

**OHUTUSNÕUDED ELEKTRILISTELE MÕÕTMIS-,  
JUHTIMIS- JA LABORATOORIUMISEADMETELE.  
OSA 2-032: ERINÕUDED KÄESHOITAVATELE JA KÄSITSI  
MANIPULEERITAVATELE ELEKTRILISTEKS  
KATSETUSTEKS JA MÕÕTMISTEKS KASUTATAVATELE  
VOOLUANDURITELE**

**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**

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN IEC 61010-2-032:2021 sisaldab Euroopa standardi EN IEC 61010-2-032:2021 ingliskeelset teksti.	This Estonian standard EN IEC 61010-2-032:2021 consists of the English text of the European standard EN IEC 61010-2-032:2021.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 12.11.2021.	Date of Availability of the European standard is 12.11.2021.
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## English Version

**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  
(IEC 61010-2-032:2019 + COR1:2020)**

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  
(IEC 61010-2-032:2019 + COR1:2020)

Sicherheitsbestimmungen für elektrische Mess-, Steuer-,  
Regel- und Laborgeräte - Teil 2-032: Besondere  
Anforderungen für handgehaltene und handbediente  
Stromsonden für elektrische Prüfungen und Messungen  
(IEC 61010-2-032:2019 + COR1:2020)

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## European foreword

The text of document 66/691/FDIS, future edition 4 of IEC 61010-2-032, prepared by IEC/TC 66 "Safety of measuring, control and laboratory equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61010-2-032:2021.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2022-05-12
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2024-11-12

This document supersedes EN 61010-2-032:2012 and all of its amendments and corrigenda (if any).

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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 61010-2-033	NOTE	Harmonized as EN IEC 61010-2-033
IEC 61010-2-034	NOTE	Harmonized as EN IEC 61010-2-034
IEC 61557-1	NOTE	Harmonized as EN 61557-1
IEC 61557-2	NOTE	Harmonized as EN 61557-2
IEC 61557-3	NOTE	Harmonized as EN 61557-3
IEC 61557-4	NOTE	Harmonized as EN 61557-4
IEC 61557-5	NOTE	Harmonized as EN 61557-5
IEC 61557-6	NOTE	Harmonized as EN 61557-6
IEC 61557-7	NOTE	Harmonized as EN 61557-7

IEC 61557-8	NOTE	Harmonized as EN 61557-8
IEC 61557-9	NOTE	Harmonized as EN 61557-9
IEC 61557-10	NOTE	Harmonized as EN 61557-10
IEC 61557-11	NOTE	Harmonized as EN 61557-11
IEC 61557-12	NOTE	Harmonized as EN 61557-12

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE



**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**

**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**



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# INTERNATIONAL STANDARD

## NORME INTERNATIONALE



**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**

**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**

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# INTERNATIONAL ELECTROTECHNICAL COMMISSION

## **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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International Standard IEC 61010-2-032 has been prepared by IEC technical committee 66: Safety of measuring, control and laboratory equipment.

This fourth edition cancels and replaces the third edition published in 2012. This edition constitutes a technical revision.

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

- a) It has been indicated that current sensors used as FIXED EQUIPMENT are not within the scope of this document.
- b) Fork-style current sensors have been added.

- c) Requirements from Part 2-033 applicable to CLAMP MULTIMETERS that have a primary purpose of measuring voltage on live MAINS have been included in the new normative Annex EE.
- d) CLEARANCES and CREEPAGE DISTANCES for measuring circuit TERMINALS exceeding 1 000 V a.c. or 1 414 V d.c. and for WET LOCATIONS have been specified.
- e) Reduced CREEPAGE DISTANCES are allowed to be according to material group I for all insulating materials.
- f) Requirements for input/output circuits of Type A, Type B and Type C current sensors have been detailed in 6.9.102.
- g) Requirements for output circuit leads have been modified.
- h) The JAW impact test has been limited to the front of the JAWS.
- i) The abrasion test for cords of flexible current sensors has been removed and replaced by a pressure test at high temperature.
- j) The voltage source for testing overvoltage limiting components or circuits may be limited to 400 V.
- k) Reference to IEC 61010-031 for probe assemblies has been added.
- l) Requirements for the prevention of TRANSIENT OVERVOLTAGES for MAINS voltage measuring circuits have been added.
- m) Requirements for measuring circuits from 1 000 V to 3 000 V have been added.
- n) An informative Annex CC about the dimensions of banana TERMINALS has been added.
- o) A flowchart for insulation according to the type of circuit has been added in a new Annex DD.

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

FDIS	Report on voting
66/691/FDIS	66/695/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.

This Part 2-032 is to be used in conjunction with the latest edition of IEC 61010-1. It was established on the basis of the third edition (2010) of IEC 61010-1 and its Amendment 1 (2016), 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 2-032 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).

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## INTRODUCTION

Part 2-030 specifies the safety requirements for equipment with testing and measuring circuits which are connected for test or measurement purposes to devices or circuits outside the measurement equipment itself. Requirements of Part 2-030 have been included in this 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 this Part 2-032.

Part 2-033 specifies the safety requirements for hand-held multimeters that have the primary purpose of measuring voltage on live MAINS. For equipment within the scope of Part 2-032 and Part 2-033, only this Part 2-032 is applicable.

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. For equipment within the scope of Part 2-032 and Part 2-034, both documents should be read in conjunction.

# 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

This clause of Part 1 is applicable except as follows:

#### 1.1.1 Equipment included in scope

*Replace the existing text with the following:*

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.

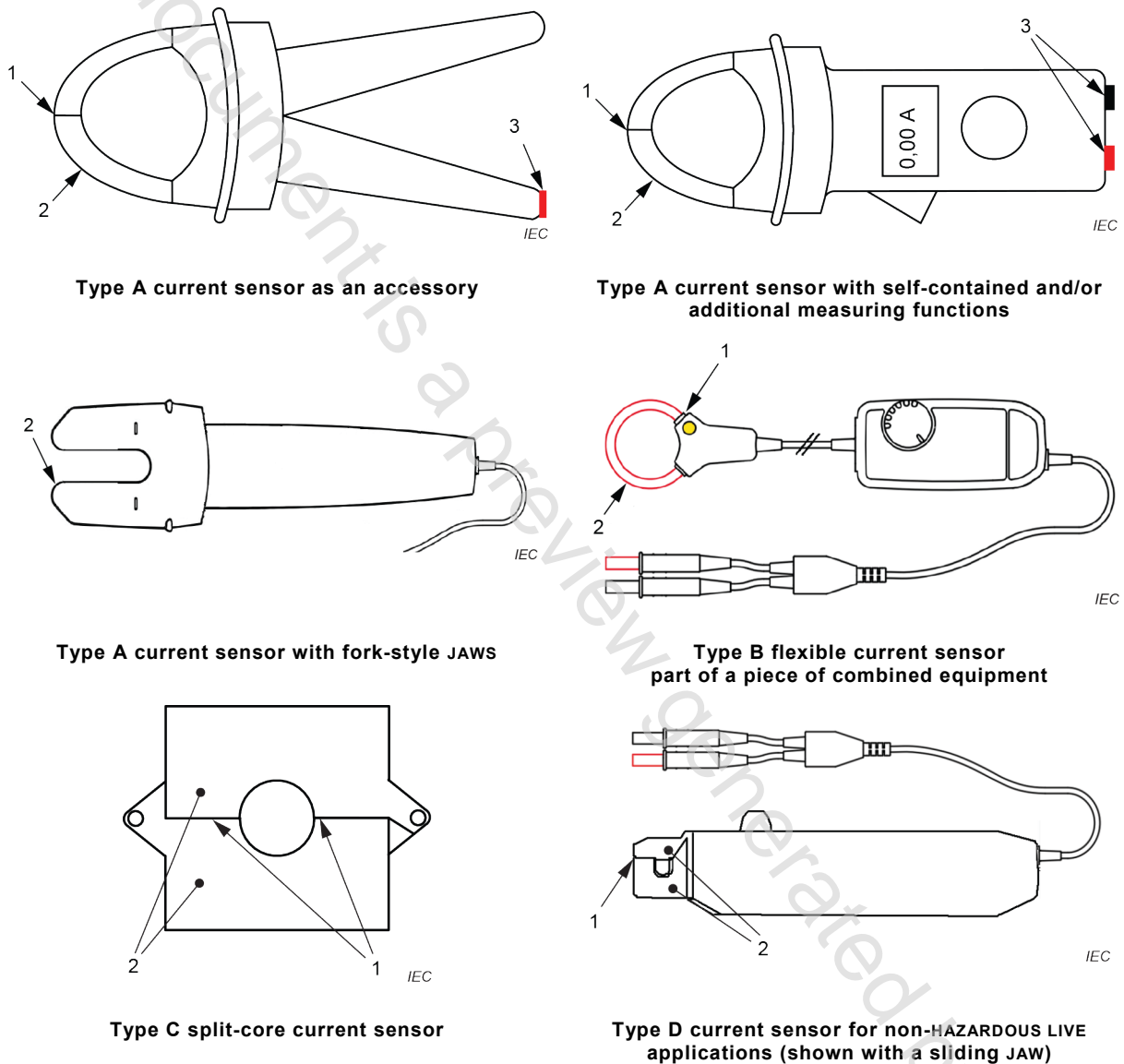
- d) Type D: a current sensor designed to be applied to or removed from insulated conductors or from limited-energy circuit conductors.

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

All current sensors can also be used with 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 EE.

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



**Figure 101 – Examples of current sensors and their parts**

### 1.2.1 Aspects included in scope

Add the following three new paragraphs at the end of the subclause:



Requirements for protection against HAZARDS resulting from NORMAL USE and REASONABLY FORESEEABLE MISUSE of measuring circuits are given in Clause 101.

Requirements for prevention of HAZARD from arc flash and short-circuits are given in Clause 102.

Requirements for reliance on the displayed value of CLAMP MULTIMETERS are given in Clause EE.5 .

## 2 Normative references

This clause of Part 1 is applicable except as follows:

*Replace "IEC 61010-031" with the following new reference:*

IEC 61010-031:2015, *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 61010-031:2015/AMD1:2018

*Replace "IEC 61180-1 (all parts)", "IEC 61180-1" and "IEC 61180-2", with the following new reference:*

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

## 3 Terms and definitions

This clause of Part 1 is applicable 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