ICS 33.100.20 SLOVENSKÁ TECHNICKÁ NORMA Apríl 2016

| STN | **Elektromagnetická kompatibilita (EMC). Časť 6-5: Všeobecné normy. Odolnosť - zariadenia používané v elektrárňach a rozvodniach.** | **STN EN 61000-6-5**<br><br>33 3432 |
|---|---|---|

Electromagnetic compatibility (EMC) - Part 6-5: Generic standards - Immunity for equipment used in power station and substation environment

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 03/16

Obsahuje: EN 61000-6-5:2015, IEC 61000-6-5:2015

**122552**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

# EN 61000-6-5

November 2015

ICS 33.100.20

English Version

# Electromagnetic compatibility (EMC) - Part 6-5: Generic standards - Immunity for equipment used in power station and substation environment (IEC 61000-6-5:2015)

Compatibilité électromagnétique (CEM) - Partie 6-5: Normes génériques - Immunité pour les équipements utilisés dans les environnements de centrales électriques et de postes (IEC 61000-6-5:2015)

Elektromagnetische Verträglichkeit (EMV) - Teil 6-5: Fachgrundnormen - Störfestigkeit von Betriebsmitteln, Geräten und Einrichtungen, die im Bereich von Kraftwerken und Schaltstationen verwendet werden (IEC 61000-6-5:2015)

This European Standard was approved by CENELEC on 2015-09-25. 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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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 CEN-CENELEC Management Centre has the same status as the official versions.

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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**

## European foreword

The text of document 77/484/FDIS, future edition 1 of IEC 61000-6-5, prepared by IEC/TC 77 "Electromagnetic compatibility" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61000-6-5:2015.

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) 2016-06-25
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2018-09-25

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

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

## Endorsement notice

The text of the International Standard IEC 61000-6-5:2015 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 61000-2 | NOTE | Harmonized in EN 61000-2 series. |
| IEC 61000-6-4 | NOTE | Harmonized as EN 61000-6-4. |
| IEC 60255-1:2009 | NOTE | Harmonized as EN 60255-1:2010 (not modified). |
| IEC 60255-26:2013 | NOTE | Harmonized as EN 60255-26:2013 (not modified). |
| IEC 61439-1:2011 | NOTE | Harmonized as EN 61439-1:2011 (not modified). |
| IEC 62271-1:2007 | NOTE | Harmonized as EN 62271-1:2008 (not modified). |
| IEC 60870-2-1:1995 | NOTE | Harmonized as EN 60870-2-1:1996 (not modified). |
| IEC 61000-6-2:2005 | NOTE | Harmonized as EN 61000-6-2:2005 (not modified). |
| IEC 61326-1:2012 | NOTE | Harmonized as EN 61326-1:2013 (not modified). |
| IEC 61812-1:2011 | NOTE | Harmonized as EN 61812-1:2011 (not modified). |

| | | |
|---|---|---|
| IEC 61000-4-1 | NOTE | Harmonized as EN 61000-4-1. |
| IEC 61000-4-12:2006 | NOTE | Harmonized as EN 61000-4-12:2006 (not modified). |
| IEC 61000-4-19:2014 | NOTE | Harmonized as EN 61000-4-19:2014 (not modified). |

# 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.

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| IEC 61000-4-2 | - | Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test | EN 61000-4-2 | 2009 |
| IEC 61000-4-3 | - | Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test | EN 61000-4-3<br>+ A1<br>+ A2 | 2006<br>2008<br>2010 |
| IEC 61000-4-4 | - | Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test | EN 61000-4-4 | 2012 |
| IEC 61000-4-5 | - | Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test | EN 61000-4-5 | 2014 |
| IEC 61000-4-6 | - | Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields | EN 61000-4-6 | 2014 |
| IEC 61000-4-8 | - | Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test | EN 61000-4-8 | 2010 |
| IEC 61000-4-11 | - | Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests | EN 61000-4-11 | 2004 |

| Publication | Year | Title | EN/HD | Year |
|---|---|---|---|---|
| IEC 61000-4-16 | - | Electromagnetic compatibility (EMC) - Part 4-16: Testing and measurement techniques - Test for immunity to conducted, common mode disturbances in the frequency range 0 Hz to 150 kHz | EN 61000-4-16<br>+ A1<br>+ A2 | 1998<br>2004<br>2011 |
| IEC 61000-4-17 | - | Electromagnetic compatibility (EMC) - Part 4-17: Testing and measurement techniques - Ripple on d.c. input power port immunity test | EN 61000-4-17<br>+ A1<br>+ A2 | 1999<br>2004<br>2009 |
| IEC 61000-4-18 | - | Electromagnetic compatibility (EMC) - Part 4-18: Testing and measurement techniques - Damped oscillatory wave immunity test | EN 61000-4-18<br>+ corrigendum Sep.<br>+ A1 | 2007<br>2007<br>2010 |
| IEC 61000-4-29 | - | Electromagnetic compatibility (EMC) - Part 4-29: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests | EN 61000-4-29 | 2000 |
| IEC 61000-4-34 | - | Electromagnetic compatibility (EMC) - Part 4-34: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current more than 16 A per phase | EN 61000-4-34<br>+ A1 | 2007<br>2009 |
| IEC 61000-6-1 | - | Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments | EN 61000-6-1 | 2007 |

# Annex ZZ
(informative)

## Coverage of Essential Requirements of EU Directives

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and within its scope the standard covers essential requirements as given in Annex I Article 1(b) of the EU Directive 2004/108/EC.

Compliance with this standard provides one means of conformity with the specified essential requirements of the Directives concerned.

**WARNING**: Other requirements and other EU Directives may be applicable to the products falling within the scope of this standard.

IEC 61000-6-5

Edition 1.0 2015-08

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

colour inside

## Electromagnetic compatibility (EMC) – Part 6-5: Generic standards – Immunity for equipment used in power station and substation environment

## Compatibilité électromagnétique (CEM) – Partie 6-5: Normes génériques – Immunité pour les équipements utilisés dans les environnements de centrales électriques et de postes

IEC 61000-6-5:2015-08(en-fr)

# IEC 61000-6-5

Edition 1.0 2015-08

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE


## Electromagnetic compatibility (EMC) – Part 6-5: Generic standards – Immunity for equipment used in power station and substation environment

## Compatibilité électromagnétique (CEM) – Partie 6-5: Normes génériques – Immunité pour les équipements utilisés dans les environnements de centrales électriques et de postes

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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# ELECTROMAGNETIC COMPATIBILITY (EMC) –

# Part 6-5: Generic standards – Immunity for equipment used in power station and substation environment

## 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.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
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8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61000-6-5 has been prepared by committee 77: Electromagnetic compatibility (EMC).

This first edition cancels and replaces the first edition of IEC TS 61000-6-5 published in 2001. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) the scope is extended in order to cover also power generating systems in industrial facilities;
b) the locations under consideration, i.e. power stations and substations are described in more detail;
c) performance criteria and the EUT functions they apply to are reviewed;

d) immunity requirements are reviewed and more specifically related to the relevant locations;

e) informative annexes for guidance and on protected zones are added.

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

| FDIS | Report on voting |
|---|---|
| 77/484/FDIS | 77/500/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 in the IEC 61000 series, published 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 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.**

# INTRODUCTION

IEC 61000 series 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 sections which are to be 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 a second number identifying the subdivision (example: IEC 61000-6-1).

This International Standard deals with the electromagnetic compatibility (EMC) of equipment used in the generation, transmission and distribution of electricity and related telecommunication systems.

Several EMC product standards have been published by technical committees dealing with different application areas in the generation, transmission and distribution of electricity and related telecommunication systems, for example:

- fixed power supply installations and apparatus for railway applications (TC 9),
- switchgear and controlgear (TC 17),
- instrument transformers (TC 38),
- nuclear instrumentation (TC 45),
- power systems management and associated information exchange (TC 57),
- industrial-process measurement and control – system aspects (SC 65A),
- measuring relays and protection equipment (TC 95), etc.

The requirements specified in these product standards consider product-specific aspects only. It is the task of this generic standard IEC 61000-6-5 to specify a set of essential requirements, test procedures and generalized performance criteria applicable to such products or systems operating in this electromagnetic environment.

# ELECTROMAGNETIC COMPATIBILITY (EMC) –

# Part 6-5: Generic standards – Immunity for equipment used in power station and substation environment

## 1 Scope and object

This part of IEC 61000 specifies EMC immunity requirements which apply to electrical and electronic equipment intended for use in power stations and substations, as described below. Immunity requirements for electromagnetic phenomena with spectral contributions in the frequency range 0 Hz to 400 GHz are covered. No tests need to be performed at frequencies or for phenomena where no requirements are specified.

This international standard sets immunity test requirements for equipment intended for use in the generation, transmission and distribution of electricity and related telecommunication systems. The electromagnetic environments encompassed by this standard are those which exist at locations

- in power stations, and
- in high and medium voltage substations.

Installations to generate or convert into electrical power inside industrial facilities are also covered by this standard as long as they, at their primary electrical connection, cannot be directly connected to the LV power network, e.g. where the generator output voltage is medium voltage or higher. Power installations that directly provide power into the low voltage network (such as photovoltaic cells or combined heat power systems in private houses) are not covered by this standard.

NOTE 1 In general, power stations comprise installations which are mainly built to convert some kind of primary energy into electrical energy. Moreover, these power stations are connected to the medium or high voltage power system directly or via a step-up transformer.

The object of this standard is to define immunity test requirements for equipment defined in the scope in relation to continuous and transient, conducted and radiated disturbances, including electrostatic discharges.

The immunity test requirements are given on a port-by-port basis, and selected according to the location, with differentiated levels for equipment to be installed in power stations or substations. In special cases, situations will arise where the level of electromagnetic disturbances may exceed the levels specified in this standard; in these instances, special mitigation measures should be adopted.

The immunity requirements are suitable for satisfying the particular needs related to the functions and tasks of equipment and systems, for which reliable operation is required under realistic electromagnetic conditions; in this respect, this standard establishes performance criteria for different functional requirements.

This generic EMC immunity standard is applicable if no relevant dedicated product or product-family EMC immunity standard exists. According to IEC Guide 107, this generic standard should be considered for the preparation or revision of any EMC standard referring to specific products used in power stations and substations.

NOTE 2 Product standards covering EMC aspects for equipment to be used in power stations or substations are for example IEC 62271-1 (switchgear and controlgear), IEC 60255-26 (measuring relays and protection equipment) or IEC 62236-5 (fixed power supply installations and apparatus for railway applications).

Non-electronic high voltage and power equipment (primary system) are excluded from the scope of this standard.

Emission requirements are not within the scope of this standard and are covered by relevant product or product-family standards.

NOTE 3 Where no dedicated product or product family standard covering emission requirements exists, the generic standard IEC 61000-6-4 applies.

## 2 Normative references

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.

IEC 61000-4-2, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

IEC 61000-4-3, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

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

IEC 61000-4-5, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-6, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-8, *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test*

IEC 61000-4-11, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests*

IEC 61000-4-16, *Electromagnetic compatibility (EMC) – Part 4-16: Testing and measurement techniques – Test for immunity to conducted, common mode disturbances in the frequency range 0 Hz to 150 kHz*

IEC 61000-4-17, *Electromagnetic compatibility (EMC) – Part 4-17: Testing and measurement techniques – Ripple on d.c. input power port immunity test*

IEC 61000-4-18, *Electromagnetic compatibility (EMC) – Part 4-18: Testing and measurement techniques – Damped oscillatory wave immunity test*

IEC 61000-4-29, *Electromagnetic compatibility (EMC) – Part 4-29: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations on d.c. input power port immunity tests*

IEC 61000-4-34, *Electromagnetic compatibility (EMC) – Part 4-34: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current more than 16 A per phase*

IEC 61000-6-1, *Electromagnetic compatibility (EMC) – Part 6-1: Generic standards – Immunity for residential, commercial and light-industrial environments*



– connections from control room or equipment room to the field of power stations and HV substations;
– connections to low voltage power equipment;
– connections within the relay house or telecommunication house of HV substations, where no special mitigation measures are adopted (e.g. shielding);
– field bus.

Note 1 to entry: Those cable ports of process instrumentation which are self-powered through the signal conductors (e.g. 4 mA to 20 mA) are considered as signal ports.