

Australian Standard™

Uninterruptible power systems (UPS)

**Part 1.2: General and safety
requirements for UPS used
in restricted access locations**

This Australian Standard was prepared by Committee EL-027, Power Electronics. It was approved on behalf of the Council of Standards Australia on 29 July 2003 and published on 3 October 2003.

The following are represented on Committee EL-027:

Australian Communications Authority
Australian Electrical and Electronic Manufacturers Association
Bureau of Steel Manufacturers of Australia
Electricity Supply Association of Australia
Monash University
University of Wollongong

Keeping Standards up-to-date

Standards are living documents which 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 Standards may also be withdrawn.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 which may have been published since the Standard was purchased.

Detailed information about Standards can be found by visiting the Standards Australia web site at www.standards.com.au and looking up the relevant Standard in the on-line catalogue.

Alternatively, the printed Catalogue provides information current at 1 January each year, and the monthly magazine, *The Global Standard*, has a full listing of revisions and amendments published each month.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact us via email at mail@standards.com.au, or write to the Chief Executive, Standards Australia International Ltd, GPO Box 5420, Sydney, NSW 2001.

This Standard was issued in draft form for comment as DR 03140.

Australian Standard™

Uninterruptible power systems (UPS)

Part 1.2: General and safety requirements for UPS used in restricted access locations

First published as AS 62040.1.2—2003.

COPYRIGHT

© Standards Australia International

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher.

Published by Standards Australia International Ltd
GPO Box 5420, Sydney, NSW 2001, Australia

ISBN 0 7337 5477 5

PREFACE

This Standard was prepared by the Standards Australia Committee EL-027, Power Electronics.

The objective of this Standard is to provide designers, manufacturers, owners and operators with general and safety requirements for Uninterruptible Power Systems (UPS) with a low voltage a.c. output intended to be installed in areas with restricted access.

This Standard is identical with, and has been reproduced from, IEC 62040-1-2:2002, *Uninterruptible power systems (UPS), Part 1-2: General and safety requirements for UPS used in restricted access locations* including Corrigendum 1 (December 2002). This Standard is to be read in conjunction with AS/NZS 60950.1 *Information technology equipment—Safety, Part 1: General requirements*.

To assist users of this Standard, the definitions for insulation classes of UPS and connection to the supply from AS/NZS 60950.1 have been added as notes to clauses 3.4 and 3.5 respectively.

This Standard is part of a series, which consists of the following:

AS

62040 Uninterruptible power systems (UPS)

62040.1.1 Part 1.1: General and safety requirements for UPS used in operator access areas

62040.1.2 Part 1.2: General and safety requirements for UPS used in restricted access locations (this Standard)

62040.2 Part 2: Electromagnetic compatibility (EMC) requirements

62040.3 Part 3: Method of specifying the performance and test requirements

The terms ‘normative’ and ‘informative’ are used to define the application of the annex to which they apply. A normative annex is an integral part of a standard, whereas an informative annex is only for information and guidance.

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

- (a) Its number does not appear on each page of text and its identity is shown only on the cover and title page.
- (b) In the source text ‘this international standard’ should read ‘this Australian Standard’.
- (c) A full point should be substituted for a comma when referring to a decimal marker.

CONTENTS

	<i>Page</i>
1	Scope and specific applications 1
1.1	Scope 1
1.2	Specific applications 1
2	Normative references 2
3	Definitions 3
4	General requirements 7
4.1	UPS design and construction 7
4.2	User information 7
4.3	Classification of UPS 7
4.4	General conditions for tests 7
4.5	Operating parameters for tests 7
4.6	Loads for tests 8
4.7	Components 8
4.8	Power interfaces 8
4.9	Marking and instructions 8
5	Fundamental design requirements 13
5.1	Protection against electric shock and energy hazards 13
5.2	SELV 14
5.3	Emergency switching device 14
5.4	Backfeed protection 14
5.5	Insulation 15
5.6	Safety extra-low voltage (SELV) circuits 15
5.7	Limited current circuits 16
5.8	Provisions for protective earthing 16
5.9	AC and d.c. power isolation 16
5.10	Overcurrent and earth fault protection 17
5.11	Service person protection 18
5.12	Clearances, creepage distances and distances through insulation 19
5.13	External signalling circuits 19
5.14	Limited power source 19
6	Wiring, connections and supply 20
6.1	General 20
6.2	Connection to power sources 20
6.3	Wiring terminals for external power conductors 20
7	Physical requirements 21
7.1	Enclosure 21
7.2	Stability 22
7.3	Construction details 22
7.4	Resistance to fire 23
7.5	Battery location 23
7.6	Temperature rise 25

	<i>Page</i>
8 Electrical requirements and simulated abnormal conditions	25
8.1 General	25
8.2 Electric strength	26
8.3 Abnormal operating and fault conditions	26
 Annexes	 27
Annex H (informative) Guidance on protection against ingress of water and foreign objects	 28
Annex L (normative) Backfeed protection test	30
Annex M (normative) Examples of reference load conditions	32
Annex N (normative) Ventilation of battery compartments	36
Annex P (normative) Minimum and maximum cross-sections of copper conductors suitable for connection (see 4.9.7)	 38
 Table 1 Location of battery protective device(s)	 18
Table 2 Temperature-rise limits	25
Table 3 Permitted temperature limits for magnetic windings at the end of stored energy mode operation	 25
Table H.1 Degrees of protection against foreign objects indicated by the first characteristic numeral	 28
Table H.2 Degrees of protection against water indicated by the second characteristic numeral	 29
Table P.1 Conductor cross-sections (extract from IEC 60439-1)	38

STANDARDS AUSTRALIA

Australian Standard**Uninterruptible power systems (UPS)****Part 1.2: General and safety requirements for UPS used
in restricted access locations**

1 Scope and specific applications**1.1 Scope**

This standard applies to electronic **uninterruptible power systems** with an electrical energy storage device in the d.c. link. It is to be used with IEC 60950-1 which is referred to in this standard as "RD".

When any item is referred to by the phrase "The definitions or the provisions of item/RD apply", this phrase is intended to mean that the definitions or provisions in that item of IEC 60950-1 apply, except any which are clearly inapplicable to **uninterruptible power systems**. National requirements additional to those in IEC 60950-1 apply and are found as notes under relevant clauses of the RD.

The primary function of the **UPS** covered by this standard is to ensure continuity of an alternating power source. The UPS may also serve to improve the quality of the power source by keeping it within specified characteristics.

This standard is applicable to **UPS** which are movable, stationary, fixed or for building-in, for use on low-voltage distribution systems and intended to be installed in **restricted access locations**. It specifies requirements to ensure safety for the **service person**.

This standard is intended to ensure the safety of installed **UPS**, both as a single **UPS** unit or as a system of interconnected **UPS** units, subject to installing, operating and maintaining the **UPS** in the manner prescribed by the manufacturer.

This standard does not cover d.c. supplied electronic ballasts (IEC 60924 and IEC 60925) and **UPS** based on rotating machines.

The relevant general and safety requirements for **UPS** intended to be installed in operator access areas are given in IEC 62040-1-1; electromagnetic compatibility (EMC) requirements and definitions are given in IEC 62040-2.

1.2 Specific applications

Even if this standard does not cover all types of **UPS**, it may be taken as a guide for such equipment. Requirements additional to those specified in this standard may be necessary for specific applications, for example:

- **UPS** intended for operation while exposed, for example, to extremes of temperature; to excessive dust, moisture, or vibration; to flammable gases; to corrosive or explosive atmospheres;
- electromedical applications with the **UPS** located within 1,5 m from the patient contact area;