BRITISH STANDARD

BS EN
61557-4:2007

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

The European Standard EN 61557-4:2007 has the status of a British Standard

ICS 17.220.20; 29.080.01; 29.240.01

BSI
British Standards

National foreword

This British Standard was published by BSI. It is the UK implementation of EN 61557-4:2007. It is identical with IEC 61557-4:2007. It supersedes BS EN 61557-4:1997, which will be withdrawn on 1 March 2010.

The UK participation in its preparation was entrusted to Technical Committee PEL/85, Measuring equipment for electrical and electromagnetic quantities.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 29 June 2007

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Supersedes EN 61557-4:1997

English version

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

(IEC 61557-4:2007)

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 (CEI 61557-4:2007)

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 (IEC 61557-4:2007)

This European Standard was approved by CENELEC on 2007-03-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Ref. No. EN 61557-4:2007 E

Foreword

The text of document 85/293/FDIS, future edition 2 of IEC 61557-4, prepared by IEC TC 85, Measuring equipment for electrical and electromagnetic quantities, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61557-4 on 2007-03-01.

This European Standard supersedes EN 61557-4:1997.

This standard is to be used in conjunction with EN 61557-1.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2007-12-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2010-03-01

Annex ZA has been added by CENELEC.

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Endorsement notice

The text of the International Standard IEC 61557-4:2007 was approved by CENELEC as a European Standard without any modification.

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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

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 referenced documents are indispensable for the application 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 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*

3 Terms and definitions

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

4 Requirements

The following requirements as well as those given in IEC 61557-1 shall apply.

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

4.2 The measuring current within the minimum measuring range according to 4.4 shall not be less than 0,2 A.

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

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

4.5 The range to be marked in accordance with 4.4 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.

4.6 The maximum percentage 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.

The operating uncertainty applies under the rated operating conditions given in IEC 61557-1.

4.7 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.

4.8 Equipment provided only with an indication of limits shall unambiguously display if either the upper or lower limit is reached.

4.9 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 may be activated.

Table 1 – Calculation of operating uncertainty

Intrinsic uncertainty or influence quantity	Reference conditions or specified operating range	Designation code	Requirements or test in accordance with relevant parts of IEC 61557	Type of test
Intrinsic uncertainty	Reference conditions	A	Part 4, 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	$B = \pm(\lvert A \rvert + 1{,}15\sqrt{E_1^2 + E_2^2 + E_3^2})$		Part 4, subclause 4.6	R

A = intrinsic uncertainty

E_n = variations

R = routine test

T = type test

$$B\,[\%] = \pm \frac{B}{\text{fiducial value}} \times 100\ \%$$

5 Marking and operating instructions

5.1 Marking

In addition to the marking in accordance with IEC 61557-1, the following information shall be provided on the measuring equipment.

5.1.1 Open-circuit voltage.

5.1.2 Measuring current.

5.1.3 The nominal system voltages for which the equipment has been rated.

5.1.4 The measuring range in accordance with 4.6.

5.2 Operating instructions

The operating instructions shall state the following information in addition to the statements specified in IEC 61557-1.

5.2.1 A warning indicating that measurements shall only be carried out on de-energized circuits.

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

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

5.2.4 For measuring equipment with a supply from batteries/rechargeable cells the possible number of measurements shall be stated.

6 Tests

In addition to IEC 61557-1 the following tests shall be executed.

6.1 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 operating uncertainty thus evaluated shall not exceed the limits specified in 4.6.

6.2 The lower value of open-circuit voltage shall be measured and compliance with the requirements under 4.1 shall be tested *(routine test).*

The upper value of open-circuit voltage shall be measured and compliance with the requirements under 4.1 shall be tested *(type test).*

6.3 The measuring current shall be measured and compliance with the requirement under 4.2 shall be tested *(routine test).*

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

6.5 The permissible overload in accordance with 4.9 shall be tested.

For this purpose, a d.c. voltage with sequential polarity change and an a.c. voltage of 1,2 times the magnitude 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).*

6.6 The possible number of measurements until the limit of the voltage range specified by the battery check facility is reached, shall be determined. In this process, the measuring equipment shall be loaded with a test resistance of (1 Ω ± 5 mΩ) for 5 s with intervals of 25 s between each new loading *(type test).*

6.7 Compliance with the tests in this clause shall be recorded.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 61557-1	-[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	EN 61557-1	2007[2)]

[1)] Undated reference.

[2)] Valid edition at date of issue.

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