



EMC TEST REPORT

For

Woan Technology (Shenzhen) Co., Ltd.

SwitchBot Relay Switch

Test Model: W5502300

Additional Model No.: Please Refer to Page 6

Prepared for : Woan Technology (Shenzhen) Co., Ltd.
Address : Room 1101, Qiancheng Commercial Center, No. 5
Haicheng Road, Mabu Community, Xixiang Sub-district,
Bao'an District, Shenzhen, Guangdong, P.R.China,
518100

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Date of receipt of test sample : August 09, 2024
Number of tested samples : 2
Sample No. : A240808040-1, A240808040-2
Serial number : Prototype
Date of Test : August 09, 2024 ~ August 14, 2024
Date of Report : August 15, 2024



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EMC TEST REPORT	
ETSI EN 301 489-1 V2.2.3 (2019-11) & ETSI EN 301 489-17 V3.2.4 (2020-09)	
Report Reference No.	LCSA08074116EA
Date Of Issue	August 15, 2024
Testing Laboratory Name	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China
Testing Location/ Procedure ...	Full application of Harmonised standards ☒ Partial application of Harmonised standards ☐ Other standard testing method ☐
Applicant's Name	Woan Technology (Shenzhen) Co., Ltd.
Address	Room 1101, Qiancheng Commercial Center, No. 5 Haicheng Road, Mabu Community, Xixiang Sub-district, Bao'an District, Shenzhen, Guangdong, P.R.China, 518100
Test Specification	
Standard	ETSI EN 301 489-1 V2.2.3 (2019-11) ETSI EN 301 489-17 V3.2.4 (2020-09) EN 55032:2015/A11:2020 EN 55035:2017/A11:2020
Test Report Form No.	TRF-4-E-132 A/0
TRF Originator	Shenzhen LCS Compliance Testing Laboratory Ltd.
Master TRF	Dated 2017-06
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Test Item Description.	
SwitchBot Relay Switch	
Trade Mark	SwitchBot
Test Model	W5502300
Ratings	Please Refer to Page 6
Result	Positive

Compiled by:

Jack Liu/Administrator

Supervised by:

Cary Luo/ Technique principal

Approved by:



Gavin Liang/ Manager



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EMC -- TEST REPORT

Test Report No. : LCSA08074116EA	<u>August 15, 2024</u> Date of issue
---	---

Test Model.....	: W5502300
EUT.....	: SwitchBot Relay Switch
Applicant.....	: Woan Technology (Shenzhen) Co., Ltd.
Address.....	: Room 1101, Qiancheng Commercial Center, No. 5 Haicheng Road, Mabu Community, Xixiang Sub-district, Bao'an District, Shenzhen, Guangdong, P.R.China, 518100
Telephone.....	: /
Fax.....	: /
Manufacturer.....	: Woan Technology (Shenzhen) Co., Ltd.
Address.....	: Room 1101, Qiancheng Commercial Center, No. 5 Haicheng Road, Mabu Community, Xixiang Sub-district, Bao'an District, Shenzhen, Guangdong, P.R.China, 518100
Telephone.....	: /
Fax.....	: /
Factory.....	: Wo'an Technology (Shenzhen) Co., Ltd. Huizhou Branch
Address.....	: Building 2, 2nd Floor, Baidi Zhigu Science and Technology Innovation Park, No.263 Chang'an Avenue, Shatian Town, Huiyang District, Huizhou City, Guangdong, China
Telephone.....	: /
Fax.....	: /

Test Result	Positive
--------------------	-----------------

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.



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Revision History

Report Version	Issue Date	Revision Content	Revised By
000	August 15, 2024	Initial Issue	--



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1. GENERAL INFORMATION

1.1. Product Description for Equipment Under Test (EUT)

EUT	: SwitchBot Relay Switch
Test Model	: W5502300
Additional Model No.	: W5502310, W5502320, W5502330, W5502340, W5502350
Model Declaration	: PCB board, structure and internal of these model(s) are the same, So no additional models were tested
Power Supply	: AC Input: 100-240V, 50/60Hz DC Input: 24V-48V, 12V Output switch AC current: 16A Maximum voltage AC: 240V Maximum voltage DC: 30V Maximum current DC: 10A
Hardware Version	: /
Software Version	: /
Bluetooth	:
Frequency Range	: 2402MHz~2480MHz
Channel Number	: 40 channels for Bluetooth V4.2 (BT LE)
Channel Spacing	: 2MHz for Bluetooth V4.2 (BT LE)
Modulation Type	: GFSK for Bluetooth V4.2 (BT LE)
Bluetooth Version	: V4.2
Antenna Description	: IFA Antenna, 1.04dBi(Max.)
WIFI(2.4G Band)	:
Frequency Range	: 2412MHz~2472MHz
Channel Number	: 13 Channel for 20MHz bandwidth(2412~2472MHz) 9 channels for 40MHz bandwidth(2422~2462MHz)
Channel Spacing	: 5MHz
Modulation Type	: 802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Antenna Description	: IFA Antenna, 1.04dBi(Max.)



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1.2. Objective

ETSI EN 301 489-1	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility
ETSI EN 301 489-17	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard for ElectroMagnetic Compatibility

The objective is to determine compliance with ETSI EN 301 489-1 V2.2.3 (2019-11), ETSI EN 301 489-17 V3.2.4 (2020-09).

1.3. Related Submittal(s)/Grant(s)

No Related Submittals.

1.4. Test Methodology

All measurements contained in this report were conducted with ETSI EN 301 489-1 V2.2.3 (2019-11), ETSI EN 301 489-17 V3.2.4 (2020-09).

1.5. Description of Test Facility

NVLAP Accreditation Code is 600167-0.

FCC Designation Number is CN5024.

CAB identifier is CN0071.

CNAS Registration Number is L4595.

1.6. Support Equipment List

Manufacturer	Description	Model	Serial Number	Certificate
--	--	--	--	--

1.7. External I/O

I/O Port Description	Quantity	Cable
--	--	--



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1.8. Measurement Uncertainty

Item	MU	Remark
Uncertainty for Power point Conducted Emissions Test	2.42dB	
Uncertainty for Radiation Emission test in 3m chamber (30MHz to 1GHz)	3.54dB	Polarize: V
	4.1dB	Polarize: H
Uncertainty for Radiation Emission test in 3m chamber (1GHz to 25GHz)	2.08dB	Polarize: H
	2.56dB	Polarize: V
Uncertainty for radio frequency	0.01ppm	
Uncertainty for conducted RF Power	0.65dB	
Uncertainty for temperature	0.2°C	
Uncertainty for humidity	1%	
Uncertainty for DC and low frequency voltages	0.06%	

1.9. Description of Test Modes

There was 3 test Modes. TM1 to TM3 were shown below:

- TM1 : Operate in Bluetooth mode;
- TM2 : Operate in 2.4G WIFI Link mode;
- TM3 : Idle mode

***Note: All test modes were tested, but we only recorded the worst case in this report.



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2. SUMMARY OF TEST RESULTS

Rule	Description of Test Items	Result
§7.1	Reference to clause 8.4 of ETSI EN 301 489-1 Conducted Emission (AC mains input/output port)	Compliant
§7.1	Reference to clause 8.3 of ETSI EN 301 489-1 Conducted Emission (DC power input/output port)	N/A*
§7.1	Reference to clause 8.7 of ETSI EN 301 489-1 Conducted Emission (Wired network port)	N/A*
§7.1	Reference to clause 8.2 of ETSI EN 301 489-1 Radiated Emission (Enclosure of ancillary equipment)	Compliant
§7.1	Reference to clause 8.5 of ETSI EN 301 489-1 Harmonic current emissions (AC mains input port)	Compliant
§7.1	Reference to clause 8.6 of ETSI EN 301 489-1 Voltage fluctuations and flicker (AC mains input port)	Compliant
§7.2	Reference to clause 9.3 of ETSI EN 301 489-1 Electrostatic discharge (Enclosure port) (EN 61000-4-2)	Compliant
§7.2	Reference to clause 9.2 of ETSI EN 301 489-1 RF electromagnetic field (80MHz to 6000MHz) (Enclosure port) (EN 61000-4-3)	Compliant
§7.2	Reference to clause 9.4 of ETSI EN 301 489-1 Fast transients common mode (signal, wired network and control ports, DC and AC power ports) (EN 61000-4-4)	Compliant
§7.2	Reference to clause 9.8 of ETSI EN 301 489-1 Surges, line to line and line to ground (AC mains power input ports, wired network ports) (EN 61000-4-5)	Compliant
§7.2	Reference to clause 9.5 of ETSI EN 301 489-1 RF common mode 0.15MHz to 80MHz (signal, wired network and control ports, DC and AC power ports) (EN 61000-4-6)	Compliant
§7.2	Reference to clause 9.6 of ETSI EN 301 489-1 Transients and surges in the vehicular environment (ISO 7637-2)	N/A*
§7.2	Reference to clause 9.7 of ETSI EN 301 489-1 Voltage dips and interruptions (AC mains power input ports) (EN 61000-4-11)	Compliant



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3. TEST RESULTS

3.1. Line Conducted Emission

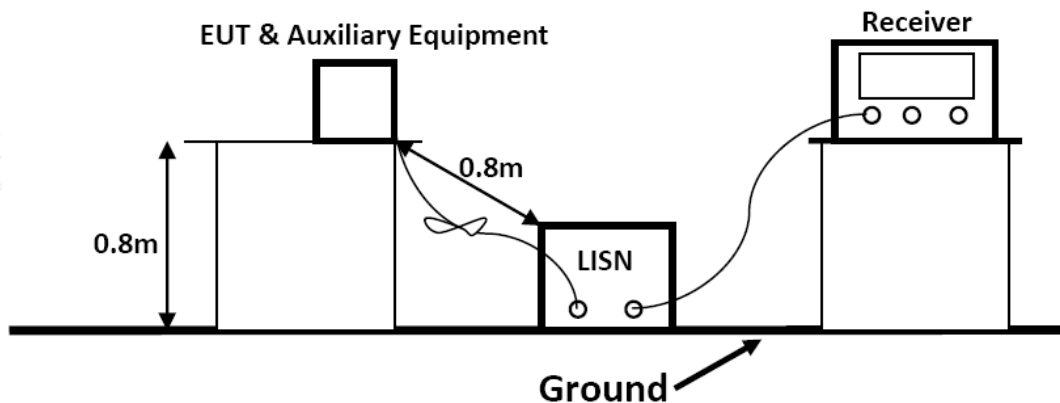
3.1.1 Conducted Emission Limit

Relevant Standard(s): ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 55032:2015/A11:2020
Class B

Limits for Line Conducted Emission		
Frequency (MHz)	Limit (dB μ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66.0 ~ 56.0 *	56.0 ~ 46.0 *
0.50 ~ 5.00	56.0	46.0
5.00 ~ 30.00	60.0	50.0

NOTE1-The lower limit shall apply at the transition frequencies.
NOTE2-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.

3.1.2 Test Configuration



The setup of EUT is according with per ETSI EN 301 489-1 measurement procedure. The specification used was with the ETSI EN 301 489-1 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The EUT received charging power from the charger which received power through a LISN supplying power of AC 230V/50Hz.



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3.1.3 EMI Test Receiver Setup

During the conducted emission test, the EMI test receiver was set with the following configurations:

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	150KHz ~ 30MHz
(IF)RBW	9kHz

All data was recorded in the Quasi-peak and average detection mode.

3.1.4 Test Procedure

Power on the EUT, the EUT begins to work. Make sure the EUT operates normally during the test.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

3.1.5 Test Results

PASS

Please refer to Appendix A.1 for Emission and Immunity test results.



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3.2. Conducted Emission (Wired Network Port)

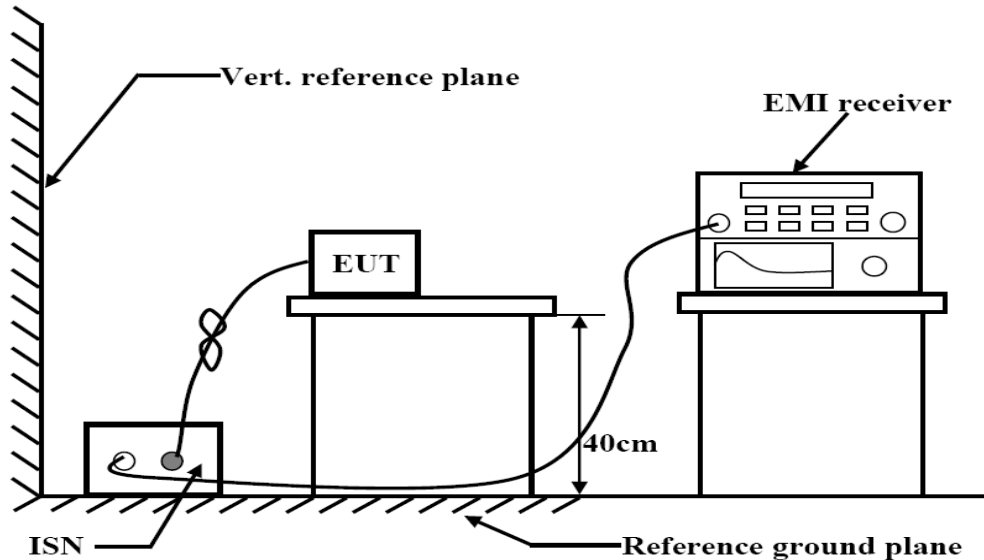
3.2.1 Conducted Emission Limit(Wired Network Port)

Limits for asymmetric mode conducted emissions				
Frequency (MHz)	Class B voltage limits (dB μ V)		Class B current limits (dB μ A)	
	Quasi-peak Level	Average Level	Quasi-peak Level	Average Level
0.15 ~ 0.50	84.0~74.0	74.0~64.0	40.0~30.0	30.0~20.0
0.50 ~ 30.00	74.0	64.0	30.0	20.0

NOTE 1-The limits decrease linearly with the logarithm of the frequency in the range 0,15 MHz to 0,5 MHz.

NOTE 2-The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150 Ω to the telecommunication port under test (conversion factor is $20 \log_{10} 150 / I = 44$ dB).

3.2.2 Test Configuration



3.2.3 EMI Test Receiver Setup

During the conducted emission test, the EMI test receiver was set with the following configurations:

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	150KHz ~ 30MHz
(IF)RBW	9kHz

All data was recorded in the Quasi-peak and average detection mode.

3.2.4 Test Procedure

Please refer to ETSI EN 301 489-1 Clause 8.7.2 and EN 55032 Clause 6 for the measurement methods.

3.2.5 Test Results

Not applicable.



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3.3. Radiated Disturbance

3.3.1 Radiated Emission Limit

Relevant Standard(s): ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 55032:2015/A11:2020
Class B

Limits for Radiated Disturbance Below 1GHz			
Frequency (MHz)	Facility	Distance (Meters)	Field Strengths Limit (dB μ V/m)
30 ~ 230	FAR	3	42-35
230 ~ 1000	FAR	3	42
***Note: (1) The smaller limit shall apply at the combination point between two frequency bands. (2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT.			
Limits for Radiated Disturbance Above 1GHz			
Frequency (MHz)	Distance (Meters)	Peak Limit (dB μ V/m)	Average Limit (dB μ V/m)
1000 ~ 3000	3	70	50
3000 ~ 6000	3	74	54
***Note: The lower limit applies at the transition frequency.			

Limits for Radiated Disturbance Below 1GHz (For FM Receivers)			
Frequency (MHz)	Distance (Meters)	Class B Limit (dBμV/m)	
		Fundamental	Harmonics
30 ~ 230	3	60	52
230 ~ 300	3		52
300 ~ 1000	3		56
***Note: These relaxed limits apply only to emissions at the fundamental and harmonic frequencies of the LO. Signals at all other frequencies shall be compliant with the limits given in above Table.			
Limits for Radiated Disturbance Above 1GHz (For FM Receivers)			
Frequency (MHz)	Distance (Meters)	Peak Limit (dBμV/m)	Average Limit (dBμV/m)
1000 ~ 3000	3	70	50
3000 ~ 6000	3	74	54
***Note: The lower limit applies at the transition frequency.			



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3.3.2 Test Configuration

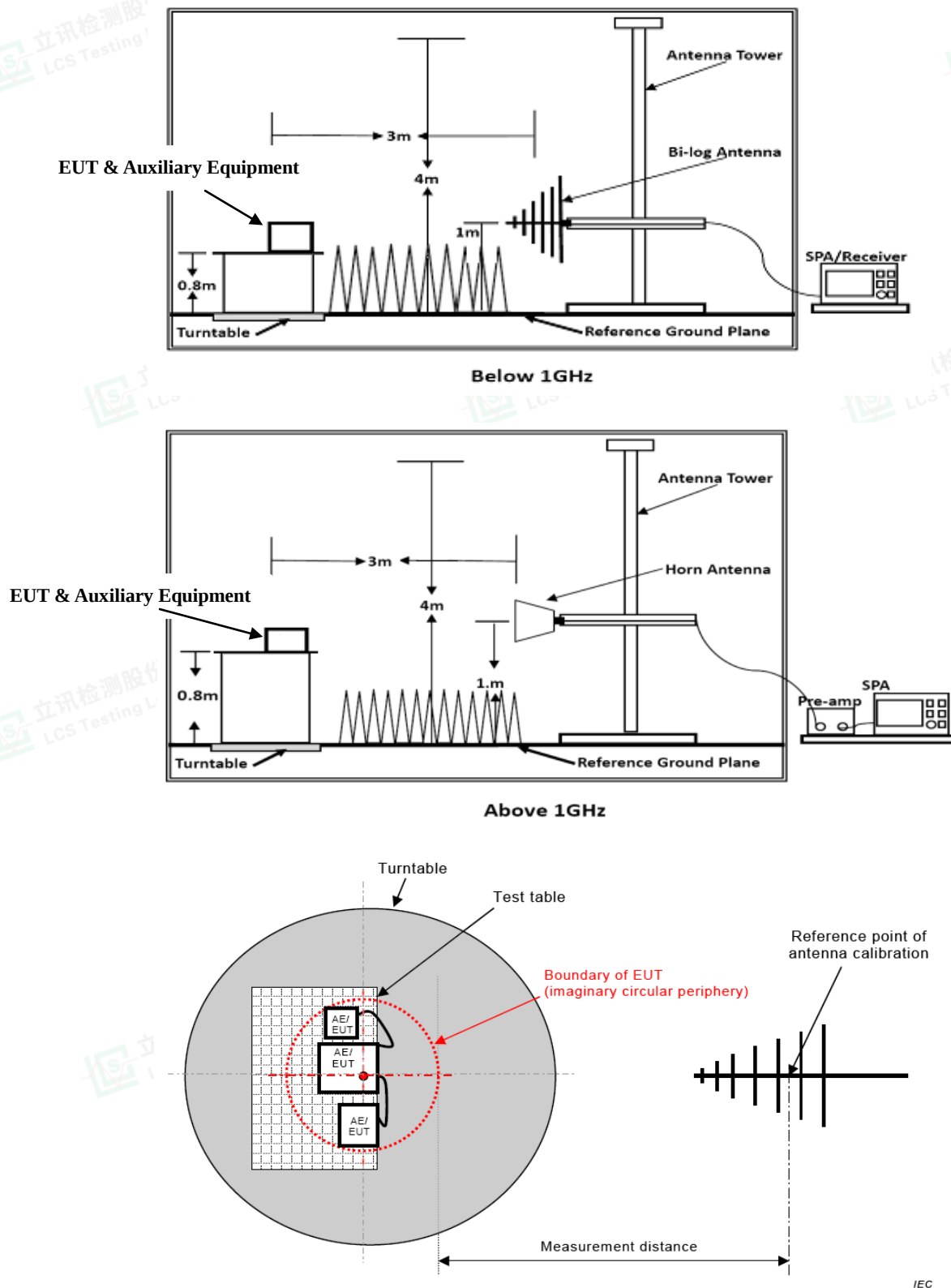


Figure C.1 – Measurement distance

Test Setup for FM Receiver



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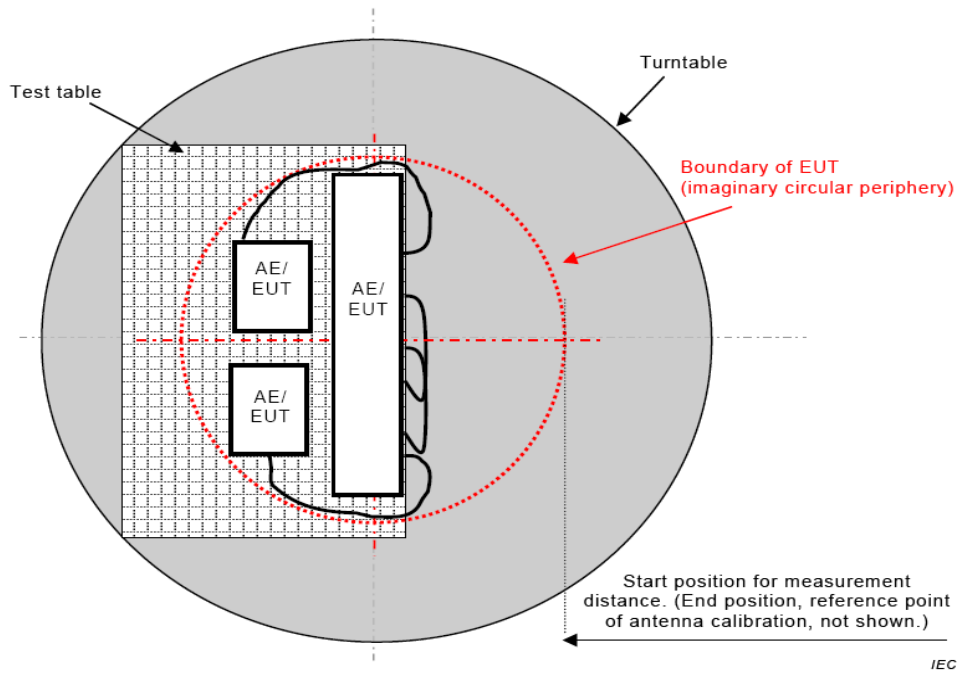


Figure C.2 – Boundary of EUT, Local AE and associated cabling

Test Setup for FM Receiver

3.3.3 Test Procedure

The test method shall be in accordance with CENELEC EN 55032 [1], annex A.3.

3.3.4 Test Results

PASS

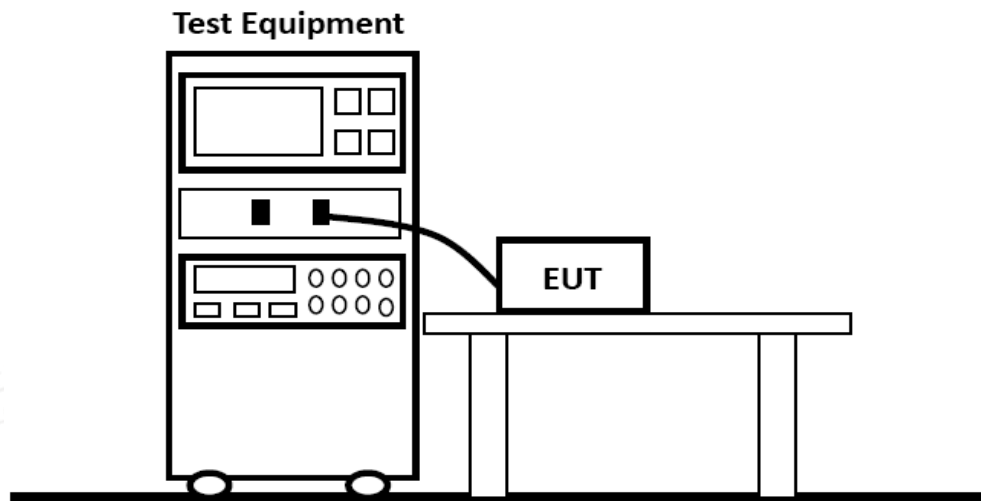
The worst test mode of the EUT was TM1, and its test data please refer to Appendix A.3 for Emission and Immunity test results.





3.4. Harmonic Current Emissions

3.4.1 Test Configuration



3.4.2 Test Standard

According to ETSI EN 301 489-1 V2.2.3 (2019-11) & EN 61000-3-2: 2014

3.4.3 Test Results

PASS

Please refer to Appendix A.4 for Emission and Immunity test results.



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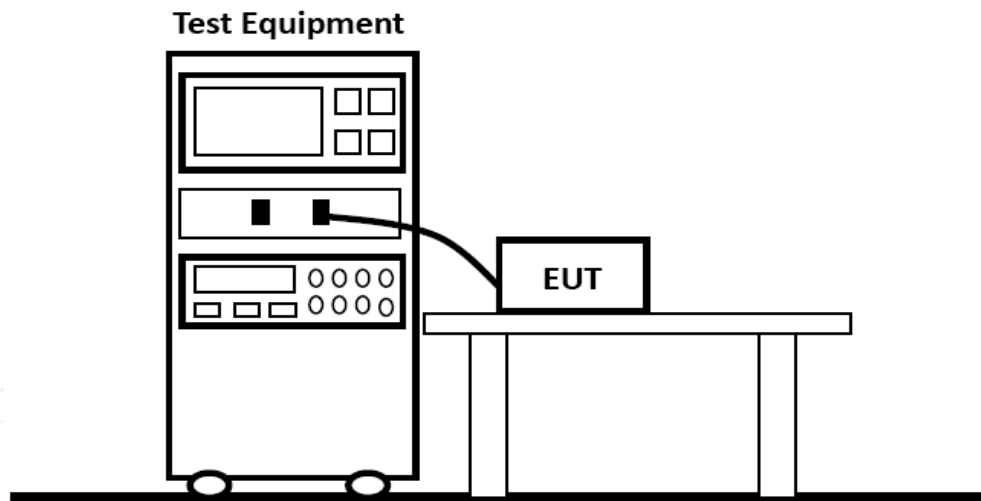
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3.5. Voltage Fluctuation and Flicker

3.5.1 Test Configuration



3.5.2 Test Standard

According to ETSI EN 301 489-1 V2.2.3 (2019-11) & EN 61000-3-3: 2013

3.5.3 Test Results

PASS

Please refer to Appendix A.5 for Emission and Immunity test results.



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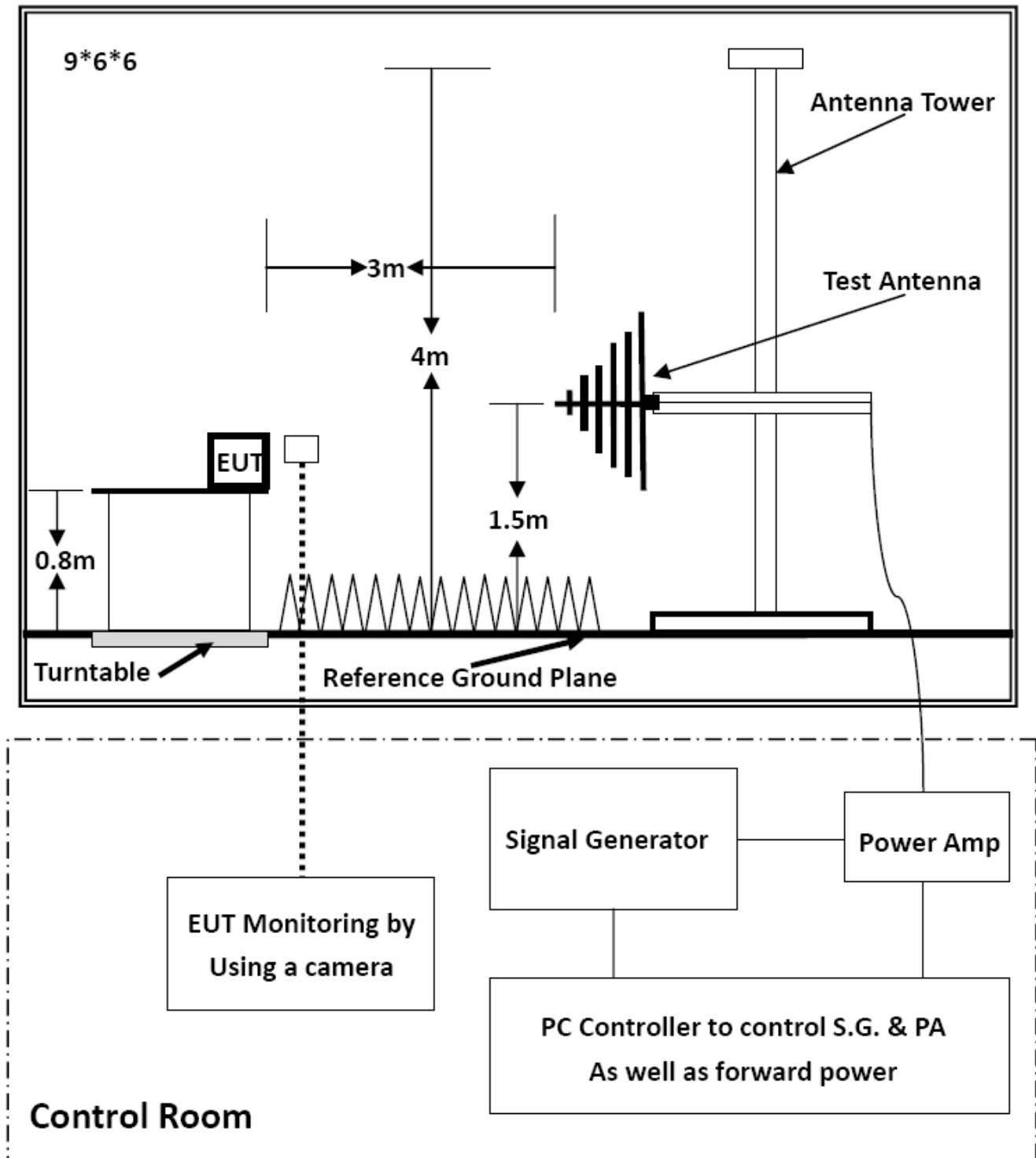
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3.6. RF Electromagnetic Field (80 MHz - 6000 MHz)

3.6.1 Test Configuration



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3.6.2 Test Standard

ETSI EN 301 489-1, ETSI EN 301 489-17 (EN 61000-4-3: 2006+A2: 2010)

Test level 2 at 3V/m.

3.6.3 Severity Level

Level	Field Strength (V/m)
1	1
2	3
3	10
X	Special
Performance Criterion: A	

3.6.4 Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. EUT is set 3 meter away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually. In order to judge the EUT performance, a CCD camera is used to monitor EUT screen. All the scanning conditions are as follows:

Condition of Test	Remark
Fielded Strength	3 V/m (Severity Level 2)
Radiated Signal	Unmodulated
Scanning Frequency	80-6000MHz
Dwell time of radiated	0.0015 decade/s
Waiting Time	3 Sec.

3.6.5 Test Results

PASS

Please refer to Appendix A.6 for Emission and Immunity test results.



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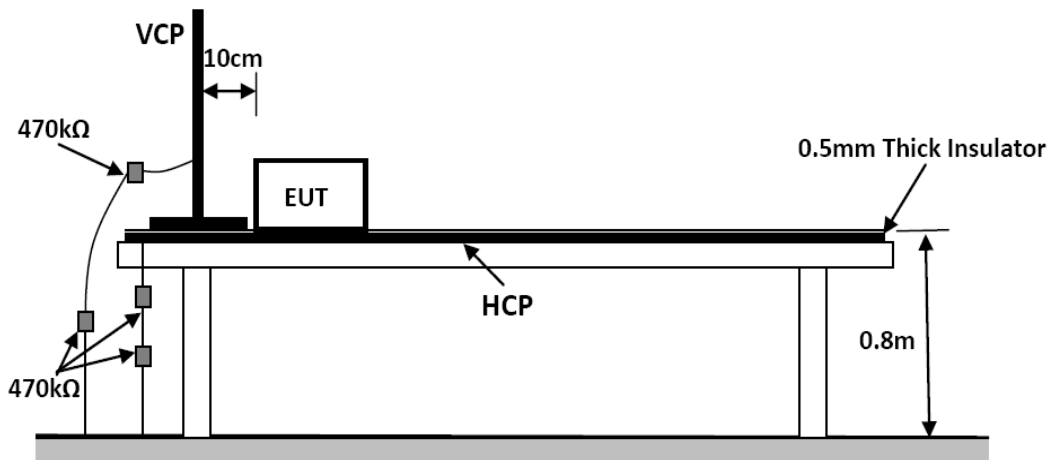
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3.7. Electrostatic Discharge

3.7.1 Test Configuration



EN 61000-4-2 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on a insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground reference plane in conformance with this requirement.

For tabletop equipment, a 1.5 by 1.0-meter metal sheet (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 k Ohms resistors in series. The EUT and attached cables are isolated from this metal sheet by 0.5-millimeter thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used.

3.7.2 Test Procedure

ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 61000-4-2: 2009

Test level 3 for Air Discharge at ± 8 kV

Test level 2 for Contact Discharge at ± 4 kV

3.7.2.1 Air Discharge

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

3.7.2.2 Contact Discharge

All the procedure shall be same as Section 3.7.2.1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

3.7.2.3 Indirect Discharge For Horizontal Coupling Plane

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.



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3.7.2.4 Indirect Discharge For Vertical Coupling Plane

At least 10 single discharges (in the most sensitive polarity) shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

3.7.3 Test Results

PASS

Please refer to Appendix A.7 for Emission and Immunity test results.



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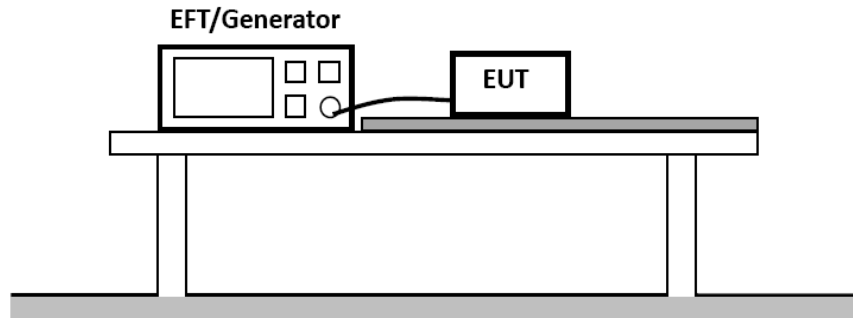
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3.8. Electrical Fast Transient Immunity

3.8.1 Test Configuration



3.8.2 Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11)/ EN61000-4-4: 2012

Test level 2 at 1 kV

Test Level		
Open Circuit Output Test Voltage $\pm 10\%$		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1	0.5 kV	0.25 kV
2	1 kV	0.5 kV
3	2 kV	1 kV
4	4 kV	2 kV
X	Special	Special
Performance Criterion: B		

3.8.3 Test Procedure

The EUT is put on the table, which is 0.8 meter high above the ground. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

3.8.3.1 For input and output AC power ports:

The EUT is connected to the power mains by using a coupling device, which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 minutes.

3.8.3.2 For signal lines and control lines ports: No I/O ports. It's unnecessary to test.

3.8.3.3 For DC output line ports: It's unnecessary to test.

3.8.4 Test Results

PASS

Please refer to Appendix A.8 for Emission and Immunity test results.



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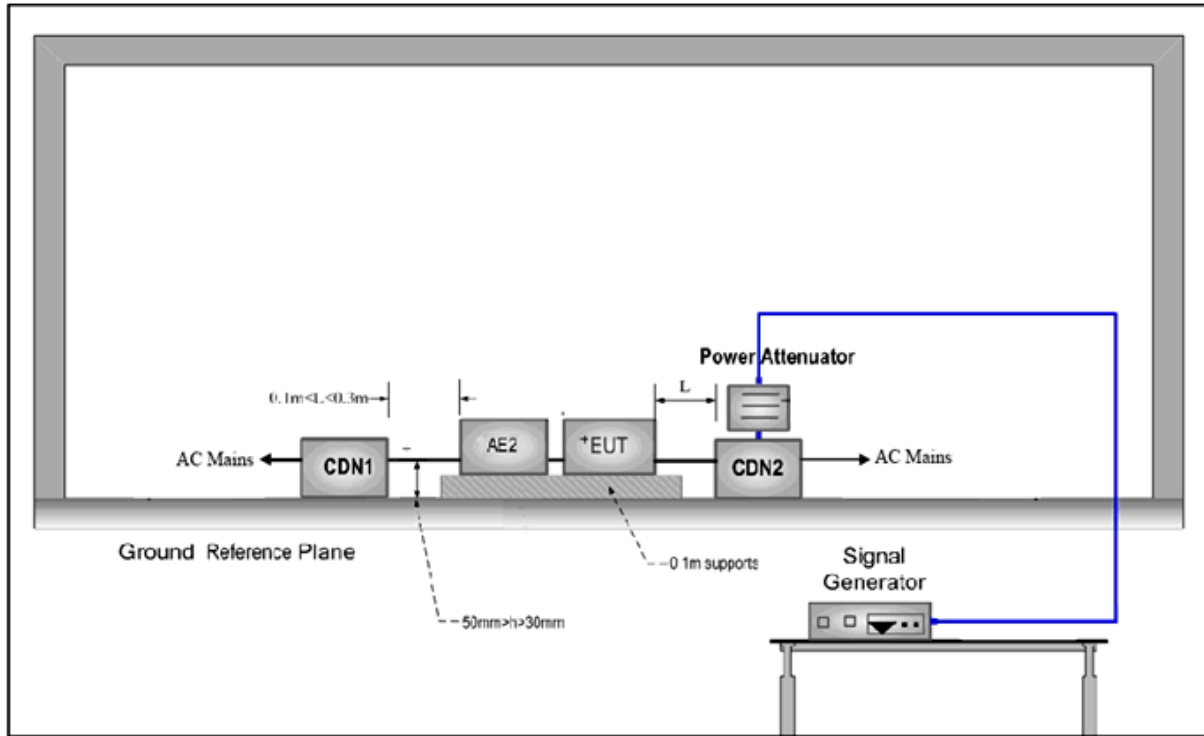
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3.9. RF Common Mode

3.9.1 Test Configuration



3.9.2 Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11)/ EN 61000-4-6: 2014

Test level: 3V (r.m.s.) for 0.15MHz ~ 10MHz; 3V (r.m.s.) to 1V (r.m.s.) for 10MHz ~ 30MHz; 1V (r.m.s.) for 30MHz ~ 80MHz

Modulation type: AM

Modulation depth: 80%

Modulation signal: 1 kHz

Test Level	
Level	Voltage Level (r.m.s.) (V)
1	1
2	3
3	10
X	Special
Performance Criterion: A	



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3.9.3 Test Procedure

3.9.3.1 Let the EUT work in test mode and test it.

3.9.3.2 The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50mm (where possible).

3.9.3.3 The disturbance signal described below is injected to EUT through CDN.

3.9.3.4 The EUT operates within its operational mode(s) under intended climatic conditions after power on.

3.9.3.5 The frequency range is swept from 150kHz to 10MHz using 3V signal level, 10MHz to 30MHz using 3V to 1V signal level, 30MHz to 80MHz using 1V signal level, and with the disturbance signal 80% amplitude modulated with a 1kHz sine wave.

3.9.3.6 The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

3.9.3.7 Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

3.9.4 Test Results

PASS

Please refer to Appendix A.9 for Emission and Immunity test results.



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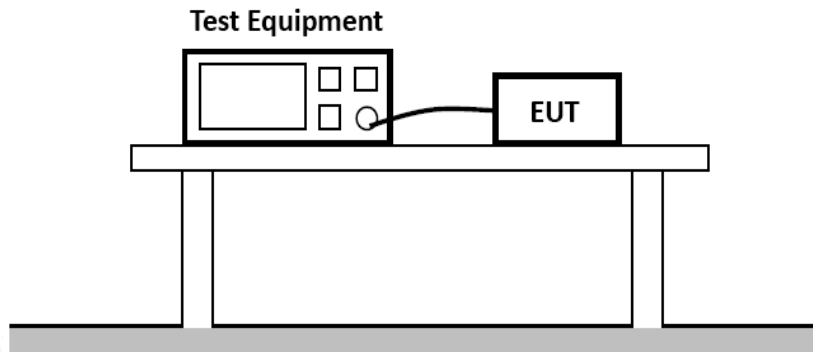
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3.10. Surges, Line to Line and Line to Ground

3.10.1 Test Configuration



3.10.2 Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11) / EN 61000-4-5: 2014+A1:2017

L-N: Test level 2 at 1 kV

L-PE, N-PE Test Level 3 at 2kV

Test Level		
Open Circuit Output Test Voltage $\pm 10\%$		
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines
1	0.5 kV	0.25 kV
2	1 kV	0.5 kV
3	2 kV	1 kV
4	4 kV	2 kV
X	Special	Special
Performance Criterion: B		

3.10.3 Test Procedure

3.10.3.1 For line to line coupling mode, provide a 0.5 kV 1.2/50us voltage surge (at open-circuit condition).

3.10.3.2 At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.

3.10.3.3 Different phase angles are done individually.

3.10.3.4 Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

3.10.4 Test Results

PASS

Please refer to Appendix A.10 for Emission and Immunity test results.



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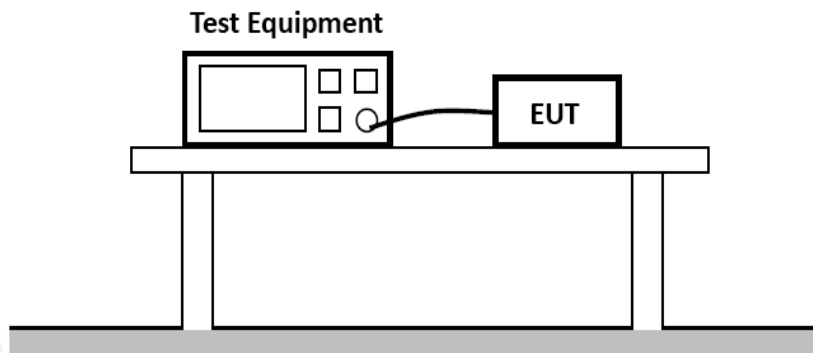
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3.11. Voltage Dips/Interruptions Immunity Test

3.11.1 Test Configuration



3.11.2 Test Standard

ETSI EN 301 489-1 V2.2.3 (2019-11)/ EN 61000-4-11: 2004
Test levels and Performance Criterion

Test Level		
Voltage Reduction $\%U_T$	Voltage Dips $\%U_T$	Duration (in Period)
100	0	0.5
100	0	1
30	70	5
Voltage Reduction $\%U_T$	Voltage Dips $\%U_T$	Duration (in Period)
100	0	250
Performance Criterion: B&C		

3.11.3 Test Procedure

3.11.3.1 The interruption is introduced at selected phase angles with specified duration.

3.11.3.2 Record any degradation of performance.

3.11.4 Test Results

PASS

Please refer to Appendix A.11 for Emission and Immunity test results.



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4. GENERAL PERFORMANCE CRITERIA FOR IMMUNITY TEST

4.1. Performance criteria for Continuous phenomena applied to Transmitter (CT)

For equipment of type II or type III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence. Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

4.2. Performance criteria for Transient phenomena applied to Transmitter (TT)

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence. Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.

4.3. Performance criteria for Continuous phenomena applied to Receiver (CR)

For equipment of type II or III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence. Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.

4.4. Performance criteria for Transient phenomena applied to Receiver (TR)

For equipment of type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence. Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.



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**Performance criteria for ETSI EN 301 489-17 V3.2.4 (2020-09)**

Criteria	During test	After test (i.e. as a result of the application of the test)
A	Shall operate as intended. (See note). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance. Shall be no loss of function. Shall be no loss of critical stored data.
B	May be loss of function.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no loss of critical stored data.
C	May be loss of function.	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no loss of critical stored data.
NOTE: Operate as intended during the test allows a level of degradation in accordance with clause 6.2.2.		





5. LIST OF MEASURING EQUIPMENT

LINE CONDUCTED EMISSION

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI Test Software	Farad	EZ	/	N/A	N/A
2	EMI Test Receiver	R&S	ESR3	102312	2024-03-02	2025-03-01
3	Artificial Mains	R&S	ENV216	101288	2024-06-06	2025-06-05
4	Pulse Limiter	R&S	ESH3-Z2	102750-NB	2024-06-06	2025-06-05
5	Impedance Stabilization Network	TESEQ	ISN T800	45130	2023-10-18	2024-10-17
6	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2024-06-06	2025-06-05

RADIATED DISTURBANCE

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI Test Software	Farad	EZ	/	N/A	N/A
2	3m Full Anechoic Chamber	MRDIANZI	FAC-3M	MR009	2022-08-17	2025-08-16
3	Positioning Controller	Max-Full	MF7802BS	MF780208586	N/A	N/A
4	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2021-09-12	2024-09-11
5	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2021-09-05	2024-09-04
6	EMI Test Receiver	R&S	ESPI	101940	2024-06-06	2025-06-05
7	Low-frequency amplifier	SchwarzZBECK	BBV9745	00253	2023-10-18	2024-10-17
8	High-frequency amplifier	JS Denki Pte	PA0118-43	JSPA21009	2023-10-18	2024-10-17
9	MXA Signal Analyzer	Agilent	N9020A	MY50510140	2023-10-18	2024-10-17
10	RS SPECTRUM ANALYZER	R&S	FSP40	100503	2024-06-06	2025-06-05
11	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2024-06-06	2025-06-05

VOLTAGE FLUCTUATION AND FLICKER/HARMONIC CURRENT EMISSIONS

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	HARMONICS&FLICKER MEASUREMENT SYSTEM	EVERFINE	HFM-3000	P630850CD1411116	2024-03-02	2025-03-01
2	HARMONICS&FLICKER TESTING POWER SOURCE	EVERFINE	HFS-4000	P624486CD1411124	2024-03-02	2025-03-01
3	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2024-06-06	2025-06-05

RF ELECTROMAGNETIC FIELD

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	RS Test Software	Tonscend	/	/	N/A	N/A
2	MXG Vector Signal Generator	Agilent	E4438C	MY42081396(6G)	2023-10-18	2024-10-17
3	3m Full Anechoic Chamber	MRDIANZI	FAC-3M	MR009	2022-08-17	2025-08-16
4	RF POWER AMPLIFIER	OPHIR	5225R	1052	2024-06-06	2025-06-05
5	RF POWER AMPLIFIER	OPHIR	5273F	1019	2024-06-06	2025-06-05
6	RF POWER AMPLIFIER	SKET	HAP_0306G-50W	/	2024-06-06	2025-06-05
7	Stacked Broadband Log Periodic Antenna	SCHWARZBECK	STLP 9128	9128ES-145	2023-07-14	2026-07-13
8	Stacked Mikrowellen Log.-Per Antenna	SCHWARZBECK	STLP 9149	9149-482	2024-07-20	2027-07-19
9	RS Electric field probe	narda	EP601	611WX80208	2024-06-25	2025-06-24
10	Sound Level meter	BK Precision	735	73500873100100	2024-06-06	2025-06-05



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Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
				20		
11	Audio Analyzer	R&S	UPV	1146.2003K02-10 1721-UW	2023-10-18	2024-10-17
12	Mouse Simulation	Bruel & Kjaer	4227	A0304216	2024-06-06	2025-06-05
13	Ear Simulation and supply	Bruel & Kjaer	2669.4182.5 935	A0305284	2024-06-06	2025-06-05
14	Acoustical Calibrators	Bruel & Kjaer	4231	A0304215	2024-06-06	2025-06-05
15	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2024-06-06	2025-06-05

ELECTROSTATIC DISCHARGE

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	ESD Simulator	SCHLODER	SESD 230	604035	2024-07-15	2025-07-14
2	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2024-06-06	2025-06-05

ELECTRICAL FAST TRANSIENT IMMUNITY

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Immunity Simulative Generator	EM TEST	UCS500-M4	0101-34	2024-06-06	2025-06-05
2	Electric fast pulse group generator	3ctest	EFT-4001G	EC0461044	2023-10-18	2024-10-17
3	Capacitive coupling clamp	3CTEST	EFTC	EC0441098	2024-06-06	2025-06-05
4	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2024-06-06	2025-06-05

RF COMMON MODE

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Simulator	FRANKONIA	CIT-10/75	A126A1195	2024-06-06	2025-06-05
2	CDN	FRANKONIA	CDN-M2+M3	A2210177	2024-06-06	2025-06-05
3	6dB Attenuator	FRANKONIA	DAM25W	1172040	2024-06-06	2025-06-05
4	Electromagnetic coupling injection clamp	ZHINAN	ZN23203	14017	2024-06-06	2025-06-05
5	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2024-06-06	2025-06-05

SURGES, LINE TO LINE AND LINE TO GROUND

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Immunity Simulative Generator	EM TEST	UCS500-M4	0101-34	2024-06-06	2025-06-05
2	Communication wave lightning generator	HTEC	HTSG 70	181701	2023-10-18	2024-10-17
3	Symmetrical data line coupling network	HTEC	HCN 8	182701	2023-10-18	2024-10-17
4	Data line decoupling network	HTEC	HDEC 8	182702	2023-10-18	2024-10-17
5	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2024-06-06	2025-06-05

VOLTAGE DIPS/INTERRUPTIONS IMMUNITY TEST

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	Voltage dips and up generator	3CTEST	VDG-1105G	EC0171014	2024-06-06	2025-06-05
2	WIDEBAND RADIO COMMUNICATION TESTER	R&S	CMW 500	103818	2024-06-06	2025-06-05

Note: N/A means no calibration requirement



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6. PHOTOGRAPHS OF TEST SETUP

Please refer to separated files Appendix B for Photographs of Test Setup_EMC

7. PHOTOGRAPHS OF THE EUT

Please refer to separated files Appendix C for Photographs of The EUT.

-----THE END OF REPORT-----



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

Report Number.....: LCSA08074117S

Date of issue.....: 2024-11-21

Total number of pages.....: 92

Name of Testing Laboratory preparing the Report.....: Shenzhen LCS Compliance Testing Laboratory Ltd.
Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China

Applicant's name.....: Woan Technology (Shenzhen) Co., Ltd
Address.....: Room 1101, Qiancheng Commercial Center, No. 5 Haicheng Road, Mabu Community, Xixiang Sub-district, Bao'an District, Shenzhen, Guangdong, P.R.China, 518100

Test specification:

Standard.....: IEC 60669-2-1:2002, IEC 60669-2-1:2002/AMD1:2008, IEC 60669-2-1:2002/AMD2:2015 used in conjunction with IEC 60669-1:2017

Test procedure.....: Type test

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

TRF template used.....: IECEE OD-2020-F1:2020, Ed.1.3

Test Report Form No.....: TRF-4-S-059 A/0

Test Report Form(s) Originator.....: IMQ S.p.A.

Master TRF.....: Dated 2020-03-05

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Test item description.....:	SwitchBot Relay Switch
Trade Mark.....:	SwitchBot
Manufacturer.....:	Same as the Applicant
Model/Type reference.....:	W5502300, W5502310, W5502320, W5502330, W5502340, W5502350
Ratings.....:	16A/100-240V~, 50/60Hz, Max.
Testing procedure and testing location:	
Testing Laboratory:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Testing location/ address.....:	Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China
Tested by.....:	Angus Lu / Test engineer
Checked by.....:	Tim Liu / Project engineer
Approved by.....:	Hart Qiu / Technical manager
List of Attachments (including a total number of pages in each attachment): Attachment No.1: EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES Attachment No.2: Photo documentation	
Summary of testing:	
Tests performed (name of test and test clause): The submitted samples were found to comply with the requirements of: ➢ Electrical safety IEC 60669-2-1:2021 used in conjunction with IEC 60669-1:2017 EN IEC 60669-2-1:2022+A11:2022 used in conjunction with EN 60669-1:2018	Testing location: Shenzhen LCS Compliance Testing Laboratory Ltd. Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China
Summary of compliance with National Differences (List of countries addressed): List of countries addressed: National Differences and Group Differences as per CB bulletin. See attachment of National and Group Differences for details ☒ The product fulfils the requirements of New Zealand and Australia differences. EN IEC 60669-2-1:2022+A11:2022 used in conjunction with EN 60669-1:2018	

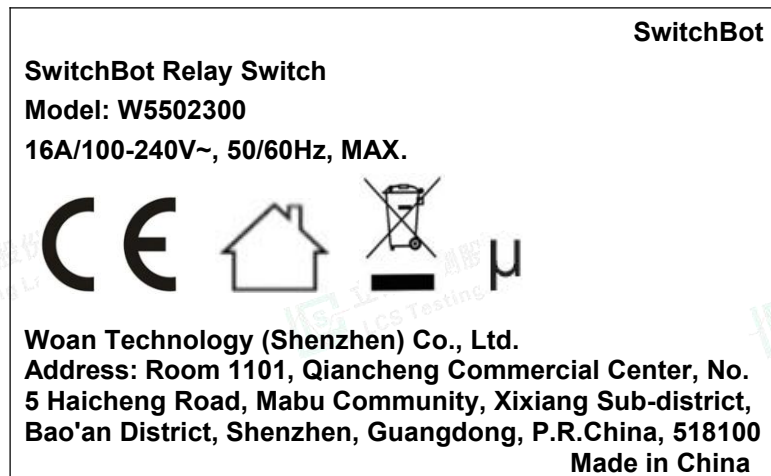


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Copy of marking plate:

The artwork below may be only a draft.



Remark:

1. Height of RCM mark at least 3mm, height dimension of CE mark at least 5mm, height of WEEE symbol at least 7mm.



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**Test item particulars:**

Type of electronic switch and its function (examples given in Annex AA)	Smart Controller (Electronically operated mechanical switching device)
Pattern number	1
Contact opening (gap) and switch performance	normal gap / mini-gap / micro-gap / without contact gap (semiconductor switching device)
Degree of protection against access to hazardous parts and against harmful effects due to the ingress of solid foreign objects	IP2X / IP4X / IP5X
Degree of protection against harmful effects due to the ingress of water	IPX0 / IPX4 / IPX5
Method of actuating	rotary / tumbler / rocker / push-button / cord-operated / momentary contact / touch / proximity / optical / acoustic / Electronic RCS / Electronic TDS / other external influences:
Method of mounting	surface-type / flush-type / semi flush-type / panel-type / architrave-type / height > 1.7 m
Method of installation	design A / design B
Type of terminals	screw-type / screwless (rigid) / screwless (rigid and flexible) / soldered by flexible cord
Flexible cable outlet	without / with
Rated current (A) / Rated load (VA or W)	16A Max.
Minimum current (A) / Minimum load (VA or W)	N/A
Kind of load controlled by the switch	incandescent lamp / externally ballasted lamps: (e.g. fluorescent lamps, CFL, LED) / motors / self-ballasted lamps: (e.g. CFLi, LEDi) / declared load (Resistive) / DLT-controlled load
Type of switching mechanism	directly operated / sequentially operated / bistable / monostable (only for RCS)
Kind of energization of the control circuit	Electronic RCS energized by impulses / Electronics RCS permanently energized
Type of control mechanism	mechanical / thermal / pneumatic / hydraulic / electrical / combination(s) of the previous (only TDS)
Rated control voltage (V)	a.c. / d.c.
Rated control current (A)	a.c. / d.c.
Rated voltage (V)	110 V / 120 V / 130 V / 220 V / 230 V / 240 V 100-240V~
Rated frequency (Hz)	50/60Hz
Characteristic of fuses	N/A
Electronics RCS or TDS having	SELV parts / PELV parts



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**Possible test case verdicts:**

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

Testing:

Date of receipt of test item: 2024-08-08

Date (s) of performance of tests: From 2024-08-08to 2024-11-21

General remarks:

" (See Enclosure #)" refers to additional information appended to the report.

" (See appended table)" refers to a table appended to the report.

Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

Clause numbers between brackets refer to clauses in IEC 60669-2-1:2002 / AMD1:2008 / AMD2:2015.

"*" This symbol refers to not within the scope of CNAS recognition.

Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60669-2-1:2002 / AMD1:2008 / AMD2:2015:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....

☐ Yes

☒ Not applicable

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies).....: Wo' an Technology (Shenzhen) Co., Ltd. Huizhou Branch
Building 2, 2nd Floor, Baidi Zhigu Science and Technology Innovation Park, No.263 Chang'an Avenue, Shatian Town, Huiyang District, Huizhou City, Guangdong, China

General product information and other remarks:

1. This product is a compact intelligent controller, and installation should comply with specific wiring regulations.
2. Tests are conducted on model W5502300 to represent the other model.
3. All models have the same components, internal construction and shape, except for the different model names.



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IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
8	MARKING		P
8.1	General		P
(8.1)	Switches marked with:		P
	- rated voltage (V)	See copy of marking plate	P
	- rated control voltage, if different from rated voltage (V)		N/A
	- rated current (A) or rated load (VA or W)	See copy of marking plate	P
	- symbol for nature of supply	~	P
	- manufacturer's or responsible vendor's name, trade mark or identification mark	See copy of marking plate	P
	- type reference	See copy of marking plate	P
	- symbol for mini-gap construction (m)		N/A
	- symbol for micro-gap construction (μ)	See copy of marking plate	P
	- symbol for semiconductor switching device (ϵ)		N/A
	- first IP characteristic numeral, if declared higher than 2, in which case the second characteristic numeral is also marked	IP20	N/A
	- second IP characteristic numeral, if declared higher than 0, in which case the first characteristic numeral is also marked	IP20	N/A
	- rated frequency (Hz)	See copy of marking plate	P
	- rating and type of any fuse incorporated		N/A
	- symbol for kind of load (see 8.2)	See copy of marking plate	P
	- the term "extension unit", if applicable, followed by the identifying reference	No extension unit	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
	For electronic switches with included automatic function, number of operations shall be stated in the accompanying instruction sheet when number of operation is higher than the indicated in sub clause 19.101, 19.102 and 19.104 and 19.109		N/A
	- symbol for the adjustment of the delay time, if applicable		N/A





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- symbol for the positions "Permanent on" and "Permanent off", if applicable		N/A
	- symbol for "Delay time"		N/A
8.2 (8.2)	Symbols		P
	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
	- for electronic RCS, Subclause 8.2 of IEC 60669-2-2 applies		P
	- for electronic TDS, Subclause 8.2 of IEC 60669-2-3 applies		N/A
8.3 (8.3)	Visibility of markings		P
	Markings are clearly visible with normal or corrected vision, without additional magnification		P
	Marking of electronic switch placed on the main part:		P
	- the rated current or rated load, rated voltage, symbol for nature of supply, rated frequency (if required by 8.1), at least one type of load, the rating and type of any incorporated fuse (this shall be marked on the fuse-holder or in the proximity of the fuse),		P
	- either the name, trade mark, or identification mark of the manufacturer or of the responsible vendor	See copy of marking plate	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	See copy of marking plate	P
	- type reference		P
	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	See copy of marking plate	P
	If a dimmer is intended to be used together with an iron core transformer, information shall be given in the manufacturer's instructions that only a transformer intended to be used with a dimmer shall be used.		N/A





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	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		P
	Markings are placed on parts which cannot be removed without the use of a tool		P
8.4 (8.4)	Marking on terminals for phase conductors		P
	Terminals for phase conductors (supply conductors): identified unless method of connection is of no importance, self-evident or indicated on a wiring diagram		P
	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		P
	Installation not made clear by the markings: a wiring diagram is provided with each electronic switch		P
	Terminals for the control circuit of a priority RCS with a current sensitive coil or voltage sensitive coil are marked with the appropriate symbol indicated in 8.2		N/A
	Terminals for the control circuit: marked according to IEC 60445 and/or with the symbols according to 8.2		N/A
8.5	Marking on terminals for neutral and earth conductors		P
	Neutral terminals: N.....: N		P
	Earthing terminals: [earth symbol (IEC 60417-5019:2006-08)]:		N/A
	Markings not placed on screws or other easily removable parts		P





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	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 (8.6)	Marking of the switch position		N/A
	Switches marked to indicate the switch position: they are so marked that the direction of movement of the actuating member to its different positions or the actual position is clearly indicated..... :		N/A
	Switches having more than one actuating member: marking indicates the effect achieved by the operation		N/A
	Marking clearly visible on the front of the switch		N/A
	Not possible to fix cover, cover plate, or removable actuating members in an incorrect position		N/A
	Symbols for "on" and "off" not used for indication of switch positions unless clearly indicate the direction of movement of the actuating members		N/A
	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		N/A
	- marking on the on-/off-state position		N/A
	- indicator lamp		N/A
	- adjusting the lamp dimmer in the lowest control state and at rated voltage minus 10%: light still visible		N/A
	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:		N/A
	- for incandescent lamps:		N/A
	the adjustment of lamp dimmers is made by the manufacturer		N/A
	not possible to reduce the lowest setting without a		N/A





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	tool		
	- for fluorescent lamps:		N/A
	the adjustment of lamp dimmers is made by the manufacturer		N/A
	it is possible for the installer to alter the lowest setting if indicated in an installation instruction		N/A
8.7	Additional requirements for marking		P
	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
	Instruction sheets are written in the official language (s) of the country in which the switch is to be sold		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		N/A
8.8 (8.8)	Durability		P
	Marking durable and easily legible. Test: 15 s with water and 15 s with 95 % n-hexane.		P
9 (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 (10.1)	Prevention of access to live parts		P
	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		N/A
	Specimen is mounted as in normal use and fitted with conductors as specified		P
	Test probe B of IEC 61032 is applied in every possible position, an electrical indicator with a voltage between 40 V and 50 V being used to show contact with the relevant part		P





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Switches having enclosures or covers in thermoplastic or elastomeric material: additional test carried out at $35\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$. Switches are subjected for 1 min to a force of 75 N, applied through the tip of test probe 11 of IEC 61032		P
	Test finger applied to thin-walled knock-outs with a force of 10 N		P
	- viewing windows or the like on electronic switches intended to be mounted at a height $> 1.7\text{ m}$ with a force of 30 N		N/A
	The test probe is not applied to membranes and the like. These parts are tested according to 13.15.1.		N/A
	During the test: switches not deform and no live parts accessible		P
10.2 (10.2)	Requirements for operating parts		P
	Knobs, operating levers, push buttons, rockers and the like: of insulating material, unless:		P
	- accessible metal parts separated from metal parts of mechanism by double or reinforced insulation, or		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 $2\text{ k}\Omega$:		N/A
	current measured: $\leq 0.7\text{ mA}$ (peak value), for a.c. up to 1 kHz		N/A
	current measured: $\leq 0.7\text{ mA}$ multiplied by the value of frequency in kHz, but not exceed 70 mA , for a.c.		N/A





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	above 1 kHz		
	current measured: ≤ 2 mA, for d.c.		N/A
10.3	Requirements for accessible metal parts		P
10.3.1	Accessible parts of switches with $I_n \leq 16$ A: made of insulating material		P
10.3.2	Metal covers or cover plates protected by supplementary insulation made by insulating linings or insulating barriers		N/A
	Insulating linings or insulating barriers:		--
	- cannot be removed without being permanently damaged, or designed that		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
	Linings or barrier comply with the tests of clauses 16 and 23		N/A
10.3.3	Earthing of metal covers or cover plates: connection of low resistance		N/A
10.4	Requirements for insulation of the mechanism		N/A
	Metal parts of 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	Requirements for insulation of the mechanism with respect to the surrounding environment		N/A
	Metal parts of mechanism not accessible and insulated from accessible metal parts, unless		N/A
	- separated from live parts (creepage distances and clearances have at least twice the value specified in clause 23), or		N/A
	- reliably connected to earth		N/A





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Unenclosed stack-type switches having a metal spindle pivoting in a metal base plate: creepage distances and clearances between live parts and the spindle, and between metal parts of the mechanism and base plate, have at least twice the values specified in clause 23		N/A
10.6	Requirements for switches operated indirectly		N/A
	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
10.7	Requirements for switches with replaceable pull cord		N/A
	Cord-operated switches: impossible to touch live parts when fitting or replacing the pull cord		N/A
(10.101)	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 dismounted from its supporting means for the replacement of the fuse-link)		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		N/A
	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:		N/A
	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





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
11 (11)	PROVISION FOR EARTHING		N/A
	Clause not applicable to SELV electronic switches		N/A
11.1	General		N/A
	Accessible metal parts: provided with, or permanently and reliably connected to, an earthing terminal		N/A
11.2	Earthing terminals		N/A
	Earthing terminals: with screw clamping or screwless terminals and comply with clause 12		N/A
11.3	Requirements for surface-type switches		N/A
	Surface-type switches with an enclosure of insulating material, with IP > X0 and more than one cable inlet, are provided 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	Test for earthing connection		N/A
	Connection between earthing terminal and accessible metal parts: of low resistance		N/A
	Test current equal to 1.5 I _n or 25 A (A)		—
	Resistance ≤ 0.05 Ω (Ω)		N/A
(11.101)	Printed circuit of printed circuit boards board may be used to provide protective earthing continuity if:		N/A
	- at least two tracks with independent soldering points which withstand a single short circuit test similar to 101.3 and immediately after the switch shall fulfil the requirements of 11.4, or		N/A
	- a single track is used with two independent means of connection on each end which will withstand a single short circuit test similar to 101.3 and immediately after the switch shall fulfil the requirements of 11.4,		N/A
	In addition:		N/A
	- the laminated of the printed circuit board shall consist of epoxide glass fabric copper-clad laminated sheet, and		N/A
	- the printed circuit boards shall comply with the overload test of 101.1.1.2.		N/A
12	TERMINALS		P





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
12.1 (12.1)	General		P
	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
	Rigid solid conductors shall be of class 1, rigid stranded conductors shall be of class 2 and flexible conductors shall be of class 5 according to IEC 60228		N/A
	Terminals having screw clamping which are in compliance with IEC 60998-2-1 can be used.		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.		P
12.2	Terminals with screw clamping for external copper conductors		P
12.2.1	Terminals with screw clamping having cross-sectional areas as shown in Table 4		P
	- for rigid copper conductors only, or		P
	- for both rigid and flexible copper conductors (tests carried out with rigid and then repeated with flexible conductors)		N/A
	Rated current (A) : 16A Max.		—
	Type of conductor (rigid / flexible) : Rigid		—
	Smallest / largest cross-sectional area (mm ²) : 1.5/4.0		—
	Diameter of largest conductor (mm) : 2.72		—
	Figure of terminal..... : 1 / 2 / 3 / 4 / 5		—
	Minimum diameter D (minimum dimensions) of conductor space: required (mm); measured (mm) ... : 3.6; 3.6		P
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		P





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
12.2.4	Terminals resistant to corrosion		P
12.2.5	Terminals with screw clamping clamp the conductor (s) without undue damage to the conductor (s)	See appended table 12.2.5	P
	For screws having a hexagonal head with slot for tightening, test shall be made twice, first the torque applying to the hexagonal head and then applying the torque by means of a screwdriver		N/A
	During the test: conductor not slip out, no break near clamping unit and no damage		P
12.2.6	Terminals 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
12.2.8	Terminals not work loose from their fixing to the switch		P
	Movement of the terminal is allowed as long as it is sufficiently limited so as to prevent noncompliance with this document		N/A
	Use of sealing compound or resin is considered to be sufficient, provided that:		--
	- the sealing compound or resin is not subject to stress during normal use, and		N/A
	- the effectiveness of the sealing compound or resin is not impaired by temperatures attained by the terminal		N/A
	Torque test:		P
	- rated current (A)	16A Max.	—
	- solid rigid copper conductor of the largest cross-sectional area (mm ²) (table 4)	4.0	—
	- torque (Nm) (table 5 or appropriate figures 1, 2, 3, 4)	2.0	—
	Screws and nuts tightened and loosened 5 times. During the test: terminals not work loose and show no damage		P





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
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		P
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):	1.8; >1.8	P
	Mantle terminals: distance g no less than the value specified in figure 5: required (mm); measured (mm):		N/A
12.2.12	Lug terminals:		N/A
	- used only for switches having rated current ≥ 40 A		N/A
	- fitted with spring washers or equally effective locking means		N/A
12.3	Screwless terminals for external copper conductors		N/A
12.3.1	Screwless terminals of the type suitable for:		N/A
	- for rigid copper conductors only, or		N/A
	- for both rigid and flexible copper conductors (tests carried out with rigid and then repeated with flexible conductors)		N/A
	12.3 is not applicable to switches provided with		N/A
	- screwless terminals requiring the fixing of special devices to the conductors before clamping in the screwless terminal		N/A
	- screwless terminals requiring twisting of the conductors		N/A
	- screwless terminals providing direct contact to the conductors by means of edges or points penetrating the insulation		N/A
12.3.2	Screwless terminals provided with clamping units which allow the proper connection of rigid or of rigid and flexible conductors having nominal cross-sectional areas as shown in table 7		N/A
	Rated current (A)		—
	Type of conductor (rigid / flexible)		—
	Smallest / largest cross-sectional area (mm ²)		—





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





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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 9	See appended table 12.3.10	N/A
	During the test conductors not move noticeably in the clamping unit		N/A
	After these tests: neither terminals nor clamping means have worked loose and conductors show no deterioration		N/A
12.3.11	Screwless terminals withstand electrical and thermal stresses occurring in normal use	See appended table 12.3.11	N/A
	After the test: inspection show no changes		N/A
	Repetition of test according to 12.3.10: screwless terminals withstand mechanical stresses occurring in normal use	See appended table 12.3.11	N/A
	During application of the pull conductor not come out of the terminal		N/A
	Test with apparatus shown in figure 10	See appended table 12.3.11	N/A
	- measured after 24 th and 192 th temperature cycle		N/A
	- measured after any three of 48 th , 72 th , 96 th , 120 th , 144 th or 168 th temperature cycle		N/A
	During the test conductors not move noticeably in the clamping unit		N/A
	After these tests: neither terminals nor clamping means have worked loose and conductors show no deterioration		N/A
12.3.12	Screwless terminals: connected rigid solid conductor remains clamped, even when deflected during normal installation	See appended table 12.3.12	N/A
13	CONSTRUCTIONAL REQUIREMENTS		P
13.1	Mechanical requirements for insulating means		P
	Insulating lining, barriers and like: adequate mechanical strength and secured in a reliable manner		P
13.2	Installation requirements		P
	Switches constructed so as to permit:		P





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Clause	Requirement + Test	Result - Remark	Verdict
	- 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		N/A
	Switches comprising screwless terminals: connecting and/or disconnecting means of the screwless terminals cannot be activated by the conductors during and after installation of the switch in a box or on a wall		N/A
	Compliance is checked by inspection and in case of doubt by the following test		N/A
	The test is carried out with a solid copper conductor having the smallest cross-sectional area, as specified in 12.3.2 (mm ²).....:		N/A
	If it is not possible to exert a force onto the connecting / disconnecting means, the product is deemed to comply with the requirements of this sub clause without further tests		N/A
	During the application of the pull, the conductor do not come out of the screwless terminal		N/A
	Switches classified as design A: permit easy positioning and removal of the cover or cover plate, without displacing the conductors		P
13.3	Fixing of covers, cover plates and actuating members		P
13.3.1	Covers, cover-plates and actuating members or parts of them intended to ensure protection against electric shock:		P
	- held in place at two or more points by effective fixings		P
	- fixed by means of a single fixing, e.g. by a screw, provided that they are located by another means (e.g. by a shoulder)		N/A
	Where the fixing of covers, cover plates or actuating members of switches of design A serves to fix the main part there are means to maintain the main part in position, even after removal of the covers, cover plates or actuating members.		P





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Clause	Requirement + Test	Result - Remark	Verdict
13.3.2	Covers, cover plates or actuating members whose fixing is of the screw-type:		N/A
	Compliance checked by inspection only		N/A
13.3.3	Covers, cover plates or actuating members whose fixing is not dependent on screws and whose removal is obtained by applying a force in a direction approximately perpendicular to the mounting / supporting surface (see table 12):		P
	Compliance checked, when their removal may give access, with the standard test finger:		P
	- when their removal may give access, with the test probe B of IEC 61032, to live parts:	by the tests of 20.5	P
	- when their removal may give access, with the test probe B of IEC 61032, to non-earthed metal parts separated from live parts in such a way that creepage distances and clearances have the values at least equal to those shown in table 23:	by the tests of 20.6	N/A
	- when their removal may give access, with the test probe B of IEC 61032, only to	by the tests of 20.7	N/A
	- insulating parts, or		N/A
	- earthed metal parts, or		N/A
	- metal parts separated from live parts in such a way that creepage distances and clearances have at least twice the values shown in table 23, or		N/A
	- live parts of SELV circuits not greater than 25 V AC and 60 V DC:		N/A
13.3.4	Covers, cover-plates or actuating members whose fixing is not dependent on screws and whose removal is obtained by using a tool, in accordance with the manufacturer's instructions given in an instruction sheet or catalogue:		N/A
	By the same tests of 13.3.3 except that the covers, cover plates, actuating members or parts of them need not come out when applying a force not exceeding 120 N in directions perpendicular to the mounting / supporting surface		N/A
13.4	Openings in normal use		P
	Switches: no free openings in their enclosures according to their IP classification		P
	Free openings according to 10.102 and 10.103 are accepted		N/A
(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		N/A





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Clause	Requirement + Test	Result - Remark	Verdict
	result in a hazard		
	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 knob have not moved so as to impair compliance with this standard		N/A
13.6	Mounting means		P
	Screws or other means for mounting the switch on a surface or in a box or enclosure: easily accessible from the front.		P
	Fixing means not serve any other fixing purpose		P
13.7	Combination of switches		N/A
	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		N/A
	Accessories combined with switches: comply with their standard		N/A
13.9	Surface-type switches having an IP code higher than IP20		N/A
	Surface-type switches with IP > 20 are in according to their classification when fitted with conduits or with sheathed cables		N/A
	Surface-type switches with IPX4 or IPX5 have provisions for opening a drain hole	IP20	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	Installation in a box		P





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Clause	Requirement + Test	Result - Remark	Verdict
	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	Connection of a second current-carrying conductor		N/A
	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		N/A
	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	Provision for back entry from a conduit		N/A
	Surface-type switches: provision for back entry (if are intended)		N/A
13.14	Switch provided with membranes or the like for inlet openings		N/A
	Switch is provided with membranes or the like for inlet openings: replaceable		N/A
13.15	Requirements for membranes in inlet 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





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Clause	Requirement + Test	Result - Remark	Verdict
	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 be so designed and made of such material that: Introduction of the cables into the switch is permitted when the ambient temperature is low.		N/A
	Test on membranes not subjected to the ageing treatment, those without opening being suitably pierced:		N/A
	Switches kept at a temperature of $(-15 \pm 2)\text{ }^{\circ}\text{C}$ 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	Pilot light units		N/A
	Pilot light units comply with IEC 60669-2-1:2002, IEC 60669-2-1:2002/AMD1:2008 and IEC 60669-2-1:2002/AMD2:2015, 101.1.1.1 and Clause 102, as far as applicable		N/A
(13.101)	Cut-outs in electronic switches for motor speed control circuits: non-self-resetting		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)	TDS shall be of the resetting type		N/A
14	MECHANISM		P
	Clause only applicable to electronic switches provided with mechanical switching devices		P
14.1	Indication of the position		P





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Clause	Requirement + Test	Result - Remark	Verdict
	Actuating member of a switch, when released, automatically take up the position corresponding to that of moving contacts		P
14.2	Rest and intermediate position		N/A
	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	Undue arcing		P
	No undue arcing in slowly operation		P
	Test carried out at the end of the test of clause 19.1: breaking of the circuit 10 times, actuating member moved over a period of 2 s. During the test: no sustained arcing		P
14.4	Making and breaking		N/A
	Switches of pattern numbers 2, 3, 03 and 6/2 make and break all poles substantially simultaneously		N/A
	Neutral pole of switches of pattern numbers 03 not make after or break before the other poles		N/A
14.5	Action of the mechanism without cover or cover plate		P
	Action of the mechanism: independent of the presence of cover or cover plate. Test: no flicker		P
14.6	Cord-operated switches: effecting a change by application and removal of a steady pull not exceeding:		N/A
	- 45 N applied vertically, and		N/A
	- 65 N applied at 45° ± 5°		N/A
(14.101)	Position indicator used in RCS equipped with an incorporated hand-operated device indicates the position of the switching circuit clearly and without ambiguity		N/A
	TDS equipped with an incorporated hand-operated device and a position indicator is used indicates the position of the switching circuit clearly and without ambiguity		N/A
15	RESISTANCE TO AGEING, PROTECTION PROVIDED BY ENCLOSURES OF SWITCHES, AND RESISTANCE TO HUMIDITY		P





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Clause	Requirement + Test	Result - Remark	Verdict
15.1	Resistance to ageing		P
	Switches are resistant to ageing		P
	Parts intended for decorative purposes only, such as certain lids, are removed		P
	Switches and boxes placed for 7 days (168 h) in a heating cabinet at 70 °C ± 2 °C		P
	- no crack visible after test with normal or corrected vision without additional magnification		P
	- no sticky or greasy material as a result of heat		P
	- no trace of cloth (forefinger pressed with 5 N)		P
	- no damage		P
15.2	Protection provided by enclosures of switches		P
15.2.1	General		P
	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	IP20	P
15.2.2	Protection against access to hazardous parts and against harmful effects due to ingress of solid foreign objects		N/A
15.2.2.1	General		N/A
	Glands: torque (Nm) (2/3 of torque applied in 20.4) :		—
	Screws of the enclosure: torque (Nm) (2/3 table 5).....:		—
	Parts which can be removed without the aid of a tool are removed		N/A
	Glands are not filled with sealing compound or the like		N/A
15.2.2.2	Protection against access to hazardous parts		P
	Appropriate test according to IEC 60529: IP20		P
15.2.2.3	Protection against harmful effects due to ingress of solid foreign objects		P
	Appropriate test according to IEC 60529: IP20		P
	For the test of the first characteristic numeral 5, enclosures of switches are considered to be of category 2 (see IEC 60529:1989 and IEC 60529:1989/AMD1:1999, 13.4); dust not penetrate in a quantity to interfere with satisfactory operation or impair safety		N/A





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Clause	Requirement + Test	Result - Remark	Verdict
	For the test of the first characteristic numeral 6, enclosures of switches are considered to be of category 1 (see IEC 60529:1989, 13.6); no dust penetrate		N/A
15.2.3	Protection against harmful effects due to ingress of water		N/A
	Enclosure of switches provide a degree of protection against harmful effects due to ingress of water in accordance with their IP classification		N/A
	Appropriate test according to IEC 60529 :		N/A
	Flush-type and semi-flush-type switches fixed:		--
	- in a test wall using an appropriate box in accordance with the manufacturer's instructions		N/A
	- in a test wall according to figure 21		N/A
	Screws of the enclosure: torque (Nm) (2/3 table 5)..... :		—
	Glands: torque (Nm) (2/3 of torque applied in table 22)..... :		—
	Specimens withstand an electric strength test specified in 16.3 which is started within 5 min of completion of the test to 15.2		N/A
15.3	Resistance to humidity		P
	Switches proof against humidity which may occur in normal use		P
	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		P
	- 7 days (168 h) for switches with IP>X0		N/A
	After this treatment: specimens show no damage		P
16	INSULATION RESISTANCE AND ELECTRIC STRENGTH		P
16.1 (16)	General		P
	One pole of any pilot lights (if available), are disconnected for this test		N/A
	Insulation resistance and electric strength of switches be adequate		P
	Insulation resistance and electric strength are measured with the protective impedances according to 10.2 disconnected.		P
16.2 (16.1)	Test for measuring the insulation resistance		P





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Clause	Requirement + Test	Result - Remark	Verdict
	The insulation resistance measured 1 min after application of 500 V _{DC}	See appended table 16.2	P
	In addition, if electrically independent pattern numbers are combined in a common base, additional tests for each combination performed		N/A
16.3 (16.2)	Electric strength test		P
	Electric strength: AC test voltage applied for 1 min	See appended table 16.3	P
	In addition, if electrically independent pattern numbers are combined in a common base, additional tests for each combination performed		N/A
17	TEMPERATURE RISE		P
17.1	General		P
(17)	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
	The electronic switches are loaded until steady-state temperature is reached at a voltage between 0.9 and 1.1 times rated voltage, whichever is the more unfavourable.		P
	Dimmers operating with leading and trailing edge shall be tested in both modes with the relevant load.		N/A
	In lamp dimmers and speed controllers, the setting is adjusted such that the highest temperature rise will occur.		N/A
	For electronic TDS, Subclause 17.1 of IEC 60669-2-3 is applicable.		N/A
	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





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Clause	Requirement + Test	Result - Remark	Verdict
18	MAKING AND BREAKING CAPACITY		P
18.1	General		P
(18)	Electronic switches have adequate making and breaking capacity		P
	Test carried out only on electronic switches provided with mechanically or electromechanically operated contact mechanisms		P
	Contact mechanisms have adequate making and breaking capacity		P
	Test made on three new specimens of the complete contact mechanism		P
	Model/type reference	See copy of marking plate	—
	Pattern number	1	—
	Rated current (A) / Rated load (W or VA)	16A Max.	—
	Rated voltage (V)	100-240	—
	Test for electronics switches for the control of:		P
	- fluorescent lamp loads, as specified in 18.2 (18.1) of part 1;		N/A
	- motor speed control circuits, as specified in 18.2 (18.1) of part 1 and, additionally, in 18.101;		P
	- voltage of iron core transformers for extra low-voltage incandescent lamps, as specified in 18.2 (18.1), 18.3 (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 18.3 (18.2) of part 1;		N/A
	- other types of load, as specified in 18.2 (18.1) and 18.3 (18.2) of part 1.	Resistive	P
	- self-ballasted lamps, as specified in 18.2 (18.1) of part 1.		N/A
	Rate of operation (operation per minute)	30	—
	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)	4.0	—





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Clause	Requirement + Test	Result - Remark	Verdict
18.2 (18.1)	Overload		P
	Test with cos ϕ 0.3 alternating current		P
	- test voltage (1.1 Vn) (V)	264	—
	- test current (1.25 In) (cos ϕ 0.3) (A)	20	—
	- 200 operations; rate (operations per minute)	30	—
(18.1)	- 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	2s	—
	- samples number	3	—
	During the test: copper wire F not melt, specimens function correctly, no sustained arcing or welding of contacts		P
	After the test: specimens show no damage		P
	During the test: specimens are not lubricated		P
(18.1)	Test with cos ϕ 0.3 alternating current for electronics TDS		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 TDS whose rate of operation is limited by their application (for example, heat and light sensors): electronic TDS 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		—
	- samples number		—
	During the test: no sustained arcing		N/A
	After the test: specimens show no damage		N/A
18.3 (18.2)	Overload test with filament lamps		P
	Test with tungsten filament lamps load (switches with $I_n \leq 16$ A / $V_n \leq 250$ V and switches of pattern numbers 3 and 03 with $V_n > 250$ V)		P
	- test voltage (Vn) (V)	240	—
	- test current ($\geq 1.2 I_n$) (A)	16*1.2	—
	- number of 200 W tungsten filament lamps	24	—
	- 200 operations; rate (operations per minute)	15	—
	- samples number	#1-#3	—





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Clause	Requirement + Test	Result - Remark	Verdict
	During the test: copper wire F not melt, specimens function correctly, no sustained arcing or welding of contacts		P
	After the test: specimens show no damage		P
(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) :		—
	Making: 50 cycles with: test current: $9 I_n$ (A); test voltage: V_n (V); $\cos\phi$ 0.8 ± 0.05		N/A
	Breaking: 50 cycles with: test current: $6 I_n$ (A); test voltage: V_n (V); $\cos\phi$ 0.6 ± 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)		—
	- 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		—
	During the test: no sustained arcing		N/A
	After the test: specimens show no damage		N/A
19 (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)	40000	
	For electronic switches with included automatic function the number of operations for tests of subclauses 19.101, 19.102 19.104 and 19.109 is that specified in the relevant subclause.		—
	If a manufacturer declares a number of operation higher than those indicated in the relevant subclause, the tests shall be made according to declared value.		—
	Sticking of the contacts, which does not prevent the next operation, is not considered as welding.		P





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Clause	Requirement + Test	Result - Remark	Verdict
	Sticking of the contacts is permitted if the contacts can be separated with a force applied to the actuator of a value which does not damage the switch mechanically		P
	Electronic switches including electronic circuits which close the contact of the contact mechanism always at zero-crossing $\pm 20^\circ$ phase angle, shall be tested together with their electronic circuit		P
	Electronic RCS withstand without excessive wear or other harmful effect, the mechanical, electrical and thermal stresses occurring in normal use		P
	- model/type reference	See copy of marking plate	—
	- pattern number	1	—
	- nominal cross-sectional area per clause 18 (mm ²)	4.0	—
	- test voltage (Vn) (V)	240	—
	- test current (In) (cos ϕ 0.6) (A)	16	—
	- number of operations per table 17	40000	—
	- rate (operations per minute)	30	—
	- samples number	3	—
	Reduced electric strength per clause 16	See appended table 19.1	P
	Temperature rise test per clause 17 after normal operation	See appended table 19.1	P
	After the tests the specimens 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		N/A
	- deterioration of enclosures, insulating lining or barriers;		P
	- seepage of sealing compound		N/A
	- loosening of electrical or mechanical connections;		P
	- displacement of moving contacts of switches pattern number 2, 3, 03 or 6/2		N/A
	No sustained arcing in slowly operation (sub-clause 14.3)		P
	RCS equipped with an incorporated hand-operated device acting directly on the switching circuit:		P





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Clause	Requirement + Test	Result - Remark	Verdict
	- 10 % of operations indicated in table 17 made by hand or in an equivalent manner		P
	- no sustained arcing in slowly operation (sub-clause 14.3 for a.c. only)		P
	- control circuit supplied as specified in clause 18 for the remaining 90 % of the operations		P
	During normal operation test: failures allowed within 1 %; no more than three consecutive failures allowed		P
	Electronics TDS withstand without excessive wear or other harmful effect, the mechanical, electrical and thermal stresses occurring in normal use		N/A
	- model/type reference		—
	- pattern number		—
	- nominal cross-sectional area per clause 18 (mm ²)		—
	- test voltage (Vn) (V)		—
	- test voltage applied to control circuit (rated control voltage) (V)		—
	- test current (In) (cos φ 0.6) (A)		—
	- adjustable TDS: adjusted delay time (s)		—
	- adjusted switching time interval between off and on (s)		—
	- number of operations indicated in table 17 (maximum test duration for adjustable and non-adjustable TDS: 1000 h)	40000 / 20000 / 10000 / 5000	—
	TDS equipped with an incorporated hand-operated device acting directly on the switching circuit:		N/A
	- 10 % of operations indicated in table 17 made by hand or in an equivalent manner		N/A
	- no sustained arcing in slowly operation (sub-clause 14.3 for a.c. only)		N/A
	During normal operation test: failures allowed within 1 %; no more than three consecutive failures allowed		N/A
	- samples number		—
	Reduced electric strength per clause 16	See appended table 19.1	N/A
	Temperature rise test per clause 17 after normal	See appended table 19.1	N/A





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Clause	Requirement + Test	Result - Remark	Verdict
	operation		
	After the tests the specimens not show:		N/A
	- wear impairing their further use;		N/A
	- discrepancy between the position of the actuating member (if indicated) and that of the moving contacts		N/A
	- deterioration of enclosures, insulating lining or barriers;		N/A
	- seepage of sealing compound		N/A
	- loosening of electrical or mechanical connections;		N/A
	- displacement of moving contacts of switches pattern number 2, 3, 03 or 6/2		N/A
	No sustained arcing in slowly operation (sub-clause 14.3)		N/A
(19.101)	Contact mechanisms intended for incandescent lamp circuits with or without step down converters and dimmers for step-down converter; number of operations 40.000:		N/A
	Rate of operation (operation per minute)		—
	Rated current (A) / Rated load (W or VA)		—
	Rated voltage (V)		—
	During the test: specimens function correctly		N/A
	No sustained arcing in slowly operation (sub-clause 14.3)		N/A
	Contact mechanism intended for motor speed control circuits; number of operations 40000:		N/A
	Making: test current: 6 In (A); test voltage: Vn (V); $\cos\phi 0.65 \pm 0.05$		N/A
	Breaking: test current In (A); test voltage Vn (V); $\cos\phi 0.65 \pm 0.05$		N/A
	During the test: specimens function correctly		N/A
19.102	Contact mechanisms incorporated in electronic switches, intended for externally ballasted lamps (e.g. fluorescent lamps, CFL, LED) are checked by the test circuit indicated in Figure 103 Load A.		N/A
	- rate of operation (operation per minute)	30 (up to and including 10 A) / 15 (10 A to 16 A)	—
	- test voltage (Vn); test current (In) ($\cos\phi 0.9$); number of operations with load A	V; A; 10000 (up to and including 10 A) / 5000 (10 A to 16 A)	—





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Clause	Requirement + Test	Result - Remark	Verdict
	Rated voltage (V)		—
	During the test: copper wire F not melt, specimens function correctly, no sustained arcing or welding of contacts		N/A
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 Vn (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:		P
	Type of mechanical control unit	Relay	—
	Rated current (A) / Rated load (W or VA)	16A Max.	—
	Rated voltage (V)	100-240	—
	Test voltage: 1.1 Vn (V)	264	—
	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.....	15 operations per minute	—
	During the test: specimens function correctly		P
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 Vn (V)		—
	Switch state changed 10 times over the whole range from min to max and back to min, and/or		N/A





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Clause	Requirement + Test	Result - Remark	Verdict
	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		N/A
	Reduced electric strength per clause 16	See appended table 19	N/A
	Temperature rise test after normal operation 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	See appended table 19	N/A
	After the test, electronic switch is in operating condition		N/A
	Sealing compounds, if any, have not flowed		N/A
	Evaluation of compliance after the normal operation: after the tests the specimens shall not show:		N/A
	- wear impairing their further use;		N/A
	- discrepancy between the position of the actuating member (if indicated) and that of the moving contacts;		N/A
	- deterioration of enclosures, insulating lining or barriers;		N/A
	- loosening of electrical or mechanical connections;		N/A
	- seepage of sealing compound;		N/A
	- displacement of the moving contacts of electronic switches of pattern number 2		N/A
19.106	Test for electronic RCS energized by impulses (under no-load conditions):		N/A
	RCS operate as intended at a control voltage between 0.9 and 1.1 times the rated value	See appended table 19.106	N/A
	Electronic TDS operate as intended at the control voltage between 0.9 and 1.1 times the rated value		N/A
	Test (under no-load conditions):		N/A





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Clause	Requirement + Test	Result - Remark	Verdict
	- rated control voltage (V)		—
	- 20 operations with a control voltage of 0.9 times the rated value (V)		—
	- 20 operations with a control voltage of 1.1 times the rated value (V)		—
	TDS operated as intended (differences in delay time permitted according to 19.102)		N/A
19.107	Electronic TDS have an adequate repetitive accuracy of delay time		N/A
	Test (under no-load conditions):		N/A
	- rated control voltage (applied ten times) (V)		—
	- adjustable TDS: delay time set 2.5 min approximately if possible, otherwise, test made with the delay time specified by the manufacturer (s)		—
	Mean value of delay times measured (s)	- s	—
	Maximum / minimum values of delay time measured (s)	- s / - s	—
	Maximum / minimum values of delay time do not deviate by more than 15 % from the mean value	- % / - %	—
19.108	Electronic TDS revert to the full delay time when the operating means is actuated during the delay time period		N/A
	Adjustable TDS: three specimens initiated at rated control voltage and after 1 min initiated again at rated control voltage:		N/A
	- rated control voltage (V)		—
	- delay time adjusted between 2 min and 3 min (s) (V)		—
	Total delay time resulting for each specimens is between 3 min and 4 min (min)		N/A
	Non-adjustable TDS: three specimens initiated at rated control voltage and after 1 min initiated again at rated control voltage:		N/A
	- rated control voltage (V)		—
	- delay time (declared by the manufacturer) (min) ..		—
	Total delay time is the delay time (declared by the manufacturer) ± 5 % plus 1 min (min)		N/A





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Clause	Requirement + Test	Result - Remark	Verdict
	Non-adjustable TDS when the delay time is less than 1 min: three specimens initiated at rated control voltage and after half the delay time declared by the manufacturer initiated again at rated control voltage:		N/A
	- rated control voltage (V)		—
	- delay time (declared by the manufacturer) (min) ...		—
	Total delay time is 1.5 times the delay time (declared by the manufacturer) $\pm 5\%$ (min)		N/A
19.109	Contact mechanisms incorporated in electronic switches, intended for self-ballasted lamps (e.g. fluorescent lamps, CFL, LED) are tested as 19.102 except for the requirements related to the power supply which are given for information only.		N/A
	Compliance is checked by connecting the load B as given in figure 103 via the electronic switch under test to a power supply.		—
	Rated Power (W).....		—
	Rated voltage (V).....		—
	The values for the maximum peak value and the maximum I ² t of the inrush current are given in Table 108 when the switching contact closes at (90 $\pm$ 5) $^{\circ}$ phase-angle		N/A
	Maximum peak of the inrush current I _{peak} (A).....		—
	Maximum I ² t of the inrush current (A ² s).....		—
	- rate of operation (operation per minute)	30 (up to and including 250 W) / 15 (higher than 250 W)	—
	During the test: copper wire F not melt, specimens function correctly, no sustained arcing or welding of contacts		N/A
20	MECHANICAL STRENGTH		P
20.1	General		P
	Accessories, surface mounting boxes, screwed glands and shrouds have adequate mechanical strength so as to withstand the stresses imposed during installation and use		P
20.2	Pendulum hammer test		P
	For all types of switches and for boxes: impact test (9 blows)	See appended table 20.2	P
	After the test: no damage, live parts no become accessible		P
20.3	Test on the main parts of surface-type switches		N/A
	Main parts of surface-type switches are first fixed to a cylinder of rigid steel sheet of radius equal to 4.5 times the distance between fixing holes (mm)....		N/A





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Clause	Requirement + Test	Result - Remark	Verdict
	Main parts are then fixed in a similar manner to a flat steel sheet		N/A
	Torque applied to fixing screws (Nm)..... : 0.5 Nm / 1.2 Nm		—
	During and after the test: main parts show no damage		N/A
20.4	Screwed glands		N/A
	Screwed glands of switches with that have IP code higher than IP20: torque test		N/A
	- diameter of cylindrical metal test rod (mm)		—
	- type of material	metal / moulded material	—
	- torque for 1 min (table 22) (Nm).....		—
	After the test: no damage of glands and enclosure of the specimens		N/A
20.5	Covers, cover plates or actuating members – accessibility to live parts		P
20.5.1	General		P
	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
20.5.2	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	40 N / 80 N	—
	Covers, cover-plates or actuating members not come off		P
	Test repeated on new specimens with a sheet of hard material, 1 mm ± 0.1 mm thick, fitted around the supporting frame (fig. 13)		P
	Covers, cover-plates or actuating members not come off		P
	After the test: no damage		P
20.5.3	Verification of the removal of covers, cover plates or actuating members		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 ± 0.1 mm thick, fitted around the supporting frame (fig. 13)		P
	Covers, cover-plates or actuating members come off		P
	After the test: no damage		P





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Clause	Requirement + Test	Result - Remark	Verdict
20.6	Covers, cover plates or actuating members – accessibility to non-earthed metal parts separated from live parts		N/A
	Test is made as described in 20.5, but applying, for 20.5.2, the following forces:	10 N / 20 N	N/A
20.7	Covers, cover plates or actuating members – accessibility to insulating parts, earthed metal parts, the live parts of SELV ≤ 25 V AC or metal parts separated from live parts		N/A
	Test is made as described in 20.5, but applying, for 20.5.2, the force of 10 N for all covers, cover plates, or actuating members		N/A
20.8	Covers, cover plates or actuating members – application of gauges		P
	Test with gauge of figure 14 applied according to figure 15 for verification of the outline of covers, cover-plates or actuating members: distances between face C of gauge and outline of side under test, not decrease.....	complying / not complying	—
20.9	Grooves, holes and reverse tapers		P
	Test with gauge according to figure 17 applied as shown in figure 18 (1 N): gauge not enter more than 1 mm.....	complying / not complying	—
20.10	Additional test for cord-operated switch		N/A
	Operating members of cord-operated switch have adequate strength		N/A
	Pull test: pull 100 N for 1 min (normal use); pull of 50 N for 1 min (unfavourable direction). After the test:		N/A
	- switch show no damage		N/A
	- operating member not broken and cord-operated switch still operate		N/A
21	RESISTANCE TO HEAT		P
21.1	General		P
	Switches and boxes are sufficiently resistant to heat		P
	Decorative parts are not subjected to the test		P
21.2	Basic heating test		P
	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





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Clause	Requirement + Test	Result - Remark	Verdict
	After the test: no access to live parts, markings still legible		P
21.3	Ball-pressure test on parts of insulating material necessary to retain current-carrying parts and parts of the earthing circuit in position		P
	Parts of insulating material necessary to retain current-carrying parts and parts of the earthing circuit in position: ball-pressure test (1 h, 125 °C)	See appended table 21.3	P
21.4	Ball-pressure test on parts of insulating material not necessary to retain current-carrying parts and parts of the earthing circuit in position		N/A
	Parts of insulating material not necessary to retain current-carrying parts and parts of the earthing circuit in position, even though in contact with them: ball-pressure test (1 h)	See appended table 21.4	N/A
22	SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS		P
22.1	General		P
	Connections withstand mechanical stresses		P
	Thread-forming or thread-cutting screws used only if supplied together with the piece in which they are intended to be inserted		N/A
	Thread-cutting screws intended to be used during installation are captive with the relevant part of the accessory		N/A
	Screws and nuts which transmit contact pressure are of metal and are in engagement with a metal thread		N/A
	Threaded part torque test	See appended table 22.1	P
22.2	Correct insertion of screws		P
	Screws in engagement with a thread of insulating material: correct introduction into the screw hole or nut ensured		P
22.3	Contact pressure of electrical connections		P
	Contact pressure: not transmitted through insulating material other than ceramic, pure mica or other material no less suitable unless there is sufficient resiliency in metallic parts		P
22.4	Screws and rivets, used both as electrical and mechanical connections		P
	Screws and rivets which serve as electrical as well as mechanical connections shall be locked against loosening and/or turning		P
22.5	Material of current-carrying parts		P





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Clause	Requirement + Test	Result - Remark	Verdict
	Current-carrying parts of metal having mechanical strength, electrical conductivity and resistance to corrosion adequate:		P
	Requirement of 22.5 does not apply to screws, nuts, washers, clamping plates and similar parts of terminals		P
	- copper;		N/A
	- alloy with at least 58 % copper for parts made from cold-rolled sheet or with at least 50 % copper for other parts;		P
	- 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
	Current-carrying parts subjected to mechanical wear: not of steel with electroplated coating		P
	Metals having a great difference of electrochemical potential: not used in contact with each other		P
22.6	Contacts subjected to sliding actions		N/A
	Contacts subjected to sliding action: of metal resistant to corrosion		N/A
22.7	Thread-forming and thread-cutting screws		N/A
	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
(23)	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		P





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Clause	Requirement + Test	Result - Remark	Verdict
	that the requirements of 101 are fulfilled		
	Electronic switches without directly associated fuse or other current-limiting means: comply with table 20		N/A
23.1	General		P
	Creepage distances, clearances and distances through sealing compound no less than the values shown in table 23	See appended table 23.1	P
	Sub clause 23.1 does not apply to pilot light units. Requirements for pilot light units are given in 13.16		N/A
23.2	Insulating compound		N/A
	Insulating compound: not protrude above the edge of the cavity in which it is contained	No such insulating compound used	N/A
(23.101)	Electronic switches having control circuit suitable for connection to a SELV supply, the switching circuit being supplied with a voltage greater than the SELV: creepage distances and clearances between the control and switching circuits are not less than 5.5 mm (mm)		N/A
	In case of electronic RCS and electronic TDS classified according to 7.103, see the relevant requirements in IEC 60669-2-2 and IEC 60669-2-3 for clearance and creepage between SELV and mains. (mm)		N/A
(23.102)	Wire enamel at least grade 1 according to IEC 60317: clearances between the wire of the control coil, live parts of different polarity and exposed conductive parts may be reduced to a value equal to two-thirds the clearances required in absence of enamel		N/A
24	RESISTANCE OF INSULATING MATERIAL TO ABNORMAL HEAT, TO FIRE AND TO TRACKING		P
24.1	Resistance to abnormal heat and to fire		P
	Parts of insulating material which might be exposed to thermal stresses due to electric effects and the deterioration of which might impair the safety are not unduly affected by abnormal heat and fire		P
	Glow-wire test according to IEC 60695-2-10 and IEC 60695-2-11	See appended table 24.1	P
24.2	Resistance to abnormal heat and to fire		N/A
	Parts of insulating material retaining live parts in position of switches with IP>X0: of material resistant to tracking		N/A





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Tracking test with solution A of IEC 60112	See appended table 24.2	N/A
25	RESISTANCE TO RUSTING		N/A
	Ferrous parts protected against rusting		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		P
	Electronic switches designed to operate correctly under the conditions of electromagnetic environment in which they are intended to be used		P
(26.1)	Immunity		P
	Electronic switches designed so that the switch state (ON or OFF) and/or the setting value are protected against interference		P
	Type of load : See copy of marking plate		—
	Test current: In (A) / Rated load (W or VA) : 16A Max.		—
	Test voltage: Vn (V) : 240		—
	Variation of less than ± 10 % of the value of the output power (rms) is not considered to be a change of setting		P
	Electronic switches shall be tested according to Table 104 with or without operation as specified in the relevant paragraph.		P
	If the load connected to the electronic switch is controlled by mechanical switching devices and no semiconductor devices are present in the load circuit, test is conducted with resistive load only		—
	For test without operation the electronic switch is tested in the following states:		P
	a) in the ON state, highest setting		P
	b) in the ON state, lowest setting		P
	c) in the OFF state		P
	For electronic switches whose cycle of operation is limited by their application, the rate of operation during the test shall be specified by the manufacturer.		—
(26.1.1)	Voltage dips and short interruptions		P
	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:		P





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Clause	Requirement + Test	Result - Remark	Verdict
	The test shall be done on the power supply lines of the electronic switch.		P
	During the test, the electronic switch is not operated		P
	During the test, the state and setting of electronic switch may alter, flickering is neglected.		P
	Test level: 0 % U_T		P
	Test level: 40 % U_T		P
	Test level: 70 % U_T		P
	After the test: electronic switch is in the original state and the setting is unchanged		P
	After the test, the electronic switch shall be in the original state and setting and shall operate as intended.		P
(26.1.2)	Surge immunity test for 1.2/50 μ s wave impulses		P
	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 Table 110-		P
	A test with lower voltages is not required		P
	During the test, the electronic switch is not operated		P
	During the test, the state and setting of electronic switch may alter, flickering is neglected.		P
	After the test, the electronic switch shall be in the original state and setting and shall operate as intended.		P
(26.1.3)	Electrical fast transient/burst test		P
	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 %):		P
	During the test, the electronic switch is not operated		P
	Supply terminals/terminations: 1 kV		P
	Control terminals/terminations: 0.5 kV		N/A
	During the test, the state and setting of the electronic switch may alter, flickering caused by the electronic switch is allowed.		P





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	After the test: the electronic switch shall be in the original state and setting and shall operate as intended.		P
(26.1.4)	Electrostatic discharge test		P
	Electronic switch not intended to operate resistive load: test carried out with only one load of the loads specified within the manufacturer's instructions		P
	Test carried out according to EN 61000-4-2 applying 10 positive and 10 negative discharge:		P
	A test with lower voltages is not required		P
	During the test , the electronic switch is not operated		P
	During the test , the state and setting of electronic switch may alter, flickering is neglected.		P
	- contact discharge to the conductive surface and to coupling planes (test voltage: 4 kV)		P
	- air discharge at insulating surfaces (test voltage: 8 kV)		P
	After the test: the electronic switch shall be in the original state and setting and shall operate as intended.		P
	Electronic switches with an adjustable time delay devices shall be adjusted in such way that the time delay is higher than the testing time		P
(26.1.5)	Radiated electromagnetic field test		P
	Test applicable only to electronic switches containing infra-red (IR) receivers, radio frequency receivers, passive infra-red (PIR) devices, devices containing microprocessors or similar		P
	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 and 1400 MHz to 2000 MHz:		P
	Electronic switch shall be loaded with resistive load only.		P
	During the test, the electronic switch is operated, if it contains automatics functions or can be remotely controlled		P
	During the test , the electronic switch shall operate as intended, flickering is not allowed.		P





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Flickering of lamps or irregular running of motors due to the switching transient caused by frequency changes of the test equipment during the test procedure is neglected.		P
(26.1.6)	Radio-frequency voltage test		P
	Test applicable only to electronic switches containing infra-red (IR) receivers, radio frequency receivers, passive infra-red (PIR) devices, devices containing microprocessors or similar		P
	Electronic switch shall be loaded with resistive load only.		P
	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:		P
	During the test, the electronic is operated, if it contains automatics functions or can be remotely controlled		P
	During and after the test, the electronic switch shall operate as intended, flickering is not allowed.		P
	Flickering of lamps or irregular running of motors due to the switching transient caused by frequency changes of the test equipment during the test procedure is neglected.		P
(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
	Electronic switch shall be loaded with resistive load only.		N/A
	During the test, the electronic is operated, if it contains automatics functions or can be remotely controlled		N/A
	During and after the test, the electronic switch shall operate as intended, flickering is not allowed.		N/A
	Flickering of lamps or irregular running of motors due to the switching transient caused by frequency changes of the test equipment during the test procedure is neglected.		N/A
(26.2)	Emission		P





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Clause	Requirement + Test	Result - Remark	Verdict
(26.2.1)	Low-frequency emission		P
	Electronic switches designed that they do not cause excessive disturbances in the network		P
	Electronic switch complies with IEC 61000-3-2 and IEC 61000-3-3		P
	This requirements applies to each channel of a multichannel dimmer provided that the channel are independent from each other		P
	Load terminals/terminations of electronic switches with electromechanically operated contact mechanism (for example, a relay), do not cause harmonic current emissions and are deemed to meet the requirements of IEC 61000-3-2 without need for testing. Therefore only the mains supply terminal/terminations of those products shall be tested.		P
(26.2.2)	Radio-frequency emission		P
	Electronic switches designed that they do not cause excessive radio interference		P
	Electronic switch complies with the requirements of CISPR 14 or CISPR 15.		P
	Electronic switch complies with the requirements of CISPR 15 (modified on sub-clauses 8.1.4.2 and 8.1.4.3)		P
(101)	ABNORMAL CONDITIONS		P
	Electronic switches do not create hazard under abnormal conditions		P
	If in case of failure the maximum power taken by the electronic switches is less than 0,5 W, the requirements of the abnormal condition are deemed to be met		P
(101.1)	electronic switches are operate under abnormal conditions no part reach such a temperature that there is danger of fire to the surroundings of the electronic switches.		P
	Temperature rises not exceed the values given in table 102, column concerning clause 101		P
(101.1.1)	The tests are made on electronic switches while they are mounted, connected and loaded as specified in clause 17. Each of the abnormal conditions indicated in 101.1.1.1 and 101. 1.1.2 is applied in turn.		P
(101.1.1.1)	The following fault conditions shall be simulated:		P





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Clause	Requirement + Test	Result - Remark	Verdict
	- short circuit across creepage distances and clearances, other than those complying with the requirements in clause 23, if they are less than the values given in Figure 10 of IEC 60065.	See appended table 101.1.1.1	P
	- short circuit across insulating coating	See appended table 101.1.1.1	N/A
	- short circuit or interruption of semiconductor devices;	See appended table 101.1.1.1	P
	- short circuit of electrolytic capacitors;	See appended table 101.1.1.1	P
	- short circuit or interruption of capacitors or resistors which do not comply with the requirements of clause 102;	See appended table 101.1.1.1	N/A
	- short circuit of the terminals on the load side.	See appended table 101.1.1.1	P
	If the temperature is limited by the operation of automatic protective devices (including fuses), the temperature is measured 2 min after the operation of the device.		N/A
	If no temperature-limiting device operates, the temperature is measured after a steady state or after 4 h, whichever is the shorter time.		P
	If the temperature is limited by a fuse, in case of doubt, the following additional test is carried out: the fuse is short-circuited and the current under the relevant fault conditions is measured.....:		N/A
	The electronic switch is then switched on for a duration corresponding to the maximum fusing time of the type of fuse as specified by IEC 60127 corresponding to the current measured above.....:		N/A
	The temperature is measured 2 min after the end of the period.		N/A
(101.1.1.2)	The following overload tests are carried out, where applicable.		P
	Electronic switches without incorporated temperature-limiting devices and without incorporated fuses are loaded for 1 h with the conventional tripping current for the fuse which, in the installation, will protect the electronic switch		P
	The tripping current of the protective devices (e.g. fuses, automatic protective devices, etc.) to be used for the verification of electronic switches without incorporated temperature-limiting devices and without incorporated fuses shall be in relation with the rated current of protective device, specified by the manufacturer, intended to protect the electronic switch.		N/A
	Type of the protective device which protect the electronic switch.....:		—
	Tripping current of the protective devices (A).....:		—





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Clause	Requirement + Test	Result - Remark	Verdict
	Test current: (A)		—
	Temperature rise measured 1 h	See appended table 101.1.1.2	P
	Electronic switches protected by automatic protective devices (including fuses) are loaded in such a way that the current through the electronic switch is 0.95 times the current with which the protecting device releases after 1 h		N/A
	Current with which the protecting device releases after 1 h (A).....		—
	Test current: 0.95 I _n (A)		—
	Temperature rise measured after steady state or after 4 h	See appended table 101.1.1.2	N/A
	Electronic switches protected by incorporated fuses complying with IEC 60127 shall have those fuses replaced by links of negligible impedance and shall be loaded in such a manner that the current through the links shall be 2,1 times the rated current of the fuse.		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
	Electronic switches protected both by enclosed fuses and by automatic protective devices are loaded either as described above with incorporated fuses or with another automatic protective device, choosing the test requiring the lower load.		N/A
	Test current: (A)		—
	Temperature rise measured after:___min	See appended table 101.1.1.2	N/A
	Electronic switches protected by automatic protective devices which will short-circuit only in case of overload shall be tested both as electronic switches with automatic protective devices and as electronic switches without automatic protective devices.		N/A
	Current with which the protecting device releases after 1 h (A).....		—
	Test current: 0.95 I _n (A)		—
	Temperature rise measured after steady state or after 4 h	See appended table 101.1.1.2	N/A
	Type of the protective device which protect the electronic switch..... :		—
	Tripping current of the protective devices (A)..... :		—
	Test current: (A)		—
	Temperature rise measured 1 h	See appended table 101.1.1.2	N/A
	Additional test on new set specimens shall be carried out, if in any of the previous test the electronic switch turn off before the temperature has been steady state:		N/A





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Clause	Requirement + Test	Result - Remark	Verdict
	The electronic switch shall be loaded to 1.1 times the rated current (A)		—
	The current is then increased by 10 % and then the temperature is allowed to stabilize.....		—
	The above test is repeated by 10 % until the conventional tripping current of the protective device is reached or the electronic switch is destroyed		—
	This is repeated until the conventional tripping current of the protective device is reached (A).....		N/A
	or the electronic switch is destroyed		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)	Electronic switches shall, without endangering their surroundings, withstand the short circuit currents they may be subjected to in the load circuit. - The electronic switch is mounted as in normal use. - Tested in a substantially non-inductive circuit in series with a load impedance and a device for limiting the let-through I^2t . - The prospective short-circuit current of the supply shall be 1500 A (RMS) at a voltage equal to the rated voltage of the electronic switch under test. - The prospective let-through I^2t minimum value shall be 15000 A ² s. - The impedance Z_1 (short-circuit impedance) shall be adjusted to satisfy the specified prospective short-circuit current. - The impedance Z_2 (load impedance) shall be adjusted that the electronic switch is loaded with its minimum load or with approximately 10 % of the rated load, whichever is the higher.		P
	The automatic overcurrent protective device, incorporated or not incorporated in the electronic switch, is inserted into the circuit.....		—
	Test voltage V_n (V)	240	—
	The variable control, if any, is set at the position of maximum output.		P
	The short circuit is applied six times without any synchronization with respect to the voltage.		P
	During the test, emission of flames or burning particles, if any, shall not be dangerous to the environment. The above requirement is fulfilled if:		P
	- no emissions of flames		P
	- no burning particles visible with normal or corrected vision without additional magnification		P





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Clause	Requirement + Test	Result - Remark	Verdict
	- If there is a visible emission of flames or burning particles, the test is repeated on new specimens with a clear polyethylene film in each direction than the area where the flames or burning particles were seen.		P
	After the test:		P
	- accessible metal parts shall not be live (Clause 10)		P
	- emissions of flames or burning particles have not visibly perforated the polyethylene film		P
	- The conductors, the flush mounting box and the mounting surface don't show traces of burns. Traces which do not prevent the further use of the cables or housing are ignored.		P
	- the contacts of any incorporated automatic protective device are not welded, unless the electronic switch is obviously useless.		P
	The specimen is re-energized in its normal operating position, for 4 hours.		P
	- The specimen no shows dangerous behaviour during this period (smoke or excessive heat)		P
	- In case of doubt the maximum temperature rise values given in table 102 shall not be exceeded		N/A
	- Electronic switch shall withstand the dielectric strength test according to Clause 16 at the voltages prescribed in Clause 19 (item 3 of Table 14 not applied).	See appended table 101.3	P
(101.4)	Abnormal operation of the control circuit (only for electronic RCS energized by impulses)		N/A
	Behaviour of electronic RCS during abnormal operation of the control circuit is not dangerous		N/A
	Test made on three additional specimens of electronic RCS meeting with requirements of clauses 15 and 16:		N/A
	Control circuit continuously energized at its rated voltage (V)		—
	Switching circuit loaded for 1 h with rated current (A) at rated voltage (V)		—
	After this test:		N/A
	- RCS still operate		N/A





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Clause	Requirement + Test	Result - Remark	Verdict
	- temperature rise of any part of the electronic RCS enclosure and plywood support, which may be touched by the standard test finger, test probe B of IEC 61032, ≤ 75 K (K)		N/A
	- temperature rise of the plywood support which cannot be touched by the standard test finger, test probe B of IEC 61032, ≤ 100 K (K)		N/A
	- electronic RCS did not emit flames, melted material, glowing particles or burning drops of insulating material		N/A
	After cooling down to ambient temperature:		N/A
	Electronic RCS withstand a dielectric test (sub-clause 16.2), test voltage (a.c., for 1 min), between switching and control circuits:		N/A
	- test voltage (V)		—
	During the test: no flashover or breakdown		N/A
	Electronic RCS still meet the requirements of 10.1		N/A
	Electronic RCS coil is then intermittently energized for 1 h using a voltage equal to its rated control voltage, the switching circuit being supplied with rated current at rated voltage:		--
	class of insulating material		—
	temperature-rise limit (IEC 60085) (K)		—
	temperature-rise measured (K)		N/A
	Behaviour of electronic TDS during abnormal operation of the control circuit is not dangerous		N/A
	Test made on three additional specimens of electronic TDS meeting with requirements of clauses 15 and 16:		N/A
	Control circuit continuously energized at its rated voltage (V)		—
	Switching circuit loaded for 6 h with rated current (A) at rated voltage (V)	- A; - V	—
	Adjustable electronic TDS: adjusted to the shortest delay time (s).....		—
	After this test:		N/A
	- electronic TDS still operate		N/A
	- temperature rise of any part of the electronic TDS enclosure and plywood support, which may be touched by the standard test finger, test probe B of IEC 61032, ≤ 75 K (K)		N/A





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- temperature rise of the plywood support which cannot be touched by the standard test finger, test probe B of IEC 61032, ≤ 100 K (K)		N/A
	- electronic TDS did not emit flames, melted material, glowing particles or burning drops of insulating material		N/A
	After cooling down to ambient temperature:		N/A
	Electronic TDS withstand a dielectric test (sub-clause 16.2), test voltage (a.c., for 1 min), between switching and control circuits:		N/A
	- test voltage (V)		—
	During the test: no flashover or breakdown		N/A
	Electronic TDS still meet the requirements of 10.1		N/A
(101.5)	Dimmers for incandescent and/or self-ballasted lamps shall so designed that no part shall reach such a temperature that there is danger of fire to the surrounding of the dimmer when non-dimmable self-ballasted lamps are installed in the load circuit.		N/A
	Tests made on dimmers mounted and connected as specified in clause 17.		N/A
	The dimmer is loaded with a number of lamp simulation circuit as Figure 103 Load B (25 W non dimmable self-ballasted lamp)		—
	Dimmer not for self-ballasted lamps the dimmer is loaded with a number of lamp simulation circuit as Figure 103 Load B having a total power equivalent to 1/5 th of the declared incandescent lamp load (W)		—
	- test voltage (V)		—
	- emission of flames or burning particles shall not occur		N/A
	- temperature rises shall not exceed the values in Table 102, column concerning Clause 101.	See appended table 101.1.1.2	N/A
	After this test:		N/A
	- accessible metal parts shall not be live		N/A
	- 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 relevant IEC standards, as far as applicable	See appended table 102	P
	Components marked with their operating		P





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	characteristics used in accordance with these markings		
(102.1)	Fuses comply with:		N/A
	- IEC 60127		N/A
	- 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:		N/A
	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	See appended table 107	N/A
	Trade mark; article of capacitor		—
	Capacitor marked with:		N/A
	- rated voltage (V)		N/A
	- rated capacitance (μ F)		N/A
	- reference temperature ($^{\circ}$ C)		N/A
	Capacitors: the short-circuiting of which cause a current = 0.5 A through the terminals of the capacitor:		N/A
	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	See appended table 107	N/A
	Trade mark; article of capacitor		—
	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		—





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Clause	Requirement + Test	Result - Remark	Verdict
	clause 17 (°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 °C: specimens tested at reference temperature according to clause 17 (°C)		N/A
(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)		—





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Clause	Requirement + Test	Result - Remark	Verdict
	During the test: no sustained arcing		N/A
	After the test: specimens show no damage		N/A
	Test voltage (V) for cuts-out in electronic switches for speed control circuit: 1200 V a.c. ($V_n \leq 130$ V) or 2000 V ($V_n > 130$ V) for 1 min:		N/A
	Test voltage (V) for cuts-out in electronic switches for lighting circuit: 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
	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	See appended table 102.4.2	N/A
	After the test, electronic switch is in operating condition		N/A
	Sealing compounds, if any, have not flowed		N/A
(102.5)	Transformer		N/A
	Transformers intended for SELV circuits shall be of the safety isolating type and shall comply with the relevant requirements of IEC 61558-2-6.		N/A
ANNEX A (ANNEX B)	ADDITIONAL REQUIREMENTS FOR SWITCHES HAVING FACILITIES FOR THE OUTLET AND RETENTION OF FLEXIBLE CABLES		N/A
10.1	Prevention of access to live parts		N/A
	For flexible cable outlet switches the test is carried out without the flexible cable fitted.		N/A
12	Terminals		N/A
12.2.5	For flexible cable outlet switches, the test is repeated with flexible cables of the appropriate size (see 13.15) following the same procedure.		N/A
13	Constructional requirements		N/A
13.17	Flexible cable outlet switches shall be so designed		N/A





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	that an appropriate flexible cable, complying with IEC 60245-4, code designation 60245 IEC 66 or IEC 60227-5, code designation 60227 IEC 53, or as specified by the manufacturer, may enter the switch through a suitable hole, groove or gland..... :		
	The entry shall accept the maximum dimensions (outer sheath) of the appropriate flexible cable, having conductors of the cross-sectional area specified in Table A.1, according to the current rating of the switch, but with a minimum of 1.5 mm ² and the entry shall be so shaped as to prevent damage to the flexible cable.		N/A
(13.16)	The cross-sectional area of external flexible cables connected between electronic switches and its associated control units and the like can be less if the current in the unit is limited by current limiting means. The minimum cross-sectional area is shown in Table B.1. Flexible cables shall comply with IEC 60245-4, code designation 60245 IEC 66, or IEC 60227-5, code designation 60227 IEC 53.....:		N/A
13.17	A cable anchorage for the flexible cable shall be provided such that the conductors are relieved from strain, including twisting, where they are connected to the terminals or terminations.		N/A
	The cable anchorage shall contain the sheath and shall be either of insulating material or, if of metal, shall be provided with an insulating lining fixed to the metal parts.		N/A
	The design shall ensure that		N/A
	- the cable anchorage cannot be released from the outside		N/A
	- clamping the cable does not require the use of a special purpose tool.		N/A
	Screws which are used when clamping the flexible cable shall not serve to fix any other component		N/A
	Switches are fitted with a flexible cable complying with IEC 60227-5, code designation 60227 IEC 53, having a nominal conductor cross-sectional area of 1,5 mm ² and the number of cores corresponding to the number of poles of the switch.		N/A
	The flexible cable is then subjected 25 times to a pull force of 30 N		N/A
	Immediately afterwards, the flexible cable is subjected for 1 min to a torque of 0,15 Nm		N/A
	The above test is then repeated, the switch being fitted with the appropriate largest diameter flexible cable complying with IEC 60245-4, code designation 60245		N/A





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	IEC66.		
	The pull is increased to 60 N		N/A
	The torque is increased to 0.35 Nm.		N/A
	After the test the flexible cable not have displaced by more than 2 mm.....:		N/A
	AC voltage of 2000 V is applied for 1 min between the conductors and the cord anchorage.		N/A
	During the test, the insulation of the flexible cable not damaged		N/A
(ANNEX CC)	ADDITION REQUIREMENTS FOR ELECTRONIC SWITCHES USING DLT-TECNOLOGY ACCORDING TO IEC 62756-1		N/A
(CC.8)	MARKING		N/A
(CC.8.1)	Switches marked with:		N/A
	- the symbol for DLT control device(DLT):		N/A
(CC.8.2)	Symbols used:		N/A
	DLT control device.....(DLT):		N/A
	Supported telegram types for DLT control devices (TPX).....:		N/A
	DLT controlled load.....:		N/A
	The maximum cable length between DLT control device and DLT load shall also be given in the instruction sheet.		N/A
(CC.17)	TEMPERATURE RISE		N/A
	In lamp dimmer, DLT control devices and speed controllers, the setting is adjusted such that the highest temperature will occur.		N/A
(CC.19)	NORMAL OPERATION		N/A
(CC.19.103)	Semiconductor switching devices and/or electronic regulating devices including DLT control devices incorporated in electronic switches are subjected to the following test.		N/A
	For DLT control devices, a cable , having the maximum cable length, as declared in 8.3, is installed between the control device and the loads.		N/A
CC.26	EMC REQUIREMENTS		N/A
(CC.26.2)	Emission		N/A
(CC.26.2.1)	Low-frequency emission		N/A
	DLT control devices shall be tested with maximum		N/A





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Clause	Requirement + Test	Result - Remark	Verdict
	resistive load		



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IEC 60669-2-1				
Clause	Requirement + Test		Result - Remark	Verdict
12.2.5	TABLE: test with apparatus shown in figure 10 (screw terminals)			P
	rated current (A)	16A Max.		—
	type of conductors	rigid solid / rigid stranded		—
	Smallest/largest cross-sectional area per table 4 (mm ²).....	2.5/4.0		—
	number of conductors.....	1		—
	Nominal diameter of thread (mm); torque per table 5 (Nm).....	2.43; 0.4		—
Cross-sectional area (mm ²)	Diameter of bushing hole per table 6 (mm)	Height H per table 6 (mm)	Mass (kg)	Remarks
2.5	9.5	280	0.7	Pass
4.0	9.5	280	0.9	Pass
supplementary information:				

12.2.6	TABLE: pull test (screw terminals)			P
	rated current (A)	16A Max.		—
	Smallest/largest cross-sectional area per table 4 (mm ²).....	1.0/2.5		—
	Nominal diameter of thread (mm); torque 2/3 per table 5 (Nm).....	2.43; 0.27		—
Cross-sectional area (mm ²)	Number of conductors	Type of conductors (rigid solid / rigid stranded)	Pull per table 7 applied for 1 min (N)	Remarks
2.5	1	rigid solid	50	Pass
2.5	1	rigid stranded	50	Pass
4.0	1	rigid solid	50	Pass
4.0	1	rigid stranded	50	Pass
supplementary information:				

12.2.7	TABLE: tightening test (screw terminals)			P
	rated current (A)	16A Max.		—
	nominal diameter of thread (mm); torque 2/3 per table 5 (Nm)	2.43; 0.27		—





IEC 60669-2-1				
Clause	Requirement + Test		Result - Remark	Verdict
Largest cross-sectional area per table 4 (mm ²)	Permissible number of conductors	Type of conductors (rigid solid / rigid stranded)	Number of wires and nominal diameter of wires	Remarks
4.0	1	rigid solid	1x2.25	Pass
4.0	1	rigid stranded	7x0.86	Pass
supplementary information:				

12.3.10	TABLE: Mechanical stresses occurring in normal use (screwless terminals)				N/A
	Rated current (A).....:		--		—
	Largest/smallest cross-sectional area per table 8 (mm ²).....:		--		—
Number of connection (after that conductor subjected to a pull of 30 N for 1 min) / disconnection		Type of conductor (solid / rigid stranded / flexible)	Cross-sectional area (mm ²)	Remarks	
--		--	--	--	
--		--	--	--	
	TABLE: Test with apparatus shown in figure 9				N/A
	Rated current (A).....:		--		—
	Type of conductors.....:		rigid solid / rigid stranded / flexible		—
	Smallest/largest cross-sectional area per table 8 (mm ²).....:		--		—
	number of conductors.....:		--		—
Cross-sectional area (mm ²)	Diameter of bushing hole per table 6 (mm)	Height H per table 6 (mm)	Mass (kg)	Remarks	
--	--	--	--	--	
--	--	--	--	--	
Supplementary information:					

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 9 (A).....:	--	—
	nominal cross-sectional area (mm ²).....:	--	—
Screwless terminal number		Voltage drop (mV)	Required voltage drop





IEC 60669-2-1							
Clause	Requirement + Test				Result - Remark		Verdict
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 9 (A).....:			--		—	
	nominal cross-sectional area (mm²).....:			--		—	
	allowed voltage drop (mV).....:			≤ 22.5 mV or 2 times 24 th cycle value (mV)		—	
Screwless terminal number		1	2	3	4	5	Remarks
voltage drop after 24 th cycle		--	--	--	--	--	--
voltage drop after 48 th cycle		--	--	--	--	--	--
voltage drop after 72 th cycle		--	--	--	--	--	--
voltage drop after 96 th cycle		--	--	--	--	--	--
voltage drop after 120 th cycle		--	--	--	--	--	--
voltage drop after 144 th cycle		--	--	--	--	--	--
voltage drop after 168 th cycle		--	--	--	--	--	--
voltage drop after 192 th cycle		--	--	--	--	--	--
12.3.10	TABLE: mechanical stresses occurring in normal use						N/A
	Rated current (A).....:			--		—	
	Largest/smallest cross-sectional area per table 8 (mm²).....:			--		—	
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 (mm²)		Remarks	
--		--		--		--	
--		--		--		--	
	TABLE: Test with apparatus shown in figure 9						N/A
	Rated current (A).....:			--		—	
	Type of conductors.....:			rigid solid / rigid stranded / flexible		—	
	Smallest/largest cross-sectional area per table 8 (mm²).....:			--		—	





IEC 60669-2-1				
Clause	Requirement + Test		Result - Remark	Verdict
	Number of conductors.....		--	—
Cross-sectional area (mm ²)	Diameter of bushing hole per table 6 (mm)	Height H per table 6 (mm)	Mass (kg)	Remarks
--	--	--	--	--
--	--	--	--	--
Supplementary information:				

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





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
16.2	TABLE: insulation resistance		P
Item per table 15	test voltage applied between:	measured (MΩ)	required (MΩ)
1)	Between all poles connected together and the body, with the switch in the "on" position:	>100MΩ	≥5MΩ
2)	Between each pole in turn and all other poles connected to the body, with the switch in the "on" position	>100MΩ	≥2MΩ
3)	Between the terminals which are electrically connected together when the switch is in the "on" position, the switch being in the "off" position: - micro-gap construction	>100MΩ	≥2MΩ
supplementary information:			

16.3	TABLE: electric strength		P
Item per table 15	test voltage applied between:	test voltage (V)	flashover / breakdown (Yes/No)
1)	Between all poles connected together and the body, with the switch in the "on" position:	2000	No
2)	Between each pole in turn and all other poles connected to the body, with the switch in the "on" position	2000	No
3)	Between the terminals which are electrically connected together when the switch is in the "on" position, the switch being in the "off" position: - micro-gap construction	750	No
8)	Between live parts and metal knobs, push-buttons and the like	4000	No
supplementary information:			

17	TABLE: temperature rise measurements		P
	Cross-sectional area of conductor not less than 1.5 mm ²	4.0mm ²	—
	Terminal screws: torque (Nm) (2/3 table 5).....	0.27	—
	Type of load	Resistive	—





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Rated current (A) / rated load (W or VA)	16A Max.	—
	Rated voltage (V)	100-240	—
	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)
Terminal block		34.3	55
Relay		36.1	60
PCB		37.9	130
Capacitance (1)		28.4	80
Capacitance (2)		29.9	80
Enclosure inside		16.0	Ref.
Enclosure outside		14.3	70
supplementary information: Choosing the most unfavorable conditions to do the test, the testing laboratory ambient is 25°C.			

19	TABLE: reduced electric strength after normal operation			P
	Rated voltage (V).....	100-240		—
Item per table 15	test voltage applied between:	test voltage (V)	flashover / breakdown (Yes/No)	
1)	Between all poles connected together and the body, with the switch in the "on" position:	1500	No	
2)	Between each pole in turn and all other poles connected to the body, with the switch in the "on" position	1500	No	
3)	Between the terminals which are electrically connected together when the switch is in the "on" position, the switch being in the "off" position: - micro-gap construction	500	No	
8)	Between live parts and metal knobs, push-buttons and the like	3000	No	
	TABLE: temperature rise measurements after normal operation			P





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Cross-sectional area of conductor not less than 1.5 mm ²	4.0mm ²	—
	Terminal screws: torque (Nm) (2/3 table 5).....	0.27	—
	Type of load	Resistive	—
	Rated current (A) / rated load (W or VA)	16A Max.	—
	Rated voltage (V)	100-240	—
	Test voltage between 0.9 and 1.1 V _n (V), whichever is the more unfavourable	264	—
parts of the electronic switch		max. measured temperature rise (K)	permissible temperature rise (K)
Terminal block		36.5	55
Relay		38.4	60
PCB		39.1	130
Capacitance (1)		29.6	80
Capacitance (2)		31.1	80
Enclosure inside		16.3	Ref.
Enclosure outside		14.7	70
supplementary information: Choosing the most unfavorable conditions to do the test, the testing laboratory ambient is 25°C.			

(19.106)	TABLE: Test for RCS energized by impulses (under no-load conditions):				N/A
	impulse duration declared by the manufacturer		/		—
n. specimen	rated control voltage (V)	control voltage of 0.9 times the rated value (V)	20 operations: RCS operates as intended (Yes/No)	control voltage of 1.1 times the rated value (V)	20 operations: RCS operates as intended (Yes/No)
--	--	--	--	--	--
supplementary information:					





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
20.2	TABLE: Impact resistance		P
Part of enclosure tested per table 21 (A, B, C, D)	Blows per part	height of fall (mm)	comments
A	5	80	Pass
B	4	80	Pass
supplementary information:			

21.3	TABLE: Ball pressure test of thermoplastic materials			P
	allowed impression diameter (mm) : ≤ 2 mm			—
part under test		material designation / manufacturer	test temperature (°C)	impression diameter (mm)
PCB		See component table	125	1.2
Terminal block		See component table	125	0.8
Relay		See component table	125	1.1
Plastic enclosure		See component table	125	1.0
supplementary information:				

21.4	TABLE: Ball pressure test of thermoplastic materials			N/A
	allowed impression diameter (mm) : ≤ 2 mm			—
part under test	material designation / manufacturer		test temperature (°C) ⁽¹⁾	impression diameter (mm)
--	--		--	--
supplementary information:				
(1) 70 °C / 40 °C + highest temperature rise determined during the test of clause 17				

22.1	TABLE: threaded part torque test					P
threaded part identification	diameter of thread (mm)	column number (I, II, or III)	applied torque (Nm)	times (5/10)	no damage	
Screw of terminal	2.43	III	0.4	5	No damage	
supplementary information:						

23.1	TABLE: creepage distances, clearances and distances through sealing compound			P
	rated voltage (V)	100-240		—





IEC 60669-2-1							
Clause	Requirement + Test			Result - Remark			Verdict
Item per table 23	Creepage distance dcr, clearance cl and distance through sealing compound dtsc at/of:	required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)	required dtsc (mm)	dtsc (mm)
2,7	Between live parts of different polarity	≥ 3.0	3.2	≥ 3.0	3.2	--	--
3,8	Between live parts to accessible part	≥ 3.0	>3.0	≥ 3.0	>3.0	--	--
supplementary information:							

24.1	TABLE: Glow-wire test			P
part under test	material designation / manufacturer	test temperature (°C)	remarks	
Terminal block	See component table	850°C	Pass	
Relay	See component table	850°C	Pass	
PCB	See component table	850°C	Pass	
Plastic enclosure	See component table	850°C	Pass	
supplementary information:				

24.2	TABLE: Resistance to tracking			N/A
	number of drops	50		—
part under test	material designation / manufacturer	test voltage (V)	flashover / breakdown (Yes/No)	
--	--	175	--	
supplementary information:				

(101.1.1.1)	TABLE: fault conditions test			P
	Cross-sectional area of conductor not less than 1.5 mm²	4.0mm²		—
	Terminal screws: torque (Nm) (2/3 table 5).....	0.27		—
	Type of load	Resistive		—
	Rated current (A) / rated load (W or VA)	16A Max.		—
	Rated voltage (V)	100-240		—
	Test voltage between 0.9 and 1.1 Vn (V), whichever is the more unfavourable	264		—
fault conditions simulated		remarks	verdict	





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Short-circuit component U14	Unit shut down, recoverable, no hazard.	Pass
	Short-circuit component U13	Unit shut down, recoverable, no hazard.	Pass
	TABLE: temperature rise measurements		P
	temperature measured after (min)	/	—
	parts of the electronic switch	max. measured temperature rise (K)	permissible temperature rise (K)
	Terminal block	61.2	110
	PCB	76.3	160
	Enclosure outside	22.4	75
	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	--	—
	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: Choosing the most unfavorable conditions to do the test, the testing laboratory ambient is 25°C.			

(101.1.1.2)	TABLE: temperature rise measurements during overload tests		P
	Cross-sectional area of conductor not less than 1.5 mm ²	4.0mm ²	—
	Terminal screws: torque (Nm) (2/3 table 5).....	0.27	—
	Type of load	Resistive	—
	Rated current (A) / rated load (W or VA)	16A Max.	—
	Rated voltage (V)	100-240	—
	Test voltage between 0.9 and 1.1 V _n (V),	264	—





IEC 60669-2-1				
Clause	Requirement + Test	Result - Remark		Verdict
	whichever is the more unfavourable			
parts of the electronic switch		max. measured temperature rise (K)	permissible temperature rise (K)	
Terminal block		69.4	110	
PCB		81.2	160	
Enclosure outside		28.7	75	
supplementary information: Choosing the most unfavorable conditions to do the test, the testing laboratory ambient is 25°C.				

(101.3)	TABLE: electric strength			P
Item per table 15	Test voltage applied between:	test voltage (V)	flashover / breakdown (Yes/No)	
1)	Between all poles connected together and the body, with the switch in the "on" position:	2000	No	
2)	Between each pole in turn and all other poles connected to the body, with the switch in the "on" position	2000	No	
8)	Between live parts and metal knobs, push-buttons and the like	4000	No	
supplementary information:				





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

(102)	TABLE: Critical components information					P
object/part No.	manufacturer/ trademark	type/model	technical data	compliance to standard	mark(s) of conformity ¹⁾	
Plastic enclosure/Cover	CHI MEI CORPORATIO N	PC-540	V-0, 80°C 1.5mm	UL 94	UL E56070 Test with appliance	
Terminal block	Dongguan Changhe Electronics Co.,Ltd	CA350-04-500	250V, 16A, 2.5mm ² , 4.0mm ²	EN 60998-1, EN 60998-2-1	VDE 40021481	
Relay	Xiamen Hongfa Electroacoustic Co.. Ltd.	HF7520	16A, 250VAC	IEC/EN 61810-1	TUV R50351269	
PCB	WMD CIRCUITS LTD	CN0103	V-0, 130°C	UL 94	UL E353931 Test with appliance	
Alt	Interchangeable	Interchangeable	V-0, 130°C	EN 60669-1, EN 60669-2-1	Test with appliance	
Fuse	Shenzhen Lanson Electronics Co., Ltd	2E-Serie(s)	AC250 500mA	EN 60127-1 EN 60127-3	VDE 40040704	
Varistor	SHENZHEN HUADY TECHNOLOGY DEVELOPMEN T CO., LTD	HZV07D391K	Min. 300VAC. 40/85/56, V-0 coating, min. 105°C	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE 40055045	
Alt	Shantou Dongling Electronic Co.,Ltd.	DL-07D391K	250VAC, 40/125/56, V-0 195pF	IEC 61051-1 IEC 61051-2 IEC 61051-2-2	VDE B 109373 0002	
¹⁾ an asterisk indicates a mark which assures the agreed level of surveillance						





IEC 60669-2-1			
Clause	Requirement + Test	Result - Remark	Verdict
(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	--	—
	Terminal screws: torque (Nm) (2/3 table 5).....	--	—
	Type of load	--	—
	Rated current (A) / rated load (W or VA)	--	—
	Rated voltage (V)	--	—
	Test voltage between 0.9 and 1.1 V _n (V), whichever is the more unfavourable	--	—
parts of the electronic switch		max. measured temperature rise (K)	permissible temperature rise (K)
--		--	--
supplementary information:			

(107)	Table: Capacitors			N/A
Application of capacitor		Approved type(s) of capacitor according to IEC 60384-14		
		Un ≤ 125 V	125 V < Un ≤ 250 V	
			Without overcurrent protection	With overcurrent protection (a)
Between live conductors (L or N) and earth (PE)		☐ Y4	☐ Y2	☐ Y2
Between live conductors (L and N or L1 and L2):	- without impedance in series	☐ X2	☐ X1	☐ X2
	- with impedance in series, which, when capacitor(s) is (are) short-circuited, limits the current to a value of	0.5 A and higher	☐ X3	☐ X2
		below 0.5 A	☐ Any type	☐ Any type
(a) External to the capacitor or built into the capacitor (for example, a fusing resistor).				





Attachment No.1 EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 60669-2-1:2021 used in conjunction with IEC 60669-1:2017 EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES Switches for household and similar fixed electrical installations - Part 2-1: Particular requirements - Electronic control devices			
	CENELEC COMMON MODIFICATIONS (EN)		--
8.1	Replace Note 4 and note 5:		--
	Note 4: See annex ZB for special national conditions		P
8.3	Replace NOTE 2 by:		--
	NOTE 2 See Annex ZB for special national conditions.		P
10	PROTECTION AGAINST ELECTRIC SHOCK		--
10.2	Add note after first paragraph:		N/A
	NOTE See Annex ZB for special national conditions.		N/A
10.3.2	Replaced:		P
	"cover or cover plates" replaced by "cover, cover plates and other parts of the enclosure"		P
10.3.3	Replaced:		N/A
	"cover or cover plates" replaced by "cover, cover plates and other parts of the enclosure"		N/A
	Add note:		N/A
	NOTE See Annex ZB for special national conditions.		N/A
10.5	Add NOTE Z1 and renumber existing note as NOTE 1		N/A
	NOTE Z1 See Annex ZB for special national conditions.		N/A





11	PROVISION FOR EARTHING		--
11.2	Add note:		N/A
	NOTE See Annex ZC for A-deviations.		N/A
12	TERMINALS		--
12.2.5	Replace the text of index a in Table 6 by "Void"		N/A
	Add at the end of the subclause NOTE Z1 and renumber existing note as NOTE 1:		N/A
	NOTE Z1 See Annex ZB for special national conditions.		N/A
	Renumber NOTE by NOTE 1		N/A
12.2.6	Replace NOTE 2 by:		N/A
	NOTE 2 See Annex ZB for special national conditions.		N/A
13	CONSTRUCTIONAL REQUIREMENTS		--
13.15.2	Replace note by:		N/A
	NOTE See Annex ZB for special national conditions.		N/A
15	RESISTANCE TO AGEING, PROTECTION PROVIDED BY ENCLOSURES OF SWITCHES, AND RESISTANCE TO HUMIDITY		--
15.1	Replace.		P
	in the 10th paragraph, the value "55 %" by "75 %".		P
16	INSULATION RESISTANCE AND ELECTRIC STRENGTH		P
	In Table 15, delete Note 4.		P
17	TEMPERATURE RISE		P
17.1	General		P
	In Table 101, in Note b) and c), replace the word "relevant" with "assessed".		P
	In Table 101, replace Note g) with:		P
	g) If a component complies to an IEC component standard and thermal considerations are included in such a standard, this Table 101 shall not be applicable to such a component."		P
18	MAKING AND BREAKING CAPACITY		--
18.1	General		N/A
	Change Note 1 and 2 to normative text.		N/A
	Change the Note in Table 102 to normative text.		N/A
	Replace the paragraph below Table 102 with:		N/A



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	The tests are made by means of an apparatus which is arranged to simulate normal operation.	N/A
18.102	Electronic switches and HBES/BACS switches for control of the voltage of iron core transformers for extra-low-voltage incandescent lamps	N/A
	delete "to simulate making" in the 3rd but last paragraph.	N/A
19	NORMAL OPERATION	N/A
19.1	General	N/A
	Replace the 5th, 6th, and 7th paragraphs with:	N/A
	For HBES/BACS switches, the tests according to 19.101 and 19.108 are conducted on the complete HBES/BACS switch which shall be controlled by the electronic extension units as described in the product instructions.	N/A
	The electronic extension units are tested when installed according to the product instructions so as to verify that they are capable of controlling the electronic switch or the HBES/BACS switch in accordance with this Clause 19	N/A
	For electronic switches and HBES/BACS switches with included automatic function the number of operations for tests of 19.101, 19.102, 19.104, 19.106 and 19.108 is that specified in the relevant subclause. If the declared number of operations are higher than those indicated in the relevant subclause, the tests shall be made according to the declared value.	N/A
20	MECHANICAL STRENGTH	P
20.1	Replace the first dash by:	P
	- for all types of switches and their dedicated boxes, where applicable: 20.2	P
	Delete the third dashed item	P
22	SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS	N/A
22.1	Delete the second sentence of the second paragraph	N/A
23	CREEPAGE DISTANCES, CLEARANCES AND DISTANCES THROUGH SEALING COMPOUND	P
23.102.3	Dimensioning of clearances of basic, double or reinforced insulation between circuits	N/A
	Replace in the first paragraph at the first occurrence "Table 107" with "Table 108"	N/A
	Replace in NOTE 101 "Table 107" with "Table 108".	N/A
	Add the following subclause after 23.2:	N/A





23.Z1	Surface-type switches shall not have bare current-carrying strips at the back.		N/A
26	EMC REQUIREMENTS		P
	Replace 26.1 as follows:		P
26.1	General		P
	Electronic control devices shall be designed to operate correctly under the conditions of the electromagnetic environment in which they are intended to be used. This applies particularly for electronic control devices intended to be connected to AC low-voltage public supply systems where the design shall take into account the normal disturbances on the supply system, as defined by the compatibility levels given in IEC 61000-2-2		P
	The tests are carried out with one new specimen.		P
	Example of test set-ups are described in Annex DD.		P
	For electronic control devices using Radio Technology, depending on the frequency, the RF-requirements of ETSI EN 300 328, ETSI EN 300 220-1, ETSI EN 300 220-2, ETSI EN 300 440, ETSI EN 301 489-1, ETSI EN 301 489-3, ETSI EN 301 489-4, ETSI EN 301 489-17 apply.		P
	For EN 55015 and EN 55032, 80/80 rules shall not be considered as they do not ensure the presumption of conformity of the EMC and RED directive.		P
	The use of dedicated software for testing purposes is allowed, providing that all significant functions are exercised.		P
	For electronic switches and HBES/BACS switches, the manufacturer shall specify all details related to the load, as given in the manufacturer's documentation.		P
26.1.1	For electronic control devices not using RF (Radio Frequency), 26.2 and 26.3 apply.		P
26.1.2	For electronic control devices using RF (Radio Frequency), 26.2 and 26.3 apply with the following additions:		P
	Exclusion bands are defined in the EUT relevant part of ETSI EN 301 489 series. In the exclusion bands a temporary loss of RF transmission is allowed.		P
	In case ETSI EN 301 489 series requests additional tests they shall be carried out and the RF functions shall meet the performance criteria.		P





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





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





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





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





	Method of connection according to 7.1.10, if necessary		N/A
	An indication that the switch is equipped with non-reusable IPTs, if necessary		N/A
	Clear information that the conductor shall not be stripped before connecting		N/A
12	TERMINALS		N/A
12.1	General		N/A
	Switches provided with screw-type terminals, with screwless terminals or insulating-piercing terminals(IPTs).....:		N/A
	The test 12.2.8, 12.3.9, 12.3.10,12.4.9 and 12.4.10 on terminals, made after the test of 15.1		N/A
12.4	IPTs for external copper conductors		N/A
12.4.1	IPTs terminals of the type suitable for:		N/A
	- for rigid copper conductors only, or		N/A
	- for both rigid and flexible copper conductors (tests carried out with rigid and then repeated with flexible conductors)		N/A
12.4.2	IPTs terminals provided with clamping units which allow the proper connection of rigid or of rigid and flexible conductors having nominal cross-sectional areas as shown in table D2:		N/A
	Rated current (A).....:		N/A
	Rated connecting capacity (mm ²).....:		N/A
	Diameter of largest rigid conductor (mm).....:		N/A
	Diameter of largest flexible conductor (mm).....:		N/A
	Diameter of largest rigid isolated conductor (mm).....:		N/A
	Diameter of largest flexible isolated conductor (mm):		N/A
	IPTs terminals allow the conductor to be connected without special preparation		N/A
	Conductor clamped between metal surfaces		N/A
12.4.3	Reusable IPTs: designed in such a way that no insulating material remains inside the terminal		N/A
	Compliance verified as follows:		N/A
	Type(s) of conductors.....:		N/A
	Largest / smallest cross-sectional area.....:		N/A
	Conductor connected and disconnected five times rotating it in such a way that is not connected twice at the same place		N/A
	No insulating material remains inside the switch, or		N/A



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





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





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





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

12.4.10	TABLE: Test with apparatus shown in figure 9			N/A
	Rated current (A)..... :			N/A
	Type of conductors..... :			N/A
	Smallest/largest cross-sectional area per table D.2 (mm ²)..... :			N/A
	Number of conductors..... :			N/A
	Nominal diameter of thread (mm); torque per table 5 (Nm)..... :			N/A
Cross-sectional area (mm ²)	Diameter of bushing hole per table 6 (mm)	Height H per table 6 (mm)	Mass (kg)	Remarks
--	--	--	--	--
--	--	--	--	--





Supplementary information:

12.4.10	TABLE: Pull test				N/A
	Rated current (A)..... :		--		
	Smallest/largest cross-sectional area per table D.2 (mm²)..... :		--		
	Nominal diameter of thread (mm); torque per table 5 (Nm)..... :		--		
Cross-sectional area (mm²)		Number of conductors	Type of conductors (rigid solid / rigid stranded / flexible)	Pull per table 7 applied for 1 min (N)	Remarks
--	--	--	rigid solid / rigid stranded / flexible	--	--
--	--	--	rigid solid / rigid stranded / flexible	--	--
--	--	--	rigid solid / rigid stranded / flexible	--	--
Supplementary information:					

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



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	Sample 1	Sample 2	Sample 3	
Solid conductors..... (after 24 cycles)	--	--	--	--
Stranded conductors..... (after 24 cycles)	--	--	--	--
Flexible conductors(after 24 cycles)	--	--	--	--
Solid conductors..... (1,5 times 24 th cycle value)	--	--	--	--
Stranded conductors (1,5 times 24 th cycle value)	--	--	--	--
Flexible conductors (1,5 times 24 th cycle value)	--	--	--	--
Solid conductors..... (after 192 cycles)	--	--	--	--
Stranded conductors..... (after 192 cycles)	--	--	--	--
Flexible conductors (after 192 cycles)	--	--	--	--
Supplementary information:				



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Attachment No.3

Photo Documentation



Figure 1 External View



Figure 2 External View



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Figure 3 External View



Figure 4 External View





Attachment No.3

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Figure 5 Internal View



Figure 6 Internal View





Attachment No.3

Photo Documentation

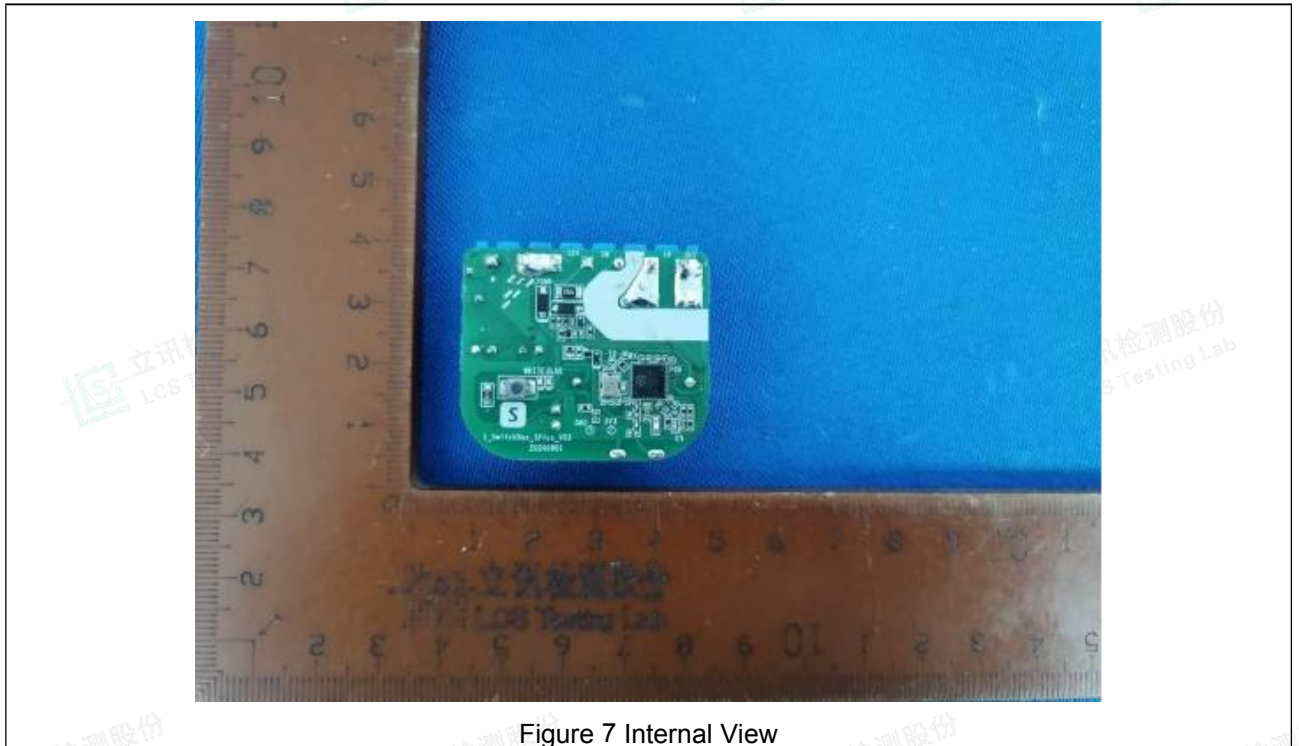


Figure 7 Internal View

--- END OF TEST REPORT ---

