TEST Africa

The Leader in Safety Testing

Company :	**Audio Codes**
Sample :	G4 Smart, SB-RLY4c20A-DN / SB-RLY6c16A-DN / SB-RLY12c10A-DN / SB-RLY8c16a-DN, Relay Different Channel Switch
Specification:	IEC 60669-1:2007 IEC 60669-2-2:2006
Report Number:	WCT 12/1103A
Date of Re-Issue:	2012-11-14

The sample complied with all the requirements of the above-mentioned specification.

TEST Africa

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Test Report

IEC 60669-2-2: Particular requirements – Electromagnetic remote-control switches
Switches for household and similar fixed-electrical installations

REPORT # : WCT 12/1103A

CLIENT: *Audio Codes*
10 Armadale Street
Sydenham
2192
Attention: MrMarc Gelman
Order #: Marc
Date of Order: 04 September 2012

SAMPLE: *Relay Different Channel Switch*
TEST SPESIFICATION: *IEC60669-1:2007*
IEC 60669-2-2:2006
SUMMARY OF RESULTS: *Complied*
DATE STARTED: *2012-09-04*
DATE COMPLETED: *2012-10-19*
DATE OF ISSUE: *2012-10-19* **RE-ISSUED:** *2012-11-14*

TESTED: GH Holtzhausen (Technical Signatory)

APPROVED: LP Kuisis

NOTE:
" The South African National Accreditation System (SANAS) is a member of the International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement (MRA). This Arrangement allows for the mutual recognition of technical test and calibration data by the member accreditation bodies worldwide. For more information on the Arrangement please consult www.ilac.org."

1. DESCRIPTION OF SAMPLE

Manufacturer:	G4 Smart Group USA.
Model:	SB-RLY4c20A-DN/ SB-RLY6c16A-DN/ SB-RLY12c10A-DN/ SB-RLY8c16A-DN
Trade Name:	G4 Smart
Country of Origin	China
Rated Input:	Class II 20 A/ 16 A
Rated Voltage:	230 V ac 50/60 Hz

2. ABBREVIATIONS

TEST DOES NOT APPLY:	**N/A**
SAMPLE MEET REQUIREMENTS (COMPLY):	**C**
SAMPLE DOES NOT MEET REQUIREMENTS (FAIL):	**F**
NOT TESTED:	**N/T**

3. SYMBOLS

■ Tests are not included in the SANAS Accreditation Schedule for our laboratory.

▲ Results from sub-contracted tests

♦ Opinions and interpretations expressed herein are outside the scope of SANAS accreditation

4. GENERAL REMARKS

* Only a brief description of the requirements, measurements, etc. is given to indicate the nature of these. Consult the specification for details.
* The sections and subsections refer to in this report, are numbered as the test specification.
* This document shall not be reproduced in full unless approved by T.E.S.T. *Africa*.
* For sample identification, please see Appendix 1.

5. TEST CONDITIONS

Climatic conditions that prevailed during tests:

	Maximum	Minimum	Limits
Ambient temperature	25 °C	20 °C	25 °C ± 5 °C
Relative humidity	65 %	46 %	Below 75 % RH

6. COMMENTS

Complete unit submitted.
Two model numbers were added to the report without the need for any testing.

IEC 60669-2-2			
Clause	Requirement - Test	Result - Remark	Verdict
8	**MARKING**		C
8.1	Switches marked with:		C
	- rated voltage (V) ..... :	230	C
	- rated current (A) or rated load (VA or W) ..... :	20 A/ 16 A	C
	- symbol for nature of supply ..... :	AC	C
	- manufacturer's or responsible vendor's name, trade mark or identification mark ..... :	G4 Smart	C
	- type reference ..... :	SB-RLY4c20A-DN/ SB-RLY6c16A-DN/ SB-RLY12c10A-DN/ SB-RLY8c16A-DN	C
	- symbol for mini-gap construction (m) ..... :		N/A
	- symbol for micro-gap construction (μ) ..... :		N/A
	- symbol for semiconductor switching device (under consideration)		N.A
	- first IP characteristic numeral, if declared higher than 2, in which case the second characteristic numeral is also marked ..... :	IP – Ordinary	N/A
	- second IP characteristic numeral, if declared higher than 0, in which case the first characteristic numeral is also marked ..... :	IP – Ordinary	N/A
	- rated frequency (Hz) ..... :	50 Hz	C
	- rating and type of any fuse incorporated .....:	None	N/A
	- symbol for kind of load (see 8.2)	Not Specified	N/A
	- 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) .....:		N/A
	Switches with screwless terminals: marked with an indication of the suitability to accept rigid conductors only (if any) ..... :		N/A
8.2	Symbols used: as required in the standard		C
	Marking for the nature of supply placed next to the marking for rated current and rated voltage		C
	Other particular symbols used are explained in the installation instructions		C
8.3	Marking of electronic switch placed on the main part:		C
	- 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)	20 A/ 16 A	C
	- either the name, trade mark, or identification mark of the manufacturer or of the responsible vendor	Clearly Marked	C

IEC 60669-2-2			
Clause	Requirement - Test	Result - Remark	Verdict
	- length of insulation to be removed, if any		N/A
	- symbol for mini-gap construction, micro-gap construction or semiconductor switching device, if applicable		N/A
	- type reference	Marked	C
	Information concerning more than one type of load not already marked on the electronic switch are stated in the accompanying instruction sheet		N/A
	Minimum and maximum current/load are stated for each type of load	Not Stated	N/A
	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		N/A
	IP code, when applicable, marked so as to be easily discernible when the switch is mounted and wired as in normal use		N/A
	Marking clearly visible and easily legible		C
	Markings not placed on parts removable without the use of a tool		C
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	By Design	C
	Indications not placed on screws or other easily removable part		C
	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		C
	Installation not made clear by the markings: a wiring diagram is provided with each electronic switch	By Design	C
8.5	Neutral terminals: N ..... :	Marked	C
	Earthing terminals: [earth symbol] ..... :	No Earthing	N/A
	Markings not placed on screws or other easily removable parts		C
	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

IEC 60669-2-2			
Clause	Requirement - Test	Result - Remark	Verdict
	- indicated in a wiring diagram fixed to the accessory		N/A
	Identification of equipment terminals may be achieved by:		C
	- their marking with graphical symbols according to IEC 60417 or colours and/or alphanumeric system, or		N/A
	- their physical dimension or relative location		C
8.6	Switches of pattern numbers 2, 3, 03 and switches with Vn > 250 V or In > 16 A are marked to indicate the switch position: direction of movement of the actuating member to its different positions or the actual switch position, 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	Fixed	C
	Symbols for "on" and "off" not used for indication of switch positions unless clearly indicate the direction of movement of the actuating members		C
	Off-state not marked with an "O" if the circuit on the load side is considered as live		C
8.7	Red colour only for push-button to open the circuit	No Push Button	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	Instruction sheet	C
	Electronic switch containing a viewing window (lens) intended to be mounted at a height greater 1.7 m: information stated in the instruction sheet		N/A
8.9	Marking durable and easily legible. Test: 15 s with water and 15 s with petroleum spirit		C

9	**CHECKING OF DIMENSIONS**		C
	Switches and boxes comply with the appropriate standard sheets, if any	No Standard Sheets	N/A
	Electronic switches with dimensions other than those specified in the standard sheets (if any) if they are supplied with suitable boxes	Suitable Box	C

10	**PROTECTION AGAINST ELECTRIC SHOCK**		C
10.1	Switches: live parts not accessible	Enclosed	C
	Switches designed to be fitted with pilot lights supplied at voltages other than ELV have means to prevent direct contact with the lamp	No Pilot Light	N/A

IEC 60669-2-2			
Clause	Requirement - Test	Result - Remark	Verdict
	Test with standard test finger shown in figure 1 of IEC 60529		C
	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)	No Hazard	C
	Test probe applied to:		C
	- thin-walled knock-outs with a force of 10 N		C
	- viewing windows or the like on electronic switches intended to be mounted at a height > 1,7 m with a force of 30 N		N/A
	During the test: switches not deform and no live parts accessible		C
10.2	Knobs, operating levers, push buttons, rockers and the like: of insulating material, unless:		N/A
	- accessible metal parts separated from metal parts of mechanism by double or reinforced insulation, or		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 in Design	N/A
	Accessible parts (for example, sensing surface) of electronic switches with IPX0 are connected to live parts by means of a protective impedance that:		N/A
	- consists of at least two independent resistors or independent capacitors in series of the same nominal value, or a combination of both		N/A
	- resistors comply with 102.3		N/A
	- capacitors comply with 102.2		N/A
	The removal of protective impedance is only possible by destruction of the electronic switch or by rendering it unusable		N/A
	Test carried out between accessible metal parts and earth, through a non-inductive resistor of 2 kΩ:		N/A
	current measured: ≤ 0,7 mA (peak value), for a.c. up to 1 kHz .....:		N/A
	current measured: ≤ 0,7 mA multiplied by the value of frequency in kHz, but not exceed 70 mA, for a.c. above 1 kHz .....:		N/A
	current measured: ≤ 2 mA, for d.c. .....:		N/A
10.3	Accessible parts of switches with In ≤ 16 A: made of insulating material		C
10.3.1	Metal covers or cover plates protected by supplementary insulation made by insulating linings or insulating barriers	No Metal Covers	N/A
	Insulating linings or insulating barriers:		N/A

IEC 60669-2-2			
Clause	Requirement - Test	Result - Remark	Verdict
	- 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	No Earthing	N/A
10.4	Metal parts of mechanism not insulated from live parts: not protrude from enclosure	All Insulated	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		C
	- separated from live parts (creepage distances and clearances have at least twice the value specified in clause 23), or		C
	- reliably connected to earth		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		C
	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		C
10.7	Cord-operated switches: impossible to touch live parts when fitting or replacing the pull cord		N/A

11	**PROVISION FOR EARTHING**		N/A
	Clause not applicable to SELV electronic switches		N/A
11.1	Accessible metal parts: provided with, or permanently and reliably connected to, an earthing terminal		N/A
11.2	Earthing terminals: with screw clamping or screwless terminals and comply with clause 12		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

IEC 60669-2-2			
Clause	Requirement - Test	Result - Remark	Verdict
	- 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**		C
12.1	General		C
	Switches provided with screw-type terminals or with screwless terminals ..... :	Screw-type	C
	Clamping means of terminals: not serve to fix any other components		C
	All the test on terminals, with the exception of the test of 12.3 11, made after the test of 15.1	Noted	C
12.2	Terminals with screw clamping for external copper conductors		C
12.2.1	Switches provided with terminals which allows the proper connection of copper conductors as shows in table 2		C
	Rated current (A) ..... :	20/ 16	—
	Type of conductor (rigid / flexible) ..... :	Rigid	—
	Smallest / largest cross-sectional area (mm^2) ..... :	2,5 – 6,0/ 1,5 – 4,0	—
	Diameter of largest conductor (mm) ..... :	3,34/ 2,72	—
	Figure of terminal ..... :		—
	Minimum diameter D (minimum dimensions) of conductor space: required (mm); measured (mm) .. :	2,5 x 4,5/ 2,7 x 4,6	C
12.2.2	Terminals allow the conductor to be connected without special preparation		C
12.2.3	Terminals have adequate mechanical strength		C
	Screws and nut for clamping the conductors have metric ISO thread or a comparable thread		C
	Screws not of soft metal such as zinc or aluminium		C
12.2.4	Terminals resistant to corrosion		C
12.2.5	Screw-type terminals clamp the conductor(s) without undue damage	See appended table 12.2.5	C
	During the test: conductor not slip out, no break near clamping unit and no damage		C
12.2.6	Terminals clamp the conductor reliably between metal surfaces	See appended table 12.2.6	C
	During the test: conductor not move noticeably		C

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Clause	Requirement - Test	Result - Remark	Verdict
12.2.7	Terminals designed or placed that the conductor cannot slip out while the clamping screws or nuts are tightened	See appended table 12.2.7	C
	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		C
12.2.8	Terminals not work loose from their fixing to the switch		C
	Torque test:		C
	- rated current (A) ..... :	20/ 16	—
	- solid rigid copper conductor of the largest cross-sectional area (mm²) (table 2) ..... :	3,34/ 2,72	—
	- torque (Nm) (table 3 or appropriate figures 1, 2, 3, 4) ..... :	0,5	—
	Screws and nuts tightened and loosened 5 times. During the test: terminals not work loose and show no damage		C
12.2.9	Clamping screws or nuts of earthing terminals: adequately locked against accidental loosening, not possible to loosen them without the aid of a tool		N/A
12.2.10	Earthing terminals: no risk of corrosion		N/A
	Body of brass or other metal no less resistant to corrosion		N/A
	If the body is a part of a frame or enclosure of aluminium alloy, precautions are taken to avoid the risk of corrosion		N/A
12.2.11	Pillar terminals: distance g no less than the value specified in figure 1: required (mm); measured (mm) ..... :	1,5/ 1,51	C
	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
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

IEC 60669-2-2			
Clause	Requirement - Test	Result - Remark	Verdict
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);		N/A
	- during disconnection, conductors can be disconnected either at the same time or separately;		N/A
	- each conductor introduced in a separate clamping unit.		N/A
	It is possible clamp securely any number of conductors up to the maximum as designed. Number of conductors; Nominal cross-sectional area (mm^2) ..... :		N/A
12.3.8	Screwless terminals: adequate insertion obvious and over-insertion prevented		N/A
	Screwless terminals of switches: undue insertion of the conductor prevented by a stop if further insertion is liable to reduce creepage distances and/or clearances required in table 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

IEC 60669-2-2			
Clause	Requirement - Test	Result - Remark	Verdict
	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	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 10	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
	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**		C
13.1	Insulating lining, barriers and like: adequate mechanical strength and secured in a reliable manner		C
13.2	Switches constructed so as to permit:		C
	- easy introduction and connection of the conductors in the terminals;		C
	- correct positioning of the conductors		C
	- easy fixing of the switch to a wall or in a box		C
	- 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)		C
	Surface-type switches: fixing means do not damage insulation of the cable		N/A

IEC 60669-2-2			
Clause	Requirement - Test	Result - Remark	Verdict
	Switches classified as design A: permit easy positioning and removal of the cover or cover plate, without displacing the conductors		N/A
13.3	Covers, cover-plates and actuating members or parts of them intended to ensure protection against electric shock:		C
	- held in place at two or more points by effective fixings		C
	- 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)		N/A
	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		C
13.3.1	Covers, cover plates or actuating members whose fixing is of the screw-type:		C
	Compliance checked by inspection only		C
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:		C
	Compliance checked, when their removal may give access, with the standard test finger:		C
	to live parts: by the test of 20.4 (verification of the non-removal and the removal)		C
	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)		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)		N/A
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:		C
	Compliance checked, when their removal may give access, with the standard test finger:		C
	to live parts: by the test of 20.4 (verification of the non-removal only)		C
	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

IEC 60669-2-2			
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		C
	Free openings according to 10.102 and 10.103 are accepted		C
13.5	Knobs of electronic switches are securely fixed in a reliable manner		N/A
	knobs used to indicate the position of switches: not possible to fix them in a wrong position, if this may result in a hazard		N/A
	Pull and push tests:		N/A
	- 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.	Din Rail	C
	Fixing means not serve any other fixing purpose		C
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
13.9	Surface-type switches with IP > 20 are in according to their classification when fitted with conduits or with sheathed cables		N/A
	Surface-type switches with IPX4 or IPX5 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

IEC 60669-2-2			
Clause	Requirement - Test	Result - Remark	Verdict
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		N/A
	Base have adequate stability when mounted in the box		N/A
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		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		N/A
	Surface-type switches: intended conduit or protective covering can enter at least 1 mm into the enclosure		N/A
	Inlet openings for conduit entries of surface-type switches: capable of accepting conduit sizes of 16, 20, 25 or 32 or a combination of at least two of these sizes not excluding two of the same size ..... :		N/A
	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) ..... :		N/A
13.13	Surface-type switches: provision for back entry (if are intended)		N/A
13.14	Membranes or the like (if provided): replaceable		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 °C ± 2 °C for 2 h; force of 30 N applied for 5 s by means of the tip of test probe 11 of IEC 61032. During these tests: membranes, lenses and the like are not deformed, live parts not accessible		N/A
	Membranes, lenses and the like likely to be subjected to an axial pull: 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

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Clause	Requirement - Test	Result - Remark	Verdict
	Switches kept at -5 °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 ..... :	Fixed Installation	N/A
	Maximum dimension of flexible cable having conductors specified in table 12a accepted by the entry:		N/A
	- rated current (A) ..... :		—
	- cross-sectional area (mm²) (min 1,5 mm²) ..... :		—
	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 mm² ..... :		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 mm²; torque (Nm) (2/3 table 3) ..... :		N/A
	Torque test: torque 0,15 Nm for 1 min, cable not displaced > 2 mm ..... :		N/A

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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	Transformers intended for SELV circuits, safety isolating type and comply with IEC 61558-2-6		N/A
14	**MECHANISM**		C
	Clause only applicable to electronic switches provided with mechanical switching devices		C
14.1	Actuating member of a switch, when released, automatically take up the position corresponding to that of moving contacts		C
14.2	Moving contact of switches can come to rest only in "on" and "off" positions		N/A
	Intermediate position permissible if:		N/A
	- it corresponds to the intermediate position of the actuating member, and		N/A
	- the insulation between fixed and moving contacts is adequate. Electric strength test as specified in 16.2: test voltage a.c. for 1 min (V) ..... :	500 V / 750 V / 1250 V / 2000 V	N/A
14.3	No undue arcing in slowly operation		C
	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		C
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:		N/A
	- 45 N applied vertically, and		N/A
	- 65 N applied at 45° ± 5°		N/A
14.101	Position for hand-operated device indicated clearly and without ambiguity	No Such Switch	N/A

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Clause	Requirement - Test	Result - Remark	Verdict
15	**RESISTANCE TO AGEING, PROTECTION PROVIDED BY ENCLOSURES OF SWITCHES, AND RESISTANCE TO HUMIDITY**		C
15.1	Resistance to ageing		C
	Switches and boxes placed for 7 days (168 h) in a heating cabinet at 70 °C ± 2 °C		C
	- no crack visible after test with normal or corrected vision without additional magnification		C
	- no sticky or greasy material as a result of heat		C
	- no trace of cloth (forefinger pressed with 5 N)		C
	- no other damage as a result of heat		C
15.2	Protection provided by enclosures of switches		C
15.2.1	Protection against access to hazardous parts and against harmful effects due to ingress of solid foreign objects		C
	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		C
	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		C
	Appropriate test according to IEC 60529 ..... :	IP - Enclosed	C
15.2.1.2	Protection against harmful effects due to ingress of solid foreign objects		C
	Appropriate test according to IEC 60529 ..... :	IP	C
	Dust not penetrate in quantity to interfere with satisfactory operation or to impair safety		C
15.2.2	Protection against harmful effects due to ingress of water		C
	Enclosure of switches provide a degree of protection against harmful effects due to ingress of water in accordance with their IP classification	By Design & Placement	C
	Appropriate test according to IEC 60529 ..... :	Ordinary	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		C

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Clause	Requirement - Test	Result - Remark	Verdict
	Switches proof against humidity which may occur in normal use		C
	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:		C
	- 2 days (48 h) for switches with IPX0		C
	- 7 days (168 h) for switches with IP>X0		N/A
	After this treatment: specimens show no damage		C
16	**INSULATION RESISTANCE AND ELECTRIC STRENGTH**		C
16.1	The insulation resistance measured 1 min after application of 500 V d.c.	See appended table 16.1	C
16.2	Electric strength: a.c. test voltage applied for 1 min	See appended table 16.2	C
17	**TEMPERATURE RISE**		C
17.1	Switches so constructed that the temperature rise in normal use is not excessive		C
	No oxidation or any other deterioration of contacts, if any		C
	Material and components of electronic switch are not adversely effected by the temperature rise in normal use		C
	During the test:		C
	- electronic switch state not change		C
	- fuses and other protective devices not operate		C
	- permissible temperature rises determined in table 102, column concerning clause 17, not exceeded	See appended table 17	C
	After the test, electronic switch is in operating condition		C
	Sealing compounds, if any, have not flowed		C

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Clause	Requirement - Test	Result - Remark	Verdict
18	**MAKING AND BREAKING CAPACITY**		C
	Electronic switches have adequate making and breaking capacity		C
	Test carried out only on electronic switches provided with mechanically or electromechanically operated contact mechanisms		C
	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 ..... :	1	—
	Rated current (A) / Rated load (W or VA) ..... :	20 / 16	—
	Rated voltage (V) ..... :	230	—
	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.		C
	Rate of operation (operation per minute) ..... :	6	—
	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 Vn) (V) ..... :		—
	- test current (1,25 In) (cos φ 0,3) (A) ..... :		—
	- 200 operations; rate (operations per minute) ..... :		—
	- 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 ± 0,5) s ..... :		—

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Clause	Requirement - Test	Result - Remark	Verdict
	- 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 In ≤ 16 A / Vn ≤ 250 V and switches of pattern numbers 3 and 03 with Vn > 250 V)		N/A
	- test voltage (Vn) (V) ..... :		—
	- test current (≥ 1,2 In) (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
19	**NORMAL OPERATION**		C
	Electronic switches withstand the mechanical, electrical and thermal stresses occurring in normal use		C
	Electronic switches whose cycle of operation is limited by their application: rate of operation specified by the manufacturer (operation per minute) ..... :	6	—
19.101	RCS energized by impulses operate as intended at control voltage between 0,9 and 1,1 times the rated value as declared by Manufacturer		N/A
19.102	Permanently energized RCS operate as intended at any value between 85 % and 110 % of rated control voltage		C
20	**MECHANICAL STRENGTH**		C
	Switches, boxes and screwed glands have adequate mechanical strength		C
20.1	For all types of switches and for boxes: impact test (9 blows)	See appended table 20.1	C
	After the test: no damage, live parts no become accessible		C
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) ..... :	0,5 Nm / 1,2 Nm	—
	During and after the test: bases show no damage		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
20.3	Screwed glands of switches other than ordinary: torque test		N/A
	- diameter of cylindrical metal test rod (mm) ..... :		—
	- type of material ..... :	metal / moulded 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)		C
20.4.1	Verification of the non-removal of covers, cover-plates or actuating member		C
	Force applied for 1 min in direction perpendicular to the mounting surface ..... :	40 N / 80 N	—
	Covers, cover-plates or actuating members not come off		C
	Test repeated on new specimens with a sheet of hard material, 1 mm ± 0,1 mm thick, fitted around the supporting frame (fig. 19)		C
	Covers, cover-plates or actuating members not come off		C
	After the test: no damage		C
20.4.2	Verification of the removal of covers, cover-plates or actuating members		C
	Force not exceeding 120 N applied 10 times in direction perpendicular to the mounting / supporting surface: covers, cover-plates or actuating members come off		C
	Test repeated on new specimens with a sheet of hard material, 1 mm ± 0,1 mm thick, fitted around the supporting frame (fig. 19)		C
	Covers, cover-plates or actuating members come off		N/A
	After the test: no damage		N/A
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)		N/A
20.4.1	Verification of the non-removal of covers, cover-plates or actuating members		N/A
	Force applied for 1 min in direction perpendicular to the mounting surface ..... :	10 N / 20 N	—
	Covers or cover-plates not 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. 19)		N/A
	Covers, cover-plates or actuating members not come off		N/A
	After the test: no damage		N/A
20.4.2	Verification of the removal of covers, cover-plates or actuating members		N/A

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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		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. 19)		N/A
	Covers, cover-plates or actuating members come off		N/A
	After the test: no damage		N/A
20.4.1	Verification of the non-removal of covers, cover-plates or actuating members		N/A
	Force 10 N applied for 1 min in direction perpendicular to the mounting surface: covers, cover-plates or actuating members not 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. 19)		N/A
	Covers, cover-plates or actuating members not come off		N/A
	After the test: no damage		N/A
20.4.2	Verification of the removal of covers, cover-plates or actuating members		N/A
	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. 19)		N/A
	Covers, cover-plates or actuating members come off		N/A
	After the test: no damage		N/A
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)		N/A
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 ..... :	complying / not complying	—
20.8	Test with gauge according to figure 23 applied as shown in figure 24 (1 N): gauge not enter more than 1mm ..... :	complying / not complying	—
20.9	Operating members of cord-operated switch have adequate strength		N/A
	Pull test: pull 100 N for 1 min (normal use); pull of 50 N for 1 min (unfavourable direction). After the test:		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
	- switch show no damage		N/A
	- operating member not broken and cord-operated switch still operate		N/A
21	**RESISTANCE TO HEAT**		C
21.1	Switches kept for 1 h in a heating cabinet at a temperature of 100 °C ± 2 °C		C
	During the test: no change impairing their further use and sealing compound, if any, not flow		C
	After the test: no access to live parts, markings still legible		C
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 °C)	See appended table 21.2	N/A
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 21.3	C
22	**SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS**		C
22.1	Connections withstand mechanical stresses		C
	Thread-forming or thread-cutting screws used only if supplied together with the piece in which they are intended to be inserted		C
	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		C
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:		C
	- copper;		C
	- 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

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Clause	Requirement - Test	Result - Remark	Verdict
	- 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
	Current-carrying parts subjected to mechanical wear: not of steel with electroplated coating		C
	Metals having a great difference of electrochemical potential: not used in contact with each other		C
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**		C
	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		C
	Electronic switches without directly associated fuse or other current-limiting means: comply with table 20		N/A
23.1	Creepage distances, clearances and distances through sealing compound no less than the values shown in table 20	See appended table 23.1	C
23.2	Insulating compound: not protrude above the edge of the cavity in which it is contained		C
23.101	RCS with control circuit suitable for connection to SELV supply, switching circuit supplied with a voltage greater than SELV, creepage distances and clearances between control and switching circuit not less than 6 mm		N/A
23.102	Wire enamel at least Grade 1 according to IEC 60317, the clearances between the wire of the control coil, live parts of different polarity and the exposed conductive parts reduced to 2/3 of clearances in absense of enamel		N/A

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Clause	Requirement - Test	Result - Remark	Verdict
24	**RESISTANCE OF INSULATING MATERIAL TO ABNORMAL HEAT, TO FIRE AND TO TRACKING**		C
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		C
24.1.1	Glow-wire test according to IEC 60695-2-1	See appended table 24.1.1	C
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	See appended table 24.2	N/A
25	**RESISTANCE TO RUSTING**		C
	Ferrous parts protected against rusting	Enclosed	N/A
	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:		N/A
	No signs of rust		N/A
26	**EMC REQUIREMENTS**		N/A
26.1	Immunity		N/A
26.2	Emission		N/A
101	**ABNORMAL CONDITIONS**		C
	Electronic switches do not create hazard under abnormal conditions		C

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Clause	Requirement - Test	Result - Remark	Verdict

12.2.5	**TABLE: test with apparatus shown in figure 10 (screw terminals)**		C
	rated current (A) ..... :	20/ 16	—
	type of conductors ..... :	rigid solid / rigid stranded	—
	smallest/largest cross-sectional area per table 2 (mm^2) ..... :	2,5 – 6,0/ 1,5 – 4,0	—
	number of conductors ..... :	3/ 3	—
	nominal diameter of thread (mm); torque per table 3 (Nm) ..... :	2,9	—

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

supplementary information:

12.2.6	**TABLE: pull test (screw terminals)**		C
	rated current (A) ..... :	20/ 16	—
	smallest/largest cross-sectional area per table 2 (mm^2) ..... :	2,5 – 6,0/ 1,5 – 4,0	—
	nominal diameter of thread (mm); torque 2/3 per table 3 (Nm) ..... :	0,33	—

Cross-sectional area (mm^2)	Number of conductors	Type of conductors (rigid solid / rigid stranded)	Pull per table 5 applied for 1 min (N)	Remarks
2,5	3	Rigid	50	Pass

supplementary information:

12.2.7	**TABLE: tightening test (screw terminals)**		C
	rated current (A) ..... :	20/ 16	—
	nominal diameter of thread (mm); torque 2/3 per table 3 (Nm) ..... :	0,33	—

Largest cross-sectional area per table 2 (mm^2)	Permissible number of conductors	Type of conductors (rigid solid / rigid stranded)	Number of wires and nominal diameter of wires per table 6	Remarks
2,72	3	Rigid	1 x 1,38	Pass
3,34	3	Rigid	1 x 1,78	Pass

supplementary information:

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Clause	Requirement - Test	Result - Remark	Verdict

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

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

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

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

supplementary information:

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

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

Test b)	Temperature cycles test) carried out on terminals subjected to Test a):		N/A
	test current per table 8 (A) ..... :		—
	nominal cross-sectional area (mm^2) ..... :		—
	allowed voltage drop (mV) ..... :	≤ 22,5 mV or 2 times 24th cycle value (mV)	—

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Clause	Requirement - Test	Result - Remark	Verdict

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

12.3.12	**TABLE: deflection test (principle of test apparatus shown in figure 11a)**		N/A
	Test carried out for 1 h connecting rigid solid conductors:		
	test current (A) (equal rated current) ..... :		—
	required voltage drop (mV) ..... :	≤ 25 mV	—

Type of conductor	Smallest			Largest			Remarks
cross-sectional area per table 9 (mm^2)							
force per table 10 (N)							
screwless terminal number	1	2	3	1	2	3	
starting point (X = deflection original point)	X	X+10°	X+20°	X	X+10°	X+20°	
voltage drop 1st deflection (mV)							
voltage drop 2nd deflection (mV)							
voltage drop 3rd deflection (mV)							
voltage drop 4th deflection (mV)							
voltage drop 5th deflection (mV)							
voltage drop 6th deflection (mV)							
voltage drop 7th deflection (mV)							
voltage drop 8th deflection (mV)							
voltage drop 9th deflection (mV)							
voltage drop 10th deflection (mV)							
voltage drop 11th deflection (mV)							
voltage drop 12th deflection (mV)							
supplementary information:							

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Clause	Requirement - Test	Result - Remark	Verdict

16.1	**TABLE: insulation resistance**		C
item per table 20	test voltage applied between:	measured (MΩ)	required (MΩ)
1	500	> 20	5
supplementary information:			

16.2	**TABLE: electric strength**		C
	rated voltage (V)..... :	240	—
item per table 20	test voltage applied between:	test voltage (V)	flashover / breakdown (Yes/No)
1	All poles and enclosure	2 000	No
3	Switch in off	2 000	No
supplementary information:			

17	**TABLE: temperature rise measurements**		C
	cross-sectional area of conductor not less than 1,5 mm^2 (mm^2) (table 15) ..... :	SB-RLY4c20A-DN - 2,5	—
	terminal screws: torque (Nm) (2/3 table 3 or appropriate figures 1, 2, 3, 4)..... :	0,33	—
	type of load ..... :	Resistive	—
	rated current (A) / rated load (W or VA) ..... :	20	—
	rated voltage (V) ..... :	230	—
	test voltage between 0,9 and 1,1 Vn (V), whichever is the more unfavourable ..... :	253	—
parts of the electronic switch		max. measured temperature rise (K)	permissible temperature rise (K)
Relay CH 2		9	85
Realy CH 3		11	85
Capacitor C 10		8	80 (105 – 25)
Capacitor C 2		7	80 (105 - 25)
IC D 4		8	No Limit

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Clause	Requirement - Test	Result - Remark	Verdict

Coil L 1	8	85
Capacitor C 6	8	80 (105 – 25)
Terminals	18	60
supplementary information:		

17	**TABLE: temperature rise measurements**		C
	cross-sectional area of conductor not less than 1,5 mm^2 (mm^2) (table 15) ..... :	SB-RLY8c16A-DN - 1,5	—
	terminal screws: torque (Nm) (2/3 table 3 or appropriate figures 1, 2, 3, 4)..... :	0,33	—
	type of load ..... :	Resistive	—
	rated current (A) / rated load (W or VA) ..... :	20	—
	rated voltage (V) ..... :	230	—
	test voltage between 0,9 and 1,1 Vn (V), whichever is the more unfavourable ..... :	253	—

parts of the electronic switch	max. measured temperature rise (K)	permissible temperature rise (K)
Relay CH 1	9	85
Realy CH 2	7	85
Capacitor C 10	5	80 (105 – 25)
Capacitor C 2	5	80 (105 - 25)
IC D 4	2	No Limit
Coil L 1	4	85
Capacitor C 6	6	80 (105 – 25)
Terminals	17	60
supplementary information:		

19	**TABLE: reduced electric strength after normal operation**		N/A
item per table 20	test voltage applied between:	test voltage (V)	flashover / breakdown (Yes/No)
	TABLE: temperature rise measurements after normal operation		N/A

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

	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 Vn (V), whichever is the more unfavourable ..... :		—

parts of the electronic switch	max. measured temperature rise (K)	permissible temperature rise (K)
supplementary information:		

20.1	**TABLE: impact test**			C
part of enclosure tested per table 18 (A, B, C, D)	blows per part	height of fall (mm)	Comments	
A	10	100	Pass	
B	5	200	Pass	
supplementary information:				

21.2	**TABLE: ball pressure test of thermoplastic materials**			C
	allowed impression diameter (mm) ..... :	≤ 2 mm		—
part under test	material designation / manufacturer	test temperature (°C)	impression diameter (mm)	
Terminals	Thermoplastic	125	0,5	
supplementary information:				

21.3	**TABLE: ball pressure test of thermoplastic materials**			C
	allowed impression diameter (mm) ..... :	≤ 2 mm		—
part under test	material designation / manufacturer	test temperature (°C) (1)	Impression diameter (mm)	
Enclosure		70	0,2	
supplementary information: (1) 70 °C / 40 °C + highest temperature rise determined during the test of clause 17				

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Clause	Requirement - Test	Result - Remark	Verdict

22.1	**TABLE: threaded part torque test**				C
threaded part identification	diameter of thread (mm)	column number (I, II, or III)	applied torque (Nm)	times (5/10)	no damage
Terminals	2,98	II	0,5	10	Pass
supplementary information:					

23.1	**TABLE: creepage distances, clearances and distances through sealing compound**						N/A
	rated voltage (V) ..... :						—
item per table 20	creepage distance dcr, clearance cl and distance through sealing compound dtsc at/of:	required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)	required dtsc (mm)	dtsc (mm)
		≥		≥		≥	
		≥		≥		≥	
supplementary information:							

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Clause	Requirement - Test	Result - Remark	Verdict

24.1.1	**TABLE: glow-wire test**		C
part under test	material designation / manufacturer	test temperature (°C)	Remarks
Enclosure		650	Pass
supplementary information:			

24.2	**TABLE: resistance to tracking**		C
	number of drops ..... :	50	—
part under test	material designation / manufacturer	test voltage (V)	flashover / breakdown (Yes/No)
PCB	V-0	175	No
supplementary information:			

101.1.1.1	**TABLE: fault conditions test**		C
	cross-sectional area of conductor not less than 1,5 mm^2 (mm^2) (table 15)	1,5	—
	terminal screws: torque (Nm) (2/3 table 3 or appropriate figures 1, 2, 3, 4).....	-	—
	type of load	Resistive	—
	rated current (A) / rated load (W or VA)	1,5	—
	rated voltage (V)	240	—
	test voltage between 0,9 and 1,1 Vn (V), whichever is the more unfavourable	264	—
fault conditions simulated		remarks	verdict
Creepage distance – short circuit		No Hazard	C
	TABLE: temperature rise measurements		C
	temperature measured after (min)		—
parts of the electronic switch		Max. measured temperature rise (K)	Permissible temperature rise (K)
	TABLE: additional temperature rise measurements in case of temperature limited by a fuse		N/A
	current under the relevant fault conditions measured with the fuse short-circuited (A)		—
	type of fuse as specified by IEC 60127		—

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Clause	Requirement - Test	Result - Remark	Verdict

	test duration corresponding to the maximum fusing time corresponding to the current measured (min)		—

parts of the electronic switch	max. measured temperature rise (K)	permissible temperature rise (K)

supplementary information:

101.1.1.2	**TABLE: temperature rise measurements during overload tests**		C
	cross-sectional area of conductor not less than 1,5 mm^2 (mm^2) (table 15)	2,5	—
	terminal screws: torque (Nm) (2/3 table 3 or appropriate figures 1, 2, 3, 4).....	-	—
	rated voltage (V)	240	—
	test voltage between 0,9 and 1,1 Vn (V), whichever is the more unfavourable	264	—

parts of the electronic switch	max. measured temperature rise (K)	permissible temperature rise (K)
Enclosure	36	65

supplementary information:

101	**TABLE: components**				C
object/part No.	manufacturer/ trademark	type/model	technical data	compliance to standard	mark(s) of conformity[1])
Terminals	CNNT	ERTB5-762	-	-	UL
SB-RLY4c20-DN					
Relay	CHF	HFE19-90	90 A 250 VAC	-	Tested in Sample
SB-RLY8c16-DN					
Relay	CHF	JE10-2	50 A 277 VAC	-	CQC; UL
[1]) an asterisk indicates a mark which assures the agreed level of surveillance					

END OF TEST REPORT

Appendix 1

Report number :WCT 12/1103A	Page 1 of 6
Trading name :G4 SMART	
Model number :SEE PAGE 2 OF TEST REPORT	
Figure 1 :Front view - SB-RLY4c20A-DN	
Figure 2 :Internal layout 1 - SB-RLY4c20A-DN	
Figure 3 :Internal layout 2 - SB-RLY4c20A-DN	
Figure 4 :Internal layout 3 - SB-RLY4c20A-DN	
Figure 5 :Marking - SB-RLY4c20A-DN	
Figure 6 : Front view - SB-RLY8c16A-DN	
Figure 7 : Internal layout 1 - SB-RLY8c16A-DN	
Figure 8 : Internal layout 2 - SB-RLY8c16A-DN	
Figure 9 : Internal layout 3 - SB-RLY8c16A-DN	
Figure 10 : Marking - SB-RLY8c16A-DN	

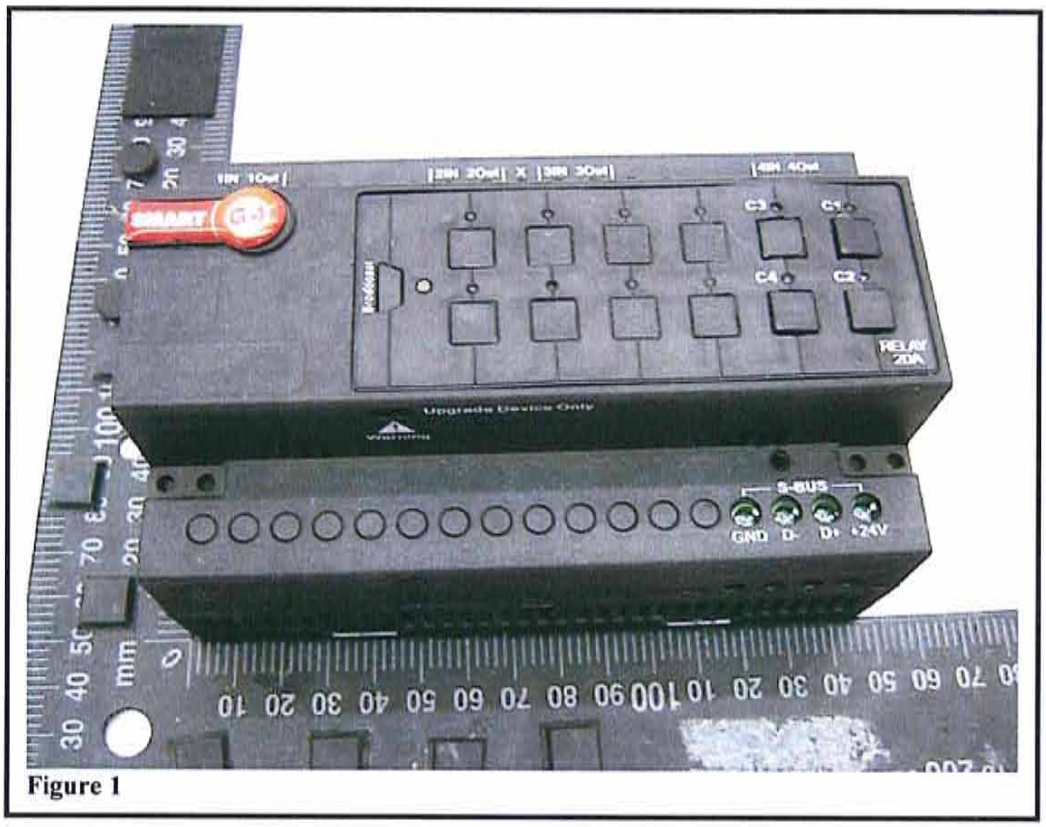

Figure 1

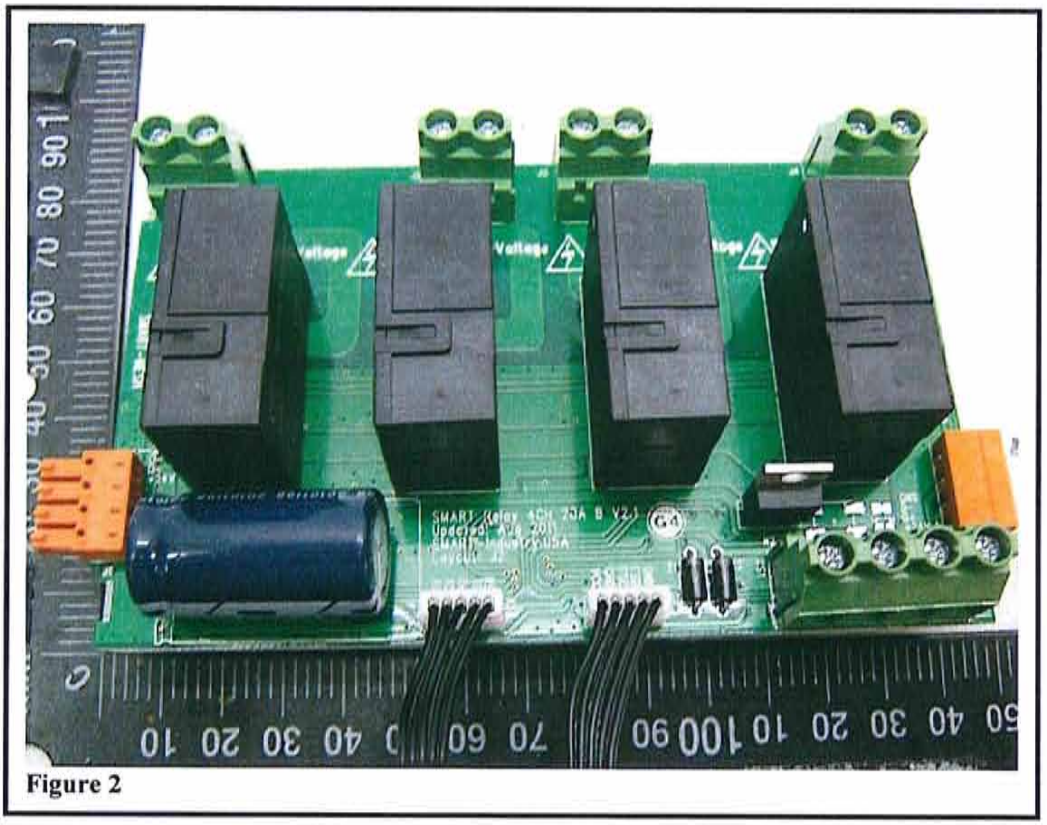

Figure 2

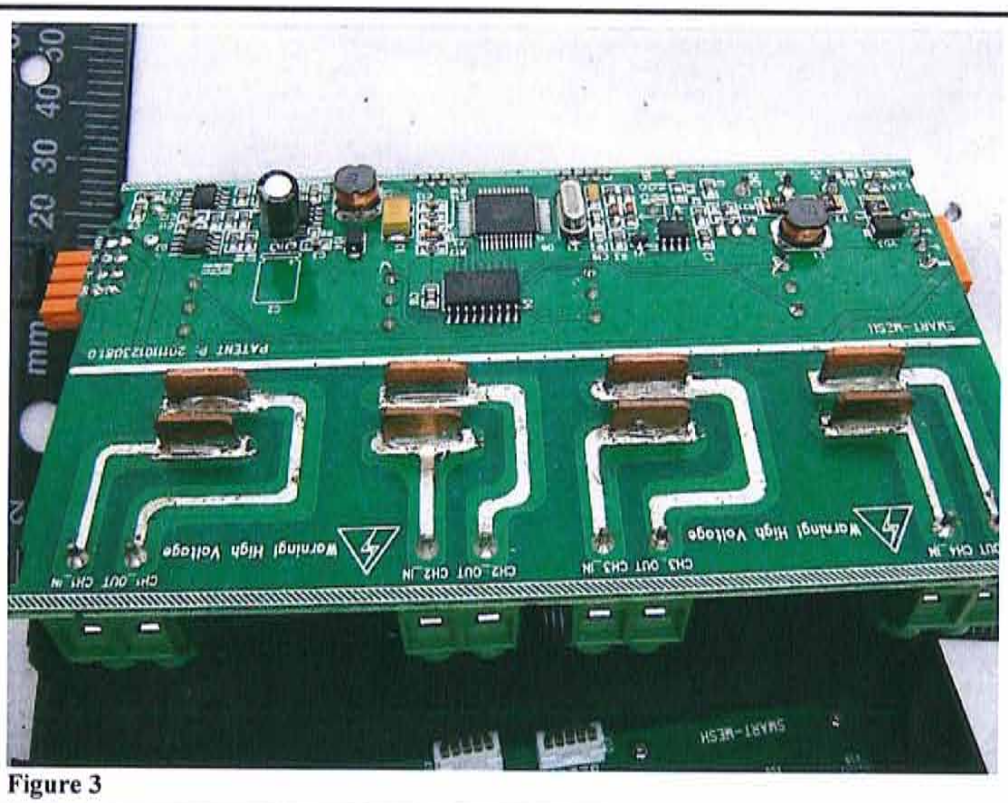

Figure 3

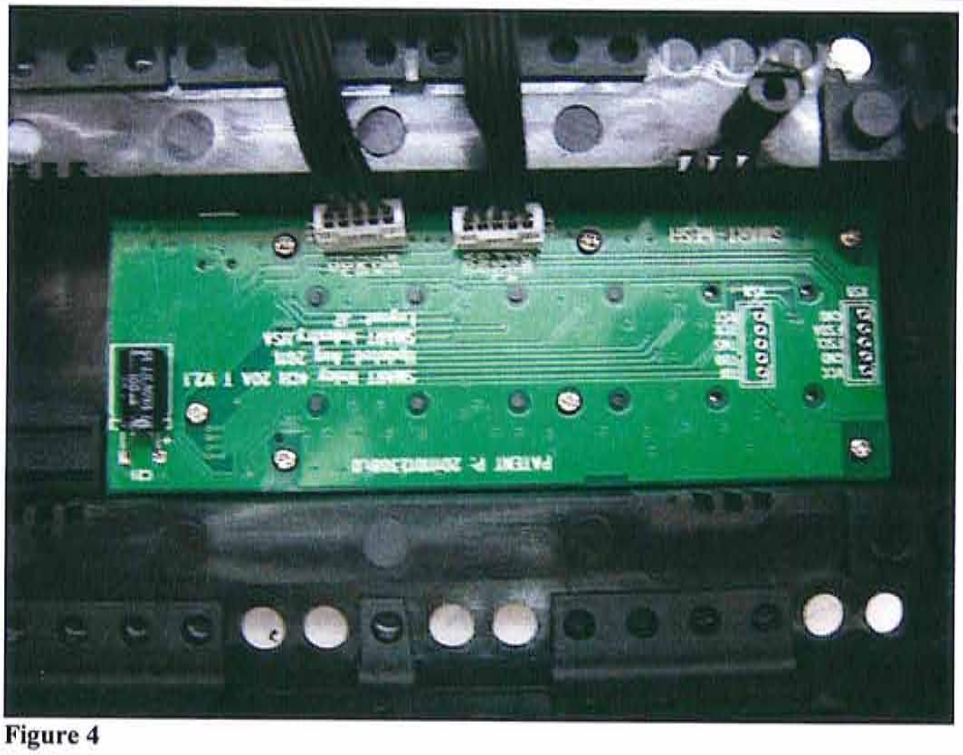

Figure 4

Figure 5

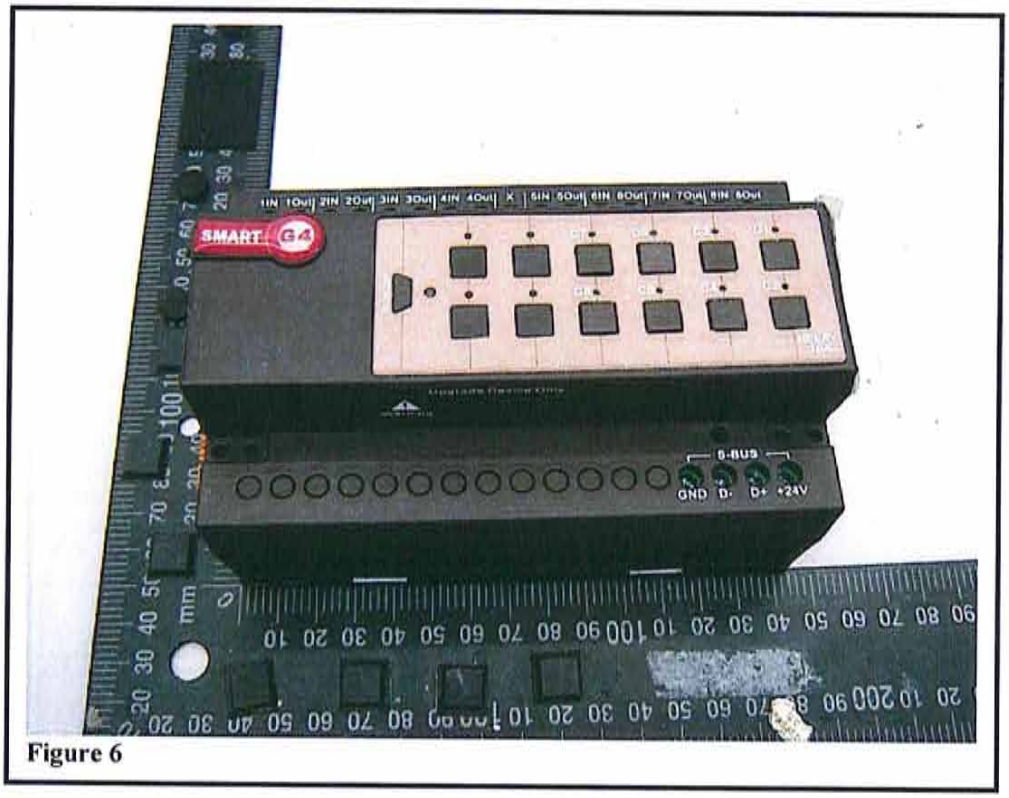

Figure 6

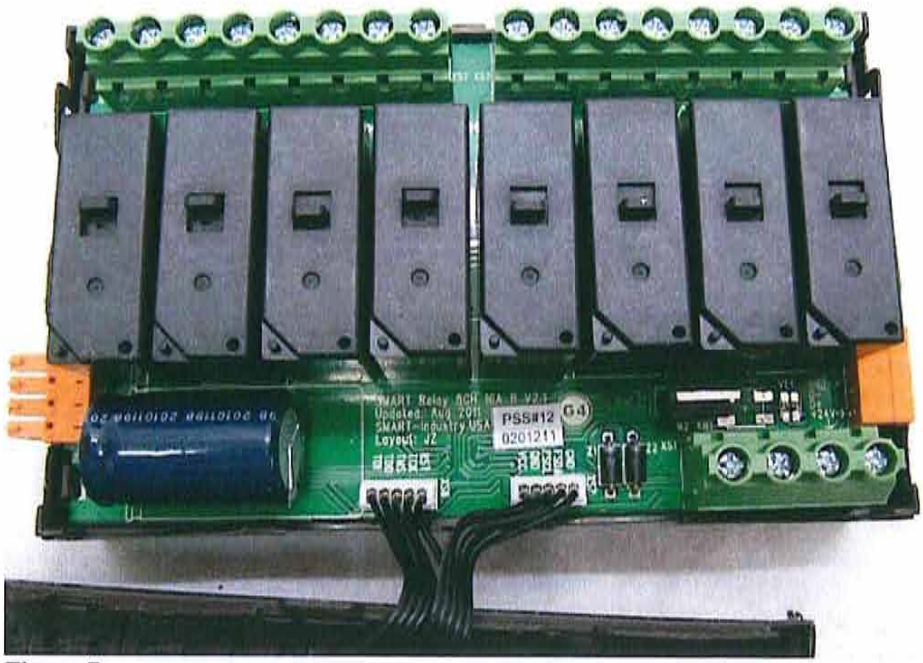

Figure 7

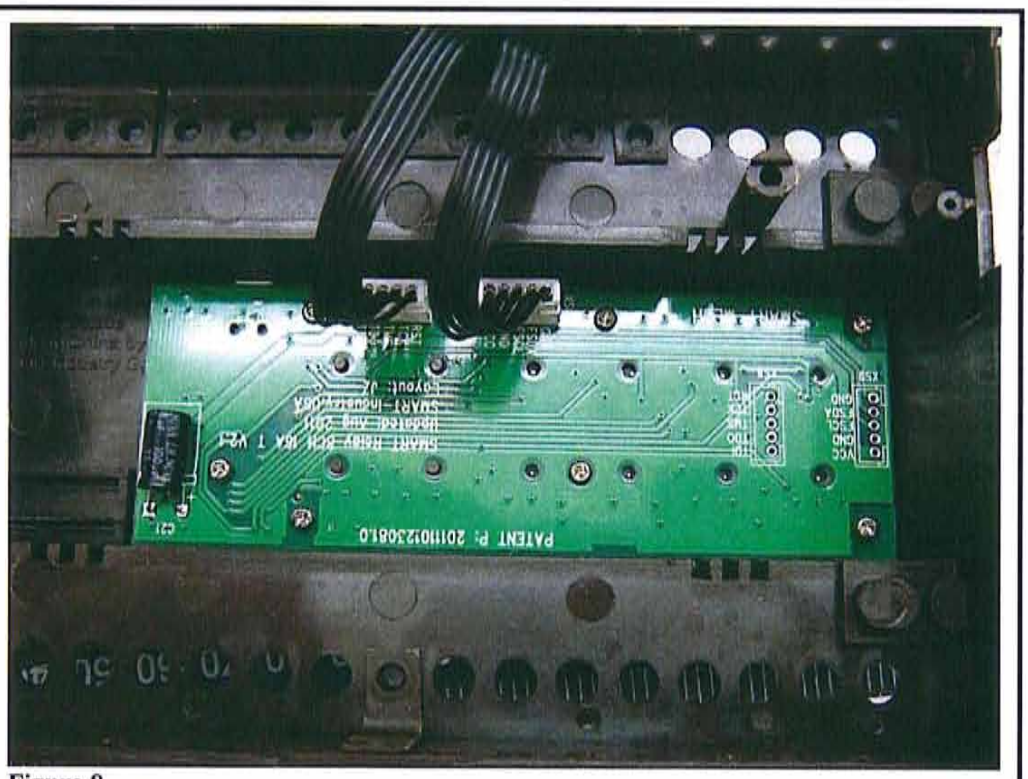

Figure 8

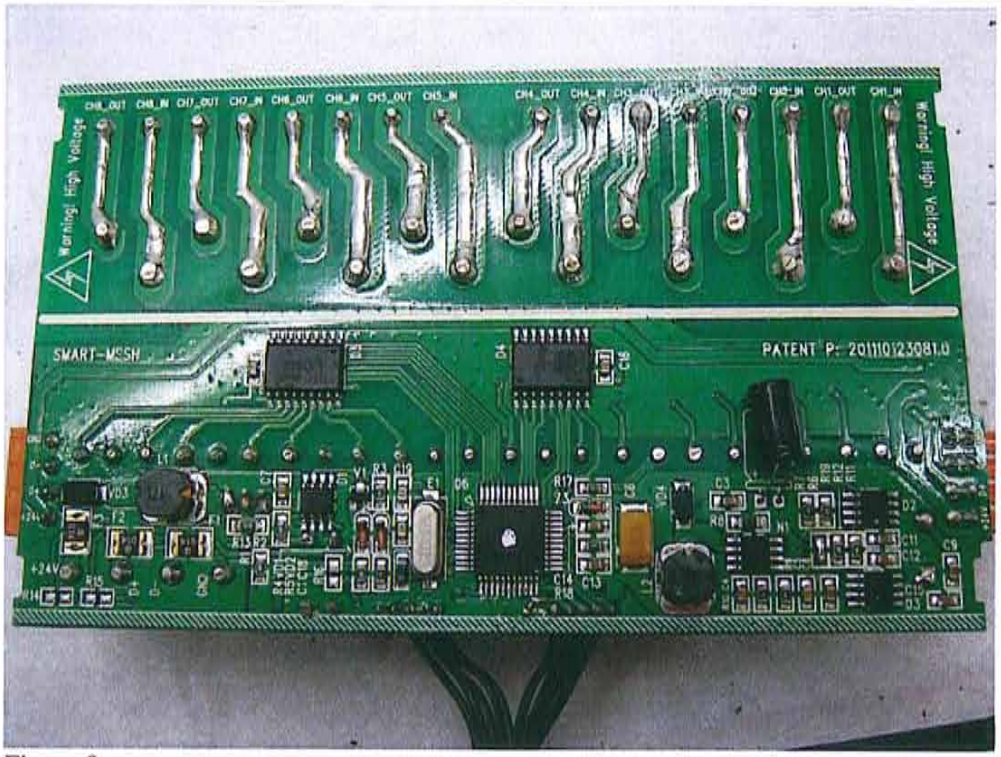

Figure 9

Figure 10