

**TEST REPORT**  
**IEC 60669-2-5**  
**Switches for household and similar fixed-electrical installations –**  
**Collateral standard – Switches and related accessories for use in home**  
**and building electronic systems (HEBS)**

Date of issue .....: 2015-12-25

**Test specification:**

Standard .....: IEC 60669-2-5:2013 (First Edition) used in conjunction with IEC 60669-1:1998 + A1:99 + A2:06 and IEC 60669-2-1:2002 + A1:08

Test procedure .....: CB Scheme

Non-standard test method .....: N/A

**Test item description** .....: Electronic switches / modules

Trade Mark .....: Qubino

Manufacturer .....: Qubino

Model and/or type reference .....: Flush 1 Relay, Flush 2 Relay, Flush shutter, Flush dimmer

Rating(s) .....: 110-230 VAC, 24 V - 30 VDC see also product data for load

Clause 10 - Protection against electric shock

Clause 12 - Terminals

Clause 16 - Electrical Strength

Clause 17 - Temperature rise

Clause 101 - Abnormal conditions

**Please note that the tests were only performed to one sample.**

**Summary of compliance with National Differences:**

Not performed

**Copy of marking plate (example)**



**Test item particulars:**

Type of electronic switch and its function (examples given in Annex AA) .....	Electronic switches, Electronic dimmer
Pattern number .....	1; 1+1; 4
Contact opening (gap) and switch performance .....	normal gap / without contact gap (semiconductor switching device)
Degree of protection against access to hazardous parts and against harmful effects due to the ingress of solid foreign objects .....	IP2X
Degree of protection against harmful effects due to the ingress of water .....	IPX0
Method of actuating .....	External via RF-remote or button
Method of mounting .....	-
Method of installation .....	Special built-in purposes
Type of terminals .....	screw-type
Flexible cable outlet .....	without
Rated current (A) / Rated load (VA or W) .....	See general product data
Minimum current (A) / Minimum load (VA or W) .....	See general product data
Kind of load controlled by the switch .....	incandescent lamp / motors
Type of switching mechanism .....	Relays or semi-conductor device
Rated control voltage (V) .....	a.c. / d.c.
Rated control current (A) .....	a.c. / d.c.
Rated voltage (V) .....	110-230 VAC, 24-30 VDC
Rated frequency (Hz) .....	50-60 Hz
Characteristic of fuses .....	N.A
Electronics RCS or TDS having .....	N/A

**Possible test case verdicts:**

- test case does not apply to the test object ....: N/A
- test object does meet the requirement .....
- test object does not meet the requirement ...: F (Fail)

**Testing:**

Date of receipt of test item .....	2015-12
Date (s) of performance of tests .....	2015-12

**General product formation:**

**Flush 1 Relay :**

Pattern no 1  
 Max load 2300 W  
 P/N: ZMNHAD1



**Flush 2 Relay :**

Pattern no. 1+1  
 Max. load 2 x 920 W  
 P/N: ZMNHBD1



**Flush Shutter :**

Pattern no. 4  
 Max. load 2 x 920 W  
 P/N: ZMNHCD1



**Flush dimmer :**

Pattern no. semi  
 Max. load 200 W  
 P/N: ZMNHDD1



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Clause	Requirement + Test	Result - Remark	Verdict

10	PROTECTION AGAINST ELECTRIC SHOCK		
10.1	Switches: live parts not accessible	After totally built-in	P
	Switches designed to be fitted with pilot lights supplied at voltages other than ELV have means to prevent direct contact with the lamp		N/A
	Test with standard test finger shown in figure 1 of IEC 60529		P
	Switches with thermoplastic or elastomeric material: additional test carried out at $35\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ with the test probe 11 of IEC 61032 (75 N for 1 min)		P
	Test probe applied to:		
	- thin-walled knock-outs with a force of 10 N		N/A
	- 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		P
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		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 k $\Omega$ :		

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Clause	Requirement + Test	Result - Remark	Verdict
	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: $\leq 2$ mA, for d.c. ....		N/A
10.3	Accessible parts of switches with $I_n \leq 16$ A: made of insulating material		N/A
10.3.1	Metal covers or cover plates protected by supplementary insulation made by insulating linings or insulating barriers		N/A
	Insulating linings or insulating barriers:		N/A
	- cannot be removed without being permanently damaged, or designed that		N/A
	- cannot be replaced in an incorrect position; if they are omitted, accessories are rendered inoperable or manifestly incomplete; there is no risk of accidental contact between live parts and metal covers or cover plates; precautions are taken to prevent creepage distances or clearances becoming less than the values specified in clause 23		N/A
10.3.2	Earthing of metal covers or cover plates: connection of low resistance		N/A
10.4	Metal parts of mechanism not insulated from live parts: not protrude from enclosure		N/A
	Switches operated by means of a removable key or similar device: metal parts of mechanism insulated from live parts		N/A
10.5	Metal parts of mechanism not accessible and insulated from accessible metal parts, unless		N/A
	- separated from live parts (creepage distances and clearances have at least twice the value specified in clause 23), or		N/A
	- reliably connected to earth		N/A
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		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

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Clause	Requirement + Test	Result - Remark	Verdict

10.7	Cord-operated switches: impossible to touch live parts when fitting or replacing the pull cord		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)	The service button needs to be pressed while device is connected to the mains. This means that the following liveparts are accessible: TS connector pins and wires endings connected to terminal block. (see Photo 1 at the end of the TRF)	F
	Compliance is checked with the test probe B of IEC 61032 (10 N); test probe does not touch live parts	Test was failed due to high probability that test probe can touch live parts	F
10.102	Hole in electronic switches for adjusting the setting:		
	The adjustment does not involve the risk of an electric shock		N/A
	Compliance is checked by applying a test pin according to figure 101 through the hole; test pin does not touch live parts		P
10.103	Ventilation openings over live parts:		
	A foreign body introduced into these openings do not come into contact with any live parts		N/A
	Compliance is checked by applying the test probe 13 of IEC 61032 through the openings; pin of test probe does not touch live parts		N/A

<b>12</b>	<b>TERMINALS</b>		
12.1	General		
	Switches provided with screw-type terminals or with screwless terminals .....	Screw-terminal	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
	Terminals having screw clamping complying with IEC 60998-2-1 are considered to be in compliance with the requirements and the tests of Subclause 12.2, except those of 12.2.6 and 12.2.7 and 12.2.8, provided they are chosen according Table 2.		N/A
12.2	Terminals with screw clamping for external copper conductors		

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Clause	Requirement + Test	Result - Remark	Verdict
12.2.1	Switches provided with terminals which allows the proper connection of copper conductors as shows in table 2	For type Flush 1 Relay and Flush 2 relays the total Load current > 6 A max 2 x 2.5 mm <sup>2</sup> wires shall be fitted in the terminals.	F
	Rated current (A) .....	Max 10 A	—
	Type of conductor (rigid / flexible) .....	Rigid	—
	Smallest / largest cross-sectional area (mm <sup>2</sup> ) .....	0.75 / 2.5 mm <sup>2</sup>	—
	Diameter of largest conductor (mm) .....	2.13 mm	—
	Figure of terminal .....	1 (pillar type)	—
	Minimum diameter D (minimum dimensions) of conductor space: required (mm); measured (mm) :	D measured : 2.75 mm D required ≥ 3.0 mm	F
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		P
	Screws not of soft metal such as zinc or aluminium	details required	Not known
12.2.4	Terminals resistant to corrosion		P
12.2.5	Screw-type terminals clamp the conductor(s) without undue damage	See appended table 12.2.5	P
	During the test: conductor not slip out, no break near clamping unit and no damage		P
12.2.6	Terminals clamp the conductor reliably between metal surfaces	See appended table 12.2.6	P
	During the test: conductor not move noticeably		P
12.2.7	Terminals designed or placed that the conductor cannot slip out while the clamping screws or nuts are tightened	See appended table 12.2.7	P
	After the test: no wire of the conductor escaped outside the clamping unit thus reducing creepage distances and clearances to values lower than those indicated in clause 23		P

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Clause	Requirement + Test	Result - Remark	Verdict
12.2.8	Terminals not work loose from their fixing to the switch		P
	Torque test:		
	- rated current (A) .....	Max 10 A	—
	- solid rigid copper conductor of the largest cross-sectional area (mm <sup>2</sup> ) (table 2) .....	0.75 – 2.5 mm <sup>2</sup>	—
	- torque (Nm) (table 3 or appropriate figures 1, 2, 3, 4) .....	2.4 mm; fig 1; 0.4 Nm	—
	Screws and nuts tightened and loosened 5 times. During the test: terminals not work loose and show no damage		P
12.2.9	Clamping screws or nuts of earthing terminals: adequately locked against accidental loosening, not possible to loosen them without the aid of a tool		N/A
12.2.10	Earthing terminals: no risk of corrosion		N/A
	Body of brass or other metal no less resistant to corrosion		N/A
	If the body is a part of a frame or enclosure of aluminium alloy, precautions are taken to avoid the risk of corrosion		N/A
12.2.11	Pillar terminals: distance g no less than the value specified in figure 1: required (mm); measured (mm) .....	g measured >1.5 mm g required ≥ 1.5 mm	P

<b>16 INSULATION RESISTANCE AND ELECTRIC STRENGTH</b>			
16.1	The insulation resistance measured 1 min after application of 500 V d.c.	See appended table 16.1	Not tested
16.2	Electric strength: a.c. test voltage applied for 1 min	See appended table 16.2	P

<b>17 TEMPERATURE RISE</b>			
17.1	Switches so constructed that the temperature rise in normal use is not excessive	Only terminals and enclosure could be measured due to the fact that the complete sample (printed wiring board) was potted with sealing compound	P
	No oxidation or any other deterioration of contacts, if any		P
	Material and components of electronic switch are		P

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Clause	Requirement + Test	Result - Remark	Verdict

	not adversely effected by the temperature rise in normal use		
	During the test:		
	- electronic switch state not change	Type Flush Dimmer	F
	- 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		P

<b>101</b>	<b>ABNORMAL CONDITIONS</b>		
	Electronic switches do not create hazard under abnormal conditions	Only 101.1.1.2	P
101.1.1.2	Electronic switches without incorporated temperature-limiting devices and without incorporated fuses:		
	Test current: conventional tripping current $I_f$ (A) for 1h of the fuse which, in the installation, will protect the electronic switch .....	16 A (25.6 A)	—
	Temperature rise measured after steady state or after 4 h .....	See appended table 101.1.1.2	F

12.2.5	<b>TABLE: test with apparatus shown in figure 10 (screw terminals)</b>				
	rated current (A) .....	Max 10 A		—	
	type of conductors .....	rigid solid		—	
	smallest/largest cross-sectional area per table 2 ( $\text{mm}^2$ ) .....	0.75 / 2.5 mm		—	
	number of conductors.....	1		—	
	nominal diameter of thread (mm); torque per table 3 (Nm) .....	2.4 mm / 0.4 Nm		—	
	Cross-sectional area ( $\text{mm}^2$ )	Diameter of bushing hole per table 4 (mm)	Height H per table 4 (mm)	Mass (kg)	Remarks
	0.75	6.5	260	0.4	P
	2.5	9.5	280	0.7	P
supplementary information:					

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Clause	Requirement + Test	Result - Remark	Verdict

12.2.6	<b>TABLE: pull test (screw terminals)</b>				
	rated current (A) .....	Max 10 A (min 0.85 A)		—	
	smallest/largest cross-sectional area per table 2 (mm <sup>2</sup> ) .....	0.75 / 2.5 mm <sup>2</sup>		—	
	nominal diameter of thread (mm); torque 2/3 per table 3 (Nm) .....	2.4 mm; 0.27 Nm		—	
	Cross-sectional area (mm <sup>2</sup> )	Number of conductors	Type of conductors (rigid solid / rigid stranded)	Pull per table 5 applied for 1 min (N)	Remarks
	0.75	1	solid	40	P
	2.5	1	solid	50	P
supplementary information:					
16.2	<b>TABLE: electric strength</b>				
	rated voltage (V) .....	230 V		—	
item per table 14	test voltage applied between:		test voltage (V)	flashover / breakdown (Yes/No)	
	Live parts to antenna		2000	No	
	Live parts to enclosure (foil)		2000	No	
supplementary information:					

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Clause	Requirement + Test	Result - Remark	Verdict

**Flush 1 Relay**

17	<b>TABLE: temperature rise measurements; Flush 1 Relay</b>		P
	cross-sectional area of conductor not less than 1,5 mm <sup>2</sup> (mm <sup>2</sup> ) (table 15) .....	1.5 mm <sup>2</sup>	—
	terminal screws: torque (Nm) (2/3 table 3 or appropriate figures 1, 2, 3, 4) .....	0.27 Nm; fig. 1	—
	type of load .....	Incandescent lamp load	—
	rated current (A) / rated load (W or VA) .....	2300 W	—
	rated voltage (V) .....	110-230 V	—
	test voltage between 0,9 and 1,1 V <sub>n</sub> (V), whichever is the more unfavourable .....	253 V	—
parts of the electronic switch		max. measured temperature rise (K)	permissible temperature rise (K)
Terminals		39	55
Enclosure		43	55
Ambient capacitor		44	60
supplementary information:			

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Clause	Requirement + Test	Result - Remark	Verdict

**Flush 2 Relay**

17	<b>TABLE: temperature rise measurements; Flush 2 Relay</b>		P
	cross-sectional area of conductor not less than 1,5 mm <sup>2</sup> (mm <sup>2</sup> ) (table 15) .....	1.5 mm <sup>2</sup>	—
	terminal screws: torque (Nm) (2/3 table 3 or appropriate figures 1, 2, 3, 4) .....	0.27 Nm; fig. 1	—
	type of load .....	Incandescent lamp load	—
	rated current (A) / rated load (W or VA) .....	2 x 4 A	—
	rated voltage (V) .....	110-230 V	—
	test voltage between 0,9 and 1,1 V <sub>n</sub> (V), whichever is the more unfavourable .....	253 V	—
parts of the electronic switch		max. measured temperature rise (K)	permissible temperature rise (K)
Terminals		33	55
Enclosure		45	55
Ambient capacitor		33	60
supplementary information:			

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Clause	Requirement + Test	Result - Remark	Verdict

**Flush shutter**

17	<b>TABLE: temperature rise measurements; Flush shutter</b>		P
	cross-sectional area of conductor not less than 1,5 mm <sup>2</sup> (mm <sup>2</sup> ) (table 15) .....	1.5 mm <sup>2</sup>	—
	terminal screws: torque (Nm) (2/3 table 3 or appropriate figures 1, 2, 3, 4) .....	0.27 Nm; fig. 1	—
	type of load .....	Resistive load	—
	rated current (A) / rated load (W or VA) .....	4 A	—
	rated voltage (V) .....	110-230 V	—
	test voltage between 0,9 and 1,1 V <sub>n</sub> (V), whichever is the more unfavourable .....	253 V	—
parts of the electronic switch		max. measured temperature rise (K)	permissible temperature rise (K)
Terminals		23	55
Enclosure		25	55
Ambient capacitor		33	60
supplementary information:			

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Clause	Requirement + Test	Result - Remark	Verdict

**Flush Dimmer**

17	<b>TABLE: temperature rise measurements; Flush Dimmer</b>		<b>F</b>
	cross-sectional area of conductor not less than 1,5 mm <sup>2</sup> (mm <sup>2</sup> ) (table 15) .....	1.5 mm <sup>2</sup>	—
	terminal screws: torque (Nm) (2/3 table 3 or appropriate figures 1, 2, 3, 4) .....	0.27 Nm; fig. 1	—
	type of load .....	Incandescent lamp load	—
	rated current (A) / rated load (W or VA) .....	200 W	—
	rated voltage (V) .....	110-230 V	—
	test voltage between 0,9 and 1,1 V <sub>n</sub> (V), whichever is the more unfavourable .....	253 V	—
parts of the electronic switch		max. measured temperature rise (K)	permissible temperature rise (K)
		Max intensity 0.95 A	Min intensity 0.64 A
Terminals		21	35
Enclosure		35	68
Ambient capacitor		36	58
supplementary information: during min intensity the dimmer broke down and stopped working			

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Clause	Requirement + Test	Result - Remark	Verdict

**Flush 1 Relay**

101.1.1.2	<b>TABLE: temperature rise measurements during overload tests</b>		<b>F</b>
	cross-sectional area of conductor not less than 1,5 mm <sup>2</sup> (mm <sup>2</sup> ) (table 15) .....	1.5 mm <sup>2</sup>	—
	terminal screws: torque (Nm) (2/3 table 3 or appropriate figures 1, 2, 3, 4) .....	0.27 Nm; fig. 1	—
	rated voltage (V) .....	230 V	—
	test voltage between 0,9 and 1,1 V <sub>n</sub> (V), whichever is the more unfavourable .....	253 V	—
parts of the electronic switch		max. measured temperature rise (K)	permissible temperature rise (K)
<b>1 hour 25.6 A</b>			
Terminals		118	110
Enclosure		189	110
supplementary information: after 20 minutes the sample exploded / see photo 2			

101.1.1.2	<b>TABLE: temperature rise measurements during overload tests</b>		<b>N/A</b>
	cross-sectional area of conductor not less than 1,5 mm <sup>2</sup> (mm <sup>2</sup> ) (table 15) .....	1.5 mm <sup>2</sup>	—
	terminal screws: torque (Nm) (2/3 table 3 or appropriate figures 1, 2, 3, 4) .....	0.27 Nm; fig. 1	—
	rated voltage (V) .....	230 V	—
	test voltage between 0,9 and 1,1 V <sub>n</sub> (V), whichever is the more unfavourable .....	253 V	—
parts of the electronic switch		max. measured temperature rise (K)	permissible temperature rise (K)
<b>Finding maximum load for 1 hour</b>			
supplementary information: not performed due to above results			

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Clause	Requirement + Test	Result - Remark	Verdict

**Flush 2 Relay**

101.1.1.2	<b>TABLE: temperature rise measurements during overload tests</b>		P
	cross-sectional area of conductor not less than 1,5 mm <sup>2</sup> (mm <sup>2</sup> ) (table 15) .....	1.5 mm <sup>2</sup>	—
	terminal screws: torque (Nm) (2/3 table 3 or appropriate figures 1, 2, 3, 4) .....	0.27 Nm; fig. 1	—
	rated voltage (V) .....	230 V	—
	test voltage between 0,9 and 1,1 V <sub>n</sub> (V), whichever is the more unfavourable .....	253 V	—
parts of the electronic switch		max. measured temperature rise (K)	permissible temperature rise (K)
<b>1 hour 25.6 A</b>			
Terminals		38	110
Enclosure		45	110
supplementary information: after 50 seconds the relay open-circuited.			

101.1.1.2	<b>TABLE: temperature rise measurements during overload tests</b>		F
	cross-sectional area of conductor not less than 1,5 mm <sup>2</sup> (mm <sup>2</sup> ) (table 15) .....	1.5 mm <sup>2</sup>	—
	terminal screws: torque (Nm) (2/3 table 3 or appropriate figures 1, 2, 3, 4) .....	0.27 Nm; fig. 1	—
	rated voltage (V) .....	230 V	—
	test voltage between 0,9 and 1,1 V <sub>n</sub> (V), whichever is the more unfavourable .....	253 V	—
parts of the electronic switch		max. measured temperature rise (K)	permissible temperature rise (K)
<b>Finding maximum load for 1 hour</b>			
Terminals		66	110
Enclosure		79	110
supplementary information: at 14 A the switch short-circuited between L-N, home fuse blows			

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Clause	Requirement + Test	Result - Remark	Verdict

**Flush shutter**

101.1.1.2	<b>TABLE: temperature rise measurements during overload tests</b>		P
	cross-sectional area of conductor not less than 1,5 mm <sup>2</sup> (mm <sup>2</sup> ) (table 15) .....	1.5 mm <sup>2</sup>	—
	terminal screws: torque (Nm) (2/3 table 3 or appropriate figures 1, 2, 3, 4) .....	0.27 Nm; fig. 1	—
	rated voltage (V) .....	230 V	—
	test voltage between 0,9 and 1,1 V <sub>n</sub> (V), whichever is the more unfavourable .....	253 V	—
parts of the electronic switch		max. measured temperature rise (K)	permissible temperature rise (K)
<b>1 hour 25.6 A</b>			
Terminals		72	110
Enclosure		85	110
supplementary information: after 3 minutes the relays open-circuited			

101.1.1.2	<b>TABLE: temperature rise measurements during overload tests</b>		F
	cross-sectional area of conductor not less than 1,5 mm <sup>2</sup> (mm <sup>2</sup> ) (table 15) .....	1.5 mm <sup>2</sup>	—
	terminal screws: torque (Nm) (2/3 table 3 or appropriate figures 1, 2, 3, 4) .....	0.27 Nm; fig. 1	—
	rated voltage (V) .....	230 V	—
	test voltage between 0,9 and 1,1 V <sub>n</sub> (V), whichever is the more unfavourable .....	253 V	—
parts of the electronic switch		max. measured temperature rise (K)	permissible temperature rise (K)
<b>Finding maximum load for 1 hour</b>			
Terminals		95	110
Enclosure		169	110
supplementary information: at 14 A the capacitor exploded, see photo 3			

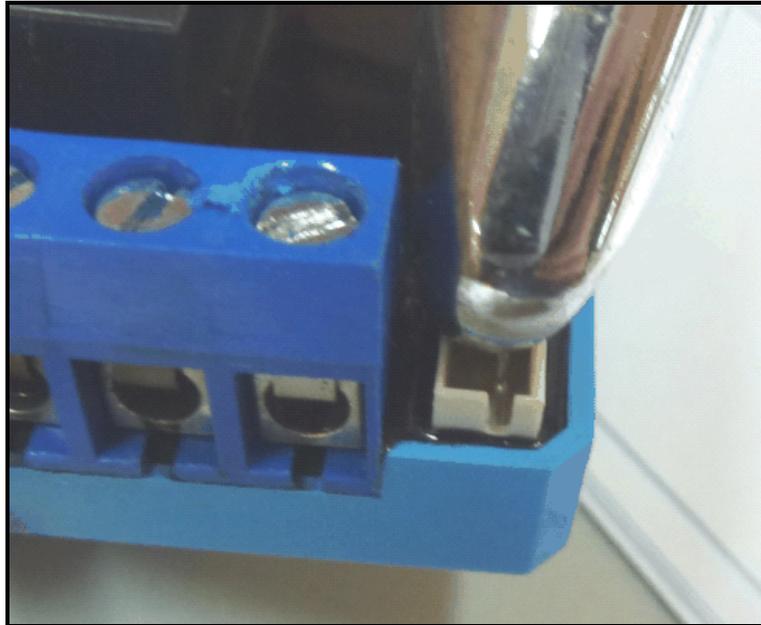
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Clause	Requirement + Test	Result - Remark	Verdict

**Flush dimmer**

101.1.1.2	<b>TABLE: temperature rise measurements during overload tests</b>		P
	cross-sectional area of conductor not less than 1,5 mm <sup>2</sup> (mm <sup>2</sup> ) (table 15) .....	1.5 mm <sup>2</sup>	—
	terminal screws: torque (Nm) (2/3 table 3 or appropriate figures 1, 2, 3, 4) .....	0.27 Nm; fig. 1	—
	rated voltage (V) .....	230 V	—
	test voltage between 0,9 and 1,1 Vn (V), whichever is the more unfavourable .....	253 V	—
parts of the electronic switch		max. measured temperature rise (K)	permissible temperature rise (K)
<b>1 hour 25.6 A</b>			
Terminals			110
Enclosure			110
supplementary information: not performed due to results of the heating test			

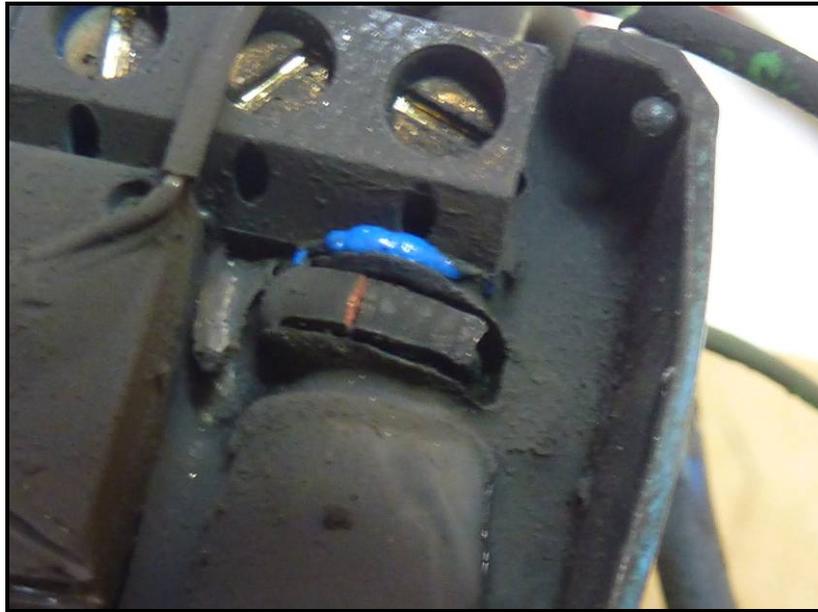
**Clause 10.101**

**Photo 1**



**Clause 101 – Abnormal conditions**

**Photo 2 Flush 1 Relay**



**Photo 3 Flush shutter**

