SLOVENSKI STANDARD
SIST EN 62047-19:2014

01-maj-2014

Polprevodniški elementi - Mikroelektromehanski elementi - 19. del: Elektronski kompasi (IEC 62047-19:2013)

Semiconductor devices - Micro-electromechanical devices - Part 19: Electronic compasses

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ICS:

31.080.01	Polprevodniški elementi (naprave) na splošno	Semiconductor devices in general

SIST EN 62047-19:2014 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 62047-19

September 2013

ICS 31.080.99

English version

Semiconductor devices - Micro-electromechanical devices - Part 19: Electronic compasses (IEC 62047-19:2013)

Dispositifs à semiconducteurs –
Dispositifs microélectromécaniques -
Partie 19: Compas électroniques
(CEI 62047-19:2013)

Halbleiterbauelemente -
Bauelemente der Mikrosystemtechnik -
Teil 19: Elektronische Kompasse
(IEC 62047-19:2013)

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 62047-19:2013 E

Foreword

The text of document 47F/156/FDIS, future edition 1 of IEC 62047-19, prepared by SC 47F "Microelectromechanical systems" of IEC/TC 47 "Semiconductor devices" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 62047-19:2013.

The following dates are fixed:

• latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2014-05-21
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2016-08-21

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In the official version, for Bibliography, the following note has to be added for the standard indicated:

EN ISO 11606	NOTE	Harmonized as ISO 11606 (not modified).

IEC 62047-19

Edition 1.0 2013-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Semiconductor devices – Micro-electromechanical devices – Part 19: Electronic compasses

Dispositifs à semiconducteurs – Dispositifs microélectromécaniques – Partie 19: Compas électroniques

INTERNATIONAL ELECTROTECHNICAL COMMISSION

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FOREWORD

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International Standard IEC 62047-19 has been prepared by subcommittee 47F: Micro-electromechanical systems, of IEC technical committee 47: Semiconductor devices.

The text of this standard is based on the following documents:

FDIS	Report on voting
47F/156/FDIS	47F/163/RVD

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

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 62047 series, published under the general title *Semiconductor devices – Micro-electromechanical devices*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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.

SEMICONDUCTOR DEVICES – MICRO-ELECTROMECHANICAL DEVICES –

Part 19: Electronic compasses

1 Scope

This part of IEC 62047 defines terms, definitions, essential ratings and characteristics, and measuring methods of electronic compasses. This standard applies to electronic compasses composed of magnetic sensors and acceleration sensors, or magnetic sensors alone. This standard applies to electronic compasses for mobile electronic equipment.

For marine electronic compasses, see ISO 11606.

Electronic compasses are called “e-compasses” for short. Types of e-compasses are: 2-axis e-compasses, 3-axis e-compasses, 6-axis e-compasses, etc., all of which are covered by this standard.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

None

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
3-axis Helmholtz coil
three Helmholtz coils that generate magnetic fields at right angles to each other

3.2
zero magnetic field environment
magnetic field environments where magnetic field strength in a space including a device under test is lower than the strength specified

Note 1 to entry: The device under test (DUT) is defined in 4.1.7.

3.3
e-compass
electronic compass
compass that calculates and outputs an azimuth using the electrical output of sensors

Note 1 to entry: The term “e-compass” is used as an abbreviated term of electronic compass. (See the above Scope.)

3.4
2-axis e-compass
e-compass that uses a 2-axis magnetic sensor as a geomagnetism detection element

3.5
3-axis e-compass
e-compass that uses a 3-axis magnetic sensor as a geomagnetism detection element

3.6
6-axis e-compass
e-compass that uses a 3-axis magnetic sensor as a geomagnetism detection element, and a 3-axis acceleration sensor as an gravity detection element

3.7
magnetic north
direction of the horizontal component of an environment magnetic vector at a location, which is the same direction a compass points to

Note 1 to entry: Geomagnetism is sometimes warped by artificial structures (buildings, vehicles, etc.), or is sometimes affected by their magnetization especially in urban areas. Strictly, therefore, the geomagnetic vector should be called a kind of environmental magnetic vector. Although the environmental magnetic vector does not point to the magnetic north pole exactly, here “magnetic north” is defined as the horizontal component of an environmental magnetic vector.

3.8
true north
direction of the horizontal component of a vector pointing to the North Pole of the Earth (north end of rotational axis) at a location, which is the same as the north to which longitude lines or a meridian point

3.9
azimuth angle
rotational angle around z-axis of a terminal coordinate system, which is defined as zero degree when the xy-plane of a terminal coordinate system is horizontal and the yz-plane includes the North Pole, where a clockwise turn is defined as positive when the z-axis is viewed from the positive direction to the negative direction

Note 1 to entry: Azimuth angle is the same as the yaw angle, see Annex C.

Note 2 to entry: For coordinate systems of e-compasses, see Annex B.

Note 3 to entry: For an explanation with diagrams, see Annex C.

Note 4 to entry: Definitions for cases in which the xy-plane of a terminal coordinate system are not horizontal are under consideration.

4 Essential ratings and characteristics

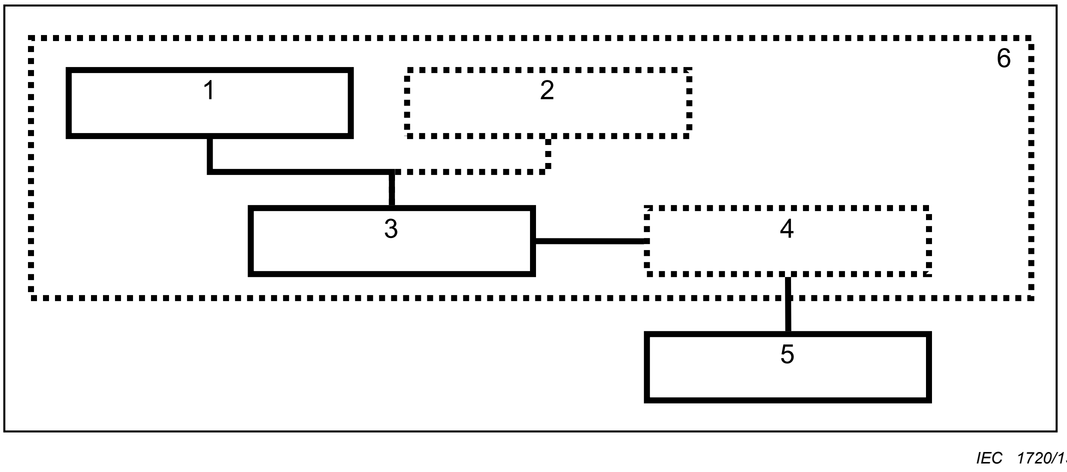
4.1 Composition of e-compasses

4.1.1 General

As shown in Figure 1, an e-compass is composed of the following sections:

– Magnetic sensor section;
– Acceleration sensor section;
– Signal processing section;
– Peripheral hardware sections;
– Peripheral software sections.

In some cases, an e-compass does not contain the acceleration sensor section and/or the peripheral hardware section.



Key

1	Magnetic sensor section	4	Peripheral hardware section
2	Acceleration sensor section	5	Peripheral software section
3	Signal processing section	6	DUT

Figure 1 – Composition of e-compasses

4.1.2 Magnetic sensor section

A magnetic sensor section is a magnetic sensor to measure magnetic fields of an Earth's magnetism level, which measures two or more axes of magnetic fields that are at right angles to each other for calculating azimuth angles using its output.

In the case of a 3-axis magnetic sensor, for example, the sensor section is composed of an x-axis sensor, a y-axis sensor, and a z-axis sensor, and the sensitivity axis of the x-axis sensor is set to the x-axis.

4.1.3 Acceleration sensor section

An acceleration sensor section is an acceleration sensor to measure gravity. Vertical direction (horizontal plane) is known from its output, and then an azimuth angle is calculated based on the information with correction considering the attitude of the magnetic sensor section (tilt angle).

In the case of a 3-axis acceleration sensor, for example, the sensor section is composed of an x-axis sensor, a y-axis sensor, and a z-axis sensor, and the sensitivity axis of the x-axis sensor is set to the x-axis.

4.1.4 Signal processing section

A signal processing section is a circuit section to drive the sensor section and to amplify its signal. In some cases, this section includes an analog-digital converter.

4.1.5 Peripheral hardware section

A peripheral hardware section includes sections of a digital interface, data storage for information to control registers and devices, and an information processing.

4.1.6 Peripheral software section

A peripheral software section includes not only a device driver section to acquire data but also software to convert the coordinate data from magnetic sensors and acceleration sensors and to calculate azimuth angles based on the results.