SLOVENSKI STANDARD
oSIST prEN IEC 61010-031:2022

01-junij-2022

Varnostne zahteve za električno opremo za meritve, nadzor in laboratorijsko uporabo - 031. del: Varnostne zahteve za ročne sonde za električne meritve in preskušanja

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

Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte - Teil 031: Sicherheitsbestimmungen für handgehaltenes Messzubehör zum elektrischen Messen und Prüfen

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

Ta slovenski standard je istoveten z: prEN IEC 61010-031:2022

ICS:

19.080	Električno in elektronsko preskušanje	Electrical and electronic testing
71.040.10	Kemijski laboratoriji. Laboratorijska oprema	Chemical laboratories. Laboratory equipment

oSIST prEN IEC 61010-031:2022 en,fr,de

66/757/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:	
IEC 61010-031 ED3	
DATE OF CIRCULATION:	CLOSING DATE FOR VOTING:
2022-04-01	**2022-06-24**
SUPERSEDES DOCUMENTS:	
66/734/CD, 66/753/CC	

IEC TC 66 : SAFETY OF MEASURING, CONTROL AND LABORATORY EQUIPMENT	
SECRETARIAT:	SECRETARY:
United Kingdom	Mr David Hyde
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD:
TC 78,TC 85	☐
	Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☒ SAFETY

☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING
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TITLE:

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

PROPOSED STABILITY DATE: 2025

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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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

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 future edition 3 constitutes a technical revision. It consists of the second edition (2015-05), its amendment 1 (2018-05), its corrigendum 1 (2018-08) and includes numerous changes.

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:

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

199 The committee has decided that the contents of the base publication and its amendment will
200 remain unchanged until the stability date indicated on the IEC web site under
201 "http://webstore.iec.ch" in the data related to the specific publication. At this date, the
202 publication will be

203 • reconfirmed,
204 • withdrawn,
205 • replaced by a revised edition, or
206 • amended.

207
208

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.

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CHANGES TO PREVIOUS EDITION

This future edition 3 of IEC 61010-031 includes the following significant changes, as well as numerous other minor changes, mainly editorial.

a) a.c., d.c. and r.m.s. have been replaced by AC, DC and RMS.

b) 1.1.1: there is no longer any a differentiation between high voltage and low voltage probe assemblies. Type C probe assemblies have been merged with Type B probe assemblies.

c) 1.1.1: “Kelvin” probes have been added to the scope as a new Type E and a new figure 4.

d) 1.1.1: probes for voltage measurement without electrical connection to conductors have been added to the scope as a new Type F and a new figure 5.

e) Clause 2: all normative references have been dated; new normative references have been added.

f) Clause 3: sources for terms and definitions have been updated when relevant.

g) 3.1.4: definition of PROBE TIP has been modified.

h) 3.1.6: a definition for REFERENCE CONNECTOR has been added.

i) 5.1.1 and 12.2: removable parts of PROBE TIPS which bear markings are allowed.

j) 5.1.5: the voltage marking for MEASUREMENT CATEGORIES is no more for voltage to earth, but for AC line-to-neutral or DC.

k) 6.4.2: requirements for unmated CONNECTORS have been modified as follows:

   i) Table 2 has been modified and expanded.

   ii) a calculation method for CLEARANCES of CONNECTORS above 20 kV has been defined,

   iii) CREEPAGE DISTANCES have been aligned with CLEARANCES.

l) 6.4.3.1 and 6.4.3.5: requirements for IP2X PROBE TIPS with retractable sleeve have been added.

m) 6.4.3.2: PROBE TIPS are now applicable to non-contact probe assemblies.

n) 6.5 has been reorganized (various editorial arrangements).

o) 6.5.2.3.2: values of Table 5 have been modified accordingly to Table F.2 and Table F.8 of IEC 60664-1:2020.

p) 6.6.2: voltage tests of CLEARANCES are done without humidity preconditioning.

q) Fire is no longer considered as a HAZARD for probe assemblies. Requirements for spread of fire have been deleted.

r) Clause 10 of edition 2 has been deleted and its pre-treatments for rigidity test have been moved to 8.2. Clauses 11 to 13 of edition 2 have been renumbered.

s) 11.1 of edition 2 has been deleted.

t) 12.2: an exception for Type E probe assembly has been added.

u) Annex F: Figure F.1 has been modified.

v) New informative Annex G and Annex H have been added.

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

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 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.

a) Type A: non-attenuating probe assemblies that are RATED for direct connection to voltages exceeding 30 V AC RMS, 42,4 V peak, or 60 V DC, but not exceeding 63 kV AC RMS or DC. 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: attenuating or divider probe assemblies that are RATED for direct connection to voltages exceeding 30 V AC RMS or 60 DC but not exceeding 63 kV AC RMS or DC. 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.a and Figure 2.b).

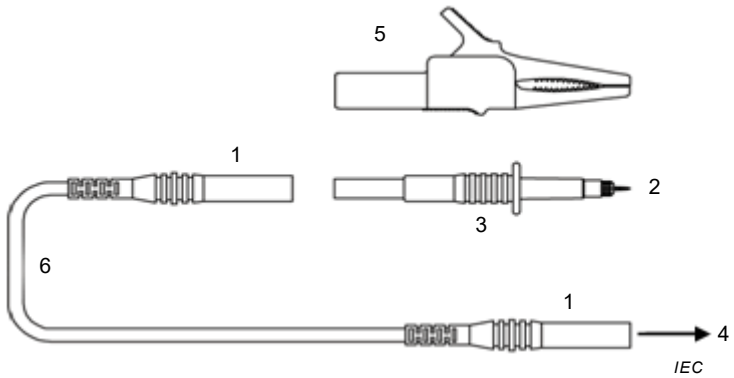
c) Type D: attenuating, non-attenuating or other signal conditioning probe assemblies, that are RATED for direct connection only to voltages not exceeding 30 V AC RMS, or 42,4 V peak, or 60 V DC, and are suitable for currents exceeding 8 A AC RMS or DC (see Figure 3).

d) Type E: non-attenuating probe assemblies for 4-pole precise resistance measurements in electrical installation (see Figure 4).

EXAMPLE: Kelvin probes.

e) Type F: probe assemblies for non-contact AC voltage test and measurement. These probe assemblies are intended for use on non-insulated conductors without electrical contact (see Figure 5).

NOTE Type F probe assemblies can be stand-alone probes or connected by a PROBE WIRE to an equipment.



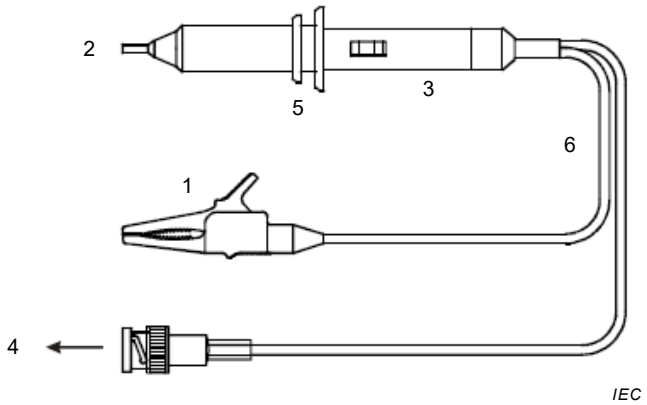
283

284 **Key**

1	CONNECTOR (typical)	4	to equipment
2	PROBE TIP	5	SPRING-LOADED CLIP
3	hand-held area of probe body	6	PROBE WIRE

285 **Figure 1 – Examples of Type A probe assemblies**

286

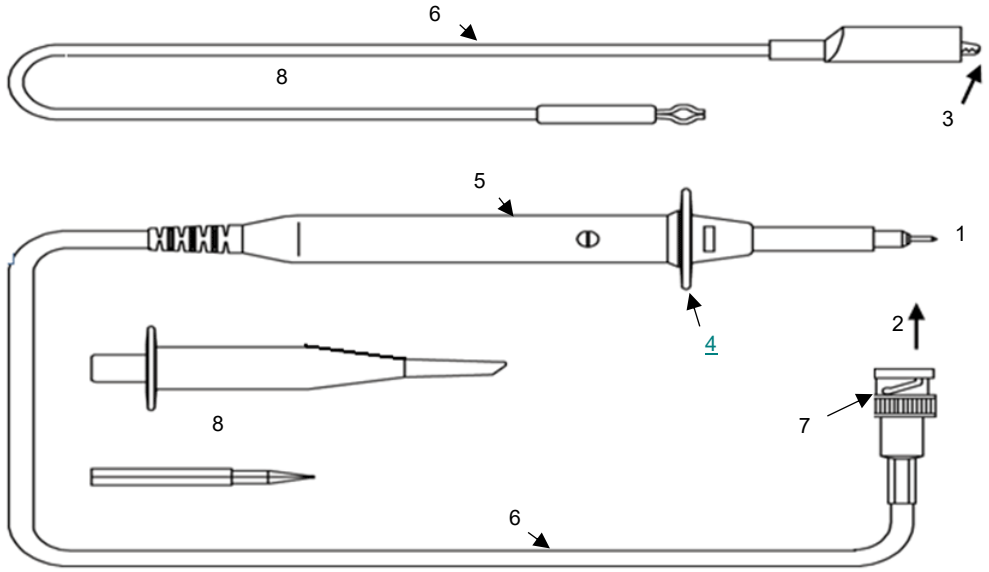


287

288 **Key**

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

289 **Figure 2.a – High-voltage Type B probe assemblies**



290

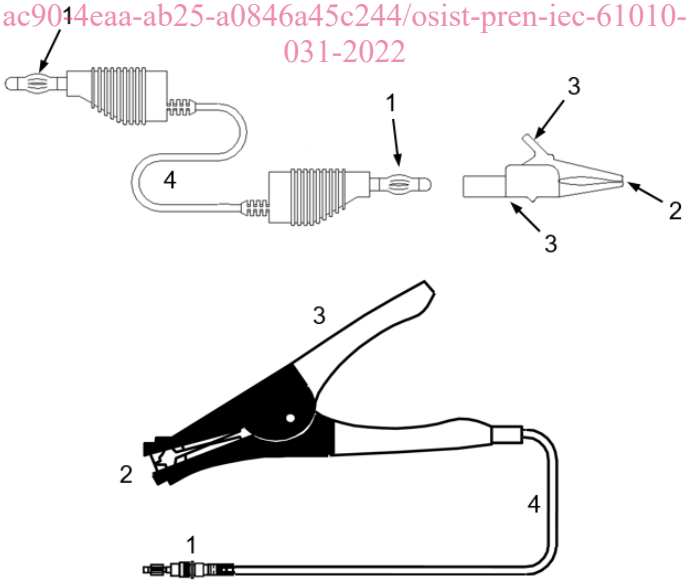
291 **Key**

1	PROBE TIP	5	hand-held area of probe body
2	to equipment	6	PROBE WIRE
3	REFERENCE CONNECTOR	7	BNC CONNECTOR
4	PROTECTIVE FINGERGUARD	8	examples of accessories

292 **Figure 2.b – Low-voltage Type B probe assemblies**

293 **Figure 2 – Example of Type B probe assemblies**

294



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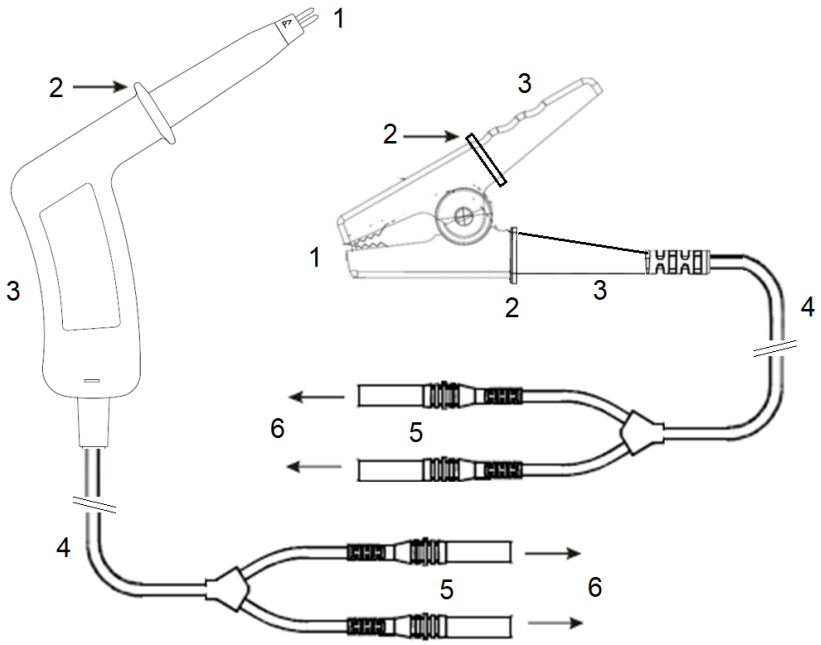
296 **Key**

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

297 **Figure 3 – Examples of Type D probe assemblies**



298

299 **Key**

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

300 **Figure 4 – Examples of Type E probe assemblies**

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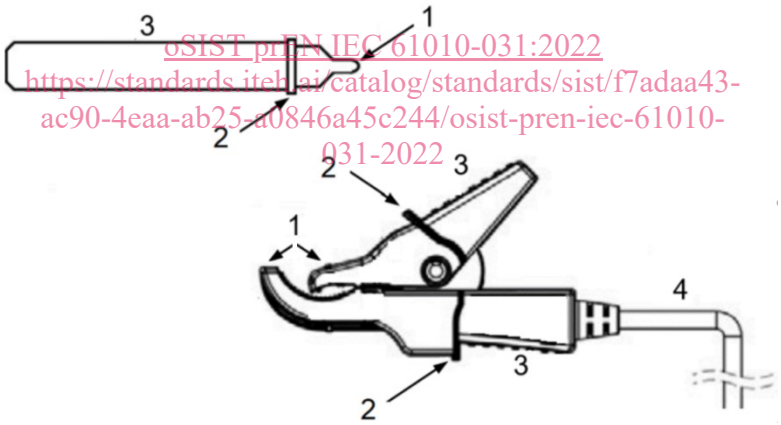

302

303 **Key**

1	PROBE TIP	3	hand-held area of probe body
2	PROTECTIVE FINGERGUARD	4	PROBE WIRE to equipment

304 **Figure 5 – Examples of Type F probe assemblies**

305 **1.1.2 Probe assemblies excluded from scope**

306 This standard does not apply to current sensors within the scope of IEC 61010-2-032:2019, but
307 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 6 to 12, as follows:

a) electric shock or burn (see Clauses 6 and 9);

b) mechanical HAZARDS (see Clauses 7 and 8);

c) excessive temperature (see Clause 9);

d) arc flash (see Clause 12).

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.

IEC 60027:1992/AMD1:1997/AMD2:2005, *Letters symbols to be used in electrical technology- Part 1: General*

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

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

IEC 60529:1989/AMD1:1999/AMD2:2013, *Degrees of protection provided by enclosures (IP Code)*

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 61010-1:2010/AMD1:2016, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements*

IEC 61010-2-032:2019, *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*

IEC GUIDE 104:2019, *The preparation of safety publications and the use of basic safety publications and group safety publications*

ISO/IEC GUIDE 51:2014*, Safety aspects – Guidelines for their inclusion in standards*

3 Terms and definitions

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

3.1 Parts and accessories

3.1.1
TERMINAL
component provided for the connection of a device (equipment) to external conductors

Note 1 to entry: TERMINALS can contain one or several contacts and the term includes sockets, pins, etc.

3.1.2
ENCLOSURE
part providing protection of a probe assembly against certain external influences and, in any direction, protection against direct contact

3.1.3
PROTECTIVE FINGERGUARD
part of the ENCLOSURE that indicates the limit of safe access and that reduces the risk of the OPERATOR touching HAZARDOUS LIVE parts