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FINAL VERSION

VERSION FINALE

Low-voltage switchgear and controlgear –
Part 5-4: Control circuit devices and switching elements – Method of assessing the performance of low-energy contacts – Special tests

Appareillage à basse tension –
Partie 5-4: Appareils et éléments de commutation pour circuits de commande – Méthode d'évaluation des performances des contacts à basse énergie – Essais spéciaux

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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This Consolidated version of IEC 60947-5-4 bears the edition number 2.1. It consists of the second edition (2002-10) [documents 17B/1228/FDIS and 17B/1254/RVD] and its amendment 1 (2019-05) [documents 121A/284/FDIS and 121A/301/RVD]. The technical content is identical to the base edition and its amendment.

This Final version does not show where the technical content is modified by amendment 1. A separate Redline version with all changes highlighted is available in this publication.

International Standard IEC 60947-5-4 has been prepared by subcommittee 17B: Low-voltage switchgear and controlgear, of IEC technical committee 17: Switchgear and controlgear.

This second edition has the status of an International Standard.

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

Some slight modifications, mainly of an editorial nature, have been introduced since the first edition.

The committee has decided that the contents of the base publication and its amendment 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- withdrawn,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.

INTRODUCTION

General usage of control switches may not be suitable for use at very low voltages and therefore it is recommended to seek the advice of the manufacturer concerning any application with a low value of operational voltage, for example, below 100 V a.c. or d.c. (see IEC 60947-5-1:2016, note of 4.3.2.2).

However, the development of electronic systems and programmable controllers in industrial processes increases the use of switching elements in low-voltage circuit control.

It is thus necessary to define how predictional behaviour of contacts in this area should be established (with an acceptable confidence level), by using precise conventional testing methods, down to specified values (such as 24 V, 1 mA; 5 V, 10 mA).

The objective of this document is to ensure the availability of contacts used in this area, including normally-open contacts.

This document shall be used as a complement of IEC 60947-5-1 for low-energy contacts applications.

LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR –

Part 5-4: Control circuit devices and switching elements – Method of assessing the performance of low-energy contacts – Special tests

1 Scope and object

This part of IEC 60947 applies to separable contacts used in the utilization area considered, such as switching elements for control circuits.

This standard takes into consideration two typical rated voltage areas:

a) above (and including) 10 V (typically 24 V) where contacts are used for switching loads with possible electrical erosion, such as programmable controller inputs;

b) below 10 V (typically 5 V) with negligible electrical erosion, such as electronic circuits.

This standard does not apply to contacts used in:

– functional safety area. In case of contacts used in functional safety area, Annex N of IEC 60947-5-1:2016 applies;

– very low energy area of measurement, for example, sensor or thermocouple systems.

The object of this standard is to propose a method of assessing the performances of low energy contacts giving

– useful definitions;

– general principles of test methods which are to monitor and record the behaviour of contacts at each operation;

– functional bases for the definition of the general testing equipment;

– preferred test values;

– particular conditions for testing contacts intended for specific applications (such as switching of PC inputs);

– information to be given in the test report;

– interpretation and presentation of the rest results.

2 Normative references

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

IEC 60068-1:2013, *Environmental testing – Part 1: General and guidance*

IEC 60068-2 (all parts), *Environmental testing – Part 2: Tests*

IEC 60605-6:2007, *Equipment reliability testing – Part 6: Tests for the validity and estimation of the constant failure rate and constant failure intensity*

IEC 60947-1:2007, *Low-voltage switchgear and controlgear – Part 1: General rules*
Amendment 1 (2010)
Amendment 2 (2014)