
Varnostne zahteve za električno opremo za meritve, nadzor in laboratorijsko uporabo - 2-033. del: Posebne zahteve za ročne multimetre in druge merilnike za domačo in profesionalno uporabo, ki omogočajo merjenje omrežne napetosti

Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-033: Particular requirements for hand-held multimeters and other meters for domestic and professional use, capable of measuring mains voltage

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Exigences de sécurité pour appareils électriques de mesure, de régulation et de laboratoire - Partie 2-033: Exigences particulières pour les multimètres portatifs pour usage domestique et professionnel, capables de mesurer la tension réseau

Ta slovenski standard je istoveten z: prEN IEC 61010-2-033:2022

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71.040.10	Kemijski laboratoriji. Laboratorijska oprema	Chemical laboratories. Laboratory equipment

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OF INTEREST TO THE FOLLOWING COMMITTEES:	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 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.	<input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING

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TITLE:

Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-033: Particular requirements for hand-held multimeters and other meters for domestic and professional use, capable of measuring mains voltage

PROPOSED STABILITY DATE: 2025

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1

CONTENTS

2	CONTENTS	2
3	FOREWORD	4
4	INTRODUCTION	7
5	1 Scope and object	8
6	2 Normative references	9
7	3 Terms and definitions	10
8	4 Tests	10
9	5 Marking and documentation	11
10	6 Protection against electric shock	13
11	7 Protection against mechanical HAZARDS	18
12	8 Resistance to mechanical stresses	18
13	9 Protection against the spread of fire and arc flash	18
14	10 Equipment temperature limits and resistance to heat	22
15	11 Protection against HAZARDS from fluids and solid foreign objects	22
16	12 Protection against radiation, including laser sources, and against sonic and 17 ultrasonic pressure	22
18	13 Protection against liberated gases and substances, explosion and implosion	22
19	14 Components and subassemblies	22
20	15 Protection by interlocks	23
21	16 HAZARDS resulting from application	23
22	17 RISK assessment	23
23	101 Measuring circuits	23
24	Annexes	26
25	Annex K (normative) Insulation requirements not covered by 6.7	26
26	Annex L (informative) Index of defined terms	34
27	Annex AA (normative) MEASUREMENT CATEGORIES	35
28	Annex BB (informative) HAZARDS pertaining to measurements performed in certain 29 environments	38
30	Annex CC (informative) 4 mm "banana" TERMINALS	41
31	Annex DD (informative) Flowchart for insulation according to the type of circuit	43
32	Annex EE (informative) Determination of CLEARANCES for Table 101	46
33	Bibliography	47
34		
35	Figure 4 – Acceptable arrangement of protective means against electric shock	14
36	Figure AA.1 – Example to identify the locations of MEASUREMENT CATEGORIES	36
37	Figure CC.1 – Recommended dimensions of 4 mm TERMINALS	42
38	Figure DD.1 – Requirements for CLEARANCE, CREEPAGE DISTANCE and solid insulation	45
39		
40	Table 101 – CLEARANCES for unmated measuring circuit TERMINALS	15
41	Table 102 – Impulse voltages for circuits connected to MAINS	22
42	Table K.15 – CLEARANCE values for the calculation of K.3.2	27
43	Table K.16 – Test voltages based on CLEARANCES	28
44	Table K.101 - CLEARANCES for measuring circuits RATED for MEASUREMENT CATEGORIES	30

45	Table K.102 – Impulse test voltages for testing electric strength of solid insulation for	
46	measuring circuits RATED for MEASUREMENT CATEGORIES	31
47	Table K.103 – a.c. test voltages for testing electric strength of solid insulation for	
48	measuring circuits RATED for MEASUREMENT CATEGORIES	31
49	Table K.104 – Minimum values for distance or thickness of solid insulation for	
50	measuring circuits RATED for MEASUREMENT CATEGORIES	32
51	Table AA.1 – Characteristics of MEASUREMENT CATEGORIES	37
52	Table EE.1 – CLEARANCES values for Table 101	46
53		

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN IEC 61010-2-033:2022](https://standards.iteh.ai/catalog/standards/sist/b85dcb6a-2ed3-4bd8-a752-514ec7ded530/osist-pren-iec-61010-2-033-2022)

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54 INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT
FOR MEASUREMENT, CONTROL, AND LABORATORY USE –****Part 2-033: Particular requirements for hand-held multimeters
for domestic and professional use, capable of measuring mains voltage****FOREWORD**

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9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 61010-2-033 has been prepared by IEC technical committee 66: Safety of measuring, control and laboratory equipment.

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

This third edition cancels and replaces the second edition published in 2019. This edition constitutes a technical revision.

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

Clause 2	All normative references have been dated and new normative references have been added.
4.4.2.101	Addition of a new subclause about surge protective devices.
6.6.101.1	Insulating material of group I may be allowed for determination of CLEARANCES of measuring circuit TERMINALS.
6.6.101.2	CLEARANCES and CREEPAGE DISTANCES up to 3 000 V for measuring circuit TERMINALS in unmated position have been defined.
6.6.101.3	Requirements for measuring circuit TERMINALS in partially mated position have been specified.
6.6.101.4	Requirements for measuring circuit TERMINALS in mated position have been specified.
6.101	The subclause replaces 6.9.101 of previous edition and has been rephrased.
9.101	New subclause to consider the protection of measuring circuits against the spread of fire and arc flash.
9.101.2	Relocation of 101.3 of previous edition.
9.101.3	Relocation of 101.4 of previous edition.
101.3	Relocation of 102 of previous edition.
K.2.1	Another method for determination of CLEARANCES of secondary circuits is proposed.
K.3.2	New Table K.15 and Table K.16 for CLEARANCE calculation.
Clause K.4	This clause of previous edition has been deleted.
K.101.4	The subclause has been reviewed. Table K.104 of previous edition has been deleted.
Annex AA	Figure AA.1 has been redesigned.
Annex EE	Addition of a new informative annex for determination of CLEARANCES for Table 101.

103

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

FDIS	Report on voting
66/xxx/FDIS	66/xxx/RVD

105

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

108 The language used for the development of this International Standard is English.

109 This document was drafted in accordance with the ISO/IEC Directives, Part 2 and developed in
110 accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available
111 at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are
112 described in greater detail at www.iec.ch/publications.

113 A list of all parts of the IEC 61010 series, under the general title *Safety requirements for*
114 *electrical equipment for measurement, control, and laboratory use*, can be found on the IEC
115 website.

116 This Part 2-033 is to be used in conjunction with IEC 61010-1:2010 and
117 IEC 61010-1:2010/AMD1:2016. It was established on the basis of the third edition (2010) of
118 IEC 61010-1, including its amendment 1 (2016) and its corrigendum 1 (2019), hereinafter
119 referred to as Part 1.

120 This Part 2-033 supplements or modifies the corresponding clauses in IEC 61010-1 so as to
121 convert that publication into the IEC standard: *Particular requirements for hand-held*
122 *multimeters for domestic and professional use, capable of measuring mains voltage*

123 Where a particular subclause of Part 1 is not mentioned in this Part 2-033, that subclause
124 applies as far as is reasonable. Where this part states “addition”, “modification”, “replacement”,
125 or “deletion” the relevant requirement, test specification or note in Part 1 should be adapted
126 accordingly.

127 In this standard:

128 a) the following print types are used:

129 – requirements: in roman type;

130 – NOTES: in small roman type;

131 – *conformity and tests: in italic type;*

132 – terms used throughout this standard which have been defined in Clause 3: SMALL ROMAN
133 CAPITALS;

134 b) subclauses, figures, tables and notes which are additional to those in Part 1 are numbered
135 starting from 101. Additional annexes are lettered starting from AA and additional list items
136 are lettered from aa).

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

- 140 • reconfirmed,
- 141 • withdrawn,
- 142 • replaced by a revised edition, or
- 143 • 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.

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145

INTRODUCTION

146 IEC 61010-1 specifies the safety requirements that are generally applicable to all equipment
147 within its scope. For certain types of equipment, the requirements of IEC 61010-1 and its
148 amendment will be supplemented or modified by the special requirements of one, or more than
149 one, particular Part 2 which are read in conjunction with the Part 1 requirements.

150 1) Part 2-030 specifies the safety requirements for equipment with testing or measuring
151 circuits which are connected for test or measurement purposes to devices or circuits outside
152 the measurement equipment itself.

153 2) Part 2-032 specifies the safety requirements for hand-held and hand-manipulated current
154 sensors for measuring, detecting, injecting current, or indicating current waveforms on
155 circuits without physically opening the current path of the circuit being measured.

156 Most of the requirements of Part 2-030 have been included into Part 2-032. Equipment
157 within the scopes of both Part 2-030 and Part 2-032 are considered to be covered by the
158 requirements of Part 2-032.

159 However, for current sensor in combined equipment with protective bonding and automatic
160 disconnection of the supply, Part 2-030 and Part 2-032 are read in conjunction

161 3) Part 2-033 specifies the safety requirements for hand-held multimeters and other meters for
162 domestic and professional use, capable of measuring mains voltage, intended to measure
163 voltage and other electrical quantities such as resistance or current.

164 All relevant requirements of Part 2-030 have been included into Part 2-033.

165 4) Part 2-034 specifies the safety requirements for measurement equipment for insulation
166 resistance and test equipment for electric strength which are connected to units, lines or
167 circuits for test or measurement purposes.

168 All relevant requirements of Part 2-030 have been included into Part 2-034. However, for
169 equipment within the scope of Part 2-032 and Part 2-034, these standards are read in
170 conjunction.

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171 IEC 61010-031 specifies the safety requirements for hand-held and hand-manipulated probe
172 assemblies and their related accessories intended to be used in particular with equipment in
173 the scope of Part 2-030, Part 2-032, Part 2-033 and Part 2-034. These probe assemblies are
174 for non-contact or direct electrical connection between a part and electrical test and
175 measurement equipment. They may be fixed to the equipment or be detachable accessories for
176 the equipment.

177

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

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182 **Part 2-033: Particular requirements for hand-held multimeters**
183 **for domestic and professional use, capable of measuring mains voltage**
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187 **1 Scope and object**

188 IEC 61010-1:2010, Clause 1 and IEC 61010-1:2010/AMD1:2016, Clause 1 apply except as
189 follows:

190 **1.1.1 Equipment included in scope**

191 *Replace the existing text with the following:*

192 This group safety publication is primarily intended to be used as a product safety standard for
193 the products mentioned in the scope, but shall also be used by technical committees in the
194 preparation of their publications for products similar to those mentioned in the scope of this
195 document, in accordance with the principles laid down in IEC Guide 104 and ISO/IEC Guide 51.

196 This part of IEC 61010 specifies safety requirements for HAND-HELD multimeters for domestic
197 and professional use, capable of measuring MAINS.

198 HAND-HELD multimeters are multi-range multifunction measuring instruments intended to
199 measure voltage and other electrical quantities such as resistance or current. Their primary
200 purpose is to measure voltage on a live MAINS. They are suitable to be supported by one hand
201 during NORMAL USE.

202 **1.1.2 Equipment excluded from scope**

203 *Add the following new item to the list and the following paragraph:*

204 aa) IEC 61557 (all parts), *Electrical safety in low voltage distribution systems up to 1 000 V a.c.*
205 *and 1 500 V d.c. – Equipment for testing, measuring or monitoring of protective measures*

206 HAND-HELD EQUIPMENT such as oscilloscopes, wattmeters, process control multimeters not
207 RATED for measuring voltage on a live MAINS, clamp multimeters and communications test sets
208 are not within the scope of this document.

209 **1.2.1 Aspects included in scope**

210 *Replace item c) of the second paragraph with the following new item:*

211 c) spread of fire or arc flash from the HAND-HELD multimeters (see Clause 9);

212 *Replace the third paragraph with the following two new paragraphs:*

213 Requirements for protection against HAZARDS arising from NORMAL USE, REASONABLY
214 FORESEEABLE MISUSE and ergonomic factors are specified in Clause 16 and Clause 101.

215 Annex BB provides guidance to equipment manufacturer on HAZARDS that should be considered
216 for equipment intended for performing tests and measurements on hazardous conductors,
217 including MAINS conductors and telecommunication network conductors.

218 **2 Normative references**

219 IEC 61010-1:2010, Clause 2 and IEC 61010-1:2010/AMD1:2016, Clause 2 apply except as
220 follows:

221 *Replace the following existing normative references:*

222 IEC 60364-4-44:2007, *Low-voltage electrical installations – Part 4-44: Protection for safety –*
223 *Protection against voltage disturbances and electromagnetic disturbances*
224 *IEC 60364-4-44:2007/AMD1:2015*

225 IEC 61010-031, *Safety requirements for electrical equipment for measurement, control and*
226 *laboratory use – Part 031: Safety requirements for hand-held probe assemblies for electrical*
227 *measurement and test*

228 IEC 61180 (all parts), *High-voltage test techniques for low-voltage equipment*

229 IEC 61180-1, *High-voltage test techniques for low-voltage equipment – Part 1: Definitions, test*
230 *and procedure requirements*

231 IEC 61180-2, *High-voltage test techniques for low-voltage equipment – Part 2: Test equipment*

232 *with the following new normative references:*

233 IEC 60364-4-44:2007, *Low-voltage electrical installations – Part 4-44: Protection for safety –*
234 *Protection against voltage disturbances and electromagnetic disturbances*
235 *IEC 60364-4-44:2007/AMD1:2015*
236 *IEC 60364-4-44:2007/AMD2:2018*

237 IEC 61010-031:—¹, *Safety requirements for electrical equipment for measurement, control and*
238 *laboratory use – Part 031: Safety requirements for hand-held and hand-manipulated probe*
239 *assemblies for electrical test and measurement*

240 IEC 61180:2016, *High-voltage test techniques for low-voltage equipment – Definitions, test and*
241 *procedure requirements, test equipment*

242 NOTE IEC 61180:2016 replaces everywhere IEC 61180, IEC 61180-1 and IEC 61180-2 are referenced in Part 1.

243 *Add the following new normative references:*

244 IEC 61000-4-5:2014, *Electromagnetic compatibility (EMC) - Part 4-5: Testing and*
245 *measurement techniques - Surge immunity test*
246 *IEC 61000-4-5:2014/AMD1:2017*

247 IEC 61010-2-030:—², *Safety requirements for electrical equipment for measurement, control,*
248 *and laboratory use – Part 2-030: Special requirements for testing and measuring circuits*

249 IEC 61010-2-032:—³, *Safety requirements for electrical equipment for measurement, control,*
250 *and laboratory use – Part 2-032: Particular requirements for hand-held and hand-manipulated*
251 *current sensors for electrical test and measurement*

1 Third edition under preparation. Stage at the time of publication: IEC FDIS 61010-031:2022.

2 Third edition under preparation. Stage at the time of publication: IEC CDV 61010-2-030:2022.

3 Fifth edition under preparation. Stage at the time of publication: IEC CDV 61010-2-032:2022.

252 **3 Terms and definitions**

253 IEC 61010-1:2010, Clause 3 and IEC 61010-1:2010/AMD1:2016, Clause 3 apply except as
254 follows:

255 **3.5 Safety terms**

256 *Replace the definition of 3.5.4 with the following new definition:*

257 **3.5.4**

258 **MAINS**

259 electricity supply system

260 *Add the following new term and definition:*

261 **3.5.101**

262 **MEASUREMENT CATEGORY**

263 classification of testing and measuring circuits according to the type of MAINS to which they are
264 intended to be connected

265 Note 1 to entry: MEASUREMENT CATEGORIES take into account OVERVOLTAGE CATEGORIES, short-circuit current levels,
266 the location where the test or measurement is to be made and some forms of energy limitation or transient protection
267 included in the building installation (see Annex AA for more information).

268 **4 Tests**

269 IEC 61010-1:2010, Clause 4 and IEC 61010-1:2010/AMD1:2016, Clause 4 apply except as
270 follows:

271 **4.3.2.5 MAINS supply**

272 *Replace the existing title and text of 4.3.2.5 with the following title and text:*

273 **4.3.2.5 Power supply**

274 The following requirements apply:

- 275 a) the MAINS supply voltage shall be between 90 % and 110 % of any RATED supply voltage for
276 which the HAND-HELD multimeter can be set or, if the HAND-HELD multimeter is RATED for a
277 greater fluctuation, at any supply voltage within the fluctuation range;
- 278 b) the MAINS frequency shall be any RATED frequency;
- 279 c) HAND-HELD multimeter for both a.c. and d.c. shall be connected to an a.c. or d.c. supply;
- 280 d) HAND-HELD multimeter powered by single-phase a.c. MAINS supply shall be connected both
281 with normal and reverse polarity;
- 282 e) if the means of connection permit reversal, battery-operated and d.c. HAND-HELD multimeter
283 shall be connected with both reverse and normal polarity.

284 **4.3.2.6 Input and output voltages**

285 *Replace the existing title and text of 4.3.2.6 with the following title and text:*

286 **4.3.2.6 Input and output voltages or currents**

287 Input and output voltages or currents, including floating voltages but excluding the MAINS supply
288 voltage, shall be set to any voltage or current within their RATED range, in normal and reverse
289 polarity if possible.

290 *Add the following new subclause:*

291 **4.4.2.101 Surge protective devices**

292 Surge protective devices *used in MAINS CIRCUITS or the circuits measuring MAINS* shall be short-
293 circuited and open-circuited.

294 **5 Marking and documentation**

295 IEC 61010-1:2010, Clause 5 and IEC 61010-1:2010/AMD1:2016, Clause 5 apply except as
296 follows:

297 **5.1.2 Identification**

298 *Add the following note after the existing note:*

299 NOTE 101 Some national regulations might require a marking to indicate the name and edition of the standard used
300 for compliance evaluation.

301 **5.1.5 TERMINALS, connections and operating devices**

302 **5.1.5.1 General**

303 *Replace the first paragraph with the following:*

304 If necessary for safety, an indication shall be given of the purpose of TERMINALS, connectors,
305 controls, and indicators. Where there is insufficient space, symbol 14 from Table 1 may be
306 used.

307 **5.1.5.2 TERMINALS**

308 *Replace the existing item d) with the following item d):*

309 d) TERMINALS supplied from the interior of the HAND-HELD multimeter and which could be
310 HAZARDOUS LIVE, with the voltage, current, charge or energy value or range, or with
311 symbol 12 of Table 1;

312 *Add the following new item to the list:*

313 aa) TERMINALS supplied from other TERMINALS which could be HAZARDOUS LIVE, with symbol 12
314 or symbol 14 of Table 1.

315 *Add the following new subclause:*

316 **5.1.5.101 Measuring circuit TERMINALS**

317 Measuring circuit TERMINALS are usually arranged in pairs or sets. Each pair or set of TERMINALS
318 may have a RATED voltage or a RATED current, or both, within that set, and each individual
319 TERMINAL will have a RATED voltage to earth. For some HAND-HELD multimeters, the RATED
320 voltage between TERMINALS may be different from the RATED voltage to earth. Markings shall be
321 clear to avoid misunderstanding.

322 Each pair or set of measuring circuit TERMINALS that are intended to be used together shall be
323 marked with the value of the RATED voltage or the RATED current as applicable to the pair or set
324 of TERMINALS.

325 TERMINALS of measuring circuits RATED for MAINS voltage measurements shall be marked with
326 "CAT III" or "CAT IV" and its RATED a.c. r.m.s. line-to-neutral or d.c. voltage as applicable.
327 Marking those TERMINALS with these two types of MEASUREMENT CATEGORY is permissible.
328 Marking of MEASUREMENT CATEGORY II is not allowed. Other measuring circuit TERMINALS shall
329 be marked with the value of the RATED voltage to earth.