

# INTERNATIONAL STANDARD



**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 1: General requirements**



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## 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 1: General requirements**

## FOREWORD

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**IEC 61557-1 edition 3.1 contains the third edition (2019-07) [documents 85/689/FDIS and 85/692/RVD] and its amendment 1 (2024-10) [documents 85/900/CDV and 85/926/RVC].**

**In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.**

International Standard IEC 61557-1 has been prepared by technical committee 85: Measuring equipment for electrical and electromagnetic quantities.

This third edition cancels and replaces the second edition published in 2007. This edition constitutes a technical revision.

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

- a) terms aligned with IEC 60050;
- b) measurement of uncertainty revised according to the equations in 4.2 of ISO/IEC Guide 98-3:2008 (GUM);
- c) updated references for safety and EMC requirements;
- d) updated references for marking and operating instructions;
- e) updated references for testing safety and EMC;
- f) Annex A contains an explanation of GUM;
- g) Annex B addresses environmental aspects.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in 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 document and its amendment will remain unchanged until the stability date indicated on the IEC website under [webstore.iec.ch](http://webstore.iec.ch) in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

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## INTRODUCTION

IEC 60364-6 stipulates standardized conditions for the initial test of power installations in TN, TT or IT systems for continuous monitoring and for testing these installations after modifications. In addition to general references for the performance of the tests, IEC 60364-6 contains requirements that have to be verified by measurements. Only in a few instances, for example when measuring the insulation resistance, does IEC 60364-6 contain details of the characteristics of the measuring device to be used. Circuits which are given as examples in IEC 60364-6, and referred to within the text of that document, are generally not suitable for practical use.

The tests are carried out in installations where hazardous voltages can occur and where careless use or a defect in the equipment can easily cause an accident. Therefore, the technician has to rely on measuring devices which ensure safe test methods, in addition to simplifying the measurements.

The application of the general safety regulations for electrical and electronic measuring devices (IEC 61010-1) for testing the protective measures is not sufficient in itself. The performance of measurements in the installation can cause hazards not only to the technician, but also to third persons, depending on the measuring method used.

Likewise, reliable and comparable results of measurement with measuring devices from different manufacturers are an important precondition in order to obtain an objective assessment about the installation, for example when the installation is handed over for periodic tests, for continuous insulation monitoring or in the case of performance warranty.

The IEC 61557 series has been established with the aim of stipulating common principles for measuring and monitoring equipment for testing electrical safety and measuring performances in systems with nominal voltages up to 1 000 V AC and 1 500 V DC which correspond to the above-mentioned characteristics.

For that reason, the following common requirements have been stipulated in IEC 61557-1 (other parts of IEC 61557 can specify additional requirements or deviations):

- protection against extraneous voltages;
- class II protection (except insulation monitoring devices and insulation fault location systems);
- requirements and safety precautions against hazardous touch voltages at the measuring device;
- requirements for the assessment of connection configurations with respect to wiring errors in the tested equipment;
- special mechanical requirements;
- measuring methods;
- measured quantity;
- specification of the maximum operating uncertainty;
- requirements for testing the influencing quantity and the calculation of the operating uncertainty;
- uncertainties of the measuring device at the thresholds specified in the respective standards;
- specification of the nature of type and routine tests and the required conditions for testing.

Contrary to the usual convention, terms and definitions that occur more than once in another part of the series are listed in IEC 61557-1:2019, Clause 3. Only terms and definitions specific to the respective part of IEC 61557 are listed in Clause 3 of that part.

# 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 1: General requirements

### 1 Scope

This part of IEC 61557 specifies the general requirements applicable to measuring and monitoring equipment for testing the electrical safety in low-voltage distribution systems with nominal voltages up to 1 000 V AC and 1 500 V DC.

When measuring equipment or measuring installations involve measurement tasks of various measuring equipment covered by this series of standards, then the part of this series relevant to each of the measurement tasks is applicable.

NOTE The term "measuring equipment" will hereafter be used to designate "testing, measuring and monitoring equipment".

Other parts of IEC 61557 can specify additional requirements or deviations.

This document does not cover functional safety or cybersecurity.

### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 60038:2009, *IEC standard voltages*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP code)*

IEC 60529:1989/AMD1:1999

IEC 60529:1989/AMD2:2013<sup>1</sup>

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

IEC 61010-1:2010/AMD1:2016<sup>2</sup>

IEC 61010-031, *Safety requirements for electrical equipment for measurement, control and laboratory use – Part 031: Safety requirements for hand-held and hand-manipulated assemblies for electrical test and measurement*

<sup>1</sup> A consolidated version of this publication exists, comprising IEC 60529:1989, IEC 60529:1989/AMD1:1999 and IEC 60529:1989/AMD2:2013.

<sup>2</sup> A consolidated version of this publication exists, comprising IEC 61010-1:2010 and IEC 61010-1:2010/AMD 1:2016.