

# INTERNATIONAL STANDARD

REDLINE VERSION

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

## 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 .....	7
4.3 Standard positioning equipment and setup.....	8
4.4 Human operator alternative to standard positioning equipment.....	9
4.5 Test bar and touch pen .....	10
4.6 Equipment for measurement of force-output characteristics.....	11
5 Touch performance measurement methods .....	12
5.1 General.....	12
5.2 Accuracy test .....	12
5.2.1 Purpose .....	12
5.2.2 Test procedure.....	13
5.2.3 Report .....	17
5.3 Repeatability or jitter test .....	17
5.3.1 Purpose .....	17
5.3.2 Test procedure.....	18
5.3.3 Report .....	20
5.4 Linearity test .....	20
5.4.1 Purpose .....	20
5.4.2 Test procedure.....	20
5.4.3 Report .....	23
5.5 Reproducibility test.....	23
5.5.1 Purpose .....	23
5.5.2 Test procedure.....	24
5.5.3 Report .....	25
5.6 Signal-to-noise ratio (SNR) test .....	26
5.6.1 Purpose .....	26
5.6.2 Test procedure.....	27
5.6.3 Report .....	28
5.7 Report rate test.....	28
5.7.1 Purpose .....	28
5.7.2 Test procedure.....	28
5.7.3 Report .....	29
5.8 Latency test .....	29
5.8.1 Purpose .....	29
5.8.2 Test procedure.....	29
5.8.3 Report .....	30
5.9 Electrical noise immunity test .....	30
5.9.1 Purpose .....	30
5.9.2 Test procedure.....	30
5.9.3 Report .....	31
5.10 Water droplet immunity test.....	31

5.10.1	Purpose .....	31
5.10.2	Test procedure.....	32
5.10.3	Report .....	32
5.11	Optical noise immunity test.....	32
5.11.1	Purpose .....	32
5.11.2	Test procedure.....	33
5.11.3	Report .....	33
5.12	Power consumption test .....	33
5.12.1	Purpose .....	33
5.12.2	Test procedure.....	33
5.12.3	Report .....	33
5.13	Perpendicular hover distance test.....	33
5.13.1	Purpose .....	33
5.13.2	Test procedure.....	33
5.13.3	Report .....	34
5.14	Force-output characteristics test.....	34
5.14.1	Purpose .....	34
5.14.2	Test procedure.....	34
5.14.3	Report .....	35
6	In-plane hovering performance measurement methods .....	35
6.1	General.....	35
6.2	Accuracy test .....	35
6.2.1	Purpose .....	35
6.2.2	Test procedure.....	36
6.2.3	Report .....	38
6.3	Repeatability or jitter test .....	39
6.3.1	Purpose .....	39
6.3.2	Test procedure.....	39
6.3.3	Report .....	41
6.4	Report rate test.....	42
6.4.1	Purpose .....	42
6.4.2	Test procedure.....	42
6.4.3	Report .....	43
Annex A (informative)	Electrical performance measurement methods of touch sensors.....	44
A.1	Resistance .....	44
A.1.1	General .....	44
A.1.2	Test samples .....	44
A.1.3	Measurement equipment .....	44
A.1.4	Procedures .....	44
A.1.5	Data analysis .....	45
A.1.6	Report .....	45
A.2	Trans-capacitance.....	45
A.2.1	General .....	45
A.2.2	Test samples .....	45
A.2.3	Measurement equipment .....	45
A.2.4	Procedure.....	45
A.2.5	Data analysis .....	46
A.2.6	Report .....	46

Bibliography .....	47
Figure 1 – Composition of test equipment.....	8
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) .....	9
Figure 4 – Examples of test bars .....	11
Figure 5 – Force sensor added to Figure 1 (in red) for measurement of force-output characteristics of a force sensitive touch sensor module .....	12
Figure 6 – Block diagram showing functions and data added to Figure 2 (in red) for force-output characteristics measurement .....	12
Figure 7 – Location of edge area and centre area .....	13
Figure 8 – Point grid .....	14
Figure 9 – Accuracy definition .....	14
Figure 10 – Example of measurement result and calculation of accuracy.....	17
Figure 11 – Repeatability in the touch sensor module .....	18
Figure 12 – Example of measurement result for repeatability .....	20
Figure 13 – Dragging line for linearity test .....	21
Figure 14 – Linearity definition .....	21
Figure 15 – Example of measurement and calculation of linearity.....	23
Figure 16 – Example of reproducibility test results .....	24
Figure 17 – Reproducibility test procedure.....	25
Figure 18 – Examples of measurements of reproducibility – Velocity dependence .....	26
Figure 19 – SNR definition concept .....	27
Figure 20 – Dragging direction for reporting time measurement .....	28
Figure 21 – Reporting time interval measurement .....	29
Figure 22 – Latency measurement .....	29
Figure 23 – Example of the effect of external noise.....	30
Figure 24 – External noise injection.....	31
Figure 25 – Report of external noise immunity .....	31
Figure 26 – Example of water drop effect .....	32
Figure 27 – Water droplet test procedure.....	32
Figure 28 – Perpendicular hover distance measurement .....	34
Figure 29 – Examples of force-output characteristics .....	34
Figure 30 – Point grid .....	36
Figure 31 – Accuracy definition for in-plane of $XY$ coordinates on the target projection plane ( $I$ ) of the active area .....	37
Figure 32 – Accuracy definition for $Z$ coordinate on the target projection plane ( $I$ ) of the active area .....	37
Figure 33 – Repeatability for in-plane of $XY$ coordinates on the target projection plane ( $I$ ) of the active area .....	39
Figure 34 – Repeatability for $Z$ coordinate on the target projection plane ( $I$ ) of the active area .....	40
Figure 35 – Dragging direction of in-plane for reporting time measurement .....	42
Figure 36 – Dragging direction of $Z$ -axis for reporting time measurement .....	43

Figure 37 – Reporting time interval measurement .....	43
Figure A.1 – Diagrammatic representation of measurement of resistance .....	45
Figure A.2 – Diagrammatic representation of measurement of capacitance .....	46
Table 1 – Standard conditions for reference measurements and tests .....	8
Table A.1 – Specification of LCR impedance meter.....	44

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) 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 redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 62908-12-10:2023. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC 62908-12-10 has been prepared by IEC technical committee 110: Electronic displays. It is an International Standard.

This third edition cancels and replaces the second edition published in 2023. This edition constitutes a technical revision.

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

- a) added principle of force sensitive touch sensor module and force-output characteristics measurement;
- b) added required equipment for force-output characteristic measurement of force sensitive touch sensor module;
- c) added test method for force-output characteristics measurement.

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

Draft	Report on voting
110/1757/CDV	110/1794A/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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

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 [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.

## 1 Scope

This part of IEC 62908 specifies the standard measuring conditions and measurement methods for determining touch and hovering performance of a touch sensor module. This document is applicable to touch sensor modules, ~~where~~ *whereas* 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.

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

IEC 62908-1-2, *Touch and interactive displays - Part 1-2: Generic - Terminology and letter symbols*



## Bibliography

IEC TR 62908-1-3:~~2024~~, *Touch and interactive displays - Part 1-3: Generic - General introduction of pen touch technology*

ISO 7500-1, *Metallic materials - Calibration and verification of static uniaxial testing machines - Part 1: Tension/compression testing machines - Calibration and verification of the force-measuring system*

---