

**OHUTUSNÕUDED ELEKTRILISTELE MÕÕTMIS-,
JUHTIMIS- JA LABORATOORIUMISEADMETELE. OSA 031:
OHUTUSNÕUDED KÄESHOITAVATELE
ELEKTRIMÕÕTMIS- JA KATSETUSSEADMETELE**

**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 + IEC 61010-031:2015/A1:2018)

EESTI STANDARDI EESSÕNA**NATIONAL FOREWORD**

See Eesti standard EVS-EN 61010-031:2015+A1+A11:2021 sisaldab Euroopa standardi EN 61010-031:2015 ja selle muudatuste A1:2021 ja A11:2021 ingliskeelset teksti.	This Estonian standard EVS-EN 61010-031:2015+A1+A11:2021 consists of the English text of the European standard EN 61010-031:2015 and its amendments A1:2021 and A11:2021.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas. Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 24.07.2015, muudatused A1 12.11.2021 ja A11 12.11.2021.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation. Date of Availability of the European standard is 24.07.2015, for A1 12.11.2021 and A11 12.11.2021.
Muudatusega A1 lisatud või muudetud teksti algus ja lõpp on tekstis tähistatud sümbolitega A1 A1 . Muudatusega A11 lisatud või muudetud teksti algus ja lõpp on tekstis tähistatud sümbolitega A11 A11 . Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.	The start and finish of text introduced or altered by amendment A1 is indicated in the text by tags A1 A1 . The start and finish of text introduced or altered by amendment A11 is indicated in the text by tags A11 A11 . The standard is available from the Estonian Centre for Standardisation and Accreditation.

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ICS 19.080

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English Version

**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 + IEC 61010-031:2015/A1:2018)**

Règles de sécurité pour appareils électriques de mesure,
de régulation et de laboratoire - Partie 031: Exigences de
sécurité pour sondes équipées tenues à la main pour
mesurage et essais électriques
(IEC 61010-031:2015 + IEC 61010-031:2015/A1:2018)

Sicherheitsbestimmungen für elektrische Mess-, Steuer-,
Regel- und Laborgeräte - Teil 031:
Sicherheitsbestimmungen für handgehaltenes
Messzubehör zum Messen und Prüfen
(IEC 61010-031:2015 + IEC 61010-031:2015/A1:2018)

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

European foreword

The text of document 66/569/FDIS, future edition 2 of IEC 61010-031, prepared by IEC/TC 66 "Safety of measuring, control and laboratory equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61010-031:2015.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2016-04-03
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2018-07-03

This document supersedes EN 61010-031:2002.

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

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

Endorsement notice

The text of the International Standard IEC 61010-031:2015 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60065	NOTE	Harmonized as EN 60065.
IEC 60270	NOTE	Harmonized as EN 60270.
IEC 60364-4-44	NOTE	Harmonized as HD 60634-4-44.
IEC 60664-1	NOTE	Harmonized as EN 60664-1.
IEC 60664-3:2003	NOTE	Harmonized as EN 60664-3:2003.
IEC 60664-3:2003/AMD1:2010	NOTE	Harmonized as EN 60664-3:2003/A1:2010.
IEC 60664-4:2005	NOTE	Harmonized as EN 60664-4:2006.
IEC 60990	NOTE	Harmonized as EN 60990.
IEC 61010 (series)	NOTE	Harmonized as EN 61010 (series).
IEC 61032:1997	NOTE	Harmonized as EN 61032:1998.

A1 Amendment A1 European foreword

The text of document 66/664/FDIS, future IEC 61010-031/A1, prepared by IEC/TC 66 "Safety of measuring, control and laboratory equipment" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61010-031:2015/A1:2021.

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- latest date by which the document has to be implemented at national (dop) 2022-05-12 level by publication of an identical national standard or by endorsement
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For the relationship with EU Directive(s) / Regulation(s), see informative Annex ZZ, which is an integral part of EN 61010-031:2015/A11:2021.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 61010-031/A1:2018 was approved by CENELEC as a European Standard without any modification. **A1**

A11 Amendment A11 European foreword

This document (EN 61010-031:2015/A11:2021) has been prepared by CLC/TC 66X "Safety of measuring, control, and laboratory equipment".

The following dates are fixed:

- latest date by which this document has to be (dop) 2022-05-12
implemented at national level by publication of
an identical national standard or by
endorsement
- latest date by which the national standards (dow) 2024-11-12
conflicting with this document have to be
withdrawn

This document amends EN 61010-031:2015/A1:2021.

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For relationship with EU Directive(s) / Regulation(s), see informative Annex ZZ, which is an integral part of this document.

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IEC 61010-031

Edition 2.1 2018-05

CONSOLIDATED VERSION



GROUP SAFETY PUBLICATION

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



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Edition 2.1 2018-05

CONSOLIDATED VERSION



GROUP SAFETY PUBLICATION

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

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ELECTROTECHNICAL
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CONTENTS

FOREWORD	7
AMENDMENT A1 FOREWORD A1	10
1 Scope and object	11
1.1 Scope	11
1.1.1 Probe assemblies included in scope	11
1.1.2 Probe assemblies excluded from scope	14
1.2 Object	14
1.2.1 Aspects included in scope	14
1.2.2 Aspects excluded from scope	14
1.3 Verification	14
1.4 Environmental conditions	14
1.4.1 Normal environmental conditions	14
1.4.2 Extended environmental conditions	14
2 Normative references	15
3 Terms and definitions	15
3.1 Parts and accessories	16
3.2 Quantities	17
3.3 Tests	17
3.4 Safety terms	18
3.5 Insulation	19
4 Tests	20
4.1 General	20
4.2 Sequence of tests	20
4.3 Reference test conditions	21
4.3.1 Environmental conditions	21
4.3.2 State of probe assemblies	21
4.3.3 Position of the probe assembly	21
4.3.4 Accessories	21
4.3.5 Covers and removable parts	21
4.3.6 Input and output voltages	21
4.3.7 Controls	21
4.3.8 Connections	21
4.3.9 A1 Short-term or intermittent operation A1	21
4.4 Testing in SINGLE FAULT CONDITION	22
4.4.1 General	22
4.4.2 Application of fault conditions	22
4.4.3 Duration of tests	22
4.4.4 Conformity after application of fault conditions	23
4.5 Tests in REASONABLY FORESEEABLE MISUSE	23
4.5.1 General	23
4.5.2 Fuses	23
5 Marking and documentation	24
5.1 Marking	24
5.1.1 General	24
5.1.2 Identification	24

5.1.3	Fuses	25
5.1.4	CONNECTORS and operating devices	25
5.1.5	RATING	25
5.2	Warning markings	26
5.3	Durability of markings	26
5.4	Documentation	27
5.4.1	General	27
5.4.2	Probe assembly RATING	27
5.4.3	Probe assembly operation	27
5.4.4	Probe assembly maintenance and service	28
6	Protection against electric shock	28
6.1	General	28
6.2	Determination of ACCESSIBLE parts	29
6.2.1	General	29
6.2.2	Examination	29
6.2.3	Openings for pre-set controls	30
6.3	Limit values for ACCESSIBLE parts	30
6.3.1	General	30
6.3.2	Levels in NORMAL CONDITION	31
6.3.3	Levels in SINGLE FAULT CONDITION	31
6.3.4	Measurement of voltage and touch current	33
6.4	Means of protection against electric shock	36
6.4.1	General	36
6.4.2	CONNECTORS	37
6.4.3	PROBE TIPS	38
6.4.4	Impedance	40
6.4.5	PROTECTIVE IMPEDANCE	40
6.4.6	BASIC INSULATION, SUPPLEMENTARY INSULATION, DOUBLE INSULATION and REINFORCED INSULATION	41
6.5	Insulation requirements	41
6.5.1	The nature of insulation	41
6.5.2	Insulation requirements for probe assemblies	43
6.6	Procedure for voltage tests	54
6.6.1	General	54
6.6.2	Humidity preconditioning	54
6.6.3	Conduct of tests	55
6.6.4	Test voltages	55
6.6.5	Test procedures	57
6.7	Constructional requirements for protection against electric shock	58
6.7.1	General	58
6.7.2	Insulating materials	58
6.7.3	ENCLOSURES of probe assemblies with DOUBLE INSULATION or REINFORCED INSULATION	58
6.7.4	PROBE WIRE attachment	59
7	Protection against mechanical HAZARDS	62
8	Resistance to mechanical stresses	62
8.1	General	62
8.2	Rigidity test	63
8.3	Drop test	63

8.4	Impact swing test	63
9	Temperature limits and protection against the spread of fire	64
9.1	General.....	64
9.2	Temperature tests	65
10	Resistance to heat.....	65
10.1	Integrity of SPACINGS	65
10.2	Resistance to heat	65
11	Protection against HAZARDS from fluids	65
11.1	General.....	65
11.2	Cleaning	66
11.3	Specially protected probe assemblies	66
12	Components	66
12.1	General.....	66
12.2	Fuses.....	66
12.3	PROBE WIRE	67
12.3.1	General	67
12.3.2	RATING of PROBE WIRE	67
12.3.3	Pressure test at high temperature for insulations	67
12.3.4	Tests for resistance of insulation to cracking	69
12.3.5	Voltage test	70
12.3.6	Tensile test.....	70
13	Prevention of HAZARD from arc flash and short-circuits.....	72
13.1	General.....	72
13.2	Exposed conductive parts	72
Annex A	(normative) Measuring circuits for touch current (see 6.3)	73
A.1	Measuring circuits for a.c. with frequencies up to 1 MHz and for d.c.	73
A.2	Measuring circuits for a.c. with sinusoidal frequencies up to 100 Hz and for d.c.	73
A.3	Current measuring circuit for electrical burns at frequencies above 100 kHz	74
A.4	Current measuring circuit for WET LOCATIONS	75
Annex B	(normative) Standard test fingers	77
Annex C	(normative) Measurement of CLEARANCES and CREEPAGE DISTANCES.....	80
Annex D	(normative) Routine spark tests on PROBE WIRE.....	82
D.1	General.....	82
D.2	Spark test procedure	82
D.3	Routine spark test method for PROBE WIRE	84
Annex E	(informative) 4 mm CONNECTORS	86
E.1	General.....	86
E.2	Dimensions	86
Annex F	(normative) MEASUREMENT CATEGORIES	88
F.1	General.....	88
F.2	MEASUREMENT CATEGORIES	88
F.2.1	MEASUREMENT CATEGORY II.....	88
F.2.2	MEASUREMENT CATEGORY III.....	88
F.2.3	MEASUREMENT CATEGORY IV	88
F.2.4	Probe assemblies without a MEASUREMENT CATEGORY RATING.....	89
Annex G	Index of defined terms	90

Annex ZA (normative) Normative references to international publications with their corresponding European publications ^{A11}	91
Annex ZZ (informative) Relationship between this European standard and the safety objectives of Directive 2014/35/EU [2014 OJ L96] aimed to be covered ^{A11}	92
Bibliography.....	94
Figure 1 – Examples of type A probe assemblies	12
Figure 2 – Examples of type B probe assemblies	12
Figure 3 – Examples of type C probe assemblies	13
Figure 4 – Examples of type D probe assemblies	13
Figure 5 – Example of a STACKABLE CONNECTOR with a male CONNECTOR and a female TERMINAL.....	17
Figure 6 – Methods for determination of ACCESSIBLE parts (see 6.2) and for voltage tests of (see 6.4.2)	30
Figure 7 – Capacitance level versus voltage in NORMAL CONDITION and SINGLE-FAULT CONDITION (see 6.3.2 c) and 6.3.3 c))	32
Figure 8 – Voltage and touch current measurement	33
Figure 9 – Voltage and touch current measurement for the reference CONNECTOR.....	34
Figure 10 – Voltage and touch current measurement with shielded test probe	35
Figure 11 – Maximum test probe input voltage for 70 mA touch current.....	36
Figure 12 – Protection by a PROTECTIVE FINGERGUARD	39
Figure 13 – Protection by distance	39
Figure 14 – Protection by tactile indicator	40
Figure 18 – Example of recurring peak voltage	46
Figure 15 – Distance between conductors on an interface between two layers	51
Figure 16 – Distance between adjacent conductors along an interface of two layers	51
Figure 17 – Distance between adjacent conductors located between the same two layers.....	53
Figure 19 – Flexing test	60
Figure 20 – Rotational flexing test.....	62
Figure 21 – Impact swing test	64
Figure 22 – Indentation device	68
Figure A.1 – Measuring circuit for a.c. with frequencies up to 1 MHz and for d.c.	73
Figure A.2 – Measuring circuits for a.c. with sinusoidal frequencies up to 100 Hz and for d.c.	74
Figure A.3 – Current measuring circuit for electrical burns	75
Figure A.4 – Current measuring circuit for high frequency test probes.....	75
Figure A.5 – Current measuring circuit for WET LOCATIONS.....	76
Figure B.1 – Rigid test finger	77
Figure B.2 – Jointed test finger	78
Figure D.1 – Bead Chain Configuration (if applicable)	83
Figure E.1 – Recommended dimensions of 4 mm CONNECTORS ^{A1}	87
Figure F.1 – Example to identify the locations of MEASUREMENT CATEGORIES.....	89

Table 1 – Symbols	25
Table 2 – SPACINGS for unmated CONNECTORS RATED up to 1 000 V a.c. or 1 500 V d.c. with HAZARDOUS LIVE conductive parts	38
Table 3 – Multiplication factors for CLEARANCES of probe assembly RATED for operation at altitudes up to 5 000 m	42
Table 6 – CLEARANCES of probe assemblies RATED for MEASUREMENT CATEGORIES A1	44
Table 7 – CLEARANCE values for the calculation of 6.5.2.3.2	45
Table 8 – CLEARANCES for BASIC INSULATION in probe assemblies subjected to recurring peak voltages or WORKING VOLTAGES with frequencies above 30 kHz	47
Table 9 – CREEPAGE DISTANCES for BASIC INSULATION or SUPPLEMENTARY INSULATION	48
Table 4 – a.c. test voltages for testing electric strength of solid insulation in probe assemblies RATED for MEASUREMENT CATEGORIES	49
Table 14 – Impulse test voltages for testing electric strength of solid insulation in probe assemblies RATED for MEASUREMENT CATEGORIES	50
Table 5 – Minimum values for distance or thickness	52
Table 10 – Test voltages based on CLEARANCES	56
Table 11 – Correction factors according to test site altitude for test voltages for CLEARANCES	57
Table 12 – Pull forces for PROBE WIRE attachment tests	61
Table 13 – Diameter of mandrel and numbers of turns	69
Table C.1 – Dimension of X	80
Table D.1 – Maximum centre-to-centre spacings of bead chains	82
Table D.2 – Formula for maximum speed of wire in terms of electrode length <i>L</i> of link- or bead-chain electrode	84
Table F.1 – Characteristics of MEASUREMENT CATEGORIES	89
Table ZZ.1 — Correspondence between this European standard and Annex I of Directive 2014/35/EU [2014 OJ L96]	92

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

FOREWORD

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International Standard IEC 61010-031 has been prepared by IEC technical committee 66: Safety of measuring, control and laboratory equipment.

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

IEC 61010-031 is a stand-alone standard. This second edition cancels and replaces the first edition published in 2002 and Amendment 1:2008. This edition constitutes a technical revision.

This edition includes the following significant changes from the first edition, as well as numerous other changes:

- a) Voltages above the levels of 30 V r.m.s., 42,4 V peak, or 60 V d.c. are deemed to be HAZARDOUS LIVE instead of 33 V r.m.s., 46,7 V peak, or 70 V d.c.
- b) Servicing is now included within the scope.
- c) Extended environmental conditions are included within the scope.

- d) New terms have been defined.
- e) Tests for REASONABLY FORESEEABLE MISUSE have been added, in particular for fuses.
- f) Additional instruction requirements for probe assembly operation have been specified.
- g) Limit values for ACCESSIBLE parts and for measurement of voltage and touch current have been modified.
- h) SPACINGS requirements for mating of CONNECTORS have been modified.
- i) PROBE TIPS and SPRING-LOADED CLIPS requirements have been modified. The PROTECTIVE FINGERGUARD replace the BARRIER with new requirements.
- j) Insulation requirements (6.5) and test procedures (6.6.5) have been rewritten and aligned when relevant with Part 1. Specific requirements have been added for solid insulation and thin-film insulation.
- k) The terminology for MEASUREMENT CATEGORY I has been replaced with the designation “not RATED for measurements within MEASUREMENT CATEGORIES II, III, or IV”.
- l) The flexing/pull test (6.7.4.3) has been partially rewritten.
- m) Surface temperature limits (Clause 10) have been modified to conform to the limits of IEC Guide 117.
- n) Requirements for resistance of PROBE WIRES to mechanical stresses have been added in Clause 12 and a new Annex D.
- o) Requirements have been added regarding the prevention of HAZARD from arc flash and short-circuits for SPRING-LOADED CLIPS.
- p) A new informative Annex E defines the dimension of the 4 mm banana CONNECTORS.

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

FDIS	Report on voting
66/569/FDIS	66/571/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 61010 series, under the general title, *Safety requirements for electrical equipment for measurement, control, and laboratory use*, may be found on the IEC website.

In this standard, the following print types are used:

- requirements and definitions: in roman type;
- NOTES and EXAMPLES: in smaller roman type;
- *conformity and tests: in italic type;*
- terms used throughout this standard which have been defined in Clause 3: SMALL ROMAN CAPITALS.

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

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

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

AMENDMENT A1 FOREWORD

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

This bilingual version (2018-10) corresponds to the monolingual English version, published in 2018-05.

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

FDIS	Report on voting
66/664/FDIS	66/670/RVD

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

The French version of this amendment has not been voted upon.

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

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended. **A1**

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

A1 Part 031: Safety requirements for hand-held and hand-manipulated probe assemblies for electrical test and measurement **A1**

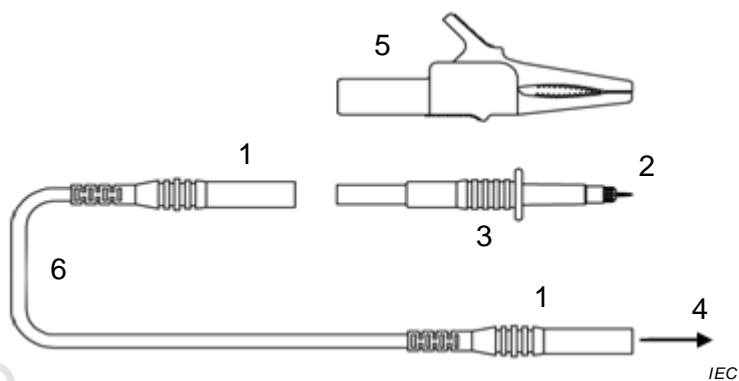
1 Scope and object

1.1 Scope

1.1.1 Probe assemblies included in scope

This part of IEC 61010 specifies safety requirements for hand-held and hand-manipulated probe assemblies of the types described below, and their related accessories. These probe assemblies are for 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.

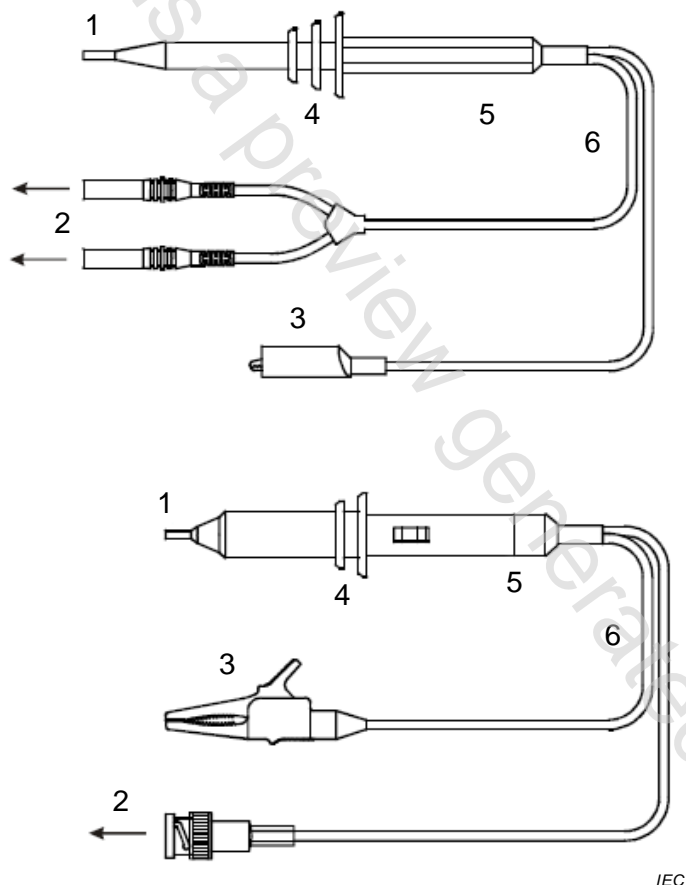
- a) Type A: low-voltage and high-voltage, non-attenuating probe assemblies. Non-attenuating probe assemblies that are **RATED** for direct connection to voltages exceeding 30 V r.m.s., 42,4 V peak, or 60 V d.c., but not exceeding 63 kV. They do not incorporate components which are intended to provide a voltage divider function or a signal conditioning function, but they may contain non-attenuating components such as fuses (see Figure 1.)
- b) Type B: high-voltage attenuating or divider probe assemblies. Attenuating or divider probe assemblies that are **RATED** for direct connection to secondary voltages exceeding 1 kV r.m.s. or 1,5 kV d.c. but not exceeding 63 kV r.m.s. or d.c. The divider function may be carried out wholly within the probe assembly, or partly within the test or measurement equipment to be used with the probe assembly (see Figure 2).
- c) Type C: low-voltage attenuating or divider probe assemblies. Attenuating or divider probe assemblies for direct connection to voltages not exceeding 1 kV r.m.s. or 1,5 kV d.c. The signal conditioning function may be carried out wholly within the probe assembly, or partly within the test or measurement equipment intended to be used with the probe assembly (see Figure 3).
- d) Type D: low-voltage attenuating, non-attenuating or other signal conditioning probe assemblies, that are **RATED** for direct connection only to voltages not exceeding 30 V r.m.s., or 42,4 V peak, or 60 V d.c., and are suitable for currents exceeding 8 A (see Figure 4).



Key

- | | |
|----------------------|----------------------|
| 1 typical CONNECTORS | 4 to equipment |
| 2 PROBE TIP | 5 SPRING-LOADED CLIP |
| 3 probe body | 6 PROBE WIRE |

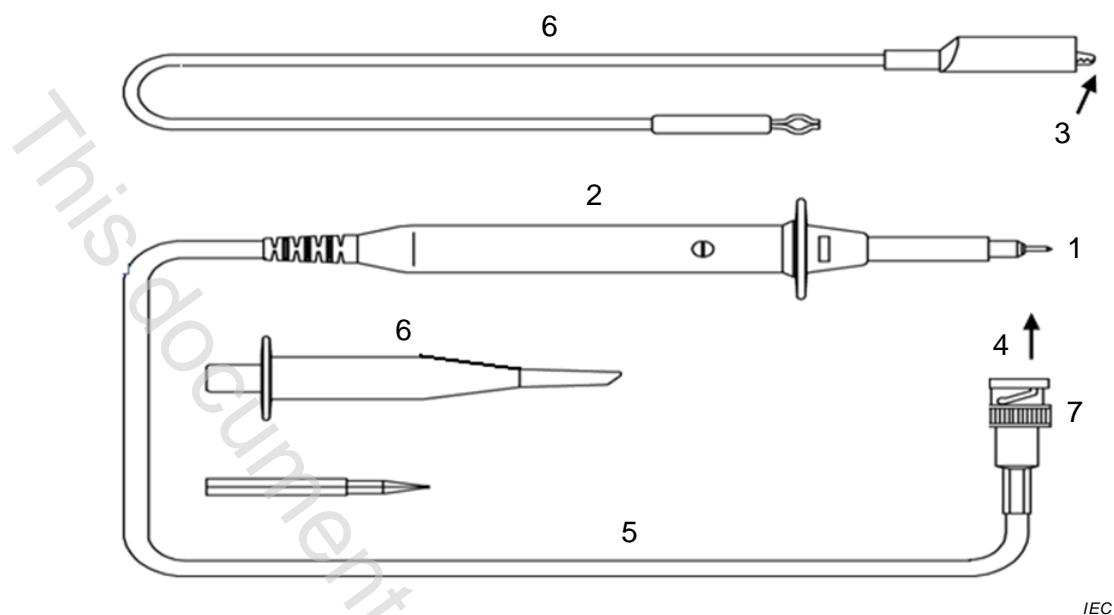
Figure 1 – Examples of type A probe assemblies



Key

- | | |
|-----------------------|--------------------------------|
| 1 PROBE TIP | 4 PROTECTIVE FINGERGUARD |
| 2 to equipment | 5 hand-held area of probe body |
| 3 reference CONNECTOR | 6 PROBE WIRE |

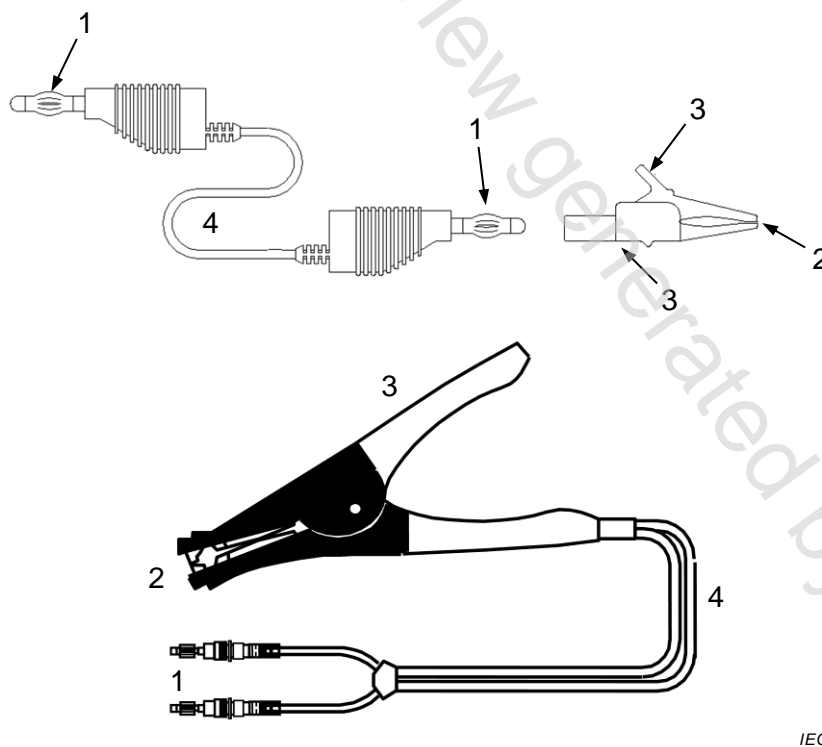
Figure 2 – Examples of type B probe assemblies



Key

- | | |
|-----------------------|---------------------------|
| 1 PROBE TIP | 5 PROBE WIRE |
| 2 probe body | 6 examples of accessories |
| 3 reference CONNECTOR | 7 BNC CONNECTOR |
| 4 to equipment | |

Figure 3 – Examples of type C probe assemblies



Key

- | | |
|-------------|--|
| 1 CONNECTOR | 3 hand-held area of SPRING-LOADED CLIP deleted text |
| 2 PROBE TIP | 4 PROBE WIRE |

Figure 4 – Examples of type D probe assemblies

1.1.2 Probe assemblies excluded from scope

This standard does not apply to current sensors within the scope of IEC 61010-2-032 (Hand-held and hand-manipulated current sensors), but may apply to their input measuring circuit leads and accessories.

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 HAZARDS are given in Clauses 0 to 0, as follows:

- a) electric shock or burn (see Clauses 0, 0 and 0);
- b) mechanical HAZARDS (see Clauses 0, 0 and 0);
- c) excessive temperature (see Clause 0);
- d) spread of fire from the probe assembly (see Clause 0);
- e) arc flash (see Clause 0).

Additional requirements for probe assemblies which are designed to be powered from a low-voltage mains supply, or include other features not specifically addressed in this standard are in other parts of IEC 61010.

NOTE Attention is drawn to the possible 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 probe assembly;
- b) effectiveness of transport packaging.

1.3 Verification

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

1.4 Environmental conditions

1.4.1 Normal environmental conditions

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

- a) altitude up to 2 000 m;
- b) ambient temperature of 5 °C to 40 °C;
- c) maximum relative humidity of 80 % for temperatures up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C;
- d) applicable POLLUTION DEGREE of the intended environment.

1.4.2 Extended environmental conditions

This standard applies to probe assemblies 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 probe assemblies:

- a) outdoor use;
- b) altitudes above 2 000 m;
- c) ambient temperatures below 5 °C or above 40 °C;
- d) relative humidities above the levels specified in 1.4.1;
- e) WET LOCATIONS.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

■A11 EN 60027-1:2006,¹ *Letter symbols to be used in electrical technology- Part 1: General (IEC 60027-1:1992+A1:1997)*

EN IEC 60027-2:2019, *Letter symbols to be used in electrical technology - Part 2: Telecommunications and electronics (IEC 60027-2:2019)*

EN 60027-3:2007, *Letter symbols to be used in electrical technology - Part 3: Logarithmic and related quantities, and their units (IEC 60027-3:2002)*

EN 60027-4:2007, *Letter symbols to be used in electrical technology - Part 4: Rotating electrical machines (IEC 60027-4:2006)*

EN 60027-6:2007, *Letter symbols to be used in electrical technology - Part 6: Control technology (IEC 60027-6:2006)*

EN 60027-7:2010, *Letter symbols to be used in electrical technology - Part 7: Power generation, transmission and distribution (IEC 60027-7:2010)* ■A11

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

IEC 61010-1:2010, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements*

■A11 EN 61180:2016, *High-voltage test techniques for low-voltage equipment - Definitions, test and procedure requirements, test equipment (IEC 61180:2016)* ■A11

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*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

¹ As impacted by EN 60027-1:2006/A2:2007.