

# SLOVENSKI STANDARD

## SIST EN 60051-1:2000

01-september-2000

Nadomešča:

SIST EN 60051-1:1995

SIST EN 60051-1:1995/A1:2000

SIST EN 60051-1:1995/A2:2000

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**Neposredni kazalni analogni električni merilni instrumenti in njihov pribor – 1. del:  
Definicije in splošne zahteve, skupne vsem delom (IEC 60051-2:1997)**

Direct acting indicating analogue electrical measuring instruments and their accessories -  
- Part 1: Definitions and general requirements common to all parts

Direkt wirkende anzeigende elektrische Meßgeräte und ihr Zubehör - Meßgeräte mit  
Skalenanzeige -- Teil 1: Definitionen und allgemeine Anforderungen für alle Teile dieser  
Norm

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Appareils mesureurs électriques indicateurs analogiques à action directe et leurs  
accessoires -- Partie 1: Définitions et prescriptions générales communes à toutes les  
parties

**Ta slovenski standard je istoveten z: EN 60051-1:1998**

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**ICS:**

01.040.17	Meroslovje in merjenje. Fizikalni pojavi (Slovarji)	Metrology and measurement. Physical phenomena (Vocabularies)
17.220.20	Merjenje električnih in magnetnih veličin	Measurement of electrical and magnetic quantities

**SIST EN 60051-1:2000**

**en**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 60051-1**

December 1998

ICS 17.220.20

Supersedes EN 60051-1:1989 + A1:1995 + A2:1995

Descriptors: Electrical measuring instruments, analogue indicating instruments, direct acting measuring instruments, accessories for electrical measuring instruments

English version

**Direct acting indicating analogue electrical measuring  
instruments and their accessories  
Part 1: Definitions and general requirements common to all parts  
(IEC 60051-1:1997)**

Appareils mesureurs électriques  
indicateurs analogiques à action directe  
et leurs accessoires  
Partie 1: Définitions et prescriptions  
générales communes à toutes les parties  
(CEI 60051-1:1997)

Direkt wirkende anzeigende elektrische  
Meßgeräte und ihr Zubehör - Meßgeräte  
mit Skalanzeige  
Teil 1: Definitionen und allgemeine  
Anforderungen für alle Teile dieser Norm  
(IEC 60051-1:1997)

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This European Standard was approved by CENELEC on 1997-10-01. 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 85/166/FDIS, future amendment to IEC 60051-1:1984, prepared by IEC TC 85, Measuring equipment for electromagnetic quantities, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A3 to EN 60051-1:1989 on 1997-10-01.

The text of this document, together with that of IEC 60051-1:1984 and its amendments 1:1994 and 2:1995, was published by IEC as the fifth edition of IEC 60051-1 in December 1997. According to a decision of principle taken by the Technical Board of CENELEC, the approval of EN 60051-1:1989/A3 has been converted into the approval of a new EN 60051-1.

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) 1999-09-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 1999-09-01

Annexes designated "normative" are part of the body of the standard.  
In this standard, annex ZA is normative.  
Annex ZA has been added by CENELEC.

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**Endorsement notice**

The text of the International Standard IEC 60051-1:1997 was approved by CENELEC as a European Standard without any modification.

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**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 60050(301)	1983	International Electrotechnical Vocabulary (IEV) Chapter 301: General terms on measurements in electricity	-	-
IEC 60050(302)	1983	Chapter 302: Electrical measuring instruments	-	-
IEC 60050(303)	1983	Chapter 303: Electronic measuring instruments	-	-
IEC 60051-9	1988	Direct acting indicating analogue electrical-measuring instruments and their accessories Part 9: Recommended test methods	EN 60051-9	1989
IEC 60068-2-6 + corr. March	1995 1995	Environmental testing Part 2: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	1995
IEC 60068-2-27	1987	Part 2: Tests - Test Ea and guidance: Shock	EN 60068-2-27	1993
IEC 60417	1973	Graphical symbols for use on equipment Index, survey and compilation of the single sheets	HD 243 S12 <sup>1)</sup>	1995
IEC 60473	1974	Dimensions for panel-mounted indicating and recording electrical measuring instruments	-	-

1) HD 243 S12 includes supplements A:1974 to M:1994 to IEC 60417.

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<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60617-2	1996	Graphical symbols for diagrams Part 2: Symbol elements, qualifying symbols and other symbols having general application	EN 60617-2	1996
IEC 61010-1 (mod)	1990	Safety requirements for electrical equipment for measurement, control and laboratory use Part 1: General requirements	EN 61010-1 <sup>2)</sup>	1993

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2) EN 61010-1 includes A1:1992 to IEC 61010-1.

# NORME INTERNATIONALE INTERNATIONAL STANDARD

**CEI  
IEC**

**60051-1**

Cinquième édition  
Fifth edition  
1997-12

## Appareils mesureurs électriques indicateurs analogiques à action directe et leurs accessoires –

### Partie 1: Définitions et prescriptions générales communes à toutes les parties

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## Direct acting indicating analogue electrical measuring instruments and their accessories –

### Part 1: Definitions and general requirements common to all parts

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Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

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Pour prix, voir catalogue en vigueur  
For price, see current catalogue

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**DIRECT ACTING INDICATING ANALOGUE ELECTRICAL MEASURING  
INSTRUMENTS AND THEIR ACCESSORIES –****Part 1: Definitions and general requirements common to all parts**

## 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 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 60051-1 has been prepared by IEC technical committee 85: Measuring equipment for electromagnetic quantities.

This fifth edition cancels and replaces the fourth edition published in 1984, amendment 1 (1994) and amendment 2 (1995). It constitutes a technical revision.

The text of this standard is based on the fourth edition, amendment 1, amendment 2 and the following documents:

FDIS	Report on voting
85/166/FDIS	85/177/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.

## INTRODUCTION

IEC 60051 is published in separate parts according to the following structure and under the general title *Direct acting indicating analogue electrical measuring instruments and their accessories*.

Part 1: Definitions and General Requirements Common to all Pans.

Part 2: Special Requirements for Ammeters and Voltmeters.

Part 3: Special Requirements for Wattmeters and Varmeters.

Part 4: Special Requirements for Frequency Meters.

Part 5: Special Requirements for Phase Meters, Power Factor Meters and Synchrosopes.

Part 6: Special Requirements for Ohmmeters (Impedance Meters) and Conductance Meters.

Part 7: Special Requirements for Multi-function Instruments.

Part 8: Special Requirements for Accessories.

Part 9: Recommended Test Methods.

Parts 2 to 9 are not complete in themselves and shall be read in conjunction with this Part 1.

All of these pans are arranged in the same format and a standard relationship between subject and clause number is maintained throughout. In addition, tables, figures and annexes add a suffix to the part number in order to differentiate the pans. This re-arrangement will assist the reader of IEC 60051 to distinguish information relating to the different types of instruments.

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# DIRECT ACTING INDICATING ANALOGUE ELECTRICAL MEASURING INSTRUMENTS AND THEIR ACCESSORIES –

## Part 1: Definitions and general requirements common to all parts

### 1 General

#### 1.1 Scope

This standard applies to direct acting indicating electrical measuring instruments having an analogue display, such as:

- ammeters and voltmeters;
- wattmeters and varimeters;
- frequency meters of pointer and vibrating-reed types;
- phasemeters, power-factor meters and synchroscopes;
- ohmmeters, impedance meters and conductance meters;
- multi-function instruments of the above types.

It also applies to certain accessories used with these instruments, such as:

- shunts;
- series resistors and impedance elements.

If other accessories are associated with instruments, this standard is applicable to the combination of the instrument and the accessory provided that the adjustments have been made for the combination.

This standard also applies to a direct acting indicating electrical measuring instrument whose scale marks do not correspond directly to its electrical input quantity, provided that the relationship between them is known.

This standard also applies to instruments and accessories having electronic devices in their measuring and/or auxiliary circuits.

This standard does not apply to special purpose instruments which are covered by their own IEC standards.

This standard does not apply to special purpose devices which are covered by their own IEC standards when they are used as accessories.

This standard does not contain either requirements for protection against environmental conditions or the relevant tests. However, when necessary, and then only by agreement between the manufacturer and the user, tests to approximate the conditions of use may be selected from IEC 60068.

This standard does not specify requirements concerning dimensions of instruments or accessories (for the former, see IEC 60473).

## 1.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60051. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 60051 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

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

IEC 60050(301), (302), (303):1983, *International Electrotechnical Vocabulary (IEV) – Chapter 301: General terms on measurements in electricity – Chapter 302: Electrical measuring instruments – Chapter 303: Electronic measuring instruments*

IEC 60051-9:1988, *Direct acting indicating analogue electrical measuring instruments and their accessories – Part 9: Recommended test methods*

IEC 60068-2-6:1995, *Environmental tests – Part 2: Tests – Test Fc and guidance: Vibrations (sinusoidal)*

IEC 60068-2-27:1987, *Environmental testing – Part 2: Tests – Test Ea and guidance: Shock*

IEC 60417:1973, *Graphical symbols for use on equipment – Index, survey and compilation of the single sheets*

IEC 60473:1974, *Dimensions for panel-mounted indicating and recording electrical measuring instruments\**

IEC 60617-2:1996, *Graphical symbols for diagrams – Part 2: Symbol elements, qualifying symbols and other symbols having general application*

IEC 61010-1:1990, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements*

## 2 Definitions

The values of a.c. quantities, given in this standard, are r.m.s. values unless otherwise stated.

For the purpose of this standard, terms as defined in IEC 60050 apply, together with the following additional terms.

### 2.1 General terms

#### 2.1.1

##### **electrical measuring instrument**

a measuring instrument intended to measure an electrical or non-electrical quantity using electrical means

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\* Revision in preparation