

© Copyright SEK. Reproduction in any form without permission is prohibited.

Elektromagnetisk kompatibilitet (EMC) – Del 4-34: Mät- och provningsmetoder – Provning av immunitet mot kortvariga spänningssänkningar, spänningsavbrott och spänningsvariationer för utrustning med matningsström större än 16 A per fas

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

Som svensk standard gäller europastandarden EN 61000-4-34:2007. Den svenska standarden innehåller den officiella engelska språkversionen av EN 61000-4-34:2007.

Nationellt förord

Europastandarden EN 61000-4-34:2007

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 61000-4-34, First edition, 2005 - Electromagnetic compatibility (EMC) - Part 4-34: Testing and measuring techniques - Voltage dips, short interruptions and voltage variations immunity tests for equipment with input current more than 16 A per phase**

utarbetad inom International Electrotechnical Commission, IEC.

ICS 33.100.20

Denna standard är fastställd av SEK Svensk Elstandard, som också kan lämna upplysningar om **sakinnehållet** i standarden.
Postadress: SEK, Box 1284, 164 29 KISTA
Telefon: 08 - 444 14 00. Telefax: 08 - 444 14 30
E-post: sek@elstandard.se. Internet: www.elstandard.se

Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a säkerhet, prestanda, dokumentation, utförande och skötsel av elprodukter, elanläggningar och metoder. Genom att utforma sådana standarder blir säkerhetskraven tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

SEK Svensk Elstandard

Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

English version

**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 61000-4-34:2005)**

Compatibilité électromagnétique (CEM) -
Partie 4-34: Techniques d'essai
et de mesure -
Essais d'immunité aux creux de tension,
coupures brèves et variations de tension
pour matériel ayant un courant appelé
de plus de 16 A par phase
(CEI 61000-4-34:2005)

Elektromagnetische Verträglichkeit (EMV) -
Teil 4-34: Prüf- und Messverfahren -
Prüfungen der Störfestigkeit von Geräten
und Einrichtungen
mit einem Eingangsstrom > 16 A je Leiter
gegen Spannungseinbrüche,
Kurzzeitunterbrechungen
und Spannungsschwankungen
(IEC 61000-4-34:2005)

This European Standard was approved by CENELEC on 2007-04-01. 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: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 77A/498/FDIS, future edition 1 of IEC 61000-4-34, 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 61000-4-34 on 2007-04-01.

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) 2008-01-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2010-04-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61000-4-34:2005 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 61000-2-4	NOTE	Harmonized as EN 61000-2-4:2002 (not modified).
IEC 61000-4-11	NOTE	Harmonized as EN 61000-4-11:2004 (not modified).
IEC 61000-4-14	NOTE	Harmonized as EN 61000-4-14:1999 (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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60050-161	- ¹⁾	International Electrotechnical Vocabulary (IEV) - Chapter 161: Electromagnetic compatibility	-	-
IEC/TR 61000-2-8	- ¹⁾	Electromagnetic compatibility (EMC) - Part 2-8: Environment - Voltage dips and short interruptions on public electric power supply systems with statistical measurement results	-	-
IEC 61000-4-30	- ¹⁾	Electromagnetic compatibility (EMC) - Part 4-30: Testing and measurement techniques - Power quality measurement methods	EN 61000-4-30	2003 ²⁾

¹⁾ Undated reference.

²⁾ Valid edition at date of issue.

CONTENTS

1	Scope.....	13
2	Normative references	13
3	Terms and definitions	15
4	General	17
5	Test levels.....	19
5.1	Voltage dips and short interruptions	19
5.2	Voltage variations (optional).....	21
6	Test instrumentation.....	25
6.1	Test generator.....	25
6.2	Power source	27
7	Test set-up	27
8	Test procedures	27
8.1	Laboratory reference conditions	29
8.2	Execution of the test.....	31
9	Evaluation of test results	35
10	Test report.....	35
	Annex A (normative) Test generator peak inrush current drive capability	39
	Annex B (informative) Electromagnetic environment classes.....	43
	Annex C (informative) Vectors for three-phase testing	45
	Annex D (informative) Test instrumentation	57
	Bibliography.....	63
	Figure 1 – Voltage dip – 70 % voltage dip sine wave graph.....	23
	Figure 2 – Voltage variation	23
	Figure 3a – Phase-to-neutral testing on three-phase systems	33
	Figure 3b – Phase-to-phase testing on three-phase systems – Acceptable Method 1 phase shift.....	33
	Figure 3c – Phase-to-phase testing on three-phase systems – Acceptable Method 2 phase shift.....	33
	Figure 3d – Not acceptable – phase-to-phase testing without phase shift.....	33
	Figure A.1 – Circuit for determining inrush current drive capability.....	41
	Figure C.1 – Phase-to-neutral dip vectors	45
	Figure C.2 – Acceptable Method 1 – phase-to-phase dip vectors	49
	Figure C.3 – Acceptable Method 2 – phase-to-phase dip vectors	53
	Figure D.1 – Schematic of example test instrumentation for voltage dips and short interruptions using tapped transformer and switches.....	57

Figure D.2 – Applying the example test instrumentation of Figure D.1 to create the
Acceptable Method 1 vectors of Figures C.1, C.2, 4a and 4b 59

Figure D.3 – Schematic of example test instrumentation for three-phase voltage dips,
short interruptions and voltage variations using power amplifier 61

Table 1 – Preferred test level and durations for voltage dips 21

Table 2 – Preferred test level and durations for short interruptions 21

Table 3 – Timing of short-term supply voltage variations 21

Table 4 – Generator specifications 25

Table A.1 – Minimum peak inrush current capability 39

Table C.1 – Vector values for phase-to-neutral dips 47

Table C.2 – Acceptable Method 1 – vector values for phase-to-phase dips 51

Table C.3 – Acceptable Method 2 – vector values for phase-to-phase dips 55

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

1 Scope

This part of IEC 61000 defines the immunity test methods and range of preferred test levels for electrical and electronic equipment connected to low-voltage power supply networks for voltage dips, short interruptions, and voltage variations.

This standard applies to electrical and electronic equipment having a rated input current exceeding 16 A per phase. It covers equipment installed in residential areas as well as industrial machinery, specifically voltage dips and short interruptions for equipment connected to either 50 Hz or 60 Hz a.c. networks, including 1-phase and 3-phase mains.

NOTE 1 Equipment with a rated input current of 16 A or less per phase is covered by publication IEC 61000-4-11.

NOTE 2 There is no upper limit on rated input current in this publication. However, in some countries, the rated input current may be limited to some upper value, for example 75 A or 250 A, because of mandatory safety standards.

It does not apply to electrical and electronic equipment for connection to 400 Hz a.c. networks. Tests for equipment connected to these networks will be covered by future IEC standards.

The object of this standard is to establish a common reference for evaluating the immunity of electrical and electronic equipment when subjected to voltage dips, short interruptions and voltage variations.

NOTE 1 Voltage fluctuations are covered by publication IEC 61000-4-14.

NOTE 2 For equipment under test with rated currents above 250 A, suitable test equipment may be difficult to obtain. In these cases, the applicability of this standard should be carefully evaluated by committees responsible for generic, product and product-family standards. Alternatively, this standard might be used as a framework for an agreement on performance criteria between the manufacturer and the purchaser.

The test method documented in this part of IEC 61000 describes a consistent method to assess the immunity of equipment or a system against a defined phenomenon. As described in IEC Guide 107, this is a basic EMC publication for use by product committees of the IEC. As also stated in Guide 107, the IEC product committees are responsible for determining whether this immunity test standard should be applied or not, and if applied, they are responsible for defining the appropriate test levels. Technical committee 77 and its sub-committees are prepared to co-operate with product committees in the evaluation of the value of particular immunity tests for their products.

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: Electro-magnetic compatibility*