



SLOVENSKI STANDARD
SIST EN 62040-5-3:2017
01-april-2017

Sistemi za neprekinjeno napajanje (UPS) - 5-3. del: Enosmerni izhod UPS - Lastnosti in preskusne zahteve (IEC 62040-5-3:2016)

Uninterruptible power systems (UPS) - Part 5-3: d.c. output UPS - Performance and test requirements (IEC 62040-5-3:2016)

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Alimentations sans interruption (ASI) - Partie 5-3: ASI à tension de sortie continue - Performances et exigences d'essai (IEC 62040-5-3:2016)

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Ta slovenski standard je istoveten z: EN 62040-5-3:2017

ICS:

29.200

Usmerniki. Pretvorniki.
Stabilizirano električno
napajanje

Rectifiers. Convertors.
Stabilized power supply

SIST EN 62040-5-3:2017

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EUROPEAN STANDARD

EN 62040-5-3

NORME EUROPÉENNE

EUROPÄISCHE NORM

February 2017

ICS 29.200

English Version

Uninterruptible power systems (UPS) -
Part 5-3: DC output UPS - Performance and test requirements
(IEC 62040-5-3:2016)

Alimentations sans interruption (ASI) -
Partie 5-3: ASI à tension de sortie continue - Performances
et exigences d'essai
(IEC 62040-5-3:2016)

Unterbrechungsfreie Stromversorgungssysteme (USV) -
Teil 5-3: USV mit Gleichstromausgang - Leistungs- und
Prüfungsanforderungen
(IEC 62040-5-3:2016)

This European Standard was approved by CENELEC on 2016-11-30. 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.

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SIST EN 62040-5-3:2017

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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

EN 62040-5-3:2017**European foreword**

The text of document 22H/208/FDIS, future edition 1 of IEC 62040-5-3, 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 approved by CENELEC as EN 62040-5-3:2017.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2017-08-30
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2019-11-30

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Endorsement notice

The text of the International Standard IEC 62040-5-3:2016 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	NOTE	Harmonized as EN 60068-1.
IEC 60068-2 Series	NOTE	Harmonized as EN 60068-2 Series.
IEC 60068-2-5	NOTE	Harmonized as EN 60068-2-5.
IEC 60068-2-13	NOTE	Harmonized as EN 60068-2-13.
IEC 60068-3-3	NOTE	Harmonized as EN 60068-3-3.
IEC 60146-1-3:1991	NOTE	Harmonized as EN 60146-1-3:1993 (not modified).
IEC 60664-1	NOTE	Harmonized as EN 60664-1.
IEC 60721-3-3	NOTE	Harmonized as EN 60721-3-3.
IEC 60947-3	NOTE	Harmonized as EN 60947-3.
IEC 60947-6-1	NOTE	Harmonized as EN 60947-6-1.
IEC 60950-1	NOTE	Harmonized as EN 60950-1.
IEC 60990	NOTE	Harmonized as EN 60990.
IEC 61000-4-30	NOTE	Harmonized as EN 61000-4-30.
IEC 61508 Series	NOTE	Harmonized as EN 61508 Series.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
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	-	Environmental testing - Part 2-31: Tests - Test Ec: Rough handling shocks, primarily for equipment-type specimens	EN 60068-2-31	-
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 60364-1 (mod)	2005	Low-voltage electrical installations - Part 1: Fundamental principles, assessment of general characteristics, definitions	HD 60364-1	2008
IEC/TR 60721-4-3	-	Classification of environmental conditions - - Part 4-3: Guidance for the correlation and transformation of environmental condition classes of IEC 60721-3 to the environmental tests of IEC 60068 - Stationary use at weatherprotected locations	-	-

EN 62040-5-3:2017

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
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 61672-1	-	Electroacoustics - Sound level meters - Part 1: Specifications	EN 61672-1	-
IEC 62040-1	-	Uninterruptible Power Systems (UPS) - Part 1: General and safety requirements for UPS	EN 62040-1	-
IEC 62040-2	-	Uninterruptible power systems (UPS) - Part 2: Electromagnetic compatibility (EMC) requirements	EN 62040-2	-
ISO 7779	-	Acoustics - Measurement of airborne noise emitted by information technology and telecommunications equipment	EN ISO 7779	-

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IEC 62040-5-3

Edition 1.0 2016-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Uninterruptible power systems (UPS) –
Part 5-3: DC output UPS – Performance and test requirements**

**Alimentations sans interruption (ASI) –
Partie 5-3: ASI à tension de sortie continue – Performances et exigences d'essai**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.200

ISBN 978-2-8322-3690-1

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

UNINTERRUPTIBLE POWER SYSTEMS (UPS) –

Part 5-3: DC output UPS – 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 62040-5-3 has been prepared by subcommittee 22H: Uninterruptible power systems (UPS), of IEC technical committee 22: Power electronic systems and equipment.

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

FDIS	Report on voting
22H/208/FDIS	22H/211/RVD

Full information on the voting for the approval of this document 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 document, 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 website 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.

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UNINTERRUPTIBLE POWER SYSTEMS (UPS) –

Part 5-3: DC output UPS – Performance and test requirements

1 Scope

This part of IEC 62040 establishes the performance and test requirements applied to movable, stationary and fixed electronic **DC uninterruptible power systems (DC UPS)** that

- are supplied from an AC voltage source not exceeding 1 000 V,
- deliver a **DC output voltage** not exceeding 1 500 V,
- incorporate an **energy storage device**, and
- have a primary function to ensure continuity of DC power to loads.

This document specifies performance and test requirements of a complete **DC UPS** and not of individual **DC UPS functional units**. The individual **DC 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 document.

DC UPSs have been developed over a wide range of power, from less than a hundred watts to 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 **DC UPS** configurations and topologies.

This document also includes **DC UPS** performance and test requirements related to **interrupters**, isolating switches, and tie switches, if any, which are integral to the **DC UPS**. These components interact with other **functional units** of the **DC UPS** to maintain **continuity of load power**.

This document does not cover

- conventional AC input distribution boards and their associated switches,
- conventional DC distribution boards and their associated switches,
- conventional AC UPSs covered by IEC 62040-3,
- low-voltage DC power supply devices covered by a specific product standard, for example IEC 61204, and those covered by a specific product standard, for example ITU communication standards, and
- systems wherein the **output voltage** is derived from a rotating machine.

NOTE 1 This document recognises that power availability to information technology (IT) equipment represents a major UPS application. The **DC UPS** output characteristics specified in this document are therefore also aimed at ensuring compatibility with the requirements of IT equipment. This, subject to 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 resistive and **constant power load** characteristics of IT equipment.

NOTE 2 Test loads specified in this document simulate both resistive and **constant power 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.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 60068-2-1, *Environmental testing – Part 2-1: Tests – Test A: Cold*

IEC 60068-2-2, *Environmental testing – Part 2-2: Tests – Test B: Dry heat*

IEC 60068-2-27, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

IEC 60068-2-31, *Environmental testing – Part 2-31: Tests – Test Ec: Rough handling shocks, primarily for equipment-type specimens*

IEC 60068-2-78, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 60146-1-1:2009, *Semiconductor converters – General requirements and line commutated converters – Part 1-1: Specification of basic requirements*

IEC 60146-2:1999, *Semiconductor converters – Part 2: Self-commutated semiconductor converters including direct d.c converters*

IEC 60364-1:2005, *Low-voltage electrical installations – Part 1: Fundamental principles, assessment of general characteristics, definitions*

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IEC TR 60721-4-3, *Classification of environmental conditions - Part 4-3: Guidance for the correlation and transformation of environmental condition classes of IEC 60721-3 to the environmental tests of IEC 60068 - Stationary use at weatherprotected locations*

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*

IEC 61672-1, *Electroacoustics – Sound level meters – Part 1: Specifications*

IEC 62040-1, *Uninterruptible power systems (UPS) – Part 1: General and safety requirements for UPS*

IEC 62040-2, *Uninterruptible power systems (UPS) – Part 2: Electromagnetic compatibility (EMC) requirements*

ISO 7779, *Acoustics – Measurement of airborne noise emitted by information technology and telecommunications equipment*

3 Terms and definitions

3.1 General

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

NOTE In this document, IEC 60050 definitions are referenced wherever possible, particularly those of IEC 60050-551.

When an existing IEC 60050 definition needs amplification or additional information, this is indicated by adding the word "modified" after the IEC 60050 reference.

3.2 System and component definitions

3.2.1

DC uninterruptible power system

DC UPS

combination of **converters**, switches and **energy storage devices** (such as batteries), constituting a power system for maintaining **continuity of DC load power** in case of **AC input power failure**

Note 1 to entry: **AC input power failure** occurs when voltages are outside rated steady-state and **transient tolerance bands** or when distortion or interruptions are outside the limits specified for the **DC UPS**.

3.2.2

electronic power converter

power converter

converter

operative unit for electronic power conversion, comprising one or more electronic valve devices, transformers and filters if necessary and auxiliaries if any

Note 1 to entry: In English, the two spellings "converter" and "convertor" are in use, and both are correct. In this document, the spelling "**converter**" is used in order to avoid duplications.

Note 2 to entry: Figure 1 shows examples of basic **electronic power converters**.

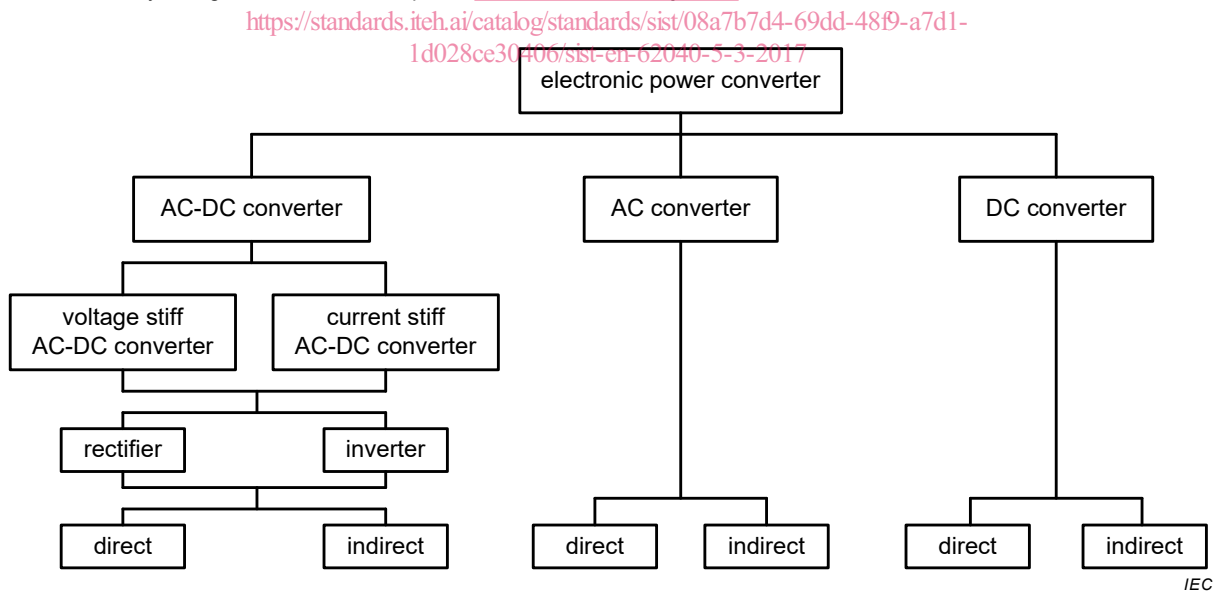


Figure 1 – Examples of basic electronic power converters

[SOURCE: IEC 60050-551:1998, 551-12-01, modified — Note 2 to entry and the figure have been added.]

3.2.3

functional unit

<DC UPS> complete subassembly that performs a given function in a **DC UPS**

EXAMPLE **Converter**, rectifier.