

**SLOVENSKI**  
**STANDARD**

**SIST EN 60947-5-  
2:2000/A1:2000**

prva izdaja  
september 2000

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**Nizkonapetostne stikalne in krmilne naprave – 5-2. del: Krmilne naprave in stikalni elementi – Približevalna stikala – Dopolnilo A1**

Low-voltage switchgear and controlgear - Part 5-2: Control circuit devices and switching elements - Proximity switches (IEC 60947-5-2:1997/A1:1999)

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[SIST EN 60947-5-2:2000/A1:2000](https://standards.iteh.ai/catalog/standards/sist/2379e01b-661e-41b9-8722-a776bddd50a4/sist-en-60947-5-2-2000-a1-2000)  
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ICS 29.130.20

Referenčna številka  
SIST EN 60947-5-2:2000/A1:2000(en)

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English version

**Low-voltage switchgear and controlgear**  
**Part 5-2: Control circuit devices and switching elements**  
**Proximity switches**  
(IEC 60947-5-2:1997/A1:1999)

Appareillage à basse tension  
Partie 5-2: Appareils et éléments de  
commutation pour circuits de  
commande - Détecteurs de proximité  
(CEI 60947-5-2:1997/A1:1999)

Niederspannungsschaltgeräte  
Teil 5-2: Steuergeräte und  
Schaltelemente - Näherungsschalter  
(IEC 60947-5-2:1997/A1:1999)

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SIST EN 60947-5-2:2000/A1:2000

<https://standards.iteh.ai/catalog/standards/sist/2379e01b-661e-41b9-8722-a776bddd50a4/sist-en-60947-5-2-2000-a1-2000>

This amendment A1 modifies the European Standard EN 60947-5-2:1998; it was approved by CENELEC on 1999-08-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This amendment exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

## CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

### Foreword

The text of document 17B/981/FDIS, future amendment 1 to IEC 60947-5-2, prepared by SC 17B, Low-voltage switchgear and controlgear, of IEC TC 17, Switchgear and controlgear, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A1 to EN 60947-5-2:1998 on 1999-08-01.

The following dates were fixed:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2000-05-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2002-08-01

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### Endorsement notice

The text of amendment 1:1999 to the International Standard IEC 60947-5-2:1997 was approved by CENELEC as an amendment to the European Standard without any modification.

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SIST EN 60947-5-2:2000/A1:2000  
<https://standards.iteh.ai/catalog/standards/sist/2379e01b-661e-41b9-8722-a776bddd50a4/sist-en-60947-5-2-2000-a1-2000>

NORME  
INTERNATIONALE

CEI  
IEC

INTERNATIONAL  
STANDARD

60947-5-2

1997

AMENDEMENT 1  
AMENDMENT 1  
1999-06

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Amendement 1

**Appareillage à basse tension –**

**Partie 5-2:**

**Appareils et éléments de commutation  
pour circuits de commande –  
DéTECTEURS DE PROXIMITÉ**

SIST EN 60947-5-2:2000/A1:2000

<https://standards.joh.cam.ac.uk/standards/sist/2379e01b-661e-41b9-8722-a776bddd50a4/sist-en-60947-5-2-2000-a1-2000>

Amendment 1

**Low-voltage switchgear and controlgear –**

**Part 5-2:**

**Control circuit devices and switching elements –  
Proximity switches**

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International Electrotechnical Commission  
Telefax: +41 22 919 0300

3, rue de Varembe Geneva, Switzerland  
e-mail: inmail@iec.ch IEC web site <http://www.iec.ch>



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## FOREWORD

This amendment has been prepared by subcommittee 17B: Low-voltage switchgear and controlgear, of IEC technical committee 17: Switchgear and controlgear.

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

FDIS	Report on voting
17B/981/FDIS	17B/993/RVD

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

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### 1.1 Scope and object

Replace the existing first paragraph by the following:

This part of IEC 60947 applies to inductive and capacitive proximity switches that sense the presence of metallic and/or non-metallic objects, ultrasonic proximity switches that sense the presence of sound reflecting objects, photoelectric proximity switches that sense the presence of objects and non-mechanical magnetic proximity switches that sense the presence of objects with a magnetic field.

<https://standards.iteh.ai/catalog/standards/sist/2379e01b-661e-41b9-8722-a776bddd50a4/sist-en-60947-5-2-2000-a1-2000>

Page 13

Add, after "Non-embeddable proximity switch", the following new definition:

Non-mechanical magnetic proximity switch .....2.1.1.5

Page 17

Add, after 2.1.1.4, the following new definition:

#### 2.1.1.5

##### non-mechanical magnetic proximity switch

proximity switch which senses the presence of a magnetic field and has a semiconductor switching element and no moving parts in the sensing element

#### 2.2.2.1

##### reference axis for inductive, capacitive and ultrasonic proximity switches

Replace the existing title by the following new title:

#### 2.2.2.1

reference axis for inductive, capacitive, non-mechanical magnetic and ultrasonic proximity switches

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Add, after 2.2.11.3, the following new definition:

#### 2.2.11.4

##### **sensing face of a non-mechanical magnetic proximity switch**

a surface of the proximity switch through which the change in a magnetic field is detected

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Table 1

Add, in column 1, the following:

M = non-mechanical magnetic

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#### 6.1.1.1 Inductive, capacitive and ultrasonic proximity switches

Replace the existing title by the following new title:

##### 6.1.1.1 Inductive, capacitive, non-mechanical magnetic and ultrasonic proximity switches

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[SIST EN 60947-5-2:2000/A1:2000](https://standards.iteh.ai/catalog/standards/sist/2379e01b-661e-41b9-8722-1947-5-2-2000-a1-2000)

[https://standards.iteh.ai/catalog/standards/sist/2379e01b-661e-41b9-8722-](https://standards.iteh.ai/catalog/standards/sist/2379e01b-661e-41b9-8722-1947-5-2-2000-a1-2000)

Add, after 7.2.1.3.4 the following new subclause: [1947-5-2-2000-a1-2000](https://standards.iteh.ai/catalog/standards/sist/2379e01b-661e-41b9-8722-1947-5-2-2000-a1-2000)

#### 7.2.1.3.5 Sensitivity and operating distances of non-mechanical magnetic proximity switches

For non-mechanical magnetic proximity switches, the operating sensing characteristics and their tolerances shall be declared by the manufacturer.

#### 7.2.1.6.1 Inductive, capacitive and ultrasonic proximity switches

Replace " ... and shall be measured according to 8.5." by "... and shall be measured according to 8.5.1 and 8.5.2."

#### 7.2.1.6.2 Photoelectric proximity switch

Add, at the end of this subclause, the following new sentence:

$t_{on}$  and  $t_{off}$  shall be measured according to 8.5.3.

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#### 7.4.2 Vibration

*Replace the existing third paragraph by the following:*

Amplitude	1 mm for inductive, capacitive, non-mechanical magnetic and ultrasonic proximity switches
	0,5 mm for photoelectric proximity switches

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*Add, after 8.3.2.1.3, the following new subclause:*

#### 8.3.2.1.4 Standard target for non-mechanical magnetic proximity switch

For non-mechanical magnetic proximity switches the target shall be specified by the manufacturer.

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#### 8.4.1 Inductive, capacitive and ultrasonic proximity switches

*Replace the existing title by the following new title:*

#### 8.4.1 Inductive, capacitive, non-mechanical magnetic and ultrasonic proximity switches

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<https://standards.iteh.ai/catalog/standards/sist/2379e01b-661e-41b9-8722-a776bddd50a4/sist-en-60947-5-2-2000-a1-2000>

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**Figure 12 – Methods for measuring the operating frequency  $f$ , inductive and capacitive proximity switches**

*Replace this title by the following new title:*

**Figure 12 – Methods for measuring the operating frequency of inductive, capacitive and non-mechanical magnetic proximity switches (if applicable)**

#### 8.5 Testing for the frequency of operating cycles

*Add, before 8.5.1, the following new paragraph:*

When the proximity switch frequency of operating cycles exceeds the limit of the measuring method described, the manufacturer shall state the method of measurement.

#### 8.5.1 Method for measuring the frequency of operating cycles

*Replace the existing title of a) by the following:*

a) Inductive, capacitive and non-mechanical magnetic proximity switches

*Delete, in a), the note.*

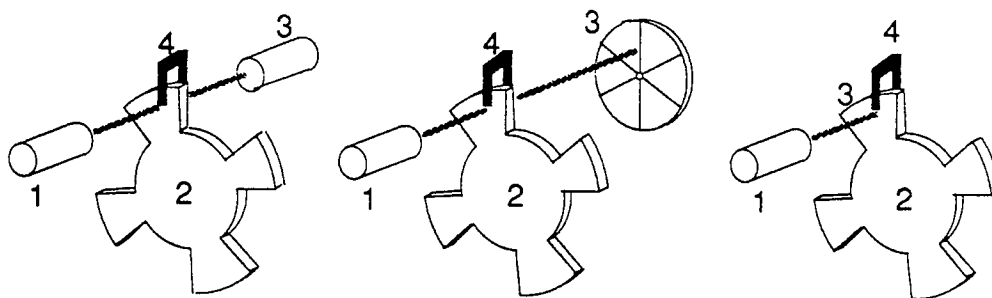


Add, after 8.5.2, the following new subclause:

### 8.5.3 Photoelectric proximity switches

#### 8.5.3.1 Measurement means

As shown in figure 15, a rotating disc with one or more targets is fixed parallel to the sensing face of the proximity switch at a distance less than 10 cm, and in such a way that the reference axis of the proximity switch passes through the centre of the target.



IEC 827/99

Type T (through beam)	Type R (retro-reflective)	Type D (diffuse reflective)
1 Receiver	1 Emitter-receiver	1 Emitter-receiver
2 Disc	2 Disc	2 Disc
3 Emitter	3 Reflector	3 Target
4 Reference sensor	4 Reference sensor	4 Reference sensor

Figure 15 – Measurement means for turn-on time  $t_{on}$  and turn-off time  $t_{off}$

For types T and R, the effective beam shall be fully broken by the rotating target.

For type D, the surface of the rotating target shall be made of the same material as the standard target.

If the operating distance affects the tests, then the manufacturer shall state the test distance.

A reference sensor having a switching frequency at least ten times higher than the equipment under test (EUT) is also put around the disc.

A recorder (for example, a memory oscilloscope) can draw simultaneously curves delivered by the proximity switch and by the reference sensor (see figures 16 and 17).

#### 8.5.3.2 Measurement of turn-on time ( $t_{on}$ )

The positional relationship between the reference sensor and the EUT shall be adjusted while moving the disc slowly so that the output of the reference sensor changes its state simultaneously with the output of the EUT.

To measure  $t_{on}$ , the disc speed is adjusted so that the EUT is operated at approximately half of the maximum operating frequency stated by the manufacturer.