, 19.102 and 19.103 of IEC 60669-2-3:2006 apply		N/A
23	**CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH SEALING COMPOUND**		
FF.23.1	Electronic RCS and electronic TDS		N/A
	For electronic RCS and electronic TDS classified according to 7.103, see the relevant requirements in IEC 60669-2-2:2006 and IEC 60669-2-3:2006 for clearance and creepage distances between SELV and mains.....:		N/A
101	**ABNORMAL CONDITIONS**		
	For electronic RCS, Clause 101 of IEC 60669-2-2:2006 applies.		N/A
	For electronic TDS, Clause 101 of IEC 60669-2-3:2006 applies		N/A

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict

Table 12.2.5 – Test with apparatus shown in figure 10 (screw terminals)				
	Rated current (A) ..... :	Max. 10		
	Type of conductors ..... :	rigid solid / rigid stranded / flexible		
	Smallest/largest cross-sectional area per table 4 (mm^2) ..... :	1,0 / 2,5		
	Number of conductors ..... :	2		
	Nominal diameter of thread (mm); torque per table 5 (Nm) ..... :	3,4; 0,8		
Cross-sectional area (mm^2)	Diameter of bushing hole per table 6 (mm)	Height H per table 6 (mm)	Mass (kg)	Remarks
1,0	6,5	260	0,4	Pass
2,5	9,5	280	0,7	Pass
Supplementary information:				

Table 12.2.6 – Pull test (screw terminals)				
	Rated current .....(A):	Max. 10		
	Smallest/largest cross-sectional area per table 4 (mm^2) .....:	1,0 / 2,5		
	Nominal diameter of thread (mm); torque 2/3 per table 5 (Nm) .....:	3,4; 0,53		
Cross-sectional area (mm^2)	Number of conductors	Type of conductors (rigid solid / rigid stranded / flexible)	Pull per table 7 applied for 1 min (N)	Remarks
1,5	1	rigid solid / rigid stranded / flexible	40	Pass
2,5	2	rigid solid / rigid stranded / flexible	50	Pass
Supplementary information:				

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
Table 12.2.7 – Tightening test (screw terminals)			
	Rated current .....(A):	Max. 10	
	Nominal diameter of thread (mm); torque 2/3 per table 5 (Nm) .....:	3,4; 0,53	

Largest cross-sectional area per table 4 (mm^2)	Permissible number of conductors	Type of conductors (rigid solid / rigid stranded / flexible)	Number of wires and nominal diameter of wires	Remarks
2,5	2	rigid solid / rigid stranded/ flexible	1 X 1,78 / 7 X 0,67 / 50 X 0,25	Pass

Supplementary information:

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
Table 12.3.10 – Mechanical stresses occurring in normal use (screwless terminals)			
	Rated current .....(A):		
	Largest/smallest cross-sectional area per table 8 (mm^2) .....:		

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

	TABLE: Test with apparatus shown in figure 9		
	Rated current .....(A):		
	Type of conductors .....:	rigid solid / rigid stranded / flexible	
	Smallest/largest cross-sectional area per table 8 (mm^2) .....:		
	number of conductors .....:		

Cross-sectional area (mm^2)	Diameter of bushing hole per table 6 (mm)	Height H per table 6 (mm)	Mass (kg)	Remarks

Supplementary information:

Table 12.3.11 – Electrical and thermal stresses occurring in normal use			
Test a)	Test carried out for 1 h connecting rigid solid conductors:		
	test current per table 9 ..... (A):		
	nominal cross-sectional area (mm^2) ..... :		

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

Test b)	Temperature cycles test) carried out on terminals subjected to Test a):		
	test current per table 9 ..... (A):		
	nominal cross-sectional area (mm^2) ..... :		
	allowed voltage drop (mV) ..... :	≤ 22,5 mV or 2 times 24^{th} cycle value (mV)	

IEC 60669-2-1							
Clause	Requirement + Test				Result - Remark		Verdict
Screwless terminal number		1	2	3	4	5	Remarks
voltage drop after 24th cycle							
voltage drop after 48th cycle							
voltage drop after 72nd cycle							
voltage drop after 96th cycle							
voltage drop after 120th cycle							
voltage drop after 144th cycle							
voltage drop after 168th cycle							
voltage drop after 192nd cycle							
Table 12.3.10b – Mechanical stresses occurring in normal use							
	Rated current ..... (A):						
	Largest/smallest cross-sectional area per table 8 (mm^2) ..... :						

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

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

Cross-sectional area (mm^2)	Diameter of bushing hole per table 6 (mm)	Height H per table 6 (mm)	Mass (kg)	Remarks

Supplementary information:

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict

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

Table 16.2 – Test for measuring the insulation resistance			
Item per table 15	Insulation resistance measured between:	Measured (MΩ)	Required (MΩ)
1)	Between all poles connected together and the body, with the switch in the “on” position	199	≥5
2)	Between each pole in turn and all other poles connected to the body, with the switch in the “on” position	199	≥ 2
3)	Between the terminals which are electrically connected together when the switch is in the “on” position, the switch being in the “off” position: - micro-gap construction.	199	≥2
Supplementary information:			

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
Table 16.3 – Electric strength test			
	Rated voltage .....(V):	100-240	

Item per table 15	Test voltage applied between:	Test voltage (V)	Flashover / breakdown (yes/no)
1)	Between all poles connected together and the body, with the switch in the “on” position	2000	No
2)	Between each pole in turn and all other poles connected to the body, with the switch in the “on” position	2000	No
3)	Between the terminals which are electrically connected together when the switch is in the “on” position, the switch being in the “off” position: - micro-gap construction.	750	No
Supplementary information:			

Table 17 – Temperature rise measurements			
	Cross-sectional area of conductor not less than 1,5 mm² .....:	1,5	
	Terminal screws: torque (Nm) (2/3 table 5).....:	0,53	
	Type of load .....:	1000W incandescent lamps	
	Rated current (A) / rated load (W or VA) .....:		
	Rated voltage .....(V):	100 - 240	
	Test voltage between 0,9 and 1,1 Vn, whichever is the more unfavourable .....(V):	110	
	Samples number.....:	A, B, C	

Thermocouple Locations	Max. Measured temperature rise (K)	Allowed temperature rise (K)

IEC 60669-2-1					
Clause	Requirement + Test		Result - Remark		Verdict
Non metallic parts: actuating member			2	60	
Non metallic parts: cover plate			3	70	
Inside of insulating material enclosure			11	125(1)	
Other insulation's (except thermoplastic): - Laminates bonded with epoxy resins			50	130	
Terminals and parts which may come into contact with cable insulation			26	55	
Supplementary information: (1) The client declared the softening temperature of body material is 170°C. This test is under the T_a = 35°C.					
Resistance method					
	Test voltage .....(V):				
	Ambient, t_1 (°C).....:				
	Ambient, t_2 (°C).....:				
Temperature rise of winding	**°C**	**R2 (Ω)**	**ΔT (K)**	**Max. dT (K)**	**Insulation class**
Supplementary information: (1) The client declared the softening temperature of body material is 170°C. This test is under the T_a = 35°C.					

IEC 60669-2-1				
Clause	Requirement + Test	Result - Remark		Verdict
Table 19 – Reduced electric strength after normal operation				
Relating to the test(s) of clause(s)..... :		19.101, 19.104		
	Rated voltage .....(V):	100-240		
Item per table 15	Test voltage applied between:	Test voltage (V)	Flashover / breakdown (yes/no)	
1)	Between all poles connected together and the body, with the switch in the “on” position	1500	No	
2)	Between each pole in turn and all other poles connected to the body, with the switch in the “on” position	1500	No	
3)	Between the terminals which are electrically connected together when the switch is in the “on” position, the switch being in the “off” position: - micro-gap construction.	500	No	
Supplementary information:				
Table 19 – Temperature rise measurements after normal operation				
Relating to the final check of the test(s) of clause(s)..... :		19.101, 19.104		
	Cross-sectional area of conductor not less than 1,5 mm² .....:	1,5		
	Terminal screws: torque (Nm) (2/3 table 5).....:	0,53		
	Type of load .....:	See page 2		
	Rated current (A) / rated load (W or VA) .....:			
	Rated voltage .....(V):	100 - 240		
	Test voltage between 0,9 and 1,1 Vn, whichever is the more unfavourable .....(V):	110 / 264		
	Samples number .....:	A, B, C, D, E, F		
Parts of the electronic switch		Max. Measured temperature rise (K)	Allowed temperature rise (K)	
Non metallic parts: actuating member		4	60	
Non metallic parts: cover plate		5	70	
Inside of insulating material enclosure		16	125(1)	
Other insulation’s (except thermoplastic): - Laminates bonded with epoxy resins		63	130	
Terminals and parts which may come into contact with cable insulation		32	55	
Supplementary information: (1) The client declared the softening temperature of body material is 170°C. This test is under the T_a = 35°C.				

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict

Table 20.2 – Impact resistance			
Part of enclosure tested per table 21 (A, B, C, D)	Blows per part	Height of fall (mm)	Comments
A	5 blows	80	Pass
B	4 blows	80	Pass
Supplementary information:			

Table 21.3 – Ball pressure test of thermoplastic materials			
	Allowed impression diameter (mm).....:	≤ 2 mm	
Part under test	Material designation	Test temperature (°C)	Impression diameter (mm)
PCB	CH-2 / HUIGENG ELECTRONIC INDUSTRIAL CO LTD	125	0,8
Housing	PC0031 / Taili (Anhui) Electric Appliance Co., Ltd.	125	1,3
Supplementary information:			

Table 21.4 – Ball pressure test of thermoplastic materials			
	Allowed impression diameter (mm).....:	≤ 2 mm	
Part under test	Material designation	Test temperature (°C) (1)	Impression diameter (mm)
Cover plate, push-button (for models with PC cover plater)	PC0031 / Taili (Anhui) Electric Appliance Co., Ltd.	70	1,1
Supplementary information: (1) 70 °C / 40 °C + highest temperature rise determined during the test of clause 17			

Table 22.1 – Threaded part torque test					
Threaded part identification	Diameter of thread (mm)	Column number (I, II, or III)	Applied torque (Nm)	Times (5/10)	No damage
Screw terminal	3,4	III	0,8	5	Pass
Supplementary information:					

IEC 60669-2-1								
Clause	Requirement + Test			Result - Remark				Verdict
Table 23.1 – Creepage distances, clearances and distances through sealing compound								
	Rated voltage .....(V):			100-240				
Item per table 23	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**: terminals or terminations**	≥3		> 3,0 by gauge	≥3	> 3,0 by gauge	-	-
2) / 7)	Between live parts of different polarity	≥3		> 3,0 by gauge	≥3	> 3,0 by gauge	-	-
3) / 8)	Between live parts and - accessible surfaces of parts of insulating material	≥3		> 3,0 by gauge	≥3	> 3,0 by gauge	-	-
	- Screws or devices for fixing bases, covers or cover-plates:	≥3		> 3,0 by gauge	≥3	> 3,0 by gauge	-	-
Supplementary information:								

Table 23.102.3 – Clearances between circuits (without verification test)				N/A
Clearance cl at/of:	Rated insulation voltage (V)	Rated impulse withstand voltage table 107 (V)	Required cl table 108 (mm)	Measured cl (mm)
			≥	
			≥	

Clearances between circuits (with verification test)			N/A
Clearance cl at/of:	Required impulse withstand voltage Table 110 (V)	Minimum clearances with verification test Table 110	Measured cl (mm)
		≥	
		≥	

Impulse withstand voltage test (6 pulses: 3 positive and 3 negative)			N/A
Test voltage applied between:	Rated impulse withstand voltage Table 107 (V)	Test voltages Table 109 (kV)	Flashover / waveform of the impulse is not distorted (Yes/No)
supplementary information:			

Table 23.102.4 – creepage distances between circuits (without verification test)	N/A

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict

creepage distance cr at/of:	Rated insulation voltage (r.m.s.) (V)	Material group	Required cr table 111 (mm)	Measured cr (mm)
			≥	
			≥	
Creepage distances between circuits (with verification test)				N/A
creepage distance cr at/of:	rated insulation voltage (r.m.s.) (V)	material group (I/II/III)	required cr per table 112 (mm)	measured cr (mm)
			≥	
			≥	
supplementary information:				

Table 24.1 – Glow-wire test			
Part under test	Material designation	Test temperature (°C)	Remarks
PCB	CH-2 / HUIGENG ELECTRONIC INDUSTRIAL CO LTD	850	P
Housing	PC0031 / Taili (Anhui) Electric Appliance Co., Ltd.	850	P
Cover plate, push-button (for models with PC cover plater)	PC0031 / Taili (Anhui) Electric Appliance Co., Ltd.	650	P
Supplementary information:			

Table 101.2.3 – Fault conditions test			
	Cross-sectional area of conductor not less than 1,5 mm² ..... :	1,5	
	Terminal screws: torque (Nm) (2/3 table 5) ..... :	0,53	
	Type of load ..... :		
	Rated current (A) / rated load (W or VA) ..... :	1000W incandescent lamps	
	Rated voltage ..... (V):	100 - 240	
	Test voltage between 0,9 and 1,1 Vn, whichever is the more unfavourable ..... (V):	110	
	Samples number ..... :	H, I, J	
Fault conditions simulated		**Remarks**	**Verdict**
a. Short circuit Q1, Q2, Q3 in turn		Still work or not work, no hazard observed	P
b. Short circuit D1, D2, D3		Still work, no hazard observed	P

IEC 60669-2-1				
Clause	Requirement + Test	Result - Remark		Verdict
c. Short circuit C2, C3, C5		Not work, no hazard observed		P
d. Short circuit load side		Not work, no hazard observed		P
Temperature rise measurements				P
	temperature measured after (min) .....:	Steady state reached		
Parts of the electronic switch		Max. Measured temperature rise (K)	Permissible temperature rise (K)	
Non metallic parts: actuating member		2	75	
Non metallic parts: cover plate		3	75	
Inside of insulating material enclosure		11	135(1)	
Other insulation's (except thermoplastic): - Laminates bonded with epoxy resins		50	160	
Terminals and parts which may come into contact with cable insulation		26	110	
Additional temperature rise measurements in case of temperature limited by a fuse				N/A
	Current under the relevant fault conditions measured with the fuse short-circuited ..... (A):			
	Type of fuse as specified by IEC 60127 .....:			
	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: (1) The client declared the softening temperature of body material is 170°C. This test is under the T_a = 35°C.				

IEC 60669-2-1				
Clause	Requirement + Test	Result - Remark		Verdict
Table 101.2.4 – Temperature rise measurements during overload tests				
	Case applicable, according to Table 119 ..... :	☒ **case A** ☐ **case B** ☐ **case C**	☐ **case D** ☐ **case E**	P
	Cross-sectional area of conductor not less than 1,5 mm² ..... :	1,5		
	Terminal screws: torque (Nm) (2/3 table 5) ..... :	0,53		
	Protection method..... :	See supplementary information		
	Test current..... (A):	14,5		
	Type of load ..... :	Resistive		
	Rated voltage .....(V):	100-240		
	Test voltage between 0,9 and 1,1 Vn, whichever is the more unfavourable .....(V):	110		
	Samples number.....:	H, I, J		

Parts of the electronic switch	Max. Measured temperature rise (K)	Permissible temperature rise (K)
Non metallic parts: actuating member	3	75
Non metallic parts: cover plate	4	75
Inside of insulating material enclosure	10	125(1)
Other insulation's (except thermoplastic): - Laminates bonded with epoxy resins	54	160
Terminals and parts which may come into contact with cable insulation	31	110

Supplementary information: (1) The client declared the softening temperature of body material is 170°C. This test is under the T_a = 35°C.

10A circuit breaker shall be used in the upstream to protect this product and 10x1,45=14,5A is conducted for the overload test in clause 101.2, as declared by client.

IEC 60669-2-1				
Clause	Requirement + Test		Result - Remark	Verdict
Table 101.4 - Reduced electric strength after normal operation				
Relating to the test(s) of clause(s) .....:				
	Rated voltage .....(V):			
Item per table 15	Test voltage applied between:		Test voltage (V)	Flashover / breakdown (yes/no)
Supplementary information:				
Table 101.4 - Temperature rise measurements after short circuit in the load circuit tests				
	Cross-sectional area of conductor not less than 1,5 mm² ..... :			
	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 Vn, whichever is the more unfavourable .....(V):			
	Samples number.....:			
Parts of the electronic switch			Max. Measured temperature rise (K)	Permissible temperature rise (K)
Supplementary information:				

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict

Table 102 – Critical components information

Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity 1)
Cover plate, push-button (for models with PC cover plater)	TAILI (ANHUI) ELECTRICALINDUSTRIAL CO., LTD	PC0031	PC, White, black, gray, gold or blue, Thickness≥1,0mm	IEC 60669-1 IEC 60669-2-1	Test in appliance
Cover plate, push-button (for models with AG cover plater)	Wenzhou Milai photoelectric technology Co., LTD	Glass	AG, White, black, gray, gold or blue, Thickness≥1,0mm	IEC 60669-1 IEC 60669-2-1	Test in appliance
Housing	TAILI (ANHUI) ELECTRICALINDUSTRIAL CO., LTD	PC0031	PC, White Thickness≥1,5mm	IEC 60669-1 IEC 60669-2-1	Test in appliance
PCB	HUIGENG ELECTRONIC INDUSTRIAL CO LTD	CH-2	V-0, 130°C Thickness≥1,1mm	IEC 60669-1 IEC 60669-2-1	Test in appliance
Relay (K1, K2, K3)	Shenzhen Yuanze Electric Co., Ltd.	Y32F-SS-105HM	250V 10A	EN 61810-1	TUV R 50198475
	Sanyou Corporation Limited	SJ-S105DMH	250V 10A	EN 61810-1	VDE 40002146
Capacitor (CX1)	Shenzhen Weidy Industrial Development Co., Ltd.	MKP	0,1uF 310V~ X2 40/110/56	IEC 60384-14	VDE 40041066
Varistor (VR1)	Cerglass MFG Inc	07D471K	300V, Max. peak current: 1,2kA	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 40028836
	Hongzhi Enterprises Ltd.	HEL7D471K	300V, Max. peak current: 1,2kA	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 40037512

Supplementary information:

1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.

2) License available upon request.

IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
Table 102.5.3 – Temperature rise measurements after current reducing automatic protective devices tests			
	Cross-sectional area of conductor not less than 1,5 mm² .....:		
	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 Vn, whichever is the more unfavourable .....(V):		
	Samples number.....:		

Parts of the electronic switch	Max. Measured temperature rise (K)	Permissible temperature rise (K)
Supplementary information:		

Table 120 – Capacitors			
Application of capacitor	Approved type(s) of capacitor in accordance with IEC 60384-14		
	$U_n \leq 125$ V	125 V < Un ≤ 250 V	
		Without overcurrent protection	With overcurrent Protection[(a)]
Between live conductors (L or N) and earth (PE):	☐ Y4	☐ Y2	☐ Y2
Between live conductors (L and N or L1 and L2):			
− without impedance in series	☐ X2	☐ X1	☐ 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	☐ X3	☐ X2	☐ X3
• below 0,5 A	☐ Any type	☐ Any type	☐ Any type
[(a)] External to the capacitor or built into the capacitor (for example, a fusing resistor).			

ATTACHMENT to TRF IEC60669_2_1K			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
ATTACHMENT TO TEST REPORT IEC 60669-2-1:2021 **used in conjunction with IEC 60669-1:2017** **EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES** Switches for household and similar fixed electrical installations - Part 2-1: Particular requirements - Electronic control devices			
Differences according to .....:	EN IEC 60669-2-1:2022 + EN IEC 60669-2-1:2022/A11:2022 used in conjunction with EN 60669-1:2018		
TRF template used .....:	IECEE OD-2020-F2:2022, Ed. 1.2		
Attachment Form No.....:	EU_GD_IEC60669_2_1K		
Attachment Originator .....:	IMQ S.p.A.		
Master Attachment.....:	Dated 2022-01-13		
	CENELEC COMMON MODIFICATIONS (EN)		
8.1	Replace Note 4 and note 5:		
	Note 4: See annex ZB for special national conditions		N/A
8.3	Replace NOTE 2 by:		
	NOTE 2 See Annex ZB for special national conditions.		N/A
10	**PROTECTION AGAINST ELECTRIC SHOCK**		
10.2	Add note after first paragraph:		
	NOTE See Annex ZB for special national conditions.		N/A
10.3.2	Replaced:		
	“cover or cover plates” replaced by “cover, cover plates and other parts of the enclosure”		P
10.3.3	Replaced:		
	“cover or cover plates” replaced by “cover, cover plates and other parts of the enclosure”		P
	Add note:		
	NOTE See Annex ZB for special national conditions.		N/A
10.5	Add NOTE Z1 and renumber existing note as NOTE 1		
	NOTE Z1 See Annex ZB for special national conditions.		N/A
11	**PROVISION FOR EARTHING**		
11.2	Add note:		

ATTACHMENT to TRF IEC60669_2_1K			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
	NOTE See Annex ZC for A-deviations.		N/A
12	**TERMINALS**		
12.2.5	**Replace** the text of index a in Table 6 by “Void”		P
	Add at the end of the subclause NOTE Z1 and renumber existing note as NOTE 1:		
	NOTE Z1 See Annex ZB for special national conditions.		
	Renumber NOTE by NOTE 1		
12.2.6	Replace NOTE 2 by:		
	NOTE 2 See Annex ZB for special national conditions.		
13	**CONSTRUCTIONAL REQUIREMENTS**		
13.15.2	Replace note by:		
	NOTE See Annex ZB for special national conditions.		N/A
15	**RESISTANCE TO AGEING, PROTECTION PROVIDED BY ENCLOSURES OF SWITCHES, AND RESISTANCE TO HUMIDITY**		
15.1	Replace.		
	in the 10th paragraph, the value “55 %” by “75 %”.		P
16	**INSULATION RESISTANCE AND ELECTRIC STRENGTH**		
	In Table 15, delete Note 4.		N/A
17	**TEMPERATURE RISE**		
17.1	**General**		
	In Table 101, in Note b) and c), replace the word “relevant” with “assessed”.		N/A
	In Table 101, replace Note g) with:		
	g) If a component complies to an IEC component standard and thermal considerations are included in such a standard, this Table 101 shall not be applicable to such a component.”		N/A
18	**MAKING AND BREAKING CAPACITY**		
18.1	**General**		
	Change Note 1 and 2 to normative text.		N/A
	Change the Note in Table 102 to normative text.		N/A
	Replace the paragraph below Table 102 with:		
	The tests are made by means of an apparatus which is arranged to simulate normal operation.		N/A

ATTACHMENT to TRF IEC60669_2_1K			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
18.102	**Electronic switches and HBES/BACS switches for control of the voltage of iron core transformers for extra-low-voltage incandescent lamps**		N/A
	delete “to simulate making” in the 3rd but last paragraph.		N/A
19	**NORMAL OPERATION**		
19.1	**General**		
	Replace the 5th, 6th, and 7th paragraphs with:		
	For HBES/BACS switches, the tests according to 19.101 and 19.108 are conducted on the complete HBES/BACS switch which shall be controlled by the electronic extension units as described in the product instructions.		N/A
	The electronic extension units are tested when installed according to the product instructions so as to verify that they are capable of controlling the electronic switch or the HBES/BACS switch in accordance with this Clause 19		N/A
	For electronic switches and HBES/BACS switches with included automatic function the number of operations for tests of 19.101, 19.102, 19.104, 19.106 and 19.108 is that specified in the relevant subclause. If the declared number of operations are higher than those indicated in the relevant subclause, the tests shall be made according to the declared value.		N/A
20	**MECHANICAL STRENGHT**		
20.1	Replace the first dash by:		
	- for all types of switches and their dedicated boxes, where applicable: 20.2		P
	Delete the third dashed item		P
22	**SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS**		
22.1	Delete the second sentence of the second paragraph		N/A
23	**CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH SEALING COMPOUND**		
23.102.3	**Dimensioning of clearances of basic, double or reinforced insulation between circuits**		
	Replace in the first paragraph at the first occurrence “Table 107” with “Table 108”		N/A
	Replace in NOTE 101 “Table 107” with “Table 108”.		N/A
	Add the following subclause after 23.2:		
23.Z1	Surface-type switches shall not have bare current-carrying strips at the back.		N/A

ATTACHMENT to TRF IEC60669_2_1K			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
26	**EMC REQUIREMENTS**		
	Replace 26.1 as follows:		
26.1	**General**		
	Electronic control devices shall be designed to operate correctly under the conditions of the electromagnetic environment in which they are intended to be used. This applies particularly for electronic control devices intended to be connected to AC low-voltage public supply systems where the design shall take into account the normal disturbances on the supply system, as defined by the compatibility levels given in IEC 61000-2-2		N/A
	The tests are carried out with one new specimen.		N/A
	Example of test set-ups are described in Annex DD.		N/A
	For electronic control devices using Radio Technology, depending on the frequency, the RF-requirements of ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 300 440, ETSI EN 301 489-1, ETSI EN 301 489-3, ETSI EN 301 489-4, ETSI EN 301 489-17 apply.		N/A
	For EN 55015 and EN 55032, 80/80 rules shall not be considered as they do not ensure the presumption of conformity of the EMC and RED directive.		N/A
	The use of dedicated software for testing purposes is allowed, providing that all significant functions are exercised.		N/A
	For electronic switches and HBES/BACS switches, the manufacturer shall specify all details related to the load, as given in the manufacturer`s documentation.		N/A
26.1.1	For electronic control devices not using RF (Radio Frequency), 26.2 and 26.3 apply.		N/A
26.1.2	For electronic control devices using RF (Radio Frequency), 26.2 and 26.3 apply with the following additions:		
	Exclusion bands are defined in the EUT relevant part of ETSI EN 301 489 series. In the exclusion bands a temporary loss of RF transmission is allowed.		N/A
	In case ETSI EN 301 489 series requests additional tests they shall be carried out and the RF functions shall meet the performance criteria.		N/A

ATTACHMENT to TRF IEC60669_2_1K			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
	For HBES/BACS switches using PL (power line), the emission requirements of EN 50065-1 and in addition the relevant requirements of EN 50065-2-2, EN 50065-2-3, EN 50561-1, EN 50561-2, EN 50561-3 apply.		N/A
	Compliance is checked by the tests of 26.2 and 26.3.”		N/A
26.2	**Immunity**		
26.2.1	**General**		
	Replace in the 2nd paragraph:		
	“manufacturers specifications” with “product instructions”		N/A
	Replace the 5th paragraph with:		
	The electronic control device shall be tested according to Table 113 with or without operation of the electronic control device as specified in the relevant paragraph of Clause 26.		N/A
	Replace in the last but one paragraph:		N/A
	“As an alternative,” with “For devices,”		N/A
26.2.6	**Radiated electromagnetic field test**		
	Replace the third paragraph with:		
	The test is carried out according to IEC 61000-4-3 by applying requirements in Table 117 with the exception of the exclusion band as defined in the relevant product standard for transmitters, receivers and duplex transceivers, providing the device contains such transmitters, receivers and duplex transceivers.		N/A
	Add at the end of 5th paragraph:		
	“…, according to the intended use of the product”		N/A
Table 117	Replace note b with:		
	A test level of 10 V/m applies except for the ITU broadcast frequency bands 87 MHz to 108 MHz, 174 MHz to 230 MHz and 470 MHz to 790 MHz		N/A
26.3.1	**Low-frequency emission**		
	Replace the 2nd paragraph with:		
	Electronic control devices shall comply with IEC 61000-3-2:2018 and IEC 61000-3-3:2013 with IEC 61000-3- 3:2013/AMD1:2017.		N/A
	Replace 26.3.2 as follows:		
26.3.2	**Conducted radio-frequency emission on main, load/or control terminal**		

ATTACHMENT to TRF IEC60669_2_1K				
Clause	**Requirement + Test**		**Result - Remark**	**Verdict**
	Electronic control devices shall be so designed that they do not cause excessive radio interference.			N/A
	The electronic control device shall comply with the requirements of CISPR 14-1:2016 or CISPR 15:2018 (Read in conjunction with CISPR 15:2018/ISH2019).			N/A
	For electronic control devices used for electrical lighting application CISPR 15:2018 (Read in conjunction with CISPR 15:2018/ISH2019) applies.			N/A
26.3.3	**Conducted radio frequency emission 0,15 MHz to 30 MHz on TP media and communications terminals**			
	Replace the 2nd and 3rd paragraph, and Table 118 with:			
	Electronic control devices with communications terminals and HBES/BACS switches and their extension unit based on TP cable shall meet the class B conducted emission requirements of CISPR 32 Table A.12, as shown in Table 118.			N/A
	Tests shall be performed on TP cable only according to the method defined in CISPR 32:2015 (As amended by CISPR 32:2015/AMD:2019), as shown in Table 118.			N/A
	Table 118 — Measurement methods			N/A
	Terminal	**Measurement method**	**Standard**	
	TP media	Asymmetric Artificial Network (AAN)	CISPR 32	
	Telecommunication	Asymmetric Artificial Network (AAN)	CISPR 32	
	Asymmetric control line (2-core)	Voltage probe	CISPR 32	
	Telecommunication with more than 4 × 2 core and coaxial cable	Capacitive Voltage probe and current clamp	CISPR 32	
	Telecommunication with more than 4 × 2 core (with screen)	Capacitive Voltage probe and current clamp	CISPR 32	
26.3.4	**Radiated radio frequency emission above 30 MHz**			
	Replace the 2nd paragraph with:			
	Electronic control devices with communications terminals and HBES/BACS switches and their extension unit based on TP cable shall meet the class B requirements for radiated emission of CISPR 32 Tables A.4 and A.5.			N/A
101	**ABNORMAL CONDITIONS**			
101.2.4	replace the 2nd paragraph with:			
	The test shall be carried out according to the protection method following Table 119			N/A
101.4	replace			

ATTACHMENT to TRF IEC60669_2_1K			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
	"environment" with "surrounding" in the paragraph after Note 6.		N/A
102	**COMPONENTS**		
102.3	**Capacitors**		
	replace the 1st paragraph with:		
	Capacitors,		
	• the short circuiting or disconnection of which would cause an infringement of the requirements under fault conditions with regards to shock or fire hazard, or		N/A
	• the short circuiting of which would cause a current of 0,5 A or more through the terminals of the capacitor, or		N/A
	• for suppression of electromagnetic interference,		N/A
	shall comply with IEC 60384-14 and shall be in accordance with Table 120.		N/A
102.4	**Resistors**		
	replace the 3rd paragraph with:		
	Compliance is checked by test a) or test b) depending on the type of the connection of the resistor as specified in a) or b) carried out on a sample of 10 specimen."		N/A
Z1	**ELECTROMAGNETIC FIELDS (EMF) REQUIREMENTS**		
	Electromagnetic field generated by switches covered by this part of the standard are considered negligible. Therefore, these requirements are deemed to be met without performing any test.		N/A
	Add the following new Clause:		
Z.101	**RADIO SPECTRUM REQUIREMENTS**		
	For electronic control devices using RF (Radio Frequency), all tests related to the efficient and effective use of the radio spectrum of the applicable standards (e.g., ETSI EN 300 220 series, ETSI EN 300 328, ETSI EN 300 330, ETSI EN 300 440 and ETSI EN 301 511) apply to the complete electronic control device.		N/A
ANNEX A	**ADDITIONAL REQUIREMENTS FOR SWITCHES HAVING FACILITIES FOR THE OUTLET AND RETENTION OF FLEXIBLE CABLES**		
8	**MARKING**		
8.1	Add the following paragraph at the end of this subclause:		

ATTACHMENT to TRF IEC60669_2_1K			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
	In addition for switches where a cord anchorage is intended to clamp effectively flexible cables other than those nominal cross-sectional areas appropriate to the rating of the switch as given in Table 2,		N/A
	then the minimum and maximum size for which the anchorage is provided may be marked in an area adjacent to the anchorage, e.g. “6 mm - 16 mm” or “6 - 16“. This information shall be put on the switch and/or the packaging unit.		N/A
13	**CONSTRUCTION REQUIREMENTS**		
13.Z1	Add at the end of the subclause:		
	For flexible cable outlet switches:		
	- it shall be clear how the reliefs from strain and the prevention of twisting is intended to be effected,		N/A
	- the cord anchorage, or at least part of it, shall be integrated with or permanently fixed to one of the components parts of the switch,		N/A
	- makeshift methods, such as tying the flexible cable in a knot or tying the ends with a string, shall not be used,		N/A
	- cord anchorage shall be suitable for the different types of flexible cables for which they are intended.		N/A
	Rewirable switches with earthing connection shall be designed with ample space for slack of the earthing conductors in such a way that, if the strain relief should fail, the connection of the earthing conductor is subjected to strain after the connection of current carrying conductors and that, in the case of excessive stresses, the earthing conductor will break after the current carrying conductors.		N/A
ANNEX D	**ADDITIONAL REQUIREMENTS FOR INSULATING REQUIREMENTS FOR INSULATION-PIERCING TERMINALS**		
8	**MARKING**		
8.1	**General**		
	Add new list item after m)		N/A
	n) length of the conductor to be inserted into the IPT, if applicable		N/A
8.9	**Manufacturer information**		
	Marking indicated on the manufacture’s documentation for IPTs:		N/A
	Connection and disconnection procedure, if necessary		N/A

ATTACHMENT to TRF IEC60669_2_1K			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
	Method of connection according to 7.1.10, if necessary		N/A
	An indication that the switch is equipped with non-reusable IPTs, if necessary		N/A
	Clear information that the conductor shall not be stripped before connecting		N/A
12	**TERMINALS**		
12.1	**General**		
	Switches provided with screw-type terminals, with screwless terminals or insulating-piercing terminals(IPTs).....:		N/A
	The test 12.2.8, 12.3.9, 12.3.10,12.4.9 and 12.4.10 on terminals, made after the test of 15.1		P
12.4	**IPTs for external copper conductors**		
12.4.1	IPTs terminals of the type suitable for:		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
12.4.2	IPTs 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 D2:		N/A
	Rated current (A).....:		
	Rated connecting capacity (mm²).....:		
	Diameter of largest rigid conductor (mm).....:		
	Diameter of largest flexible conductor (mm) .....:		
	Diameter of largest rigid isolated conductor (mm) ....:		
	Diameter of largest flexible isolated conductor (mm):		
	IPTs terminals allow the conductor to be connected without special preparation		N/A
	Conductor clamped between metal surfaces		N/A
12.4.3	Reusable IPTs: designed in such a way that no insulating material remains inside the terminal		
	Compliance verified as follows:		
	Type(s) of conductors .....:		N/A
	Largest / smallest cross-sectional area.....:		N/A
	Conductor connected and disconnected five times rotating it in such a way that is not connected twice at the same place		N/A
	No insulating material remains inside the switch, or		N/A

ATTACHMENT to TRF IEC60669_2_1K			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
	It is possible to withdraw the insulating material from the switch		N/A
12.4.4	Parts of screwless terminals intended for carrying current of materials as specified in 22.5		N/A
12.4.5	IPTs transmitting sufficient contact pressure and without undue damage to the conductor		N/A
	Contact pressure between metal surfaces		N/A
12.4.6	Disconnection of a conductor from the reusable IPT: requires and operation other than a pull on the conductor only		N/A
12.4.7	IPTs intended to be used for the interconnections of two or more conductors, so designed that:		N/A
	- each conductor is clamped individually		N/A
	- the conductors can be connected or disconnected either at the same time or separately		N/A
	- each conductor is introduced in a separate clamping unit		N/A
	It is possible to clamp securely any number of conductors up the maximum as designed		N/A
12.4.8	IPTs designed so that adequate insertion of the conductor is obvious		N/A
	Over-insertion is prevented if further insertion is liable to reduce the creepage distances and/or clearances required, or to influence the operation of the accessory		N/A
12.4.9	IPTs properly fixed to the switch		N/A
12.4.10	IPTs terminals withstand mechanical stresses occurring in normal use	See appended table 12.4.10	N/A
	During application of the pull, conductor not come out of the terminal	See appended table 12.4.10	N/A
	During the test conductors not move noticeably in the clamping unit		N/A
	After these tests: neither terminals nor clamping means have worked loose and conductors show no deterioration		N/A
	Flexible conductor, the break of individual wires of the conductor shall not considered		N/A
	No lack of the insulating material		N/A
12.4.11	IPTs terminals withstand electrical and thermal stresses occurring in normal use		N/A
	Test A: 192 temperature cycles test, each cycle with a duration of 1 h, with the test current as defined in Table 2 of Part I	See appended table 12.4.11	N/A

ATTACHMENT to TRF IEC60669_2_1K			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
	- measured after 24th and 192nd temperature cycle	See appended table 12.4.11	N/A
	Maximum voltage drop did not exceed 22,5 mV or 1,5 times 24th cycle value	See appended table 12.4.11	N/A
	During the test conductors not move noticeably in the clamping unit		N/A
	After these tests: neither terminals nor clamping means have worked loose and conductors show no deterioration		N/A
12.4.12	Non-reusable IPT not possible to disconnect the product without destroying		N/A
12.4.13	IPTs that uses screws wire connections tested as follows (before each test of 12.4):		N/A
	Toque (stated in table 5 or by the manufacturer):		N/A
	Screws tightened and loosened 5 times. IPT not be damaged so as to impair its further use.		N/A
12.4.14	Screws for making the contact- pressure: not serve to fix any other component		N/A
	Screws not of soft metal		N/A
	The use of aluminium requires additional tests, according to EN 61545.		N/A
ANNEX E	**ADDITIONAL REQUIREMENTS AND TESTS FOR SWITCHES INTENDED TO BE USED AT A TEMPERATURE LOWER THAN − 5 °C**		
8	**MARKING**		
8.1	**General**		
	Add new list item after m)		N/A
	n) Symbols for products declared as suitable for use at a temperature below the normal range	- 25 °C	N/A
8.2	**Symbols**		
	Add the following marking:		
	- Intended for use in cold environment down to −25 °C, symbol IEC 60417-6292:2015-11 		N/A
13.15.2	The tests of 13.15.2 are performed at a temperature of – 25 °C		N/A
19	**NORMAL OPERATION**		
	Add the following new subclause		
19.4	Switches intended to be used in ambient temperature below – 5°C		
	Switches kept for 16 h in a freezer at a temperature – 25 °C ± 2 °C		
	- rate (operations per minute) ..... :	30	N/A

ATTACHMENT to TRF IEC60669_2_1K			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
	number of operations without load every 4 h ..... :	20	N/A
	During and after the test: specimens function correctly, no visible harmful deformation, cracks or similar damage		N/A
	Reduced electric strength per clause 16		N/A
20	**MECHANICAL STRENGTH**		
	Add the following new subclause		
20.11	Impact test at low temperatures		
	Switches kept for 16 h in a freezer at a temperature – 25 °C ± 2 °C		
	The specimens are subjected to the impact test in according to 20.2		N/A
ZB	**ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)**		
7.7	**Belgium, Finland, Germany, Netherlands, Norway and Sweden** Design B is not used due to installation practice.		N/A
8.1	**United Kingdom** Add after the first paragraph: The marking of the type reference is not used.		N/A
8.1	**Germany** Add at the index n: n) the symbol that electrotechnical expertise is required (see IEC 60417-6182) is to be placed on the packaging.		N/A
8.3	**United Kingdom** Add after the first paragraph: Due to the lack of an earthing conductor in many existing old buildings, accessories requiring earth connection cannot normally be used.		N/A
10.2	**Norway** Add after the first paragraph: Due to the lack of an earthing conductor in many existing old buildings, accessories requiring earth connection cannot normally be used.		N/A
10.3.3	**Norway** Add after the first paragraph: Due to the lack of an earthing conductor in many existing old buildings, accessories requiring earth connection cannot normally be used.		N/A
10.5	**Norway** Add after the second paragraph: Due to the lack of an earthing conductor in many existing old buildings, accessories requiring earth connection cannot normally be used.		N/A

ATTACHMENT to TRF IEC60669_2_1K			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**
12.2.5	**Finland, Norway and Sweden** Add at the end: The test shall be repeated with rigid solid conductors in the case they exist in the relevant IEC standard, if the first test has been made with rigid stranded conductors. In the case rigid stranded conductors do not exist, the test may be made with rigid solid conductors only.		P
12.2.6	**Finland, Norway and Sweden** Add the following paragraph at the end of the subclause: An additional test with one rigid solid conductor and one rigid stranded conductor with the same nominal cross-sectional area connected at the same time is required for terminals allowing the connection of two conductors.		P
13.15.2	**Denmark, Finland, Norway, Sweden and Switzerland** This subclause is mandatory.		N/A
Annex E	**Finland, Norway and Sweden** This annex is normative.	-25 °C	N/A
ZC	**ANNEX ZC, NATIONAL DEVIATIONS (EN)**		
11.2	**Belgium** (Reglement General sur les Installations Electriques, R.G.I.E. § 73.02). Replace the second paragraph by: They shall have a capacity not less than that of the corresponding terminals for the supply conductors except that any additional external earthing terminal shall be of a size suitable for conductors of at least 4 mm 2.		N/A

12.4.10	**TABLE: Test with apparatus shown in figure 9**		N/A
	Rated current (A)..... :		
	Type of conductors ..... :		
	Smallest/largest cross-sectional area per table D.2 (mm^2) ..... :		
	Number of conductors ..... :		
	Nominal diameter of thread (mm); torque per table 5 (Nm)..... :		

Cross-sectional area (mm^2)	Diameter of bushing hole per table 6 (mm)	Height H per table 6 (mm)	Mass (kg)	Remarks

Supplementary information:

ATTACHMENT to TRF IEC60669_2_1K			
Clause	**Requirement + Test**	**Result - Remark**	**Verdict**

12.4.10	**TABLE: Pull test**				N/A
	Rated current (A) ..... :				
	Smallest/largest cross-sectional area per table D.2 (mm^2) ..... :				
	Nominal diameter of thread (mm); torque per table 5 (Nm) ..... :				
Cross-sectional area (mm^2)	Number of conductors	Type of conductors (rigid solid / rigid stranded / flexible)	Pull per table 7 applied for 1 min (N)	Remarks	
		rigid solid / rigid stranded / flexible			
		rigid solid / rigid stranded / flexible			
		rigid solid / rigid stranded / flexible			
Supplementary information:					

12.4.11	**TABLE: Temperature-cycling test**				N/A
	Model/type reference ..... :				
	Test torque for screws, if any (Table 5) (Nm) ..... :				
	Smallest cross-sectional area (mm^2) ..... :				
	Test current (Table D.3) (A) ..... :				
Measured voltage drop of:		**Measured voltage drop (mV)**			
		Sample 1	**Sample 2**	**Sample 3**	
Solid conductors ..... (after 24 cycles)					
Stranded conductors ..... (after 24 cycles)					
Flexible conductors ..... (after 24 cycles)					
Solid conductors ..... (1,5 times 24th cycle value)					
Stranded conductors (1,5 times 24th cycle value)					
Flexible conductors .....(1,5 times 24th cycle value)					
Solid conductors ..... (after 192 cycles)					
Stranded conductors ..... (after 192 cycles)					
Flexible conductors ..... (after 192 cycles)					
	Largest cross-sectional area (mm^2) ..... :				
	Test current (Table D.3) (A) ..... :				
Measured voltage drop of:		**Measured voltage drop (mV)**			
		Sample 1	**Sample 2**	**Sample 3**	

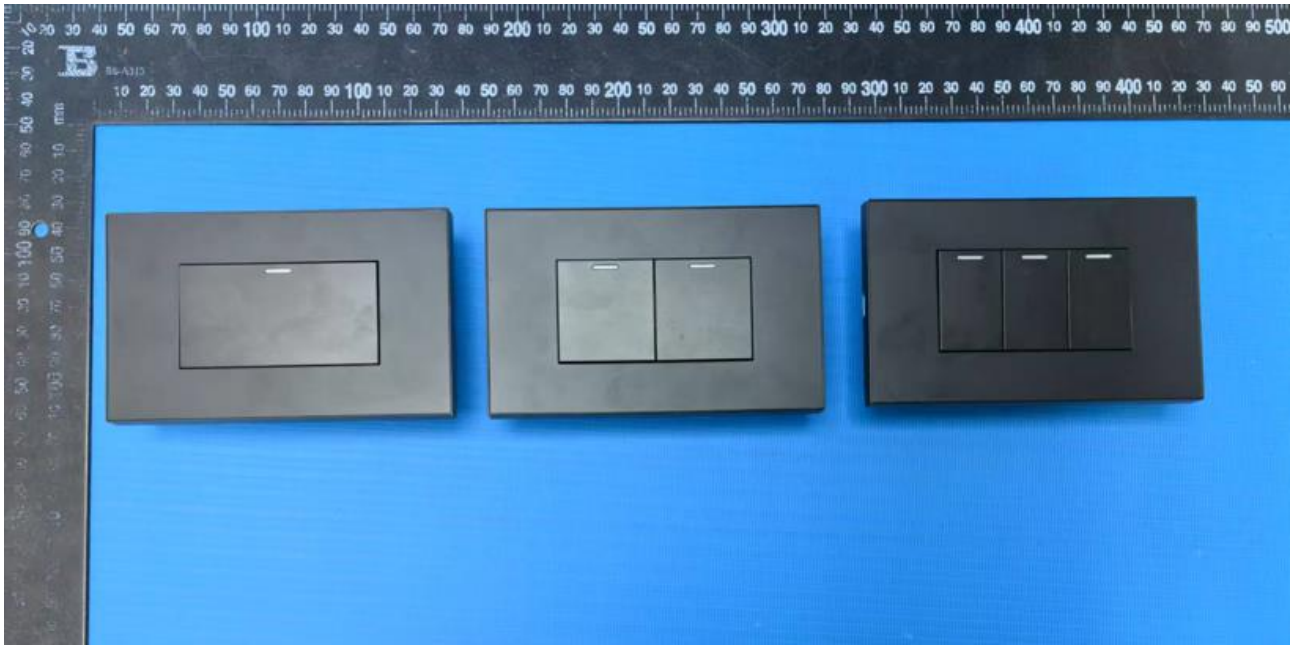
ATTACHMENT to TRF IEC60669_2_1K					
Clause	**Requirement + Test**		**Result - Remark**		**Verdict**
Solid conductors ..... (after 24 cycles)					
Stranded conductors ..... (after 24 cycles)					
Flexible conductors ..... (after 24 cycles)					
Solid conductors ..... (1,5 times 24th cycle value)					
Stranded conductors (1,5 times 24th cycle value)					
Flexible conductors .....(1,5 times 24th cycle value)					
Solid conductors ..... (after 192 cycles)					
Stranded conductors ..... (after 192 cycles)					
Flexible conductors ..... (after 192 cycles)					
Supplementary information:					

Photograph attachment

Front view of AS6A-01W, AS6A-02W, AS6A-03W (from left to right)

Back view of AS6A-01W, AS6A-02W, AS6A-03W (from left to right)

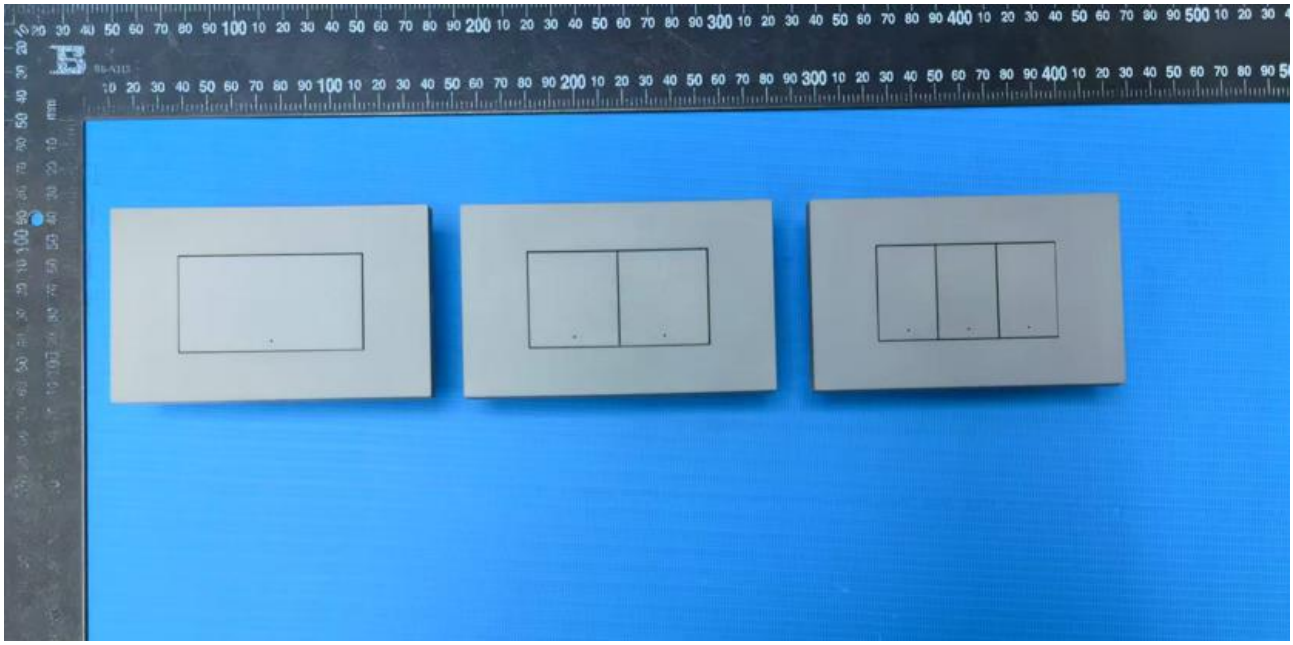
Photograph attachment



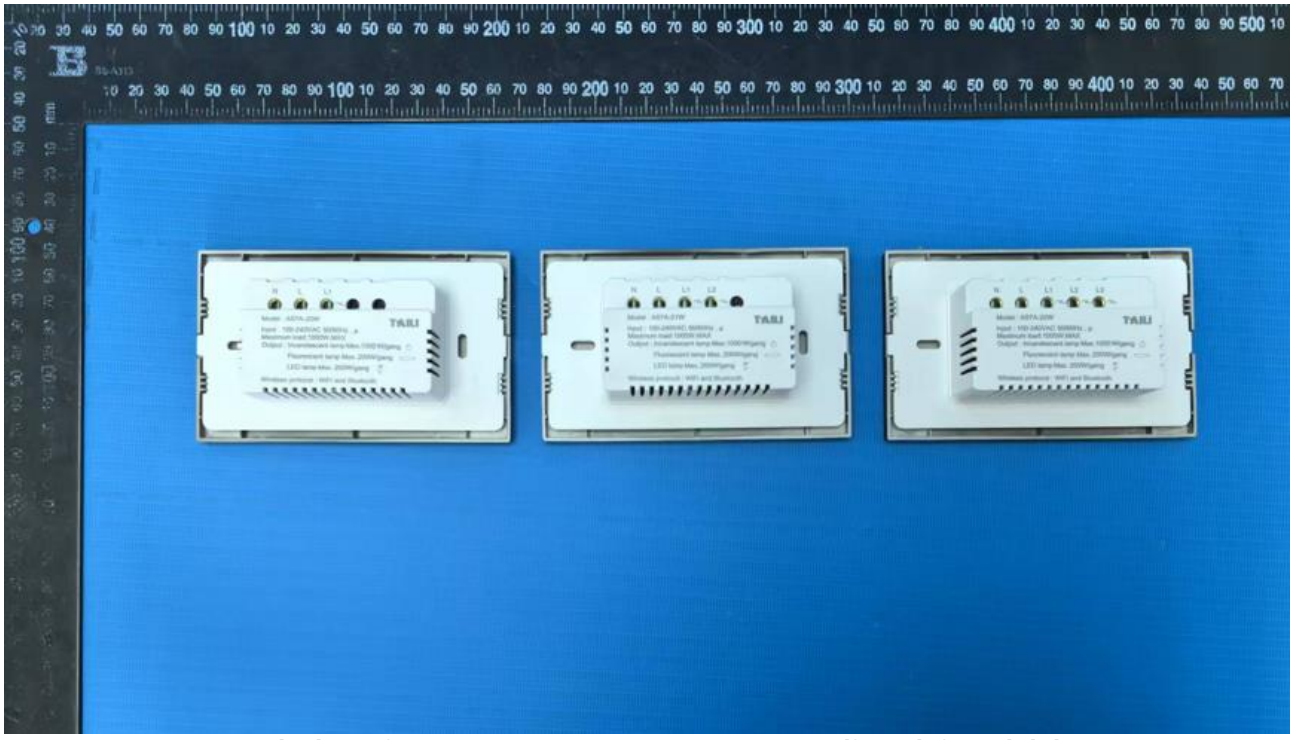
Front view of AS7A-10W, AS7A-11W, AS7A-12W (from left to right)

Back view of AS7A-10W, AS7A-11W, AS7A-12W (from left to right)

Photograph attachment

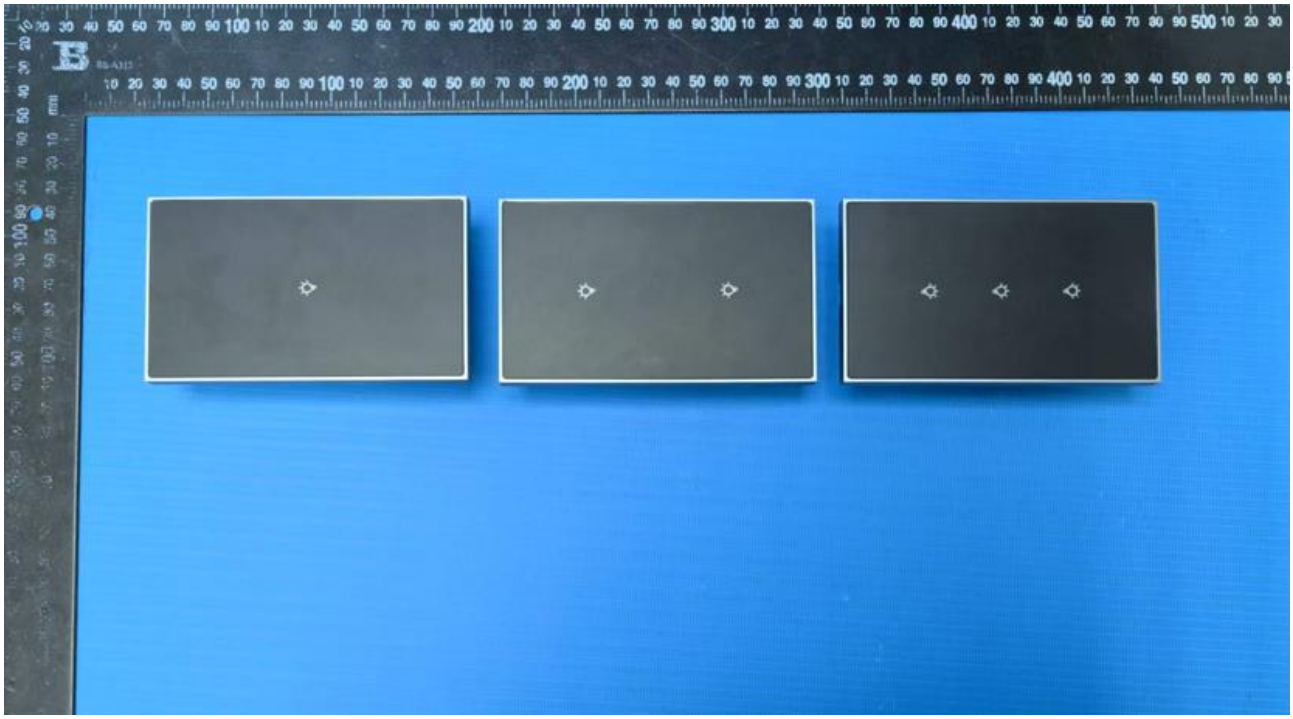


Front view of AS7A-20W, AS7A-21W, AS7A-22W (from left to right)



Back view of AS7A-20W, AS7A-21W, AS7A-22W (from left to right)

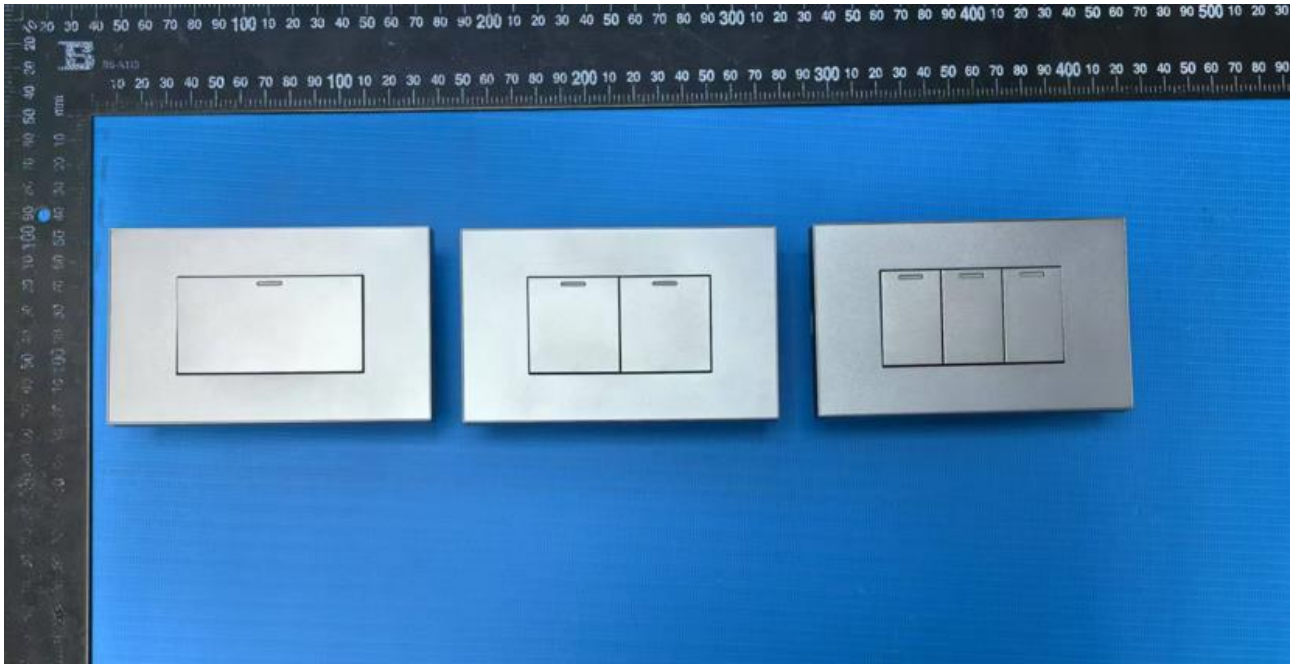
Photograph attachment



Front view of AS6A-04Ze, AS6A-05Ze, AS6A-06Ze (from left to right)

Back view of AS6A-04Ze, AS6A-05Ze, AS6A-06Ze (from left to right)

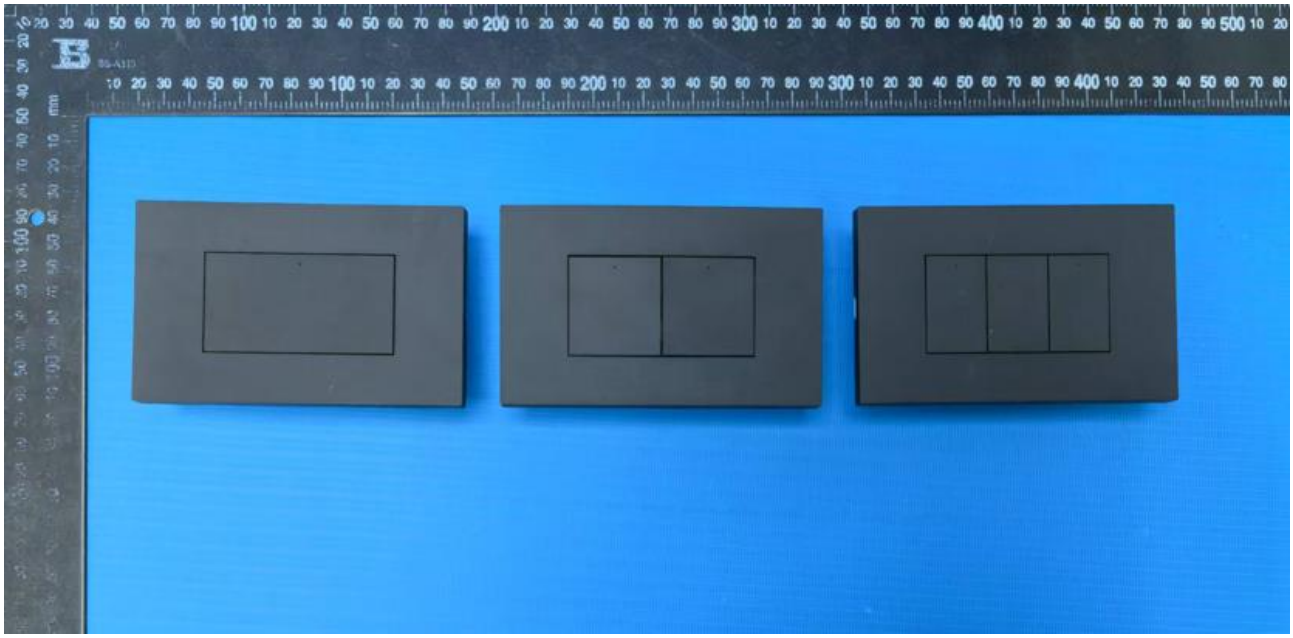
Photograph attachment



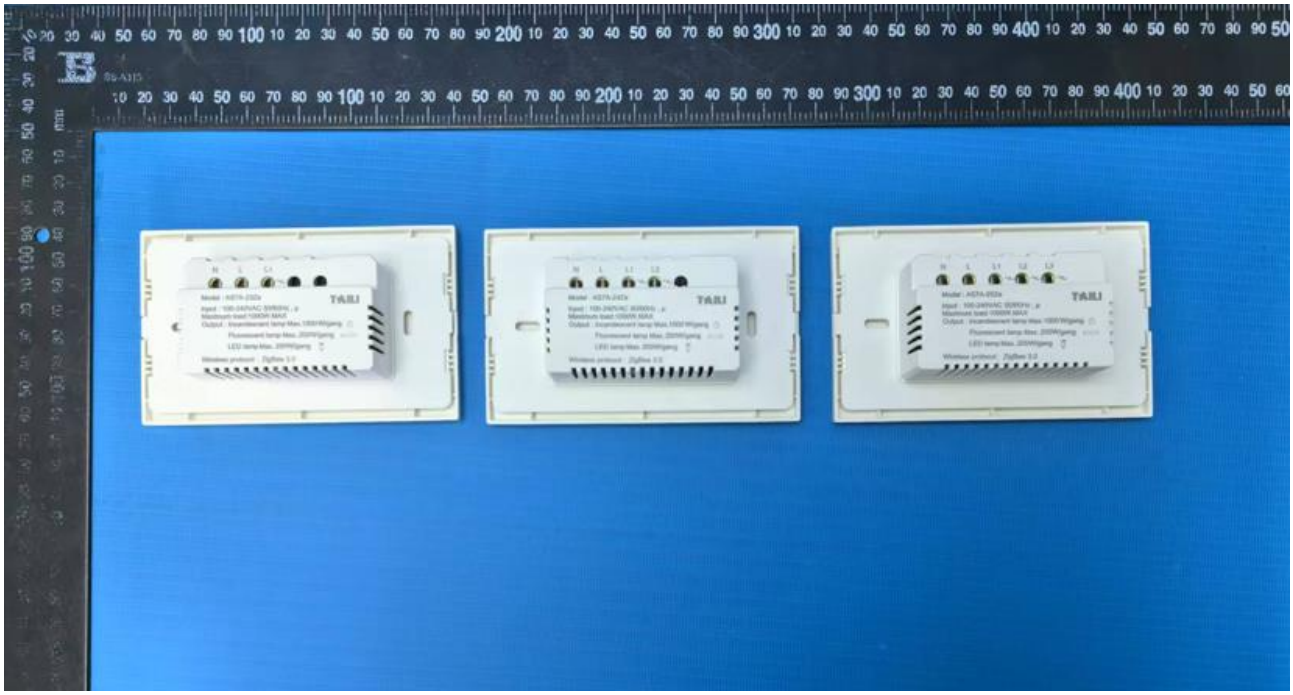
Front view of AS7A-13Ze, AS7A-14Ze, AS7A-15Ze (from left to right)

Back view of AS7A-13Ze, AS7A-14Ze, AS7A-15Ze (from left to right)

Photograph attachment

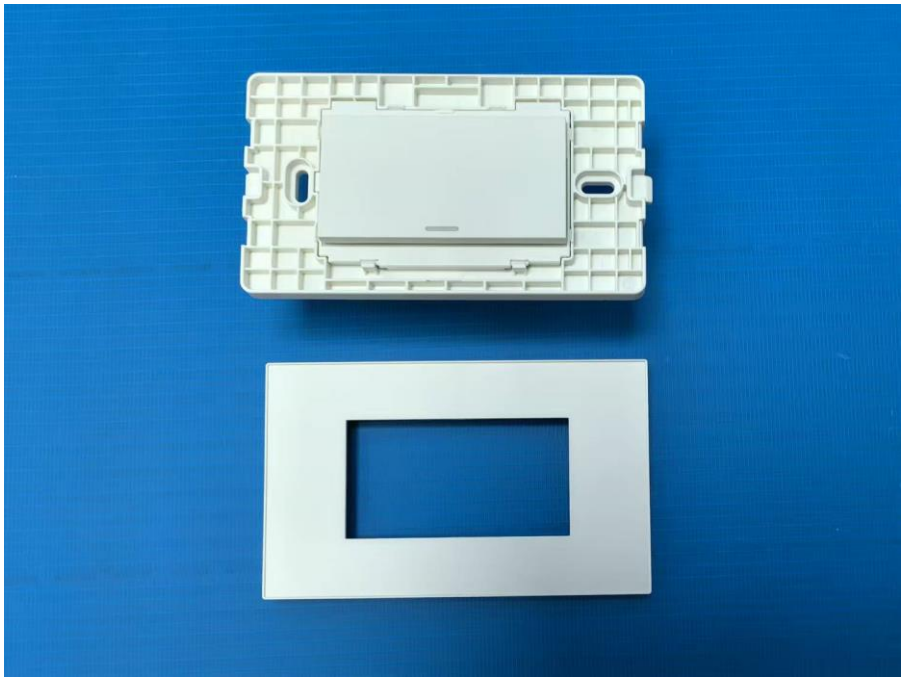


Front view of AS7A-23Ze, AS7A-24Ze, AS7A-25Ze (from left to right)

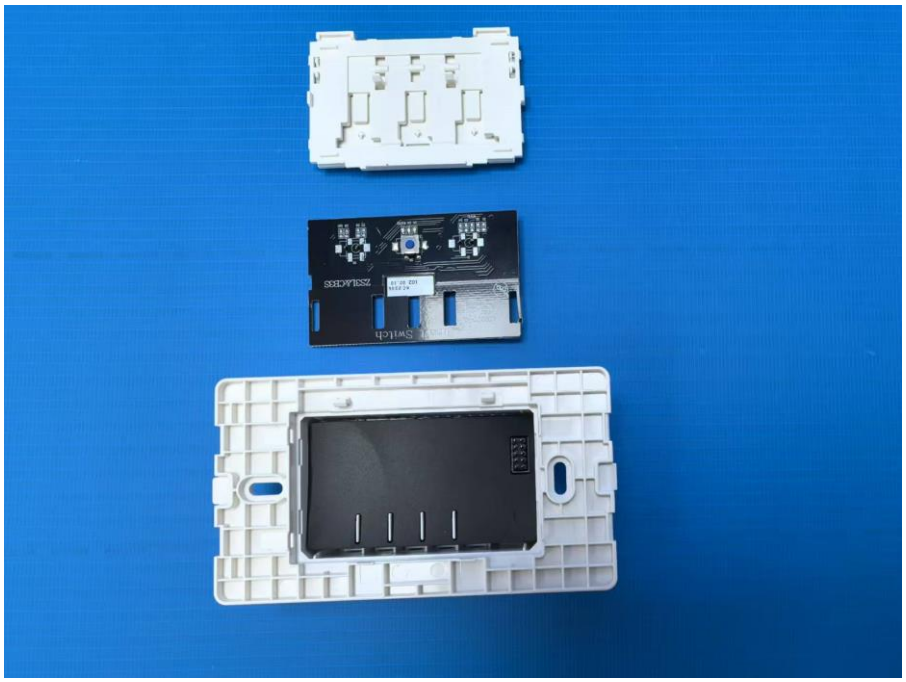


Back view of AS7A-23Ze, AS7A-24Ze, AS7A-25Ze (from left to right)

Photograph attachment

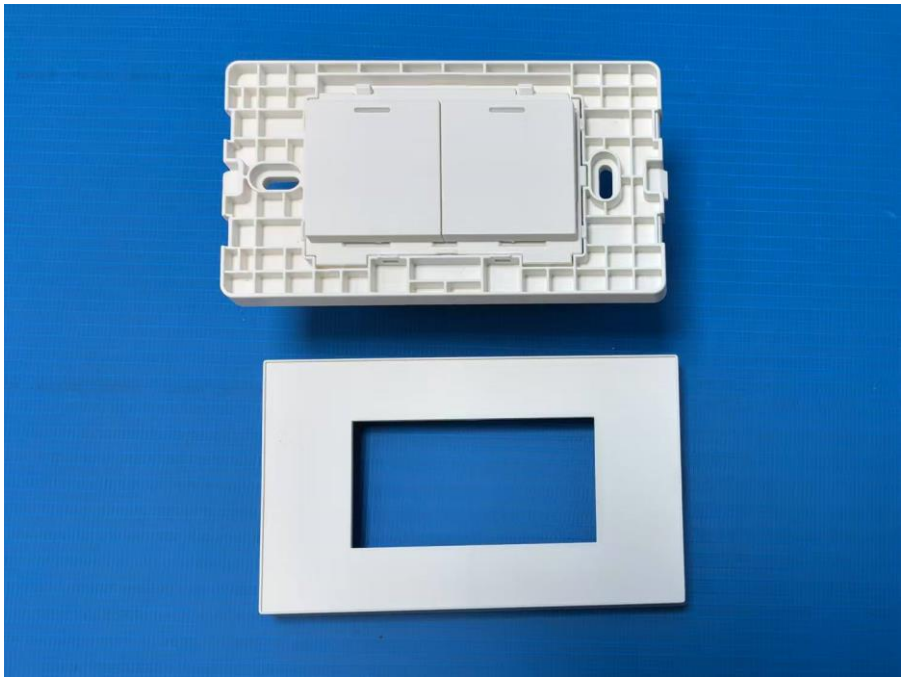


Open view of AS7A-13Ze (as representative for 1gang switch)

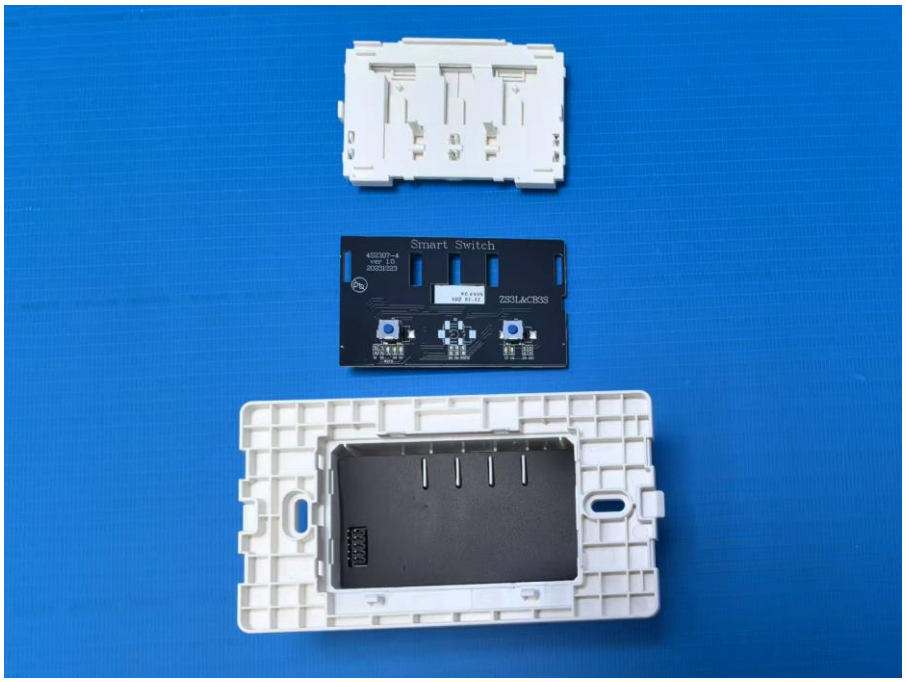


Open view of AS7A-13Ze (as representative for 1gang switch)

Photograph attachment

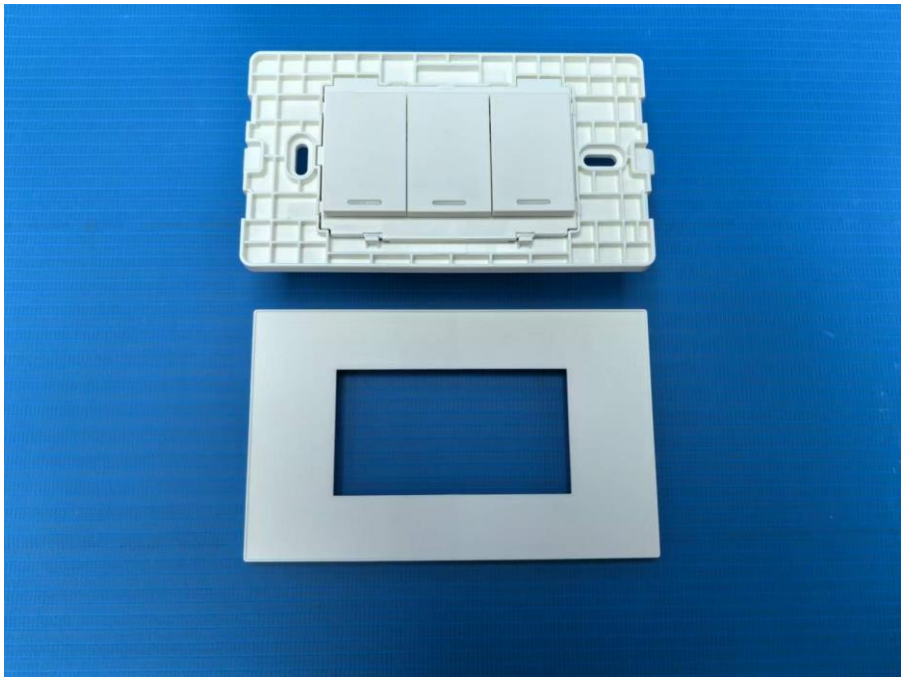


Open view of AS7A-14Ze (as representative for 2gang switch)



Open view of AS7A-14Ze (as representative for 2gang switch)

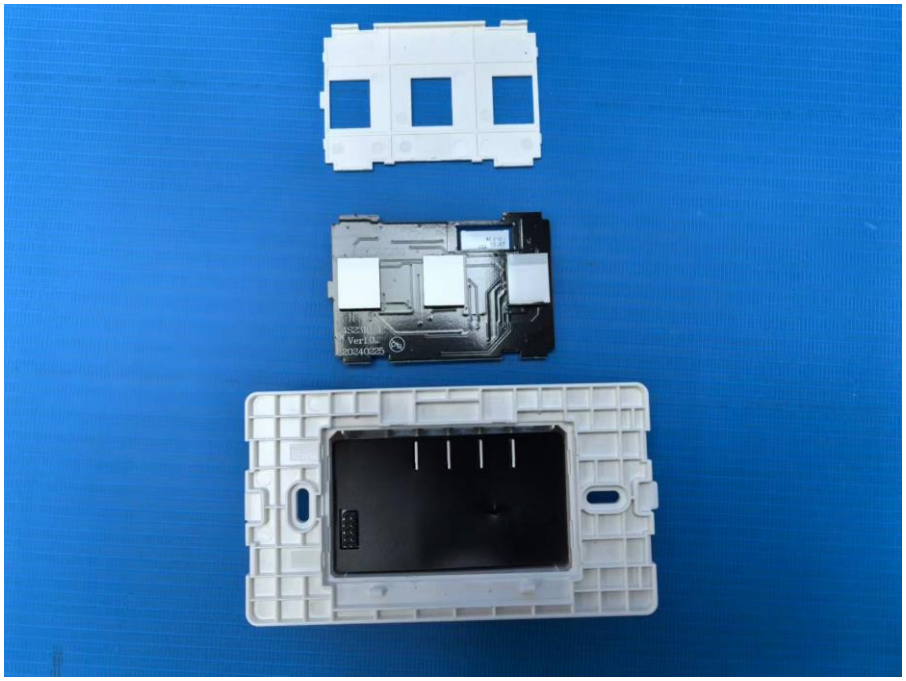
Photograph attachment



Open view of AS7A-15Ze (as representative for 3gang switch)

Open view of AS7A-15Ze (as representative for 3gang switch)

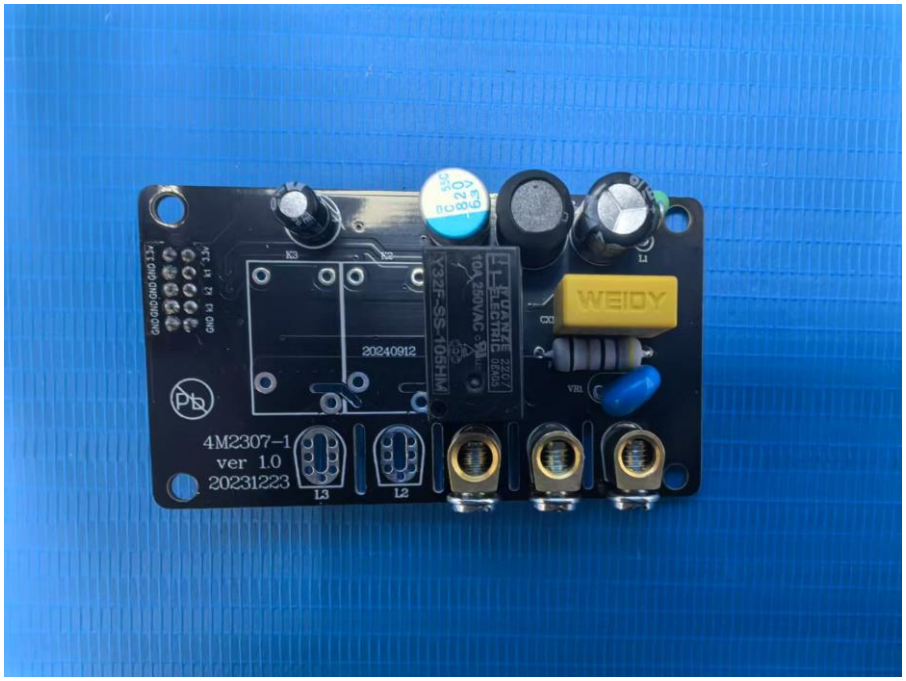
Photograph attachment



Open view of AS6A-06Ze (as representative for smart touch switch)

Open view of AS7A-22W (as representative for smart full touch controls switch)

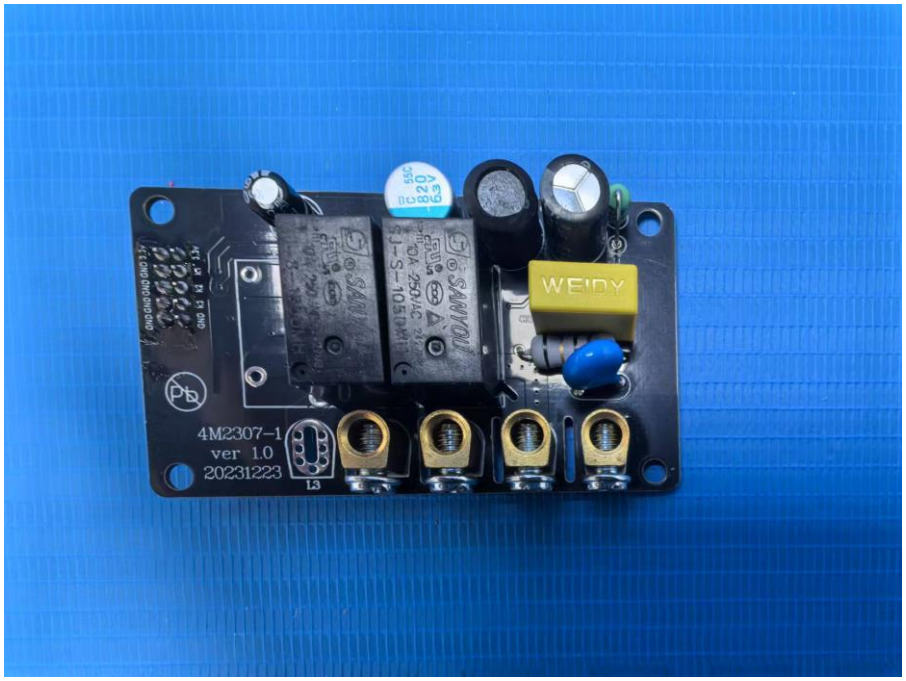
Photograph attachment



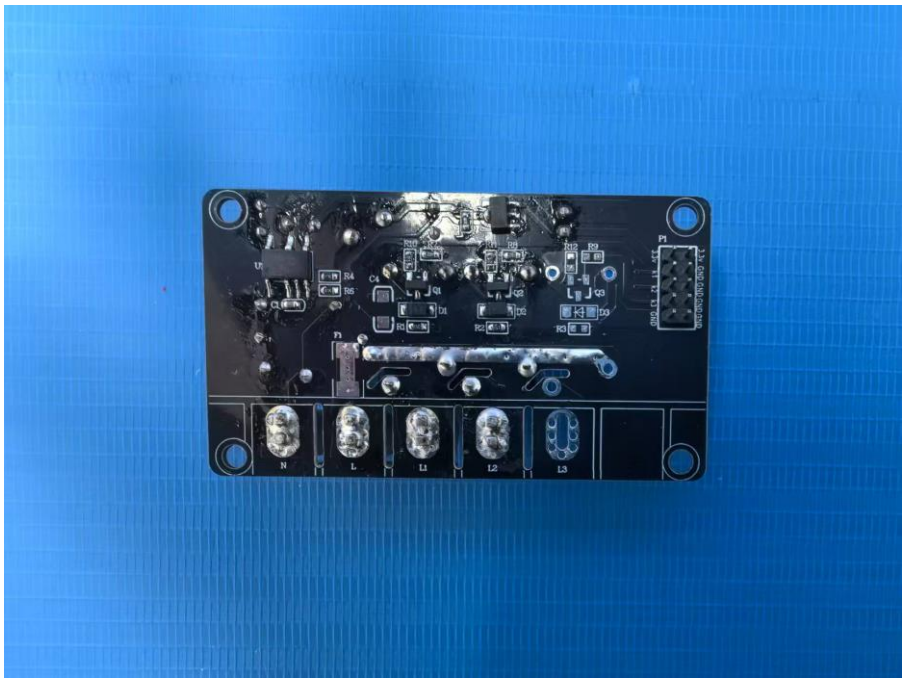
Front view of main PCB of 1gang switch

Back view of main PCB of 1gang switch

Photograph attachment

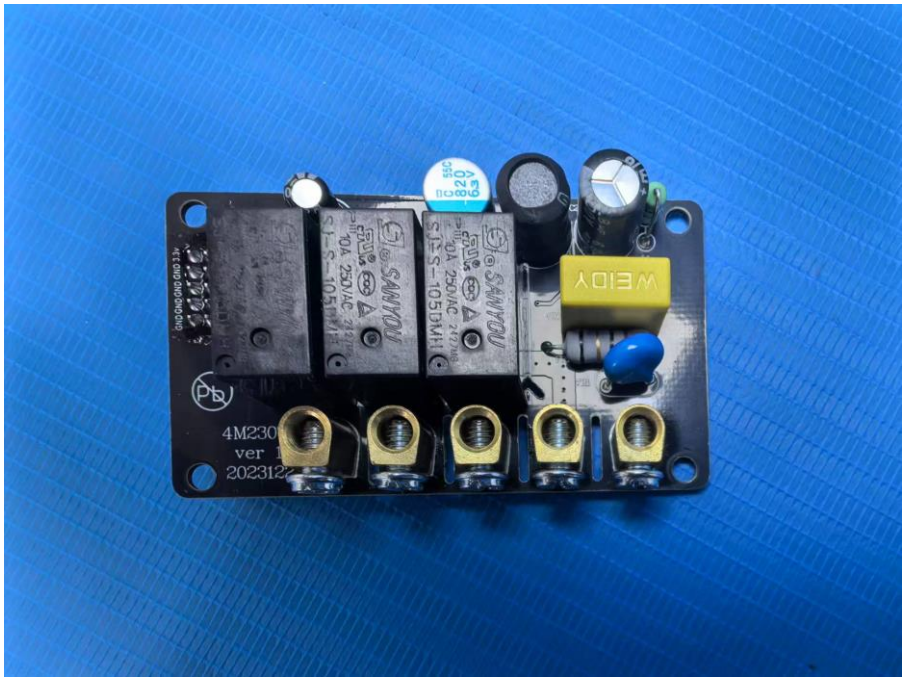


Front view of main PCB of 2gang switch



Back view of main PCB of 2gang switch

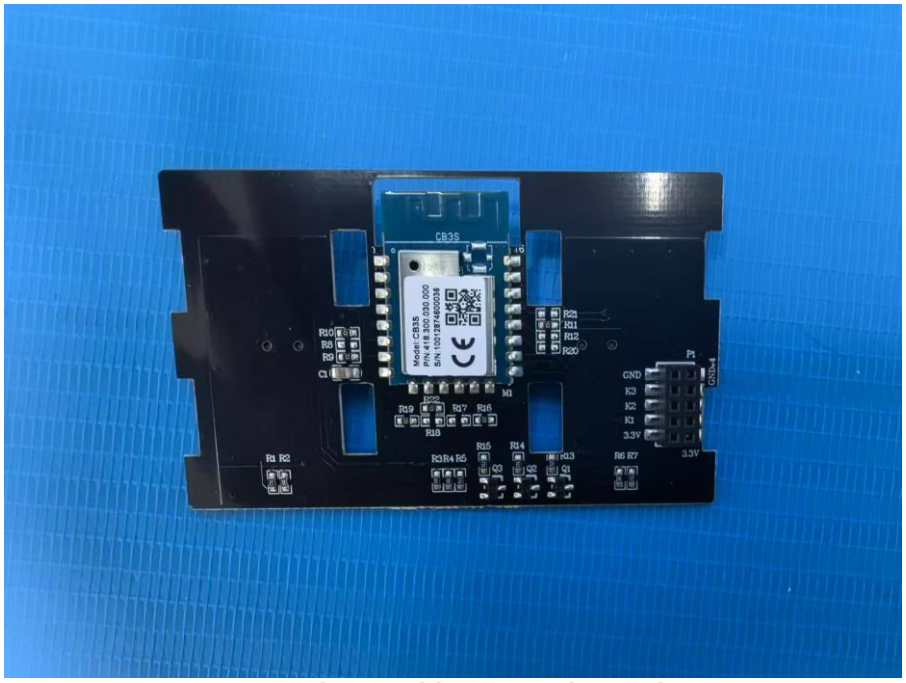
Photograph attachment



Front view of main PCB of 3gang switch

Back view of main PCB of 3gang switch

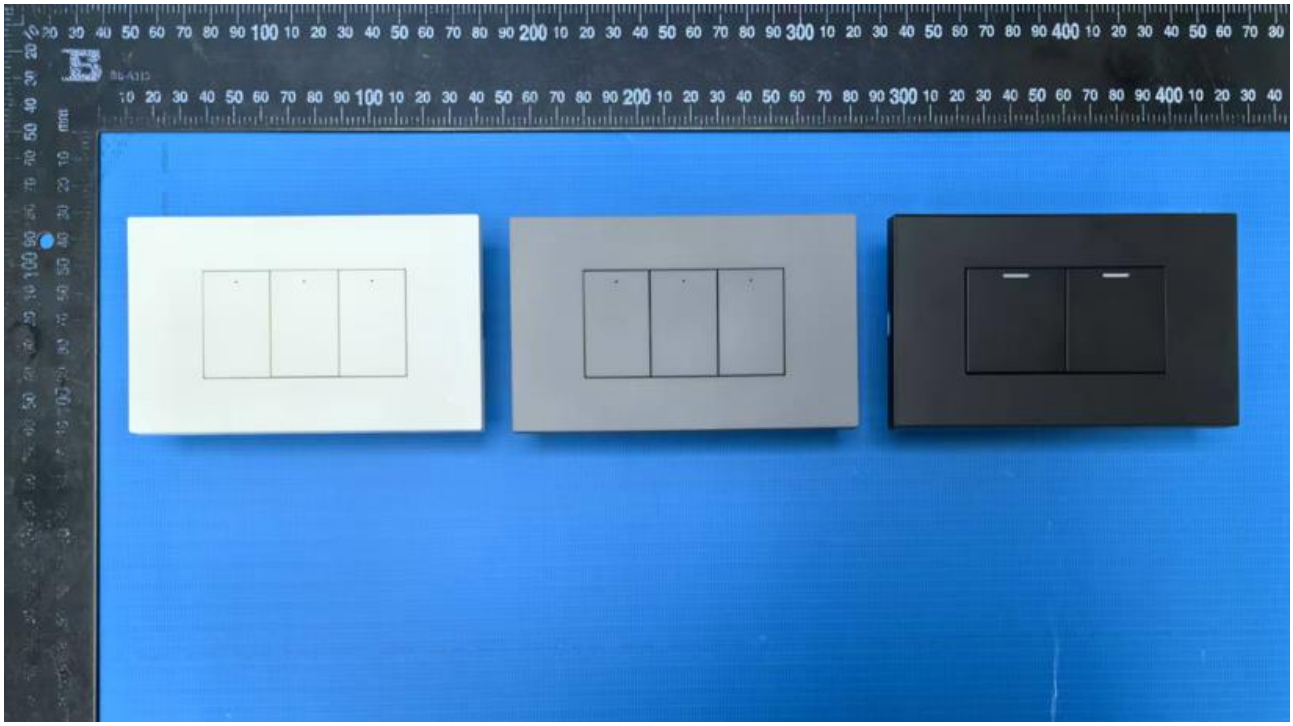
Photograph attachment



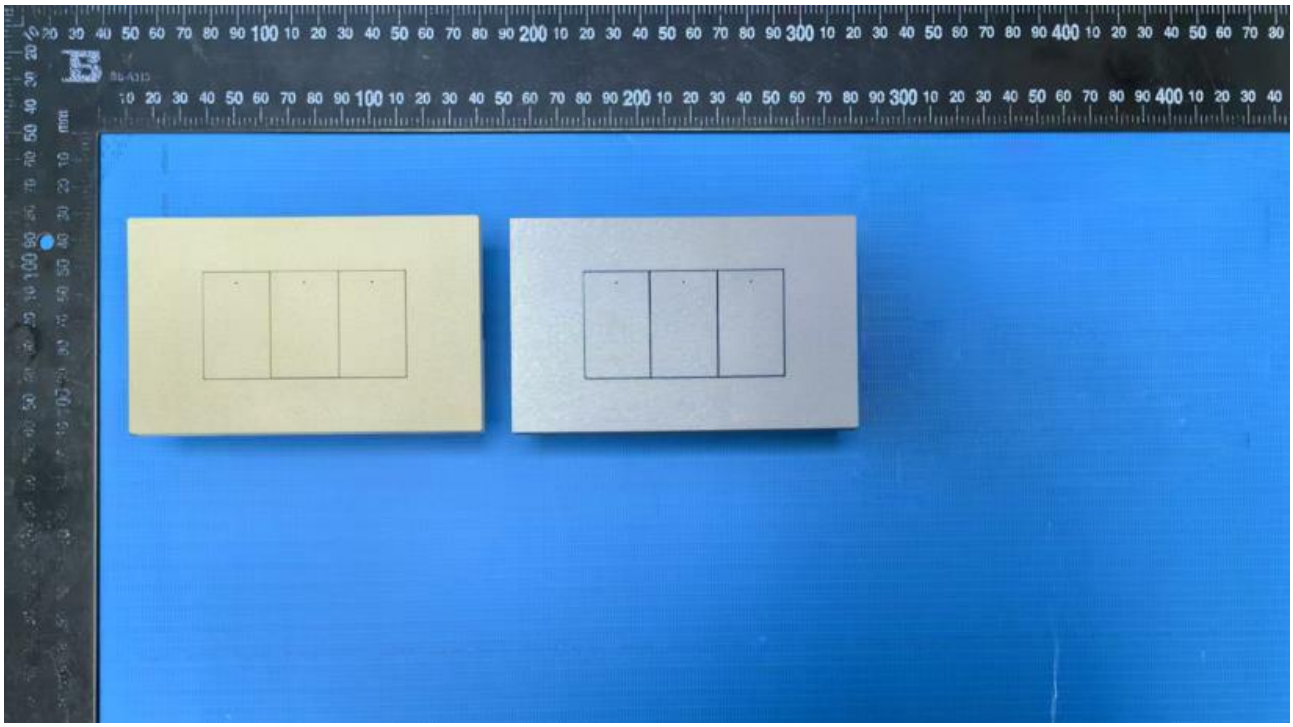
Control PCB with WIFI & Bluetooth

Control PCB with zigbee

Photograph attachment



Switch with white, gray, black cover plate and actuating member (from left to right)



Switch with gold, blue cover plate and actuating member (from left to right)