
**Neposredni kazalni analogni električni merilni instrumenti in njihov pribor – 5. del:
Posebne zahteve za merilnike faze, merilnike močnostnega faktorja in za
sinhroskope (IEC 60051-5:1985)**

Direct acting indicating analogue electrical measuring instruments and their accessories -
- Part 5: Special requirements for phase meters, power factor meters and synchrosopes

Direkt wirkende anzeigende elektrische Meßgeräte und ihr Zubehör - Meßgeräte mit
Skalenanzeige -- Teil 5: Spezielle Anforderungen für Phasenverschiebungswinkel-
Meßgeräte, Leistungsfaktor- Meßgeräte und Synchronoskope

Appareils mesureurs électriques indicateurs analogiques à action directe et leurs
accessoires -- Partie 5: Prescriptions particulières pour les phasemètres, les indicateurs
de facteur de puissance et les synchronoscopes

Ta slovenski standard je istoveten z: EN 60051-5:1989

ICS:

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

DIRECT ACTING INDICATING ANALOGUE ELECTRICAL
MEASURING INSTRUMENTS AND THEIR ACCESSORIES
PART 5: SPECIAL REQUIREMENTS FOR PHASE METERS,
POWER FACTOR METERS AND SYNCHROSCOPES
(IEC 51-5 (1985) edition 4)

Appareils mesureurs électriques
indicateurs analogiques
à action directe
et leurs accessoires
Cinquième partie: Prescriptions
particulières pour les phasemètres,
les indicateurs de facteur de
puissance et les synchrosopes
(CEI 51-5 (1985) édition 4)

Direkt wirkende anzeigende
elektrische Meßgeräte
und ihr Zubehör
Meßgeräte mit Skalenanzeige
Teil 5: Spezielle Anforderungen
für Phasenverschiebungswinkel-
Meßgeräte, Leistungsfaktor-
Meßgeräte und Synchroskope
(IEC 51-5 (1985) 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.

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CENELEC

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

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BRIEF HISTORY

The text of IEC-Publication 51-5 (4th edition - 1985) was submitted to the CENELEC members for unique acceptance.

TECHNICAL TEXT

The text of the International Standard IEC 51-5 (4th edition - 1985) was approved by CENELEC on 11 September 1989 as a European Standard with the following editorial corrections:

- Page 11, table II-5, column 4, for "distortion of voltage and/or current components of the measured quantity": replace 3.7.3 by 3.7.4.
- Page 13, note 2 - c): replace "S.I." by "SI".

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**Appareils mesureurs électriques indicateurs analogiques
à action directe et leurs accessoires**

**Cinquième partie: Prescriptions particulières pour les phasemètres,
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**Direct acting indicating analogue electrical measuring instruments
and their accessories**

**Part 5: Special requirements for phase meters,
power factor meters and synchrosopes**



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

DIRECT ACTING INDICATING ANALOGUE ELECTRICAL MEASURING
INSTRUMENTS AND THEIR ACCESSORIESPart 5: Special requirements for phase meters, power factor meters
and synchrosopes

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.

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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 5.

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 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	Two Months' Procedure	Report on Voting
13B(CO)88	13B(CO)97	13B(CO)103	85(CO)1

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

DIRECT ACTING INDICATING ANALOGUE ELECTRICAL MEASURING INSTRUMENTS AND THEIR ACCESSORIES

Part 5: Special requirements for phase meters, power factor meters and synchrosopes

1. Scope

- 1.1 Part 5 of this standard applies to direct acting indicating analogue phase meters, power factor meters and synchrosopes.
- 1.2 This part also applies to non-interchangeable accessories (as defined in Sub-clause 2.1.15.3 of Part 1) used with phase meters, power factor meters and synchrosopes.
- 1.3 This part also applies to a phase meter or power factor meter whose scale marks do not correspond directly to its electrical input quantity, provided that the relationship between them is known.

1.4 to 1.8 See Part 1.

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2. Definitions

See Part 1.

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3. Description, classification and compliance

3.1 Description

Phase meters, power factor meters and synchrosopes shall be described according to their method of operation as given in Sub-clause 2.2 of Part 1.

3.2 Classification

Phase meters, power factor meters and synchrosopes shall be classified in one of the accuracy classes denoted by the following class indices:

0.1, 0.2, 0.3, 0.5, 1, 1.5, 2, 2.5, 3, 5.

3.3 Compliance with the requirements of this standard

See Part 1.

4. Reference conditions and intrinsic errors

4.1 Reference conditions

4.1.1 The reference values of the influence quantities shall be as given in Tables I-1 and I-5.

TABLE I-5
Reference conditions and tolerances, additional to those given in Table I-1,
for testing purposes

Influence quantity	Reference conditions unless otherwise marked		Tolerance permitted for testing purposes, applicable for a single reference value ¹⁾
Voltage component of the measured quantity	Rated voltage or any voltage within the reference range, if any		± 2% of the rated value
Current component of the measured quantity	40% ... 100% of rated current		—
Phase balance (for polyphase instruments)	Symmetrical voltages and currents		2)
Frequency of current and voltage components of the measured quantity	Instruments using phase shifting devices	Reference frequency	± 0.1% of the reference frequency
	Other instruments	45 Hz to 65 Hz	± 2% of the reference frequency

¹⁾ This tolerance applies when a single reference value is specified in this table or is marked by the manufacturer. For a reference range, no tolerance is allowed.

²⁾ Each of the voltages (between any two lines or between line and neutral) should not differ by more than 1% from the average of the voltages (line-to-line or line-to-neutral) of the system.
Each of the currents in the phases should not differ by more than 1% from the average of the currents.
The angles between each of the currents and the corresponding phase-to-neutral voltages should not differ by more than 2° from the average of the angles.

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4.1.2 See Part 1.

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4.1.3 Reference conditions different from those given in Tables I-1 and I-5 may be specified, but they shall then be marked in accordance with Clause 8 of Part 1.

4.2 Limits of intrinsic error, fiducial value

See Part 1.

For a synchroscope, the accuracy requirements apply only at the synchronizing mark.

4.2.1 Correspondence between intrinsic error and accuracy class

See Part 1.

4.2.2 Fiducial value

The fiducial value corresponds to 90 electrical degrees.

The class index is marked using Symbol E-1 given in Table III-1 of Part 1 (see Part 1, Clause 8).

5. Nominal range of use and variations

5.1 Nominal range of use

See Part 1 and Table II-5.