

**MADALPINGELISED LÜLITUSAPARAADID. OSA 2:
KAITSELÜLITID**

**Low-voltage switchgear and controlgear - Part 2:
Circuit-breakers (IEC 60947-2:2016 + COR1:2016 +
IEC 60947-2:2016/A1:2019)**

EESTI STANDARDI EESSÕNA**NATIONAL FOREWORD**

See Eesti standard EVS-EN 60947-2:2017 +A1:2020 sisaldab Euroopa standardi EN 60947-2:2017 ingliskeelset teksti ja selle muudatuse A1:2020 ingliskeelset teksti.	This Estonian standard EVS-EN 60947-2:2017+A1:2020 consists of the English text of the European standard EN 60947-2:2017 and its amendment A1:2020.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas. Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 13.10.2017, muudatus A1 07.02.2020.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation. Date of Availability of the European standard is 13.10.2017, for A1 07.02.2020.
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English Version

**Low-voltage switchgear and controlgear -
Part 2: Circuit-breakers
(IEC 60947-2:2016 + COR1:2016 +
IEC 60947-2:2016/A1:2019)**

Appareillage à basse tension - Partie 2: Disjoncteurs
(IEC 60947-2:2016 + COR1:2016 +
IEC 60947-2:2016/A1:2019)

Niederspannungsschaltgeräte - Teil 2: Leistungsschalter
(IEC 60947-2:2016 + COR1:2016 +
IEC 60947-2:2016/A1:2019)

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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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European foreword

The text of document 121A/71/FDIS, future edition 5 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 60947-2:2017.

The following dates are fixed:

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This document supersedes EN 60947-2:2006.

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The text of the International Standard IEC 60947-2:2016 + COR1:2016 was approved by CENELEC as a European Standard without any modification.

Amendment 1 European foreword

The text of document 121A/286/FDIS, future IEC 60947-2/A1, 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 60947-2:2017/A1:2020.

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CONTENTS

FOREWORD	15
1 General	18
1.1 Scope and object	18
1.2 Normative references	19
2 Terms and definitions	20
3 Classification	24
4 Characteristics of circuit-breakers	25
4.1 Summary of characteristics	25
4.2 Type of circuit-breaker	25
4.3 Rated and limiting values of the main circuit	25
4.3.1 General	25
4.3.2 Rated voltages	26
4.3.3 Currents	26
4.3.4 Rated frequency	26
4.3.5 Rated duty	27
4.3.6 Short-circuit characteristics	27
4.4 Selectivity categories	29
4.5 Control circuits	29
4.5.1 Electrical control circuits	29
4.5.2 Air-supply control circuits (pneumatic or electro-pneumatic)	30
4.6 Auxiliary circuits	30
4.7 Releases	30
4.7.1 Types	30
4.7.2 Characteristics	30
4.7.3 Current setting of over-current releases	31
4.7.4 Tripping time setting of over-current releases	31
4.8 Integral fuses (integrally fused circuit-breakers)	31
5 Product information	32
5.1 Nature of the information	32
5.2 Marking	32
5.3 Instructions for installation, operation and maintenance	33
6 Normal service, mounting and transport conditions	33
7 Constructional and performance requirements	34
7.1 Constructional requirements	34
7.1.1 General	34
7.1.2 Withdrawable circuit-breakers	34
7.1.3 Additional requirements for circuit-breakers suitable for isolation	34
7.1.4 Clearances and creepage distances	34
7.1.5 Requirements for the safety of the operator	35
7.1.6 List of construction breaks	35
7.1.7 Additional requirements for circuit-breakers provided with a neutral pole	35
7.1.8 Digital inputs and outputs for use with programmable logic controllers (PLCs)	35
7.2 Performance requirements	36
7.2.1 Operating conditions	36

7.2.2	Temperature-rise	38
7.2.3	Dielectric properties	39
7.2.4	Ability to make and break under no load, normal load and overload conditions	40
7.2.5	Ability to make and break under short-circuit conditions	41
7.2.6	Vacant	41
7.2.7	Additional requirements for circuit-breakers suitable for isolation	41
7.2.8	Specific requirements for integrally fused circuit-breakers	41
7.2.9	Co-ordination between a circuit-breaker and another short-circuit protective device	42
7.3	Electromagnetic compatibility (EMC)	42
8	Tests	42
8.1	Kind of tests	42
8.1.1	General	42
8.1.2	Type tests	42
8.1.3	Routine tests	42
8.2	Compliance with constructional requirements	42
8.3	Type tests	42
8.3.1	Test sequences	43
8.3.2	General test conditions	50
8.3.3	Test sequence I: General performance characteristics	58
8.3.4	Test sequence II: Rated service short-circuit breaking capacity	67
8.3.5	Test sequence III: Rated ultimate short-circuit breaking capacity	69
8.3.6	Test sequence IV: Rated short-time withstand current	70
8.3.7	Test sequence V: Performance of integrally fused circuit-breakers	71
8.3.8	Test sequence VI: combined test sequence	73
8.3.9	Critical d.c. load current test	75
8.4	Routine tests	76
8.4.1	General	76
8.4.2	Mechanical operation tests	76
8.4.3	Verification of the calibration of overcurrent releases	77
8.4.4	Verification of the operation of undervoltage and shunt releases	77
8.4.5	Additional tests for CBRs	78
8.4.6	Dielectric tests	78
8.4.7	Test for the verification of clearances less than those corresponding to case A of Table 13 of IEC 60947-1:2007	79
8.5	Special tests – Damp heat, salt mist, vibration and shock	79
Annex A (normative)	Co-ordination between a circuit-breaker and another short-circuit protective device associated in the same circuit	81
A.1	General	81
A.2	Scope and object	81
A.3	General requirements for the co-ordination of a circuit-breaker with another SCPD	82
A.3.1	General considerations	82
A.3.2	Take-over current	82
A.3.3	Behaviour of C_1 in association with another SCPD	82
A.4	Type and characteristics of the associated SCPD	82
A.5	Verification of selectivity	83
A.5.1	General	83

A.5.2	Consideration of selectivity by desk study.....	83
A.5.3	Selectivity determined by test.....	84
A.6	Verification of back-up protection	85
A.6.1	Determination of the take-over current	85
A.6.2	Verification of back-up protection.....	85
A.6.3	Tests for verification of back-up protection	86
A.6.4	Results to be obtained.....	87
Annex B (normative)	Circuit-breakers incorporating residual current protection	92
B.1	General	92
B.1.1	Preamble	92
B.1.2	Scope and object	92
B.2	Terms and definitions.....	93
B.2.1	Terms and definitions relating to currents flowing from live parts to earth.....	93
B.2.2	Terms and definitions relating to the energization of a CBR.....	93
B.2.3	Terms and definitions relating to the operation and the functions of a CBR	94
B.2.4	Terms and definitions relating to values and ranges of energizing quantities	95
B.3	Classification	96
B.3.1	Classification according to the method of operation of the residual current function.....	96
B.3.2	Classification according to the possibility of adjusting the residual operating current	96
B.3.3	Classification according to time delay of the residual current function.....	96
B.3.4	Classification according to behaviour in presence of a d.c. component	96
B.4	Characteristics of CBRs concerning their residual current function.....	96
B.4.1	Rated values	96
B.4.2	Preferred and limiting values.....	97
B.4.3	Value of the rated residual short-circuit making and breaking capacity ($I\Delta_m$)	98
B.4.4	Operating characteristics in the case of an earth fault current in the presence or absence of a d.c. component.....	98
B.5	Marking	99
B.6	Normal service, mounting and transport conditions.....	101
B.7	Design and operating requirements	101
B.7.1	Design requirements	101
B.7.2	Operating requirements	101
B.7.3	Electromagnetic compatibility	105
B.8	Tests.....	105
B.8.1	Test sequences	105
B.8.2	Verification of the operating characteristics.....	108
B.8.3	Verification of dielectric properties	110
B.8.4	Verification of the operation of the test device at the limits of rated voltage.....	110
B.8.5	Verification of the limiting value of the non-operating current under over-current conditions	111
B.8.6	Verification of the resistance against unwanted tripping due to surge currents resulting from impulse voltages.....	112
B.8.7	Additional verifications for CBRs of types A and B.....	113

B.8.8	Additional verifications for CBRs of type B.....	114
B.8.9	Verification of the behaviour of CBRs functionally dependent on line voltage classified under B.3.1.2.1	119
B.8.10	Verification of the behaviour of CBRs functionally dependent on line voltage classified under B.3.1.2.2	120
B.8.11	Verification of the residual short-circuit making and breaking capacity	120
B.8.12	Verification of the effects of environmental conditions	121
B.8.13	Verification of electromagnetic compatibility.....	122
B.8.14	Test for variations or interruptions of voltage and for voltage dips	124
Annex C (normative)	Individual pole short-circuit test sequence	137
C.1	General	137
C.2	Test of individual pole short-circuit breaking capacity	137
C.3	Verification of dielectric withstand	137
C.4	Verification of overload releases	137
Annex D (normative)	Additional requirements for circuit-breakers intended for connection of aluminium conductors	138
D.1	General	138
D.2	Terms and definitions.....	138
D.3	Classification	139
D.4	Characteristics	139
D.5	Product information.....	139
D.5.1	Nature of information.....	139
D.5.2	Marking.....	139
D.5.3	Instructions for installation, operation and maintenance	139
D.6	Normal service, mounting and transport conditions.....	139
D.7	Constructional and performance requirements.....	139
D.8	Tests.....	140
D.8.1	General.....	140
D.8.2	Current cycling test	140
D.8.3	Mechanical properties of terminals	143
D.8.4	Test for insertability of unprepared round aluminium conductors having the maximum cross-section.....	144
Annex E (informative)	Items subject to agreement between manufacturer and user	150
Annex F (normative)	Additional tests for circuit-breakers with electronic over-current protection	151
F.1	General	151
F.2	List of tests	151
F.2.1	General.....	151
F.2.2	Electromagnetic compatibility (EMC) tests	151
F.2.3	Suitability for multiple frequencies	152
F.2.4	Dry heat test.....	152
F.2.5	Damp heat test	152
F.2.6	Temperature variation cycles at a specified rate of change.....	152
F.3	General test conditions.....	152
F.3.1	General.....	152
F.3.2	Electromagnetic compatibility tests	152
F.4	Immunity tests.....	153
F.4.1	Harmonic currents.....	153
F.4.2	Electrostatic discharges.....	154

F.4.3	Radiated RF electromagnetic fields.....	154
F.4.4	Electrical fast transient/burst (EFT/B).....	154
F.4.5	Surges.....	155
F.4.6	Conducted disturbances induced by RF fields (common mode).....	155
F.4.7	Current dips.....	155
F.5	Emission tests.....	156
F.5.1	Harmonics.....	156
F.5.2	Voltage fluctuations.....	156
F.5.3	Conducted RF disturbances (150 kHz to 30 MHz).....	156
F.5.4	Radiated RF disturbances (30 MHz to 1 GHz).....	156
F.6	Suitability for multiple frequencies.....	157
F.6.1	General.....	157
F.6.2	Test conditions.....	157
F.6.3	Test procedure.....	157
F.6.4	Test results.....	157
F.7	Dry heat test.....	157
F.7.1	Test procedure.....	157
F.7.2	Test results.....	158
F.7.3	Verification of overload releases.....	158
F.8	Damp heat test.....	158
F.8.1	Test procedure.....	158
F.8.2	Verification of overload releases.....	158
F.9	Temperature variation cycles at a specified rate of change.....	158
F.9.1	Test conditions.....	158
F.9.2	Test procedure.....	158
F.9.3	Test results.....	159
F.9.4	Verification of overload releases.....	159
Annex G (normative)	Power loss.....	172
G.1	General.....	172
G.2	Test methods.....	172
G.2.1	General case.....	172
G.2.2	AC circuit-breakers of rated current not exceeding 400 A.....	172
G.2.3	DC circuit-breakers.....	173
G.3	Test procedure.....	173
Annex H (normative)	Test sequence for circuit-breakers for IT systems.....	175
H.1	General.....	175
H.2	Individual pole short-circuit.....	175
H.3	Verification of dielectric withstand.....	176
H.4	Verification of overload releases.....	176
H.5	Marking.....	176
Annex J (normative)	Electromagnetic compatibility (EMC) – Requirements and test methods for circuit-breakers.....	177
J.1	General.....	177
J.2	Immunity.....	178
J.2.1	General.....	178
J.2.2	Electrostatic discharges.....	180
J.2.3	Radiated RF electromagnetic fields.....	181
J.2.4	Electrical fast transients/bursts (EFT/B).....	181

J.2.5	Surges	181
J.2.6	Conducted disturbances induced by RF fields (common mode)	182
J.3	Emission	182
J.3.1	General	182
J.3.2	Conducted RF disturbances (150 kHz to 30 MHz)	183
J.3.3	Radiated RF disturbances (30 MHz to 1 000 MHz)	183
Annex K (informative)	Glossary of symbols and graphical representation of characteristics	188
Annex L (normative)	Circuit-breakers not fulfilling the requirements for overcurrent protection	197
L.1	General	197
L.2	Terms and definitions	197
L.3	Classification	197
L.4	Rated values	197
L.4.1	Rated current (I_n)	197
L.4.2	Rated conditional short-circuit current (I_{cc})	198
L.5	Product information	198
L.6	Constructional and performance requirements	198
L.7	Tests	198
L.7.1	General	198
L.7.2	Rated conditional short-circuit tests	199
Annex M (normative)	Modular residual current devices (without integral current breaking device)	202
M.1	General	202
M.1.1	Preamble	202
M.1.2	Scope and object	202
M.2	Terms and definitions	202
M.2.1	Terms and definitions relating to the energization of an MRCD	202
M.2.2	Terms and definitions relating to the operation and the functions of an MRCD	203
M.3	Classification	203
M.3.1	Classification according to the configuration of the primary conductors	203
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	204
M.3.4	Classification according to time delay of the residual current function	204
M.3.5	Classification according to behaviour in presence of a d.c. component	204
M.4	Characteristics of MRCDs	204
M.4.1	General characteristics	204
M.4.2	Characteristics of MRCDs concerning their residual current function	205
M.4.3	Behaviour under short-circuit conditions	206
M.4.4	Preferred and limiting values	206
M.5	Product information	206
M.6	Normal service, mounting and transport conditions	208
M.7	Design and operating requirements	208
M.7.1	Design requirements	208
M.7.2	Operating requirements	208
M.8	Tests	211
M.8.1	General	211

M.8.2	Compliance with constructional requirements.....	212
M.8.3	Verification of the operating characteristics.....	212
M.8.4	Verification of dielectric properties	214
M.8.5	Verification of the operation of the test device at the limits of the rated voltage.....	215
M.8.6	Verification of the limiting value of non-operating current under overcurrent conditions, in the case of a single phase load	215
M.8.7	Verification of the resistance against unwanted tripping due to surge currents resulting from impulse voltages.....	215
M.8.8	Verification of the behaviour in the case of an earth fault current comprising a d.c. component.....	216
M.8.9	Verification of the behaviour of MRCDs with separate sensing means in the case of a failure of the sensing means connection	219
M.8.10	Verification of temperature-rise of terminal type MRCDs	220
M.8.11	Verification of mechanical and electrical endurance	220
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.....	221
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.....	221
M.8.14	Verification of the behaviour of MRCDs under short-circuit conditions	222
M.8.15	Verification of the effects of environmental conditions	224
M.8.16	Verification of electromagnetic compatibility.....	224
Annex N (normative) Electromagnetic compatibility (EMC) – Additional requirements and test methods for devices not covered by Annex B, Annex F and Annex M.....		248
N.1	General	248
N.1.1	General.....	248
N.1.2	General test conditions.....	248
N.2	Immunity.....	248
N.2.1	General.....	248
N.2.2	Electrostatic discharges.....	249
N.2.3	Radiated RF electromagnetic fields.....	249
N.2.4	Electrical fast transients/bursts (EFT/B)	249
N.2.5	Surges.....	250
N.2.6	Conducted disturbances induced by RF fields (common mode)	250
N.2.7	Voltage dips and interruptions	250
N.3	Emission.....	250
N.3.1	General.....	250
N.3.2	Conducted RF disturbances (150 kHz to 30 MHz).....	251
N.3.3	Radiated RF disturbances (30 MHz to 1 000 MHz).....	251
Annex O (normative) Instantaneous trip circuit-breakers (ICB)		252
O.1	General	252
O.2	Terms and definitions.....	252
O.3	Rated values.....	252
O.3.1	General.....	252
O.3.2	Rated current (I_n).....	252
O.3.3	Rated short-circuit making capacity	252
O.3.4	Rated short-circuit breaking capacities	252
O.4	Product information.....	253
O.5	Constructional and performance requirements	253
O.6	Tests.....	253

O.6.1	Test sequence of the ICB alone.....	253
O.6.2	ICB associated with a specified protected device (i.e. motor-starter or overload relay)	254
Annex P	(normative) DC circuit-breakers for use in photovoltaic (PV) applications	255
P.1	Field of application	255
P.2	Terms and definitions.....	255
P.3	Classification	255
P.4	Characteristics of PV circuit-breakers	255
P.5	Product information.....	256
P.6	Normal service, mounting and transport conditions.....	256
P.7	Constructional and performance requirements	256
P.7.1	Constructional requirements.....	256
P.7.2	Performance requirements.....	256
P.7.3	Electromagnetic compatibility (EMC).....	257
P.8	Tests.....	257
P.8.1	Kind of tests	257
P.8.2	Compliance with constructional requirements.....	257
P.8.3	Type tests	257
P.8.4	Routine tests	259
P.8.5	Special tests.....	259
Annex Q	Vacant	260
Annex R	(normative) Circuit-breakers incorporating residual current protection with automatic re-closing functions.....	261
R.1	General	261
R.1.1	Preamble	261
R.1.2	Field of application.....	261
R.2	Terms and definitions.....	262
R.3	Classification	263
R.3.1	According to the method of construction	263
R.3.2	According to the method of automatic reclosing	263
R.4	Characteristics	263
R.4.1	Rated automatic reclosing operating residual current ($I_{\Delta ar}$).....	263
R.4.2	Maximum number of consecutive reclosing operations	263
R.5	Marking and instructions.....	264
R.6	Normal service, mounting and transport conditions.....	264
R.7	Design and operating requirements	264
R.7.1	Design requirements	264
R.7.2	Operating requirements	265
R.8	Tests.....	266
R.8.1	General conditions	266
R.8.2	Verification of the non-reclosing after tripping under over-current conditions	266
R.8.3	Verification of the non-reclosing after intentional opening.....	267
R.8.4	Verification of the automatic reclosing function after tripping on earth fault.....	267
R.8.5	Verification of mechanical endurance	268
R.8.6	Verification of the isolation function	269
R.8.7	Verification of residual short-circuit making and breaking capacity	269

R.8.8	Verification of the automatic reclosing function after the test sequences of Clause B.8.....	270
R.8.9	Test items for external type automatic reclosing devices	270
Annex ZA (normative)	Normative references to international publications with their corresponding European publications	272
Annex ZZA (informative)	Relationship between this European standard and the essential requirements of Directive 2014/30/EU [2014 OJ L96] aimed to be covered and the standardisation request M/552	274
Annex ZZB (informative)	Relationship between this European standard and the safety objectives of Directive 2014/35/EU [2014 OJ L96] aimed to be covered	275
Bibliography.....		276
Figure 1 – Test arrangement (connecting cables not shown) for short-circuit tests.....		80
Figure A.1 – Over-current co-ordination between a circuit-breaker and a fuse or back-up protection by a fuse: operating characteristics.....		87
Figure A.2 – Total selectivity between two circuit-breakers		88
Figure A.3 – Back-up protection by a circuit-breaker – Operating characteristics.....		89
Figure A.4 – Example of test circuit for conditional short-circuit breaking capacity tests showing cable connections for a 3-pole circuit-breaker (C ₁).....		90
Figure A.5 – Example of test circuit for the verification of selectivity		91
Figure B.1 – Test circuit for the verification of the operating characteristic (see B.8.2)		125
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)		126
Figure B.3 – Test circuit for the verification of the behaviour of CBRs classified under B.3.1.2.2 (see B.8.10)		127
Figure B.4 – Current ring wave 0,5 µs/100 kHz.....		128
Figure B.5 – Example of a test circuit for the verification of resistance to unwanted tripping.....		128
Figure B.6 – Surge current wave 8/20 µs		129
Figure B.7 – Test circuit for the verification of resistance to unwanted tripping in the case of flashover without follow-on current.....		129
Figure B.8 – Test circuit for the verification of the correct operation of CBRs, in the case of residual pulsating direct currents		130
Figure B.9 – Test circuit for residual pulsating direct current superimposed by a smooth direct current		131
Figure B.10 – Test circuit for residual alternating currents superimposed by a smooth direct current		132
Figure B.11 – Test circuit for residual pulsating direct currents which can result from rectifying circuits supplied from two phases.....		133
Figure B.12 – Test circuit for residual pulsating direct currents which can result from rectifying circuits supplied from three phases		134
Figure B.13 – Test circuit for residual smooth direct current		135
Figure B.14 – Test circuit for composite residual currents, and residual sinusoidal alternating current up to 1 000 Hz		136
Figure D.1 – General test arrangement.....		144
Figure D.2 – Mounting of terminals for the current cycling test.....		144
Figure F.1 – Representation of test current produced by back-to-back thyristors in accordance with F.4.1		159

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.....	160
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	161
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	161
Figure F.5 – Test current for the verification of the influence of the current dips and interruptions in accordance with F.4.7.1	162
Figure F.6 – Circuit for electrical fast transients/bursts (EFT/B) immunity test in accordance with F.4.4 – Two phase poles in series.....	162
Figure F.7 – Circuit for electrical fast transients/bursts (EFT/B) immunity test in accordance with F.4.4 – Three phase poles in series	163
Figure F.8 – Circuit for electrical fast transients/bursts (EFT/B) immunity test in accordance with F.4.4 – Three-phase connection	163
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.....	164
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.....	164
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.....	165
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.....	165
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.....	166
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.....	166
Figure F.15 – Temperature variation cycles at a specified rate of change in accordance with F.9.1	167
Figure F.16 – General test set-up for immunity tests	168
Figure F.17 – Test set-up for the verification of immunity to radiated RF electromagnetic fields	168
Figure F.18 – Test set-up for the verification of immunity to electrical fast transients/bursts (EFT/B) on power lines.....	169
Figure F.19 – Test set-up for verification of immunity to electrical fast transients/bursts (EFT/B) on signal lines.....	169
Figure F.20 – General test set-up for the verification of immunity to conducted disturbances induced by RF fields (common mode).....	169
Figure F.21 – Arrangement of connections for the verification of immunity to conducted disturbances induced by RF fields – Two phase poles in series configuration	170
Figure F.22 – Arrangement of connections for the verification of immunity to conducted disturbances induced by RF fields – Three phase poles in series configuration.....	170
Figure F.23 – Arrangement of connections for the verification of immunity to conducted disturbances induced by RF fields – Three-phase configuration.....	171
Figure G.1 – Example of power loss measurement according to G.2.1	173
Figure G.2 – Example of power loss measurement according to G.2.2 and G.2.3	174
Figure J.1 – EUT mounted in a metallic enclosure.....	184
Figure J.2 – Test set up for the measurement of radiated RF emissions	185
Figure J.3 – Test set up for the verification of immunity to electrostatic discharges.....	186

Figure J.4 – Test set up for the verification of immunity to radiated RF electromagnetic fields.....	186
Figure J.5 – Test set up for the verification of immunity to electrical fast transients/bursts (EFT/B) on power lines.....	187
Figure J.6 – Test set up for the verification of immunity to electrical fast transients/bursts (EFT/B) on signal lines.....	187
Figure K.1 – Relationship between symbols and tripping characteristics.....	190
Figure K.2 – Template for characteristics of cut-off current versus prospective current from 1 kA to 200 kA.....	191
Figure K.3 – Template for characteristics of cut-off current versus prospective current from 0,01 kA to 200 kA.....	192
Figure K.4 – Template for characteristics of let-through energy versus prospective current from 1 kA to 200 kA.....	193
Figure K.5 – Template for characteristics of let-through energy versus prospective current from 0,01 kA to 200 kA.....	194
Figure K.6 – Example of the use of template to Figure K.2.....	195
Figure K.7 – Example of the use of template to Figure K.4.....	196
Figure M.1 – Test circuits for the verification of operation in the case of a steady increase of residual current	225
Figure M.2 – Test circuits for the verification of operation in the case of a sudden appearance of residual current (with current breaking device)	226
Figure M.3 – Test circuits for the verification of operation in the case of a sudden appearance of residual current (without current breaking device)	227
Figure M.4 – Test circuits for the verification of the limiting value of non-operating current under overcurrent conditions	228
Figure M.5 – Test circuits for the verification of the resistance to unwanted tripping in the case of loading of the network capacitance.....	229
Figure M.6 – Test circuit for the verification of the resistance to unwanted tripping in the case of flashover without follow-on current	230
Figure M.7 – Test circuits for the verification of operation in the case of a continuous rise of a residual pulsating direct current.....	231
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)	232
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)	233
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	234
Figure M.11 – Test circuits for the verification of operation in the case of a slowly rising residual smooth direct current.....	235
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)	236
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)	237
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	238
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	239

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.....	240
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	241
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.....	242
Figure M.19 – Test circuit for the verification of the behaviour of MRCD with separate sensing means under short-circuit conditions	243
Figure M.20 – Test circuit for the verification of the behaviour of MRCD with integral sensing means under short-circuit conditions	244
Figure M.21 – Test circuit for the verification of the behaviour of terminal-type MRCDs under short-circuit conditions.....	245
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)	246
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)	246
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)	247
Figure R.1 – Test circuit for the verification of the automatic reclosing functions	271
Table 1 (void).....	28
Table 2 – Ratio n between short-circuit making capacity and short-circuit breaking capacity and related power factor (for a.c. circuit-breakers)	28
Table 3 – Minimum values of rated short-time withstand current.....	29
Table 4 (void).....	29
Table 5 – Preferred values of the rated control supply voltage, if different from that of the main circuit.....	30
Table 13 – Product information	32
Table 6 – Characteristics of the opening operation of inverse time-delay over-current opening releases at the reference temperature.....	38
Table 7 – Temperature-rise limits for terminals and accessible parts.....	39
Table 8 – Number of operating cycles.....	41
Table 9 – Overall schema of test sequences ^a	45
Table 9a – Applicability of test sequences according to the relationship between I_{CS} , I_{CU} and I_{CW} ^a	46
Table 9b – Applicability of tests or test sequences to 1, 2 and 4-pole circuit-breakers according to the alternative programme 1 of 8.3.1.4	48
Table 9c – Applicability of tests or test sequences to 1, 2 and 3-pole circuit-breakers according to the alternative programme 2 of 8.3.1.4	49
Table 10 – Number of samples for test (1 of 2).....	52
Table 11 – Values of power factors and time constants corresponding to test currents.....	54
Table 12 – Test circuit characteristics for overload performance.....	66
Table B.1 – Operating characteristic in the case of sinusoidal residual current for non-time-delay type.....	97
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	98

Table B.3 – Product information	100
Table B.4 – Requirements for CBRs functionally dependent on line voltage	105
Table B.5 – Additional test sequences	108
Table B.6 – Tripping current range for CBRs in the case of an earth fault comprising a d.c. component	113
Table B.7 – Composite test current definition and starting current value	115
Table B.8 – Operating current range for composite residual current	115
Table B.9 – Operating limits for residual sinusoidal alternating currents up to 1 000 Hz	116
Table D.1 – List of tests for terminal connections ^a with aluminium cables	140
Table D.2 – Conductor length for the current cycling test as per conductor cross-section	145
Table D.3 – Equalizer dimensions	145
Table D.4 – Starting test current for the current cycling test	146
Table D.5 – Example of stability factor calculation	146
Table D.6 – Test values for flexion and pull-out test for cables	147
Table D.7 – Test aluminium cables for test currents up to 800 A ^{a,d}	148
Table D.8 – Test aluminium bars for test currents above 400 A ^g and up to 3 150 A ^{a, f}	149
Table F.1 – Test parameters for current dips and interruptions	156
Table H.1 – Product information	176
Table J.1 – EMC – Immunity tests	178
Table J.2 – Reference data for immunity test specifications	180
Table J.3 – EMC – Emission tests	183
Table J.4 – Reference data for emission test specifications	183
Table L.1 – Product information	198
Table M.1 – Product information	207
Table M.2 – Requirements for MRCDs with voltage source	210
Table M.3 – Test sequences	211
Table O.1 – Product information	253
Table P.1 – Rated impulse withstand levels for PV circuit-breakers	255
Table P.3 – Product information	256
Table P.2 – Number of operating cycles	257
Table R.2 – Product information	264
Table R.1 – Test sequences for external type automatic re-closing devices	270
Table ZZA.1 — Correspondence between this European standard and the Essential Requirements set out in Directive 2014/30/EU [2014 OJ L96]	274
Table ZZB.1 — Correspondence between this European standard and Annex I of Directive 2014/35/EU [2014 OJ L96]	275

INTERNATIONAL ELECTROTECHNICAL COMMISSION

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 2: Circuit-breakers

FOREWORD

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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.

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.

AMENDMENT 1 FOREWORD

This amendment 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.

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

FDIS	Report on voting
121A/286/FDIS	121A/302/RVD

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

The committee has decided that the contents of this amendment and the base 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.

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, 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 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.

For certain specific applications (for example traction, rolling mills, marine service, downstream of variable frequency drives, use in explosive atmospheres), 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:

the characteristics of circuit-breakers;

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;

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

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 60228, *Conductors of insulated cables*

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

deleted text

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*

deleted text

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

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

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

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

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

IEC 61545, *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

deleted text

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

2 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60947-1, as well as the following apply.

NOTE Where these definitions are taken unchanged from the *International Electrotechnical Vocabulary (IEV)*, IEC 60050-441, the reference to this publication is given in brackets.

2.1

circuit-breaker

a mechanical switching device, capable of making, carrying and breaking currents under normal circuit conditions and also making, carrying for a specified time and breaking currents under specified abnormal circuit conditions such as those of short-circuit

[SOURCE: IEC 60050-441:1984, 441-14-20]

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.