IEC 61010-2-033

Edition 2.0 2019-06

REDLINE VERSION

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Safety requirements for electrical equipment for measurement, control and laboratory use – Part 2-033: Particular requirements for hand-held multimeters ~~and other METERS,~~ for domestic and professional use, capable of measuring MAINS voltage

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ICS 19.080; 71.040.10

ISBN 978-2-8322-7106-3

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 2-033: Particular requirements for hand-held multimeters ~~and other METERS,~~ for domestic and professional use, capable of measuring MAINS voltage

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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This Redline version is not an official Standard and is intended to provide the user with an indication of what changes have been made to the previous version. Only the IEC International Standard provided in this package is to be considered the official Standard.

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 61010-2-033 has been prepared by IEC technical committee 66: Safety of measuring, control and laboratory equipment.

This second edition cancels and replaces the first 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) The scope has been reduced to hand-held multimeters. Voltmeters and clamp multimeters have been removed. They are addressed respectively by IEC 61010-2-030 and IEC 61010-2-032. The relevant definitions have been removed.

b) Subclause 4.4.2.101 has been relocated into Clause 102.

c) CLEARANCES and CREEPAGE DISTANCES for WET LOCATIONS and for measuring circuit TERMINALS exceeding 1 000 V a.c. or 1 414 V d.c. have been specified.

d) Subclause 14.101 related to "Circuits or components used as TRANSIENT OVERVOLTAGE limiting devices in measuring circuits used to measure MAINS" has been removed.

e) References to IEC 61010-031 for probe assemblies and IEC 61010-2-032 for current sensors have been added.

f) Requirements for protection against MAINS overvoltage measuring circuits have been added.

g) Clause 102 has been rewritten.

h) Requirements for measuring circuits from 1 000 V to 3 000 V have been added.

i) An informative Annex CC about dimensions of 4-mm banana TERMINALS has been added.

j) A flowchart for insulation according to the type of circuit has been added in a new Annex DD.

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

FDIS	Report on voting
66/692/FDIS	66/694/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 the parts in the IEC 61010 series, published under the general title *Safety requirements for electrical equipment for measurement, control, and laboratory use*, can be found on the IEC website.

This Part 2-033 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 2-033 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 multimeters for domestic and professional use, capable of measuring MAINS voltage.*

Where a particular subclause of Part 1 is not mentioned in this Part 2-033, that subclause applies as far as is reasonable. Where this Part 2-033 states "addition", "modification", "replacement", or "deletion", the relevant requirement, test specification or note in Part 1 should be adapted accordingly.

In this standard:

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

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

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

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

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

~~Part 2-032 specifies the safety requirements that are generally applicable to HAND HELD and hand-manipulated current sensors.~~

~~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.~~

~~VOLTMETER and similar equipment that are not within the scope of Part 2-033 are considered to be covered by the requirements of Part 2-030 or Part 2-032. But for equipment within the scopes of both Part 2-032 and Part 2-033, the two standards must 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 2-033. Equipment within the scopes of both Part 2-030 and Part 2-033 are considered to be covered by the requirements of this Part 2-033.

Part 2-032 specifies the safety requirements for hand-held and hand-manipulated current sensors. For equipment within the scope of Part 2-032 and Part 2-033, only 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 2-033 and Part 2-034, only Part 2-034 is applicable.

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

Part 2-033: Particular requirements for hand-held multimeters ~~and other METERS,~~ for domestic and professional use, capable of measuring MAINS voltage

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 METERS.~~

~~The METERS that have a primary purpose of measuring voltage on a live MAINS CIRCUIT are within the scope of this standard. They have various names, but all of them have capability for measurements of voltages on a live MAINS CIRCUIT. Some of the names given to this equipment are as follows:~~

- ~~MULTIMETER;~~
- ~~digital MULTIMETER;~~
- ~~VOLTMETER;~~
- ~~clamp METER (see also Part 2-032).~~

~~For the purpose of this standard, the term METER is used for these HAND-HELD measuring instruments.~~

~~NOTE Parts of the equipment that are not within the scope of this Part 2-033 are considered to be covered by the requirements of Part 1 or other part 2's of IEC 61010 and then will also need to meet the requirements of these other parts.~~

This part of IEC 61010 specifies safety requirements for hand-held multimeters for domestic and professional use, capable of measuring MAINS.

Hand-held multimeters are multi-range multifunction measuring instruments intended to measure voltage and other electrical quantities such as resistance or current. Their primary purpose is to measure voltage on a live MAINS. They are suitable to be supported by one hand during NORMAL USE.

1.1.2 Equipment excluded from scope

Add the following new item to the list and the following paragraph:

aa) IEC 61557-1 to IEC 61557-12, *Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c. – Equipment for testing, measuring or monitoring of protective measures*

~~*Addition:*~~

~~*Add the two following paragraphs at the end of the subclause:*~~

~~Equipment that is not capable of measuring MAINS voltages is not within the scope of this Part 2-033. See IEC 61010-2-030 for requirements pertaining to such equipment.~~

~~Such equipment, including other~~ HAND-HELD EQUIPMENT such as oscilloscopes, wattmeters, process control multimeters not RATED for measuring voltage on a live MAINS, clamp multimeters and communications test sets ~~is~~ are not within the scope of this document.

1.2.1 Aspects included in scope

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

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

Requirements for reliance on the displayed value are given in Clause 102.

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*

Add the following new normative reference:

IEC 61010-2-032, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 2-032: Particular requirements for hand-held and hand-manipulated current sensors for electrical test and measurement*

IEC 61010-2-033

Edition 2.0 2019-06

INTERNATIONAL STANDARD

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Safety requirements for electrical equipment for measurement, control and laboratory use –
Part 2-033: Particular requirements for hand-held multimeters for domestic and professional use, capable of measuring MAINS voltage

Exigences de sécurité pour appareils électriques de mesurage, de régulation et de laboratoire –
Partie 2-033: Exigences particulières pour les multimètres portatifs pour usage domestique et professionnel, capables de mesurer la tension RESEAU



IEC 61010-2-033:2019-06(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

Part 2-033: Particular requirements for hand-held multimeters for domestic and professional use, capable of measuring MAINS voltage

FOREWORD

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a) The scope has been reduced to hand-held multimeters. Voltmeters and clamp multimeters have been removed. They are addressed respectively by IEC 61010-2-030 and IEC 61010-2-032. The relevant definitions have been removed.
b) Subclause 4.4.2.101 has been relocated into Clause 102.

c) CLEARANCES and CREEPAGE DISTANCES for WET LOCATIONS and for measuring circuit TERMINALS exceeding 1 000 V a.c. or 1 414 V d.c. have been specified.

d) Subclause 14.101 related to "Circuits or components used as TRANSIENT OVERVOLTAGE limiting devices in measuring circuits used to measure MAINS" has been removed.

e) References to IEC 61010-031 for probe assemblies and IEC 61010-2-032 for current sensors have been added.

f) Requirements for protection against MAINS overvoltage measuring circuits have been added.

g) Clause 102 has been rewritten.

h) Requirements for measuring circuits from 1 000 V to 3 000 V have been added.

i) An informative Annex CC about dimensions of 4-mm banana TERMINALS has been added.

j) A flowchart for insulation according to the type of circuit has been added in a new Annex DD.

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This Part 2-033 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 2-033 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 multimeters for domestic and professional use, capable of measuring MAINS voltage.*

Where a particular subclause of Part 1 is not mentioned in this Part 2-033, that subclause applies as far as is reasonable. Where this Part 2-033 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

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- replaced by a revised edition, or
- amended.

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INTRODUCTION

Part 2-030 specifies the safety requirements for equipment with testing and measuring circuits which are connected for test or measurement purposes to devices or circuits outside the measurement equipment itself. Requirements of Part 2-030 have been included in this Part 2-033. Equipment within the scopes of both Part 2-030 and Part 2-033 are considered to be covered by the requirements of this Part 2-033.

Part 2-032 specifies the safety requirements for hand-held and hand-manipulated current sensors. For equipment within the scope of Part 2-032 and Part 2-033, only 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 2-033 and Part 2-034, only Part 2-034 is applicable.

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

Part 2-033: Particular requirements for hand-held multimeters for domestic and professional use, capable of measuring MAINS voltage

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 multimeters for domestic and professional use, capable of measuring MAINS.

Hand-held multimeters are multi-range multifunction measuring instruments intended to measure voltage and other electrical quantities such as resistance or current. Their primary purpose is to measure voltage on a live MAINS. They are suitable to be supported by one hand during NORMAL USE.

1.1.2 Equipment excluded from scope

Add the following new item to the list and the following paragraph:

aa) IEC 61557-1 to IEC 61557-12, *Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c. – Equipment for testing, measuring or monitoring of protective measures*

HAND-HELD EQUIPMENT such as oscilloscopes, wattmeters, process control multimeters not RATED for measuring voltage on a live MAINS, clamp multimeters and communications test sets are not within the scope of this document.

1.2.1 Aspects included in scope

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

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

Requirements for reliance on the displayed value are given in Clause 102.

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*

Add the following new normative reference:

IEC 61010-2-032, *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*

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

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EXIGENCES DE SÉCURITÉ POUR APPAREILS ÉLECTRIQUES DE MESURAGE, DE RÉGULATION, ET DE LABORATOIRE –

Partie 2-033: Exigences particulières pour les multimètres portatifs pour usage domestique et professionnel, capables de mesurer la tension RESEAU

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La Norme internationale IEC 61010-2-033 a été établie par le comité d'études 66 de l'IEC: Sécurité des appareils de mesure, de commande et de laboratoire.

Cette deuxième édition annule et remplace la première 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) Le domaine d'application a été réduit aux multimètres portatifs. Les voltmètres et les pinces multimétriques ont été supprimés. Ils sont traités respectivement par

l'IEC 61010-2-030 et l'IEC 61010-2-032. Les définitions correspondantes ont été supprimées.

b) Le 4.4.2.101 a été intégré à l'Article 102.

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

d) Les exigences pour "Circuits ou composants utilisés comme limiteurs de surtensions dans les circuits de mesure utilisés sur un RESEAU" ont été supprimées. Le paragraphe 14.102 a été renuméroté 14.101.

e) Des références à l'IEC 61010-031 pour les sondes équipées et à l'IEC 61010-2-032 pour les capteurs de courant ont été ajoutées.

f) Des exigences relatives à la protection des circuits de mesure contre les surtensions du RESEAU ont été ajoutées.

g) L'Article 102 a été reformulé.

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

i) Une Annexe CC informative relative aux dimensions des BORNES "banane" de 4 mm a été ajoutée.

j) 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 basé sur les documents suivants:

FDIS	Rapport de vote
66/692/FDIS	66/694/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, publiées 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 2-033 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 dénommé la Partie 1.

La présente Partie 2-033 complète ou modifie les articles correspondants de l'IEC 61010-1 de façon à transformer cette publication en norme IEC: *Exigences particulières pour les multimètres portatifs pour usage domestique et professionnel, capables de mesurer la tension RESEAU.*

Lorsqu'un paragraphe particulier de la Partie 1 n'est pas mentionné dans cette Partie 2-033, ce paragraphe s'applique pour autant que cela soit raisonnable. Lorsque cette Partie 2-033 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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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 2-033. Les appareils dans les domaines d'application de la Partie 2-030 et de la Partie 2-033 sont considérés comme étant couverts par les exigences de cette Partie 2-033.

La Partie 2-032 spécifie les exigences de sécurité applicables aux capteurs de courant portatifs et manipulés manuellement. Pour les appareils qui relèvent du domaine d'application de la Partie 2-032 et de la Partie 2-033, seule la 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 2-033 et de la Partie 2-034, seule la Partie 2-034 s'applique.

EXIGENCES DE SÉCURITÉ POUR APPAREILS ÉLECTRIQUES DE MESURAGE, DE RÉGULATION, ET DE LABORATOIRE –

Partie 2-033: Exigences particulières pour les multimètres portatifs pour usage domestique et professionnel, capables de mesurer la tension RESEAU

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 applicables aux multimètres portatifs pour usage domestique et professionnel, capables de mesurer la tension RESEAU.

Les multimètres portatifs sont des instruments de mesure multifonctions et avec plusieurs plages, destinés à mesurer la tension et d'autres grandeurs électriques telles que la résistance ou le courant. Ils ont pour objectif principal de mesurer la tension sur un RESEAU sous tension. Ils peuvent être tenus à la main en UTILISATION NORMALE.

1.1.2 Appareils exclus du domaine d'application

Ajouter le nouveau point suivant à la liste ainsi que l'alinéa suivant:

aa) IEC 61557-1 à IEC 61557-12, *Sécurité électrique dans les réseaux de distribution basse tension de 1 000 V c.a. et 1 500 V c.c – Dispositifs de contrôle, de mesure ou de surveillance de mesures de protection*

Les APPAREILS PORTATIFS tels que les oscilloscopes, les wattmètres, les multimètres utilisés pour la commande de processus non ASSIGNES pour mesurer la tension sur un RESEAU sous tension, les pinces multimétriques et les équipements d'essais de transmission ne relèvent pas du domaine d'application du présent document.

1.2.1 Aspects inclus dans le domaine d'application

Ajouter les deux 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 relatives à la confiance dans la valeur affichée sont données à l'Article 102.

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*

Ajouter la nouvelle référence normative suivante:

IEC 61010-2-032, *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*