

საქართველოს სტანდარტი

დაბალი ძაბვის გამანაწილებელი და მარეგულირებელი მოწყობილობა-
ნაწილი 4-2: კონტაქტორები და ძრავის ამძრავები - AC
ნახევარგამტარები ძრავის რეგულატორებისა და სტარტერებისათვის
(იეკ 60947-4-2:2011)

საქართველოს სტანდარტების და
მეტროლოგიის ეროვნული სააგენტო
თბილისი

სსტ ენ 60947-4-2:2012/2014

საინფორმაციო მონაცემები

1 დამტკიცებულია და შემოღებულია სამოქმედოდ საქართველოს სტანდარტების და მეტროლოგიის ეროვნული სააგენტოს 2014 წლის 14 მაისის № 44 და 2014 წლის 17 თებერვლის № 6 განკარგულებებით

2 მიღებულია გარეკანის თარგმნის მეთოდით სტანდარტიზაციის ევროპული კომიტეტის სტანდარტი ენ 60947-4-2:2012 „ დაბალი ძაბვის გამანაწილებელი და მარეგულირებელი მოწყობილობა-ნაწილი 4-2: კონტაქტორები და ძრავის ამძრავები - AC ნახევარგამტარები ძრავის რეგულატორებისა და სტარტერებისათვის (იეკ 60947-4-2:2011)“

3 პირველად

4 რეგისტრირებულია საქართველოს სტანდარტების და მეტროლოგიის ეროვნული სააგენტოს რეესტრში: 2014 წლის 14 მაისი №268-1.3-5837

წინამდებარე სტანდარტის სრული ან ნაწილობრივი აღწარმოება, ტირაჟირება და გავრცელება საქართველოს სტანდარტების და მეტროლოგიის ეროვნული სააგენტოს ნებართვის გარეშე არ დაიშვება

საინფორმაციო ნაწილი. სრული ტექსტის სანახავად შეიძინეთ სტანდარტი.

English version

**Low-voltage switchgear and controlgear -
Part 4-2: Contactors and motor-starters -
AC semiconductor motor controllers and starters
(IEC 60947-4-2:2011)**

Appareillage à basse tension -
Partie 4-2: Contacteurs et démarreurs de
moteurs -
Gradateurs et démarreurs à
semiconducteurs de moteurs à courant
alternatif
(CEI 60947-4-2:2011)

Niederspannungsschaltgeräte -
Teil 4-2: Schütze und Motorstarter -
Halbleiter-Motor-Steuergeräte und -Starter
für Wechselspannungen
(IEC 60947-4-2:2011)

This European Standard was approved by CENELEC on 2011-06-22. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Foreword

The text of document (17B/1734/FDIS), future edition 3 of IEC 60947-4-2, prepared by SC 17B, "Low-voltage switchgear and controlgear", of IEC TC 17, "Switchgear and controlgear", was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60947-4-2:2012.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2012-12-29
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2014-06-22

This European Standard supersedes EN 60947-4-2:2000 + A1:2002 + A2:2006.

EN 60947-4-2:2012 includes the following significant technical changes with respect to EN 60947-4-2:2000 + A1:2002 + A2:2006:

- updated EMC normative references and associated requirements,
- new references to EN 60947-1,
- marking of electronic relays without thermal memory,
- marking of tripping time at 0 °C ambient or below,
- new test requirements for limits of operation of time-delay overload relays,
- new classes of overload current withstand time,
- damp heat, salt mist, vibration and shock tests,
- short-circuit test in the smallest enclosure,
- update of the routine and sampling tests.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

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

This standard covers the Principle Elements of the Safety Objectives for Electrical Equipment Designed for Use within Certain Voltage Limits (LVD - 2006/95/EC).

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

Endorsement notice

The text of the International Standard IEC 60947-4-2:2011 was approved by CENELEC as a European Standard without any modification.

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

IEC 60146 series	NOTE Harmonized in EN 60146 series (not modified).
IEC 60255 series	NOTE Harmonized in EN 60255 series (partially modified).
IEC 60947-5 series	NOTE Harmonized in EN 60947-5 series (partially modified).
IEC 61000-3-2:2005 + A1: 2008 + A2: 2009	NOTE Harmonized as EN 61000-3-2:2006 + A1:2009 + A2:2009 (not modified).
IEC 61000-4-2:2008	NOTE Harmonized as EN 61000-4-2:2009 (not modified).
IEC 61000-4-3:2006 + A1: 2007 + A2: 2010	NOTE Harmonized as EN 61000-4-3:2006 + A1:2008 + A2:2010 (not modified).
IEC 61000-4-4:2004 + A1: 2010	NOTE Harmonized as EN 61000-4-4:2004 + A1:2010 (not modified).
IEC 61000-4-5:2005	NOTE Harmonized as EN 61000-4-5:2006 (not modified).
IEC 61000-4-6:2008	NOTE Harmonized as EN 61000-4-6:2009 (not modified).
IEC 61000-4-11:2004	NOTE Harmonized as EN 61000-4-11:2004 (not modified).
IEC 61131-2:2007	NOTE Harmonized as EN 61131-2:2007 (not modified).



საინფორმაციო ნაწილი. სრული ტექსტის საწარმოო სტანდარტი.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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

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

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60034-1 (mod)	2010	Rotating electrical machines - Part 1: Rating and performance	EN 60034-1 + corr. October	2010 2010
IEC 60085	2007	Electrical insulation - Thermal evaluation and designation	EN 60085	2008
IEC 60269-1 + A1	2006 2009	Low-voltage fuses - Part 1: General requirements	EN 60269-1 + A1	2007 2009
IEC 60410	1973	Sampling plans and procedures for inspection by attributes	-	-
IEC 60664	Series	Insulation coordination for equipment within low-voltage systems	EN 60664	Series
IEC 60947-1	2007	Low-voltage switchgear and controlgear - Part 1: General rules	EN 60947-1	2007
IEC 61000-4	Series	Electromagnetic compatibility (EMC) - Part 4: Testing and measurement techniques -	EN 61000-4	Series
CISPR 11 (mod) + A1	2009 2010	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement	EN 55011 + A1	2009 2010

Annex ZZ (informative)

Coverage of Essential Requirements of EU Directives

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and within its scope the standard covers all relevant essential requirements as given in Article 1 of Annex I of the Directive 2004/108/EC.

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

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

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Low-voltage switchgear and controlgear –
Part 4-2: Contactors and motor-starters – AC semiconductor motor controllers
and starters**

**Appareillage à basse tension –
Partie 4-2: Contacteurs et démarreurs de moteurs – Gradateurs et démarreurs à
semiconducteurs de moteurs à courant alternatif**





THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2011 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.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de la CEI ou du Comité national de la CEI du pays du demandeur.

Si vous avez des questions sur le copyright de la CEI ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de la CEI de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: 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.

- Catalogue of IEC publications: www.iec.ch/searchpub

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

- IEC Just Published: www.iec.ch/online_news/justpub

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

- Electropedia: www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 20 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary online.

- Customer Service Centre: www.iec.ch/webstore/custserv

If you wish to give us your feedback on this publication or need further assistance, please visit the Customer Service Centre FAQ or contact us:

Email: csc@iec.ch
Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00

A propos de la CEI

La Commission Electrotechnique Internationale (CEI) est la première organisation mondiale qui élabore et publie des normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications CEI

Le contenu technique des publications de la CEI est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

- Catalogue des publications de la CEI: www.iec.ch/searchpub/cur_fut-f.htm

Le Catalogue en-ligne de la CEI vous permet d'effectuer des recherches en utilisant différents critères (numéro de référence, texte, comité d'études,...). Il donne aussi des informations sur les projets et les publications retirées ou remplacées.

- Just Published CEI: www.iec.ch/online_news/justpub

Restez informé sur les nouvelles publications de la CEI. Just Published détaille deux fois par mois les nouvelles publications parues. Disponible en-ligne et aussi par email.

- Electropedia: www.electropedia.org

Le premier dictionnaire en ligne au monde de termes électroniques et électriques. Il contient plus de 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans les langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International en ligne.

- Service Clients: www.iec.ch/webstore/custserv/custserv_entry-f.htm

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions, visitez le FAQ du Service clients ou contactez-nous:

Email: csc@iec.ch
Tél.: +41 22 919 02 11
Fax: +41 22 919 03 00



IEC 60947-4-2

Edition 3.0 2011-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Low-voltage switchgear and controlgear –
Part 4-2: Contactors and motor-starters – AC semiconductor motor controllers
and starters**

**Appareillage à basse tension –
Partie 4-2: Contacteurs et démarreurs de moteurs – Gradateurs et démarreurs à
semiconducteurs de moteurs à courant alternatif**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE **XD**
CODE PRIX

ICS 29.130.20

ISBN 978-2-88912-505-0

საინფორმაციო ნაწილი. სრული ტექსტის სანახავად შეიძინეთ სტანდარტი.

CONTENTS

FOREWORD.....	6
INTRODUCTION.....	8
1 Scope.....	9
2 Normative references	10
3 Terms, definitions, symbols and abbreviations.....	10
3.1 General	10
3.2 Alphabetical index of terms	10
3.3 Terms and definitions concerning a.c. semiconductor motor controllers and starters.....	12
3.4 Terms and definitions concerning hybrid motor controllers and starters	14
3.5 Terms and definitions concerning EMC definitions.....	18
3.6 Symbols and abbreviations.....	19
4 Classification.....	19
5 Characteristics of a.c. semiconductor motor controllers and starters.....	20
5.1 Summary of characteristics	20
5.2 Type of equipment.....	20
5.2.1 Form of equipment	20
5.2.2 Number of poles	20
5.2.3 Kind of current.....	20
5.2.4 Interrupting medium (air, vacuum, etc.)	20
5.2.5 Operating conditions of the equipment.....	20
5.3 Rated and limiting values for main circuits.....	21
5.3.1 Rated voltages	21
5.3.2 Currents	23
5.3.3 Rated frequency	23
5.3.4 Rated duty.....	23
5.3.5 Normal load and overload characteristics	24
5.3.6 Rated conditional short-circuit current	25
5.4 Utilization category.....	25
5.4.1 General	25
5.4.2 Assignment of ratings based on the results of tests	26
5.5 Control circuits	27
5.6 Auxiliary circuits	27
5.7 Characteristics of relays and releases (overload relays).....	27
5.7.1 Summary of characteristics.....	28
5.7.2 Types of relay or release	28
5.7.3 Characteristic values	28
5.7.4 Designation and current settings of overload relays.....	29
5.7.5 Time-current characteristics of overload relays.....	29
5.7.6 Influence of ambient air temperature	30
5.8 Co-ordination with short-circuit protective devices (SCPD)	30
6 Product information	30
6.1 Nature of information.....	30
6.2 Marking	31
6.3 Instructions for installation, operation, and maintenance	31
7 Normal service, mounting and transport conditions.....	32

7.1	Normal service conditions	32
7.1.1	Ambient air temperature	32
7.1.2	Altitude	32
7.1.3	Atmospheric conditions	32
7.1.4	Shock and vibrations	32
7.2	Conditions during transport and storage	32
7.3	Mounting	32
7.4	Electrical system disturbances and influences	32
8	Constructional and performance requirements	33
8.1	Constructional requirements	33
8.1.1	General	33
8.1.2	Materials	33
8.1.3	Current-carrying parts and their connections	33
8.1.4	Clearances and creepage distances	33
8.1.5	Actuator	33
8.1.6	Indication of the contact position	33
8.1.7	Additional requirements for equipment suitable for isolation	33
8.1.8	Terminals	33
8.1.9	Additional requirements for equipment provided with a neutral pole	34
8.1.10	Provisions for protective earthing	34
8.1.11	Enclosures for equipment	34
8.1.12	Degrees of protection of enclosed equipment	34
8.1.13	Conduit pull-out, torque and bending with metallic conduits	34
8.2	Performance requirements	34
8.2.1	Operating conditions	34
8.2.2	Temperature rise	38
8.2.3	Dielectric properties	41
8.2.4	Normal load and overload performance requirements	42
8.2.5	Co-ordination with short-circuit protective devices	47
8.3	EMC requirements	47
8.3.1	General	47
8.3.2	Emission	48
8.3.3	Immunity	48
9	Tests	50
9.1	Kinds of tests	50
9.1.1	General	50
9.1.2	Type tests	50
9.1.3	Routine tests	50
9.1.4	Sampling tests	50
9.1.5	Special tests	51
9.2	Compliance with constructional requirements	51
9.3	Compliance with performance requirements	51
9.3.1	Test sequences	51
9.3.2	General test conditions	52
9.3.3	Performance under no load, normal load, and overload conditions	52
9.3.4	Performance under short-circuit conditions	62
9.3.5	EMC tests	65
9.3.6	Routine and sampling tests	68
Annex A (normative)	Marking and identification of terminals	70

Annex B Vacant	73
Annex C (normative) Co-ordination at the crossover current between the starter and associated SCPD	74
Annex D Vacant	78
Annex E Vacant	79
Annex F (informative) Operating capability	80
Annex G (informative) Examples of control circuit configurations	83
Annex H Vacant	85
Annex I (normative) Modified test circuit for short-circuit testing of semiconductor motor controllers and starters	86
Annex J (informative) Flowchart for constructing bypassed semiconductor controllers tests	88
Annex K (normative) Extended functions within electronic overload relays	89
Bibliography	94
Figure 1 – Semiconductor motor control devices	13
Figure 2 – Connecting methods	22
Figure 3 – Thermal memory test	36
Figure 4 – Multiple of current setting limits for ambient air temperature compensated time-delay overload relays	62
Figure C.1 – Examples of time-current withstand characteristic	77
Figure F.1 – Thermal stability test profile	80
Figure F.2 – Overload capability test profile	81
Figure F.3 – Blocking and commutating capability test profile	82
Figure G.1 – Diagrammatic representation of an ECD	83
Figure G.2 – Single supply and control input	83
Figure G.3 – Single supply and control input	84
Figure G.4 – Controllers with an internal control supply and control input only	84
Figure I.1 – Modified circuit for short-circuit testing of semiconductor devices	86
Figure I.2 – Time line for the short-circuit test of 9.3.4.1.6	87
Figure K.1 – Test circuit for the verification of the operating characteristic of a residual current electronic overload relay	93
Table 1 – Functional possibilities of semiconductor motor control devices	14
Table 2 – Utilization categories	26
Table 3 – Relative levels of severity	27
Table 4 – Trip classes of overload relays	29
Table 5 – Limits of operation of time-delay overload relays when energized on all poles	35
Table 6 – Limits of operation of three-pole time-delay overload relays when energized on two poles only	37
Table 7 – Temperature rise limits for insulated coils in air and in oil	40
Table 8 – Intermittent duty test cycle data	40
Table 9 – Minimum overload current withstand time (T_x) in relation to overload current ratio (X) and corresponding to overload relay trip class (see Table 19)	43
Table 10 – Minimum requirements for thermal stability test conditions ^a	43

Table 11 – Minimum requirements for overload capability test conditions.....	44
Table 12 – Minimum requirements and conditions for performance testing with an induction motor load	44
Table 13 – Making and breaking capacity test; making and breaking conditions according to utilization categories for the mechanical switching device of hybrid motor controllers H1, H2, H3 and for certain forms of bypassed controllers	46
Table 14 – Conventional operational performance making and breaking conditions according to utilization categories for the mechanical switching device of hybrid motor controllers H1B, H2B, H3B and for certain forms of bypassed controllers.....	46
Table 15 – Specific acceptance or performance criteria when EM disturbances are present	49
Table 16 – Thermal stability test specifications	57
Table 17 – Initial case temperature requirements.....	57
Table 18 – Blocking and commutating capability test specifications	59
Table 19 – Terminal disturbance voltage limits for conducted radio-frequency emission	67
Table 20 – Radiated emissions test limits	67
Table A.1 – Main circuit terminal markings.....	70
Table C.1 – Test conditions	76
Table K.1 – Operating time of residual current electronic overload relays	90

INTERNATIONAL ELECTROTECHNICAL COMMISSION

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

**Part 4-2: Contactors and motor-starters –
AC semiconductor motor controllers and 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.

International Standard IEC 60947-4-2 has been prepared by subcommittee 17B: Low-voltage switchgear and controlgear, of IEC technical committee 17: Switchgear and controlgear.

This third edition replaces the second edition published in 1999 and its Amendments 1 (2001) and 2 (2006). It is a technical revision.

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

- updated EMC normative references and associated requirements,
- new references to IEC 60947-1,
- marking of electronic relays without thermal memory,
- marking of tripping time at 0 °C ambient or below,
- new test requirements for limits of operation of time-delay overload relays,

- new classes of overload current withstand time,
- damp heat, salt mist, vibration and shock tests,
- short-circuit test in the smallest enclosure,
- update of the routine and sampling tests.

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

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

FDIS	Report on voting
17B/1734/FDIS	17B/1741/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 the parts in the IEC 60947 series, under the general title *Low-voltage switchgear and controlgear*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site 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 July 2012 have been included in this copy.

INTRODUCTION

This standard covers low-voltage a.c. semiconductor motor controllers and starters that have many capabilities and features beyond the simple starting and stopping of an induction motor, such as controlled starting and stopping, manoeuvring and controlled running.

The generic term “controller” is used in this standard wherever the unique features of the power semiconductor switching elements are the most significant points of interest. The generic term “starter” is used wherever the consequences of operating the power semiconductor switching elements, together with suitable overload protective means, are the most significant points of interest. Specific designations (for example form 1, form HxB, etc.) are used wherever the unique features of various configurations comprise significant points of interest.