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This extended version of IEC 61010-2-032:2023 includes the content of the references made to IEC 61010-1:2010 and IEC 61010-1:2010/AMD1:2016

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

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

Part 1: General requirements

INTERPRETATION SHEET 1

This interpretation sheet has been prepared by IEC technical committee 66: Safety of measuring, control and laboratory equipment.

The text of this interpretation sheet is based on the following documents:

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66/497A/ISH	66/505/RVD

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

IEC 61010-1:2010 contains a requirement in 6.8.3.1 pertaining to voltage testers for type tests as follows:

“The generator shall be able to supply a power of at least 500 VA.”

This has given rise to the following questions:

How does one interpret the requirement for voltage testers in 6.8.3.1 of IEC 61010-1:2010? Specifically, this subclause requires that “The generator shall be able to supply a power of at least 500 VA.” Does this requirement apply throughout the rated output range of the voltage tester? What is meant by the word “generator”? Is the “generator” the power supply within the voltage tester, or the voltage tester output, or something else?

Interpretation:

“A voltage tester used for type tests must be able to deliver at least 500 VA at its full-rated output voltage. It does not necessarily need to deliver 500 VA if set for lower voltages.

For example, a voltage tester that can deliver 100 mA at any test output voltage up to 5 000 V (and a current corresponding to 500 VA above 5 000 V) would meet the requirement.

The requirements for voltage testers used for routine (production line) tests are included in Annex F. The requirements of 6.8.3.1 do not apply to these voltage testers.”

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 1: General requirements

FOREWORD

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IEC 61010-2-032:2023 EXV includes the content of IEC 61010-2-032:2023, and the references made to IEC 61010-1:2010 and IEC 61010-1:2010/AMD1:2016.

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

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:

- a) In 1.1.1, definitions of current sensor types have been moved to a new Annex FF;
- b) Clause 2, all normative references have been dated and new normative references have been added;
- c) 3.2.103, a new definition PROTECTIVE FINGERGUARD has been added which replaces the previous definition of PROTECTIVE BARRIER;
- d) 4.4.2.101 is a new subclause about surge protective devices;
- e) in 5.1.5.101.2, minimum RATINGS for voltage of measuring TERMINALS are required;
- f) Subclause 6.5.1 has been modified;
- g) Subclause 6.5.5 is no longer used;
- h) Subclause 6.6.101 modifies 6.6.101 and 6.6.102 of previous edition:
 - 1) in 6.6.101.1, insulating material of group I may be allowed for determination of CREEPAGE DISTANCES of measuring circuit TERMINALS;
 - 2) in 6.6.101.2, CLEARANCES and CREEPAGE DISTANCES up to 3 000 V for measuring circuit TERMINALS in unmated position have been defined;
 - 3) in 6.6.101.3, requirements for measuring circuit TERMINALS in partially mated position have been specified;
 - 4) in 6.6.101.4, requirements for measuring circuit TERMINALS in mated position have been specified;
 - 5) Subclause 6.6.101.5 replaces 6.6.102;
- i) Subclause 6.6.102 replaces 6.101 of previous edition with modifications;
- j) Subclause 6.101.2 replaces 6.9.101.1 of previous edition with modifications;
- k) Subclause 6.101.3 replaces 6.9.101.2 of previous edition with modifications;
- l) Subclause 6.101.4 replaces 6.9.102 of previous edition with modifications;
- m) in 8.101, JAW ENDS abrasion test has been modified;
- n) 8.105 is a new subclause for input/output leads attachment has been added;
- o) in 9.101.2, relocation of 101.3 of previous edition;
- p) in 9.101.3, relocation of 101.4 of previous edition, extension to MEASUREMENT CATEGORY II and reference to IEC 61000-4-5 for tests;
- q) Table 104 has been replaced by Table K.101;
- r) in 9.102, relocation of Clause 102 of previous edition;
- s) in 14.101, relocation of 14.102. Subclause 14.101 of previous edition has been deleted;
- t) 101.3 is a new subclause for protections against HAZARD occurring from reading a voltage value in replacement of Clause EE.5 of previous edition;
- u) in Table D.101, transients are disregarded for insulation between JAW ENDS and input/output circuits;
- v) in Clause F.101, test voltages for routine test of JAWS have been modified;
- w) in K.2.1, another method for determination of CLEARANCES of secondary circuits is proposed;
- x) in K.3.2, new Table K.15 and Table K.16 for CLEARANCE calculation;

- y) K.3.101 is a new clause;
- z) Clause K.4, redraft of the clause to propose a method for determination of U_t for circuits which reduce TRANSIENT OVERVOLTAGES;
- aa) Table K.101 replaces Table 104;
- bb) Subclause K.101.4 has been reviewed and tables and tests for solid insulation have been modified;
- cc) Table K.104 of previous edition has been deleted;
- dd) Annex AA: Figure AA.1 has been redesigned;
- ee) Annex EE: addition of a new informative annex for determination of CLEARANCES for Table 101;
- ff) Annex GG: this annex was Annex EE of previous edition and 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:

Draft	Report on voting
66/788A/FDIS	66/798/RVD

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

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 document is to be used in conjunction with IEC 61010-1:2010 and IEC 61010-1:2010/AMD1:2016.

This document 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 IEC 61010-1 is not mentioned in this document, that subclause applies as far as is reasonable. Where this document states "addition", "modification", "replacement", or "deletion", the relevant requirement, test specification or note in IEC 61010-1 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 IEC 61010-1 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 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 document 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 to IEC 61010-1:2010 and IEC 61010-1:2010/AMD1:2016

This International Standard specifies the safety requirements that are generally applicable to all equipment within its scope. For certain types of equipment, these requirements will be supplemented or modified by the special requirements of one, or more than one, particular part 2 of the standard which must be read in conjunction with the part 1 requirements.

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 standard from the IEC 61010-2 series which is/are read in conjunction with the requirements of IEC 61010-1.

- 1) IEC 61010-2-030:2023 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) This document 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 IEC 61010-2-030:2023 have been included in this document. Equipment within the scopes of both IEC 61010-2-030:2023 and this document is considered to be covered by the requirements of this document.

However, for current sensors in combined equipment with protective bonding and automatic disconnection of the supply, IEC 61010-2-030:2023 and this document are read in conjunction.

- 3) IEC 61010-2-033:2023 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 IEC 61010-2-030 have been included in IEC 61010-2-033:2023.

- 4) IEC 61010-2-034:2023 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 IEC 61010-2-030:2023 have been included in IEC 61010-2-034:2023. However, for equipment within the scope of this document and IEC 61010-2-034:2023, 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 IEC 61010-2-030, this document, IEC 61010-2-033 and IEC 61010-2-034. 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 1: General requirements

1 Scope and object

1.1 Scope

1.1.1 Equipment included in scope

This document specifies safety requirements for HAND-HELD and hand-manipulated current sensors intended for measuring, detecting or injecting current, or indicating current waveforms on circuits without physically opening the current path of the circuit being measured.

These current sensors are hand-manipulated before and/or after a test or measurement, but are not necessarily HAND-HELD during the test or measurement. They can be stand-alone current sensors or accessories to other equipment or parts of combined equipment. These include measurement circuits which are part of electrical test and measurement equipment, laboratory equipment, or process control equipment.

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.

The types of current sensors covered by this document are defined in Annex FF.

1.1.2 Equipment excluded from scope

This standard does not apply to equipment within the scope of:

- a) IEC 60065 (Audio, video and similar electronic apparatus);
- b) IEC 60204 (Safety of machinery – Electrical equipment of machines);
- c) IEC 60335 (Household and similar electrical appliances);
- d) IEC 60364 (Electrical installations of buildings);
- e) IEC 60439 (Low-voltage switchgear and controlgear assemblies);
- f) IEC 60601 (Medical electrical equipment);
- g) IEC 60950 (Information technology equipment including electrical business equipment, except as specified in 1.1.3);
- h) IEC 61558 (Power transformers, power supply units and similar);
- i) IEC 61010-031 (Hand-held probe assemblies);
- j) IEC 61243-3 (Live working – Voltage detectors – Part 3: Two-pole low-voltage type).

This document does not apply to current sensors used as FIXED EQUIPMENT.

1.1.3 Computing equipment

This standard applies only to computers, processors, etc. which form part of equipment within the scope of this standard or are designed for use exclusively with the equipment.

NOTE Computing devices and similar equipment within the scope of IEC 60950 and conforming to its requirements are considered to be suitable for use with equipment within the scope of this standard. However,

some of the requirements of IEC 60950 for resistance to moisture and liquids are less stringent than those in this standard (see 5.4.4 second paragraph)).

1.2 Object

1.2.1 Aspects included in scope

The purpose of the requirements of this standard is to ensure that HAZARDS to the OPERATOR and the surrounding area are reduced to a tolerable level.

Requirements for protection against particular types of HAZARD are given in Clauses 6 to 13, as follows:

- a) electric shock or burn (see Clause 6);
- b) mechanical HAZARDS (see Clauses 7 and 8);
- c) spread of fire or arc flash from the current sensor (see Clause 9);
- d) excessive temperature (see Clause 10);
- e) effects of fluids and fluid pressure (see Clause 11);
- f) effects of radiation, including lasers sources, and sonic and ultrasonic pressure (see Clause 12);
- g) liberated gases, explosion and implosion (see Clause 13).

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

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

RISK assessment for HAZARDS or environments not fully covered above is specified in Clause 17.

NOTE Attention is drawn to the existence of additional requirements regarding the health and safety of labour forces.

1.2.2 Aspects excluded from scope

This standard does not cover:

- a) reliable function, performance, or other properties of the equipment not related to safety;
- b) effectiveness of transport packaging;
- c) EMC requirements (see the IEC 61326 series);
- d) protective measures for explosive atmospheres (see the IEC 60079 series).

1.3 Verification

This standard also specifies methods of verifying that the equipment meets the requirements of this standard, through inspection, TYPE TESTS, ROUTINE TESTS, and RISK assessment.

1.4 Environmental conditions

1.4.1 Normal environmental conditions

This standard applies to equipment designed to be safe at least under the following conditions:

- a) indoor use;

- b) altitude up to 2 000 m;
- c) temperature 5 °C to 40 °C;
- d) maximum relative humidity 80 % for temperatures up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C;
- e) MAINS supply voltage fluctuations up to ± 10 % of the nominal voltage;
- f) TRANSIENT OVERVOLTAGES up to the levels of OVERVOLTAGE CATEGORY II;

NOTE 1 These levels of transient overvoltage are typical for equipment supplied from the building wiring.

- g) TEMPORARY OVERVOLTAGES occurring on the MAINS supply.
- h) applicable POLLUTION DEGREE of the intended environment (POLLUTION DEGREE 2 in most cases).

NOTE 2 Manufacturers may specify more restricted environmental conditions for operation; nevertheless the equipment must be safe within these normal environmental conditions.

1.4.2 Extended environmental conditions

This standard applies to equipment designed to be safe not only in the environmental conditions specified in 1.4.1, but also in any of the following conditions as RATED by the manufacturer of the equipment:

- a) outdoor use;
- b) altitude above 2 000 m;
- c) ambient temperatures below 5 °C or above 40 °C;
- d) relative humidity above the levels specified in 1.4.1;
- e) MAINS supply voltage fluctuations exceeding ± 10 % of the nominal voltage;
- f) WET LOCATION;
- g) TRANSIENT OVERVOLTAGES up to the levels of OVERVOLTAGE CATEGORY III or IV (see Annex K).

2 Normative references

The following referenced documents, where applicable, are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60027 (all parts), *Letter symbols to be used in electrical technology*

IEC 60065, *Audio, video and similar electronic apparatus – Safety requirements*

IEC 60068-2-14, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

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

IEC 60073, *Basic and safety principles for man-machine interface, marking and identification – Coding principles for indicators and actuators*

IEC 60227 (all parts), *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V*

IEC 60245 (all parts), *Rubber insulated cables – Rated voltages up to and including 450/750 V*

IEC 60309 (all parts), *Plugs, socket-outlets and couplers for industrial purposes*

IEC 60320 (all parts), *Appliance couplers for household and similar general purposes*

IEC 60332-1-2, *Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test for vertical flame propagation for a single insulated wire or cable – Procedure for 1 kW pre-mixed flame*

IEC 60332-2-2, *Tests on electric and optical fibre cables under fire conditions – Part 2-2: Test for vertical flame propagation for a single small insulated wire or cable – Procedure for diffusion flame*

IEC 60335-2-24, *Household and similar electrical appliances – Safety – Part 2-24: Particular requirements for refrigerating appliances, ice-cream appliances and ice-makers.*

IEC 60335-2-89, *Household and similar electrical appliances – Safety – Part 2-89: Particular requirements for commercial refrigerating appliances with an incorporated or remote refrigerant condensing unit or compressor*

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 60417, *Graphical symbols for use on equipment*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60664-3, *Insulation coordination for equipment within low-voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution*

IEC 60695-11-10, *Fire hazard testing – Part 11-10: Test flames – 50 W horizontal and vertical flame test methods*

IEC 60799, *Electrical accessories – Cord sets and interconnection cord sets*

IEC 60825-1, *Safety of laser products – Part 1: Equipment classification and requirements*

IEC 60947-1, *Low-voltage switchgear and controlgear – Part 1: General rules*

IEC 60947-2, *Low-voltage switchgear and controlgear – Part 2: Circuit-breakers*

IEC 60947-3, *Low-voltage switchgear and controlgear – Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units*

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

IEC 61010-031:2022, *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*¹

IEC 61672-1, *Electroacoustics – Sound level meters – Part 1: Specifications*

IEC 61672-2, *Electroacoustics – Sound level meters – Part 2: Pattern evaluation tests*

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

IEC 62471, *Photobiological safety of lamps and lamp systems*

IEC TR 62471-2, *Photobiological safety of lamps and lamp systems – Part 2: Guidance on manufacturing requirements relating to non-laser optical radiation safety*

IEC 62598, *Nuclear instrumentation – Constructional requirements and classification of radiometric gauges*

IEC Guide 104, *The preparation of safety publications and the use of basic safety publications and group safety publications*

ISO/IEC Guide 51, *Safety aspects – Guidelines for their inclusion in standards*

ISO 306:2013, *Plastics – Thermoplastic materials – Determination of Vicat softening temperature (VST)*

ISO 361, *Basic ionizing radiation symbol*

ISO 3746, *Acoustics – Determination of sound power levels of noise sources using sound pressure – Survey method using an enveloping measurement surface over a reflecting plane*

ISO 7000, *Graphical symbols for use on equipment*

ISO 9614-1, *Acoustics – Determination of sound power levels of noise sources using sound intensity – Part 1: Measurement at discrete points*

ISO 13857, *Safety of machinery – Safety distances to prevent hazard zones being reached by upper and lower limbs*

EN 378-2, *Refrigerating systems and heat pumps – Safety and environmental requirements. Design, construction, testing, marking and documentation*

¹ "IEC 61180:2016" replaces everywhere IEC 61180, IEC 61180-1 and IEC 61180-2 are referenced in IEC 61010-1.

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

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
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- 6) All users should ensure that they have the latest edition of this publication.
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- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

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

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:

- a) In 1.1.1, definitions of current sensor types have been moved to a new Annex FF;
- b) Clause 2, all normative references have been dated and new normative references have been added;
- c) 3.2.103, a new definition PROTECTIVE FINGERGUARD has been added which replaces the previous definition of PROTECTIVE BARRIER;
- d) 4.4.2.101 is a new subclause about surge protective devices;

- e) in 5.1.5.101.2, minimum RATINGS for voltage of measuring TERMINALS are required;
- f) Subclause 6.5.1 has been modified;
- g) Subclause 6.5.5 is no longer used;
- h) Subclause 6.6.101 modifies 6.6.101 and 6.6.102 of previous edition:
 - 1) in 6.6.101.1, insulating material of group I may be allowed for determination of CREEPAGE DISTANCES of measuring circuit TERMINALS;
 - 2) in 6.6.101.2, CLEARANCES and CREEPAGE DISTANCES up to 3 000 V for measuring circuit TERMINALS in unmated position have been defined;
 - 3) in 6.6.101.3, requirements for measuring circuit TERMINALS in partially mated position have been specified;
 - 4) in 6.6.101.4, requirements for measuring circuit TERMINALS in mated position have been specified;
 - 5) Subclause 6.6.101.5 replaces 6.6.102;
- i) Subclause 6.6.102 replaces 6.101 of previous edition with modifications;
- j) Subclause 6.101.2 replaces 6.9.101.1 of previous edition with modifications;
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- w) in K.2.1, another method for determination of CLEARANCES of secondary circuits is proposed;
- x) in K.3.2, new Table K.15 and Table K.16 for CLEARANCE calculation;
- y) K.3.101 is a new clause;
- z) Clause K.4, redraft of the clause to propose a method for determination of U_t for circuits which reduce TRANSIENT OVERVOLTAGES;
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- bb) Subclause K.101.4 has been reviewed and tables and tests for solid insulation have been modified;
- cc) Table K.104 of previous edition has been deleted;
- dd) Annex AA: Figure AA.1 has been redesigned;
- ee) Annex EE: addition of a new informative annex for determination of CLEARANCES for Table 101;
- ff) Annex GG: this annex was Annex EE of previous edition and 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:

Draft	Report on voting
66/788A/FDIS	66/798/RVD

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

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.

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This document 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 IEC 61010-1 is not mentioned in this document, that subclause applies as far as is reasonable. Where this document states "addition", "modification", "replacement", or "deletion", the relevant requirement, test specification or note in IEC 61010-1 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 IEC 61010-1 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 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 document 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 standard from the IEC 61010-2 series which is/are read in conjunction with the requirements of IEC 61010-1.

- 1) IEC 61010-2-030:2023 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) This document 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 IEC 61010-2-030:2023 have been included in this document. Equipment within the scopes of both IEC 61010-2-030:2023 and this document is considered to be covered by the requirements of this document.

However, for current sensors in combined equipment with protective bonding and automatic disconnection of the supply, IEC 61010-2-030:2023 and this document are read in conjunction.

- 3) IEC 61010-2-033:2023 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 IEC 61010-2-030 have been included in IEC 61010-2-033:2023.

- 4) IEC 61010-2-034:2023 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 IEC 61010-2-030:2023 have been included in IEC 61010-2-034:2023. However, for equipment within the scope of this document and IEC 61010-2-034:2023, 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 IEC 61010-2-030, this document, IEC 61010-2-033 and IEC 61010-2-034. 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 document specifies safety requirements for HAND-HELD and hand-manipulated current sensors intended for measuring, detecting or injecting current, or indicating current waveforms on circuits without physically opening the current path of the circuit being measured.

These current sensors are hand-manipulated before and/or after a test or measurement, but are not necessarily HAND-HELD during the test or measurement. They can be stand-alone current sensors or accessories to other equipment or parts of combined equipment. These include measurement circuits which are part of electrical test and measurement equipment, laboratory equipment, or process control equipment.

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.

The types of current sensors covered by this document are defined in Annex FF.

1.1.2 Equipment excluded from scope

Add the following new paragraph:

This document does not apply to current sensors used as FIXED EQUIPMENT.

1.2.1 Aspects included in scope

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

- 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 GG.

Annex BB provides guidance to equipment manufacturers 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 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 61010-031:2022, *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*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 reference:

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

¹ "IEC 61180:2016" replaces everywhere IEC 61180, IEC 61180-1 and IEC 61180-2 are referenced in IEC 61010-1.

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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 propriété intellectuelle ou de droits analogues. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets.

L'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. Il s'agit d'une Norme internationale.

Cette cinquième édition annule et remplace la quatrième édition parue en 2019. Cette édition constitue une révision technique.

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

- a) au paragraphe 1.1.1, les définitions des types de capteurs de courant ont été déplacées vers une nouvelle Annexe FF;

- b) à l'Article 2, toutes les références normatives ont été datées et de nouvelles références normatives ont été ajoutées;
- c) au paragraphe 3.2.103, une nouvelle définition de PROTEGE-DOIGTS a été ajoutée pour remplacer la définition précédente de BARRIERE DE PROTECTION;
- d) le paragraphe 4.4.2.101 est un nouveau paragraphe sur les dispositifs de protection contre les surtensions;
- e) au paragraphe 5.1.5.101.2, des VALEURS ASSIGNEES minimales de tension des BORNES des circuits de mesure sont exigées;
- f) le paragraphe 6.5.1 a été modifié;
- g) le paragraphe 6.5.5 a été supprimé;
- h) le paragraphe 6.6.101 modifie les paragraphes 6.6.101 et 6.6.102 de l'édition précédente:
 - 1) au paragraphe 6.6.101.1, les matériaux isolants du groupe I peuvent être admis pour la détermination des DISTANCES D'ISOLEMENT des BORNES des circuits de mesure;
 - 2) au paragraphe 6.6.101.2, les DISTANCES D'ISOLEMENT et les LIGNES DE FUITE inférieures à 3 000 V pour les BORNES des circuits de mesure en position découplée ont été définies;
 - 3) au paragraphe 6.6.101.3, des exigences relatives aux BORNES des circuits de mesure en position partiellement couplée ont été spécifiées;
 - 4) au paragraphe 6.6.101.4, des exigences relatives aux BORNES des circuits de mesure en position couplée ont été spécifiées;
 - 5) le paragraphe 6.6.101.5 remplace le paragraphe 6.6.102;
- i) le paragraphe 6.6.102 remplace le paragraphe 6.101 de l'édition précédente avec des modifications;
- j) le paragraphe 6.101.2 remplace le paragraphe 6.9.101.1 de l'édition précédente avec des modifications;
- k) le paragraphe 6.101.3 remplace le paragraphe 6.9.101.2 de l'édition précédente avec des modifications;
- l) le paragraphe 6.101.4 remplace le paragraphe 6.9.102 de l'édition précédente avec des modifications;
- m) au paragraphe 8.101, l'essai d'abrasion des EXTREMITES DE LA MACHOIRE a été modifié;
- n) le paragraphe 8.105 est un nouveau paragraphe concernant la fixation des cordons d'entrée/sortie;
- o) le paragraphe 101.3 de la précédente édition a été déplacé en 9.101.2;
- p) le paragraphe 101.4 de la précédente édition a été déplacé au paragraphe 9.101.3. Ce paragraphe a été étendu à la CATEGORIE DE MESURE II et fait référence à l'IEC 61000-4-5 pour les essais;
- q) le Tableau 104 a été remplacé par le Tableau K.101;
- r) l'Article 102 de la précédente édition a été déplacé en 9.102;
- s) le paragraphe 14.102 a été déplacé en 14.101; le paragraphe 14.101 de l'édition précédente a été supprimé;
- t) le paragraphe 101.3 est un nouveau paragraphe concernant les protections contre les DANGERS liés à la lecture d'une valeur de tension en remplacement de l'Article EE.5 de l'édition précédente;
- u) dans le Tableau D.101, les surtensions transitoires ne sont pas prises en compte pour l'isolation entre les EXTREMITES DE LA MACHOIRE et les circuits d'entrée/sortie;
- v) à l'Article F.101, les tensions d'essai pour les essais individuels de série des MACHOIRES ont été modifiées;
- w) au paragraphe K.2.1, une autre méthode de détermination des DISTANCES D'ISOLEMENT des circuits secondaires a été proposée;
- x) au paragraphe K.3.2, le Tableau K.15 et le Tableau K.16 ont été ajoutés pour le calcul de la DISTANCE D'ISOLEMENT;

- y) le paragraphe K.3.101 est un nouveau paragraphe;
- z) l'Article K.4 a fait l'objet d'une refonte pour proposer une méthode de détermination de U_t pour les circuits qui réduisent les SURTENSIONS TRANSITOIRES;
- aa) le Tableau K.101 remplace le Tableau 104;
- bb) le paragraphe K.101.4 a été révisé et les tableaux et les essais relatifs à l'isolation solide ont été modifiés;
- cc) le Tableau K.104 de l'édition précédente a été supprimé;
- dd) en Annexe AA: la Figure AA.1 a été modifiée;
- ee) en Annexe EE: une nouvelle annexe informative a été ajoutée pour la détermination des DISTANCES D'ISOLEMENT pour le Tableau 101;
- ff) l'Annexe GG correspond à l'Annexe EE de l'édition précédente et le type de capteur de courant d'une PINCE MULTIMETRE est le Type A ou le Type B.

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

Projet	Rapport de vote
66/788A/FDIS	66/798/RVD

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La langue employée pour l'élaboration de cette Norme internationale est l'anglais.

Le présent document a été rédigé selon les Directives ISO/IEC, Partie 2, et a été élaboré selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles à l'adresse www.iec.ch/members_experts/refdocs. Les principaux types de documents développés par l'IEC sont décrits plus en détail à l'adresse www.iec.ch/publications.

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

Le présent document est à utiliser conjointement avec l'IEC 61010-1:2010 et l'IEC 610101-1:2010/A1:2016.

Le présent document 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 mesure*.

Lorsqu'un paragraphe particulier de l'IEC 61010-1 n'est pas mentionné dans le présent document, ce paragraphe s'applique pour autant que cela soit raisonnable. Lorsque le présent document spécifie "addition", "modification", "remplacement" ou "suppression", il convient d'adapter en conséquence l'exigence, la spécification d'essai ou la note correspondante de l'IEC 61010-1.

Dans la présente norme:

a) les caractères d'imprimerie suivants sont employés:

- exigences: caractères romains;
- NOTES: petits caractères romains;
- *conformité et essais: caractères italiques*;
- termes définis à l'Article 3 et utilisés tout au long de la présente norme: PETITES CAPITALES EN CARACTÈRES ROMAINS;

b) les paragraphes, figures, tableaux et notes supplémentaires à ceux de l'IEC 61010-1 sont numérotés à partir de 101. Les annexes supplémentaires sont nommées 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 webstore.iec.ch dans les données relatives au document recherché. À cette date, le document sera:

- reconduit,
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- amendé.

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

INTRODUCTION

L'IEC 61010-1 spécifie les exigences de sécurité qui sont d'application générale à tous les appareils qu'elle concerne. Pour certains types d'appareils, les exigences de l'IEC 61010-1 et de son amendement sont complétées ou modifiées par les exigences particulières d'une ou de plusieurs normes de la série IEC 61010-2, qui sont utilisées conjointement avec les exigences de l'IEC 61010-1.

- 1) L'IEC 61010-2-030:2023 spécifie les exigences de sécurité pour les appareils équipés de circuits d'essai ou de mesure qui sont reliés à des fins d'essai ou de mesurage à des dispositifs ou à des circuits extérieurs à l'appareil de mesure même.
- 2) Le présent document spécifie les exigences de sécurité pour les capteurs de courant portatifs et manipulés à la main 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.

La plupart des exigences de l'IEC 61010-2-030:2023 ont été incluses dans le présent document. Les appareils entrant dans le champ d'application de l'IEC 61010-2-030:2023 et du présent document sont considérés comme couverts par les exigences du présent document.

Cependant, pour un capteur de courant dans un appareil combiné avec liaison de protection et déconnexion automatique de l'alimentation, l'IEC 61010-2-030:2023 et le présent document sont utilisées conjointement.

- 3) L'IEC 61010-2-033:2023 spécifie les exigences de sécurité pour les multimètres portatifs et autres mesureurs pour usage domestique et professionnel, capables de mesurer la tension réseau, destinés à mesurer la tension et d'autres grandeurs électriques comme la résistance ou le courant.

Toutes les exigences pertinentes de l'IEC 61010-2-030 ont été incluses dans l'IEC 61010-2-033:2023.

- 4) L'IEC 61010-2-034:2023 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.

Toutes les exigences pertinentes de l'IEC 61010-2-030:2023 ont été incluses dans l'IEC 61010-2-034:2023. Cependant, pour les appareils relevant des domaines d'application du présent document et de l'IEC 61010-2-034:2023, ces normes sont utilisées conjointement.

L'IEC 61010-031 spécifie les exigences de sécurité relatives aux sondes portatives et manipulées à la main et leurs accessoires connexes destinés à être utilisés en particulier avec les appareils relevant du domaine d'application de l'IEC 61010-2-030, du présent document, de l'IEC 61010-2-033 et de l'IEC 61010-2-034. Ces sondes équipées sont prévues pour la connexion sans contact électrique ou la connexion électrique directe entre une partie et un appareil de mesure et d'essai électrique. Elles peuvent être solidaires de l'appareil ou en être des accessoires détachables.

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'IEC 61010-1:2010, Article 1, et l'IEC 61010-1:2010/A1:2016, Article 1, s'appliquent avec les exceptions suivantes:

1.1.1 Appareils inclus dans le domaine d'application

Remplacer le texte existant par le texte suivant:

Le présent document spécifie les exigences de sécurité pour les capteurs de courant PORTATIFS et manipulés à la main 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.

Ces 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 peuvent être autonomes, ou accessoires d'autres appareils ou parties d'appareils combinés. 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.

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 MULTIMETRES et sondes de courant.

Les types de capteurs de courant couverts par le présent document sont définis dans l'Annexe FF.

1.1.2 Appareils exclus du domaine d'application

Ajouter le nouvel alinéa suivant:

Le présent document ne s'applique pas aux capteurs de courant utilisés comme appareils installés à poste fixe.

1.2.1 Aspects inclus dans le domaine d'application

Remplacer le point c) du deuxième alinéa par le nouveau point c) suivant:

- c) la propagation du feu et les arcs électriques à partir du capteur de courant (voir Article 9);

Remplacer le troisième alinéa par les deux nouveaux alinéas suivants:

Les exigences relatives à la protection contre les DANGERS engendrés par l'UTILISATION NORMALE, le MAUVAIS USAGE RAISONNABLEMENT PREVISIBLE et les facteurs ergonomiques sont spécifiées à l'Article 16, à l'Article 101 et à l'Annexe GG.

L'Annexe BB fournit des recommandations aux fabricants d'appareils sur les DANGERS qu'il convient de prendre en compte pour les appareils destinés à effectuer des essais et des mesurages sur des conducteurs dangereux, y compris des conducteurs du RESEAU et des conducteurs de réseaux de télécommunication.

2 Références normatives

L'IEC 61010-1:2010, Article 2, et l'IEC 61010-1:2010/A1:2016, Article 2, s'appliquent avec les exceptions suivantes:

Remplacer les références normatives existantes suivantes:

IEC 60068-2-75, *Essais d'environnement – Partie 2-75: Essais – Test Eh: Essais au marteau*

IEC 60364-4-44:2007, *Installations électriques à basse tension – Partie 4-44: Protection pour assurer la sécurité – Protection contre les perturbations de tension et les perturbations électromagnétiques*

IEC 60364-4-44:2007/A1:2015

IEC 61010-031, *Règles de sécurité pour appareils électriques de mesurage, de régulation et de laboratoire – Partie 031: Exigences de sécurité pour sondes équipées portatives pour mesurage et essais électriques*

IEC 61180 (toutes les parties), *Techniques des essais à haute tension pour matériel à basse tension*

IEC 61180-1, *Techniques des essais à haute tension pour matériels à basse tension – Partie 1: Définitions, prescriptions et modalités relatives aux essais*

IEC 61180-2, *Techniques des essais à haute tension pour matériel à basse tension – Partie 2: Matériel d'essai*

IEC 62262, *Degrés de protection procurés par les enveloppes de matériels électriques contre les impacts mécaniques externes (code IK)*

par les nouvelles références normatives suivantes:

IEC 60068-2-75:2014, *Essais d'environnement – Partie 2-75: Essais – Test Eh: Essais au marteau*

IEC 60364-4-44:2007, *Installations électriques à basse tension – Partie 4-44: Protection pour assurer la sécurité – Protection contre les perturbations de tension et les perturbations électromagnétiques*

IEC 60364-4-44:2007/A1:2015

IEC 60364-4-44:2007/A2:2018

IEC 61010-031:2022, *Exigences de sécurité pour appareils électriques de mesurage, de régulation et de laboratoire – Partie 031: Exigences de sécurité pour sondes équipées tenues à la main et manipulées pour mesurage et essais électriques*

IEC 61180:2016, *Techniques des essais à haute tension pour matériels à basse tension – Définitions, exigences et modalités relatives aux essais, matériel d'essai*¹

¹ L'IEC 61180:2016 remplace partout l'IEC 61180, l'IEC 61180-1 et l'IEC 61180-2 sont référencées dans l'IEC 61010-1.

IEC 62262:2002, *Degrés de protection procurés par les enveloppes de matériels électriques contre les impacts mécaniques externes (code IK)*
IEC 62262:2002/A1:2021

Ajouter la nouvelle référence normative suivante:

IEC 61000-4-5:2014, *Compatibilité électromagnétique (CEM) – Partie 4-5: Techniques d'essai et de mesure – Essai d'immunité aux ondes de choc*
IEC 61000-4-5:2014/A1:2017