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TECHNICAL REPORT

Touch and interactive displays -
Part 1-3: Generic - Overview of pen touch technology

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FOREWORD

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IEC TR 62908-1-3 has been prepared by IEC technical committee 110: Electronic displays. It is a Technical Report.

This second edition cancels and replaces the first edition published in 2021. This edition constitutes a technical revision.

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

a) add writing characteristics as physical properties of interaction between a pen and a surface of a screen;
b) add example of frictional response between paper and pencil, AGL and touch pen, and glass and touch pen;
c) add example of touch display used in the classroom regarding writing and optical characteristics.

The text of this Technical Report is based on the following documents:

Draft	Report on voting
110/1834/DTR	110/1849/RVDTR

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 Technical Report 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.

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 in the data related to the specific document. At this date, the document will be

– reconfirmed,
– withdrawn, or
– revised.

INTRODUCTION

With the spread of smartphones in recent years, finger touch technology has become widespread throughout the world. The field of popularization has started with smartphones and has spread out with information terminals such as notebook (laptop) PCs and tablets to kiosks, ATMs, sales equipment in the field of social infrastructure, medical equipment for professional use, and construction-related items.

Finger touch technology faces several challenges, such as malfunction due to usage environment, wearing of gloves or water droplets, in addition to difficulty of fine drawing with finger touch, signature input, and so on.

In the early stage of the pen touch technologies, the operating system and application software only supported the same function as finger touch. However, a new concept of digital ink has enabled to treat the progressing data, such as writing pressure, pen angle, and drawing, in addition to the data of the entered trajectory. These are digitized and saved together with the trajectory data. This means that a new technique with pen input has been developed, which goes beyond the conventional technology of finger touch input.

Based on the above situation, this document aims to focus on the issues related to future standardization by summarizing the sensing methods of pen touch, the types of touch pens and the corresponding technologies, and the market's trend of pen touch technology.

1 Scope

This part of IEC 62908, which is a technical report, provides general information on pen touch technology with the aim toward standardization. This document includes an overview of the pen touch technology, critical performance characteristics, issues of characteristics measurements, and other information.

The purpose of this document is to provide an overview of the different products available in pen touch technology. The companies and products named in this document do not constitute an endorsement by IEC of these products.

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*

3 Terms, definitions and abbreviated terms

3.1 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 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

3.2 Abbreviated terms

AES active electrostatic
AGL anti-glare layer
AP Apple pencil
API application program(ing) interface
AR/VR augmented reality/virtual reality
ATM automated [automatic] teller machine
DSC Digital Stationery Consortium
EMI electromagnetic induction
EMR electromagnetic resonance
ES electrostatics
IC integrated circuits
MPP Microsoft Pen Protocol
OS operating system
PCAP projected capacitive touch panel

SDK software developer's kit
SNR signal-to-noise ratio
USI Universal Stylus Initiative
WA Wacom AES
WE Wacom EMR

4 Generic information on pen touch technology

4.1 General

In Clause 4, the classification of pen types, the corresponding sensing technology, and the touch panel structure and principle are described.

4.2 Classification

To clarify the performance of the touch pens, a comparison is made among a finger touch, a pen touch, and a mouse as a pointing device, as shown in Table 1.

The main difference is that finger touch and pen touch indicate an absolute position of the screen, whereas a mouse indicates a relative position, because it is operated away from the screen.

The next point is regarding the positional accuracy. As the pen directly touches a specific position of the screen, it therefore has the highest positional accuracy. The second highest positional accuracy is the mouse, because it can control a precise position. Finger touch has the lowest positional accuracy because the finger's contact area is much larger than the precise point where the user wants to touch on the screen.

On the other hand, the finger touch is suitable for multi-point designation and intuitive gesture motion.

In addition, as a pen is "a general writing tool", the pen touch is the most suitable tool for drawing pictures and signs, and also most suitable for manual input of letters without using a keyboard.

Table 1 – Comparison among pointing devices

	Finger	Pen	Mouse
Coordinates	Absolute coordinates	Absolute coordinates	Relative coordinates
Positional accuracy	Poor	Excellent	Fair
Multi-points	Available	Available	Not applicable
Gesture operation	Excellent	Fair	Poor
Drawing performance	Fair	Excellent	Poor
Conformance of the signature	Fair	Excellent	Poor
Compatibility with digital ink	Not applicable	Available	Not applicable

Next, the types of touch pens can be classified as shown in Table 2: the first category is whether the pen has a built-in electrical circuit or not. The next category is about the sensing method of the pen touch. In the third category, there are two types of communications: one-way communication (unidirectional) and two-way communication (bidirectional) between the pen and the sensing panel or the system.