

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Direct acting indicating analogue electrical measuring instruments and their accessories –

Part 7: Special requirements for multi-function instruments

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

Partie 7: Exigences particulières pour les appareils à fonctions multiples



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**DIRECT ACTING INDICATING ANALOGUE ELECTRICAL MEASURING
INSTRUMENTS AND THEIR ACCESSORIES –****Part 7: Special requirements for multi-function instruments****FOREWORD**

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International Standard IEC 60051-7 has been prepared by IEC technical committee 85: Measuring equipment for electrical and electromagnetic quantities.

This fifth edition cancels and replaces the fourth edition published in 1984. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) updating of content in line with new editions of IEC 60051-1 and IEC 60051-9;
- b) addition of Annex A to specify the nonconformity classification of test items.

The text of this International Standard is based on the following documents:

CDV	Report on voting
85/560/CDV	85/583A/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This International Standard is to be used in conjunction with IEC 60051-1:2016.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60051 series, published under the general title *Direct acting indicating analogue electrical measuring instruments and their accessories*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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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 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

IEC 60051-7 is not complete in itself and is read in conjunction with IEC 60051-1.

All of these parts are arranged in the same format and a standard relationship between subject and clause number is maintained throughout these parts. This 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 7: Special requirements for multi-function instruments

1 Scope

This part of IEC 60051 applies to multi-function analogue instruments.

This document also applies to non-interchangeable accessories (as defined in 3.1.23 of IEC 60051-1:2016) used with multi-function analogue instruments.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60051-1:2016, *Direct acting indicating analogue electrical measuring instruments and their accessories – Part 1: Definitions and general requirements common to all parts*

3 Terms and definitions

[IEC 60051-7:2017](https://standards.iteh.ai/catalog/standards/sist/d03736e1-6fbf-4839-93b5-25ff6f240318/iec-60051-7-2017)

See IEC 60051-1:2016.

4 Description, classification and compliance

4.1 Description

See IEC 60051-1:2016.

4.2 Classification

See IEC 60051-1:2016.

Each function of a multi-function instrument shall be classified in one of the accuracy classes denoted by the class indices as given in 4.2 of the part relevant to that function.

Each function may have a different class index.

DC and AC are considered to be different measuring functions as are the measurement of current and voltage.

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

4.3 Compliance with the requirements of this standard

See IEC 60051-1:2016.

5 Requirements

5.1 Reference conditions

See IEC 60051-1:2016, for general requirements and 5.1 of the relevant part for each function for special requirements, if any.

5.2 Limits of intrinsic uncertainty, fiducial value

5.2.1 Limits of intrinsic uncertainty

See IEC 60051-1:2016, for general requirements and 5.2.1 of the relevant part for each function for special requirements, if any.

5.2.2 Correspondence between intrinsic uncertainty and accuracy class

See IEC 60051-1:2016, for general requirements and 5.2.2 of the relevant part for each function for special requirements, if any.

5.2.3 Fiducial value

The fiducial value for each function of a multi-function instrument shall be as given in 5.2.3 of the part relevant to that function.

5.3 Nominal range of use and variations

5.3.1 Nominal range of use (standards.iteh.ai)

See Table 3 of IEC 60051-1:2016. The limits of the nominal range of use shall be given in the specific table for the relevant part. [IEC 60051-7:2017](https://standards.iteh.ai/catalog/standards/sist/d03736e1-6fbf-4839-93b5-25ff6f240318/iec-60051-7-2017)

5.3.2 Limits of variations

See IEC 60051-1:2016, for general requirements and 5.3.2 of the relevant part for each function for special requirements, if any.

5.3.3 Conditions for the determination of variations

See IEC 60051-1:2016, for general requirements and 5.3.3 of the relevant part for each function for special requirements, if any.

5.4 Operating uncertainty, overall system uncertainty and variations

See IEC 60051-1:2016.

5.5 Electrical requirements

5.5.1 Electrical safety requirements

See IEC 60051-1:2016.

5.5.2 Self-heating

See IEC 60051-1:2016, for general requirements and 5.5.2 of the relevant part for each function for special requirements, if any.

However, if a multi-function instrument cannot meet all of the requirements of 5.5.2 of IEC 60051-1:2016 on one or more ranges, the manufacturer shall mark symbol F-31 given in Table 6 of IEC 60051-1:2016 (see Clause 6 of IEC 60051-1:2016) 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.

5.5.3 Permissible overloads

See IEC 60051-1:2016, for general requirements and 5.5.3 of the relevant part for each function for special requirements, if any.

However, if a multi-function instrument cannot meet all of the requirements of 5.5.3 of IEC 60051-1:2016 on one or more ranges, the manufacturer shall mark symbol F-31 given in Table 6 of IEC 60051-1:2016 (see Clause 6 of IEC 60051-1:2016) 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.

5.5.4 Limiting range of temperature

See IEC 60051-1:2016.

5.5.5 Deviation from zero

Special requirements and tests for deviation from zero and for return to zero are given in 5.5.5 of the part relevant to each function.

5.5.6 Electromagnetic compatibility (EMC)

See IEC 60051-1:2016.

5.6 Constructional requirements

5.6.1 General constructional requirements

See IEC 60051-1:2016.

5.6.2 Damping

See IEC 60051-1:2016 for general requirements and 5.6.2 of the relevant part for each function for special requirements, if any.

However, if a multi-function instrument cannot meet all of the requirements of 5.6.2 of IEC 60051-1:2016 on one or more ranges, the manufacturer shall mark symbol F-31 given in Table 6 of IEC 60051-1:2016 (see Clause 6 of IEC 60051-1:2016) 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.

5.6.3 Sealing to prevent access

See IEC 60051-1:2016.

5.6.4 Scales

See IEC 60051-1:2016.

5.6.5 Stopper

See IEC 60051-1:2016.

5.6.6 Preferred values

Special requirements concerning preferred values are given in 5.6.6 of the part relevant to each function.

5.6.7 Adjusters, mechanical and/or electrical

See IEC 60051-1:2016.

5.6.8 Effects of vibration and shock

See IEC 60051-1:2016.

5.6.9 Degrees of protection provided by enclosure

See IEC 60051-1:2016.

5.6.10 Terminals

See IEC 60051-1:2016.

6 Information, markings and symbols

6.1 Information

See IEC 60051-1:2016.

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6.2 Markings, symbols and their locations

See IEC 60051-1:2016. <https://standards.iteh.ai/catalog/standards/sist/d03736e1-6bbf-4839-93b5-25ff6f240318/iec-60051-7-2017>

However, if it is unpractical to mark on the dial all of the information that is required by 6.2 of IEC 60051-1:2016, the manufacturer shall mark symbol F-31 given in Table 6 of IEC 60051-1:2016 (see Clause 6 of IEC 60051-1:2016) 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.

6.3 Markings relating to the reference values and nominal ranges of use of influence quantities

See IEC 60051-1:2016.

6.4 The symbols for marking instruments and accessories

See IEC 60051-1:2016.

6.5 Markings and symbols for terminals

6.5.1 Requirements for markings

See IEC 60051-1:2016.

6.5.2 Earthing (grounding) terminals

See IEC 60051-1:2016.

6.5.3 Measuring circuit terminals

See IEC 60051-1:2016.