IEC 60051-6

Edition 5.0 2017-12

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Direct acting indicating analogue electrical measuring instruments and their accessories –
Part 6: Special requirements for ohmmeters (impedance meters) and conductance meters

Appareils mesureurs électriques indicateurs analogiques à action directe et leurs accessoires –
Partie 6: Exigences particulières pour les ohmmètres (les impédancemètres) et les conductancemètres

IEC 60051-6:2017-12(en-fr)

Documents
Document Sharing Hub

Full document details: IEC 60051-6 2017

THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2017 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, 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 either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, 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'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue
The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,…). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org
The world's leading online dictionary of electronic and electrical terms containing 20 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary
65 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de l'IEC
La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC
Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Catalogue IEC - webstore.iec.ch/catalogue
Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Recherche de publications IEC - www.iec.ch/searchpub

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,…). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient 20 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary
65 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.

Documents
Document Sharing Hub

Full document details: IEC 60051-6 2017

IEC 60051-6

Edition 5.0 2017-12

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Direct acting indicating analogue electrical measuring instruments and their accessories –
Part 6: Special requirements for ohmmeters (impedance meters) and conductance meters

Appareils mesureurs électriques indicateurs analogiques à action directe et leurs accessoires –
Partie 6: Exigences particulières pour les ohmmètres (les impédancemètres) et les conductancemètres

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 17.220.20

ISBN 978-2-8322-5189-8

Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.

® Registered trademark of the International Electrotechnical Commission
Marque déposée de la Commission Electrotechnique Internationale

Documents
Document Sharing Hub

Full document details: IEC 60051-6 2017

CONTENTS

FOREWORD 4
INTRODUCTION 6
1 Scope 7
2 Normative references 7
3 Terms and definitions 7
4 Description, classification and compliance 7
4.1 Description 7
4.1.1 Description according to methods of operation or nature 7
4.1.2 Description according to environmental conditions 7
4.1.3 Description according to mechanical conditions 8
4.1.4 Description according to degrees of protection 8
4.1.5 Description according to methods of measurement 8
4.1.6 Description according to linearity of scale 8
4.2 Classification 8
4.3 Compliance with the requirements of this standard 8
5 Requirements 8
5.1 Reference conditions 8
5.2 Limits of intrinsic uncertainty, fiducial value 8
5.2.1 Limits of intrinsic uncertainty 8
5.2.2 Correspondence between intrinsic uncertainty and accuracy class 8
5.2.3 Fiducial value 8
5.3 Nominal range of use and variations 9
5.3.1 Nominal range of use 9
5.3.2 Limits of variations 9
5.3.3 Conditions for the determination of variations 9
5.4 Operating uncertainty, overall system uncertainty and variations 9
5.5 Electrical requirements 9
5.5.1 Electrical safety requirements 9
5.5.2 Self-heating 9
5.5.3 Permissible overloads 9
5.5.4 Limiting range of temperature 10
5.5.5 Deviation from zero 10
5.5.6 Electromagnetic compatibility (EMC) 10
5.6 Constructional requirements 10
5.6.1 General constructional requirements 10
5.6.2 Damping 10
5.6.3 Sealing to prevent access 10
5.6.4 Scales 10
5.6.5 Stopper 10
5.6.6 Preferred values 10
5.6.7 Adjusters, mechanical and/or electrical 11
5.6.8 Effects of vibration and shock 11
5.6.9 Degrees of protection provided by enclosure 11
5.6.10 Terminals 11
6 Information, markings and symbols 11
6.1 Information 11

AVA Documents
Document Sharing Hub
Full document details: IEC 60051-6 2017

6.2 Markings, symbols and their locations 11
6.3 Markings relating to the reference values and nominal ranges of use of influence quantities 11
6.4 The symbols for marking instruments and accessories 11
6.5 Markings and symbols for terminals 11
6.5.1 Requirements for markings 11
6.5.2 Earthing (grounding) terminals 11
6.5.3 Measuring circuit terminals 11
6.5.4 Special markings for terminals 12
6.6 Instructions for use 12
7 Package 12
8 Test rules 12
Annex A (normative) Nonconformity classification of tests 13
Bibliography 14

Table A.1 – Nonconformity classification of tests 13

Documents
Document Sharing Hub

Full document details: IEC 60051-6 2017

INTERNATIONAL ELECTROTECHNICAL COMMISSION

DIRECT ACTING INDICATING ANALOGUE ELECTRICAL MEASURING INSTRUMENTS AND THEIR ACCESSORIES –

Part 6: Special requirements for ohmmeters (impedance meters) and conductance meters

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60051-6 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.

Documents
Document Sharing Hub

Full document details: IEC 60051-6 2017

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

CDV	Report on voting
85/559/CDV	85/582A/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.

Documents
Document Sharing Hub

Full document details: IEC 60051-6 2017

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 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

IEC 60051-6 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.

Documents
Document Sharing Hub

Full document details: IEC 60051-6 2017

DIRECT ACTING INDICATING ANALOGUE ELECTRICAL MEASURING INSTRUMENTS AND THEIR ACCESSORIES –

Part 6: Special requirements for ohmmeters (impedance meters) and conductance meters

1 Scope

This part of IEC 60051 applies to direct acting indicating analogue electrical measuring ohmmeters (impedance meters) and conductance meters.

This document also applies to some non-interchangeable accessories of ohmmeters (impedance meters) and conductance meters.

This document 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.

This document also applies to electronic devices of ohmmeters (impedance meters) and conductance meters in their measuring and/or auxiliary circuits.

This document does not apply to insulation ohmmeters, grounding ohmmeters and external commercial power ohmmeters (impedance meters) and conductance meters.

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 – Part1: Definitions and general requirements common to all parts*

3 Terms and definitions

See IEC 60051-1:2016.

4 Description, classification and compliance

4.1 Description

4.1.1 Description according to methods of operation or nature

See IEC 60051-1:2016.

4.1.2 Description according to environmental conditions

See IEC 60051-1:2016.

Documents
Document Sharing Hub

Full document details: IEC 60051-6 2017

4.1.3 Description according to mechanical conditions

See IEC 60051-1:2016.

4.1.4 Description according to degrees of protection

See IEC 60051-1:2016.

4.1.5 Description according to methods of measurement

Ohmmeters (impedance meters) and conductance meters shall be described according to whether they measure resistance values by a two-terminal or a four-terminal method.

4.1.6 Description according to linearity of scale

Ohmmeters (impedance meters) and conductance meters shall be described according to whether they have a linear scale or a non-linear scale.

4.2 Classification

Ohmmeters (impedance meters) and conductance meters shall be classified in one of the accuracy classes denoted by the following class indices:

0,05, 0,1, 0,2, 0,5, 1, 1,5, 2, 2,5, 3, 5, 10, 20.

4.3 Compliance with the requirements of this standard

4.3.1 See IEC 60051-1:2016.

4.3.2 See IEC 60051-1:2016.

4.3.3 See IEC 60051-1:2016.

4.3.4 For impedance meters and for instruments not scaled in units of resistance or conductance, the manufacturer's instructions shall be followed.

5 Requirements

5.1 Reference conditions

See IEC 60051-1:2016.

5.2 Limits of intrinsic uncertainty, fiducial value

5.2.1 Limits of intrinsic uncertainty

See IEC 60051-1:2016.

5.2.2 Correspondence between intrinsic uncertainty and accuracy class

See IEC 60051-1:2016.

5.2.3 Fiducial value

5.2.3.1 The fiducial value for non-linear scale ohmmeters and impedance meters is the indicated value.

The class index is marked using symbol E-3 given in Table 6 of IEC60051-1:2016 (see Clause 6 of IEC 60051-1:2016).

AVA Documents
Document Sharing Hub

Full document details: IEC 60051-6 2017