SLOVENSKI STANDARD
oSIST prEN IEC 61010-2-032:2022

01-december-2022

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

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

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)

PROJECT NUMBER: **IEC 61010-2-032 ED5**	
DATE OF CIRCULATION: **2022-10-14**	CLOSING DATE FOR VOTING: **2023-01-06**
SUPERSEDES DOCUMENTS: **66/762/RR**	

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: ☐ 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:

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

NOTE FROM TC/SC OFFICERS:

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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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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.

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

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

FDIS	Report on voting
66/xxx/FDIS	66/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.

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

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

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

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

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

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

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

In this standard:

a) the following print types are used:
   - requirements: in roman type;
   - NOTES: in small roman type;
   - *conformity and tests: in italic type;*
   - terms used throughout this standard which have been defined in Clause 3: SMALL ROMAN CAPITALS;

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

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.

INTRODUCTION

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

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

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

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

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

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

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

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

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

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

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

1 Scope and object

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

1.1.1 Equipment included in scope

Replace the existing text with the following:

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

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

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

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

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

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

The following types of current sensors are covered:

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

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

EXAMPLE 1 Flexible current sensors.

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

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

EXAMPLE 2 Split-core transducers.

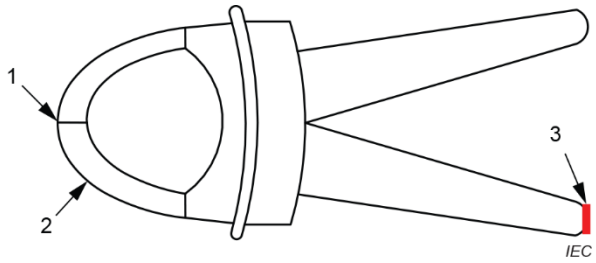
d) Type D: a current sensor designed to be applied to or removed from insulated conductors or from limited-energy circuit conductors.

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

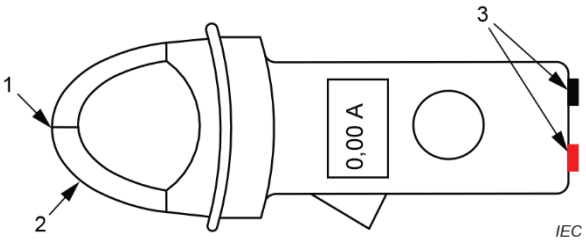
Type A, Type B and Type C current sensors can also be applied to or removed from insulated conductors. In this case, HAZARDS are limited to acceptable levels by the insulation of the conductors.

Additional requirements for CLAMP MULTIMETERS are given in Annex FF.

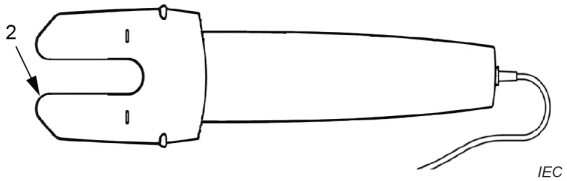
Figure 101 shows graphical representations of typical current sensors for illustration purposes. Current sensors can look different depending on the design.



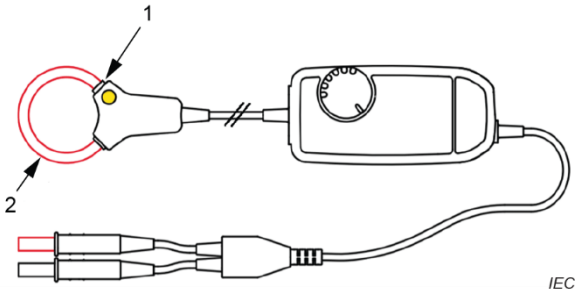
Type A - Current sensor as an accessory



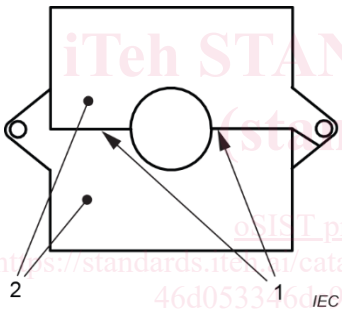
Type A - Current sensor with self-contained and/or additional measuring functions



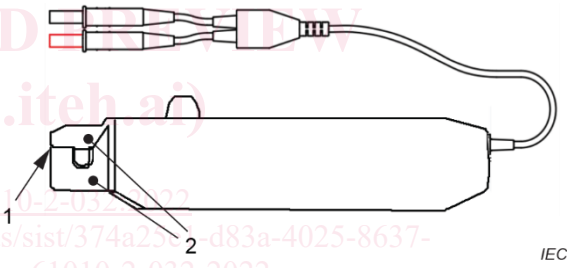
Type A - Current sensor with fork-style JAWS



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)

Key

1 JAW END(S)

2 JAW

3 measuring circuit TERMINALS

Figure 101 – Examples of current sensors and their parts

1.2.1 Aspects included in scope

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

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

Replace the third paragraph with the following two new paragraphs:

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

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

2 Normative references

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

Replace the following existing normative references:

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

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

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

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

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

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

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

with the following new normative references:

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

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

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

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

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

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

Add the following new normative references:

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

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

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

3 Terms and definitions

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

3.1 Equipment and states of equipment

Add the following two new terms and definitions:

3.1.101
HAND-HELD
intended to be supported by one hand during NORMAL USE

3.1.102
CLAMP MULTIMETER
HAND-HELD multi-range and multifunction measuring instrument intended to measure current on a live MAINS without physically opening the conductors, voltage on a live MAINS and other electrical quantities such as resistance

3.2 Parts and accessories

Add the following two new terms and definitions:

3.2.101
JAW
part of a current sensor which surrounds or partially surrounds the conductor under test

3.2.102
JAW END
part of the JAW where opening occurs while clamping around a conductor

3.2.103
PROTECTIVE FINGERGUARD
part of the enclosure that indicates the limit of safe access and that reduces the risk of the operator touching HAZARDOUS LIVE parts

3.5 Safety terms

Replace the definition of 3.5.4 with the following new definition:

3.5.4
MAINS
electricity supply system

Add the following new term and definition:

3.5.101
MEASUREMENT CATEGORY
classification of testing and measuring circuits according to the type of MAINS to which they are intended to be connected

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

3.6 Insulation

Add the following new term and definition:

3.6.101
UNINSULATED CONDUCTOR
conductor not insulated by solid insulation or insulated by solid insulation which does not meet the requirements for BASIC INSULATION for the relevant voltage to earth

4 Tests

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

4.3.2.5 MAINS supply

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

4.3.2.5 Power supply

The following requirements apply:

a) the MAINS supply voltage shall be between 90 % and 110 % of any RATED supply voltage for which the current sensor can be set or, if the current sensor is RATED for a greater fluctuation, at any supply voltage within the fluctuation range;

b) the MAINS frequency shall be any RATED frequency;

c) current sensor for both a.c. and d.c. shall be connected to an a.c. or d.c. supply;

d) current sensor powered by single-phase a.c. MAINS supply shall be connected both with normal and reverse polarity;

e) if the means of connection permit reversal, battery-operated and d.c. current sensor shall be connected with both reverse and normal polarity.

4.3.2.6 Input and output voltages

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

4.3.2.6 Input and output voltages or currents

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

4.4.2.8 Outputs

Replace the text with the following:

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

Add the following new subclause:

4.4.2.101 Surge protective devices

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