

**SLOVENSKI  
STANDARD**

**SIST EN 61009-1:1996/A2:1999**

prva izdaja  
april 1999

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Electrical accessories - Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's) - Part 1: General rules - Amendment A2

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ICS 29.120.50

Referenčna številka  
SIST EN 61009-1:1996/A2:1999(en)

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UDC 621.316.573:621.316.9:620.1  
ICS 29.120.50

Descriptors: Electrical household accessory, low-voltage equipment, residual current operated circuit-breakers, overcurrent protection, definition, characteristics, construction, tests

English version

**Electrical accessories**  
**Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's)**  
**Part 1: General rules**

Petit appareillage électrique  
Interrupteurs automatiques à  
courant différentiel résiduel avec  
protection contre les surintensités  
incorporée pour installations  
domestiques et analogues (DD)  
Partie 1: Règles générales

Elektrisches Installationsmaterial  
Fehlerstrom-Schutzschalter mit  
Überstromauslöser (RCBO's) für  
Hausinstallationen und für ähnliche  
Anwendungen  
Teil 1: Allgemeine Anforderungen

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EN 61009-1:1996/A2:1998  
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This amendment A2 modifies the European Standard EN 61009-1:1994; it was approved by CENELEC on 1996-10-01. 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, 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 23E/246/FDIS, future amendment to IEC 61009-1:1991, prepared by SC 23E, Circuit-breakers and similar equipment for household use, of IEC TC 23, Electrical accessories, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A2 to EN 61009-1:1994 on 1996-10-01.

NOTE: The text of this document was included in a new edition of IEC 61009-1; it is however published as a separate amendment by CENELEC.

The following dates were fixed:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1998-07-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2001-01-01

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## 1 Scope

*Add before the existing NOTE 4, the following new text:*

RCBOs of the general type are resistant to unwanted tripping, including the case where surge voltages (as a result of switching transients or induced by lightning) cause loading currents in the installation without occurrence of flashover.

RCBOs of the S type are considered to be sufficiently proof against unwanted tripping even if the surge voltage causes a flashover and a follow-on current occurs.

NOTE 4 – Surge arresters installed downstream of the general type of RCBOs and connected in common mode may cause unwanted tripping.

*Replace "NOTE 4" by "NOTE 5"*

## 2 Normative reference

*Add the following new normative reference:*

IEC 60-2: 1994, *High-voltage test techniques – Part 2: Measuring Systems*

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### 4.5 According to resistance to unwanted tripping due to voltage surges

*Replace "Under consideration." by the following new text:*

- RCBOs with normal resistance to unwanted tripping (general type as in table 2);
- RCBOs with increased resistance to unwanted tripping (S type as in table 2).

**8.14 Resistance of RCBOs against unwanted tripping due to impulse voltages**

*Replace the title and text of this subclause by the following:*

**8.14 Resistance of RCBOs to unwanted tripping due to current surges caused by impulse voltages**

RCBOs shall adequately withstand the current surges to earth due to the loading of the capacitances of the installation. RCBOs with increased resistance to unwanted tripping (S type as in table 2) shall additionally withstand the current surges to earth due to flashover in the installation.

*Compliance is checked by the tests of 9.19.*

**Table 10 – List of type tests**

*Replace the 17th dashed text by the following:*

- Resistance against unwanted tripping due to current surges

9.19

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**9.19 Verification of resistance against unwanted tripping due to an impulse voltage**

*Replace the title and text of this subclause by the following:*

**9.19 Verification of resistance against unwanted tripping due to current surges caused by impulse voltages**

**9.19.1 Current surge test for all RCBOs (0,5  $\mu$ s/100 kHz ring wave test)**

*The RCBO is tested using a surge generator capable of delivering a damped oscillator current wave as shown in figure 23. An example of a circuit diagram for the connection of the RCBO is shown in figure 24.*

One pole of the RCBO, chosen at random, shall be submitted to 10 applications of the surge current. The polarity of the surge wave shall be inverted after every two applications. The interval between two consecutive applications shall be about 30 s.

The current impulse shall be measured by appropriate means and adjusted using an additional RCBO of the same type with the same  $I_n$  and the same  $I_{\Delta n}$ , to meet the following requirements:

- peak value: 200 A  $^{+10}_0$  %  
or 25 A  $^{+10}_0$  % for RCBOs with  $I_{\Delta n} \leq 10$  mA
- virtual front time: 0,5  $\mu$ s  $\pm$  30 %
- period of the following oscillatory wave: 10  $\mu$ s  $\pm$  20 %
- each successive peak: about 60 % of the preceding peak

During the tests, the RCBO shall not trip. After the ring wave test, the correct operation of the RCBO is verified by a test according to 9.9.1.2c at  $I_{\Delta n}$  only with the measurement of the tripping time.

NOTE – Test procedures and relevant test circuits for RCBOs with integral or incorporated overvoltage protection are under consideration.

#### 9.19.2 Verification of higher resistance against unwanted tripping (8/20 $\mu$ s surge current test, applicable to S-type RCBOs only)

The RCBO is tested using a current generator capable of delivering a damped surge current 8/20  $\mu$ s (IEC 60-2) as shown in figure 25. An example of a circuit diagram for the connection of the RCBO is shown in figure 26.

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One pole of the RCBO, chosen at random, shall be submitted to 10 applications of the surge current. The polarity of the surge current wave shall be inverted after every two applications. The interval between two consecutive applications shall be about 30 s.

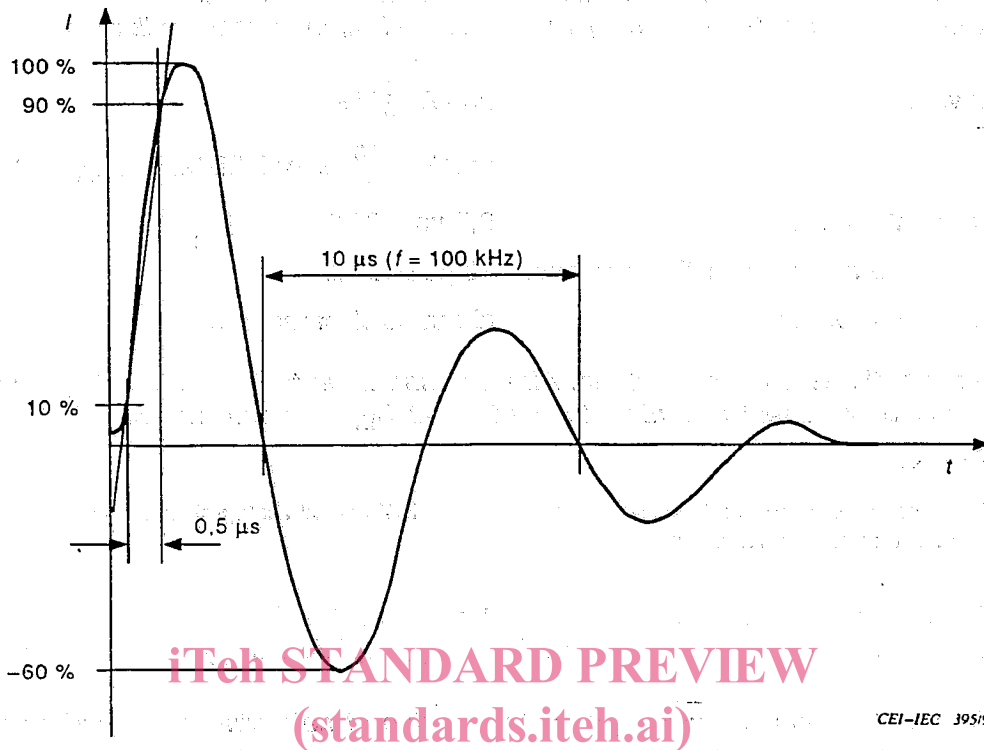
The current impulse shall be measured by appropriate means and adjusted using an additional RCBO of the same type with the same  $I_n$  and the same  $I_{\Delta n}$ , to meet the following requirements:

- peak value: 3 000 A  $^{+10}_0$  %
- virtual front time: 8  $\mu$ s  $\pm$  20 %
- virtual time to half value: 20  $\mu$ s  $\pm$  20 %
- peak of reverse current: less than 30 % of peak value

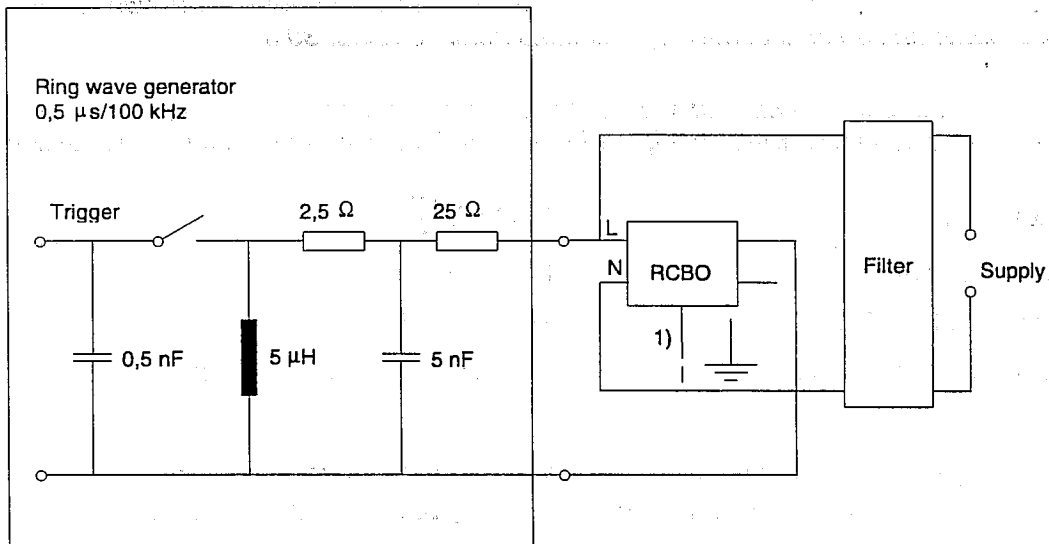
The current should be adjusted to the asymptotic current shape. For the tests on other samples of the same type with the same  $I_n$  and the same  $I_{\Delta n}$ , the reverse current, if any, should not exceed 30 % of the peak value.

During the tests, the RCBO shall not trip. After the ring wave test, the correct operation of the RCBO is verified by a test according to 9.9.1.2 c) at  $I_{\Delta n}$  only with the measurement of the tripping time.

Add the following new figures:



SIST EN 61009-1:1996/A2:1999  
 Figure 23 – Damped oscillator current wave, 0,5 μs/100 kHz  
<https://standards.iteh.ai/catalog/standards/sist/4a140c16-1c74-445c-a565-133b01de1114/sist-en-61009-1-1996-a2-1999>



1) If the RCBO has an earthing terminal, it should be connected to the neutral terminal, if any, and if so marked on the RCBO or, that failing, to any phase terminal.

Figure 24 – Test circuit for the ring wave test at RCBOs