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

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 04/25

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English Version

**Low-voltage switchgear and controlgear - Part 2: Circuit-breakers
(IEC 60947-2:2024)**Appareillage à basse tension - Partie 2: Disjoncteurs
(IEC 60947-2:2024)Niederspannungsschaltgeräte - Teil 2: Leistungsschalter
(IEC 60947-2:2024)

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EN IEC 60947-2:2025 (E)**European foreword**

The text of document 121A/608/FDIS, future edition 6 of IEC 60947-2, prepared by SC 121A "Low-voltage switchgear and controlgear" of IEC/TC 121 "Switchgear and controlgear and their assemblies for low voltage" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60947-2:2025.

The following dates are fixed:

- latest date by which the document has to be implemented at national (dop) 2026-02-28 level by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with the (dow) 2028-02-29 document have to be withdrawn

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

IEC 60051 series	NOTE	Approved as EN IEC 60051 series
IEC 60112	NOTE	Approved as EN IEC 60112
IEC 60269-1:2006	NOTE	Approved as EN 60269-1:2007 (not modified)
IEC 60269-1:2006/A1:2009	NOTE	Approved as EN 60269-1:2007/A1:2009 (not modified)
IEC 60269-1:2006/A2:2014	NOTE	Approved as EN 60269-1:2007/A2:2014 (not modified)
IEC 60335-1:2020	NOTE	Approved as EN IEC 60335-1:2023 (not modified) +A11:2023
IEC 60364 series	NOTE	Approved as HD 60364 series
IEC 60364-5-52	NOTE	Approved as HD 60364-5-52
IEC 60695-2-11:2021	NOTE	Approved as EN IEC 60695-2-11:2021 (not modified)
IEC 60898 series	NOTE	Approved as EN 60898 series
IEC 60898-1	NOTE	Approved as EN 60898-1
IEC 60934	NOTE	Approved as EN IEC 60934
IEC 60947-3	NOTE	Approved as EN IEC 60947-3

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IEC 60947-5-1	NOTE	Approved as EN 60947-5-1
IEC 61000-3-2	NOTE	Approved as EN IEC 61000-3-2
IEC 61000-3-3	NOTE	Approved as EN 61000-3-3
IEC 61000-4-13	NOTE	Approved as EN 61000-4-13
IEC 61008-1:2010	NOTE	Approved as EN 61008-1:2012 +A11:2015
IEC 61008-1:2010/A1:2012	NOTE	Approved as EN 61008-1:2012/A1:2014
IEC 61008-1:2010/A2:2013	NOTE	Approved as EN 61008-1:2012/A2:2014
IEC 61009-1:2010	NOTE	Approved as EN 61009-1:2012 +A11:2015
IEC 61009-1:2010/A1:2012	NOTE	Approved as EN 61009-1:2012/A1:2014
IEC 61009-1:2010/A2:2013	NOTE	Approved as EN 61009-1:2012/A2:2014
IEC 61131-1:2003	NOTE	Approved as EN 61131-1:2003 (not modified)
IEC 61238-1 series	NOTE	Approved as EN IEC 61238-1 series
IEC 61439 series	NOTE	Approved as EN IEC 61439 series
IEC/TR 63201	NOTE	Approved as CLC IEC/TR 63201
IEC/TR 63216:2019	NOTE	Approved as CLC IEC/TR 63216:2020 (not modified)

EN IEC 60947-2:2025 (E)**Annex ZA**
(normative)**Normative references to international publications
with their corresponding European publications**

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

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

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60068-2-14	-	Environmental testing - Part 2-14: Tests - Test N: Change of temperature	EN IEC 60068-2-14	-
IEC 60068-2-30	-	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)	EN 60068-2-30	-
IEC 60228	-	Conductors of insulated cables	EN IEC 60228	-
IEC 60664-1	2020	Insulation coordination for equipment within low-voltage supply systems - Part 1: Principles, requirements and tests	EN IEC 60664-1	2020
-	-		+AC	2020
IEC 60947-1	2020	Low-voltage switchgear and controlgear - Part 1: General rules	EN IEC 60947-1	2021
IEC 60947-4-1	-	Low-voltage switchgear and controlgear - Part 4-1: Contactors and motor-starters - Electromechanical contactors and motor-starters	EN IEC 60947-4-1	-
IEC 61000-4-2	2008	Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test	EN 61000-4-2	2009
IEC 61000-4-3	2020	Electromagnetic compatibility (EMC) - Part 4-3 : Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN IEC 61000-4-3	2020
IEC 61000-4-4	2012	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4	2012
IEC 61000-4-5	2014	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5	2014
+ A1	2017		+ A1	2017

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<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61000-4-6	2023	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	EN IEC 61000-4-6	2023
IEC 61000-4-11	2020	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase	EN IEC 61000-4-11	2020
-	-		+AC	2020
-	-		+AC	2022
IEC 61140	2016	Protection against electric shock - Common aspects for installation and equipment	EN 61140	2016
IEC 61545	1996	Connecting devices - Devices for the connection of aluminium conductors in clamping units of any material and copper conductors in aluminium bodied clamping units	-	-
IEC 62475	2010	High-current test techniques - Definitions and requirements for test currents and measuring systems	EN 62475	2010
CISPR 11 (mod)	2015	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement	EN 55011	2016
+ A1	2016		+ A1	2017
-	-		+ A11	2020
+ A2	2019		+ A2	2021
CISPR 32	2015	Electromagnetic compatibility of multimedia equipment - Emission requirements	EN 55032	2015
-	-		+AC	2016
-	-		+A11	2020



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Part 2: Circuit-breakers**

**Appareillage à basse tension –
Partie 2: Disjoncteurs**



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NORME INTERNATIONALE



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

**Appareillage à basse tension –
Partie 2: Disjoncteurs**

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CONTENTS

FOREWORD.....	15
1 Scope.....	17
2 Normative references	18
3 Terms and definitions	19
4 Classification.....	23
4.1 According to the selectivity category, A or B (see 5.4).....	23
4.2 According to the method of controlling the operating mechanism:	23
4.3 According to the provision for maintenance:.....	23
4.4 According to the method of installation:.....	23
4.5 According to the degree of protection provided by the enclosure (see 8.1.12 of IEC 60947-1:2020).....	23
5 Characteristics of circuit-breakers.....	23
5.1 Summary of characteristics	23
5.2 Type of circuit-breaker	23
5.3 Rated and limiting values of the main circuit	23
5.3.1 General	23
5.3.2 Rated voltages	24
5.3.3 Currents	24
5.3.4 Rated frequency	24
5.3.5 Rated duty.....	24
5.3.6 Short-circuit characteristics	25
5.4 Selectivity categories	27
5.5 Control circuits.....	27
5.5.1 Electrical control circuits.....	27
5.5.2 Air-supply control circuits (pneumatic or electro-pneumatic)	28
5.6 Auxiliary circuits.....	28
5.7 Releases.....	28
5.7.1 Types	28
5.7.2 Characteristics.....	28
5.7.3 Current setting of overcurrent releases	29
5.7.4 Tripping time setting of overcurrent releases	29
5.8 Integral fuses (integrally fused circuit-breakers).....	30
6 Product information	30
6.1 Nature of the information	30
6.2 Marking.....	30
6.3 Instructions for installation, operation and maintenance	32
7 Normal service, mounting and transport conditions.....	32
8 Constructional and performance requirements	32
8.1 Constructional requirements	32
8.1.1 General	32
8.1.2 Withdrawable circuit-breakers.....	33
8.1.3 Isolation.....	33
8.1.4 Clearances and creepage distances	33
8.1.5 Requirements for the safety of the operator	33
8.1.6 List of construction breaks	33
8.1.7 Additional requirements for circuit-breakers provided with a neutral pole	34

8.1.8	Digital inputs and outputs for use with programmable logic controllers (PLCs).....	34
8.2	Performance requirements.....	34
8.2.1	Operating conditions.....	34
8.2.2	Temperature-rise.....	37
8.2.3	Dielectric properties.....	38
8.2.4	Ability to make and break under no load, normal load and overload conditions.....	39
8.2.5	Ability to make and break under short-circuit conditions.....	40
8.2.6	Requirements for isolation.....	40
8.2.7	Specific requirements for integrally fused circuit-breakers.....	40
8.2.8	Coordination between a circuit-breaker and another short-circuit protective device.....	41
8.3	Electromagnetic compatibility (EMC).....	41
9	Tests.....	41
9.1	Kind of tests.....	41
9.1.1	General.....	41
9.1.2	Type tests.....	41
9.1.3	Routine tests.....	41
9.1.4	Special tests.....	41
9.2	Compliance with constructional requirements.....	42
9.3	Type tests.....	42
9.3.1	General.....	42
9.3.2	Test sequences.....	43
9.3.3	General test conditions.....	50
9.3.4	Test sequence I: General performance characteristics.....	58
9.3.5	Test sequence II: Rated service short-circuit breaking capacity.....	68
9.3.6	Test sequence III: Rated ultimate short-circuit breaking capacity.....	69
9.3.7	Test sequence IV: Rated short-time withstand current.....	71
9.3.8	Test sequence V: Performance of integrally fused circuit-breakers.....	72
9.3.9	Test sequence VI: Combined test sequence.....	74
9.3.10	Test sequence VII: Critical DC load current.....	76
9.3.11	Test sequence VIII: Rated individual pole ultimate short-circuit breaking capacity at phase-to-neutral AC voltage.....	77
9.4	Routine tests.....	78
9.4.1	General.....	78
9.4.2	Mechanical operation tests.....	78
9.4.3	Verification of the calibration of overcurrent releases.....	79
9.4.4	Verification of the operation of undervoltage and shunt releases.....	79
9.4.5	Additional tests for CBRs.....	80
9.4.6	Dielectric tests.....	80
9.4.7	Test for the verification of clearances less than those corresponding to case A of Table 13 of IEC 60947-1:2020.....	81
9.5	Special tests – Damp heat, salt mist, vibration and shock.....	81
Annex A (normative)	Coordination between a circuit-breaker and another short-circuit protective device associated in the same circuit.....	84
A.1	General.....	84
A.2	Object.....	84
A.3	General requirements for the co-ordination of a circuit-breaker with another SCPD.....	84

A.4	Type and characteristics of the associated SCPD	84
A.5	Verification of selectivity	84
A.6	Verification of back-up protection	84
Annex B (normative) Circuit-breakers incorporating residual current protection (CBRs)		86
B.1	General.....	86
B.1.1	Preamble	86
B.1.2	Object.....	86
B.2	Terms and definitions.....	87
B.2.1	Terms and definitions relating to currents flowing from live parts to earth.....	87
B.2.2	Terms and definitions relating to the energization of a CBR	87
B.2.3	Terms and definitions relating to the operation and the functions of a CBR	88
B.2.4	Terms and definitions relating to values and ranges of energizing quantities.....	89
B.3	Classification	90
B.3.1	Classification according to the method of operation of the residual current function	90
B.3.2	Classification according to the possibility of adjusting the residual operating current	90
B.3.3	Classification according to time delay of the residual current function	90
B.3.4	Classification according to behaviour in presence of a DC component	90
B.4	Characteristics of CBRs concerning their residual current function.....	90
B.4.1	Rated values	90
B.4.2	Preferred and limiting values	91
B.4.3	Value of the rated residual short-circuit making and breaking capacity ($I_{\Delta m}$)	92
B.4.4	Operating characteristics in the case of an earth fault current in the presence or absence of a DC component	92
B.5	Marking.....	93
B.6	Normal service, mounting and transport conditions	95
B.7	Design and operating requirements.....	95
B.7.1	Design requirements.....	95
B.7.2	Operating requirements	95
B.7.3	Electromagnetic compatibility	99
B.8	Tests	99
B.8.1	Test sequences	99
B.8.2	Verification of the operating characteristics	102
B.8.3	Verification of dielectric properties.....	104
B.8.4	Verification of the operation of the test device at the limits of rated voltage	104
B.8.5	Verification of the limiting value of the non-operating current under overcurrent conditions	105
B.8.6	Verification of the resistance against unwanted tripping due to surge currents resulting from impulse voltages	105
B.8.7	Additional verifications for CBRs of types A and B	106
B.8.8	Additional verifications for CBRs of type B.....	108
B.8.9	Verification of the behaviour of CBRs functionally dependent on line voltage classified under B.3.1.2.1	113
B.8.10	Verification of the behaviour of CBRs functionally dependent on line voltage classified under B.3.1.2.2	113

B.8.11	Verification of the residual short-circuit making and breaking capacity	114
B.8.12	Verification of the effects of environmental conditions	115
B.8.13	Verification of electromagnetic compatibility	116
B.8.14	Test for variations or interruptions of voltage and for voltage dips	118
Annex C (normative)	Individual pole short-circuit test sequence	130
C.1	General	130
C.2	Test of individual pole short-circuit breaking capacity	130
C.3	Verification of dielectric withstand and leakage current	130
C.4	Verification of overload releases	130
Annex D (normative)	Additional requirements for circuit-breakers intended for connection of aluminium conductors	131
D.1	General	131
D.2	Terms and definitions	131
D.3	Classification	132
D.4	Characteristics	132
D.5	Product information	132
D.5.1	Nature of information	132
D.5.2	Marking	132
D.5.3	Instructions for installation, operation and maintenance	132
D.6	Normal service, mounting and transport conditions	132
D.7	Constructional and performance requirements	133
D.8	Tests	133
D.8.1	General	133
D.8.2	Current cycling test	134
D.8.3	Climatic test	138
D.8.4	Mechanical properties of terminals	139
D.8.5	Test for insertability of unprepared round aluminium conductors having the maximum cross-section	139
Annex E (informative)	Items subject to agreement between manufacturer and user	143
Annex F (normative)	Additional tests for circuit-breakers with electronic overcurrent protection	144
F.1	General	144
F.2	List of tests	144
F.2.1	General	144
F.2.2	Electromagnetic compatibility (EMC) tests	144
F.2.3	Suitability for multiple frequencies	145
F.2.4	Dry heat test	145
F.2.5	Damp heat test	145
F.2.6	Temperature variation cycles at a specified rate of change	145
F.3	General test conditions	145
F.3.1	General	145
F.3.2	Electromagnetic compatibility tests	145
F.4	Immunity tests	146
F.4.1	Harmonic currents	146
F.4.2	Electrostatic discharges	147
F.4.3	Radiated RF electromagnetic fields	147
F.4.4	Electrical fast transient/burst (EFT/B)	148
F.4.5	Surges	148
F.4.6	Conducted disturbances induced by RF fields (common mode)	148

F.4.7	Current dips.....	149
F.5	Emission tests	149
F.5.1	Harmonics	149
F.5.2	Voltage fluctuations	149
F.5.3	Conducted RF disturbances (150 kHz to 30 MHz).....	150
F.5.4	Radiated RF disturbances (30 MHz to 6 000 MHz).....	150
F.6	Suitability for multiple frequencies.....	150
F.6.1	General	150
F.6.2	Test conditions	150
F.6.3	Test procedure	150
F.6.4	Test results.....	151
F.7	Dry heat test	151
F.7.1	Test procedure	151
F.7.2	Test results.....	151
F.7.3	Verification of overload releases	151
F.8	Damp heat test	151
F.8.1	Test procedure	151
F.8.2	Verification of overload releases	152
F.9	Temperature variation cycles at a specified rate of change	152
F.9.1	Test conditions	152
F.9.2	Test procedure	152
F.9.3	Test results.....	152
F.9.4	Verification of overload releases	152
Annex G (normative)	Power loss	167
G.1	General.....	167
G.2	Determination method	167
G.2.1	AC circuit-breakers of rated current exceeding 400 A	167
G.2.2	AC circuit-breakers of rated current not exceeding 400 A	168
G.2.3	DC circuit-breakers	168
G.3	Test conditions	168
G.4	Test method.....	169
G.4.1	General	169
G.4.2	Voltage drop measurements	169
G.4.3	Current measurement	169
Annex H (normative)	Test sequence for circuit-breakers for IT systems	172
H.1	General.....	172
H.2	Individual pole short-circuit	172
H.3	Verification of dielectric withstand and leakage current	173
H.4	Verification of overload releases	173
H.5	Marking.....	173
Annex I	Vacant	174
Annex J (normative)	Electromagnetic compatibility (EMC) – Requirements and test methods for circuit-breakers.....	175
J.1	General.....	175
J.2	Immunity	176
J.2.1	General	176
J.2.2	Electrostatic discharges.....	178
J.2.3	Radiated RF electromagnetic fields	179
J.2.4	Electrical fast transients/bursts (EFT/B).....	179

J.2.5	Surges	179
J.2.6	Conducted disturbances induced by RF fields (common mode).....	180
J.3	Emission	180
J.3.1	General	180
J.3.2	Conducted RF disturbances (150 kHz to 30 MHz).....	181
J.3.3	Radiated RF disturbances (30 MHz to 6 000 MHz).....	181
Annex K (informative)	Glossary of symbols and graphical representation of characteristics	187
Annex L (normative)	Circuit-breakers not fulfilling the requirements for overcurrent protection (CBIs).....	196
L.1	General.....	196
L.2	Terms and definitions.....	196
L.3	Classification	196
L.4	Characteristics.....	197
L.4.1	Rated current (I_n)	197
L.4.2	Rated conditional short-circuit current (I_{CC})	197
L.4.3	Other characteristics.....	197
L.5	Product information.....	197
L.6	Constructional and performance requirements	198
L.7	Tests	198
L.7.1	General	198
L.7.2	Rated conditional short-circuit current tests	200
L.7.3	Routine tests	202
Annex M (normative)	Modular residual current devices (without integral current breaking device)	203
M.1	General.....	203
M.1.1	Preamble	203
M.1.2	Object.....	203
M.2	Terms and definitions.....	203
M.2.1	Terms and definitions relating to the energization of an MRCD	203
M.2.2	Terms and definitions relating to the operation and the functions of an MRCD.....	204
M.3	Classification	204
M.3.1	Classification according to the configuration of the primary conductors.....	204
M.3.2	Classification according to the method of operation	204
M.3.3	Classification according to the possibility of adjusting the residual operating current	205
M.3.4	Classification according to time delay of the residual current function	205
M.3.5	Classification according to behaviour in presence of a DC component.....	205
M.4	Characteristics of MRCDs	205
M.4.1	General characteristics	205
M.4.2	Characteristics of MRCDs concerning their residual current function	206
M.4.3	Behaviour under short-circuit conditions	206
M.4.4	Preferred and limiting values	207
M.5	Product information.....	207
M.6	Normal service, mounting and transport conditions	209
M.7	Design and operating requirements.....	209
M.7.1	Design requirements.....	209
M.7.2	Operating requirements	209

M.8	Tests	212
M.8.1	General	212
M.8.2	Compliance with constructional requirements	213
M.8.3	Verification of the operating characteristics	213
M.8.4	Verification of dielectric properties	215
M.8.5	Verification of the operation of the test device at the limits of the rated voltage	216
M.8.6	Verification of the limiting value of non-operating current under overcurrent conditions, in the case of a single phase load	216
M.8.7	Verification of the resistance against unwanted tripping due to surge currents resulting from impulse voltages	216
M.8.8	Verification of the behaviour in the case of an earth fault current comprising a DC component	217
M.8.9	Verification of the behaviour of MRCDs with separate sensing means in the case of a failure of the sensing means connection	221
M.8.10	Verification of temperature-rise of terminal type MRCDs	221
M.8.11	Verification of mechanical and electrical endurance	222
M.8.12	Verification of the behaviour of MRCDs classified under M.3.2.2.1 in the case of failure of the voltage source	222
M.8.13	Verification of the behaviour of MRCDs classified under M.3.2.2.2 in the case of failure of the voltage source	223
M.8.14	Verification of the behaviour of MRCDs under short-circuit conditions	223
M.8.15	Verification of the effects of environmental conditions	225
M.8.16	Verification of electromagnetic compatibility	226
Annex N (normative)	Electromagnetic compatibility (EMC) – Additional requirements and test methods for devices not covered by Annex B, Annex F and Annex M	250
N.1	General	250
N.1.1	Overview	250
N.1.2	General test conditions	250
N.2	Immunity	250
N.2.1	General	250
N.2.2	Electrostatic discharges	251
N.2.3	Radiated RF electromagnetic fields	251
N.2.4	Electrical fast transients/bursts (EFT/B)	251
N.2.5	Surges	252
N.2.6	Conducted disturbances induced by RF fields (common mode)	252
N.2.7	Voltage dips and interruptions	252
N.3	Emission	252
N.3.1	General	252
N.3.2	Conducted RF disturbances (150 kHz to 30 MHz)	253
N.3.3	Radiated RF disturbances (30 MHz to 6 000 MHz)	253
Annex O (normative)	Instantaneous trip circuit-breakers (ICBs)	254
O.1	General	254
O.2	Terms and definitions	254
O.3	Rated values	254
O.3.1	General	254
O.3.2	Rated current (I_n)	254
O.3.3	Rated short-circuit making capacity	254
O.3.4	Rated short-circuit breaking capacities	255
O.4	Product information	255

O.5	Constructional and performance requirements	255
O.6	Tests	256
O.6.1	Test sequence of the ICB alone	256
O.6.2	ICB associated with a specified protected device (i.e. motor-starter or overload relay).....	256
Annex P	(normative) DC circuit-breakers for use in photovoltaic (PV) applications.....	257
P.1	Field of application.....	257
P.2	Terms and definitions.....	257
P.3	Classification	257
P.4	Characteristics of PV circuit-breakers	257
P.5	Product information.....	258
P.6	Normal service, mounting and transport conditions	258
P.7	Constructional and performance requirements	258
P.7.1	Constructional requirements	258
P.7.2	Performance requirements.....	258
P.7.3	Electromagnetic compatibility (EMC)	259
P.8	Tests	259
P.8.1	Kind of tests	259
P.8.2	Compliance with constructional requirements	259
P.8.3	Type tests.....	259
P.8.4	Routine tests	261
P.8.5	Special tests.....	261
Annex Q	Vacant.....	262
Annex R	(normative) Circuit-breakers incorporating residual current protection with automatic reclosing functions (CBARs)	263
R.1	General.....	263
R.1.1	Preamble	263
R.1.2	Field of application	263
R.2	Terms and definitions.....	264
R.3	Classification	265
R.3.1	According to the method of construction	265
R.3.2	According to the method of automatic reclosing	265
R.4	Characteristics.....	265
R.4.1	Rated automatic reclosing operating residual current ($I_{\Delta ar}$).....	265
R.4.2	Maximum number of consecutive reclosing operations.....	265
R.5	Marking and instructions	265
R.6	Normal service, mounting and transport conditions	266
R.7	Design and operating requirements.....	266
R.7.1	Design requirements.....	266
R.7.2	Operating requirements	267
R.8	Tests	268
R.8.1	General conditions.....	268
R.8.2	Verification of the non-reclosing after tripping under overcurrent conditions	268
R.8.3	Verification of the non-reclosing after intentional opening	268
R.8.4	Verification of the automatic reclosing function after tripping on earth fault.....	269
R.8.5	Verification of mechanical endurance	270
R.8.6	Verification of the isolation function	270

R.8.7	Verification of residual short-circuit making and breaking capacity.....	271
R.8.8	Verification of the automatic reclosing function after the test sequences of Clause B.8.....	271
R.8.9	Test items for external type automatic reclosing devices.....	272
Bibliography.....		274
Figure 1	– Test arrangement (connecting cables not shown) for short-circuit tests	82
Figure 2	– Examples of application of the test force for the verification of the effectiveness of the indication of the main contact position (first criterion, actuator being left free)	83
Figure A.1	– Cable connections for conditional short-circuit breaking capacity tests in the case of a single pole under phase-to-neutral AC voltage (C1)	85
Figure B.1	– Test circuit for the verification of the operating characteristic (see B.8.2).....	118
Figure B.2	– Test circuit for the verification of the limiting value of the non-operating current under overcurrent conditions (see B.8.5).....	119
Figure B.3	– Test circuit for the verification of the behaviour of CBRs classified under B.3.1.2.2 (see B.8.10).....	120
Figure B.4	– Current ring wave 0,5 μ s/100 kHz	121
Figure B.5	– Example of a test circuit for the verification of resistance to unwanted tripping	121
Figure B.6	– Surge current wave 8/20 μ s	122
Figure B.7	– Test circuit for the verification of resistance to unwanted tripping in the case of flashover without follow-on current	122
Figure B.8	– Test circuit for the verification of the correct operation of CBRs, in the case of residual pulsating direct currents	123
Figure B.9	– Test circuit for residual pulsating direct current superimposed by a smooth direct current	124
Figure B.10	– Test circuit for residual alternating currents superimposed by a smooth direct current	125
Figure B.11	– Test circuit for residual pulsating direct currents which can result from rectifying circuits supplied from two phases	126
Figure B.12	– Test circuit for residual pulsating direct currents which can result from rectifying circuits supplied from three phases.....	127
Figure B.13	– Test circuit for residual smooth direct current.....	128
Figure B.14	– Test circuit for composite residual currents and residual sinusoidal alternating current up to 1 000 Hz	129
Figure D.1	– General test arrangement	135
Figure D.2	– Mounting of terminals for the current cycling test	135
Figure F.1	– Representation of test current produced by back-to-back thyristors in accordance with F.4.1	153
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.6.3 – Two phase poles in series	154
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.6.3 – Three phase poles in series.....	154
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.6.3 – Three-phase connection	155
Figure F.5	– Test current for the verification of the influence of the current dips and interruptions in accordance with F.4.7.1	155
Figure F.6	– Circuit for electrical fast transients/bursts (EFT/B) immunity test in accordance with F.4.4 – Two phase poles in series.....	156

Figure F.7 – Circuit for electrical fast transients/bursts (EFT/B) immunity test in accordance with F.4.4 – Three phase poles in series	156
Figure F.8 – Circuit for electrical fast transients/bursts (EFT/B) immunity test in accordance with F.4.4 – Three-phase connection	157
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.....	157
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.....	158
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	158
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	159
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	159
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	160
Figure F.15 – Temperature variation cycles at a specified rate of change in accordance with F.9.1	160
Figure F.16 – General test set-up for immunity tests	161
Figure F.17 – Test set-up for the verification of immunity to radiated RF electromagnetic fields	162
Figure F.18 – Test set-up for the verification of immunity to electrical fast transients/bursts (EFT/B) on power lines	163
Figure F.19 – Test set-up for verification of immunity to electrical fast transients/bursts (EFT/B) on signal lines	163
Figure F.20 – General test set-up for the verification of immunity to conducted disturbances induced by RF fields (common mode)	164
Figure F.21 – Arrangement of connections for the verification of immunity to conducted disturbances induced by RF fields – Two phase poles in series configuration	164
Figure F.22 – Arrangement of connections for the verification of immunity to conducted disturbances induced by RF fields – Three phase poles in series configuration.....	165
Figure F.23 – Arrangement of connections for the verification of immunity to conducted disturbances induced by RF fields – Three-phase configuration	166
Figure G.1 – Power loss measurement circuit for AC circuit-breakers	169
Figure G.2 – Power loss measurement circuit for AC circuit-breakers with rated current not exceeding 400 A and DC circuit-breakers.....	170
Figure G.3 – Measurement points for circuit-breakers with a single pole per phase.....	170
Figure G.4 – Measurement points for circuit-breakers with multiple poles per phase	171
Figure J.1 – EUT mounted in a metallic enclosure	182
Figure J.2 – Test set up for the measurement of radiated RF emissions.....	183
Figure J.3 – Test set up for the verification of immunity to electrostatic discharges.....	184
Figure J.4 – Test set up for the verification of immunity to radiated RF electromagnetic fields.....	185
Figure J.5 – Test set up for the verification of immunity to electrical fast transients/bursts (EFT/B) on power lines	186
Figure J.6 – Test set up for the verification of immunity to electrical fast transients/bursts (EFT/B) on signal lines.....	186
Figure K.1 – Relationship between symbols and tripping characteristics	189

Figure K.2 – Template for characteristics of cut-off current versus prospective current from 1 kA to 200 kA	190
Figure K.3 – Template for characteristics of cut-off current versus prospective current from 0,01 kA to 200 kA	191
Figure K.4 – Template for characteristics of let-through energy versus prospective current from 1 kA to 200 kA	192
Figure K.5 – Template for characteristics of let-through energy versus prospective current from 0,01 kA to 200 kA.....	193
Figure K.6 – Example of the use of template to Figure K.2.....	194
Figure K.7 – Example of the use of template to Figure K.4.....	195
Figure M.1 – Test circuits for the verification of operation in the case of a steady increase of residual current.....	227
Figure M.2 – Test circuits for the verification of operation in the case of a sudden appearance of residual current (with current breaking device).....	228
Figure M.3 – Test circuits for the verification of operation in the case of a sudden appearance of residual current (without current breaking device).....	229
Figure M.4 – Test circuits for the verification of the limiting value of non-operating current under overcurrent conditions.....	230
Figure M.5 – Test circuits for the verification of the resistance to unwanted tripping in the case of loading of the network capacitance	231
Figure M.6 – Test circuit for the verification of the resistance to unwanted tripping in the case of flashover without follow-on current.....	232
Figure M.7 – Test circuits for the verification of operation in the case of a continuous rise of a residual pulsating direct current	233
Figure M.8 – Test circuits for the verification of operation in the case of a sudden appearance of residual pulsating direct current (without current-breaking device).....	234
Figure M.9 – Test circuits for the verification of operation in the case of a sudden appearance of residual pulsating direct current (with current-breaking device).....	235
Figure M.10 – Test circuits for the verification of operation in the case of a residual pulsating direct current superimposed by a smooth direct current	236
Figure M.11 – Test circuits for the verification of operation in the case of a slowly rising residual smooth direct current.....	237
Figure M.12 – Test circuits for the verification of operation in the case of a sudden appearance of residual smooth direct current (without current-breaking device).....	238
Figure M.13 – Test circuits for the verification of operation in the case of a sudden appearance of residual smooth direct current (with current-breaking device)	239
Figure M.14 – Test circuits for the verification of the correct operation in the case of residual direct currents which can result from rectifying circuits supplied from three phases.....	240
Figure M.15 – Test circuits for the verification of the correct operation in the case of residual direct currents which can result from rectifying circuits supplied from two phases.....	241
Figure M.16 – Test circuits for the verification of correct operation in the case of composite residual currents and residual sinusoidal alternating current up to 1 000 Hz.....	242
Figure M.17 – Test circuits for the verification of the correct operation in the case of a residual alternating current superimposed on a smooth direct current	243
Figure M.18 – Test circuit for the verification of the behaviour of MRCDs with separate sensing means in the case of a failure of the connection of the sensing means.....	244
Figure M.19 – Test circuit for the verification of the behaviour of MRCD with separate sensing means under short-circuit conditions.....	245

Figure M.20 – Test circuit for the verification of the behaviour of MRCD with integral sensing means under short-circuit conditions	246
Figure M.21 – Test circuit for the verification of the behaviour of terminal-type MRCDs under short-circuit conditions	247
Figure M.22 – Verification of immunity to radiated RF electromagnetic fields – Test set-up for MRCDs with separate sensing means (in addition to the test of Annex B)	248
Figure M.23 – Verification of immunity to electrical fast transients/bursts (EFT/B) on the sensing means connection of an MRCD with separate sensing means (in addition to the test of Annex B)	248
Figure M.24 – Verification of immunity to conducted disturbances induced by RF fields – Test setup for MRCD with separate sensing means (in addition to the test of Annex B).....	249
Figure R.1 – Test circuit for the verification of the automatic reclosing functions	273
Table 1 – Ratio n between short-circuit making capacity and short-circuit breaking capacities and related power factor for AC circuit-breakers	26
Table 2 – Minimum values of rated short-time withstand current	27
Table 3 – Preferred values of the rated control circuit supply voltage, if different from that of the main circuit	28
Table 4 – Product information	30
Table 5 – Characteristics of the opening operation of inverse time-delay overcurrent opening releases at the reference temperature	36
Table 6 – Temperature-rise limits for terminals and accessible parts	38
Table 7 – Number of operating cycles	40
Table 8 – Type tests	41
Table 9 – Alphabetical index of tests.....	43
Table 10 – Overall schema of test sequences	44
Table 11 – Applicability of test sequences according to the relationship between I_{CS} , I_{CU} and I_{CW}	46
Table 12 – Alternative test programmes for AC circuit-breakers	47
Table 13 – Applicability of tests or test sequences to 1, 2 and 4-pole circuit-breakers according to the alternative programme 1 of 9.3.2.4.....	48
Table 14 – Applicability of tests or test sequences to 1, 2 and 3-pole circuit-breakers according to the alternative programme 2 of 9.3.2.4.....	49
Table 15 – Number of samples for test.....	52
Table 16 – Values of power factors and time constants corresponding to test currents	54
Table 17 – Tests of test sequence I	58
Table 18 – Test circuit characteristics for overload performance	66
Table 19 – Tests of test sequence II	68
Table 20 – Tests of test sequence III	70
Table 21 – Tests of test sequence IV	71
Table 22 – Tests of test sequence V	72
Table 23 – Tests of test sequence VI	75
Table 24 – Tests of test sequence VIII	77
Table B.1 – Operating characteristic in the case of sinusoidal residual current for non-time-delay type	91

Table B.2 – Operating characteristics in the case of sinusoidal residual currents, for time-delay type having a limiting non-actuating time of 0,06 s	92
Table B.3 – Product information	94
Table B.4 – Requirements for CBRs functionally dependent on line voltage	99
Table B.5 – Additional test sequences	101
Table B.6 – Tripping current range for CBRs in the case of an earth fault comprising a DC component	107
Table B.7 – Composite test current definition and starting current value	108
Table B.8 – Operating current range for composite residual current	109
Table B.9 – Operating limits for residual sinusoidal alternating currents up to 1 000 Hz	110
Table C.1 – Tests of Annex C	130
Table D.1 – List of tests for terminal connections with aluminium cables	133
Table D.2 – Conductor length for the current cycling test as per conductor cross-section	136
Table D.3 – Equalizer dimensions	136
Table D.4 – Starting test current for the current cycling test	139
Table D.5 – Example of stability factor calculation	140
Table D.6 – Test values for flexion and pull-out test for cables	140
Table D.7 – Test aluminium cables for test currents up to 800 A	141
Table D.8 – Test aluminium bars for test currents above 400 A and up to 3 150 A	142
Table E.1 – List of items subject to agreement between manufacturer and user	143
Table F.1 – Test parameters for current dips and interruptions	149
Table H.1 – Tests of Annex H	172
Table H.2 – Product information	173
Table J.1 – EMC – Immunity tests	176
Table J.2 – Reference data for immunity test specifications	178
Table J.3 – EMC – Emission tests	181
Table J.4 – Reference data for emission test specifications	181
Table K.1 – Glossary of symbols and graphical representation of characteristics	187
Table L.1 – Product information	198
Table L.2 – Rated conditional short-circuit tests when the OCPD is specified	201
Table L.3 – Rated conditional short-circuit tests when the OCPD is not specified	201
Table M.1 – Product information	208
Table M.2 – Requirements for MRCDs with voltage source	211
Table M.3 – Test sequences	212
Table O.1 – Product information	255
Table P.1 – Rated impulse withstand levels for PV circuit-breakers	257
Table P.2 – Product information	258
Table P.3 – Number of operating cycles	259
Table R.1 – Product information	266
Table R.2 – Test sequences for external type automatic re-closing devices	272

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.
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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. It is an International Standard.

This sixth edition cancels and replaces the fifth edition published in 2016 and its Amendment 1: 2019. This edition constitutes a technical revision.

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

- a) suitability for isolation (see Clause 1);
- b) removal of the classification according to the interrupting medium, according to the design, according to the suitability for isolation (see Clause 4);
- c) adjustment of current settings with an external device connectable to the release (see 5.7.3);

- d) requirements for circuits with protective separation (see 8.2.3.8);
- e) additional tests for ground-fault overcurrent releases (see 9.3.4.2.5);
- f) additional tests concerning dielectric properties in tripped position (see 9.3.4.3);
- g) use of DC voltage for dielectric tests (see 9.3.4.6.2 and 9.4.6);
- h) tests of individual pole breaking capacity under phase-to-neutral AC voltage (see 9.3.11);
- i) improvement of measurement of power loss in Annex G;
- j) changes in EMC tests (see Annex J);
- k) introduction of CBI class W in Annex L.

The text of this International Standard is based on the following documents:

Draft	Report on voting
121A/608/FDIS	121A/621/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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 60947-1:2020.

The provisions of the general rules dealt with in IEC 60947-1 are applicable to this document, where specifically called for. Clauses and subclauses, tables, figures and annexes of the general rules thus applicable are identified by reference to IEC 60947-1:2020.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

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

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 2: Circuit-breakers

1 Scope

This document applies to circuit-breakers, intended to be installed and operated by instructed or skilled persons, the main contacts of which are intended to be connected to circuits, the rated voltage of which does not exceed 1 000 V AC or 1 500 V DC; it also contains additional requirements for integrally fused circuit-breakers.

This document also applies to circuit-breakers with ratings at or below 1 000 V AC, additionally having one or more ratings above 1 000 V AC but not exceeding 1 500 V AC.

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

Circuit-breakers per this document are suitable for isolation.

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

Additional requirements for circuit-breakers intended for connection of aluminium conductors are contained in Annex D.

The additional requirements for circuit-breakers with electronic overcurrent 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 overcurrent 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 for instantaneous trip circuit-breakers are contained in Annex O.

The requirements and test methods for DC 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 overcurrent protection for household and similar installations, and designed for use by uninstructed persons, are contained in IEC 60898 series.

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, downstream of variable frequency drives, use in explosive atmospheres), particular or additional requirements can be applicable.

NOTE 1 Circuit-breakers can have dedicated accessories.

NOTE 2 Circuit-breakers which are dealt with in this document can be provided with devices for automatic opening under predetermined conditions other than those of overcurrent and undervoltage as, for example, reversal of power or current. This document does not deal with the verification of operation under such pre-determined conditions.

The object of this document is to state:

- a) the characteristics of circuit-breakers;
- b) the requirements for circuit-breakers with reference to:
 - 1) operation and behaviour in normal service;
 - 2) operation and behaviour in case of overload, operation and behaviour in case of short-circuit, including co-ordination in service (selectivity and back-up protection), as well as the operation and behaviour in case of ground-fault;
 - 3) dielectric properties;
 - 4) requirements on electromagnetic compatibility, where applicable;
- 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 circuit-breakers.

NOTE 3 For cybersecurity requirements, see IEC TS 63208.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

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 60228, *Conductors of insulated cables*

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60947-1:2020, *Low-voltage switchgear and controlgear – Part 1: General rules*

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

IEC 61000-4-2:2008, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3:2020, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

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 61000-4-5:2014/AMD1:2017

IEC 61000-4-6:2023, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-11:2020, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current up to 16 A per phase*

IEC 61140:2016, *Protection against electric shock – Common aspects for installation and equipment*

IEC 61545:1996, *Connecting devices – Devices for the connection of aluminium conductors in clamping units of any material and copper conductors in aluminium bodied clamping units*

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

CISPR 11:2015, *Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement*
CISPR 11:2015/AMD1:2016
CISPR 11:2015/AMD2:2019

CISPR 32:2015, *Electromagnetic compatibility of multimedia equipment – Emission requirements*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN