



**SLOVENSKI STANDARD**  
**SIST EN 62040-3:2002/A11:2010**  
**01-januar-2010**

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

Unterbrechungsfreie Stromversorgungssysteme - Teil 3: Methoden zum Festlegen der Leistungs- und Prüfungsanforderungen

Alimentations sans interruption (ASI) - Partie 3: Méthode de spécification des performances et procédures d'essai

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**Ta slovenski standard je istoveten z: EN 62040-3:2001/A11:2009**

**ICS:**

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**SIST EN 62040-3:2002/A11:2010**                      **en,fr,de**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 62040-3/A11**

November 2009

ICS 29.200

English version

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

Alimentations sans interruption (ASI) -  
Partie 3: Méthode de spécification  
des performances et procédures d'essai

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

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This amendment A11 modifies the European Standard EN 62040-3:2001; it was approved by CENELEC on 2009-09-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment 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 amendment 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, 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

**Central Secretariat: Avenue Marnix 17, B - 1000 Brussels**

## Foreword

This amendment to the European Standard EN 62040-3:2001 was prepared by the Technical Committee CENELEC TC 22X, Power electronics.

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as amendment A11 to EN 62040-3:2001 on 2009-09-01.

The following dates were fixed:

- latest date by which the amendment has to be implemented  
at national level by publication of an identical  
national standard or by endorsement (dop) 2010-09-01
- latest date by which the national standards conflicting  
with the amendment have to be withdrawn (dow) 2012-09-01

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Add the following Annex AA:

## Annex AA (normative)

### Methods of efficiency measurement for UPS

#### AA.1 Introduction

This annex is intended to give the detailed UPS efficiency measuring method and conditions. This method shall be used also for the efficiency test specified in 6.3.10. The definition of efficiency given in 3.3.19 (ratio of output active power to input active power under specified conditions with no significant energy transfer to and from the energy storage means) applies.

#### AA.2 Measurement conditions

The efficiency measurement shall be carried out as type test (see 3.2.39) under the following conditions:

##### AA.2.1 Environmental conditions

The environmental conditions shall be within the limits specified in 4.1. The following conditions also apply:

- 1) ambient temperature between 20 °C to 30 °C;
- 2) elevation between 0 m and 1 000 m above sea level.

##### AA.2.2 Operational and electrical conditions

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The following conditions apply during the measurement:

- 1) the UPS shall be in Normal Mode (see 3.2.13);
- 2) there shall be no significant transfer to and from the energy storage means (see 3.3.19) or the energy storage means shall be disconnected during the test;
- 3) the UPS and the load shall have reached stabilized conditions (see 6.3.10);

NOTE Trend variation of less than 2 % in the measured values over 10 min may be considered stable for the purpose of this annex. Instrument power readings may be used in this case.

- 4) all UPS sub-systems intended to be operational in Normal Mode shall be activated;
- 5) rated input voltage and frequency. The input AC supply shall be within the tolerances specified in EN 61000-2-2;
- 6) instruments used for the measurement of electrical parameters shall have sufficient bandwidth to accurately measure true active power value on waveforms which may be other than a fundamental sinewave, i.e. considerable harmonic content (see 6.3). Simultaneous or multiplexed input and output measures shall be taken.

#### AA.3 Measurement method

Resistive load (i.e. linear load at power factor 1) and the reference non linear load (see Annex E) shall be used for the efficiency measure. Efficiency measurement values using only resistive load shall be provided for load fractions lower than the **rated** output **active power**. For the **rated** output **active power** two efficiency values shall be provided: using **rated** resistive load and using reference non-linear load (see 6.3.10 and Annex E - Connection for reference non-linear loads to UPS).

NOTE The test with resistive load is considered to be the most reliable in terms of repeatability and constitutes a solid base for the evaluation of efficiency improvements at all load levels below the **rated output active power**. At **rated output active power** the resistive and the reference non-linear load are considered to provide respectively the upper and lower bound for the efficiency values in field applications.

Under the conditions specified in AA.2.1 and AA.2.2, the measurement of the UPS efficiency shall be carried out as follows:

In case separate or multiplexed instruments are used for the readings and the accuracy of the active power measurement is equal or better than 0,5 % the following procedure apply:

- 1) a suitable stabilization time shall be allowed to reach the stable conditions as specified above;
- 2) the input and output power shall be measured simultaneously in three successive readings. The efficiency shall be calculated as defined in 3.3.19 for each reading, and the arithmetic mean of the measures shall then be obtained. The result is considered to be the value of the efficiency measure with no additional tolerances;
- 3) the measure shall than be repeated following the steps 1) and 2) described above for all the requested load fractions, if applicable.

If separate instruments with an accuracy less then 0,5 % are used the following procedure apply:

- 1) a suitable stabilization time shall be allowed to reach the stable conditions as specified above;
- 2) the input and output power shall be measured simultaneously in three successive readings. The efficiency shall be calculated as defined in 3.3.19 for each reading, and the arithmetic mean of the measures shall then be obtained;
- 3) the input and output measuring equipments shall be swapped;
- 4) the same procedure described in step 2) above will then be repeated;
- 5) the arithmetic mean of the values calculated in step 2) and step 4) is considered to be the value of the efficiency measure with no additional tolerances;
- 6) the measure shall than be repeated following the steps 1) to 5) described above for all the requested load fractions, if applicable.

## AA.4 Test report

The following information shall be recorded in the test report.

### AA.4.1 Equipment details

- Brand, model, type, and serial number.
- Product description, as appropriate.
- Rated voltage and frequency.
- Rated output active and apparent power.
- Details of manufacturer marked on the product (if any).
- In the case of products with multiple functions or with options to include additional modules or attachments, the configuration of the appliance as tested shall be noted in the report.

**AA.4.2 Test parameters**

- Ambient temperature (°C).
- Input and output test voltage (V) and frequency (Hz).
- Total harmonic input voltage distortion.
- Information and documentation on the instrumentation, set-up and circuits used for electrical testing.

**AA.4.3 Measured data**

- Efficiency in % rounded to the first decimal place at the given **rated** load fraction (two values in case of **rated output active power**).
- Measurement method used.
- Any notes regarding the operation of the equipment.

**AA.4.4 Test and laboratory details**

- Test report number/reference.
- Date of test.
- Test officer(s).

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