SLOVENSKI STANDARD
oSIST prEN 61557-4:2018

01-april-2018

Električna varnost v nizkonapetostnih razdelilnih sistemih izmenične napetosti do 1 kV in enosmerne napetosti do 1,5 kV - Oprema za preskušanje, merjenje ali nadzorovanje zaščitnih ukrepov - 4. del: Upornost ozemljitvenega priključka in izenačitev potencialov

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 4: Resistance of earth connection and equipotential bonding

Elektrische Sicherheit in Niederspannungsnetzen bis AC 1 000 V und DC 1 500 V - Geräte zum Prüfen, Messen oder Überwachen von Schutzmaßnahmen - Teil 4: Widerstand von Erdungsleitern, Schutzleitern und Potentialausgleichsleitern

Sécurité électrique dans les réseaux de distribution basse tension de 1 000 V c.a. et 1 500 V c.c. - Dispositifs de contrôle, de mesure ou de surveillance de mesures de protection - Partie 4: Résistance de conducteurs de terre et d'équipotentialité

Ta slovenski standard je istoveten z: **prEN 61557-4:2018**

ICS:

17.220.20	Merjenje električnih in magnetnih veličin	Measurement of electrical and magnetic quantities
29.080.01	Električna izolacija na splošno	Electrical insulation in general
29.240.01	Omrežja za prenos in distribucijo električne energije na splošno	Power transmission and distribution networks in general

oSIST prEN 61557-4:2018 **en,fr,de**

85/632/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 61557-4 ED3**	
DATE OF CIRCULATION: **2018-02-09**	CLOSING DATE FOR VOTING: **2018-05-04**
SUPERSEDES DOCUMENTS: **85/610/CD,85/624/CC**	

IEC TC 85 : MEASURING EQUIPMENT FOR ELECTRICAL AND ELECTROMAGNETIC QUANTITIES	
SECRETARIAT: China	SECRETARY: Mr Bo Chen
OF INTEREST TO THE FOLLOWING COMMITTEES: TC 26,TC 44,TC 62,TC 64,TC 66,TC 108	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:

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 4: Resistance of earth connection and equipotential bonding

PROPOSED STABILITY DATE: 2025

NOTE FROM TC/SC OFFICERS:

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

____

ELECTRICAL SAFETY IN LOW VOLTAGE DISTRIBUTION SYSTEMS UP TO 1 000 V AC AND 1 500 V DC – EQUIPMENT FOR TESTING, MEASURING OR MONITORING OF PROTECTIVE MEASURES –

Part 4: Resistance of earth connection and equipotential bonding

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 61557-4 has been prepared by IEC technical committee 85: Measuring equipment for electrical and electromagnetic quantities.

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

a) The measurement category is complemented in Clause 4
b) The equation for the operating uncertainty is corrected
c) The requirements for measuring with DC are complemented
d) Alignment of the structure to the whole series IEC61557

The text of this standard is based on the following documents:

FDIS	Report on voting
XX/XX/FDIS	XX/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 publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

This part of IEC 61557 shall be used in conjunction with Part 1.

A list of all parts of the IEC 61557 series, published under the general title *Electrical safety in low voltage distribution systems up to 1 000 V AC and 1 500 V DC – Equipment for testing, measuring or monitoring of protective measures*, 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 2025.

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

ELECTRICAL SAFETY IN LOW VOLTAGE DISTRIBUTION SYSTEMS UP TO 1 000 V AC AND 1 500 V DC – EQUIPMENT FOR TESTING, MEASURING OR MONITORING OF PROTECTIVE MEASURES –

Part 4: Resistance of earth connection and equipotential bonding

1 Scope

This part of IEC 61557 specifies the requirements applicable to equipment for measuring the resistance of earth conductors, protective earth conductors and conductors for equipotential bonding, including their connections and terminals, with an indication of the measured value or indication of limits.

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 61010-031:2015 Ed.2.0, *Safety requirements for electrical equipment for measurement, control and laboratory use - Part 031: Safety requirements for hand-held probe assemblies for electrical measurement and test*

IEC 61010-1:2010 Ed.3.0, AMD1:2016, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements*

IEC 61010-2-030:2017, *Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 2-030: Particular requirements for equipment having testing or measuring circuits*

IEC 61010-031:2015, Ed.2.0, *Safety requirements for electrical equipment for measurement, control and laboratory use - Part 031: Safety requirements for hand-held probe assemblies for electrical measurement and test*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61557-1 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

– IEC Electropedia: available at http://www.electropedia.org/

– ISO Online browsing platform: available at http://www.iso.org/obp

4 Requirements

4.1 General

In addition to the requirements of Clause 4 of IEC 61557-1, the requirements of Clause 4 shall apply.

Equipment intended for making measurements on distribution systems shall be rated at least for measurement category III in accordance with IEC 61010-2-030.

Equipment intended for making measurements on electrical equipment shall be rated at least for measurement category II in accordance with IEC 61010-2-030.

Test leads and test probes used with the measuring equipment shall fulfil the requirements of IEC 61010-031.

4.2 Measuring voltage

The measuring voltage may be a DC or an AC voltage. The open-circuit voltage shall not exceed 24 V and shall not be less than 4 V.

4.3 Measuring current

The measuring current within the minimum measuring range according to 4.5.1 shall not be less than 0,2 A.

4.4 Measuring with DC

Resistance measuring equipment using a DC voltage as a measuring voltage shall be provided either with a reversing switch or allow the interchanging of test leads.

4.5 Measuring range

The measuring range within which the operating uncertainty in accordance with 4.6 is maintained, shall include the values 0,2 Ω to 2 Ω.

The measuring range shall be marked on the equipment. With analogue only presentation of the measuring results, the range shall be marked on the scale.

The measuring range to be marked in accordance with 4.5.1 on analogue measuring equipment shall cover at least 50 % of the length of the scale.

The division on the scale within this range shall be at least 0,5 mm per 0,1 Ω.

The resolution for digital equipment shall be at least 0,1 Ω.

The operating uncertainty applies under the rated operating conditions given in 4.3 of IEC 61557-1:20xx.

4.6 External resistance

When external resistances are included in the calibration as a zero offset, then this shall be indicated.

This offset shall remain included as long as it is indicated, regardless of any changes in range or function.

4.7 Indication of limits

Equipment that purely indicates the result of a comparison between measurements and limit values shall unambiguously display if either the upper or lower limit is reached.

4.8 Overvoltage

The user shall not be exposed to danger and the equipment shall not be damaged when the measuring equipment is accidentally connected with 120 % of the nominal voltage of the distribution system on which the measuring equipment may be used.

Protective devices of the test equipment may be activated.

5 Marking and operating instructions

5.1 Marking

In addition to Clause 5 of IEC 61557-1:20xx, the following information shall be provided on the measuring equipment.

– open-circuit voltage;

– measuring current;

– the nominal system voltages for which the equipment has been rated;

– the measuring range in accordance with 4.5;

– rated voltage to earth and measurement category.

5.2 Operating instructions

In addition to Clause 5 of IEC 61557-1, the following information shall be provided in the operating instructions for the measuring equipment.

– A warning stating that measurements shall only be carried out on de-energized circuits.

– A warning stating that the results of measurements can be adversely affected by impedances of additional operating circuits connected in parallel or by transient currents.

– A statement on the correct operation when power is supplied by a hand-driven generator.

– For measuring equipment powered by batteries/rechargeable cells, the possible number of measurements shall be stated.

– For measuring equipment using DC voltage where the measured values of both polarities are indicated, a statement about the interpretation of the results, if they are different.

6 Tests

6.1 General

In addition to Clause 6 of IEC 61557-1, the following tests shall be performed.

6.2 Operating uncertainty

1.1 The operating uncertainty shall be determined in accordance with Table 1. In this process, the intrinsic uncertainties shall be determined under the following reference conditions:

– nominal value of the supply voltage;

– nominal r.p.m. of the hand-driven generator when used as a supply;

– reference temperature 23 °C ± 2 °C;

– reference position in accordance with the manufacturer's statement.

The maximum operating uncertainty within the measuring range to be marked or stated shall not exceed ±30 %, with the measured value as fiducial value determined in accordance with Table 1.

Table 1 – Calculation of operating uncertainty

Intrinsic uncertainty or influence quantity	Reference conditions or specified operating range	Designation code	Requirements or tests in accordance with relevant parts of IEC 61557	Type of test
Intrinsic uncertainty	Reference conditions	A	Part 2, subclause 6.1	R
Position	Reference position ± 90°	E_1	Part 1, subclause 4.2	R
Supply voltage	At the limits stated by the manufacturer	E_2	Part 1, subclauses 4.2, 4.3	R
Temperature	0 °C and 35 °C	E_3	Part 1, subclause 4.2	T
Operating uncertainty	$B = \pm\sqrt{A^2 + \frac{4}{3}\sum_i E_i^2}$		Part 2, subclause 4.5	R

A = intrinsic uncertainty
E_i = variations
R = routine test
T = type test

$$B\,[\%] = \pm\frac{B}{F}\cdot 100\,\%$$

F =	Fiducial value

6.3 Open-circuit voltage

1.2 The lower value of open-circuit voltage shall be measured and compliance with the requirements under 4.2 shall be tested (type test).

The upper value of open-circuit voltage shall be measured and compliance with the requirements under 4.2 shall be tested (type test).

6.4 Measuring current

The measuring current shall be measured and compliance with the requirement under 4.3 shall be tested (routine test).

6.5 Indication of limits

Compliance with the requirements under 4.7 shall be tested (type test).

6.6 Overvoltage

The permissible overload in accordance with 4.8 shall be tested.

For this purpose, an AC voltage of 1,2 times the amplitude of the nominal voltage of the distribution system shall be applied in turns for a duration of 10 s to the measurement terminals. The test shall be performed with the measuring equipment switched on and off. After this, the measuring equipment shall not be damaged (type test).

After tests with AC overvoltage, defects, if any, shall be clearly indicated. Indications and displayed values shall not lead to unsafe interpretations.

After tests with AC overvoltages, the equipment shall stay within the specification. This includes reactivation of protective devices by the user without any repair.

The replacement of fuses accessible to the user should be considered as reactivation of a protective device.

Instead of an AC voltage, a DC voltage 1,5 times the AC voltage with sequential polarity change may be used.

6.7 Battery life in battery operated instruments

In this process, the measuring equipment shall be loaded with a test resistance of (1 Ω ± 5 mΩ) using a duty cycle of 5 s measurement time and an interval of approximately 25 s between measurements (type test).