
(istoveten EN 61543:1995/A11:2003)

Residual current-operated protective devices (RCDs) for household and similar use - Electromagnetic compatibility - Amendment A11

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EUROPEAN STANDARD

EN 61543/A11

NORME EUROPÉENNE

EUROPÄISCHE NORM

September 2003

ICS 29.020; 29.120.50

Incorporates Corrigendum May 2004

English version

**Residual current-operated protective devices (RCDs)
for household and similar use –
Electromagnetic compatibility**

Dispositifs différentiels résiduels (DDR)
pour usages domestiques et analogues –
Compatibilité électromagnétique

Fehlerstromschutzeinrichtungen (RCDs)
für Hausinstallationen und ähnliche
Verwendung –
Elektromagnetische Verträglichkeit

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This amendment A11 modifies the European Standard EN 61543:1995; it was approved by CENELEC on 2003-06-01. 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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Lithuania, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, 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 this document, prepared by the Technical Committee CENELEC TC 23E, Circuit breakers and similar devices for household and similar applications, was submitted to the Unique Acceptance Procedure and was approved by CENELEC as amendment A11 to EN 61543:1995 on 2003-06-01.

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) 2004-03-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2007-03-01

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

In this standard, annex ZA is normative.

Annex ZA has been added by CENELEC.

The contents of the corrigendum of May 2004 have been included in this copy.

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1 Introduction

Add, after the last paragraph, the following new paragraph:

The EMC characteristics of a product are generally influenced by the design and not by the manufacturing process, therefore the tests of this standard are to be made for design verification and will be repeated only in the case of modifications influencing the EMC behaviour.

Add the following title to Table 1:

Table 1 – Standard low-frequency environmental conditions

Add table footnote ²⁾ to the reference T 1.2: Signalling voltages in the second column as follows:

- 2) Superimposed mains signalling voltages are not allowed in common mode, except under specific conditions as indicated in IEC 60364-4-44.

Add the following title to Table 2:

Table 2 – Standard high-frequency environmental conditions

Add the following title to Table 3:

Table 3 – Standard electrostatic environmental conditions

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5.1.3 Add after the first sentence:

After each tripping the RCD shall be reclosed.

Replace the existing Table 4 by the following new table (modifications are underlined):

Table 4 – Low frequency immunity test conditions

Reference (see table 1)	Electromagnetic phenomena	Reference of basic standard for test description	Test level and test specification	Subclauses including the performance criteria
T1.1	Harmonics, interharmonics	<u>No requirements</u> ¹⁾		
T1.2	Signalling voltages	<u>No requirements</u>		
T1.3	Voltage amplitude variations			
	Voltage fluctuations ²⁾	9.9.5 and 9.17 of IEC 61008-1; 9.9.1.5 and 9.17 of IEC 61009-1	From 0,85 U_n to 1,1 U_n ³⁾	9.16 and 9.17 of IEC 61008-1 and IEC 61009-1
	Voltage dips ²⁾	9.17 of IEC 61008-1 and IEC 61009-1		
	Voltage interruptions ²⁾	9.17 of IEC 61008-1 and IEC 61009-1		
T1.4	Voltage unbalance	Refer to T1.3		
T1.5	Power frequency variations	⁴⁾		
T1.8	Magnetic field	9.11 and 9.18 of IEC 61008-1 (RCCBs) 9.12 and 9.18 of IEC 61009-1 (RCBOs)		

¹⁾ A study is undertaken for possible inclusion of requirements in a future revision.

²⁾ Tests specified in product standards do not need be repeated. The functioning of RCDs functionally independent of line voltage is not affected by voltage amplitude variations. The tests of this standard apply only to RCDs dependent on line voltage.

³⁾ For PRCDs 0,7 U_n instead of 0,85 U_n .

⁴⁾ Immunity from power frequency variations is ensured by the fact that all performances of the device are tested at frequencies which may be subjected to variations in the range of ± 5 % of the rated frequency: see 9.2 of IEC 61008-1 and IEC 61009-1.

Replace the existing Table 5 by the following table (modifications are underlined):

Table 5 – High-frequency immunity test conditions

Reference (see Table 1)	Electromagnetic phenomena	Reference of basic standard for test description	Test level and test specification	Subclauses including the performance criteria
T2.1	Conducted sine-wave form voltages or currents	IEC 61000-4-6	0,15 to 80 MHz $Z = 150 \Omega$ 3V for $I_{\Delta n} \geq 30 \text{ mA}$ 1V for $I_{\Delta n} < 30 \text{ mA}$	5.1.1
T2.2	Fast transients (bursts) Common mode	IEC 61000-4-4 ²⁾	Level 4: 4 kV (peak) ⁵⁾ Tr/Th 5/50 ns Repetition frequency 2,5 kHz	5.1.2 ³⁾
<u>T2.3 a</u>	<u>Surges</u>	IEC 61000-4-5	Tr/Th 1,2/50 μs 5 kV (peak) (4 kV for SRCDs & PRCDs) ¹⁾ common mode 4 kV (peak) (2 kV for SRCDs & PRCDs) ¹⁾ differential mode	5.1.3 ⁸⁾
<u>T2.3 b</u>			Tr/Th 1,2/50 μs 4 kV (peak) ¹⁾ common mode 2 kV (peak) ¹⁾ differential mode	5.1.2
T2.4	Current oscillatory transients (ring wave)	9.19 of IEC 61008-1 and IEC 61009-1	Tr/Th 0,5 μs /100 kHz 200 A (peak) ⁴⁾	5.1.4
T2.5	Radiated electromagnetic field	IEC 61000-4-3 ⁶⁾	10 V/m ⁷⁾	5.1.1

¹⁾ Tests with lower voltages than those given in this table are not required (reason: IEC 61000-4-5, subclause 8.2 requires to carry out the tests at each voltage up to the chosen level). This test shall be carried out on the device in the closed position and supplied at rated voltage. 5 positive and 5 negative pulses shall be applied successively:

- between the metal support and parts intended to be earthed (PE conductor, earthing terminal), if any, connected together and each live conductor in turn at an impedance of 12 Ω .
- between each phase and neutral, in turn, and between each couple of poles, in turn, at an impedance of 2 Ω .

For SRCDs and PRCDs the performance criterion is given in 5.1.3 and only T2.3 a. has to be performed.

²⁾ In addition, the sample shall be mounted as in normal use on a flat insulating support at a distance of 10 cm from the earth plane.

³⁾ The test is carried out in single phase on one pole of each sample taken at random. Three new samples are submitted to the test. If one sample does not comply with the criterion by tripping during the test, three further samples are tested, which shall fully comply with criterion 5.1.2.

⁴⁾ For PRCDs and SRCDs the current level is presently 25 A.

⁵⁾ For PRCDs and SRCDs the level is 3, i.e. 2 kV (peak).

⁶⁾ For the test at radiated high frequency, in order to simplify the tests, an important number of verifications of non-tripping will be carried out by sweeping the frequency range. Only five trippings are carried out on each sample at random frequencies that are different from one sample to the other, but with one of them at 900 MHz and one at 450 MHz.

⁷⁾ For PRCDs and SRCDs the level is 3 V/m.

⁸⁾ If the RCD doesn't trip after the test T2.3 a. (performance criteria 5.1.2), the test T2.3 b. has not to be performed.

Replace the existing Table 6 by the following new table (modifications are underlined):

Table 6 – Test conditions for electrostatic discharges

Reference (see Table 3)	Electrical phenomenon	Reference of basic standard for test description	Test level and test specification	Subclauses including the performance criteria
<u>I</u> 3.1	Electrostatic discharges	<u>IEC 61000-4-2</u>	Level 3 <u>8 kV air</u> <u>6 kV contact</u>	5.1.3 <u>1)</u>
<p><u>1)</u> Three new samples are submitted to the test. All three samples shall pass the test.</p> <p>The point to which discharges shall be applied is selected by an exploration of the accessible surfaces of the RCD, when installed as for normal use. During exploration the selection is made with 20 discharges per second.</p> <p><u>The selected point is tested with 10 positive and 10 negative polarity discharges with a time interval of minimum 1 s between subsequent discharges.</u></p>				

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