
Nizkonapetostne stikalne naprave – 2. del: Odklopniki (IEC 60947-2:2006)

Low-voltage switchgear and controlgear – Part 2: Circuit-breakers (IEC 60947-2:2006)

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 60947-2:2006
<https://standards.iteh.ai/catalog/standards/sist/c8c4217b-e877-47b4-9f76-4cef1c084a1/sist-en-60947-2-2006>

iTeh STANDARD PREVIEW **(standards.iteh.ai)**

SIST EN 60947-2:2006

<https://standards.iteh.ai/catalog/standards/sist/c8c4217b-e877-47b4-9f76-4cefc1c084a1/sist-en-60947-2-2006>

English version

Low-voltage switchgear and controlgear
Part 2: Circuit-breakers
(IEC 60947-2:2006)

Appareillage à basse tension
Partie 2: Disjoncteurs
(CEI 60947-2:2006)

Niederspannungsschaltgeräte
Teil 2: Leistungsschalter
(IEC 60947-2:2006)

This European Standard was approved by CENELEC on 2006-07-01. 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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

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

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 17B/1455/FDIS, future edition 4 of IEC 60947-2, prepared by SC 17B, Low-voltage switchgear and controlgear, of IEC TC 17, Switchgear and controlgear, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60947-2 on 2006-07-01.

This European Standard supersedes EN 60947-2:2003.

The main changes introduced in EN 60947-2:2006 are an amendment to the verification of dielectric properties, the improvement of EMC clauses in Annexes B, F, J and M, and the addition of a new Annex O regarding instantaneous trip circuit-breakers.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2007-04-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2009-07-01

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directive EMC (89/336/CEE). See Annex ZZ.

Annexes ZA and ZZ have been added by CENELEC.

ITCH STANDARD PREVIEW
(standards.itech.ai)

Endorsement notice

[SIST EN 60947-2:2006](#)

The text of the International Standard IEC 60947-2:2006 was approved by CENELEC as a European Standard without any modification. [4cefc1c084a1/sist-en-60947-2-2006](#)

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

IEC 60112	NOTE Harmonized as EN 60112:2003 (not modified).
IEC 60269-1	NOTE Harmonized as EN 60269-1:1998 (not modified), new edition at draft stage.
IEC 60269-2-1	NOTE Harmonized as HD 60269-2-1:2005 (not modified).
IEC 60269-3	NOTE Harmonized as EN 60269-3:1995 (not modified), new edition at draft stage.
IEC 60439	NOTE Harmonized as EN 60439 (Series) (not modified).
IEC 60947-3	NOTE Harmonized as EN 60947-3:1999 (not modified).
IEC 60947-5-1	NOTE Harmonized as EN 60947-5-1:2004 (not modified).

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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

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

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-441 A1	1984 2000	International Electrotechnical Vocabulary (IEV) Chapter 441: Switchgear, controlgear and fuses	- -	- -
IEC 60051	Series	Direct acting indicating analogue electrical measuring instruments and their accessories	EN 60051	Series
IEC 60068-2-14 + A1	1984 1986	Environmental testing Part 2: Tests - Test N: Change of temperature	EN 60068-2-14	1999
IEC 60068-2-30	2005	Environmental testing Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)	EN 60068-2-30	2005
IEC 60364	Series	Low-voltage electrical installations	-	-
IEC 60364-4-41	2001	Electrical installations of buildings Part 4-41: Protection for safety - Protection against electric shock	-	-
IEC 60695-2-10	2000	Fire hazard testing Part 2-10: Glowing/hot-wire based test methods - Glow-wire apparatus and common test procedure	EN 60695-2-10	2001
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
IEC 60695-2-12	2000	Fire hazard testing Part 2-12: Glowing/hot-wire based test methods - Glow-wire flammability test method for materials	EN 60695-2-12	2001
IEC 60695-2-13	2000	Fire hazard testing Part 2-13: Glowing/hot-wire based test methods - Glow-wire ignitability test method for materials	EN 60695-2-13	2001
IEC/TR 60755 A1 A2	1983 1988 1992	General requirements for residual current operated protective devices	- - -	- - -

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60898 (mod)	Series	Electrical accessories - Circuit-breakers for overcurrent protection for household and similar installations	EN 60898	Series
IEC 60934	- ¹⁾	Circuit-breakers for equipment (CBE)	EN 60934	2001 ²⁾
IEC 60947-1	2004	Low-voltage switchgear and controlgear Part 1: General rules	EN 60947-1 + corr. November	2004 2004
IEC 60947-4-1 A1	2000 2002	Low-voltage switchgear and controlgear Part 4-1: Contactors and motor-starters - Electromechanical contactors and motor-starters	EN 60947-4-1 A1	2001 2002
IEC 61000-3-2 (mod) A1 + A2	2000 2001 2004	Electromagnetic compatibility (EMC) Part 3-2: Limits - Limits for harmonic current emissions (equipment input current up to and including 16 A per phase)	EN 61000-3-2 ³⁾ A2	2000 2005
IEC 61000-3-3 A1	1994 2001	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 + corr. July A1	1995 1997 2001
IEC 61000-4-2 A1 A2	1995 1998 2000	Electromagnetic compatibility (EMC) Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2 A1 A2	1995 1998 2001
IEC 61000-4-3 A1	2002 2002	Electromagnetic compatibility (EMC) Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3 ⁴⁾ A1	2002 2002
IEC 61000-4-4 A1 A2	1995 2000 2001	Electromagnetic compatibility (EMC) Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4 ⁵⁾ A1 A2	1995 2001 2001
IEC 61000-4-5 A1	1995 2000	Electromagnetic compatibility (EMC) Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5 A1	1995 2001
IEC 61000-4-6 A1	2003 2004	Electromagnetic compatibility (EMC) Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	- -	- -

¹⁾ Undated reference.

²⁾ Valid edition at date of issue.

³⁾ EN 61000-3-2 + A2 are superseded by EN 61000-3-2:2006, which is based on IEC 61000-3-2:2005.

⁴⁾ EN 61000-4-3 + A1 are superseded by EN 61000-4-3:2006, which is based on IEC 61000-4-3:2006.

⁵⁾ EN 61000-4-4 + A1 + A2 are superseded by EN 61000-4-4:2004, which is based on IEC 61000-4-4:2004.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61000-4-11	2004	Electromagnetic compatibility (EMC) Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests	EN 61000-4-11	2004
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	EN 61000-4-13	2002
IEC 61000-5-2	1997	Electromagnetic compatibility (EMC) Part 5: Installation and mitigation guidelines - Section 2: Earthing and cabling	-	-
IEC 61008-1 (mod) + A1 (mod)	1996 2002	Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB's) Part 1: General rules	EN 61008-1	2004
IEC 61009-1 + corr. May + A1 (mod)	1996 2003 2002	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's) Part 1: General rules	EN 61009-1 + corr. July	2004 2006
CISPR 11 (mod) +A1 (mod)	2003 2004	Industrial scientific and medical (ISM) radio- frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement	EN 55011	- 200X ⁶⁾
CISPR 22 (mod) A1	2005 2005	Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	EN 55022	200X ⁶⁾ -

⁶⁾ To be published.

Annex ZZ (informative)

Coverage of Essential Requirements of EC Directives

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and within its scope the standard covers all relevant essential requirements as given in Article 4 of the EC Directive 89/336/EEC.

Compliance with this standard provides one means of conformity with the specified essential requirements of the Directive concerned.

WARNING: Other requirements and other EC Directives may be applicable to the products falling within the scope of this standard.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 60947-2:2006

<https://standards.iteh.ai/catalog/standards/sist/c8c4217b-e877-47b4-9f76-4cef1c084a1/sist-en-60947-2-2006>

INTERNATIONAL STANDARD

IEC
60947-2

Fourth edition
2006-05

Low-voltage switchgear and controlgear –

Part 2: Circuit-breakers

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 60947-2:2006

<https://standards.iteh.ai/catalog/standards/sist/c8c4217b-e877-47b4-9f76-4cefc1c084a1/sist-en-60947-2-2006>

© IEC 2006 Copyright - all rights reserved

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Electrotechnical Commission, 3, rue de Varembe, PO Box 131, CH-1211 Geneva 20, Switzerland
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch



Commission Electrotechnique Internationale
International Electrotechnical Commission
Международная Электротехническая Комиссия

PRICE CODE

XK

For price, see current catalogue

CONTENTS

FOREWORD	13
1 General	17
1.1 Scope and object	17
1.2 Normative references	19
2 Definitions	23
3 Classification	29
4 Characteristics of circuit-breakers	31
4.1 Summary of characteristics	31
4.2 Type of circuit-breaker	33
4.3 Rated and limiting values of the main circuit	33
4.4 Utilization categories	41
4.5 Control circuits	41
4.6 Auxiliary circuits	43
4.7 Releases	43
4.8 Integral fuses (integrally fused circuit-breakers)	45
5 Product information	45
5.1 Nature of the information	45
5.2 Marking	47
5.3 Instructions for installation, operation and maintenance	49
6 Normal service, mounting and transport conditions	49
7 Constructional and performance requirements	49
7.1 Constructional requirements	49
7.2 Performance requirements	53
7.3 Electromagnetic compatibility (EMC)	65
8 Tests	65
8.1 Kind of tests	65
8.2 Compliance with constructional requirements	67
8.3 Type tests	67
8.4 Routine tests	121
Annex A (normative) Co-ordination under short-circuit conditions between a circuit-breaker and another short-circuit protective device associated in the same circuit	131
Annex B (normative) Circuit-breakers incorporating residual current protection	149
Annex C (normative) Individual pole short-circuit test sequence	213
Annex D Vacant	215
Annex E (informative) Items subject to agreement between manufacturer and user	217
Annex F (normative) Additional tests for circuit-breakers with electronic over-current protection	219
Annex G (normative) Power loss	279
Annex H (normative) Test sequence for circuit-breakers for IT systems	285

Annex J (normative) Electromagnetic compatibility (EMC) – Requirements and test methods for circuit-breakers	289
Annex K (informative) Glossary of symbols related to products covered by this standard	317
Annex L (normative) Circuit-breakers not fulfilling the requirements for overcurrent protection	321
Annex M (normative) Modular residual current devices (without integral current breaking device)	331
Annex N (normative) Electromagnetic compatibility (EMC) – Additional requirements and test methods for devices not covered by Annexes B, F and M	421
Annex O Instantaneous trip circuit-breakers (ICB)	429
 Bibliography	 435
 Figure 1 – Test arrangement (connecting cables not shown) for short-circuit tests	 129
Figure A.1 – Over-current co-ordination between a circuit-breaker and a fuse or back-up protection by a fuse: operating characteristics	141
Figure A.2 Figure A.3	143
Total discrimination between two circuit-breakers	143
Figure A.4 Figure A.5	145
Back-up protection by a circuit-breaker – Operating characteristics	145
Figure A.6 – Example of test circuit for conditional short-circuit breaking capacity tests showing cable connections for a 3-pole circuit-breaker (C ₁)	147
Figure B.1 – Test circuit for the verification of the operating characteristic (see B.8.2)	197
Figure B.2 – Test circuit for the verification of the limiting value of the non-operating current under over-current conditions (see B.8.5)	199
Figure B.3 – Test circuit for the verification of the behaviour of CBRs classified under B.3.1.2.2 (see B.8.9)	201
Figure B.4 – Current ring wave 0,5 µs/100 kHz	203
Figure B.5 – Example of test circuit for the verification of resistance to unwanted tripping	205
Figure B.6 – Surge current wave 8/20 µs	205
Figure B.7 – Test circuit for the verification of resistance to unwanted tripping in case of flashover without follow-on current (B.8.6.2)	207
Figure B.8 – Test circuit for the verification of the correct operation of CBRs, in the case of residual pulsating direct currents (see B.8.7.2.1, B.8.7.2.2 and B.8.7.2.3)	209
Figure B.9 – Test circuit for the verification of the correct operation of CBRs, in the case of a residual pulsating direct current superimposed by a smooth direct residual current (see B.8.7.2.4)	211
Figure F.1 – Representation of test current produced by back-to-back thyristors in accordance with F.4.1	237
Figure F.2 – Test circuit for immunity and emission tests in accordance with F.4.1.3, F.4.2, F.4.3, F.4.6, F.4.7.1, F.5.4 and F.6.2 – Two phase poles in series	239
Figure F.3 – Test circuit for immunity and emission tests in accordance with F.4.1.3, F.4.2, F.4.3, F.4.6, F.4.7.1, F.5.4 and F.6.2 – Three phase poles in series	241

Figure F.4 – Test circuit for immunity and emission tests in accordance with F.4.1.3, F.4.2, F.4.3, F.4.6, F.4.7.1, F.5.4 and F.6.2 – Three-phase connection	243
Figure F.5 – Test current for the verification of the influence of the current dips and interruptions in accordance with F.4.7.1.....	245
Figure F.6 – Circuit for electrical fast transients/bursts (EFT/B) immunity test in accordance with F.4.4 – Two phase poles in series.....	247
Figure F.7 – Circuit for electrical fast transients/bursts (EFT/B) immunity test in accordance with F.4.4 – Three phase poles in series	249
Figure F.8 – Circuit for electrical fast transients/bursts (EFT/B) immunity test in accordance with F.4.4 – Three-phase connection	251
Figure F.9 – Test circuit for the verification of the influence of surges in the main circuit (line-to-earth) in accordance with F.4.5 – Two phase poles in series	253
Figure F.10 – Test circuit for the verification of the influence of surges in the main circuit (line-to-earth) in accordance with F.4.5 – Three phase poles in series	255
Figure F.11 – Test circuit for the verification of the influence of surges in the main circuit (line-to-earth) in accordance with F.4.5 – Three-phase connection.....	257
Figure F.12 – Test circuit for the verification of the influence of current surges in the main circuit in accordance with F.4.5 – Two phase poles in series	259
Figure F.13 – Test circuit for the verification of the influence of current surges in the main circuit in accordance with F.4.5 – Three phase poles in series.....	259
Figure F.14 – Test circuit for the verification of the influence of current surges in the main circuit in accordance with F.4.5 – Three-phase connection	261
Figure F.15 – Temperature variation cycles at a specified rate of change in accordance with F.9.1	261
Figure F.16 – General test set up for immunity tests	263
Figure F.17 – Test set up for the verification of immunity to radiated r.f. electromagnetic fields	265
Figure F.18 – Test set up for the verification of immunity to electrical fast transients/bursts (EFT/B) on power lines	267
Figure F.19 – Test set up for verification of immunity to electrical fast transients/bursts (EFT/B) on signal lines	269
Figure F.20 – General test set-up for the verification of immunity to conducted disturbances induced by r.f. fields (common mode)	271
Figure F.21 – Arrangement of connections for the verification of immunity to conducted disturbances induced by r.f. fields - Two phase poles in series configuration.....	273
Figure F.22 – Arrangement of connections for the verification of immunity to conducted disturbances induced by r.f. fields - Three phase poles in series configuration	275
Figure F.23 – Arrangement of connections for the verification of immunity to conducted disturbances induced by r.f. fields – Three-phase configuration	277
Figure G.1 – Example of power loss measurement according to G.2.1	283
Figure G.2 – Example of power loss measurement according to G.2.2 and G.2.3	283
Figure J.1 – EUT mounted in a metallic enclosure	305
Figure J.2 – Test set up for the measurement of radiated r.f. emissions.....	307
Figure J.3 – Test set up for the verification of immunity to electrostatic discharges	309

Figure J.4 – Test set up for the verification of immunity to radiated r.f. electromagnetic fields.....	311
Figure J.5 – Test set up for the verification of immunity to electrical fast transients/bursts (EFT/B) on power lines	313
Figure J.6 – Test set up for the verification of immunity to electrical fast transients/bursts (EFT/B) on signal lines	315
Figure K.1 – Relationship between symbols and tripping characteristics.....	319
Figure M.1 – Test circuits for the verification of operation in the case of a steady increase of residual current	379
Figure M.2 – Test circuits for the verification of operation in the case of a sudden appearance of residual current (with breaking device)	381
Figure M.3 – Test circuits for the verification of operation in the case of a sudden appearance of residual current (without breaking device).....	383
Figure M.4 – Test circuits for the verification of the limiting value of non-operating current under overcurrent conditions	385
Figure M.5 – Test circuits for the verification of the resistance to unwanted tripping in the case of loading of the network capacitance	387
Figure M.6 – Test circuit for the verification of the resistance to unwanted tripping in the case of flashover without follow-on current	389
Figure M.7 – Test circuits for the verification of operation in the case of a continuous rise of a residual pulsating direct current	391
Figure M.8 – Test circuits for the verification of operation in the case of a sudden appearance of residual pulsating direct current (without breaking device)	393
Figure M.9 – Test circuits for the verification of operation in the case of a sudden appearance of residual pulsating direct current (with breaking device)	395
Figure M.10 – Test circuits for the verification of operation in the case of a residual pulsating direct current superimposed by smooth direct current of 6 mA	397
Figure M.11 – Test circuits for the verification of operation in the case of a slowly rising residual smooth direct current	399
Figure M.12 – Test circuits for the verification of operation in the case of a sudden appearance of residual smooth direct current (without breaking device).....	401
Figure M.13 – Test circuits for the verification of operation in the case of a sudden appearance of residual smooth direct current (with breaking device).....	403
Figure M.14 – Test circuits for the verification of operation in the case of a slowly rising residual current resulting from a fault in a circuit fed by a three-pulse star or a six-pulse bridge connection.....	405
Figure M.15 – Test circuits for the verification of operation in the case of a slowly rising residual current resulting from a fault in a circuit fed by a two-pulse bridge connection line-to-line.....	407
Figure M.16 – Test circuit for the verification of the behaviour of MRCDs with separate sensing means in the case of a failure of the sensor means connection	409
Figure M.17 – Test circuit for the verification of the behaviour of MRCD with separate sensing means under short-circuit conditions	411
Figure M.18 – Test circuit for the verification of the behaviour of MRCD with integral sensing means under short-circuit conditions	413

Figure M.19 – Test circuit for the verification of the behaviour of terminal type MRCD under short-circuit conditions.....	415
Figure M.20 – Verification of immunity to radiated r.f. electromagnetic fields - Test set-up for MRCD with separate sensing means (additional to the test of Annex B)	417
Figure M.21 – Verification of immunity to electrical fast transients/bursts (EFT/B) on the sensing means connection of an MRCD with separate sensing means (additional to the test of Annex B)	419
Figure M.22 – Verification of immunity to conducted disturbances induced by r.f. fields - Test set up for MRCD with separate sensing means (additional to the test of Annex B)	419
Table 1 – Standard ratios between I_{CS} and I_{CU}	37
Table 2 – Ratio n between short-circuit making capacity and short-circuit breaking capacity and related power factor (for a.c. circuit-breakers)	39
Table 3 – Minimum values of rated short-time withstand current	39
Table 4 – Utilization categories.....	41
Table 5 – Preferred values of the rated control supply voltage, if different from that of the main circuit	41
Table 6 – Characteristics of the opening operation of inverse time-delay over-current opening releases at the reference temperature	57
Table 7 – Temperature-rise limits for terminals and accessible parts	61
Table 8 – Number of operating cycles.....	63
Table 9 – Overall schema of test sequences a.....	71
Table 9a – Applicability of test sequences according to the relationship between I_{CS} , I_{CU} and I_{CW}	73
Table 10 – Number of samples for test.....	79
Table 11 – Values of power factors and time constants corresponding to test currents	83
Table 12 – Test circuit characteristics for overload performance	105
Table B.1 – Operating characteristic for non-time-delay type.....	159
Table B.2 – Operating characteristic for time-delay-type having a limiting non-actuating time of 0,06 s	161
Table B.3 – Requirements for CBRs functionally dependent on line voltage	169
Table B.4 – Additional test sequences	175
Table B.5 – Tripping current range for CBRs in case of an earth fault comprising a d.c. component.....	185
Table F.1 – Test parameters for current dips and interruptions	229
Table J.1 – EMC – Immunity tests	293
Table J.2 – Reference data for immunity test specifications	295
Table J.3 – EMC – Emission tests	301
Table J.4 – Reference data for emission test specifications	301
Table M.1 – Product information.....	343
Table M.2 – Requirements for MRCDs with voltage source	347
Table M.3 – Test sequences	351

INTERNATIONAL ELECTROTECHNICAL COMMISSION

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 2: Circuit-breakers

FOREWORD

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

International Standard IEC 60947-2 has been prepared by subcommittee 17B: Low-voltage switchgear and controlgear, of IEC technical committee 17: Switchgear and controlgear.

This fourth edition of IEC 60947-2 cancels and replaces the third edition published in 2003.

The main changes introduced in this new edition are an amendment to the verification of dielectric properties, the improvement of EMC clauses in Annexes B, F, J and M, and the addition of a new Annex O regarding instantaneous trip circuit-breakers.