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

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

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Descriptors: Low-voltage switchgear and controlgear, control circuit devices, switching elements, proximity switches

English version

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

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

Niederspannungsschaltgeräte  
Teil 5-2: Steuergeräte und  
Schaltelemente - Näherungsschalter  
(IEC 60947-5-2:1997, modifiziert)

This European Standard was approved by CENELEC on 1998-10-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard 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 European Standard 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.

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**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 the International Standard IEC 60947-5-2:1997, prepared by SC 17B, Low-voltage switchgear and controlgear, of IEC TC 17, Switchgear and controlgear, together with common modifications prepared by the Technical Committee CENELEC TC 17B, Low-voltage switchgear and controlgear including dimensional standardization, was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 60947-5-2 on 1998-10-01.

This European Standard supersedes EN 60947-5-2:1997.

The following dates were fixed:

- latest date by which the EN has to be implemented  
at national level by publication of an identical  
national standard or by endorsement (dop) 1999-10-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 2001-10-01

Annexes designated "normative" are part of the body of the standard.  
In this standard, annexes A to E and ZA are normative.  
Annex ZA has been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 60947-5-2:1997 was approved by CENELEC as a European Standard with agreed common modifications as given below.

### COMMON MODIFICATIONS

#### CONTENTS

Add the title of the following annex :

Annex ZA Normative references to international publications with their corresponding European publications.

#### 1 General

##### 1.2 Add the following normative references :

IEC 61000-3-2:1995, *Electromagnetic compatibility (EMC) – Part 3: Limits – Section 2: Limits for harmonic current emissions (equipment input current up to and including 16 A per phase)*

IEC 61000-3-3:1994, *Electromagnetic compatibility (EMC) – Part 3: Limits – Section 3: Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current up to and including 16 A*

CISPR 11:1990, *Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment*

#### 7 Constructional and performance requirements

##### 7.1.5 Replace this subclause by the following :

###### 7.1.5 Indicating means

Proximity switches may incorporate one or more colour indicators.

The meaning of the colours shall be :

- a) continuous GREEN : power ON ;
- b) continuous YELLOW : output ON ;
- c) continuous RED : fault
- d) any other continuous colour or any colour in flashing mode : other functions (e.g. short-circuit).

##### 7.1.7.3 Add the following text at the end of this subclause :

For plug-in type proximity switches, the built-in connector shall be in accordance with annex D (normative).

**Annex ZA (normative)**

**Normative references to international publications  
with their corresponding European publications**

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

NOTE: When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050(441)	1984	International Electrotechnical Vocabulary (IEV) Chapter 441: Switchgear, controlgear and fuses	-	-
IEC 60068-2-6 + corr. March	1995 1995	Environmental testing Part 2: Tests - Test Fc: Vibration (sinusoidal)	EN 60068-2-6	1995
IEC 60068-2-14	1984	Part 2: Tests - Test N: Change of temperature	HD 323.2.14 S2 <sup>1)</sup>	1987
IEC 60068-2-27	1987	Part 2: Tests - Test Ea and guidance: Shock	EN 60068-2-27	1993
IEC 60068-2-30	1980	Part 2: Tests - Test Db and guidance: Damp heat, cyclic (12 + 12 hour cycle)	HD 323.2.30 S3 <sup>2)</sup>	1988
IEC 60364 (mod) series		Electrical installations of buildings	HD 384	series
IEC 60446	1989 <sup>3)</sup>	Identification of conductors by colours or numerals	-	-
IEC 60536	1976	Classification of electrical and electronic equipment with regard to protection against electric shock	HD 366 S1	1977
IEC 60947-1 (mod)	1996	Low-voltage switchgear and controlgear Part 1: General rules	EN 60947-1	1997
IEC 60947-5-1	1997	Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices	EN 60947-5-1 + A11	1997 1997

1) HD 323.2.14 S2 includes A1:1986 to IEC 60068-2-14.

2) HD 323.2.30 S3 includes A1:1985 to IEC 60068-2-30.

3) IEC 60446:1973 is harmonized as HD 324 S1:1977.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 61000-3-2	1995	Electromagnetic compatibility (EMC) Part 3-2: Limits - Limits for harmonic current emissions (equipment input current up to and including 16 A per phase)	EN 61000-3-2 + corr. July	1995 1997
IEC 61000-3-3	1994	Part 3: Limits Section 3: Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current up to and including 16 A	EN 61000-3-3 + corr. July	1995 1997
IEC 61000-4-2	1995	Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test - Basic EMC publication	EN 61000-4-2	1995
IEC 61000-4-3 (mod)	1995	Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3	1996
IEC 61000-4-4	1995	Part 4: Testing and measurement techniques Section 4: Electrical fast transient/burst immunity test - Basic EMC publication	EN 61000-4-4	1995
IEC 61020-5-1	1991	Electromechanical switches for use in electronic equipment Part 5: Sectional specification for pushbutton switches Section 1: Blank detail specification	-	-
CISPR 11 (mod)	1990	Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment	EN 55011 <sup>4)</sup>	1991
ISO 630	1995	Structural steels - Plates, wide flats, bars, sections and profiles	-	-

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4) EN 55011 is superseded by EN 55011:1998, which is based on CISPR 11:1997, mod.

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INTERNATIONALE  
INTERNATIONAL  
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**CEI  
IEC**

**60947-5-2**

Deuxième édition  
Second edition  
1997-10

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**Appareillage à basse tension –**

**Partie 5-2:  
Appareils et éléments de commutation  
pour circuits de commande –  
DéTECTEURS de proximité**

**Low-voltage switchgear and controlgear –**

**Part 5-2:  
Control circuit devices and switching elements –  
Proximity switches**

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International Electrotechnical Commission  
Международная Электротехническая Комиссия

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For price, see current catalogue*

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 5-2: Control circuit devices and switching elements –  
Proximity switches

## FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
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- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60947-5-2 has been prepared by subcommittee 17B: Low-voltage switchgear and controlgear, of IEC technical committee 17: Switchgear and controlgear.

This second edition replaces the first edition published in 1992, amendments 1 (1994), and 2 (1995).

It should be used in conjunction with IEC 60947-5-1.

The text of this standard is based on the first edition, amendments 1 and 2 and the following documents:

SIST EN 60947-5-2:2000	
FDIS	Report on voting
17B/833/FDIS	17B/854/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.

Annexes A, B, C, D and E form an integral part of this standard.

## LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

### Part 5-2: Control circuit devices and switching elements – Proximity switches

#### 1 General

The provisions of the General Rules in part 1 (IEC 60947-1) are applicable to this standard, where specifically called for. General Rules clauses and subclauses thus applicable, as well as tables, figures and appendices, are identified by references to part 1, e.g. subclause 7.1.9.3 of part 1 or annex C of part 1.

Clauses 1 to 8 contain the general requirements. Specific requirements for the various types of proximity switches are given in annex A.

#### 1.1 Scope and object

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 and photoelectric proximity switches that sense the presence of objects.

These proximity switches are self-contained, have semiconductor switching elements(s) and are intended to be connected to circuits, the rated voltage of which does not exceed 250 V 50 Hz/60 Hz a.c. or 300 V d.c. This Standard is not intended to cover proximity switches with analogue outputs.

The object of this standard is to state for proximity switches:

- definitions;
- classification;
- characteristics;
- product information;
- normal service, mounting and transport conditions;
- constructional and performance requirements;
- tests to verify rated characteristics.

#### 1.2 Normative references

[SIST EN 60947-5-2:2000](https://standards.iteh.ai/catalog/standards/sist/d18674da-45d4-4c5f-9cb0-630342c1c6d1/sist-en-60947-5-2-2000)

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 60947. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 60947 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60050(441):1984, *International Electrotechnical Vocabulary (IEV) – Chapter 441: Switchgear, controlgear and fuses*

IEC 60068-2-6:1995, *Environmental testing – Part 2: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-14:1984, *Environmental testing – Part 2: Tests – Test N: Change of temperature*

IEC 60068-2-27:1987, *Environmental testing – Part 2: Tests – Test Ea and guidance: Shock*

IEC 60068-2-30:1980, *Environmental testing – Part 2: Tests – Test Db and guidance: Damp heat, cyclic (12 + 12 hour cycle)*

IEC 60364 (all parts), *Electrical installations of buildings*

IEC 60446:1989, *Identification of conductors by colours or numerals*

IEC 60536:1976, *Classification of electrical and electronic equipment with regard to protection against electric shock*

IEC 60947-1:1996, *Low-voltage switchgear and controlgear – Part 1: General rules*

IEC 60947-5-1:1997, *Low-voltage switchgear and controlgear – Part 5-1: Control circuit devices and switching elements – Electromechanical control circuit devices*

IEC 61000-4-2:1995, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 2: Electrostatic discharge immunity test – Basic EMC publication*

IEC 61000-4-3:1995, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 3: Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4:1995, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 4: Electrical fast transient/burst immunity test – Basic EMC publication*

IEC 61020-5-1:1991, *Electromechanical switches for use in electronic equipment – Part 5: Sectional specification for pushbutton switches – Section 1: Blank detail specification*

ISO 630: 1995, *Structural steels – Plates, wide flats, bars, sections and profiles*

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## 2 Definitions

Clause 2 of part 1 applies with the following additions:

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