IEC 61010-2-032

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REDLINE VERSION

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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

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ICS 19.080

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CONTENTS

FOREWORD 4
1 Scope and object 8
2 Normative references 12
3 Terms and definitions 12
4 Tests 13
5 Marking and documentation 14
6 Protection against electric shock 18
7 Protection against mechanical HAZARDS 28
8 Resistance to mechanical stresses 28
9 Protection against the spread of fire 33
10 Equipment temperature limits and resistance to heat 33
11 Protection against HAZARDS from fluids and solid foreign objects 34
12 Protection against radiation, including laser sources, and against sonic and ultrasonic pressure 34
13 Protection against liberated gases and substances, explosion and implosion 34
14 Components and subassemblies 35
15 Protection by interlocks 36
16 HAZARDS resulting from application 36
17 RISK assessment 37
Annexes 45
Annex D (normative) Parts between which insulation requirements are specified (see 6.4, 6.5.3, 6.9.101 and 6.101) 45
Annex F (normative) Routine tests 47
Annex K (normative) Insulation requirements not covered by 6.7 48
Annex L (informative) Index of defined terms 57
Annex AA (normative) MEASUREMENT CATEGORIES 58
Annex BB (informative) HAZARDS pertaining to measurements performed in certain environments 61
Annex CC (informative) 4-mm "banana" TERMINALS 64
Annex DD (informative) Flowchart for insulation according to the type of circuit 66
Annex EE (normative) CLAMP MULTIMETER 69
Bibliography 72

Figure 101 – Examples of current sensors and their parts 10
Figure 102 – CLEARANCE between the PROTECTIVE BARRIER to the JAWS and to the HAZARDOUS LIVE conductor 26
Figure 103 – Abrasion test of the JAW ENDS 30
Figure 104 – Impact points for JAW impact test 31
Figure 105 – Indentation device 32
Figure 106 – Test probe to check protection against short-circuits 43
Figure 107 – Use of the test probe of Figure 106 43
Figure D.101 – Parts of current sensors (see also Table D.101) 45

Figure AA.1 – Example to identify the locations of measuring circuits 59
Figure CC.1 – Recommended dimensions of 4-mm TERMINALS 65
Figure DD.1 – Requirements for CLEARANCE, CREEPAGE DISTANCE and solid insulation 68
Figure EE.1 – Examples of CLAMP MULTIMETERS 69

Table 1 – Symbols 14
Table 101 – CLEARANCES and CREEPAGE DISTANCES for measuring circuit TERMINALS with HAZARDOUS LIVE conductive parts up to 1 000 V a.c. or 1 500 V d.c. 19
Table 102 – Energy level for JAW impact test 30
Table 103 – Pull forces for endcaps of flexible current sensors 33
Table 104 – Impulse voltages 36
Table 105 – Thickness of the test probe of Figure 106 and test voltages 44
Table D.101 – Insulation requirements for current sensors 46
Table K.101 – CLEARANCES of measuring circuits RATED for MEASUREMENT CATEGORIES 50
Table K.102 – a.c. test voltages for testing electric strength of solid insulation in measuring circuits RATED for MEASUREMENT CATEGORIES 52
Table K.103 – Impulse test voltages for testing electric strength of solid insulation in measuring circuits RATED for MEASUREMENT CATEGORIES 53
Table K.104 –Test voltages for testing long-term stress of solid insulation in measuring circuits RATED for MEASUREMENT CATEGORIES 54
Table K.105 – Minimum values for distance or thickness of solid insulation in measuring circuits RATED FOR MEASUREMENT CATEGORIES III and IV 55
Table AA.1 – Characteristics of MEASUREMENT CATEGORIES 60

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

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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This Redline version provides you with a quick and easy way to compare all the changes between this standard and its previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

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).

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.

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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 handheld 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 Part2-032 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.~~

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 ~~may~~ 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. ~~The existence of~~ These current sensors and circuits ~~in equipment requires~~ need 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 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 ~~require hand manipulation~~ 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.

~~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~~ to or removed from ~~UNINSULATED~~ 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 ~~UNINSULATED~~ 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 ~~around~~ to or removed from insulated conductors or from limited-energy circuit conductors.

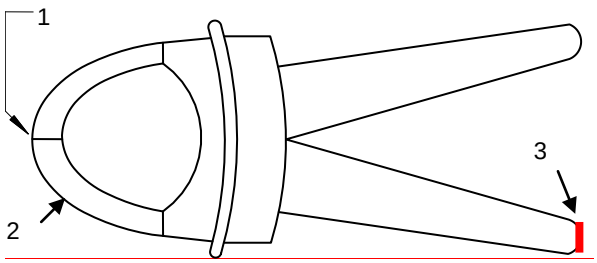
~~A Type D current sensor does not need protection against short-circuits during clamping and has no defined HAND HELD or hand manipulated parts providing protection against electric shock from the conductor being measured.~~

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

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

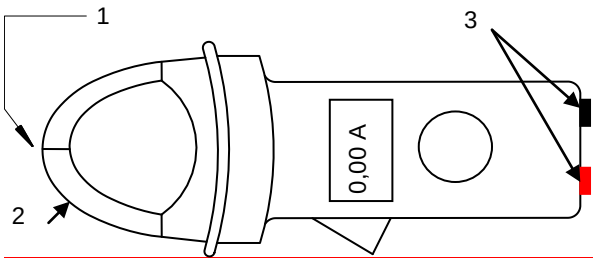
Additional requirements for CLAMP MULTIMETERS are given in Annex EE.

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



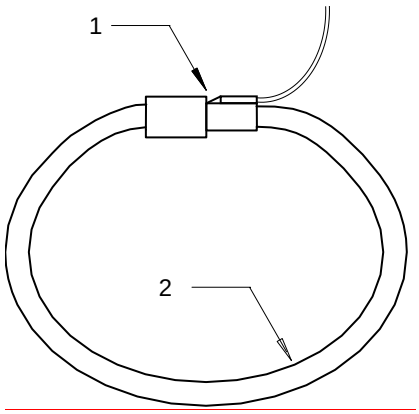
~~Type A~~

~~Current sensor as an accessory~~



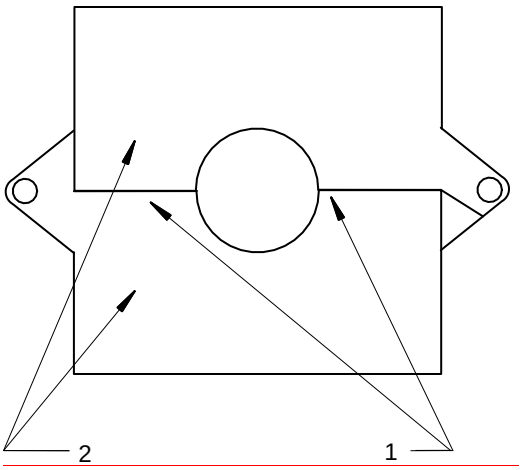
~~Type A~~

~~Current sensor with self-contained measuring functions or with additional measuring functions~~



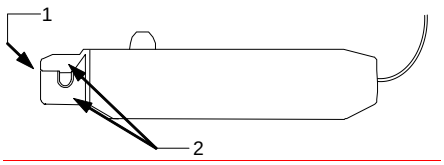
~~Type B~~

~~Flexible current sensor~~



~~Type C~~

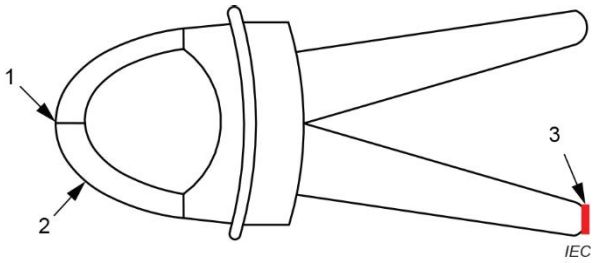
~~Split-core current sensor~~



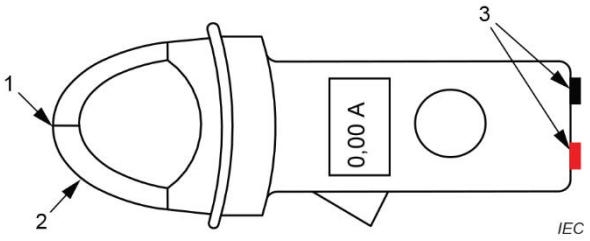
~~Type D~~

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

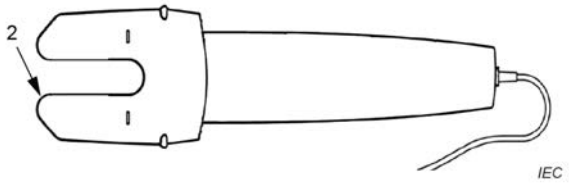
IEC 1865/12



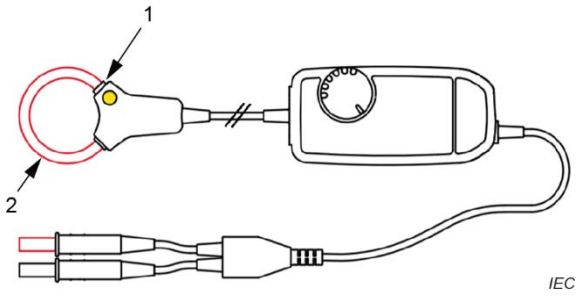
Type A current sensor as an accessory



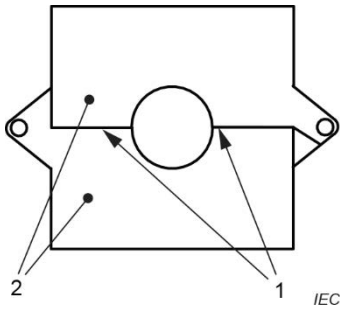
Type A current sensor with self-contained and/or additional measuring functions



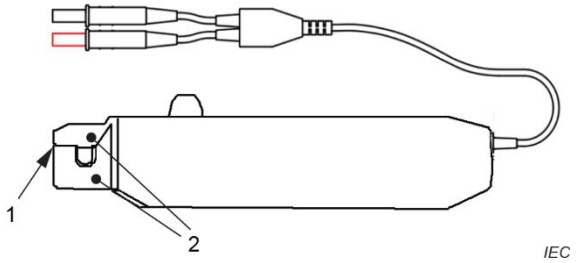
Type A current sensor with fork-style JAWS



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

Add the following ~~two~~ 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*

IEC 61010-2-032

Edition 4.0 2019-06

INTERNATIONAL STANDARD

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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

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 61010-2-032:2019-06(en-fr)

CONTENTS

FOREWORD 4
INTRODUCTION 7
1 Scope and object 8
2 Normative references 10
3 Terms and definitions 10
4 Tests 11
5 Marking and documentation 12
6 Protection against electric shock 16
7 Protection against mechanical HAZARDS 21
8 Resistance to mechanical stresses 21
9 Protection against the spread of fire 25
10 Equipment temperature limits and resistance to heat 25
11 Protection against HAZARDS from fluids and solid foreign objects 26
12 Protection against radiation, including laser sources, and against sonic and ultrasonic pressure 26
13 Protection against liberated gases and substances, explosion and implosion 26
14 Components and subassemblies 27
15 Protection by interlocks 28
16 HAZARDS resulting from application 28
17 RISK assessment 28
Annexes 36
Annex D (normative) Parts between which insulation requirements are specified (see 6.4, 6.5.3, 6.9.101 and 6.101) 36
Annex F (normative) Routine tests 38
Annex K (normative) Insulation requirements not covered by 6.7 39
Annex L (informative) Index of defined terms 46
Annex AA (normative) MEASUREMENT CATEGORIES 47
Annex BB (informative) HAZARDS pertaining to measurements performed in certain environments 49
Annex CC (informative) 4-mm "banana" TERMINALS 52
Annex DD (informative) Flowchart for insulation according to the type of circuit 54
Annex EE (normative) CLAMP MULTIMETER 57
Bibliography 60

Figure 101 – Examples of current sensors and their parts 9
Figure 102 – CLEARANCE between the PROTECTIVE BARRIER to the JAWS and to the HAZARDOUS LIVE conductor 19
Figure 103 – Abrasion test of the JAW ENDS 22
Figure 104 – Impact points for JAW impact test 23
Figure 105 – Indentation device 24
Figure 106 – Test probe to check protection against short-circuits 34
Figure 107 – Use of the test probe of Figure 106 34

Figure D.101 – Parts of current sensors (see also Table D.101) 36
Figure AA.1 – Example to identify the locations of measuring circuits 48
Figure CC.1 – Recommended dimensions of 4-mm TERMINALS 53
Figure DD.1 – Requirements for CLEARANCE, CREEPAGE DISTANCE and solid insulation 56
Figure EE.1 – Examples of CLAMP MULTIMETERS 57

Table 1 – Symbols 12
Table 101 – CLEARANCES and CREEPAGE DISTANCES for measuring circuit TERMINALS with HAZARDOUS LIVE conductive parts up to 1 000 V a.c. or 1 500 V d.c. 17
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Table D.101 – Insulation requirements for current sensors 37
Table K.101 – CLEARANCES of measuring circuits RATED for MEASUREMENT CATEGORIES 40
Table K.102 – a.c. test voltages for testing electric strength of solid insulation in measuring circuits RATED for MEASUREMENT CATEGORIES 41
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Table K.104 –Test voltages for testing long-term stress of solid insulation in measuring circuits RATED for MEASUREMENT CATEGORIES 43
Table K.105 – Minimum values for distance or thickness of solid insulation in measuring circuits RATED FOR MEASUREMENT CATEGORIES III and IV 44
Table AA.1 – Characteristics of MEASUREMENT CATEGORIES 48

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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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).

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

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.

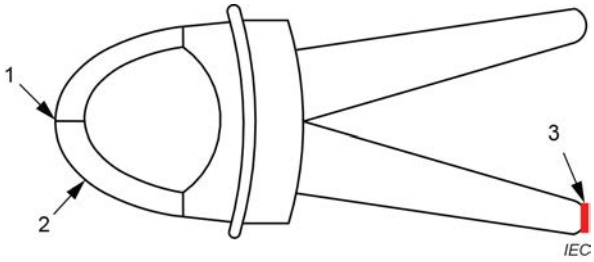
d) Type D: a current sensor designed to be applied to or removed from insulated conductors or from limited-energy circuit conductors.

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

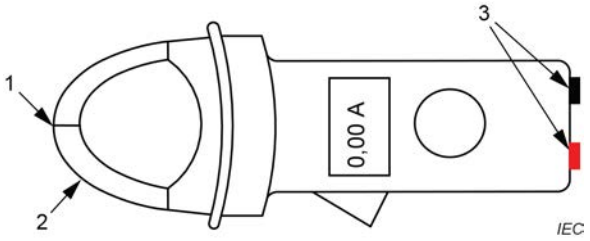
All current sensors can also be used with insulated conductors. In this case, HAZARDS are limited to acceptable levels by the insulation of the conductors.

Additional requirements for CLAMP MULTIMETERS are given in Annex EE.

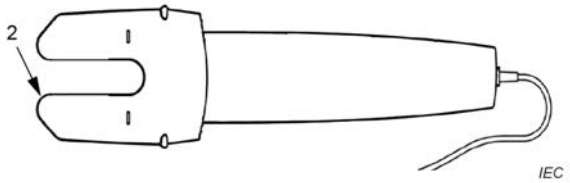
Figure 101 shows graphical representations of typical current sensors for illustration purposes. Current sensors can look different depending on the design.



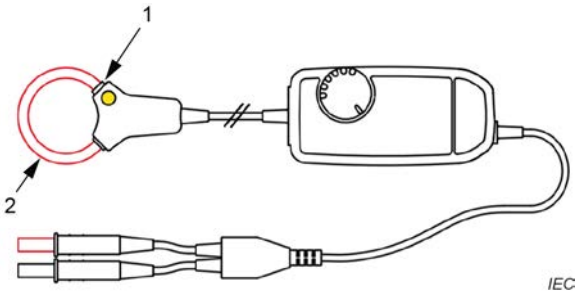
Type A current sensor as an accessory



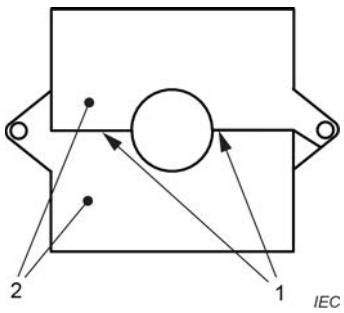
Type A current sensor with self-contained and/or additional measuring functions



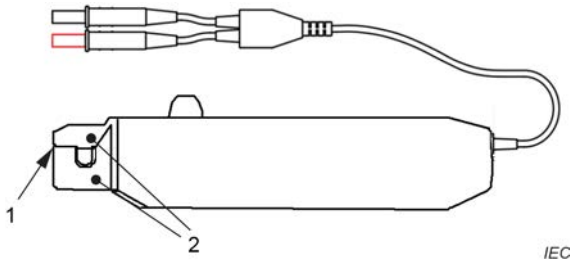
Type A current sensor with fork-style JAWS



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

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*

SOMMAIRE

AVANT-PROPOS 64
INTRODUCTION 67
1 Domaine d'application et objet 68
2 Références normatives 71
3 Termes et définitions 71
4 Essais 72
5 Marquage et documentation 73
6 Protection contre les chocs électriques 77
7 Protection contre les DANGERS mécaniques 83
8 Résistance aux contraintes mécaniques 83
9 Protection contre la propagation du feu 87
10 Limites de température de l'appareil et résistance à la chaleur 87
11 Protection contre les DANGERS des fluides et des corps solides étrangers 88
12 Protection contre les radiations, y compris les sources laser, et contre la pression acoustique et ultrasonique 88
13 Protection contre les émissions de gaz et substances, les explosions et les implosions 89
14 Composants et sous-ensembles 89
15 Protection par systèmes de verrouillage 90
16 DANGERS résultant de l'application 90
17 Appréciation du RISQUE 90
Annexes 98
Annexe D (normative) Parties entre lesquelles les exigences d'isolation sont spécifiées (voir 6.4, 6.5.3, 6.9.101 et 6.101) 98
Annexe F (normative) Essais individuels de série 100
Annexe K (normative) Exigences d'isolation non couvertes par 6.7 101
Annexe L (informative) Index des termes définis 108
Annexe AA (normative) CATEGORIES DE MESURE 109
Annexe BB (Informative) DANGERS se rapportant aux mesurages effectués dans certains environnements 111
Annexe CC (Informative) BORNES "banane" de 4 mm 114
Annexe DD (informative) Organigramme de l'isolation selon le type de circuit 116
Annexe EE (normative) PINCE MULTIMETRIQUE 119
Bibliographie 123

Figure 101 – Exemples de capteurs de courant et de leurs parties 70
Figure 102 – DISTANCE D'ISOLEMENT entre la BARRIERE DE PROTECTION, les MACHOIRES et le conducteur SOUS TENSION DANGEREUSE 80
Figure 103 – Essai d'abrasion des EXTREMITES DE MACHOIRES 84
Figure 104 – Points de choc pour l'essai de choc de la MACHOIRE 85
Figure 105 – Dispositif de pénétration 86
Figure 106 – Sonde d'essai pour vérifier la protection contre les courts-circuits 96
Figure 107 – Utilisation de la sonde d'essai de la Figure 106 96

Figure D.101 – Parties des capteurs de courant (voir aussi le Tableau D.101) 98
Figure AA.1 – Exemple d'identification des emplacements des circuits de mesure 110
Figure CC.1 – Dimensions recommandées des BORNES de 4 mm 115
Figure DD.1 – Exigences relatives à la DISTANCE D'ISOLEMENT, à la LIGNE DE FUITE et à l'isolation solide 118
Figure EE.1 – Exemples de PINCE MULTIMETRIQUE 119

Tableau 1 – Symboles 73
Tableau 101 – DISTANCES D'ISOLEMENT et LIGNES DE FUITE des BORNES d'un circuit de mesure ayant des parties conductrices sous TENSION DANGEREUSE qui peuvent atteindre 1 000 V en courant alternatif ou 1 500 V en courant continu 78
Tableau 102 – Niveau d'énergie pour l'essai de choc de la MACHOIRE 84
Tableau 103 – Forces de traction des capots d'extrémité des capteurs de courant flexibles 87
Tableau 104 – Tensions de choc 90
Tableau 105 – Épaisseur de la sonde d'essai de la Figure 106 et tensions d'essai 97
Tableau D.101 – Exigences d'isolation pour les capteurs de courant 99
Tableau K.101 – DISTANCES D'ISOLEMENT des circuits de mesure dont les CATEGORIES DE MESURE sont des CARACTERISTIQUES ASSIGNEES 102
Tableau K.102 – Tensions d'essai alternatives pour la vérification par essai de la rigidité diélectrique de l'isolation solide des circuits de mesure dont les CATEGORIES DE MESURE sont des CARACTERISTIQUES ASSIGNEES 104
Tableau K.103 – Tensions d'essai de choc pour la vérification par essai de la rigidité diélectrique de l'isolation solide des circuits de mesure dont les CATEGORIES DE MESURE sont des CARACTERISTIQUES ASSIGNEES 104
Tableau K.104 – Tensions d'essai pour la vérification par essai des contraintes de longue durée de l'isolation solide dans les circuits de mesure dont les CATEGORIES DE MESURE sont des CARACTERISTIQUES ASSIGNEES 105
Tableau K.105 – Valeurs minimales des distances ou de l'épaisseur de l'isolation solide dans les circuits de mesure dont les CATEGORIES DE MESURES III et IV sont des CARACTERISTIQUES ASSIGNEES 106
Tableau AA.1 – Caractéristiques des CATEGORIES DE MESURE 110

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

_____

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

AVANT-PROPOS

1) La Commission Électrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. À cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
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8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
9) L'attention est attirée sur le fait que certains des éléments de la présente Publication de l'IEC peuvent faire l'objet de droits de brevet. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets et de ne pas avoir signalé leur existence.

La Norme internationale IEC 61010-2-032 a été établie par le comité d'études 66 de l'IEC: Sécurité des appareils de mesure, de commande et de laboratoire.

Cette quatrième édition annule et remplace la troisième édition parue en 2012. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

a) Il est indiqué que les capteurs de courant utilisés comme APPAREILS INSTALLES A POSTE FIXE ne relèvent pas du domaine d'application du présent document.

b) Les capteurs de courant à fourche ont été ajoutés.

c) Les exigences de la Partie 2-033 applicables aux PINCES MULTIMETRIQUES qui ont pour objectif principal de mesurer la tension sur des RESEAUX sous tension ont été incluses dans la nouvelle Annexe EE normative.

d) Les DISTANCES D'ISOLEMENT et les LIGNES DE FUITE applicables aux EMPLACEMENTS HUMIDES et aux BORNES d'un circuit de mesure dont la tension alternative est supérieure à 1 000 V ou dont la tension continue est supérieure à 1 414 V ont été spécifiées.

e) Il est admis d'utiliser les LIGNES DE FUITE conformes au groupe de matériaux I pour tous les matériaux isolants.

f) Les exigences relatives aux circuits d'entrée/sortie des capteurs de courant de Type A, de Type B et de Type C ont été détaillées en 6.9.102.

g) Les exigences relatives aux cordons des circuits de sortie ont été modifiées.

h) L'essai de choc de la MACHOIRE a été limité à la partie avant des MACHOIRES.

i) L'essai d'abrasion des cordons de capteurs de courant flexibles a été supprimé et remplacé par un essai de pression à haute température.

j) La source de tension utilisée pour l'essai des composants ou des circuits de limitation des surtensions peut être limitée à 400 V.

k) Une référence à l'IEC 61010-031 pour les sondes équipées a été ajoutée.

l) Des exigences permettant d'éviter les SURTENSIONS TRANSITOIRES applicables aux circuits de mesure de tension de RESEAU ont été ajoutées.

m) Des exigences concernant les circuits de mesure entre 1 000 V et 3 000 V ont été ajoutées.

n) Une Annexe CC informative relative aux dimensions des BORNES "banane" a été ajoutée.

o) Un organigramme de l'isolation selon le type de circuit a été ajouté dans une nouvelle Annexe DD.

Le texte de cette Norme internationale est issu des documents suivants:

FDIS	Rapport de vote
66/691/FDIS	66/695/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

Une liste de toutes les parties de la série IEC 61010, sous le titre général *Exigences de sécurité pour appareils électriques de mesurage, de régulation et de laboratoire*, peut être consultée sur le site web de l'IEC.

La présente Partie 2-032 doit être utilisée conjointement avec la dernière édition de l'IEC 61010-1. Elle a été établie sur la base de la troisième édition (2010) de l'IEC 61010-1 et son Amendement 1 (2016), ci-après dénommée la Partie 1.

La présente Partie 2-032 complète ou modifie les articles correspondants de l'IEC 61010-1 de façon à transformer cette publication en norme IEC: *Exigences particulières pour les capteurs de courant, PORTATIFS et manipulés manuellement, pour essai électrique et mesurage*.

Lorsqu'un paragraphe particulier de la Partie 1 n'est pas mentionné dans cette Partie 2-032, ce paragraphe s'applique pour autant que cela soit raisonnable. Lorsque cette Partie 2-032 indique "addition", "modification", "remplacement" ou "suppression", il convient d'adapter en conséquence l'exigence, la modalité d'essai ou la note correspondante de la Partie 1.

Dans la présente norme:

a) les caractères d'imprimerie suivants sont utilisés:
   - exigences: caractères romains;
   - NOTES: petits caractères romains;
   - *conformité et essais: caractères italiques;*
   - termes définis à l'Article 3 et utilisés dans toute cette norme: PETITES CAPITALES EN CARACTERES ROMAINS;

b) les paragraphes, figures, tableaux et notes qui viennent en supplément de ceux de la Partie 1 sont numérotés à partir de 101. Les annexes complémentaires sont numérotées à partir de AA et les listes de termes additionnels à partir de aa).

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "http://webstore.iec.ch" dans les données relatives au document recherché. À cette date, le document sera

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- amendé.

IMPORTANT – Le logo "*colour inside*" qui se trouve sur la page de couverture de cette publication indique qu'elle contient des couleurs qui sont considérées comme utiles à une bonne compréhension de son contenu. Les utilisateurs devraient, par conséquent, imprimer ce document en utilisant une imprimante couleur.

INTRODUCTION

La Partie 2-030 spécifie les exigences de sécurité applicables aux appareils équipés de circuits d'essai et de mesure qui sont connectés à des fins d'essai ou de mesurage à des dispositifs ou à des circuits externes à l'appareil de mesure lui-même. Les exigences de la Partie 2-030 ont été incluses dans cette Partie 2-032. Les appareils qui relèvent des domaines d'application de la Partie 2-030 et de la Partie 2-032 sont considérés comme étant couverts par les exigences de cette Partie 2-032.

La Partie 2-033 spécifie les exigences de sécurité pour les multimètres PORTATIFS qui ont pour objectif principal de mesurer la tension de RESEAUX sous tension. Pour les appareils qui relèvent du domaine d'application de la Partie 2-032 et de la Partie 2-033, seule cette Partie 2-032 s'applique.

La Partie 2-034 spécifie les exigences de sécurité applicables aux appareils de mesure de la résistance d'isolement et aux appareils d'essai de rigidité diélectrique qui sont connectés aux unités, aux lignes ou aux circuits à des fins d'essai ou de mesurage. Pour les appareils qui relèvent du domaine d'application de la Partie 2-032 et de la Partie 2-034, il convient de lire les deux documents conjointement.

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

1 Domaine d'application et objet

L'article de la Partie 1 est applicable avec les exceptions suivantes:

1.1.1 Appareils inclus dans le domaine d'application

Remplacer le texte existant par le suivant:

La présente partie de l'IEC 61010 spécifie les exigences de sécurité pour les capteurs de courant PORTATIFS et manipulés manuellement décrits ci-dessous.

Ces capteurs de courant sont conçus pour mesurer, détecter ou injecter du courant, ou afficher les formes d'onde du courant sur les circuits sans ouverture physique du chemin du courant sur le circuit mesuré. Les capteurs de courant peuvent être autonomes, ou accessoires d'autres appareils ou parties d'appareils combinés (voir la Figure 101). Cela comprend les circuits de mesure qui font partie des appareils électriques d'essai et de mesure, du matériel de laboratoire ou des appareils de contrôle de procédés industriels. Ces capteurs de courant et circuits nécessitent des moyens de protection supplémentaires entre le capteur de courant, le circuit et un OPERATEUR.

NOTE 1 Un appareil combiné est un appareil connecté électriquement à un capteur de courant au moyen d'une connexion permanente qui peut être déconnectée uniquement à l'aide d'un OUTIL.

NOTE 2 Certains capteurs de courant sont également connus sous les noms de pinces de courant, PINCES MULTIMETRIQUES et sondes de courant.

Les capteurs de courant sont manipulés manuellement avant et/ou après un essai ou un mesurage, mais il n'est pas nécessaire qu'ils soient PORTATIFS pendant l'essai ou le mesurage. Les capteurs de courant utilisés comme APPAREILS INSTALLES A POSTE FIXE ne relèvent pas du domaine d'application du présent document.

Les types suivants de capteurs de courant sont couverts:

a) Type A: capteur de courant conçu pour être mis en place sur ou retiré de CONDUCTEURS NON ISOLES SOUS TENSION DANGEREUSE. Les capteurs de courant de Type A ont des parties PORTATIVES ou manipulées manuellement définies, assurant la protection contre les chocs électriques du conducteur mesuré et ont aussi une protection contre les courts-circuits entre les fils et entre les barres omnibus lors des opérations d'insertion.

b) Type B: capteur de courant avec protection contre les courts-circuits entre les fils ou les barres omnibus lors des opérations d'insertion, mais sans parties PORTATIVES ou manipulées manuellement définies, assurant la protection contre les chocs électriques lors des opérations d'insertion. Des moyens de protection supplémentaires sont nécessaires pour éviter le choc électrique des conducteurs SOUS TENSION DANGEREUSE qui ne peuvent être mis hors service durant la mise en place ou le retrait du capteur de courant.

   EXEMPLE 1 Capteurs de courant flexibles.

c) Type C: capteur de courant sans protection contre les courts-circuits entre les fils ou les barres omnibus lors des opérations d'insertion. Les capteurs de courant de Type C sont conçus pour être mis en place sur ou retirés de CONDUCTEURS NON ISOLES SOUS TENSION

DANGEREUSE ou de conducteurs de circuit à énergie non limitée uniquement lorsqu'ils sont mis hors service.

EXEMPLE 2 Transducteurs à noyau ouvrant.

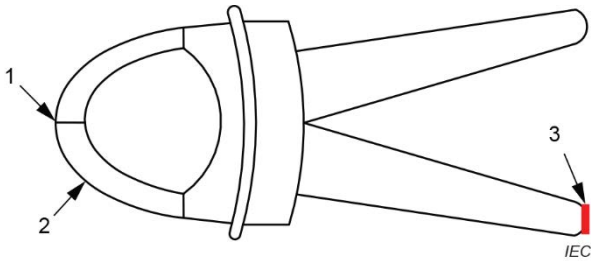
d) Type D: capteur de courant conçu pour être mis en place sur ou retiré de conducteurs isolés ou de conducteurs de circuit à énergie limitée.

EXEMPLE 3 Sondes de courant pour oscilloscopes et détecteurs de courant de fuite à la terre.

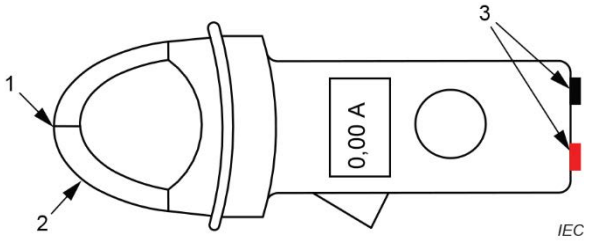
Tous les capteurs de courant peuvent également être utilisés avec des conducteurs isolés. Dans ce cas, les DANGERS sont limités à des niveaux acceptables par l'isolation des conducteurs.

Des exigences complémentaires applicables aux PINCES MULTIMETRIQUES sont données à l'Annexe EE.

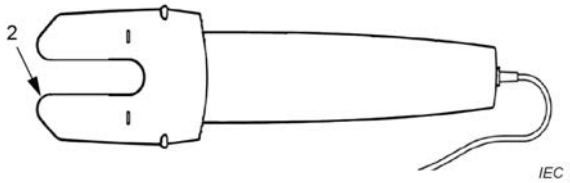
La Figure 101 donne des exemples représentatifs de capteurs de courant type. Les capteurs de courant peuvent être différents selon la conception.



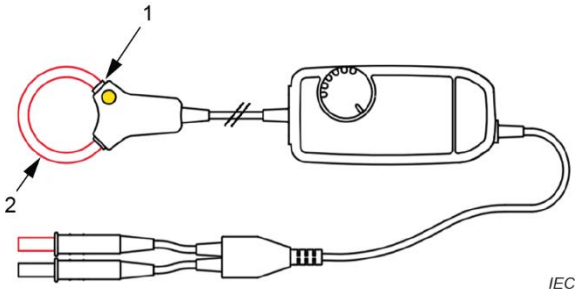
Capteur de courant de Type A utilisé comme accessoire



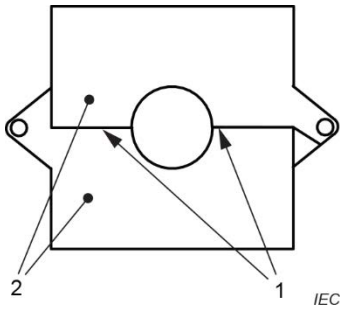
Capteur de courant de Type A avec des fonctions de mesure internes et/ou additionnelles



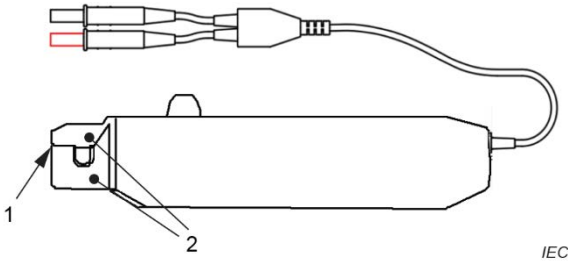
Capteur de courant de Type A avec mâchoires à fourche



Capteur de courant flexible de Type B, partie d'un appareil combiné



Capteur de courant à noyau ouvrant de Type C



Capteur de courant de Type D pour les applications SOUS TENSION non DANGEREUSE (représenté avec une MACHOIRE coulissante)

Légende

1 EXTREMITE(S) de la MACHOIRE

2 MACHOIRE

3 BORNES du circuit de mesure

Figure 101 – Exemples de capteurs de courant et de leurs parties

1.2.1 Aspects inclus dans le domaine d'application

Ajouter les trois nouveaux alinéas suivants à la fin du paragraphe:

Les exigences pour la protection contre les DANGERS résultant d'une UTILISATION NORMALE et d'un MAUVAIS USAGE RAISONNABLEMENT PREVISIBLE de circuits de mesure sont données à l'Article 101.

Les exigences pour la prévention du DANGER d'arc électrique et de courts-circuits sont données à l'Article 102

Les exigences relatives à la confiance dans la valeur affichée des PINCES MULTIMETRIQUES sont données à l'Article EE.5.

2 Références normatives

L'article de la Partie 1 est applicable à l'exception de ce qui suit.

Remplacer "IEC 61010-031" par la nouvelle référence suivante:

IEC 61010-031:2015, *Règles de sécurité pour appareils électriques de mesurage, de régulation et de laboratoire – Partie 031: Exigences de sécurité pour sondes équipées tenues à la main pour mesurage et essais électriques*

Remplacer "IEC 61180-1 (toutes les parties)", *"IEC 61180-1" et "IEC 61180-2", par la nouvelle référence suivante:*

IEC 61180, *Techniques des essais à haute tension pour matériel à basse tension – Définitions, exigences relatives aux essais, matériel d'essai*