

REDLINE VERSION



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

Preview



THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2018 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing 21 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

REDLINE VERSION



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

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.120.99, 29.130.20

ISBN 978-2-8322-6208-5

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	10
INTRODUCTION.....	13
1 Scope and object	14
2 Normative references	17
3 Terms, definitions, symbols and abbreviated terms.....	20
3.1 General.....	20
3.2 Alphabetical index of terms.....	20
3.3 Terms and definitions concerning contactors	22
3.4 Terms and definitions concerning starters.....	24
3.5 Terms and definitions concerning characteristic quantities.....	29
3.6 Terms and definitions concerning safety aspects	30
3.7 Symbols and abbreviated terms	31
4 Classification.....	32
5 Characteristics of contactors and starters.....	32
5.1 Summary of characteristics.....	32
5.2 Type of equipment	33
5.2.1 Kind of equipment.....	33
5.2.2 Number of poles.....	33
5.2.3 Kind of current (AC or DC).....	33
5.2.4 Interrupting medium (air, oil, gas, vacuum, etc.)	33
5.2.5 Operating conditions of the equipment.....	33
5.3 Rated and limiting values for main circuits	33
5.3.1 Rated voltages.....	33
5.3.2 Currents or powers	35
5.3.3 Rated frequency.....	37
5.3.4 Rated duties	37
5.3.5 Normal load and overload characteristics.....	38
5.3.6 Short-circuit characteristics	40
5.3.7 Pole impedance of a contactor (Z)	40
5.4 Utilization category	40
5.4.1 General	40
5.4.2 Assignment of utilization categories based on the results of tests.....	41
5.5 Control circuits.....	43
5.6 Auxiliary circuits.....	44
5.7 Characteristics of relay and release of overload relays and motor protective switching device (MPSD)	44
5.7.1 Summary of characteristics.....	44
5.7.2 Types of relay or release	45
5.7.3 Characteristic values	45
5.7.4 Designation and current settings of overload relays.....	47
5.7.5 Time-current characteristics of overload relays.....	47
5.7.6 Influence of ambient air temperature.....	48
5.8 Co-ordination with short-circuit protective devices.....	48
5.9 Void.....	48
5.10 Types and characteristics of automatic change-over devices and automatic acceleration control devices.....	48

5.10.1	Types	48
5.10.2	Characteristics.....	48
5.11	Types and characteristics of auto-transformers for two-step auto-transformer starters	49
5.12	Types and characteristics of starting resistors for rheostatic rotor starters	49
6	Product information	49
6.1	Nature of information	49
6.1.1	Identification.....	49
6.1.2	Characteristics, basic rated values and utilization.....	50
6.2	Marking.....	51
6.3	Instructions for installation, operation, maintenance, decommissioning and dismantling.....	52
6.4	Environmental information	53
7	Normal service, mounting and transport conditions.....	53
8	Constructional and performance requirements	53
8.1	Constructional requirements	53
8.1.1	General.....	53
8.1.2	Materials.....	54
8.1.3	Current-carrying parts and their connections	54
8.1.4	Clearances and creepage distances	54
8.1.5	Actuator.....	55
8.1.6	Indication of the contact position	55
8.1.7	Additional requirements for equipment suitable for isolation.....	55
8.1.8	Terminals.....	55
8.1.9	Additional requirements for equipment provided with a neutral pole.....	56
8.1.10	Provisions for protective earthing.....	56
8.1.11	Enclosures for equipment.....	56
8.1.12	Degrees of protection of enclosed equipment	56
8.1.13	Conduit pull-out, torque and bending with metallic conduits	56
8.1.14	Limited energy source	56
8.1.15	Stored charge energy circuit.....	58
8.1.16	Fault and abnormal conditions.....	59
8.1.17	Short-circuit and overload protection of ports.....	59
8.2	Performance requirements.....	59
8.2.1	Operating conditions.....	59
8.2.2	Temperature-rise.....	67
8.2.3	Dielectric properties.....	69
8.2.4	Normal load and overload performance requirements	70
8.2.5	Co-ordination with short-circuit protective devices	80
	Void.....	
	Additional requirements for combination starters and combination switching devices suitable for isolation	
8.3	Electromagnetic compatibility (EMC).....	82
8.3.1	General	82
8.3.2	Immunity.....	83
8.3.3	Emission.....	83
9	Tests.....	84
9.1	Kinds of test.....	84
9.1.1	General	84

9.1.2	Type tests.....	84
9.1.3	Routine tests	84
9.1.4	Sampling tests.....	85
9.1.5	Special tests.....	85
9.2	Compliance with constructional requirements.....	86
9.2.1	General	86
9.2.2	Electrical performance of screwless-type clamping units.....	86
9.2.3	Ageing test for screwless-type clamping units.....	87
9.2.4	Limited energy source test.....	87
9.2.5	Breakdown of components.....	88
9.3	Compliance with performance requirements.....	88
9.3.1	Test sequences	88
9.3.2	General test conditions	89
9.3.3	Performance under no load, normal load and overload conditions.....	90
9.3.4	Performance under short-circuit conditions	101
9.3.5	Overload current withstand capability of contactors	106
9.3.6	Routine tests and sampling tests	107
9.4	EMC tests	108
9.4.1	General.....	108
9.4.2	Immunity.....	109
9.4.3	Emission.....	111
Annex A (normative) Marking and identification of terminals of contactors, starters and associated overload relays.....		113
A.1	General.....	113
A.2	Marking and identification of terminals of main circuits.....	113
A.3	Marking and identification of terminals of overload relays	113
Annex B (normative) Special tests		115
B.1	General.....	115
B.2	Mechanical durability	115
B.2.1	General	115
B.2.2	Verification of mechanical durability.....	115
B.3	Electrical durability	117
B.3.1	General	117
B.3.2	Results to be obtained.....	118
B.3.3	Statistical analysis of test results for contactors or starters.....	119
B.4	Coordination at the crossover current between the starter and associated SCPD	119
B.4.1	General and definitions.....	119
B.4.2	Condition for the test for the verification of co-ordination at the crossover current by a direct method	120
B.4.3	Test currents and test circuits.....	120
B.4.4	Test procedure and results to be obtained	120
B.4.5	Verification of co-ordination at the crossover current by an indirect method	121
Annex C (Void) (informative) Typical characteristics of starters.....		124
Annex D (informative) Items subject to agreement between manufacturer and user		131
Annex E (informative) Examples of control circuit configurations (Void)		131
Annex F (normative) Requirements for auxiliary contact linked with power contact (mirror contact)		133

F.1	Application and object.....	133
F.1.1	Application.....	133
F.1.2	Object.....	133
F.2	Terms and definitions.....	133
F.3	Characteristics.....	133
F.4	Product information.....	133
F.5	Normal service, mounting and transport conditions.....	134
F.6	Constructional and performance requirements.....	134
F.7	Tests.....	134
F.7.1	General.....	134
F.7.2	Tests on products in a new condition.....	134
F.7.3	Test after conventional operational performance (defined under Table 10).....	135
Annex G (informative)	Rated operational currents and rated operational powers of switching devices for electrical motors.....	136
G.1	General.....	136
G.2	Rated operational powers and rated operational currents.....	136
Annex H (normative)	Extended functions within to electronic overload relays.....	140
H.1	General.....	140
H.2	Terms and definitions.....	140
H.3	Limits of operation of control functions.....	140
H.3.1	General.....	140
H.3.2	Limits of electronic overload relay with main circuit under-voltage restarting function.....	140
H.4	Test of the control functions.....	141
Annex I (informative)	AC-4 contactors for use with semiconductor controlled motor load.....	142
Annex J (Void)	143
Annex K (normative)	Procedure to determine data for electromechanical contactors used in functional safety applications.....	144
K.1	General.....	145
K.2	Test requirements.....	145
K.3	Characterization of a failure mode.....	145
K.4	Failure ratios of a contactor.....	146
Annex L (normative)	Assessment procedure for electromechanical overload protection used in safety applications and especially in explosive atmospheres.....	147
L.1	Application and object.....	147
L.1.1	Application.....	147
L.1.2	Object.....	147
L.2	Terms, definitions and symbols.....	147
L.2.1	Terms and definitions.....	147
L.2.2	Symbols and abbreviations.....	148
L.3	Procedure.....	149
L.3.1	General.....	149
L.3.2	Safety design process.....	149
L.4	Requirements.....	150
L.4.1	General.....	150
L.4.2	Safety plan.....	150
L.4.3	Design.....	151

L.4.4	Failure mode and effects analysis of the safety function	151
L.4.5	Design plan	152
L.4.6	Verification	152
L.4.7	Function assessed.....	152
L.5	Documentation.....	152
L.5.1	Technical safety documentation.....	152
L.5.2	Safety instructions	152
L.6	Example.....	153
L.6.1	architecture description	153
L.6.2	FMEA.....	154
Annex M	(normative) DC contactors for use in photovoltaic (PV) applications	162
M.1	Application	162
M.2	Object	162
M.3	Terms and definitions.....	162
M.4	Classification	163
M.5	Characteristics.....	163
M.5.1	General.....	163
M.5.2	Rated impulse withstand voltage.....	163
M.5.3	Utilization category	163
M.6	Product information.....	164
M.7	Normal service, mounting and transport conditions	164
M.7.1	General	164
M.7.2	Ambient air temperature.....	164
M.7.3	Altitude.....	164
M.8	Constructional and performance requirements	165
M.8.1	Constructional requirements.....	165
M.8.2	Performance requirements.....	165
M.8.3	Electromagnetic compatibility (EMC)	166
M.9	Tests	166
M.9.1	General	166
M.9.2	Type tests.....	166
M.9.3	Making and breaking capacities and conventional operational performance	167
M.9.4	Thermal cycling test.....	167
M.9.5	Climatic test.....	167
M.9.6	Dielectric test	167
M.9.7	Critical load current test.....	168
M.9.8	Mechanical properties.....	169
M.9.9	Degree of protection of enclosed contactors	170
M.9.10	EMC	170
M.9.11	Clearance and creepage distances	170
Annex N	(normative) Additional requirements and tests for equipment with protective separation.....	171
N.1	General.....	171
N.2	Definitions.....	171
N.3	Requirements	171
N.3.1	Test method for implementing protective impedance.....	171
N.3.2	Touch current measurement	172
Annex O	(informative) Load monitoring indicators	174

O.1	General.....	174
O.2	Indicators list	174
O.3	Uncertainty	176
O.4	Tests	177
O.4.1	Routine tests	177
O.4.2	Type tests.....	177
Annex P (normative)	Short-circuit breaking tests of MPSD	179
P.1	General test conditions	179
P.2	Rated service short-circuit breaking capacity	179
P.2.1	General	179
P.2.2	Test of rated service short-circuit breaking capacity.....	180
P.2.3	Verification of operational performance capability	180
P.2.4	Verification of dielectric withstand.....	180
P.2.5	Verification of temperature-rise.....	181
P.2.6	Verification of overload releases	181
P.3	Rated ultimate short-circuit breaking capacity	181
P.3.1	General.....	181
P.3.2	Verification of overload releases	181
P.3.3	Test of rated ultimate short-circuit breaking capacity	182
P.3.4	Verification of dielectric withstand.....	182
P.3.5	Verification of overload releases	182
P.4	Test of MPSD for IT system	182
P.4.1	General	182
P.4.2	Individual pole short-circuit	182
P.4.3	Verification of dielectric withstand.....	183
P.4.4	Verification of overload releases	183
P.4.5	Marking	183
Annex Q (normative)	Co-ordination under short-circuit conditions between a MPSD and another short-circuit protective device associated in the same circuit.....	184
Q.1	Application	184
Q.2	Object.....	184
Q.3	General requirements for the co-ordination of a MPSD with another SCPD	185
Q.3.1	General considerations	185
Q.3.2	Behaviour of C_1 in association with another SCPD	185
Q.4	Type and characteristics of the associated SCPD	185
Q.5	Verification of selectivity	186
Q.5.1	General	186
Q.5.2	Consideration of selectivity by desk study.....	186
Q.5.3	Selectivity determined by test	187
Bibliography.....		192
Figure 1	– Multiple of current setting limits for ambient air temperature compensated time-delay overload relays	64
Figure 2	– Thermal memory test	65
Figure 3	– Examples of co-ordination characteristics of a starter.....	81
Figure 4	– Voltage drop measurement at contact point of the clamping terminal	87
Figure 5	– Example of a pole impedance measurement for a 3 pole contactor	92
Figure A.1	– Main circuit	113

Figure A.2 – Overload relays	114
Figure B.1 – Examples of time-current withstand characteristic.....	123
Figure C.1 – Typical curves of currents and torques during a star-delta start (see 3.4.4.1).....	124
Figure C.2 – Typical curves of currents and torques during an auto-transformer start (see 3.4.4.2).....	125
Figure C.3 – Typical variants of protected starters, combination starters, protected switching devices and combination switching devices	126
Figure C.4 – Example of three-phase diagram of a rheostatic rotor starter with three starting steps and one direction of rotation (in the case when all the mechanical switching devices are contactors)	127
Figure C.5 – Typical methods and diagrams of starting alternating-current induction motors by means of auto-transformers.....	129
Figure C.6 – Examples of speed/time curves corresponding to cases a), b), c), d), e) and f) of 5.3.5.6.1	130
Figure F.1 – Mirror contact.....	134
Figure L.1 – Safety design process.....	150
Figure L.2 – Typical structure of a thermal overload relay.....	153
Figure L.3 – typical structure of MPSD.....	154
Figure M.1 – Critical current.....	168
Figure N.1 – Protection by means of protective impedance.....	172
Figure N.2 – Measuring instrument.....	173
Figure O.1 – Example of quantification of a process change	176
Figure Q.1 – Over-current co-ordination between a MPSD and a fuse or back-up protection by a fuse: operating characteristics.....	189
Figure Q.2 – Total selectivity between MPSD and circuit-breakers – Case 1	190
Figure Q.3 – Total selectivity between MPSD and circuit-breakers – Case 2.....	190
Figure Q.4 – Back-up protection by a circuit-breaker – Operating characteristics – Case 1	191
Figure Q.5 – Back-up protection by a circuit-breaker – Operating characteristics – Case 2.....	191
Table 1 – Utilization categories	42
Table 2 – Trip classes of overload relays	46
Table 3 – Limits of operation of time-delay overload relays when energized on all poles.....	63
Table 4 – Limits of operation of three-pole time-delay overload relays when energized on two poles only.....	66
Table 5 – Temperature-rise limits for insulated coils in air and in oil	68
Table 6 – Intermittent duty test cycle data.....	69
Table 7 – Making and breaking capacities – Making and breaking conditions according to utilization category.....	71
Table 8 – Relationship between the test current broken I_c and off-time for the verification of rated making and breaking capacities	75
Table 9 – Operational current determination for utilization categories AC-6a and AC-6b when derived from AC-3 ratings	76
Table 10 – Conventional operational performance – Making and breaking conditions according to utilization category.....	77

Table 11 – Overload current withstand requirements	79
Table 12 – Specific acceptance criteria for immunity tests	83
Table 13 – Value of the prospective test current according to the rated operational current	103
Table 14 – Value of the prospective test current according to the rated operational current (harmonized table)	104
Table 15 – Test conditions for I_{cd}	82
Table 16 – EMC immunity tests	109
Table 17 – Terminal disturbance voltage limits for conducted radio-frequency emission test limits (for mains ports)	111
Table 18 – Radiated emission test limits	112
Table 19 – Limits for limited energy sources without an over-current protective device	57
Table 20 – Limits for limited energy sources with an over-current protective device	57
Table 21 – Limits for limited energy source with current limiting impedance	58
Table B.1 – Verification of the number of on-load operating cycles – Conditions for making and breaking corresponding to the several utilization categories	118
Table B.2 – Test conditions	121
Table F.1 – Test voltage according to altitude	135
Table G.1 – Rated operational powers and rated operational currents of motors	137
Table K.1 – Failure mode of contactors	146
Table K.2 – Typical failure ratios for normally open contactors	146
Table L.1 – Severity	154
Table L.2 – Occurrence	155
Table L.3 – Detection levels	155
Table L.4 – Conclusion	156
Table L.5 – Example of failure mode and effects analysis for thermal overload relay	157
Table M.1 – Rated impulse voltage levels for PV contactors	163
Table M.2 – Utilization categories	163
Table M.3 – Ambient air temperature conditions	164
Table M.4 – Verification of rated making and breaking capacities – Conditions for making and breaking corresponding to the DC-PV category	165
Table M.5 – Conventional operational performance – Making and breaking condition corresponding to the DC-PV category	166
Table M.6 – Overall scheme of test sequences	167
Table M.7 – Number of operating cycles corresponding to the critical load current	169
Table M.8 – Critical load current performance	169
Table O.1 – AC monitoring indicators list	175
Table O.2 – Different possibilities authorized for verification of indicators	177
Table O.3 – Reference for verification conditions	178
Table O.4 – Harmonic levels	178

INTERNATIONAL ELECTROTECHNICAL COMMISSION

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –**Part 4-1: Contactors and motor-starters –
Electromechanical contactors and motor-starters**

FOREWORD

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

DISCLAIMER

This Redline version is not an official Standard and is intended to provide the user with an indication of what changes have been made to the previous version. Only the IEC International Standard provided in this package is to be considered the official Standard.

This Redline version provides you with a quick and easy way to compare all the changes between this standard and its previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 60947-4-1 has been prepared by subcommittee 121A: Low-voltage switchgear and controlgear, of IEC technical committee 121: Switchgear and controlgear and their assemblies for low voltage.

This fourth edition cancels and replaces the third edition published in 2009 and its Amendment 1:2012. This edition constitutes a technical revision.

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

- Scope structure and exclusions
- Editorial correction of notes and hanging paragraphs
- Reference to IEC 62683-1
- Motor protective switching device (MPSD) with its requirements
- Safety aspects related to:
 - General aspects;
 - Limited energy circuits;
 - Electronic circuits;
 - Assessment procedure for electromechanical overload protection used in safety - applications (new Annex L)
- Introduction of provisions covering the impact of higher locked rotor current to achieve high efficiency class
- Mention of dedicated wiring accessories
- Pickup power measurement
- Alignment to IEC 60947-1:2007, IEC 60947-1:2007/AMD1:2010, and IEC 60947-1:2007/AMD2:2014
- Direct current requirements for covering photovoltaic application (new Annex M)
- Load monitoring indicators (new Annex O)
- Short-circuit breaking tests of MPSD (new Annex P)
- Co-ordination under short-circuit conditions between a MPSD and another short-circuit protective device associated in the same circuit (new Annex Q)

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

FDIS	Report on voting
121A/224/FDIS	121A/233/RVD

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

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

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

This document shall be read in conjunction with IEC 60947-1:2007, IEC 60947-1:2007/AMD1:2010, IEC 60947-1:2007/AMD2:2014, *Low voltage switchgear and controlgear – Part 1: General rules*. The provisions of the general rules are applicable to this document, where specifically called for.

The provisions of the general rules dealt with IEC 60947-1 are applicable to this part of IEC 60947 series where specifically called for. Clauses and subclauses, tables, figures and annexes of the general rules thus applicable are identified by reference to IEC 60947-1:2007, IEC 60947-1:2007/AMD1:2010, and IEC 60947-1:2007/AMD2:2014. For example, 4.3.4.1 of IEC 60947-1:2007, Table 4 of IEC 60947-1:2007, or Annex A of IEC 60947-1:2007.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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 document using a colour printer.

Preview
Copyright

INTRODUCTION

This document introduces the requirements for motor protection switching devices (MPSD).

MPSDs have been available on the market for many years. They are introduced in this document for covering the minimum safety and performance requirements of a manual motor starter with integral electromechanical or electronic short-circuit protection. This device fulfils all requirements of a starter and specific requirements of a circuit-breaker according to IEC 60947-2, mainly I_{cu} and I_{cs} , for protecting the motor and its circuit with control devices e.g. a contactor. An MPSD is not intended to support neutral pole, DC ratings, rated uninterrupted current I_u , backup protection, short-circuit tripping time-delay, selectivity category, withdrawable capability, RCD, recloser, EMC requirements of IEC 60947-2, etc.

Circuit-breakers according to Annex O of IEC 60947-2:2016 with motor overload protection characteristic according to this document but without starter ratings e.g. AC-3 are also available on the market. These devices are not covered by this document.

Copyright
Preview

ALTIJD DE ACTUELE NORM IN UW BEZIT HEBBEN?

Nooit meer zoeken in de systemen en uzelf de vraag stellen:
'Is IEC 60947-4-1:2018-RL en de laatste versie?'

Via het digitale platform NEN Connect heeft u altijd toegang tot de meest actuele versie van deze norm. Vervallen versies blijven ook beschikbaar. **U en uw collega's** kunnen de norm via NEN Connect makkelijk raadplagen, online en offline.

Kies voor slimmer werken en bekijk onze mogelijkheden op www.nenconnect.nl.

Heeft u vragen?

Onze Klantenservice is bereikbaar maandag tot en met vrijdag, van 8.30 tot 17.00 uur.

Telefoon: 015 2 690 391

E-mail: klantenservice@nen.nl

