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Elektrisk utrustning för mätning, styrning och för laboratorieändamål – Säkerhet –

Del 1: Allmänna fordringar

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

Som svensk standard gäller europastandarden EN 61010-1:2001. Den svenska standarden innehåller den officiella engelska språkversionen av EN 61010-1:2001.

Nationellt förord

Europastandarden EN 61010-1:2001

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 61010-1, Second edition, 2001 - Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements**

utarbetad inom International Electrotechnical Commission, IEC.

SS-EN 61010-1, utgåva 1, 1993, fortsätter att gälla tillsammans med de svenska standarder för elektrisk utrustning för mätning, styrning och laboratorieändamål som utgör Del 2 till denna standard och som hänvisar till denna.

ICS 19.080; 71.040.10

Denna standard är fastställd av Svenska Elektriska Kommissionen, SEK, som också kan lämna upplysningar om **sakinnehållet** i standarden.
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EUROPEAN STANDARD

EN 61010-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2001

ICS 19.080; 71.040.10

Supersedes EN 61010-1:1993 + A2:1995

English version

**Safety requirements for electrical equipment for measurement,
control, and laboratory use
Part 1: General requirements
(IEC 61010-1:2001)**

Règles de sécurité pour appareils
électriques de mesure, de régulation
et de laboratoire
Partie 1: Prescriptions générales
(CEI 61010-1:2001)

Sicherheitsbestimmungen für elektrische
Meß-, Steuer-, Regel- und Laborgeräte
Teil 1: Allgemeine Anforderungen
(IEC 61010-1:2001)

This European Standard was approved by CENELEC on 2001-01-01. 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, 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 66/233/FDIS, future edition 2 of IEC 61010-1, 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 61010-1 on 2001-01-01.

This European Standard supersedes EN 61010-1:1993 and its amendment A2:1995.

The following dates were fixed:

- latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2001-11-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) -

Annexes designated "normative" are part of the body of the standard. In this standard, annexes A to H and ZA are normative. Annex ZA has been added by CENELEC.

In this standard, the following print types are used:

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

Endorsement notice

The text of the International Standard IEC 61010-1:2001 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60027	Series	Letter symbols to be used in electrical technology	HD 245	Series
IEC 60060	Series	High-voltage test techniques	HD 588.1 S1 EN 60060-2	1991 1994
IEC 60065 (mod)	¹⁾	Audio, video and similar electronic apparatus - Safety requirements	EN 60065	1998 ²⁾
IEC 60085	¹⁾	Thermal evaluation and classification of electrical insulation	HD 566 S1	1990 ²⁾
IEC 60227	Series	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V	- ³⁾	-
IEC 60245	Series	Rubber insulated cables of rated voltages up to and including 450/750 V	- ⁴⁾	-
IEC 60309	Series	Plugs, socket-outlets and couplers for industrial purposes	EN 60309	Series
IEC 60335 (mod)	Series	Safety of household and similar electrical appliances	EN 60335	Series
IEC 60529	¹⁾	Degrees of protection provided by enclosures (IP Code)	EN 60529	1991 ²⁾
IEC 606051	¹⁾	Sound level meters	EN 60651	1994 ²⁾

¹⁾ undated reference.

²⁾ valid edition at date of issue.

³⁾ The HD 21 series is related to but not equivalent to the IEC 60227 series.

⁴⁾ The HD 22 series is related to but not equivalent to the IEC 60245 series.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60664-3	1)	Insulation coordination for equipment within low-voltage systems Part 3: Use of coatings to achieve insulation coordination of printed board assemblies	HD 625.3 S1	1997 ²⁾
IEC 60707	1)	Flammability of solid non-metallic materials when exposed to flame sources - List of test methods	EN 60707	1999 ²⁾
IEC 60799	1)	Electrical accessories - Cord sets and interconnection cord sets	EN 60799	1998 ²⁾
IEC 60804	1)	Integrating-averaging sound level meters	EN 60804	2000 ²⁾
IEC 60825-1	1)	Safety of laser products Part 1: Equipment classification, requirements and user's guide	EN 60825-1	1994 ²⁾
IEC 60947-1 (mod)	1)	Low-voltage switchgear and controlgear Part 1: General rules	EN 60947-1	1999 ²⁾
IEC 60947-3	1)	Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units	EN 60947-3	1999 ²⁾
ISO 306	1)	Plastics - Thermoplastic materials - Determination of Vicat softening temperature (VST)	EN ISO 306	1996 ²⁾
ISO 3746	1)	Acoustics - Determination of sound power levels of noise sources using sound pressure - Survey method using an enveloping measurement surface over a reflecting plane	EN ISO 3746	1995 ²⁾
ISO 4126-1	1)	Safety valves - Part 1: General requirements	-	-
ISO 9614-1	1)	Acoustics - Determination of sound power levels of noise sources using sound intensity - Part 1: Measurement at discrete points	EN ISO 9614-1	1995 ²⁾

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR
MEASUREMENT, CONTROL, AND LABORATORY USE –****Part 1: General requirements**

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61010-1 has been prepared by IEC technical committee 66: Safety of measuring, control and laboratory equipment.

It has the status of a group safety publication, as specified in IEC Guide 104.

This second edition cancels and replaces the first edition published in 1990, amendment 1 (1992) and amendment 2 (1995). It constitutes a technical revision.

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

FDIS	Report on voting
66/233/FDIS	66/244/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 3.

Annexes A to H form an integral part of this standard.

In this standard, the following print types are used:

- requirements and definitions: in roman type;
- NOTES: in smaller roman type;
- *conformity: 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 2002. At this date, the publication will be

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

INTRODUCTION

This part 1 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.

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 part of IEC 61010 specifies general safety requirements for electrical equipment intended for professional, industrial process, and educational use, any of which may incorporate computing devices, as defined in a) to d) below, when used under the environmental conditions of 1.4.

a) Electrical test and measurement equipment

This is equipment which by electrical means tests, measures, indicates or records one or more electrical or non-electrical quantities, also non-measuring equipment such as signal generators, measurement standards, power supplies, transducers, transmitters, etc.

NOTE All indicating and recording electrical measuring instruments (except those excluded in 1.1.2) fall within the scope of IEC 61010 unless they are panel meters designed only for building-in to other equipment. Built-in panel meters are considered to be components and only need to meet the relevant requirements of IEC 61010, or other standards, as part of the equipment into which they are built.

b) Electrical control equipment

This is equipment which controls one or more output quantities to specific values, with each value determined by manual setting, by local or remote programming, or by one or more input variables.

c) Electrical laboratory equipment

This is equipment which measures, indicates, monitors or analyses substances, or is used to prepare materials, and includes in vitro diagnostic (IVD) equipment

This equipment may also be used in areas other than laboratories, for example self-test IVD equipment may be used in the home.

d) Accessories intended for use with the above (for example, sample handling equipment).

1.1.2 Equipment excluded from scope

This standard does not apply to equipment within the scope of

- a) IEC 60065 (Safety requirements for audio, video and similar electronic apparatus);
- b) IEC 60204 (Controls for electrical machines);
- c) IEC 60335 (Safety of household and similar electrical appliances);
- d) IEC 60364 (Electrical installations of buildings);
- e) IEC 60439-1 (Low-voltage switchgear and controlgear assemblies);
- f) IEC 60521 (Class 0,5; 1 and 2 alternating current watt-hour meters);
- g) IEC 60601 (Medical electrical equipment);

- h) IEC 60950 (Safety of information technology equipment including electrical business equipment, except as specified in 1.1.3);
- i) IEC 61558 (Power transformers, power supply units and similar).

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. If HAZARDS from moisture or liquids could affect equipment that conforms to IEC 60950 and is used with equipment which conforms to this standard, the instructions for use should specify any additional precautions required.

1.2 Object

1.2.1 Aspects included in scope

The purpose of the requirements of this part 1 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 clause 6);
- b) mechanical HAZARDS (see clauses 7 and 8);
- c) excessive temperature (see clauses 9 and 10);
- d) spread of fire from the equipment (see clause 9);
- 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).

NOTE Attention is drawn to the existence of additional requirements which may be specified by national authorities responsible for 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, which are covered by IEC 61326;
- d) protective measures for explosive atmospheres (see IEC 60079);
- e) servicing (repair);
- f) 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 by the use of warning labels, shields for hazardous voltage TERMINALS, segregation of low-voltage circuits from hazardous voltages, etc. More important, servicing personnel should be trained to recognize unexpected HAZARDS and to react accordingly.

1.3 Verification

This standard also specifies methods of verifying, through inspection and type testing, that the equipment meets the requirements of this standard.

NOTE Requirements for ROUTINE TESTS are given in annex F.

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 ± 10 % of the nominal voltage;
- f) transient overvoltages typically present on the MAINS supply.

NOTE The normal level of transient overvoltages is impulse withstand (overvoltage) category II of IEC 60364-4-443.

- g) applicable RATED POLLUTION degree.

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 for which the equipment is RATED by the manufacturer:

- 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 ± 10 % of the nominal voltage.

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 ISO and IEC maintain registers of currently valid International Standards.

IEC 60027, *Letter symbols to be used in electrical technology*

IEC 60060, *High-voltage test techniques*

IEC 60065, *Audio, video and similar electronic apparatus – Safety requirements*

IEC 60085, *Thermal evaluation and classification of electrical insulation*