

Australian/New Zealand Standard™

**Residual current operated circuit-
breakers with integral overcurrent
protection for household and similar
uses (RCBOs)**

**Part 1: General rules
(IEC 61009-1, Ed. 3.0 (2010) MOD)**



AS/NZS 61009.1:2011

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Australian/New Zealand Standard™

Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs)

Part 1: General rules (IEC 61009-1, Ed. 3.0 (2010) MOD)

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PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee EL-004, Electrical Accessories, to supersede AS/NZS 61009.1:2004, *Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs)—Part 1: General rules*.

The objective of this Standard is to provide Australian and New Zealand electrical industries, manufacturers and regulatory bodies with safety requirements for residual current operated circuit-breakers with integral overcurrent protection for household and similar uses, and which may be used as the bases for approval for sale or for connection to supply in Australia and New Zealand.

This Standard is an adoption with national modifications and has been reproduced from IEC 61009-1 Ed.3.0 (2010), *Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs)—Part 1: General rules* and has been varied as indicated to take account of Australian/New Zealand conditions. The modifications are specified in Appendix ZZ and shall be used for the IEC CB scheme.

This Standard will exist in parallel with AS/NZS 3190 *Approval and test specification—Residual current devices (current-operated earth-leakage devices)*, AS/NZS 3111, *Approval and test specification—Miniature overcurrent circuit-breakers* and any revisions thereof. This Standard, AS/NZS 3190 and AS/NZS 3111 are acceptable for RCBOs. For other RCBO devices refer to AS/NZS 3190.

The essential safety requirements in AS/NZS 3820, *Essential safety requirements for electrical equipment* that could be applicable to RCBOs are covered by this Standard taken in conjunction with any other relevant requirements affecting safety.

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- (a) Its number appears on the cover and title page while the International Standard number appears only on the cover.
- (b) In the source text ‘this International Standard’ should read ‘this Australian/New Zealand Standard’.
- (c) 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:

<i>Reference to International Standard</i>		<i>Australian/New Zealand Standard</i>	
IEC		AS	
60060	High-voltage test techniques	1931	High-voltage test techniques
60060-1	Part 1: General definitions and test requirements	1931.1	Part 1: General definitions and test requirements
60060-2	Part 2: Measuring systems	1931.2	Part 2: Measuring systems
60068	Environmental testing	60068	Environmental testing
60068-2-30	Part 2-30: Tests— Test Db: Damp heat, cyclic (12 + 12 h cycle)	60068.2.30	Part 2: Tests—Test Db and guidance: Damp heat, cyclic (12 + 12 hour cycle)
60068-3-4	Part 3-4: Supporting documentation and guidance— Damp heat tests	60068.3.4	Part 3: Supporting documentation and guidance—Damp heat tests
60417	Graphical symbols for use on equipment	1104	Informative symbols for use on electrical and electronic equipment
60529	Degrees of protection provided by enclosures (IP Code)	60529	Degrees of protection provided by enclosures (IP Code)

IEC		AS	
60038	IEC standard voltages	60038	Standard voltages
		AS/NZS	
60112	Method for the determination of the proof and the comparative tracking indices of solid insulating materials	60112	Method for the determination of the proof and the comparative tracking indices of solid insulating materials
60364	Electrical installations of buildings (series)	3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)
60364-5-52	Part 5-52: Selection and erection of electrical equipment—Wiring systems	and	
60364-5-53	Part 5-53: Selection and erection of electrical equipment—Isolation, switching and control	3008.1	Electrical installations—Selection of cables (series)
60898	Electrical accessories—Circuit-breakers for overcurrent protection for household and similar installations	60898	Electrical accessories—Circuit-breakers for overcurrent protection for household and similar installations
60898-1	Part 1: Circuit-breakers for a.c. operation	60898.1	Part 1: Circuit-breakers for a.c. operation

Only International Standards that have been adopted as Australian or Australian/new Zealand Standards have been listed.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix or annex to which they apply. A ‘normative’ appendix or annex is an integral part of a Standard, whereas an ‘informative’ appendix or annex is only for information and guidance.

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FOREWORD

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

- complete revision of EMC sequences, including the new test T.2.6, already approved in IEC 61543;
- clarification of RCDs current/time characteristics reported in Tables 2 and 3;
- revision of test procedure for $I_{\Delta n}$ between 5 A and 200 A;
- tests for the use of RCBOs in IT systems;
- testing procedure regarding the 6mA d.c. current superimposed to the fault current;
- improvement highlighting RCDs with multiple sensitivity;
- some alignments with IEC 60898-1.

INTRODUCTION

This part includes definitions, requirements and tests covering all types of RCBOs. For applicability to a specific type, this part applies in conjunction with the relevant part, as follows:

Part 2-1: Applicability of the general rules to RCBOs functionally independent of line voltage.

Part 2-2: Applicability of the general rules to RCBOs functionally dependent on line voltage.

AUSTRALIAN/NEW ZEALAND STANDARD

Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs)**Part 1:
General rules (IEC 61009-1, Ed. 3.0 (2010) MOD)****1 Scope**

This International Standard applies to residual current operated circuit-breakers with integral overcurrent protection functionally independent of, or functionally dependent on, line voltage for household and similar uses (hereafter referred to as RCBOs), for rated voltages not exceeding 440 V a.c. with rated frequencies of 50 Hz, 60 Hz or 50/60 Hz and rated currents not exceeding 125 A and rated short-circuit capacities not exceeding 25 000 A for operation at 50 Hz or 60 Hz.

These devices are intended to protect people against indirect contact, the exposed conductive parts of the installation being connected to an appropriate earth electrode and to protect against overcurrents the wiring installations of buildings and similar applications. They may be used to provide protection against fire hazards due to a persistent earth fault current, without the operation of the overcurrent protective device.

RCBOs having a rated residual operating current not exceeding 30 mA are also used as a means for additional protection in the case of failure of the protective means against electric shock.

This standard applies to devices performing simultaneously the function of detection of the residual current, of comparison of the value of this current with the residual operating value and of opening of the protected circuit when the residual current exceeds this value, and also of performing the function of making, carrying and breaking overcurrents under specified conditions.

NOTE 1 The content of the present standard related to operation under residual current conditions is based on IEC 61008-1. The content of the present standard related to protection against overcurrents is based on IEC 60898-1.

NOTE 2 RCBOs are essentially intended to be operated by uninstructed persons and designed not to require maintenance. They may be submitted for certification purposes.

NOTE 3 Installation and application rules of RCBOs are given in the IEC 60364 series.

They are intended for use in an environment with pollution degree 2.

NOTE 4 For more severe overvoltage conditions, circuit-breakers complying with other standards (e.g. IEC 60947-2) should be used.

NOTE 5 For environments with higher pollution degrees, enclosures giving the appropriate degree of protection should be used.

RCBOs of the general type are resistant to unwanted tripping, including the case where surge voltages (as a result of switching transients or induced by lightning) cause loading currents in the installation without occurrence of flashover.

RCBOs of type S are considered to be sufficiently proof against unwanted tripping even if the surge voltage causes a flashover and a follow-on current occurs.

NOTE 6 Surge arresters installed downstream of the general type of RCBOs and connected in common mode may cause unwanted tripping.