

INTERNATIONAL STANDARD



GROUP SAFETY PUBLICATION

**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**

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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
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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

1 Scope and object

1.1 Scope

1.1.1 Probe assemblies included in scope

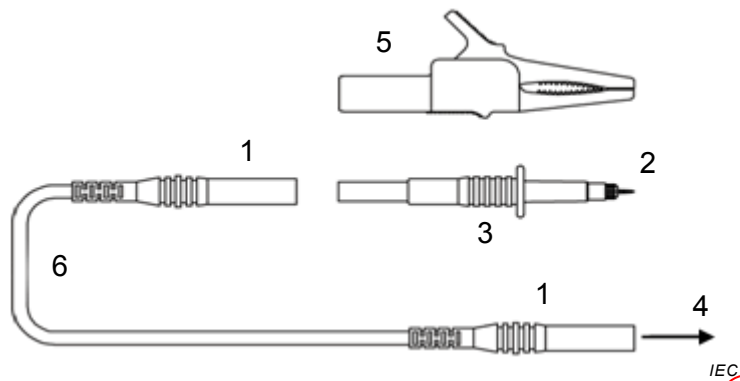
This part of IEC 61010 ~~applies to~~ specifies safety requirements for hand-held and hand-manipulated probe assemblies of the types described below, and their related accessories ~~which are intended for professional, industrial process, and educational use~~. These probe assemblies are for ~~use in the interface between an direct electrical phenomenon and connection between a part and electrical test or~~ 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 ~~33~~ 30 V r.m.s. ~~or 46,7, 42,4 V peak, or 70 60 V d.c.~~, but not exceeding 63 kV. They do not incorporate ~~active~~ components, ~~nor which are they~~ intended to provide a voltage divider function or a signal conditioning function, but they may contain ~~passive~~ 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 or~~ ~~other signal conditioning~~ probe assemblies for direct connection to voltages ~~exceeding 33 V r.m.s. or 46,7 V peak or 70 V d.c., but~~ 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).

NOTE ~~PROBE ASSEMBLIES which~~

- ~~— are not within the definitions of types A, B or C, or,~~
 - ~~— which are designed to be powered from a low-voltage mains supply, or~~
 - ~~— include other features not specifically addressed in this standard~~
- may also need to meet the relevant requirements of other parts of IEC 61010 [6]¹⁾.

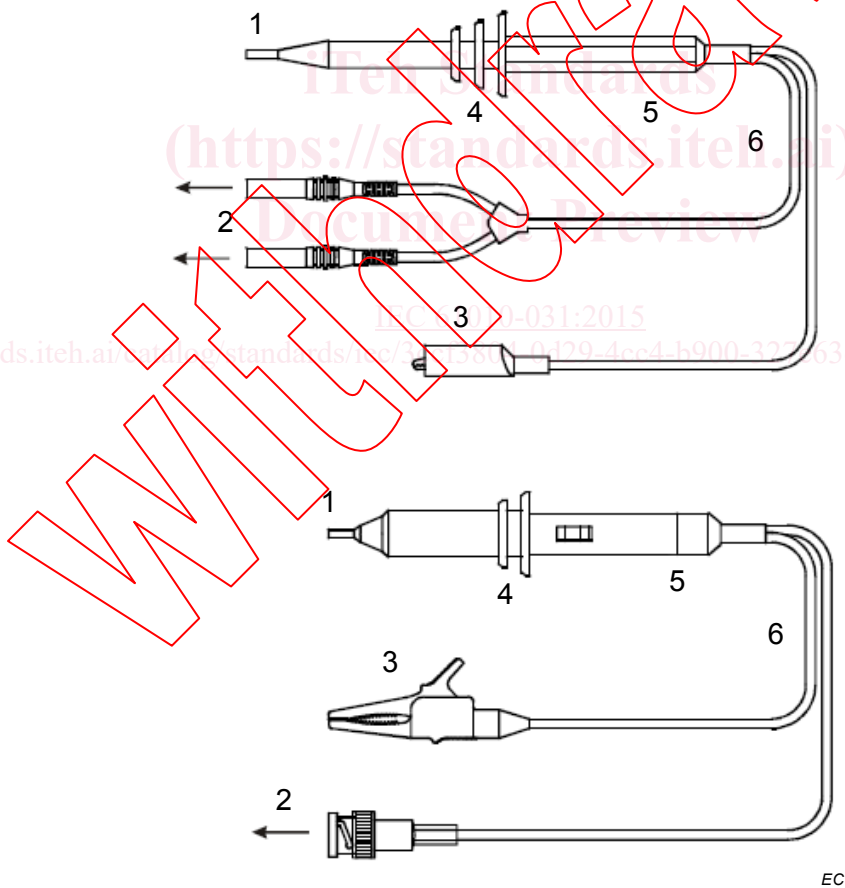
¹⁾ ~~Figures in square brackets refer to the bibliography.~~



Key

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

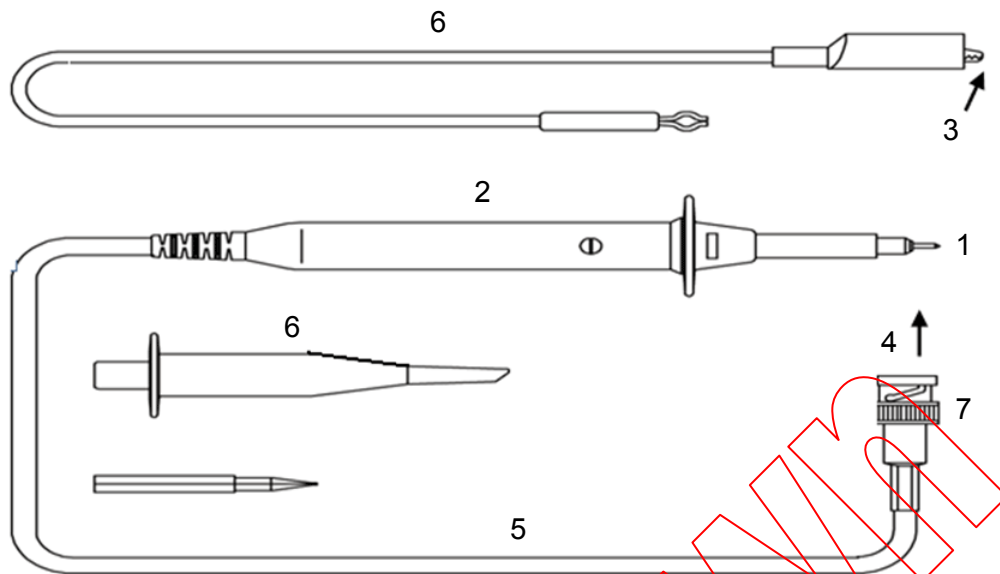
Figure 1 – Examples of type A probe assemblies



Key

- | | |
|-----------------------|----------------------------------|
| 1 PROBE TIP | 4 BARRIER 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

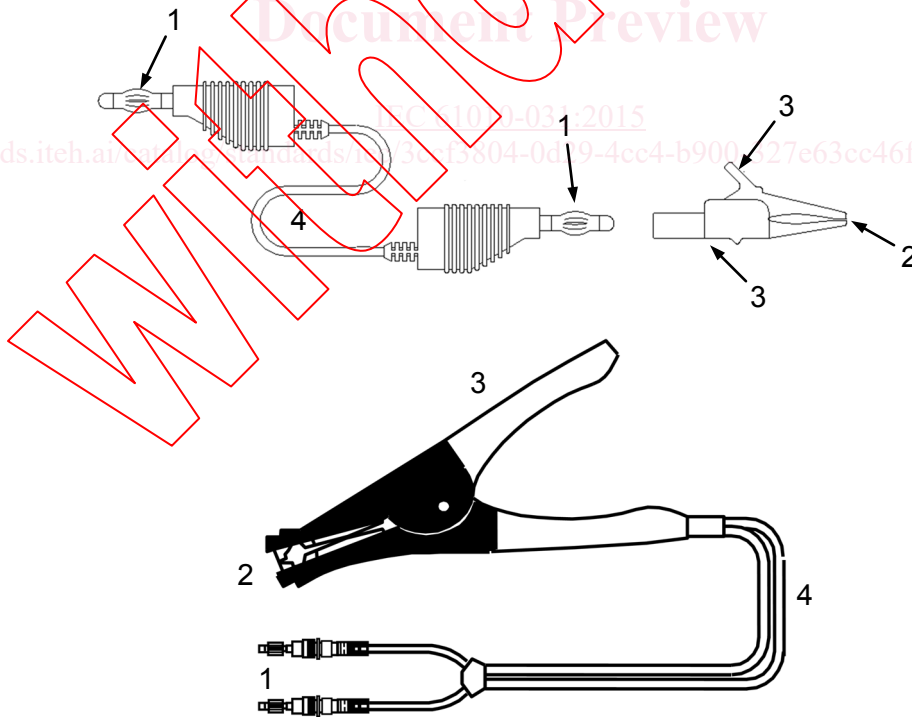


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Key

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

Figure 3 – Examples of type C probe assemblies



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Key

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

Figure 4 – Examples of type D probe assemblies