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IEC 60947-2

Edition 5.0 2016-06
REDLINE VERSION

INTERNATIONAL STANDARD

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Low-voltage switchgear and controlgear – Part 2: Circuit-breakers

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.130.20

ISBN 978-2-8322-3456-3

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LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 2: Circuit-breakers

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International Standard IEC 60947-2 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 fifth edition cancels and replaces the fourth edition published in 2006, Amendment 1:2009 and Amendment 2:2013. This edition constitutes a technical revision.

This edition includes the following significant additions with respect to the previous edition:

- tests for verification of selectivity in Annex A (see A.5.3);
- critical load current tests for d.c. circuit-breakers (see 8.3.9);
- new Annex P for circuit-breakers for use in photovoltaic applications;
- new Annex R for residual-current circuit-breakers with automatic reclosing functions.

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

FDIS	Report on voting
121A/71/FDIS	121A/83/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.

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

This International Standard is to be used in conjunction with IEC 60947-1:2007 and its Amendment 1:2010 and Amendment 2:2014.

The provisions of the general rules dealt with in IEC 60947-1 are applicable to this standard, where specifically called for. Clauses and subclauses, tables, figures and annexes of the general rules thus applicable are identified by reference to IEC 60947-1 and its amendments when applicable, for example, 1.2.3 of IEC 60947-1:2007, Table 4 of IEC 60947-1:2007/AMD1:2010, or Annex A of IEC 60947-1:2007/AMD1:2010/AMD2:2014.

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 corrigendum of November 2016 have been included in this copy.

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LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 2: Circuit-breakers

1 General

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

1.1 Scope and object

This part of IEC 60947 series applies to circuit-breakers, the main contacts of which are intended to be connected to circuits, the rated voltage of which does not exceed 1 000 V a.c. or 1 500 V d.c.; it also contains additional requirements for integrally fused circuit-breakers.

Circuit-breakers rated above 1 000 V a.c. but not exceeding 1 500 V a.c. may also be tested to this standard.

It applies whatever the rated currents, the method of construction or the proposed applications of the circuit-breakers may be.

The requirements for circuit-breakers which are also intended to provide earth leakage protection are contained in Annex B.

The additional requirements for circuit-breakers with electronic over-current protection are contained in Annex F.

The additional requirements for circuit-breakers for IT systems are contained in Annex H.

The requirements and test methods for electromagnetic compatibility of circuit-breakers are contained in Annex J.

The requirements for circuit-breakers not fulfilling the requirements for over-current protection are contained in Annex L.

The requirements for modular residual current devices (without integral current breaking device) are contained in Annex M.

The requirements and test methods for electromagnetic compatibility of circuit-breaker auxiliaries are contained in Annex N.

The requirements and test methods for d.c. circuit-breakers for use in photovoltaic (PV) applications are contained in Annex P.

The requirements and test methods for circuit-breakers incorporating residual current protection with automatic reclosing functions are contained in Annex R.

Supplementary requirements for circuit-breakers used as direct-on-line starters are given in IEC 60947-4-1, applicable to low-voltage contactors and starters.

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The requirements for circuit-breakers for the protection of wiring installations in buildings and similar applications, and designed for use by uninstructed persons, are contained in IEC 60898.

The requirements for circuit-breakers for equipment (for example electrical appliances) are contained in IEC 60934.

For certain specific applications (for example traction, rolling mills, marine service) particular or additional requirements may be necessary.

NOTE Circuit-breakers which are dealt with in this standard ~~may~~ can be provided with devices for automatic opening under predetermined conditions other than those of over-current and undervoltage as, for example, reversal of power or current. This standard does not deal with the verification of operation under such pre-determined conditions.

The object of this standard is to state:

a)the characteristics of circuit-breakers;

b)the conditions with which circuit-breakers shall comply with reference to:

1) operation and behaviour in normal service;
2) operation and behaviour in case of overload and operation and behaviour in case of short-circuit, including co-ordination in service (~~discrimination~~ selectivity and back-up protection);
3) dielectric properties;

c)tests intended for confirming that these conditions have been met and the methods to be adopted for these tests;

d)information to be marked on or given with the apparatus.

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 60051 (all parts) *Direct acting indicating analogue electrical measuring instruments and their accessories*~~

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

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

IEC 60269-1:2006, *Low-voltage fuses – Part 1: General requirements*

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

~~IEC 60364-4-41:2001, *Electrical installations of buildings – Part 4-41: Protection for safety – Protection against shock*~~

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

~~IEC 60695-2-10:2000, *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 60695-2-12:2000, *Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods – Glow-wire flammability test method for materials*~~

~~IEC 60695-2-13:2000, *Fire hazard testing – Part 2-13: Glowing/hot-wire based test methods – Glow-wire ignitability test method for materials*~~

~~IEC 60755:1983, *General requirements for residual current operated protective devices*~~
~~Amendment 1 (1988)~~
~~Amendment 2 (1992)~~

~~IEC 60898, *Circuit-breakers for over-current protection for household and similar installations*~~

~~IEC 60934, *Circuit-breakers for equipment (CBE)*~~

IEC 60947-1:~~2004~~ 2007, *Low-voltage switchgear and controlgear – Part 1: General rules*
IEC 60947-1:2007/AMD1:2010
IEC 60947-1:2007/AMD2:2014

IEC 60947-4-1~~:2000~~, *Low-voltage switchgear and controlgear – Part 4-1: Contactors and motor-starters – Electromechanical contactors and motor-starters*
~~Amendment 1 (2002)~~

IEC 61000-3-2~~:2000~~, *Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)*
~~Amendment 1 (2001)~~
~~Amendment 2 (2004)~~

IEC 61000-3-3~~:1994~~, *Electromagnetic compatibility (EMC) – Part 3: Limits –~~ Section 3:* 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*
~~Amendment 1 (2001)~~

IEC 61000-4-2~~:1995~~, *Electromagnetic compatibility(EMC) – Part 4-2: Testing and measurement techniques –~~ Section 2:* 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:~~2002~~ 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)~~

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IEC 61000-4-5:~~1995~~ 2014, *Electromagnetic compatibility(EMC) – Part 4-5: Testing and measurement techniques –~~ Section 5:~~ Surge immunity test*
~~Amendment 1 (2000)~~

IEC 61000-4-6:~~2003~~ 2013, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio frequency fields*
~~Amendment 1 (2004)~~

IEC 61000-4-11~~:2004~~, *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*~~

~~IEC 61000-5-2:1997, *Electromagnetic compatibility (EMC) – Part 5: Installation and mitigation guidelines – Section 2: Earthing and cabling*~~

~~IEC 61008-1:1996, *Residual current operated circuit-breakers without integral over-current protection for household and similar uses (RCCBs) – Part 1: General rules*~~
~~Amendment 1 (2002)~~

~~IEC 61009-1:1996, *Residual current operated circuit-breakers with integral over-current protection for household and similar uses (RCBOs) – Part 1: General rules*~~
~~Amendment 1 (2002)~~

IEC 61140, *Protection against electric shock – Common aspects for installation and equipment*

IEC 62475:2010, *High-current test techniques – Definitions and requirements for test currents and measuring systems*

CISPR 11~~:2003~~, *Industrial, scientific and medical~~ (ISM) radio-frequency~~ equipment – ~~Electromagnetic~~ Radio-frequency disturbance characteristics – Limits and methods of measurement*
~~Amendment 1 (2004)~~

CISPR 22~~:2005~~, *Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement*
~~Amendment 1 (2005)~~

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2.1.1
frame size
a term designating a group of circuit-breakers, the external physical dimensions of which are common to a range of current ratings.

Note 1 to entry: Frame size is expressed in amperes corresponding to the highest current rating of the group.

Note 2 to entry: Within a frame size, the width may vary according to the number of poles.

Note 3 to entry: This definition does not imply dimensional standardization.

2.1.2
construction break
a significant difference in construction between circuit-breakers of a given frame size, requiring additional type testing ~~(see 7.1.5)~~

2.2
integrally fused circuit-breaker
a combination, in a single device, of a circuit-breaker and fuses, one fuse being placed in series with each pole of the circuit-breaker intended to be connected to a phase conductor

[SOURCE: IEC 60050-441:1984, 441-14-22]

2.3
current-limiting circuit-breaker
~~circuit-breaker with a break-time short enough to prevent the short-circuit current reaching its otherwise attainable peak value~~
circuit-breaker that, within a specified range of current, prevents the let-through current reaching the prospective peak value and which limits the let-through energy (I^2t) to a value less than the let-through energy of a half-cycle wave of the symmetrical prospective current

Note 1 to entry: Reference may be made to either the symmetrical or asymmetrical prospective peak value of let-through current.

Note 2 to entry: The let-through current is also referred to as the cut-off current (see IEC 60050-441:1984, 441-17-12).

Note 3 to entry: Templates for the graphical representation of the cut-off current characteristic and the let-through energy characteristic are given from Figure K.2 to Figure K.5 and examples of the use of the templates in Figure K.6 and in Figure K.7.

~~[IEV 441-14-21]~~

2.4
plug-in circuit-breaker
a circuit-breaker which, in addition to its interrupting contacts, has a set of contacts which enable the circuit-breaker to be removed

Note 1 to entry: Some circuit-breakers may be of the plug-in type on the line side only, the load terminals being usually suitable for wiring connection.

2.5
withdrawable circuit-breaker
circuit-breaker which, in addition to its interrupting contacts, has a set of isolating contacts which enable the circuit-breaker to be ~~disconnected~~ withdrawn from the main circuit, and, in the ~~withdrawn~~ disconnected position, to achieve an isolating distance in accordance with specified requirements

2.6
moulded-case circuit-breaker
a circuit-breaker having a supporting housing of moulded insulating material forming an integral part of the circuit-breaker

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IEC 60947-2

Edition 5.0 2016-06

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Appareillage à basse tension – Partie 2: Disjoncteurs

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 2: Circuit-breakers

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International Standard IEC 60947-2 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 fifth edition cancels and replaces the fourth edition published in 2006, Amendment 1:2009 and Amendment 2:2013. This edition constitutes a technical revision.

This edition includes the following significant additions with respect to the previous edition:

- tests for verification of selectivity in Annex A (see A.5.3);
- critical load current tests for d.c. circuit-breakers (see 8.3.9);
- new Annex P for circuit-breakers for use in photovoltaic applications;
- new Annex R for residual-current circuit-breakers with automatic reclosing functions.

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

FDIS	Report on voting
121A/71/FDIS	121A/83/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.

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

This International Standard is to be used in conjunction with IEC 60947-1:2007 and its Amendment 1:2010 and Amendment 2:2014.

The provisions of the general rules dealt with in IEC 60947-1 are applicable to this standard, where specifically called for. Clauses and subclauses, tables, figures and annexes of the general rules thus applicable are identified by reference to IEC 60947-1 and its amendments when applicable, for example, 1.2.3 of IEC 60947-1:2007, Table 4 of IEC 60947-1:2007/AMD1:2010, or Annex A of IEC 60947-1:2007/AMD1:2010/AMD2:2014.

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 corrigendum of November 2016 have been included in this copy.

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

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LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 2: Circuit-breakers

1 General

1.1 Scope and object

This part of IEC 60947 series applies to circuit-breakers, the main contacts of which are intended to be connected to circuits, the rated voltage of which does not exceed 1 000 V a.c. or 1 500 V d.c.; it also contains additional requirements for integrally fused circuit-breakers.

Circuit-breakers rated above 1 000 V a.c. but not exceeding 1 500 V a.c. may also be tested to this standard.

It applies whatever the rated currents, the method of construction or the proposed applications of the circuit-breakers may be.

The requirements for circuit-breakers which are also intended to provide earth leakage protection are contained in Annex B.

The additional requirements for circuit-breakers with electronic over-current protection are contained in Annex F.

The additional requirements for circuit-breakers for IT systems are contained in Annex H.

The requirements and test methods for electromagnetic compatibility of circuit-breakers are contained in Annex J.

The requirements for circuit-breakers not fulfilling the requirements for over-current protection are contained in Annex L.

The requirements for modular residual current devices (without integral current breaking device) are contained in Annex M.

The requirements and test methods for electromagnetic compatibility of circuit-breaker auxiliaries are contained in Annex N.

The requirements and test methods for d.c. circuit-breakers for use in photovoltaic (PV) applications are contained in Annex P.

The requirements and test methods for circuit-breakers incorporating residual current protection with automatic reclosing functions are contained in Annex R.

Supplementary requirements for circuit-breakers used as direct-on-line starters are given in IEC 60947-4-1, applicable to low-voltage contactors and starters.

The requirements for circuit-breakers for the protection of wiring installations in buildings and similar applications, and designed for use by uninstructed persons, are contained in IEC 60898.

The requirements for circuit-breakers for equipment (for example electrical appliances) are contained in IEC 60934.

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For certain specific applications (for example traction, rolling mills, marine service) particular or additional requirements may be necessary.

NOTE Circuit-breakers which are dealt with in this standard can be provided with devices for automatic opening under predetermined conditions other than those of over-current and undervoltage as, for example, reversal of power or current. This standard does not deal with the verification of operation under such pre-determined conditions.

The object of this standard is to state:

a) the characteristics of circuit-breakers;

b) the conditions with which circuit-breakers shall comply with reference to:

   1) operation and behaviour in normal service;

   2) operation and behaviour in case of overload and operation and behaviour in case of short-circuit, including co-ordination in service (selectivity and back-up protection);

   3) dielectric properties;

c) tests intended for confirming that these conditions have been met and the methods to be adopted for these tests;

d) information to be marked on or given with the apparatus.

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

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

IEC 60269-1:2006, *Low-voltage fuses – Part 1: General requirements*

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

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

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

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

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

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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

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

IEC 61000-4-5:2014, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-6:2013, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-11, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

IEC 61140, *Protection against electric shock – Common aspects for installation and equipment*

IEC 62475:2010, *High-current test techniques – Definitions and requirements for test currents and measuring systems*

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

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

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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APPAREILLAGE À BASSE TENSION –

Partie 2: Disjoncteurs

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La Norme internationale IEC 60947-2 a été établie par le sous-comité 121A: Appareillages à basse tension, du comité d'études 121 de l'IEC: Appareillage et ensembles d'appareillages basse tension.

Cette cinquième édition annule et remplace la quatrième édition parue en 2006, l'Amendement 1:2009 et l'Amendement 2:2013. Cette édition constitue une révision technique.

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

- essais pour la vérification de la sélectivité dans l'Annexe A (voir A.5.3),
- essais de courants de charge critiques pour disjoncteurs à courant continu (voir 8.3.9),

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- nouvelle Annexe P relative aux disjoncteurs pour utilisation dans des applications photovoltaïques,
- nouvelle Annexe R relative aux disjoncteurs de courant différentiel résiduel avec fonctions de refermeture automatique.

Le texte de cette norme est issu des documents suivants:

FDIS	Rapport de vote
121A/71/FDIS	121A/83/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.

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

Cette Norme internationale doit être utilisée conjointement avec l'IEC 60947-1:2007 et ses Amendement 1:2010 et Amendement 2:2014.

Les dispositions des règles générales qui font l'objet de l'IEC 60947-1 sont applicables à la présente norme lorsque celle-ci le précise. Les articles, paragraphes, tableaux, figures et annexes des règles générales qui sont ainsi applicables sont identifiés par référence à l'IEC 60947-1 et ses amendements le cas échéant, par exemple: 1.2.3 de l'IEC 60947-1:2007, Tableau 4 de l'IEC 60947-1:2007/AMD1:2010, ou Annexe A de l'IEC 60947-1:2007/AMD1:2010/AMD2:2014.

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- reconduite,
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- amendée.

Le contenu du corrigendum de novembre 2016 a été pris en considération dans cet exemplaire.

IMPORTANT – Le logo «colour inside» qui se trouve sur la page de couverture de cette publication indique qu'elle contient des couleurs qui sont considérées comme utiles à une bonne compréhension de son contenu. Les utilisateurs devraient, par conséquent, imprimer cette publication en utilisant une imprimante couleur.

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APPAREILLAGE À BASSE TENSION –

Partie 2: Disjoncteurs

1 Généralités

1.1 Domaine d'application et objet

La présente partie de la série IEC 60947 est applicable aux disjoncteurs dont les contacts principaux sont destinés à être reliés à des circuits dont la tension assignée ne dépasse pas 1 000 V en courant alternatif ou 1 500 V en courant continu; elle contient aussi des exigences supplémentaires pour les disjoncteurs à fusibles incorporés.

Les disjoncteurs de caractéristiques assignées supérieures à 1 000 V en courant alternatif mais ne dépassant pas 1 500 V en courant alternatif peuvent également être soumis à essai selon la présente norme.

Elle est applicable quels que puissent être les courants assignés, les méthodes de construction et l'emploi prévu des disjoncteurs.

Les exigences pour les disjoncteurs qui sont aussi prévus pour assurer une protection contre les courants différentiels résiduels font l'objet de l'Annexe B.

Les exigences supplémentaires pour les disjoncteurs à protection électronique contre les surintensités font l'objet de l'Annexe F.

Les exigences supplémentaires relatives aux disjoncteurs pour réseaux IT font l'objet de l'Annexe H.

Les exigences et les méthodes d'essai pour la compatibilité électromagnétique des disjoncteurs font l'objet de l'Annexe J.

Les exigences pour les disjoncteurs ne satisfaisant pas aux exigences concernant les protections contre les surintensités font l'objet de l'Annexe L.

Les exigences pour les appareils modulaires à courant différentiel résiduel (non intégrés à un appareil de coupure de courant) font l'objet de l'Annexe M.

Les exigences et les méthodes d'essai pour la compatibilité électromagnétique des auxiliaires de disjoncteurs font l'objet de l'Annexe N.

Les exigences et les méthodes d'essai pour les disjoncteurs à courant continu utilisables dans les applications photovoltaïques (PV) font l'objet de l'Annexe P.

Les exigences et les méthodes d'essai pour les disjoncteurs incorporant une protection par courant différentiel résiduel avec fonctions de refermeture automatique font l'objet de l'Annexe R.

Les exigences supplémentaires pour les disjoncteurs utilisés comme démarreurs directs sont données dans l'IEC 60947-4-1, applicable aux contacteurs et aux démarreurs à basse tension.

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Les exigences concernant les disjoncteurs destinés à la protection des installations électriques des bâtiments et à des emplois analogues et prévus pour être utilisés par des personnes non averties figurent dans l'IEC 60898.

Les exigences relatives aux disjoncteurs pour le matériel (par exemple pour les appareils électriques) figurent dans l'IEC 60934.

Des exigences particulières ou complémentaires peuvent être nécessaires pour certaines applications spécifiques (par exemple: traction, laminoirs, service à bord des navires).

NOTE Les disjoncteurs, objet de la présente norme, peuvent être munis d'appareils provoquant l'ouverture automatique dans des conditions prédéterminées autres que la surintensité et la chute de tension, telles que, par exemple, l'inversion de la puissance ou du courant. La présente norme ne traite pas de la vérification du fonctionnement dans de telles conditions prédéterminées.

La présente norme a pour objet de fixer:

a) les caractéristiques des disjoncteurs;
b) les conditions auxquelles doivent répondre les disjoncteurs concernant:
   1) leur fonctionnement et leur tenue en service normal;
   2) leur fonctionnement et leur tenue en cas de surcharge et en cas de court-circuit, y compris la coordination en service (sélectivité et protection d'accompagnement);
   3) leurs propriétés diélectriques;
c) les essais destinés à vérifier si ces conditions sont remplies et les méthodes à adopter pour ces essais;
d) les informations à marquer sur les appareils ou à fournir avec ceux-ci.

1.2 Références normatives

Les documents suivants sont cités en référence de manière normative, en intégralité ou en partie, dans le présent document et sont indispensables pour son application. 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 60068-2-14, *Essais d'environnement – Partie 2-14: Essais – Essai N: Variation de température*

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

IEC 60269-1:2006, *Fusibles basse tension – Partie 1: Exigences générales*

IEC 60364 (toutes les parties), *Installations électriques à basse tension*

IEC 60664-1:2007, *Coordination de l'isolement des matériels dans les systèmes (réseaux) à basse tension – Partie 1: Principes, exigences et essais*

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, *Appareillage à basse tension – Partie 4-1: Contacteurs et démarreurs de moteurs – Contacteurs et démarreurs électromécaniques*

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)*

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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, *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 radioélectriques*
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 61000-4-11, *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 61140, *Protection contre les chocs électriques – Aspects communs aux installations et aux matériels*

IEC 62475:2010, *Techniques des essais à haute intensité – Définitions et exigences relatives aux courants d'essai et systèmes de mesure*

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

CISPR 22, *Appareils de traitement de l'information – Caractéristiques des perturbations radioélectriques – Limites et méthodes de mesure*