SLOVENSKI STANDARD
oSIST prEN IEC 60445:2021

01-januar-2021

Osnovna in varnostna načela za vmesnik človek-stroj, označevanje in razpoznavanje - Razpoznavanje terminalov opreme, končnikov vodnikov in vodnikov

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

Grund- und Sicherheitsregeln für die Mensch-Maschine-Schnittstelle - Kennzeichnung von Anschlüssen elektrischer Betriebsmittel, angeschlossenen Leiterenden und Leitern

Principes fondamentaux et de sécurité pour les interfaces hommes-machines, le marquage et lidentification - Identification des bornes de matériels, des extrémités de conducteurs et des conducteurs

Ta slovenski standard je istoveten z: **prEN IEC 60445:2020**

ICS:

01.080.20	Grafični simboli za posebno opremo	Graphical symbols for use on specific equipment
13.110	Varnost strojev	Safety of machinery
29.020	Elektrotehnika na splošno	Electrical engineering in general

oSIST prEN IEC 60445:2021 **en,fr,de**

3/1461/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:	
IEC 60445 ED7	
DATE OF CIRCULATION:	CLOSING DATE FOR VOTING:
2020-11-20	**2021-02-12**
SUPERSEDES DOCUMENTS:	
3/1450/CD, 3/1460/CC	

IEC TC 3 : DOCUMENTATION, GRAPHICAL SYMBOLS AND REPRESENTATIONS OF TECHNICAL INFORMATION

SECRETARIAT:	SECRETARY:
Sweden	Mr Thomas Borglin
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD:
TC 20,TC 44,TC 64	☒
	Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY

☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING
Attention IEC-CENELEC parallel voting The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

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

PROPOSED STABILITY DATE: 2026

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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BASIC AND SAFETY PRINCIPLES FOR MAN-MACHINE INTERFACE, MARKING AND IDENTIFICATION – IDENTIFICATION OF EQUIPMENT TERMINALS, CONDUCTOR TERMINATIONS AND CONDUCTORS

FOREWORD

This document has been prepared by IEC technical committee 3: Documentation, graphical symbols and representations of technical information.

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

This seventh edition cancels and replaces the sixth edition of IEC 60445, published in 2017.

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

a) the definitions have been aligned with the latest edition of IEV 195 and IEV 826 (currently marked as of 202x);
b) the requirements for the colour to be used for identification of certain designated conductors are made normative and not only recommendations;

c) introduction of a new sub-clause on marking of protecting earthing terminal for multiple power supply input on an equipment;

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

FDIS	Report on voting
3/XXX/FDIS	3/XXX/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.

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 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.

BASIC AND SAFETY PRINCIPLES FOR MAN-MACHINE INTERFACE, MARKING AND IDENTIFICATION – IDENTIFICATION OF EQUIPMENT TERMINALS, CONDUCTOR TERMINATIONS AND CONDUCTORS

1 Scope

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 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 or alphanumeric notations are intended to be applied in cables or cores, busbars, electrical equipment and installations.

This basic safety publication 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*

IEC 60617, *Graphical symbols for diagrams*

IEC Guide 104, *The preparation of safety publications and the use of basic safety publications and group safety publications*

ISO/IEC Guide 51, *Safety aspects – Guidelines for their inclusion in standards*

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
earth, verb
ground, verb, US
to make an electric connection between a conductive part and a local earth

Note 1 to entry: The connection to local earth can be
– intentional, or
– unintentional or accidental
and can be permanent or temporary.

[SOURCE: IEC 60050-195: 202x, 195-01-08]

3.2
earthed protective bonding conductor
protective bonding conductor which has a conductive path to local earth

3.3
electrical equipment
item used for such purposes as generation, conversion, transmission, distribution or utilization of electric energy, such as electric machines, transformers, switchgear and controlgear, measuring instruments, protective devices, wiring systems, current-using equipment

[SOURCE: IEC 60050-826:202x, 826-16-01]

3.4
electrical safety
freedom from risk that is not tolerable and which is caused by electricity

[SOURCE: IEC 60050-195:202x, 195-01-20]

3.5
equipotential bonding
set of electric connections intended to achieve equipotentiality between conductive parts

[SOURCE: IEC 60050-195: 202x, 195-01-10]

3.6
equipotentiality
state when conductive parts are at a substantially equal electric potential

[SOURCE: IEC 60050-195: 202x, 195-01-09]

3.7
functional bonding conductor
conductor provided for functional-equipotential-bonding

[SOURCE: IEC 60050-195: 202x, 195-02-16]

3.8
functional earthing
functional grounding (US)
earthing for purposes other than electrical safety

[SOURCE: IEC 60050-195:202x, 195-01-13]

3.9
functional earthing conductor
functional grounding conductor, US
conductor provided for functional earthing

[SOURCE: IEC 60050-195: 202x, 195-02-15]

3.10
functional-equipotential-bonding
equipotential bonding for reasons other than electrical safety

[SOURCE: IEC 60050-195: 202x, 195-01-16]

3.11
line conductor
conductor intended to be energized and capable of contributing to the transmission or distribution of electric energy but which is not a neutral conductor or mid-point conductor

[SOURCE: IEC 60050-195: 202x, 195-02-08, modified – Note 1 to entry removed]

3.12
mid-point
common point between two symmetrical circuit elements of which the opposite ends are electrically connected to different line conductors of the same circuit

[SOURCE: IEC 60050-195:202x, 195-02-04]

3.13
mid-point conductor

conductor electrically connected to the mid-point and capable of contributing to the distribution of electric energy

[SOURCE: IEC 60050-195: 202x, 195-02-07]

3.14
neutral conductor
conductor electrically connected to the neutral point and capable of contributing to the distribution of electric energy

[SOURCE: IEC 60050-195: 202x, 195-02-06]

3.15
neutral point
common point of a star-connected polyphase system

[SOURCE: IEC 60050-195:202x, 195-02-05]

3.16
PEL conductor
conductor combining the functions of both a protective earthing conductor and a line conductor

[SOURCE: IEC 60050-195: 202x, 195-02-14]

3.17
PEM conductor
conductor combining the functions of both a protective earthing conductor and a mid-point conductor

[SOURCE: IEC 60050-195: 202x, 195-02-13]

3.18
PEN conductor
conductor combining the functions of both a protective earthing conductor and a neutral conductor

[SOURCE: IEC 60050-195: 202x, 195-02-12]

3.19
protective bonding conductor
protective conductor provided for protective-equipotential-bonding

[SOURCE: IEC 60050-195: 202x, 195-02-10]

3.20
protective conductor
equipment grounding conductor, US
grounding electrode conductor, US
conductor provided for purposes of electrical safety

Note 1 to entry: The terms equipment grounding conductor and grounding electrode conductor are used in the US depending on their application.

[SOURCE: IEC 60050-195: 202x, 195-02-09, modified – two synonyms and note 1 to entry have been added.]

3.21
protective earthing
protective grounding, US
earthing for purposes of electrical safety

[SOURCE: IEC 60050-195: 202x, 195-01-11]

3.22
protective earthing conductor
PE conductor
protective grounding conductor, US
protective conductor provided for protective earthing

[SOURCE: IEC 60050-195: 202x, 195-02-11]

3.23
protective-equipotential-bonding
equipotential bonding for the purposes of electrical safety

[SOURCE: IEC 60050-195: 202x, 195-01-15]

3.24
protective terminal
terminal provided on equipment and intended for the electric connection with a protective conductor