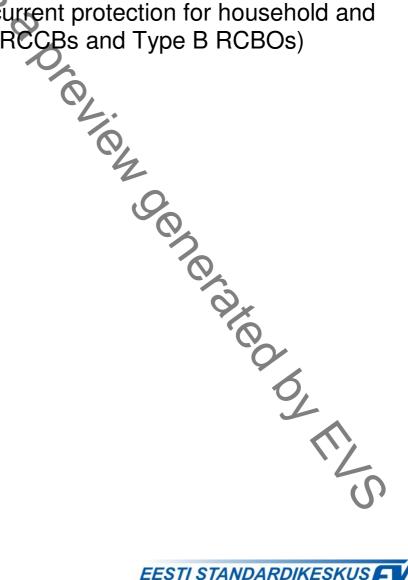Majapidamises ja muuks taoliseks kasutamiseks ette nähtud tüüpi B kuuluvad rikkevoolukaitselülitid sisseehitatud liigvoolukaitsega või ilma selleta

Type B residual current operated circuit-breakers with and without integral overcurrent protection for household and similar uses (Type B RCCBs and Type B RCBOs)

EESTI STANDARDIKESKUS **EVS**
ESTONIAN CENTRE FOR STANDARDISATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

Käesolev Eesti standard EVS-EN 62423:2009 sisaldab Euroopa standardi EN 62423:2009 ingliskeelset teksti.	This Estonian standard EVS-EN 62423:2009 consists of the English text of the European standard EN 62423:2009.
Standard on kinnitatud Eesti Standardikeskuse 31.12.2009 käskkirjaga ja jõustub sellekohase teate avaldamisel EVS Teatajas.	This standard is ratified with the order of Estonian Centre for Standardisation dated 31.12.2009 and is endorsed with the notification published in the official bulletin of the Estonian national standardisation organisation.
Euroopa standardimisorganisatsioonide poolt rahvuslikele liikmetele Euroopa standardi teksti kättesaadavaks tegemise kuupäev on 22.10.2009.	Date of Availability of the European standard text 22.10.2009.
Standard on kättesaadav Eesti standardiorganisatsioonist.	The standard is available from Estonian standardisation organisation.

ICS 29.120, 29.120.50

EUROPEAN STANDARD

EN 62423

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 2009

ICS 29.120; 29.120.50

English version

Type B residual current operated circuit-breakers with and without integral overcurrent protection for household and similar uses (Type B RCCBs and Type B RCBOs)
(IEC 62423:2007, modified)

Interrupteurs automatiques
à courant différentiel résiduel de Type B
avec et sans protection contre
les surintensités incorporée
pour usages domestiques et analogues
(ID et DD de Type B)
(CEI 62423:2007, modifiée)

Typ B Fehlerstsrom-/Differenzstrom-
Schutzschalter mit und ohne eingebautem
Überstromschutz für Hausinstallationen
und für ähnliche Anwendungen
(Typ B RCCBs und Typ B RCBOs)
(IEC 62423:2007, modifiziert)

This European Standard was approved by CENELEC on 2009-07-01. 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: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 62423:2009 E

Foreword

The text of the International Standard IEC 62423:2007, prepared by SC 23E, Circuit-breakers and similar equipment for household use, of IEC TC 23, Electrical accessories, together with the common modifications 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 EN 62423 on 2009-07-01.

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)   2010-07-01

– latest date by which the national standards conflicting
 with the EN have to be withdrawn   (dow)   2012-07-01

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and covers essential requirements of EC Directive 2004/108/EC. See Annex ZZ.

Clauses, subclauses, notes, tables and figures which are additional to those in IEC 62423 are prefixed "Z".

Annexes ZA, ZB and ZZ have been added by CENELEC.

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Endorsement notice

The text of the International Standard IEC 62423:2007 was approved by CENELEC as a European Standard with agreed common modifications as given below.

COMMON MODIFICATIONS

Contents **Add:**

9.Z1 Electromagnetic compatibility (EMC)

Annex ZA Normative references to international publications
with their corresponding European publications

Annex ZB Special national conditions

Annex ZZ Coverage of Essential Requirements of EC Directives

Table Z1 Tests to be applied for EMC

Table A.Z1

Table A.Z2 Number of samples for full test procedure

Table A.Z3 Number of samples for simplified test procedure

Table B.Z1

Table B.Z2 Number of samples for full test procedure

Table B.Z3 Number of samples for simplified test procedure

1 Scope

Replace the first two paragraphs by the following new paragraphs:

The scope of EN 61008-1 and EN 61008-2-1 or EN 61009-1 and EN 61009-2-1 applies.

This standard specifies requirements and tests for type B RCDs. Requirements and tests given in this standard are in addition to the requirements of type A residual current devices according to EN 61008-2-1 or EN 61009-2-1. Type B RCCBs and type B RCBOs are able to provide protection in case of alternating residual sinusoidal currents up to 1 000 Hz, pulsating direct residual currents and smooth direct residual currents in case of three phase supply.

Delete the fifth paragraph.

Replace note 2 by the following new note:

NOTE 2 Requirements for 2 poles devices are under consideration.

5 Characteristics

5.3 **Delete** the value "60 Hz" three times: in the title of 5.3, in the title of Table 2 and in note 4 of Table 2.

9 Tests

9.2 **Delete** the third paragraph.

9.Z1   **Add** the new following subclause:

9.Z1   Electromagnetic compatibility (EMC)

EMC tests shall be performed according to EN 61543 as follows:

–   *Tests listed in the following table are covered by EN 61008-1 or EN 61009-1 as applicable and have not to be repeated:*

Table Z1 – Tests to be applied for EMC

Reference to Tables 4 and 5 of EN 61543	Electromagnetic phenomena	Tests of EN 61008-1	Tests of EN 61009-1
T 1.3	Voltage amplitude variations	9.9.5 and 9.17	9.9.1.5 and 9.17
T 1.4	Voltage unbalance	9.9.5 and 9.17	9.9.1.5 and 9.17
T 1.5	Power frequency variations	9.2	9.2
T 1.8	Magnetic fields	9.11 and 9.18	9.12 and 9.18
T 2.4	Current oscillatory transients	9.19	9.19

–   *The remaining tests in Tables 4, 5 and 6 of EN 61543 shall be done according to the test sequences Z1, Z2 and Z3 listed in Annex A or B of this standard.*

For devices containing a continuously operating oscillator, the test of EN 55014 (series) shall be carried out on the samples prior to the tests of EN 61543.

Annex A   Number of samples to be submitted and test sequences to be applied for verification of conformity for type B RCCBs

Modify the note before A.1 into a requirement.

Table A.1   Replace the second column heading by the following:

Tests according to EN 61008-1 and EN 61008-2-1

Delete in sequence D_1 the row referred to 9.17.

Modify footnote reference [a] into *.

Add the following new test sequences D_2 and H:

D_2	9.11.2.3 c)		Verification of the suitability in IT system
H	9.24		Verification of correct operation at low ambient air temperature of RCCBs for use in the range of -25 °C to +40 °C

Replace footnote [a] by the following new footnote *:

*   An additional test according to 9.21.1.1 shall be made with a supply voltage of 1,1 U_n. Only the lower limits of the tripping currents are verified.

Delete the last sentence after Table A.1.

Add the following new Tables A.Z1, A.Z2 and A.Z3.

Table A.Z1

Test sequence	Tests according to EN 61543		Test (or Inspection)
Z1 [a]	EN 61543 Table 4 – T1.1		Harmonics, interharmonics
	EN 61543 Table 4 – T1.2		Signalling voltage
	EN 61543 Table 5 – T2.3		Conducted unidirectional transients of the ms and μs time scale
Z2	EN 61543 Table 5 – T2.1 and T2.5		Conducted oscillatory voltages or currents
	EN 61543 Table 5 – T2.2		Conducted unidirectional transients of the ns time scale (burst)
Z3	EN 61543 Table 5 – T2.6		Conducted common mode disturbances in the frequency range lower than 150 kHz
	EN 61543 Table 6 – T3.1		Electrostatic discharges

[a] For devices containing a continuously operating oscillator, the test of EN 55014 series shall be carried out on the samples prior to the tests of this sequence.

Table A.Z2 – Number of samples for full test procedure

Test sequence	Number of samples	Minimum number of samples which shall pass the tests [a] [b]	Maximum number of samples for repeated tests [c]
A	1	1	–
B	3	2	3
C	3	2 [d]	3
D	3	2 [d]	3
D_2	3	2	3
E	3	2 [d]	3
F_0	3	2 [d]	3
F_1	3	2 [d]	3
G	3	2	3
H	3	2	3
Z1 [e]	3	2	3
Z2 [e]	3	2	3
Z3 [e]	3	2	3

[a] In total a maximum of three test sequences may be repeated.

[b] It is assumed that a sample which has not passed a test has not met the requirements due to workmanship or assembly defects which are not representative of the design.

[c] In the case of repeated tests, all test results must be acceptable.

[d] Except for tests of 9.12.10, 9.12.11.2, 9.12.11.3, 9.12.11.4, and 9.12.13, as appropriate, which all samples shall pass.

[e] On request of the manufacturer the same set of samples may be subjected to more than one of these test sequences.

Table A.Z3 – Number of samples for simplified test procedure

Test sequence	Number of samples according to number of poles [a]					
	2 poles [b]		3 poles [c]		4 poles	
A	1	max. rating I_n min. rating $I_{\Delta n}$	1	max. rating I_n min. rating $I_{\Delta n}$	1	max. rating I_n min. rating $I_{\Delta n}$
B	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$
C	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$
$D_0 + D_1$	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$
D_0	1	for all other ratings of $I_{\Delta n}$				
D_2	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$
E	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$
F	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$
	3 [d]	min. rating I_n max. rating $I_{\Delta n}$	3 [d]	min. rating I_n max. rating $I_{\Delta n}$	3 [d]	min. rating I_n max. rating $I_{\Delta n}$
G	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$
	3 [d]	min. rating I_n max. rating $I_{\Delta n}$	3 [d]	min. rating I_n max. rating $I_{\Delta n}$	3 [d]	min. rating I_n max. rating $I_{\Delta n}$
H	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$
	3 [d]	min. rating I_n max. rating $I_{\Delta n}$	3 [d]	min. rating I_n max. rating $I_{\Delta n}$	3 [d]	min. rating I_n max. rating $I_{\Delta n}$
Z1 [e]	3	any rating I_n min. rating $I_{\Delta n}$	3	any rating I_n min. rating $I_{\Delta n}$	3	any rating I_n min. rating $I_{\Delta n}$
Z2 [e]	3	any rating I_n min. rating $I_{\Delta n}$	3	any rating I_n min. rating $I_{\Delta n}$	3	any rating I_n min. rating $I_{\Delta n}$
Z3 [e]	3	any rating I_n min. rating $I_{\Delta n}$	3	any rating I_n min. rating $I_{\Delta n}$	3	any rating I_n min. rating $I_{\Delta n}$

[a] If a test is to be repeated according to the minimum performance criteria of A.2, a new set of samples is used for the relevant test. In the repeated test all test results must be acceptable.

[b] If only 3-pole or 4-pole RCCBs are submitted, this column shall also apply to a set of samples with the smallest number of poles.

[c] This column is omitted when 4-pole RCCBs have been tested.

[d] If only one value of $I_{\Delta n}$ is submitted, these sets of samples are not required.

[e] If a range of RCCBs of the same fundamental design are submitted, only the samples with the maximum number of poles need to be tested.

Annex B   Number of samples to be submitted and test sequences to be applied for verification of conformity for type B RCCOs

Modify the note before B.1 into a requirement.

Table B.1   **Replace** the second column heading by the following:

Tests according to EN 61009-1 and EN 61009-2-1

Replace the test sequences C_1 and C_2 by the following:

C_1	9.10		Mechanical and electrical endurance
	-	9.3	Verification of the RCD after test sequence
	9.12.11.2.Z1 (and 9.12.12)		Performance at reduced short-circuit currents (Verification of the RCBO after short-circuit tests)
C_2	9.12.11.2.Z2 (and 9.12.12)		Short-circuit test for verifying the suitability of RCBOs for use in IT systems (Verification of the RCBO after short-circuit tests)

Delete in sequence D_1 the rows referred to 9.17 and 9.12.13.

Modify footnote reference [a] into *.

Replace footnote [a] by the following new footnote *:

*   An additional test according to 9.21.1.1 shall be made with a supply voltage of 1,1 U_n. Only the lower limits of the tripping currents are verified.

Delete the last sentence after Table B.1.

Add the following new Tables B.Z1, B.Z2 and B.Z3.

Table B.Z1

Test sequence	Tests according to EN 61543		Test (or Inspection)
Z1 [a]	EN 61543 Table 4 – T1.1		Harmonics, interharmonics
	EN 61543 Table 4 – T1.2		Signalling voltage
	EN 61543 Table 5 – T2.3		Conducted unidirectional transients of the ms and µs time scale
Z2	EN 61543 Table 5 – T2.1 and T2.5		Conducted oscillatory voltages or currents
	EN 61543 Table 5 – T2.2		Conducted unidirectional transients of the ns time scale (burst)
Z3	EN 61543 Table 5 – T2.6		Conducted common mode disturbances in the frequency range lower than 150 kHz
	EN 61543 Table 6 – T3.1		Electrostatic discharges
[a] For devices containing a continuously operating oscillator, the test of EN 55014 series shall be carried out on the samples prior to the tests of this sequence.			

Table B.Z2 – Number of samples for full test procedure

Test sequence	Number of samples	Minimum number of samples which shall pass the tests [a] [b]	Maximum number of samples for repeated tests [c]
A	1	1	–
B	3	2	3
C_1	3	2 [d]	3
C_2	3	2 [d]	3
$D_0 + D_1$	3	2 [d]	3
$E_0 + E_1$	3	2 [d]	3
F_0	3	2 [d]	3
F_1	3	2 [d]	3
F_2	3	2 [d]	3
G	3	2	3
H	3	2 [d]	3
Z1 [e]	3	2	3
Z2 [e]	3	2	3
Z3 [e]	3	2	3

[a]   In total a maximum of three test sequences may be repeated.

[b]   It is assumed that a sample which has not passed a test has not met the requirements due to workmanship or assembly defects which are not representative of the design.

[c]   In the case of repeated tests, all test results must be acceptable.

[d]   Except for tests of 9.12.10, 9.12.11.2, 9.12.11.3, 9.12.11.4, and 9.12.13, as appropriate, which all samples shall pass.

[e]   On request of the manufacturer the same set of samples may be subjected to more than one of these test sequences.

Table B.Z3 – Number of samples for simplified test procedure

Test sequence	Number of samples according to number of poles [a]					
	2 poles [b] [c]		**3 poles [d]**		**4 poles**	
A	1	max. rating I_n min. rating $I_{\Delta n}$	1	max. rating I_n min. rating $I_{\Delta n}$	1	max. rating I_n min. rating $I_{\Delta n}$
B	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$
C_1	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$
C_2	For 2 protected poles: 2 / For 1 protected pole: 3	max. rating I_n min. rating $I_{\Delta n}$ / max. rating I_n min. rating $I_{\Delta n}$	1	max. rating I_n min. rating $I_{\Delta n}$	1	max. rating I_n min. rating $I_{\Delta n}$
$D_0 + D_1$	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$
D_0	1	for all other ratings of $I_{\Delta n}$ with max. I_n				
$E_0 + E_1$	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$
E_0	1	for all other ratings of I_n with min. $I_{\Delta n}$				
F_0	3 / 3 [e]	max. rating I_n min. rating $I_{\Delta n}$ / min. rating I_n max. rating $I_{\Delta n}$	3 / 3 [e]	max. rating I_n min. rating $I_{\Delta n}$ / min. rating I_n max. rating $I_{\Delta n}$	3 / 3 [e]	max. rating I_n min. rating $I_{\Delta n}$ / min. rating I_n max. rating $I_{\Delta n}$
F_1	3 / 3 [e]	max. rating I_n min. rating $I_{\Delta n}$ / min. rating I_n max. rating $I_{\Delta n}$	3 / 3 [e]	max. rating I_n min. rating $I_{\Delta n}$ / min. rating I_n max. rating $I_{\Delta n}$	3 / 3 [e]	max. rating I_n min. rating $I_{\Delta n}$ / min. rating I_n max. rating $I_{\Delta n}$
F_2	3 [f]	max. rating I_n min. rating $I_{\Delta n}$	3 [f]	max. rating I_n min. rating $I_{\Delta n}$	3 [f]	max. rating I_n min. rating $I_{\Delta n}$
G	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$	3	max. rating I_n min. rating $I_{\Delta n}$
H	3 / 3 [e]	max. rating I_n min. rating $I_{\Delta n}$ / min. rating I_n max. rating $I_{\Delta n}$	3 / 3 [e]	max. rating I_n min. rating $I_{\Delta n}$ / min. rating I_n max. rating $I_{\Delta n}$	3 / 3 [e]	max. rating I_n min. rating $I_{\Delta n}$ / min. rating I_n max. rating $I_{\Delta n}$
Z1 [f]	3	any rating I_n min. rating $I_{\Delta n}$	3	any rating I_n min. rating $I_{\Delta n}$	3	any rating I_n min. rating $I_{\Delta n}$
Z2 [f]	3	any rating I_n min. rating $I_{\Delta n}$	3	any rating I_n min. rating $I_{\Delta n}$	3	any rating I_n min. rating $I_{\Delta n}$
Z3 [f]	3	any rating I_n min. rating $I_{\Delta n}$	3	any rating I_n min. rating $I_{\Delta n}$	3	any rating I_n min. rating $I_{\Delta n}$

[a] If a test is to be repeated according to the minimum performance criteria of A.2, a new set of samples is used for the relevant test.

[b] In the repeated test all test results must be acceptable.

[c] Apply also to 2 pole RCBOs with 1 protected pole.

[d] Also applicable to 4-pole RCBOs with 3 protected poles.

[e] This column is omitted when 4-pole RCBOs have been tested. If only one value of $I_{\Delta n}$ is submitted, these samples are not required.

[f] Only on the maximum number of poles.

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 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
CISPR 14	series	Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus	EN 55014	series
IEC/TS 60479-1	-[1]	Effects of current on human beings and livestock - Part 1: General aspects	-	-
IEC 60479-2	-	Effects of current passing through the human body - Part 2: Special aspects	-	-
IEC 61008-1 (mod) + A1 A2	1996 2002 2006	Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB's) - Part 1: General rules	EN 61008-1 - A11 A12	2004 - 2007 2009
IEC 61008-2-1	1990	Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCB's) - Part 2-1: Applicability of the general rules to RCCB's functionally independent of line voltage	EN 61008-2-1 A11 + corr. March	1994 1998 1999
IEC 61009-1 (mod) + A1 + corr. May A2	1996 2002 2003 2006	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's) - Part 1: General rules	EN 61009-1 - + corr. July A11 A12 A13	2004 - 2006 2008 2009 2009
IEC 61009-2-1	1991	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's) - Part 2-1: Applicability of the general rules to RCBO's functionally independent of line voltage	EN 61009-2-1 + A11 + corr. March	1994 1998 1999
IEC 61543	1995	Residual current-operated protective devices (RCDs) for household and similar use - Electromagnetic compatibility	EN 61543 + corr. Dec. + A11 + corr. May + A12	1995 1997 2003 2004 2005

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[1] Undated reference.

Annex ZB
(normative)

Special national conditions

Special national condition: National characteristic or practice that cannot be changed even over a long period, e.g. climatic conditions, electrical earthing conditions.

NOTE   If it affects harmonization, it forms part of the European Standard.

For the countries in which the relevant special national conditions apply these provisions are normative, for other countries they are informative.

Clause   Special national condition

Denmark

9.1   In accordance to the requirement of this standard multi-pole RCDs shall be able to operate down to a supply voltage of 85 V a.c. (phase – neutral).

In accordance to the requirement of this Standard multi-pole RCDs shall be able to operate when used for single phase circuits.

Germany

9.1   Multi-pole RCDs shall be able to operate down to a supply voltage of 50 V AC. This applies also to RCDs which are used for single phase circuits. Therefore the tests shall be carried out at 50 V instead of 0,85 U_n.

Ireland, the Netherlands and the United Kingdom

1   Modify note 2 to read:

NOTE 2   Additional requirements for 1 pole devices for use in TN-S or TN-C-S systems and 2 pole devices (L-L) for use between phases are under consideration.

3.2   Replace 3.2 by:

3.2
type B residual current devices
residual current devices for which tripping is ensured as for type A according to IEC 61008-1 or IEC 61009-1, as applicable, and in addition for the following residual currents:

3.2.1
type B residual current device with 3 or 4 poles
residual current device for which tripping is ensured as for type A according to IEC 61008-1 or IEC 61009-1, as applicable, and in addition
– for residual sinusoidal alternating currents up to 1 000 Hz,
– for residual pulsating direct currents,
– for residual alternating currents superimposed on a smooth direct current,
– for residual pulsating direct currents superimposed on a smooth direct current,
– for residual pulsating rectified d.c. which results from two or more phases,
– for residual smooth direct currents,
independent of polarity and independent of whether the residual current appears suddenly or is slowly increased

| Clause | Special national condition |

Ireland, the Netherlands and the United Kingdom (continued)

3.2.2
type BC residual current device with 2 poles
residual current devices for which tripping is ensured as for RCD type A according to
IEC 61008-1 or IEC 61009-1, as applicable, and in addition
– for residual sinusoidal alternating currents up to 1 000 Hz,
– for residual pulsating direct currents,
– for residual alternating currents superimposed on a smooth direct current,
– for residual pulsating rectified d.c which results from 2 phases,
– for residual d.c currents that may result from inverter circuits.

NOTE The above 5th dash refers to fault conditions in micro generators, such as fuel cells or PV systems, being connected through an inverter to the electrical installation connected in turn to another supply source (in general the public supply system)

5.1   Add to the last dash: "for 3 and 4 pole residual current devices only".

Add the following new dash

– for residual direct currents originating from invertors connected to the supply system.

Add the following new subclause

5.4   Standard values of break time and non-actuating time for general type 2 pole BC type RCDs in case of residual pulsating direct currents which may result from an inverter circuit connected to the supply system.

Table 3 – Standard values of non-operating current and break times for general type 2-pole BC type RCDs in case of residual pulsating direct currents which may result from an inverter circuit connected to the supply system

	Standard values of break time (s) at a residual current composed by a smooth dc current and a half wave rectified sinusoidal current having opposite polarity			
	$I_{\Delta 1}$	$I_{\Delta 2}$	$I_{\Delta 3}$	$I_{\Delta 4}$
Smooth residual current	+ 1,5 $I_{\Delta n}$	+ 3 $I_{\Delta n}$	+ 6 $I_{\Delta n}$	+ 15 $I_{\Delta n}$
Half wave sinusoidal residual current (peak value) [a]	- 1,125 $I_{\Delta n}$	- 2,25 $I_{\Delta n}$	- 4,5 $I_{\Delta n}$	- 11,25 $I_{\Delta n}$
Break time	Non- tripping	0,3	0,15	0,04
[a] The peak value should be measured using an oscilloscope.				

<u>Clause</u>   <u>Special national condition</u>

Ireland, the Netherlands and the United Kingdom (continued)

8.1.4   Add after the first paragraph:

This test is not applicable for 2 pole devices

8.1.5   Add after the first paragraph:

This test is not applicable for 2 pole devices

8.1.6   Add after the first paragraph:

This test is not applicable for 2 pole devices

Add the following new subclause

8.1.7   Residual pulsating direct currents originating from a single phase inverter circuit connected to the supply system.

2 pole type BC RCDs shall operate in response to a steady increase of residual pulsating direct currents resulting from an inverter connected to the supply system within the limits of the composed residual current according to Table 3 between the values $I_{\Delta 1}$ and $I_{\Delta 2}$.

2 pole type BC RCDs shall operate in response to a sudden appearance of residual pulsating direct currents resulting from an inverter connected to the supply system within the time limits specified in Table 3 for the currents $I_{\Delta 2}$, $I_{\Delta 3}$ and $\geq I_{\Delta 4}$.

9.1.6   Replace the subclause title by the following:

9.1.6   Verification of the correct operation of 3 and 4 pole type B RCDs in case of residual smooth direct current

Add the following new subclause

9.1.7   Verification of the correct operation of 2 pole type BC RCDs in case of residual direct currents when protecting a single phase inverter circuit connected to the supply.

The RCD is connected as shown in Figure ZB.1 and supplied with rated voltage.

9.1.7.1   Slowly rising residual pulsating current

The test circuit being connected to line and neutral terminal or if applicable to the line terminals, the RCD and test switch S_1 being closed.

The test currents I_1 and I_2 are set to 0,2 x the values as given for the tripping current $I_{\Delta 2}$.

Current I_1 is increased to the value 0,3 x the value of the smooth residual current applicable for $I_{\Delta 2}$ followed by increasing the half wave pulsating residual current to 0,3 times the value as given for $I_{\Delta 2}$

Subsequently the currents are further increased in steps to 0,4 times, 0,5 times, 0,6 times etc of the residual operating current $I_{\Delta 2}$.

The RCD shall not trip before the current reaches the value $I_{\Delta 1}$ and shall trip before this current exceeds the value $I_{\Delta 2}$

<u>Clause</u>   <u>Special national condition</u>

Ireland, the Netherlands and the United Kingdom (continued)

9.1.7.2 Suddenly appearing residual pulsating current

The supply and load terminals of the RCD are inter-connected using suitable means and the currents I_1 and I_2 are set in turn to the values as applicable for $I_{\Delta2}$, $I_{\Delta3}$ and $I_{\Delta4}$, respectively, as given in Table 3.

Test switch S_1 is opened, the RCD is closed, and the calibration connections removed.

Test switch S_1 is then closed. The residual currents start to flow when S_1 is closed.

The break time is measured for each value and shall not exceed the specified break times given in Table 3. This test is repeated 3 times for each of the residual current values.

9.3   *Modify this subclause as follows:*

9.3   Verification of RCD after test sequences

2 pole BC type RCD shall trip within 0,3 s with the composite residual test current $I_{\Delta2}$ as specified in Table 2.

3 and 4 pole type B RCD shall trip with a test current of 2,5 $I_{\Delta n}$ with smooth direct current.

One test only is made without measurement of break time.

Clause   Special national condition

Ireland, the Netherlands and the United Kingdom (continued)

Components

A   ammeters
S and S1   all-pole switch
RCD   2-pole RCD under test

**Figure ZB.1 – Test circuit for the verification of correct operation of 2 pole type BC RCD
for protection of single phase inverter circuit connected to a supply L-N**

Clause   Special national condition

Ireland, the Netherlands and the United Kingdom (continued)

Annex A Replace Sequence D_0 in Table A.1 by the following:

Test sequence		Tests according to IEC 61008-1	Additional tests according to this standard	Test (or inspection)
D	D_0		9.1.6.1	Verification of correct operation of 3 and 4 pole type B RCCB in case of residual smooth direct current without load for ratings of $I_{\Delta n}$ not tested in D_1
			9.1.7	Verification of correct operation of 2 pole type BC RCCB in case of residual currents when protecting a single phase inverter circuit connected to the supply

Annex B Replace Sequence D_0 in Table B.1 by the following:

Test sequence		Tests according to IEC 61009-1	Additional tests according to this standard	Test (or inspection)
D	D_0		9.1.6.1	Verification of correct operation of 3 and 4 pole type B RCBO in case of residual smooth direct current without load for ratings of $I_{\Delta n}$ not tested in D_1
			9.1.7	Verification of correct operation of 2 pole type BC RCBO in case of residual currents when protecting a single phase inverter circuit connected to the supply

Annex C Add at the beginning of the 3rd paragraph: *"In case of 3 or 4 pole RCD".*

Add after the 3rd paragraph the following new paragraph

In case of a 2 pole RCD, a pulsating residual current being composed of a smooth d.c. current having the value I and a half wave pulsating residual current with power frequency and having the peak value of – 0,75 I is passed through one pole. The type BC RCCB or type BC RCBO, as applicable, shall not trip at a current less or equal to the value specified for $I_{\Delta n1}$ and shall trip at the current $I_{\Delta n2}$ within the time specified in Table 3.

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Annex ZZ
(informative)

Coverage of Essential Requirements of EC Directives

This European Standard has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association and within its scope the standard covers all relevant essential requirements as given in Annex I of the EC Directive 2004/108/EC.

Compliance with this standard provides one means of conformity with the specified essential requirements of the Directive concerned.

WARNING: Other requirements and other EC Directives may be applicable to the products falling within the scope of this standard.

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CONTENTS

INTRODUCTION

RCCBs and RCBOs designed according to IEC 61008-1 and IEC 61009-1 are suitable in most of the applications, however the use of new electronic technology in equipment may result in particular residual currents not covered in IEC 61008-1 or IEC 61009-1.

This standard includes definitions, additional requirements and tests for Type B RCCBs and Type B RCBOs to cover particular situations.

The tests shall first be applied according to IEC 61008-1 for Type B RCCBs and according to IEC 61009-1 for Type B RCBOs.

After completion of the tests given either in IEC 61008-1 or IEC 61009-1 the additional tests given in this standard shall be applied in order to show conformity to this standard (see Annex A or Annex B respectively).

The number of samples to be submitted and test sequences to be applied for verification of conformity for RCCB Type B or RCBO Type B are given in Annex A or Annex B respectively.

Smooth d.c. currents are unlikely to occur in a single phase supply with neutral. If nevertheless a smooth d.c. residual current can occur, a three-pole or four-pole device may be used if the manufacturer declares the device appropriate for single phase application.

TYPE B RESIDUAL CURRENT OPERATED CIRCUIT-BREAKERS WITH AND WITHOUT INTEGRAL OVERCURRENT PROTECTION FOR HOUSEHOLD AND SIMILAR USES (TYPE B RCCBs AND TYPE B RCBOs)

1 Scope

The scope of IEC 61008-1 and IEC 61009-1 applies.

This standard specifies requirements and tests for type B RCDs. Requirements and tests given in this standard are in addition to the requirements of type A residual current devices. Type B RCCBs and Type B RCBOs are able to provide protection in case of alternating residual sinusoidal currents up to 1 000 Hz, pulsating direct residual currents and smooth direct residual currents in case of three phase supply.

Type B RCCBs and Type B RCBOs according to this standard are not intended to be used in d.c. supply systems.

Further requirements and tests for products to be used in situations where the residual current was not intended to be covered in IEC 61008-1 or IEC 61009-1 are under consideration.

For the purpose of manufacturer's declaration or verification of conformity type tests should be carried out in test sequences in compliance with Annex A or Annex B of this standard.

The complete test sequence for type test of Type B RCCBs and Type B RCBOs is given in Tables A.1 or B.1.

NOTE 1 Throughout the document, the term RCD refers to RCCBs and RCBOs.

NOTE 2 Requirements for 1 pole and 2 poles are under consideration.

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 60479-1, *Effects of current on human beings and livestock – Part 1: General aspects*

IEC 60479-2, *Effects of current passing through the human body – Part 2: Special aspects*

IEC 61008-1:1996, *Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs) – Part 1: General rules*
Amendment 1 (2002)
Amendment 2 (2006)

IEC 61009-1:1996, *Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs) – Part 1: General rules*
Amendment 1 (2002)
Amendment 2 (2006)

3 Terms and definitions

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

3.1
smooth direct current
a direct current which is ripple free

3.2
type B residual current device
residual current device for which tripping is ensured as for type A according to IEC 61008-1 or IEC 61009-1, as applicable, and in addition

– for residual sinusoidal alternating currents up to 1 000 Hz,

– for residual pulsating direct currents,

– for residual alternating currents superimposed on a smooth direct current,

– for residual pulsating direct currents superimposed on a smooth direct current,

– for residual pulsating rectified d.c. which results from two or more phases,

– for residual smooth direct currents,

independent of polarity and independent whether the residual current appears suddenly or is slowly increased

4 Classification

According to IEC 61008-1 or IEC 61009-1, as applicable.

5 Characteristics

5.1 Type B residual current device

Type B RCD for which tripping is ensured as for type A according to IEC 61008-1 or IEC 61009-1 as applicable and in addition

– for residual sinusoidal alternating currents up to 1 000 Hz (see 8.1.1),

– for residual smooth direct current of 0,4 times the rated residual operating current ($I_{\Delta n}$) or 10 mA whichever is the highest value superimposed on an alternating current (see 8.1.2),

– for residual smooth direct current of 0,4 times the rated residual operating current ($I_{\Delta n}$) or 10 mA, whichever is the highest value superimposed on a pulsating direct current (see 8.1.3),

– for residual pulsating rectified d.c. currents which results from two or more phases (see 8.1.4 and 8.1.5),

– for residual smooth direct currents originating from multiphase circuits (see 8.1.6).

The above specified residual currents may be suddenly applied or slowly increased.