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Kopplingsapparater för högst 1000 V – Del 7-4: Övrigt hithörande materiel – Kopplingsplintar för kopparledare för montering på mönsterkort

*Low-voltage switchgear and controlgear –
Part 7-4: Ancillary equipment –
PCB terminal blocks for copper conductors*

Som svensk standard gäller europastandarden EN IEC 60947-7-4:2019. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 60947-7-4:2019.

Nationellt förord

Europastandarden EN IEC 60947-7-4:2019

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 60947-7-4, Second edition, 2019 - Low-voltage switchgear and controlgear - Part 7-4: Ancillary equipment - PCB terminal blocks for copper conductors**

utarbetad inom International Electrotechnical Commission, IEC.

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English Version

**Low-voltage switchgear and controlgear - Part 7-4: Ancillary
equipment - PCB terminal blocks for copper conductors
(IEC 60947-7-4:2019)**

Appareillage à basse tension - Partie 7-4: Matériels
accessoires - Blocs de jonction pour cartes de circuits
imprimés pour conducteurs en cuivre
(IEC 60947-7-4:2019)

Niederspannungsschaltgeräte - Teil 7-4: Hilfseinrichtungen
- Leiterplatten-Anschlussklemmen für Kupferleiter
(IEC 60947-7-4:2019)

This European Standard was approved by CENELEC on 2019-02-22. 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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey 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/255/FDIS, future edition 2 of IEC 60947-7-4, 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 60947-7-4:2019.

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) 2019-11-22
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2022-02-22

This document supersedes EN 60947-7-4:2013.

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.

Endorsement notice

The text of the International Standard IEC 60947-7-4:2019 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 60512-2-1	NOTE Harmonized as EN 60512-2-1
IEC 60512-5-1	NOTE Harmonized as EN 60512-5-1
IEC 60512-9-5:2010	NOTE Harmonized as EN 60512-9-5:2010 (not modified)
IEC 60664-1:2007	NOTE Harmonized as EN 60664-1:2007 (not modified)
IEC 60695-10-2	NOTE Harmonized as EN 60695-10-2
IEC 60695-11-5	NOTE Harmonized as EN 60695-11-5
IEC 60947-7-1:2009	NOTE Harmonized as EN 60947-7-1:2009 (not modified)
IEC 60998-1:2002	NOTE Harmonized as EN 60998-1:2004
IEC 61984	NOTE Harmonized as EN 61984

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.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60068-2-20	-	Environmental testing - Part 2-20: Tests - Test T: Test methods for solderability and resistance to soldering heat of devices with leads	EN 60068-2-20	-
IEC 60352-1	-	Solderless connections - Part 1: Wrapped connections - General requirements, test methods and practical guidance	EN 60352-1	-
IEC 60352-2	-	Solderless connections - Part 2: Crimped connections - General requirements, test methods and practical guidance	EN 60352-2	-
IEC 60352-3	-	Solderless connections - Part 3: Solderless accessible insulation displacement connections - General requirements, test methods and practical guidance	EN 60352-3	-
IEC 60352-4	-	Solderless connections - Part 4: Solderless non-accessible insulation displacement connections - General requirements, test methods and practical guidance	EN 60352-4	-
IEC 60352-5	-	Solderless connections - Part 5: Press-in connections - General requirements, test methods and practical guidance	EN 60352-5	-
IEC 60352-6	-	Solderless connections - Part 6: Insulation piercing connections - General requirements, test methods and practical guidance	EN 60352-6	-
IEC 60352-7	-	Solderless connections - Part 7: Spring clamp connections - General requirements, test methods and practical guidance	EN 60352-7	-
IEC 60512-2-2	2003	Connectors for electronic equipment - Tests and measurements - Part 2-2: Electrical continuity and contact resistance tests - Test 2b: Contact resistance - Specified test current method	EN 60512-2-2	2003

EN IEC 60947-7-4:2019 (E)

IEC 60512-4-1	-	Connectors for electronic equipment -EN 60512-4-1	-
		Tests and measurements - Part 4-1: Voltage stress tests - Test 4a: Voltage proof	
IEC 60512-5-2	2002	Connectors for electronic equipment -EN 60512-5-2	2002
		Tests and measurements - Part 5-2: Current-carrying capacity tests - Test 5b: Current-temperature derating	
IEC 60512-11-7	-	Connectors for electronic equipment -EN 60512-11-7	-
		Tests and measurements - Part 11-7: Climatic tests - Test 11g: Flowing mixed gas corrosion test	
IEC 60512-11-9	-	Connectors for electronic equipment -EN 60512-11-9	-
		Tests and measurements - Part 11-9: Climatic tests - Test 11i: Dry heat	
IEC 60512-11-10	-	Connectors for electronic equipment -EN 60512-11-10	-
		Tests and measurements - Part 11-10: Climatic tests - Test 11j: Cold	
IEC 60695-2-10	-	Fire hazard testing - Part 2-10:EN 60695-2-10	-
		Glowing/hot-wire based test methods - Glow-wire apparatus and common test procedure	
IEC 60695-2-11	-	Fire hazard testing - Part 2-11:EN 60695-2-11	-
		Glowing/hot-wire based test methods - Glow-wire flammability test method for end-products (GWEPT)	
IEC 60695-2-12	-	Fire hazard testing - Part 2-12:EN 60695-2-12	-
		Glowing/hot-wire based test methods - Glow-wire flammability index (GWFI) test method for materials	
IEC 60695-2-13	-	Fire hazard testing - Part 2-13:EN 60695-2-13	-
		Glowing/hot-wire based test methods - Glow-wire ignition temperature (GWIT) test method for materials	
IEC 60947-1	2007	Low-voltage switchgear and controlgear -EN 60947-1	2007
		Part 1: General rules	
+ A1	2010		+ A1 2011
+ A2	2014		+ A2 2014
IEC 60998-2-3	-	Connecting devices for low-voltage circuitsEN 60998-2-3	-
		for household and similar purposes - Part 2-3: Particular requirements for connecting devices as separate entities with insulation-piercing clamping units	
IEC 60999-1	-	Connecting devices - Electrical copperEN 60999-1	-
		conductors - Safety requirements for screw-type and screwless-type clamping units - Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 mm ² up to 35 mm ² (included)	
IEC 60999-2	-	Connecting devices - Electrical copperEN 60999-2	-
		conductors - Safety requirements for screw-type and screwless-type clamping units - Part 2: Particular requirements for clamping units for conductors above 35 mm ² up to 300 mm ² (included)	
IEC 61210	-	Connecting devices - Flat quick-connectEN 61210	-
		terminations for electrical copper conductors - Safety requirements	

ISO 6998	-	Carbonaceous materials for the production- of aluminium - Pitch for electrodes - Determination of coking value	-
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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

**Part 7-4: Ancillary equipment –
PCB terminal blocks for copper conductors**

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 60947-7-4 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 second edition cancels and replaces the first edition published in 2013. This edition constitutes a technical revision.

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

- a) additional test for PCB terminal blocks with clamping units, where contact pressure is transmitted through insulating materials;
- b) tightening torques for screws now given in Table 4 of this document (previously given in Table 4 of IEC 60947-1:2007); tightening torques added for an additional type of screw;
- c) new criteria for verification of contact resistance introduced;

- d) clarification in the description of the temperature-rise test (current-temperature derating); corrections in the test sequence according to Figure 4.

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

FDIS	Report on voting
121A/255/FDIS	121A/265/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 in the IEC 60947 series, published 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 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.

INTRODUCTION

This document covers not only the terminal block requirements in accordance with the IEC 60947-7 series but also takes into account the specifications of connectors in accordance with IEC 61984 as the requirements for both components are highly similar owing to equivalent applications.

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 7-4: Ancillary equipment – PCB terminal blocks for copper conductors

1 Scope

This part of IEC 60947-7 specifies requirements for PCB terminal blocks primarily intended for industrial or similar use.

Mounting and fixing on the printed circuit board is made by soldering, press-in or equivalent methods to provide electrical and mechanical connection between copper conductors and the printed circuit board.

This document applies to PCB terminal blocks intended to connect copper conductors, with or without special preparation, having a cross-section between 0,08 mm² and 300 mm² (AWG 28-600 kcmil), intended to be used in circuits of a rated voltage not exceeding 1 000 V AC up to 1 000 Hz or 1 500 V DC.

NOTE 1 Large-cross-section terminal blocks are dedicated to the specific design of high-current PCBs. The range up to 300 mm² is kept to cover any possible application. Examples of high current PCBs and PCB terminal blocks are shown in Annex C.

NOTE 2 AWG is the abbreviation of "American Wire Gage" (Gage (US) = Gauge (UK)).

1 kcmil = 1 000 cmil;

1 cmil = 1 circular mil = surface of a circle having a diameter of 1 mil;

1 mil = 1/1 000 inch.

This document can be used as a guide for special types of PCB terminal blocks with components, such as disconnect units, integrated cartridge fuse-links and the like or with other dimensions of conductors.

If applicable, in this document the term "clamping unit" is used instead of "terminal". This is taken into account in the case of references to IEC 60947-1.

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 60068-2-20, *Environmental testing – Part 2-20: Tests – Test T: Test methods for solderability and resistance to soldering heat of devices with leads*

IEC 60352-1, *Solderless connections – Part 1: Wrapped connections – General requirements, test methods and practical guidance*

IEC 60352-2, *Solderless connections – Part 2: Crimped connections – General requirements, test methods and practical guidance*

IEC 60352-3, *Solderless connections – Part 3: Solderless accessible insulation displacement connections – General requirements, test methods and practical guidance*

IEC 60352-4, *Solderless connections – Part 4: Solderless non-accessible insulation displacement connections – General requirements, test methods and practical guidance*

IEC 60352-5, *Solderless connections – Part 5: Press-in connections – General requirements, test methods and practical guidance*

IEC 60352-6, *Solderless connections – Part 6: Insulation piercing connections – General requirements, test methods and practical guidance*

IEC 60352-7, *Solderless connections – Part 7: Spring clamp connections – General requirements, test methods and practical guidance*

IEC 60512-2-2:2003, *Connectors for electronic equipment – Tests and measurements – Part 2-2: Electrical continuity and contact resistance tests – Test 2b: Contact resistance – Specified test current method*

IEC 60512-4-1, *Connectors for electronic equipment – Tests and measurements – Part 4-1: Voltage stress tests – Test 4a: Voltage proof*

IEC 60512-5-2:2002, *Connectors for electronic equipment – Tests and measurements – Part 5-2: Current-carrying capacity tests – Test 5b: Current-temperature derating*

IEC 60512-11-7, *Connectors for electronic equipment – Tests and measurements – Part 11-7: Climatic tests – Test 11g: Flowing mixed gas corrosion test*

IEC 60512-11-9, *Connectors for electronic equipment – Tests and measurements – Part 11-9: Climatic tests – Test 11i: Dry heat*

IEC 60512-11-10, *Connectors for electronic equipment – Tests and measurements – Part 11-10: Climatic tests – Test 11j: Cold*

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

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

IEC 60695-2-12, *Fire hazard testing – Part 2-12: Glowing/hot-wire based test methods – Glow-wire flammability index (GWFI) test method for materials*

IEC 60695-2-13, *Fire hazard testing – Part 2-13: Glowing/hot-wire based test methods – Glow-wire ignition temperature (GWIT) test method for materials*

IEC 60947-1:2007, *Low-voltage switchgear and controlgear – Part 1: General rules*

IEC 60947-1:2007/AMD1:2010

IEC 60947-1:2007/AMD2:2014

IEC 60998-2-3, *Connecting devices for low-voltage circuits for household and similar purposes – Part 2-3: Particular requirements for connecting devices as separate entities with insulation-piercing clamping units*

IEC 60999-1, *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 1: General requirements and particular requirements for clamping units for conductors from 0,2 mm² up to 35 mm² (included)*

IEC 60999-2, *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units – Part 2: Particular requirements for clamping units for conductors above 35 mm² up to 300 mm² (included)*

IEC 61210, *Connecting devices – Flat quick-connect terminations for electrical copper conductors – Safety requirements*

ISO 6988, *Metallic and other non-organic coatings – Sulfur dioxide test with general condensation of moisture*