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AS/NZS IEC 60947.5.1:2015

Australian/New Zealand Standard™

Low-voltage switchgear and controlgear

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

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee EL-006, Industrial Switchgear and Controlgear. It was approved on behalf of the Council of Standards Australia on 27 May 2015 and on behalf of the Council of Standards New Zealand on 29 May 2015.
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Part 5.1: Control circuit devices and switching elements—Electromechanical control circuit devices

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-006, Industrial Switchgear and Controlgear, to supersede AS 60947.5.1—2004.

The objective of this Standard is to state—

(a) the characteristics of control circuit devices;

(b) The electrical and mechanical requirements with respect to—

  (i) The various duties to be performed;

  (ii) The significance of the rated characteristics and of the markings;

  (iii) The tests to verify the rated characteristics;

  (iv) their construction;

(c) The functional requirements to be satisfied by the control circuit devices with respect to—

  (i) environmental conditions, including those of enclosed equipment;

  (ii) dielectric properties; and

  (iii) terminals

This Standard is identical with, and has been reproduced from IEC 60947-5-1, Ed. 3.1 (2009), *Low-voltage switchgear and controlgear*, Part 5.1: *Control circuit devices and switching elements—Electromechanical control circuit devices* and its amendment 1 (2009). A vertical line in the margins shows where IEC 60947-5-1, Ed. 3.0 (2003) has been modified by amendment 1 (2009).

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

(A) In the source text ‘this part of IEC 60947’ should read ‘this Australian/New Zealand Standard’.

(B) A full point substitutes for a comma when referring to a decimal marker.

References to International Standards should be replaced by references to Australian or Australian/New Zealand Standards, as follows:

Reference to International Standard		*Australian/New Zealand Standard*	
IEC		AS	
60068	Environmental testing	60068	Environmental testing
60068-2-6	Part 2-6: Tests—Test Fc: Vibration (sinusoidal)	60068.2.6	Part 2.6: Tests—Test Fc: Vibration (sinusoidal)
60068-2-14	Part 2-14: Tests—Test N: Change of temperature Amendment 1 (1986)	60068.2.14	Part 2.14: Tests—Test N: Change of temperature
60068-2-27	Part 2-27: Tests—Test Ea and guidance: Shock	60068.2.27	Part 2.27: Tests—Test Ea and guidance: Shock
		AS/NZS IEC	
60947	Low-voltage switchgear and controlgear	60947	Low-voltage switchgear and controlgear
60947-4-1	Part 4-1: Contactors and motor-starters—Electromechanical contactors and motor-starters Amendment 1 (2002) Amendment 2 (2005)	60947.4.1	Part 4.1: Contactors and motor-starters—Electromechanical contactors and motor-starters

IEC		AS/NZS IEC	
61000	Electromagnetic compatibility (EMC)	61000	Electromagnetic compatibility (EMC)
61000-4-2	Part 4-2: Testing and measurement techniques—Electrostatic discharge immunity test Amendment 1 (1998) Amendment 2 (2000)	61000.4.2	Part 4.2: Testing and measurement techniques—Electrostatic discharge immunity test
61000-4-3	Part 4-3: Testing and measurement techniques—Radiated, radio-frequency, electromagnetic field immunity test	61000.4.3	Part 4.3: Testing and measurement techniques—Radiated, radio-frequency, electromagnetic field immunity test
61000-4-4	Part 4-4: Testing and measurement techniques—Electrical fast transient/burst immunity test	61000.4.4	Part 4.4: Testing and measurement techniques—Electrical fast transient/burst immunity test
61000-4-5	Part 4-5: Testing and measurement techniques—Surge immunity test	61000.4.5	Part 4.5: Testing and measurement techniques—Surge immunity test
61000-4-6	Part 4-6: Testing and measurement techniques—Immunity to conducted disturbances, induced by radio-frequency fields	61000.4.6	Part 4.6: Testing and measurement techniques—Immunity to conducted disturbances, induced by radio-frequency fields
CISPR		AS/NZS CISPR	
11	Industrial, scientific and medical (ISM) radio-frequency equipment—Electromagnetic Radio-frequency disturbance characteristics—Limits and methods of measurement Amendment 1 (2004) Amendment 2 (2006)	11	Industrial, scientific and medical (ISM) radio-frequency equipment—Electromagnetic Radio-frequency disturbance characteristics—Limits and methods of measurement

Only normative references that have been adopted as Australian or Australian/New Zealand Standards have been listed.

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

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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 IEC 60947-1, for example 1.2.3, Table 4 or Annex A of IEC 60947-1.

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 in the IEC 61810 series, nor 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.

1.2 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 60050(441):1984, *International Electrotechnical Vocabulary (IEV) – Chapter 441: Switchgear, controlgear and fuses*
Amendment 1 (2000)

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

IEC 60068-2-6:1995, *Environmental testing – Part 2: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-14:1984, *Environmental testing – Part 2: Tests – Test N: Change of temperature*
Amendment 1 (1986)

IEC 60068-2-27:1987, *Environmental testing – Part 2: Tests – Test Ea and guidance: Shock*

IEC 60068-2-30:2005, *Environmental testing – Part 2-30: Tests – Test Db: Damp heat, cyclic (12 h + 12 h cycle)*

IEC 60073:2002, *Basic and safety principles for man-machine interface, marking and identification – Coding principles for indications and actuators*

IEC 60112:2003, *Method for the determination of the proof and the comparative tracking indices of solid insulating materials*

IEC 60255 (all parts), *Electrical relays*

IEC 60417, *Graphical symbols for use on equipment*

IEC 60617 (all parts), *Graphical symbols for diagrams*

IEC 60947-1:2007, *Low-voltage switchgear and controlgear – Part 1: General rules*