
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

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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

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

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3/1461/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

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IEC TC 3 : DOCUMENTATION, GRAPHICAL SYMBOLS AND REPRESENTATIONS OF TECHNICAL INFORMATION	
SECRETARIAT: Sweden	SECRETARY: Mr Thomas Borglin
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 20, TC 44, TC 64	PROPOSED HORIZONTAL STANDARD: <input checked="" type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: <input type="checkbox"/> EMC <input type="checkbox"/> ENVIRONMENT <input type="checkbox"/> QUALITY ASSURANCE <input type="checkbox"/> SAFETY	
<input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING <input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING https://standards.iteh.ai/catalog/standards/sist/dc522a52-67d6-40dc-8d05-0053beb2d/osist-pr-en-iec-60445-2021 Attention IEC-CENELEC parallel voting	
<p>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.</p> <p>The CENELEC members are invited to vote through the CENELEC online voting system.</p>	

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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

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

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100 patent rights. IEC shall not be held responsible for identifying any or all such patent rights.
- 101 This document has been prepared by IEC technical committee 3: Documentation, graphical
102 symbols and representations of technical information.
- 103 It has the status of a basic safety publication in accordance with IEC Guide 104.
- 104 This seventh edition cancels and replaces the sixth edition of IEC 60445, published in 2017.
- 105 This edition includes the following significant technical changes with respect to the previous
106 edition:
- 107 a) the definitions have been aligned with the latest edition of IEC 195 and IEC 826 (currently
108 marked as of 202x);
- 109 b) the requirements for the colour to be used for identification of certain designated
110 conductors are made normative and not only recommendations;

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

113

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

FDIS	Report on voting
3/XXX/FDIS	3/XXX/RVD

115

116 Full information on the voting for the approval of this International Standard can be found in
117 the report on voting indicated in the above table.

118 This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

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

122 The committee has decided that the contents of this document will remain unchanged until the
123 stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to
124 the specific document. At this date, the document will be

- 125 • reconfirmed,
- 126 • withdrawn,
- 127 • replaced by a revised edition, or
- 128 • amended.

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131

132 **BASIC AND SAFETY PRINCIPLES FOR MAN-MACHINE**
133 **INTERFACE, MARKING AND IDENTIFICATION –**
134 **IDENTIFICATION OF EQUIPMENT TERMINALS,**
135 **CONDUCTOR TERMINATIONS AND CONDUCTORS**
136
137
138

139 **1 Scope**

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

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

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

155 **2 Normative references**

156 The following documents are referred to in the text in such a way that some or all of their
157 content constitutes requirements of this document. For dated references, only the edition
158 cited applies. For undated references, the latest edition of the referenced document (including
159 any amendments) applies.

160 IEC 60417, *Graphical symbols for use on equipment*

161 IEC 60617, *Graphical symbols for diagrams*

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

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

165 **3 Terms and definitions**

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

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

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

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

172 **3.1**
 173 **earth**, verb
 174 **ground**, verb, US
 175 to make an electric connection between a conductive part and a local earth

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

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

181 **3.2**
 182 **earthed protective bonding conductor**
 183 protective bonding conductor which has a conductive path to local earth

184 **3.3**
 185 **electrical equipment**
 186 item used for such purposes as generation, conversion, transmission, distribution or utilization
 187 of electric energy, such as electric machines, transformers, switchgear and controlgear,
 188 measuring instruments, protective devices, wiring systems, current-using equipment

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

190 **3.4**
 191 **electrical safety**
 192 freedom from risk that is not tolerable and which is caused by electricity

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

194 **3.5**
 195 **equipotential bonding**
 196 set of electric connections intended to achieve equipotentiality between conductive parts

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

198 **3.6**
 199 **equipotentiality**
 200 state when conductive parts are at a substantially equal electric potential

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

202 **3.7**
 203 **functional bonding conductor**
 204 conductor provided for functional-equipotential-bonding

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

206 **3.8**
 207 **functional earthing**
 208 **functional grounding** (US)
 209 earthing for purposes other than electrical safety

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

- 211 **3.9**
212 **functional earthing conductor**
213 **functional grounding conductor, US**
214 conductor provided for functional earthing
- 215 [SOURCE: IEC 60050-195: 202x, 195-02-15]
- 216 **3.10**
217 **functional-equipotential-bonding**
218 equipotential bonding for reasons other than electrical safety
- 219 [SOURCE: IEC 60050-195: 202x, 195-01-16]
- 220 **3.11**
221 **line conductor**
222 conductor intended to be energized and capable of contributing to the transmission or
223 distribution of electric energy but which is not a neutral conductor or mid-point conductor
- 224 [SOURCE: IEC 60050-195: 202x, 195-02-08, modified – Note 1 to entry removed]
- 225 **3.12**
226 **mid-point**
227 common point between two symmetrical circuit elements of which the opposite ends are
228 electrically connected to different line conductors of the same circuit
- 229 [SOURCE: IEC 60050-195:202x, 195-02-04]
- 230 **3.13**
231 **mid-point conductor**
232 conductor electrically connected to the mid-point and capable of contributing to the
233 distribution of electric energy
- 234 [SOURCE: IEC 60050-195: 202x, 195-02-07]
- 235 **3.14**
236 **neutral conductor**
237 conductor electrically connected to the neutral point and capable of contributing to the
238 distribution of electric energy
- 239 [SOURCE: IEC 60050-195: 202x, 195-02-06]
- 240 **3.15**
241 **neutral point**
242 common point of a star-connected polyphase system
- 243 [SOURCE: IEC 60050-195:202x, 195-02-05]
- 244 **3.16**
245 **PEL conductor**
246 conductor combining the functions of both a protective earthing conductor and a line
247 conductor
- 248 [SOURCE: IEC 60050-195: 202x, 195-02-14]

249 **3.17**
 250 **PEM conductor**
 251 conductor combining the functions of both a protective earthing conductor and a mid-point
 252 conductor

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

254 **3.18**
 255 **PEN conductor**
 256 conductor combining the functions of both a protective earthing conductor and a neutral
 257 conductor

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

259 **3.19**
 260 **protective bonding conductor**
 261 protective conductor provided for protective-equipotential-bonding

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

263 **3.20**
 264 **protective conductor**
 265 equipment grounding conductor, US
 266 grounding electrode conductor, US
 267 conductor provided for purposes of electrical safety

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

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

272 **3.21**
 273 **protective earthing**
 274 **protective grounding, US**
 275 earthing for purposes of electrical safety

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

277 **3.22**
 278 **protective earthing conductor**
 279 **PE conductor**
 280 **protective grounding conductor, US**
 281 protective conductor provided for protective earthing

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

283 **3.23**
 284 **protective-equipotential-bonding**
 285 equipotential bonding for the purposes of electrical safety

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

287 **3.24**
 288 **protective terminal**
 289 terminal provided on equipment and intended for the electric connection with a protective
 290 conductor