

# SLOVENSKI STANDARD

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**Nizkonapetostne stikalne in krmilne naprave – 5-1. del: Krmilne naprave in stikalni elementi – Elektromehanske krmilne naprave**

Low-voltage switchgear and controlgear -- Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices

**iTeh STANDARD PREVIEW**

Niederspannungsschaltgeräte -- Teil 5-1: Steuergeräte und Schaltelemente - Elektromechanische Steuergeräte

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Appareillage à basse tension -- Partie 5-1: Appareils et éléments de commutation pour circuits de commande - Appareils électromécaniques pour circuits de commande

**Ta slovenski standard je istoveten z: EN 60947-5-1:1997**

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**ICS:**

29.130.20	Nizkonapetostne stikalne in krmilne naprave	Low voltage switchgear and controlgear
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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 60947-5-1**

November 1997

ICS 29.120.60

Supersedes EN 60947-5-1:1991 and its amendments

Descriptors: Low-voltage switchgear and controlgear, electromechanical control circuit devices, characteristics, tests

English version

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

Appareillage à basse tension  
Partie 5-1: Appareils et éléments  
de commutation pour circuits de  
commande - Appareils  
électromécaniques pour circuits  
de commande  
(CEI 60947-5-1:1997)

Niederspannungsschaltgeräte  
Teil 5-1: Steuergeräte und  
Schaltelemente - Elektromechanische  
Steuergeräte  
(IEC 60947-5-1:1997)

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This European Standard was approved by CENELEC on 1997-10-01. 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.

**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/832 + 832A/FDIS, future amendment to IEC 60947-5-1:1990, 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 A3 to EN 60947-5-1:1991 on 1997-10-01.

The text of this document, together with that of IEC 60947-5-1:1990 and its amendments 1:1994 and 2:1996, was published by IEC as the second edition of IEC 60947-5-1 in October 1997. According to a decision of principle taken by the Technical Board of CENELEC, the approval of EN 60947-5-1:1991/A3 has been converted into the approval of a new EN 60947-5-1.

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) 1998-07-01
- latest date by which the national standards conflicting  
with the EN have to be withdrawn (dow) 1998-07-01

This standard is to be used in conjunction with EN 60947-1.

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

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#### Endorsement notice

The text of the International Standard IEC 60947-5-1:1997 was approved by CENELEC as a European Standard without any modification.

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## 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 60050(446)	1983	Chapter 446: Electrical relays	-	-
IEC 60068-2-14	1984	Basic environmental testing procedures Part 2: Tests - Test N: Change of temperature	HD 323.2.14 S2 <sup>1)</sup>	1987
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 60073	1996	Basic and safety principles for man-machine interface, marking and identification Coding principles for indication devices and actuators	EN 60073	1996
IEC 60112	1979	Method for determining the comparative and the proof tracking indices of solid insulating materials under moist conditions	HD 214 S2	1980
IEC 60255 (mod)	series	Electrical relays	EN 60255	series
IEC 60536	1976	Classification of electrical and electronic equipment with regard to protection against electric shock	HD 366 S1	1977
IEC 60617	series	Graphical symbols for diagrams	EN 60617	series
IEC 60947-1 (mod)	1996	Low-voltage switchgear and controlgear Part 1: General rules	EN 60947-1	1997

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

2) HD 323.2.30 S2 includes A1:1985 to IEC 60068-2-30.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60947-4-1	1990	Part 4: Contactors and motor-starters Section 1: Electromechanical contactors and motor-starters	EN 60947-4-1 + corr. June	1992 1997
IEC 61000-4-2	1995	Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 2: Electrostatic discharge immunity test - Basic EMC publication	EN 61000-4-2	1995
IEC 61000-4-3 (mod)	1995	Section 3: Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3	1996
IEC 61000-4-4	1995	Séction 4: Electrical fast transient/burst immunity test - Basic EMC publication	EN 61000-4-4	1995

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INTERNATIONAL  
STANDARD

60947-5-1

Deuxième édition  
Second edition  
1997-10

Appareillage à basse tension –

Partie 5-1:

Appareils et éléments de commutation  
pour circuits de commande –

Appareils électromécaniques  
pour circuits de commande

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Low-voltage switchgear and controlgear –

Part 5-1:

Control circuit devices and switching elements –  
Electromechanical control circuit devices

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Commission Electrotechnique Internationale  
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 5-1: Control circuit devices and switching elements  
Electromechanical control circuit devices

## 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.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 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.

This standard IEC 60947-5-1 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 1990, its amendment 1 (1994) and its amendment 2 (1996).

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

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

FDIS	Report on voting
17B/832+832A/FDIS	17B/853/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, E, F, G, H, J and K form an integral part of this standard.

## LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR -

### Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices

#### 1 General

The provisions of the general rules, 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 annexes are identified by a reference to part 1, for example 1.2.3, table 4 or annex A of part 1.

##### 1.1 Scope and object

This part of IEC 60947 applies to control circuit devices and switching elements intended for controlling, signalling, interlocking, etc., of switchgear and controlgear.

It applies to control circuit devices having a rated voltage not exceeding 1 000 V a.c. (at a frequency not exceeding 1 000 Hz) or 600 V d.c.

However, for operational voltages below 100 V a.c. or d.c., see note 2 of 4.3.1.1.

This standard applies to specific types of control circuit devices such as:

- manual control switches, for example pushbuttons, rotary switches, foot switches, etc.;
- electromagnetically operated control switches, either time-delayed or instantaneous, for example contactor relays;
- pilot switches, for example pressure switches, temperature sensitive switches (thermostats), programmers, etc.;
- position switches; for example control switches operated by part of a machine or mechanism;
- associated control circuit equipment, for example indicator lights, etc.

NOTE 1 - A control circuit device includes (a) control switch(es) and associated devices such as (an) indicator light(s).

NOTE 2 - A control switch includes (a) switching element(s) and an actuating system.

NOTE 3 - A switching element may be a contact element or a semiconductor element.

It also applies to specific types of switching elements associated with other devices (whose main circuits are covered by other standards) such as:

- auxiliary contacts of a switching device (e.g. contactor, circuit breaker, etc.) which are not dedicated exclusively for use with the coil of that device;
- interlocking contacts of enclosure doors;

- control circuit contacts of rotary switches;
- control circuit contacts of overload relays.

Contactor relays shall also meet the requirements and tests of IEC 60947-4-1 except for the utilization category which shall comply with this standard.

This standard does not include the relays covered in IEC 60255 or automatic electrical control devices for household and similar purposes.

The colour requirements of indicator lights, pushbuttons, etc., are found in IEC 60073 and also in publication 2 of the International Commission of Illumination (CIE).

The object of this standard is to state:

- a) The characteristics of control circuit devices.
- b) The electrical and mechanical requirements with respect to:
  - 1) The various duties to be performed.
  - 2) The significance of the rated characteristics and of the markings.
  - 3) The tests to verify the rated characteristics.
- c) The functional requirements to be satisfied by the control circuit devices with respect to:
  - 1) Environmental conditions, including those of enclosed equipment.
  - 2) Dielectric properties.
  - 3) Terminals.

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## 1.2 Normative references

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, control gear and fuses*

IEC 60050(446):1983, *International Electrotechnical Vocabulary (IEV) – Chapter 446: Electrical relays*

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

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

IEC 60073:1996, *Basic and safety principles for man-machine interface, marking and identification – Coding principles for indication devices and actuators*

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IEC 60112:1979, *Method for determining the comparative and the proof tracking indices of solid insulating materials under moist conditions*

IEC 60255, — *Electrical relays*

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

IEC 60617, — *Graphical symbols for diagrams*

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

IEC 60947-4-1:1990, *Low-voltage switchgear and controlgear – Part 4: Contactors and motor starters – Section one: Electromechanical contactors and motor-starters*

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*

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## 2 Definitions

For the purposes of this part of IEC 60947 the definitions of IEC 60947-1 and the following additions apply:

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## 2.1 Basic definitions

### 2.1.1

#### control circuit device

an electrical device intended for the controlling, signalling, interlocking, etc., of switchgear and controlgear

NOTE – Control circuit devices may include associated devices dealt with in other standards, such as instruments, potentiometers, relays, in so far as associated devices are used for the purposes specified above.

### 2.1.2

#### control switch (for control and auxiliary circuits)

a mechanical switching device which serves the purpose of controlling the operation of switchgear or controlgear, including signalling, electrical interlocking, etc.

NOTE 1 – A control switch consists of one or more contact elements with a common actuating system.