

Direct acting indicating analogue electrical measuring instruments and their accessories —

Part 8: Specification for special requirements for accessories

This European Standard EN 60051-8 has the status of a
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Cooperating organizations

The European Committee for Electrotechnical Standardization (CENELEC), under whose supervision this European Standard was prepared, comprises the National Committees of the following countries.

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National foreword

This British Standard has been prepared under the direction of the Power Electrical Engineering Standards Policy Committee and is the English language version of EN 60051-8 “*Direct acting indicating analogue electrical measuring instruments and their accessories — Part 8: Special requirements for accessories*”, published by the European Committee for Electrotechnical Standardization (CENELEC). It is identical with IEC publication 51-8 published by the International Electrotechnical Commission (IEC).

This Part of BS 89 together with Parts 1, 2, 3, 4, 5, 6, 7 and 9 of this standard supersedes BS 89:1977, which is withdrawn. BS 89 comprises the following Parts, which will be the English language version of the listed European Standards.

European Standard	Corresponding Part of BS 89
EN 60051-1	Part 1 <i>Specification for definitions and general requirements common to all Parts</i>
EN 60051-2	Part 2 <i>Specification for special requirements for ammeters and voltmeters</i>
EN 60051-3	Part 3 <i>Specification for special requirements for wattmeters and varmeters</i>
EN 60051-4	Part 4 <i>Specification for special requirements for frequency meters</i>
EN 60051-5	Part 5 <i>Specification for special requirements for phase meters, power factor meters and synchrosopes</i>
EN 60051-6	Part 6 <i>Specification for special requirements for ohmmeters (impedance meters) and conductance meters</i>
EN 60051-7	Part 7 <i>Specifications for special requirements for multi-function instruments</i>
EN 60051-8	Part 8 <i>Specification for special requirements for accessories</i>
EN 60051-9	Part 9 <i>Recommended test methods</i>

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 8, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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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 8: Special requirements for accessories**

(IEC 51-8 (1984) edition 4)

Appareils mesureurs électriques indicateurs
analogiques à action directe et leurs accessoires
Huitième partie: Prescriptions particulières
pour les accessoires
(CEI 51-8 (1984) édition 4)

Direkt wirkende anzeigende elektrische
Meßgeräte und ihr Zubehör Meßgeräte mit
Skalanzeige Teil 8: Spezielle Anforderungen
für Zebehör
(IEC 51-8 (1984) Ausgabe 4)

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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.

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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

Brief history

The text of IEC-Publication 51-8 (4th edition — 1984) was submitted to the CENELEC members for unique acceptance.

Technical text

The text of the International Standard IEC 51-8 (4th edition — 1984) was approved by CENELEC on 11 September 1989 as a European Standard.

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

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.

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 8.

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
13B(CO)91	13B(CO)100

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

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1 Scope

1.1 This sub-clause of Part 1 does not apply to accessories.

1.2 Part 8 of the standard applies to accessories as defined in Sub-clause **2.1.15** of Part 1.

1.3 This sub-clause of Part 1 does not apply to accessories.

1.4 to 1.8 See Part 1.

2 Definitions

See Part 1.

3 Description, classification and compliance

3.1 Description

Accessories shall be described:

3.1.1 According to their nature as:

3.1.1.1 Shunts as defined in Sub-clause **2.1.16** of Part 1.

3.1.1.2 Series resistors (impedances) as defined in Sub-clause **2.1.17** of Part 1.

3.1.1.3 Special-to-type accessories, for example reactor boxes for frequency meters.

3.1.2 According to their interchangeability as:

3.1.2.1 Interchangeable accessories as defined in Sub-clause **2.1.15.1** of Part 1.

3.1.2.2 Accessories of limited interchangeability as defined in Sub-clause **2.1.15.2** of Part 1.

3.1.2.3 Non-interchangeable accessories as defined in Sub-clause **2.1.15.3** of Part 1.

3.2 Classification

3.2.1 Interchangeable accessories and accessories of limited interchangeability shall be classified in one of the accuracy classes denoted by the following class indices:

0.02, 0.05, 0.1, 0.2, 0.3, 0.5, 1, 2*, 5*, 10*,

NOTE The class indices marked with an asterisk (*) are only for use with high-voltage series resistors and impedances.

3.2.2 A non-interchangeable accessory has no accuracy class of its own: the accuracy class of the associated instrument applies to the combination of the instrument and accessory.

3.3 Compliance with the requirements of this standard

See Part 1.

3.3.1 and **3.3.2** See Part 1.

3.3.3 Interchangeable accessories and accessories of limited interchangeability

3.3.3.1 The error shall not exceed the amount specified by Sub-clause **4.2** at all values of the measured quantity up to and including the rated value.

3.3.3.2 Shunts and series resistors shall be tested using direct current unless a frequency is stated.

3.3.3.3 Interchangeable shunts

When the current taken by the associated measuring instrument is smaller than the rated current multiplied by the class index of the shunt and divided by 300, the current taken by the associated measuring instrument may be neglected.

3.3.4 Accessories of limited interchangeability

3.3.4.1 The accessory is connected to an instrument of the associated type and the errors of the combination are determined.

3.3.4.2 The instrument alone is tested under the same conditions as used in the test of Sub-clause **3.3.4.1** and its errors are determined for the same indicated values that were obtained in that test.

3.3.4.3 The error of the accessory for each pair of indicated values is taken to be the difference obtained by subtracting the error determined in Sub-clause **3.3.4.2** from the error determined in Sub-clause **3.3.4.1**, taking account of the signs of the errors (see Part 1, Sub-clause **2.7.1**).

3.3.4.4 Instruments intended to be used with accessories of limited interchangeability may necessitate special values of certain circuit elements. Where this is necessary, the relevant information shall be given by the manufacturer and shall be complied with when carrying out the tests.

3.3.4.5 When an instrument cannot be tested without an accessory, the accuracy class applies to the combination only and the class index is marked on the instrument. The errors are determined in accordance with Sub-clause **3.3.4.1**.

3.3.5 Non-interchangeable accessories

The accessory is tested in combination with its own instrument. There are no requirements relating to limits of error for either component alone and the class index relates to the combination.

4 Reference conditions and intrinsic errors

4.1 Reference conditions

See Part 1.

4.2 Limits of intrinsic error, fiducial value

See Part 1.

4.2.1 Correspondence between intrinsic error and accuracy class

See Part 1.

4.2.2 Fiducial value

The fiducial value for an interchangeable accessory or an accessory of limited interchangeability corresponds to the rated value.

The class index is marked using Symbol E-1 given in Table III-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-8.

5.2 Limits of variations

See Part 1.

5.2.1 and **5.2.2** See Part 1. These sub-clauses apply when relevant (e.g. to reactor boxes).

5.2.3 This sub-clause of Part 1 does not apply to accessories.

5.2.4 See Part 1. However, this sub-clause does not apply to an accessory which is intended to be supported by its associated wiring or supported by a bus bar.

5.3 Conditions for the determination of variations

See Part 1.

6 Further electrical and mechanical requirements**6.1 Voltage tests, insulation tests and other safety requirements**

See Part 1.

6.2 Damping

The requirements of Part 1 do not apply to accessories.

6.3 Self-heating

See Part 1.

6.4 Permissible overloads**6.4.1 Continuous overload**

For the recommended test, see Part 9, Sub-clause 4.7.

Accessories, except those provided with a non-locking switch, shall be subjected to a continuous overload of 120 % of the rated value for a period of 2 h.

After having cooled to the reference temperature, the accessory shall comply with the requirements relating to its accuracy class.

This test shall be carried out under reference conditions.

6.4.2 Overloads of short duration

For the recommended tests, see Part 9, Sub-clause 4.5.

Accessories, except those provided with a non-locking switch, shall be subjected to overloads of short duration.

6.4.2.1 The currents and voltages for the overloads of short duration shall be the product of the relevant factor given in Table IV-8 and the rated value of the shunt or the series resistor (impedance), unless other values are stated by the manufacturer.

6.4.2.2 The full duration of each overload shall be applied except when an automatic cut-out (fuse) fitted to the accessory has interrupted the circuit in less than the time specified in Table IV-8.

The automatic cut-out shall be reset (or the fuse replaced) before the application of the next overload.

Table II-8 — Limits of the nominal range of use and permissible variations additional to those given in Table II-1

Influence quantity	Limits of the nominal range of use, unless otherwise marked	Permissible variations expressed as a percentage of the class index	For the recommended tests, see Part 9, Sub-clause:
Ripple on d.c. measured quantity	20 %	50 %	3.6
Distortion of a.c. measured quantity	20 % (with a peak factor less than 3)	100 %	3.7
Frequency of a.c. measured quantity	Reference frequency ± 10 %	100 %	3.8
Magnetic field of external origin	0.4 kA/m	100 %	3.5

Table IV-8 — Overloads of short duration

Rated value	Current factor	Voltage factor	Number of overloads	Duration of each overload (s)	Interval between any two overloads (s)
Shunts of class indices 0.3 and smaller					
≤ 10 kA	2	—	1	0,5	—
> 10 kA	Subject to special agreement				
Shunts of class indices 0.5 and greater					
≤ 250 A	10	—	1	5	—
250 A < ... ≤ 2 kA	5	—	1	5	—
2 kA < ... ≤ 10 kA	2	—	1	5	—
> 10 kA	Subject to special agreement				
Series resistors (impedances) of class indices 0.3 and smaller					
≤ 2 kV	—	2	5	0.5	15
> 2 kV	Subject to special agreement				
Series resistors (impedances) of class indices 0.5 and 1					
≤ 2 kV	—	2	9	0.5	60
	—	2	1	5	—
> 2 kV	Subject to special agreement				
Series resistors (impedances) of class indices 2 and greater					
All rated values	—	2	9	0.5	60
	—	2	1	5	—

NOTE When two series of tests are specified, they should both be carried out, in the order given.

6.4.2.3 After having been subjected to the overloads of short duration and after having cooled to the reference temperature, an accessory shall comply with the requirements relating to its class index; however, the overloads shall not be repeated.

6.5 Limiting values of temperature

See Part 1.

6.6 Deviation from zero

There are no requirements relating to deviation from zero for accessories.

7 Constructional requirements

7.1 Sealing to prevent access

See Part 1.

7.2 Scales

There are no requirements relating to scales for accessories.

7.3 Preferred values

7.3.1 The value of the resistance of a shunt should be such as to develop one of the voltage drops given in Sub-clause 7.3.2 for one of the preferred instrument currents given in Sub-clause 7.3.1 of the relevant part.

7.3.2 The voltage drop at the nominal current of a shunt should be one of the following values:

50 mV, 60 mV, 75 mV, 100 mV, 300 mV.

7.4 Adjuster(s), mechanical and/or electrical

There are no requirements relating to adjusters for accessories.

8 Information, general markings and symbols

8.1 Information

See Part 1.

8.1.1 A series resistor (impedance) shall be marked with its resistance (or impedance at a marked frequency) expressed in ohms and/or with its nominal current.

These values are treated as rated values and shall be stated as required by Item e) in Sub-clause 8.1 of Part 1.

8.2 and 8.3 See Part 1.

9 Markings and symbols for terminals

See Part 1.

10 Tests to prove compliance with this standard

See Part 1.

National appendix W

The United Kingdom participation in the preparation of this European Standard was entrusted by the Power Electrical Engineering Standards Policy Committee (PEL/-) to Technical Committee PEL/13 upon which the following bodies were represented:

Association of Consulting Engineers

Association of Supervisory and Executive Engineers

Department of Energy (Electricity Division)

Department of Trade and Industry (National Physical Laboratory)

Department of Trade and Industry (National Measurement Accreditation Service)

Electrical Power Engineers' Association

Electricity Supply Industry in England and Wales

Engineering Teaching Equipment Manufacturers' Association

GAMBICA (BEAMA) Ltd.

General Electric Company Limited

Institution of Electrical Engineers

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