SVENSK STANDARD

SS-EN IEC 60947-4-3, utg 3:2025

Fastställd	Sida	Ansvarig kommitté
2025-09-24	1 (94)	SEK TK 121A

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Kopplingsapparater för högst 1000 V – Del 4-3: Kontaktorer och startkopplare – Halvledarbaserade kontaktorer och startkopplare för annat än motordrifter

Low-voltage switchgear and controlgear – Part 4-3: Contactors and motor-starters – Semiconductor controllers and semiconductor contactors for non-motor loads

Som svensk standard gäller europastandarden EN IEC 60947-4-3:2024. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 60947-4-3:2024.

Nationellt förord

Europastandarden EN IEC 60947-4-3:2024

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 60947-4-3, Third edition, 2020 - Low-voltage switchgear and controlgear - Part 4-3: Contactors and motor-starters - Semiconductor controllers and semiconductor contactors for non-motor loads**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 60947-4-3, utg 2:2014 med eventuella tillägg, ändringar och rättelser gäller ej fr o m 2027-12-31.

ICS 31.180.00; 29.130.20

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 60947-4-3

December 2024

ICS 29.130.20; 31.180

Supersedes EN 60947-4-3:2014

English Version

Low-voltage switchgear and controlgear - Part 4-3: Contactors and motor-starters - Semiconductor controllers and semiconductor contactors for non-motor loads (IEC 60947-4-3:2020)

Appareillage à basse tension - Partie 4-3: Contacteurs et démarreurs de moteurs - Gradateurs et contacteurs à semiconducteurs pour charges autres non moteurs (IEC 60947-4-3:2020)

Niederspannungsschaltgeräte - Teil 4-3: Schütze und Motorstarter - Halbleiter-Steuergeräte und Halbleiter-Schütze für nichtmotorische Lasten (IEC 60947-4-3:2020)

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

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Ref. No. EN IEC 60947-4-3:2024 E

SEK Svensk Elstandard

SS-EN IEC 60947-4-3, utg 3:2025

European foreword

The text of document 121A/357/FDIS, future edition 3 of IEC 60947-4-3, prepared by SC 121A "Low-voltage switchgear and controlgear" of IEC/TC 121 "Switchgear and controlgear and their assemblies for low voltage" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60947-4-3:2024.

The following dates are fixed:

• latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2025-12-31
• latest date by which the national standards conflicting with this document have to be withdrawn	(dow)	2027-12-31

This document supersedes EN 60947-4-3:2014 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.

This document has been prepared under a standardization request addressed to CENELEC by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative Annex ZZ, which is an integral part of this document.

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 60947-4-3:2020 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 60068-2-2:2007	NOTE	Approved as EN 60068-2-2:2007 (not modified)
IEC 60079 (series)	NOTE	Approved as EN IEC 60079-7:2015/A1 (series)
IEC 60085	NOTE	Approved as EN 60085
IEC 60146 (series)	NOTE	Approved as EN 60146 (series)
IEC 60269-1:2006	NOTE	Approved as EN 60269-1:2007 (not modified)
IEC 60269-1:2006/A1:2009	NOTE	Approved as EN 60269-1:2007/A1:2009 (not modified)
IEC 60269-1:2006/A2:2014	NOTE	Approved as EN 60269-1:2007/A2:2014 (not modified)

IEC 60364-1	NOTE	Approved as HD 60364-1
IEC 60664 (series)	NOTE	Approved as EN 60664 (series)
IEC 60947-2	NOTE	Approved as EN 60947-2
IEC 60947-3	NOTE	Approved as EN IEC 60947-3
IEC 60947-4-2	NOTE	Approved as EN IEC 60947-4-2
IEC 60990:2016	NOTE	Approved as EN 60990:2016 (not modified)
IEC 61000-4 (series)	NOTE	Approved as EN 61000-4 (series)
IEC 61032	NOTE	Approved as EN 61032
IEC 61439 (series)	NOTE	Approved as EN IEC 61439 (series)
IEC 62314	NOTE	Approved as EN 62314
IEC 62477-1:2012	NOTE	Approved as EN 62477-1:2012 (not modified) + A11:2014
IEC 62477-1:2012/A1:2016	NOTE	Approved as EN 62477-1:2012/A1:2017 (not modified)
IEC/TR 63201	NOTE	Approved as CLC IEC/TR 63201

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

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

Publication	Year	Title	EN/HD	Year
IEC 60445	-	Basic and safety principles for man-machine interface, marking and identification - Identification of equipment terminals, conductor terminations and conductors	EN IEC 60445	2021
IEC 60715	-	Dimensions of low-voltage switchgear and controlgear - Standardized mounting on rails for mechanical support of switchgear, controlgear and accessories	EN 60715	2017
IEC 60730-1 (mod)	-	Automatic electrical controls - Part 1: General requirements	EN 60730-1	2016
			+ A1	2019
IEC 60947-1	2020	Low-voltage switchgear and controlgear - Part 1: General rules	EN 60947-1	2020
IEC 60947-4-1	-	Low-voltage switchgear and controlgear - Part 4-1: Contactors and motor-starters - Electromechanical contactors and motor-starters	EN IEC 60947-4-1	2019
IEC 61000-3-2	-	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current <= 16 A per phase)	EN IEC 61000-3-2	2019
IEC 61000-3-3	-	Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current <= 16 A per phase and not subject to conditional connection	EN 61000-3-3	2013
			+ A1	2019

Publication	Year	Title	EN/HD	Year
IEC 61000-3-11	-	Electromagnetic compatibility (EMC) - Part 3-11: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems - Equipment with rated current <= 75 A and subject to conditional connection	EN IEC 61000-3-11	2019
IEC 61000-3-12	-	Electromagnetic compatibility (EMC) - Part 3-12: Limits - Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and < or = 75 A per phase	EN 61000-3-12	2011
IEC 61000-4-5	-	Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test	EN 61000-4-5	2014
			+ A1	2017
IEC 61140	2016	Protection against electric shock - Common aspects for installation and equipment	EN 61140	2016
CISPR 11 (mod)	2015	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement	EN 55011	2016
+ A1	2016		+ A1	2017
ISO 2859-1	1999	Sampling procedures for inspection by attributes - Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection	-	-
+ A1	2011		-	-

Annex ZZ
(informative)

Relationship between this European standard and the essential requirements of Directive 2014/30/EU [2014 OJ L96] aimed to be covered

This European standard has been prepared under a Commission's standardisation request as regards harmonised standards in support of Directive 2014/30/EU relating to electromagnetic compatibility, 'M/552' / C(2016) 7641 final of 30.11.2016[1], to provide one voluntary means of conforming to essential requirements of Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility [2014 OJ L96].

Once this standard is cited in the Official Journal of the European Union under that Directive, compliance with the normative clauses of this standard given in Table ZZ.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding essential requirements of that Directive, and associated EFTA regulations.

Table ZZ.1 — Correspondence between this European standard and Annex I of Directive 2014/30/EU [2014 OJ L96]

Essential requirements of Directive 2014/30/EU	Clause(s) / sub-clause(s) of this EN	Remarks / Notes
Annex I. 1(a) (electromagnetic disturbances)	8.3.1, 8.3.3, 9.4.1, 9.4.3	
Annex I. 1(b) (electromagnetic immunity)	8.3.1, 8.3.2, 9.4.1, 9.4.2	

WARNING 1 — Presumption of conformity stays valid only as long as a reference to this European standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2 — Other Union legislation may be applicable to the product(s) falling within the scope of this standard.

[1] COMMISSION IMPLEMENTING DECISION C(2016) 7641 final of 30.11.2016 on a standardisation request to the European Committee for Standardisation, to the European Committee for Electrotechnical Standardisation and to the European Telecommunications Standards Institute as regards harmonised standards in support of Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility.

IEC 60947-4-3

Edition 3.0 2020-07

INTERNATIONAL STANDARD

Low-voltage switchgear and controlgear – Part 4-3: Contactors and motor-starters – Semiconductor controllers and semiconductor contactors for non-motor loads

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 4-3: Contactors and motor-starters – Semiconductor controllers and semiconductor contactors for non-motor loads

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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International Standard IEC 60947-4-3 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 third edition cancels and replaces the second edition published in 2014. This edition constitutes a technical revision.

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

a) scope exclusions;

b) editorial correction of notes and hanging paragraphs;

c) safety aspects related to:
   – general aspects;
   – limited energy circuits;
   – electronic circuits;
d) mention of dedicated wiring accessories;
e) power consumption measurement;
f) alignment to IEC 60947-1:2020;
g) alignment with IEC 60947-4-2 when appropriate.

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 60947-1:2020.

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

FDIS	Report on voting
121A/357/FDIS	121A/368/RVD

Full information on the voting for the approval of this document 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 in the IEC 60947 series, published under the general title *Low-voltage switchgear and controlgear*, can be found on the IEC website.

The following differing practices of a less permanent nature exist in the countries indicated below.

5.5 USA and Canada

8.1.14.1 Canada

Table 14 USA

Table 15 USA

9.4.3.2 USA

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.

INTRODUCTION

This document covers low-voltage semiconductor controllers and semiconductor contactors (solid-state contactors) intended for the use with non-motor loads. As semiconductor controllers, they have many capabilities beyond the simple switching on and off of non-motor loads. As semiconductor contactors, they perform the same functions as mechanical contactors, but utilize one or more semiconductor switching devices in their main poles.

The devices may be single-pole or multi-pole (see 3.5.1 of IEC 60947-1:2020). This document refers to complete devices rated as a unit incorporating all necessary heat-sinking material and terminals. It includes devices with all necessary terminals, which are supplied with or without heat-sink in knocked-down form for combination by the users, when the manufacturer gives with the device detailed information about choosing the heat-sink and mounting the device on the heat-sink.

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 4-3: Contactors and motor-starters – Semiconductor controllers and semiconductor contactors for non-motor loads

1 Scope

This document applies to semiconductor controllers and semiconductor contactors for non-motor load intended to be connected to circuits, the rated voltage of which does not exceed 1 000 V AC.

It covers their use:

– for operations of changing the state of AC electric circuits between the ON-state and the OFF-state;
– with or without bypass switching devices;
– as controller, for reducing the amplitude of the RMS AC voltage.

This document does not apply to:

– electromechanical contactors (see IEC 60947-4-1);
– short-circuit protective device associated with semiconductor controllers and semiconductor contactors (see IEC 60947-4-1 (MPSD), IEC 60947-2 and IEC 60947-3);
– semiconductor motor controller or soft-starter equipment (see IEC 60947-4-2);
– semiconductor converters (see IEC 60146 (all parts));
– solid-state relays (see IEC 62314);
– use of the product within explosive atmospheres (see IEC 60079 (all parts));
– software and firmware requirements (see IEC TR 63201);
– cyber security aspects (see IEC TS 63208).

Contactors and control-circuit devices used in semiconductor controllers and contactors are considered compliant with the requirements of their relevant product standard. Where mechanical switching devices are used, they are considered meeting the requirements of their own IEC product standard and the additional requirements of this document.

The object of this document is to state as follows:

– the characteristics of semiconductor controllers and semiconductor contactors;
– the conditions with which semiconductor controllers and semiconductor contactors comply with reference to:
  a) their operation and behaviour in normal and abnormal operating conditions including overcurrent operating conditions;
  b) their dielectric properties;
  c) the degrees of protection provided by their enclosures, where applicable;
  d) their construction including safety measures against electric shock, fire hazard and mechanical hazard;
– the tests intended for confirming that these conditions have been met, and the methods to be adopted for these tests;
– the information to be given with the equipment 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 60445, *Basic and safety principles for man-machine interface, marking and identification – Identification of equipment terminals, conductor terminations and conductors*

IEC 60715, *Dimensions of low-voltage switchgear and controlgear – Standardized mounting on rails for mechanical support of switchgear, controlgear and accessories*

IEC 60730-1, *Automatic electrical controls – Part 1: General requirements*

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

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

IEC 61000-3-2, *Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)*

IEC 61000-3-3, *Electromagnetic compatibility (EMC) – Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection*

IEC 61000-3-11, *Electromagnetic compatibility (EMC) – Part 3-11: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems – Equipment with rated current ≤ 75 A and subject to conditional connection*

IEC 61000-3-12, *Electromagnetic compatibility (EMC) – Part 3-12: Limits – Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and ≤ 75 A per phase*

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

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

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

ISO 2859-1:1999, *Sampling procedures for inspection by attributes – Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*
ISO 2859-1:1999/AMD1:2011