

Australian/New Zealand Standard™

**Low-voltage switchgear and controlgear**

**Part 5.4: Control circuit devices and  
switching elements—Methods of  
assessing the performance of  
low-energy contacts—Special tests**



Standards Australia



STANDARDS  
NEW ZEALAND  
Pūnaha Aotearoa

## **AS/NZS 3947.5.4:2000**

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This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee EL/6, Industrial Switchgear and Controlgear. It was approved on behalf of the Council of Standards Australia on 28 March 2000 and on behalf of the Council of Standards New Zealand on 20 March 2000. It was published on 30 May 2000.

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### Part 5.4: Control circuit devices and switching elements—Methods of assessing the performance of low-energy contacts—Special tests

First published as AS/NZS 3947.5.4:2000.

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## PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL/6, Industrial Switchgear and Controlgear.

The objective of this Standard is to provide a method of assessing the performance of low-energy contacts which will give general principles of testing, preferred test values, particular conditions of test, information on the contents of test reports and interpretation and presentation of test results.

This Standard is Part 5.4 of a series which, when complete, will consist of the following:

AS/(NZS) 3947	Low-voltage switchgear and controlgear
AS/NZS 3947.1	Part 1: General rules
AS 3947.2	Part 2: Circuit-breakers
AS/NZS 3947.3	Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units
AS/NZS 3947.3 Suppl1	Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units Supplement 1: Fuse-switch-disconnectors and switch-disconnectors for use with low voltage aerial bundled cables
AS 3947.4.1	Part 4.1: Contactors and motor-starters—Electromechanical contactors and motor-starters
AS 3947.4.2	Part 4.2: Contactors and motor-starters—A.C. semiconductor motor controllers and starters
AS/NZS 3947.4.3	Part 4.3: Contactors and motor-starters—A.C. semiconductor controllers and contactors for non-motor loads
AS/NZS 3947.5.1	Part 5.1 Control circuit devices and switching elements—Electromechanical control circuit devices
AS/NZS 3947.5.2	Part 5.2: Control circuit devices and switching elements—Proximity switches
AS/NZS 3947.5.3	Part 5.3 Control circuit devices and switching elements—Requirements for proximity devices with defined behaviour under fault conditions
AS/NZS 3947.5.4	Part 5.4: Control circuit devices and switching elements—Methods of assessing the performance of low-energy contacts—Special tests
AS/NZS 3947.5.5	Part 5.5 Control circuit devices and switching elements—Electrical emergency stop devices with mechanical latching function
AS/NZS 3947.5.6	Part 5.6 Control circuit devices and switching elements—D.C. interface for proximity sensors and switching amplifiers (NAMUR)
AS 3947.6.1	Part 6.1: Multiple function equipment—Automatic transfer switching equipment
AS 3947.6.2	Part 6.2: Multiple function equipment—Control and protective switching devices (or equipment) (CPS)
AS 3947.7.1	Part 7.1: Ancillary equipment—Terminal blocks for copper conductors

AS 3947.7.2	Part 7.2:	Ancillary equipment—Protective conductor terminal blocks for copper conductors
AS/NZS 3947.7.3	Part 7.3:	Ancillary equipment—Safety requirements for terminal blocks for the reception of cartridge fuse-links

This Standard is identical with and has been reproduced from IEC 60947-5-4:1996, *Low-voltage switchgear and controlgear Part 5: Control circuit devices and switching elements, Section 4: Methods of assessing the performance of low-energy contacts—Special tests*.

A reference to an International Standard identified in the Normative References Clause by strikethrough (~~example~~) is replaced by a reference to the Australian or Australian/New Zealand Standard(s) listed immediately thereafter and identified by shading (**example**). Where the struck-through referenced document and the referenced Australian or Australian/New Zealand Standard are identical, this is indicated in parenthesis after the title of the latter.

In January 1997, the IEC commenced numbering its Standards from 60000 by adding 60000 to the number of each existing Standard. This coordinates IEC numbering with ISO numbering. During the transition period an IEC Standard might be identified by its new number or its old number (for example, IEC 60050 or IEC 50).

As this Standard is reproduced from an International Standard, the following applies:

- (a) Its number does not appear on each page of text and its identity is shown only on the cover and title page.
- (b) In the source text ‘this standard’ should read ‘this Australian/New Zealand Standard’.
- (c) A full point should be substituted for a comma when referring to a decimal marker.

The term ‘normative’ has been used in this Standard to define the application of the annex to which it applies. A ‘normative’ annex is an integral part of a Standard.

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## INTRODUCTION

IEC 60947-5-1 indicates (see note 2 of 4.3.1.1) that 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.

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

So it is 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).

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Any IEC table, figure or passage of text that is struck-through is not part of this Standard. Any Australian/NewZealand table, figure or passage of text that is added (and identified by shading) is part of this Standard.

**1 General****1.1 Scope and object**

This report applies to separable contacts used in the utilisation area considered, such as switching elements for control circuits.

This report takes into consideration two 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 report does not apply to contacts used in the very low energy area of measurement, for example sensor or thermocouple systems.

The object of this report 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 a 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 reports;
- interpretation and presentation of the test results.

**1.2 Normative references**

The following normative documents contain provisions which, through reference in this text, constitute provisions of this report. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this report 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 60068-1: 1988, *Environmental testing — Part 1: General and guidance*