

Superconductivity - Part 22-1: Superconducting
electronic devices - Generic specification for sensors
and detectors

EESTI STANDARDI EESSÕNA

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English Version

**Superconductivity - Part 22-1: Superconducting electronic
devices - Generic specification for sensors and detectors
(IEC 61788-22-1:2017)**

Supraconductivité - Partie 22-1: Composants électroniques
supraconducteurs - Spécification générique pour capteurs
et détecteurs
(IEC 61788-22-1:2017)

Supraleitung - Teil 22-1: Supraleitende Elektronik -
Generische Spezifikationen für Sensoren und Detektoren
(IEC 61788-22-1:2017)

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Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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European foreword

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The following dates are fixed:

- latest date by which the document has to be (dop) 2018-05-31
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standard or by endorsement
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In the official version, for Bibliography, the following note has to be added for the standard indicated:

ISO/TS 80004-2:2015	NOTE	Harmonized as CEN ISO/TS 80004-2:2017 (not modified).
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Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60027	Series	Letter symbols to be used in electrical technology	EN 60027	Series
IEC 60050-815	-	International Electrotechnical Vocabulary - Part 815: Superconductivity	-	-
IEC 60417-DB	-	Graphical symbols for use on equipment	-	-
IEC 60617-DB	-	Graphical symbols for diagrams	-	-
ISO 1000 ¹	-	SI units and recommendations for the use of their multiples and of certain other units	-	-
ISO 7000	-	Graphical symbols for use on equipment - Registered symbols	-	-

¹ Superseded by ISO 80000-1.

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INTRODUCTION

Superconductivity offers various possibilities for the realization of sensing and detection of a variety of measurands. Several sensors and detectors have been developed, exploiting features like superconducting energy gaps, sharp normal-superconducting transition, nonlinear I – V characteristics, superconducting coherent states, and quantization of magnetic flux. All these properties can be influenced by the interaction with electromagnetic fields, photons, ions, etc. Superconducting sensors and detectors have extremely high performance for energy resolution, time response, and low noise, most of which cannot be realized by any other phenomena.

The word "sensor" is normally used for measuring stationary or slowly changing electromagnetic fields, physical quantities such as current and temperature. On the other hand, the word "detector" is normally used for single quanta such as photons from infrared to γ -rays and individual particles. However, the boundary between "sensor" and "detector" is ambiguous. In this document, therefore, both "sensor" and "detector" are used. Additionally, a detector using a sensor is possible, for example, X-ray detector using transition edge sensor (TES) that measures temperature rise due to the deposition of measurand energy. In this document, for example, the terminology "transition edge sensor X-ray detector" is used for X-ray detection using TES.

Superconducting sensors and detectors have been applied to a variety of fields including medical diagnosis, telecommunications, mineral exploration, astronomical instruments, quantum information processing, and analytical instruments. For users, IEC standardization is necessary because there is confusing terminology, there are no graphical symbols for diagrams, and no test methods.