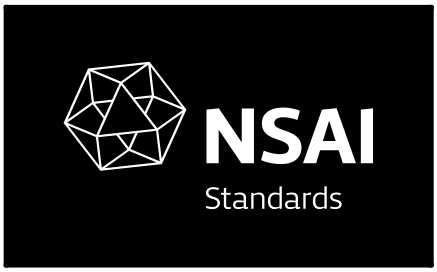


Irish Standard
I.S. EN IEC 60947-7-4:2019

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

**I.S. EN IEC 60947-7-4:2019**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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## National Foreword

I.S. EN IEC 60947-7-4:2019 is the adopted Irish version of the European Document EN IEC 60947-7-4:2019, Low-voltage switchgear and controlgear - Part 7-4: Ancillary equipment - PCB terminal blocks for copper conductors

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN IEC 60947-7-4

March 2019

ICS 29.130.20

Supersedes EN 60947-7-4:2013

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)

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- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2022-02-22

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

| | |
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| 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.

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| 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 |

| | | | | |
|---|---|---|---|---|
| IEC 60512-4-1 | - | Connectors for electronic equipment - Tests and measurements - Part 4-1: Voltage stress tests - Test 4a: Voltage proof | EN 60512-4-1 | - |
| IEC 60512-5-2 | 2002 | Connectors for electronic equipment - Tests and measurements - Part 5-2: Current-carrying capacity tests - Test 5b: Current-temperature derating | EN 60512-5-2 | 2002 |
| IEC 60512-11-7 | - | Connectors for electronic equipment - Tests and measurements - Part 11-7: Climatic tests - Test 11g: Flowing mixed gas corrosion test | EN 60512-11-7 | - |
| IEC 60512-11-9 | - | Connectors for electronic equipment - Tests and measurements - Part 11-9: Climatic tests - Test 11i: Dry heat | EN 60512-11-9 | - |
| IEC 60512-11-10 | - | Connectors for electronic equipment - Tests and measurements - Part 11-10: Climatic tests - Test 11j: Cold | EN 60512-11-10 | - |
| IEC 60695-2-10 | - | Fire hazard testing - Part 2-10: Glowing/hot-wire based test methods - Glow-wire apparatus and common test procedure | EN 60695-2-10 | - |
| 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) | EN 60695-2-11 | - |
| 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 | EN 60695-2-12 | - |
| 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 | EN 60695-2-13 | - |
| IEC 60947-1 | 2007 | Low-voltage switchgear and controlgear - Part 1: General rules | EN 60947-1 | 2007 |
| + A1 | 2010 | | + A1 | 2011 |
| + A2 | 2014 | | + A2 | 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 | EN 60998-2-3 | - |
| 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 $mm^2$ up to 35 $mm^2$ (included) | EN 60999-1 | - |
| 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 $mm^2$ up to 300 $mm^2$ (included) | EN 60999-2 | - |
| IEC 61210 | - | Connecting devices - Flat quick-connect terminations for electrical copper conductors - Safety requirements | EN 61210 | - |

| | | | |
|---|---|---|---|
| ISO 6998 | - | Carbonaceous materials for the production of aluminium - Pitch for electrodes - Determination of coking value | - |

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IEC 60947-7-4

Edition 2.0 2019-01

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

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

## Appareillage à basse tension – Partie 7-4: Matériels accessoires – Blocs de jonction pour cartes de circuits imprimés pour conducteurs en cuivre

IEC 60947-7-4:2019-01(en-fr)



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IEC 60947-7-4

Edition 2.0 2019-01

# INTERNATIONAL STANDARD

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

## Appareillage à basse tension – Partie 7-4: Matériels accessoires – Blocs de jonction pour cartes de circuits imprimés pour conducteurs en cuivre

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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# CONTENTS

FOREWORD ..... 4
INTRODUCTION ..... 6
1 Scope ..... 7
2 Normative references ..... 7
3 Terms and definitions ..... 9
4 Classification ..... 10
5 Characteristics ..... 10
5.1 Summary of characteristics ..... 10
5.2 Type of PCB terminal block ..... 10
5.3 Rated and limiting values ..... 10
5.3.1 Rated voltages ..... 10
5.3.2 Rated current ..... 11
5.3.3 Standard cross-sections ..... 11
5.3.4 Maximum cross-section ..... 12
5.3.5 Connecting capacity ..... 12
6 Product information ..... 13
6.1 Marking ..... 13
6.2 Additional information ..... 13
7 Normal service, mounting and transport conditions ..... 13
8 Constructional and performance requirements ..... 13
8.1 Constructional requirements ..... 13
8.1.1 Clamping units ..... 13
8.1.2 Mounting and installation ..... 14
8.1.3 Clearances and creepage distances ..... 14
8.1.4 Terminal identification and marking ..... 14
8.1.5 Resistance to abnormal heat and fire ..... 15
8.1.6 Maximum cross-section and connecting capacity ..... 15
8.2 Performance requirements ..... 15
8.2.1 Temperature-rise (current-temperature derating) ..... 15
8.2.2 Dielectric properties ..... 15
8.2.3 Short-time withstand current ..... 15
8.2.4 Contact resistance ..... 16
8.2.5 Ageing tests ..... 16
8.3 Electromagnetic compatibility (EMC) ..... 16
9 Tests ..... 16
9.1 Kinds of test ..... 16
9.2 General ..... 16
9.3 Verification of mechanical characteristics ..... 17
9.3.1 General ..... 17
9.3.2 Attachment of the PCB terminal block on its support ..... 17
9.3.3 Vacant ..... 18
9.3.4 Verification of the maximum cross-section and connecting capacity ..... 18
9.3.5 Verification of maximum cross-section (special test with gauges) ..... 18
9.4 Verification of electrical characteristics ..... 19
9.4.1 General ..... 19

9.4.2 Verification of clearances and creepage distances ..... 19
9.4.3 Dielectric tests ..... 19
9.4.4 Verification of contact resistance ..... 20
9.4.5 Temperature-rise test (current-temperature derating) ..... 22
9.4.6 Short-time withstand current test ..... 24
9.4.7 Ageing tests ..... 25
9.5 Verification of thermal characteristics ..... 29
9.6 Verification of EMC characteristics ..... 30
9.6.1 General ..... 30
9.6.2 Immunity ..... 30
9.6.3 Emission ..... 30
Annex A (informative) Structure of a PCB terminal block ..... 31
Annex B (informative) Additional information to be specified between the manufacturer and the user ..... 32
B.1 Additional information available on request of the user ..... 32
B.2 Information for testing in addition to those mentioned above ..... 32
Annex C (informative) Examples of PCBs and PCB terminal blocks for high-current application ..... 33
C.1 Layout of high-current PCBs (schematic diagram) ..... 33
C.2 High-current PCB terminal blocks ..... 34
Bibliography ..... 35

Figure 1 – Test assembly for the measurement of contact resistance and temperature-rise .. 22
Figure 2 – Example of wiring structure of a multi-tier PCB terminal block ..... 23
Figure 3 – Test assembly for the measurement of short-time withstand current ..... 25
Figure 4 – Test sequence ..... 26
Figure 5 – Test sequence for PCB terminal blocks with contact pressure via insulating material ..... 27
Figure 6 – Current cycling ageing test procedure ..... 29
Figure A.1 – Structure of a PCB terminal block ..... 31
Figure C.1 – Structure of a high current PCB ..... 33
Figure C.2 – PCB terminal block with soldered connection to the PCB ..... 34
Figure C.3 – PCB terminal block with screwed connection to the PCB ..... 34

Table 1 – Standard cross-sections of copper conductors ..... 11
Table 2 – Relationship between maximum cross-section and connecting capacity of PCB terminal blocks ..... 12
Table 3 – Standards for clamping units and connecting methods ..... 14
Table 4 – Tightening torques for PCB terminal blocks with screw-type clamping units ..... 18
Table 5 – Impulse withstand test voltages ..... 20
Table 6 – Dielectric test voltages corresponding to the rated insulation voltage ..... 20
Table 7 – Length of connectable conductors and conductor loops ..... 23
Table 8 – Examples of cross-sectional distribution of interconnections on printed circuit boards ..... 24

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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# LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

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

## FOREWORD

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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 $mm^2$ and 300 $mm^2$ (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 $mm^2$ 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*