SLOVENSKI STANDARD
SIST EN 61000-4-30:2009

01-september-2009

Nadomeġ a:
SIST EN 61000-4-30:2003

Elektromagnetna združljivost (EMC) - 4-30. del: Preskusne in merilne tehnike - Metode merjenja kakovosti napetosti (IEC 61000-4-30:2008)

Electromagnetic compatibility (EMC) -- Part 4-30 : Testing and measurement techniques - Power quality measurement methods

Elektromagnetische Verträglichkeit (EMV) -- Teil 4-30: Prüf- und Messverfahren – Verfahren zur Messung der Spannungsqualität

Compatibilité Electromagnétique (CEM) -- Partie 4-30: Techniques d'essai et de mesure - Méthodes de mesure de la qualité de l'alimentation

Ta slovenski standard je istoveten z: **EN 61000-4-30:2009**

ICS:

33.100.01	Elektromagnetna združljivost na splošno	Electromagnetic compatibility in general

SIST EN 61000-4-30:2009 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61000-4-30

January 2009

ICS 33.100.99

Supersedes EN 61000-4-30:2003

English version

Electromagnetic compatibility (EMC) - Part 4-30: Testing and measurement techniques - Power quality measurement methods

(IEC 61000-4-30:2008)

Compatibilité électromagnétique (CEM) - Partie 4-30: Techniques d'essai et de mesure - Méthodes de mesure de la qualité de l'alimentation (CEI 61000-4-30:2008)

Elektromagnetische Verträglichkeit (EMV) - Teil 4-30: Prüf- und Messverfahren - Verfahren zur Messung der Spannungsqualität (IEC 61000-4-30:2008)

This European Standard was approved by CENELEC on 2008-12-01. 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, 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

Ref. No. EN 61000-4-30:2009 E

Foreword

The text of document 77A/660/FDIS, future edition 2 of IEC 61000-4-30, prepared by SC 77A, Low frequency phenomena, of IEC TC 77, Electromagnetic compatibility, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61000-4-30 on 2008-12-01.

This European Standard supersedes EN 61000-4-30:2003.

EN 61000-4-30:2009 includes the following significant technical changes with respect to EN 61000-4-30:2003.

– adjustments, clarifications, and corrections to class A and class B measurement methods;

– a new category, class S, intended for survey instruments, has been added;

– a new Annex C gives guidance on instruments.

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)	2009-09-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2011-12-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61000-4-30:2008 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 60044-1	NOTE	Harmonized as EN 60044-1:1999 (modified).
IEC 60044-2	NOTE	Harmonized as EN 60044-2:1999 (modified).
IEC 61000-2-12	NOTE	Harmonized as EN 61000-2-12:2003 (not modified).
IEC 61000-3-3 + A1 + A2	NOTE	Harmonized as EN 61000-3-3:1995 (not modified) + A1:2001 + A2:2005
IEC 61000-3-11	NOTE	Harmonized as EN 61000-3-11:2000 (not modified).
IEC 61010	NOTE	Harmonized in EN 61010 series (not modified).
IEC 61010-2-032	NOTE	Harmonized as EN 61010-2-032:2002 (not modified).
IEC 61557-12	NOTE	Harmonized as EN 61557-12:2008 (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 60050-161	-[1]	International Electrotechnical Vocabulary (IEV) - Chapter 161: Electromagnetic compatibility	-	-
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[2]
IEC 61000-2-4	-[1]	Electromagnetic compatibility (EMC) - Part 2-4: Environment - Compatibility levels in industrial plants for low-frequency conducted disturbances	EN 61000-2-4	2002[2]
IEC 61000-3-8	-[1]	Electromagnetic compatibility (EMC) - Part 3-8: Limits - Signalling on low-voltage electrical installations - Emission levels, frequency bands and electromagnetic disturbance levels	-	-
IEC 61000-4-4	2004	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4	2004
IEC 61000-4-7 A1	2002 2008	Electromagnetic compatibility (EMC) - Part 4-7: Testing and measurement techniques - General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto	EN 61000-4-7 A1	2002 200X[3]
IEC 61000-4-15	-[1]	Electromagnetic compatibility (EMC) - Part 4-15: Testing and measurement techniques - Flickermeter - Functional and design specifications	EN 61000-4-15	1998[2]
IEC 61180	Series	High-voltage test techniques for low-voltage equipment	EN 61180	Series

[1] Undated reference.

[2] Valid edition at date of issue.

[3] To be ratified.

IEC 61000-4-30

Edition 2.0 2008-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

BASIC EMC PUBLICATION

PUBLICATION FONDAMENTALE EN CEM

Electromagnetic compatibility (EMC) – Part 4-30: Testing and measurement techniques – Power quality measurement methods

Compatibilité électromagnétique (CEM) – Partie 4-30: Techniques d'essai et de mesure – Méthodes de mesure de la qualité de l'alimentation

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

PRICE CODE
CODE PRIX XB

ICS 33.100.99

ISBN 2-8318-1002-0

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 4-30: Testing and measurement techniques – Power quality measurement methods

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 61000-4-30 has been prepared by subcommittee 77A: Low-frequency phenomena, of IEC technical committee 77: Electromagnetic compatibility.

This standard forms part 4-30 of IEC 61000. It has the status of a basic EMC publication in accordance with IEC Guide 107.

This second edition cancels and replaces the first edition published in 2003. This edition includes the following significant technical changes with respect to the previous edition.

– Adjustments, clarifications, and corrections to class A and class B measurement methods.
– A new category, class S, intended for survey instruments, has been added.
– A new Annex C gives guidance on instruments.

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

FDIS	Report on voting
77A/660/FDIS	77A/666/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.

A list of all parts of the IEC 61000 series, under the general title *Electromagnetic compatibility (EMC)*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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.

INTRODUCTION

IEC 61000 is published in separate parts according to the following structure:

Part 1: General

General considerations (introduction, fundamental principles)

Definitions, terminology

Part 2: Environment

Description of the environment

Classification of the environment

Compatibility levels

Part 3: Limits

Emission limits

Immunity limits (in so far as they do not fall under the responsibility of the product committees)

Part 4: Testing and measurement techniques

Measurement techniques

Testing techniques

Part 5: Installation and mitigation guidelines

Installation guidelines

Mitigation methods and devices

Part 6: Generic standards

Part 9: Miscellaneous

Each part is further subdivided into several parts, published either as International Standards or as Technical Specifications or Technical Reports, some of which have already been published as sections. Others will be published with the part number followed by a dash and completed by a second number identifying the subdivision (example: IEC 61000-6-1).

ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 4-30: Testing and measurement techniques – Power quality measurement methods

1 Scope

This part of IEC 61000-4 defines the methods for measurement and interpretation of results for power quality parameters in 50/60 Hz a.c. power supply systems.

Measurement methods are described for each relevant parameter in terms that give reliable and repeatable results, regardless of the method's implementation. This standard addresses measurement methods for *in situ* measurements.

Measurement of parameters covered by this standard is limited to voltage phenomena that can be conducted in a power system. The power quality parameters considered in this standard are power frequency, magnitude of the supply voltage, flicker, supply voltage dips and swells, voltage interruptions, transient voltages, supply voltage unbalance, voltage harmonics and interharmonics, mains signalling on the supply voltage and rapid voltage changes. Depending on the purpose of the measurement, all or a subset of the phenomena on this list may be measured.

NOTE 1 Information about current parameters may be found in A.3 and A.5.

This standard gives measurement methods and appropriate performance requirements, but does not set thresholds.

The effects of transducers inserted between the power system and the instrument are acknowledged but not addressed in detail in this standard. Precautions on installing monitors on live circuits are addressed.

NOTE 2 Some guidance about effects of transducers may be found in IEC 61557-12.

2 Normative references

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.

IEC 60050-161, *International Electrotechnical Vocabulary (IEV) – Chapter 161: Electromagnetic compatibility*

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 61000-2-4, *Electromagnetic compatibility (EMC) – Part 2-4: Environment – Compatibility levels in industrial plants for low-frequency conducted disturbances*

IEC 61000-3-8, *Electromagnetic compatibility (EMC) – Part 3: Limits – Section 8: Signalling on low-voltage electrical installations – Emission levels, frequency bands and electromagnetic disturbance levels*

IEC 61000-4-4:2004, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test*

IEC 61000-4-7:2002, *Electromagnetic compatibility (EMC) – Part 4-7: Testing and measurement techniques – General guide on harmonics and interharmonics measurements and instrumentation, for power supply systems and equipment connected thereto*
Amendment 1 (2008)

IEC 61000-4-15, *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 15: Flickermeter – Functional and design specifications*

IEC 61180 (all parts), *High-voltage test techniques for low voltage equipment*

3 Terms and definitions

For the purpose of this document, the definitions of IEC 60050-161, as well as the following, apply.

3.1
channel
individual measurement path through an instrument

NOTE "Channel" and "phase" are not the same. A voltage channel is by definition the difference in potential between 2 conductors. Phase refers to a single conductor. On polyphase systems, a channel may be between 2 phases, or between a phase and neutral, or between a phase and earth, or between neutral and earth.

3.2
Coordinated Universal Time
UTC

time scale which forms the basis of a coordinated radio dissemination of standard frequencies and time signals. It corresponds exactly in rate with international atomic time, but differs from it by an integral number of seconds.

NOTE 1 Coordinated universal time is established by the International Bureau of Weights and Measures (BIPM) and the International Earth Rotation Service (IERS).

NOTE 2 The UTC scale is adjusted by the insertion or deletion of seconds, so called positive or negative leap seconds, to ensure approximate agreement with UT1.

[IEV 713-05-20]

3.3
declared input voltage
$\boldsymbol{U}_{\mathbf{din}}$
value obtained from the declared supply voltage by a transducer ratio

3.4
declared supply voltage
$\boldsymbol{U}_{\mathbf{c}}$
declared supply voltage U_c is normally the nominal voltage U_n of the system. If, by agreement between the supplier and the customer, a voltage different from the nominal voltage is applied to the terminal, then this voltage is the declared supply voltage U_c

3.5
dip threshold
voltage magnitude specified for the purpose of detecting the start and the end of a voltage dip

3.6
flagged data
data that has been marked to indicate that its measurement or its aggregation may have been affected by interruptions, dips, or swells

NOTE Flagging enables other methods that may prevent a single event from being counted as several different types of events. Flagging is supplemental information about a measurement or aggregation. Flagged data is not removed from the data set. In some applications, flagged data may be excluded from further analysis but in other applications, the fact that data was flagged may be unimportant. The user, application, regulation, or other standards determine the use of flagged data. See 4.7 for further explanation.

3.7
flicker
impression of unsteadiness of visual sensation induced by a light stimulus whose luminance or spectral distribution fluctuates with time

[IEV 161-08-13]

3.8
fundamental component
component whose frequency is the fundamental frequency

[IEV 101-14-49, modified]

3.9
fundamental frequency
frequency in the spectrum obtained from a Fourier transform of a time function, to which all the frequencies of the spectrum are referred

[IEV 101-14-50, modified]

NOTE In case of any remaining risk of ambiguity, the fundamental frequency may be derived from the number of poles and speed of rotation of the synchronous generator(s) feeding the system.

3.10
harmonic component
any of the components having a harmonic frequency

[IEC 61000-2-2:2002, 3.2.4, modified]

NOTE Its value is normally expressed as an r.m.s. value. For brevity, such component may be referred to simply as a harmonic.

3.11
harmonic frequency
frequency which is an integer multiple of the fundamental frequency

NOTE The ratio of the harmonic frequency to the fundamental frequency is the *harmonic order* (notation: *h)*.

3.12
hysteresis
difference in magnitude between the start and end thresholds

NOTE 1 This definition of hysteresis is relevant to Power Quality (PQ) measurement parameters and is different from the IEV definition which is relevant to iron core saturation.

NOTE 2 The purpose of hysteresis in the context of PQ measurements is to avoid counting multiple events when the magnitude of the parameter oscillates about the threshold level.

3.13
influence quantity
any quantity which may affect the working performance of a measuring equipment