BS EN IEC 60947-7-1:2025

BSI Standards Publication

Low-voltage switchgear and controlgear

Part 7-1: Ancillary equipment — Terminal blocks for copper conductors

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Full document details: BS EN IEC 60947-7-1:2025

National foreword

This British Standard is the UK implementation of EN IEC 60947-7-1:2025. It is identical to IEC 60947-7-1:2025. It supersedes BS EN 60947-7-1:2009, which will be withdrawn on 30 June 2028.

The UK participation in its preparation was entrusted to Technical Committee PEL/121/1, Low voltage switchgear and controlgear.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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UK Government is responsible for legislation. For information on legislation and policies relating to that legislation, consult the relevant pages of [http://www.gov.uk%3c/ext-link%3e.%3c/p]www.gov.uk.

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Amendments/corrigenda issued since publication

Date	Text affected

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NORME EUROPÉENNE

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English Version

Low-voltage switchgear and controlgear - Part 7-1: Ancillary equipment - Terminal blocks for copper conductors (IEC 60947-7-1:2025)

Appareillage à basse tension - Partie 7-1: Matériels accessoires - Blocs de jonction pour conducteurs en cuivre (IEC 60947-7-1:2025)

Niederspannungsschaltgeräte - Teil 7-1: Hilfseinrichtungen - Reihenklemmen für Kupferleiter (IEC 60947-7-1:2025)

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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.

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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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European foreword

The text of document 121A/646/FDIS, future edition 4 of IEC 60947-7-1, 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 60947-7-1:2025.

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) 2026-06-30
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2028-06-30

This document supersedes EN 60947-7-1:2009 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.

This document is read in conjunction with EN IEC 60947-1:2021.

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 60947-7-1:2025 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 60228:2023	NOTE	Approved as EN IEC 60228:2024 (not modified)
IEC 60352-4:2020	NOTE	Approved as EN IEC 60352-4:2020 (not modified)
IEC 60715	NOTE	Approved as EN 60715

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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 60068-2-1	2007	Environmental testing - Part 2-1: Tests - Test A: Cold	EN 60068-2-1	2007
IEC 60068-2-2	2007	Environmental testing - Part 2-2: Tests - Test B: Dry heat	EN 60068-2-2	2007
IEC 60695-11-5	2016	Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance	EN 60695-11-5	2017
IEC 60947-1	2020	Low-voltage switchgear and controlgear Part 1: General rules	EN IEC 60947-1 +AC +AC	2021 2023 2024
ISO 4046-4	2016	Paper, board, pulps and related terms — Vocabulary — Part 4: Paper and board grades and converted products	–	–

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Annex ZZ
(informative)

Relationship between this European standard and the safety objectives of Directive 2014/35/EU [2014 OJ L96] aimed to be covered

This European Standard has been prepared under a Commission's standardization request relating to harmonized standards in the field of the Low Voltage Directive, M/511, to provide one voluntary means of conforming to safety objectives of Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits [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 safety objectives of that Directive, and associated EFTA regulations.

Table ZZ.1 — Correspondence between this European standard and Annex I of Directive 2014/35/EU [2014 OJ L96]

Safety objectives of Directive 2014/35/EU	Clause(s) / sub-clause(s) of this EN	Remarks / Notes
1 a) The essential characteristics, the recognition and observance of which will ensure that electrical equipment will be used safely and in applications for which it was made, shall be marked on the electrical equipment, or, if this is not possible, on an accompanying document.	6.1, 8.1.4, Annex D.6	* Subclause 6.1.1 is to be excluded, because is already covered by LVD
1 b) the electrical equipment, together with its component parts, shall be made in such a way as to ensure that it can be safely and properly assembled and connected.	6.1, 6.2, 7, 8.1, Annex D.6, D.7 and D.8.1	
1 c) The electrical equipment shall be so designed and manufactured as to ensure that protection against the hazards set out in points 2 and 3 is assured, providing that the equipment is used in applications for which it was made and is adequately maintained.	1 2nd para *, 8.2, 8.3, and Annex D.1, D.8.2, D.8.3 and D.8.4	

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Safety objectives of Directive 2014/35/EU	Clause(s) / sub-clause(s) of this EN	Remarks / Notes
2 a) Measures of a technical nature shall be laid down in accordance with point 1, in order to ensure that persons and domestic animals are adequately protected against the danger of physical injury or other harm which might be caused by direct or indirect contact.	1 2nd para and Annex D.1	
2 b) Measures of a technical nature shall be laid down in accordance with point 1, in order to ensure that temperatures, arcs or radiation which would cause a danger, are not produced.	8.2.1, 8.1.5, 9.4.5, 9.5 and Annex D.8.2.1, D.9.4.5, D.9.5	
2 c) Measures of a technical nature shall be laid down in accordance with point 1, in order to ensure that persons, domestic animals and property are adequately protected against non-electrical dangers caused by the electrical equipment which are revealed by experience.	1 2nd para and Annex D.1	
2 d) Measures of a technical nature shall be laid down in accordance with point 1, in order to ensure that the insulation is suitable for foreseeable conditions.	8.1.3, 8.2.2, 9.4.2, 9.4.3 and Annex D.8.1.3, D.8.2.2, D.9.4.2, D.9.4.3	
3 a) Technical measures shall be laid down in accordance with point 1, in order to ensure that the electrical equipment meets the expected mechanical requirements in such a way that persons, domestic animals and property are not endangered.	1 2nd para and Annex D.1	
3 b) Technical measures shall be laid down in accordance with point 1, in order to ensure that the electrical equipment is resistant to non-mechanical influences in expected environmental conditions, in such a way that persons, domestic animals and property are not endangered.	1 2nd para and Annex D.1	

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Safety objectives of Directive 2014/35/EU	Clause(s) / sub-clause(s) of this EN	Remarks / Notes
3 c) Technical measures shall be laid down in accordance with point 1, in order to ensure that the electrical equipment does not endanger persons, domestic animals and property in foreseeable conditions of overload.	8.2.3, 9.4.6 and Annex D.8.2.3, D.9.4.6	

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.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 7-1: Ancillary equipment – 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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IEC 60947-7-1 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. It is an International Standard.

This fourth edition cancels and replaces the third 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) Scope extension for smaller conductor cross-sections;
b) Implementation of a contact pressure via insulation material (CoPI) test;
c) Introduction of new informative Annex E for larger cross-sections;

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d) Reorganisation of all tables merged into two tables for electrical and mechanical values;

e) Implementation of AWG-sizes conductor types as an equivalent type of metric conductor with examples in Annex C;

f) Reorganisation of Annex D test disconnect terminal blocks to enhance readability;

g) Introduction of new informative Annex A for main characteristics of terminal blocks.

This document shall be read in conjunction with IEC 60947-1:2020. The provisions of the general rules dealt with in IEC 60947-1:2020 are applicable to this document, where specifically called for. Clauses and subclauses, tables, figures and annexes thus applicable are identified by reference to IEC 60947-1:2020, e.g. 1.2 of IEC 60947-1:2020, Table 4 of IEC 60947-1:2020 or Annex A of IEC 60947-1:2020.

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

Draft	Report on voting
121A/646/FDIS	121A/674/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.

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.

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. The main document types developed by IEC are described in greater detail at 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 in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

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LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 7-1: Ancillary equipment – Terminal blocks for copper conductors

1 Scope

This part of IEC 60947 specifies requirements for terminal blocks and test disconnect terminal blocks according to Annex D with screw-type or screw-less-type clamping units primarily intended for industrial or similar use and to be fixed to a support to provide electrical and mechanical connection between copper conductors. It applies to terminal blocks intended to connect round copper conductors, with or without special preparation, having a cross-section between 0,05 mm^2/30 AWG and 300 mm^2/600 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. The tests on terminal blocks are made with AC or DC supply as required in relevant clauses of this document.

NOTE 1 This document is not intended for connecting devices for household purposes according to IEC 60998-1.

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

kcmil = 1 000 cmil;

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

1 mil = 1/1 000 inch.

NOTE 3 This document can be used as a guide in conjunction with an additional product risk assessment for:

– terminal blocks requiring the fixing of special devices to the conductors, for example quick connect terminations or wrapped connection, etc.;
– terminal blocks providing wire-binding screw (see IEC 60947-1:2020, Figure D.2), stud and nut terminations (see IEC 60947-1:2020, Figures D.4 and D.5), lug terminations (see IEC 60947-1:2020, Figure D.6) and terminal blocks providing direct contact to the conductors by means of edges or points penetrating the insulation, for example insulation displacement connection (IDC) (see IEC 60352-4:2020, Figure 2), etc.;
– special types of terminal blocks, for example with diodes or varistors or similar component holders, etc.;
– terminal blocks with capability to connect conductors with cross sections larger than 300 mm^2/600 kcmil, see Annex E.

Where applicable in this document, the term "clamping unit" has been used instead of the term "terminal". This is taken into account in case of reference to IEC 60947-1:2020.

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 60068-2-1:2007, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2:2007, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60695-11-5:2016, *Fire hazard testing – Part 11-5: Test flames – Needle-flame test method – Apparatus, confirmatory test arrangement and guidance*

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

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ISO 4046-4:2016, *Paper, board, pulps and related terms – Vocabulary – Part 4: Paper and board grades and covered products*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60947-1:2020 and the following 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
terminal block
insulating part carrying one or more mutually insulated terminal assemblies and intended to be fixed to a support

3.2
rated cross-section
value of the maximum cross-section of all connectable types of conductors, rigid (solid and stranded) and flexible, stated by the manufacturer, and to which certain thermal, mechanical and electrical requirements are referred

3.3
rated connecting capacity
range of cross-section and, if applicable, the number of connectable conductors, for which the terminal block is designed

3.4
terminal assembly
two or more clamping units fixed to the same conductive part

3.5
contact pressure via insulating material
CoPI
<for a clamping unit> contact force of a clamping unit where contact pressure is transmitted through insulating material

4 Classification

Distinction is made between various types of terminal blocks as follows:

– method of fixing the terminal block to the support;
– number of poles;
– type of clamping units: screw-type clamping units or screwless-type clamping units (see 3.5.25 of IEC 60947-1:2020);
– ability to receive prepared conductors (see 3.5.28 of IEC 60947-1:2020);
– terminal assemblies with identical or dissimilar clamping units;
– number of clamping units on each terminal assembly;
– service conditions;
– ability to receive different types of conductors, e.g. solid, rigid stranded or flexible conductors.

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5 Characteristics

5.1 Summary of characteristics

The characteristics of a terminal block are as follows:

– type of terminal block (see 5.2);
– rated and limiting values (see 5.3).

5.2 Type of terminal block

The following shall be stated:

– type of clamping units (e.g. screw-type, screwless-type);
– number of clamping units.

5.3 Rated and limiting values

5.3.1 Rated voltages

Subclauses 5.3.1.2 and 5.3.1.3 of IEC 60947-1:2020 apply.

5.3.2 Short-time withstand current

A specified RMS value of current which a terminal block shall be able to withstand during a specified short-time under prescribed conditions of use and behaviour (see 8.2.3 and 9.4.6).

5.3.3 Standard cross-sections

The standard values of cross-sections of round copper conductors to be used are contained in Table 1.

5.3.4 Rated cross-section

The rated cross-section shall be selected from the standard cross-sections given in Table 1.

5.3.5 Rated connecting capacity

For terminal blocks with a rated cross-section of 35 mm^2/2 AWG or less, the minimal requirement of rated connecting capacity specified in Table 1 applies. A rated connecting capacity wider than the rated connecting capacity specified in Table 1 is to be declared, if applicable.

For rated cross-sections above 35 mm^2/2 AWG, the manufacturer shall state the maximum and minimum cross sections conductors that can be connected. Several connecting capacities can be defined according to the type of conductors, rigid (solid or stranded) or flexible, while remaining consistent with the same rated cross-section.

The manufacturer shall also state the number of conductors that can be connected simultaneously to each clamping unit and any necessary preparation at the end of the conductor.

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