BRITISH STANDARD

BS EN
61557-7:2007

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 7: Phase sequence

The European Standard EN 61557-7:2007 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 61557-7:2007. It is identical with IEC 61557-7:2007. It supersedes BS EN 61557-7:1997, which will be withdrawn on 1 March 2010.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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Amendments issued since publication

Amd. No.	Date	Comments

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61557-7

March 2007

ICS 17.220.20; 29.080.01; 29.240.01

Supersedes EN 61557-7:1997

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 7: Phase sequence

(IEC 61557-7:2007)

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 7: Ordre de phases

(CEI 61557-7:2007)

Elektrische Sicherheit in Niederspannungsnetzen bis AC 1000 V und DC 1500 V - Geräte zum Prüfen, Messen oder Überwachen von Schutzmaßnahmen - Teil 7: Drehfeld

(IEC 61557-7:2007)

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Ref. No. EN 61557-7:2007 E

Foreword

The text of document 85/295/FDIS, future edition 2 of IEC 61557-7, 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 61557-7 on 2007-03-01.

This European Standard supersedes EN 61557-7:1997.

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 61557-7:2007 was approved by CENELEC as a European Standard without any modification.

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CONTENTS

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 7: Phase sequence

1 Scope

This part of IEC 61557 specifies the requirements for measuring equipment applied to testing the phase sequence in three-phase distribution systems. Indication of the phase sequence may be mechanical, visual and/or audible.

This part of IEC 61557 does not apply to ancillary measuring equipment for other quantities, for example voltage testers comprising an additional phase sequence indicator. It does not apply to monitoring relays.

NOTE Phase lamps are not considered to be voltage testers.

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 60417, *Graphical symbols for use on equipment*

IEC 61010-3-031, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 3-031: Conformity verification report for IEC 61010-031:2002 – Safety requirements for hand-held probe assemblies for electrical test and measurement*

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 Indication shall be unambiguous between 85 % and 110 % of the nominal system voltage or within the range of the nominal voltage and between 95 % and 105 % of the nominal system frequency.

4.2 Indication shall also be unambiguously detectable in the presence of visual or audible interference.

4.3 The measuring equipment shall be suitable for continuous operation.

4.4 Portable measuring equipment shall be housed in an enclosure of insulating material and comply with double insulation or reinforced insulation (protection class II).

4.5 Portable measuring equipment shall be designed in such a manner that when either one or two measuring leads are connected to earth and the remaining measuring leads are connected to their corresponding phase conductors, the resulting total current to earth should not exceed 3,5 mA r.m.s. The phase conductors shall be at 110 % of the maximum rated voltage for which the equipment is designed.

4.6 The measuring equipment shall not be damaged nor shall the user be exposed to danger when the measuring equipment is connected to 120 % of the rated system voltage or to 120 % of its rated maximum voltage range.

4.7 Portable measuring equipment shall be provided with permanently attached leads or with a plug device with live parts not accessible, whether plugged or unplugged (according to IEC 61010-3-031).

The following applies to leads

– they shall have an outer diameter of at least 3,5 mm;

– the copper cross-section shall be at least ≥ 0,75 mm^2;

– they shall be made from individual wires with a diameter ≤ 0,07 mm;

– they shall be provided with double or reinforced insulation.

4.8 Portable measuring equipment, together with their leads, shall comply with the mechanical requirements and shall be tested in accordance with 6.3. After these tests:

– the enclosure of the measuring equipment shall be free from damage;

– permanently attached leads shall not have become detached from the measuring equipment;

– live parts of the leads connected by means of plugs shall remain inaccessible when they have become unplugged from the measuring equipment;

– no parts inside the measuring equipment shall have become loose.

4.9 Requirements given in 4.8 need not apply when the phase sequence indicator forms part of multi-purpose measuring equipment, provided that the following conditions are met:

– live parts of the leads remain inaccessible even when they have become unplugged from the measuring equipment;

– the measuring equipment shall be suitable for being carried, for example over the shoulder, when measurements are carried out.

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 Symbol for the protection class in accordance with symbol IEC 60417-5172 (2003-02).

5.1.2 Phase sequence.

5.1.3 Designation of the leads L1, L2 and L3 on the equipment and on the leads.

5.2 Operating instructions

The operating instructions need not include any statements other than the statements given in IEC 61557-1, except for the equipment mentioned in 4.9.

6 Tests

In addition to IEC 61557-1, with the exception of the tests given in 6.1 to 6.3 of that standard, the following tests shall be executed.

6.1 Test of the detectability of the indication in accordance with 4.1 and 4.2.

6.1.1 Tests of the visual display are executed under the following conditions *(type tests).*

The display shall be unambiguously discernible from a distance of 500 mm at lighting levels from 30 lx to 1 000 lx. During the measurement, the measuring equipment shall be placed on a matt grey surface.

A visual comparison under reference conditions with equipment that has successfully passed the test is adequate for a routine test with respect to the visual display. The display on the item under test shall produce a similar or better readability.

6.1.2 The test for the audible indication is executed at a sound level of 75 dB(A) (white noise). The indication shall be unambiguously discernible under these conditions *(routine test).*

6.2 Proof of compliance with the requirements under 4.5 shall be provided as follows:

The phase sequence indicator shall be connected in series with a current measuring instrument on one lead connected with earth, and with the interconnected other leads connected with a phase conductor at a voltage of 110 % of its rated voltage or a voltage at the upper limit of its rated voltage range. The magnitude of the current shall not exceed the value under 4.5.

This test shall be executed on each conductor *(routine test).*

6.3 Test of mechanical requirements *(type test)*

6.3.1 For the purpose of a mechanical shock test, the item under test shall be suspended as shown in Figure A.1, using a pendulum length of 2 m. The item under test shall be dropped in a pendulum movement with a deflection of 1 m in height to hit a hard wooden plate 50 mm thick. The test shall be carried out so that each of the sides of the enclosure parallel to the suspension hits the wood once.

6.3.2 The strain relief of permanently attached leads shall be tested by a drop test in accordance with Figure A.2, in the following manner:

– the item under test shall be suspended so that it is caught with the extended lead after a free drop of 2 m;

– the item under test shall be dropped three times from the suspension point for each of the leads.

6.4 Compliance with the requirements given in 4.6 shall be checked by visual inspection or by measurement *(type test).*

6.5 Compliance with the requirements given in 4.6 shall be tested by connecting, for a duration of 10 min, the item under test to a three-phase system at 120 % of the rated system voltage or, in the case of multi-range measuring equipment, at 120 % of all rated voltages *(type test).*

6.6 Compliance with the requirements given in 4.3 shall be tested by operating the item under test for a duration of 1 h at the rated voltage or, in the case of multi-range measuring equipment, at all rated voltage values *(type test).*

6.7 The markings shall be checked in respect of legibility by a visual inspection *(type test).*

6.8 Compliance with the requirements given in 4.9 shall be tested by visual inspection of the sling and with probe assemblies plugged and unplugged *(type test).*

6.9 The compliance with the tests in this clause shall be recorded.

Annex A
(normative)

Illustrations for mechanical tests

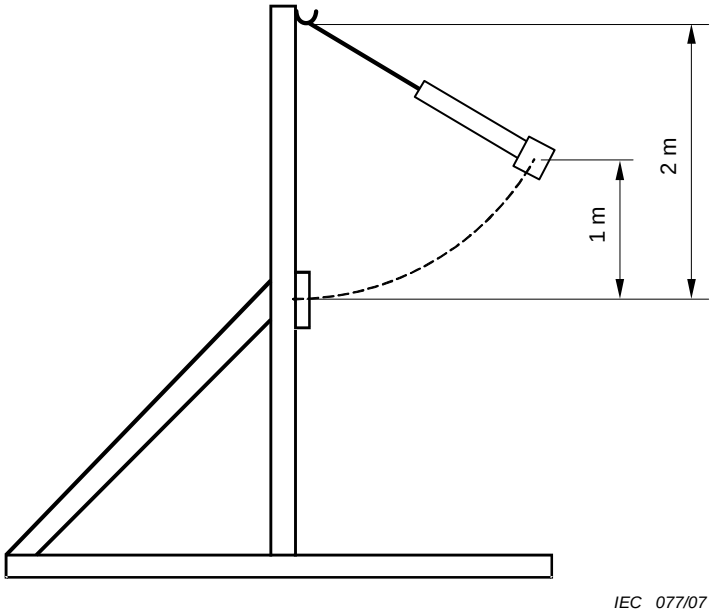
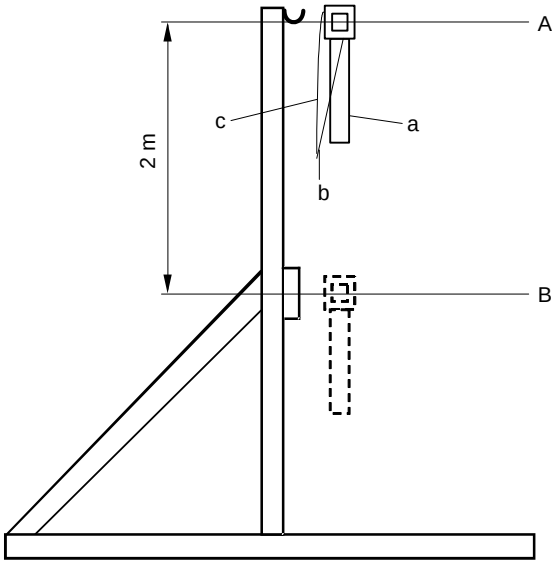


Figure A.1 – Mechanical shock test



a Original lead
b Joint
c Extension to 2 m

A Initial position where the equipment is held
B End position after the release of the equipment

Figure A.2 – Drop test

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 60417	Data-base	Graphical symbols for use on equipment	-	-
IEC/TR 61010-3-031	-[1)]	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 3-031: Conformity verification report for IEC 61010-031:2002 - Safety requirements for hand-held probe assemblies for electrical test and measurement	-	-
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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