AS 60947.3:2018

Australian STANDARD

Low voltage switchgear and controlgear

Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units (IEC 60947-3:2015 (ED. 3.2) MOD)

STANDARDS Australia

This Australian Standard® was prepared by Committee EL-006, Industrial Switchgear and Controlgear. It was approved on behalf of the Council of Standards Australia on 7 June 2018. This Standard was published on 29 June 2018.

The following are represented on Committee EL-006:

- Association of Accredited Certification Bodies
- Australian Industry Group
- Bureau of Steel Manufacturers of Australia
- Energy Network Australia
- Engineers Australia
- National Electrical and Communications Association
- National Electrical Switchboard Manufacturers Association
- Rail Industry Safety and Standards Board (RISSB)

This Standard was issued in draft form for comment as DR AS 60947.3:2018.

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Standard through their representation on the Committee and through the public comment period.

Keeping Standards up-to-date

Australian Standards® are living documents that reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued.

Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments that may have been published since the Standard was published.

Detailed information about Australian Standards, drafts, amendments and new projects can be found by visiting **www.standards.org.au**

Standards Australia welcomes suggestions for improvements, and encourages readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact us via email at **mail@standards.org.au**, or write to Standards Australia, GPO Box 476, Sydney, NSW 2001.

Australian Standard®

Low voltage switchgear and controlgear

Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units (IEC 60947-3:2015 (ED. 3.2) MOD)

Originally as AS 1775—1975.
Previous edition AS/NZS IEC 60947.3:2015.
Revised and designated as AS 60947.3:2018.

Published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001, Australia

ISBN 978 1 76072 133 6

PREFACE

This Standard was prepared by the Australian members of Joint Standards Australia/Standards New Zealand Committee EL-006, Industrial Switchgear and Controlgear, to supersede AS/NZS IEC 60947.3:2015.

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard rather than an Australian/New Zealand Standard.

AS/NZS IEC 60947.3:2015 will also remain current for 12 months and after this time it will be superseded by AS 60947.3:2018. Regulatory authorities that reference this Standard in regulation may apply these requirements at a different time. Users of this Standard should consult with these authorities to confirm their requirements.

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

This Preface is in addition to the IEC foreword of IEC 60947-3 Edition 2.2, which follows the table of contents.

The objective of this Standard is to state particular classifications, characteristics, marking and tests required as follows—

(a) Classification:

  (i) Utilization category.

  (ii) Independent manual operation.

  (iii) Suitable for isolation.

  (iv) Individual dedicated outdoor enclosures to suit switch disconnectors are required to have an ingress protection (IP) rating of IP56NW and be suitable for vertical mounting.

  The current rating type tests for I_{the} and I_{the} *solar* with solar effects are to be done in the dedicated individual outdoor enclosure and enclosures, which differ from those used for type tests and may require additional tests.

(b) Characteristics:

  (i) Minimum one pole circuit configuration per polarity.

  (ii) Current rating I_{the} *solar* to be the current rating when tested in a dedicated individual outdoor enclosure when subject to solar effects in accordance with D.8.3.11 at a shade ambient air temperature of 40 °C and be suitable for uninterrupted duty (I_u).

  The I_{the} *solar* current value is also to be stated for a shade ambient air temperature of 60 °C.

(c) Marking: Additional information and change to locations.

(d) Normal service: Minimum pollution P3.

(e) Tests: Tests for hinged flaps or covers to ensure flaps and covers close and remain firmly closed when subject to external effects.

This Standard is an adoption with national modifications. It has been reproduced from IEC 60947-3:2008+A1:2012+A2:2015 CSV (ED. 3.2), *Low voltage switchgear and controlgear*, Part 3: *Switches, disconnectors, switch-disconnectors and fuse-combination units*, and has been varied to take account of Australian conditions. 'CSV' means 'consolidated version' to indicate IEC amendments 1 and 2 are incorporated into the source text. IEC Amendment 2:2015 introduced requirements for photovoltaic (PV) d.c. applications in a new Annex D. The variations to take account of Australian conditions, which are set out in Appendix ZZ, relate to Annex D.

The variations in Appendix ZZ were prepared by Committee EL-006, Switchgear and Controlgear, in consultation with Committee EL-042, Renewable Energy Power Supply Systems and Equipment, and align with AS/NZS 5033, *Installation and safety requirements for photovoltaic (PV) arrays*.

Variations made to IEC 60947-3 form the Australian variations for the purposes of the CB scheme for recognition of testing to standards for safety of electrical equipment. The variations are clearly shown to enable certified test stations (refer to CTI listings) to test under the CB scheme.

The Standard is structured as follows:

(A) Preface.

(B) IEC 60947-3:2008+A1:2012+A2:2015 (ED. 3.2) (unedited from the contents page to the final clause of the source document).

(C) Appendix ZZ, comprising Australian variations to the source document.

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

(1) In the source text 'this part of IEC 60947' should read 'this Australian/New Zealand Standard'.

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

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific standards. In Appendix ZZ, references to IEC 60947-1 are shown as (AS/NZS) IEC 60947.1 to reflect this interchangeability.

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

CONTENTS

Page

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

DISCLAIMER
This Consolidated version is not an official IEC Standard and has been prepared for user convenience. Only the current versions of the standard and its amendment(s) are to be considered the official documents.

This Consolidated version of IEC 60947-3 bears the edition number 3.2. It consists of the third edition (2008-08) [documents 17B/1601/FDIS and 17B/1608/RVD], its amendment 1 (2012-02) [documents 17B/1758/FDIS and 17B/1763/RVD] and its amendment 2 (2015-07) [documents 121A/42/FDIS and 121A/46/RVD]. The technical content is identical to the base edition and its amendments.

This final version does not show where the technical content is modified by amendments 1 and 2. A separate Redline version with all changes highlighted is available in this publication.

International Standard IEC 60947-3 has been prepared by subcommittee 17B: Low-voltage switchgear and controlgear, of IEC technical committee 17: Switchgear and controlgear.

The document 17B/1601/FDIS, circulated to the National Committees as amendment 3, led to the publication of the new edition.

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

– alignment with the fifth edition of IEC 60947-1;
– a switching operation without current allowed between making and breaking operation (Table 3);
– increased number of operations for AC-23 allowed with agreement of the manufacturer (Table 3);
– simplified test procedure amended, f) added to 8.3.2.1.3;
– temperature rise test shall be made at the rated operational current I_e instead of the conventional enclosed thermal current I_{the} (8.3.3.1).

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 60947 series can be found, under the general title *Low-voltage switchgear and controlgear*, on the IEC website.

This part is to be used in conjunction with IEC 60947-1. The numbering of the subclauses is sometimes not continuous because it is based on IEC 60947-1.

The committee has decided that the contents of the base publication and its amendments will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

The contents of the corrigenda 1 (September 2012) and 2 (November 2013) have been included in this copy.

AUSTRALIAN STANDARD

Low voltage switchgear and controlgear

Part 3:
Switches, disconnectors, switch-disconnectors and fuse-combination units (IEC 60947-3:2015 (ED. 3.2) MOD)

1 General

The provisions of the general rules dealt with in IEC 60947-1 are applicable to this part, where specifically called for. Clauses and subclauses, tables, figures and appendices of the general rules thus applicable are identified by reference IEC 60947-1, e.g., 4.3.4.1 of IEC 60947-1, Table 4 of IEC 60947-1, or Annex A of IEC 60947-1.

1.1 Scope and object

This part of IEC 60947 applies to switches, disconnectors, switch-disconnectors and fuse-combination units to be used in distribution circuits and motor circuits of which the rated voltage does not exceed 1 000 V a.c. or 1 500 V d.c.

The manufacturer shall specify the type, ratings and characteristics according to the relevant standard of any incorporated fuses.

This part does not apply to equipment coming within the scope of IEC 60947-2, IEC 60947-4-1 and IEC 60947-5-1; however, when switches and fuse-combination units coming into the scope of this part are normally used to start, accelerate and/or stop an individual motor they shall also comply with the additional requirements given in Annex A.

The requirements for single pole operated three pole switches are included in Annex C.

Auxiliary switches fitted to equipment within the scope of this part shall comply with the requirements of IEC 60947-5-1.

This part does not include the additional requirements necessary for electrical apparatus for explosive gas atmospheres.

NOTE 1 Depending on its design a switch (or disconnector) can be referred to as "a rotary switch (disconnector)", "cam-operated switch (disconnector)", "knife-switch (disconnector)", etc.

NOTE 2 In this part the word "switch" also applies to the apparatus referred to in French as "commutateurs", intended to modify the connections between several circuits and *inter alia* to substitute a part of a circuit for another.

NOTE 3 In general, throughout this part switches, disconnectors, switch-disconnectors and fuse-combination units will be referred to as "equipment".

The object of this part is to state

a) the characteristics of the equipment;

b) the conditions with which the equipment shall comply with reference to

   1) operation and behaviour in normal service;

   2) operation and behaviour in case of specified abnormal conditions, e.g. short circuit;

   3) dielectric properties;

c) the tests for confirming that these conditions have been met and the methods to be adopted for these tests;