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**Varnostne zahteve za električno opremo za meritve, nadzor in laboratorijsko uporabo - 2-032. del: Posebne zahteve za ročne in ročno vodene tokovne senzorje za električno preskušanje in meritve**

Safety requirements for electrical equipment for measurement, control and laboratory use - Part 2-032: Particular requirements for hand-held and hand-manipulated current sensors for electrical test and measurement

Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte – Teil 2-032: Besondere Anforderungen für handgehaltene und handbediente Stromsonden für elektrische Prüfungen und Messungen

<https://standards.iteh.ai/catalog/standards/sist/374a25e1-d83a-4025-8637-16d053346dc9/pr-en-iec-61010-2-032-2022>

Exigences de sécurité pour appareils électriques de mesure, de régulation et de laboratoire - Partie 2-032 : Exigences particulières pour les capteurs de courant, portatifs et manipulés manuellement, pour essai électrique et mesure

**Ta slovenski standard je istoveten z: prEN IEC 61010-2-032:2022**

**ICS:**

19.080	Električno in elektronsko preskušanje	Electrical and electronic testing
71.040.10	Kemijski laboratoriji. Laboratorijska oprema	Chemical laboratories. Laboratory equipment

**oSIST prEN IEC 61010-2-032:2022**      **en,fr,de**





66/768/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

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DATE OF CIRCULATION: <b>2022-10-14</b>	CLOSING DATE FOR VOTING: <b>2023-01-06</b>
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IEC TC 66 : SAFETY OF MEASURING, CONTROL AND LABORATORY EQUIPMENT	
SECRETARIAT: United Kingdom	SECRETARY: Ms Stephanie Lavy
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	<input type="checkbox"/> NOT SUBMITTED FOR CENELEC PARALLEL VOTING
<p><b>Attention IEC-CENELEC parallel voting</b></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 2-032: Particular requirements for hand-held and hand-manipulated current sensors for electrical test and measurement**

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 .....	11
7	3 Terms and definitions .....	12
8	4 Tests .....	13
9	5 Marking, documentation and indicator .....	14
10	6 Protection against electric shock .....	17
11	7 Protection against mechanical HAZARDS .....	25
12	8 Resistance to mechanical stresses .....	25
13	9 Protection against the spread of fire and arc flash .....	32
14	10 Equipment temperature limits and resistance to heat .....	38
15	11 Protection against HAZARDS from fluids and solid foreign objects .....	39
16	12 Protection against radiation, including laser sources, and against sonic and 17 ultrasonic pressure .....	39
18	13 Protection against liberated gases and substances, explosion and implosion .....	39
19	14 Components and subassemblies .....	39
20	15 Protection by interlocks .....	40
21	16 HAZARDS resulting from application .....	40
22	17 RISK assessment .....	40
23	101 Measuring circuits .....	40
24	Annexes .....	43
25	Annex D (normative) Parts between which insulation requirements are specified (see 26 6.4, 6.5.3 and 6.101) .....	43
27	Annex F (normative) Routine tests .....	45
28	Annex K (normative) Insulation requirements not covered by 6.7 .....	46
29	Annex L (informative) Index of defined terms .....	58
30	Annex AA (normative) MEASUREMENT CATEGORIES .....	59
31	Annex BB (informative) HAZARDS pertaining to measurements performed in certain 32 environments .....	62
33	Annex CC (informative) 4 mm "banana" TERMINALS .....	65
34	Annex DD (informative) Flowchart for insulation according to the type of circuit .....	67
35	Annex EE (informative) Determination of CLEARANCES for Table 101 .....	70
36	Annex FF (normative) CLAMP MULTIMETER .....	71
37	Bibliography .....	73
38		
39	Figure 101 – Examples of current sensors and their parts .....	10
40	Figure 4 – Acceptable arrangement of protective means against electric shock .....	18
41	Figure 102 – CLEARANCE between the PROTECTIVE FINGERGUARD to the JAWS and to the 42 HAZARDOUS LIVE conductor .....	23
43	Figure 103 – Abrasion test of the JAW ENDS .....	26
44	Figure 104 – Impact points for JAW impact test .....	27

45	Figure 105 – Indentation device .....	28
46	Figure 106 – Example of a current sensor with strain reliefs .....	30
47	Figure 107 – Flexing test .....	31
48	Figure 108 – Test probe to check protection against short-circuits .....	37
49	Figure 109 - Use of the test probe of Figure 108.....	37
50	Figure D.101 – Parts of current sensors (see also Table D.101) .....	43
51	Figure K.101 – CLEARANCES between the conductor, the input/output circuit and the enclosure of a Type A current sensor .....	50
52	Figure K.102 – Test circuit for evaluation of TRANSIENT OVERVOLTAGE attenuation .....	52
53	Figure AA.1 – Example to identify the locations of MEASUREMENT CATEGORIES.....	60
54	Figure CC.1 – Recommended dimensions of 4 mm TERMINALS .....	66
55	Figure DD.1 – Requirements for CLEARANCE, CREEPAGE DISTANCE and solid insulation.....	69
56	Figure FF.1 – Examples of CLAMP MULTIMETERS .....	71
57		
58		
59	Table 1 – Symbols .....	14
60	Table 101 – CLEARANCES for unmated measuring circuit TERMINALS .....	19
61	Table 102 – Energy level for JAW impact test .....	26
62	Table 103 – Pull forces for endcaps of flexible current sensors .....	29
63	Table 104 – Pull forces for input/output lead attachment test .....	32
64	Table 105 – Thickness of the test probe of Figure 108 and test voltages .....	38
65	Table D.101 – Insulation requirements for current sensors .....	44
66	Table K.15 – CLEARANCE values for the calculation of K.3.2 .....	47
67	Table K.16 – Test voltages based on CLEARANCES .....	48
68	Table K.101 - Impulse voltages for circuits connected to MAINS .....	52
69	Table K.102 - CLEARANCES for measuring circuits RATED for MEASUREMENT CATEGORIES.....	53
70	Table K.103 – Impulse test voltages for testing electric strength of solid insulation for measuring circuits RATED for MEASUREMENT CATEGORIES .....	54
71	Table K.104 – a.c. test voltages for testing electric strength of solid insulation for measuring circuits RATED for MEASUREMENT CATEGORIES .....	55
72	Table K.105 – Minimum values for distance or thickness of solid insulation for measuring circuits RATED for MEASUREMENT CATEGORIES .....	56
73	Table AA.1 – Characteristics of MEASUREMENT CATEGORIES .....	61
74	Table EE.1 – CLEARANCES values for Table 101.....	70
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## 79 INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT  
FOR MEASUREMENT, CONTROL, AND LABORATORY USE –****Part 2-032: Particular requirements for hand-held and  
hand-manipulated current sensors for electrical test and measurement****FOREWORD**

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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.

2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.

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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 61010-2-032 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 fifth edition cancels and replaces the fourth edition published in 2019. This edition constitutes a technical revision.

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

Clause 2	All normative references have been dated and new normative references have been added.
3.2.103	A new definition PROTECTIVE FINGERGUARD has been added to replace PROTECTIVE BARRIER
4.4.2.101	Addition of a new subclause about surge protective devices.
5.1.5.101.2	Minimum RATINGS for voltage of measuring TERMINALS are required.
6.5.1	The subclause has been modified
6.5.5	The subclause is no more used
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 above 1 000 V a.c. and 1 500 V d.c. 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.
6.6.102	This subclause replaces 6.6.101
6.101	This subclause replaces 6.9.101 of previous edition and has been modified.
6.102	The subclause replaces 6.9.102 of previous edition and has been modified.
8.101	JAW ENDS abrasion test has been modified.
8.105	A new subclause for input/output leads attachment has been added
9.101.2	Relocation of 101.3 of previous edition.
9.101.3	Relocation of 101.4 of previous edition, extension to MEASUREMENT CATEGORY II and reference to IEC 61000-4-5 for tests. Table 102 has been replaced by Table K.101.
9.102	Relocation of 102 of previous edition.
14.101	Relocation of 14.102. 14.101 of previous edition has been deleted.
101.3	New subclause for protections against HAZARD occurring from reading a voltage value in replacement of EE.5 of previous edition.
Table D.101	Transients are disregarded for insulation between JAW ENDS and input/output circuits.
F.101	Tests voltage for routine test of JAWS have been modified.
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.
K.3.101	New clause
Clause K.4	Redraft of the clause to propose a method for determination of $U_t$ for circuits which reduce TRANSIENT OVERVOLTAGES. Table K.101 replaces Table K.106.
K.101.4	The subclause has been reviewed. Tables and tests for solid insulation have been modified. 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.
Annex FF	This Annex was Annex EE of previous edition. The current sensor type of a CLAMP MULTIMETER is type A or type B.

128

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

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

130

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

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

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

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

138 This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in  
139 accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available  
140 at [www.iec.ch/members\\_experts/refdocs](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are  
141 described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

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

145 This Part 2-032 is to be used in conjunction with IEC 61010-1:2010 and  
146 IEC 61010-1:2010/AMD1:2016. It was established on the basis of the third edition (2010) of  
147 IEC 61010-1, including its amendment 1 (2016) and its corrigendum 1 (2019), hereinafter  
148 referred to as Part 1.

149 This Part 2-032 supplements or modifies the corresponding clauses in IEC 61010-1 so as to  
150 convert that publication into the IEC standard: *Particular requirements for hand-held and hand-*  
151 *manipulated current sensors for electrical test and measurement*.

152 Where a particular subclause of Part 1 is not mentioned in this Part 2-032, that subclause  
153 applies as far as is reasonable. Where this part states “addition”, “modification”, “replacement”,  
154 or “deletion” the relevant requirement, test specification or note in Part 1 should be adapted  
155 accordingly.

156 In this standard:

157 a) the following print types are used:

158 – requirements: in roman type;

159 – NOTES: in small roman type;

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

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

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

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

- 169 • reconfirmed,
- 170 • withdrawn,
- 171 • replaced by a revised edition, or
- 172 • amended.

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174

## INTRODUCTION

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

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

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

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

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

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

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

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

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

oSIST prEN IEC 61010-2-032:2022

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

206

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

209  
210 **Part 2-032: Particular requirements for hand-held and**  
211 **hand-manipulated current sensors for electrical test and measurement**

212  
213  
214  
215 **1 Scope and object**

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

218 **1.1.1 Equipment included in scope**

219 *Replace the existing text with the following:*

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

224 This part of IEC 61010 specifies safety requirements for HAND-HELD and hand-manipulated  
225 current sensors described below.

226 These current sensors are for measuring, detecting or injecting current, or indicating current  
227 waveforms on circuits without physically opening the current path of the circuit being measured.  
228 They can be stand-alone current sensors or accessories to other equipment or parts of  
229 combined equipment (see Figure 101). These include measurement circuits which are part of  
230 electrical test and measurement equipment, laboratory equipment, or process control  
231 equipment. These current sensors and circuits need additional protective means between the  
232 current sensor, the circuit and an OPERATOR.

233 NOTE 1 Combined equipment is equipment that is electrically connected to a current sensor by means of a  
234 permanent connection which can be detached only by the use of a TOOL.

235 NOTE 2 Some current sensors are also known as current clamps, CLAMP MULTIMETERS and current probes.

236 Current sensors are hand-manipulated before and/or after a test or measurement, but do not  
237 necessarily need to be HAND-HELD during the test or measurement. Current sensors used as  
238 FIXED EQUIPMENT are not within the scope of this document.

239 The following types of current sensors are covered:

240 a) Type A: a current sensor designed to be applied to or removed from HAZARDOUS LIVE  
241 UNINSULATED CONDUCTORS. Type A current sensors have defined HAND-HELD or hand-  
242 manipulated parts providing protection against electric shock from the conductor being  
243 measured, and also have protection against short-circuits between wires and between  
244 busbars during clamping.

245 b) Type B: a current sensor which has protection against short-circuits between wires or  
246 busbars during clamping but without defined HAND-HELD or hand-manipulated parts which  
247 provide protection against electric shock during clamping. Additional protective means are  
248 necessary to avoid electric shock from HAZARDOUS LIVE conductors which cannot be de-  
249 energised during application or removal of the current sensor.

250 EXAMPLE 1 Flexible current sensors.

251 c) Type C: a current sensor without protection against short-circuits between wires or busbars  
252 during clamping. Type C current sensors are intended to be applied to or removed from

253 HAZARDOUS LIVE UNINSULATED CONDUCTORS or from non-limited-energy circuit conductors  
254 only when they are de-energised.

255 EXAMPLE 2 Split-core transducers.

256 d) Type D: a current sensor designed to be applied to or removed from insulated conductors  
257 or from limited-energy circuit conductors.

258 EXAMPLE 3 Current probes for oscilloscopes and earth leakage current detectors.

259 Type A, Type B and Type C current sensors can also be applied to or removed from insulated  
260 conductors. In this case, HAZARDS are limited to acceptable levels by the insulation of the  
261 conductors.

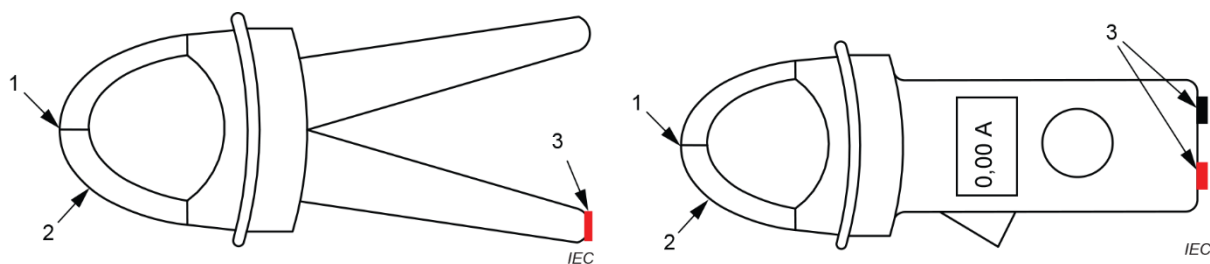
262 Additional requirements for CLAMP MULTIMETERS are given in Annex FF.

263 Figure 101 shows graphical representations of typical current sensors for illustration purposes.  
264 Current sensors can look different depending on the design.

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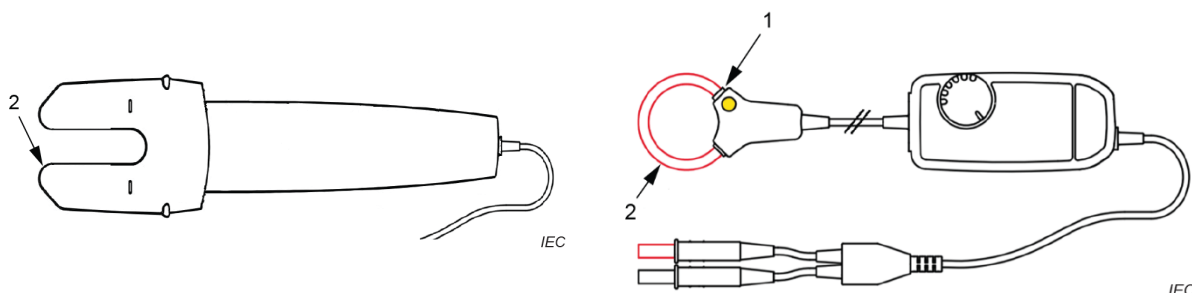
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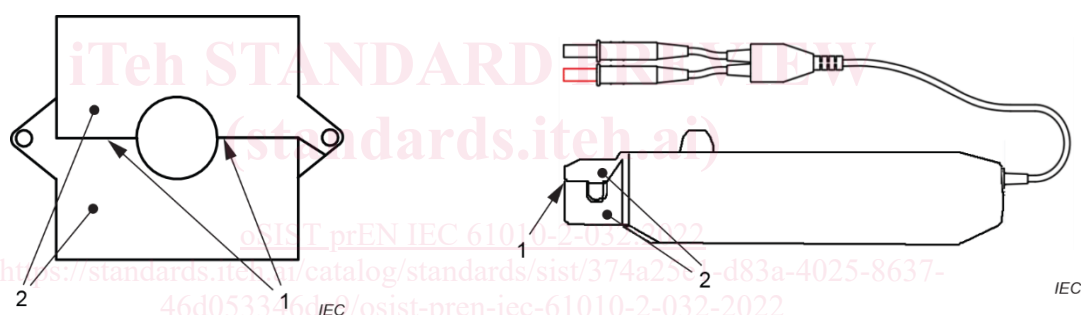
Type A - Current sensor as an accessory

Type A - Current sensor with self-contained and/or additional measuring functions



Type A - Current sensor with fork-style JAWS

Type B - Flexible current sensor part of a piece of combined equipment



Type C - Split-core current sensor

Type D - Current sensor for non-HAZARDOUS LIVE applications (shown with a sliding JAW)

265

266 **Key**

267 1 JAW END(S)

268 2 JAW

269 3 measuring circuit TERMINALS

270

**Figure 101 – Examples of current sensors and their parts**271 **1.2.1 Aspects included in scope**272 *Replace item c) of the second paragraph with the following new item:*

273 c) spread of fire or arc flash from the current sensor (see Clause 9);

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

275 Requirements for protection against HAZARDS arising from NORMAL USE, REASONABLY  
 276 FORESEEABLE MISUSE and ergonomic factors are specified in Clause 16, Clause 101 and  
 277 Annex FF.

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

281 **2 Normative references**

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

284 *Replace the following existing normative references:*

285 IEC 60068-2-75, *Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests*

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

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

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

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

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

296 IEC 62262, *Degrees of protection provided by enclosures for electrical equipment against*  
297 *external mechanical impacts (IK code)*

298 *with the following new normative references:*

<https://standards.iteh.ai/catalog/standards/sist/374a25e1-d83a-4025-8637-3357-5b1e/iec-61010-2-032:2022>

299 IEC 60068-2-75:2014, *Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests*

300 IEC 60364-4-44:2007, *Low-voltage electrical installations – Part 4-44: Protection for safety –*  
301 *Protection against voltage disturbances and electromagnetic disturbances*  
302 *IEC 60364-4-44:2007/AMD1:2015*  
303 *IEC 60364-4-44:2007/AMD2:2018*

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

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

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

310 IEC 62262:2002, *Degrees of protection provided by enclosures for electrical equipment*  
311 *against external mechanical impacts (IK code)*  
312 *IEC 62262:2002/AMD1:2021*

313 *Add the following new normative references:*

314 IEC 60695-10-2:2014, *Fire hazard testing - Part 10-2: Abnormal heat - Ball pressure test*  
315 *method*

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

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

### 319 **3 Terms and definitions**

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

#### 322 **3.1 Equipment and states of equipment**

323 *Add the following two new terms and definitions:*

##### 324 **3.1.101**

##### 325 **HAND-HELD**

326 intended to be supported by one hand during NORMAL USE

##### 327 **3.1.102**

##### 328 **CLAMP MULTIMETER**

329 HAND-HELD multi-range and multifunction measuring instrument intended to measure current on  
330 a live MAINS without physically opening the conductors, voltage on a live MAINS and other  
331 electrical quantities such as resistance

#### 332 **3.2 Parts and accessories**

333 *Add the following two new terms and definitions:*

##### 334 **3.2.101**

##### 335 **JAW**

336 part of a current sensor which surrounds or partially surrounds the conductor under test

##### 337 **3.2.102**

##### 338 **JAW END**

339 part of the JAW where opening occurs while clamping around a conductor

##### 340 **3.2.103**

##### 341 **PROTECTIVE FINGERGUARD**

342 part of the enclosure that indicates the limit of safe access and that reduces the risk of the  
343 operator touching HAZARDOUS LIVE parts

#### 344 **3.5 Safety terms**

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

##### 346 **3.5.4**

##### 347 **MAINS**

348 electricity supply system

349 *Add the following new term and definition:*

##### 350 **3.5.101**

##### 351 **MEASUREMENT CATEGORY**

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

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

357 **3.6 Insulation**

358 *Add the following new term and definition:*

359 **3.6.101**

360 **UNINSULATED CONDUCTOR**

361 conductor not insulated by solid insulation or insulated by solid insulation which does not meet  
362 the requirements for BASIC INSULATION for the relevant voltage to earth

363 **4 Tests**

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

366 **4.3.2.5 MAINS supply**

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

368 **4.3.2.5 Power supply**

369 The following requirements apply:

- 370 a) the MAINS supply voltage shall be between 90 % and 110 % of any RATED supply voltage for  
371 which the current sensor can be set or, if the current sensor is RATED for a greater  
372 fluctuation, at any supply voltage within the fluctuation range;
- 373 b) the MAINS frequency shall be any RATED frequency;
- 374 c) current sensor for both a.c. and d.c. shall be connected to an a.c. or d.c. supply;
- 375 d) current sensor powered by single-phase a.c. MAINS supply shall be connected both with  
376 normal and reverse polarity;
- 377 e) if the means of connection permit reversal, battery-operated and d.c. current sensor shall  
378 be connected with both reverse and normal polarity.

379 **4.3.2.6 Input and output voltages**

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

381 **4.3.2.6 Input and output voltages or currents**

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

385 **4.4.2.8 Outputs**

386 *Replace the text with the following:*

387 Outputs shall be open-circuited and short-circuited, one at a time.

388 *Add the following new subclause:*

389 **4.4.2.101 Surge protective devices**

390 Surge protective devices used in MAINS CIRCUITS or the circuits measuring MAINS shall be short-  
391 circuited and open-circuited.