Irish Standard
I.S. EN 62040-3:2011

Uninterruptible power systems (UPS) -- Part 3: Method of specifying the performance and test requirements (IEC 62040-3:2011 (EQV))

I.S. EN 62040-3:2011

Incorporating amendments/corrigenda issued since publication:

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I.S. xxx: Irish Standard – national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation - recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

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EN 62040-3

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English version

Uninterruptible power systems (UPS) - Part 3: Method of specifying the performance and test requirements

(IEC 62040-3:2011)

Alimentations sans interruption (ASI) - Partie 3: Méthode de spécification des performances et exigences d'essais (CEI 62040-3:2011)

Unterbrechungsfreie Stromversorgungssysteme (USV) - Teil 3: Methoden zum Festlegen der Leistungs- und Prüfungsanforderungen (IEC 62040-3:2011)

This European Standard was approved by CENELEC on 2011-04-18. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 62040-3:2011 E

Foreword

The text of document 22H/129/FDIS, future edition 2 of IEC 62040-3, prepared by SC 22H, Uninterruptible power systems (UPS), of IEC TC 22, Power electronic systems and equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 62040-3 on 2011-04-18.

This European Standard supersedes EN 62040-3:2001 + A11:2009.

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2012-01-18
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2014-04-18

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**.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 62040-3:2011 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60034-22	NOTE Harmonized as EN 60034-22.
IEC 60068-1:1988	NOTE Harmonized as EN 60068-1:1994 (not modified).

IEC 60068-2 series	NOTE	Harmonized in EN 60068-2 series (not modified).
IEC 60068-3-3:1991	NOTE	Harmonized as EN 60068-3-3:1993 (not modified).
IEC 60146-1-3:1991	NOTE	Harmonized as EN 60146-1-3:1993 (not modified).
IEC 60664-1:2007	NOTE	Harmonized as EN 60664-1:2007 (not modified).
IEC/TR 61508 series	NOTE	Harmonized in EN 61508 series (not modified).

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60038	-	IEC standard voltages	FprEN 60038[1]	-
IEC 60068-2-1	-	Environmental testing - Part 2-1: Tests - Test A: Cold	EN 60068-2-1	-
IEC 60068-2-2	-	Environmental testing - Part 2-2: Tests - Test B: Dry heat	EN 60068-2-2	-
IEC 60068-2-27	-	Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock	EN 60068-2-27	-
IEC 60068-2-31	2008	Environmental testing - Part 2-31: Tests - Test Ec: Rough handling shocks, primarily for equipment-type specimens	EN 60068-2-31	2008
IEC 60068-2-78	-	Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state	EN 60068-2-78	-
IEC 60146-1-1	2009	Semiconductor converters - General requirements and line commutated converters - Part 1-1: Specification of basic requirements	EN 60146-1-1	2010
IEC 60146-2	1999	Semiconductor converters - Part 2: Self-commutated semiconductor converters including direct d.c. converters	EN 60146-2	2000
IEC 60196	-	IEC standard frequencies	EN 60196	-
IEC 60364-1	-	Low-voltage electrical installations - Part 1: Fundamental principles, assessment of general characteristics, definitions	HD 60364-1	-
IEC 60364-5-52	-	Low-voltage electrical installations - Part 5-52: Selection and erection of electrical equipment - Wiring systems	HD 60364-5-52	-
IEC 60947-3	-	Low-voltage switchgear and controlgear - Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units	EN 60947-3	-
IEC 60947-6-1	-	Low-voltage switchgear and controlgear - Part 6-1: Multiple function equipment - Transfer switching equipment	EN 60947-6-1	-

[1] At draft stage.

Publication	Year	Title	EN/HD	Year
IEC 60950-1	-	Information technology equipment - Safety - Part 1: General requirements	EN 60950-1	-
IEC 60990	-	Methods of measurement of touch current and protective conductor current	EN 60990	-
IEC 61000-2-2	2002	Electromagnetic compatibility (EMC) - Part 2-2: Environment - Compatibility levels for low-frequency conducted disturbances and signalling in public low-voltage power supply systems	EN 61000-2-2	2002
IEC 61000-3-2	-	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)	EN 61000-3-2	-
IEC/TS 61000-3-4	-	Electromagnetic compatibility (EMC) - 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	-	-
IEC 61000-3-12	-	Electromagnetic compatibility (EMC) - 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	EN 61000-3-12	-
IEC 61000-4-30	-	Electromagnetic compatibility (EMC) - Part 4-30 : Testing and measurement techniques - Power quality measurement methods	EN 61000-4-30	-
IEC 61672-1	-	Electroacoustics - Sound level meters - Part 1: Specifications	EN 61672-1	-
IEC 62040-1 + corr. September	2008 2008	Uninterruptible Power Systems (UPS) - Part 1: General and safety requirements for UPS	EN 62040-1 + corr. February	2008 2009
IEC 62040-2	-	Uninterruptible power systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements	EN 62040-2	-
IEC 62310-3	2008	Static transfer systems (STS) - Part 3: Method for specifying performance and test requirements	EN 62310-3	2008
ISO 7779	2010	Acoustics - Measurement of airborne noise emitted by information technology and telecommunications equipment	EN ISO 7779	2010

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

UNINTERRUPTIBLE POWER SYSTEMS (UPS) –

Part 3: Method of specifying the performance and test requirements

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.
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International Standard IEC 62040-3 has been prepared by subcommittee 22H: Uninterruptible power systems (UPS), of IEC technical committee 22: Power electronic systems and equipment.

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).

The text of this standard is based on the following documents:

FDIS	Report on voting
22H/129/FDIS	22H/133A/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

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

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**.

A list of all parts of the IEC 62040 series, under the general title: *Uninterruptible power systems (UPS)* can be found on the IEC website.

The committee has decided that the contents of this publication 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.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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.