

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**

ICS 19.080; 11.080.10; 71.040.20

National foreword

This British Standard is the UK implementation of EN 61010-031:2002+A1:2008. It is identical with IEC 61010-031:2002. It supersedes BS EN 61010-031:2002 which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to IEC text carry the number of the IEC amendment. For example, text altered by IEC amendment 1 is indicated by A1 A1.

The UK participation in its preparation was entrusted to Technical Committee EPL/66, Safety of measuring, control and laboratory equipment.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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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**
(IEC 61010-031:2002)

Règles de sécurité pour appareils
électriques de mesure,
de régulation et de laboratoire
Partie 031: Prescriptions de sécurité
pour sondes équipées tenues à la main
pour mesure et essais électriques
(CEI 61010-031:2002)

Sicherheitsbestimmungen für elektrische
Mess-, Steuer-, Regel- und Laborgeräte
Teil 031: Sicherheitsbestimmungen
für handgehaltenes Messzubehör
zum Messen und Prüfen
(IEC 61010-031:2002)

This European Standard was approved by CENELEC on 2002-02-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 66/262/FDIS, future edition 1 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 was approved by CENELEC as EN 61010-031 on 2002-02-01.

This European Standard supersedes EN 61010-2-031:1994.

The following dates were fixed:

- | | | |
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| – latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement | (dop) | 2002-11-01 |
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In this standard, the following print types are used:

- requirements and definitions: in roman type;
- NOTES: in smaller roman type;
- *conformity and tests: in italic type;*
- TERMS USED THROUGHOUT THIS STANDARD WHICH HAVE BEEN DEFINED IN CLAUSE 3: IN SMALL ROMAN CAPITALS.

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annexes A, B, C and ZA are normative and annex D is informative.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61010-031:2002 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 60065:1998 (modified).
IEC 60270	NOTE Harmonized as EN 60270:2001 (not modified).
IEC 60664-1	NOTE Harmonized as HD 625.1 S1:1996 (modified).
IEC 61032	NOTE Harmonized as EN 61032:1998 (not modified).
IEC 61010 (Series)	NOTE Harmonized as EN 61010 (Series) (modified).

Foreword to amendment 1

The text of document 66/383/CDV, future amendment 1 to IEC 61010-031:2002, prepared by IEC TC 66, Safety of measuring, control, and laboratory equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A1 to EN 61010-031:2002 on 2008-03-01.

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- | | | |
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Endorsement notice

The text of amendment 1:2008 to the International Standard IEC 61010-031:2002 was approved by CENELEC as an amendment to the European Standard without any modification.

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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

This part of IEC 61010 applies to hand-held and hand-manipulated PROBE ASSEMBLIES of the types described below, and related accessories which are intended for professional, industrial process, and educational use. These PROBE ASSEMBLIES are for use in the interface between an electrical phenomenon and test or measurement equipment. They may be fixed to the equipment or be detachable accessories for the equipment.

- a) Low-voltage and high-voltage, non-attenuating PROBE ASSEMBLIES (type A). Non-attenuating PROBE ASSEMBLIES that are RATED for direct connection to voltages exceeding 33 V r.m.s. or 46,7 V peak or 70 V d.c., but not exceeding 63 kV. They do not incorporate active components, nor 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.
- b) High-voltage attenuating or divider PROBE ASSEMBLIES (type B). Attenuating or divider PROBE ASSEMBLIES that are RATED for direct connection to secondary voltages exceeding 1 kV but not exceeding 63 kV. 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.
- c) Low-voltage attenuating or divider PROBE ASSEMBLIES (type C). Attenuating, 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.
-  d) Low-voltage attenuating and non-attenuating PROBE ASSEMBLIES (type D), that are RATED for direct connection only to voltages not exceeding 33 V r.m.s., or 46,7 V peak, or 70 V d.c., and are suitable for currents exceeding 8 A.

NOTE PROBE ASSEMBLIES which

- are not within the definitions of types A, B, C, or D, 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⁾.

1.2 Object

1.2.1 Aspects included in scope

The object of this standard is to ensure that the design and methods of construction used provide adequate protection for the OPERATOR and the surrounding area against:

- a) electric shock or burn (see clauses 6, 10 and 11);
- b) mechanical HAZARDS (see clauses 7, 8 and 11);

¹⁾ Figures in square brackets refer to the bibliography.

- c) excessive temperature (see clause 9);
- d) spread of fire from the PROBE ASSEMBLY (see clause 9);

A1 e) arc flash (see Clause 13). A1

NOTE Attention is drawn to the existence of additional requirements which may be specified by national authorities responsible for 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;
- c) servicing (repair);
- d) protection of servicing (repair) personnel.

NOTE Servicing personnel are expected to be reasonably careful in dealing with obvious HAZARDS, but the design should protect against mishap in an appropriate manner, and the service documentation should point out any residual HAZARDS.

1.3 Verification

This standard also specifies methods of verifying, through inspection and TYPE TESTING, that the PROBE ASSEMBLY meets the requirements of this standard.

1.4 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, or above 2 000 m if specified by the manufacturer;
- b) temperature 5 °C to 40 °C; or below 5 °C or above 40 °C if specified by the manufacturer;
- c) maximum relative humidity 80 % for temperatures up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C;
- d) applicable RATED POLLUTION degree.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61010. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 61010 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60027 (all parts), *Letter symbols to be used in electrical technology*

IEC 60060 (all parts), *High-voltage test techniques*

IEC 60417 (all parts), *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 coatings to achieve insulation coordination of printed board assemblies*

ISO 7000, *Graphical symbols for use on equipment – Index and synopsis*

3 Definitions

For the purpose of this part of IEC 61010, the following definitions apply.

Unless otherwise specified, the terms "voltage" and "current" mean the r.m.s. values of an alternating, direct or composite voltage or current. Where the term "mains" is used, it refers to the low-voltage electricity supply system (above the values of 6.3.2.1).

3.1 Parts and accessories

3.1.1

TERMINAL

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

[IEV 151-01-03, modified]

NOTE TERMINALS can contain one or several contacts and the term includes sockets, pins, connectors, etc.

3.1.2

ENCLOSURE

part providing protection of equipment against certain external influences and, in any direction, protection against direct contact

3.1.3

BARRIER

part providing protection against direct contact from any usual direction of access

NOTE ENCLOSURES and BARRIERS may provide protection against the spread of fire (see 9.1).

3.1.4

PROBE ASSEMBLY

device for making temporary contact between test or measurement equipment and a point on an electrical circuit being measured or tested. It includes the cable and the means for making a connection with the test or measurement equipment

NOTE See figures 1 , 2 and 10  for examples of PROBE ASSEMBLIES and an explanation of the function of their parts.

3.1.5

PROBE TIP

part of the PROBE ASSEMBLY which makes the connection to the point being measured or tested

3.1.6

REFERENCE CONNECTOR

device used to connect a reference point in the test or measurement equipment (usually the functional earth TERMINAL) to a reference point on the electrical circuit being measured or tested

3.1.7

TOOL

external device, including a key or coin, used to aid a person to perform a mechanical function

3.2 Electrical quantities

3.2.1

RATED (value)

quantity value assigned, generally by a manufacturer, for a specified operating condition of a component, device or equipment

[IEV 151-04-03]

3.2.2

RATING

set of RATED values and operating conditions

[IEV 151-04-04]

3.2.3

WORKING VOLTAGE

highest voltage which can continuously appear across an insulation during NORMAL USE

NOTE Both open-circuit conditions and normal operating conditions are taken into account.

3.3 Tests

3.3.1

TYPE TEST

test of one or more samples of equipment (or parts of equipment) made to a particular design, to show that the design and construction meet one or more requirements of this standard

NOTE This is an amplification of the IEC 151-04-15 definition to cover both design and construction requirements.

3.4 Safety terms

3.4.1

ACCESSIBLE (of a part)

able to be touched with a standard test finger or test pin, when used as specified in 6.2

3.4.2

HAZARDOUS LIVE

capable of rendering an electric shock or electric burn in NORMAL CONDITION or SINGLE FAULT CONDITION (see 6.3.1 for values applicable to NORMAL CONDITION and 6.3.2 for the higher values deemed to be appropriate in SINGLE FAULT CONDITION)

3.4.3

HIGH INTEGRITY

not liable to become defective in such a manner as to cause a risk of HAZARD; a HIGH INTEGRITY part is considered as not subject to failure when tests under fault conditions are made

3.4.4

PROTECTIVE IMPEDANCE

component, assembly of components or the combination of BASIC INSULATION and a current or voltage limiting device, the impedance, construction and reliability of which are such that when connected between parts which are HAZARDOUS LIVE and ACCESSIBLE conductive parts, it provides protection to the extent required by this standard in NORMAL CONDITION and SINGLE FAULT CONDITION

3.4.5

NORMAL USE

operation, including stand-by, according to the instructions for use or for the obvious intended purpose

NOTE In most cases, NORMAL USE also implies NORMAL CONDITION, because the instructions for use will warn against using the equipment when it is not in NORMAL CONDITION.

3.4.6

NORMAL CONDITION

condition in which all means for protection against HAZARDS are intact

3.4.7

SINGLE FAULT CONDITION

condition in which one means for protection against HAZARD is defective or one fault is present which could cause a HAZARD

NOTE If a SINGLE FAULT CONDITION results unavoidably in another SINGLE FAULT CONDITION, the two failures are considered as one SINGLE FAULT CONDITION.

3.4.8

OPERATOR

person operating equipment for its intended purpose

NOTE The OPERATOR should have received training appropriate for this purpose.

3.4.9

RESPONSIBLE BODY

individual or group responsible for the use and maintenance of equipment, and for ensuring that OPERATORS are adequately trained

3.4.10

WET LOCATION

Location where water or another conductive liquid may be present and is likely to cause reduced human body impedance due to wetting of the contact between the human body and the equipment, or wetting of the contact between the human body and the environment

3.4.11

HAZARD

potential source of harm (see 1.2)

3.5 Insulation

3.5.1

BASIC INSULATION

insulation, the failure of which could cause a risk of electric shock

NOTE BASIC INSULATION may serve also for functional purposes.

3.5.2

SUPPLEMENTARY INSULATION

independent insulation applied in addition to BASIC INSULATION in order to provide protection against electric shock in the event of a failure of BASIC INSULATION

3.5.3

DOUBLE INSULATION

insulation comprising both BASIC INSULATION and SUPPLEMENTARY INSULATION

3.5.4

REINFORCED INSULATION

insulation which provides protection against electric shock not less than that provided by DOUBLE INSULATION

NOTE REINFORCED INSULATION may comprise several layers which cannot be tested singly as SUPPLEMENTARY INSULATION or BASIC INSULATION.

3.5.5

POLLUTION

any addition of foreign matter, solid, liquid or gaseous (ionized gases), that may produce a reduction of dielectric strength or surface resistivity

3.5.6

A1 POLLUTION DEGREE

a numeral indicating the level of POLLUTION that may be present in the environment

3.5.6.1

POLLUTION DEGREE 1

no POLLUTION or only dry, non-conductive POLLUTION

NOTE The POLLUTION has no influence.

3.5.6.2

POLLUTION DEGREE 2

only non-conductive POLLUTION. Occasionally, however, a temporary conductivity caused by condensation must be expected

3.5.6.3

POLLUTION DEGREE 3 A1

conductive POLLUTION occurs or dry non-conductive POLLUTION occurs which becomes conductive due to condensation which is to be expected

3.5.7

CLEARANCE

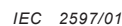
shortest distance in air between two conductive parts

3.5.8

CREEPAGE DISTANCE

shortest distance along the surface of the insulating material between two conductive parts

[IEV 151-03-37]



1	Typical connectors	5	Crocodile clip
2	PROBE TIP	6	Reference connector
3	Probe body	7	BNC connector
4	To equipment	8	Examples of accessories

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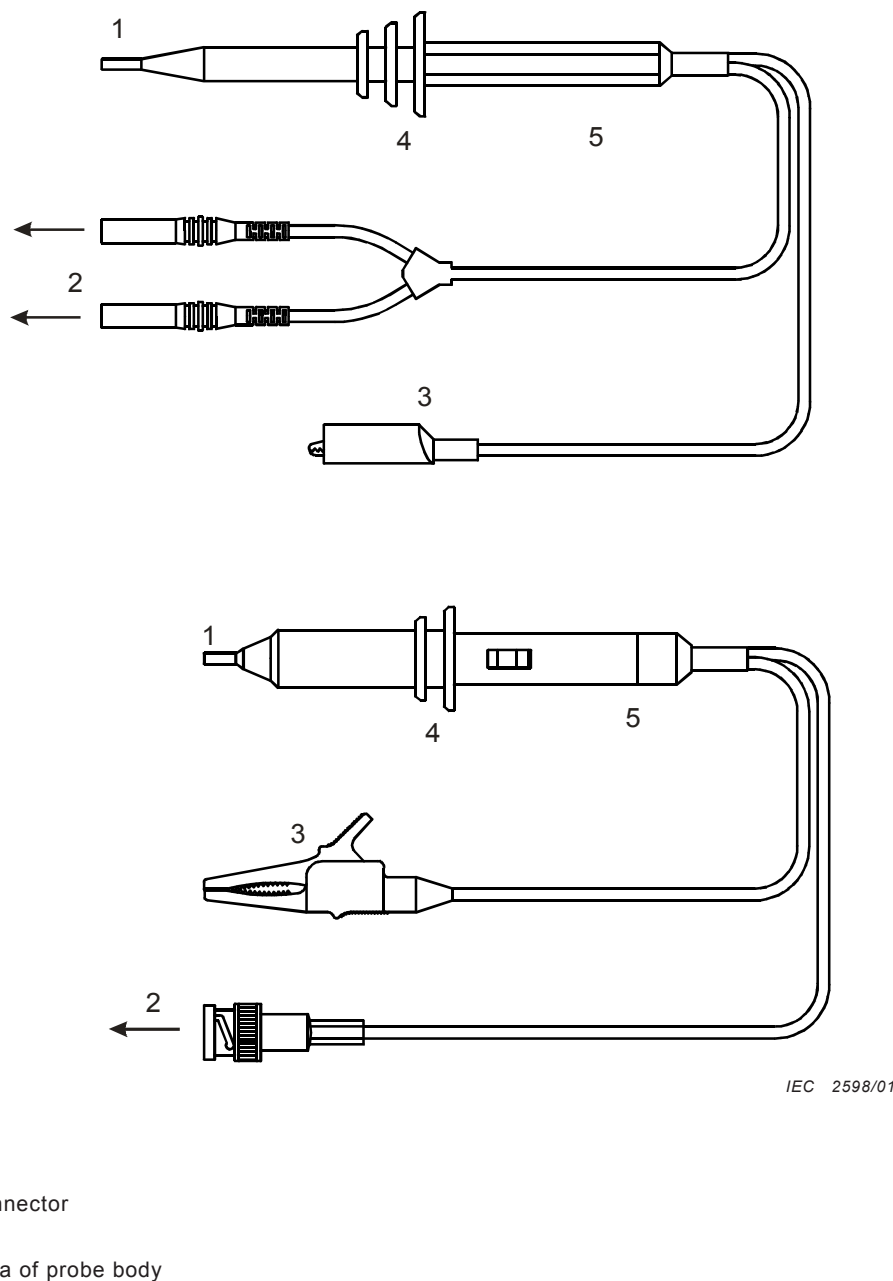
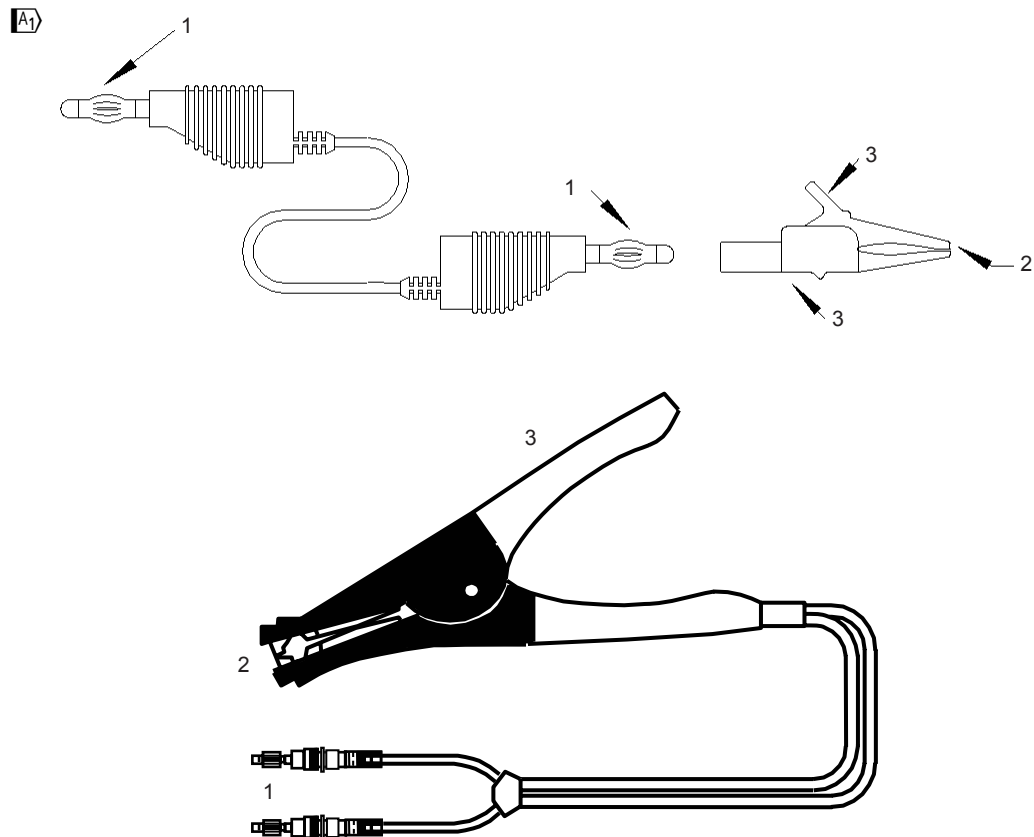


Figure 2 – Examples of type B PROBE ASSEMBLIES



IEC 076/08

Key

- 1 connector
- 2 jaw
- 3 hand-held area of crocodile clip or clamp

Figure 10 – Examples of type D PROBE ASSEMBLIES 

4 Tests

4.1 General

Tests in this standard are TYPE TESTS to be carried out on samples of PROBE ASSEMBLIES or their parts. Their only purpose is to check that the design and construction ensure conformity with this standard.

Tests on components or parts of the PROBE ASSEMBLY meeting the requirements of the relevant standards need not be repeated during TYPE TESTS of the whole PROBE ASSEMBLY.

If a PROBE ASSEMBLY is of more than one probe type (see 1.1), each type shall be tested according to its applicable requirements.

Conformity with the requirements of this standard is checked by carrying out all applicable tests, except that a test may be omitted if examination of the PROBE ASSEMBLY demonstrates conclusively that it would pass the test. Tests are carried out under

a) *reference test conditions (see 4.3);*

b) *SINGLE FAULT CONDITIONS (see 4.4).*

NOTE 1 If the RATED range of environmental conditions for PROBE ASSEMBLIES is wider than that stated in 1.4, the manufacturer should make sure (for example, by suitable alteration of test requirements or additional tests) that the safety requirements of this standard are still fulfilled.

NOTE 2 If when carrying out a conformity test, there is any uncertainty about the exact value of the applied or measured quantity (for example, voltage) due to the tolerance,

- the manufacturer should ensure that at least the specified test value is applied;
- the test house should ensure that no more than the specified test value is applied.

NOTE 3 PROBE ASSEMBLIES which have been TYPE TESTED may no longer be suitable for their intended function because of the residual effect of stresses resulting from tests. For this reason TYPE TESTS should never be carried out (for example, by the RESPONSIBLE BODY) after the PROBE ASSEMBLIES have left the manufacturer.

4.2 Sequence of tests

The sequence of tests is optional unless otherwise specified in the standard. The PROBE ASSEMBLIES under test shall be carefully inspected after each test. If the result of a test causes doubt whether any earlier tests would have been passed if the sequence had been reversed, these earlier tests shall be repeated. Tests under fault conditions may be destructive and may follow those under reference test conditions.

4.3 Reference test conditions

4.3.1 Environmental conditions

Unless otherwise specified in this standard, the following environmental conditions (but not conflicting with those of 1.4) shall exist in the test location:

- a) a temperature of 15 °C to 35 °C;
- b) a relative humidity of not more than 75 %;
- c) an air pressure of 75 kPa to 106 kPa;
- d) no hoarfrost, dew, percolating water, rain, solar irradiation, etc.

4.3.2 State of PROBE ASSEMBLIES

Unless otherwise specified, tests shall be carried out on the PROBE ASSEMBLIES assembled for NORMAL USE and under the least favourable combination of the conditions given in 4.3.3 to 4.3.9.

When dimensions or mass make it unsuitable to carry out particular tests on a complete PROBE ASSEMBLY, tests on sub-assemblies are allowed, provided it is verified that the assembled PROBE ASSEMBLY will be in accordance with this standard.

4.3.3 Position of the PROBE ASSEMBLY

The PROBE ASSEMBLY shall be in any position of NORMAL USE and with any ventilation unimpeded

4.3.4 Accessories

Accessories and OPERATOR interchangeable parts available from, or recommended by, the manufacturer for use with the PROBE ASSEMBLY under test shall be either connected or not connected.

4.3.5 Covers and removable parts

Covers or parts which can be removed without using a TOOL shall be removed or not removed.

4.3.6 Input and output voltages

Input and output voltages, including floating voltages shall be set to any voltage within the RATED voltage range.

4.3.7 Controls

Controls which the OPERATOR can adjust by hand shall be set to any position except for combinations of settings prohibited by the manufacturer, as shown by marking on the PROBE ASSEMBLY.

4.3.8 Connections

The PROBE ASSEMBLY shall be connected for its intended purpose, or not connected.

4.3.9 Duty cycle

PROBE ASSEMBLIES for short-term or intermittent operation shall be operated for the longest period and have the shortest recovery period consistent with the manufacturer's instructions.

4.4 Testing in SINGLE FAULT CONDITION

4.4.1 General

The following requirements apply.

- a) Examination of the PROBE ASSEMBLY and its circuit diagram will generally show the fault conditions which are liable to result in HAZARDS within the meaning of this standard and which, therefore, shall be applied.
- b) Fault tests shall be made unless it can be demonstrated that no HAZARD could arise from a particular fault condition.
- c) The PROBE ASSEMBLY shall be operated under the least favourable combination of reference test conditions (see 4.3). These combinations may be different for different faults and they should be recorded for each test.

4.4.2 Application of fault conditions

Fault conditions shall include those specified in 4.4.2.1 to 4.4.2.4. They shall be applied only one at a time and shall be applied in turn in the most convenient order. Multiple simultaneous faults shall not be applied unless they are a consequence of an applied fault.

After each application of a fault condition, the PROBE ASSEMBLY or part shall pass the applicable tests of 4.4.4.

4.4.2.1 PROBE ASSEMBLIES or parts for short-term or intermittent operation

These shall be operated continuously if continuous operation could occur in a SINGLE FAULT CONDITION.

4.4.2.2 Outputs

Outputs of type B and C PROBE ASSEMBLIES shall be short-circuited one at a time.

4.4.2.3 Insulation between circuits and parts

Insulation between circuits and parts which is below the level specified for BASIC INSULATION shall be bridged to check against the spread of fire.

NOTE See 9.1 for an alternative method of checking protection against spread of fire.

4.4.2.4 Components

Components (except HIGH INTEGRITY components) of type B and type C PROBE ASSEMBLIES shall be short-circuited or open-circuited, whichever is less favourable.

4.4.3 Duration of tests

The PROBE ASSEMBLY shall be operated until further change as a result of the applied fault is unlikely. Each test is normally limited to 1 h since any secondary fault arising from a SINGLE FAULT CONDITION will usually manifest itself within that time. ^{A1} If the minimum operating current of the fuse is not reached in the test, the PROBE ASSEMBLY shall be operated for a period corresponding to the maximum fusing time or continuously for 1 h or 4 h, as specified above. ^{A1}

If a fault is terminated by the opening of a fuse and if the fuse does not operate within approximately 1 s, the current through the fuse under the relevant fault condition shall be measured. Evaluation with the pre-arcing time/current characteristics shall be made to find out whether the minimum operating current of the fuse is reached or exceeded and what is the maximum time before the fuse operates. The current through the fuse may vary as a function of time. If the minimum operating current of the fuse is not reached in the test, the equipment shall be operated for a period corresponding to the maximum fusing time or continuously for the duration specified in 4.4.3.1.

4.4.4 Conformity after application of SINGLE FAULT CONDITIONS

4.4.4.1 *Conformity with requirements for electric shock protection is checked after the application of SINGLE FAULTS as follows:*

- a) *by making the measurements of 6.3.2 to check that no ACCESSIBLE conductive parts have become HAZARDOUS LIVE, except as permitted by 6.1.1;*
- b) *by performing a voltage test on DOUBLE INSULATION or REINFORCED INSULATION to check that there is still one level of protection by insulation. The voltage test is made as specified in 6.6 (without humidity preconditioning) with the test voltage for BASIC INSULATION.*

4.4.4.2 *Conformity with requirements for temperature protection is checked by determining the temperature of the outer surface of the PROBE ASSEMBLY.*

The temperature of the outer surface shall not exceed 105 °C at maximum RATED ambient temperature.

This temperature is determined by measuring the temperature rise of the surface or part and adding it to the maximum RATED ambient temperature.

4.4.4.3 *Conformity with requirements for protection against the spread of fire is checked by placing the PROBE ASSEMBLY on white tissue-paper covering a softwood surface and covering the PROBE ASSEMBLY with cheesecloth. No molten metal, burning insulation, flaming particles, etc. shall fall on the surface on which the PROBE ASSEMBLY stands and there shall be no charring, glowing, or flaming of the tissue paper or cheesecloth. Melting of insulation material shall be ignored if the molten material could not contribute to starting a fire, and if it would be obvious to the operator that the PROBE ASSEMBLY needs to be de-energized and allowed to cool before it is touched.*

4.4.4.4 *Conformity with the requirements for protection against other HAZARDS is checked as specified in clauses 7 to 11.*

5 Marking and documentation

5.1 Marking

5.1.1 General

PROBE ASSEMBLIES shall bear markings in accordance with 5.1.2 to 5.2. Markings applying to a PROBE ASSEMBLY as a whole shall not be put on parts which can be removed by an OPERATOR without the use of a TOOL.

Letter symbols for quantities and units shall be in accordance with IEC 60027. Graphic symbols shall be in accordance with table 1, but there are no requirements for size or colour. If there is no applicable symbol in table 1, any other graphic symbol may be used on a PROBE ASSEMBLY provided the symbol is explained in the accompanying documentation (see 5.4.1).

If it is not possible to put all of the required markings on the part, symbol 10 of table 1 may be used, and the necessary information shall be included in the documentation.

Conformity is checked by inspection.

5.1.2 Identification

Each PROBE ASSEMBLY and separable mating part of a PROBE ASSEMBLY shall, as a minimum, be identified by marking showing

- a) the name or registered trade mark of the manufacturer or supplier;
- b) in addition for types B and C only, the model number or name or other means of identifying the PROBE ASSEMBLY or part.

If a PROBE ASSEMBLY is designed for use only with a specific model of equipment, this shall be made clear, and the specific equipment or model shall be identified, either by marking on the PROBE ASSEMBLY or in the accompanying documentation.

Conformity is checked by inspection.

Table 1 – Symbols

Number	Symbol	Reference	Description
1		IEC 60417-5031	Direct current
2		IEC 60417-5032	Alternating current
3		IEC 60417-5033	Both direct and alternating current
4			Three-phase alternating current
5		IEC 60417-5017	Earth (ground) TERMINAL
6		IEC 60417-5021	Equipotentiality
 7			Not used 
8			Caution, risk of electric shock
9		IEC 60417-5041	Caution, hot surface
10		ISO 7000-0434	Caution, risk of danger (see note 1)
NOTE 1 See 5.4.1 which requires manufacturers to state that documentation must be consulted in all cases where this symbol is marked.			
NOTE 2 There are no requirements for sizes or colours (see 5.1.1).			

5.1.3 Fuses

PROBE ASSEMBLIES which contain fuses intended to be replaced by an OPERATOR shall be marked with all the details necessary for the OPERATOR to obtain the correct fuse. These shall include the voltage RATING and the breaking capacity (the maximum current that the fuse can safely interrupt at maximum RATED voltage). If the OPERATOR has to select a fuse according to the particular application, symbol 10 of table 1 shall be marked on the probe and the necessary information included in the documentation.

Conformity is checked by inspection.