

Direct acting indicating analogue electrical measuring instruments and their accessories —

Part 7: Specification for special requirements for multi-function instruments

This European Standard EN 60051-7 has the status of a
British Standard

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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 60051-7 “*Direct acting indicating analogue electrical measuring instruments and their accessories — Part 7: Special requirements for multi-function instruments*” published by the European Committee for Electrotechnical Standardization (CENELEC). It is identical with IEC publication 51-7 published by the International Electrotechnical Commission (IEC).

This Part of BS 89 together with Parts 1, 2, 3, 4, 5, 6, 8 and 9 of this standard supersedes BS 89:1977, which is withdrawn.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>Specification 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 6, 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; multi-function measuring instruments

English version

Direct acting indicating analogue electrical
measuring instruments and their accessories
Part 7: Special requirements for multi-function
instruments

(IEC 51-7 (1984) edition 4)

Appareils mesureurs électriques indicateurs
analogues à action directe et leurs accessoires
Septième partie: Prescriptions particulières
pour les appareils à fonctions multiples
(CEI 51-7 (1984) édition 4)

Direkt wirkende anzeigende elektrische
Meßgeräte und ihr Zubehör Meßgeräte mit
Skalenanzeige Teil 7: Spezielle Anforderungen
für Vielfach-Meßgeräte
(IEC 51-7 (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 alternation.

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 de Stassart 35, B-1050 Brussels

Brief history

The text of IEC-Publication 51-7 (4th edition — 1984) was submitted to the CENELEC members for unique acceptance.

Technical text

The text of the International Standard IEC 51-7 (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 7.

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 Synchroscopes;*
- *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)90	13B(CO)99

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

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1 Scope

1.1 Part 7 of the standard applies to multi-function analogue instruments as defined in Sub-clause **2.1.7** of Part 1.

1.2 This part also applies to non-interchangeable accessories (as defined in Sub-clause **2.1.15.3** of Part 1) used with multi-function analogue instruments.

1.3 to 1.8 See Part 1.

2 Definitions

See Part 1.

3 Description, classification and compliance

3.1 Description

Multi-function instruments shall be described in accordance with the quantities which they measure, for example d.c./a.c. ammeter—d.c./a.c. voltmeter—ohmmeter.

3.2 Classification

3.2.1 Each function of a multi-function instrument shall be classified in one of the accuracy classes denoted by the class indices as given in Sub-clause **3.2** of the part relevant to that function.

3.2.2 Each function may have a different class index.

D.C. and a.c. are considered to be different measuring functions as are the measurement of current and voltage.

3.2.3 Some ranges of a function may have a different class index from the other ranges.

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 The special requirements of the relevant Parts 2 to 6 apply to the various functions of a multi-function instrument.

4 Reference conditions and intrinsic errors

4.1 Reference conditions

See Part 1 for general requirements and Sub-clause **4.1** in the relevant part for each function for special requirements, if any.

4.2 Limits of intrinsic error; fiducial value

See Part 1 for general requirements and Sub-clause **4.2** in the relevant part for each function for special requirements, if any.

4.2.1 Correspondence between intrinsic error and accuracy class

See Part 1 for general requirements and Sub-clause **4.2.1** in the relevant part for each function for special requirements, if any.

4.2.2 Fiducial value

The fiducial value for each function of a multi-function instrument shall be as given in Sub-clause **4.2.2** of the part relevant to that function.

5 Nominal range of use and variations

5.1 Nominal range of use

See Part 1 and Tables II of the parts relevant to each function.

5.2 Limits of variations

See Part 1 for general requirements and Sub-clause **5.2** of the relevant parts for each function for special requirements, if any.

5.3 Conditions for the determination of variations

See Part 1 for general requirements and Sub-clause **5.3** of the relevant parts for each function for special requirements, if any.

6 Further electrical and mechanical requirements

6.1 Voltage tests; insulation tests and other safety requirements

See Part 1.

6.2 Damping

See Part 1 for general requirements and Sub-clause **6.2** of the relevant parts for each function for special requirements, if any.

However, if a multi-function instrument cannot meet all of the requirements of Sub-clause **6.2** of Part 1 on one or more ranges, the manufacturer shall mark Symbol F-33 (Table III-1) on the dial or on a part which is visible while the instrument is in use and shall give details in a separate document of the requirements which cannot be met.

6.3 Self-heating

See Part 1 for general requirements and Sub-clause **6.3** in the relevant part for each function for special requirements, if any.

However, if a multi-function instrument cannot meet all of the requirements of Sub-clause **6.3** of Part 1 on one or more ranges, the manufacturer shall mark Symbol F-33 (Table III-1) on the dial or on a part which is visible while the instrument is in use and shall give details in a separate document of the requirements which cannot be met.

6.4 Permissible overloads

See Part 1 for general requirements and Sub-clause 6.4 of the relevant parts for each function for special requirements, if any.

However, if a multi-function instrument cannot meet all of the requirements of Sub-clause 6.4 of Part 1 on one or more ranges, the manufacturer shall mark Symbol F-33 (Table III-1) on the dial or on a part which is visible while the instrument is in use and shall give details in a separate document of the requirements which cannot be met.

6.5 Limiting values of temperature

See Part 1.

6.6 Deviation from zero

Special requirements and tests for deviation from zero and for return to zero are given in Sub-clause 6.6 of the parts relevant to each function.

7 Constructional requirements

7.1 and 7.2 See Part 1.

7.3 Preferred values

Special requirements concerning preferred values are given in Sub-clause 7.3 of the part relevant to each function.

7.4 Adjuster(s), mechanical and/or electrical

See Part 1.

8 Information, general markings and symbols

See Part 1.

However, if it is unpractical to mark on the dial all of the information that is required by Sub-clauses 8.2.1 and 8.2.2 of Part 1, the manufacturer shall mark Symbol F-33 (Table III-1) on the dial or on a part which is visible while the instrument is in use and shall give in a separate document the information which is not marked.

9 Markings and symbols for terminals

9.1 to 9.3 See Part 1

9.4 Special markings for terminals

9.4.1 Terminals shall be clearly marked to show their function and/or range.

9.4.2 If a terminal is used as the positive terminal of a d.c. current or voltage measuring function, either it shall be marked using Symbol F-46 (+) given in Table III-1, or the terminal and/or its immediate surround shall be coloured red. This requirement applies no matter what its use may be with any other function.

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

BS 89-7:1990
EN 60051-7:
1989
IEC 51-7:1984

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