Irish Standard
I.S. EN 61010-2-032:2012

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 61010-2-032:2012 (EQV))

I.S. EN 61010-2-032:2012

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NSAI
1 Swift Square,
Northwood, Santry
Dublin 9

T +353 1 807 3800
F +353 1 807 3838
E standards@nsai.ie

W NSAI.ie

Sales:
T +353 1 857 6730
F +353 1 857 6729
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

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EN 61010-2-032

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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 61010-2-032:2012)

Règles 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 à la main, de test et de mesure électriques
(CEI 61010-2-032:2012)

Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte – Teil 2-032: Besondere Anforderungen für handgehaltene und handbediente Stromsonden für elektrische Prüfungen und Messungen
(IEC 61010-2-032:2012)

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European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 61010-2-032:2012 E

Foreword

The text of document 66/474/FDIS, future edition 3 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 61010-2-032:2012.

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)	2013-07-31
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2015-10-31

This document supersedes EN 61010-2-032:2002.

EN 61010-2-032:2012 includes the following significant technical changes with respect to EN 61010-2-032:2002:
a) A new Type D current sensor has been defined.
b) The terminology for MEASUREMENT CATEGORY I has changed. In this Part 2-032, it is termed “not RATED for measurements within MEASUREMENT CATEGORIES II, III, or IV”.
c) Requirements for markings of measuring circuit TERMINALS and JAWS have been modified.
d) CLEARANCES and CREEPAGE DISTANCES have been added for unmated measuring circuit TERMINALS.
e) Requirements have been added for specialized measuring circuit TERMINALS.
f) The pull test for endcaps of flexible current sensors has been revised.
g) Requirements for output circuit leads have been revised.
h) Requirements have been added for temperature limits and resistance to heat to prevent thermal HAZARDS from eddy currents and high currents.
i) Requirements for circuits or components used as TRANSIENT OVERVOLTAGE limiting devices have been revised.
j) Requirements have been added for low battery indication.
k) Requirements have been revised and added pertaining to REASONABLY FORESEEABLE MISUSE of measuring circuits, including usage of the current sensor in a manner that might cause arc flash.
l) Requirements for MAINS voltage measuring circuits have been added.
m) Requirements to prevent HAZARDs from short-circuits have been revised and located in a new Clause 102.
n) ROUTINE TESTS have been modified.
o) Insulation requirements for measuring circuits have been primarily located in Annex K.
p) Annex AA has been added to describe the characteristics of MEASUREMENT CATEGORIES.
q) Annex BB has been added to describe HAZARDS that may be encountered when using measuring circuits.

EN 61010-2-032:2012 is to be used in conjunction with EN 61010-1:2010, on the basis of which It was established. Consideration may be given to future editions of, or amendments to, EN 61010-1.

This Part 2-032 supplements or modifies the corresponding clauses in EN 61010-1 so as to convert that publication into the European Standard: *Particular requirements for HAND-HELD MULTIMETERS and other METERS, for domestic and professional use, capable of measuring MAINS voltage.*

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 test: 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; and additional list items are numbered from aa). Additional annexes are numbered AA and BB.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This standard covers the Principle Elements of the Safety Objectives for Electrical Equipment Designed for Use within Certain Voltage Limits (LVD - 2006/95/EC)

Endorsement notice

The text of the International Standard IEC 61010-2-032:2012 was approved by CENELEC as a European Standard without any modification.

Add the following reference to the bibliography of EN 61010-1:

IEC 61010-2-033	NOTE	Harmonized as EN 61010-2-033.

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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

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.
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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.

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

FDIS	Report on voting
66/474/FDIS	66/488/RVD

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

This third edition cancels and replaces the second edition published in 2002. This edition constitutes a technical revision.

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

a) A new Type D current sensor has been defined.

b) The terminology for MEASUREMENT CATEGORY I has changed. In this Part 2-032, it is termed “not RATED for measurements within MEASUREMENT CATEGORIES II, III, or IV”.

c) Requirements for markings of measuring circuit TERMINALS and JAWS have been modified.

d) CLEARANCES and CREEPAGE DISTANCES have been added for unmated measuring circuit TERMINALS.

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j) Requirements have been added for low battery indication.

k) Requirements have been revised and added pertaining to REASONABLY FORESEEABLE MISUSE of measuring circuits, including usage of the current sensor in a manner that might cause arc flash.

l) Requirements for MAINS voltage measuring circuits have been added.

m) Requirements to prevent HAZARDs from short-circuits have been revised and located in a new Clause 102.

n) ROUTINE TESTS have been modified.

o) Insulation requirements for measuring circuits have been primarily located in Annex K.

p) Annex AA has been added to describe the characteristics of MEASUREMENT CATEGORIES.

q) Annex BB has been added to describe HAZARDS that may be encountered when using measuring circuits.

This Part 2-032 is intended to be used in conjunction with IEC 61010-1. It was established on the basis of the third edition (2010). Consideration may be given to future editions of, or amendments to, IEC 61010-1.

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 test: 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; and additional list items are numbered from aa). Additional annexes are numbered AA and BB.

This publication 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 committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication 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 will be supplemented or modified by the special requirements of one, or more than one, particular part 2s of the standard which are to be read in conjunction with the Part 1 requirements.

This Part 2-032 specifies the safety requirements that are generally applicable to HAND-HELD and hand-manipulated current sensors (see Clause 1).

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

Part 2-033 specifies the safety requirements for HAND HELD METERS that have a primary purpose of measuring voltage on a live MAINS CIRCUIT.

Except for protective bonding, all requirements of Part 2-030 have been included into Part 2-032. Equipment within the scopes of Part 2-030 and Part 2-032 are considered to be covered by the requirements of Part 2-032. However, for equipment within the scope of both Part 2-032 and Part 2-033, the two standards are to 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

Replacement:

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 may 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. The existence of these current sensors and circuits in equipment requires additional protective means between the current sensor, the circuit and an OPERATOR.

NOTE 1 This part includes also the requirements of Part 2-030. Testing and measuring circuits that are not within the scope of this part are considered to be covered by the requirements of Part 1 or other parts 2s of IEC 61010, and then will also need to meet the requirements of these other parts with the exception of Part 2-030. Current clamp meters and similar currents sensors that have a primary purpose of measuring voltage on a live MAINS CIRCUIT are also within the scope of Part 2-033.

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

Current sensors require hand manipulation before or after a test or measurement, but do not necessarily need to be HAND-HELD during the test or measurement.

NOTE 3 Some current sensors designed for portable use can also be used for fixed installations.

The following types of current sensors are covered:

a) Type A: a current sensor designed to be applied around or removed from UNINSULATED HAZARDOUS LIVE 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 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 UNINSULATED HAZARDOUS LIVE conductors or from non-limited-energy circuit conductors only when they are de-energised.

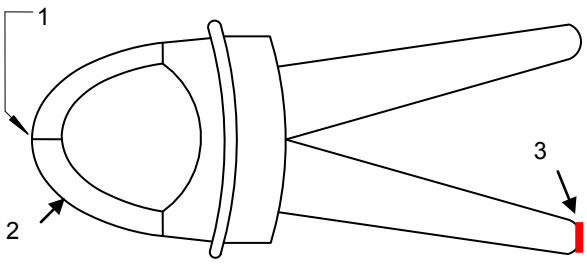
EXAMPLE 2 Split-core transducers.

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

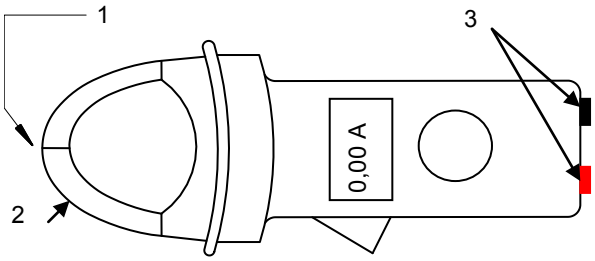
A Type D current sensor does not need protection against short-circuits during clamping and has no defined HAND-HELD or hand-manipulated parts providing protection against electric shock from the conductor being measured.

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

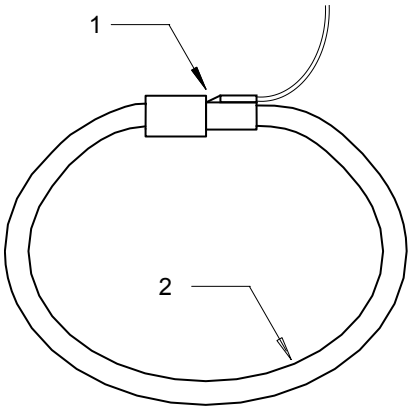
NOTE 4 All current sensors can also be used around insulated conductors. In this case, HAZARDS are limited to acceptable levels by the insulation of the conductors.



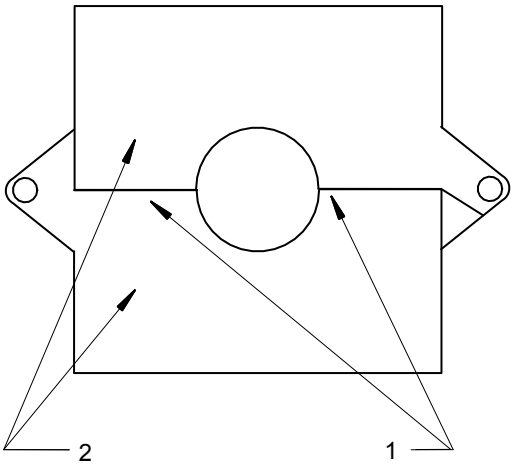
Type A
Current sensor as an accessory



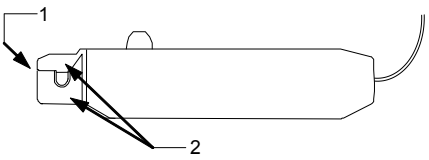
Type A
Current sensor with self-contained measuring functions or with additional measuring functions



Type B
Flexible current sensor



Type C
Split-core current sensor



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

IEC 1865/12

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

Addition:

Add the following two 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.

2 Normative references

This clause of Part 1 is applicable.

3 Terms and definitions

This clause of Part 1 is applicable except as follows:

3.1 Equipment and states of equipment

Addition:

Add the following new definition:

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

3.2 Parts and accessories

Addition:

Add the following new 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

3.5 Safety terms

Replacement:

Replace the definitions of 3.5.4 and 3.5.5 with the following new definitions:

3.5.4
MAINS
low-voltage electricity supply system to which the current sensor concerned is designed to be connected for the purpose of powering the current sensor or for measurements

3.5.5
MAINS CIRCUIT
circuit which is intended to be directly connected to the MAINS for the purpose of powering the current sensor or for measurements