SLOVENSKI STANDARD
oSIST prEN 60051-9:2018

01-april-2018

Neposredni kazalni analogni električni merilni instrumenti in njihov pribor - 9. del: Priporočene preskusne metode

Direct acting indicating analogue electrical-measuring instruments and their accessories - Part 9: Recommended test methods

Direkt wirkende anzeigende elektrische Meßgeräte und ihr Zubehör - Meßgeräte mit Skalenanzeige - Teil 9: Empfohlene Prüfverfahren

Appareils mesureurs électriques indicateurs analogiques à action directe et leurs accessoires - Partie 9: Méthodes d'essai recommandées

Ta slovenski standard je istoveten z: **prEN 60051-9:2018**

ICS:

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

oSIST prEN 60051-9:2018 **en,fr,de**

85/620/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER:	
IEC 60051-9 ED5	
DATE OF CIRCULATION:	CLOSING DATE FOR VOTING:
2018-01-26	**2018-04-20**
SUPERSEDES DOCUMENTS:	
85/577/CD,85/618/CC	

IEC TC 85 : MEASURING EQUIPMENT FOR ELECTRICAL AND ELECTROMAGNETIC QUANTITIES	
SECRETARIAT: China	SECRETARY: Mr Bo Chen
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☐ ENVIRONMENT ☐ QUALITY ASSURANCE ☐ SAFETY	
☒ SUBMITTED FOR CENELEC PARALLEL VOTING **Attention IEC-CENELEC parallel voting** The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Direct acting indicating analogue electrical measuring instruments and their accessories. Part 9: Recommended test methods

PROPOSED STABILITY DATE: 2020

NOTE FROM TC/SC OFFICERS:

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

DIRECT ACTING INDICATING ANALOGUE ELECTRICAL MEASURING INSTRUMENTS AND THEIR ACCESSORIES –

Part 9: Recommended test methods

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 60051-9 has been prepared by IEC technical committee 85: Measuring equipment for electromagnetic quantities.

This fifth edition cancels and replaces the fourth edition published in 1988, Amendment 1:1994 and Amendment 2:1995. This edition constitutes a technical revision.

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

- adding performance requirements for test equipment;

- updating the references to applicable standards of test methods.

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

FDIS	Report on voting
85/XX/FDIS	85/XX/RVD

Full information on the voting for the approval of this 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 publication 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 publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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

The National Committees are requested to note that for this publication the stability date is 2020

THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE DELETED AT THE PUBLICATION STAGE.

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 60051-9 is not complete in itself and is read in conjunction with IEC 60051-1.

DIRECT ACTING INDICATING ANALOGUE ELECTRICAL MEASURING INSTRUMENTS AND THEIR ACCESSORIES –

Part 9: Recommended Test methods

1 Scope

This part of IEC 60051 applies to direct acting indicating analogue electrical measuring instruments and their accessories and, gives guidance for applicable test methods and for the performance of test equipment.

This document does not apply to:

- special purpose instruments that are covered by their own IEC standards;
- special purpose devices that are covered by their own IEC standards when they are used as accessories.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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*

IEC 61000-4-8, *Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test*

IEC 61010-1, Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements

IEC 61010-2-030, Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-030: Particular requirements for testing and measuring circuits

IEC 61326-1, *Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements*

IEC 61326-2-1, *Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-1: Particular requirements - Test configurations, operational conditions and performance criteria for sensitive test and measurement equipment for EMC unprotected applications*

IEC 61557-1, *Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c. - Equipment for testing, measuring or monitoring of protective measures - Part 1: General requirements*

IEC 61557-12, *Electrical safety in low voltage distribution systems up to 1 000 V a.c. and 1 500 V d.c. - Equipment for testing, measuring or monitoring of protective measures - Part 12: Performance measuring and monitoring devices (PMD)*

3 Terms and definitions

See IEC 60051-1:2016.

4 Requirements for test equipment

4.1 General

Test equipment shall have sufficient accuracy and stability for determination of intrinsic uncertainty of the measurand and its variations.

NOTE Calibration protocols can be used.

4.2 Test equipment for measuring the intrinsic uncertainty of the measurand and its variations

The maximum instrumental uncertainty of reference instruments used to determine the intrinsic uncertainty of the measurand and variations shall be 0,2 times the class index of the tested instrument.

4.3 Test equipment for overload tests, self-heating, damping, overshoot and response time

The maximum uncertainty of the settings of the electrical quantities that will be used to test overload, self-heating, damping, overshoot and response time shall be ± 1% of those settings.

4.4 Test equipment for phase shift

Test equipment for settings of phase shift for power meters shall have an uncertainty of ±1° or better.

The instrumental uncertainty of test equipment for phase meters and power factor meters shall comply with 4.2.

4.5 Test equipment for temperatures

Equipment for settings of temperatures shall have a maximum uncertainty in the temperature settings of ± 1°C.

4.6 Test equipment for humidity

Equipment for settings of humidity shall have a maximum uncertainty in the humidity settings of ± 2%

5 Test methods for determination of intrinsic uncertainty

The intrinsic uncertainty at defined test points shall be checked with slowly increasing or decreasing measuring values without any overshoot and without tapping. The test points for the type test can be defined by the manufacturer. The routine tests should be carried out at full scale at all ranges and the characteristic should be tested in one range at the minimum.

NOTE Tapping is only allowed for the determination of scale marks and for the determination of variations.

6 Test methods for damping

Damping shall be tested at 75% of the scale length.

7 Test methods for humidity

Settings of relative humidity in relationship to temperatures shall follow the relevant requirements of IEC 61557-12. The duration time for the determination of the variation shall be 1 h at the minimum.

8 Tests with distorted ac. quantities

Peak factors deviating from 1, 4141 should be simulated by a combination of 3rd, 5th and 7th harmonic. Distortions should be simulated with the 7th harmonic.

9 Test methods for shock and vibration

Tests for mechanical shock shall follow the requirements for mechanical strength of IEC 61010-1.

The test method for vibration shall follow the requirements of IEC 61557-1.

10 Test methods for external magnetic field

The test configuration shall comply with IEC 61000-4-8 but with a test level of 400A/m

11 Test methods for external electric field

Electric fields should be simulated by two metallic plates with a distance of 1m in parallel. The EUT shall be placed in the centre between the plates and shall be turned around to find the worst case position. Test points may be specified by the manufacturer. The cubature of this configuration should be at the minimum 10 times higher than the cubature of EUT to keep the field homogenous.

12 Test methods for electrical safety

Test methods shall comply with IEC 61010-1 and IEC 61010-2-030.

13 Test methods for electromagnetic compatibility (EMC)

Test methods shall comply with IEC 61326-1 and IEC 61326-2-1.