
Direct acting indicating analogue electrical measuring instruments and their accessories - Part 1: Definition and general requirements common to all parts (IEC 51-1:1984)

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

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 60051-1:1989

ICS:

17.220.20	Merjenje električnih in magnetnih veličin	Measurement of electrical and magnetic quantities
-----------	---	---

SIST EN 60051-1:1995**en**

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 60051-1:1995](#)

<https://standards.iteh.ai/catalog/standards/sist/37631330-5036-4b4a-b4d3-9db7647d4204/sist-en-60051-1-1995>

EUROPEAN STANDARD

EN 60 051-1

NORME EUROPEENNE

November 1989

EUROPÄISCHE NORM

UDC: 621.317.7.037.33:620.1

KEY WORDS: 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 51-1 (1984) edition 4)

Appareils mesureurs électriques indicateurs analogiques à action directe et leurs accessoires	Direkt wirkende anzeigende elektrische Meßgeräte und ihr Zubehör Meßgeräte mit Skalenanzeige
Première partie: Définitions et prescriptions générales communes à toutes les parties (CEI 51-1 (1984) édition 4)	Teil 1: Definitionen und allgemeine Anforderungen für alle Teile dieser Norm (IEC 51-1 (1984) Ausgabe 4)

This European Standard was ratified by CENELEC on 11 September 1989. CENELEC members are bound to comply with the requirements of the 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 CENELEC Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French and German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to CENELEC 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, Luxemburg, 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 Bréderode 2, B-1000 Brussels

BRIEF HISTORY

The text of IEC-Publication 51-1 (4th edition - 1984) was submitted to the CENELEC members for unique acceptance.

TECHNICAL TEXT

The text of the International Standard IEC 51-1 (4th edition - 1984) was approved by CENELEC on 11 September 1989 as a European Standard with the following editorial corrections to the English version:

- Page 35, table II-1, column 1: Read "Frequency of a.c. measured quantity" instead of "Frequency on a.c. measured quantity".
- Page 51, 8.3.3 and 8.3.4:
In the examples, the reference values/ranges should be underlined instead of printed in italics (see 8.3.1).

SIST EN 60051-1:1995

Thus: <https://standards.iteh.ai/catalog/standards/sist/37631330-5036-4b4a-b4d3-9db7647d4204/sist-en-60051-1-1995>

- 8.3.3 Line 3 should be "35 ... 50 ... 60 Hz"
- 8.3.3 Line 5 should be "35 ... 45 ... 55 ... 60 Hz"
- 8.3.4 Line 4 should be "23 ... 23 ... 37°C"
- 8.3.4 Line 6 should be "20 ... 20 ... 25 ... 35°C".

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given only for information.

In this standard, annex ZA is normative.

The following dates are applicable:

- latest date of announcement
of the EN at national level (doa) : 1990-03-01
- date of latest publication of
a new harmonized standard (dop) : 1990-09-01
- date of withdrawal of conflicting
national standards (dow) : 1990-09-01

ANNEX ZA (normative)

OTHER INTERNATIONAL PUBLICATIONS QUOTED IN THIS STANDARD

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

<u>Nos</u>	<u>Title</u>	<u>EN/HD</u>	<u>Issue date</u>
27	Letter symbols to be used in electrical technology.	Series HD 245	-
50 (301) (1983)	International Electrotechnical Vocabulary (IEV), Chapter 301: General terms on measurements in electricity.	-	-
68-2-6 (1982)	Basic environmental testing procedures, part 2: Tests - test Fc and guidance: vibrations (sinusoidal).	HD 323.2.6 S2	88-01
68-2-27 (1972)	Part 2: Tests - test Ea: shock.	HD 323.2.27 S2	88-01
160 (1963)	Standard atmospheric conditions for test purposes.	-	-
348 (1978)	Safety requirements for electronic measuring apparatus.	HD 401 S1	80-04
414 mod (1973)	Safety requirements for indicating and recording electrical measuring instruments and their accessories.	HD 215 S1	78-06
417 (1973)	Graphical symbols for use on equipment. Index, survey and compilation of the single sheets.	HD 243 S7	88-01
473 (1974)	Dimensions for panel-mounted indicating and recording electrical measuring instruments.	-	-
617-2 (1983)	Graphical symbols for diagrams, part 2: symbol elements. Qualifying symbols and other symbols having general application.	-	-

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 60051-1:1995](#)

<https://standards.iteh.ai/catalog/standards/sist/37631330-5036-4b4a-b4d3-9db7647d4204/sist-en-60051-1-1995>

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE
NORME DE LA CEI

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC STANDARD

Publication 51-1
Quatrième édition — Fourth edition
1984

Appareils mesureurs électriques indicateurs analogiques
à action directe et leurs accessoires

Première partie: Définitions et prescriptions générales communes à toutes les parties

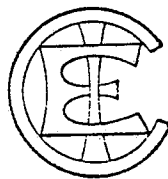
iTeh STANDARD PREVIEW

(standards.iteh.ai)

Direct acting indicating analogue electrical measuring
instruments and their accessories

Part 1: Definitions and general requirements common to all parts

<https://standards.iteh.ai/catalog/standards/sist/37631330-5036-4b4a-6229-3d767d420438/sist-en-60051-1-1995>



© CEI 1984

Droits de reproduction réservés — Copyright — all rights reserved

Aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'auteur

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher

Bureau Central de la Commission Electrotechnique Internationale

3 rue de Varembé

Genève Suisse

Price 30.—

CONTENTS

	Page
FOREWORD	5
PREFACE	5
 Clause	
1. Scope	9
2. Definitions	9
3. Description, classification and compliance	27
4. Reference conditions and intrinsic errors	29
5. Nominal range of use and variations	33
6. Further electrical and mechanical requirements	39
7. Constructional requirements	41
8. Information, general markings and symbols	47
9. Markings and symbols for terminals	63
10. Tests to prove compliance with this standard	65
 APPENDIX A-1 — Tests	 67
APPENDIX B-1 — Permissible errors and variations	69

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 60051-1:1995

<https://standards.iteh.ai/catalog/standards/sist/37631330-5036-4b4a-b4d3-9db7647d4204/sist-en-60051-1-1995>

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 formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.
- 3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

iTeh STANDARD PREVIEW

PREFACE

This standard has been prepared by IEC Technical Committee No. 85: Measuring Equipment for Basic Electrical Quantities (former Sub-Committee 13B: Electrical Measuring Instruments).

This fourth edition replaces the third edition of IEC Publication 51.

This standard constitutes Part 1.

The general layout for the revised Publication 51 is as follows:

- Part 1: Definitions and General Requirements Common to all Parts.
- 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 parts are arranged in the same format and a standard relationship between subject and clause number is maintained throughout. In addition, tables, figures and appendices add a suffix to the part number in order to differentiate the parts. This re-arrangement will assist the reader of IEC Publication 51 to distinguish information relating to the different types of instruments.

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

Six Months' Rule	Report on Voting
13B(CO)104	85(CO)3

Further information can be found in the Report on Voting indicated in the table above.

The following IEC publications are quoted in this standard:

- Publications Nos.: 27: — Letter Symbols to be Used in Electrical Technology.
50(301) (1983): International Electrotechnical Vocabulary (IEV), Chapter 301: General Terms on Measurements in Electricity.
68-2-6 (1982): Basic Environmental Testing Procedures, Part 2: Tests — Test Fc and Guidance: Vibration (Sinusoidal).
68-2-27 (1972): Part 2: Tests — Test Ea: Shock.
160 (1963): Standard Atmospheric Conditions for Test Purposes.
348 (1978): Safety Requirements for Electronic Measuring Apparatus.
414 (1973): Safety Requirements for Indicating and Recording Electrical Measuring Instruments and their Accessories.
417 (1973): Graphical Symbols for Use on Equipment. Index, Survey and Compilation of the Single Sheets.
473 (1974): Dimensions for Panel-mounted Indicating and Recording Electrical Measuring Instruments.
617-2 (1983): Graphical Symbols for Diagrams, Part 2: Symbol Elements. Qualifying Symbols and Other Symbols having General Application.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 60051-1:1995

<https://standards.iteh.ai/catalog/standards/sist/37631330-5036-4b4a-b4d3-9db7647d4204/sist-en-60051-1-1995>

DIRECT ACTING INDICATING ANALOGUE ELECTRICAL MEASURING INSTRUMENTS AND THEIR ACCESSORIES

Part 1: Definitions and general requirements common to all parts

1. Scope

1.1 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 synchrosopes;
- ohmmeters, impedance meters and conductance meters;
- multi-function instruments of the above types.

1.2 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.

1.3 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.

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

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

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

1.7 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 Publication 68: Basic Environmental Testing Procedures, to prove protection against environmental conditions.

1.8 This standard does not specify requirements concerning dimensions of instruments or accessories (for the former, see IEC Publication 473: Dimensions for Panel-mounted Indicating and Recording Electrical Measuring Instruments).

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 Publication 50: International Electrotechnical Vocabulary (IEV) 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.

2.1.2 Analogue display instrument

A measuring instrument intended to present or display the output information as a continuous function of the measured quantity.

Note. — An instrument in which a change of the indication occurs by small discrete steps, but which does not have a digital display, is considered to be an analogue instrument.

2.1.3 Indicating instrument

A measuring instrument which displays at any time the value of the measured quantity without recording it.

Note. — The indicated value may be different from the value of the quantity measured by the instrument and may be in units of a different quantity.

2.1.4 Direct acting indicating instrument

An instrument in which the indicating device is mechanically connected to and actuated by the moving element.

2.1.5 Electronic measuring instrument

A measuring instrument intended to measure an electrical or non-electrical quantity using electronic means.

2.1.6 Single function instrument

An instrument intended for the measurement of one kind of quantity only.

2.1.7 Multi-function instrument

An instrument having a single means of indication intended for the measurement of more than one kind of quantity (e.g. an instrument measuring current, voltage and resistance).

2.1.8 Fixed instrument

An instrument designed to be permanently mounted and which is intended to be connected to (an) external circuit(s) by means of permanently installed leads.

2.1.9 Portable instrument

An instrument specifically designed to be carried out by hand.

Note. — The instrument is intended to be connected and disconnected by the user.

2.1.10 Polyphase instrument

An instrument for measurement in a polyphase system and arranged for connection to more than one phase of the system.

2.1.11 *Balanced load polyphase instrument*

A polyphase instrument for use in a balanced polyphase system. This does not include a single-phase wattmeter scaled in terms of polyphase power.

2.1.12 *Instrument with magnetic screen*

An instrument shielded by ferro-magnetic material from the influence of a magnetic field of external origin.

2.1.13 *Astatic instrument*

An instrument in which the measuring element is so constructed as to be unaffected by a uniform magnetic field of external origin.

2.1.14 *Instrument with electric screen*

An instrument shielded by conductive material from the influence of an electric field of external origin.

2.1.15 *Accessory*

An element group of elements or device associated with the measuring circuit of a measuring instrument in order to confer specified characteristics to the measuring instrument.

2.1.15.1 *Interchangeable accessory*

An accessory having its own properties and accuracy, these being independent of those of the instrument with which it may be associated.

Note. — An accessory is considered to be interchangeable when its rated characteristics are known and marked and are sufficient to enable its errors and variations to be determined without using the associated instrument. A shunt whose adjustment takes into account an instrument current which is not negligible and which is known, is considered to be interchangeable.

SIST EN 60051-1:1995

<https://standards.iteh.ai/catalog/standards/sist/37631330-5036-4b4a-7d4204/sist-en-60051-1-1995>

2.1.15.2 *Accessory of limited interchangeability*

An accessory having its own properties and accuracy, which can only be associated with measuring instruments for which certain characteristics are within specified limits.

2.1.15.3 *Non-interchangeable accessory*

An accessory adjusted to take into account the electrical characteristics of a specific measuring instrument.

2.1.16 *Shunt*

A resistor connected in parallel with a measuring circuit of a measuring instrument.

Note. — A shunt is generally intended to provide a voltage proportional to a current to be measured.

2.1.17 *Series resistor (impedance)*

A resistor (impedance) connected in series with a measuring circuit of a measuring instrument.

Note. — A series resistor (impedance) is generally intended to extend the voltage measuring range of an instrument.

2.1.18 *Instrument lead*

A lead comprising one or more conductors, specially designed for interconnecting measuring instruments to external circuits or to accessories.