

ELEKTROMEHAANILISED KONTAKTORID  
MAJAPIDAMIS- JA MUUKS TAOLISEKS KASUTUSEKS

Electromechanical contactors for household and  
similar purposes

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>See Eesti standard EVS-EN IEC 61095:2025 sisaldab Euroopa standardi EN IEC 61095:2025 ingliskeelset teksti.</p> <p>Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 05.09.2025.</p> <p>Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.</p>	<p>This Estonian standard EVS-EN IEC 61095:2025 consists of the English text of the European standard EN IEC 61095:2025.</p> <p>This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.</p> <p>Date of Availability of the European standard is 05.09.2025.</p> <p>The standard is available from the Estonian Centre for Standardisation and Accreditation.</p>
--	---

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile [standardiosakond@evs.ee](mailto:standardiosakond@evs.ee).

ICS 29.120.99, 29.130.20

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardimis- ja Akrediteerimiskeskusele. Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardimis- ja Akrediteerimiskeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardimis- ja Akrediteerimiskeskusega: Koduleht [www.evs.ee](http://www.evs.ee); telefon 605 5050; e-post [info@evs.ee](mailto:info@evs.ee)

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation and Accreditation. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation and Accreditation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation and Accreditation: Homepage [www.evs.ee](http://www.evs.ee); phone +372 605 5050; e-mail [info@evs.ee](mailto:info@evs.ee)

EUROPEAN STANDARD

**EN IEC 61095**

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2025

ICS 29.130.20; 29.120.99

Supersedes EN 61095:2009

English Version

**Electromechanical contactors for household and similar  
purposes  
(IEC 61095:2023)**

Contacteurs électromécaniques pour usages domestiques  
et analogues  
(IEC 61095:2023)

Elektromechanische Schütze für Hausinstallationen und  
ähnliche Zwecke  
(IEC 61095:2023)

This European Standard was approved by CENELEC on 2024-10-16. 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.



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

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

## European foreword

The text of document 121A/566/FDIS, future edition 3 of IEC 61095, prepared by SC 121A "Low-voltage switchgear and controlgear" of IEC/TC 121 "Switchgear and controlgear and their assemblies for low voltage" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61095:2025.

The following dates are fixed:

- latest date by which the document has to be implemented at national (dop) 2026-09-30 level by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with the (dow) 2028-09-30 document have to be withdrawn

This document supersedes EN 61095:2009 and all of its amendments and corrigenda (if any).

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

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

## Endorsement notice

The text of the International Standard IEC 61095:2023 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 standard indicated:

IEC 60216 series	NOTE	Approved as EN 60216 series
IEC 60228	NOTE	Approved as EN IEC 60228
IEC 60364-4-44:2007	NOTE	Approved as HD 60364-4-442:2012
IEC 60364-4-44:2007/A1:2015	NOTE	Approved as HD 60364-4-443:2016
IEC 60669-1:2017	NOTE	Approved as EN 60669-1:2018
IEC 60669-2-1:2021	NOTE	Approved as EN IEC 60669-2-1:2022 (not modified) +A11:2022
IEC 60947-1:2020	NOTE	Approved as EN IEC 60947-1:2021 (not modified)
IEC 60998-2-2:2002	NOTE	Approved as EN 60998-2-2:2004
IEC/TR 63201:2019	NOTE	Approved as CLC IEC/TR 63201:2020 (not modified)
IEC 63365	NOTE	Approved as EN IEC 63365

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



**Electromechanical contactors for household and similar purposes**

**Contacteurs électromécaniques pour usages domestiques et analogues**



## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2023 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 l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

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

Tel.: +41 22 919 02 11  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://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 corrigendum or an amendment might have been published.

#### IEC publications search - [webstore.iec.ch/advsearchform](http://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](http://webstore.iec.ch/justpublished)

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

#### IEC Customer Service Centre - [webstore.iec.ch/csc](http://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](mailto:sales@iec.ch).

#### IEC Products & Services Portal - [products.iec.ch](http://products.iec.ch)

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

---

### A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) 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 IEC

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

#### Recherche de publications IEC -

##### [webstore.iec.ch/advsearchform](http://webstore.iec.ch/advsearchform)

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, ...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

#### Service Clients - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: [sales@iec.ch](mailto:sales@iec.ch).

#### IEC Products & Services Portal - [products.iec.ch](http://products.iec.ch)

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 300 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 19 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



---

**Electromechanical contactors for household and similar purposes**

**Contacteurs électromécaniques pour usages domestiques et analogues**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

---

ICS 29.130.20, 29.120.99

ISBN 978-2-8322-7537-5

**Warning! Make sure that you obtained this publication from an authorized distributor.  
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

## CONTENTS

FOREWORD.....	8
INTRODUCTION.....	10
1 Scope.....	11
2 Normative references .....	11
3 Terms and definitions .....	13
3.1 General terms .....	13
3.2 Switching devices .....	16
3.3 Parts of switching devices.....	18
3.4 Operation of switching devices.....	22
3.5 Characteristic quantities .....	24
4 Classification.....	28
5 Characteristics of contactors .....	28
5.1 Summary of characteristics.....	28
5.2 Type of contactor .....	29
5.2.1 General .....	29
5.2.2 Number of poles .....	29
5.2.3 Method of control.....	29
5.3 Rated and limiting values for main circuits .....	29
5.3.1 General .....	29
5.3.2 Rated voltages .....	29
5.3.3 Currents or powers .....	30
5.3.4 Rated frequency .....	31
5.3.5 Rated duties .....	31
5.3.6 Normal load and overload characteristics .....	32
5.3.7 Rated conditional short-circuit current.....	32
5.4 Utilization category .....	33
5.4.1 General .....	33
5.4.2 Assignment of utilization categories based on the results of tests .....	33
5.5 Control circuits.....	34
5.6 Auxiliary circuits.....	34
5.7 Co-ordination with short-circuit protective devices.....	34
6 Product information .....	34
6.1 Nature of information .....	34
6.1.1 General .....	34
6.1.2 Identification.....	34
6.1.3 Characteristics, basic rated values and utilization.....	34
6.2 Marking.....	35
6.3 Instructions for installation, operation and maintenance .....	36
7 Normal service, mounting and transport conditions.....	36
7.1 Normal service conditions .....	36
7.1.1 General .....	36
7.1.2 Ambient air temperature .....	36
7.1.3 Altitude .....	37
7.1.4 Atmospheric conditions.....	37
7.1.5 Normal electromagnetic environmental conditions .....	38
7.2 Conditions during transport and storage.....	38

7.3	Mounting.....	38
8	Constructional and performance requirements.....	38
8.1	Constructional requirements.....	38
8.1.1	General.....	38
8.1.2	Materials.....	38
8.1.3	Strength of screws or nuts other than those on terminals which are intended to be operated during installation or maintenance.....	39
8.1.4	Vacant.....	40
8.1.5	Actuator.....	40
8.1.6	Indication of the OFF and ON positions.....	40
8.1.7	Terminals.....	41
8.1.8	Additional requirements for contactors provided with a neutral pole.....	43
8.1.9	Provisions for earthing.....	43
8.1.10	Enclosures.....	44
8.1.11	Degrees of protection of enclosed contactors.....	45
8.1.12	Resistance to impact.....	45
8.1.13	Durability of markings.....	45
8.1.14	Fault and abnormal conditions.....	45
8.2	Performance requirements.....	46
8.2.1	Operating conditions.....	46
8.2.2	Temperature-rise.....	47
8.2.3	Dielectric properties.....	50
8.2.4	Normal load and overload performance requirements.....	52
8.2.5	Co-ordination with short-circuit protective devices.....	54
8.3	EMC Electromagnetic compatibility.....	55
8.3.1	General.....	55
8.3.2	Immunity.....	55
8.3.3	Emission.....	55
8.4	Embedded software.....	55
9	Tests.....	56
9.1	Types of test.....	56
9.1.1	General.....	56
9.1.2	Type tests.....	56
9.1.3	Routine tests.....	56
9.1.4	Sampling tests for clearance verification.....	57
9.2	Compliance with constructional requirements.....	57
9.2.1	General.....	57
9.2.2	Materials.....	57
9.2.3	Test on screws or nuts other than those on terminals which are intended to be operated during installation or maintenance.....	60
9.2.4	Verification of the degrees of protection of enclosed contactors.....	60
9.2.5	Mechanical properties of terminals.....	60
9.2.6	Test of resistance to impact.....	66
9.2.7	Test of durability of marking.....	68
9.2.8	Breakdown of components.....	68
9.3	Compliance with performance requirements.....	69
9.3.1	Test sequences.....	69
9.3.2	General test conditions.....	69
9.3.3	Performance under no load, normal load and overload conditions.....	71

9.3.4	Performance under short-circuit conditions .....	85
9.3.5	Overload current withstand capability .....	90
9.3.6	Routine tests .....	90
9.4	Tests for EMC .....	90
9.4.1	General .....	90
9.4.2	Immunity .....	90
9.4.3	Emission .....	92
Annex A (normative)	Terminal marking and distinctive number .....	114
A.1	General .....	114
A.2	Terminal marking of impedances (alphanumeric) .....	114
A.2.1	Coils .....	114
A.2.2	Electromagnetic releases .....	114
A.2.3	Interlocking electromagnets .....	115
A.2.4	Indicating light devices .....	115
A.3	Terminal marking of contact elements for contactors with two positions (numerical) .....	115
A.3.1	Contact elements for main circuits (main contact elements) .....	115
A.3.2	Contact elements for auxiliary circuit (auxiliary contact elements) .....	116
A.4	Distinctive number .....	118
Annex B (normative)	Test sequences and number of samples .....	119
B.1	Test sequences .....	119
B.2	Number of samples .....	119
Annex C (normative)	Description of a method for adjusting the load circuit .....	121
Annex D (normative)	Determination of short-circuit power-factor .....	123
D.1	General .....	123
D.2	Method I – Determination from DC component .....	123
D.3	Method II – Determination with pilot generator .....	124
Annex E (normative)	Measurement of creepage distances and clearances .....	125
E.1	Basic principles .....	125
E.2	Use of ribs .....	125
Annex F (normative)	Correlation between the nominal voltage of the supply system and the rated impulse withstand voltage of a contactor .....	130
Annex G (normative)	Hot wire ignition test .....	132
Annex H (normative)	Degrees of protection of enclosed contactor .....	133
H.0	Guide to the use of Annex H .....	133
H.1	Scope and object .....	133
H.3	Terms and definitions .....	133
H.4	Designation .....	133
H.5	Degrees of protection against access to hazardous parts and against ingress of solid foreign objects indicated by the first characteristic numeral .....	133
H.6	Degrees of protection against ingress of water indicated by the second characteristic numeral .....	134
H.7	Degrees of protection against access to hazardous parts indicated by the additional letter .....	134
H.8	Supplementary letters .....	134
H.9	Examples of designations with IP Code .....	134
H.10	Marking .....	134
H.11	General requirements for tests .....	134
H.11.1	Subclause 11.1 of IEC 60529:1989 applies .....	134

H.11.2	Subclause 11.2 of IEC 60529:1989 applies with the following additions .....	134
H.11.3	Subclause 11.3 of IEC 60529:1989 applies with the following addition .....	135
H.11.4	Subclause 11.4 of IEC 60529:1989 applies .....	135
H.11.5	Where an empty enclosure is used as a component of an enclosed device, 11.5 of IEC 60529:1989 applies .....	135
H.12	Tests for protection against access to hazardous parts indicated by the first characteristic numeral .....	135
H.13	Tests for protection against ingress of solid foreign objects indicated by the first characteristic numeral .....	135
H.13.4	Dust test for first characteristic numerals 5 and 6 .....	135
H.14	Tests for protection against water indicated by the second characteristic numeral .....	136
H.14.1	Subclause 14.1 of IEC 60529:1989 and IEC 60529:1989/AMD2:2013 apply .....	136
H.14.2	Subclause 14.2 of IEC 60529:1989 and IEC 60529:1989/AMD2:2013 apply .....	136
H.14.3	Subclause 14.3 of IEC 60529:1989 and IEC 60529:1989/AMD2:2013 apply with the following addition .....	136
H.15	Tests for protection against access to hazardous parts indicated by the additional letter .....	136
Annex I (normative)	Requirements and tests for equipment with protective separation .....	137
I.1	General .....	137
I.2	Terms and definitions .....	137
I.3	Requirements .....	138
I.3.1	General .....	138
I.3.2	Dielectric requirements .....	138
I.3.3	Construction requirements .....	139
I.4	Tests .....	139
I.4.1	General .....	139
I.4.2	Dielectric tests .....	139
I.4.3	Examples of constructional measures .....	140
Bibliography	.....	141
Figure 1	– Thread-forming tapping screw .....	92
Figure 2	– Thread-cutting tapping screw .....	93
Figure 3	– Ball-pressure test apparatus (see 9.2.2.3.1) .....	93
Figure 4	– Test equipment for flexion test (see 9.2.5.4) .....	93
Figure 5	– Gauges of form A and form B (see 9.2.5.6) .....	94
Figure 6	– Pendulum for mechanical impact test apparatus (striking element) (see 9.2.6.2.1) .....	95
Figure 7	– Mounting support for sample, for mechanical impact test (see 9.2.6.2.1) .....	96
Figure 8	– Pendulum hammer test apparatus (see 9.2.6.2.1) .....	97
Figure 9	– Sphere test apparatus (see 9.2.6.2.2) .....	97
Figure 10	– Jointed test finger (according to IEC 60529:1989, Figure 1) .....	98
Figure 11	– Diagram of the test circuit for the verification of making and breaking capacities of a single-pole contactor on single-phase AC .....	99
Figure 12	– Diagram of the test circuit for the verification of making and breaking capacities of a two-pole contactor on single-phase AC .....	100

Figure 13 – Diagram of the test circuit for the verification of making and breaking capacities of a three-pole contactor .....	101
Figure 14 – Diagram of the test circuit for the verification of making and breaking capacities of a four-pole contactor .....	102
Figure 15 – Schematic illustration of the recovery voltage across contacts of the first phase to clear (see 9.3.3.5.2, e)) under ideal conditions .....	103
Figure 16 – Diagram of a load circuit adjustment method .....	104
Figure 17 – Diagram of the test circuit for the verification of short-circuit making and breaking capacities of a single-pole contactor on single-phase AC.....	105
Figure 18 – Diagram of the test circuit for the verification of short-circuit making and breaking capacities of a two-pole contactor on single-phase AC .....	106
Figure 19 – Diagram of the test circuit for the verification of short-circuit making and breaking capacities of a three-pole contactor .....	107
Figure 20 – Diagram of the test circuit for the verification of short-circuit making and breaking capacities of a four-pole contactor.....	108
Figure 21 – Example of short-circuit making and breaking test record in the case of a single-pole contactor on single-phase AC .....	109
Figure 22 – Diagram of the test circuit for making and breaking verification for utilization category AC-7c .....	110
Figure 23 – Example of screwless-type clamping units.....	111
Figure 24 – Voltage drop measurement at contact point of the clamping terminal.....	112
Figure 25 – Connecting samples for ageing test for screwless-type clamping units .....	112
Figure 26 – Diagram of the test circuit for making and breaking verification for utilization category AC-7d .....	113
Figure C.1 – Determination of the actual value of the factor $\gamma$ .....	122
Figure E.1 – Measurement of ribs .....	126
Figure E.2 – Creepage distance example 1 .....	126
Figure E.3 – Creepage distance example 2 .....	126
Figure E.4 – Creepage distance example 3 .....	126
Figure E.5 – Creepage distance example 4 .....	127
Figure E.6 – Creepage distance example 5 .....	127
Figure E.7 – Creepage distance example 6 .....	127
Figure E.8 – distance example 7 .....	128
Figure E.9 – Creepage distance example 8 .....	128
Figure E.10 – Creepage distance example 9 .....	128
Figure E.11 – Creepage distance example 10 .....	129
Figure E.12 – Creepage distance example 11 .....	129
Figure G.1 – Test fixture for hot wire ignition test.....	132
Figure I.1 – Example of application with component connected between separated circuits .....	140
Table 1 – Utilization categories .....	33
Table 2 – Standard cross-sections of round copper conductors.....	42
Table 3 – Temperature-rise limits for insulated coils in air.....	47
Table 4 – Temperature-rise limits of terminals .....	48
Table 5 – Temperature-rise limits of accessible parts.....	48

Table 6 – Intermittent duty test cycle data.....	49
Table 7 – Making and breaking capacities. Making and breaking conditions corresponding to the utilization categories .....	53
Table 8 – Relationship between current broken $I_C$ and off-time for the verification of rated making and breaking capacities .....	53
Table 9 – Conventional operational performance. Making and breaking conditions corresponding to the utilization categories .....	54
Table 10 – Overload current withstand requirements .....	54
Table 11 – Tightening torques for the verification of the mechanical strength of screw-type terminals .....	61
Table 12 – Test values for flexion and pull-out tests for round copper conductors .....	62
Table 13 – Maximum conductor cross-sections and corresponding gauges .....	64
Table 14 – Tolerances on test quantities .....	70
Table 15 – Test copper conductors .....	73
Table 16 – Impulse test voltages and corresponding altitudes .....	78
Table 17 – Minimum clearances in air .....	78
Table 18 – Minimum creepage distances .....	79
Table 19 – Dielectric test voltage corresponding to the rated insulation voltage .....	79
Table 20 – Values for $I_{peak}$ and $I^2t$ depending on the type of distribution system.....	82
Table 21 – Calculated circuit parameters .....	83
Table 22 – relationship between the prospective fault current in the fusible element circuit and the diameter of the copper wire.....	84
Table 23 – Values of power-factors corresponding to test currents and ratio $n$ between peak and RMS values of current .....	87
Table 24 – Value of the prospective test current according to the rated operational current.....	89
Table 25 – Tests for EMC – Immunity .....	91
Table 26 – Specific acceptance criteria for immunity tests .....	91
Table 27 – Terminal disturbance voltage limits for conducted radio-frequency emission (for mains ports) .....	92
Table 28 – Radiated emission test limits .....	92
Table B.1 – Test sequences.....	119
Table B.2 – Number of samples to be tested.....	120
Table E.1 – Minimum values of width of grooves according to the pollution degrees .....	125
Table F.1 – Correspondence between the nominal voltage of the supply system and the contactor rated impulse withstand voltage, in case of overvoltage protection by surge-arresters according to IEC 60099-1 <sup>a</sup> .....	131

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**ELECTROMECHANICAL CONTACTORS  
FOR HOUSEHOLD AND SIMILAR PURPOSES**

## 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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 61095 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, in conjunction with subcommittee 23E: Circuit-breakers and similar equipment for household use, of IEC technical committee 23: Electrical accessories. It is an International Standard.

This third edition cancels and replaces the second edition published in 2009. This edition constitutes a technical revision.

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

- a) addition of requirements for screwless terminals;
- b) addition of requirements for the switching of LED lamps. Contactors for domestic and similar applications can be used for controlling lighting loads which is increasingly using LED lamp technology. A specific category for contactors is created: AC-7d. Requirements and tests

are added to cover this market development, mainly for making and breaking and conventional operational performance;

- c) addition of requirements for contactors with electronically controlled electromagnet. Household contactors with electronically controlled electromagnet are available for years on the market. To fully cover such device, requirements and tests are added, dealing mainly with operating limits, behaviour in abnormal conditions, breakdown of components, EMC tests, etc.
- d) Embedded software. More and more contactors are incorporating electronic circuits with embedded software. A reference is provided to guide the design of the software.

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

Draft	Report on voting
121A/566/FDIS	121A/573/RVD

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

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

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

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

- reconfirmed,
- withdrawn, or
- revised.

## INTRODUCTION

This document gives requirements for contactors household and similar purposes, including contactors for distribution control in buildings.

Contactors for such purposes have particular requirements which include test sequences and sampling plans to facilitate testing.

Contactors according to this document are limited in the range of operational currents and operational voltages to values appropriate to the applications. Such contactors are for use in circuits of limited prospective short-circuit fault current for which they are co-ordinated with an appropriate short-circuit protective device to provide suitable co-ordination.

This document defines in a single document the specific utilization category for a described application and states the relevant requirements. As far as possible, it is in line with the requirements contained in IEC 60947-4-1.

This document also applies to contactors which are components of an appliance, unless otherwise stated in the standard covering the relevant appliance.

This document is a preview generated by EVS

# ELECTROMECHANICAL CONTACTORS FOR HOUSEHOLD AND SIMILAR PURPOSES

## 1 Scope

This document applies to electromechanical air break contactors for household and similar purposes provided with main contacts intended to be connected to circuits the rated voltage of which does not exceed 440 V AC (between phases) with rated operational currents less than or equal to 63 A for utilization category AC-7a, and 32 A for utilization categories AC-7b, AC-7c and AC-7d (expressed in rated power), and rated conditional short-circuit current less than or equal to 6 kA.

NOTE Today, most LED lamp manufacturers provide information in Watt. So, the main contactor characteristic for utilization category AC-7d is expressed in Watt to be directly applicable to the corresponding LED lamp load.

Specific requirements apply to contactors equipped with screwless-type terminals.

This document does not apply to

- contactors complying with IEC 60947-4-1;
- semiconductor contactors;
- contactors designed for special applications;
- auxiliary contacts of contactors. These are dealt with in IEC 60947-5-1.

This document states

- 1) the characteristics of contactors.
- 2) the conditions with which contactors comply with reference to:
  - a) their operation and behaviour;
  - b) their dielectric properties;
  - c) the degrees of protection provided by their enclosures, where applicable;
  - d) their construction;
  - e) their electromagnetic compatibility characteristics.
- 3) the tests intended for confirming that these conditions have been met, and the methods to be adopted for these tests.
- 4) the test sequences and the number of samples.
- 5) the information to be given with contactors or in the manufacturer's literature.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60028:1925, *International standard of resistance for copper*

IEC 60068-2-78:2012, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 60073:2002, *Basic and safety principles for man-machine interface, marking and identification – Coding principles for indicators and actuators*

IEC 60085:2007, *Electrical insulation – Thermal evaluation and designation*

IEC 60112:2020, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60417, *Graphical symbols for use on equipment*, available at <https://www.graphical-symbols.info/equipment>

IEC 60445:2021, *Basic and safety principles for man-machine interface, marking and identification – Identification of equipment terminals, conductor terminations and conductors*

IEC 60447:2004, *Basic and safety principles for man-machine interface, marking and identification – Actuating principles*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP Code)*

IEC 60529:1989/AMD1:1999

IEC 60529:1989/AMD2:2013

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

IEC 60695-2-10:2021, *Fire hazard testing – Part 2-10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure*

IEC 60695-2-11:2021, *Fire hazard testing – Part 2-11: Glowing/hot-wire based test methods – Glow-wire flammability test method for end products (GWEPT)*

IEC 60695-11-10:2013, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*

IEC 60947-4-1:2018, *Low-voltage switchgear and controlgear – Part 4-1: Contactors and motor-starters – Electromechanical contactors and motor-starters*

IEC 60947-5-1:2016, *Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices*

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

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

IEC 61000-4-4, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-5, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-6, *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 for equipment with input current up to 16 A per phase*

IEC 61000-4-34, *Electromagnetic compatibility (EMC) – Part 4-34: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current more than 16 A per phase*

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

IEC 61180:2016, *High-voltage test techniques for low-voltage equipment – Definitions, test and procedure requirements, test equipment*

CISPR 14-1:2020, *Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus – Part 1: Emission*

ISO 7000:2019, *Graphical symbols for use on equipment – Registered symbols*

ISO 2039-2:1987, *Plastics – Determination of hardness – Part 2: Rockwell hardness*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

#### 3.1 General terms

##### 3.1.1

##### **overcurrent**

current exceeding the rated current

[SOURCE: IEC 60050-441:1984, 441-11-06]

##### 3.1.2

##### **short-circuit**

accidental or intentional conductive path between two or more conductive parts forcing the electric potential differences between these conductive parts to be equal to or close to zero

[SOURCE: IEC 60050-151:2001, 151-12-04]

##### 3.1.3

##### **short-circuit current**

overcurrent resulting from a short circuit due to a fault or an incorrect connection in an electric circuit

[SOURCE: IEC 60050-441:1984, 441-11-07]