

**01-junij-2022**

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**Odklopniki na residualni tok z vgrajeno nadtokovno zaščito za gospodinjsko in podobno rabo (RCBO) - Dodatek N - Dodatne zahteve in preskusi za RCBO, sestavljen iz ene zaščitne funkcije za residualni tok in več neodvisnih funkcij dvopolne zaščite pred nadtokom**

Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs) - Annex N - Additional requirements and tests for RCBOs consisting of one residual current protection function and several independent two-pole overcurrent protection functions

Fehlerstrom-/Differenzstrom (Schutzschalter mit eingebautem Überstromschutz (RCBOs) für Hausinstallationen und für ähnliche Anwendungen - Teil 1: Allgemeine Anforderungen

SIST EN 61009-1:2013/A13:2022

Interrupteurs automatiques à courant différentiel résiduel avec dispositif de protection contre les surintensités incorporé pour usages domestiques et analogues (DD) - Annexe N - Exigences et essais supplémentaires pour les DD constitués d'une fonction de protection à courant différentiel résiduel et de plusieurs fonctions de protection contre les surintensités bipolaires indépendantes

**Ta slovenski standard je istoveten z: EN 61009-1:2012/A13:2021**

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**ICS:**

29.120.50	Varovalke in druga nadtokovna zaščita	Fuses and other overcurrent protection devices
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**SIST EN 61009-1:2013/A13:2022**

**en,fr,de**

**iTeh STANDARD  
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SIST EN 61009-1:2013/A13:2022

<https://standards.iteh.ai/catalog/standards/sist/909a4a72-2532-4e78-863f-91411846a9a8/sist-en-61009-1-2013-a13-2022>

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Residual current operated circuit-breakers with integral  
overcurrent protection for household and similar uses (RCBOs) -  
Annex N - Additional requirements and tests for RCBOs  
consisting of one residual current protection function and several  
independent two-pole overcurrent protection functions

Interrupteurs automatiques à courant différentiel résiduel  
avec dispositif de protection contre les surintensités  
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DD constitués d'une fonction de protection à courant  
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Fehlerstrom-/Differenzstrom-Schutzschalter mit  
eingebautem Überstromschutz (RCBOs) für  
Hausinstallationen und für ähnliche Anwendungen - Teil 1:  
Allgemeine Anforderungen

This amendment A13 modifies the European Standard EN 61009-1:2012; it was approved by CENELEC on 2021-08-09. 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.

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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

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**EN 61009-1:2012/A13:2021 (E)****European foreword**

This document (EN 61009-1:2012/A13:2021) has been prepared by CLC/TC 23E “Circuit breakers and similar devices for household and similar applications”.

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2022-08-09
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2026-08-09

This document amends EN 61009-1:2012.

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.

This document has been prepared under a Standardization Request given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), see informative Annexes ZZA and ZZB, which are an integral part of this document.

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

<http://standards.iteh.ai/catalog/standards/sist-en-61009-1-2013-a13-2022>

## 1 Modification to the Scope

*In the Scope, add the following paragraph after NOTE 8:*

“Particular requirements for RCBOs consisting of one residual current protection function and several independent two-pole overcurrent protection functions are given in Annex ZN.”

## 2 Modification to subclause 9.24, “Electromagnetic compatibility (EMC)”

*Replace the sentence below Table 29 with:*

“Emission tests are required only for RCDs containing a continuously operating oscillator. The requirements of CISPR 14-1 apply.”

## 3 Modification to the Annex ZA

*Replace the individual entries in the Annex ZA with the following:*

“

Publication	Date	Title	EN/HD	Date
IEC 60529	-	Degrees of protection provided by enclosures (IP Code)	EN 60529 +A1 +A2	1991 2000 2013
IEC 60364-5-53	2001	Low-voltage electrical installations – Part 5–53: Selection and erection of electrical equipment – Isolation, switching and control	HD 60364-5-53	2015
IEC 60695-2-10	-	Fire hazard testing – Part 2–10: Glowing/hot-wire based test methods – Glow-wire apparatus and common test procedure	EN 60695-2-10	2013
IEC 60364-4-44	2007	Low-voltage electrical installations – Part 4–44: Protection for safety – Protection against voltage disturbances and electromagnetic disturbances	HD 60364-4-442	2012

“

## 4 Addition of Annex ZN, “Additional requirements and tests for RCBOs consisting of one residual current protection function and several independent two-pole overcurrent protection functions”

*Add the following Annex ZN:*

“

## Annex ZN (normative)

### Additional requirements and tests for RCBOs consisting of one residual current protection function and several independent two-pole overcurrent protection functions

#### Introduction

If not otherwise mentioned, Annex ZN amends specific requirements of this document. All requirements not mentioned in this annex shall be applied unchanged.

In Clause ZN.x below, the same numbering of the subclauses has been kept as in the main document.

#### ZN.1 Scope

This annex applies to RCBOs with one residual current protection function and several independent two-pole overcurrent protection functions.

NOTE These devices are intended for the protection of independent single phase final circuits.

#### ZN.3 Definitions

*The following definition applies additionally:*

##### ZN.3.3.24 Residual current protection function

Function performing simultaneously the functions of detection of the residual current, of comparison of the value of this current with the residual operating value, and containing the means to activate the tripping mechanism of all incorporated overcurrent functions.

#### ZN.4 Classification

*Replace 4.3 with the following:*

##### ZN.4.3 According to the number of poles and outputs

- RCBO with 2-pole input and a maximum of 3 identical two-pole outputs (each with one overcurrent protected pole);
- RCBO with 4-pole input and a maximum of 3 identical two-pole outputs (each with one overcurrent protected pole).

NOTE RCBOs with non-identical overcurrent protected poles (e.g. different rated currents or different instantaneous tripping ranges B, C or D) and with two protected poles are under consideration.

*Replace 5.3.1 with:*

##### ZN.5.3.1 Rated operational voltage (U<sub>e</sub>)

Standard rated operational voltages are:

RCBO		Rated operational voltages for use in systems 230 V, 230 V/400 V, 400 V
2-poles	Input	230 V
	Output	230 V
4-poles	Input	400 V
	Output	230V

Replace 5.3.2 with:

### ZN.5.3.2 Rated current ( $I_n$ )

Preferred rated currents are:

RCBO		Rated current ( $I_n$ )
2-poles	Input	Sum of all output currents
	Output	6 A – 10 A – 13 A – 16 A – 20 A
4-poles	Input	6 A – 10 A – 13 A – 16 A – 20 A
	Output	

When reference is made to rated current  $I_n$  in the main standard or in this annex, it corresponds to the output rated current.

The maximum rated output current is 20 A.

### ZN.6.3 Requirements for marking

#### Table Z3 — Requirements for marking

Replace c) with:

c) Rated operational voltage of input and output with the symbol ~

Replace d) with:

At the input: Rated current with the symbol "A"

At the output: Rated current without symbol "A" preceded by the symbol of overcurrent instantaneous tripping (B, C or D), for example B 16;

### ZN.8.1.2 Mechanism

The requirements of 8.1.2 apply with following changes:

The first paragraph is modified as follows:

The moving contacts of both poles of each independent overcurrent protection function shall be mechanically coupled so that both poles, except the switched neutral, if any, make and break substantially together, whether operated manually or automatically.

Add the following:

The RCD function shall trip all overcurrent protection functions in case of a residual current. Each two-pole output shall trip individually under an overcurrent condition without causing operation of the other two-pole outputs.

Compliance is checked by inspection and by the tests of 9.9.1 and 9.9.2.

### ZN.9.8 Test of temperature-rise

#### ZN.9.8.2 Test procedure

Requirements from 9.8.2 apply with the following changes:

A current equal to  $I_n$  of the overcurrent output is passed simultaneously through all overcurrent outputs, ensuring that the RCD function is loaded to the input  $I_n$  for a period of time sufficient for the temperature-rise to reach the steady-state value. In practice, this condition is reached when the variation of the temperature-rise does not exceed 1 K per hour.

**EN 61009-1:2012/A13:2021 (E)**

Replace 9.9.2.1 with:

**ZN.9.9.2.1 Test of time-(over)current characteristic**

- a) A current equal to  $I_n$  is passed for the conventional time (see 8.5.2.1 and 8.5.2.2 a)) through all outputs, starting from cold (see Table 10). The RCBO shall not trip. The current is then steadily increased within 5 s to  $1,45 I_n$  in one output (conventional tripping current). The overcurrent protection function shall trip within one hour.
- b) A current equal to  $1,13 I_n$  (conventional non-tripping current) is passed for the conventional time (see 8.5.2.1 and 8.5.2.2 a)) through one randomly chosen output, starting from cold (see Table 10). The RCBO shall not trip.

The current is then steadily increased within 5 s to  $1,45 I_n$  (conventional tripping current). The corresponding overcurrent protection function shall trip within one hour.

A different output shall be used for each of the samples.

- c) A current equal to  $2,55 I_n$  is passed through one randomly chosen output, starting from cold. The opening time of the corresponding overcurrent protection function shall be not less than 1 s nor more than 60 s.

A different output shall be used for each of the samples.

**ZN.9.9.2.2 Test of instantaneous tripping and correct opening of the contacts**

Replace a), b), c) and d) with:

- a) General test conditions

For the lower values of the test current of 9.9.2.2 b), 9.9.2.2 c) and 9.9.2.2 d) respectively

the test is made once, at any convenient voltage.

For the upper value of the test current, the test is carried out at rated operational voltage  $U_e$  (phase to neutral) with a power factor between 0,95 and 1 on each output, the following sequence of operation is performed:

O-t-CO-t-CO-t-CO

the interval t being as defined in 9.12.11.1. The tripping time of the O operation is measured. After each operation the indicating means shall show the open position of the contacts.

- b) For B type RCBOs

A current equal to  $3 I_n$  is passed individually through each output, starting from cold.

The opening time shall be not less than 0,1 s.

A current equal to  $5 I_n$  is then passed individually through each output, again starting from cold.

The corresponding overcurrent protection function shall trip in a time less than 0,1 s.



## c) For C type RCBOs

A current equal to  $5 I_n$  is passed individually through each output, starting from cold.

The opening time shall be not less than 0,1 s.

A current equal to  $10 I_n$  is then passed individually through each output, again starting from cold.

The corresponding overcurrent protection function shall trip in a time less than 0,1 s

## d) For D type RCBOs

A current equal to  $10 I_n$  is passed individually through each output, starting from cold. The opening time shall be not less than 0,1 s.

A current equal to  $20 I_n$  or to the maximum instantaneous tripping current (see Clause 6, item t) is then passed individually through each output, again starting from cold.

The corresponding overcurrent protection function shall trip in a time less than 0,1 s.

Replace 9.9.2.3 with:

**ZN.9.9.2.3 Test of effect of ambient temperature on the tripping characteristic**

a) The RCBO is placed in an ambient temperature of  $(35 \pm 2)$  K below the ambient air reference temperature until it has attained steady-state temperature. A current equal to  $1,13 I_n$  (conventional non-tripping current) is passed simultaneously through all outputs for the conventional time (see 8.5.2.1 and 8.5.2.2a)). The current in one randomly selected output is then steadily increased within 5 s to  $1,9 I_n$ . A different output shall be used for each of the samples. The corresponding overcurrent protection function shall trip within the conventional time.

b) The RCBO is placed in an ambient temperature of  $(10 \pm 2)$  K above the ambient air reference temperature until it has attained steady-state temperature. A current equal to  $I_n$  is passed through all outputs. The RCBO shall not trip within the conventional time.

**9.9.2.Z1 does not apply****ZN.9.10 Verification of mechanical and electrical endurance****ZN.9.10.1 General test conditions**

Replace the second paragraph with:

The test is made on a randomly chosen output at rated operational voltage, at a current adjusted to the rated current by means of resistors and reactors in series, connected to the load terminals.

A different output shall be used for each of the samples.

**ZN.9.12.2 Test circuit for short-circuit performance**

Add the following sentence after the 1st paragraph:

The product shall be connected with the corresponding input rated operational voltage. For each sample a different output is tested as a two-pole RCBO.

**ZN. Annex A**

Replace the test sequence A1 of Table A.1 with:

## EN 61009-1:2012/A13:2021 (E)

A1	6	Marking
	8.1.1	General
	8.1.2 / ZN.8.1.2	Mechanism
	9.3	Indelibility of marking
	8.1.3	Clearances and creepage distances (external parts only)
	8.1.6	Non-interchangeability
	9.11	Trip-free mechanism
	9.4	Reliability of screws, current-carrying parts and connections
	9.5	Reliability of terminals for external conductors
	9.6	Protection against electric shock
	9.14	Resistance to heat
	8.1.3	Clearance and creepage distances (internal parts)
	9.25	Resistance to rusting

Replace the test sequence B of Table A.1 with:

B	9.7.7.4	Resistance of the insulation of open contacts and basic insulation against an impulse voltage in normal conditions
	9.7.7.5 a	Verification of the behaviour of components bridging the basic insulation
	9.7.1	Resistance to humidity
	9.7.2	Insulation resistance of the main circuit
	9.7.3	Dielectric strength of the main circuit
	9.7.4	Insulation resistance and dielectric strength of auxiliary circuits
	9.7.7.2	Verification of clearances with the impulse withstand voltage
	9.7.5	Secondary circuit of detection transformers
	9.7.6	Capability of control circuits connected to the main circuits
	9.8 / ZN.9.8	Temperature-rise
	9.22.2	Reliability at 40 °C
	9.23	Ageing

Replace the test sequence C1 of Table A.1 with:

C	C1	9.10 / ZN.9.10	Mechanical and electrical endurance
		9.12.11.2.1	Performance at reduced short-circuit currents
		(and 9.12.12)	(Verification of the RCBO after short-circuit tests)

Replace the test sequence E0 of Table A.1 with:

	E0	9.9.2 / ZN.9.9.2.1 / ZN.9.9.2.2 / ZN.9.9.2.3	Overcurrent operating characteristics
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## ZN. Annex D

Replace D.2 with:

### D.2 Tripping test

A residual current is passed through each pole of the RCBO in turn. The RCBO shall not trip at a current less than or equal to 0,5 I<sub>Δn</sub>, but it shall trip at I<sub>Δn</sub> within a specified time (see Table 2).