

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 10: Combined measuring equipment for testing, measuring and monitoring
of protective measures**



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2024 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IECNORM.COM : Click to view the full PDF of IEC 60381-10:2024 CMV

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 10: Combined measuring equipment for testing, measuring and monitoring
of protective measures**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 17.220.20; 29.080.01; 29.240.01

ISBN 978-2-8322-9833-6

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD	3
1 Scope	5
2 Normative references	5
3 Terms and definitions	6
4 Requirements	6
4.1 General	6
4.2 Extraneous overvoltage withstand capability	7
4.3 Performance after application of extraneous overvoltage	7
5 Marking and operating instructions	8
5.1 General	8
5.2 Marking and Pictogram	8
6 Tests	9
Bibliography	10
List of comments	11
Figure 1 – Maximum distribution system voltage marking	8
Figure 2 – Example of a pictogram for a 500V AC system	9
Table 1 – Extraneous overvoltage withstand capability	6

IECNORM.COM : Click to view the full PDF of IEC 61557-10:2024 CMV

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 10: Combined measuring equipment for testing, measuring ~~or~~ and
monitoring of protective measures**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

This commented version (CMV) of the official standard IEC 61557-10:2024 edition 3.0 allows the user to identify the changes made to the previous IEC 61557-10:2013 edition 2.0. Furthermore, comments from IEC TC 85 experts are provided to explain the reasons of the most relevant changes, or to clarify any part of the content.

A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text. Experts' comments are identified by a blue-background number. Mouse over a number to display a pop-up note with the comment.

This publication contains the CMV and the official standard. The full list of comments is available at the end of the CMV.

IEC 61557-10 has been prepared by IEC technical committee TC85: Measuring equipment for electrical and electromagnetic quantities. It is an International Standard.

This third edition cancels and replaces the second edition published in 2013. This edition constitutes a technical revision.

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

- a) The scope has been updated to include the combination of measuring functions covered by the IEC 61557 series with those not covered by the IEC 61557 series.
- b) Reasonably foreseeable misuse is now considered.
- c) An exemption has been added for terminals that can only be accessed by use of a tool.
- d) Table 1 has been updated for clarification.
- e) The voltage source used for the overload test takes into account the expected short-circuit currents for measurement categories in accordance with IEC 61010-2-030:2017.

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

Draft	Report on voting
85/887/CDV	85/914/RVC

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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

A list of all parts of 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 webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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 10: Combined measuring equipment for testing, measuring ~~or~~ and monitoring of protective measures

1 Scope

This part of IEC 61557 specifies the requirements for ~~combined~~ measuring equipment that combines several measuring functions or methods of testing, measuring or monitoring, that are in accordance with the respective parts of IEC 61557, into one piece of apparatus.

Measuring equipment which combines measuring functions or methods of testing, measuring or monitoring covered by the respective parts of IEC 61557 with those not covered by the respective parts of IEC 61557 is also within the scope of this document. **1**

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 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*

IEC 61557-2, *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*

IEC 61557-3, *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 3: Loop impedance*

IEC 61557-4, *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 4: Resistance of earth connection and equipotential bonding*

IEC 61557-5, *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 5: Resistance to earth*

IEC 61557-6, *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 6: Effectiveness of residual current devices (RCD) in TT, TN and IT systems*

IEC 61557-7, *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 7: Phase sequence*

IEC 61010-2-030:2010/2023, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 2-030: Particular requirements for equipment having testing and or measuring circuits*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61557-1, IEC 61557-2, IEC 61557-3, IEC 61557-4, IEC 61557-5, IEC 61557-6, IEC 61557-7 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1

combined measuring equipment

~~equipment~~ device that combines, into one piece of apparatus, several measuring functions or methods of testing, measuring or monitoring, some or all of which are in accordance with other parts of IEC 61557

3.2

extraneous overvoltage

voltage applied to the **measurement** terminals of the combined measuring equipment to test the overvoltage withstand capability

4 Requirements

4.1 General

~~4.1.1 The following requirements in addition to those given in all relevant parts of IEC 61557 shall apply:~~

~~4.1.2 No hazard shall arise for the user when the highest extraneous overvoltage according to the respective parts of this document (see Table 1) is accidentally applied to each combination of tests and measurement terminals with every combination of function and range settings, even though some of these functions are not themselves covered by IEC 61557 Parts 2 to Parts 7.~~

~~4.1.3 Terminals that are clearly identifiable as not test or measurement terminals and that will not retain the terminals of specified probes or accessories need not be tested.~~

~~The duration time shall be the longest possible indicated in the respective parts of IEC 61557.~~

In addition to the requirements of IEC 61557-1:2019, Clause 4 and all respective parts, the requirements of Clause 4 shall apply.

Under normal conditions and in cases of reasonably foreseeable misuse, no hazard shall arise when: **2**

- the maximum rated voltage or current of a measuring circuit terminal, or
- the maximum extraneous overvoltage according to the respective parts of IEC 61557 (see Table 1)

is applied to that terminal or to any other compatible terminal, with any combination of function and range settings.

If the measuring device bears a marking or a pictogram in accordance with 5.2, the extraneous overvoltage can be reduced to 1,1 times of the maximum expected line to line voltage.

4.2 Extraneous overvoltage withstand capability

Terminals that are clearly not of similar types and that will not retain the connectors of the probe assembly or the accessory do not need to be tested.

Terminals that can only be accessed by use of a tool do not need to meet the requirements of this clause **3**. The duration time shall be the longest possible indicated in the respective parts of IEC 61557.

Table 1 – Extraneous overvoltage ~~withstand capability~~

	Part of IEC 61557					
	2 Insulation	3 Loop	4 Protective bonding	5 Earth resistance	6 RCD	7 Phase sequence
AC extraneous overvoltage and duration time	$1,2 \times U_N$ 10 s	$1,2 \times U_O$ continuous and 1,1 x phase to phase line-to-line voltage 1 min	$1,2 \times U_O$ continuous	$1,2 \times U_O$ continuous	$1,2 \times U_O$ continuous and 1,1 x phase to phase line-to-line voltage 1 min	$1,2 \times U_O$ continuous
DC extraneous overvoltage and duration time	$1,2 \times U_N$ 10 s	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable 4
NOTE 1 U_O is the voltage referenced to earth (see IEC 61557-1: 2007 ¹ 2019, 3.3a).						
NOTE 2 U_N is the nominal output voltage (see IEC 61557-1: 2007 2019, 3.1 and IEC 61557-2:2007 ² , 3.1)						
NOTE 3 RCD is residual current device						

4.3 Performance after application of extraneous overvoltage

If parts of the combined measuring equipment are defective after the extraneous overvoltage is applied, the defect shall be clearly indicated. Indications and displayed values shall not lead to erroneous interpretations of safe or unsafe situations or conditions. The indication shall be visible to the user when the instrument is in the normal position.

When the extraneous overvoltage is applied, protective components or protective circuits within the measuring equipment may be activated. The activation of ~~protective~~ these components or circuits in equipment for measuring or testing insulation resistance in accordance with IEC 61557-2 shall be clearly indicated if the operation of the equipment is impaired. The indication shall be visible to the user when the instrument is in the normal position. Indications and displayed values shall not lead to erroneous interpretations of safe or unsafe situations or conditions.

¹ ~~IEC 61557-1:2007, 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 1: General requirements~~

² ~~IEC 61557-2:2007, 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 2: Insulation resistance~~

Protective components or circuits shall have sufficient voltage rating and current ~~breakability~~ breaking capacity for the expected overload ~~current~~ condition.

5 Marking and operating instructions

5.1 General

~~The requirements specified in the respective parts of IEC 61557 shall apply.~~

In addition to IEC 61557-1:2019, Clause 5, and all other respective parts, the following information shall be provided on the combined measuring equipment.

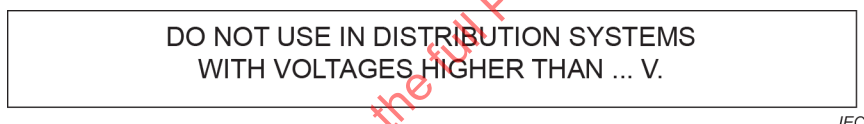
If the requirements of 5.2 are applicable, the marking shall be clearly ~~readable~~ legible in the position of normal use.

If a pictogram in accordance with 5.2 is used, the meaning of the ~~relevant~~ pictogram shall be clearly explained in the ~~user manual~~ operating instructions.

5.2 Marking and Pictogram

When the combined measuring equipment bears ~~one of~~ the following marking or pictogram, the applied extraneous overvoltage can be reduced to a voltage of 1,1 times the maximum expected ~~phase-to-phase~~ line-to-line voltage:

a) Marking



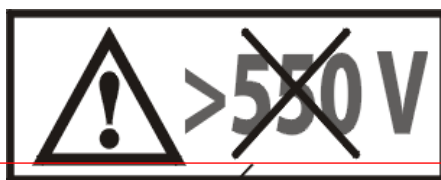
IEC

Figure 1 – Maximum distribution system voltage marking

The marking shown in Figure 1 shall be written in ~~the corresponding country~~ a language that can be easily understood by the user.

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

b) Figure 2 shows an example of a pictogram for a 500 V AC system



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

IEC 892/13



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

IEC

Figure 2 – Example of a pictogram for a 500V AC system

Combined measuring equipment bearing ~~one of the markings of a) or pictograms of b)~~ the marking in Figure 1 or the pictogram in Figure 2 shall withstand the ~~above~~ specified overvoltage for 1 min without any defect. The test configuration shall be in accordance with 4.2; protective devices may be activated in accordance with 4.3.

If the combined measuring equipment includes an insulation resistance measuring or testing function, this function shall also fulfil the overvoltage requirements in accordance with IEC 61557-2.

6 Tests

In addition to the tests specified in Clause 6 of the respective parts of IEC 61557, the following tests shall be performed:

- the **over**voltage withstand capability for the combined measuring equipment shall be type tested by using an extraneous overvoltage either in accordance with ~~4.1 or in accordance with~~ 4.2;
- the technical specifications of protective devices shall be verified;
- the voltage source for the overload test shall be capable of ~~driving~~ providing the **highest** maximum expected overload current, taking in account the expected short circuit currents for measurement categories according to IEC 61010-2-030:2023, Table AA.1 **5**. If certified protective devices are used, the test can be limited in accordance with IEC 61010-2-030:2023, 101.3.4;
- compliance with the requirements of Clause 5 shall be verified as a routine test.
- ~~compliance with the tests in Clause 6 shall be documented.~~

Bibliography

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

~~IEC 61557-8, *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 61557-9, *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 9: Equipment for insulation fault location in IT systems*~~

~~IEC 61557-11, *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 11: Effectiveness of residual current monitors (RCMs) type A and type B in TT, TN and IT systems*~~

~~IEC 61557-12, *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 12: Performance measuring and monitoring devices (PMD)*~~

~~IEC 61557-13, *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 13: Hand-held and hand-manipulated current clamps and sensors for measurement of leakage currents in electrical distribution systems*~~

IECNORM.COM : Click to view the full PDF of IEC 61557-10:2024 CMV

List of comments

- 1 The scope is not limited to the combination of measuring functions covered by the respective parts of IEC 61557.

If any of the measuring functions in combined measuring equipment are covered by the IEC 61557 series, the measuring equipment is within scope.

- 2 Measuring equipment that incorporates different measuring functions is more prone to misuse. For example, the user may select the incorrect measurement function before connecting test probes to an energy source.

- 3 Access to terminals may be restricted to reduce the risk of foreseeable misuse, for example by use of a cover that requires a tool to gain access to a terminal or set of terminals.

If access is restricted such that a tool is required, then the terminals with restricted access do not need to meet the requirements of Subclause 4.2.

- 4 Table 1 is updated to clarify when an AC test, a DC test or both AC and DC tests are required.

The DC extraneous overvoltage test is only applicable to combined measuring equipment that includes an insulation resistance measurement function.

- 5 The AC extraneous overvoltage test is intended to simulate connection of the test probes to an electrical installation. The voltage source used for this test must be capable of providing the maximum current expected for this condition. IEC 61010-2-030, Table AA.1 provides typical short-circuit currents for each measurement category.

The requirements for the DC extraneous overvoltage test source are given in IEC 61557-2.

IECNORM.COM : Click to view the full PDF of IEC 61557-10:2024 CMV

INTERNATIONAL STANDARD

NORME INTERNATIONALE

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 10: Combined measuring equipment for testing, measuring and monitoring of protective measures

Sécurité électrique dans les réseaux de distribution basse tension au plus égale à 1 000 V C.A. et 1 500 V C.C. – Dispositifs de contrôle, de mesure ou de surveillance de mesures de protection –

Partie 10: Appareils combinés de contrôle, de mesure et de surveillance de mesures de protection

CONTENTS

FOREWORD.....	3
1 Scope.....	5
2 Normative references	5
3 Terms and definitions	6
4 Requirements	6
4.1 General.....	6
4.2 Extraneous overvoltage withstand capability	6
4.3 Performance after application of extraneous overvoltage	7
5 Marking and operating instructions	7
5.1 General.....	7
5.2 Pictogram	8
6 Tests	8
Bibliography.....	9
Figure 1 – Maximum distribution system voltage marking.....	8
Figure 2 – Example of a pictogram for a 500V AC system.....	8
Table 1 – Extraneous overvoltage.....	7

IECNORM.COM : Click to view the full PDF of IEC 61557-10:2024 CMV

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 10: Combined measuring equipment for testing, measuring and
monitoring of protective measures**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 61557-10 has been prepared by IEC technical committee TC85: Measuring equipment for electrical and electromagnetic quantities. It is an International Standard.

This third edition cancels and replaces the second edition published in 2013. This edition constitutes a technical revision.

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

- a) The scope has been updated to include the combination of measuring functions covered by the IEC 61557 series with those not covered by the IEC 61557 series.
- b) Reasonably foreseeable misuse is now considered.

- c) An exemption has been added for terminals that can only be accessed by use of a tool.
- d) Table 1 has been updated for clarification.
- e) The voltage source used for the overload test takes into account the expected short-circuit currents for measurement categories in accordance with IEC 61010-2-030:2017.

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

Draft	Report on voting
85/887/CDV	85/914/RVC

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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

A list of all parts of 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 webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

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 10: Combined measuring equipment for testing, measuring and monitoring of protective measures

1 Scope

This part of IEC 61557 specifies the requirements for measuring equipment that combines several measuring functions or methods of testing, measuring or monitoring, that are in accordance with the respective parts of IEC 61557, into one piece of apparatus.

Measuring equipment which combines measuring functions or methods of testing, measuring or monitoring covered by the respective parts of IEC 61557 with those not covered by the respective parts of IEC 61557 is also within the scope of this document.

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 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*

IEC 61557-2, *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*

IEC 61557-3, *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 3: Loop impedance*

IEC 61557-4, *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 4: Resistance of earth connection and equipotential bonding*

IEC 61557-5, *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 5: Resistance to earth*

IEC 61557-6, *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 6: Effectiveness of residual current devices (RCD) in TT, TN and IT systems*

IEC 61557-7, *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 7: Phase sequence*

IEC 61010-2-030:2023, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 2-030: Particular requirements for equipment having testing or measuring circuits*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 61557-1, IEC 61557-2, IEC 61557-3, IEC 61557-4, IEC 61557-5, IEC 61557-6, IEC 61557-7 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

3.1

combined measuring equipment

device that combines, into one piece of apparatus, several measuring functions or methods of testing, measuring or monitoring, some or all of which are in accordance with other parts of IEC 61557

3.2

extraneous overvoltage

voltage applied to the measurement terminals of the combined measuring equipment to test the overvoltage withstand capability

4 Requirements

4.1 General

In addition to the requirements of IEC 61557-1:2019, Clause 4 and all respective parts, the requirements of Clause 4 shall apply.

Under normal conditions and in cases of reasonably foreseeable misuse, no hazard shall arise when:

- the maximum rated voltage or current of a measuring circuit terminal, or
- the maximum extraneous overvoltage according to the respective parts of IEC 61557 (see Table 1)

is applied to that terminal or to any other compatible terminal, with any combination of function and range settings.

If the measuring device bears a marking or a pictogram in accordance with 5.2, the extraneous overvoltage can be reduced to 1,1 times of the maximum expected line to line voltage.

4.2 Extraneous overvoltage withstand capability

Terminals that are clearly not of similar types and that will not retain the connectors of the probe assembly or the accessory do not need to be tested.

Terminals that can only be accessed by use of a tool do not need to meet the requirements of this clause. The duration time shall be the longest possible indicated in the respective parts of IEC 61557.

Table 1 – Extraneous overvoltage

	Part of IEC 61557					
	2 Insulation	3 Loop	4 Protective bonding	5 Earth resistance	6 RCD	7 Phase sequence
AC extraneous overvoltage and duration time	$1,2 \times U_N$ 10 s	$1,2 \times U_O$ continuous and $1,1 \times$ line-to-line voltage 1 min	$1,2 \times U_O$ continuous	$1,2 \times U_O$ continuous	$1,2 \times U_O$ continuous and $1,1 \times$ line-to-line voltage 1 min	$1,2 \times U_O$ continuous
DC extraneous overvoltage and duration time	$1,2 \times U_N$ 10 s	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
NOTE 1 U_O is the voltage referenced to earth (see IEC 61557-1:2019, 3.3a).						
NOTE 2 U_N is the nominal output voltage (see IEC 61557-1:2019, 3.1 and IEC 61557-2:2007, 3.1)						
NOTE 3 RCD is residual current device						

4.3 Performance after application of extraneous overvoltage

If parts of the combined measuring equipment are defective after the extraneous overvoltage is applied, the defect shall be clearly indicated. Indications and displayed values shall not lead to erroneous interpretations of safe or unsafe situations or conditions. The indication shall be visible to the user when the instrument is in the normal position.

When the extraneous overvoltage is applied, protective components or protective circuits within the measuring equipment may be activated. The activation of these components or circuits in equipment for measuring or testing insulation resistance in accordance with IEC 61557-2 shall be clearly indicated if the operation of the equipment is impaired. The indication shall be visible to the user when the instrument is in the normal position. Indications and displayed values shall not lead to erroneous interpretations of safe or unsafe situations or conditions.

Protective components or circuits shall have sufficient voltage rating and current breaking capacity for the expected overload condition.

5 Marking and operating instructions

5.1 General

In addition to IEC 61557-1:2019, Clause 5, and all other respective parts, the following information shall be provided on the combined measuring equipment.

If the requirements of 5.2 are applicable, the marking shall be clearly legible in the position of normal use.

If a pictogram in accordance with 5.2 is used, the meaning of the pictogram shall be clearly explained in the operating instructions.

5.2 Pictogram

When the combined measuring equipment bears the following marking or pictogram, the applied extraneous overvoltage can be reduced to a voltage of 1,1 times the maximum expected line-to-line voltage:

a) Marking

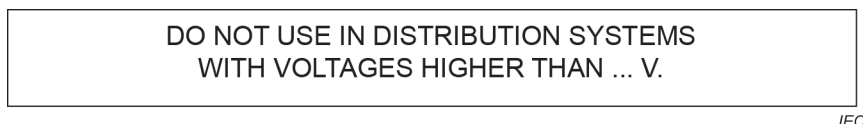


Figure 1 – Maximum distribution system voltage marking

The marking shown in Figure 1 shall be written in a language that can be easily understood by the user.

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

b) Figure 2 shows an example of a pictogram for a 500 V AC system



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

IEC

Figure 2 – Example of a pictogram for a 500V AC system

Combined measuring equipment bearing the marking in Figure 1 or the pictogram in Figure 2 shall withstand the specified overvoltage for 1 min without any defect. The test configuration shall be in accordance with 4.2; protective devices may be activated in accordance with 4.3.

If the combined measuring equipment includes an insulation resistance measuring or testing function, this function shall also fulfil the overvoltage requirements in accordance with IEC 61557-2.

6 Tests

In addition to the tests specified in Clause 6 of the respective parts of IEC 61557, the following tests shall be performed:

- the overvoltage withstand capability for the combined measuring equipment shall be type tested by using an extraneous overvoltage either in accordance with 4.2;
- the technical specifications of protective devices shall be verified;
- the voltage source for the overload test shall be capable of providing the maximum expected overload current, taking in account the expected short circuit currents for measurement categories according to IEC 61010-2-030:2023, Table AA.1. If certified protective devices are used, the test can be limited in accordance with IEC 61010-2-030:2023, 101.3;
- compliance with the requirements of Clause 5 shall be verified as a routine test.

Bibliography

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

IECNORM.COM : Click to view the full PDF of IEC 61557-10:2024 CMV

SOMMAIRE

AVANT-PROPOS	11
1 Domaine d'application	13
2 Références normatives	13
3 Termes et définitions	14
4 Exigences.....	14
4.1 Généralités	14
4.2 Tenue à la surtension extérieure	14
4.3 Performances après l'application d'une surtension extérieure	15
5 Marquage et instructions de fonctionnement.....	15
5.1 Généralités	15
5.2 Pictogramme.....	16
6 Essais	16
Bibliographie.....	18
Figure 1 – Marquage de la tension maximale des réseaux de distribution	16
Figure 2 – Exemple de pictogramme pour un réseau de 500 V en courant alternatif.....	16
Tableau 1 – Surtension extérieure	15

IECNORM.COM : Click to view the full PDF of IEC 61557-10:2024 CMV

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

**SÉCURITÉ ÉLECTRIQUE DANS LES RÉSEAUX DE DISTRIBUTION BASSE
TENSION AU PLUS ÉGALE À 1 000 V C.A. ET 1 500 V C.C. –
DISPOSITIFS DE CONTRÔLE, DE MESURE OU DE SURVEILLANCE
DE MESURES DE PROTECTION –****Partie 10: Appareils combinés de contrôle, de mesure et de surveillance
de mesures de protection**

AVANT-PROPOS

- 1) La Commission Electrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. À cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
- 2) Les décisions ou accords officiels de l'IEC concernant les questions techniques représentent, dans la mesure du possible, un accord international sur les sujets étudiés, étant donné que les Comités nationaux de l'IEC intéressés sont représentés dans chaque comité d'études.
- 3) Les Publications de l'IEC se présentent sous la forme de recommandations internationales et sont agréées comme telles par les Comités nationaux de l'IEC. Tous les efforts raisonnables sont entrepris afin que l'IEC s'assure de l'exactitude du contenu technique de ses publications; l'IEC ne peut pas être tenue responsable de l'éventuelle mauvaise utilisation ou interprétation qui en est faite par un quelconque utilisateur final.
- 4) Dans le but d'encourager l'uniformité internationale, les Comités nationaux de l'IEC s'engagent, dans toute la mesure possible, à appliquer de façon transparente les Publications de l'IEC dans leurs publications nationales et régionales. Toutes divergences entre toutes Publications de l'IEC et toutes publications nationales ou régionales correspondantes doivent être indiquées en termes clairs dans ces dernières.
- 5) L'IEC elle-même ne fournit aucune attestation de conformité. Des organismes de certification indépendants fournissent des services d'évaluation de conformité et, dans certains secteurs, accèdent aux marques de conformité de l'IEC. L'IEC n'est responsable d'aucun des services effectués par les organismes de certification indépendants.
- 6) Tous les utilisateurs doivent s'assurer qu'ils sont en possession de la dernière édition de cette publication.
- 7) Aucune responsabilité ne doit être imputée à l'IEC, à ses administrateurs, employés, auxiliaires ou mandataires, y compris ses experts particuliers et les membres de ses comités d'études et des Comités nationaux de l'IEC, pour tout préjudice causé en cas de dommages corporels et matériels, ou de tout autre dommage de quelque nature que ce soit, directe ou indirecte, ou pour supporter les coûts (y compris les frais de justice) et les dépenses découlant de la publication ou de l'utilisation de cette Publication de l'IEC ou de toute autre Publication de l'IEC, ou au crédit qui lui est accordé.
- 8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
- 9) L'IEC attire l'attention sur le fait que la mise en application du présent document peut entraîner l'utilisation d'un ou de plusieurs brevets. L'IEC ne prend pas position quant à la preuve, à la validité et à l'applicabilité de tout droit de brevet revendiqué à cet égard. À la date de publication du présent document, l'IEC n'avait pas reçu notification qu'un ou plusieurs brevets pouvaient être nécessaires à sa mise en application. Toutefois, il y a lieu d'avertir les responsables de la mise en application du présent document que des informations plus récentes sont susceptibles de figurer dans la base de données de brevets, disponible à l'adresse <https://patents.iec.ch>. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets.

L'IEC 61557-10 a été établie par le comité d'études 85 de l'IEC: Équipement de mesure des grandeurs électriques et électromagnétiques. Il s'agit d'une Norme internationale.

Cette troisième édition annule et remplace la deuxième édition parue en 2013. Cette édition constitue une révision technique.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

- a) Le domaine d'application a été mis à jour en vue d'inclure la combinaison de fonctions de mesure couverte par la série IEC 61557 ainsi que celles non couvertes par la série IEC 61557.
- b) Un mauvais usage raisonnablement prévisible est dorénavant pris en considération.
- c) Une exemption a été ajoutée pour les bornes accessibles uniquement à l'aide d'un outil.
- d) Le Tableau 1 a été mis à jour à des fins de clarification.
- e) La source de tension utilisée pour l'essai de surcharge prend en compte les courants de court-circuit prévus pour les catégories de mesure conformément à l'IEC 61010-2-030:2017

Le texte de cette Norme internationale est issu des documents suivants:

Projet	Rapport de vote
85/887/CDV	85/914/RVC

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à son approbation.

La langue employée pour l'élaboration de cette Norme internationale est l'anglais.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2, il a été développé selon les Directives ISO/IEC, Partie 1 et les Directives ISO/IEC, Supplément IEC, disponibles sous www.iec.ch/members_experts/refdocs. Les principaux types de documents développés par l'IEC sont décrits plus en détail sous www.iec.ch/publications/.

La présente Norme internationale doit être utilisée conjointement avec l'IEC 61557-1:2019.

Une liste de toutes les parties de l'IEC 61557, publiées sous le titre général *Sécurité électrique dans les réseaux de distribution basse tension au plus égale à 1 000 V c.a. et 1 500 V c.c. – Dispositifs de contrôle, de mesure ou de surveillance de mesures de protection*, se trouve sur le site web de l'IEC.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous webstore.iec.ch dans les données relatives au document recherché. À cette date, le document sera

- reconduit,
- supprimé, ou
- révisé.

SÉCURITÉ ÉLECTRIQUE DANS LES RÉSEAUX DE DISTRIBUTION BASSE TENSION AU PLUS ÉGALE À 1 000 V C.A. ET 1 500 V C.C. – DISPOSITIFS DE CONTRÔLE, DE MESURE OU DE SURVEILLANCE DE MESURES DE PROTECTION –

Partie 10: Appareils combinés de contrôle, de mesure et de surveillance de mesures de protection

1 Domaine d'application

La présente partie de l'IEC 61557 spécifie les exigences relatives aux appareils de mesure qui combinent en un seul appareil plusieurs fonctions de mesures ou méthodes de contrôle, de mesure ou de surveillance, et qui sont conformes aux parties concernées de l'IEC 61557.

Les appareils de mesure qui combinent des fonctions de mesures ou méthodes de contrôle, de mesure ou de surveillance et sont couverts par les parties concernées de l'IEC 61557, ainsi que ceux qui ne sont pas couverts par les parties concernées de l'IEC 61557, sont également inclus dans le domaine d'application du présent document.

2 Références normatives

Les documents suivants sont cités dans le texte de sorte qu'ils constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l'édition citée s'applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 61557-1:2019, *Sécurité électrique dans les réseaux de distribution basse tension au plus égale à 1 000 V c.a. et 1 500 V c.c. – Dispositifs de contrôle, de mesure ou de surveillance de mesures de protection – Partie 1: Exigences générales*

IEC 61557-2, *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 2: Résistance d'isolement*

IEC 61557-3, *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 3: Impédance de boucle*

IEC 61557-4, *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*

IEC 61557-5, *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 5: Résistance à la terre*

IEC 61557-6, *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 6: Efficacité des dispositifs à courant différentiel résiduel (DDR) dans les réseaux TT, TN et IT*