


TEST REPORT EN 60669-1&EN 60669-2-1 Switches for household and similar fixed electrical installations Part 2-1: Particular requirements - Electronic switches	
Report Number.....:	BCTC-FY170603345S
Date of issue	Jun. 13, 2017
Total number of pages	51
Testing Laboratory.....:	Shenzhen BCTC Testing Co., Ltd.
Address	BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen, China
Applicant's name	Shenzhen Leehur Technology Co.,Ltd.
Address	7B Building A guangbo xiandai zhi chuang Huaqiang North shenzhen city, Guangdong province
Test specification:	
Standard.....:	EN 60669-1:1999+A1:2002+A2:2008 EN 60669-2-1: 2004+A1:2009+A12:2010
Test procedure	CE-LVD
Non-standard test method	N/A
Test Report Form No.....:	IEC60669_2_1F
Test Report Form(s) Originator	IMQ S.p.A.
Master TRF	Dated 2010-12
Copyright © 2013 Worldwide System for Conformity Testing and Certification of Electrotechnical Equipment and Components (IECEE), Geneva, Switzerland. All rights reserved. This publication may be reproduced in whole or in part for non-commercial purposes as long as the IECEE is acknowledged as copyright owner and source of the material. IECEE takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context. If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed. 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.	
Test item description	sonoff
Trademark	
Manufacturer	Shenzhen ITEAD Intelligent Systems Co.,Ltd. 5F, Building A, Yuxing Multiple-use Building, Huaya Industrial Park, Jihua Road, Longhua Dist. Shenzhen, Guangdong province
Model/Type reference	sonoff
Rating(s).....:	90-250VAC~, 50/60HZ Maxload: 10A

**Testing procedure and testing location:****Testing Laboratory.....: Shenzhen BCTC Testing Co., Ltd.**Address: BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen, China
-----**Date of Test.....: Jun. 05, 2017 to Jun. 13, 2017**
-----**Tested by (name + signature)** Sabrina Liang
-----**Reviewed by (name + signature)** Seven Zheng
-----**Approved by (name + signature).....** Awen He
-----

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

-- Attachment II: 2 pages for Photo documentation from 60-51

Tests performed (name of test and test clause):

EN 60669-1:1999+A1:2002+A2:2008

EN 60669-2-1: 2004+A1:2009+A12:2010

Testing location:

BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen, China

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.

sonoff

Model no.: sonoff

Input: 90-250VAC~ 50/60Hz

Maxload: 10A



Importer: XXXXXX

Address: XXXXXX

Manufacturer: Shenzhen ITEAD Intelligent Systems Co.,Ltd.

Address: 5F, Building A, Yuxing Multiple-use Building, Huaya Industrial Park, Jihua Road, Longhua Dist. Shenzhen, Guangdong province
Made in China

Remark on above marking:

1, The height of CE symbols is more than 5 mm;

2, The height of WEEE symbols is more than 7 mm;

**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.....: Jun. 05, 2017

Date(s) of performance of tests.....: Jun. 05, 2017 to Jun. 13, 2017

General remarks

This report shall not be reproduced except in full without the written approval of the testing laboratory.

The test results presented in this report relate only to the item(s) tested.

"(see remark #)" refers to a remark appended to the report.

"(see Annex #)" refers to an annex appended to the report.

Clause numbers between brackets refer to clauses in EN 60669-1

Throughout this report a comma is used as the decimal separator.

Brief description of the test sample:

The equipment is a sonoff for general use.

General product information:

1. EUT is a sonoff manufactured by Shenzhen ITEAD Intelligent Systems Co.,Ltd. according to the information technology equipment.



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
8	MARKING		P
8.1	Switches marked with:		P
	- rated voltage (V)	90-250V~	P
	- rated current (A) or rated load (VA or W)	See marking label	P
	- symbol for nature of supply	~	P
	- manufacturer's or responsible vendor's name, trade mark or identification mark	See marking label	P
	- type reference	See marking label	P
	- symbol for mini-gap construction (m)		N/A
	- symbol for micro-gap construction (μ)		N/A
	- symbol for semiconductor switching device (ϵ)		P
	- first IP characteristic numeral, if declared higher than 2, in which case the second characteristic numeral is also marked	IPX0	N/A
	- second IP characteristic numeral, if declared higher than 0, in which case the first characteristic numeral is also marked	IPX0	N/A
	- rated frequency (Hz)	50/60Hz	P
	- rating and type of any fuse incorporated		P
	- symbol for kind of load (see 8.2)		P
	- the term "extension unit", if applicable, followed by the identifying reference		N/A
	- the minimum height for mounting the switch indicated in the installation instruction if there is a restriction (see 10.1)		P
	Switches with screwless terminals: marked with an indication of the suitability to accept rigid conductors only (if any)	Not such terminal	N/A
8.2	Symbols used: as required in the standard		P
	Marking for the nature of supply placed next to the marking for rated current and rated voltage		P
	Other particular symbols used are explained in the installation instructions		P



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
8.3	Marking of electronic switch placed on the main part:		P
	- rated current or rated load, rated voltage, symbol for nature of supply, rated frequency (if any), type of load, rating and type of any incorporated fuse (marked on the fuse-holder or in proximity of the fuse)		P
	- either the name, trade mark, or identification mark of the manufacturer or of the responsible vendor		P
	- length of insulation to be removed, if any		N/A
	- symbol for mini-gap construction, micro-gap construction or semiconductor switching device, if applicable		P
	- type reference	sonoff	P
	Information concerning more than one type of load not already marked on the electronic switch are stated in the accompanying instruction sheet	See instruction	P
	Minimum and maximum current/load are stated for each type of load		P
	Information of the iron core transformer intended to be used with the electronic switch are given in the instruction sheet		N/A
	Cover plates necessary for safety purposes and intended to be sold separately: marked with the manufacturer's or responsible vendor's name, trade mark or identification mark and type reference	See marking	P
	IP code, when applicable, marked so as to be easily discernible when the switch is mounted and wired as in normal use	IPX0	N/A
	Marking clearly visible and easily legible		P
	Markings are placed on parts which cannot be removed without the use of a tool		P
8.4	Terminals for phase conductors (supply conductors): identified unless method of connection is of no importance, self evident or indicated on a wiring diagram		P



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Indications not placed on screws or other easily removable part		P
	Terminals associated with any one pole for switches of pattern number 2, 3, 03 and 6/2: similar identification differing from that of terminals associated with other poles		N/A
	Switches with more than two terminals: load terminal marked with an arrow pointing away from the terminal or with one of the symbol mentioned in 8.2		N/A
	Other terminals marked corresponding to the installation instructions		N/A
	Installation not made clear by the markings: a wiring diagram is provided with each electronic switch		N/A
8.5	Neutral terminals: N :		P
	Earthing terminals: [earth symbol] :	Class II equipment	N/A
	Markings not placed on screws or other easily removable parts		P
	Terminals for conductors not forming part of the main function of the switch:		N/A
	- clearly identified unless their purpose is self evident, or		N/A
	- indicated in a wiring diagram fixed to the accessory		N/A
	Identification of equipment terminals may be achieved by:		N/A
	- 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	Switches marked to indicate the switch position: they are so marked that the direction of movement of the actuating member to its different positions or the actual position is clearly indicated :		N/A
	Switches having more than one actuating member: marking indicates the effect achieved by the operation		N/A
	Marking clearly visible on the front of the switch		N/A



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Not possible to fix cover, cover plate, or removable actuating members in an incorrect position		N/A
	Symbols for "on" and "off" not used for indication of switch positions unless clearly indicate the direction of movement of the actuating members		N/A
	Off-state not marked with an "O" if the circuit on the load side is considered as live		N/A
8.6.101	Actual state of electronic switches intended to control the brightness of lamps is indicated		P
	- marking on the on-/off-state position		P
	- indicator lamp		P
	- adjusting the lamp sonoff in the lowest control state and at rated voltage minus 10%: light still visible		P
	When the indication of the electronic switch state is given only by the lamp, adjustment of the lamp at the lowest control state is made as specified in the following:		P
	- for incandescent lamps:		P
	the adjustment of lamp sonoffs is made by the manufacturer		P
	not possible to reduce the lowest setting without a tool		P
	- for fluorescent lamps:		P
	the adjustment of lamp sonoffs is made by the manufacturer		P
	it is possible for the installer to alter the lowest setting if indicated in an installation instruction		P
8.7	Red colour only for push-button to open the circuit		N/A
8.8	Special precautions necessary to take when installing the switch: details of these and clear information given in an instruction sheet which accompanies the switch		P
	Electronic switch containing a viewing window (lens) intended to be mounted at a height greater 1.7 m: information stated in the instruction sheet		P



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
8.9	Marking durable and easily legible. Test: 15 s with water and 15 s with petroleum spirit	The label durable and easily legible	P

9	CHECKING OF DIMENSIONS		N/A
	Switches and boxes comply with the appropriate standard sheets, if any		N/A
	Electronic switches with dimensions other than those specified in the standard sheets (if any) if they are supplied with suitable boxes		N/A

10	PROTECTION AGAINST ELECTRIC SHOCK		P
10.1	Switches: live parts not accessible		P
	Switches designed to be fitted with pilot lights supplied at voltages other than ELV have means to prevent direct contact with the lamp		P
	Test with standard test finger shown in figure 1 of IEC 60529		P
	Switches with thermoplastic or elastomeric material: additional test carried out at 35 °C ± 2 °C with the test probe 11 of IEC 61032 (75 N for 1 min)		P
	Test probe applied to:		P
	- thin-walled knock-outs with a force of 10 N		P
	- viewing windows or the like on electronic switches intended to be mounted at a height > 1,7 m with a force of 30 N		P
	During the test: switches not deform and no live parts accessible	No hazard	P
10.2	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 such part	N/A
	- reliably connected to earth		N/A
	For touch sensitive electronic switches the associated protective impedance does not have to comply with the requirements of clauses 16 and 23	Not the touch sensitive switch	N/A



EN 60669-1 & EN 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:	By reinforced insulation	P
	- consists of at least two independent resistors or independent capacitors in series of the same nominal value, or a combination of both	No such part	N/A
	- resistors comply with 102.3		N/A
	- capacitors comply with 102.2		P
	The removal of protective impedance is only possible by destruction of the electronic switch or by rendering it unusable	No protective impedance	N/A
	Test carried out between accessible metal parts and earth, through a non-inductive resistor of 2 k Ω :		N/A
	current measured: $\leq 0,7$ mA (peak value), for a.c. up to 1 kHz		N/A
	current measured: $\leq 0,7$ mA multiplied by the value of frequency in kHz, but not exceed 70 mA, for a.c. above 1 kHz		N/A
	current measured: ≤ 2 mA, for d.c.		N/A
10.3	Accessible parts of switches with $I_n \leq 16$ A: made of insulating material		P
10.3.1	Metal covers or cover plates protected by supplementary insulation made by insulating linings or insulating barriers		P
	Insulating linings or insulating barriers:		P
	- cannot be removed without being permanently damaged, or designed that		N/A
	- cannot be replaced in an incorrect position; if they are omitted, accessories are rendered inoperable or manifestly incomplete; there is no risk of accidental contact between live parts and metal covers or cover plates; precautions are taken to prevent creepage distances or clearances becoming less than the values specified in clause 23		N/A
10.3.2	Earthing of metal covers or cover plates: connection of low resistance		N/A



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
10.4	Metal parts of mechanism not insulated from live parts: not protrude from enclosure	No such part	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	Metal parts of mechanism not accessible and insulated from accessible metal parts, unless	No such part	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	No such part	N/A
10.6	Switches operated by means of a removable key or an intermediate part: key or an intermediate part can only touch parts insulated from live parts	Not operated by means of a removable key or an intermediate part	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	Cord-operated switches: impossible to touch live parts when fitting or replacing the pull cord	Not cord operated.	N/A
10.101	If a cover or cover-plate or a fuse can be removed without a tool or if the installation instructions for the user indicate that, for the purpose of maintenance, when replacing the fuse, covers and cover plates fastened by means of a tool have to be removed, the protection against contact with live parts is assured even after removal of cover or cover-plate (this requirement does not apply when the electronic switch must be dismantled from its supporting means for the replacement of the fuse-link)	Tool is used.	N/A
	Compliance is checked with the test probe B of IEC 61032 (10 N); test probe does not touch live parts		N/A
10.102	Hole in electronic switches for adjusting the setting:		N/A
	The adjustment does not involve the risk of an electric shock	No hole for adjusting	N/A



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Compliance is checked by applying a test pin according to figure 101 through the hole; test pin does not touch live parts		N/A
10.103	Ventilation openings over live parts:		P
	A foreign body introduced into these openings do not come into contact with any live parts		P
	Compliance is checked by applying the test probe 13 of IEC 61032 through the openings; pin of test probe does not touch live parts		P

11	PROVISION FOR EARTHING		N/A
	Clause not applicable to SELV electronic switches	Class II construction	N/A
11.1	Accessible metal parts: provided with, or permanently and reliably connected to, an earthing terminal	No accessible metal parts	N/A
11.2	Earthing terminals: with screw clamping or screwless terminals and comply with clause 12	Class II	N/A
	Capacity of earthing terminals of the same size as the corresponding terminals for the supply conductors		N/A
	Any additional external earthing terminal has a size suitable for conductors of at least 6 mm ² (mm ²) :		N/A
11.3	Surface-type switches with an enclosure of insulating material, with IP > X0 and more than one cable inlet, are provided for the continuity of the earthing circuit 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
11.4	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) :		N/A

12	TERMINALS		P
12.1	General		P



EN 60669-1 & EN 60669-2-1

Clause	Requirement + Test	Result - Remark	Verdict
	Switches provided with screw-type terminals or with screwless terminals	Screw-type terminals	P
	Clamping means of terminals: not serve to fix any other components		P
	All the test on terminals, with the exception of the test of 12.3 11, made after the test of 15.1		P
12.2	Terminals with screw clamping for external copper conductors		P
12.2.1	Switches provided with terminals which allows the proper connection of copper conductors as shows in table 2		P
	Rated current (A)	16	—
	Type of conductor (rigid / flexible)	KF301	—
	Smallest / largest cross-sectional area (mm ²)		—
	Diameter of largest conductor (mm)		—
	Figure of terminal		—
	Minimum diameter D (minimum dimensions) of conductor space: required (mm); measured (mm) ..		N/A
12.2.2	Terminals allow the conductor to be connected without special preparation		P
12.2.3	Terminals have adequate mechanical strength		P
	Screws and nut for clamping the conductors have metric ISO thread or a comparable thread		N/A
	Screws not of soft metal such as zinc or aluminium		N/A
12.2.4	Terminals resistant to corrosion		P
12.2.5	Screw-type terminals clamp the conductor(s) without undue damage		N/A
	During the test: conductor not slip out, no break near clamping unit and no damage		N/A
12.2.6	Terminals clamp the conductor reliably between metal surfaces		N/A
	During the test: conductor not move noticeably		N/A
12.2.7	Terminals designed or placed that the conductor cannot slip out while the clamping screws or nuts are tightened		N/A



EN 60669-1 & EN 60669-2-1			
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 clause 23		N/A
12.2.8	Terminals not work loose from their fixing to the switch		N/A
	Torque test:		N/A
	- rated current (A)		—
	- solid rigid copper conductor of the largest cross-sectional area (mm ²) (table 2)		—
	- torque (Nm) (table 3 or appropriate figures 1, 2, 3, 4)		—
	Screws and nuts tightened and loosened 5 times. During the test: terminals not work loose and show no damage		N/A
12.2.9	Clamping screws or nuts of earthing terminals: adequately locked against accidental loosening, not possible to loosen them without the aid of a tool		N/A
12.2.10	Earthing terminals: no risk of corrosion		N/A
	Body of brass or other metal no less resistant to corrosion		N/A
	If the body is a part of a frame or enclosure of aluminium alloy, precautions are taken to avoid the risk of corrosion		N/A
12.2.11	Pillar terminals: distance g no less than the value specified in figure 1: required (mm); measured (mm)		N/A
	Mantle terminals: distance g no less than the value specified in figure 5: required (mm); measured (mm)		N/A
12.2.12	Lug terminals:		N/A
	- used only for switches having rated current ≥ 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



EN 60669-1 & EN 60669-2-1			
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
12.3.2	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 7		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
	- during insertion, operation of clamping means of one of the conductors is independent of operation of that for the other conductor(s);	No such part	N/A
	- during disconnection, conductors can be disconnected either at the same time or separately;		N/A



EN 60669-1 & EN 60669-2-1

Clause	Requirement + Test	Result - Remark	Verdict
	- 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 20 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 not subject to mechanical stress		N/A
12.3.10	Screwless terminals withstand mechanical stresses occurring in normal use		N/A
	During application of the pull conductor not come out of the terminal		N/A
	Test with apparatus shown in figure 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		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		N/A
	During application of the pull conductor not come out of the terminal		N/A



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Test with apparatus shown in figure 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
12.3.12	Screwless terminals: connected rigid solid conductor remains clamped, even when deflected during normal installation		N/A

13	CONSTRUCTIONAL REQUIREMENTS		P
13.1	Insulating lining, barriers and like: adequate mechanical strength and secured in a reliable manner		P
13.2	Switches constructed so as to permit:		P
	- easy introduction and connection of the conductors in the terminals;		P
	- correct positioning of the conductors		P
	- easy fixing of the switch to a wall or in a box		P
	- adequate space between underside of the base and the surface on which the base is mounted or between the sides of the base and the enclosure (cover or box)		P
	Surface-type switches: fixing means do not damage insulation of the cable		P
	Switches classified as design A: permit easy positioning and removal of the cover or cover plate, without displacing the conductors		P
13.3	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		N/A
	- fixed by means of a single fixing, for example by a screw, provided that they are located by another means (for example by a shoulder)		P



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Fixings of covers, cover-plates or actuating members of switches of design A serves to fix the base: there is means to maintain the base in position, even after removal of the covers, cover-plates or actuating members	End equipment consider	P
13.3.1	Covers, cover plates or actuating members whose fixing is of the screw-type:		N/A
	Compliance checked by inspection only		N/A
13.3.2	Covers, cover plates or actuating members whose fixing is not dependent on screws and whose removal is obtained by applying a force in a direction approximately perpendicular to the mounting/supporting surface:		P
	Compliance checked, when their removal may give access, with the standard test finger:		P
	to live parts: by the test of 20.4 (verification of the non-removal and the removal)	See Clause 20.4	N/A
	to non-earthed metal parts separated from live parts by creepage distances and clearances according to table 20: by the test of 20.5 (verification of the non-removal and the removal)	See Clause 20.5	N/A
	only to insulating parts, or earthed metal parts, or metal parts separated from live parts by creepage distances and clearances twice those according to table 20, or live parts of SELV circuits not greater than 25 V a.c.: by the test of 20.6 (verification of the non-removal and the removal)	Only to insulating parts, See Clause 20.6	P
13.3.3	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 information given in an instruction sheet or in a catalogue:		N/A
	Compliance checked, when their removal may give access, with the standard test finger:		N/A
	to live parts: by the test of 20.4 (verification of the non-removal only)		N/A
	to non-earthed metal parts separated from live parts by creepage distances and clearances according to table 20: by the test of 20.5 (verification of the non-removal only)		N/A



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	only to insulating parts, or earthed metal parts, or metal parts separated from live parts by creepage distances and clearances twice those according to table 20, or live parts of SELV circuits not greater than 25 V a.c.: by the test of 20.6 (verification of the non-removal only)		N/A
13.4	Switches: no free openings in their enclosures according to their IP classification		P
	Free openings according to 10.102 and 10.103 are accepted		N/A
13.5	Knobs of electronic switches are securely fixed in a reliable manner	No knobs	N/A
	knobs used to indicate the position of switches: not possible to fix them in a wrong position, if this may result in a hazard		N/A
	Pull and push tests:		N/A
	- axial pull is likely to be applied: 30 N for 1 min		N/A
	- axial pull is unlikely to be applied: 15 N for 1 min		N/A
	- axial push: 30 N for 1 min		N/A
	During and after these tests:		N/A
	- the electronic switch shows no damage		N/A
	- an actuating member have not moved so as to impair compliance with this standard		N/A
13.6	Screws or other means for mounting the switch on a surface or in a box or enclosure: easily accessible from the front.		N/A
	Fixing means not serve any other fixing purpose		N/A
13.7	Combinations of switches, or of switches and socket-outlets, comprising separate bases: correct position of each base ensured		N/A
	Fixing of each base independent of the fixing of the combination to the mounting surface		N/A
13.8	Accessories combined with switches: comply with their standard		N/A



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
13.9	Surface-type switches with IP > 20 are in according to their classification when fitted with conduits or with sheathed cables	IPX0, see the instruction	N/A
	Surface-type switches with IPX4 or IPX5 have provisions for opening a drain hole	IPX0	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		N/A
	Drain hole: effective		N/A
	Lid springs (if any): of corrosion resistant material (bronze or stainless steel)		N/A
13.10	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
	Base have adequate stability when mounted in the box		P
13.11	Surface-type switches with IP > X0, 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	IPX0	N/A
	- adequate space for a floating terminal		N/A
13.12	Inlet openings: allow the introduction of the conduit or the sheath of the cable		P
	Surface-type switches: intended conduit or protective covering can enter at least 1 mm into the enclosure		P
	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		P
	Inlet openings for cable entries of surface-type switches: capable of accepting cables having the dimensions specified in table 12 or be as specified by the manufacturer: rated current (A); limits of external diameter of cables min/max (mm)		P



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
13.13	Surface-type switches: provision for back entry (if are intended)		N/A
13.14	Membranes or the like (if provided): replaceable	No membranes provided	N/A
13.15	Requirements for membranes in inlet openings		N/A
13.15.1	Membranes, lenses and the like reliably fixed and not displaced by the mechanical and thermal stresses occurring in normal use		N/A
	Test on electronic switches fitted with membranes, lenses and the like subjected to the ageing treatment specified in 15.1:		N/A
	Electronic switches placed at $40\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ for 2 h; force of 30 N applied for 5 s by means of the tip of test probe 11 of IEC 61032. During these tests: membranes, lenses and the like are not deformed, live parts not accessible		N/A
	Membranes, lenses and the like likely to be subjected to an axial pull: axial pull of 30 N applied for 5 s. During this test: membranes, lenses and the like not come out		N/A
	Test repeated on membranes, lenses and the like not subjected to any treatment		N/A
13.15.2	Membranes in inlet openings: introduction of the cables into the accessory permitted when the ambient temperature is low		N/A
	Test on membranes not subjected to the ageing treatment specified in 15.1 and fitted with the switches		N/A
	Switches kept at $-5\text{ }^{\circ}\text{C}$ 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	Flexible cable outlet switches: flexible cable (60245 IEC 66 or 60227 IEC 53, or as specified by the manufacturer) may enter the switch through a suitable hole, groove or gland		N/A
	Maximum dimension of flexible cable having conductors specified in table 12a accepted by the entry:		N/A



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- rated current (A)		—
	- cross-sectional area (mm ²) (min 1,5 mm ²)		—
	Entry shaped to prevent damage to the flexible cable		N/A
	Switches intended to be connected via a flexible cable to an electronic extension unit having a rated current equal to the rated current of the electronic switch: flexible cable complies with 60245 IEC 66 or 60227 IEC 53 with a minimum cross sectional area of 0,75 mm ²		N/A
	Switches intended to be connected via a flexible cable to an electronic extension unit having a rated current lower than the rated current of the electronic switch: flexible cable complies with the requirements of 13.103		N/A
	Switches with flexible cable outlet: provided with cable anchorage		N/A
	Cable anchorage: contains the sheath, of insulating material or provided with an insulating lining fixed to the metal parts		N/A
	Cable anchorage: anchor the flexible cable securely to the switch		N/A
	Cable anchorage cannot be released from the outside		N/A
	Use of a special purpose tool not required		N/A
	Screws: not serve to fix any other component, unless		N/A
	- switch is rendered manifestly incomplete if component omitted or replaced in an incorrect position, or		N/A
	- component cannot be removed without further use of a tool		N/A
	Pull test (30 N, 25 times): cable 60227 IEC 53, cross-sectional area 1,5 mm ² ; torque (Nm) (2/3 table 3)		N/A
	Torque test: torque 0,15 Nm for 1 min, cable not displaced > 2 mm		N/A



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Pull test (60 N, 25 times): cable 60245 IEC 66, diameter (mm) of cable; torque (Nm) (2/3 table 3) :		N/A
	Torque test: torque 0,35 Nm for 1 min, cable not displaced > 2 mm :		N/A
	Test voltage of 2000 V a.c. applied for 1 min between the conductors and the cord anchorage:		N/A
	During the test: insulation of flexible cable not damaged (no breakdown or flashover)		N/A
13.101	Automatic protective devices incorporated in electronic switches for lamp circuits have at least micro-disconnection		N/A
	Cut-outs in electronic switches for motor speed control circuits: non-self-resetting	No cut-out	N/A
13.102	Electronic switches for the control of the voltage of iron core transformers for extra low-voltage incandescent lamps (for example, halogen): maximum tolerance of the phase-control angle between the positive and negative half-wave of $\pm 2^\circ$:		N/A
13.103	A cable is considered as a bare conductor if the insulation is not at least electrically equivalent to that of flexible cable according IEC standard or the insulation does not comply with the electric strength test carried out between the conductor and a metallic foil wrapped around the cable under the conditions specified in 16.2		N/A

14	MECHANISM		P
	Clause only applicable to electronic switches provided with mechanical switching devices		N/A
14.1	Actuating member of a switch, when released, automatically take up the position corresponding to that of moving contacts		N/A
14.2	Moving contact of switches can come to rest only in "on" and "off" positions		N/A
	Intermediate position permissible if:		N/A



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- 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 16.2: test voltage a.c. for 1 min (V) :		N/A
14.3	No undue arcing in slowly operation		N/A
	Test carried out at the end of the test of clause 19.1: breaking of the circuit 10 times, actuating member moved over a period of 2 s. During the test: no sustained arcing		N/A
14.4	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 numbers 03 not make after or break before the other poles		N/A
14.5	Action of the mechanism: independent of the presence of cover or cover plate. Test: no flicker		N/A
14.6	Cord-operated switches: effecting a change by application and removal a pull not exceeding:		P
	- 45 N applied vertically, and		P
	- 65 N applied at $45^\circ \pm 5^\circ$		P

15	RESISTANCE TO AGEING, PROTECTION PROVIDED BY ENCLOSURES OF SWITCHES, AND RESISTANCE TO HUMIDITY		P
15.1	Resistance to ageing		P
	Switches and boxes placed for 7 days (168 h) in a heating cabinet at $70^\circ\text{C} \pm 2^\circ\text{C}$	$70^\circ\text{C} \pm 2^\circ\text{C}$, 168 h 25°C , 96 h	P
	- no crack visible after test with normal or corrected vision without additional magnification		P
	- no sticky or greasy material as a result of heat		P
	- no trace of cloth (forefinger pressed with 5 N)		P
	- no other damage as a result of heat		P
15.2	Protection provided by enclosures of switches		P
15.2.1	Protection against access to hazardous parts and against harmful effects due to ingress of solid foreign objects		P



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Enclosure of the switch 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		N/A
	Glands: torque (Nm) (2/3 of torque applied in 20.3) :		—
	Screws of the enclosure: torque (Nm) (2/3 table 3) :		—
15.2.1.1	Protection against access to hazardous parts		P
	Appropriate test according to IEC 60529 : IPX0		N/A
15.2.1.2	Protection against harmful effects due to ingress of solid foreign objects		P
	Appropriate test according to IEC 60529 :		P
	Dust not penetrate in quantity to interfere with satisfactory operation or to impair safety		P
15.2.2	Protection against harmful effects due to ingress of water		P
	Enclosure of switches provide a degree of protection against harmful effects due to ingress of water in accordance with their IP classification	IPX0	P
	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 27		N/A
	Screws of the enclosure: torque (Nm) (2/3 table 3) :		—
	Glands: torque (Nm) (2/3 of torque applied in table 19) :		—
	Specimens withstand an electric strength test specified in 16.2 which is started within 5 min of completion of the test		N/A
15.3	Resistance to humidity		P
	Switches proof against humidity which may occur in normal use		P

**EN 60669-1 & EN 60669-2-1**

Clause	Requirement + Test	Result - Remark	Verdict
	Compliance checked by a humidity treatment carried out in a humidity cabinet containing air with relative humidity maintained between 91 % and 95 %. Specimens kept in the cabinet for:		P
	- 2 days (48 h) for switches with IPX0	40°C , 93%RH, 48 h	P
	- 7 days (168 h) for switches with IP>X0		N/A
	After this treatment: specimens show no damage		N/A

16	INSULATION RESISTANCE AND ELECTRIC STRENGTH		P
16.1	The insulation resistance measured 1 min after application of 500 V d.c.	See appended table 16.1	P
16.2	Electric strength: a.c. test voltage applied for 1 min	See appended table 16.2	P

17	TEMPERATURE RISE		P
17.1	Switches so constructed that the temperature rise in normal use is not excessive		P
	No oxidation or any other deterioration of contacts, if any		P
	Material and components of electronic switch are not adversely effected by the temperature rise in normal use		P
	During the test:		P
	- electronic switch state not change		P
	- fuses and other protective devices not operate		P
	- permissible temperature rises determined in table 102, column concerning clause 17, not exceeded	See appended table 17	P
	After the test, electronic switch is in operating condition		P
	Sealing compounds, if any, have not flowed		N/A

18	MAKING AND BREAKING CAPACITY		N/A
	Electronic switches have adequate making and breaking capacity		N/A
	Test carried out only on electronic switches		N/A



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	provided with mechanically or electromechanically operated contact mechanisms		
	Contact mechanisms have adequate making and breaking capacity		N/A
	Test made on three new specimens of the complete contact mechanism		N/A
	Model/type reference		—
	Pattern number		—
	Rated current (A) / Rated load (W or VA)		—
	Rated voltage (V)		—
	Test for electronics switches for the control of:		N/A
	- fluorescent lamp loads, as specified in 18.1 of part 1;		N/A
	- motor speed control circuits, as specified in 18.1 of part 1 and, additionally, in 18.101;		N/A
	- voltage of iron core transformers for extra low-voltage incandescent lamps, as specified in 18.1, 18.2 of part 1 and, additionally, in 18.102;		N/A
	- voltage of electronic step-down converters for extra low-voltage incandescent lamps, as specified in 18.2 of part 1;		N/A
	- other types of load, as specified in 18.1 and 18.2 of part 1.		N/A
	Rate of operation (operation per minute)		—
	Electronic switches whose cycle of operation limited by their application: rate of operation specified by the manufacturer (operation per minute)		—
	Electronic switches fitted with conductors having nominal cross-sectional area as for the test of clause 17 (mm ²)		—
18.1	Test with cos ϕ 0,3 alternating current		N/A
	- test voltage (1,1 V _n) (V)		—
	- test current (1,25 I _n) (cos ϕ 0,3) (A)		—
	- 200 operations; rate (operations per minute)		—



EN 60669-1 & EN 60669-2-1

Clause	Requirement + Test	Result - Remark	Verdict
	- electronic switches whose rate of operation is limited by their application (for example, heat and 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 $(2 \pm 0,5) \text{ s}$		—
	- samples number		—
	During the test: no sustained arcing		N/A
	After the test: specimens show no damage		N/A
18.2	Test with tungsten filament lamps load (switches with $I_n \leq 16 \text{ A}$ / $V_n \leq 250 \text{ V}$ and switches of pattern numbers 3 and 03 with $V_n > 250 \text{ V}$)		N/A
	- test voltage (V_n) (V)		—
	- test current ($\geq 1,2 I_n$) (A)		—
	- number of 200 W tungsten filament lamps		—
	- 200 operations; rate (operations per minute)		—
	- samples number		—
	During the test: no sustained arcing nor welding of the contacts		N/A
	After the test: specimens show no damage		N/A
18.101	Additional test for electronic switches for the control of motor speed control circuits:		N/A
	Rated current I_n (A) of electronic switch ($\cos\phi 0.6$)	Not for speed control	—
	Making: 50 cycles with: test current: $9 I_n$ (A); test voltage: V_n (V); $\cos\phi 0.8 \pm 0.05$		N/A
	Breaking: 50 cycles with: test current: $6 I_n$ (A); test voltage: V_n (V); $\cos\phi 0.6 \pm 0.05$		N/A
	During the test: no sustained arcing		N/A
	After the test: specimens show no damage		N/A
18.102	Additional test for electronic switches for the control of the voltage of iron core transformers for extra low-voltage incandescent lamps (for example, halogen):		N/A
	- test voltage (V_n) (V)	Not for ELV	—
	- 50 making operations in a test circuit adjusted to a test current 10 times I_n (A) for one half-cycle of the power supply frequency		—

**EN 60669-1 & EN 60669-2-1**

Clause	Requirement + Test	Result - Remark	Verdict
	During the test: no sustained arcing		N/A
	After the test: specimens show no damage		N/A

19	NORMAL OPERATION		P
	Electronic switches withstand the mechanical, electrical and thermal stresses occurring in normal use		P
	Electronic switches whose cycle of operation is limited by their application: rate of operation specified by the manufacturer (operation per minute)		—
19.101	Contact mechanisms intended for incandescent lamp circuits; number of operations 40.000:		P
	Rate of operation (operation per minute)		—
	Rated current (A) / Rated load (W or VA)		—
	Rated voltage (V)		—
	During the test: specimens function correctly		P
	No sustained arcing in slowly operation (sub-clause 14.3)		P
	Contact mechanism intended for motor speed control circuits; number of operations 40000:		P
	Making: test current: $6 I_n$ (A); test voltage: V_n (V); $\cos\phi 0.65 \pm 0.05$		P
	Breaking: test current I_n (A); test voltage V_n (V); $\cos\phi 0.65 \pm 0.05$		P
	During the test: specimens function correctly		P
19.102	Contact mechanisms incorporated in electronic switches, intended for fluorescent lamp circuits or other capacitive loads (for example, electronic ballast) tested according to modified sub-clause 19.2 of part 1:		P
	- rate of operation (operation per minute)		—
	- test voltage (V_n); test current (I_n) ($\cos\phi 0,9$); number of operations with load A		P
	- test voltage (V_n); 100 operations with load B		P



EN 60669-1 & EN 60669-2-1			
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
19.103	Semiconductor switching devices and/or electronic regulating units incorporated in electronic switches:		N/A
	Rated current (A) / Rated load (W or VA)		—
	Rated voltage (V)		—
	Test voltage: 1.1 V _n (V)		—
	Switch state changed 10 times by means of the sensing surface or unit, or/and		N/A
	Setting value altered 10 times from min to max and back to min by means of the sensing surface or unit		N/A
	Additional test, where appropriate:		N/A
	Switch state changed 10 times by means of an electronic extension unit, and/or		N/A
	Setting value altered 10 times from min to max and back to min by means of an electronic extension unit		N/A
	During the test: specimens operate correctly		N/A
19.104	Mechanical control units incorporate in electronic switches:		N/A
	Type of mechanical control unit		—
	Rated current (A) / Rated load (W or VA)		—
	Rated voltage (V)		—
	Test voltage: 1.1 V _n (V)		—
	Setting altered 10000 times from min to max and back to min by means of its control unit; rate of operation between 10 and 15 operations per minute.....		—
	During the test: specimens function correctly		N/A
19.105	Electronic switches for which a minimum load or current is specified by the manufacturer:		N/A
	Test current: rated minimum current (A) / rated minimum load (W or VA)		—
	Test voltage: 0,9 V _n (V)		—



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Switch state changed 10 times over the whole range from min to max and back to min, and/or		N/A
	Setting value altered 10 times over the whole range from min to max and back to min		N/A
	Additional test, where appropriate:		N/A
	Switch state changed 10 times over the whole range from min to max and back to min by means of an electronic extension unit, and/or		N/A
	Setting value altered 10 times over the whole range from min to max and back to min by means of an electronic extension unit		N/A
	During the test: electronic switch functions correctly		P
	Reduced electric strength per clause 16	See appended table 19	P
	Temperature rise test after normal operation per clause 17:		P
	- electronic switch state not change		P
	- fuses and other protective devices not operate		P
	- permissible temperature rises determined in table 102, column concerning clause 17, not exceeded	See appended table 19	P
	After the test, electronic switch is in operating condition		P
	Sealing compounds, if any, have not flowed		P
	Evaluation of compliance after the normal operation: after the tests the specimens shall not show:		P
	- wear impairing their further use;		P
	- discrepancy between the position of the actuating member (if indicated) and that of the moving contacts;		P
	- deterioration of enclosures, insulating lining or barriers;		P
	- loosening of electrical or mechanical connections;		P
	- seepage of sealing compound;		N/A
	- displacement of the moving contacts of electronic switches of pattern number 2		P



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
20	MECHANICAL STRENGTH		P
	Switches, boxes and screwed glands have adequate mechanical strength		N/A
20.1	For all types of switches and for boxes: impact test (9 blows)		P
	After the test: no damage, live parts no become accessible		P
20.2	Bases of surface-type switches first fixed to a cylinder of rigid steel sheet of radius equal to 4,5 times the distance between fixing holes (mm)		N/A
	Bases then fixed to a flat steel sheet		N/A
	Torque applied to fixing screws (Nm)		—
	During and after the test: bases show no damage		N/A
20.3	Screwed glands of switches other than ordinary: torque test		N/A
	- diameter of cylindrical metal test rod (mm)		—
	- type of material		—
	- torque for 1 min (table 19) (Nm)		—
	After the test: no damage of glands and enclosure of the specimens		N/A
20.4	Force necessary for covers, cover-plates or actuating members to come off or not to come off (accessibility with the test finger to live parts)		P
20.4.1	Verification of the non-removal of covers, cover-plates or actuating member		P
	Force applied for 1 min in direction perpendicular to the mounting surface	End equipment consider	—
	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. 19)		P
	Covers, cover-plates or actuating members not come off		P
	After the test: no damage		P
20.4.2	Verification of the removal of covers, cover-plates or actuating members		P



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Force not exceeding 120 N applied 10 times in direction perpendicular to the mounting / supporting surface: covers, cover-plates or actuating members come off		P
	Test repeated on new specimens with a sheet of hard material, 1 mm \pm 0,1 mm thick, fitted around the supporting frame (fig. 19)		P
	Covers, cover-plates or actuating members come off		P
	After the test: no damage		P
20.5	Force necessary for covers, cover-plates or actuating members to come off or not to come off (accessibility with the test finger to non-earthed metal parts separated from live parts by creepage distances and clearances according to table 20)		P
20.4.1	Verification of the non-removal of covers, cover-plates or actuating members		P
	Force applied for 1 min in direction perpendicular to the mounting surface : 20 N		—
	Covers or cover-plates not come off		P
	Test repeated on new specimens with a sheet of hard material, 1 mm \pm 0,1 mm thick, fitted around the supporting frame (fig. 19)		P
	Covers, cover-plates or actuating members not come off		P
	After the test: no damage		P
20.4.2	Verification of the removal of covers, cover-plates or actuating members		P
	Force not exceeding 120 N applied 10 times in direction perpendicular to the mounting / supporting surface: covers, cover-plates or actuating members come off		P
	Test repeated on new specimens with a sheet of hard material, 1 mm \pm 0,1 mm thick, fitted around the supporting frame (fig. 19)		P
	Covers, cover-plates or actuating members come off		P
	After the test: no damage		P



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
20.6	Force necessary for covers, cover-plates or actuating members to come off or not to come off (accessibility to insulating parts, earthed metal parts, live parts of SELV ≤ 25 V a.c. or metal parts separated from live parts by creepage distances twice those according to table 20)		P
	Covers, cover-plates or actuating members come off		P
	After the test: no damage		P
20.7	Test with gauge of figure 20 applied according to figure 21 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		—
20.8	Test with gauge according to figure 23 applied as shown in figure 24 (1 N): gauge not enter more than 1mm		—
20.9	Operating members of cord-operated switch have adequate strength	No such switch	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		P
21.1	Switches kept for 1 h in a heating cabinet at a temperature of $100\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$		P
	During the test: no change impairing their further use and sealing compound, if any, not flow		P
	After the test: no access to live parts, markings still legible		P
21.2	Parts of insulating material necessary to retain current-carrying parts and parts of the earthing circuit in position: ball-pressure test (1 h, $125\text{ }^{\circ}\text{C}$)		P
21.3	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 21.2	P

**EN 60669-1 & EN 60669-2-1**

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

22	SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS		N/A
22.1	Connections withstand mechanical stresses		N/A
	Thread-forming or thread-cutting screws used only if supplied together with the piece in which they are intended to be inserted		N/A
	Screws and nuts which transmit contact pressure: in engagement with a metal thread		N/A
	Threaded part torque test	See appended table 22.1	N/A
22.2	Screws in engagement with a thread of insulating material: correct introduction into the screw hole or nut ensured		N/A
22.3	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		N/A
22.4	Screws and rivets locked against loosening or turning		N/A
22.5	Current-carrying parts of metal having mechanical strength, electrical conductivity and resistance to corrosion adequate:		N/A
	- 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;		N/A
	- stainless steel with at least 13 % chromium and not more than 0,12 % carbon		N/A
	- steel with electroplated coating of zinc (ISO 2081): service condition ISO no. (1/2/3); IP (X0/X4/X5); 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); thickness (µm)		N/A
	- steel with electroplated coating of tin (ISO 2093): service condition ISO no. (2/3/4); IP (X0/X4/X5); thickness (µm)		N/A



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	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 action: of metal resistant to corrosion		N/A
22.7	Thread-forming screws and thread-cutting screws not used for the connection of current-carrying parts		N/A
	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		P
	Values of items 1, 2, 6 and 7 of table 20 applied to terminals for external wiring and not applied to other live parts which are protected by a directly associated fuse with adequate breaking capacity or other current-limiting means, under the provision that the requirements of 101 are fulfilled		P
	Electronic switches without directly associated fuse or other current-limiting means: comply with table 20		P
23.1	Creepage distances, clearances and distances through sealing compound no less than the values shown in table 20	See appended table 23.1	P
23.2	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		P
24.1	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	See appended table 24.1.1	P
24.1.1	Glow-wire test according to IEC 60695-2-1		P



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
24.2	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		N/A

25	RESISTANCE TO RUSTING		P
	Ferrous parts protected against rusting		P
	Test: 10 min in carbontetrachloride, trichloroethane or equivalent degreasing agent, 10 min 10 % solution of ammonium chloride, 10 min in a box with air saturated with moisture and 10 min at 100 °C ± 5 °C:		P
	No signs of rust		P

26	EMC REQUIREMENTS		N/A
	Electronic switches designed to operate correctly under the conditions of electromagnetic environment in which they are intended to be used	See EMC report. end equipment consider	N/A
26.1	Immunity		N/A
	Electronic switches designed so that the switch state (ON or OFF) and/or the setting value are protected against interference		N/A
	Type of load		—
	Test current: In (A) / Rated load (W or VA)		—
	Test voltage: Vn (V)		—
	Variation of less than ± 10 % of the value of the output power (rms) is not considered to be a change of setting		N/A
	Electronic switches tested, if applicable, in the following states (test parameters referred to table 104):		N/A
	a) in the ON state, highest setting		N/A
	b) in the ON state, lowest setting		N/A
	c) in the OFF state		N/A
26.1.1	Voltage dips and short interruptions		N/A



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Electronic switch tested using the equipment specified in IEC 61000-4-11 in accordance with table 105: sequence: 3 dips/interruptions (duration: 10 cycles at rated frequency) with interval of 10 s minimum between each test event:		N/A
	Test level: 0 % UT		N/A
	Test level: 40 % UT		N/A
	Test level: 70 % UT		N/A
	After the test: electronic switch is in the original state and the setting is unchanged		N/A
26.1.2	Surge immunity test for 1,2/50 μ s wave impulses		N/A
	Test carried out according to IEC 61000-4-5 applying two positive discharges and two negative discharges at each of the following angles 0°, 90°, 270°, at a repetition rate of (60 \pm 5) s, with an open-circuit test voltage of 1 kV (level 2)		N/A
	After the test: electronic switch is in the original state and the setting is unchanged		N/A
26.1.3	Electrical fast transient/burst test		N/A
	Test carried out according to IEC 61000-4-4 in accordance with table 106, duration of the test 1 min +5/0 s for each positive and negative polarities: open-circuit output test voltage (\pm 10 %):		N/A
	Supply terminals/terminations: 1 kV		N/A
	Control terminals/terminations: 0,5 kV		N/A
	After the test: electronic switch is in the original state and the setting is unchanged		N/A
26.1.4	Electrostatic discharge test		N/A
	Electronic switch not intended to operate incandescent lamp: test carried out with only one load of the loads specified within the manufacturer's instructions		N/A
	Test carried out according to EN 61000-4-2 applying 10 positive and 10 negative discharge:		N/A
	- contact discharge to the conductive surface and to coupling planes (test voltage: 4 kV)		N/A
	- air discharge at insulating surfaces (test voltage: 8 kV)		N/A
	After the test: electronic switch is in the original switch state and the setting is unchanged		N/A



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Alter in the state and/or setting of electronic switches with a sensing surface intended to be operated by touch: possibility to operate the electronic switch as intended		N/A
26.1.5	Radiated electromagnetic field test		N/A
	Test applicable only to electronic switches containing infra-red (IR) receivers, radio frequency receivers, passive infra-red (PIR) devices, devices containing microprocessors or similar		N/A
	Test carried out according to IEC 61000-4-3 applying a field strength of 3 V/m in the frequency range 80 MHz to 1000 MHz:		N/A
	During the test: state of electronic switch is not changed		N/A
	After the test: electronic switch is in the original state and the setting is unchanged		N/A
	Time delay switches (TDS): switch is in the original state after the time delay		N/A
26.1.6	Radio-frequency voltage test		N/A
	Test applicable only to electronic switches containing infra-red (IR) receivers, radio frequency receivers, passive infra-red (PIR) devices, devices containing microprocessors or similar		N/A
	Test carried out according to IEC 61000-4-6 applying a conducted radio-frequency voltage of 3 V r.m.s. on supply lines and control lines:		N/A
	During the test: state of electronic switch is not changed		N/A
	After the test: electronic switch is in the original state and the setting is unchanged		N/A
26.1.7	Power-frequency magnetic field test		N/A
	Test applicable only to electronic switches containing devices susceptible to magnetic fields, for example, Hall elements, electrodynamic microphones, etc.		N/A
	Test carried out according to IEC 61000-4-8 applying a magnetic field of 3 A/m, 50 Hz:		N/A



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	During the test: state of electronic switch is not changed		N/A
	After the test: electronic switch is in the original state and the setting is unchanged		N/A
26.2	Emission		N/A
26.2.1	Low-frequency emission		N/A
	Electronic switches designed that they do not cause excessive disturbances in the network		N/A
	Electronic switch complies with IEC 61000-3-2 and IEC 61000-3-3		N/A
	Electronic switches with electromechanically operated contact mechanism (for example, a relay) are deemed to meet the requirements of IEC 61000-3-2 without need for testing		N/A
26.2.2	Radio-frequency emission		N/A
	Electronic switches designed that they do not cause excessive radio interference		N/A
	Electronic switch complies with the requirements of CISPR 14		N/A
	Electronic switch complies with the requirements of CISPR 15 (modified on sub-clauses 8.1.3.1 and 8.1.3.2)		N/A

101	ABNORMAL CONDITIONS		P
	Electronic switches do not create hazard under abnormal conditions		P
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	P
	Temperature limited by a fuse: additional test carried out in case of doubt		N/A
101.1.1.2	Electronic switches without incorporated temperature-limiting devices and without incorporated fuses:		P
	Test current: conventional tripping current I_f (A) for 1h of the fuse which, in the installation, will protect		—

**EN 60669-1 & EN 60669-2-1**

Clause	Requirement + Test	Result - Remark	Verdict
	the electronic switch		
	Temperature rise measured after steady state or after 4 h	See appended table 101.1.1.1	P
	Electronic switches protected by automatic protective devices (including fuses):		P
	Current with which the protecting device releases after 1 h (A)		—
	Test current: 0.95 times the current with which the protecting device releases after 1 h (A)		—
	Temperature rise measured after steady state or after 4 h		N/A
	Electronic switches protected by incorporated fuses complying with IEC 60127:		N/A
	Rated current of incorporated fuse (A)		—
	Test current: 2.1 I _n (A)		—
	Temperature rise measured after 30 min	See appended table 101.1.1.2	N/A
101.2	Protection against electric shock even during fault conditions		P
	Electronic switches tested according to clause 10 immediately following the test of 101.1		P
101.3	Short circuit test: prospective short circuit of the supply: 1500 A; I ² t: 15000 A ² s:		P
	Test voltage V _n (V)	240V~	—
	Type of fuse recommended by the manufacturer ..	--	—
	N° of short circuits; N° of specimens used	6	—
	During the test: emission of flames or burning particles not occur		P
	After the test:		P
	- accessible metal parts not live		P
	- contacts of any incorporated automatic protective device not welded, unless the electronic switch is obviously useless		N/A
102	COMPONENTS		P
	Components which, if they fail, may impair the safety of the electronic switch comply with the		P



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	relevant IEC standards, as far as applicable		
	Components marked with their operating characteristics used in accordance with these markings		P
102.1	Fuses comply with:		P
	- IEC 60127		P
	- other relevant IEC publications		N/A
	Rated breaking capacity (A): 1500 A or 35 A		N/A
102.2	Capacitors: the short-circuiting or disconnection of which cause an infringement of the requirements under fault conditions with regard to shock or fire hazard:		P
	Trade mark; article of capacitor		—
	Capacitor complies with IEC 60384-14		P
	Capacitor passing the damp heat steady-state test specified in 4.12 of IEC 60384-14 with a duration of not less than 21 days are considered acceptable		P
	Capacitor in accordance with table 107: approved type of capacitor required by table 107 according to the application in the electronic switch; observed		P
	Capacitor marked with:		N/A
	- rated voltage (V)		N/A
	- rated capacitance (μF)		N/A
	- reference temperature (°C)		N/A
	Capacitors: the short-circuiting of which cause a current = 0,5 A through the terminals of the capacitor:		N/A
	Trade mark; article of capacitor		—
	Capacitor complies with IEC 60384-14		N/A
	Capacitor passing the damp heat steady-state test specified in 4.12 of IEC 60384-14 with a duration of not less than 21 days are considered acceptable		N/A
	Capacitor in accordance with table 107: approved type of capacitor required by table 107 according to the application in the electronic switch; observed ..		N/A
	Capacitor marked with:		N/A



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- rated voltage (V)		N/A
	- rated capacitance (μ F)		N/A
	- reference temperature ($^{\circ}$ C)		N/A
	Capacitors: for suppression of electromagnetic interference:		N/A
	Trade mark; article of capacitor		—
	Capacitor complies with IEC 60384-14		N/A
	Capacitor passing the damp heat steady-state test specified in 4.12 of IEC 60384-14 with a duration of not less than 21 days are considered acceptable		N/A
	Capacitor in accordance with table 107: approved type of capacitor required by table 107 according to the application in the electronic switch; observed		N/A
	Capacitor marked with:		N/A
	- rated voltage (V)		N/A
	- rated capacitance (μ F)		N/A
	- reference temperature ($^{\circ}$ C)		N/A
102.3	Resistors: the short-circuiting or interruption of which cause an infringement of the requirements with regard to the protection against fire and electric shock in case of a defect:		N/A
	Manufacturer / characteristics of resistor	/ Ω	—
	- constant value under overload conditions		N/A
	reference temperature of the resistor according to clause 17 ($^{\circ}$ C)		—
	- comply with sub-clause 14.1 of IEC 60065		N/A
102.4	Automatic protective devices (other than fuses)		N/A
	Automatic protective devices comply with IEC 60730 as far as applicable		N/A
102.4.1	Automatic protective devices which switch off the current (cut-outs):		N/A
	Adequate making and breaking capacity		N/A
	Reference temperature above 55 $^{\circ}$ C: specimens tested at reference temperature according to clause 17 ($^{\circ}$ C)		N/A



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
102.4.1.1	Non-self-resetting cut-outs in the load circuit of the electronic switch:		N/A
	Test voltage: 1.1 V _n (V)		—
	Cut-outs in electronic switches for incandescent or fluorescent lamps:		N/A
	10 cycles; test current: 2.1 I _n (A) of the protecting fuse (IEC 60127) or the conventional fusing current (other fuses)		—
	During the test: no sustained arcing		N/A
	After the test: specimens show no damage		N/A
	Electric strength between open contacts: test voltage 500 V a.c. for 1 min		N/A
	Cut-outs in electronic switches for speed control circuits:		N/A
	I _n (A) of electronic switch (cosφ 0.6)		—
	Making: 10 operations with: test current: 9 I _n (A); cosφ 0.8 ± 0.05		—
	Breaking: 10 operations with: test current: 6 I _n (A); cosφ 0.6 ± 0.05		—
	During the test: no sustained arcing		N/A
	After the test: specimens show no damage		N/A
	Electric strength between open contacts: test voltage (V): 1200 V a.c. (V _n ≤ 130 V) or 2000 V (V _n > 130 V) for 1 min:		N/A
102.4.1.2	Self-resetting cut-outs in the load circuit of the electronic switch:		N/A
	Test voltage: 1.1 V _n (V)		—
	Cut-outs in electronic switches for incandescent lamps:		N/A
	200 cycles; test current: 2.1 I _n (A) of the protecting fuse (IEC 60127) or conventional fusing current (other fuses)		—
	During the test: no sustained arcing		N/A
	After the test: specimens show no damage		N/A
	Electric strength between open contacts: test voltage 500 V a.c. for 1 min		N/A
102.4.2	Automatic protective devices which only decrease current to the electronic switch (10 cycles):		N/A



EN 60669-1 & EN 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Test current per clause 17 for 4 h (A)		—
	Test current increased to 2.1 I _n (A) of the protecting fuse (IEC 60127) or the conventional fusing current (other fuses) for 30 min		—
	After the test: specimens function correctly		N/A
	Temperature rise test per clause 17:		N/A
	- electronic switch state not change		N/A
	- fuses and other protective devices not operate		N/A
	- permissible temperature rises determined in table 102, column concerning clause 17, not exceeded		N/A
	After the test, electronic switch is in operating condition		N/A
	Sealing compounds, if any, have not flowed		N/A



16.1	TABLE: insulation resistance			P
item per table 20	test voltage applied between:	measured (MΩ)	required (MΩ)	
1	All poles connected together and the body,	>100	4	
2	L and N	>100	2	
supplementary information:				

16.2	TABLE: electric strength			P
	rated voltage (V).....:	250V~		—
item per table 20	test voltage applied between:	test voltage (V)	flashover / breakdown (Yes/No)	
1	All poles connected together and the body,	2000	No	
2	L and N	1000	No	
supplementary information:				

17	TABLE: temperature rise measurements			P
	type of load	--		—
	rated current (A) / rated load (W or VA)	10A		—
	rated voltage (V)	250V~		—
	test voltage between 0,9 and 1,1 Vn (V), whichever is the more unfavourable	265V~		—
parts of the electronic switch		max. measured temperature rise (K)	permissible temperature rise (K)	
PCB under U1		40.9	105	
Inductance winding		51.4	95	
C8 body		27.8	80	
PCB near U1		38.6	105	
Relay		34.1	60	
Terminal block		16.2	100	
Plastic enclosure		11.7	50	
Ambient		25.1°C	--	
supplementary information:				



20.1	TABLE: impact test			P
part of enclosure tested per table 18 (A, B, C, D)	blows per part	height of fall (mm)	comments	
--	3	250	No crack	
supplementary information:				

21.2	TABLE: ball pressure test of thermoplastic materials			P
	allowed impression diameter (mm)	≤ 2 mm		—
part under test	material designation / manufacturer	test temperature (°C) ⁽¹⁾	impression diameter (mm)	
Plasitc enclosure	PA-765A(+)/CHI MEI CORPORATION	125	0.8	
supplementary information:				

21.3	TABLE: ball pressure test of thermoplastic materials			P
	allowed impression diameter (mm)	≤ 2 mm		—
part under test	material designation / manufacturer	test temperature (°C) ⁽¹⁾	impression diameter (mm)	
Plasitc enclosure	PA-765A(+)/CHI MEI CORPORATION	125	0.8	
supplementary information:				
⁽¹⁾ 70 °C / 40 °C + highest temperature rise determined during the test of clause 17				

23.1	TABLE: creepage distances, clearances and distances through sealing compound						P
	rated voltage (V)	250V					—
item per table 20	creepage distance dcr, clearance cl and distance through sealing compound dtsc at/of:	required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)	required dtsc (mm)	dtsc (mm)
2&7	Between live parts of different polarity	≥ 3.0	≥ 3.0	≥ 3.0	≥ 3.0	--	--
3&8	Between live parts and : -accessible surfaces of parts of insulating material	≥ 3.0	≥ 3.0	≥ 3.0	≥ 3.0	--	--
supplementary information:							



24.1.1	TABLE: glow-wire test			P
part under test		material designation / manufacturer	test temperature (°C)	remarks
Plasitc enclosure		PA-765A(+)/CHI MEI CORPORATION	650	No hazards
supplementary information:				

101.1.1.1	TABLE: fault conditions test			P
	number of dro cross-sectional area of conductor not less than 1,5 mm ² (mm ²) (table 15)	--		—
	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)	--		—
	type of load	--		—
	rated current (A) / rated load (W or VA)	10A		—
	rated voltage (V)	250V~		—
	test voltage between 0,9 and 1,1 V _n (V), whichever is the more unfavourable	265V~		—
fault conditions simulated		remarks	verdict	
U1 short		Unit shutdown, no damaged, no hazard.	P	
C9 short		Unit shutdown, no damaged, no hazard.	P	
	TABLE: temperature rise measurements			—
	temperature measured after (min)			—
parts of the electronic switch		max. measured temperature rise (K)	permissible temperature rise (K)	
PCB under U1		49.6	150	
Metal enclosure		16.8	75	



102.4.2	TABLE: temperature rise measurements after test for automatic protective devices which only decrease current to the electronic switch		N/A
	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)		—
	type of load		—
	rated current (A) / rated load (W or VA)		—
	rated voltage (V)		—
	test voltage between 0,9 and 1,1 V _n (V), whichever is the more unfavourable		—
parts of the electronic switch		max. measured temperature rise (K)	permissible temperature rise (K)
--		--	--
supplementary information:			

1.5.1	TABLE: List of critical components					P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity ¹⁾	
Enclosure	CHI MEI CORPORATION	PA-765A(+)	V-0 or better, 125℃ min. 1.5mm thickness	UL94	UL	
PCB	Interchangeable	Interchangeable	V-0 or batter, 105℃	UL 796	UL	
Relay	HKE	HRS3FNH-S-DC 5V-A	10A 250VAC	IEC/EN 61810-1	CE	
Terminal block	Heavy power Co., Ltd.	KF301	16A/300V	UL1059	UL	

ANNEX A:

Photo-documentation



Fig.1

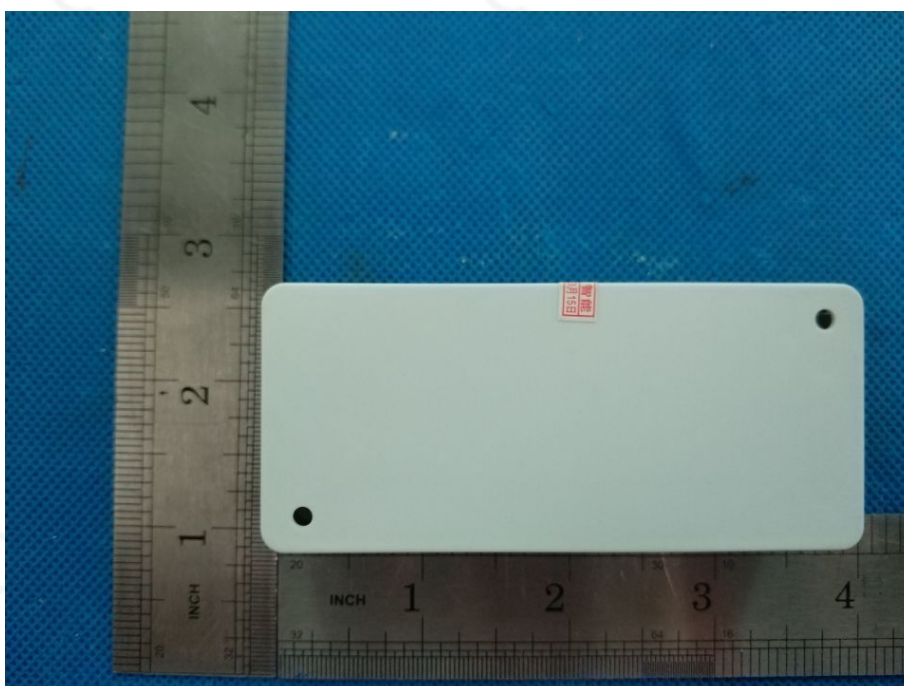


Fig.2

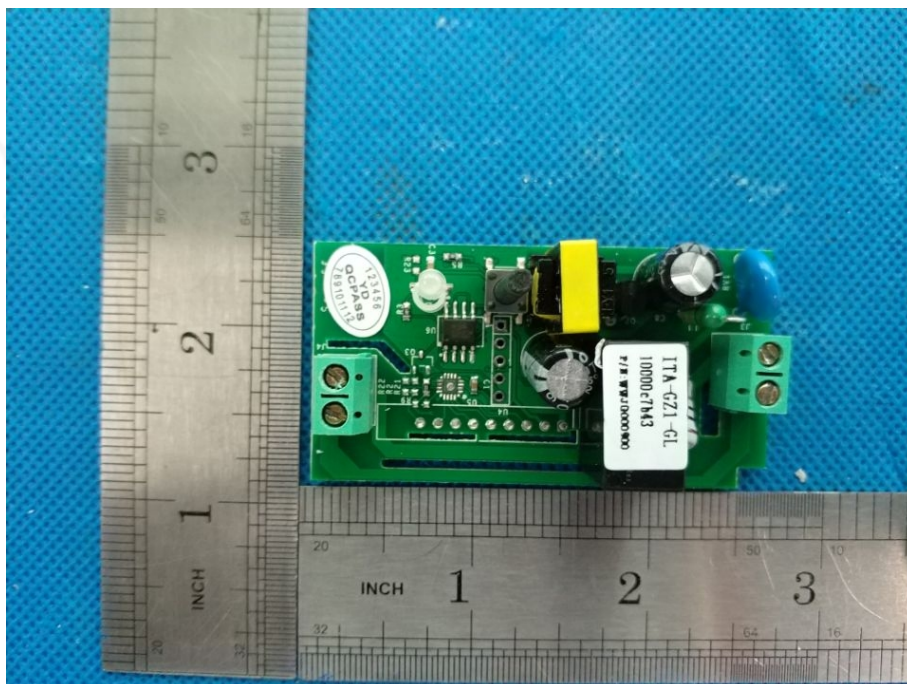


Fig.3

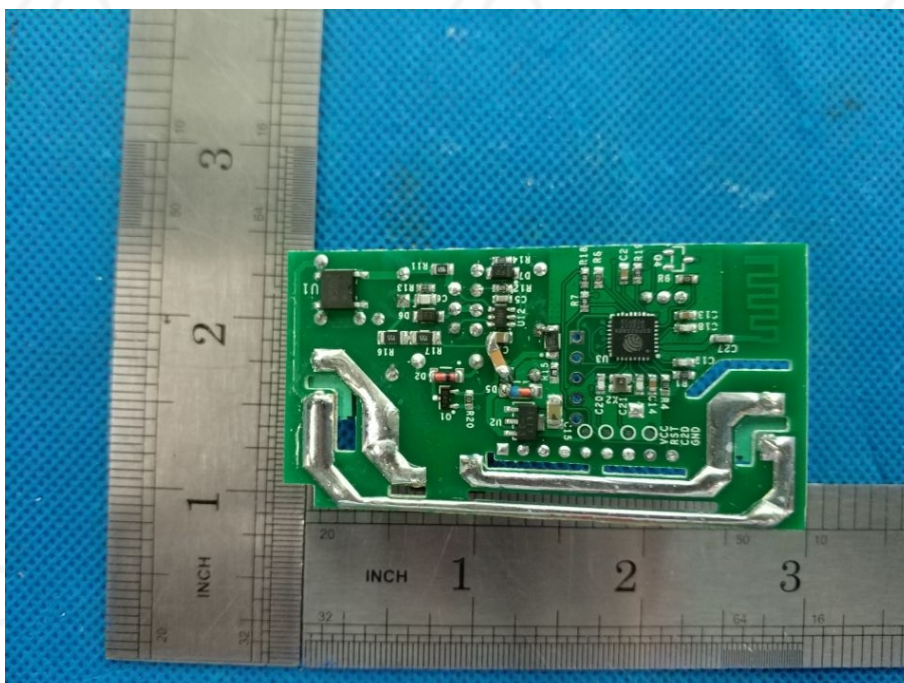


Fig.4

***** END OF REPORT *****