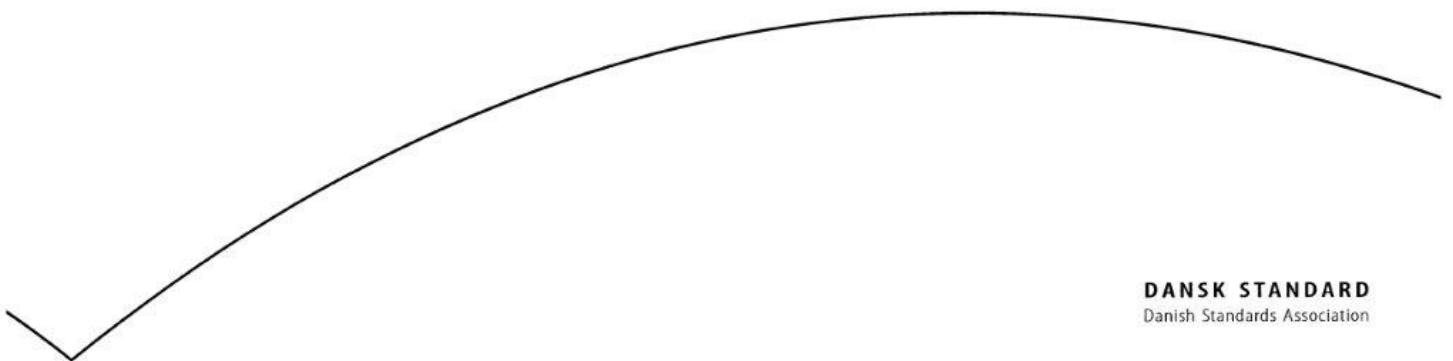


# Elektromagnetisk kompatibilitet (EMC) – Del 4-11: Prøvnings- og måleteknikker – Immunitetsprøvning med spændingsdyk, korte spændingsudfald og variationer i forsyningsspændingen

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



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DS projekt: M507750  
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**DS/EN, hvilket betyder, at det er en europæisk standard, der har status som dansk standard.**

**Denne publikations overensstemmelse er:**

**IDT med: IEC 61000-4-11:2004/AMD1:2017.**

**IDT med: EN 61000-4-11:2004/A1:2017.**

**DS-publikationen er på engelsk.**

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## EUROPÄISCHE NORM

August 2017

ICS 33.100.20

English Version

Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests  
(IEC 61000-4-11:2004/A1:2017)

Compatibilité électromagnétique (CEM) - Partie 4-11:  
Techniques d'essai et de mesure - Essais d'immunité aux  
creux de tension, coupures brèves et variations de tension  
(IEC 61000-4-11:2004/A1:2017)

Elektromagnetische Verträglichkeit (EMV) - Teil 4-11: Prüf-  
und Messverfahren - Prüfungen der Störfestigkeit gegen  
Spannungseinbrüche, Kurzzeitunterbrechungen und  
Spannungsschwankungen  
(IEC 61000-4-11:2004/A1:2017)

This amendment A1 modifies the European Standard EN 61000-4-11:2004; it was approved by CENELEC on 2017-06-22. 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 CEN-CENELEC Management Centre 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 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 77A/951/FDIS, future IEC 61000-4-11:2004/A1, prepared by SC 77A, "EMC -Low-frequency phenomena", of IEC TC 77, "Electromagnetic compatibility" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 61000-4-11:2004/A1:2017.

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) 2018-03-22
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2020-06-22

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association.

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

## **Endorsement notice**

The text of the International Standard IEC 61000-4-11:2004/A1:2017 was approved by CENELEC as a European Standard without any modification.



# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

BASIC EMC PUBLICATION  
PUBLICATION FONDAMENTALE EN CEM

AMENDMENT 1  
AMENDEMENT 1

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

**Compatibilité électromagnétique (CEM) –  
Partie 4-11: Techniques d'essai et de mesure – Essais d'immunité aux creux de  
tension, coupures brèves et variations de tension**



## FOREWORD

This amendment has been prepared by subcommittee 77A: EMC – Low frequency phenomena, of IEC technical committee 77: Electromagnetic compatibility.

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

FDIS	Report on voting
77A/951/FDIS	77A/961/RVD

Full information on the voting for the approval of this amendment can be found in the report on voting indicated in the above table.

The committee has decided that the contents of this amendment and the base 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.

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*Add, after Annex C, the following new Annex D:*

## **Annex D** (informative)

### **Rationale for generator specification regarding voltage, rise-time and fall-time, and inrush current capability**

#### **D.1 Concept of basic standard**

The immunity basic standards of the IEC 61000-4-x series are based on the concept of defining a test system in one document representing typically one type of electromagnetic disturbance. The environmental description of the IEC 61000-2-x series (which includes also compatibility levels) together with practical industry experience are the basis for defining the disturbance source simulator, the necessary coupling and decoupling networks and the range of test levels.

Parameters in the basic standard are always compromises selected from a large amount of data derived from the disturbance source. The compromise is assumed to be correct if, once the immunity test is applied, only a few malfunctions occur in the real world.

To keep the immunity test as easy as possible, the generator output shall be verified in a calibration set-up and not with the EUT connected to the output of the generator. The purpose of the calibration is to guarantee comparable test results between different brands of generators.

#### **D.2 IEC 61000-4-11:1994 (first edition)**

Data from UNIPEDE report was used which indicated short circuit in terms of voltage reduction and interrupt duration. At that time, rare measurement results were available showing how equipment on the same phase was affected, in the public power network.

Based on this information, IEC 61000-4-11:1994 (first edition) was defined and published in 1994. For the switching time a value of 1  $\mu$ s to 5  $\mu$ s was chosen for representing the short circuit's worst case occurring at a distance of up to 50 m between the source and the affected equipment. For example, the equipment used in a laboratory or in an industrial plant has a greater risk of being affected by voltage dips and short interruptions within 50 m.

#### **D.3 Rationale for the need of rapid fall-times**

In case of short circuit in the line, the voltage at the input terminals of the equipment might go to zero in less than 5  $\mu$ s.

If the short circuit originates from the public network, the fall-time will be relatively slow, in the order of hundreds of microseconds to some milliseconds. If, however, the short circuit is at the local premise, for example due to the failure of another equipment installed in close proximity, the mains voltage will go to zero within microseconds, with fall-times shorter than 1  $\mu$ s reported for some cases.

In this case, the input rectifier diodes of the equipment will be commutated from conduction mode to blocking mode with a sudden high reverse voltage due to that very fast voltage rise-time. As those diodes are usually designed for natural line commutation with a rise-time of the voltage in the range of milliseconds, this event is an increased stress for the rectifier diodes. More generally, fast voltage transients may disturb electronics as well, leading to the damage of the equipment.