



**BSI Standards Publication**

**Basic and safety principles for man-machine interface, marking and identification —  
Identification of equipment terminals, conductor terminations and conductors**

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This is a preview of BS EN IEC 60445:2021+A1:2026. [Click here to purchase the full version from the ANSI store.](#)

## National foreword

This British Standard is the UK implementation of EN IEC 60445:2021+A1:2026. It is identical to IEC 60445:2021, incorporating amendment 1:2026. It supersedes BS EN IEC 60445:2021, which will be withdrawn on 31 March 2029.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment 1 is indicated by A1 A1.

The UK participation in its preparation was entrusted to Technical Committee GEL/3, Documentation and graphical symbols.

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

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Published by BSI Standards Limited 2026

ISBN 978 0 539 31755 8

ICS 01.080.20; 13.110; 29.020

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 September 2021.

### Amendments/corrigenda issued since publication

Date	Text affected
31 March 2026	Implementation of IEC amendment 1:2026 with CENELEC endorsement A1:2026

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## EUROPÄISCHE NORM

March 2026

ICS 01.080.20; 13.110; 29.020

Supersedes EN 60445:2017 and all of its amendments  
and corrigenda (if any)

English Version

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

Principes fondamentaux et de sécurité pour les interfaces  
hommes-machines, le marquage et l'identification -  
Identification des bornes de matériels, des extrémités de  
conducteurs et des conducteurs  
(IEC 60445:2021)

Grund- und Sicherheitsregeln für die Mensch-Maschine-  
Schnittstelle - Kennzeichnung von Anschlüssen elektrischer  
Betriebsmittel, angeschlossenen Leiterenden und Leitern  
(IEC 60445:2021)

This European Standard was approved by CENELEC on 2021-08-20. 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.

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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, 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

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## European foreword

The text of document 3/1491/FDIS, future edition 7 of IEC 60445, prepared by IEC/TC 3 “Documentation, graphical symbols and representations of technical information” was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60445:2021.

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) 2022-05-20
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2024-08-20

This document supersedes EN 60445:2017 and all of its amendments and corrigenda (if any).

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## Endorsement notice

The text of the International Standard IEC 60445:2021 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 60079-11 NOTE Harmonized as EN 60079-11

IEC 60757 NOTE Harmonized as HD 457 S1

IEC 61666:2010 NOTE Harmonized as EN 61666:2010 (not modified)

IEC 62491 NOTE Harmonized as EN 62491

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## **European foreword to Amendment 1**

The text of document 3/1753/FDIS, future edition 7 of IEC 60445/AMD1, prepared by TC 3 "Documentation, graphical symbols and representations of technical information" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60445:2021/A1:2026.

The following dates are fixed:

- latest date by which the document has to be implemented at national (dop) 2027-03-31 level by publication of an identical national standard or by endorsement
- latest date by which the national standards conflicting with the (dow) 2029-03-31 document have to be withdrawn

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## **Endorsement notice**

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(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](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60417	-	Graphical symbols for use on equipment	-	-
IEC 60617	-	Graphical symbols for diagrams	-	-

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## **Basic and safety principles for man-machine interface, marking and identification - Identification of equipment terminals, conductor terminations and 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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and representations of technical information. It is an International Standard.

It has the status of a basic safety publication in accordance with IEC Guide 104.

This seventh edition cancels and replaces the sixth edition published in 2017. This edition constitutes a technical revision.

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

- a) the definitions have been aligned with IEC 60050-195:2021 and IEC 60050-826:—<sup>1</sup>;
- b) the provisions for colour to be used for identification of certain designated conductors are made requirements and not only recommendations;
- c) introduction of a new subclause on marking of protective terminals for multiple power supply inputs on equipment.

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

FDIS	Report on voting
3/1491/FDIS	3/1517/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/standardsdev/publications](http://www.iec.ch/standardsdev/publications).

The reader's attention is drawn to the fact that Annex B lists all of the "in-some-country" clauses on differing practices of a less permanent nature relating to the subject of this standard.

The committee has decided that the contents of this document and its amendment 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.

<sup>1</sup> Third edition under preparation. Stage at time of publication: IEC FDIS 60050-826:2021.

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This document applies to the identification and marking of terminals of electrical equipment such as resistors, fuses, relays, contactors, transformers, rotating machines and, wherever applicable, to combinations of such equipment (e.g. assemblies), and it also applies to the identification of terminations of certain designated conductors. It also provides general rules for the use of certain colours or alphanumeric notations to identify conductors with the aim of avoiding ambiguity and ensuring safe operation. These conductor colours and alphanumeric notations are intended to be applied on cores, busbars, and electrical equipment, and in cables or installations.

This basic safety publication focusing on safety essential requirements is primarily intended for use by technical committees in the preparation of standards in accordance with the principles laid down in IEC Guide 104 and ISO/IEC Guide 51.

It is not intended for use by manufacturers or certification bodies. One of the responsibilities of a technical committee is, wherever applicable, to make use of basic safety publications in the preparation of its publications. The requirements of this basic safety publication will not apply unless specifically referred to or included in the relevant publications.

## 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 60417, *Graphical symbols for use on equipment* (available at <http://www.graphical-symbols.info/equipment>)

IEC 60617, *Graphical symbols for diagrams* (available at <http://std.iec.ch/iec60617>)

## 3 Terms and definitions

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

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

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

NOTE The terms are sorted in alphabetical order in the English language.

### 3.1

#### **earthing**

#### **grounding, US**

electric connections between conductive parts and local earth

[SOURCE: IEC 60050-195:2021, 195-01-24]

### 3.2

#### **earthed protective bonding conductor**

protective bonding conductor which has a conductive path to local earth