

**KOHTKINDLATE MAJAPIDAMIS- JA MUUDE TAOLISTE
ELEKTRIPAIGALDISTE LÜLITID. OSA 2-1: ERINÕUDED.
ELEKTRONLÜLITID**

**Switches for household and similar fixed electrical
installations - Part 2-1: Particular requirements -
Electronic control devices (IEC 60669-2-1:2021)**

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN IEC 60669-2-1:2022+A11:2022 sisaldab Euroopa standardi EN IEC 60669-2-1:2022, selle muudatuse A11:2022 ja paranduse AC:2024 ingliskeelset teksti.	This Estonian standard EVS-EN IEC 60669-2-1:2022+A11:2022 consists of the English text of the European standard EN IEC 60669-2-1:2022, its amendment A11:2022 and its corrigendum AC:2024.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas. Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 16.09.2022, muudatus A11 16.09.2022.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation. Date of Availability of the European standard is 16.09.2022, for A11 16.09.2022.
Muudatusega A11 lisatud või muudetud teksti algus ja lõpp on tekstis tähistatud sümbolitega A11 A11 . Parandusega AC lisatud või muudetud teksti algus ja lõpp on tekstis tähistatud sümbolitega AC AC . Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.	The start and finish of text introduced or altered by amendment A11 is indicated in the text by tags A11 A11 . The start and finish of text introduced or altered by corrigendum AC is indicated in the text by tags AC AC . The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 29.120.40

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardimis- ja Akrediteerimiskeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardimis- ja Akrediteerimiskeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autoriõiguse kaitse kohta, võtke palun ühendust Eesti Standardimis- ja Akrediteerimiskeskusega: Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation and Accreditation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation and Accreditation.

If you have any questions about standards copyright protection, please contact the Estonian Centre for Standardisation and Accreditation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

ICS 29.120.40

Supersedes EN 60669-2-1:2004; EN 50428:2005;
EN 60669-2-1:2004/corrigendum Dec. 2007;
EN 50428:2005/A1:2007; EN 60669-2-1:2004/A1:2009;
EN 50428:2005/A2:2009; EN 60669-2-1:2004/A12:2010,
[AC] EN 60669-2-5:2016 [AC]

English Version

Switches for household and similar fixed electrical installations -
Part 2-1: Particular requirements - Electronic control devices
(IEC 60669-2-1:2021)

Interrupteurs pour installations électriques fixes
domestiques et analogues - Partie 2-1: Exigences
particulières - Dispositifs de commande électronique
(IEC 60669-2-1:2021)

Schalter für Haushalt und ähnliche ortsfeste elektrische
Installationen - Teil 2-1: Besondere Anforderungen -
Elektronische Schalter
(IEC 60669-2-1:2021)

This European Standard was approved by CENELEC on 2021-03-12. Amendment A11 was approved by CENELEC on 2022-07-12. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard and its amendment the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard and its Amendment A11 exist in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 23B/1326/FDIS, future edition 5 of IEC 60669-2-1, prepared by SC 23B “Plugs, socket-outlets and switches” of IEC/TC 23 “Electrical accessories” was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60669-2-1:2022.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2023-07-12
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2025-07-12

 This document supersedes EN 60669-2-1:2004, EN 50428:2005 and EN 60669-2-5:2016 and all of their amendments and corrigenda (if any). 

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document is read in conjunction with EN 60669-1:2018.

This document has been prepared under a Standardization Request given to CENELEC by the European Commission and the European Free Trade Association.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 60669-2-1:2021 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60050 (series)	NOTE	Harmonized as EN IEC 63223 ¹ (series)
IEC 60085:1984	NOTE	Harmonized as HD 566 S1:1990 (not modified)
IEC 60364-4-41	NOTE	Harmonized as HD 60364-4-41
IEC 60664-3	NOTE	Harmonized as EN 60664-3
IEC 61000-6-3	NOTE	Harmonized as EN IEC 61000-6-3
IEC 61058-1:2016	NOTE	Harmonized as EN IEC 61058-1:2018 (not modified)
IEC 61140	NOTE	Harmonized as EN 61140
IEC 62612	NOTE	Harmonized as EN 62612
IEC 62717	NOTE	Harmonized as EN 62717

¹ Under preparation. Stage at time of publication: prEN IEC 63223.

A11 Amendment A11 European foreword

This document EN IEC 60669-2-1:2022/A11:2022 has been prepared by CLC/TC 23BX "Switches, boxes and enclosures for household and similar purposes, plugs and socket outlet for D.C.".

The following dates are fixed:

- latest date by which this document has to be (dop) 2023-07-12
implemented at national level by publication of
an identical national standard or by
endorsement
- latest date by which the national standards (dow) 2025-07-12
conflicting with this document have to be
withdrawn

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

This document is read in conjunction with EN IEC 60669-2-1:2022.

This document has been prepared under a Standardization Request given to CENELEC by the European Commission and the European Free Trade Association.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website. **A11**

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**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**



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2021 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC -

webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 000 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

67 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**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**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.120.40

ISBN 978-2-8322-9179-5

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

This document is a preview generated by EVS

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	36
19 Normal operation	38
20 Mechanical strength.....	45
21 Resistance to heat.....	46
22 Screws, current-carrying parts and connections.....	46
23 Creepage distances, clearances and distances through sealing compound	46
24 Resistance of insulating material to abnormal heat, to fire and to tracking	53
25 Resistance to rusting	53
26 EMC requirements.....	53
101 Abnormal conditions	63
102 Components	68
103 Electromagnetic fields (EMF)	72
▮ A11 ▫ Z.101 Radio spectrum requirements ▮ A11 ▫	72
Annex A (normative) <i>Replacement of title to Annex A as follows:</i> Additional requirements for electronic control devices having facilities for the outlet and retention of flexible cables	77
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	78
Annex C (informative) Circuit development (19.3)	79
Annex D (informative) Additional requirements for insulation-piercing terminals.....	80
Annex E (informative) Additional requirements and tests for switches intended to be used at a temperature lower than -5 °C	81

Annex AA (informative) Examples of types of electronic switches or HBES/BACS switches and their functions	86
Annex BB (informative) Circuit development: 19.106 explained	87
Annex CC (normative) Additional requirements for electronic control devices using DLT-technology in accordance with IEC 62756-1.....	92
Annex DD (informative) Test set-ups	94
Annex EE (informative) Electrical interface specification for phase-cut dimmer in phase-cut dimmed lighting systems	101
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	132
Annex ZA (normative) Normative references to international publications with their corresponding European publications	137
Bibliography	141
Figure 101 – Protective separation between circuits	48
Figure 102 – Current path tested in the looping through circuit.....	73
Figure 103 – Circuit diagram for testing electronic switches and HBES/BACS switches according to 17.101 and 101.4	73
Figure 104 – Minimum creepage and clearances on printed circuit boards	74
Figure 105 – Surge test	75
Figure 106 – Test pin for checking the protection against electric shock	76
Figure BB.1 – 120 V 15 W (LT spice model)	88
Figure BB.2 – 230 V 15 W (LT spice model)	89
Figure BB.3 – Model for multiple lamp loads	90
Figure BB.4 – I_{peak} and I^2t for multiple lamp loads	91
Figure DD.1 – Test setup for AC mains connection according to IEC 61000-4-4	94
Figure DD.2 – Test setup for bus and DC mains connection according to IEC 61000-4-4	95
Figure DD.3 – Test setup for AC mains connection according to IEC 61000-4-5	96
Figure DD.4 – Test setup for bus and DC mains connection according to IEC 61000-4-5	97
Figure DD.5 – Test setup for the ESD according to IEC 61000-4-2.....	98
Figure DD.6 – Test setup for AC mains connection according to IEC 61000-4-6	99
Figure DD.7 – Test setup for bus and DC mains connection according to IEC 61000-4-6	100
Figure EE.1 – Example of wiring diagram	104
Figure EE.2 – Timing leading edge dimming method	107
Figure EE.3 – Timing trailing edge dimming method	112
Figure EE.4 – Circuit to test the properties of the phase-cut dimmer during the non-conducting phase (Method 1)	118
Figure EE.5 – Circuit to test the properties of the phase-cut dimmer during the non-conducting phase (Method 2)	119
Figure EE.6 – Circuit to test the properties of the phase-cut dimmer during the transition from the non-conducting to the conducting phase	120
Figure EE.7 – Circuit to test the properties of the phase-cut dimmer during the electronic off-state	122

Figure EE.8 – Waveform of AC voltage source – Leading edge	123
Figure EE.9 – Waveform of AC voltage source – Trailing edge	123
Figure EE.10 – Equivalent circuit for controlgear in the on state to be used during dimmer tests	124
Figure EE.11 – Equivalent circuit for controlgear being in off state	125
Figure EE.12 – Test enclosure	128
Figure EE.13 – Geometry of microphone placement in regard to device under test	128
Figure EE.14 – Test circuit to test stability of phase angle	129
Figure EE.15 – Possibilities for proper triggering	130
Figure EE.16 – Equivalent circuit EC_CG2	131
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	30
Table 101 – Permissible temperature rise values	34
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	37
Table 103 – Relationship between rated current and capacitance	41
Table 104 – Values for I_{peak} and I^2t depending on the type of distribution system	43
Table 105 – Calculated circuit parameters	44
Table 106 – Test loads for HBES/BACS switches for heating installations	45
Table 23 – Creepage distances, clearances and distances through insulating sealing compound	46
Table 107 – Relation between the rated voltage of the HBES/BACS switch, the rated insulation voltage and the rated impulse voltage	49
Table 108 – Minimum clearances without verification test	50
Table 109 – Test voltages and corresponding altitudes	51
Table 110 – Minimum clearances with verification test	51
Table 111 – Minimum creepage distances of basic, supplementary and reinforced insulation without verification test for clearances	52
Table 112 – Minimum creepage distances of basic, supplementary and reinforced insulation with verification test for clearances	52
Table 113 – Immunity tests (overview)	55
Table 114 – Voltage dip and short-interruption test values	56
Table 115 – Surge immunity test voltages	57
Table 116 – Fast transient test values	58
Table 117 – Values for radiated electromagnetic field test of IEC 61000-4-3 ^a	60
Table 118 – Measurement methods	62
Table 119 – Protection methods and test conditions	65
Table 120 – Capacitors	69
Table A.101 – Maximum current and minimum cross-sectional area	77
Table E.101 – Energy for impact tests	84
Table AA.1 – Functions overview	86
Table BB.1 – Lamp	87

Table EE.1 – Nominal mains voltage 100 V – Frequency 50 Hz or 60 Hz.....	108
Table EE.2 – Nominal mains voltage 120 V – Frequency 50 Hz or 60 Hz.....	108
Table EE.3 – Nominal mains voltage 200 V – Frequency 50 Hz or 60 Hz.....	108
Table EE.4 – Nominal mains voltage 230 V – Frequency 50 Hz or 60 Hz.....	108
Table EE.5 – Nominal mains voltage 277 V – Frequency 50 Hz or 60 Hz.....	109
Table EE.6 – Slew rate for voltage decrease across the phase-cut dimmer	109
Table EE.7 – Nominal mains voltage 100 V – Frequency 50 Hz or 60 Hz.....	110
Table EE.8 – Nominal mains voltage 120 V – Frequency 50 Hz or 60 Hz.....	110
Table EE.9 – Nominal mains voltage 200 V – Frequency 50 Hz or 60 Hz.....	110
Table EE.10 – Nominal mains voltage 230 V – Frequency 50 Hz or 60 Hz.....	111
Table EE.11 – Nominal mains voltage 277 V – Frequency 50 Hz or 60 Hz.....	111
Table EE.12 – Nominal mains voltage from 100 V to 277 V – Frequency 50 Hz or 60 Hz	113
Table EE.13 – Nominal mains voltage 100 V – Frequency 50 Hz or 60 Hz.....	114
Table EE.14 – Nominal mains voltage 120 V – Frequency 50 Hz or 60 Hz.....	114
Table EE.15 – Nominal mains voltage 200 V – Frequency 50 Hz or 60 Hz.....	114
Table EE.16 – Nominal mains voltage 230 V – Frequency 50 Hz or 60 Hz.....	115
Table EE.17 – Nominal mains voltage 277 V – Frequency 50 Hz or 60 Hz.....	115
Table EE.18 – Currents and voltages for controlgear during the electronic off state	116
Table EE.19 – Parameters for testing purposes	117
Table EE.20 – Parameters for testing purposes	126

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SWITCHES FOR HOUSEHOLD AND SIMILAR FIXED ELECTRICAL INSTALLATIONS –

Part 2-1: Particular requirements – Electronic control devices

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

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.

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).

A11 The operation and/or control as mentioned in the paragraph above can be transmitted by an electronic signal **A11** 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.

ⓘ This document also applies to electronic control devices using DLT-technology in accordance with IEC 62756-1. Additional Requirements 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.

ⓘ *deleted text* ⓘ

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 mm² up to 35 mm² (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