



SLOVENSKI STANDARD
oSIST prEN IEC 61010-2-203:2022
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Varnostne zahteve za električno opremo za meritve, nadzor in laboratorijsko uporabo - 2-203. del: Posebne zahteve za industrijska komunikacijska vezja in povezovanje komunikacijskih vrat

Safety requirements for electrical equipment for measurement, control and laboratory use - Part 2-203: Particular requirements for industrial communication circuits and communication port interconnection

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Règles de sécurité pour appareils électriques de mesurage, de régulation et de laboratoire - Partie 2-203: Règles particulières concernant les circuits de communication industriels et l'interconnexion des ports de communication

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IEC TC 65 : INDUSTRIAL-PROCESS MEASUREMENT, CONTROL AND AUTOMATION	
SECRETARIAT: France	SECRETARY: Mr Didier GIARRATANO
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 66	PROPOSED HORIZONTAL STANDARD: <input 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 checked="" type="checkbox"/> SAFETY	
<input checked="" type="checkbox"/> SUBMITTED FOR CENELEC PARALLEL VOTING <input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING	
<p>Attention IEC-CENELEC parallel voting</p> <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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TITLE:

Safety requirements for electrical equipment for measurement, control and laboratory use - Part 2-203: Particular requirements for industrial communication circuits and communication port interconnection

PROPOSED STABILITY DATE: 2028

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR
MEASUREMENT, CONTROL AND LABORATORY USE –****Part 2-203: Particular requirements for industrial communication circuits
and communication port interconnection**

FOREWORD

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94 international co-operation on all questions concerning standardization in the electrical and electronic fields. To
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126 International Standard IEC 61020-2-203 has been prepared by committee TC 65: Industrial-
127 process measurement and automation.

128 The text of this standard is based on the following documents:

FDIS	Report on voting
65/XX/FDIS	XX/XX/RVD

129
130 Full information on the voting for the approval of this standard can be found in the report on
131 voting indicated in the above table.

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

133 This Part 2-203 is to be used in conjunction with the latest edition of IEC 61010-1. It was
134 established on the basis of IEC 61010-1 Edition 3.1.

135 The Annex(es) form an integral part of this standard.

136 The committee has decided that the contents of this publication will remain unchanged until
137 the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data
138 related to the specific publication. At this date, the publication will be

- 139 • reconfirmed,
- 140 • withdrawn,
- 141 • replaced by a revised edition, or
- 142 • amended.

143

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145

INTRODUCTION

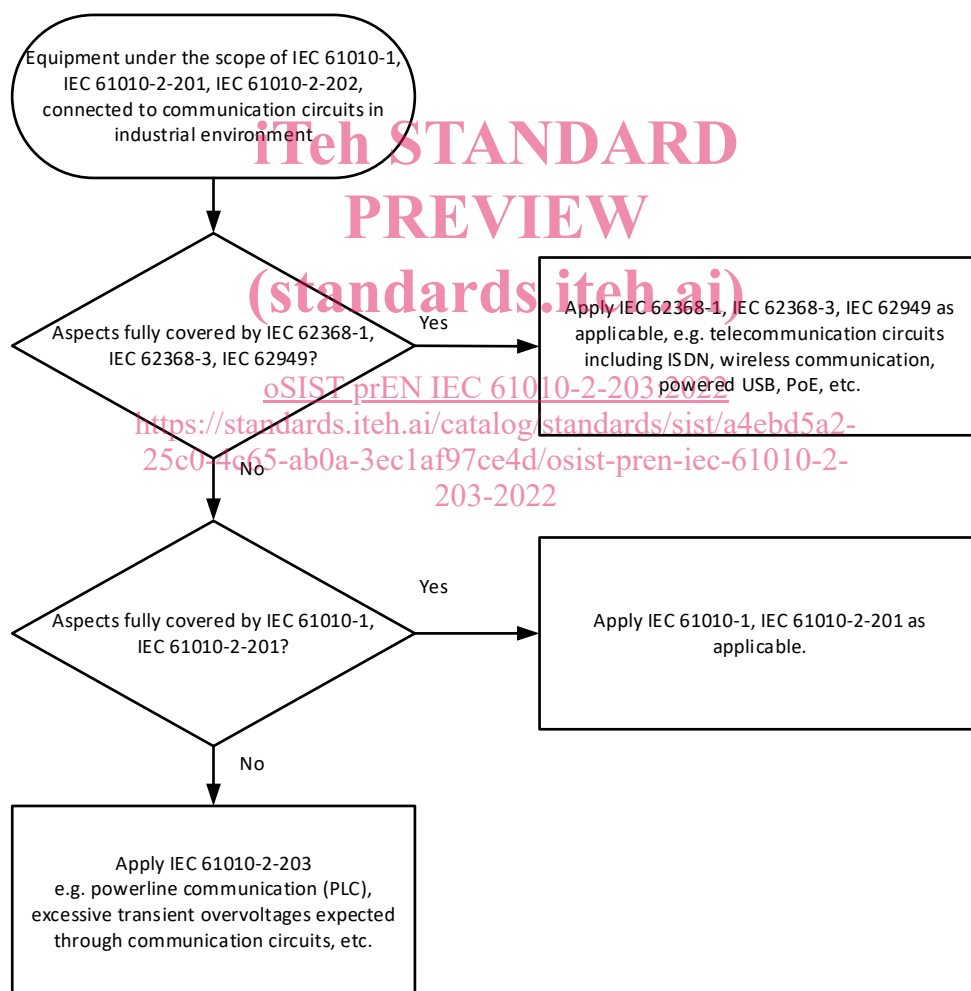
146 IEC 61010-2-2xx documents are a series of standards on safety of industrial-process
147 measurement, control and automation equipment.

148 Safety terms of general use are defined in IEC 61010-1. More specific terms are defined in
149 each part.

150 Part 2-203 incorporates the safety related requirements for industrial COMMUNICATION
151 CIRCUITS.

152 This document compliments IEC 62368-1, where IEC 62368-1 applies to domestic and
153 commercial equipment, covering mostly one-to-one connections without considering the whole
154 communication network that can contain several COMMUNICATION PROTOCOLS.

155 Thus, industrial COMMUNICATION CIRCUITS might require additional consideration based
156 on the expected transients of interconnected equipment, where the equipment is supplied
157 from different mains with different overvoltage categories (OVC), or where environmental
158 factors may affect the COMMUNICATION CIRCUITS.



159

160 Additional requirements for equipment having the capability to supply DC power over
161 commonly used communication cables, such as USB or Ethernet (PoE), are given in IEC
162 62368-3.

163 Additional requirements for equipment acting as communication end device connected to
164 information and communication networks, where no further interfaces to other nets need to be
165 considered, are covered in IEC 62949.

166

SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL AND LABORATORY USE –

Part 2-203: Particular requirements for industrial communication circuits and communication port interconnection

1 Scope and object

This clause of Part 1 is applicable, except as follows.

1.1.1 Equipment included in scope

Replacement:

Replace the text by the following paragraphs:

This part of IEC 61010 specifies:

This part of IEC 61010 specifies particular safety requirements for industrial COMMUNICATION CIRCUITS and their INTERCONNECTION where equipment is intended to be installed in a process or discrete control environment.

NOTE – The equipment could be connected to an overall communication network.

These include COMMUNICATION CIRCUITS and INTERCONNECTIONS which are part of electrical test and measurement equipment or process control equipment, where these are intended to be used in an industrial environment.

Type of COMMUNICATION CIRCUITS covered:

NOTE – Any industrial process control equipment can have more than one COMMUNICATION CIRCUIT.

- COMMUNICATION CIRCUITS with COMMUNICATION PROTOCOLS below 50 V r.m.s., 70 V peak and 120 V DC, where the COMMUNICATION CIRCUIT is expected to be exposed to excessive transients in the end use installation.

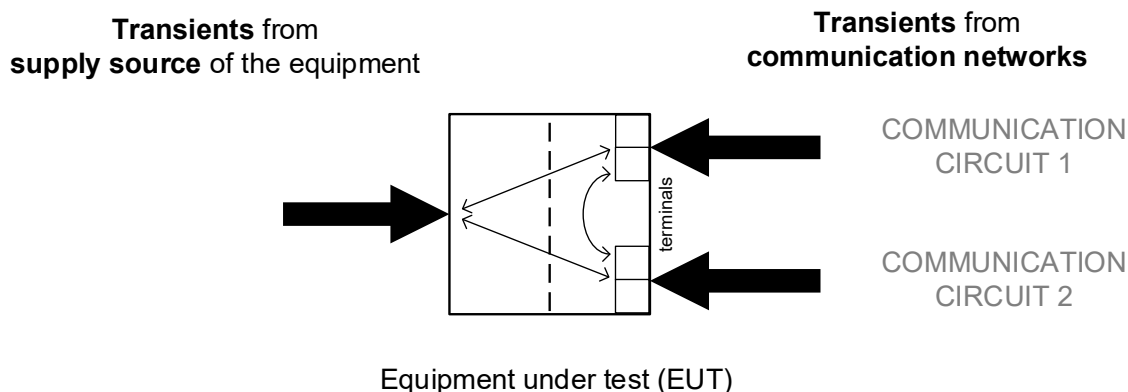


Figure 1 – Equipment under test (EUT)

NOTE 1 – Excessive overvoltage transients can occur from the equipment supply sources or from COMMUNICATION CIRCUIT terminals. A mismatch of overvoltage transients for equipment interconnected through a COMMUNICATION CIRCUIT can result in an electrical shock hazard.

NOTE 2 – Excessive overvoltage transients through the supply sources can occur in COMMUNICATION PROTOCOLS of secondary circuits when the expected overvoltage transient from the supply source may be equal to or exceed 2500 V peak.

Example:

- Supply from an OVC III supply source, with a line to neutral voltage exceeding 150 V r.m.s.
- Supply from an OVC II supply source, with a line to neutral voltage exceeding 300 V r.m.s.

204 NOTE 3 – Excessive overvoltage transients through COMMUNICATION CIRCUIT terminal inputs can be
205 caused by environmental factors or equipment connected to an overall communication network.

206 Example:

207 Cables / wiring between transmitting and receiving equipment, can act as an antenna and expose a risk of
208 higher transients from environmental factors, e.g. lightning strikes.

209 COMMUNICATION CIRCUITS can experience excessive transients from the remote COMMUNICATION
210 CIRCUIT terminal outputs from interconnected equipment.

211 NOTE 4 – SELV and PELV communication cables / wiring between equipment located in the same building are
212 generally considered to not be subjected to external transients due to reduced environmental influences.

213 – COMMUNICATION CIRCUITS with COMMUNICATION protocols below 50 V r.m.s., 70 V peak and
214 120 V DC;

215 – In addition, where the equipment contains connection to multiple different COMMUNICATION
216 CIRCUITS, where the interconnection of these different COMMUNICATION CIRCUITS can create
217 voltages (differential mode) exceeding 50 V r.m.s., 70 V peak and 120 V DC.

218 COMMUNICATION CIRCUITS not classified in one of the circuit types above, are excluded, and not
219 covered by the scope and requirements of this document.

220 1.1.2 Equipment excluded from scope

221 *Replacement:*

222 *Replace the text by the following paragraphs:*

223 This standard does not apply to equipment within the scope of:

224 – IEC 62368-1 Audio/video, information and communication technology equipment – Part 1:
225 Safety requirements

226 Additionally, this standard does not apply to COMMUNICATION CIRCUITS within the scope of

227 – IEC 62368-3 Audio/video, information and communication technology equipment – Part 3:
228 Safety aspects for DC power transfer through communication cables and
229 ports

230 – IEC 62949 Particular safety requirements for equipment to be connected to information
231 and communication technology networks

232 – IEC 60825-2 Safety of laser products - Part 2: Safety of optical fibre communication
233 systems (OFCS)

234 1.2.2 Aspects excluded from scope

235 This standard does not cover:

236 a) Optical or wireless interfaces resp. COMMUNICATION CIRCUITS.

237 b) Requirements for protection against the effects of direct lightning strikes.

238 2 Normative references

239 This clause of Part 1 is applicable.

240 3 Terms and definitions

241 This clause of Part 1 is applicable, except as follows:

242 *Add the following terms and definitions:*

243 3.101.1

244 SECONDARY CIRCUIT

245 circuit where separation from MAINS CIRCUITS is achieved by a transformer in which the
246 primary windings are separated from the secondary windings by REINFORCED INSULATION,
247 DOUBLE INSULATION, or a screen connected to the PROTECTIVE CONDUCTOR TERMINAL.

248 The secondary circuit has no direct conductive connection to a MAINS CIRCUITS and derives its
249 power from a transformer, converter or equivalent isolation device, or from a small battery.

250 Note to entry - These circuits are assumed to be subjected to 1 overvoltage category lower TRANSIENT OVERVOLTAGE levels than
251 the MAINS CIRCUITS.

252 3.101.2

253 SAFETY EXTRA-LOW VOLTAGE CIRCUIT

254 SELV CIRCUIT

255 non-protective earth referenced electrical circuit in which the voltage cannot exceed the
256 following:

257 NORMAL CONDITION and SINGLE FAULT CONDITION: The AC voltage levels are 30 V r.m.s., 42,4 V
258 peak and the DC voltage level is 60 V. For equipment intended for use in WET LOCATIONS, the
259 AC voltage levels are 16 V r.m.s., 22,6 V peak and the DC. voltage level is 35 V.

260 Note to entry - Transients are not considered in SELV (OVC I circuits), where these are derived from circuits
261 supplied from OVC II, below 300 V line to neutral voltage.

262 [SOURCE: IEC 60050-826-12-31:2004, modified – clarified and more fully described]

263 3.101.3

264 PROTECTIVE EXTRA-LOW VOLTAGE CIRCUIT

265 PELV CIRCUIT

266 protective earth referenced electrical circuit in which the voltage cannot exceed the following:

267 NORMAL CONDITION and SINGLE FAULT CONDITION: The AC voltage levels are 30 V r.m.s., 42,4 V
268 peak and the DC voltage level is 60 V. For equipment intended for use in WET LOCATIONS, the
269 AC voltage levels are 16 V r.m.s., 22,6 V peak and the DC. voltage level is 35 V.

270 Note to entry - Transients are not considered in PELV (OVC II circuits), where these are derived from circuits
271 supplied from OVC II, below 300 V line to neutral voltage.

272 [SOURCE: IEC 60050-826-12-31:2004, modified – clarified and more fully described]

273 3.101.4

274 COMMUNICATION CIRCUIT
275 circuit that is in the equipment and to which the accessible area of contact is limited and that
276 is so designed and protected that, under normal conditions and single fault conditions, the
277 voltages do not exceed specified limit values.

278 NOTE 1 to entry – See Annex AA for COMMUNICATION PROTOCOLS and their specified limit values.

279 NOTE 2 to entry – A COMMUNICATION CIRCUIT is considered to be a secondary circuit derived from another
280 secondary circuit in this standard.

281 NOTE 3 to entry – A COMMUNICATION CIRCUIT can be part of an overall COMMUNICATION NETWORK.

282 3.101.5

283 COMMUNICATION NETWORK

284 metallicly terminated transmission medium intended for communication between equipment
285 that may be located in separate buildings, excluding:

- 286 – the mains system for supply, transmission and distribution of electrical power, if used as a
287 communication transmission medium;
- 288 – cable distribution systems;
- 289 – SELV CIRCUITS

290 NOTE 1 to entry - The term COMMUNICATION NETWORK is defined in terms of its functionality, not its electrical
291 characteristics. A COMMUNICATION NETWORK is not itself defined as being either an SELV circuit or a
292 COMMUNICATION CIRCUIT. Only the circuits in the equipment are so classified.

293 NOTE 2 to entry: Cable for COMMUNICATION NETWORK consists of two or more conductors intended for
294 communication and/or power transfer between the various pieces of equipment. The equipment may be located
295 within the same or separate structures, buildings or locations, excluding:
296 – the mains system for supply, transmission and distribution of electrical power, if used as a communication
297 transmission medium;

298 - this may include twisted pairs, and may include circuits, that are subjected to transient overvoltages of up to 1,5
299 kV. This may be 2kV in critical industrial environment, e.g. close to a welding machine.

300 NOTE 3 to entry: For information about circuit voltages and signals which may be present, see Annex B of IEC
301 62949:2017.

302 NOTE 4 to entry - A COMMUNICATION NETWORK may be:

303 – publicly or privately owned;

304 – subject to transient overvoltages due to atmospheric discharges and faults in power distribution systems;

305 – subject to longitudinal (common mode) voltages induced from nearby power lines or electric traction lines.

306 NOTE 5 to entry - Examples of COMMUNICATION NETWORKS are:

307 – level meters connected to a control room via Ethernet for monitoring the liquid level of tanks in a chemical plant;

308 – a bottling plant build-up via fieldbuses for control and diagnoses;

309 – a waste incineration plant interconnected via different COMMUNICATION CIRCUITS as SDCI (Single-drop digital
310 communication interface) and RS485

311 for emergency shut-downs of discrete parts;

312 – a data network of an industrial facility, as those specified in IEC 61784-1, IEC 61784-2, whose installation is
313 specified in IEC 61918 and detailed in IEC 61784-5 series of installation profiles.

314

315 [SOURCE: IEC 62368-3 ed 1.0 (2017-12), information and communication technology network
316 ICT network definition modified]

317 3.101.6

318 COMMUNICATION VOLTAGE

319 maximum signal voltage utilized to transfer information

320 Note: for the communication techniques listed in Annex AA the physical interface is mostly fixed. But to almost all
321 protocols named there,
322 special physical interfaces can be used i.e. for the purpose to use the mains distribution system as communication
323 media.

324

325 3.101.7

326 COMMUNICATION CIRCUIT TRANSIENT OVERVOLTAGE

327 highest peak voltage expected at the COMMUNICATION CIRCUIT connection point of the
328 equipment, arising from external transients.

329 Note to entry - The effect of transients from cable distribution systems is not taken into account.

330 [SOURCE: IEC 60950-1 ed 2.0 (2005-12), telecommunication network transient voltage
331 definition modified]

332 4 Tests

333 This clause of Part 1 is applicable.

334 5 Marking and documentation

335 This clause of Part 1 is applicable, except as follows:


336 5.1.3 Mains supply

337 *Addition:*

338 *Add the following new symbol in Table 1.*

339

Table 1 – Symbols

Number	Symbol	Reference	Description
101		IEC 60417-5021 (2002-10).	equipotential bonding terminal

340 5.1.5 **TERMINALS, connections and operating devices**

341 *Add a new subclause:*