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Australian Standard®

Uninterruptible power systems (UPS)

Part 3: Method of specifying the performance and test requirements

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- Australian Communications and Media Authority
- Australian Industry Group
- Bureau of Steel Manufacturers of Australia
- RMIT University

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Australian Standard®

Uninterruptible power systems (UPS)

Part 3: Method of specifying the performance and test requirements

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PREFACE

This Standard was prepared by the Standards Australia Committee EL-027, Power Electronics, to supersede AS 62040.3—2002, *Uninterruptible power systems (UPS)*—Part 3: *Method of specifying the performance and test requirements*.

The objective of this Standard is to provide manufacturers, designers and users with a means of specifying performance and test requirements of a complete uninterruptible power system.

This Standard is identical with, and has been reproduced from IEC 62040-3, Ed.2.0 (2011), *Uninterruptible power system (UPS),* Part *3: Method of specifying the performance and test requirements.*

IEC 62040-3 Ed.2.0 (2011) contained errors in Table 3, sub-clauses 6.2.2.6, 6.4.1.2, and Figure A.7. A corrigendum was issued by IEC in September 2011 to rectify these errors. The Corrigendum 1 has been added at the end of the source text.

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

(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:

Reference to International Standard		*Australian or Australian/New Zealand Standard*	
IEC		AS	
60038	IEC standard voltages	60038	Standard voltages
60068	Environmental testing	60068	Environmental testing
60068-2-1	Part 2-1: Tests—Test A: Cold	60068.2.1	Part 2.1: Tests—Test A: Cold
60068-2-2	Part 2-2: Tests—Test B: Dry heat	60068.2.2	Part 2.2: Tests—Test B: Dry heat
60068-2-27	Part 2-27: Tests—Test Ea and guidance: Shock	60068.2.27	Part 2.27: Tests—Test Ea and guidance: Shock
60068-2-78	Part 2-78: Tests—Test Cab: Damp heat, steady state	60068.2.78	Part 2.78: Tests—Test Cab: Damp heat, steady state
60146	Semiconductor converters—	60146	Semiconductor converters
60146-2	Part 2: Self-commutated semiconductor converters including direct d.c. converters	60146.2	Part 2: Self-commutated semiconductor converters including direct d.c. converters
		AS/NZS	
60950	Information technology equipment—Safety	60950	Information technology equipment—Safety
60950-1	Part 1: General requirements	60950.1	Part 1: General requirements
60990	Methods of measurement of touch current and protective conductor current	60990	Methods of measurement of touch current and protective conductor current

IEC		AS/NZS	
61000	Electromagnetic compatibility (EMC)	61000	Electromagnetic compatibility (EMC)
61000-2-2	Part 2-2: Environment—Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems	61000.2.2	Part 2.2: Environment—Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems
61000-3-2	Part 3-2: Limits—Limits for harmonic current emissions (equipment input current ≤16 A per phase)	61000.3.2	Part 3.2: Limits—Limits for harmonic current emissions (equipment input current ≤16 A per phase)
61000-3-4	Part 3-4: Limits—Limitation of emission of harmonic currents in low-voltage power supply systems for equipment with rated current greater than 16 A	61000.3.4	Part 3.4: Limits—Limitation of emission of harmonic currents in low-voltage power supply systems for equipment with rated current greater than 75 A
61000-3-12	Part 3-12: Limits—Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current >16 A and ≤75 A per phase	61000.3.12	Part 3.12: Limits—Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current >16 A and ≤75 A per phase
61000-4-30	Part 4-30: Testing and measurement techniques—Power quality measurement methods	61000.4.30	Part 4.30: Testing and measurement techniques—Power quality measurement methods
61672	Electroacoustics—Sound level meters	61672	Electroacoustics—Sound level meters
61672-1	Part 1: Specifications	61672.1	Part 1: Specifications
62040	Uninterruptible power systems (UPS)	62040	Uninterruptible power systems (UPS)
62040-2	Part 2: Electromagnetic compatibility (EMC) requirements	62040.2	Part 2: Electromagnetic compatibility (EMC) requirements

The terms ‘normative’ and ‘informative’ have been used in this Standard 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.

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FOREWORD

This second edition cancels and replaces first edition published in 1999 and constitutes a technical revision. The significant technical changes are:

– reference test load – definition and application revised (3.3.5 and 6.1.1.3);

– test schedule – presented as a single table grouped by revised type and routine tests (see 6.1.6, Table 3);

– dynamic output voltage performance characteristics – guidance to measure – addition (Annex H);

– UPS efficiency – requirements and methods of measure – addition (Annexes I and J);

– functional availability – guidance for UPS reliability integrity level classification – addition (Annex K).

In this standard, the following print types are used:

– requirements proper and normative annexes: in roman type;

– compliance statements and test specifications: *in italic type*;

– notes and other informative matter: in smaller roman type;

– normative conditions within tables: in smaller roman type;

– terms that are defined in Clause 3: **bold**.

AUSTRALIAN STANDARD

Uninterruptible power systems (UPS)

Part 3:
Method of specifying the performance and test requirements

1 Scope

This International Standard applies to movable, stationary and fixed electronic **uninterruptible power systems** (UPS) that deliver single or three-phase fixed frequency a.c. output voltage not exceeding 1 000 V a.c. and that incorporate an **energy storage system**, generally connected through a d.c. link.

This standard is intended to specify performance and test requirements of a complete UPS and not of individual **UPS functional units**. The individual UPS functional units are dealt with in IEC publications referred to in the bibliography that apply so far that they are not in contradiction with this standard.

The primary function of the UPS covered by this standard is to ensure continuity of an a.c. power source. The UPS may also serve to improve the quality of the power source by keeping it within specified characteristics. UPS have been developed over a wide range of power, from less than hundred watts to several megawatts, to meet requirements for availability and quality of power to a variety of loads. Refer to Annexes A and B for information on typical UPS configurations and topologies.

This standard also covers UPS test and performance when power switches form integral part of a UPS and are associated with its output. Included are interrupters, bypass switches, isolating switches, and tie switches. These switches interact with other functional units of the UPS to maintain **continuity of load power**.

This standard does not cover

- conventional a.c. input and output distribution boards or d.c. boards and their associated switches (e.g. switches for batteries, rectifier output or inverter input);
- stand-alone static transfer systems covered by IEC 62310-3;
- systems wherein the output voltage is derived from a rotating machine.

NOTE 1 This standard recognises that power availability to information technology (IT) equipment represents a major UPS application. The UPS output characteristics specified in this standard are therefore also aimed at ensuring compatibility with the requirements of IT equipment. This, subject any limitation stated in the manufacturer's declaration, includes requirements for steady state and transient voltage variation as well as for the supply of both linear and non-linear load characteristics of IT equipment.

NOTE 2 Test loads specified in this standard simulate both linear and non-linear load characteristics. Their use is prescribed with the objective of verifying design and performance, as declared by the manufacturer, and also of minimising any complexity and energy consumption during the tests.

NOTE 3 This standard is aimed at 50 Hz and 60 Hz applications but does not exclude other frequency applications within the domain of IEC 60196. This is subject to an agreement between manufacturer and purchase in respect to any particular requirements arising.

NOTE 4 Single phase and three-phase voltage UPS covered by this standard include without limitation UPS supplying single-phase, two-wire; single-phase, three-wire; two-phase, three-wire, three-phase, three-wire and three-phase, four-wire loads.