

# INTERNATIONAL STANDARD



**Touch and interactive displays –  
Part 12-10: Measurement methods of touch displays – Touch and electrical  
performance**

**STANDARD PREVIEW**  
**(standards.iteh.ai)**  
IEC 62908-12-10:2017  
<https://standards.iteh.ai/catalog/standards/sist/6f4e123b-d2ad-4156-b2f0-bd624db2f4c7/iec-62908-12-10-2017>



**THIS PUBLICATION IS COPYRIGHT PROTECTED**  
**Copyright © 2017 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 Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
Fax: +41 22 919 03 00  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://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 corrigenda or an amendment might have been published.

**IEC Catalogue - [webstore.iec.ch/catalogue](http://webstore.iec.ch/catalogue)**

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

**Electropedia - [www.electropedia.org](http://www.electropedia.org)**

The world's leading online dictionary of electronic and electrical terms containing 20 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

**IEC publications search - [www.iec.ch/searchpub](http://www.iec.ch/searchpub)**

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 Glossary - [std.iec.ch/glossary](http://std.iec.ch/glossary)**

65 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

**IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)**

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

**IEC Customer Service Centre - [webstore.iec.ch/csc](http://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: [csc@iec.ch](mailto:csc@iec.ch).

IEC'S STANDARD PREVIEW  
(standards.iec.ch)  
IEC 62908-14:2017  
https://standards.iec.ch/catalog/standards/csc/iec-62908-14-10-2017  
bd624db2f4c7/iec-62908-14-10-2017

# INTERNATIONAL STANDARD



---

**Touch and interactive displays –  
Part 12-10: Measurement methods of touch displays – Touch and electrical  
performance**

**STANDARD PREVIEW**  
(standards.iteh.ai)  
[https://standards.iteh.ai/catalog/standards/sist/6f4e123b-d2ad-4156-b2f0-  
bd624db2f4c7/iec-62908-12-10-2017](https://standards.iteh.ai/catalog/standards/sist/6f4e123b-d2ad-4156-b2f0-bd624db2f4c7/iec-62908-12-10-2017)

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

---

ICS 31.120

ISBN 978-2-8322-4394-7

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

## CONTENTS

FOREWORD.....	5
1 Scope.....	7
2 Normative references .....	7
3 Terms and definitions .....	7
4 Measuring conditions.....	7
4.1 Standard measuring environmental conditions .....	7
4.2 Standard atmospheric conditions for reference measurements and tests .....	8
4.3 Standard positioning equipment and setup.....	8
4.4 Human operator alternative to standard positioning equipment .....	9
4.5 Test bar size, shape and material parameters.....	10
5 Touch performance measuring methods .....	11
5.1 General.....	11
5.2 Accuracy test.....	11
5.2.1 Purpose.....	11
5.2.2 Test procedure .....	11
5.2.3 Report .....	15
5.3 Repeatability/jitter test .....	15
5.3.1 Purpose.....	15
5.3.2 Test procedure .....	15
5.3.3 Report .....	17
5.4 Linearity test.....	18
5.4.1 Purpose.....	18
5.4.2 Test procedure .....	18
5.4.3 Report .....	20
5.5 Reproducibility test .....	20
5.5.1 Purpose.....	20
5.5.2 Test procedure .....	21
5.5.3 Report .....	22
5.6 Signal-to-noise ratio (SNR) test .....	23
5.6.1 Purpose.....	23
5.6.2 Test procedure .....	24
5.6.3 Report .....	25
5.7 Report rate test.....	25
5.7.1 Purpose.....	25
5.7.2 Test procedure .....	25
5.7.3 Report .....	26
5.8 Latency test .....	26
5.8.1 Purpose.....	26
5.8.2 Test procedure .....	26
5.8.3 Report .....	27
5.9 Electrical noise immunity test.....	27
5.9.1 Purpose.....	27
5.9.2 Test procedure .....	27
5.9.3 Report .....	28
5.10 Water droplet immunity test .....	28
5.10.1 Purpose.....	28
5.10.2 Test procedure .....	29

ITeH STANDARD PREVIEW  
 (standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/6f4e123b-d2ad-4156-b2f0-bd624db2f4c7/iec-62908-12-10-2017>

5.10.3	Report .....	29
5.11	Optical noise immunity test .....	29
5.11.1	Purpose .....	29
5.11.2	Test procedure .....	30
5.11.3	Report .....	30
5.12	Power consumption test .....	30
5.12.1	Purpose .....	30
5.12.2	Test procedure .....	30
5.12.3	Report .....	30
5.13	Perpendicular touch/hover distance test .....	30
5.13.1	Purpose .....	30
5.13.2	Test procedure .....	30
5.13.3	Report .....	31
Annex A	(informative) Electrical performance measuring methods of touch sensor .....	32
A.1	Resistance .....	32
A.1.1	General .....	32
A.1.2	Test samples .....	32
A.1.3	Measurement equipment .....	32
A.1.4	Procedures .....	32
A.1.5	Data analysis .....	33
A.1.6	Report .....	33
A.2	Trans-capacitance .....	33
A.2.1	General .....	33
A.2.2	Test samples .....	33
A.2.3	Measurement equipment .....	33
A.2.4	Procedure .....	33
A.2.5	Data analysis .....	34
A.2.6	Report .....	34
Figure 1	– Composition of test equipment .....	9
Figure 2	– Concept of performance measurement .....	9
Figure 3	– Example of manual test tool (left), positioning without triggering a touch event (middle) and recording a touch event (right) .....	10
Figure 4	– Examples of test bars .....	10
Figure 5	– Location of edge area and centre area .....	12
Figure 6	– Point grid .....	12
Figure 7	– Accuracy definition .....	13
Figure 8	– Example of measurement result and calculation of accuracy .....	15
Figure 9	– Repeatability in touch sensor module .....	16
Figure 10	– Example of measurement result for repeatability .....	17
Figure 11	– Dragging line for linearity test .....	18
Figure 12	– Linearity definition .....	19
Figure 13	– Example of measurement and calculation of linearity .....	20
Figure 14	– Example of reproducibility test results .....	21
Figure 15	– Reproducibility test procedure .....	22
Figure 16	– Examples of measurements of reproducibility – Velocity dependence .....	23
Figure 17	– SNR definition concept .....	24

Figure 18 – Dragging direction for reporting time measurement ..... 25  
Figure 19 – Reporting time interval measurement ..... 26  
Figure 20 – Latency measurement ..... 26  
Figure 21 – Example of the effect of external noise ..... 27  
Figure 22 – External noise injection ..... 28  
Figure 23 – Report of external noise immunity ..... 28  
Figure 24 – Example of water drop effect ..... 29  
Figure 25 – Water droplet test procedure ..... 29  
Figure 26 – Perpendicular touch/hover distance measurement ..... 31  
Figure A.1 – Diagrammatic representation of measurement of resistance ..... 33  
Figure A.2 – Diagrammatic representation of measurement of capacitance ..... 34  
  
Table 1 – Standard conditions for reference measurements and tests ..... 8  
Table A.1 – Specification of LCR impedance meter ..... 32

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[IEC 62908-12-10:2017](https://standards.iteh.ai/catalog/standards/sist/6f4e123b-d2ad-4156-b2f0-bd624db2f4c7/iec-62908-12-10-2017)

<https://standards.iteh.ai/catalog/standards/sist/6f4e123b-d2ad-4156-b2f0-bd624db2f4c7/iec-62908-12-10-2017>

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## TOUCH AND INTERACTIVE DISPLAYS –

Part 12-10: Measurement methods of touch displays –  
Touch and electrical performance

## 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) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 62908-12-10 has been prepared by IEC technical committee 110: Electronic display devices.

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

FDIS	Report on voting
110/861/FDIS	110/872/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.

A list of all parts in the IEC 62908 series, published under the general title *Touch and interactive displays*, 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
- amended.

A bilingual version of this publication may be issued at a later date.

The contents of the corrigendum of Novembre 2018 have been included in this copy.

**IMPORTANT – The 'colour inside' logo on the cover page of this publication 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.**

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[IEC 62908-12-10:2017](https://standards.iteh.ai/catalog/standards/sist/6f4e123b-d2ad-4156-b2f0-bd624db2f4c7/iec-62908-12-10-2017)

<https://standards.iteh.ai/catalog/standards/sist/6f4e123b-d2ad-4156-b2f0-bd624db2f4c7/iec-62908-12-10-2017>



## TOUCH AND INTERACTIVE DISPLAYS –

### Part 12-10: Measurement methods of touch displays – Touch and electrical performance

#### 1 Scope

This part of IEC 62908 specifies the standard measuring conditions and methods for determining touch performance of a touch sensor module. This document is applicable to touch sensor modules, where the structural relationship between touch sensor, touch controller, touch sensor module, display panel, touch display panel, and touch display module is defined in IEC 62908-1-2.

#### 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.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

IEC 60068-1, *Environmental testing – Part 1: General and guidance*

IEC 62908-1-2<sup>1</sup>, *Touch and interactive displays – Part 1-2: Generic – Terminology and letter symbols*

[IEC 62908-12-10:2017](#)

<https://standards.iteh.ai/catalog/standards/sist/6f4e123b-d2ad-4156-b2f0-bd624db2f4c7/iec-62908-12-10-2017>

#### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60068-1 and IEC 62908-1-2 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>

#### 4 Measuring conditions

##### 4.1 Standard measuring environmental conditions

Measurements shall be carried out under the standard environmental conditions:

- temperature: 25 °C ± 3 °C,
- relative humidity: 25 % RH to 85 % RH,
- atmospheric pressure: 86 kPa to 106 kPa.

When different environmental conditions are used, they shall be noted in the measurement report.

---

<sup>1</sup> Under preparation. Stage at the time of publication: IEC/AFDIS 62908-1-2:2017.

#### 4.2 Standard atmospheric conditions for reference measurements and tests

If the parameters to be measured depend on temperature, pressure and humidity and their dependence on temperature, pressure and humidity is unknown, the atmospheres to be specified shall be selected from the following values, as shown in Table 1. The selected values shall be noted in the relevant specifications.

**Table 1 – Standard conditions for reference measurements and tests**

Temperature <sup>a</sup> °C	Relative humidity <sup>a, b</sup> % RH	Air pressure <sup>a</sup> kPa
20, 25, 30, and 35 ± 3	45 to 75	86 to 106
<sup>a</sup> Including extreme values. <sup>b</sup> Absolute humidity ≤ 22 g/m <sup>3</sup> .		

#### 4.3 Standard positioning equipment and setup

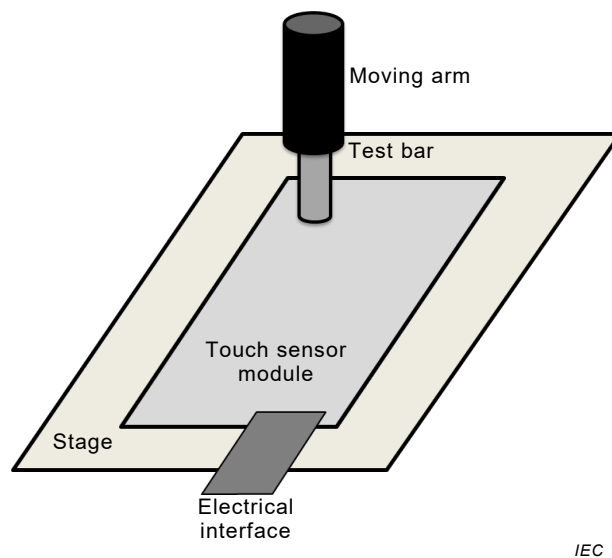
Standard positioning equipment for touch performance shall be the positioning machine equipped with a test bar, a moving arm, and a stage onto which the touch sensor module is placed, as shown in Figure 1. The positioning machine shall move its arm and stage to place the test bar on the touch sensor module.

There are three types of positions associated with a given test: target, actual and reported positions. The target position is a desired measurement location in physical space referenced to a fixed datum on the touch sensor module surface. The actual position is the actual location of contact during test, referenced to the same fixed datum, which may differ from the target position due to test bar placement error. The reported position is the location reported by the touch controller.

<https://standards.iteh.ai/catalog/standards/sist/6f4e123b-d2ad-4156-b2f0-bd624db2f4c7/iec-62908-12-10-2017>

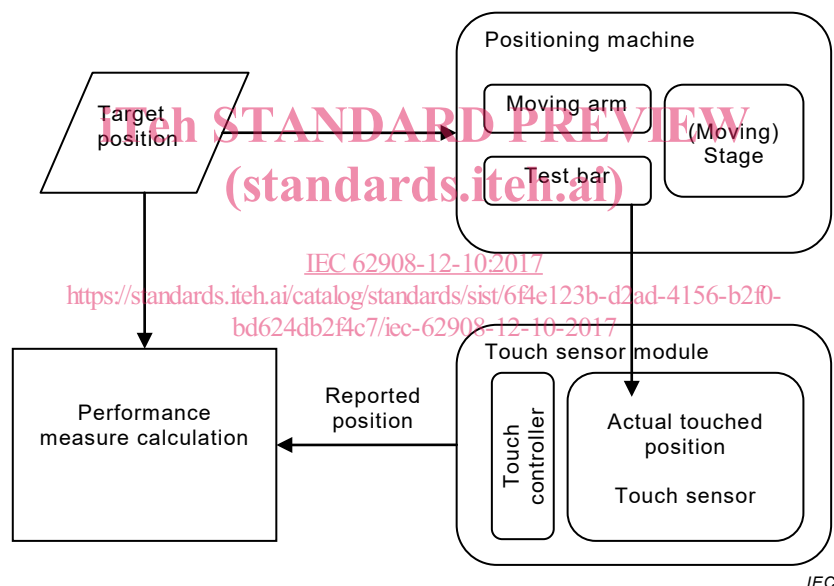
As shown in Figure 2, the reported positions from the touch controller are analysed to define performance measures with respect to the target positions.

The touch sensor module and the stage shall be aligned correctly while setting up the measurement equipment, because a misalignment between them may introduce coordinate shifts or rotation between the actual touch positions and target positions; each positioning machine has its inherent accuracy, which means that an actual touched position does not coincide with its target position. The performance measurements based on target positions may include errors due to the accuracy of the positioning machine. The touch sensor module under test shall be attached to the stage and connected to the electrical interface. The test bar of the selected diameter shall be attached to the moving arm.



IEC

**Figure 1 – Composition of test equipment**



IEC

**Figure 2 – Concept of performance measurement**

#### 4.4 Human operator alternative to standard positioning equipment

Under certain circumstances, for example if the display under test is too large for suitable positioning equipment to be available, a suitably designed test arm may be manually positioned to enable completion of a subset of the tests described in this document. In this situation, the test arm needs to be designed carefully to minimise the reasonable achievable error between actual and target positions when conducting measurements. An example of such a test arm may consist of a rod with a sliding tip (Figure 3, left), whose materials are chosen so that contact between the rod and the display does not trigger a touch event (Figure 3, middle), whereas contact between the sliding tip and the display does trigger a touch event (Figure 3, right). Such a test arm may be placed accurately and reliably by the human operator with the sliding tip away from the display, subsequent to which a measurement may be made by sliding the tip into contact with the display.

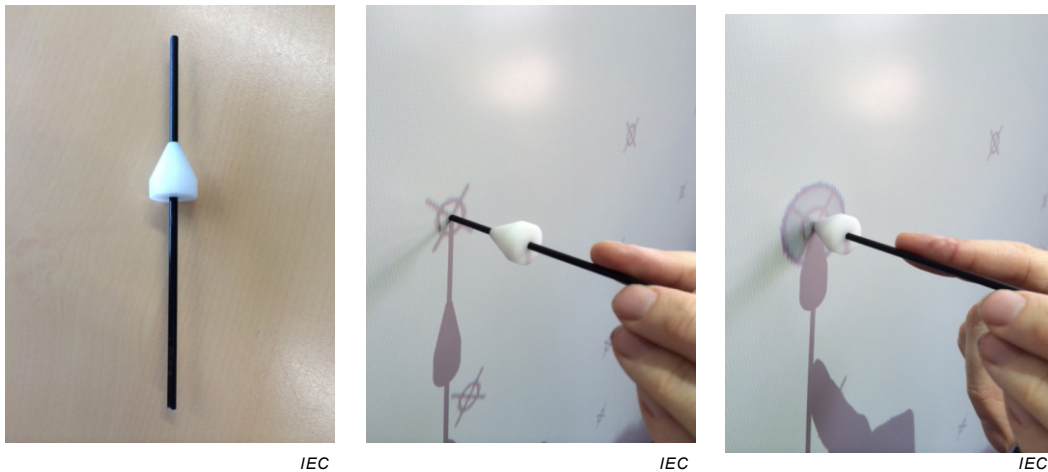


Figure 3 – Example of manual test tool (left), positioning without triggering a touch event (middle) and recording a touch event (right)

4.5 Test bar size, shape and material parameters

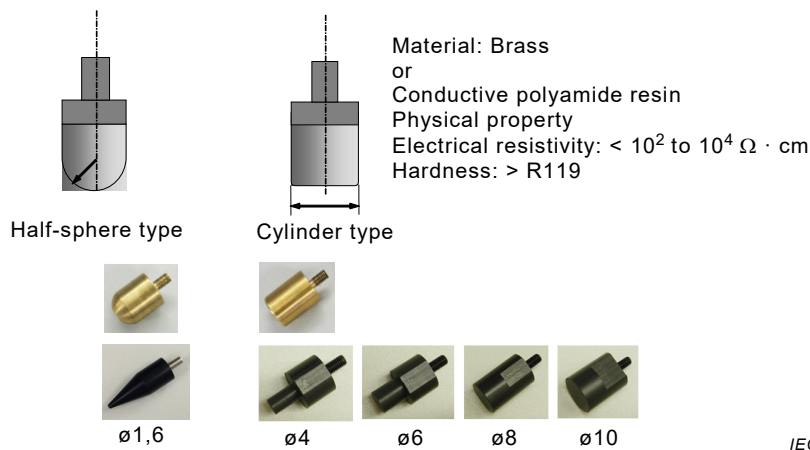
The parameters of the test bar shall be size, shape, and material. Examples of suitable sizes and shapes of the test bar are shown in Figure 4. Care shall be taken to ensure that material parameters for the test bar are appropriately chosen given the device category under test.

When the touch sensor module is a capacitive touch system, the test bar shall be electrically conductive and shall additionally be grounded in order to avoid potential performance degradation due to electrical noise, unless otherwise stated. A test bar may have an insulating layer on the base to model the effect of a gloved finger.

<https://standards.iteh.ai/catalog/standards/sist/64e123b-d2ad-4156-b2f0-b624d129173e-62908-12-10-2017>

For reflection-based optical systems, the reflectivity of the contact end of the test bar shall be chosen to be spectrally representative of human skin.

In all cases, the appropriate properties (including size, shape and material) of the test bar shall be reported.



NOTE ø (test bar diameter) = 4 mm, 6 mm, 7 mm, 9 mm, or 12 mm.

Figure 4 – Examples of test bars