IEC 60669-2-1

Edition 5.0 2021-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Switches for household and similar fixed electrical installations – Part 2-1: Particular requirements – Electronic control devices

Interrupteurs pour installations électriques fixes domestiques et analogues – Partie 2-1: Exigences particulières – Dispositifs de commande électronique



IEC 60669-2-1:2021-02(en-fr)



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Interrupteurs pour installations électriques fixes domestiques et analogues – Partie 2-1: Exigences particulières – Dispositifs de commande électronique

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

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CONTENTS

FOREWORD 6
1 Scope 8
2 Normative references 9
3 Terms and definitions 11
4 General requirements 15
5 General remarks on tests 15
6 Ratings 18
7 Classification 18
8 Marking 20
9 Checking of dimensions 23
10 Protection against electrical shock 23
11 Provision for earthing 26
12 Terminals 26
13 Constructional requirements 27
14 Mechanism 29
15 Resistance to ageing, protection provided by enclosures of switches and resistance to humidity 29
16 Insulation resistance and electric strength 29
17 Temperature rise 31
18 Making and breaking capacity 35
19 Normal operation 37
20 Mechanical strength 44
21 Resistance to heat 45
22 Screws, current-carrying parts and connections 45
23 Creepage distances, clearances and distances through sealing compound 45
24 Resistance of insulating material to abnormal heat, to fire and to tracking 52
25 Resistance to rusting 52
26 EMC requirements 52
101 Abnormal conditions 62
102 Components 67
103 Electromagnetic fields (EMF) 71
Annex A (normative) *Replacement of title to Annex A as follows:* Additional requirements for electronic control devices having facilities for the outlet and retention of flexible cables 76
Annex B (informative) Changes planned for the future in order to align IEC 60669-1 with the requirements of IEC 60998 (all parts), IEC 60999 (all parts) and IEC 60228 77
Annex C (informative) Circuit development (19.3) 78
Annex D (informative) Additional requirements for insulation-piercing terminals 79
Annex E (informative) Additional requirements and tests for switches intended to be used at a temperature lower than −5 °C 80
Annex AA (informative) Examples of types of electronic switches or HBES/BACS switches and their functions 85
Annex BB (informative) Circuit development: 19.106 explained 86

Annex CC (normative) Additional requirements for electronic control devices using DLT-technology in accordance with IEC 62756-1 91
Annex DD (informative) Test set-ups 93
Annex EE (informative) Electrical interface specification for phase-cut dimmer in phase-cut dimmed lighting systems 100
Annex FF (normative) Requirements for electronic RCS and electronic TDS that provide the function, markings and connection configuration in accordance with IEC 60669-2-2 and IEC 60669-2-3 131
Bibliography 136

Figure 101 – Protective separation between circuits 47
Figure 102 – Current path tested in the looping through circuit 72
Figure 103 – Circuit diagram for testing electronic switches and HBES/BACS switches according to 17.101 and 101.4 72
Figure 104 – Minimum creepage and clearances on printed circuit boards 73
Figure 105 – Surge test 74
Figure BB.1 – 120 V 15 W (LT spice model) 87
Figure BB.2 – 230 V 15 W (LT spice model) 88
Figure BB.3 – Model for multiple lamp loads 89
Figure BB.4 – I_{peak} and I^2t for multiple lamp loads 90
Figure DD.1 – Test setup for AC mains connection according to IEC 61000-4-4 93
Figure DD.2 – Test setup for bus and DC mains connection according to IEC 61000-4-4 94
Figure DD.3 – Test setup for AC mains connection according to IEC 61000-4-5 95
Figure DD.4 – Test setup for bus and DC mains connection according to IEC 61000-4-5 96
Figure DD.5 – Test setup for the ESD according to IEC 61000-4-2 97
Figure DD.6 – Test setup for AC mains connection according to IEC 61000-4-6 98
Figure DD.7 – Test setup for bus and DC mains connection according to IEC 61000-4-6 99
Figure EE.1 – Example of wiring diagram 103
Figure EE.2 – Timing leading edge dimming method 106
Figure EE.3 – Timing trailing edge dimming method 111
Figure EE.4 – Circuit to test the properties of the phase-cut dimmer during the non-conducting phase (Method 1) 117
Figure EE.5 – Circuit to test the properties of the phase-cut dimmer during the non-conducting phase (Method 2) 118
Figure EE.6 – Circuit to test the properties of the phase-cut dimmer during the transition from the non-conducting to the conducting phase 119
Figure EE.7 – Circuit to test the properties of the phase-cut dimmer during the electronic off-state 121
Figure EE.8 – Waveform of AC voltage source – Leading edge 122
Figure EE.9 – Waveform of AC voltage source – Trailing edge 122
Figure EE.10 – Equivalent circuit for controlgear in the on state to be used during dimmer tests 123
Figure EE.11 – Equivalent circuit for controlgear being in off state 124
Figure EE.12 – Test enclosure 127

Figure EE.13 – Geometry of microphone placement in regard to device under test 127
Figure EE.14 – Test circuit to test stability of phase angle 128
Figure EE.15 – Possibilities for proper triggering 129
Figure EE.16 – Equivalent circuit EC_CG2 130

Table 1 – Number of specimens needed for the tests 16
Table 15 – Test voltage, points of application and minimum values of insulating resistance for the verification of electric strength 29
Table 101 – Permissible temperature rise values 33
Table 102 – Application of tests for making and breaking capacity and normal operation for electronic switches and HBES/BACS switches according to 7.102.2 36
Table 103 – Relationship between rated current and capacitance 40
Table 104 – Values for I_{peak} and I^2t depending on the type of distribution system 42
Table 105 – Calculated circuit parameters 43
Table 106 – Test loads for HBES/BACS switches for heating installations 44
Table 23 – Creepage distances, clearances and distances through insulating sealing compound 45
Table 107 – Relation between the rated voltage of the HBES/BACS switch, the rated insulation voltage and the rated impulse voltage 48
Table 108 – Minimum clearances without verification test 49
Table 109 – Test voltages and corresponding altitudes 50
Table 110 – Minimum clearances with verification test 50
Table 111 – Minimum creepage distances of basic, supplementary and reinforced insulation without verification test for clearances 51
Table 112 – Minimum creepage distances of basic, supplementary and reinforced insulation with verification test for clearances 51
Table 113 – Immunity tests (overview) 54
Table 114 – Voltage dip and short-interruption test values 55
Table 115 – Surge immunity test voltages 56
Table 116 – Fast transient test values 57
Table 117 – Values for radiated electromagnetic field test of IEC 61000-4-3[a] 59
Table 118 – Measurement methods 62
Table 119 – Protection methods and test conditions 64
Table 120 – Capacitors 68
Table A.101 – Maximum current and minimum cross-sectional area 76
Table E.101 – Energy for impact tests 83
Table AA.1 – Functions overview 85
Table BB.1 – Lamp 86
Table EE.1 – Nominal mains voltage 100 V – Frequency 50 Hz or 60 Hz 107
Table EE.2 – Nominal mains voltage 120 V – Frequency 50 Hz or 60 Hz 107
Table EE.3 – Nominal mains voltage 200 V – Frequency 50 Hz or 60 Hz 107
Table EE.4 – Nominal mains voltage 230 V – Frequency 50 Hz or 60 Hz 107
Table EE.5 – Nominal mains voltage 277 V – Frequency 50 Hz or 60 Hz 107
Table EE.6 – Slew rate for voltage decrease across the phase-cut dimmer 108

Table EE.7 – Nominal mains voltage 100 V – Frequency 50 Hz or 60 Hz 109
Table EE.8 – Nominal mains voltage 120 V – Frequency 50 Hz or 60 Hz 109
Table EE.9 – Nominal mains voltage 200 V – Frequency 50 Hz or 60 Hz 109
Table EE.10 – Nominal mains voltage 230 V – Frequency 50 Hz or 60 Hz 109
Table EE.11 – Nominal mains voltage 277 V – Frequency 50 Hz or 60 Hz 110
Table EE.12 – Nominal mains voltage from 100 V to 277 V – Frequency 50 Hz or 60 Hz 112
Table EE.13 – Nominal mains moltage 100 V – Frequency 50 Hz or 60 Hz 113
Table EE.14 – Nominal mains voltage 120 V – Frequency 50 Hz or 60 Hz 113
Table EE.15 – Nominal mains voltage 200 V – Frequency 50 Hz or 60 Hz 113
Table EE.16 – Nominal mains voltage 230 V – Frequency 50 Hz or 60 Hz 114
Table EE.17 – Nominal mains voltage 277 V – Frequency 50 Hz or 60 Hz 114
Table EE.18 – Currents and voltages for controlgear during the electronic off state 115
Table EE.19 – Parameters for testing purposes 116
Table EE.20 – Parameters for testing purposes 125

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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SWITCHES FOR HOUSEHOLD AND SIMILAR FIXED ELECTRICAL INSTALLATIONS –

Part 2-1: Particular requirements – Electronic control devices

FOREWORD

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International Standard IEC 60669-2-1 has been prepared by subcommittee 23B: Plugs, socket-outlets and switches, of IEC technical committee 23: Electrical accessories.

This fifth edition cancels and replaces the fourth edition published in 2002, Amendment 1:2008 and Amendment 2:2015. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) incorporation of the requirements for HBES switches, previously included in IEC 60669-2-5;
b) modification of 19.106, test and requirements for switches for LEDs;
c) general indication to cover electronic control devices;
d) test for looping through.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
23B/1326/FDIS	23B/1342/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

This part of IEC 60669 is to be used in conjunction with IEC 60669-1:2017, hereinafter referred to as Part 1. It lists the changes necessary to convert that standard into a specific standard for electronic control devices.

In this document, the following print types are used:

– requirements proper: in roman type;
– *test specifications: in italic type;*
– notes: in smaller roman type.

Subclauses, figures, tables or notes which are additional to those in Part 1 are numbered starting from 101.

A list of all the parts in the IEC 60669 series, published under the general title *Switches for household and similar fixed electrical installations*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

The contents of the corrigendum 1 (2024-05) only applies to the French version.

SWITCHES FOR HOUSEHOLD AND SIMILAR FIXED ELECTRICAL INSTALLATIONS –

Part 2-1: Particular requirements – Electronic control devices

1 Scope

This clause of Part 1 is completely replaced by the following:

This part of IEC 60669 applies to electronic control devices, a general term to cover electronic switches, home and building electronic systems (HBES) / building automation and control systems (BACS) switches and electronic extension units.

It applies to electronic switches and to HBES/BACS switches, for alternating current (AC) only with a rated switching voltage not exceeding 250 V and a rated current not exceeding 16 A, intended for household and similar fixed electrical installations, either indoors or outdoors.

It also applies to electronic extension units with a rated supply voltage not exceeding 250 V AC and 120 V DC, such as sensors and push buttons.

This document also applies to electronic remote control switches (RCS) and electronic time delay switches (TDS). Particular requirements are given in Annex FF.

Switches including only passive components such as resistors, capacitors, inductors, positive temperature coefficient (PTC) and negative temperature coefficient (NTC) components, varistors, printed wiring boards and connectors are not considered as electronic control devices.

This document also applies to electronic switches and HBES/BACS switches for the operation of lighting equipment circuits and the control of the brightness of lighting equipment (dimmers) as well as the control of the speed of motors (for example, those used in ventilating fans) and for other purposes (for example, heating controls).

The operation and/or control as mentioned above can be transmitted by an electronic signal via several media, for example, powerline (mains), twisted pair, optical fibre, radio frequency, infrared, etc. and are performed:

– intentionally by a person via an actuating member, a key, a card, etc., via a sensing surface or a sensing unit, by means of touch, proximity, turn, optical, acoustic, thermal;
– by physical means, for example, light, temperature, humidity, time, wind velocity, presence of people;
– by any other influence.

This document also applies to electronic control devices which include integrated radio receivers and transmitters.

This document covers only those requirements for mounting boxes which are necessary for the tests on the electronic control devices.

Requirements for general purpose mounting boxes are given in the relevant part, if any, of IEC 60670.

Electronic control devices complying with this document are suitable for use at ambient temperature not normally exceeding 25 °C but occasionally reaching 35 °C with a lower limit of the ambient air temperature of −5 °C.

NOTE 1 For lower temperatures, see Annex E.

Functional safety aspects are not covered by this document. Functional safety requirements are covered by the standards of the controlled devices.

In locations where special conditions prevail, such as in ships, vehicles and the like and in hazardous locations, for example where explosions are liable to occur, special construction and/or additional requirements may be required.

This document is not intended to cover devices which are designed to be incorporated in appliances or are intended to be delivered together with a specific appliance and which are within the scope of IEC 60730 (all parts) or IEC 61058-1.

Examples of designs of electronic switches and HBES/BACS switches and functions are shown in Annex AA.

Additional requirements for electronic control devices using DLT-technology in accordance with IEC 62756-1 are given in Annex CC.

Electrical interface specification for phase-cut dimmer used in phase-cut dimmed lighting systems are given for information only in Annex EE.

NOTE 2 Electronic switches and HBES/BACS switches without a mechanical switch in the main circuit do not provide a "full off-state". Therefore, the circuit on the load side are to be considered to be live.

2 Normative references

This clause of Part 1 applies except as follows.

Addition:

IEC 60050-845, *International Electrotechnical Vocabulary (IEV) – Part 845: Lighting* (available at www.electropedia.org)

IEC 60068-2-78, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 60127 (all parts), *Miniature fuses*

IEC 60317 (all parts), *Specifications for particular types of winding wires*

IEC 60317-0-1:2013, *Specifications for particular types of winding wires – Part 0-1: General requirements – Enamelled round copper wire*

IEC 60384-14:2013, *Fixed capacitors for use in electronic equipment – Part 14: Sectional specification – Fixed capacitors for electromagnetic interference suppression and connection to the supply mains*
IEC 60384-14:2013/AMD1:2016

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage supply systems – Part 1: Principles, requirements and tests*

IEC 60669-1:2017, *Switches for household and similar fixed electrical installations – Part 1: General requirements*

IEC 60669-2-2:2006, *Switches for household and similar fixed electrical installations – Part 2-2: Particular requirements – Electromagnetic remote-control switches (RCS)*

IEC 60669-2-3:2006, *Switches for household and similar fixed electrical installations – Part 2-3: Particular requirements – Time-delay switches (TDS)*

IEC 60670 (all parts), *Boxes and enclosures for electrical accessories for household and similar fixed electrical installations*

IEC 60704-1, *Household and similar electrical appliances – Test code for the determination of airborne acoustical noise – Part 1: General requirements*

IEC 60715, *Dimensions of low-voltage switchgear and controlgear – Standardized mounting on rails for mechanical support of switchgear, controlgear and accessories*

IEC 60730 (all parts), *Automatic electrical controls*

IEC 60990, *Methods of measurement of touch current and protective conductor current*

IEC 60999-1, *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 mm^2 up to 35 mm^2 (included)*

IEC 61000-2-2, *Electromagnetic compatibility (EMC) – Part 2-2: Environment – Compatibility levels for low-frequency conducted disturbances and signaling in public low-voltage power supply systems*

IEC 61000-3-2:2018, *Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)*

IEC 61000-3-3:2013, *Electromagnetic compatibility (EMC) – Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection*
IEC 61000-3-3:2013/AMD1:2017

IEC 61000-4-2, *Electromagnetic compatibility (EMC) − Part 4-2: Testing and measurement techniques − Electrostatic discharge immunity test*

IEC 61000-4-3, *Electromagnetic compatibility (EMC) − Part 4-3: Testing and measurement techniques − Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4, *Electromagnetic compatibility (EMC) − Part 4-4: Testing and measurement techniques − Electrical fast transient/burst immunity test*

IEC 61000-4-5, *Electromagnetic compatibility (EMC) − Part 4-5: Testing and measurement techniques − Surge immunity test*

IEC 61000-4-6, *Electromagnetic compatibility (EMC) − Part 4-6: Testing and measurement techniques − Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-8, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test*

IEC 61000-4-11, *Electromagnetic compatibility (EMC) − Part 4-11: Testing and measurement techniques − Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase*

IEC 61000-4-20:2010, *Electromagnetic compatibility (EMC) – Part 4-20: Testing and measurement techniques – Emission and immunity testing in transverse electromagnetic (TEM) waveguides*

IEC 61558-2-6, *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V – Part 2-6: Particular requirements and tests for safety isolating transformers and power supply units incorporating safety isolating transformers*

IEC 61558-2-16, *Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1 100 V – Part 2-16: Particular requirements and tests for switch mode power supply units and transformers for switch mode power supply units*

IEC 62504, *General lighting – Light emitting diode (LED) products and related equipment – Terms and definitions*

IEC 62756-1, *Digital load side transmission lighting control (DLT) – Part 1: Basic requirements*

IEC/TR 63037:2019, *Electrical interface specifications for self ballasted lamps and controlgear in phase-cut dimmed lighting systems*

IEC 63044-3:2017, *Home and Building Electronic Systems (HBES) and Building Automation and Control Systems (BACS) – Part 3: Electrical safety requirements*

CISPR 14-1:2016, *Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission*

CISPR 15:2018, *Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment*

CISPR 32:2015, *Electromagnetic compatibility of multimedia equipment – Emission requirements*
CISPR 32:2015/AMD1:2019

ISO 306:2013, *Plastics – Thermoplastic materials – Determination of Vicat softening temperature (VST)*

ISO 3741, *Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Precision methods for reverberation test rooms*

ISO 3744, *Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure – Engineering methods for an essentially free field over a reflecting plane*

3 Terms and definitions

This clause of Part 1 applies except as follows.

Add the terms and definitions in IEC 63044-3:2017 and the following:

3.101
electronic switch
stand-alone device designed to make or break and/or control directly the current in one or more electric circuits either through mechanical switching element(s) via an electronic control circuit, or through an electronic switching element via a mechanical/electronic control circuit

Note 1 to entry: A stand-alone device can still be controlled remotely via RF, IR or a dedicated electronic extension unit.

Note 2 to entry: To make or break and/or to control directly means that an actuator makes or breaks the current and/or controls the current.

3.102
HBES/BACS
combination of HBES/BACS products (including their separate connected/detachable devices) linked together via one or more HBES/BACS networks

Note 1 to entry: Other names used such as "home control network", "home control systems", "home and building electronic systems", "building systems", "building automation system", etc. describe types of HBES/BACS system.

Note 2 to entry: HBES is the abbreviated term for "home and building electronic systems" and BACS is the abbreviated term for "building automation and control systems".

[SOURCE: IEC 63044-1:2017, 3.1.3, modified – Note 2 added.]

3.103
HBES/BACS switch
network operated electronic device intended to be used in an HBES/BACS, using two-way communication and designed to make or break and/or to control directly the current in one or more electric circuits

Note 1 to entry: The communication can use different media, for example twisted pair (TP), power line (PL), infrared (IR) and radio frequency (RF).

Note 2 to entry: To make or break and/or to control directly means that an actuator makes or breaks the current and/or controls the current.

3.104
electronic extension unit
device connected to an electronic switch, an HBES/BACS switch, and to lighting products used in lighting systems in the building environment in order to remotely control and/or to monitor the electronic switch, the HBES/BACS switch, and lighting products used in lighting systems in the building environment

Note 1 to entry: The electronic extension unit does not control directly the current in one or more circuits (e.g. sensors, HBES/BACS push buttons, status display).

3.105
ELV
extra low voltage
nominal voltage in the electrical installation of buildings according to the voltage band I specified in IEC 61140:2016

Note 1 to entry: Voltage band I according to IEC 61140 is a voltage below or equal to 50 V AC or 120 V DC.

[SOURCE: IEC 63044-3:2017, 3.1.7, modified – The publication IEC 61140 has been dated.]

3.106
FELV
functional extra low voltage
electrical circuit in which the nominal voltage cannot exceed ELV under normal conditions

Note 1 to entry: FELV has simple separation from mains.

Note 2 to entry: A FELV circuit is not safe to touch and may be connected to protective earth.

[SOURCE: IEC 63044-3:2017, 3.1.9, modified – The word "circuit" has been omitted from both terms.]