



IEC 61010-2-030

Edition 3.0 2023-09  
EXTENDED VERSION

# INTERNATIONAL STANDARD



This extended version of IEC 61010-2-030:2023 includes the content of the references made to IEC 61010-1:2010 and IEC 61010-1:2010/AMD1:2016

GROUP SAFETY PUBLICATION

**Safety requirements for electrical equipment for measurement, control, and laboratory use –  
Part 2-030: Particular requirements for equipment having testing or measuring circuits**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

ICS 19.080, 71.040.10

ISBN 978-2-8322-7562-7

**Warning! Make sure that you obtained this publication from an authorized distributor.**



**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:

ISH	Report on voting
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.”

## CONTENTS

FOREWORD.....	10
INTRODUCTION to IEC 61010-1:2010 and IEC 61010-1:2010/AMD1:2016.....	14
<b>INTRODUCTION.....</b>	<b>15</b>
1 Scope and object.....	16
1.1 Scope.....	16
1.1.1 Equipment included in scope .....	16
1.1.2 Equipment excluded from scope .....	16
1.1.3 Computing equipment.....	17
1.2 Object .....	17
1.2.1 Aspects included in scope .....	17
1.2.2 Aspects excluded from scope .....	17
1.3 Verification .....	17
1.4 Environmental conditions .....	18
1.4.1 Normal environmental conditions .....	18
1.4.2 Extended environmental conditions .....	18
2 Normative references .....	18
3 Terms and definitions .....	21
3.1 Equipment and states of equipment.....	21
3.2 Parts and accessories .....	21
3.3 Quantities.....	22
3.4 Tests.....	22
3.5 Safety terms .....	23
3.6 Insulation .....	24
4 Tests .....	26
4.1 General .....	26
4.2 Sequence of tests.....	26
4.3 Reference test conditions .....	26
4.3.1 Environmental conditions.....	26
4.3.2 State of equipment .....	27
4.4 Testing in SINGLE FAULT CONDITION .....	28
4.4.1 General .....	28
4.4.2 Application of fault conditions .....	29
4.4.3 Duration of tests .....	31
4.4.4 Conformity after application of fault conditions.....	31
5 Marking and documentation.....	32
5.1 Marking .....	32
5.1.1 General .....	32
5.1.2 Identification.....	32
5.1.3 MAINS supply .....	33
5.1.4 Fuses .....	34
5.1.5 TERMINALS, connections and operating devices.....	35
5.1.6 Switches and circuit-breakers .....	37
5.1.7 Equipment protected by DOUBLE INSULATION or REINFORCED INSULATION.....	37
5.1.8 Field-wiring TERMINAL boxes .....	37
5.2 Warning markings .....	37

5.3	Durability of markings.....	38
5.4	Documentation .....	38
5.4.1	General .....	38
5.4.2	Equipment RATINGS.....	39
5.4.3	Equipment installation .....	40
5.4.4	Equipment operation.....	40
5.4.5	Equipment maintenance and service .....	41
5.4.6	Integration into systems or effects resulting from special conditions .....	41
6	Protection against electric shock .....	41
6.1	General .....	41
6.1.1	Requirements .....	41
6.1.2	Exceptions.....	42
6.2	Determination of ACCESSIBLE parts.....	42
6.2.1	General .....	42
6.2.2	Examination.....	42
6.2.3	Openings above parts that are HAZARDOUS LIVE.....	43
6.2.4	Openings for pre-set controls.....	43
6.3	Limit values for ACCESSIBLE parts.....	43
6.3.1	Levels in NORMAL CONDITION.....	43
6.3.2	Levels in SINGLE FAULT CONDITION.....	44
6.4	Primary means of protection .....	47
6.4.1	General .....	47
6.4.2	ENCLOSURES and PROTECTIVE BARRIERS.....	47
6.4.3	BASIC INSULATION .....	47
6.4.4	Impedance.....	47
6.5	Additional means of protection in case of SINGLE FAULT CONDITIONS .....	47
6.5.1	General .....	47
6.5.2	PROTECTIVE BONDING.....	48
6.5.3	SUPPLEMENTARY INSULATION and REINFORCED INSULATION .....	52
6.5.4	PROTECTIVE IMPEDANCE .....	53
6.5.5	Automatic disconnection of the supply .....	53
6.5.6	Current- or voltage-limiting device .....	53
6.6	Connections to external circuits.....	54
6.6.1	General .....	54
6.6.2	TERMINALS for external circuits.....	54
6.6.3	Circuits with TERMINALS which are HAZARDOUS LIVE.....	54
6.6.4	TERMINALS for stranded conductors .....	54
	6.6.101 Measuring circuit TERMINALS.....	55
6.7	Insulation requirements .....	57
6.7.1	The nature of insulation .....	57
6.7.2	Insulation for MAINS CIRCUITS of OVERVOLTAGE CATEGORY II with a nominal supply voltage up to 300 V .....	60
6.7.3	Insulation for secondary circuits derived from MAINS CIRCUITS of OVERVOLTAGE CATEGORY II up to 300 V .....	63
6.8	Procedure for voltage tests.....	69
6.8.1	General .....	69
6.8.2	Humidity preconditioning .....	70
6.8.3	Test procedures .....	71
6.9	Constructional requirements for protection against electric shock.....	72

6.9.1	General .....	72
6.9.2	Insulating materials .....	72
6.9.3	Colour coding .....	72
6.10	Connection to the MAINS supply source and connections between parts of equipment .....	72
6.10.1	MAINS supply cords .....	72
6.10.2	Fitting of non-detachable MAINS supply cords .....	73
6.10.3	Plugs and connectors .....	75
6.11	Disconnection from supply source .....	75
6.11.1	General .....	75
6.11.2	Exceptions .....	75
6.11.3	Requirements according to type of equipment .....	76
6.11.4	Disconnecting devices .....	76
7	Protection against mechanical HAZARDS .....	77
7.1	General .....	77
7.2	Sharp edges .....	77
7.3	Moving parts .....	77
7.3.1	General .....	77
7.3.2	Exceptions .....	78
7.3.3	RISK assessment for mechanical HAZARDS to body parts .....	78
7.3.4	Limitation of force and pressure .....	79
7.3.5	Gap limitations between moving parts .....	80
7.4	Stability .....	82
7.5	Provisions for lifting and carrying .....	83
7.5.1	General .....	83
7.5.2	Handles and grips .....	83
7.5.3	Lifting devices and supporting parts .....	83
7.6	Wall mounting .....	83
7.7	Expelled parts .....	84
8	Resistance to mechanical stresses .....	84
8.1	General .....	84
8.2	ENCLOSURE rigidity tests .....	85
8.2.1	Static test .....	85
8.2.2	Impact test .....	85
8.3	Drop test .....	86
8.3.1	Equipment other than HAND-HELD EQUIPMENT and DIRECT PLUG-IN EQUIPMENT .....	86
8.3.2	HAND-HELD EQUIPMENT and DIRECT PLUG-IN EQUIPMENT .....	87
9	Protection against the spread of fire and arc flash .....	87
9.1	General .....	87
9.2	Eliminating or reducing the sources of ignition within the equipment .....	89
9.3	Containment of fire within the equipment, should it occur .....	89
9.3.1	General .....	89
9.3.2	Constructional requirements .....	89
9.4	Limited-energy circuit .....	92
9.5	Requirements for equipment containing or using flammable liquids .....	93
9.6	Overcurrent protection .....	93
9.6.1	General .....	93
9.6.2	PERMANENTLY CONNECTED EQUIPMENT .....	94

9.6.3	Other equipment.....	94
9.101	Protection of measuring circuits.....	94
9.101.1	General.....	94
9.101.2	Protection against mismatches of inputs and ranges.....	94
9.101.3	Protection against MAINS overvoltages.....	97
10	Equipment temperature limits and resistance to heat.....	98
10.1	Surface temperature limits for protection against burns.....	98
10.2	Temperatures of windings.....	99
10.3	Other temperature measurements.....	99
10.4	Conduct of temperature tests.....	100
10.4.1	General.....	100
10.4.2	Temperature measurement of heating equipment.....	100
10.4.3	Equipment intended for installation in a cabinet or a wall.....	100
10.5	Resistance to heat.....	101
10.5.1	Integrity of CLEARANCES and CREEPAGE DISTANCES.....	101
10.5.2	Non-metallic ENCLOSURES.....	101
10.5.3	Insulating material.....	101
11	Protection against HAZARDS from fluids and solid foreign objects.....	102
11.1	General.....	102
11.2	Cleaning.....	102
11.3	Spillage.....	103
11.4	Overflow.....	103
11.5	Battery electrolyte.....	103
11.6	Equipment RATED with a degree of ingress protection (IP code).....	103
11.6.1	General.....	103
11.6.2	Conditions for testing.....	104
11.6.3	Protection against solid foreign objects (including dust).....	104
11.6.4	Protection against water.....	104
11.7	Fluid pressure and leakage.....	105
11.7.1	Maximum pressure.....	105
11.7.2	Leakage and rupture at high pressure.....	105
11.7.3	Leakage from low-pressure parts.....	106
11.7.4	Overpressure safety device.....	106
12	Protection against radiation, including laser sources, and against sonic and ultrasonic pressure.....	107
12.1	General.....	107
12.2	Equipment producing ionizing radiation.....	107
12.2.1	Ionizing radiation.....	107
12.2.2	Accelerated electrons.....	108
12.3	Optical radiation.....	108
12.4	Microwave radiation.....	109
12.5	Sonic and ultrasonic pressure.....	109
12.5.1	Sound level.....	109
12.5.2	Ultrasonic pressure.....	110
12.6	Laser sources.....	110
13	Protection against liberated gases and substances, explosion and implosion.....	111
13.1	Poisonous and injurious gases and substances.....	111
13.2	Explosion and implosion.....	111
13.2.1	Components.....	111

13.2.2	Batteries and battery charging .....	111
13.2.3	Implosion of cathode ray tubes .....	112
14	Components and subassemblies .....	112
14.1	General .....	112
14.2	Motors .....	113
14.2.1	Motor temperatures .....	113
14.2.2	Series excitation motors .....	113
14.3	Overtemperature protection devices .....	114
14.4	Fuse holders .....	114
14.5	MAINS voltage selection devices .....	114
14.6	MAINS transformers tested outside equipment.....	114
14.7	Printed wiring boards.....	115
14.8	Circuits used to limit TRANSIENT OVERVOLTAGES.....	115
14.101	Probe assemblies and accessories .....	115
15	Protection by interlocks .....	116
15.1	General .....	116
15.2	Prevention of reactivating .....	116
15.3	Reliability .....	116
16	HAZARDS resulting from application .....	116
16.1	REASONABLY FORESEEABLE MISUSE.....	116
16.2	Ergonomic aspects .....	116
17	RISK assessment .....	117
101	Measuring circuits .....	117
101.1	General .....	117
101.2	Current measuring circuits.....	118
101.3	Indicating devices.....	118
101.3.1	General .....	118
101.3.2	Battery level .....	118
101.3.3	Over-range indication .....	119
101.3.4	Permanent overvoltages .....	119
Annex A (normative)	Measuring circuits for touch current (see 6.3).....	121
Annex B (normative)	Standard test fingers (see 6.2) .....	124
Annex C (normative)	Measurement of CLEARANCES and CREEPAGE DISTANCES .....	126
Annex D (normative)	Parts between which insulation requirements are specified (see 6.4 and 6.5.3) .....	130
Annex E (informative)	Guideline for reduction of POLLUTION DEGREES .....	133
Annex F (normative)	ROUTINE TESTS.....	134
Annex G (informative)	Leakage and rupture from fluids under pressure .....	136
Annex H (normative)	Qualification of conformal coatings for protection against POLLUTION .....	141
Annex I (informative)	Line-to-neutral voltages for common MAINS supply systems .....	144
Annex J (informative)	RISK assessment .....	146
Annex K (normative)	Insulation requirements not covered by 6.7 .....	149
Annex L (informative)	Index of defined terms .....	176
Annex AA (normative)	MEASUREMENT CATEGORIES .....	178
Annex BB (informative)	HAZARDS pertaining to measurements performed in certain environments .....	181



Annex CC (informative) 4 mm "banana" TERMINALS .....	184
Annex DD (informative) Flowchart for insulation according to the type of circuit .....	186
Annex EE (informative) Determination of CLEARANCES for Table 101 .....	189
Bibliography.....	190
Figure 1 – Measurements through openings in ENCLOSURES.....	43
Figure 2 – Maximum duration of short-term ACCESSIBLE voltages in SINGLE FAULT CONDITION (see 6.3.2 a)) .....	45
Figure 3 – Capacitance level versus voltage in NORMAL CONDITION and SINGLE FAULT CONDITION (see 6.3.1 c) and 6.3.2 c)) .....	46
Figure 4 – Acceptable arrangement of protective means against electric shock .....	48
Figure 5 – Examples of binding screw assemblies .....	50
Figure 101 – Duration of current flow versus body current for a.c. and d.c. currents.....	52
Figure 6 – Distance between conductors on an interface between two layers.....	61
Figure 7 – Distance between adjacent conductors along an interface of two inner layers.....	62
Figure 8 – Distance between adjacent conductors located between the same two layers.....	63
Figure 9 – Detachable MAINS supply cords and connections .....	73
Figure 10 – Impact test using a sphere .....	86
Figure 11 – Flow chart to explain the requirements for protection against the spread of fire .....	88
Figure 12 – Baffle .....	91
Figure 13 – Area of the bottom of an ENCLOSURE to be constructed as specified in 9.3.2 c) 1) .....	91
Figure 14 – Ball-pressure test apparatus.....	102
Figure 16 – Ratio between test pressure and maximum working pressure.....	106
Figure 15 – Flow chart for conformity options 14.1 a), b), c) and d).....	113
Figure A.1 – Measuring circuit for a.c. with frequencies up to 1 MHz and for d.c. ....	121
Figure A.2 – Measuring circuits for sinusoidal a.c. with frequencies up to 100 Hz and for d.c. ....	122
Figure A.3 – Current measuring circuit for electrical burns .....	123
Figure A.4 – Current measuring circuit for wet contact .....	123
Figure B.1 – Rigid test finger .....	124
Figure B.2 – Jointed test finger .....	125
Figure C.1 – Examples of methods of measuring CLEARANCES and CREEPAGE DISTANCES.....	129
Figures D.1a) to d) – Protection between HAZARDOUS LIVE circuits and ACCESSIBLE parts.....	131
Figures D.1e) to h) – Protection between HAZARDOUS LIVE circuits and circuits with ACCESSIBLE external TERMINALS .....	131
Figures D.2 a) and D.2 b) – Protection between a HAZARDOUS LIVE internal circuit and an ACCESSIBLE part which is not bonded to other ACCESSIBLE parts.....	132
Figures D.2 c) and D.2 d) – Protection between a HAZARDOUS LIVE primary circuit and circuits which have ACCESSIBLE external TERMINALS.....	132
Figure D.3 – Protection of external ACCESSIBLE TERMINALS of two HAZARDOUS LIVE circuits.....	132
Figure G.1 – Conformity verification process (see G.2).....	137

Figure H.1 – Test sequence and conformity .....	143
Figure J.1 – Iterative process of RISK assessment and RISK reduction .....	146
Figure J.2 – RISK reduction .....	147
Figure K.1 – Distance between conductors on an interface between two layers .....	153
Figure K.2 – Distance between adjacent conductors along an interface of an inner layer .....	154
Figure K.3 – Distance between adjacent conductors located between the same two layers.....	155
Figure K.4 – Example of recurring peak voltage .....	167
Figure K.101 – Test circuit for evaluation of TRANSIENT OVERVOLTAGE attenuation.....	170
Figure AA.1 – Example to identify the locations of MEASUREMENT CATEGORIES .....	179
Figure CC.1 – Recommended dimensions of 4 mm TERMINALS .....	185
Figure DD.1 – Requirements for CLEARANCE, CREEPAGE DISTANCE and solid insulation.....	188
Table 1 – Symbols .....	34
Table 2 – Tightening torque for binding screw assemblies .....	50
Table 101 – CLEARANCES for unmated measuring circuit TERMINALS.....	56
Table 3 – Multiplication factors for CLEARANCES of equipment RATED for operation at altitudes up to 5 000 m .....	58
TABLE 4 – CLEARANCES and CREEPAGE DISTANCES for MAINS CIRCUITS of OVERVOLTAGE CATEGORY II up to 300 V .....	60
Table 5 – Test voltages for solid insulation in MAINS CIRCUITS of OVERVOLTAGE CATEGORY II up to 300 V.....	61
Table 6 – CLEARANCES and test voltages for secondary circuits derived from MAINS CIRCUITS of OVERVOLTAGE CATEGORY II up to 300 V.....	65
Table 7 – CREEPAGE DISTANCES for secondary circuits .....	66
Table 8 – Minimum values for distance or thickness (see 6.7.3.4.2 to 6.7.3.4.4) .....	68
Table 9 – Distances between TERMINALS and foil.....	69
Table 10 – Correction factors according to test site altitude for test voltages for CLEARANCES .....	70
Table 11 – Values for physical tests on cord anchorages .....	74
Table 12 – Protective measures against mechanical HAZARDS to body parts.....	79
Table 13 – Minimum maintained gaps to prevent crushing for different body parts .....	81
Table 14 – Maximum gaps to prevent access for different body parts.....	81
Table 15 – Impact energy levels, test height and corresponding IK codes .....	86
Table 16 – Acceptable perforation of the bottom of an ENCLOSURE .....	90
Table 17 – Limits of maximum available current.....	92
Table 18 – Values for overcurrent protection devices .....	93
Table 19 – Surface temperature limits in NORMAL CONDITION.....	99
Table 20 – Maximum temperatures for insulation material of windings .....	99
Table 22 – Lamp or lamp systems considered photobiologically safe .....	109
Table 23 – Lamp or lamp systems considered photobiologically safe under certain conditions .....	109
Table 21 – Impulse voltages for OVERVOLTAGECATEGORY II.....	115
Table C.1 – Dimensions of X.....	126

Table E.1 – Environmental situations .....	133
Table E.2 – Reduction of POLLUTION DEGREES .....	133
Table F.1 – Test voltages for ROUTINE TESTS of MAINS CIRCUITS .....	135
Table G.1 – Test pressures for equipment with pressures above 14 Mpa .....	139
Table H.1 – Test parameters, test conditions and test procedures .....	142
Table I.1 – Line-to-neutral voltages for common MAINS supply systems .....	144
Table J.1 – Severity of harm .....	148
Table J.2 – Probability of harm .....	148
Table J.3 – Risk category .....	148
Table K.1 – Multiplication factors for CLEARANCES for equipment RATED for operation at altitudes up to 5 000 m .....	150
Table K.2 – CLEARANCES and CREEPAGE DISTANCES for MAINS CIRCUITS of OVERVOLTAGE CATEGORY II above 300 V .....	150
Table K.3 – CLEARANCES and CREEPAGE DISTANCES for MAINS CIRCUITS of OVERVOLTAGE CATEGORY III .....	151
Table K.4 – CLEARANCES and CREEPAGE DISTANCES for MAINS CIRCUITS of OVERVOLTAGE CATEGORY IV .....	151
Table K.5 – Test voltages for solid insulation in MAINS CIRCUITS of OVERVOLTAGE CATEGORY II above 300 V .....	152
Table K.6 – Test voltages for solid insulation in MAINS CIRCUITS of OVERVOLTAGE CATEGORY III .....	152
Table K.7 – Test voltages for solid insulation in MAINS CIRCUITS of OVERVOLTAGE CATEGORY IV .....	152
Table K.8 – Test voltages for testing long-term stress of solid insulation in MAINS CIRCUITS .....	153
Table K.9 – Minimum values for distance or thickness of solid insulation .....	154
Table K.10 – CLEARANCES and test voltages for secondary circuits derived from MAINS CIRCUITS of OVERVOLTAGE CATEGORY II above 300 V .....	157
Table K.11 – CLEARANCES and test voltages for secondary circuits derived from MAINS CIRCUITS of OVERVOLTAGE CATEGORY III .....	158
Table K.12 – CLEARANCES and test voltages for secondary circuits derived from MAINS CIRCUITS of OVERVOLTAGE CATEGORY IV .....	159
Table K.13 – CREEPAGE DISTANCES for secondary circuits .....	160
Table K.14 – Minimum values for distance or thickness (see K.2.4.2 to K.2.4.4) .....	162
Table K.15 – CLEARANCE values for the calculation of K.3.2 .....	165
Table K.16 – Test voltages based on CLEARANCES .....	165
Table K.17 – CLEARANCES for BASIC INSULATION in circuits having recurring peak voltages or WORKING VOLTAGES with frequencies above 30 kHz .....	168
Table K.101 – Impulse voltages for circuits connected to MAINS .....	170
Table K.102 – CLEARANCES for measuring circuits RATED for MEASUREMENT CATEGORIES .....	171
Table K.103 – Impulse test voltages for testing electric strength of solid insulation for measuring circuits RATED for MEASUREMENT CATEGORIES .....	172
Table K.104 – a.c. test voltages for testing electric strength of solid insulation for measuring circuits RATED for MEASUREMENT CATEGORIES .....	173
Table K.105 – Minimum values for distance or thickness of solid insulation for measuring circuits RATED for MEASUREMENT CATEGORIES .....	174
Table AA.1 – Characteristics of MEASUREMENT CATEGORIES .....	180
Table EE.1 – CLEARANCE values for Table 101 .....	189

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

---

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

## Part 1: General requirements

### 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.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 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.

**This extended version (EXV) of the official IEC Standard provides the user with the comprehensive content of the Standard.**

**IEC 61010-2-030:2023 EXV includes the content of IEC 61010-2-030:2023, and the references made to IEC 61010-1:2010 and IEC 61010-1:2010/AMD1:2016.**

**The specific content of IEC 61010-2-030:2023 is displayed on a blue background.**

IEC 61010-2-030 has been prepared by IEC technical committee 66: Safety of measuring, control and laboratory equipment. It is an International Standard.

It has the status of a group safety publication in accordance with IEC Guide 104.

This third edition cancels and replaces the second edition published in 2017. This edition constitutes a technical revision.

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

- a) in 1.2.1, requirements for protection against HAZARDS which could occur from reading a voltage have been added to the scope;
- b) Clause 2, all normative references have been dated and new normative references have been added;
- c) in 4.3.2.5, requirements for power supply have been modified;
- d) in 4.3.2.6, requirements for inputs/outputs have been modified;
- e) in 4.4.2.101, a new subclause about surge protective devices has been added;
- f) in 5.1.5.101.2, minimum RATINGS for voltage of measuring TERMINALS are required;
- g) 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;
- h) Subclause 9.101 to consider the protection of measuring circuits against the spread of fire and arc flash has been added and Table 102 has been replaced by Table K.101;
- i) in 9.101.2, relocation of 101.3 of previous edition;
- j) 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;
- k) in 14.101, relocation of 14.102 and 14.101 of previous edition has been removed;
- l) in 101.3, relocation of 101.5 of previous edition, and more requirements added against HAZARD occurring from reading a voltage value;
- m) in K.2.1, another method for determination of CLEARANCES of secondary circuits is proposed;
- n) in K.3.2, new Table K.15 and Table K.16 for CLEARANCE calculation;
- o) in K.101.4.1, new Table K.103 and Table K.104 replace Table K.102, Table K.103 and Table K.104;
- p) in K.101.4, the subclause has been reviewed; Tables and tests for solid insulation have been modified; Table K.105 replaces Table K.9;
- q) Table K.101, replacement of Table K.106;
- r) Clause K.4, redraft of the clause to propose a method for determination of  $U_t$  for circuits which reduce TRANSIENT OVERVOLTAGES;
- s) Annex AA: Figure AA.1 has been redesigned;
- t) Annex EE: addition of a new informative annex for determination of CLEARANCES for Table 101.

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

Draft	Report on voting
66/786/FDIS	66/796/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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://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 equipment having testing or measuring circuits*.

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:

- 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;
- 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](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 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) This document 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) IEC 61010-2-032:2023 specifies the safety requirements for hand-held and hand-manipulated current sensors for measuring, detecting, injecting current, or indicating current waveforms on circuits without physically opening the current path of the circuit being measured.

Most of the requirements of this document have been included in IEC 61010-2-032:2023. Equipment within the scopes of both this document and IEC 61010-2-032:2023 is considered to be covered by the requirements of IEC 61010-2-032:2023.

However, for current sensors in combined equipment with protective bonding and automatic disconnection of the supply, this document and IEC 61010-2-032:2023 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 this document 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 this document have been included in IEC 61010-2-034:2023. However, for equipment within the scope of IEC 61010-2-032:2023 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 this document, IEC 61010-2-032, 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 equipment having testing or measuring circuits which are connected for test or measurement purposes to devices or circuits outside the measurement equipment itself.

These include measuring circuits which are part of electrical test and measurement equipment, laboratory equipment, or process control equipment. These circuits in equipment have additional protective means between the circuit and an OPERATOR.

NOTE These testing and measuring circuits can, for example:

- measure voltages in circuits of other equipment,
- measure temperature of a separate device via a thermocouple,
- measure force on a separate device via a strain gauge,
- inject a voltage or current onto a circuit to analyse or test a new design.

This group safety publication focusing on safety essential requirements is primarily intended to be used as a product safety standard for the products mentioned in the scope, but is also intended to be used by technical committees in the preparation of publications for products similar to those mentioned in the scope of this document, in accordance with the principles laid down in IEC Guide 104 and ISO/IEC Guide 51.

One of the responsibilities of a technical committee is, wherever applicable, to make use of basic safety publications and/or group safety publications in the preparation of its publications.

##### 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).

### 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 equipment (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 and Clause 101.

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  $\pm 10$  % 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  $\pm 10$  % 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, *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 61000-4-5:2014:2017, *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 61010-2-032:2023, *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 61180:2016, *High-voltage test techniques for low-voltage equipment – Definitions, test and procedure requirements, test equipment*<sup>1</sup>

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

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

IEC 62262, *Degrees of protection provided by enclosures for electrical equipment against external impacts (IK code)*

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*

---

<sup>1</sup> IEC 61180:2016 replaces everywhere IEC 61180, IEC 61180-1 and IEC 61180-2 are referenced in IEC 61010-1.

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE



GROUP SAFETY PUBLICATION  
PUBLICATION GROUPEE DE SÉCURITÉ

**Safety requirements for electrical equipment for measurement, control, and laboratory use –  
Part 2-030: Particular requirements for equipment having testing or measuring circuits**

**Exigences de sécurité pour appareils électriques de mesurage, de régulation et de laboratoire –  
Partie 2-030: Exigences particulières pour les appareils équipés de circuits d'essai ou de mesure**

## CONTENTS

FOREWORD.....	4
INTRODUCTION.....	7
1 Scope and object.....	8
2 Normative references .....	9
3 Terms and definitions .....	10
4 Tests .....	10
5 Marking and documentation.....	11
6 Protection against electric shock .....	13
7 Protection against mechanical HAZARDS.....	18
8 Resistance to mechanical stresses.....	18
9 Protection against the spread of fire and arc flash .....	18
10 Equipment temperature limits and resistance to heat.....	22
11 Protection against HAZARDS from fluids and solid foreign objects .....	22
12 Protection against radiation, including laser sources, and against sonic and ultrasonic pressure .....	22
13 Protection against liberated gases and substances, explosion and implosion .....	23
14 Components and subassemblies .....	23
15 Protection by interlocks .....	23
16 HAZARDS resulting from application.....	23
17 RISK assessment .....	23
101 Measuring circuits .....	23
Annexes .....	27
Annex K (normative) Insulation requirements not covered by 6.7 .....	28
Annex L (informative) Index of defined terms .....	40
Annex AA (normative) MEASUREMENT CATEGORIES .....	41
Annex BB (informative) HAZARDS pertaining to measurements performed in certain environments .....	44
Annex CC (informative) 4 mm "banana" TERMINALS .....	47
Annex DD (informative) Flowchart for insulation according to the type of circuit.....	49
Annex EE (informative) Determination of CLEARANCES for Table 101 .....	52
Bibliography.....	53
Figure 101 – Duration of current flow versus body current for a.c. and d.c. currents.....	14
Figure K.101 – Test circuit for evaluation of TRANSIENT OVERVOLTAGE attenuation.....	33
Figure AA.1 – Example to identify the locations of MEASUREMENT CATEGORIES .....	42
Figure CC.1 – Recommended dimensions of 4 mm TERMINALS .....	48
Figure DD.1 – Requirements for CLEARANCE, CREEPAGE DISTANCE and solid insulation.....	51
Table 101 – CLEARANCES for unmated measuring circuit TERMINALS.....	15
Table K.15 – CLEARANCE values for the calculation of K.3.2 .....	29
Table K.16 – Test voltages based on CLEARANCES .....	30
Table K.101 – Impulse voltages for circuits connected to MAINS .....	33



Table K.102 – CLEARANCES for measuring circuits RATED for MEASUREMENT CATEGORIES ..... 35

Table K.103 – Impulse test voltages for testing electric strength of solid insulation for measuring circuits RATED for MEASUREMENT CATEGORIES ..... 36

Table K.104 – a.c. test voltages for testing electric strength of solid insulation for measuring circuits RATED for MEASUREMENT CATEGORIES ..... 36

Table K.105 – Minimum values for distance or thickness of solid insulation for measuring circuits RATED for MEASUREMENT CATEGORIES ..... 38

Table AA.1 – Characteristics of MEASUREMENT CATEGORIES ..... 43

Table EE.1 – CLEARANCE values for Table 101 ..... 52

# INTERNATIONAL ELECTROTECHNICAL COMMISSION

---

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

### **Part 2-030: Particular requirements for equipment having testing or measuring circuits**

#### 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.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 61010-2-030 has been prepared by IEC technical committee 66: Safety of measuring, control and laboratory equipment. It is an International Standard.

It has the status of a group safety publication in accordance with IEC Guide 104.

This third edition cancels and replaces the second edition published in 2017. This edition constitutes a technical revision.

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

- a) in 1.2.1, requirements for protection against HAZARDS which could occur from reading a voltage have been added to the scope;

- b) Clause 2, all normative references have been dated and new normative references have been added;
- c) in 4.3.2.5, requirements for power supply have been modified;
- d) in 4.3.2.6, requirements for inputs/outputs have been modified;
- e) in 4.4.2.101, a new subclause about surge protective devices has been added;
- f) in 5.1.5.101.2, minimum RATINGS for voltage of measuring TERMINALS are required;
- g) 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;
- h) Subclause 9.101 to consider the protection of measuring circuits against the spread of fire and arc flash has been added and Table 102 has been replaced by Table K.101;
- i) in 9.101.2, relocation of 101.3 of previous edition;
- j) 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;
- k) in 14.101, relocation of 14.102 and 14.101 of previous edition has been removed;
- l) in 101.3, relocation of 101.5 of previous edition, and more requirements added against HAZARD occurring from reading a voltage value;
- m) in K.2.1, another method for determination of CLEARANCES of secondary circuits is proposed;
- n) in K.3.2, new Table K.15 and Table K.16 for CLEARANCE calculation;
- o) in K.101.4.1, new Table K.103 and Table K.104 replace Table K.102, Table K.103 and Table K.104;
- p) in K.101.4, the subclause has been reviewed; Tables and tests for solid insulation have been modified; Table K.105 replaces Table K.9;
- q) Table K.101, replacement of Table K.106;
- r) Clause K.4, redraft of the clause to propose a method for determination of  $U_t$  for circuits which reduce TRANSIENT OVERVOLTAGES;
- s) Annex AA: Figure AA.1 has been redesigned;
- t) Annex EE: addition of a new informative annex for determination of CLEARANCES for Table 101.

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

Draft	Report on voting
66/786/FDIS	66/796/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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://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 equipment having testing or measuring circuits*.

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:

- 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;
- 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](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 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) This document 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) IEC 61010-2-032:2023 specifies the safety requirements for hand-held and hand-manipulated current sensors for measuring, detecting, injecting current, or indicating current waveforms on circuits without physically opening the current path of the circuit being measured.

Most of the requirements of this document have been included in IEC 61010-2-032:2023. Equipment within the scopes of both this document and IEC 61010-2-032:2023 is considered to be covered by the requirements of IEC 61010-2-032:2023.

However, for current sensors in combined equipment with protective bonding and automatic disconnection of the supply, this document and IEC 61010-2-032:2023 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 this document 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 this document have been included in IEC 61010-2-034:2023. However, for equipment within the scope of IEC 61010-2-032:2023 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 this document, IEC 61010-2-032, 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 2-030: Particular requirements for equipment having testing or measuring circuits

### 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 equipment having testing or measuring circuits which are connected for test or measurement purposes to devices or circuits outside the measurement equipment itself.

These include measuring circuits which are part of electrical test and measurement equipment, laboratory equipment, or process control equipment. These circuits in equipment have additional protective means between the circuit and an OPERATOR.

NOTE These testing and measuring circuits can, for example:

- measure voltages in circuits of other equipment,
- measure temperature of a separate device via a thermocouple,
- measure force on a separate device via a strain gauge,
- inject a voltage or current onto a circuit to analyse or test a new design.

This group safety publication focusing on safety essential requirements is primarily intended to be used as a product safety standard for the products mentioned in the scope, but is also intended to be used by technical committees in the preparation of publications for products similar to those mentioned in the scope of this document, in accordance with the principles laid down in IEC Guide 104 and ISO/IEC Guide 51.

One of the responsibilities of a technical committee is, wherever applicable, to make use of basic safety publications and/or group safety publications in the preparation of its publications.

#### 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 equipment (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 and Clause 101.

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 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*

*with the following new normative references:*

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*<sup>1</sup>

*Add the following new normative references:*

IEC 61000-4-5:2014:2017, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*  
IEC 61000-4-5:2014/AMD1:2017

IEC 61010-2-032:2023, *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*

---

<sup>1</sup> IEC 61180:2016 replaces everywhere IEC 61180, IEC 61180-1 and IEC 61180-2 are referenced in IEC 61010-1.

## SOMMAIRE

AVANT-PROPOS.....	56
INTRODUCTION.....	60
1 Domaine d'application et objet.....	61
2 Références normatives.....	62
3 Termes et définitions.....	63
4 Essais.....	63
5 Marquage et documentation.....	64
6 Protection contre les chocs électriques.....	66
7 Protection contre les DANGERS mécaniques.....	72
8 Résistance aux contraintes mécaniques.....	72
9 Protection contre la propagation du feu et des arcs électriques.....	72
10 Limites de température de l'appareil et résistance à la chaleur.....	76
11 Protection contre les DANGERS des fluides et des corps solides étrangers.....	77
12 Protection contre les radiations, y compris les sources laser, et contre la pression acoustique et ultrasonique.....	77
13 Protection contre les émissions de gaz et substances, les explosions et les implosions.....	77
14 Composants et sous-ensembles.....	77
15 Protection par systèmes de verrouillage.....	77
16 DANGERS résultant de l'application.....	77
17 Évaluation des RISQUES.....	77
101 Circuits de mesure.....	78
Annexes.....	81
Annexe K (normative) Exigences d'isolation non couvertes par 6.7.....	82
Annexe L (informative) Index des termes définis.....	95
Annexe AA (normative) CATEGORIES DE MESURE.....	96
Annexe BB (informative) DANGERS se rapportant aux mesurages effectués dans certains environnements.....	99
Annexe CC (informative) Bornes "bananes" de 4 MM.....	102
Annexe DD (informative) Organigramme de l'isolation selon le type de circuit.....	104
Annexe EE (informative) Détermination des DISTANCES D'ISOLEMENT pour le Tableau 101.....	107
Bibliographie.....	108
Figure 101 – Durée de l'écoulement du courant par rapport au courant passant par le corps pour les courants alternatif et continu.....	68
Figure K.101 – Circuit d'essai pour l'évaluation de l'affaiblissement des SURTENSIONS TRANSITOIRES.....	88
Figure AA.1 – Exemple d'identification des emplacements des CATEGORIES DE MESURE.....	97
Figure CC.1 – Dimensions recommandées des BORNES de 4 mm.....	103
Figure DD.1 – Exigences relatives à la DISTANCE D'ISOLEMENT, à la LIGNE DE FUITE et à l'isolation solide.....	106



Tableau 101 – DISTANCES D'ISOLEMENT pour les BORNES des circuits de mesure en position découplée .....	69
Tableau K.15 – Valeurs de la DISTANCE D'ISOLEMENT pour le calcul de K.3.2.....	84
Tableau K.16 – Tensions d'essai en fonction des DISTANCES D'ISOLEMENT .....	85
Tableau K.101 – Tensions de choc pour les circuits connectés au RESEAU.....	88
Tableau K.102 – DISTANCES D'ISOLEMENT pour les circuits de mesure dont les CATEGORIES DE MESURE sont des CARACTERISTIQUES ASSIGNEES .....	90
Tableau K.103 – Tensions d'essai de choc pour l'essai de rigidité diélectrique de l'isolation solide des circuits de mesure dont les CATEGORIES DE MESURE sont des CARACTERISTIQUES ASSIGNEES .....	91
Tableau K.104 – Tensions d'essai alternatives pour l'essai de rigidité diélectrique de l'isolation solide des circuits de mesure dont les CATEGORIES DE MESURE sont des CARACTERISTIQUES ASSIGNEES .....	91
Tableau K.105 – Valeurs minimales pour la ligne de fuite ou l'épaisseur de l'isolation solide des circuits de mesure dont les CATEGORIES DE MESURE sont des CARACTERISTIQUES ASSIGNEES .....	93
Tableau AA.1 - Caractéristiques des CATEGORIES DE MESURE.....	98
Tableau EE.1 - Valeurs de la distance d'isolement pour Tableau 101 .....	107

## COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

---

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

#### Partie 2-030: Exigences particulières pour les appareils équipés de circuits d'essai ou de mesure

##### 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.
- 2) Les décisions ou accords officiels de l'IEC concernant les questions techniques représentent, dans la mesure du possible, un accord international sur les sujets étudiés, étant donné que les Comités nationaux de l'IEC intéressés sont représentés dans chaque comité d'études.
- 3) Les Publications de l'IEC se présentent sous la forme de recommandations internationales et sont agréées comme telles par les Comités nationaux de l'IEC. Tous les efforts raisonnables sont entrepris afin que l'IEC s'assure de l'exactitude du contenu technique de ses Publications; l'IEC ne peut pas être tenue responsable de l'éventuelle mauvaise utilisation ou interprétation qui en est faite par un quelconque utilisateur final.
- 4) Dans le but d'encourager l'uniformité internationale, les Comités nationaux de l'IEC s'engagent, dans toute la mesure possible, à appliquer de façon transparente les Publications de l'IEC dans leurs publications nationales et régionales. Toutes divergences entre toutes Publications de l'IEC et toutes publications nationales ou régionales correspondantes doivent être indiquées en termes clairs dans ces dernières.
- 5) L'IEC elle-même ne fournit aucune attestation de conformité. Des organismes de certification indépendants fournissent des services d'évaluation de conformité et, dans certains secteurs, accèdent aux marques de conformité de l'IEC. L'IEC n'est responsable d'aucun des services effectués par les organismes de certification indépendants.
- 6) Tous les utilisateurs doivent s'assurer qu'ils sont en possession de la dernière édition de cette publication.
- 7) Aucune responsabilité ne doit être imputée à l'IEC, à ses administrateurs, employés, auxiliaires ou mandataires, y compris ses experts particuliers et les membres de ses comités d'études et des Comités nationaux de l'IEC, pour tout préjudice causé en cas de dommages corporels et matériels, ou de tout autre dommage de quelque nature que ce soit, directe ou indirecte, ou pour supporter les coûts (y compris les frais de justice) et les dépenses découlant de la publication ou de l'utilisation de cette Publication de l'IEC ou de toute autre Publication de l'IEC, ou au crédit qui lui est accordé.
- 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'IEC attire l'attention sur le fait que la mise en application du présent document peut entraîner l'utilisation d'un ou de plusieurs brevets. L'IEC ne prend pas position quant à la preuve, à la validité et à l'applicabilité de tout droit de propriété revendiqué à cet égard. À la date de publication du présent document, l'IEC n'avait pas reçu notification qu'un ou plusieurs brevets pouvaient être nécessaires à sa mise en application. Toutefois, il y a lieu d'avertir les responsables de la mise en application du présent document que des informations plus récentes sont susceptibles de figurer dans la base de données de brevets, disponible à l'adresse <https://patents.iec.ch>. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets.

L'IEC 61010-2-030 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.

Elle a le statut d'une publication groupée de sécurité conformément à l'IEC Guide 104.

Cette troisième édition annule et remplace la deuxième édition publiée en 2017. Cette édition constitue une révision technique.

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

- a) au paragraphe 1.2.1, les exigences relatives à la protection contre les DANGERS susceptibles de survenir lors de la lecture d'une tension ont été ajoutées au domaine d'application;
- b) à l'Article 2, toutes les références normatives ont été datées et de nouvelles références normatives ont été ajoutées;
- c) au paragraphe 4.3.2.5, les exigences relatives à l'alimentation électrique ont été modifiées;
- d) au paragraphe 4.3.2.6, les exigences relatives aux entrées/sorties ont été modifiées;
- e) au paragraphe 4.4.2.101, un nouveau paragraphe concernant les dispositifs de protection contre les surtensions a été ajouté;
- f) au paragraphe 5.1.5.101.2, des VALEURS ASSIGNEES minimales de tension des BORNES des circuits de mesure sont exigées;
- g) 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;
- h) le paragraphe 9.101 a été ajouté pour prendre en compte la protection des circuits de mesure contre la propagation du feu et les arcs électriques et le Tableau 102 a été remplacé par le Tableau K.101;
- i) le paragraphe 101.3 de la précédente édition a été déplacé en 9.101.2;
- j) 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;
- k) le paragraphe 14.102 a été déplacé au paragraphe 14.101 et le paragraphe 14.101 de l'édition précédente a été supprimé;
- l) le paragraphe 101.5 de l'édition précédente a été déplacé au paragraphe 101.3 et des exigences supplémentaires ont été ajoutées contre les DANGERS liés à la lecture d'une valeur de tension;
- m) au paragraphe K.2.1, une autre méthode de détermination des DISTANCES D'ISOLEMENT des circuits secondaires a été proposée;
- n) 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;
- o) au paragraphe K.101.4.1, les nouveaux tableaux (Tableau K.103 et Tableau K.104) remplacent le Tableau K.102, le Tableau K.103 et le Tableau K.104;
- p) le paragraphe K.101.4 a été révisé. Les tableaux et les essais relatifs à l'isolation solide ont été modifiés; Le Tableau K.105 remplace le Tableau K.9;
- q) le Tableau K.101 remplace le Tableau K.106;
- r) l'Article K.4 a fait l'objet d'une refonte pour proposer une méthode de détermination de  $U_i$  pour les circuits qui réduisent les SURTENSIONS TRANSITOIRES;
- s) en Annexe AA: la Figure AA.1 a été modifiée;
- t) en Annexe EE: une nouvelle annexe informative a été ajoutée pour la détermination des DISTANCES D'ISOLEMENT pour le Tableau 101.

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

Projet	Rapport de vote
66/786/FDIS	66/796/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](http://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](http://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 mesurage, 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 61010-1:2010/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 appareils équipés de circuits d'essai ou de 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:

- 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;
- 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](http://webstore.iec.ch) dans les données relatives au document recherché. À cette date, le document sera:

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- 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) Le présent document 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) L'IEC 61010-2-032:2023 spécifie les exigences de sécurité pour les capteurs de courant portatifs et manipulés à la main pour mesurer, détecter, 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 du présent document ont été incluses dans l'IEC 61010-2-032:2023. Les appareils entrant dans le champ d'application du présent document et de l'IEC 61010-2-032:2023 sont considérés comme couverts par les exigences de l'IEC 61010-2-032:2023.

Cependant, pour les capteurs de courant dans un appareil combiné avec liaison de protection et déconnexion automatique de l'alimentation, le présent document et l'IEC 61010-2-032:2023 sont utilisés 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 du présent document 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 du présent document ont été incluses dans l'IEC 61010-2-034:2023. Cependant, pour les appareils relevant des domaines d'application de l'IEC 61010-2-032:2023 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 du présent document, de l'IEC 61010-2-032, 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 2-030: Exigences particulières pour les appareils équipés de circuits d'essai ou de mesure

#### 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 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.

Ceux-ci comprennent les circuits de mesure qui font partie d'appareils électriques d'essai et de mesure, d'appareils de laboratoire ou d'appareils de contrôle de processus. Ces circuits dans l'appareil disposent des moyens de protection additionnels entre le circuit et un OPERATEUR.

NOTE Ces circuits d'essai et de mesure peuvent, par exemple:

- mesurer des tensions sur des circuits d'autres matériels;
- mesurer la température d'un dispositif séparé par l'intermédiaire d'un thermocouple;
- mesurer la force d'un dispositif séparé avec une jauge de contrainte;
- injecter une tension ou un courant sur un circuit pour analyser ou soumettre à essai un nouveau montage.

La présente publication groupée de sécurité centrée sur les exigences essentielles de sécurité est avant tout destinée à être utilisée en tant que norme de sécurité de produits pour les produits cités dans le domaine d'application. Elle est également destinée à être utilisée par les comités d'études dans le cadre de l'élaboration de publications pour des produits similaires à ceux cités dans le domaine d'application du présent document, conformément aux principes établis dans l'IEC Guide 104 et l'ISO/IEC Guide 51.

L'une des responsabilités d'un comité d'études consiste, le cas échéant, à utiliser les publications fondamentales de sécurité et/ou les publications groupées de sécurité dans le cadre de l'élaboration de ses publications.

##### 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 des appareils (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 et à l'Article 101.

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 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/AMD1:2015

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

*par les nouvelles références normatives suivantes:*

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/AMD1:2015

IEC 60364-4-44:2007/AMD2:2018

IEC 61010-031:2022, *Exigences de sécurité pour appareils électriques de mesure, de régulation et de laboratoire – Partie 031: Exigences de sécurité pour sondes équipées tenues à la main et manipulées pour mesure 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<sup>1</sup>*

*Ajouter les nouvelles références normatives suivantes:*

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

IEC 61000-4-5:2014/AMD1:2017

---

<sup>1</sup> 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 61010-2-032:2023, *Exigences de sécurité pour appareils électriques de mesure, de régulation et de laboratoire – Partie 2-032: Exigences particulières pour les capteurs de courant, portatifs et manipulés manuellement, pour essai électrique et mesure*