SLOVENSKI STANDARD
oSIST prEN IEC 61000-4-29:2025

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Elektromagnetna združljivost (EMC) - 4-29. del: Preskusne in merilne tehnike - Preskusi odpornosti proti upadom napetosti, kratkotrajnim prekinitvam in odklonom napetosti za enosmerni (DC) napajalni priključek

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

Elektromagnetische Verträglichkeit (EMV) - Teil 4-29: Prüf- und Messverfahren - Prüfungen der Störfestigkeit gegen Spannungseinbrüche, Kurzzeitunterbrechungen und Spannungsschwankungen an Gleichstrom-Netzeingängen

Compatibilité électromagnétique (CEM) - Partie 4-29: Techniques d'essai et de mesure - Essais d'immunité aux creux de tension, coupures brèves et varations de tension sur les accès d'alimentation en courant continu

Ta slovenski standard je istoveten z: **prEN IEC 61000-4-29:2025**

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COMMITTEE DRAFT FOR VOTE (CDV)

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IEC SC 77A : EMC - LOW FREQUENCY PHENOMENA	
SECRETARIAT: France	SECRETARY: Mr Cédric LAVENU
OF INTEREST TO THE FOLLOWING COMMITTEES:	HORIZONTAL FUNCTION(S):
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☒ SUBMITTED FOR CENELEC PARALLEL VOTING **Attention IEC-CENELEC parallel voting** The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING

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TITLE:

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

PROPOSED STABILITY DATE: 2025

NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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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

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IEC 61000-4-29 has been prepared by subcommittee 77A: EMC – Low frequency phenomena, of IEC technical committee 77: Electromagnetic compatibility. It is an International Standard.

This standard forms part 4-29 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 2000. This edition constitutes a technical revision.

The text of this International Standard is based on the following documents:

Draft	Report on voting
XX/XX/FDIS	XX/XX/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

ELECTROMAGNETIC COMPATIBILITY (EMC) –

Part 4-29: Testing and measurement techniques – Voltage dips, short interruptions and voltage variations on d.c. input

1 Scope

This part of IEC 61000 defines test methods for immunity to voltage dips, short interruptions and voltage variations at the d.c. input power port of electrical or electronic equipment.

This standard is applicable to low voltage d.c. power ports of equipment supplied by external d.c. networks.

The object of this standard is to establish a common and reproducible basis for testing electrical and electronic equipment when subjected to voltage dips, short interruptions or voltage variations on d.c. input power ports.

This standard defines:

– the range of test levels;

– the test generator;

– the test set-up;

– the test procedure.

The test described hereinafter applies to electrical and electronic equipment and systems. It also applies to modules or subsystems whenever the EUT (equipment under test) rated power is greater than the test generator capacity specified in clause 6.

The ripple at the d.c. input power port is not included in the scope of this part of IEC 61000. It is covered by IEC 61000-4-17 1)

This standard does not specify the tests to be applied to particular apparatus or systems. Its main aim is to give a general basic reference to IEC product committees. These product committees (or users and manufacturers of equipment) remain responsible for the appropriate choice of the tests and the severity level to be applied to their equipment.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 61000-4-11, *Electromagnetic compatibility (EMC) – Part 4: Testing and measuring techniques – Section 11: Voltage dips, short interruptions and voltage variations immunity tests*

IEC 60038:2021, *IEC standard voltages*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

3.1
EUT
equipment under test

3.2
immunity (to a disturbance)
the ability of a device, equipment or system to perform without degradation in the presence of an electromagnetic disturbance
[IEV 161-01-20]

3.3
voltage dip
a sudden reduction of the voltage at a point in the low voltage d.c. distribution system, followed by voltage recovery after a short period of time, from a few milliseconds up to a few seconds
[IEV 161-08-10, modified]

3.4
short interruption
the disappearance of the supply voltage at a point of the low voltage d.c. distributed system for a period of time typically not exceeding 1 min. In practice, a dip with amplitude at least 80 % of the nominal voltage may be considered as an interruption.

3.5
voltage variation
a gradual change of the supply voltage to the lowest supply voltage and highest supply voltage a higher or lower value than the rated voltage. defined by the equipment manufacturer. The duration of the change can be short or long.

3.6
malfunction
the termination of the ability of an equipment to carry out intended functions, or the execution of unintended functions by the equipment.

4 General

The operation of electrical or electronic equipment may be affected by voltage dips, short interruptions or voltage variations of the power supply.

Voltage dips and short interruptions are mainly caused by faults in the d.c. distribution system, or by sudden large changes of load. It is also possible for two or more consecutive dips or interruptions to occur.

Faults in the d.c. distribution system may inject transient overvoltages into the distribution network; this particular phenomenon is not covered by this standard.

Voltage interruptions are primarily caused by the switching of mechanical relays when changing from one source to another (e.g. from generator set to battery).

During a short interruption, the d.c. supply network may present either a "high impedance" or "low impedance" condition. The first condition can be due to switching from one source to another; the second condition can be due to the clearing of an overload or fault condition on the supply bus. The latter can cause reverse current (negative peak inrush current) from the load.

These phenomena are random in nature and can be characterised in terms of the deviation from the rated nominal voltage, and duration. Voltage dips and short interruptions are not always abrupt.

The primary cause of voltage variations is the discharging and recharging of battery systems; however they are also created when there are significant changes to the load condition of the d.c. network.

Voltage variations can be also an inherent function of a d.c. power system when using droop control.

5 Test levels

The rated voltage for the equipment (U_T) shall be used, as a reference for the specification of the voltage test level.

The following voltage test levels (in % U_T) are used:

– 0 %, corresponding to interruptions;
– 40 % and 70 %, corresponding to dips with residual voltages of 40 % and 70 %;
– 80 % and 120 %, corresponding to ±20 % variations.

The change of the voltage is abrupt, in the range of μs (see generator specification in clause 6).

The preferred test levels and durations are given in tables 1a, 1b and 1c.

The levels and durations shall be selected by the product committee.

The test conditions of “high impedance” and “low impedance” reported in table 1b refer to the output impedance of the test generator as seen by the EUT during the voltage interruption; additional information is given in the definition of the test generator and test procedures.

Table 1a – Preferred test levels and durations for voltage dips

Test	**Test level** % U_T	**Duration** s
Voltage dips	40 and 70 or *x*	0,01 0,03 0,1 0,3 1 *x*

Table 1b – Preferred test levels and durations for short interruptions

Test	Test condition	Test level % U_T	Duration s
Short interruptions	High impedance and/or Low impedance	0	0,001 0,003 0,01 0,03 0,1 0,3 1 *x*

Table 1c – Preferred test levels and durations for voltage variations

Test	Test level % U_T	Duration s
Voltage variations	85 and 120 or 80 and 120 or *x*	0,1 0,3 1 3 10 *x*

NOTE 1 "*x*" is an open value.

NOTE 2 One or more of the test levels and durations specified in each table may be chosen.

NOTE 3 If the EUT is tested for short interruptions, it is unnecessary to test for other levels of the same duration, unless the immunity of the equipment is detrimentally affected by voltage dips of less than 70 % U_T.

NOTE 4 Shorter duration in the tables, in particular the shortest one, should be tested to be sure that the EUT operates as intended.

6 Test generator

6.1 Introduction

The following features are common to the generator for voltage dips, short interruptions and voltage variations, except where otherwise indicated.

The generator shall have provisions to prevent the emission of disturbances which may influence the test results.

Examples of generators are given in figure A.1 (test generator based on two power sources with internal switching) and figure A.2 (test generator based on a programmable power supply).

6.2 Characteristics and performances of the generator

6.2.1 General

The test generator shall be able to operate in continuous mode with the following main specifications: