

CONSOLIDATED VERSION

VERSION CONSOLIDÉE



**Automatic electrical controls –
Part 1: General requirements**

**Dispositifs de commande électrique automatiques –
Partie 1: Exigences générales**



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**Automatic electrical controls –
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**Dispositifs de commande électrique automatiques –
Partie 1: Exigences générales**

CONTENTS

FOREWORD	7
1 Scope and normative references	10
2 Terms and definitions	15
3 General requirements	38
4 General notes on tests	38
5 Rating.....	42
6 Classification	42
7 Information	49
8 Protection against electric shock	58
9 Provision for protective earthing	62
10 Terminals and terminations.....	64
11 Constructional requirements.....	73
12 Moisture and dust resistance.....	91
13 Electric strength and insulation resistance	93
14 Heating.....	96
15 Manufacturing deviation and drift.....	102
16 Environmental stress	103
17 Endurance	104
18 Mechanical strength	114
19 Threaded parts and connections.....	121
20 Creepage distances, clearances and distances through solid insulation.....	124
21 Resistance to heat, fire and tracking.....	133
22 Resistance to corrosion	135
23 Electromagnetic compatibility (EMC) requirements – Emission	136
24 Components	137
25 Normal operation	139
26 Electromagnetic compatibility (EMC) requirements – Immunity	139
27 Abnormal operation	139
28 Guidance on the use of electronic disconnection	142
Annex A (normative) Indelibility of markings.....	162
Annex B (normative) Measurement of creepage distances and clearances in air.....	164
Annex C (normative) Cotton used for mercury switch test (not applicable in the countries members of CENELEC)	169
Annex D (informative) Heat, fire and tracking.....	170
Annex E (normative) Circuit for measuring leakage current.....	171
Annex F (informative) Fire hazard testing.....	172
Annex G (normative) Heat and fire resistance tests.....	173
Annex H (normative) Requirements for electronic controls	175
Annex J (normative) Requirements for thermistor elements and controls using thermistors.....	241
Annex K (informative) Nominal voltages of supply systems for different modes of overvoltage control	259

Annex L (normative) Overvoltage categories	261
Annex M (informative) Typical usage	262
Annex N (normative) Pollution degrees	263
Annex P (normative) Printed circuit board coating performance test.....	264
Annex Q (normative) Printed circuit board coating performance test	266
Annex R (informative) Explanatory notes for surge immunity test	272
Annex S (informative) Guidance for applying Clause 20	277
Annex T (normative) Requirements for SELV and PELV.....	279
Annex U (normative) Requirements for relays when used as controls in IEC 60335 appliances	282
Annex V (normative) Requirements for controls powered by secondary batteries (rechargeable)	285
Bibliography.....	287
Figure 1 – Test pin.....	142
Figure 2 – Standard test finger.....	143
Figure 3 – Test nail	144
Figure 4 – Impact test for free-standing controls	145
Figure 5 – Tumbling barrel	145
Figure 6 – Ball-pressure apparatus	146
Figure 7 – Void	146
Figure 8 – Apparatus for testing durability of markings on rating labels	146
Figure 9 – Apparatus for flexing test	147
Figure 10 – Screw terminals and stud terminals	148
Figure 11 – Pillar terminals	150
Figure 12 – Mantle terminals.....	151
Figure 13 – Saddle and lug terminals	152
Figure 14 – Tabs.....	153
Figure 15 – Tabs for non-reversible connectors	154
Figure 16 – Receptacles	155
Figure 17 – Measurement of creepage distance and clearance	156
Figures 18 to 24 Void.....	157
Figure 25 – Diagram for leakage current measurement at operating temperature for single-phase connection of class II controls	157
Figure 26 – Diagram for leakage current measurement at operating temperature for single-phase connection of controls other than class II	158
Figure 27 – Diagram for leakage current measurement at operating temperature for three-phase connection of class II controls	159
Figure 28 – Diagram for leakage current measurement at operating temperature for three-phase connection of controls other than class II.....	160
Figure 29 – Diagram for leakage current measurement at operating temperature for single-phase connection of controls other than class II	160
Figure 30 – Diagram for leakage current measurement at operating temperature for two-phase connection of controls to three-wire, ground neutral supply other than class II	161
Figure B.1 – Narrow groove	165

Figure B.2 – Wide groove	165
Figure B.3 – V-shaped groove.....	165
Figure B.4 – Rib.....	166
Figure B.5 – Uncemented joint with narrow groove	166
Figure B.6 – Uncemented joint with wide groove	166
Figure B.7 – Uncemented joint with narrow and wide grooves	167
Figure B.8 – Diverging side walls	167
Figure B.9 – Narrow recess.....	168
Figure B.10 – Wide recess	168
Figure B.11 – Conductive floating part	168
Figure E.1 – Circuit for measuring leakage currents.....	171
Figure H.1 – V-Model for the software life cycle	201
Figure H.2 – Voltage variation test.....	218
Figure H.3 – Ring wave characteristics (open-circuit voltage)	223
Figure H.4 – Schematic of a ring wave generator 0,5 µs /100 kHz.....	223
Figure H.5 – Example of an electronic circuit with low power points	228
Figure J.1 – Test circuit for inrush-current limiting thermistor endurance test	257
Figure P.1 – Test sample	265
Figure Q.1 – Test sample.....	270
Figure Q.2 – Examples of land configurations (see also Figure Q.1).....	271
Figure Q.1 – Example of type 1 protection.....	270
Figure Q.2 – Example of type 2 protection.....	271
Figure R.1 – Example of surge protection by shielding in buildings with common earth reference systems.....	275
Figure R.2 – Example of secondary surge protection in buildings with separate common earth reference systems	275
Figure R.3 – Example of primary and secondary surge protection of indoor/outdoor equipment.....	276
Figure S.1 – Guidance flowchart for application of requirements of Clause 20	277
Table 1 (7.2 of edition 3) – Required information and methods of providing information)	52
Table 2 (9.3.2 of edition 3) – Quick connect terminal dimensions (Canada and USA).....	63
Table 3 (10.1.4 of edition 3) – Minimum cross-sectional area of conductors.....	66
Table 4 (10.1.8 of edition 3) – Terminal conductors.....	68
Table 5 (10.1.9 of edition 3) – Conductor pull test values.....	69
Table 6 (10.2.1 of edition 3) – Nominal cross-sectional areas of conductors	71
Table 7 (10.2.4.2 of edition 3) – Material and plating for tabs	72
Table 8 (10.2.4.3 of edition 3) – Axial force values for tab insertion and withdrawal	72
Table 9 (11.7.2 of edition 3) – Pull and torque values	83
Table 10 (11.8.2 of edition 3) – Minimum cord conductor sizes	84
Table 11 (13.1 of edition 3) – Minimum insulation resistance	94
Table 12 (13.2 of edition 3) – Insulation or disconnection test voltages ^a	94
Table 13 (14.1 of edition 3) – Maximum heating temperatures	99

Table 14 (17.2.1 of edition 3) – Electrical conditions for the overvoltage test (this table applies in all countries except Canada, and the USA)	106
Table 15 (17.2.2 of edition 3) – Electrical conditions for the overload tests of 17.7 and 17.10 (this table applies in Canada, USA, and all countries which use an overload test)	107
Table 16 (17.2.3 of edition 3) – Electrical conditions for the overload endurance tests of 17.8, 17.9, 17.11, 17.12 and 17.13 (this table applies in Canada, USA, <i>and all countries which use an overload test</i>)	109
Table 17 (18.4.1 of edition 3) – Minimum thickness of sheet metal for enclosures made of carbon steel or stainless steel	117
Table 18 (18.4.2 of edition 3) – Minimum thickness of sheet metal for enclosures of aluminium, copper or brass	118
Table 19 (18.7 of edition 3) – Pull-cord force test values	120
Table 20 (19.1 of edition 3) – Threaded parts torque test values	122
Table 21 (20.1 of edition 3) – Rated impulse voltage for equipment energized directly from the supply mains (from IEC 60664-1:2007, Table F.1)	125
Table 22 (20.2 of edition 3) – Clearances for insulation co-ordination (from IEC 60664-1:2007, Table F.2)	126
Table 23 (20.3 of edition 3) – Minimum creepage distances for basic insulation	130
Table 24 (20.4 of edition 3) – Minimum creepage distances for functional insulation	131
Table 25 (21.4 of edition 3) – Mercury switch short-circuit conditions	135
Table 26 (27.2.3 of edition 3) – Maximum winding temperature (for test of mechanical blocked output conditions)	140
Table B.1 – Value of X	164
Table H.1 (H.11.12.7 of edition 3) – Acceptable measures to address fault/errors ^a	194
Table H.2 – Semi-formal methods	201
Table H.3 – Software architecture specification	202
Table H.4 – Module design specification	203
Table H.5 – Design and coding standards	203
Table H.6 – Software module testing	204
Table H.7 – Software integration testing	205
Table H.8 – Software safety validation	205
Table H.9 (H.11.12.6 of edition 3) – Combinations of analytical measures during hardware development	206
Table H.10 – Data exchange	207
Table H.11 – Examples of defences against unauthorised access and transmission failure modes	208
Table H.12 (H.23 of edition 3) – Emission	214
Table H.13 (H.26.2.1 of edition 3) – Applicable test levels	215
Table H.14 – Voltage dips, short interruptions and voltage variations	217
Table H.15 (H.26.5.4.2 of edition 3) – Test values for voltage variations	218
Table H.16 (H.26.8.2 of edition 3) – Test voltages for test level 2 (depending on the installation class conditions)	220
Table H.17 – Test level for electrical fast transient burst test	221
Table H.18 (H.26.10.4 of edition 3) – Peak voltages	222
Table H.19 (H.26.12.2.1 of edition 3) – Test levels for conducted disturbances on mains and I/O lines	224

Table H.20 (H.26.12.3.1 of edition 3) – Test level for immunity to radiated electromagnetic fields	225
Table H.21 – Increased test level for radiated immunity (ISM, GSM, DECT bands)	225
Table H.22 (H.26.13.2 of edition 3) – Test level for supply frequency variations	226
Table H.23 (H.26.14.2 of edition 3) – Test level for continuous fields	227
Table H.24 (H.27.1 of edition 3) – Electrical/electronic component fault modes table	231
Table J.1 – Maximum current	243
Table J.2 (J.7, 7.2 of edition 3) – Normal operating conditions	244
Table J.3 – Samples for the test (clause reference)	245
Table J.4 – Electrical and thermal ratings of a thermistor	246
Table J.5 – Additional items to Table 1	248
Table J.6 – Sequence of calibration and conditioning tests for PTC thermistors	250
Table J.7 – Classes for PTC sensing thermistors	251
Table J.8 – Sequence of calibration and conditioning tests for NTC thermistors	252
Table J.9 – Classes for NTC sensing thermistors	252
Table J.10 – Number of cycles for endurance test	255
Table J.11 – Ageing test temperature	256
Table J.12 – Number of cycles for endurance test	257
Table K.1 – Inherent control or equivalent protective control	259
Table K.2 – Cases where protective control is necessary and control is provided by surge arresters having a ratio of clamping voltage to rated voltage not smaller than that specified by IEC 60099-1	260
Table M.1 – Typical usage	262
Table P.1 – Environmental cycling conditions	264
Table Q.1 – IEC 60664-3 test levels or conditions	267
Table S.1 – Example A – Using Annex S guidance for applying Clause 20	278
Table S.2 – Example B – Using Annex S guidance for applying Clause 20	278

INTERNATIONAL ELECTROTECHNICAL COMMISSION

AUTOMATIC ELECTRICAL CONTROLS –

Part 1: General requirements

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This Consolidated version of IEC 60730-1 bears the edition number 5.2. It consists of the fifth edition (2013-11) [documents 72/899/FDIS and 72/928/RVD] and its corrigendum 1 (2014-09), its amendment 1 (2015-12) [documents 72/1017/FDIS and 72/1026/RVD] and its amendment 2 (2020-04) [documents 72/1226/FDIS and 72/1237/RVD]. The technical content is identical to the base edition and its amendments.

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendments 1 and 2. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

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

This edition 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.

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

Table 6 (10.2.1), footnote b	17.7.7	T.3.2
11.5	17.8.4.1	
Table 10 (11.8.2), footnote b	17.10	

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 the base publication and its amendments 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.

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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.

This standard applies to **controls** powered by primary or secondary batteries, requirements for which are contained within the standard, including Annex V.

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.

1.1.9 This standard applies to the electrical and **functional safety** of **controls** capable of receiving and responding to communications signals, including signals for power billing rate and demand response.

The signals may be transmitted to or received from external units being part of the **control** (wired), or to and from external units which are not part of the **control** (wireless) under test.

1.1.10 This standard does not address the integrity of the output signal to the network devices, such as interoperability with other devices unless it has been evaluated as part of the **control system**.

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

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

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*

² Withdrawn.

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

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