SVENSK STANDARD SS-EN 60730-1

Fastställd	Utgåva	Sida	Ansvarig kommitté
2016-09-14	5	1 (1+309)	SEK TK 23

Automatiska elektriska styr- och reglerdon – Del 1: Allmänna fordringar

Automatic electrical controls – Part 1: General requirements

Som svensk standard gäller europastandarden EN 60730-1:2016. Den svenska standarden innehåller den officiella engelska språkversionen av EN 60730-1:2016.

Nationellt förord

Europastandarden EN 60730-1:2016

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 60730-1, Fifth edition, 2013*) - Automatic electrical controls - Part 1: General requirements**

utarbetad inom International Electrotechnical Commission, IEC.

I bilaga ZB redovisas en svensk avvikelse, vilken inom CENELEC accepterats till följd av speciella nationella förhållanden.

I bilaga ZC redovisas en svensk avvikelse, vilken inom CENELEC noterats vara föranledd av svenska myndigheters föreskrifter.

Tidigare fastställd svensk standard SS-EN 60730-1, utgåva 4, 2012.

SS-EN 60730-1, utgåva 5, 2016, gäller endast i det fall det finns en Del 2 för en särskild typ av styr- och reglerdon eller för styr- och reglerdon för särskilda användningsområden. Där så befinns rimligt kan dock Del 1 tillämpas på styr- och reglerdon som ej omfattas av någon Del 2, i vilket fall ytterligare fordringar kan bli nödvändiga.

*) Corrigendum 1, september 2014 till IEC 60730-1:2013 är inarbetat i standarden.

ICS 97.120.00

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Box 1284
164 29 Kista
Tel 08-444 14 00
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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60730-1

July 2016

ICS 97.120

Supersedes EN 60730-1:2011

English Version

Automatic electrical controls - Part 1: General requirements (IEC 60730-1:2013 , modified + COR1:2014)

Dispositifs de commande électrique automatiques - Partie 1: Exigences générales (IEC 60730-1:2013 , modifiée + COR1:2014)

Automatische elektrische Regel- und Steuergeräte - Teil 1: Allgemeine Anforderungen (IEC 60730-1:2013 , modifiziert + COR1:2014)

This European Standard was approved by CENELEC on 2016-03-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard 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 exists 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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 60730-1:2016 E

SEK Svensk Elstandard

European foreword

This document (EN 60730-1:2016*)* consists of the text of IEC 60730-1:2013 + corrigendum 1:2014 prepared by IEC/TC 72 "Automatic electrical controls", together with the common modifications prepared by CLC/TC 72 "Automatic controls for household use*"*.

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)	2017-01-29
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	- *

** Justification for no dow:*
This European Standard supersedes EN 60730-1:2011. However, EN 60730-1:2011 remains valid until all the Part 2's which are used in conjunction with it have been withdrawn. No date of withdrawal (dow) has been given pending the updating of all the Part 2's to align with this EN 60730-1:2016. The applicable date of withdrawal is given in each Part 2. It is intended the dow for this Part 1 will be fixed once all the Part 2's have been updated.

This document supersedes EN 60730-1:2011.

EN 60730-1:2016 includes the following significant technical changes with respect to EN 60730-1:2011:

– changes of the title of the Standard into "*Automatic electrical controls – Part 1: General requirements*";
– revisions to Clause H.26 based on changes in technology, applications, and to improve consistency and layout;
– modification to Table H.12 to align with CISPR 22;
– revisions to Annex J to correlate the fault modes of thermistors, and to exempt thermistors used in conjunction with type 1 controls in SELV low power circuits from the tests specified in Annex J;
– new requirements covering battery-powered controls, and the use of batteries in controls;
– revision addressing the relay faults in Table H.24;
– new/updated requirements in Clause 24, for switch mode power supplies;
– revisions covering the allowance of screwless-type clamping units complying with IEC 60999-1;
– new requirements addressing remotely actuated control functions;
– addition of a new/updated leakage current diagram to align the Annex E diagram with the diagram in IEC 60990;
– updated requirements for temperature sensing controls.

This Part 1 is to be used in conjunction with the appropriate Part 2 for a particular type of control, or for controls for particular applications. This Part 1 may also be applied, so far as reasonable, to controls not mentioned in a Part 2, and to controls designed on new principles, in which case additional requirements may be considered to be necessary.

Where, for a particular clause or subclause, the text of Part 2 indicates:

Addition: the Part 1 text applies with the additional requirement indicated in a Part 2;

Modification: the Part 1 text applies with a minor change as indicated in a Part 2;

Replacement: the Part 2 text contains a change which replaces the Part 1 text in its entirety.

Where no change is necessary, the Part 2 indicates that the relevant clause or subclause applies.

NOTE In this standard the following print types are used:

– Requirements proper: in roman type.

– *Test specifications: in italic type.*

– Explanatory matter: in smaller roman type.

- Defined terms: **bold type**.

Some table titles contain reference in brackets to table numbers in IEC 60730-1:1999 (edition 3) for ease of correlation between Parts 2 and the Part 1.

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 60730-1:2013 are prefixed “Z”.

Special national conditions are listed in Annex ZB (normative) which forms part of this standard.

National deviations are listed in Annex ZC (informative).

Endorsement notice

The text of the International Standard IEC 60730-1:2013 was approved by CENELEC as a European Standard with agreed common modifications.

Add Annexes ZA, ZB, ZC, ZD as follows.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
-	-	Electric cables - Low voltage energy cables of rated voltages up to and including 450/750 V (U_o/U) Part 2-11: Cables for general applications - Flexible cables with thermoplastic PVC insulation	EN 50525-2-11	-
-	-	Electric cables - Low voltage energy cables of rated voltages up to and including 450/750 V (U_o/U) Part 2-21: Cables for general applications - Flexible cables with crosslinked elastomeric insulation	EN 50525-2-21	-
IEC 60038	-	IEC standard voltages	EN 60038	-
IEC 60065 (mod) + A1 (mod) - - + A2 (mod) -	2001 2005 - - 2010 -	Audio, video and similar electronic apparatus - Safety requirements	EN 60065 + A1 + corrig. August + A11 + A2 + A12	2002 [1)] 2006 [1)] 2007 [1)] 2008 [1)] 2010 [1)] 2011 [1)]
IEC 60068-2-75	-	Environmental testing Part 2-75: Tests - Test Eh: Hammer tests	EN 60068-2-75	-
IEC 60085	-	Electrical insulation - Thermal evaluation and designation	EN 60085	-
IEC 60099-1	-	Surge arresters Part 1: Non-linear resistor type gapped surge arresters for a.c. systems	EN 60099-1	-
IEC 60112 + A1	2003 2009	Method for the determination of the proof and the comparative tracking indices of solid insulating materials	EN 60112 + A1	2003 2009

[1)] Superseded by EN 60065:2014 (IEC 60065:2014): DOW = 2017-11-17.

Publication	Year	Title	EN/HD	Year
IEC 60127-1	-	Miniature fuses Part 1: Definitions for miniature fuses and general requirements for miniature fuse-links	EN 60127-1	-
IEC 60227-1	-	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V Part 1: General requirements	-	-
IEC 60245-1	-	Rubber insulated cables - Rated voltages up to and including 450/750 V Part 1: General requirements	-	-
IEC 60269-1	-	Low-voltage fuses Part 1: General requirements	EN 60269-1	-
IEC 60335-1 (mod) -	2010 -	Household and similar electrical appliances - Safety Part 1: General requirements	EN 60335-1 + AC	2012 2014
IEC 60364	Series	Low-voltage electrical installations	HD 384 / HD 60364	Series
IEC 60384-14	-	Fixed capacitors for use in electronic equipment Part 14: Sectional specification - Fixed capacitors for electromagnetic interference suppression and connection to the supply mains	EN 60384-14	-
IEC 60384-16	-	Fixed capacitors for use in electronic equipment Part 16: Sectional specification: Fixed metallized polypropylene film dielectric d.c. capacitors	EN 60384-16	-
IEC 60384-17	-	Fixed capacitors for use in electronic equipment Part 17: Sectional specification: Fixed metallized polypropylene film dielectric a.c. and pulse capacitors	EN 60384-17	-
IEC 60417	series	Graphical symbols for use on equipment	-	-
IEC 60423	-	Conduit systems for cable management - Outside diameters of conduits for electrical installations and threads for conduits and fittings	EN 60423	-
IEC 60529 - + A1	1989 - 1999	Degrees of protection provided by enclosures (IP Code)	EN 60529 + corrig. May + A1	1991 1993 2000
IEC 60539	series	Directly heated negative temperature coefficient thermistors	EN 60539	series
IEC 60664-1	2007	Insulation coordination for equipment within low-voltage systems Part 1: Principles, requirements and tests	EN 60664-1	2007
IEC 60664-3 + A1	2003 2010	Insulation coordination for equipment within low-voltage systems Part 3: Use of coating, potting or moulding for protection against pollution	EN 60664-3 + A1	2003 2010

Publication	Year	Title	EN/HD	Year
IEC 60664-4	-	Insulation coordination for equipment within low-voltage systems Part 4: Consideration of high-frequency voltage stress	EN 60664-4	-
IEC 60669-1 (mod) + A1 (mod) + A2 (mod)	1998 1999 2006	Switches for household and similar fixed-electrical installations Part 1: General requirements	EN 60669-1 + A1 + A2	1999 2002 2008
IEC 60695-2-10	-	Fire hazard testing Part 2-10: Glowing/hot-wire based test methods - Glow-wire apparatus and common test procedure	EN 60695-2-10	-
IEC 60695-2-11	2000	Fire hazard testing Part 2-11: Glowing/hot-wire based test methods - Glow-wire flammability test method for end-products	EN 60695-2-11	2001 [2)]
IEC 60695-10-2	-	Fire hazard testing Part 10-2: Abnormal heat - Ball pressure test	EN 60695-10-2	-
IEC 60730	series	Automatic electrical controls for household and similar use	EN 60730	series
IEC 60738-1	-	Thermistors - Directly heated positive temperature coefficient Part 1: Generic specification	EN 60738-1	-
IEC 60738-1-1	-	Thermistors - Directly heated positive step-function temperature coefficient Part 1-1: Blank detail specification - Current limiting application - Assessment level EZ	EN 60738-1-1	-
IEC 60947-1	2007	Low-voltage switchgear and controlgear Part 1: General rules	EN 60947-1	2007
IEC 60998-2-2	-	Connecting devices for low-voltage circuits for household and similar purposes Part 2-2: Particular requirements for connecting devices as separate entities with screwless-type clamping units	EN 60998-2-2	-
IEC 60998-2-3	-	Connecting devices for low-voltage circuits for household and similar purposes Part 2-3: Particular requirements for connecting devices as separate entities with insulation-piercing clamping units	EN 60998-2-3	-
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)	EN 60999-1	-
IEC 61000	Series	Electromagnetic compatibility (EMC)	EN 61000	Series

[2)] Superseded by EN 60695-2-11:2014 (IEC 60695-2-11:2014): DOW = 2017-03-13.

Publication	Year	Title	EN/HD	Year
IEC 61000-3-2	-	Electromagnetic compatibility (EMC) Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)	EN 61000-3-2	-
IEC 61000-3-3	2008	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	EN 61000-3-3	2008 [3)]
IEC 61000-4-2	2008	Electromagnetic compatibility (EMC) Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	2009
IEC 61000-4-3	-	Electromagnetic compatibility (EMC) Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3	-
IEC 61000-4-4	-	Electromagnetic compatibility (EMC) Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4	-
IEC 61000-4-5	-	Electromagnetic compatibility (EMC) Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5	-
IEC 61000-4-6	-	Electromagnetic compatibility (EMC) Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	EN 61000-4-6	-
IEC 61000-4-8	-	Electromagnetic compatibility (EMC) Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test	EN 61000-4-8	-
IEC 61000-4-11	-	Electromagnetic compatibility (EMC) Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests	EN 61000-4-11	-
IEC 61000-4-13 + A1	2002 2009	Electromagnetic compatibility (EMC) Part 4-13: Testing and measurement techniques - Harmonics and interharmonics including mains signalling at a.c. power port, low frequency immunity tests	EN 61000-4-13 + A1	2002 2009

[3)] Superseded by EN 61000-3-3:2013 (IEC 61000-3-3:2013): DOW = 2016-06-18.

Publication	Year	Title	EN/HD	Year
IEC 61000-4-28	-	Electromagnetic compatibility (EMC) Part 4-28: Testing and measurement techniques - Variation of power frequency, immunity test for equipment with input current not exceeding 16 A per phase	EN 61000-4-28	-
IEC 61058-1	-	Switches for appliances Part 1: General requirements	-	-
IEC 61210	-	Connecting devices - Flat quick-connect terminations for electrical copper conductors - Safety requirements	EN 61210	-
IEC 61249	series	Materials for printed boards and other interconnecting structures	EN 61249	series
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	EN 61558-2-6	-
IEC 61558-2-16	-	Safety of transformers, reactors, power supply units and similar products for 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	EN 61558-2-16	-
IEC 61643-11	-	Low-voltage surge protective devices Part 11: Surge protective devices connected to low-voltage power systems - Requirements and test methods	EN 61643-11	-
IEC 62326	series	Printed boards	EN 62326	series
CISPR 11	-	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement	EN 55011	-
CISPR 14-1 + A1	2005 2008	Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus Part 1: Emission	EN 55014-1 + A1	2006 2009
CISPR 16-1-1	-	Specification for radio disturbance and immunity measuring apparatus and methods Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus	EN 55016-1-1	-
CISPR 22 (mod)	2008	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	EN 55022 + AC	2010 2011
ISO 16484-2	-	Building automation and control systems (BACS) Part 2: Hardware	EN ISO 16484-2	-

Bibliography

Delete reference to IEC 60669-1:1998, Amendment 1:1999, and Amendment 2:2006.

Add the following after IEC 60998-2-1:

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

EN 61000-6-1, *Electromagnetic compatibility (EMC) – Part 6-1: Generic standards – Immunity for residential, commercial and light-industrial environments* (IEC 61000-6-1)

EN 61000-6-2, *Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments* (IEC 61000-6-2)

Add the following after ISO 527-1:2012:

ISO 4046:1978 [1)], *Paper, board, pulp and related terms – Vocabulary*

1) ISO 4046:1978 is replaced by ISO 4046-1:2002, *Paper, board, pulps and related terms – Vocabulary – Part 1: Alphabetical index*.

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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AUTOMATIC ELECTRICAL CONTROLS –

Part 1: General requirements

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.
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International Standard IEC 60730-1 has been prepared by IEC technical committee 72: Automatic electrical controls.

This fifth edition cancels and replaces the fourth edition published in 2010. It constitutes a technical revision. The major changes with respect to the previous edition are as follows.

– modification of the title and scope;
– revisions to Clause H.26 based on changes in technology, applications, and to improve consistency and layout;
– modification to Table H.12 to align with CISPR 22;
– revisions to Annex J to correlate the fault modes of thermistors and to exempt thermistors used in conjunction with type 1 controls in SELV low power circuits from the tests specified in Annex J;
– new requirements covering battery-powered controls, and the use of batteries in controls;
– revision addressing the exclusion of relay faults;
– new/updated requirements in Clause 24, for switch mode power supplies;

– revisions covering the allowance of screwless-type clamping units complying with IEC 60999-1;

– new requirements addressing remotely actuated control functions;

– addition of a new/updated leakage current diagram to align the Annex E diagram with the diagram in IEC 60990;

– updated requirements for temperature sensing controls.

The text of this standard is based on the following documents:

FDIS	Report on voting
72/899/FDIS	72/928/RVD

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

A list of all parts of the IEC 60730 series, under the general title: *Automatic electrical controls*, can be found on the IEC website.

In the development of a fully international standard to cover automatic controls for household and similar use, it has been necessary to take into consideration the differing requirements resulting from practical experience in various parts of the world and to recognize the variation in national electrical systems and wiring rules.

The “in some countries” notes regarding differing national practices are contained in the following subclauses:

2.1.5
2.7.2
2.7.3
2.14.2
4.2.1
6.6.1
Table 1 (7.2), footnote d
7.4.3
7.4.3.2
8.1.1.1
8.4
9.3.2
9.3.4
9.5.2
Table 3 (10.1.4), footnote b
10.1.4.1
10.1.14
10.1.16
10.1.16.1
Table 6 (10.2.1), footnote b
11.5
Table 10 (11.8.2), footnote b
11.11.1.2
11.11.1.3
11.11.1.4
12.1.6
12.3
Table 12 (13.2.1), footnote a
13.3.4
14.4
Table 13 (14.7.4), footnote f
15.1
16.2.1
17.1.3.1
17.2.2
17.2.3
17.2.3.1
Table 14 (17.2.5)
Table 15 (17.2.5)
Table 16 (17.2.5)
17.5.1
17.7.7
17.8.4.1
17.10
17.10.4
17.12.5
18.1.6
18.1.6.1
18.1.6.2
18.1.6.3
18.4
19.2.4.1
19.2.5.1
21.1
21.4
27.2.3.1
Annex C
Annex D
H.26.10
Table H.18 (H.26.10.4)
H.27.1.1.3
Table K.1, footnote b
Table K.2, footnote b
T.3.2

It is envisaged that in the next edition of this standard it will be found possible to remove those differences that are covered by new IEC standards now being prepared by other technical committees.

This part 1 is to be used in conjunction with the appropriate part 2 for a particular type of control, or for controls for particular applications. This part 1 may also be applied, so far as reasonable, to controls not mentioned in a part 2, and to controls designed on new principles, in which cases additional requirements may be considered to be necessary.

Where, for a particular clause or subclause, the text of part 2 indicates:

Addition: the part 1 text applies with the additional requirement indicated in a part 2;

Modification: the part 1 text applies with a minor change as indicated in a part 2;

Replacement: the part 2 text contains a change which replaces the part 1 text in its entirety.

Where no change is necessary, the part 2 indicates that the relevant clause or subclause applies.

NOTE In this standard the following print types are used:

– Requirements proper: in roman type;

– *Test specifications: in italic type;*

– Explanatory matter: in smaller roman type;

– Defined terms: **bold type**.

Some table titles contain reference in brackets to table numbers in IEC 60730-1, edition 3 for ease of correlation between parts 2 and the Part 1.

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

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

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

The contents of the corrigendum of September 2014 have been included in this copy.

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AUTOMATIC ELECTRICAL CONTROLS –

Part 1: General requirements

1 Scope and normative references

1.1 Scope

In general, this part of IEC 60730 applies to automatic **electrical controls** for use in, on, or in association with equipment for household and similar use. The equipment may use electricity, gas, oil, solid fuel, solar thermal energy, etc., or a combination thereof.

NOTE 1 Throughout this standard the word "equipment" means "appliance and equipment."

EXAMPLE 1 **Controls** for appliances within the scope of IEC 60335.

This International Standard is applicable to **controls** for building automation within the scope of ISO 16484.

This standard also applies to automatic **electrical controls** for equipment that may be used by the public, such as equipment intended to be used in shops, offices, hospitals, farms and commercial and industrial applications.

EXAMPLE 2 **Controls** for commercial catering, heating and air-conditioning equipment.

This standard is also applicable to individual **controls** utilized as part of a **control** system or **controls** which are mechanically integral with multifunctional **controls** having non-electrical outputs.

EXAMPLE 3 Independently mounted water valves, **controls** in smart grid systems and **controls** for building automation systems within the scope of ISO 16484-2.

This standard is also applicable to relays when used as **controls** for IEC 60335 appliances. Additional requirements for the safety and **operating values** of relays when used as **controls** for IEC 60335 appliances are contained in Annex U.

NOTE 2 These requirements are referred to in the scope of IEC 61810-1.

NOTE 3 This standard is intended to be used for the testing of any stand-alone relay which is intended to be used as a **control** of an appliance according to IEC 60335-1. It is not intended to be used for any other stand-alone relay, or to replace the IEC 61810 series of standards.

This standard does not apply to automatic **electrical controls** intended exclusively for industrial process applications unless explicitly mentioned in the relevant part 2 or the equipment standard.

1.1.1 This International Standard applies to the inherent safety, to the **operating values**, **operating times**, and **operating sequences** where such are associated with equipment safety, and to the testing of automatic **electrical control** devices used in, or in association with, equipment.

This standard applies to **controls** using **thermistors**, see also Annex J.

This standard is also applicable to the **functional safety** of **low complexity safety related systems** and **controls**.

1.1.2 This standard applies to automatic **electrical controls**, mechanically or electrically operated, responsive to or controlling such characteristics as temperature, pressure, passage of time, humidity, light, electrostatic effects, flow, or liquid level, current, voltage, acceleration, or combinations thereof.

1.1.3 This standard applies to starting relays, which are a specific type of automatic **electrical control**, intended to switch the starting winding of a motor. Such **controls** may be built into, or be separate from, the motor.

1.1.4 This standard applies to **manual controls** when such are electrically and/or mechanically integral with **automatic controls**.

NOTE Requirements for manual switches not forming part of an **automatic control** are contained in IEC 61058-1.

1.1.5 This standard applies to a.c. or d.c. powered **controls** with a rated voltage not exceeding 690 V a.c. or 600 V d.c.

1.1.6 This standard does not take into account the **response value** of an **automatic action** of a **control**, if such a **response value** is dependent upon the method of mounting the **control** in the equipment. Where a **response value** is of significant purpose for the protection of the **user**, or surroundings, the value defined in the appropriate household equipment standard or as determined by the manufacturer shall apply.

1.1.7 This standard applies also to **controls** incorporating **electronic devices**, requirements for which are contained in Annex H.

1.1.8 This standard applies also to **controls** using NTC or PTC **thermistors**, requirements for which are contained in Annex J.

1.2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60038, *IEC standard voltages*

IEC 60065:2001, *Audio, video and similar electronic apparatus – Safety requirements*[1]
Amendment 1:2005
Amendment 2:2010

IEC 60068-2-75, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*

IEC 60085, *Electrical insulation – Thermal evaluation and designation*

IEC 60099-1, *Surge arresters – Part 1: Non-linear resistor type gapped arresters for a.c. systems*[2]

IEC 60112:2003, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*[3]
Amendment 1:2009

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1 There exists a consolidated edition 7.2:2011 including IEC 60065:2001 and its Amendments 1:2005 and 2:2010.

2 Withdrawn.

3 There exists a consolidated edition 4.1:2009 including IEC 60112:2003 and its Amendment 1:2009.

IEC 60127-1, *Miniature fuses – Part 1: Definitions for miniature fuses and general requirements for miniature fuse-links*

IEC 60227-1, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V – Part 1: General requirements*

IEC 60245-1, *Rubber insulated cables – Rated voltages up to and including 450/750 V – Part 1: General requirements*

IEC 60269-1, *Low-voltage fuses – Part 1:General requirements*

IEC 60335-1:2010, *Household and similar electrical appliances – Safety – Part 1: General requirements*

IEC 60364 (all parts), *Low-voltage electrical installations*

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

IEC 60384-16, *Fixed capacitors for use in electronic equipment – Part 16: Sectional specification: Fixed metallized polypropylene film dielectric d.c. capacitors*

IEC 60384-17, *Fixed capacitors for use in electronic equipment – Part 17: Sectional specification: Fixed metallized polypropylene film dielectric a.c. and pulse capacitors*

IEC 60417 (all parts), *Graphical symbols for use on equipment*

IEC 60423, *Conduit systems for cable management – Outside diameters of conduits for electrical installations and threads for conduits and fittings*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP code)*[4]
Amendment 1:1999

IEC 60539 (all parts), *Directly heated negative temperature coefficient thermistors*

IEC 60664-1:2007, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60664-3:2003, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*
Amendment 1:2010

IEC 60664-4, *Insulation coordination for equipment within low-voltage systems – Part 4: Consideration of high-frequency voltage stress*

IEC 60695-2-10, *Fire Hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC 60695-2-11:2000, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products*

IEC 60695-10-2, *Fire hazard testing – Part 10-2: Abnormal heat – Ball pressure test*

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4 There exists a consolidated edition 2.1:2001 including IEC 60529:1989 and its Amendment 1:1999.

IEC 60738-1, *Thermistors – Directly heated positive temperature coefficient – Part 1: Generic specification*

IEC 60738-1-1, *Thermistors – Directly heated positive step-function temperature coefficient – Part 1-1: Blank detail specification – Current limiting application – Assessment level EZ*

IEC 60947-1:2007, *Low-voltage switchgear and controlgear – Part 1: General rules*

IEC 60998-2-2, *Connecting devices for low-voltage circuits for household and similar purposes – Part 2-2: Particular requirements for connecting devices as separate entities with screwless-type clamping units*

IEC 60998-2-3, *Connecting devices for low-voltage circuits for household and similar purposes – Part 2-3: Particular requirements for connecting devices as separate entities with insulation-piercing clamping units*

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 (all parts), *Electromagnetic compatibility (EMC)*

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

IEC 61000-3-3:2008, *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 61000-4-2:2008, *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*

IEC 61000-4-13:2002, *Electromagnetic compatibility (EMC) – Part 4-13: Testing and measurement techniques – Harmonics and interharmonics including mains signalling at a.c. power port, low frequency immunity tests*
Amendment 1:2009

IEC 61000-4-28, *Electromagnetic compatibility (EMC) – Part 4-28: Testing and measurements techniques – Variation of power frequency, immunity test*

IEC 61058-1, *Switches for appliances – Part 1: General requirements*

IEC 61210, *Connecting devices – Flat quick-connect terminations for electrical copper conductors – Safety requirements*

IEC 61249 (all parts), *Materials for printed boards and other interconnecting structures*

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 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 61643-11, *Low-voltage surge protective devices – Part 11: Surge protective devices connected to low-voltage power systems – Requirements and test methods*

IEC 62326 (all parts), *Printed boards*

CISPR 11, *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*

CISPR 14-1:2005, *Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission*[5]
Amendment 1:2008

CISPR 22:2008, *Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement*

ISO 16484-2, *Building automation and control systems (BACS) – Part 2: Hardware*

5 There exists a consolidated edition 5.1:2009 including CISPR 14-1:2005 and its Amendment 1:2008.