



BSI Standards Publication

Low-voltage switchgear and controlgear

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

National foreword

This British Standard is the UK implementation of EN IEC 60947-5-2:2020+A11:2022. It is derived from IEC 60947-5-2:2019, incorporating CENELEC amendment A11:2022. It supersedes BS EN IEC 60947-5-2:2020, which will be withdrawn on 28 February 2025.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to text carry the number of the CENELEC amendment. For example, text altered by CENELEC amendment A11 is indicated by A11 A11.

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éléments de commutation pour circuits de commande -
DéTECTEURS DE PROXIMITÉ
(IEC 60947-5-2:2019)

Niederspannungsschaltgeräte - Teil 5-2: Steuergeräte und
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(IEC 60947-5-2:2019)

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European foreword

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For the relationship with EU Directives see informative Annexes ZZA and ZZB, which are an integral part of this document.

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The text of the International Standard IEC 60947-5-2:2019 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60825 (series)	NOTE	Harmonized as EN 60825 (series)
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IEC 61000-3-3:2013	NOTE	Harmonized as EN 61000-3-3:2013 (not modified)
IEC 61000-3-3:2013/A1:2017	NOTE	Harmonized as EN 61000-3-3:2013/A1:2019 (not modified)
IEC 61076-2-101	NOTE	Harmonized as EN 61076-2-101
IEC 61076-2-104	NOTE	Harmonized as EN 61076-2-104
IEC 61076-2-105	NOTE	Harmonized as EN 61076-2-105
IEC 62471:2006	NOTE	Harmonized as EN 62471:2008 (modified)
IEC 62683-1:2017	NOTE	Harmonized as EN 62683-1:2017 (not modified)
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European foreword to A11

This document (EN IEC 60947-5-2:2020/A11:2022) has been prepared by CLC/TC 121A “Low-voltage switchgear and controlgear”.

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This document is read in conjunction with EN IEC 60947-5-2:2020.

It specifies additional safety and EMC requirements for proximity switches that incorporate radio functionality in a fixed and permanent manner.

This document has been prepared under a Standardization Request given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), see informative Annex ZZC, which is an integral part of this document.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –**Part 5-2: Control circuit devices and switching elements –
Proximity switches**

FOREWORD

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International Standard IEC 60947-5-2 has been prepared by subcommittee 121A: Low-voltage switchgear and controlgear, of IEC technical committee 121: Switchgear and controlgear and their assemblies for low voltage.

This fourth edition cancels and replaces the third edition published in 2007 and Amendment 1:2012. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- update of the scope;
- adaptation and update of the construction requirements according to IEC Guide 116 (e.g. material requirements, artificial optical radiation, instruction requirements, hot surface, unattended operation, foreseeable misuse...);
- modification of the specifications concerning the sensing range and operating distance;

- new definitions for photoelectric proximity switch type D with background suppression;
- integration of the requirements and test procedures of photoelectric proximity switch type D with background suppression;
- update of EMC requirements in Table 9 and Table 10;
- integration of environmental information requirements and environmental condition by referencing Annexes O, W and Q of IEC 60947-1:2007, IEC 60947-1:2007/AMD1:2010 and IEC 60947-1:2007/AMD2:2014;
- modification of impulse withstand voltage test (5.3.1.3, 9.3.3.4.5);
- modification of the references in the (normative) standard body to the (informative) Annex A;
- major update of Annex A (definitions update, new dimensions and shapes);
- update of C.9.1.1;
- update of Annex D in order to consider new connector types and normative references;
- update of Annex F (additional symbols for photoelectric proximity switches).

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

FDIS	Report on voting
121A/313/FDIS	121A/322/RVD

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

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

A list of all the parts in the IEC 60947 series, under the general title *Low-voltage switchgear and controlgear*, can be found on the IEC website.

This International Standard should be used in conjunction with IEC 60947-1:2007, IEC 60947-1:2007/AMD1:2010 and IEC 60947-1:2007/AMD2:2014.

The provisions of the general rules, IEC 60947-1, are applicable to this document, where specifically called for. General rules, clauses and subclauses thus applicable, as well as tables, figures and annexes are identified by a reference to IEC 60947-1, for example 1.2.3, Table 4 or Annex A of IEC 60947-1:2007.

The following differing practices of a less permanent nature exist in the countries indicated below.

- 8.1.7.3: recommendations are given in the National US Electrical Code about connections means;
- 8.1.7.4: in the United States of America, there are other documents that define conductor colour coding schemes that can apply to the installation of proximity switches;
- 8.1.15.2: for European Union Countries: in certain ranges the defined limits of exposure values in IEC 60825-1:2014 exceed the requirements of the European directive 2006/25/EC Directive on the minimum health and safety requirements regarding the exposure of workers to risks arising from physical agents (artificial optical radiation).

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

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

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

1 Scope

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.

Products covered by the scope of this document are not subjected to defined behaviours under fault conditions. Proximity switches with defined behaviour are covered by IEC 60947-5-3 and have to fulfil additional requirements.

These proximity switches are self-contained, have semiconductor switching element(s) and are intended to be connected to circuits, the rated voltage of which does not exceed 250 V 50 Hz/60 Hz AC RMS or 300 V DC.

Examples of typical applications for in-scope products:

- factory automation and machinery industry;
- logistic and packaging industry;
- conveyor belts, lifts;
- process industry;
- power plants.

Special applications (e.g. corrosive atmosphere) can cause additional requirements. This

document is not intended to cover proximity switches with analogue outputs. The object of

this document 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.

Products covered by the scope of this document are expected to be selected, installed, and maintained by skilled personnel only.

Annex ZC of this document defines requirements in respect of safety under article 3.1(a) and Electromagnetic Compatibility (EMC) under article 3.1(b) of Directive 2014/53/EU for proximity switches that incorporate one or more radio technologies as set out in ZC.4 in a fixed and permanent manner.

NOTE Requirements applicable to the efficient use of radio spectrum are not included in this document. These requirements can be found in the applicable ETSI product standard(s) for the effective use of the radio spectrum under article 3.2 of Directive 2014/53/EU.