



# INTERNATIONAL STANDARD



**Low-voltage switchgear and controlgear –  
Part 5-1: Control circuit devices and switching elements – Electromechanical  
control circuit devices**

INTERNATIONAL  
ELECTROTECHNICAL  
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Withdrawing



## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

#### Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices

#### FOREWORD

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International Standard IEC 60947-5-1 has been prepared by subcommittee 121A: Low-voltage switchgear and controlgear, of IEC technical committee 121: Switchgear and controlgear and their assemblies for low voltage.

This fourth edition cancels and replaces the third edition published in 2003 and its Amendment 1:2009. This edition constitutes a technical revision.

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

- a) update of normative references;
- b) update and restructuration of subclauses in 7.1;
- c) addition of material requirements and test;
- d) update of EMC requirements;
- e) clarification of requirements and update of 8.2;
- f) addition of requirements for screwless-type clamping units;
- g) update of existing Tables 4 and 5;
- h) addition of new Tables 6, 7, 8 and 9;
- i) addition of a new Figure 10 ;
- j) addition of a new Annex N.

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

FDIS	Report on voting
121A/62/FDIS	121A/76/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.

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

This International Standard should be used in conjunction with IEC 60947-1.

The provisions of the general rules, IEC 60947-1, are applicable to this standard, where specifically called for. General rules, clauses and subclauses thus applicable, as well as tables, figures and annexes are identified by a reference to IEC 60947-1, for example 1.2.3, Table 4 or Annex A of IEC 60947-1:2007.

The following differing practices of a less permanent nature exist in the countries indicated below.

- 7.2.4.1: Making and breaking capacities (United States of America and Canada)
- 8.3.3.5.2: Test circuits and connections (United States of America and Canada)

A list of all the parts in the IEC 60947 series, under the general title *Low-voltage switchgear and controlgear*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website 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 corrigenda of July 2016 and April 2020 have been included in this copy.

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## LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

### Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices

#### 1 General

~~The provisions of the general rules, IEC 60947-1, are applicable to this standard, where specifically called for. General rules, clauses and subclauses thus applicable, as well as tables, figures and annexes are identified by a reference to IEC 60947-1, for example 1.2.3, Table 4 or Annex A of IEC 60947-1.~~

##### 1.1 Scope and object

This part of IEC 60947 applies to control circuit devices and switching elements intended for controlling, signalling, interlocking, etc., of switchgear and controlgear.

It applies to control circuit devices having a rated voltage not exceeding 1 000 V a.c. (at a frequency not exceeding 1 000 Hz) or 600 V d.c.

However, for operational voltages below 100 V a.c. or d.c., see 4.3.2.2.

This standard applies to specific types of control circuit devices such as:

- manual control switches, for example push-buttons, rotary switches, foot switches, etc.;
- electromagnetically operated control switches, either time-delayed or instantaneous, for example contactor relays;
- pilot switches, for example pressure switches, temperature sensitive switches (thermostats), programmers, etc.;
- position switches, for example control switches operated by part of a machine or mechanism;
- associated control circuit equipment, for example indicator lights, etc.

NOTE 1 A control circuit device includes (a) control switch(es) and associated devices such as (an) indicator light(s).

NOTE 2 A control switch includes (a) switching element(s) and an actuating system.

NOTE 3 A switching element ~~may~~ can be a contact element or a semiconductor element.

It also applies to specific types of switching elements associated with other devices (whose main circuits are covered by other standards) such as:

- auxiliary contacts of a switching device (e.g. contactor, circuit breaker, etc.) which are not dedicated exclusively for use with the coil of that device;
- interlocking contacts of enclosure doors;
- control circuit contacts of rotary switches;
- control circuit contacts of overload relays.

Contactor relays ~~shall~~ also ~~meet~~ comply with the requirements and tests of IEC 60947-4-1 except for the utilization category which ~~shall~~ comply with this standard.

This standard does not include the relays covered in IEC 60255 or in the IEC 61810 series, nor automatic electrical control devices for household and similar purposes.

The colour requirements of indicator lights, push-buttons, etc., are found in IEC 60073 and also in ~~publication 2 of the International~~ CIE S 0004/E-2001 from the Commission of Illumination (CIE).

The object of this standard is to state:

- a) the characteristics of control circuit devices;
- b) the electrical and mechanical requirements with respect to:
  - 1) the various duties to be performed;
  - 2) the significance of the rated characteristics and of the markings;
  - 3) the tests to verify the rated characteristics;
- c) the functional requirements to be satisfied by the control circuit devices with respect to:
  - 1) environmental conditions, including those of enclosed equipment;
  - 2) dielectric properties;
  - 3) terminals.

## 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 60050(441):1984, International Electrotechnical Vocabulary (IEV) – Chapter 441: Switchgear, controlgear and fuses Amendment 1 (2000)~~

~~IEC 60050(446):1983, International Electrotechnical Vocabulary (IEV) – Chapter 446: Electrical relays~~

IEC 60068-2-6:1995 2007, Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)

IEC 60068-2-14:1984 2009, Environmental testing – Part 2-14: Tests – Test N: Change of temperature Amendment 1 (1986)

IEC 60068-2-27:1987 2008, Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock

IEC 60068-2-30:1980 2005, Environmental testing – Part 2-30: Tests – Test Db ~~and guidance:~~ Damp heat, cyclic (12 h + 12 h cycle) Amendment 1 (1985)

IEC 60073:2002, Basic and safety principles for man-machine interface, marking and identification – Coding principles for indications and actuators

~~IEC 60112:2003, Method for the determination of the proof and the comparative tracking indices of solid insulating materials~~

~~IEC 60255 (all parts), Electrical relays~~

IEC 60417-DB:2002<sup>1</sup>, *Graphical symbols for use on equipment*

IEC 60617-~~(all parts)~~-DB:2012<sup>2</sup>, *Graphical symbols for diagrams*

IEC 60695-2-10:2013, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC 60695-2-11:2014, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products (GWEPT)*

IEC 60695-2-12:2010, *Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods – Glow-wire flammability index (GWFI) test method for materials*

IEC 60695-2-12:2010/AMD1:2014

IEC 60947-1:~~1999~~ 2007, *Low-voltage switchgear and controlgear – Part 1: General rules*

IEC 60947-1:2007/AMD1:~~2000~~ 2010

IEC 60947-1:2007/AMD2:~~2004~~ 2014

IEC 60947-4-1:~~2000~~ 2009, *Low-voltage switchgear and controlgear – Part 4-1: Contactors and motor-starters – Electromechanical contactors and motor-starters*

IEC 60947-4-1:2009/AMD1:2012

IEC 60947-5-5:1997, *Low-voltage switchgear and controlgear – Part 5-5: Control circuit devices and switching elements – Electrical emergency stop device with mechanical latching function*

IEC 60947-5-5:1997/AMD1:2005

IEC 60947-5-5:1997/AMD2:2016

IEC 60999-1:1999, *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<sup>2</sup> up to 35 mm<sup>2</sup> (included)*

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, *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:~~1995~~ 2008, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

~~Amendment 1 (1998)~~

~~Amendment 2 (2000)~~

IEC 61000-4-3:~~2002~~ 2006, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-3:2006/AMD1:2007

IEC 61000-4-3:2006/AMD2:2010

IEC 61000-4-4:~~1995~~ 2012, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – ~~Section 4: Electrical fast transient/burst immunity test~~*

~~Amendment 1 (2000)~~

~~Amendment 2 (2001)~~

<sup>1</sup> “DB” refers here to the IEC on-line database, available at: <http://www.graphical-symbols.info/equipment>.

<sup>2</sup> “DB” refers there to the IEC on-line database, available at: <http://std.iec.ch/iec60617>.

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IEC 61000-4-13:2002/AMD1:2009  
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IEC 61140:2015/AMD1:2004

CISPR 11:~~1997~~ 2015, *Industrial, scientific and medical (ISM) radio-frequency equipment – ~~Electromagnetic~~ Radio-frequency disturbance characteristics – Limits and methods of measurement*  
~~Amendment 1 (1999)~~

CIE S 004/E-2001, *Colours of Light Signals*



# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

**Low-voltage switchgear and controlgear –  
Part 5-1: Control circuit devices and switching elements – Electromechanical  
control circuit devices**

**Appareillage à basse tension –  
Partie 5-1: Appareils et éléments de commutation pour circuits de commande –  
Appareils électromécaniques pour circuits de commande**

WILSON



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Withdrawn

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

#### Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit 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.
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International Standard IEC 60947-5-1 has been prepared by subcommittee 121A: Low-voltage switchgear and controlgear, of IEC technical committee 121: Switchgear and controlgear and their assemblies for low voltage.

This fourth edition cancels and replaces the third edition published in 2003 and its Amendment 1:2009. This edition constitutes a technical revision.

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

- a) update of normative references;
- b) update and restructuration of subclauses in 7.1;
- c) addition of material requirements and test;
- d) update of EMC requirements;



- e) clarification of requirements and update of 8.2;
- f) addition of requirements for screwless-type clamping units;
- g) update of existing Tables 4 and 5;
- h) addition of new Tables 6, 7, 8 and 9;
- i) addition of a new Figure 10 ;
- j) addition of a new Annex N.

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

FDIS	Report on voting
121A/62/FDIS	121A/76/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.

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

This International Standard should be used in conjunction with IEC 60947-1.

The provisions of the general rules, IEC 60947-1, are applicable to this standard, where specifically called for. General rules, clauses and subclauses thus applicable, as well as tables, figures and annexes are identified by a reference to IEC 60947-1, for example 1.2.3, Table 4 or Annex A of IEC 60947-1:2007.

The following differing practices of a less permanent nature exist in the countries indicated below.

- 7.2.4.1: Making and breaking capacities (United States of America and Canada)
- 8.3.3.5.2: Test circuits and connections (United States of America and Canada)

A list of all the parts in the IEC 60947 series, under the general title *Low-voltage switchgear and controlgear*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website 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 corrigenda of July 2016 and April 2020 have been included in this copy.

## LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

### Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices

#### 1 General

##### 1.1 Scope and object

This part of IEC 60947 applies to control circuit devices and switching elements intended for controlling, signalling, interlocking, etc., of switchgear and controlgear.

It applies to control circuit devices having a rated voltage not exceeding 1 000 V a.c. (at a frequency not exceeding 1 000 Hz) or 600 V d.c.

However, for operational voltages below 100 V a.c. or d.c., see 4.3.2.2.

This standard applies to specific types of control circuit devices such as:

- manual control switches, for example push-buttons, rotary switches, foot switches, etc.;
- electromagnetically operated control switches, either time-delayed or instantaneous, for example contactor relays;
- pilot switches, for example pressure switches, temperature sensitive switches (thermostats), programmers, etc.;
- position switches, for example control switches operated by part of a machine or mechanism;
- associated control circuit equipment, for example indicator lights, etc.

NOTE 1 A control circuit device includes (a) control switch(es) and associated devices such as (an) indicator light(s).

NOTE 2 A control switch includes (a) switching element(s) and an actuating system.

NOTE 3 A switching element can be a contact element or a semiconductor element.

It also applies to specific types of switching elements associated with other devices (whose main circuits are covered by other standards) such as:

- auxiliary contacts of a switching device (e.g. contactor, circuit breaker, etc.) which are not dedicated exclusively for use with the coil of that device;
- interlocking contacts of enclosure doors;
- control circuit contacts of rotary switches;
- control circuit contacts of overload relays.

Contactors also comply with the requirements and tests of IEC 60947-4-1 except for the utilization category which comply with this standard.

This standard does not include the relays covered in IEC 60255 or in the IEC 61810 series, nor automatic electrical control devices for household and similar purposes.

The colour requirements of indicator lights, push-buttons, etc., are found in IEC 60073 and also in CIE S 0004/E-2001 from the Commission of Illumination (CIE).

The object of this standard is to state:

- a) the characteristics of control circuit devices;
- b) the electrical and mechanical requirements with respect to:
  - 1) the various duties to be performed;
  - 2) the significance of the rated characteristics and of the markings;
  - 3) the tests to verify the rated characteristics;
- c) the functional requirements to be satisfied by the control circuit devices with respect to:
  - 1) environmental conditions, including those of enclosed equipment;
  - 2) dielectric properties;
  - 3) terminals.

## 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 60068-2-6:2007, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-14:2009, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-27:2008, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

IEC 60068-2-30:2005, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60073:2002, *Basic and safety principles for man-machine interface, marking and identification – Coding principles for indications and actuators*

IEC 60417-DB:2002<sup>1</sup>, *Graphical symbols for use on equipment*

IEC 60617-DB:2012<sup>2</sup>, *Graphical symbols for diagrams*

IEC 60695-2-10:2013, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC 60695-2-11:2014, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end-products (GWEPT)*

IEC 60695-2-12:2010, *Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods – Glow-wire flammability index (GWFI) test method for materials*

IEC 60695-2-12:2010/AMD1:2014

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

IEC 60947-1:2007/AMD1:2010

IEC 60947-1:2007/AMD2:2014

<sup>1</sup> “DB” refers here to the IEC on-line database, available at: <http://www.graphical-symbols.info/equipment>.

<sup>2</sup> “DB” refers there to the IEC on-line database, available at: <http://std.iec.ch/iec60617>.

IEC 60947-4-1:2009, *Low-voltage switchgear and controlgear – Part 4-1: Contactors and motor-starters – Electromechanical contactors and motor-starters*  
IEC 60947-4-1:2009/AMD1:2012

IEC 60947-5-5:1997, *Low-voltage switchgear and controlgear – Part 5-5: Control circuit devices and switching elements – Electrical emergency stop device with mechanical latching function*  
IEC 60947-5-5:1997/AMD1:2005  
IEC 60947-5-5:1997/AMD2:2016

IEC 60999-1:1999, *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<sup>2</sup> up to 35 mm<sup>2</sup> (included)*

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, *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 61000-4-3:2006, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*  
IEC 61000-4-3:2006/AMD1:2007  
IEC 61000-4-3:2006/AMD2:2010

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## COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

### APPAREILLAGE À BASSE TENSION –

#### Partie 5-1: Appareils et éléments de commutation pour circuits de commande – Appareils électromécaniques pour circuits de commande

##### AVANT-PROPOS

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La Norme internationale IEC 60947-5-1 a été établie par le sous-comité 121A: Appareillage à basse tension, du comité d'études 121 de l'IEC: Appareillages et ensembles d'appareillages basse tension.

Cette quatrième édition annule et remplace la troisième édition parue en 2003 et l'Amendement 1:2009. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- a) mise à jour des références normatives;
- b) mise à jour et restructuration des paragraphes du 7.1;

- c) addition des exigences et de l'essai relatif aux matériaux;
- d) mise à jour des exigences CEM;
- e) clarification des exigences et mise à jour du 8.2;
- f) addition des exigences pour les organes de serrage sans vis;
- g) mise à jour des Tableaux 4 et 5 existants;
- h) addition des nouveaux Tableaux 6, 7, 8 et 9;
- i) addition de la nouvelle Figure 10;
- j) addition de la nouvelle Annexe N.

Le texte de cette norme est issu des documents suivants:

FDIS	Rapport de vote
121A/62/FDIS	121A/76/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette norme.

Cette publication a été rédigée selon les Directives ISO/IEC, Partie 2.

Cette Norme internationale doit être utilisée conjointement avec l'IEC 60947-1.

Les dispositions des règles générales de l'IEC 60947-1 sont applicables à la présente norme lorsque celle-ci le précise. Les articles, paragraphes, tableaux et figures des règles générales qui sont ainsi applicables sont identifiés par référence à l'IEC 60947-1, par exemple: paragraphe 1.2.3, Tableau 4 ou Annexe A de l'IEC 60947-1:2007.

Les différentes pratiques suivantes, à caractère moins permanent, existent dans les pays indiqués ci-après:

- 7.2.4.1: Pouvoirs de fermeture et de coupure en conditions normales (États-Unis d'Amérique et Canada)
- 8.3.3.5.2: Circuits d'essai et connexions (États-Unis d'Amérique et Canada)

Une liste de toutes les parties de la série IEC 60947, présentées sous le titre général *Appareillage à basse tension*, peut être consultée sur le site web de l'IEC.

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- amendée.

Le contenu des corrigenda de juillet 2016 et avril 2020 a été pris en considération dans cet exemplaire.

## APPAREILLAGE À BASSE TENSION –

### Partie 5-1: Appareils et éléments de commutation pour circuits de commande – Appareils électromécaniques pour circuits de commande

#### 1 Généralités

##### 1.1 Domaine d'application et objet

La présente partie de l'IEC 60947 est applicable aux appareils pour circuits de commande et aux éléments de commutation destinés à la commande, la signalisation, le verrouillage, etc., de l'appareillage.

Elle est applicable aux appareils pour circuits de commande dont la tension assignée ne dépasse pas 1 000 V en courant alternatif (à une fréquence ne dépassant pas 1 000 Hz) ou 600 V en courant continu.

Toutefois, pour des tensions d'emploi, alternatives ou continues, inférieures à 100 V, voir 4.3.2.2.

La présente norme s'applique à des types déterminés d'appareils pour circuits de commande, tels que:

- auxiliaires manuels de commande, par exemple boutons-poussoirs, commutateurs rotatifs, interrupteurs à pédale, etc.;
- auxiliaires électromagnétiques de commande, soit temporisés, soit instantanés, par exemple contacteurs auxiliaires;
- auxiliaires automatiques de commande, par exemple détecteurs de pression à contacts, détecteurs de température à contacts (thermostats), programmeurs, etc.;
- interrupteurs de position, par exemple auxiliaires de commande actionnés par une partie d'une machine ou d'un mécanisme;
- matériel de commande associé, par exemple voyants lumineux, etc.

NOTE 1 Un appareil pour circuits de commande comprend un (des) auxiliaire(s) de commande et des appareils associés, tels que voyant(s) lumineux.

NOTE 2 Un auxiliaire de commande comprend un (des) élément(s) de commutation et un mécanisme transmetteur.

NOTE 3 Un élément de commutation peut être un élément de contact ou un élément à semi-conducteurs.

Elle s'applique également à des types déterminés d'éléments de commutation associés à d'autres appareils (dont les circuits principaux font l'objet d'autres normes), tels que:

- contacts auxiliaires d'un appareil de connexion (par exemple contacteur, disjoncteur, etc.) qui ne sont pas prévus pour être utilisés exclusivement avec la bobine de cet appareil;
- contacts de verrouillage de portes d'enveloppes;
- contacts de circuits de commande d'interrupteurs rotatifs;
- contacts de circuits de commande de relais de surcharge.

Les contacteurs auxiliaires satisfont également aux exigences et aux essais de l'IEC 60947-4-1, sauf en ce qui concerne la catégorie d'emploi qui satisfait à la présente norme.



La présente norme ne prend pas en compte les relais couverts par l'IEC 60255, la série IEC 61810 ou les dispositifs de commande électrique automatiques à usage domestique et analogue.

Les exigences relatives aux couleurs des voyants lumineux, boutons-poussoirs, etc., figurent dans l'IEC 60073 et également dans la publication CIE S 0004/E-2001 de la Commission Internationale de l'Éclairage (CIE).

La présente norme a pour objet de fixer:

- a) les caractéristiques des appareils pour circuits de commande;
- b) les qualités électriques et mécaniques requises en ce qui concerne:
  - 1) les différentes fonctions qui doivent être remplies;
  - 2) la signification des caractéristiques assignées et des indications portées sur les appareils;
  - 3) les essais de vérification des caractéristiques assignées;
- c) les conditions de fonctionnement auxquelles doivent répondre les appareils pour circuits de commande en ce qui concerne:
  - 1) les conditions d'environnement y compris celles concernant le matériel sous enveloppe;
  - 2) les propriétés diélectriques;
  - 3) les bornes.

## 1.2 Références normatives

Les documents de référence suivants sont indispensables pour l'application du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60068-2-6:2007, *Essais d'environnement – Partie 2-6: Essais – Essai Fc: Vibrations (sinusoïdales)*

IEC 60068-2-14:2009, *Essais d'environnement – Partie 2-14: Essais – Essai N: Variations de température*

IEC 60068-2-27:2008, *Essais d'environnement – Partie 2-27: Essais – Essai Ea et guide – Chocs*

IEC 60068-2-30:2005, *Essais d'environnement – Partie 2-30: Essais – Essai Db: Essai cyclique de chaleur humide (cycle de 12 h + 12 h)*

IEC 60073:2002, *Principes fondamentaux et de sécurité pour l'interface homme-machine, le marquage et l'identification – Principes de codage pour les indicateurs et les organes de commande*

IEC 60417-DB:2002<sup>1</sup>, *Symboles graphiques utilisables sur le matériel*

IEC 60617-DB:2012<sup>2</sup>, *Symboles graphiques pour schémas*

<sup>1</sup> "DB" fait référence ici à la base de données en ligne de la CEI, disponible à l'adresse: <http://www.graphical-symbols.info/equipment>

<sup>2</sup> "DB" fait référence là à la base de données en ligne de la CEI, disponible à l'adresse: <http://std.iec.ch/iec60617>



IEC 60695-2-10:2013, *Essais relatifs aux risques du feu – Partie 2-10: Essais au fil incandescent/chauffant – Appareillage et méthode commune d'essai*

IEC 60695-2-11:2014, *Essais relatifs aux risques du feu – Partie 2-11: Essais au fil incandescent/chauffant – Méthode d'essai d'inflammabilité pour produits finis (GWEPT)*

IEC 60695-2-12:2010, *Essais relatifs aux dangers du feu – Partie 2-12: Essais au fil incandescent/chauffant – Méthode d'essai d'indice d'inflammabilité au fil incandescent (GWFI) pour matériaux*  
IEC 60695-2-12:2010/AMD1:2014

IEC 60947-1:2007, *Appareillage à basse tension – Partie 1: Règles générales*  
IEC 60947-1:2007/AMD1:2010  
IEC 60947-1:2007/AMD2:2014

IEC 60947-4-1:2009, *Appareillage à basse tension – Partie 4-1: Contacteurs et démarreurs de moteurs – Contacteurs et démarreurs électromécaniques*  
IEC 60947-4-1:2009/AMD1:2012

IEC 60947-5-5:1997, *Appareillage à basse tension – Partie 5-5: Appareils et éléments de commutation pour circuits de commande – Appareils d'arrêt d'urgence électrique à accrochage mécanique*  
IEC 60947-5-5:1997/AMD1:2005  
IEC 60947-5-5:1997/AMD2:2016

IEC 60999-1:1999, *Dispositifs de connexion – Conducteurs électriques en cuivre – Prescriptions de sécurité pour organes de serrage à vis et sans vis – Partie 1: Prescriptions générales et particulières pour les organes de serrage pour les conducteurs de 0,2 mm<sup>2</sup> à 35 mm<sup>2</sup> (inclus)*

IEC 61000-3-2, *Compatibilité électromagnétique (CEM) – Partie 3-2: Limites – Limites pour les émissions de courant harmonique (courant appelé par les appareils < 16 A par phase)*

IEC 61000-3-3, *Compatibilité électromagnétique (CEM) – Partie 3-3: Limites – Limitation des variations de tension, des fluctuations de tension et du papillotement dans les réseaux publics d'alimentation basse tension, pour les matériels ayant un courant assigné < 16 A par phase et non soumis à un raccordement conditionnel*

IEC 61000-4-2:2008, *Compatibilité électromagnétique (CEM) – Partie 4-2: Techniques d'essai et de mesure – Essai d'immunité aux décharges électrostatiques*

IEC 61000-4-3:2006, *Compatibilité électromagnétique (CEM) – Partie 4-3: Techniques d'essai et de mesure – Essai d'immunité aux champs électromagnétiques rayonnés aux fréquences*  
IEC 61000-4-3:2006/AMD1:2007  
IEC 61000-4-3:2006/AMD2:2010

IEC 61000-4-4:2012, *Compatibilité électromagnétique (CEM) – Partie 4-4: Techniques d'essai et de mesure – Essais d'immunité aux transitoires électriques rapides en salves*

IEC 61000-4-5:2014, *Compatibilité électromagnétique (CEM) – Partie 4-5: Techniques d'essai et de mesure – Essai d'immunité aux ondes de choc*

IEC 61000-4-6:2013, *Compatibilité électromagnétique (CEM) – Partie 4-6: Techniques d'essai et de mesure – Immunité aux perturbations conduites, induites par les champs radioélectriques*

IEC 61000-4-8:2009, *Compatibilité électromagnétique (CEM) – Partie 4-8: Techniques d'essai et de mesure – Essai d'immunité au champ magnétique à la fréquence du réseau*

IEC 61000-4-11:2004, *Compatibilité électromagnétique (CEM) – Partie 4-11: Techniques d'essai et de mesure – Essais d'immunité aux creux de tension, coupures brèves et variations de tension*

IEC 61000-4-13:2002, *Compatibilité électromagnétique (CEM) – Partie 4-13: Techniques d'essai et de mesure – Essais d'immunité basse fréquence aux harmoniques et inter-harmoniques incluant les signaux transmis sur le réseau électrique alternatif*

IEC 61000-4-13:2002/AMD1:2009

IEC 61000-4-13:2002/AMD2:2015

IEC 61140:2015, *Protection contre les chocs électriques – Aspects communs aux installations et aux matériels*

IEC 61140:2015/AMD1:2004

CISPR 11:2015, *Appareils industriels, scientifiques et médicaux – Caractéristiques de perturbations radioélectriques – Limites et méthodes de mesure*

CIE S 004/E-2001, *Colours of Light Signals* (disponible en anglais seulement)

Withdrawing