

Australian/New Zealand Standard™

**Low-voltage switchgear and controlgear**

**Part 5.1: Control circuit devices  
and switching elements—  
Electromechanical control circuit  
devices**



Standards Australia



STANDARDS  
NEW ZEALAND  
*Te Ara Raukawa*

## **AS/NZS 3947.5.1:2000**

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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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# Australian/New Zealand Standard™

## Low-voltage switchgear and controlgear

### Part 5.1: Control circuit devices and switching elements— Electromechanical control circuit devices

Originated as part of AS 1431.1—1974, AS 1431.2—1983 and AS 1431.7—1989.  
Previous edition AS 3947.5.1—1995.  
Jointly revised and designated AS/NZS 3947.5.1:2000.

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Jointly published by Standards Australia International Ltd, GPO Box 5420, Sydney NSW 2001 and Standards New Zealand, Private Bag 2439, Wellington 6020

ISBN 0 7337 3370 0

## PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL/6, Industrial Switchgear and Controlgear to supersede AS 3947.5.1—1995.

The objective of this Standard is to specify characteristics and electrical, mechanical and functional requirements of electromechanical control circuit devices.

This Standard is Part 5.1 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 Suppl	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 60947-5-1:1997 incorporating Amendment 1:1999 and Amendment 2:1999, *Low-voltage switchgear and controlgear Part 5-1: Control circuit devices and switching elements—Electromechanical control circuit devices*.

Changes required by Amendments 1 and 2 have been indicated by a marginal bar against each clause, figure, table or annex affected.

This Standard differs from AS 3947.5.1—1995 in the following areas:

- (a) All Australian variations have been removed. For material relating to push-buttons refer to IEC 60073:1996. For material relating to direction of movement of control circuit devices refer IEC 60447 and for the definition of safety and auxiliary colours refer to Publication 2 of the International Commission of Illumination(CIE).
- (b) The layout of the Standard has been revised so that the material previously in Chapter 1 now forms the text of the body of the Standard. Material from Chapters 2 & 3 is reproduced unchanged as are Annexes J and K respectively.
- (c) Test sequences have been changed with an extra test in test sequence I, changed making and breaking capacities test and dielectric verification test in test sequences II-IV and an extra test in test sequences V and VI.
- (d) Conditional short-circuit current test was a 3 phase test.
- (e) Tables for semiconductor switching elements added in Annex A.
- (f) Durability declaration added in Annex C.

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:

- (i) Its number does not appear on each page of text and its identity is shown only on the cover and title page.
- (ii) In the source text ‘this standard’ should read ‘this Australian/New Zealand Standard’.
- (iii) 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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—Electromechanical control circuit devices**

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Any IEC table, figure or passage of text that is struckthrough is not part of this Standard. Any Australian/New Zealand table, figure or passage of text that is added (and identified by shading) is part of this Standard.

**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;