

# **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 8: Insulation monitoring devices for IT systems**

The European Standard EN 61557-8:2007 has the status of a British Standard

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## National foreword

This British Standard is the UK implementation of EN 61557-8:2007, incorporating corrigendum May 2007. It is identical to IEC 61557-8:2007. It supersedes BS EN 61557-8:1997, which will be withdrawn on 1 May 2010.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.**

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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 8: Insulation monitoring devices for IT systems  
(IEC 61557-8:2007 + corrigendum May 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 8: Contrôleurs d'isolement  
pour réseaux IT  
(CEI 61557-8:2007  
+ corrigendum May 2007)

Elektrische Sicherheit  
in Niederspannungsnetzen  
bis AC 1 000 V und DC 1 500 V -  
Geräte zum Prüfen,  
Messen oder Überwachen  
von Schutzmaßnahmen -  
Teil 8: Isolationsüberwachungsgeräte  
für IT-Systeme  
(IEC 61557-8:2007  
+ corrigendum May 2007)

This European Standard was approved by CENELEC on 2007-04-11. 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**

## Foreword

The text of document 85/296/FDIS, future edition 2 of IEC 61557-8, 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 61557-8 on 2007-04-11.

This European Standard supersedes EN 61557-8:1997.

The following changes were made with respect to EN 61557-8:1997:

- definitions complemented;
- revision of some requirements;
- addition of information on operating instructions;
- sections “type tests” and “routine tests” complemented;
- modification of Table 1;
- addition of Annexes A and B.

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) | 2008-02-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn                                               | (dow) | 2010-05-01 |

Annexes ZA and ZB have been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 61557-8:2007, including the corrigendum May 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 8: Insulation monitoring devices for IT systems**

## **1 Scope**

This part of IEC 61557 specifies the requirements for insulation monitoring devices (IMD) which permanently monitor the insulation resistance to earth of unearthed IT a.c. systems, for IT a.c. systems with galvanically connected d.c. circuits having nominal voltages up to 1 000 V a.c., as well as of unearthed IT d.c. systems with voltages up to 1 500 V d.c. independent from the method of measuring.

NOTE 1 IT systems are described in IEC 60364-4-41 amongst other literature. Additional data for a selection of devices in other standards should be noted.

NOTE 2 Various standards specify the use of insulation monitoring devices in IT systems. In such cases, the objective of the equipment is to signal a drop in insulation resistance below a minimum limit.

NOTE 3 Insulation monitoring devices according to this part of IEC 61557 may also be used for de-energized electrical systems.

## **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 60364-7-710:2002, *Electrical installations of buildings – Part 7-710: Requirements for special installations or locations – Medical locations*

IEC 60664-1, *Insulation co-ordination for equipment within low-voltage systems – Part 1: Principles, requirements and tests*

IEC 60664-3, *Insulation coordination for equipment within low voltage systems – Part 3: Use of coating, potting or moulding for protection against pollution.*

IEC 60691:2002, *Thermal-links – Requirements and application guide*

IEC 60721-3-1, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 1: Storage*

IEC 60721-3-2, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 2: Transportation*

IEC 60721-3-3, *Classification of environmental conditions – Part 3: Classification of groups of environmental parameters and their severities – Section 3: Stationary use at weatherprotected locations*

IEC 60947-5-1, *Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices*

IEC 60947-5-4, *Low-voltage switchgear and controlgear – Part 5-4: Control circuit devices and switching elements – Method of assessing the performance of low-energy contacts – Special tests*

IEC 61010-1:2001, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements*

IEC 61326-2-4, *Electrical equipment for measurement, control and laboratory use – EMC requirements – Part 2-4: Particular requirements – Test configurations, operational conditions and performance criteria for insulation monitoring devices according to IEC 61557-8 and for equipment for insulation fault location according to IEC 61557-9*

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 61810-2, *Electromechanical elementary relays – Part 2: Reliability*

CISPR 11, *Industrial, scientific and medical (ISM) radio-frequency equipment – Electromagnetic disturbance characteristics – Limits and methods of measurement*

### 3 Terms and definitions

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

#### 3.1 extraneous d.c. voltage

$U_{fg}$

d.c. voltage occurring in a.c. systems between the a.c. conductors and earth (derived from d.c. parts)

#### 3.2 insulation resistance

$R_F$

resistance in the system being monitored, including the resistance of all the connected appliances to earth

#### 3.3 specified response value

$R_{an}$

value of the insulation resistance, permanently set or adjustable, on the device and monitored if the insulation resistance falls below this limit

#### 3.4 response value

$R_a$

value of the insulation resistance at which the device responds under specified conditions

**3.5****relative (percentage) uncertainty** **$A$  [%]**

response value minus the specified response value, divided by the specified response value, multiplied by 100 and stated as a percentage

$$A [\%] = \frac{R_a - R_{an}}{R_{an}} \times 100 \%$$

**3.6****system leakage capacitance** **$C_e$** 

maximum permissible value of the total capacitance to earth of the system to be monitored, including any connected appliances, up to which value the insulation monitoring device can work as specified

**3.7****rated contact voltage**

voltage for which a relay contact is rated to open and close under specified conditions

**3.8****response time** **$t_{an}$** 

time required by an insulation monitoring device to respond under the conditions specified in 6.1.2

**3.9****measuring voltage** **$U_m$** 

voltage present at the measuring terminals during the measurement

NOTE Additionally to the definition given in IEC 61557-1, the measuring voltage ( $U_m$ ) is the voltage present in a fault-free and de-energized system between the terminals of the system to be monitored and the terminals of the protective conductor

**3.10****measuring current** **$I_m$** 

maximum current that can flow between the system and earth, limited by the internal resistance  $R_i$  from the measuring voltage source of the insulation monitoring device

NOTE Measuring current is designated as injected current in IEC 60364-7-710.

**3.11****internal impedance** **$Z_i$** 

total impedance of the insulation monitoring device between the terminals to the system being monitored and earth, measured at the nominal frequency

**3.12****internal d.c. resistance** **$R_i$** 

resistance of the insulation monitoring device between the terminals to the system being monitored and earth

**3.13****functional earthing****FE**

earthing a point or points in a system or in an installation or in equipment for purposes other than electrical safety

NOTE For insulation monitoring devices this is the measuring connection to earth.