SIS - Standardiseringskommissionen i Sverige

SVENSKA ELEKTROTEKNISKA NORMER, SEN

SVENSK STANDARD SS-EN 61 010-1

Handläggande organ	Fastställd	Utgåva	Ingår i
SEK, SVENSKA ELEKTRISKA KOMMISSIONEN	1993-09-30	1	SEK Översikt 66

Registrering
Reg 443 50 30

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

SIS TRYCKERI, STOCKHOLM
Prisgrupp W

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Fastställd	Utgåva	Sida	Ingår i
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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 61 010-1: 1993. Den svenska standarden innehåller den officiella engelska språkversionen av EN 61 010-1: 1993 .

Nationellt förord

Europastandarden EN 61 010-1: 1993

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 1010-1, First edition, 1990 – Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements**

  jämte

  Amendment No. 1, 1992

  utarbetad inom International Electrotechnical Commission, IEC.

Tidigare utgiven svensk standard SS-IEC 348, utgåva 1, 1982, gäller ej fr o m 1993-09-30.

UDK 62-5:542.23:62-78:614.8

Prisgrupp W

Tryckt i oktober 1993

EUROPEAN STANDARD

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EUROPÄISCHE NORM

April 1993

UDC 62-5:542.23:62-78:614.8

Supersedes HD 401 S1:1980

Descriptors: Electrical equipment for measurement, electrical equipment for control, electrical equipment for laboratory use, safety requirements

ENGLISH VERSION

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

(IEC 1010-1:1990 + A1:1992, modified)

Règles de sécurité pour appareils électriques de mesurage, de régulation et de laboratoire Partie 1: Prescriptions générales

(CEI 1010-1:1990 + A1:1992, modifiés)

Sicherheitsanforderungen an elektrische Meß-, Steuer-, Regel- und Laborgeräte Teil 1: Allgemeine Anforderungen

(IEC 1010-1:1990 + A1:1992, modifiziert)

This European Standard was approved by CENELEC on 1993-03-09. 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, 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

Ref. No. EN 61010-1:1993 E

1993-04-28

FOREWORD

Further to the decision of the 72nd Technical Board meeting of CENELEC, the text of the International Standard IEC 1010-1:1990 with inclusion of DIS 66E(C.O.)12, ADIS 66E(C.O.)15 and 15A, together with a common modification prepared by Reporting Secretariat SR 66E, was submitted to the CENELEC members for formal vote.

This draft was approved by CENELEC as EN 61010-1 on 9 March 1993.

NOTE: Documents DIS 66E(C.O.) 12 and ADIS 66E(C.O.)15 and 15A were published as amendment 1 to the International Standard IEC 1010-1 in September 1992.

This European Standard supersedes HD 401 S1:1980.

The following dates were fixed:

- latest date of publication of an identical national standard	(dop)	1993-12-01
- latest date of withdrawal of conflicting national standards	(dow)	1993-12-01

For products which have complied with HD 401 S1:1980 before 1993-12-01, as shown by the manufacturer or by a certification body, this previous standard may continue to apply for production until 1998-12-01.

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given only for information.
In this standard, annexes A, B, C, D, E, F, G and ZA are normative and annexes H, J, K, L and M are informative.

This European Standard constitutes part 1 of a series of standards dealing with safety requirements for electrical equipment for measurement, control, and laboratory use.

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

ENDORSEMENT NOTICE

The text of the International Standard IEC 1010-1:1990 and its amendment 1:1992 was approved by CENELEC as a European Standard with agreed common modifications as given below.

COMMON MODIFICATIONS

ANNEX ZA (normative)

OTHER INTERNATIONAL PUBLICATIONS QUOTED IN THIS STANDARD WITH THE REFERENCES OF THE RELEVANT EUROPEAN PUBLICATIONS

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

IEC Publication	Date	Title	EN/HD	Date
50(151)	1978	International Electrotechnical Vocabulary (IEV) - Part 151: Electrical and magnetic devices	-	-
50(351)	1975	Part 351: Automatic control	-	-
51	series	Direct acting indicating analogue electrical measuring instruments and their accessories	EN 60051	series
60-2	1973	High-voltage test techniques Part 2: Test procedures	-	-
65 (mod)	1985	Safety requirements for mains operated electronic and related apparatus for household and similar general use	HD 195 S6	1988
68-2-3	1969	Environmental testing Part 2: Tests - Test Ca: Damp heat, steady state	HD 323.2.3 S2*	1987
68-2-6	1982	Part 2: Tests - Test Fc and guidance: Vibration (sinusoidal)	HD 323.2.6 S2*	1988
68-2-31	1969	Test Ec: Drop and topple, primarily for equipment-type specimens	EN 60068-2-31*	1993
85	1984	Thermal evaluation and classification of electrical insulation	HD 566 S1	1990
227 (mod)	series	Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V	HD 21	series
245 (mod)	series	Rubber insulated cables of rated voltages up to and including 450/750 V	HD 22	series
309	1969	Plugs, socket-outlets and couplers for industrial purposes	HD 196 S1*	1978

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* HD 323.2.3 S2 includes A1:1984 to IEC 68-2-3
HD 323.2.6 S2 includes A1:1983 + A2:1985 to IEC 68-2-6
EN 60068-2-31 includes A1:1982 to IEC 68-2-31
HD 196 S1 includes supplement A:1973 to IEC 309

IEC Publication	Date	Title	EN/HD	Date
359	1987	Expression of the performance of electrical and electronic measuring equipment	-	-
417	1973	Graphical symbols for use on equipment Index, survey and compilation of the single sheets	HD 243 S10*	1993
529	1989	Degrees of protection provided by enclosures (IP Code)	EN 60529	1991
617-2	1983	Graphical symbols for diagrams Part 2: Symbol elements, qualifying symbols and other symbols having general application	-	-
664	-	Insulation coordination for equipment within low-voltage systems	-	-
707	1981	Methods of test for the determination of the flammability of solid electrical insulating materials when exposed to an igniting source	HD 441 S1	1983
799 (mod)	1984	Cord sets	EN 60799	1987
817	1984	Spring-operated impact-test apparatus and its calibration	HD 495 S1	1987
825 (mod)	1984	Radiation safety of laser products, equipment classification, requirements and user's guide	HD 482 S1*	1988
947-1 (mod)	1988	Low-voltage switchgear and controlgear Part 1: General rules	EN 60947-1	1991
947-3 (mod)	1990	Low-voltage switchgear and controlgear Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units	EN 60947-3	1992
990	1990	Methods of measurement of touch-current and protective conductor current	-	-

Other publications

ISO 306:1987 - Plastics - Thermoplastic materials - Determination of Vicat softening temperature

ISO 3864:1984 - Safety colours and safety signs

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* HD 243 S10 includes supplements A:1974 to K:1991 to IEC 417
HD 482 S1 is superseded by EN 60825:1991 which is based on IEC 825:1984 + A1:1990

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INTRODUCTION

After many years of discussion and aware of the need for a General Standard for the safety of electrical equipment for measurement, control, and laboratory use, the majority of National Committees voted in 1988 in favour of the publication of IEC 1010-1.

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 a Particular Standard which must be read in conjunction with Part 1 requirements.

Particular standards are under consideration for the following types of equipment or conditions of use:

- probes;
- laboratory centrifuges;
- laboratory heating equipment;
- laboratory flame and arc photometers, and ionizing equipment;
- laboratory sterilisers;
- laboratory mixing, crushing and shaking equipment;
- equipment for use in outdoor and harsh indoor conditions.

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

Part 1: General requirements

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1 Scope and object

1.1 *Scope*

This International Standard specifies general safety requirements for electrical equipment intended for professional, industrial process, and educational use, including equipment and computing devices for:

- measurement and test;
- control;
- laboratory use;
- accessories intended for use with the above (e.g. sample handling equipment).

This Part 1 of the standard applies to the equipment defined in a) to c) below, when used under the environmental conditions of 1.4.

a) Electrical measurement and test equipment

This is equipment which by electrical means 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.

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.

This equipment may also be used in areas other than laboratories.

1.1.1 *Aspects excluded from scope*

This Part 1 of the standard does not cover:

- reliable function, performance or other properties of the equipment;
- servicing (repair);
- 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 against unexpected hazards.

1.1.2 *Equipment excluded from scope*

This Part 1 does not apply to:

- electric power equipment, for example power electronics;
- machine tools and their controls (see IEC 204);
- Class 0,5, 1 and 2 alternating current watt-hour meters (see IEC 521);
- medical electrical equipment within the scope of IEC 601;
- biological amplifiers which link humans to equipment in research or teaching contexts;
- type-tested and partially type-tested assemblies of low-voltage switchgear and controlgear (see IEC 439-1);
- circuits and equipment which are part of the building electrical installation (see IEC 364);
- computers, processors and similar equipment, except as specified in 1.1.3 (see IEC 950);
- transformers separate from the equipment (see IEC 742);
- equipment intended for household use (see IEC 335);
- equipment intended for use in explosive gas atmospheres (see IEC 79).

1.1.3 *Computing equipment*

This Part 1 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 950 and complying with its requirements are considered to be suitable for use with equipment within the scope of this Part 1.

1.2 *Object*

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:

- electric shock or burn (see clause 6);
- mechanical hazards (see clauses 7 and 8);
- excessive temperature (see clause 9);
- spread of fire from the equipment (see clause 9);
- effects of radiation, including lasers sources, sonic and ultrasonic pressure (see clause 12);
- 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 health and safety of labour forces.

1.3 *Verification*

This Part 1 also specifies methods of verifying, through inspection and type testing, that the equipment meets the requirements of this standard.

NOTE - Recommendations for ROUTINE TESTS are given in annex K.

1.4 *Environmental conditions*

This Part 1 applies to equipment designed to be safe at least under the following conditions:

- indoor use;
- altitude up to 2 000 m;
- temperature 5 °C to 40 °C;
- maximum relative humidity 80 % for temperatures up to 31 °C decreasing linearly to 50 % relative humidity at 40 °C;
- mains supply voltage fluctuations not to exceed ± 10 % of the nominal voltage;
- other supply voltage fluctuations as stated by the manufacturer;
- transient overvoltages according to INSTALLATION CATEGORIES (OVERVOLTAGE CATEGORIES) I, II and III (see annex J). For mains supply the minimum and normal category is II;
- POLLUTION DEGREE 1 or 2 in accordance with IEC 664 (see 3.7.3).

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this Part 1 of IEC 1010. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Part 1 of IEC 1010 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

2.1 *IEC standards*

50 (151): 1978, *International Electrotechnical Vocabulary - Chapter 151: Electrical and magnetic devices.*

50 (351): 1975, *International Electrotechnical Vocabulary - Chapter 351: Automatic control.*

51, *Direct acting indicating analogue electrical measuring instruments and their accessories.*

60, *High-voltage test techniques.*

60-2: 1973, *High-voltage test techniques - Part 2: Test procedures.*

65: 1985, *Safety requirements for mains operated electronic and related apparatus for household and similar general use.*

68-2-3: 1969, *Environmental testing - Part 2: Tests - Test Ca: Damp heat, steady state.*

68-2-6: 1982, *Environmental testing - Part 2: Tests - Test Fc and guidance: Vibration (sinusoidal).*

68-2-31:1969, *Environmental testing - Part 2: Tests - Test Ec: Drop and topple, primarily for equipment-type specimens.*

85: 1984, *Thermal evaluation and classification of electrical insulation.*

227, *Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V.*

245, *Rubber insulated cables of rated voltages up to and including 450/750 V.*

309, *Plugs, socket-outlets and couplers for industrial purposes.*

359: 1987, *Expression of the performance of electrical and electronic measuring equipment.*

417: 1973, *Graphical symbols for use on equipment. Index, survey and compilation of the single sheets.*

529: 1976, *Classification of degrees of protection provided by enclosures.*

612-2: 1983, *Graphical symbols - Part 2: Symbol elements, qualifying symbols and other symbols having general applications.*

664: 1980, *Insulation co-ordination within low-voltage systems including clearances and creepage distances for equipment.*

664A: 1981, *First supplement (to IEC 664: 1980).*

707: 1981, *Methods of test for the determination of the flammability of solid electrical insulating materials when exposed to an igniting source.*

817: 1984, *Spring-operated impact-test apparatus and its calibration.*

825: 1984, *Radiation safety of laser products, equipment classification, requirements and user's guide.*

2.2 *ISO standards*

306: 1987, *Plastics - Thermoplastic materials. Determination of Vicat softening temperature.*

3864: 1984, *Safety colours and safety signs.*

3 Definitions

For the purpose of this International Standard the following definitions apply.

For definitions of further terms used in this standard see IEC 50(351), IEC 51 and IEC 359. Unless otherwise specified, the terms "voltage" and "current" mean the r.m.s. values of an alternating, direct or composite voltage or current.