

WITHDRAWN:  
19970805  
SUPERSEDED BY:  
AS 3947-2-1997

AS 3858—1990

Australian Standard®

---

**Low voltage switching gear and  
controlgear—Circuit-breakers**

---

IEC title: Low-voltage switching gear and controlgear,  
Part 2: Circuit breakers

This Australian Standard was prepared by Committee EL/6, Industrial Switchgear and Controlgear. It was approved on behalf of the Council of Standards Australia on 16 August 1990 and published on 10 December 1990.

---

The following interests are represented on Committee EL/6:

Australian-British Chamber of Commerce  
Australian Electrical and Electronic Manufacturers Association  
Bureau of Steel Manufacturers of Australia  
Electrical Contractors Association of Australia  
Electricity Supply Association of Australia  
Independent Electrical Switchboard Manufacturers Association  
Institution of Engineers, Australia  
Testing Authorities  
Water Board, Sydney, Illawarra, Blue Mountains  
Workcover Authority, New South Wales

---

*Review of Australian Standards.* To keep abreast of progress in industry, Australian Standards are subject to periodic review and are kept up-to-date by the issue of amendments or new editions as necessary. It is important therefore that Standards users ensure that they are in possession of the latest edition, and any amendments thereto.

Full details of all Australian Standards and related publications will be found in the Standards Australia Catalogue of Publications; this information is supplemented each month by the magazine 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.

Suggestions for improvements to Australian Standards, addressed to the head office of Standards Australia, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian Standard should be made without delay in order that the matter may be investigated and appropriate action taken.

---

*This Standard was issued in draft form for comment as DR 89137.*

AS 3858—1990

Australian Standard®

---

**Low voltage switchgear and  
controlgear—Circuit-breakers**

---

First published as AS 3858—1990.

PUBLISHED BY STANDARDS AUSTRALIA  
(STANDARDS ASSOCIATION OF AUSTRALIA)  
STANDARDS HOUSE, 80 ARTHUR ST, NORTH SYDNEY NSW

ISBN 0 7262 6541 1

## PREFACE

This Standard was prepared by the Standards Australia Committee on Industrial Switchgear and Controlgear to supersede AS 1930—1976, *Circuit-breakers for distribution circuits (up to and including 1000 V a.c. and 1200 V d.c.)*, and AS 2184—1980, *Low voltage switchgear and controlgear—Moulded-case circuit-breakers for rated voltages up to and including 600 V a.c. and 250 V d.c.*

AS 1930 and AS 2184 will be withdrawn after an appropriate time, nominally ten years, to allow manufacturers to adapt their range of circuit-breakers to comply with this Standard.

With the exception of Appendices A, F and G, this Standard has been reproduced from IEC 947-2 (1989), *Low-voltage switchgear and controlgear, Part 2: Circuit-breakers*.

Appendix A has been prepared from IEC document 17B(Central Office)181 in the same format, amended in accordance with IEC document 17B(Central Office)185.

Appendix F sets out the differences between this Standard and IEC 947-2, and between this Standard and IEC document 17B(Central Office)181.

For the purpose of this Standard, the IEC text is amended, supplemented or replaced as set out in Appendix F. These changes are indicated by a rule in the margin against each clause, table, figure or part thereof affected, or by a reference to Appendix F.

Appendix G sets out information which should be given with enquiries, and orders.

References to other publications should be replaced by references to Australian Standards:

Reference to International Standard		Australian Standard	
IEC		AS	
50	International Electrotechnical Vocabulary (IEV)	1852	International electrotechnical Vocabulary
50(441)	Switchgear, Controlgear and fuses	1852(41)	Switchgear, controlgear and fuses
112	Method for determining the comparative and the proof tracking indices of solid-insulating materials undermoist conditions	—	—
269	Low-voltage fuses	2005	Low voltage fuses—Fuses with enclosed fuse-links
269-1	Part 1: General requirements	2005.10	Part 10:
269-2	Part 2: Supplementary requirements for fuses for use by authorized persons (fuses mainly for industrial applications)	2005.20	Part 20: Supplementary requirements for fuses for use by authorized persons (fuses mainly for industrial application)
269-3	Part 3: Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household and similar applications)	—	—
755	General requirements for residual current operated protective devices	—	—
898	Circuit-breakers for over-current protection for household and similar installations	—	—
947	Circuit-breakers for equipment(CBE)	—	—
947	Low-voltage switchgear and controlgear	—	—
947-1	Part 1: General rules	3650	Low voltage switchgear and controlgear—Common requirements
947-4	Part 4: Contactors and motor-starters	—	—

The following Australian documents are referred to in this Standard:

AS	
1931	High voltage testing techniques
1931.1	Part 1: General definitions, test requirements, test procedures and measuring devices

1939 Classification of degrees of protection provided by enclosures for electrical equipment

3111 Approval and test specifications for miniature overcurrent circuit-breakers

3190 Approval and test specification for current-operated (core balance) earth-leakage devices

Unless otherwise indicated in Appendix F, specific references to clauses and sub-clauses in Part 1, (IEC 947-1) should be replaced by clauses of the same number in AS 3650. IEC 947-1 clause numbers with one to four digits are generally the same as those of the equivalent clauses in AS 3650.

© Copyright — STANDARDS AUSTRALIA

Users of Standards are reminded that copyright subsists in all Standards Australia publications and software. Except where the Copyright Act allows and except where provided for below no publications or software produced by Standards Australia may be reproduced, stored in a retrieval system in any form or transmitted by any means without prior permission in writing from Standards Australia. Permission may be conditional on an appropriate royalty payment. Requests for permission and information on commercial software royalties should be directed to the Head Office of Standards Australia.

Standards Australia will permit up to 10 percent of the technical content pages of a Standard to be copied for use exclusively in-house by purchasers of the Standard without payment of a royalty or advice to Standards Australia.

Standards Australia will also permit the inclusion of its copyright material in computer software programs for no royalty payment provided such programs are used exclusively in-house by the creators of the programs.

Care should be taken to ensure that material used is from the current edition of the Standard and that it is updated whenever the Standard is amended or revised. The number and date of the Standard should therefore be clearly identified.

The use of material in print form or in computer software programs to be used commercially, with or without payment, or in commercial contracts is subject to the payment of a royalty. This policy may be varied by Standards Australia at any time.

## CONTENTS

	<i>Page</i>
1 GENERAL .....	5
2 DEFINITIONS .....	6
3 CLASSIFICATION .....	9
4 CHARACTERISTICS OF CIRCUIT-BREAKERS .....	10
5 PRODUCT INFORMATION .....	18
6 NORMAL SERVICE, MOUNTING AND TRANSPORT CONDITIONS .....	19
7 CONSTRUCTIONAL AND PERFORMANCE REQUIREMENTS .....	19
8 TESTS .....	26
<b>APPENDICES</b>	
A COORDINATION UNDER SHORT-CIRCUIT CONDITIONS BETWEEN A CIRCUIT-BREAKER AND ANOTHER SHORT-CIRCUIT PROTECTIVE DEVICE IN THE SAME CIRCUIT .....	57
B CIRCUIT-BREAKERS INCORPORATING RESIDUAL CURRENT PROTECTION .....	66
C INDIVIDUAL POLE SHORT-CIRCUIT TEST SEQUENCE .....	67
D CLEARANCES AND CREEPAGE DISTANCES .....	69
E ITEMS SUBJECT TO AGREEMENT BETWEEN MANUFACTURER AND USER .....	70
F DIFFERENCES BETWEEN THIS STANDARD AND IEC 947-1 (1989) .....	71
G—INFORMATION TO BE GIVEN WITH ENQUIRIES, AND ORDERS .....	76

## STANDARDS AUSTRALIA

## Australian Standard

## Low voltage switchgear and controlgear—Circuit-breakers

## 1. General

The provisions of the general rules dealt with in Part 1 (IEC Publication 947-1) are applicable to this standard, where specifically called for. Clauses and sub-clauses, tables, figures and appendices of the general rules thus applicable are identified by reference to Part 1, e.g., sub-clause 1.2.3 of Part 1, Table IV of Part-1, or Appendix A of Part 1.

## 1.1 Scope

This standard applies to circuit-breakers, the main contacts of which are intended to be connected to circuits, the rated voltage of which does not exceed 1000 V a.c. or 500 V d.c.; it also contains additional requirements for integrally fused circuit-breakers.

It applies whatever the rated currents, the method of construction or the proposed applications of the circuit-breakers may be.

Supplementary requirements for circuit-breakers used as direct-on-line starters are given in IEC Publication 947-4, applicable to low-voltage contactors and starters.

See Append. F | The requirements for circuit-breakers for the protection of wiring installations in buildings and similar applications, and designed for use by un instructed persons, are contained in IEC Publication 898.

The requirements for circuit-breakers for equipment (e.g. electrical appliances) are contained in IEC Publication 934.

See Append. F | The requirements for circuit-breakers which are also intended to provide earth-leakage protection are under consideration (see also IEC Publication 755).

For certain special applications (e.g. traction, rolling mills, marine service) particular or additional requirements may be necessary.

*Note.* — Circuit-breakers which are dealt with in this standard may be provided with devices for automatic opening under pre-determined conditions other than those of over-current and undervoltage as, for example, reversal of power or current. This standard does not deal with the verification of operation under such pre-determined conditions.

## 1.2 Object

The object of this standard is to state:

- a) the characteristics of circuit-breakers;
- b) the conditions with which circuit-breakers shall comply with reference to:
  - 1) operation and behaviour in normal service;
  - 2) operation and behaviour in case of overload and operation and behaviour in case of short circuit, including co-ordination in service (discrimination and back-up protection);
  - 3) dielectric properties;