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REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

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 2: Insulation resistance

IEC 61557-2:2019-07 RLV(en)

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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 2: Insulation resistance

FOREWORD

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International Standard IEC 61557-2 has been prepared by IEC 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 edition includes the following significant technical changes with respect to the previous edition:

a) addition of requirements as regards measurement category;

b) addition of new requirements for operating instructions;

c) alignment of the structure with that of the whole IEC 61557 series.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
85/688/FDIS	85/693/RVD

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

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

This International Standard is to be used in conjunction with IEC 61557-1:2019.

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 will remain unchanged until the stability date indicated on the IEC website under "http://webstore.iec.ch" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
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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 2: Insulation resistance

1 Scope

This part of IEC 61557 specifies the requirements applicable to equipment for measuring the insulation resistance of equipment and installations in the de-energized state.

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 61010-1:~~2001~~2010, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements*
IEC 61010-1:2010/AMD1:2016[1]

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

IEC 61010-2-034:2017, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 2-034: Particular requirements for measurement equipment for insulation resistance and test equipment for electric strength*

IEC 61557-1:2019, *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*

3 Terms and definitions

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

[1] A consolidated version of this publication exists, comprising IEC 61010-1:2010 and IEC 61010-1:2010/AMD1:2016.

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~~**3.1**~~
~~**rated output voltage**~~
~~U_N~~
~~voltage output across the measuring equipment terminals when this equipment is loaded with the rated current~~

3.1
line-to-line voltage
DEPRECATED: phase-to-phase voltage
voltage between two line conductors at a given point of an electric circuit

[SOURCE: IEC 60050-195:1998, 195-05-01]

4 Requirements

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

4.1 General requirements

~~The output voltage shall be a d.c. voltage; the indication at the rated output voltage across a resistor of a value of U_N × (1 000 Ω/V) shall not differ by more than 10 % relative to the indicated value, as a result of possibly present a.c. voltage components in the output voltage, when a capacitor of 2 μF is connected in parallel with the insulation resistance to be measured.~~

In addition to the requirements of IEC 61557-1:2019, Clause 4, the requirements of Clause 4 of this document shall apply.

Insulation measurement equipment shall fulfil the safety requirements of IEC 61010-2-034.

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

Equipment intended for making measurements on distribution systems shall be rated at least for measurement category III.

Equipment intended for making measurements on electrical equipment shall be rated at least for measurement category II.

4.2 Output voltage

The output voltage shall be a DC voltage.

The open-circuit voltage shall not exceed 1,25 times the rated output voltage.

4.3 Rated current

The rated current shall be at least 1 mA.

4.4 Measuring current

The measuring current shall not exceed 15 mA peak. Any AC component present shall not exceed 1,5 mA peak.

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4.5 Influence of external capacitors

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

~~The operating uncertainty shall apply under the rated operating conditions in accordance with IEC 61557-1.~~

The indication of a measured resistance of 1 (± 1 %) MΩ shall not differ by more than 10 % as a result of AC voltage components possibly present in the output voltage, when a capacitor of 2 (± 10 %) µF is connected in parallel with the measured resistance. If the manufacturer specifies a higher capacitance for the object under test, the 2 µF capacitor shall be replaced to adhere to the manufacturer's specified capacitance value.

4.6 Overvoltage

The user shall not be subjected to danger when extraneous DC or AC voltages up to 120 % of the highest rated output voltage are accidentally applied for a duration of not less than 10 s to the measurement terminals of the measuring equipment.

When the measuring equipment bears one of the following markings, the applied extraneous AC overvoltage ~~can~~ may be reduced to a voltage of 1,1 times the ~~phase to phase~~ line-to-line voltage:

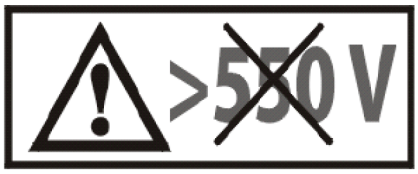
a) DO NOT USE IN DISTRIBUTION SYSTEMS WITH VOLTAGES HIGHER THAN ... V.

The marking shall be written in the corresponding country language.

The value of the voltage shown on the marking shall be 1,1 times the maximum ~~phase to phase~~ line-to-line voltage.

or

a) Example of pictogram for a 500 V AC system



IEC

Figure 1 – Example of a pictogram for a 500 V AC system

The pictogram and outline in Figure 1 shall contrast with the background. The value of the voltage shown on the marking shall be 1,1 times the maximum ~~phase to phase~~ line-to-line voltage.

After applying this reduced AC overvoltage, the equipment shall ~~stay within~~ meet the specifications of 4.6.

5 Marking and operating instructions

5.1 Marking

In addition to the marking in accordance with IEC 61557-1:2019, 5.1 and 5.2 and IEC 61010-2-034:2017, Clause 5, the following information shall be provided on the measuring equipment.

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– rated output voltage,
– rated current,
– measurement range ~~in accordance with 4.5~~,
– rated voltage to earth and measuring category.

5.2 Operating instructions

The operating instructions shall state the following information in addition to the statements specified in IEC 61557-1:2019, 5.3 and in IEC 61010-2-034:2017, Clause 5:

– a warning stating that measurements shall be carried out only on parts of an installation or equipment that is de-energized;
– a statement on the correct operation when power is supplied by a hand-driven generator;
– ~~In accordance with 6.7,~~ the number of possible measurements shall be stated for measuring equipment with power supplied by batteries/accumulators;
– a statement about the maximum capacitance value of the tested object if higher than 2 µF;
– a statement about intended applications of the equipment;
– a statement about discharge time and relevant capacity of the tested object.

6 Tests

6.1 General

In addition to IEC 61557-1:2019, Clause 6 and IEC 61010-2-034:2017, Clause 6, the following tests shall be ~~executed~~ performed.

6.2 Operating uncertainty

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

The operating uncertainty shall apply under the rated operating conditions in accordance with IEC 61557-1:

– nominal value of the supply voltage;
– nominal ~~r.p.m.~~ r/min when power is supplied by a hand-driven generator;
– 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 4.5.~~

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