TEST REPORT
IEC 60669-1
Switches for household and similar fixed-electrical installations
Part 1: General requirements

Report Number. .....:	2403B1538SHA-001
Date of issue .....:	2024-04-08
Total number of pages .....:	59 (49 pages test report + 10 pages photos)
Name of Testing Laboratory preparing the Report.....:	Intertek Testing Services Shanghai
Applicant's name.....:	HIMEL HONG KONG LIMITED
Address .....:	11/F KERRY CTR 683, KING'S RD, QUARRY BAY, HONG KONG
Test specification:	
Standard.....:	IEC 60669-1:2017
Test procedure .....:	CB Scheme
Non-standard test method.....:	N/A
Test Report Form No.....:	IEC60669_1F
Test Report Form(s) Originator .....:	VDE
Master TRF .....:	Dated 2018-02-09

This report is not valid as a CB Test Report unless signed by an approved CB 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 .....:	Switch for fixed installation
Trade Mark .....:	**Himel**
Manufacturer .....:	Same as applicant
Model/Type reference .....:	HWDAL*** (totally 85 models)
Ratings .....:	250V~ 16AX or 10AX (other switches) 250V~ 16A or 10A (bell switches)

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**CB Testing Laboratory:**	Intertek Testing Services Shanghai	
Testing location/ address ..... :		Building No.86, 1198 Qinzhou Road (North), Shanghai 200233, China	
Tested by (name, function, signature)..... :		Frank Zhang (Project Engineer)	Frank Zhang
Approved by (name, function, signature) ..... :		Kent Wu (Mandated Reviewer)	
☐	**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:**		
Testing location/ address ..... :			
Tested by (name, function, signature)..... :			
Witnessed by (name, function, signature)..... :			
Approved by (name, function, signature) ..... :			
Supervised by (name, function, signature)..... :			

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

European group differences and national differences (7 pages in total): page 43 to 49.

Photo attachment (10 pages in total): page 50 to 59.

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
1. The sample arrangement is listed as below: HWDAL1G1BQ: full test HWDAL1G2BQ: clause 13, 15-20 and 23 HWDAL1G3BQ: clause 13, 15-20 and 23 HWDALBSBQ: clause 13, 15-20 and 23 HWDAL2G1BQY, HWDAL2G2BQ, HWDAL3G1BQY, HWDAL3G2BQ, HWDAL4G1BQY, HWDAL4G2BQ, HWDAL2G3BQ, HWDALBSBQ, HWDALPBQ, HWDAL2BSBQ, HWDAL2PBQ, HWDAL2G1BQ, HWDAL3G1BQ, HWDAL4G1BQ: clause 10, 13 HWDAL1G1BQG, HWDAL1G1BQB, HWDAL1G1BQD, HWDAL1G1BQM: clause 21 and 24. For temperature rise test, only the highest values are recorded. 2. Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty. 3. We conclude that the products described in this test report comply with the standard according to the testing results on the submitted samples.	Intertek Testing Services Shanghai 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 EN 60669-1: 2018.**

The test of the International Standard IEC 60669-1:2017 was approved by CENELEC as a European Standard with agreed common modifications (see page 43-49 for details).

Copy of marking plate:

For example：

Himel
HWDAL1G1BQ
250V~ 16AX
250V~ 10AX

Type reference:
See page 6 for details
Ratings:
250V~ 16A or 10A (for bell switches)
250V~ 16AX or 10AX (for other switches)
Trade mark:
Himel
Terminal identification:
Pattern No.1: L, L1;
Pattern No.1+1: L1, L11, L2, L21;
Pattern No.1+1+1: L1, L11, L2, L21, L3, L31;
Pattern No.1+1+1+1: L1, L11, L2, L21, L3, L31, L4, L41;
Pattern No.5: L, L1, L2;
Pattern No.1+5: L, L3, L, L1, L2;
Pattern No.6: L, L1, L2;
Pattern No.6+6 & 6/2: L1, L11, L12, L2, L21, L22
Pattern No.6+6+6: L1, L11, L12, L2, L21, L22, L3, L31, L32
Pattern No. 5+5: L, L1, L2, L, L3, L4;
Pattern No.6+6+6+6 & 6/2+6/2: L1, L11, L12, L2, L21, L22, L3, L31, L32, L4, L41, L42

Test item particulars ..... :	
Pattern number ..... :	**See page 6 for details**
Contact opening (gap) ..... :	**normal gap** / mini-gap / micro-gap / without contact gap (semiconductor switching device)
Degree of protection against access to hazardous parts and against harmful effects due to the ingress of solid foreign objects ..... :	**IP2X** / IP4X / IP5X
Degree of protection against harmful effects due to the ingress of water ..... :	**IPX0** / IPX4 / IPX5 / IPX6
Method of actuating ..... :	rotary / tumbler / **rocker** / push-button / cord-operated / **momentary contact (for bell switches)**
Method of application ..... :	surface-type / **flush-type** / semi flush-type / panel-type / architrave-type
Method of installation ..... :	**design A** / design B
Type of terminals ..... :	screw-type (rigid) / **screw-type (rigid and flexible)** / screwless (rigid) / screwless (rigid and flexible)
Flexible cable outlet ..... :	**without** / with
Rated voltage (V) ..... :	250
Rated current (A)..... :	16A or 10A (for bell switches) 16AX or 10AX (for other switches)
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 ..... :	2024-01-03
Date (s) of performance of tests ..... :	2024-01-03 to 2024-02-26

General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. 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. **Throughout this report a ☒ comma / ☐ point is used as the decimal separator.**	
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) ..... :	Wenzhou Kaiyuan Electric Co., Ltd. No. 527, 16th Binhai Road, Xinghai Street, Wenzhouwan New District, Wenzhou City, Zhejiang Province, China.

The devices under evaluation are 85 models of switch for fixed installation. The difference among them is listed as below:

1	2	3	4
Prefix for applicant	Number of switch rocker	Pattern no.	Colour of switch
HWDAL	*	*	*

1	Prefix for installation	HWDAL	250V~, 16A or 16AX, 10A or 10AX, design A, IP20, with normal gap
2	Number of switch rocker	1G, BS, P	1 switch rocker, 1 gang
		2G, 2BS, BP	2 switch rockers, 2 gangs
		3G	3 switch rockers, 3 gangs
		4G	4 switch rockers, 4 gangs
		BS	1 switch rocker, 1 gang
3	Pattern no.	1BQ	Pattern no.1
		2BQ	Pattern no.6
		3BQ	pattern no. 6/2
		1BQY	Pattern no.5
		BQ	Pattern no.1, with momentary contact
4	Colour of switch	Blank	With white rocker and cover plate
		D	With grey rocker and cover plate
		G	With golden rocker and cover plate
		B	With black rocker and cover plate
		M	With silver rocker and cover plate

Model list:
HWDAL1G1BQ, HWDAL1G1BQG, HWDAL1G1BQB, HWDAL1G1BQD, HWDAL1G1BQM,
HWDAL1G2BQ, HWDAL1G2BQG, HWDAL1G2BQB, HWDAL1G2BQD, HWDAL1G2BQM,
HWDAL1G3BQ, HWDAL1G3BQG, HWDAL1G3BQB, HWDAL1G3BQD, HWDAL1G3BQM,
HWDAL2G1BQY, HWDAL2G1BQYG, HWDAL2G1BQYB, HWDAL2G1BQYD, HWDAL2G1BQYM,
HWDAL2G2BQ, HWDAL2G2BQG, HWDAL2G2BQB, HWDAL2G2BQD, HWDAL2G2BQM,
HWDAL3G1BQY, HWDAL3G1BQYG, HWDAL3G1BQYB, HWDAL3G1BQYD, HWDAL3G1BQYM
HWDAL3G2BQ, HWDAL3G2BQG, HWDAL3G2BQB, HWDAL3G2BQD, HWDAL3G2BQM,
HWDAL4G1BQY, HWDAL4G1BQYG, HWDAL4G1BQYB, HWDAL4G1BQYD, HWDAL4G1BQYM,
HWDAL4G2BQ, HWDAL4G2BQG, HWDAL4G2BQB, HWDAL4G2BQD, HWDAL4G2BQM,
HWDAL2G3BQ, HWDAL2G3BQG, HWDAL2G3BQB, HWDAL2G3BQD, HWDAL2G3BQM,
HWDALBSBQ, HWDALBSBQG, HWDALBSBQB, HWDALBSBQD, HWDALBSBQM,
HWDALPBQ, HWDALPBQG, HWDALPBQB, HWDALPBQD, HWDALPBQM,
HWDAL2BSBQ, HWDAL2BSBQG, HWDAL2BSBQB, HWDAL2BSBQD, HWDAL2BSBQM,
HWDAL2PBQ, HWDAL2PBQG, HWDAL2PBQB, HWDAL2PBQD, HWDAL2PBQM,
HWDAL2G1BQ, HWDAL2G1BQG, HWDAL2G1BQB, HWDAL2G1BQD, HWDAL2G1BQM,
HWDAL3G1BQ, HWDAL3G1BQG, HWDAL3G1BQB, HWDAL3G1BQD, HWDAL3G1BQM,
HWDAL4G1BQ, HWDAL4G1BQG, HWDAL4G1BQB, HWDAL4G1BQD, HWDAL4G1BQM

85 models in total

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Clause	Requirement + Test	Result - Remark	Verdict

8	**MARKING**		
8.1	**General**		
	Switches are marked with:		
	a) rated current(s) (A or AX) ..... :	See page 3	P
	b) rated voltage(s) (V) ..... :	250	P
	c) symbol for nature of supply ..... :	~	P
	d) manufacturer's or responsible vendor's name, trade mark or identification mark ..... :	See page 3	P
	e) type reference ..... :	See page 3	P
	f) symbol for mini-gap construction (m) ..... :		N/A
	g) symbol for micro-gap construction (μ) ..... :		N/A
	h) symbol for semiconductor switching device (without contact gap) (ε) ..... :		N/A
	i) first IP characteristic numeral, if declared higher than 4, in which case the second characteristic numeral is also marked ..... :	IP2X	N/A
	j) second IP characteristic numeral, if declared higher than 2, in which case the first characteristic numeral is also marked ..... :	IPX0	N/A
	i & j) suitable for smooth and even wall only (IPXX)		N/A
	i & j) suitable for smooth and even wall and for rough wall (test wall of figure 21) (IPXX) ..... :		N/A
	k) length of insulation to be removed before the insertion of the conductor into the screwless-type terminal ..... :		N/A
	l) symbol for the suitability to accept rigid conductors only (r) ..... :		N/A
	In addition the following information shall be given in the manufacturer's documentation:		
	m) for SBL loads: the rated power in watts and the type of load if the switch is tested according to 19.3 :	SBL: 200W (models for 16AX); 100W (models for 10AX)	P
8.2	**Symbols**		
	Symbols used: as required in the standard		P
	The symbol "AX" may be replaced by the symbol "X". For the marking with rated current and rated voltage the figures may be used alone		N/A
	The marking for the nature of supply shall be placed next to the marking for rated current and rated voltage		P
8.3	**Visibility of markings**		
	Markings are clearly visible with normal or corrected vision, without additional magnification		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Markings as given in 8.1 a), b), c), d), e) and, if applicable, f), g), h), k), and l) shall be placed on the main part of the switch		P
	Parts such as cover plates, which are necessary for safety purposes and are intended to be sold separately, are marked with the manufacturer's or responsible vendor's name, trade mark or identification mark and type reference		N/A
	Markings as given in 8.1 i) and j), when applicable, are marked so as to be easily discernible when the switch is mounted and wired as in normal use		N/A
	Markings are placed on parts which cannot be removed without the use of a tool		P
8.4	**Marking on terminals for phase conductors**		
	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	See page 3	P
	Indications not placed on screws or other easily removable part		P
	Alternatively, the surface of such terminals shall be bare brass or copper, other terminals being covered with a metallic layer of another colour		N/A
	For switches of pattern numbers 2, 3, 03 and 6/2, terminals associated with any one pole have similar identification, if applicable, differing from that of the terminals associated with the other poles, unless the relationship is self-evident		N/A
8.5	**Marking on terminals for neutral and earth conductors**		
	Neutral terminals: N ..... :		N/A
	Earthing terminals: [earth symbol (IEC 60417-5019:2006-08)] ..... :		N/A
	Markings not placed on screws or other easily removable parts		N/A
	Terminals for conductors not forming part of the main function of the switch:		
	- clearly identified unless their purpose is self-evident, or		N/A
	- indicated in a wiring diagram fixed to the accessory		N/A
	Identification of switch terminals may be achieved by:		
	- their marking with graphical symbols according to IEC 60417 or colours and/or alphanumeric system, or		N/A
	- their physical dimension or relative location		N/A
8.6	**Marking of the switch position**		

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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
8.7	**Additional requirements for marking**		
	Special precautions necessary to take when installing the switch: details of these and clear information given in an instruction sheet which accompanies the switch		N/A
	Instruction sheets are written in the official language(s) of the country in which the switch is to be sold		N/A
8.8	**Durability**		
	Marking durable and easily legible. Test: 15 s with water and 15 s with 95 % n-hexane.		P
9	**CHECKING OF DIMENSIONS**		
	Switches and boxes comply with the appropriate standard sheets, if any	Checked with BS 4662 as a reference	P
10	**PROTECTION AGAINST ELECTRIC SHOCK**		
10.1	**Prevention of access to live parts**		
	Switches: live parts not accessible		P
	Switches designed to be fitted with pilot lights supplied at voltage other than ELV have means to prevent direct contact with the lamp		N/A
	Specimen is mounted as in normal use and fitted with conductors as specified		P
	Test probe B of IEC 61032 is applied in every possible position, an electrical indicator with a voltage between 40 V and 50 V being used to show contact with the relevant part		P
	Switches having enclosures or covers in thermoplastic or elastomeric material: additional test carried out at 35 °C ± 2 °C. Switches are subjected for 1 min to a force of 75 N, applied through the tip of test probe 11 of IEC 61032		P
	Test finger applied to thin-walled knock-outs with a force of 10 N		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	During the test: switches not deform and no live parts accessible with test probe 11 of IEC 61032		P
10.2	**Requirements for operating parts**		
	Knobs, operating levers, push buttons, rockers and the like: of insulating material, unless:	Rocker	P
	- accessible metal parts separated from metal parts of mechanism by double or reinforced insulation, or		N/A
	- reliably connected to earth		N/A
	Requirement does not apply to removable keys or intermediate parts, such as chains or rods		N/A
10.3	**Requirements for accessible metal parts**		
10.3.1	Accessible parts of switches when in normal use are made of insulating material as specified.		P
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, or designed that		P
	- cannot be replaced in an incorrect position; if they are omitted, accessories are rendered inoperable or manifestly incomplete; there is no risk of accidental contact between live parts and metal covers or cover plates; precautions are taken to prevent creepage distances or clearances becoming less than the values specified in clause 23		P
	Linings or barrier comply with the tests of clauses 16 and 23		P
10.3.3	Earthing of metal covers or cover plates: connection of low resistance		N/A
10.4	**Requirements for insulation of the mechanism**		
	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**		
	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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**		
	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**		
	Cord-operated switches: impossible to touch live parts when fitting or replacing the pull cord		N/A
11	**PROVISION FOR EARTHING**		
11.1	**General**		
	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**		
	Earthing terminals: with screw clamping or screwless terminals and comply with clause 12		N/A
11.3	**Requirements for surface-type switches**		
	Surface-type switches with an enclosure of insulating material, with IP > X0 and more than one cable inlet, are provided with:		
	- 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
11.4	**Test for earthing connection**		
	Connection between earthing terminal and accessible metal parts: of low resistance		N/A
	Test current equal to 1,5 In or 25 A (A) ..... :		
	Resistance ≤ 0,05 Ω (Ω) ..... :		
12	**TERMINALS**		
12.1	**General**		

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Clause	Requirement + Test	Result - Remark	Verdict
	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 shall be of class 1, rigid stranded conductors shall be of class 2 and flexible conductors shall be of class 5 according to IEC 60228		P
12.2	**Terminals with screw clamping for external copper conductors**		
12.2.1	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) ..... :	16; 10	
	Type of conductor (rigid / flexible) ..... :	rigid / flexible	
	Smallest / largest cross-sectional area (mm^2) ..... :	1,5 / 4,0; 1,0 / 2,5	
	Diameter of largest conductor (mm)..... :	2,72; 2,13	
	Figure of terminal ..... :	**1** / 2 / 3 / 4 / 5	
	Minimum diameter D (minimum dimensions) of conductor space: required (mm); measured (mm) ... :	3,6; 4,9	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 shall be made twice, first the torque applying to the hexagonal head and then applying the torque by means of a screwdriver		N/A
	During the test: conductor not slip out, no break near clamping unit and no damage		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

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Clause	Requirement + Test	Result - Remark	Verdict
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
	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:		
	- 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:		
	- rated current (A)..... :	16; 10	
	- solid rigid copper conductor of the largest cross-sectional area (mm²) (table 4) ..... :	4,0; 2,5	
	- torque (Nm) (table 5 or appropriate figures 1, 2, 3, 4)..... :	1,2	
	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):	Required: 1,8; Measured: >2,0	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**		
12.3.1	Screwless terminals of the type suitable for:		

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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		
	- 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:		
	- the clamping of one of the conductors is independent of the clamping of the other conductor(s)		N/A
	- 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

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Clause	Requirement + Test	Result - Remark	Verdict
	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^{th} temperature cycle		N/A
	- measured after any three of 48^{th}, 72^{th}, 96^{th}, 120^{th}, 144^{th} or 168^{th} temperature cycle		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
12.3.12	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**		

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Clause	Requirement + Test	Result - Remark	Verdict
13.1	**Mechanical requirements for insulating means**		
	Insulating lining, barriers and like: adequate mechanical strength and secured in a reliable manner		P
13.2	**Installation requirements**		
	Switches constructed so as to permit:		
	- 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
	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**		
13.3.1	Covers, cover-plates and actuating members or parts of them intended to ensure protection against electric shock:		
	- held in place at two or more points by effective fixings		P
	- fixed by means of a single fixing, e.g. by a screw, provided that they are located by another means (e.g. by a shoulder)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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:		
	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):		
	- when their removal may give access, with the test probe B of IEC 61032, to live parts:		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:		N/A
	- when their removal may give access, with the test probe B of IEC 61032, only to		N/A
	- insulating parts, or		P
	- earthed metal parts, or		N/A
	- metal parts separated from live parts in such a way that creepage distances and clearances have at least twice the values shown in table 23, or		P
	- live parts of SELV circuits not greater than 25 V AC and 60 V DC:		N/A
13.3.4	Covers, cover-plates or actuating members whose fixing is not dependent on screws and whose removal is obtained by using a tool, in accordance with the manufacturer's instructions given in an instruction sheet or catalogue:		
	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		P
13.4	**Openings in normal use**		
	Switches: no free openings in their enclosures according to their IP classification		P
13.5	**Attachment of knobs**		
	Knobs of rotary switches securely attached to the shaft or part operating the mechanism		N/A
	- axial pull be applied for 1 min to try to pull off the actuating member		N/A
	- axial pull is likely to be applied in normal use, the force is 30 N		N/A
	- axial pull is unlikely to be applied in normal use, the force is 15 N		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- knob of switches having only one direction of operation: turned 100 times in the reverse direction		N/A
	During the test: knob not become detached		N/A
13.6	**Mounting means**		
	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**		
	Combinations of switches, or of switches and socket-outlets, comprising separate bases: correct position of each main part is ensured	Combinate base	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**		
	Accessories combined with switches: comply with their standard		N/A
13.9	**Surface-type switches having an IP code higher than IP20**		
	Surface-type switches with IP > 20 are in according to their classification when fitted with conduits or with sheathed cables	IP20	N/A
	Surface-type switches with IPX4, IPX5 and IPX6 have provisions for opening a drain hole		N/A
	Switches provided with a drain hole: it is not less than 5 mm in diameter, or 20 mm^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**		
	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**		
	Surface-type switches with IP > IPX0, pattern numbers 1, 5 and 6, with more than one inlet opening, provided with:		
	- 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**		
	Inlet openings: allow the introduction of the conduit or the sheath of the cable		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Surface-type switches: intended conduit or the sheath of the cable can enter at least 1 mm into the enclosure		N/A
	lnlet 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
	lnlet 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**		
	Surface-type switches: provision for back entry (if are intended)		N/A
13.14	**Switch provided with membranes or the like for inlet openings**		
	Switch is provided with membranes or the like for inlet openings: replaceable		N/A
13.15	**Requirements for membranes in inlet openings**		
13.15.1	Membranes are reliably fixed and not displaced by the mechanical and thermal stresses occurring in normal use		N/A
	Test on membranes subjected to the ageing treatment specified in 15.1 and fitted with the switches		
	Switches 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. During the test: no deformation, live parts not accessible		N/A
	Membranes likely to be subjected to an axial pull: axial pull of 30 N applied for 5 s. During the test: membranes not come out		N/A
	Test repeated with membranes not 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:		
	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**		

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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
14	**MECHANISM**		
14.1	**Indication of the position**		
	Actuating member of a switch, when released, automatically take up the position corresponding to that of moving contacts		P
14.2	**Rest and intermediate position**		
	Moving contact of switches can come to rest only in “on” and “off” positions		P
	Intermediate position permissible if:		
	- it corresponds to the intermediate position of the actuating member, and		N/A
	- the insulation between fixed and moving contacts is adequate. Electric strength test as specified in 16.3: test voltage a.c. for 1 min (V) ..... :	500 V / 750 V / 1250 V / 2000 V	N/A
14.3	**Undue arcing**		
	No undue arcing in slowly operation		P
	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**		
	Switches of pattern numbers 2, 3, 03 and 6/2 make and break all poles substantially simultaneously		P
	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**		
	Action of the mechanism: independent of the presence of cover or cover plate. Test: no flicker		P
14.6	**Cord-operated switches: effecting a change by application and removal of a steady pull not exceeding:**		
	- 45 N applied vertically, and		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**		
	Switches are resistant to ageing		P
	Parts intended for decorative purposes only, such as certain lids, are removed		N/A
	Switches and boxes placed for 7 days (168 h) in a heating cabinet at 70 °C ± 2 °C		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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**		
15.2.1	General		
	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		
15.2.2.1	General		
	Glands: torque (Nm) (2/3 of torque applied in 20.4) :		
	Screws of the enclosure: torque (Nm) (2/3 table 5) ..... :		
	Parts which can be removed without the aid of a tool are removed		N/A
	Glands are not filled with sealing compound or the like		N/A
15.2.2.2	Protection against access to hazardous parts		
	Appropriate test according to IEC 60529..... :	IP2X	P
15.2.2.3	Protection against harmful effects due to ingress of solid foreign objects		
	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		
	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:		
	- 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

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Clause	Requirement + Test	Result - Remark	Verdict
	Screws of the enclosure: torque (Nm) (2/3 table 5) ..... :		
	Glands: torque (Nm) (2/3 of torque applied in table 22) ..... :		
	Specimens withstand an electric strength test specified in 16.3 which is started within 5 min of completion of the test to 15.2		N/A
15.3	**Resistance to humidity**		
	Switches proof against humidity which may occur in normal use		P
	Compliance checked by a humidity treatment described in 15.3, carried out in a humidity cabinet containing air with relative humidity maintained between 91 % and 95 %. Specimens kept in the cabinet for:		
	- 2 days (48 h) for switches with IPX0	48h	P
	- 7 days (168 h) for switches with IP>X0		N/A
	After this treatment: specimens show no damage		P
16	**INSULATION RESISTANCE AND ELECTRIC STRENGTH**		
16.1	**General**		
	One pole of any pilot lights (if available), are disconnected for this test		N/A
	Insulation resistance and electric strength of switches be adequate		P
16.2	**Test for measuring the insulation resistance**		
	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		P
16.3	**Electric strength test**		
	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		P
17	**TEMPERATURE RISE**		
17.1	**General**		
	Switches so constructed that the temperature rise in normal use is not excessive	See appended table 17	P
	No oxidation or any other deterioration of contacts		P
17.2	**Switches incorporating pilot lights**		
	Switches incorporating or intended to incorporate pilot lights are designed that in normal use temperature of the accessible surface is not excessive	See appended table 17	N/A
18	**MAKING AND BREAKING CAPACITY**		
18.1	**General**		

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Clause	Requirement + Test	Result - Remark	Verdict
	For the purpose of this test, pilot lights are disconnected		P
	Switches have adequate making and breaking capacity		P
	- model / type reference ..... :	See page 3	
	- pattern number ..... :	See page 6	
	- rated voltage (V) ..... :	250	
	- rated current (A) ..... :	16 / 10	
	- nominal cross-sectional area as for the test of clause 17 (mm^2) ..... :	2,5 / 2,5	
18.2	**Overload**		
	Test with cos φ 0,3 alternating current		
	- test voltage (1,1 Vn) (V) ..... :	275	
	- test current (1,25 In) (cos φ 0,3) (A) ..... :	20 / 12,5	
	- 200 operations; rate (operations per minute) ..... :	15 / 30	
	- samples number ..... :	See page 3	
	During the test: copper wire F not melt, specimens function correctly, no sustained arcing or welding of contacts		P
	After the test: specimens show no damage		P
	During the test: specimens are not lubricated		P
18.3	**Overload test with filament lamps**		
	Test with a number of tungsten filament lamps or a number of halogen filament lamps (switches with In ≤ 16 A / Vn ≤ 250 V and switches of pattern numbers 3 and 03 with Vn > 250 V)		
	- test voltage (Vn) (V) ..... :	250	
	- test current (≥ 1,2 In) (A) ..... :	19,2 / 12	
	- number of 200 W tungsten filament lamps ..... :	24 / 15	
	- 200 operations; rate (operations per minute) ..... :	15 / 30	
	- samples number ..... :	See page 3	
	During the test: copper wire F not melt, specimens function correctly, no sustained arcing or welding of contacts		P
	After the test: specimens show no damage		P
19	**NORMAL OPERATION**		
19.1	**Test for switches intended for inductive loads**		
	For the purpose of this test, pilot lights are disconnected		N/A
	Switches withstand, without excessive wear or other harmful effect, the mechanical, electrical and thermal stresses occurring in normal use		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- model / type reference ..... :	See page 3	
	- pattern number ..... :	See page 6	
	- nominal cross-sectional area per clause 18 (mm^2):	2,5 / 2,5	
	- test voltage (Vn) (V) ..... :	250	
	- test current (In) (cos φ 0,6) (A) ..... :	16 / 10	
	- number of operations per table 18 ..... :	40 000	
	- rate (operations per minute) ..... :	15 / 30	
	- samples number ..... :	See page 3	
	During the test: copper wire F not melt, specimens function correctly, no sustained arcing or welding of contacts		P
	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
	After the tests the specimens not show:		
	- wear impairing their further use		P
	- discrepancy between the position of the actuating member (if indicated) and that of the moving contacts		P
	- deterioration of enclosures, insulating lining or barriers		P
	- seepage of sealing compound		N/A
	- loosening of electrical or mechanical connections		P
	- displacement of moving contacts of switches pattern number 2, 3, 03 or 6/2		P
	During the test, specimens are not lubricated		P
	No sustained arcing in slowly operation (sub clause 14.3)		P
19.2	**Test for switches intended for externally ballasted lamp loads**		
	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		P
	- model / type reference ..... :	See page 3	
	- pattern number ..... :	See page 6	
	- nominal cross-sectional area per clause 18 (mm^2):	2,5 / 2,5	
	- rate (operations per minute) ..... :	15 / 30	
	- test voltage (Vn); test current (In) (cos φ 0,9); number of operations with load A ..... :	250; 16; 5000 / 250; 10; 10000	
	- test voltage (Vn); 100 operations with load B ..... :	250	
	- samples number ..... :	See page 3	

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Clause	Requirement + Test	Result - Remark	Verdict
	During the test: copper wire F not melt, specimens function correctly, no sustained arcing or welding of contacts		P
	Reduced electric strength per clause 16	See appended table 19.2	P
	Reduced temperature rise test per clause 17	See appended table 19.2	P
	After the tests it is possible to make and break the switch by hand, and specimen not show:		
	- wear impairing their further use		P
	- discrepancy between the position of the actuating member (if indicated) and that of the moving contacts		P
	- deterioration of enclosures, insulating lining or barriers		P
	- loosening of electrical or mechanical connections		P
	- seepage of sealing compound		N/A
	- displacement of moving contacts of switches pattern number 2, 3 or 6/2		P
19.3	**Test for switches intended for self-ballasted lamp loads**		
	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		P
	- model / type reference.....:	See page 3	
	- pattern number .....:	See page 6	
	- nominal cross-sectional area per clause 18 (mm^2):	2,5 / 2,5	
	- test voltage (Vn) (V).....:	250	
	- test current (Ipeak) (A).....:	170 / 108	
	- number of operations per table 18.....:	40000	
	- rate (operations per minute).....:	15 / 30	
	- samples number .....:	See page 3	
	During the test: copper wire F not melt, specimens function correctly, no sustained arcing or welding of contacts		P
	Reduced electric strength per clause 16	See appended table 19.3	P
	Reduced temperature rise test per clause 17	See appended table 19.3	P
	After these tests, it is possible to make and break the switch by hand in the test circuit and the specimen not show:		
	- wear impairing further use		P
	- discrepancy between the position of the actuating member and that of the moving contacts		P
	- deterioration of the enclosures, insulating lining or barriers		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- loosening of electrical or mechanical connections		P
	- seepage of sealing compound		N/A
	- displacement of the moving contacts of switches of pattern numbers 2, 3 or 6/2		P
20	**MECHANICAL STRENGTH**		
20.1	**General**		
	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**		
	For all types of switches and for boxes: impact test (9 blows)	See appended table 20.2	P
	After the test: no damage, live parts no become accessible		P
20.3	**Test on the main parts of surface-type switches**		
	Main parts of surface-type switches are first fixed to a cylinder of rigid steel sheet of radius equal to 4,5 times the distance between fixing holes (mm) .. :		N/A
	Main parts are then fixed in a similar manner to a flat steel sheet		N/A
	Torque applied to fixing screws (Nm) ..... :	0,5 Nm / 1,2 Nm	
	During and after the test: main parts show no damage		N/A
20.4	**Screwed glands**		
	Screwed glands of switches with that have IP code higher than IP20: torque test		
	- diameter of cylindrical metal test rod (mm) ..... :		
	- type of material..... :	metal / moulded material	
	- torque for 1 min (table 22) (Nm)..... :		
	After the test: no damage of glands and enclosure of the specimens		N/A
20.5	**Covers, cover plates or actuating members – accessibility to live parts**		
20.5.1	General		
	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)		
20.5.2	Verification of the non-removal of covers, cover-plates or actuating member		
	Force applied for 1 min in direction perpendicular to the mounting surface ..... :	10N	P
	Covers, cover-plates or actuating members not come off		P
	Test repeated on new specimens with a sheet of hard material, 1 mm ± 0,1 mm thick, fitted around the supporting frame (fig. 13)		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Covers, cover-plates or actuating members not come off		P
	After the test: no damage		P
20.5.3	Verification of the removal of covers, cover plates or actuating members		
	Force not exceeding 120 N applied 10 times in direction perpendicular to the mounting / supporting surface: covers, cover-plates or actuating members come off		N/A
	Test repeated on new specimens with a sheet of hard material, 1 mm ± 0,1 mm thick, fitted around the supporting frame (fig. 13)		N/A
	Covers, cover-plates or actuating members come off		N/A
	After the test: no damage		N/A
20.6	**Covers, cover plates or actuating members – accessibility to non-earthed metal parts separated from live parts**		
	Test is made as described in 20.5, but applying, for 20.5.2, the following forces:	10 N / 20 N	N/A
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**		
	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, rocker	P
20.8	**Covers, cover plates or actuating members – application of gauges**		
	Test with gauge of figure 14 applied according to figure 15 for verification of the outline of covers, cover-plates or actuating members: distances between face C of gauge and outline of side under test, not decrease ..... :	**complying** / not complying	
20.9	**Grooves, holes and reverse tapers**		
	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	
20.10	**Additional test for cord-operated switch**		
	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:		
	- 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**		
	Switches and boxes are sufficiently resistant to heat		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Decorative parts are not subjected to the test		N/A
21.2	**Basic heating test**		
	Switches kept for 1 h in a heating cabinet at a temperature of 100 °C ± 2 °C		
	During the test: no change impairing their further use and sealing compound, if any, not flow		P
	After the test: no access to live parts, markings still legible		P
21.3	**Ball-pressure test on parts of insulating material necessary to retain current-carrying parts and parts of the earthing circuit in position**		
	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**		
	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**		
	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	Not used	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**		
	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**		
	Contact pressure: not transmitted through insulating material other than ceramic, pure mica or other material no less suitable unless there is sufficient resiliency in metallic parts		P
22.4	**Screws and rivets, used both as electrical and mechanical connections**		
	Screws and rivets which serve as electrical as well as mechanical connections shall be locked against loosening and/or turning		P
22.5	**Material of current-carrying parts**		

IEC 60669-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Current-carrying parts of metal having mechanical strength, electrical conductivity and resistance to corrosion adequate:		
	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**		
	Contacts subjected to sliding action: of metal resistant to corrosion		N/A
22.7	**Thread-forming and thread-cutting screws**		
	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**		
23.1	**General**		
	Creepage distances, clearances and distances through sealing compound no less than the values shown in table 23	See appended table 23.1	P
	Sub clause 23.1 does not apply to pilot light units. Requirements for pilot light units are given in 13.16		N/A
23.2	**Insulating compound**		
	Insulating compound: not protrude above the edge of the cavity in which it is contained		N/A
24	**RESISTANCE OF INSULATING MATERIAL TO ABNORMAL HEAT, TO FIRE AND TO TRACKING**		

IEC 60669-1			
Clause	Requirement + Test	Result - Remark	Verdict
24.1	**Resistance to abnormal heat and to fire**		
	Parts of insulating material which might be exposed to thermal stresses due to electric effects and the deterioration of which might impair the safety are not unduly affected by abnormal heat and fire		P
	Glow-wire test according to IEC 60695-2-10 and IEC 60695-2-11	See appended table 24.1	P
24.2	**Resistance to abnormal heat and to fire**		
	Parts of insulating material retaining live parts in position of switches with IP>X0: of material resistant to tracking		N/A
	Tracking test with solution A of IEC 60112	See appended table 24.2	N/A
25	**RESISTANCE TO RUSTING**		
	Ferrous parts protected against rusting		P
	Test: 10 min in a 10 % solution of ammonium chloride in water at a temperature of (+20 ± 5) °C., 10 min in a box containing air saturated with moisture at a temperature of (+20 ± 5) °C., 10 min in a heating cabinet at a temperature of (+100 ± 5) °C		
	No signs of rust		P
26	**EMC REQUIREMENTS**		
26.1	**Immunity**		
	No immunity tests necessary		P
26.2	**Emission**		
	No emission tests necessary		P

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

12.2.5	**TABLE: Test with apparatus shown in figure 10 (screw terminals)**		P
	Rated current (A) ..... :	16; 10	
	Type of conductors ..... :	**rigid solid / rigid stranded / flexible**	
	Smallest/largest cross-sectional area per table 4 (mm^2) ..... :	1,5 / 4,0; 1,0 / 2,5	
	Number of conductors ..... :	2 (1,0~2,5 mm^2); 1 (4,0 mm^2)	
	Nominal diameter of thread (mm); torque per table 5 (Nm) ..... :	3,8; 1,2	

Cross-sectional area (mm^2)	Diameter of bushing hole per table 6 (mm)	Height H per table 6 (mm)	Mass (kg)	Remarks
1,0 (10A)	6,5	260	0,4	Pass
2,5 (10A)	9,5	280	0,7	Pass
1,5 (16A)	6,5	260	0,4	Pass
4,0 (16A)	9,5	280	0,9	Pass
Supplementary information:				

12.2.6	**TABLE: Pull test (screw terminals)**		P
	Rated current (A) ..... :	16; 10	
	Smallest/largest cross-sectional area per table 4 (mm^2) ..... :	1,5 / 4,0; 1,0 / 2,5	
	Nominal diameter of thread (mm); torque 2/3 per table 5 (Nm) ..... :	3,8; 0,8	

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
1,0 (10A)	2	1 x 1,13 / 7 X 0,42 / 32x0,20	35	OK
2,5 (10A)	2	1 x 1,78 / 7 X 0,67 / 50 x 0,25	50	OK
1,5 (16A)	2	1 x 1,38 / 7 X 0,52 / 30 x 0,25	40	OK
4,0 (16A)	1	1 x 2,25 / 7 X 0,86 / 50 x 0,30	50	OK
Supplementary information:				

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

12.2.7	**TABLE: Tightening test (screw terminals)**		P
	Rated current (A) ..... :	16 / 10	
	Nominal diameter of thread (mm); torque 2/3 per table 5 (Nm) ..... :	3,8; 0,8	

Largest cross-sectional area per table 2 (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 (10A)	2	**rigid solid / rigid stranded / flexible**	1 x 1,78 / 7 X 0,67 / 50 x 0,25	OK
4,0 (16A)	1	**rigid solid / rigid stranded / flexible**	1 x 2,25 / 7 X 0,86 / 50 x 0,30	OK
Supplementary information:				

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

12.3.10	**TABLE: Mechanical stresses occurring in normal use (screwless terminals)**		N/A
	Rated current (A) ..... :		
	Largest/smallest cross-sectional area per table 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 ..... :		
	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 60669-1			
Clause	Requirement + Test	Result - Remark	Verdict

12.3.11	**TABLE: Electrical and thermal stresses occurring in normal use**		N/A
Test a)	Test carried out for 1 h connecting rigid solid conductors:		
	test current per table 9 (A) .....:		
	nominal cross-sectional area (mm^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 24th cycle value (mV)	

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

12.3.10	TABLE: 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) .....:		

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

	Type of conductors ..... :		
	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:

12.3.12	**TABLE: Deflection test (principle of test apparatus shown in figure 10a)**	N/A
	Test carried out for 1 h connecting rigid solid conductors:	
	test current (A) (equal rated current) ..... :	
	required voltage drop (mV) ..... :	≤ 25 mV

Type of conductor	Smallest			Largest			Remarks
cross-sectional area per table 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:

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

16.2	**TABLE: Insulation resistance**		P
Item per table 15	test voltage applied 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: - normal-gap construction	199	2
Supplementary information:			

16.3	**TABLE: Dielectric strength**		P
	Rated voltage (V)..... :	250	
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: - normal-gap construction	2000	No
5	Between any metal enclosure and metal foil in contact with the inner surface of its insulating linings	2000	No
Supplementary information:			

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

17	**TABLE: Temperature rise measurements**		P
	Rated current (A) ..... :	16 / 10	
	Nominal cross-sectional area (mm^2) ..... :	2,5 / 2,5	
	Terminal screws: torque (Nm) (2/3 table 5)..... :	3,8; 0,8	
	Test current per table 16 passed for 1 h (A)..... :	20 / 13,5	
	Rated voltage of pilot light (V)..... :	-	
	Samples number ..... :	See page 3	

thermocouple locations	max. measured temperature rise (K)	allowed temperature rise (K)
Terminals	25	45
Non-metallic rocker	6	55
Supplementary information:		

19.1	**TABLE: Test for switches intended for inductive loads (clause 19.1)**		P
	Reduced electric strength per clause 16		
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: - Normal-gap construction	1500	No
	Reduced temperature rise test per clause 17		
	Rated current passed for 1 h (A) ..... :	16 / 10	

thermocouple locations	max. measured temperature rise (K)	allowed temperature rise (K)
Terminals	24	≤ 45
Supplementary information:		

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

19.2	**TABLE: Test for switches intended for externally ballasted lamp loads (clause 19.2)**		P
	Reduced electric strength per clause 16		
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: - Normal-gap construction	1500	No
	Reduced temperature rise test per clause 17		
	Rated current passed for 1 h (A) ..... :	16 / 10	
thermocouple locations		max. measured temperature rise (K)	allowed temperature rise (K)
Terminals		26	≤ 45
Supplementary information:			

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

19.3	**TABLE: Test for switches intended for self-ballasted lamp loads (clause 19.3)**		P
	Reduced electric strength per clause 16		
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: - Normal-gap construction	1500	No
	Reduced temperature rise test per clause 17		
	Rated current passed for 1 h (A) ..... :	16 / 10	
thermocouple locations		max. measured temperature rise (K)	allowed temperature rise (K)
Terminals		22	≤ 45
Supplementary information:			

20.2	**TABLE: Impact resistance**			P
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:				

21.3	**TABLE: Ball pressure test of thermoplastic materials**			P
	Allowed impression diameter (mm).....	≤ 2 mm		
part under test	material designation	test temperature (°C)	impression diameter (mm)	
All insulation material	PC / Wenzhou Kaiyuan Electric Co., Ltd	125	Max.1,5	
Supplementary information:				

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

21.4	**TABLE: Ball pressure test of thermoplastic materials**			P
	Allowed impression diameter (mm).....	≤ 2 mm		
part under test	material designation	test temperature (°C) (1)	impression diameter (mm)	
Covered by 21.3				
Supplementary information: (1) 70 °C / 40 °C + highest temperature rise determined during the test of clause 17				

22.1	**TABLE: Threaded part torque test**				P
threaded part identification	diameter of thread (mm)	column number (I, II, or III)	applied torque (Nm)	times (5/10)	no damage
Terminal screws	3,8	III	1,2	5	OK
Supplementary information:					

23.1	**TABLE: Creepage distances, clearances and distances through sealing compound**						P
	Rated voltage (V).....	250					
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 internal live parts which are separated when the contacts are open	≥ 3	>3,0 by gauge	≥ 3	>3,0 by gauge	-	-
2 / 7	Between live parts of different polarity including all terminals for external wiring	≥ 3	>4,0 by gauge	≥ 3	>4,0 by gauge	-	-
3 / 8	Between live parts and - accessible surfaces of parts of insulating material	≥ 3	>4,0 by gauge	≥ 3	>4,0 by gauge	-	-
	- screws or devices for fixing main parts, covers or cover-plates	≥ 3	>4,0 by gauge	≥ 3	>4,0 by gauge	-	-
9	Between live parts and exclusively earthed metal boxes (see NOTE) with the switch mounted in the most unfavourable position	≥ 3	>6,0 by gauge	-	-	-	-
	Between live parts and unearthed metal boxes, without insulating lining, with the switch mounted in the most unfavourable position	≥ 4,5	>6,0 by gauge	-	-	-	-
Supplementary information:							

24.1	**TABLE: Glow-wire test**			P
part under test	material designation	test temperature (°C)	remarks	
All insulation material	PC / Wenzhou Kaiyuan Electric Co., Ltd	850	OK	

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

Supplementary information:

24.2	**TABLE: Resistance to tracking**		N/A
	Number of drops.....:		

part under test	material designation	test voltage (V)	flashover / breakdown (Yes/No)
Supplementary information:			

Critical Components					
Object / part no.	Manufacturer / trademark	Type / model	Technical data	Standard	Mark(s) of Conformity
All insulation material	Wenzhou Kaiyuan Electric Co., Ltd	PC	Min. thickness>1,0mm	IEC 60669-1	Test with appliance

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

Additional evaluation for LED indicator based on IEC 60669-2-1: 2021

101	**ABNORMAL CONDITIONS**		
	Electronic switches do not create hazard under abnormal conditions		N/A
101.1.1.1	Fault conditions test: temperature rises not exceed the values given in table 102, column concerning clause 101	See appended table 101.1.1.1	N/A
	Temperature limited by a fuse: additional test carried out in case of doubt	See appended table 101.1.1.1	N/A

101.1.1.1	**TABLE: fault conditions test**		
	cross-sectional area of conductor not less than 1,5 mm^2 (mm^2) (table 15) .....:		—
	terminal screws: torque (Nm) (2/3 table 3 or appropriate figures 1, 2, 3, 4).....:		—
	rated current (A) / rated load (W or VA) ..... :		—
	rated voltage (V) ..... :		—
	test voltage between 0,9 and 1,1 Vn (V), whichever is the more unfavourable ..... :		—
fault conditions simulated		remarks	verdict
Short circuit the two pins of LED indicator module			N/A
	TABLE: temperature rise measurements No significant heat occurred by fault conditions		N/A

ATTACHMENT TO TEST REPORT IEC 60669-1
EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES
SWITCHES FOR HOUSEHOLD AND SIMILAR FIXED-ELECTRICAL INSTALLATIONS
Part 1: General requirements

IEC60669_1F ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
ATTACHMENT TO TEST REPORT **IEC 60669-1 (ED. 4)** **EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES** SWITCHES FOR HOUSEHOLD AND SIMILAR FIXED ELECTRICAL INSTALLATIONS PART 1: GENERAL REQUIREMENTS			
Differences according to ..... : EN 60669-1:2018			
Attachment Form No. ..... : EU_GD_ IEC60669_1F **Attachment Originator**..... : IMQ S.p.A. **Master Attachment** ..... : 2018-09-20			
	CENELEC COMMON MODIFICATIONS (EN)		
8.1	Replace Note 4 and note 5:		
	Note 4 see annex ZB for special national conditions		N/A
10	**PROTECTION AGAINST ELECTRIC SHOCK**		
10.3.2	Replaced by:		
	“cover or cover plates” replaced by “cover, cover plates and other parts of the enclosure”		P
10.3.3	Replaced by:		
	“cover or cover plates” replaced by “cover, cover plates and other parts of the enclosure”		N/A
12	**TERMINALS**		
12.2.5	**Replace** the text of index a in Table 6 by “Void”		P
15	**RESISTANCE TO AGEING, PROTECTION PROVIDED BY ENCLOSURES OF SWITCHES, AND RESISTANCE TO HUMIDITY**		
15.1	Replace the value 55 % by 75 %		P
20	**SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS**		
20.1	Replace the first dash by:		
	- for all type of switches and their dedicated boxes, where applicable		P
22	**SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS**		
22.1	Second sentence of the second paragraph deleted		N/A
23	**CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH SEALING COMPOUND**		

ATTACHMENT TO TEST REPORT IEC 60669-1
EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES
SWITCHES FOR HOUSEHOLD AND SIMILAR FIXED-ELECTRICAL INSTALLATIONS
Part 1: General requirements

IEC60669_1F ATTACHMENT			
23.Z1	Subclause added:		N/A
	Surface-type switches do not have bare current-carrying strips at the back		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
ANNEX A	**ADDITIONAL REQUIREMENTS FOR SWITCHES HAVING FACILITIES FOR THE OUTLET AND RETENTION OF FLEXIBLE CABLES**		
8.1	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.Z1	Subclause added at the end:		
	Flexible cable outlet switches:		
	- clear how relief from strain and prevention of twisting is intended to be effected		N/A
	- cord anchorage, or at least part of it, integral with or permanently fixed to one of the component parts of the switch		N/A
	- makeshift methods not used		N/A
	- cord anchorages suitable for different type of flexible cables		N/A
	Rewirable switches with earthing connection are designed with ample space for slack of the earthing conductor		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) 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
	Method of connection according to 7.1.10, if necessary		N/A

ATTACHMENT TO TEST REPORT IEC 60669-1
EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES
SWITCHES FOR HOUSEHOLD AND SIMILAR FIXED-ELECTRICAL INSTALLATIONS
Part 1: General requirements

IEC60669_1F ATTACHMENT			
	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		N/A
12.4	**IPTs for external copper conductors**		
12.4.1	IPTs terminals of the type suitable for:		
	- 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		N/A
	Compliance verified as follows:		
	Type(s) of conductors:	Flexible / rigid / stranded	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
	It is possible to withdraw the insulating material from the switch		N/A

ATTACHMENT TO TEST REPORT IEC 60669-1
EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES
SWITCHES FOR HOUSEHOLD AND SIMILAR FIXED-ELECTRICAL INSTALLATIONS
Part 1: General requirements

IEC60669_1F ATTACHMENT			
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
	- measured after 24th and 192th temperature cycle	See appended table 12.4.11	N/A

ATTACHMENT TO TEST REPORT IEC 60669-1
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Part 1: General requirements

IEC60669_1F ATTACHMENT			
	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) Symbols for products declared as suitable for use at a temperature below the normal range		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) .....:		N/A
	number of operations without load every 4 h .....:		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		

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IEC60669_1F ATTACHMENT			
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
ANNEX ZB	**SPECIAL NATIONAL CONDITIONS (EN)**		
7.7	BELGIUM, FINLAND, GERMANY, NETHERLANDS, NORWAY, SWEDEN: design B not used due to installation practice		N/A
8.1	UNITED KINGDOM: marking of type reference not used		N/A
	GERMANY Add at the index n: n) The symbol that electrotechnical expertise is required		N/A
8.3	UNITED KINGDOM: marking of type reference not used		N/A
10.2	NORWAY: accessories requiring earth connection cannot normally be used due to the lack of an earthing conductor in many existing old buildings		N/A
10.3.3	NORWAY: accessories requiring earth connection cannot normally be used due to the lack of an earthing conductor in many existing old buildings		N/A
10.5	NORWAY: accessories requiring earth connection cannot normally be used due to the lack of an earthing conductor in many existing old buildings		N/A
12.2.5	FINLAND, NORWAY, SWEDEN: - additional test with rigid solid conductors (if exist in relevant IEC standard), if the first test has been made with rigid stranded conductors		P
	- in the case rigid stranded conductors do not exist, the test may be made with rigid solid conductors only		N/A
12.2.6	FINLAND, NORWAY, SWEDEN: additional test with one rigid solid conductor and one rigid stranded conductor with same cross-sectional areas connected at same time is required for terminals allowing the connection of two conductors		P
13.15.2	DENMARK, FINLAND, NORWAY, SWEDEN, SWITZERLAND: sub-clause mandatory		N/A
Annex E	FINLAND, NORWAY, SWEDEN: This annex is normative		N/A
ANNEX ZC	**A- DEVIATIONS (EN)**		

ATTACHMENT TO TEST REPORT IEC 60669-1
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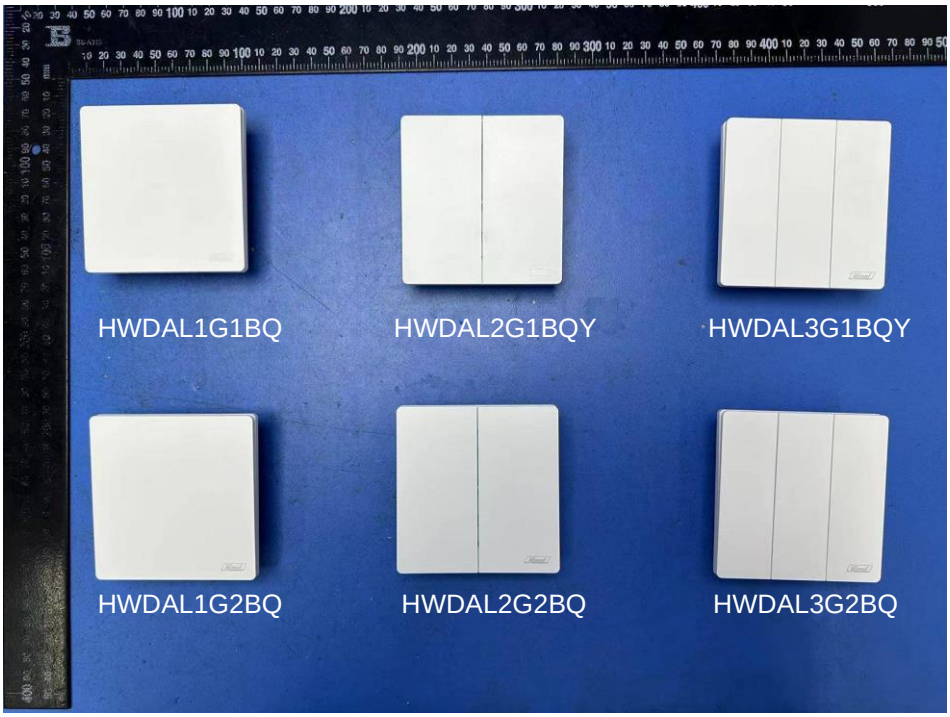
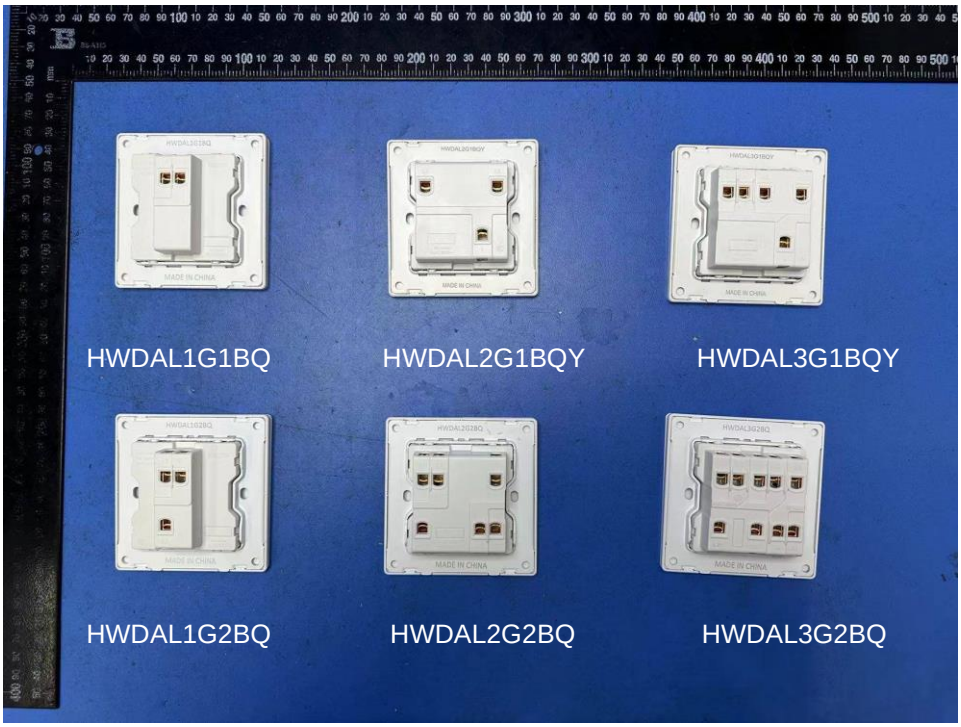
IEC60669_1F ATTACHMENT			
11.2	BELGIUM: earthing terminals have a capacity not less than that of corresponding terminals for the supply conductors except that any additional external earthing terminal shall be of a size suitable for conductors of at least 4 mm^2		N/A

Photo attachment

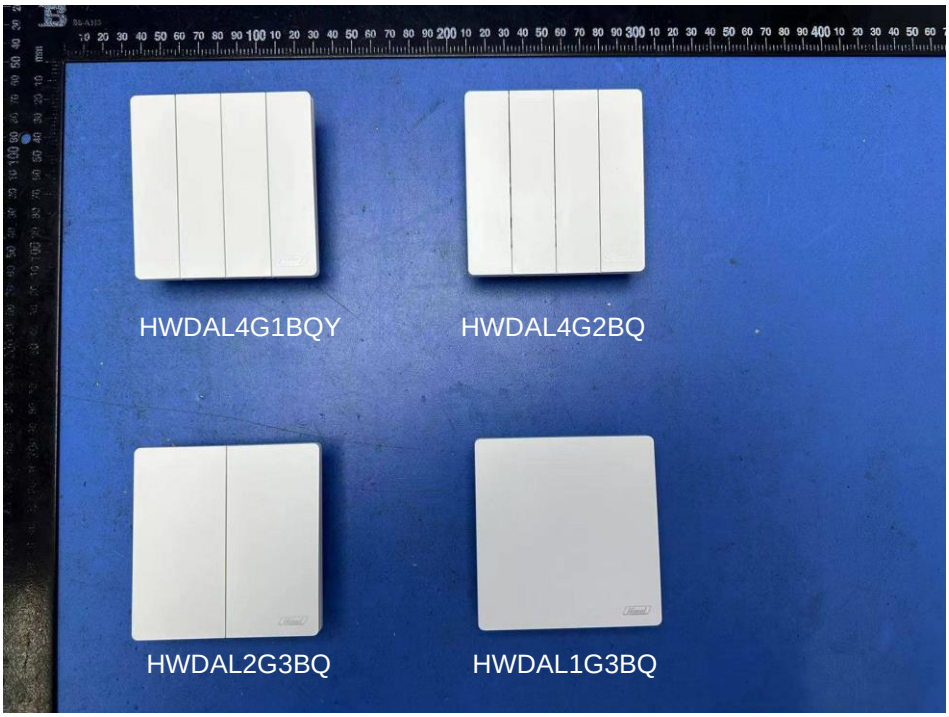


Front view of switch



Back view of switch

Photo attachment

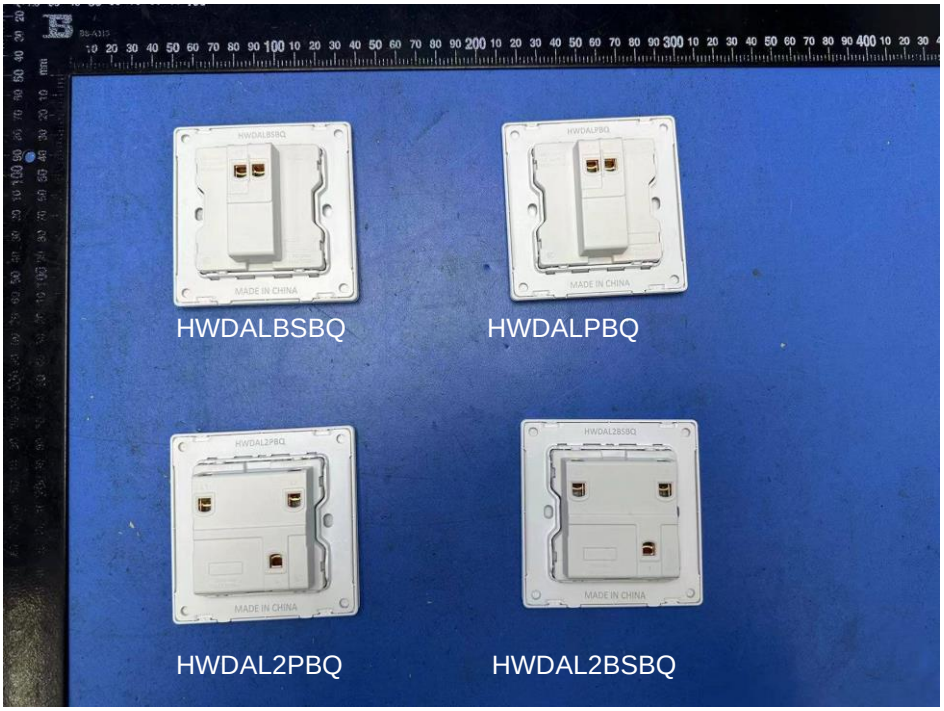


Front view of switch

Back view of switch

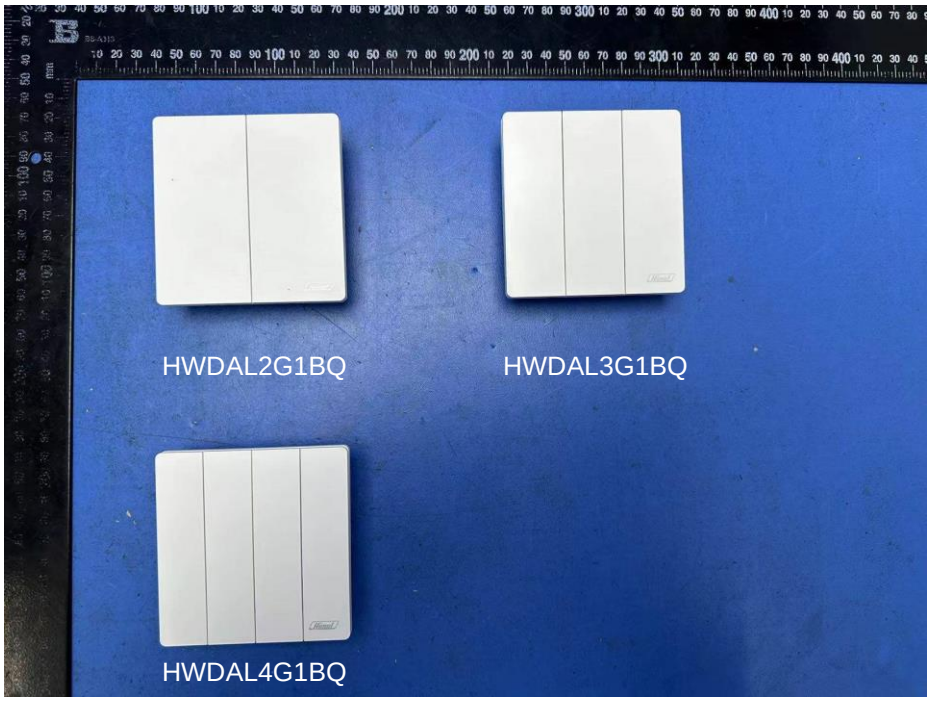
Photo attachment

Front view of switch



Back view of switch

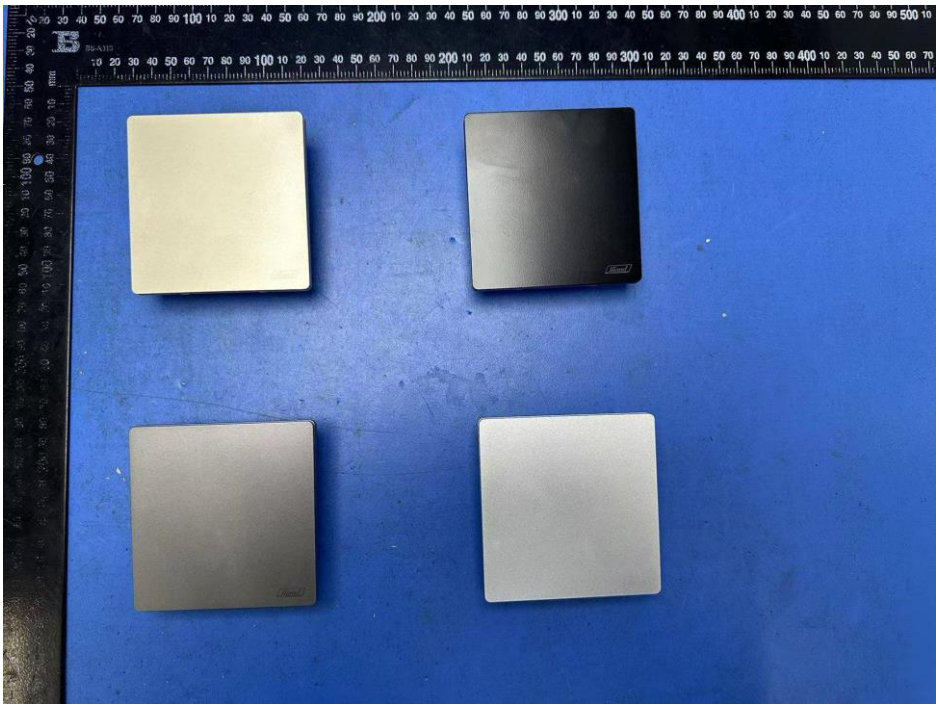
Photo attachment



Front view of switch

Back view of switch

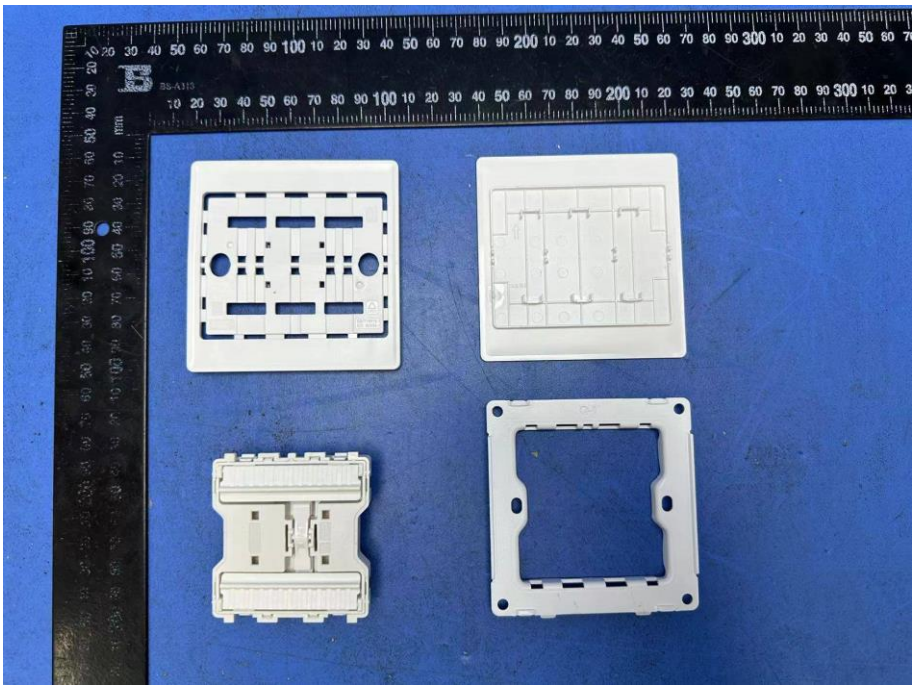
Photo attachment



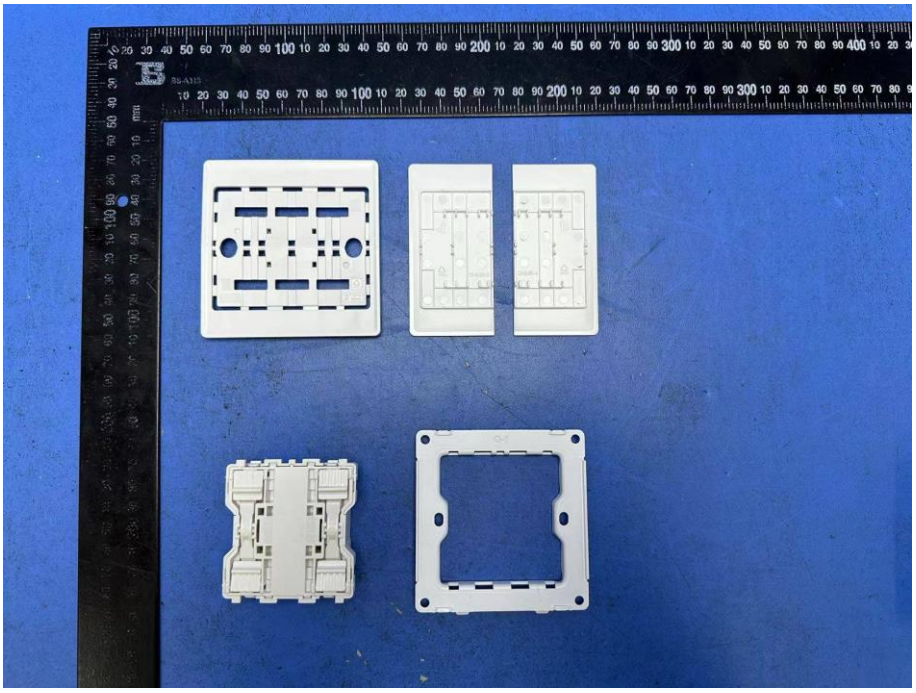
Front view of switch

Back view of switch

Photo attachment

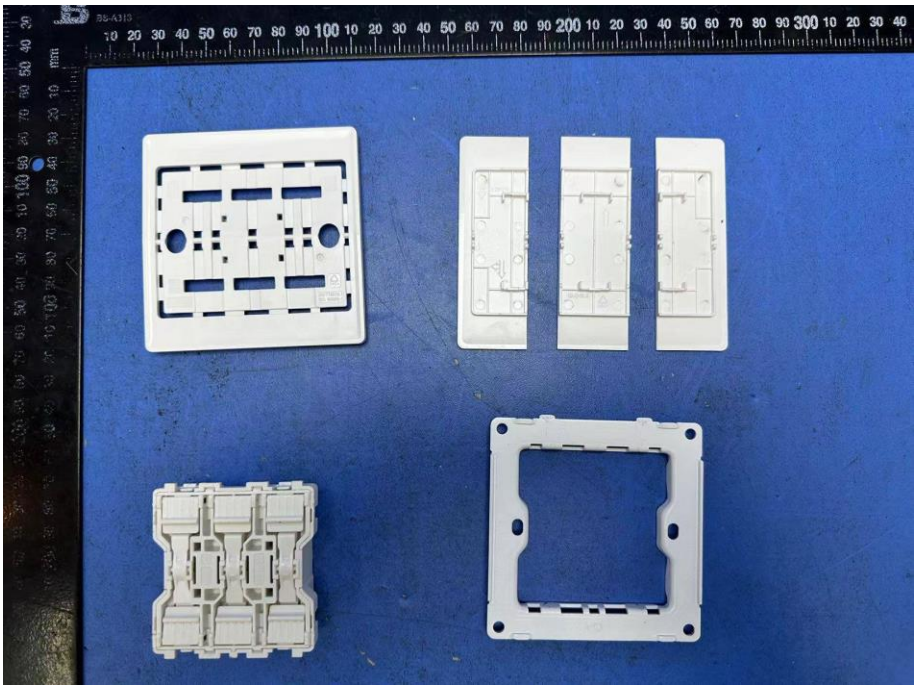


Open view of HWDAL1G1BQ (as representative)

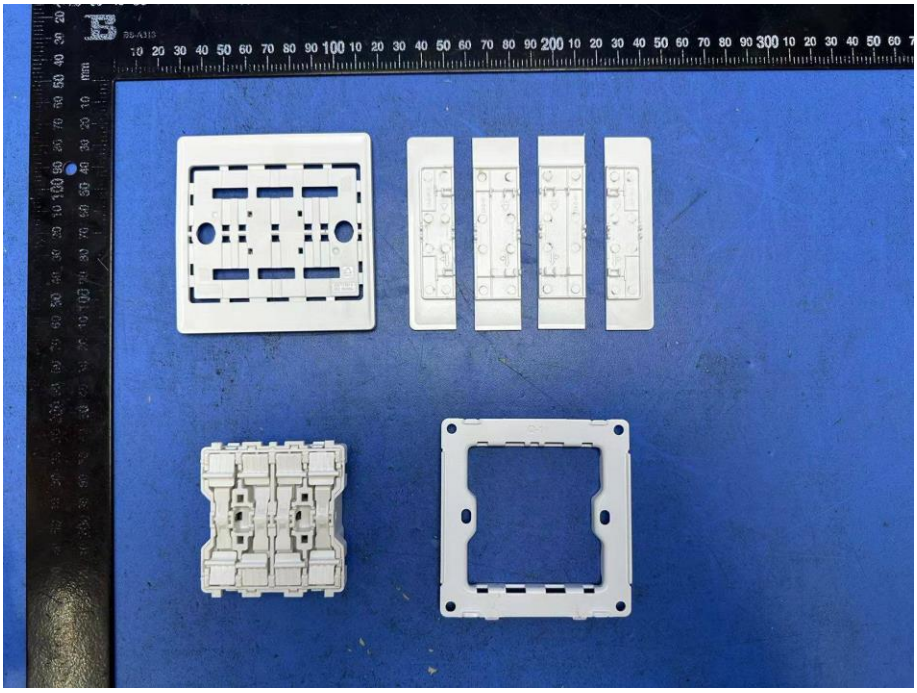


Open view of HWDAL2G1BQY (as representative)

Photo attachment

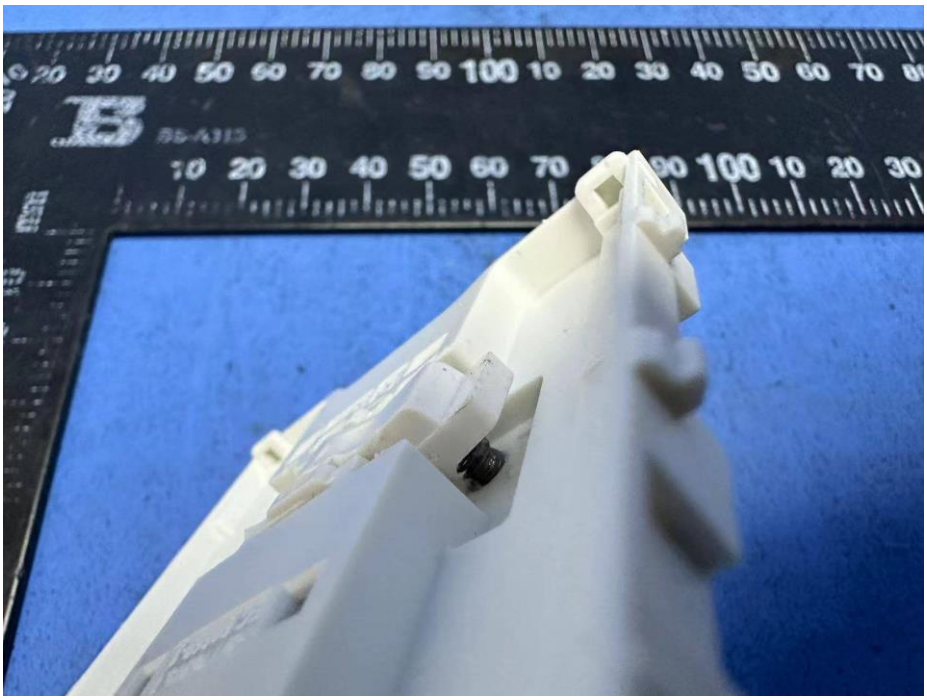


Open view of HWDAL3G1BQY (as representative)

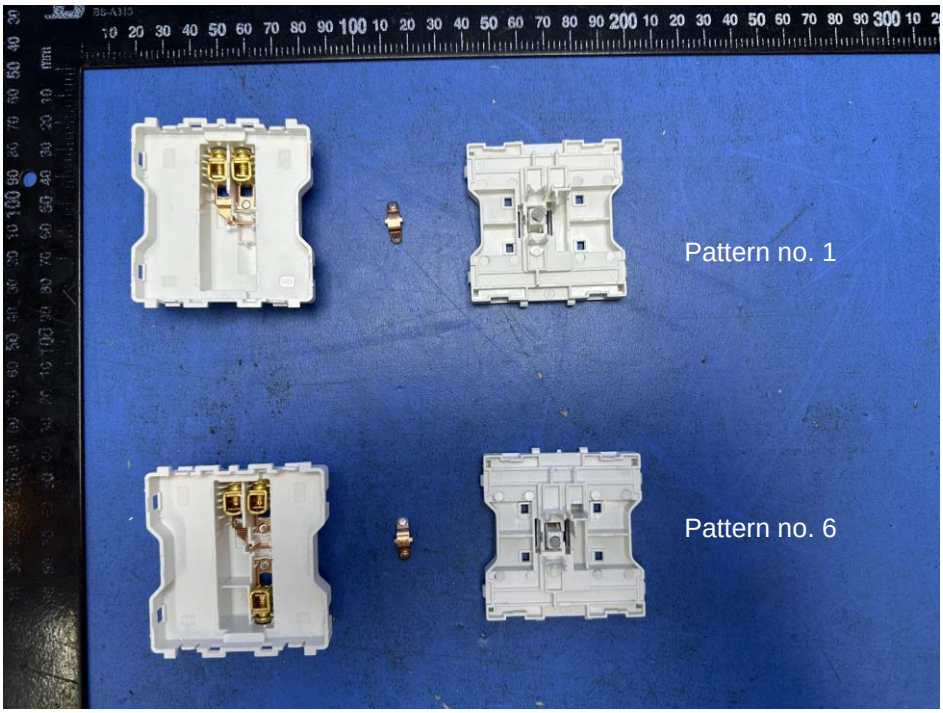


Open view of HWDAL4G1BQY (as representative)

Photo attachment

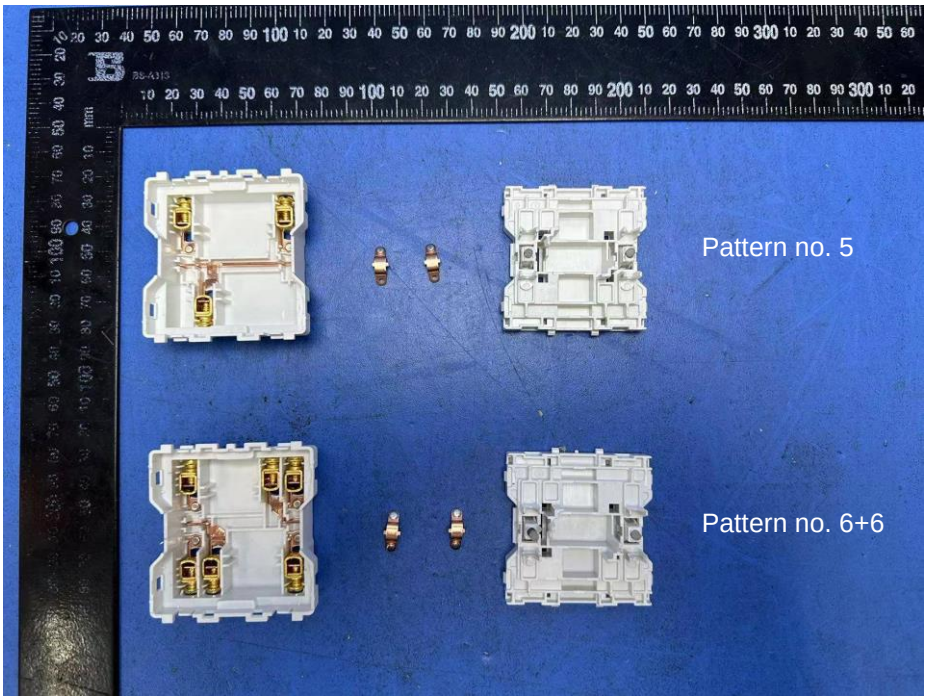


Close up view of spring for bell switches

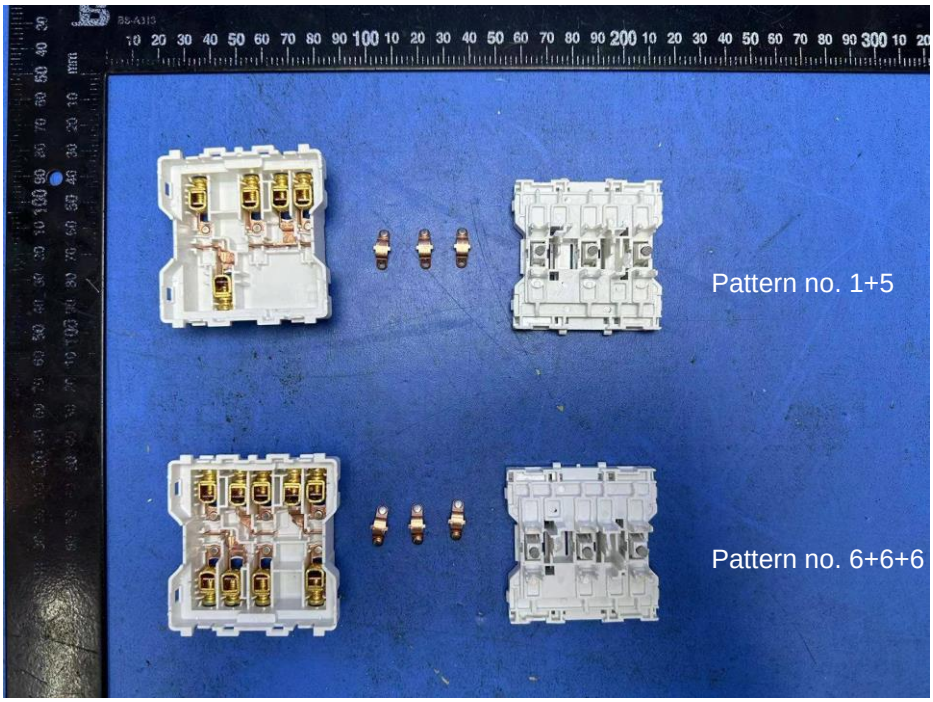


Internal view of switch mechanism

Photo attachment

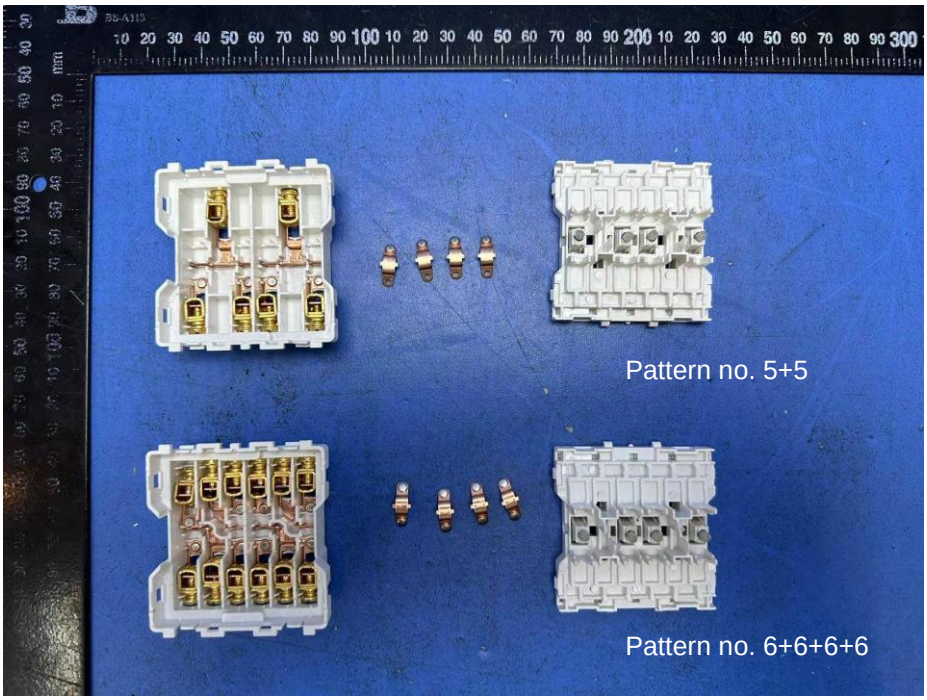


Internal view of switch mechanism

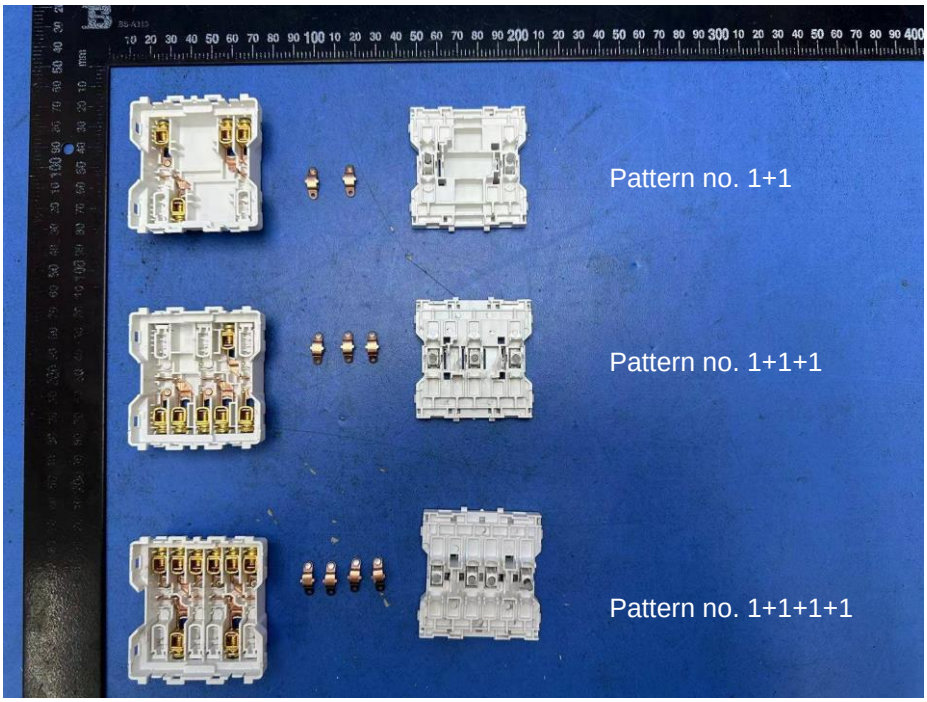


Internal view of switch mechanism

Photo attachment



Internal view of switch mechanism



Internal view of switch mechanism