
Electromagnetic compatibility (EMC) - Part 5: Installation and mitigation guidelines - Section 5: Specification of protective devices for HEMP conducted disturbance - Basic EMC publication (IEC 1000-5-5:1996)

Electromagnetic compatibility (EMC) -- Part 5: Installation and mitigation guidelines -- Section 5: Specification of protective devices for HEMP conducted disturbance

Elektromagnetische Verträglichkeit (EMV) -- Teil 5: Installationsrichtlinien und Abhilfemaßnahmen -- Hauptabschnitt 5: Festlegung von Schutzeinrichtungen gegen leitungsgeführte HEMP-Störgrößen

Compatibilité électromagnétique (CEM) -- Partie 5: Guides d'installation et d'atténuation - Section 5: Spécification des dispositifs de protection pour perturbations conduites IEMN -HA

Ta slovenski standard je istoveten z: EN 61000-5-5:1996

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EUROPEAN STANDARD
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English version

**Electromagnetic compatibility (EMC)
Part 5: Installation and mitigation guidelines
Section 5: Specification of protective devices for
HEMP conducted disturbance
Basic EMC Publication
(IEC 1000-5-5:1996)**

Compatibilité électromagnétique (CEM)

Partie 5: Guides d'installation et
d'atténuation

Section 5: Spécification des dispositifs

de protection pour perturbations
conduites IEMN-HA

Publication fondamentale en CEM
(CEI 1000-5-5:1996)

Elektromagnetische

Verträglichkeit (EMV)

Teil 5: Installationsrichtlinien
und Abhilfemaßnahmen

Hauptabschnitt 5: Festlegung

von Schutzeinrichtungen gegen

leitungsgeführte HEMP-Störgrößen

EMV-Grundnorm

(IEC 1000-5-5:1996)

This European Standard was approved by CENELEC on 1996-03-05. 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, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 77C/29/FDIS, future edition 1 of IEC 1000-5-5, prepared by SC 77C, Immunity to high altitude nuclear electromagnetic pulse (HEMP), of IEC TC 77, Electromagnetic compatibility, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61000-5-5 on 1996-03-05.

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) 1996-12-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1996-12-01

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annex ZA is normative and annexes A, B, C, D and E are informative.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 1000-5-5:1996 was approved by CENELEC as a European Standard without any modification.

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Annex ZA (normative)

Normative references to international publications
with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 50(161)	1990	International Electrotechnical Vocabulary (IEV) Chapter 161: Electromagnetic compatibility	-	-
IEC 60-1	1989	High-voltage test techniques Part 1: General definitions and test requirements	HD 588.1 S1	1991
IEC 99-1	1991	Surge arresters Part 1: Non-linear resistor type gapped surge arresters for a.c. systems	EN 60099-1	1994
IEC 617	series	Graphical symbols for diagrams	-	-
IEC 939-1	1988	Complete filter units for radio interference suppression Part 1: Generic specification	-	-
IEC 939-2	1988	Part 2: Sectional specification - Selection of methods of test and general requirements	-	-
IEC 1051-1	1991	Varistors for use in electronic equipment Part 1: Generic specification	-	-
IEC 1051-2	1991	Part 2: Sectional specification for surge suppression varistors	-	-
CISPR 17	1981	Methods of measurement of the suppression characteristics of passive radio interference filters and suppression components	-	-

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Compatibilité électromagnétique (CEM) –

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Electromagnetic compatibility (EMC) –

Part 5:

Installation and mitigation guidelines

Section 5: Specification of protective devices
for HEMP conducted disturbance –
Basic EMC publication

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International Electrotechnical Commission
Международная Электротехническая Комиссия

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 5: Installation and mitigation guidelines
Section 5: Specification of protective devices for
HEMP conducted disturbance –
Basic EMC publication

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
- 4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
- 5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
- 6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 1000-5-5 has been prepared by subcommittee 77C: Immunity to high altitude nuclear electromagnetic pulse (HEMP), of IEC technical committee 77: Electromagnetic compatibility.

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

FDIS	Report on voting
77C/29/FDIS	77C/35/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.

Annexes A, B, C, D and E are for information only.

INTRODUCTION

The IEC has initiated the preparation of standardized methods to protect civilian society from the effects of high altitude nuclear bursts. Such effects could disrupt systems for communications, electric power, information technology, etc.

This section of IEC 1000-5 is part of a complete set of standards that covers the entire category of immunity to high altitude nuclear electromagnetic pulse. The appropriate acronym is either HA-NEMP or more simply HEMP.

The application of this section is, however, not dependent on access to other sections and parts of the IEC 1000, except for those specifically referred to.

IEC/DIS 1000-4-24 ¹⁾ indicates the projects running in parallel with this work.

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¹⁾ IEC/DIS 1000-4-24: *Electromagnetic compatibility (EMC) – Part 4: Testing and measurement techniques – Section 24: Test methods for protective devices for HEMP conducted disturbance* (at present at the stage of final draft international standard)

ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 5: Installation and mitigation guidelines Section 5: Specification of protective devices for HEMP conducted disturbance – Basic EMC publication

1 Scope

This part of IEC 1000-5 defines how protective devices for conducted disturbance proposed for HEMP protection shall be specified. It is intended to be used for the harmonization of existing or future specifications issued by protective device manufacturers, electronic equipment manufacturers, administrations and other ultimate buyers. Performance requirements shall be given in future IEC documents.

This section covers protective devices currently being used for protection against induced HEMP transients on signal and low voltage power lines (nominal voltage up to 1 kV a.c.).

General information can be applied also to high voltage lines. However, in these cases, the additional requirements for the protection levels of existing lightning arresters (especially gapless MO-arresters) are under consideration.

In general, HEMP-relevant parameters, i.e. parameters related to very fast changes of electromagnetic field, voltage (u) and current (i) as a function of time, are of interest. For basic specifications, reference is made to other relevant standards (see annex E) dealing with phenomena other than HEMP. When such standards do not adequately consider the requirements of modern electronics, additional specifications, modifications or extensions based on non-HEMP-relevant standards are defined.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this section of IEC 1000-5. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this section of IEC 1000-5 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 50(161): 1990, *International Electrotechnical Vocabulary (IEV) – Chapter 161: Electromagnetic compatibility*

IEC 60-1: 1989, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 99-1: 1991, *Surge arresters – Part 1: Non-linear resistor type gapped surge arresters for a.c. systems*

IEC 617, *Graphical symbols for diagrams*

IEC 939-1: 1988, *Complete filter units for radio interference suppression – Part 1: Generic specification*

IEC 939-2: 1988, *Complete filter units for radio interference suppression – Part 2: Sectional specification – Selection of methods of test and general requirements*

IEC 1051-1: 1991, *Varistors for use in electronic equipment – Part 1: Generic specification*

IEC 1051-2: 1991, *Varistors for use in electronic equipment – Part 2: Sectional specification for surge suppression varistors*

CISPR 17: 1991, *Methods of measurement of the suppression characteristics of passive radio interference filters and suppression components*

3 Definitions

For the purpose of this section of IEC 1000-5, the following definitions apply:

3.1 avalanche-junction transient voltage suppressor (protective diode): A semiconductor diode that suppresses transient voltages in either the forward or reverse direction of its voltage-current characteristic.

3.2 clamping voltage: The peak voltage across the device terminals measured under conditions of a specified current waveform.

3.3 d.c. spark-over voltage (gas discharge tubes): The voltage at which the gas discharge tube sparks over when subjected to a rate of rise of 100 V/ μ s or slower. Higher rates may be used for testing if it can be shown that the spark-over voltage is not significantly changed thereby.

3.4 DUT: Device under test.

3.5 differential residual voltage: The residual voltage between the protected terminals of a two-path device (six-terminal network) during a specified surge event.

3.6 expulsion-type arrester: An arrester for a.c. power circuits, having an arcing chamber in which the follow-current arc is confined and brought into contact with gas or other arc extinguishing material in a manner which results in the limitation of the voltage at the line terminal and the interruption of the follow current.

3.7 gas discharge tube: A gap, or several gaps with two or three metal electrodes hermetically sealed so that gas mixture and pressure are under control, designed to protect apparatus or personnel from high transient voltages.

3.8 HEMP/HA-NEMP: The two acronyms are equivalent and accepted as High Altitude Nuclear Electromagnetic Pulse. HEMP is preferable to HA-NEMP.