Rikkevoolukaitselülitid sisseehitatud liigvoolukaitsega, kasutamiseks majapidamises ja muudel taolistel juhtudel. Osa 1: Üldreeglid

Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs) - Part 1: General rules (IEC 61009-1:2010, modified)

EESTI STANDARDIKESKUS
ESTONIAN CENTRE FOR STANDARDISATION

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN 61009-1:2012 sisaldab Euroopa standardi EN 61009-1:2012 ingliskeelset teksti.	This Estonian standard EVS-EN 61009-1:2012 consists of the English text of the European standard EN 61009-1:2012.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 14.12.2012.	Date of Availability of the European standard is 14.12.2012.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 29.120.50

EUROPEAN STANDARD

NORME EUROPÉENNE

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EN 61009-1

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Supersedes EN 61009-1:2004 + corr. Jul.2006 + A11:2008 + A12:2009 + A13:2009 + A14:2012 + AC:2012

English version

Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs) - Part 1: General rules

(IEC 61009-1:2010, modified)

Interrupteurs automatiques à courant différentiel résiduel avec dispositif de protection contre les surintensités incorporé pour usages domestiques et analogues (DD) -
Partie 1: Règles générales
(CEI 61009-1:2010, modifiée)

Fehlerstrom-/Differenzstrom-Schutzschalter mit eingebautem Überstromschutz (RCBOs) für Hausinstallationen und für ähnliche Anwendungen -
Teil 1: Allgemeine Anforderungen
(IEC 61009-1:2010, modifiziert)

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 61009-1:2012 E

Foreword

This document (EN 61009-1:2012) consists of the text of IEC 61009-1:2010 prepared by IEC/TC 23E "Circuit-breakers and similar equipment for household use", together with the common modifications 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) 2013-06-18
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2017-06-18

This document supersedes EN 61009-1:2004 + corr.Jul.2006 + A11:2008 + A12:2009 + A13:2009 + A14:2012 + AC:2012.

– complete revision of EMC sequences, including the new test T.2.6, already approved in EN 61543;

– clarification of RCDs current/time characteristics reported in Tables 2 and 3;

– revision of test procedure for $I_{\Delta n}$ between 5 A and 200 A;

– tests for the use of RCBOs in IT systems;

– testing procedure regarding the 6mA d.c. current superimposed to the fault current;

– improvement highlighting RCDs with multiple sensitivity;

– some alignments with EN 60898-1.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

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

For the relationship with EU Directive(s) see informative Annex ZZ, which is an integral part of this document.

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 61009-1:2010 are prefixed “Z”.

Endorsement notice

The text of the International Standard IEC 61009-1:2010 was approved by CENELEC as a European Standard with agreed common modifications.

COMMON MODIFICATIONS

Clause	Common modification
1	Add in the first paragraph “for fixed installations” after “125 A”. Delete in the first paragraph “with rated frequencies of 50 Hz, 60 Hz or 50/60 Hz” and “for operation at 50 Hz or 60 Hz” Add after ”They are intended for use in an environment with pollution degree 2”, “and overvoltage category III”. Delete in the second paragraph after note 6: “, with the exception of those with an uninterrupted neutral,” Delete after note 7 “It also applies to RCBOs having more than one rated current, provided that the means for changing from one discrete rating to another is not accessible in normal service and that the rating cannot be changed without the use of a tool.“ Modify the third paragraph after note 7 by “Particular requirements are necessary for RCBOs : - integrated in one unit with a socket-outlet or designed exclusively for being associated locally with a socket-outlet in the same mounting box - if intended to be used at frequencies other than 50 Hz or 60 Hz“ Replace Note 8 by the following sentence in the core text of the scope: “ For RCBOs incorporated in, or intended only for association with socket-outlets, the requirements of this standard may be used in conjunction with the requirements of IEC 60884-1 or national requirements of the country where the product is placed on the market”. Delete notes 9 and 10.
2	Replace the text of Clause 2 by: NOTE Normative references to international publications are listed in Annex ZA (normative).
3.3.16	Modify by “void”
3.3.17	Replace "current paths" by "poles".
3.3.Z.1	Add the following new definition: **3.3.Z1** **plug-in RCBO** RCBO having one or more plug-in terminals (see 3.6.Z1) and designed for use with appropriate means for the plug-in connection
3.4.19.1	Modify twice “current paths” by “poles”
3.6.Z1	Add the following new definition: **3.6.Z1** **plug-in terminal** terminal the electrical connection and disconnection of which can be effected without displacing the conductors of the corresponding circuit. The connection is effected without the use of a tool and is provided by the resilience of the fixed and/or moving parts and/or by springs
4	Delete the number “12” in the first paragraph.
4.1	Replace the note by the following specification: The selection of the various types is made according to HD 60364 and non-conflicting national wiring rules. Table Z1 lists the types of RCBOs according to the various applications but does not exclude the use of RCBOs of any classification for protection over and above that required by the relevant wiring rules.

<table>
<tr><th>Clause</th><th>Common modification</th></tr>
<tr><td>4.1</td><td>Add the following table at the end :
Table Z1 – Survey of the types of RCBOs according to their method of operation
<table>
<tr><td>Classification</td><td>4.1.1</td><td>4.1.2.2a)</td><td>4.1.2.1 b)</td><td>4.1.2.2b)</td></tr>
<tr><td>Marking of use</td><td>Without</td><td>E1</td><td>E2</td><td>E3</td></tr>
<tr><td>Protection</td><td>Indirect contact and additional protection[a]</td><td>Indirect contact and additional protection[a]</td><td>Additional protection[a]</td><td>Additional protection[a b]</td></tr>
<tr><td>Service continuity [c]</td><td>Yes</td><td>Yes</td><td>No</td><td>Yes</td></tr>
<tr><td colspan="5">[a] Additional protection, provided only by RCBOs with $I_{\Delta n} \leq 0{,}03$ A.
[b] Only devices integrated in one unit with a socket-outlet or designed exclusively for being associated locally with a socket outlet in a same mounting box.
[c] This information is given for guidance only.</td></tr>
</table></td></tr>
<tr><td>4.1.2.1</td><td>Replace a) by “a) deleted”</td></tr>
<tr><td>4.1.2.2 a)</td><td>Replace the final sentence in brackets by "(additional requirements are under consideration)".</td></tr>
<tr><td>4.1.2.2 b)</td><td>Delete the note.</td></tr>
<tr><td>4.2</td><td>Replace the text by "Deleted".</td></tr>
<tr><td>4.3</td><td>Delete:
– single-pole RCBO with one overcurrent protected pole and uninterrupted neutral (see 3.3.16) (two current paths)
– three-pole RCBO with three overcurrent protected poles and uninterrupted neutral (four current paths).</td></tr>
<tr><td>4.4</td><td>Replace the text by 'Deleted'</td></tr>
<tr><td>4.10</td><td>Replace the existing subclause title and text by the following new subclause:
4.10 According to the methods of connection
4.10.1 According to the fixation system:
- RCBO’s, the electrical connections of which are not associated with the mechanical mounting;
- RCBO’s, the electrical connections of which are associated with the mechanical mounting.
NOTE Examples of this type are:
– plug-in type;
– bolt-on type;
– screw-in type.
Some RCBO’s may be of the plug-in type or bolt-on type on the line side only, the load terminals being usually suitable for wiring connection.
4.10.2 According to the type of terminals:
– RCBO’s with screw-type terminals for external copper conductors;
– RCBO’s with screwless type terminals for external copper conductors;
NOTE 1 The requirements for RCBO’s equipped with this type of terminals are given in Annex ZE.
– RCBO’s with flat quick-connect terminals for external copper conductors;
NOTE 2 The requirements for RCBO’s equipped with this type of terminals are given in Annex ZF.</td></tr>
</table>

<table>
<tr><th>Clause</th><th>Common modification</th></tr>
<tr><td>4.12</td><td>Replace the text by:
RCBOs of B-type and C-type, having rated current up to and including 63 A and having short-circuit breaking capacity of 3 000 A, 4 500 A, 6 000 A and 10 000 A, shall be classified according to the limits within which their I²t characteristics lie, measured according to 9.12.6 (see Annex ZD).
Other ratings and D-type RCBOs cannot be classified according to this Annex ZD.</td></tr>
<tr><td>4.Z.1</td><td>Add the following new subclause:
4.Z1 According to the range of ambient air temperature
– RCBOs for use at ambient air temperatures between -5 °C and +40 °C;
– RCBOs for use at ambient air temperatures between -25 °C and +40 °C.</td></tr>
<tr><td>5.1</td><td>Delete the first dashed item.</td></tr>
<tr><td>5.1</td><td>Add the following item to the list of common characteristics:
– ranges of ambient air temperature (see 5.3.Z1)</td></tr>
<tr><td>5.2.1.3</td><td>Replace “Table 5” by 5.3.10</td></tr>
<tr><td>5.2.3</td><td>Delete second and third paragraphs of 5.2.3.</td></tr>
<tr><td>5.2.7</td><td>Add a note :
NOTE the corresponding rated quantity of circuit-breaker is the rated making and breaking capacity of an individual pole Icn1 (see 5.2.5 of EN 60898-1:2002).
Replace the last line by:
The conditions are those specified in 9.12.11.4d)</td></tr>
<tr><td>5.3.1</td><td>Replace "preferred" by "standard" (twice).</td></tr>
<tr><td>5.3.1</td><td>Replace the table by the following:
<table><tr><th>RCBO</th><th>Rated voltage of RCB0s for use in systems 230 V, 230 V/400 V, 400V</th></tr><tr><td rowspan="2">Two-pole</td><td>230 V</td></tr><tr><td>400 V</td></tr><tr><td>Three-pole</td><td>400 V</td></tr><tr><td>Four-pole</td><td>400 V</td></tr></table>Delete the note.</td></tr>
<tr><td>5.3.2</td><td>Delete in the second line the value 8 A.</td></tr>
<tr><td>5.3.3</td><td>Delete the value “0,006”.
Delete the note.</td></tr>
<tr><td>5.3.3</td><td>Add 1A to the standard values.</td></tr>
<tr><td>5.3.5</td><td>Replace the title by "Value of rated frequency".
Replace the text by:
The preferred value of rated frequency is 50 Hz.</td></tr>
<tr><td>5.3.6</td><td>Replace the subclause title by:
5.3.6 Values of rated short-circuit capacity (I_{cn}) and of rated residual making and breaking capacity ($I_{\Delta m}$)</td></tr>
<tr><td>5.3.6.1</td><td>Replace the first sentence by:
Standard values of rated short-circuit capacity and of rated residual making and breaking capacity are given in Table 1. The values of I_{cn} and $I_{\Delta m}$ may be different on the same product.</td></tr>
<tr><td>5.3.6.1</td><td>Replace Table 1 and the subsequent footnote by:
Table 1 - Standard values of rated short-circuit capacity and of the rated residual making and breaking capacity
<table><tr><td>1 500 A (*)</td></tr><tr><td>3 000 A</td></tr><tr><td>4 500 A</td></tr><tr><td>6 000 A</td></tr><tr><td>10 000 A</td></tr></table>(*) Only for RCBOs integrated in one unit with a socket outlet or designed exclusively for being associated locally with a socket outlet in the same mounting box.</td></tr>
<tr><td>5.3.7</td><td>Delete 5.3.7 and replace by “Void”</td></tr>
</table>

Clause	Common modification
5.3.8.1	In Table 2 Modify “Minimum non operating times” by” Minimum non-actuating times“ Delete the note.
5.3.9	Delete “a)” and “[a] For special cases values up to 50 I_n may also be used.”
5.3.10	Change contents of 5.3.10 to Standard value of the rated impulse voltage (U_{imp}) is 4 kV. NOTE 1 For test voltages to check the insulation see 9.20. NOTE 2 For test voltages to check the isolation distance across open contacts see Table 18.
5.3.Z1	Add the following new subclause: **5.3.Z1 Standard ranges of ambient air temperature** The standard ranges of ambient air temperature are: – -5 °C to +40 °C – -25 °C to +40 °C
6.Z.1	**Replace** the whole subclause by: **6.Z1 Standard marking** Each RCBO shall be marked in a durable manner according to the following Table Z3. For RCBOs other than those operated by means of push-button, the open position shall be indicated by the symbol "O" and the closed position by the symbol "|" (a short straight line). Additional national symbols are allowed for this indication. Provisionally the use of national indications only is allowed. These indications shall be readily visible when the RCBO is installed. For RCBOs operated by means of two push-buttons, the push-button designed for the opening operation only shall be RED and/or be marked with the symbol "O". RED shall not be used for any other push-button of the RCBO. If a push-button is used for closing the contacts and is evidently identified as such, its depressed position is sufficient to indicate the closed position. If a single push-button is used for closing and opening the contacts and is identified as such, the button remaining in its depressed position is sufficient to indicate the closed position. On the other hand, if the button does not remain depressed, an additional means indicating the position of the contacts shall be provided. If it is necessary to distinguish between the supply and the load terminals, they shall be clearly marked (e.g. by "line" and "load" placed near the corresponding terminals or by arrows indicating the direction of power flow). Terminals exclusively intended for the connection of the neutral circuit shall be indicated by the letter N. Terminals intended for the protective conductor, if any, shall be indicated by the symbol  (IEC 60417-5019 a)). NOTE The symbol  (IEC 60417-5017 a)), previously recommended, shall be progressively superseded by the preferred symbol IEC 60417-5019 a), given above. If a degree of protection higher than IP20 is marked on the device, it shall comply with it, whichever the method of installation. If the higher degree of protection is obtained only by a specific method of installation and/or with the use of specific accessories (e.g. terminal covers, enclosures, etc.), this shall be specified in the manufacturer's literature The suitability for isolation, which is provided by all RCBOs of this standard, may be indicated by the symbol on the device. When affixed, this marking may be included in a wiring

Clause	Common modification
	diagram, where it may be combined with symbols of other functions, (e.g. overload protection, or other symbols of IEC TC 3). When the symbol is used on its own (i.e. not in a wiring diagram), combination with sym bols of other functions is not allowed. The base for plug-in RCBOs shall be marked with the following: - rated current or maximum rated current; - trade mark. Marking shall be indelible, easily legible and not be placed on screws, washers or other removable parts. Compliance is checked by inspection and by the test of 9.3.
6.Z.2	Add the following subclause **6.Z2 Additional marking** Additional marking to other standards (EN or IEC or other) or additional requirements are allowed under the following conditions: - the RCBO shall comply with all the requirements of the additional standard; - the relevant standard to which the additional marking refers shall be indicated adjacent to this marking and shall be clearly differentiated or separated from the standard marking according to 6.Z1. *Compliance is checked by inspection and by carrying out all the test sequences required by the relevant standard. Equivalent or less severe test sequences need not be repeated.* **Table Z3 – Requirements for marking** Secretary note : see the table at the end of this document
7.1	In Table 6, second column, add to "-5° C to +40 °C" in the same box, the range "-25 °C to +40 °C[2)]". Modify footnote 7) to read: 7) Extreme limits of -20 °C and 60°C, for RCBOs for use in the range of –5 °C to +40 °C and of –35 °C and 60 °C, for RCBOs for use in the range of –25 °C to +40 °C, are admissible during storage and transportation. These conditions should be taken into account in the design of the device.
7.1	In Table 6, second column, after "2 000 m", add a footnote reference "[8)]" Add footnote 8) as follows: 8) For installations at higher altitudes, it is necessary to take into account the reduction of the dielectric strength and of the cooling effect of the air. RCBOs intended to be so used shall be designed specially or used according to an agreement between manufacturer and user. Information given in the manufacturer's catalogue may take the place of such an agreement.
8.1.1	Delete in the third paragraph “other than those specifically intended for changing the setting of the residual operating current”. Delete the first sentence of fourth paragraph. Delete last paragraph.
8.1.2	Modify Note 1 by “Note 1: deleted”.
8.1.2	Delete the paragraph “In the case of RCBOs…” and the note 3.
8.1.2	Delete note 4
8.1.3	In second paragraph, add “in addition” after “and” and before “for item 1” In third paragraph, replace “2, 4 and 5” by “2 and 4” In fifth paragraph, replace “2.7.1.1” by “4.8.1.1” and “2.7.1.3” by “4.8.1.3”. Modify Table 7 in deleting columns 2 and 3 and deleting item 5 (in the first column).

<table>
<tr><th>Clause</th><th>Common modification</th></tr>
<tr><td></td><td>
Add in item 2 of Table 7 the reference to footnote j).

Modify table note 2 by:
“The parts of the neutral pole, if any, are considered to be live parts.

Replace table note 3 by “Note 3: deleted”.

Modify table note c by:
“Including a metal foil in contact with the surfaces of insulating material which are accessible after installation for normal use. The foil is pushed into corners, grooves, etc., by means of a straight jointed test finger according to 9.6 (see Figure 3).

Add the following new footnote j) in Table 7:
j) This applies also to clearance and creepage distances between live parts of different polarity of the RCBO and equipments mounted close to it.
</td></tr>
<tr><td>8.1.5.1</td><td>
Delete the second paragraph and the relevant note.

Add at the end of last paragraph “for screw-type terminals, by specific tests for plug-in or bolt-on RCBO’s included in the standard, or by the tests of Annex ZE or ZF, as relevant for the type of connection”
</td></tr>
<tr><td>8.1.5.2</td><td>Delete the note in Table 8 which refers to AWG</td></tr>
<tr><td>8.1 .Z1</td><td>
Add the following new subclause:

8.1.Z1 Mechanical mounting of plug-in type RCBOs

The mechanical mounting of plug-in type RCBOs shall be reliable and have adequate stability.

8.1.Z1.1 Plug-in type RCBOs, the holding in position of which does not depend solely on their plug-in connection(s)

Compliance of the mechanical mounting is checked by the relevant tests of 9.13.

Add the following new subclause:

8.1.Z1.2 Plug-in type RCBOs, the holding in position of which depends solely on their plug-in connection(s)

Compliance of the mechanical mounting is checked by the relevant tests of 9.13.
</td></tr>
<tr><td>8.5.2.1</td><td>
Table 10, replace test d by :
<table>
<tr><td>d</td><td>B

C

D</td><td>3 I_n

5 I_n

10 I_n</td><td>Cold a</td><td>0,1 < t < 45 s (I_n ≤ 32 A)
0,1 < t < 90 s (I_n > 32 A)

0,1 < t < 15 s (I_n ≤ 32 A)
0,1 < t < 30 s (I_n > 32 A)

0,1 < t < 4 s b (I_n ≤ 32 A)
0,1 < t < 8 s (I_n > 32 A)</td><td>Tripping</td><td>Current established by closing an auxiliary switch</td></tr>
</table>
</td></tr>
</table>

Clause	Common modification
8.5.2.1	Table 10, test e, delete “b”
8.5.2.1	Table 10, replace contents of note b by: “For I_n ≤ 10 A, t < 8 s is permitted.”
8.5.2.Z1	**Add** the following new subclause: **8.5.2.Z1 Effect of single phase loading of multi-pole RCBO on the tripping characteristic** Single phase loading of RCBO with more than 2 current paths shall not have a significant effect on the overcurrent tripping characteristic. *Compliance is checked by the tests of 9.9.2.Z1.*
8.11	Delete the third paragraph: "In the case of RCBOs having ... shall be used."
8.11	*Replace the 3rd paragraph by the following*: For RCBOs with rated residual current of 30 mA the ampere-turns produced when operating the test device of a RCBO, supplied at rated voltage or at the highest value of the voltage range, if applicable, shall not exceed 1,66 times the ampere-turns produced, when a residual current equal to $I_{\Delta n}$ is passed through one of the poles of the RCBO. For RCBOs with rated residual currents other than 30 mA the ampere-turns produced when operating the test device of a RCBO, supplied at rated voltage or at the highest value of the voltage range, if applicable, shall not exceed 2,5 times the ampere-turns produced, when a residual current equal to $I_{\Delta n}$ is passed through one of the poles of the RCBO.
8.12	Replace in the first paragraph “current paths” by “poles”.
8.13	**Delete** this subclause and **replace** it by "Void".
8.Z1	Add the following new subclause: **8.Z1 Behaviour of RCBOs at low ambient air temperatures** RCBOs for use in the range of –25 °C to +40 °C (see 4.Z1) shall operate reliably at low temperatures. *Compliance is checked by the tests of 9.Z1.*
9.1.1	Add the following note before Table 12: NOTE To verify compliance of additional marking to 6.Z2, if any, tests are carried out according to the relevant standard. In Table 12 replace the fifth dash by: - Dielectric properties and isolating capability In Table 12 add the following dashed item: - Behaviour at low ambient air temperatures of RCBOs classified for use in the range of -25 °C to +40 °C and add correspondingly "9.Z1" in the column named "Subclause".
9.1.1	**Delete** in Table 12 the row concerning 9.18.
9.1.2	Modify first paragraph by: “*For the purpose of verification of conformity with the standard, type tests are carried out in test sequences.”* Replace the note by: “NOTE Verification of the conformity to the standards may be made – by the manufacturer for the purpose of suppliers declaration (13.5.1 of ISO/IEC Guide 2); – by an independent body for certification (13.5.2 of ISO/IEC Guide 2). According to the terminology of ISO/IEC Guide 2 the term "certification" can be used

Clause	Common modification
	for the second case only."
9.2	Delete the note after Table 13.
9.7	Amend the title to read: **9.7 Test of dielectric properties and isolating capability**
9.7.2	In the second line of Item b) replace "current paths" by poles". Add after b): NOTE To this purpose samples specially prepared by the manufacturer should be submitted to the test sequences implying this test.
9.7.2	Modify dash c) by c) with *the RCBO in the closed position, between all poles connected together and the frame, including a metal foil or part in contact with the outer surface of the housing of insulating material but with the terminal areas kept completely free in an appropriate manner to avoid flashover between terminals and the metal foil;*
9.7.2	**Delete** item d). **Rename** item e) as item d). **Modify** the beginning of the last but one paragraph as follows: "For the measurements according to items b), c) and d), ..."
9.7.3	In the first paragraph, delete "*electronic components, if any, being disconnected for the test.".* Replace the first dashed lines by *– 2 000 V for a) to c) of 9.7.2, electronic components, if any, having been disconnected for test b) (see relevant note on 9.7.2 b);* *– 2 500 V for d) of 9.7.2.*
9.7.7.1	Modify in the 9th paragraph "Table 5" by "5.3.10" Delete in Table 18 the line beginning with "2,5"
9.7.7.2	Modify in the 10th paragraph "Table 5" by "5.3.10" Delete in Table 19 the line beginning with "2,5
9.9.1.1	Delete in the third paragraph "*shall be at least of Class 0.5 and"*
9.9.1.2	Delete the second paragraph.
9.9.1.3	Add a note after the second paragraph: NOTE Preheating may be carried out at reduced voltage but auxiliary circuit shall be connected to their normal operating voltage (particularly for components depending on line voltage)
9.9.1.3	Delete last paragraph
9.9.1.4	Delete the last paragraph before the note.
9.9.1.2 d)	Add at the end of first paragraph "among the following list : 5A – 10A – 20A – 50A – 100A – 200A".
9.9.2.2	Amend the title to read: **9.9.2.2 Test of instantaneous tripping and of correct opening of the contacts**
9.9.2.2 a)	Modify a) by: 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 two following tests are carried out:* *At any convenient voltage, one opening operation on each combination of two poles connected in series is performed. The tripping time is measured and shall be within the limits of Table 10.*

Clause	Common modification
	At rated voltage U_0 (phase to neutral) with a power factor between 0,95 and 1 separately on each protected pole of the RCBO, 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.*
9.9.2.Z1	**Add** the following new subclause: **9.9.2.Z1 Test of effect of single phase loading on the over-current tripping characteristic of RCBO with three or four current paths** This test does not apply to RCBOs obtained by the assembly of an adaptable residual current unit on a circuit-breaker complying with EN 60898-1. *RCBOs with three or four current paths are loaded on 2 current paths. Where a switched neutral pole exists, the test circuit shall include the neutral pole. The test current having the value of 1,2 times the conventional tripping current is applied, starting from cold.* *Except for the neutral pole if applicable, the test is carried out on different poles for each sample.* *The RCBO shall trip within the conventional times as for test b according to Table 10.*
9.10.2	Delete the note.
9.10.3	Replace the last sentence of the second paragraph by: *One test only is made, on one pole taken at random, with measurement of break time: the latter shall not exceed the value specified in Table 2 at $I_{\Delta n}$.*
9.11.2	Delete note 2.
9.12.1	Delete the note after the first paragraph.

<table>
<tr><th>Clause</th><th>Common modification</th></tr>
<tr><td>9.12.1</td><td>Replace Table 20 by

<table>
<tr><th>Kind of test</th><th>RCBOs to be tested</th><th>Verification according to subclause</th></tr>
<tr><td>Test at rated making and breaking capacity on one pole (9.12.13.1)</td><td>All RCBOs</td><td>9.12.12.2</td></tr>
<tr><td>Test at reduced short-circuit currents (9.12.11.2.1)</td><td>All RCBOs</td><td>9.12.12.1</td></tr>
<tr><td>Test to verify suitability for IT systems (9.12.11.2.2)</td><td>All RCBOs</td><td>9.12.12.1</td></tr>
<tr><td>Tests at 1500 A (9.12.11.3)</td><td>All RCBOs</td><td>9.12.12.1</td></tr>
<tr><td>Test at rated residual making and breaking capacity (9.12.11.4 d)</td><td>All RCBOs</td><td>9.12.12.2</td></tr>
<tr><td>Tests at service short-circuit capacity (9.12.11.4 b)</td><td rowspan="2">RCBOs with Icn > 1 500 A</td><td>9.12.12.1</td></tr>
<tr><td>Tests at rated short-circuit capacity(9.12. 11.4.c)</td><td>9.12.12.2</td></tr>
</table>
</td></tr>
<tr><td>9.12.2</td><td>Amend the first paragraph and all the dashes to read:

Figures 7 and 11 give diagrams of the circuits to be used for the tests concerning:

– a two-pole RCBO (with one or two overcurrent protected poles) ;
– a three-pole RCBO;
– a four-pole RCBO (with three or four overcurrent protected poles).

Replace in third paragraph “resistor R1” by “resistor r”.

Replace second paragraph after the note by:
A resistor R_2 of about 0,5 Ω is connected in series with a copper wire F as shown in Figures 7 and 11, as applicable.

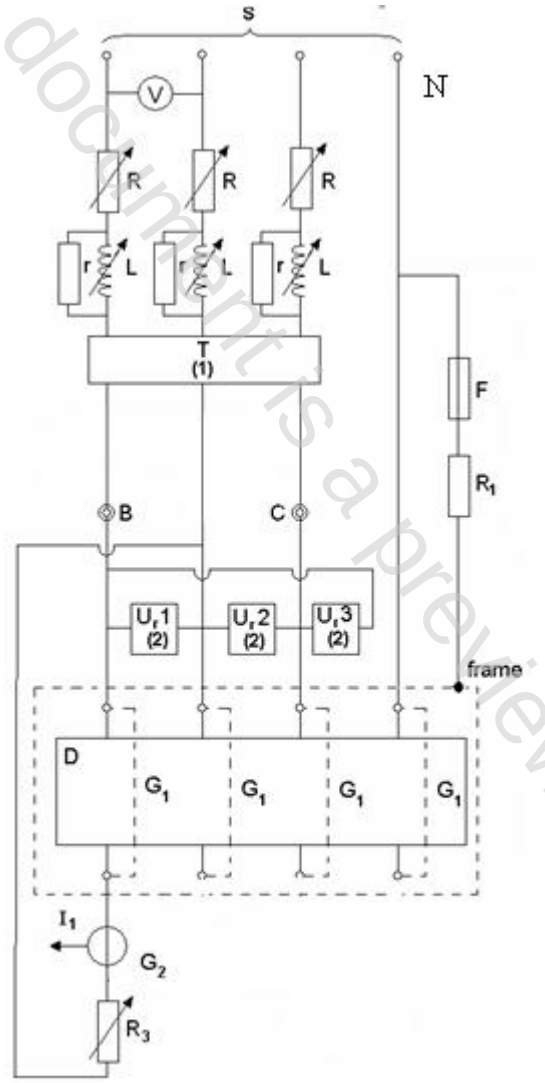
Replace in sixth paragraph after the note “current sensors O_1 are “ by “current sensors I_1,I_2 and I_3 are”.
Replace in seventh paragraph after the note “voltage sensors O_2 are “ by “voltage sensors U_{r1} , U_{r2} and U_{r3} are”.</td></tr>
<tr><td>9.12.2</td><td>Replace in the 1st paragraph after note “9.12.13” by “9.12.11.4 d)”</td></tr>
</table>

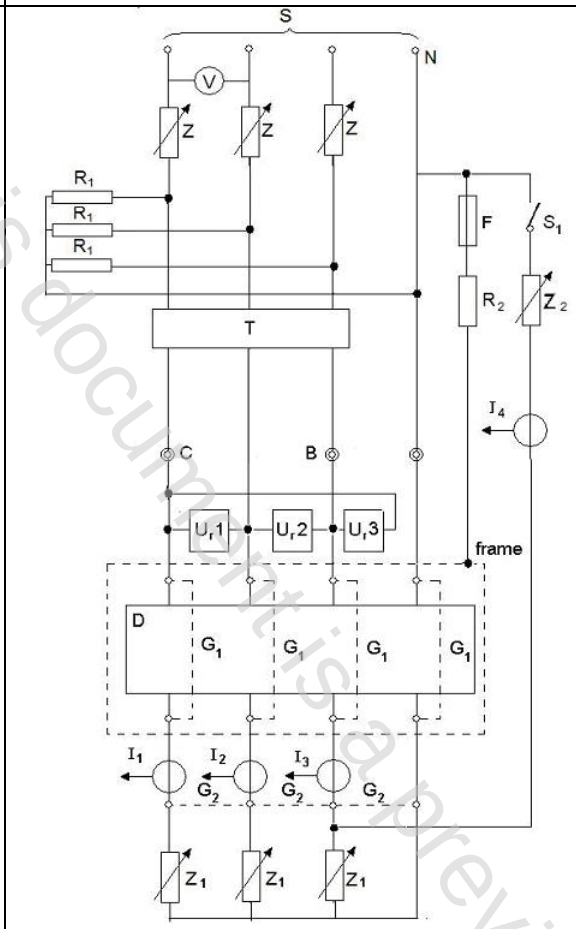
Clause	Common modification
9.12.2	Delete the first dash: - across the terminals of the pole for single-pole RCBOs
9.12.3	Replace in the third paragraph "105 %" by "110 %". Replace in the note "105 % (± 5 %) by "110 % (0, - 5 %)".
9.12.4	Replace, in the last line, "± 5 %" by "0, - 5%".
9.12.7.1, 9.12.7.3 and 9.12.7.4	In 9.12.7.1, 9.12.7.3 and 9.12.7.4, replace “in Figures 8 to 12” by “in Figures 7 and 11”.
9.12.8	Replace "Figure 13" by "Figure Z4" in both 9.12.8.a) and 9.12.8.b).
9.12.9.1	Amend to read after note 1: *The grid circuit(s) (see Figure C.3) shall be connected to the points B and C as shown in the test circuit diagrams of Figures 7 and 11.*
9.12.9.2	*Amend to read in the note:* NOTE This means that if other RCBOs (or other devices) are normally fitted in the direction(s) in which the grid(s) would be placed, they should be installed in that position. These RCBOs (or other devices) should be supplied as in normal use, but via F' and R' as defined in 9.12.9.1 and connected as shown in the appropriate Figures 7 and 11.
9.12.11.2.1	Amend second paragraph to read : “ *“Each overcurrent protected pole of the RCBO is subjected separately to a test in a circuit the principle of connections of which are shown in Figure 11. Phases which do not carry the short circuit current during this test shall be connected to the supply voltage at the line terminals.* Add after second paragraph: *“The measurement of the breaking time shall be carried out at every test and the values shall comply with the values of Table 2.”* Delete the note.
9.12.11.2.2	Modify end of first paragraph from “*105 % of the rated phase to phase voltage value”* to “*105 % of 400 V.”* Modify “Uo” in the second paragraph by “230 V”.
9.12.11.2.2	Delete the note
9.12.11.3	Delete the third paragraph. Amend the paragraph beginning with “Three-pole RCBOs” to read: *Three-pole RCBOs and four-pole RCBOs with three overcurrent protected poles are tested in a circuit the diagram of which is shown in Figure 11.* Delete the paragraph beginning with “For three-pole RCBOs…”. Delete in the ninth paragraph "single-pole and".
9.12.11.4	Delete in b) 2) "single-pole and". Delete in the title of Table 23 "single- and".
9.12.11.4	Add a new 9.12.11.4 d): *d) Test at the residual making and breaking capacity $I_{\Delta m}$* *The test circuit is calibrated according to 9.12.7.* *The test is carried out on one pole taken at random which shall not be the switched neutral or the overcurrent unprotected pole. This pole is connected according to the diagram of Figure 11.* *In addition phases which do not carry the short-circuit current during this test shall be connected to their supply voltage at the corresponding terminals.*

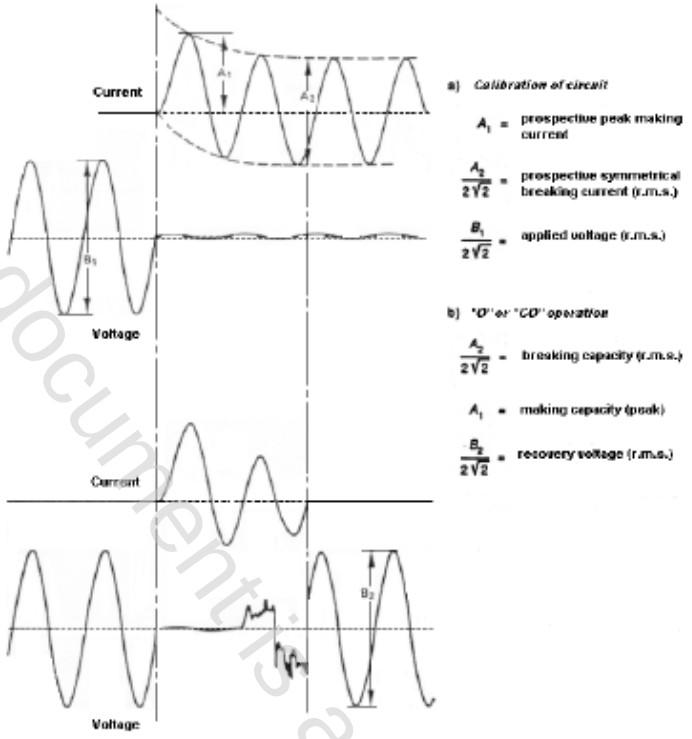
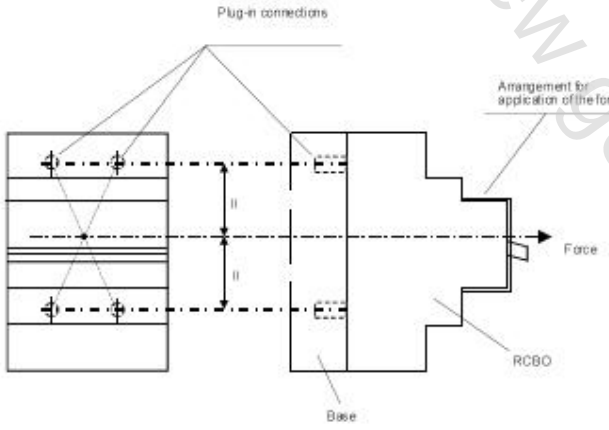
Clause	Common modification
	The sequence of operation is : *O - t - CO* *For the "O" operations, the auxiliary switch S_1 is synchronised with respect to the voltage wave so that the circuit is closed on the point 15° on the wave for the "O" operation on the first sample.* *This point is then shifted by 30° for the "O" operation on the second sample and by a further 30° for the "O" operation on the third sample.* *The synchronisation tolerance shall be ± 5°.* *For the three and four-pole RCBOs, the same pole shall be used as reference for the purpose of synchronisation.*
9.12.12.2	Amend to read "*After the tests according to 9.12.1 1.4.c) and 9.12.11.4 d), the polyethylene"…*
9.12.12. Z1	Add the new subclause: **9.12.12.Z1 Condition of the RCBO after the tests** *After the test of 9.12.11.4 d), under the condition of 9.9.1.2 c), the RCBO shall trip with a test current of 1,25 $I_{\Delta n}$. One test only is made on one pole, taken at random, with measurement of break time. This shall not exceed the value specified in Table 2 for $I_{\Delta n}$.*
9.12.13	Delete
9.13	Replace the title by: **9.13 Mechanical stresses**
9.13.2	Replace the title by: **9.13.2 Resistance to mechanical stresses and impact**
9.13.2	Replace the two dashed items by: *- 9.13.2.2 for RCBOs intended to be mounted on a rail and for all types of plug-in RCBOs designed for surface mounting;* *- 9.13.2.3 for plug-in type RCBOs, the holding in position of which depends solely on their connections.*
9.13.2.2	Add after the first paragraph: *Plug-in RCBOs designed for surface mounting are mounted complete with the appropriate means for the plug-in connection but without cables being connected and without any cover-plate.*
9.13.2.3	Replace the note by: *Plug-in type RCBOs, the holding in position of which depends solely on their connections, are mounted, complete with the appropriate plug-in base but without cables being connected and without any cover-plate, on a vertical rigid wall.* *A force of 20 N is applied to the RCBO portion at a point equidistant between the plug-in connections, without jerks for 1 min (see Figure Z5).* *During this test the RCBO portion shall not become loose and shall not move from the base portion and after the test both portions shall show no damage impairing their further use.*
9.14.1	Replace the second sentence of the fourth paragraph by: *One test only is made on one pole taken at random, with measurement of break lime: the latter shall not exceed the value specified in Table 2 at $I_{\Delta n}$.*
9.15	Add the requirements for small parts after the note: Small parts, where each surface lies completely within a circle of 15 mm diameter, or where any part of the surface lies outside a 15 mm diameter circle and it is not possible to fit a circle of 8 mm diameter on any of the surfaces, are not subjected to the test of this subclause (see Figure Z7 for diagrammatic representation).

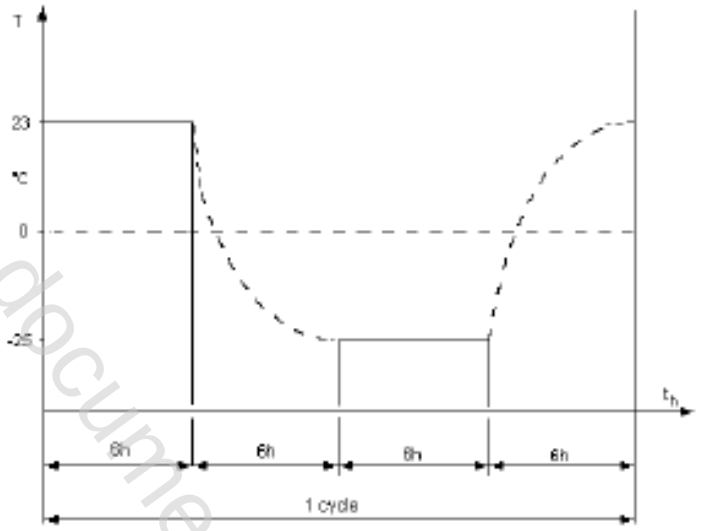
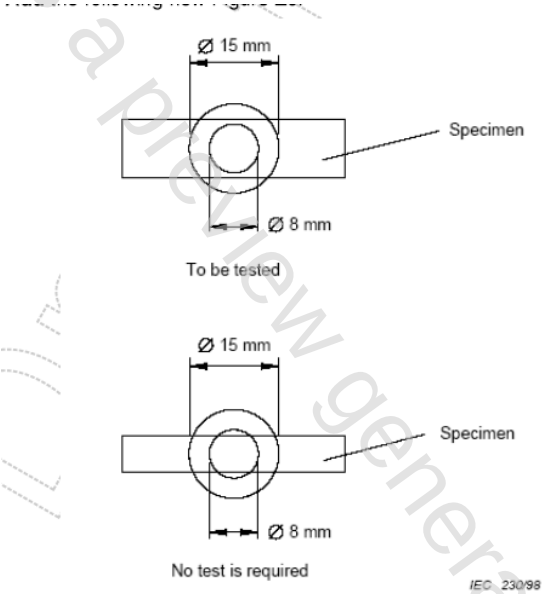
Clause	Common modification
9.16	*Replace the 3rd paragraph by the following*: In order to verify that at rated voltage or the highest voltage of the voltage range, if applicable, the ampere-turns due to the operation of the test device are less than • 1,66 times the ampere turns produced at rated residual current for RCBO 30 mA and • 2,5 times the ampere turns produced at rated residual current for all other RCBO the impedance of the circuit is measured and the test ampere turns are calculated, taking into account the configuration of the circuit of the test device.
9.17.1	Replace the fourth, fifth and sixth paragraphs by: *All the values measured shall be less than 0,70 times the rated voltage (or, if relevant, 0,70 times the minimum value of the range of rated voltages).* *At the end of these measurements the RCBO is supplied with a voltage just above the highest measured value and it shall be verified that the RCBO operates in a period of lime corresponding to the value specified in Table 2 for $I_{\Delta n,}$ when a current equal to 1,25 $I_{\Delta n}$ is applied.* *It shall also be verified that for any value of the line voltage less than the lowest measured value it shall not be possible to close the apparatus by the manual operating means.*
9.17.2	Replace in the title the words "automatic opening" by "behaviour". Add after item a): *No tripping shall occur if the voltage is switched off for a time not exceeding 0,03 s.* Add after item b): *RCBOs classified in 4.1.2.1 b) are additionally submitted to the following test.* *The RCBO, previously energized with the rated voltage and brought to the closed position, is opened by hand or by operating the test device. The rated voltage is then switched off at the line side of the RCBO and suddenly re-established: the RCBO shall not close automatically.* *The test is carried out five times.*
9.17.4	Replace, in the title and in the first line, "current paths" by "poles".
9.17.5	Replace by "Deleted".
9.18	**Delete** this subclause and **replace** it by "Void".
9.19.1	**Modify in fourth dash "**each successive peak" by "each successive reverse peak"
9.20	Replace the third paragraph by: *A first series of tests is made at an impulse voltage of 6 kV peak, the impulses being applied between the phase pole(s), connected together, and the neutral pole of the RCBO or, in absence of the neutral pole, on one pole taken at random.*
9.20	Delete, in the last line of the fourth paragraph, the words "(or path)".
9.21.1.1	Delete in the last sentence of third paragraph "and the relevant break time".
9.22	Delete second paragraph
9.22.1.5	Replace the second sentence by: *One test only is made on one pole taken at random, with measurement of the break time: the latter shall not exceed the value specified in Table 2 at $I_{\Delta n}$.*
9.22.2	Replace the last sentence by: *One test only is made on one pole taken at random, with measurement of the break time: the latter shall not exceed the value specified in Table 2 at $I_{\Delta n}$.*
9.23	Delete in the title "of electronic components".
9.23	Replace the last sentence before the note by: *One test only is made one pole taken at random, with measurement of the break time: the latter shall not exceed the value specified in Table 2 at $I_{\Delta n}$.*
9.Z1	Add the following new subclause: **9.Z1 Verification of the correct operation at low ambient air temperatures for RCBOs for use at temperatures between -25 °C and +40 °C**

Clause	Common modification
	Enclosed-type RCBOs are tested in their enclosure, unenclosed-type RCBOs are mounted in an individual enclosure with a degree of protection IP55, and are connected as for normal use (see Figure 4a). NOTE 1 No drain hole in the enclosure shall be opened for this test. NOTE 2 RCBOs tested in enclosures IP55 may also be used in enclosures of a degree of protection other than IP55 within the temperature range of –25 °C to +40 °C. *The RCBO (including the enclosure) is brought into a suitable test chamber with an ambient air temperature of (23 ± 2) °C and a relative humidity of (93 ± 3) %. The volume ratio of the test chamber to the test samples (including enclosures) shall be greater than 50.* *The RCBO is in the ON-position without load and shall be subjected to the following cycle (see Figure Z6).* *For the first 6 h (stabilization period) the temperature is kept at (23 ± 2) °C and the humidity at (93 ± 3) %. Within the next 6 h the ambient air temperature is decreased to (-25 ± 2) °C without any supply of humidity. This temperature of (-25 ± 2) °C is kept for 6 h. Within the next 6 h the temperature is increased to (+ 23 ± 2) °C and the relative humidity is increased to (93 ± 3) % (end of the first cycle). This cycle is performed five times.* *During these cycles the RCBO shall not trip.* *During the fifth cycle, at the end of the period at (-25 ± 2) °C, an a.c. residual current is passed through one pole of the RCBO (see Figure 4a)* – *for RCBOs of the general type, the residual current is calibrated to 1,25 $I_{\Delta n}$ and established by closing S2. One test only is made on one pole taken at random. The break time measured shall not exceed the value specified in Table 2 for $I_{\Delta n}$;* – *for RCBOs of type S the residual current is calibrated to I,25 x 2$I_{\Delta n}$ and established by closing S2 One test only is made on one pole taken at random. The break time measured shall not exceed the value specified in Table 2 for 2 $I_{\Delta n}$.* *In addition, RCBOs of type A are tested with pulsating d.c. residual currents immediately after the above test with a.c. residual current, the test circuit corresponding to Figure 4b* – *for RCBOs of the general type, the residual current is calibrated to 1,25 x 2 $I_{\Delta n}$ for RCBOs with $I_{\Delta n}$ ≤ 0,01 A, and to 1,25 x 1,4 $I_{\Delta n}$ for RCBOs with $I_{\Delta n}$ > 0,01 A. The current delay angle shall be = 0°, the position of S3 is set at random, and the current is established by closing S2 One test only is made on one pole taken at random. The break time measured shall not exceed the value specified in Table 2 for $I_{\Delta n}$.* – *for RCBOs of type S the residual current is calibrated to 1,25 x 1,4 x 2 $I_{\Delta n}$ current delay angle shall be = 0°, the position of S3 is set at random, and the current is established by closing S2 One test only is made on one pole taken at random. The break time measured shall not exceed the value specified in Table 2 for 2 $I_{\Delta n}$.* *After these tests a visual inspection shall show that the materials have not undergone deterioration impairing the further use of the RCBO and it shall be possible to switch on the RCBO, without the presence of any residual current, at the temperature of -25 °C.*
9.24	Delete “and 9.18” in Table 27

Clause	Common modification
Figure 4	Add the following dashed item in the title of Figure 4: **– behaviour at low ambient air temperature of RCBOs for use in the range of -25 °C to +40 °C (9.Z1)**
Before Figure 7 **Figure 7**	Replace all the page on Explanation of letter symbols by: **Explanation of letter symbols used in Figures 7 and 11** Replace Figure 7 by: 
Figure 8	Delete Figure 8 *Comment : covered by Figure 11*
Figure 9	Delete Figure 9 *Comment : covered by Figure 11*
Figure 10	Delete Figure 10 *Comment : covered by Figure 11*
Figure 11	Modify Figure 11 by:

Clause	Common modification
	 Replace the title of Figure 11 by: "Test circuit for the verification of the rated making and breaking capacity of a two-pole 400V, three-pole or four-pole RCBO on a three-phase circuit with neutral (9.12)"
Figure 12	Delete Figure 12 *Comment : covered by Figure 11*
Figure 13	Replace Figure 13 by Figure Z4 (see Figure 7 of EN 60898-1:2002).

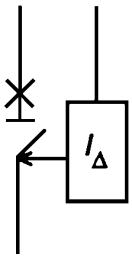
Clause	Common modification
	 Figure Z4 – Example of short-circuit making or breaking test record in the case of a single-pole RCBO on single phase a.c.
Figure 22)	Replace Figure 22 by "Void"
Figure 25	Delete in the title of Figure 25 "of electronic components".
Figure Z5	Add the following new figure:  Figure Z5 – Example of application of force for mechanical test on two-pole plug-in RCBO, the holding in position of which depends solely on the plug-in connections (9.13.2.3)
Figure Z6	Add the following new figure:

Clause	Common modification
	 **Figure Z6 – Test cycle for low temperature test (9.Z1)**
Figures	**Add** the following new Figure Z7:  **Figure Z7 – Diagrammatic representation of a small part**
Annex A	Modify the title and the first paragraph by: **Annex A** **Test sequence and number of samples to be submitted for verification of conformity** Verification of conformity may be made – by the manufacturer for the purpose of suppliers declaration (13.5.1 of ISO/IEC Guide 2); – by an independent body for certification (13.5.2 of ISO/IEC Guide 2).

<table>
<tr><th>Clause</th><th>Common modification</th></tr>
<tr><td></td><td>According to the terminology of ISO/IEC Guide 2 the term "certification" can be used for the second case only.</td></tr>
<tr><td>Annex A
Table
A.1</td><td>Replace test sequences D, E, F and G by:

<table>
<tr><td>D_0</td><td>9.9.1</td><td>Operating characteristics under residual current conditions</td></tr>
<tr><td>D_1</td><td>9.17
9.19
9.21
9.16</td><td>Behaviour in case of failure of the line voltage
Behaviour in case of surge currents
D.C. components
Test device</td></tr>
<tr><td>E_0</td><td>9.9.2</td><td>Overcurrent operating characteristics</td></tr>
<tr><td>E_1</td><td>9.13
9.12.11.3
(and 9.12.12)</td><td>Resistance to mechanical stresses
Short-circuit performance at 1 500 A
(Verification of RCBO after short-circuit test)</td></tr>
<tr><td>F_0</td><td>9.12.11.4 b)
(and 9.12.12)</td><td>Performance at service short-circuit capacity
(Verification of RCBO after short-circuit test)</td></tr>
<tr><td>F_1</td><td>9.12.11.4 c)
(and
9.12.12.2)</td><td>Performance at rated short-circuit capacity
(Verification of RCBO after short-circuit test)</td></tr>
<tr><td>F_2</td><td>9.12.11.4 d)
(and
9.12.12.2)</td><td>Performance at $I_{\Delta m}$
(Verification of RCBO after short-circuit test)</td></tr>
<tr><td>G_0</td><td>9.22.1</td><td>Reliability (climatic tests)</td></tr>
<tr><td>G_1</td><td>9.Z1</td><td>Verification of correct operation at low ambient air temperature of RCBOs operating at temperatures between -25 °C and + 40 °C</td></tr>
</table></td></tr>
<tr><td>A.2</td><td>Delete the last paragraph.</td></tr>
<tr><td>Table
A.2</td><td>Change the table to read at the second line
A 1+3 f) 1+3 f) –
And add note f:
f) Test 9.15 shall be applied to 3 additional new samples.</td></tr>
<tr><td>Table
A.2</td><td>Add sequence F2 (3, 2^d, 3)</td></tr>
<tr><td>Table
A.2</td><td>Change sequence G into G_0
Add sequence G_1 (3, 2^d, 3)</td></tr>
<tr><td>Table
A.2</td><td>In note d), delete "9.12.13".</td></tr>
<tr><td>Table
A.3</td><td>Replace test sequence C by:
<table>
<tr><td rowspan="2">C</td><td>C_1</td><td>3 max. rating I_n min. rating $I_{\Delta n}$</td><td>3 max. rating I_n min. rating $I_{\Delta n}$</td><td>3 max. rating I_n min. rating $I_{\Delta n}$</td></tr>
<tr><td>C_2</td><td>for 2 protected poles
2 max. rating I_n min. rating $I_{\Delta n}$
or for one protected pole
3 max. rating I_n min. rating $I_{\Delta n}$</td><td>1 max. rating I_n min. rating $I_{\Delta n}$</td><td>1 max. rating I_n min. rating $I_{\Delta n}$</td></tr>
</table></td></tr>
</table>

<table>
<tr><th>Clause</th><th>Common modification</th></tr>
<tr><td>Table A.3</td><td>Add new F_2 and G_1 test sequences as follows:
<table>
<tr><td>F_2</td><td>3 h) max. rating I_n
min. rating $I_{\Delta n}$</td><td>3 h) max. rating I_n
min. rating $I_{\Delta n}$</td><td>3 h) max. rating I_n
min. rating $I_{\Delta n}$</td></tr>
<tr><td>G_0</td><td>3 max. rating I_n
min. rating $I_{\Delta n}$</td><td>3 max. rating I_n
min. rating $I_{\Delta n}$</td><td>3 max. rating I_n
min. rating $I_{\Delta n}$</td></tr>
<tr><td>G_1 h)</td><td>3 max. rating I_n
min. rating $I_{\Delta n}$
3 min. rating I_n
max. rating $I_{\Delta n}$</td><td>3 max. rating I_n
min. rating $I_{\Delta n}$
3 min. rating I_n
max. rating $I_{\Delta n}$</td><td>3 max. rating I_n
min. rating $I_{\Delta n}$
3 min. rating I_n
max. rating $I_{\Delta n}$</td></tr>
</table></td></tr>
<tr><td>Table A.3</td><td>Delete reference to note d) in the third column (3-poles box)
Modify notes b), c) d), e), h) and j) by:
b) If only 3-pole and/or 4-pole RCBOs are submitted, this column shall also apply to a set of samples with the smallest number of poles.
c) Also applicable to two-pole RCBOs with one protected pole.
d) Void
e) Also applicable to 4-pole RCBOs with 3 protected poles.
h) Only the highest number of current poles.
j) If a 4-pole RCBO with 3 protected poles and a 4-pole RCBO are submitted, then only the 4-pole RCBO is tested, with exception of the test of 9.8 of test sequence B for which both types are submitted to the test.</td></tr>
<tr><td>Table A.4</td><td>Add at the end of note a : “for all ratings including the maximum rating”</td></tr>
<tr><td>Table A.5</td><td>Delete in note c) "to 1-pole RCBOs with uninterrupted neutral and".</td></tr>
<tr><td>Table A.5</td><td>Delete reference to note d) in the third column (3-poles box)
Modify notes b), c) d) and e) by:
b) If only 3-pole and/or 4-pole RCBOs are submitted, this column shall also apply to a set of samples with the smallest number of poles.
c) Also applicable to two-pole RCBOs with one protected pole.
d) Void
e) Also applicable to 4-pole RCBOs with 3 protected poles.</td></tr>
<tr><td>Annex E</td><td>Add a note mark (*) to the title and add, immediately below, the following footnote:
(*) For auxiliary contact units assembled or to be assembled separately to RCBO, see EN 62019.</td></tr>
<tr><td>Annex F</td><td>Replace the title by:
Annex F
(informative)
Co-ordination under short circuit conditions between a RCBO and another short circuit protective device (SCPD) associated in the same circuit</td></tr>
<tr><td>Annex G</td><td>Transfer G.1 into an Introduction and renumber other clauses accordingly.</td></tr>
<tr><td>G.3.2.2</td><td>Delete in the third line the letters g), k) and m).
Replace at the end of the first dash "60 A" by "63 A".
Replace the symbol by the following:</td></tr>
</table>

Clause	Common modification
	 **Delete** the note after the symbol.
G.3.2.3	**Add** in the first line after “The following marking” the words “on the r.c. unit”. **Delete** the third dash.
Annex G **G 3.3**	Delete the note and the first line after the note.
G.4.1	Modify contents of G.4.1 by: The design shall be such that it shall be possible to assemble the RCBO on site. Design may be such that the device may be disassembled on site in accordance with the manufacturer's instructions. For devices declared not suitable for disassembling, the disassembly shall leave permanent visible damage. *Compliance is checked according to G.5.4*.
G.4.4	**Add** after the last paragraph the following paragraph : *Compliance is checked by inspection and manual test.*
G.5.2	**Delete** in the last line the words “9.11 (if applicable)”.
G.5.3	**Add** in the first dash “9.9.2.3” after 9.5. **Add** at the end of G.5.3: Conventional non tripping current 1,13 In shall be replaced everywhere by In.
G.5.4	Replace contents of G.5.4 by: *Compliance with the requirements of G.3.1, G.3.2, G.3.3, G 4.1, G.4.2, G 4.3 and G.4.4 shall be checked by inspection and manual test, as applicable.* For devices declared suitable to be disassembled, compliance with the requirements of G.4.1 is checked by the following test to be performed at the beginning of test sequence D0 in Table A.1. The number of samples shall be in accordance with test sequence D0+D1 in Table A.3. The r.c. unit and compatible circuit-breakers as declared by the manufacturer have to be assembled and disassembled 5 times. The r.c unit and the compatible circuit breaker are then reassembled and used for the test of test sequence D0. After each assembly the correct operation of the combination shall be verified by using the test button. The RCBO shall trip each time.
Annex ID	Delete

Clause	Common modification
Annexes	Add the new Annex ZD:

Annex ZD
(normative)

Classification of RCBOs Type B and C up to and including 63A into energy limiting classes

RCBOs of B-type and C-type up to and including 63A, shall be classified into energy limiting classes 1 or 3 in accordance with Tables ZD.1 or ZD.2, as applicable, and be marked with the number of the energy limiting class in a square adjoining the symbol given in t) of Clause 6. This classification shall not be applied to RCBOs type D and to RCBOs with rated current higher than 63A.

Table ZD.1 – Permissible I^2t (let-through) values for RCBOs type B with rated current up to and including 63 A

Type B					
Rated short-circuit capacity(A) I_{cn}	Class 1	class 3			
	≤ 63A	≤ 16A	20A, 25A, 32A	40A	50A, 63A
3 000	No limits specified	15 000	18 000	21 600	28 000
4 500		25 000	32 000	38 400	48 000
6 000		35 000	45 000	54 000	65 000
10 000		70 000	90 000	108 000	135 000

Table ZD.2 – Permissible I^2t (let-through) values for RCBOs type C with rated current up to and including 63 A

Type C					
Rated short-circuit capacity(A) I_{cn}	Class 1	class 3			
	≤ 63A	≤ 16A	20A, 25A, 32A	40A	50A, 63A
3 000	No limits specified	17 000	20 000	24 000	30 000
4 500		28 000	37 000	45 000	55 000
6 000		40 000	52 000	63 000	75 000
10 000		80 000	100 000	120 000	145 000

The maximum I^2t values measured during the test of I_{cn} (test sequence F_0 or F_1 as applicable), in accordance with 9.12.11.4 serve as reference values for the classification. Compliance with the requirements of Tables ZD.1 and ZD.2 is checked on the RCBOs with the highest rated current available within the range covered by each of these tables.
If these current ratings are not included in the samples submitted to test sequences F_0 or F_1 of Annex A, the appropriate number of samples of these ratings shall be additionally submitted to that test sequence. None of the values measured shall exceed the permissible I^2t value of the proposed energy limiting class in accordance with Tables ZD.1 and ZD.2.
If RCBOs rated 40 A are submitted with the range of RCBOs with rating exceeding 16 A and their measured I^2t values are lower than those indicated in Tables ZD.1 or ZD.2 for rating 32 A, no relevant test is necessary for the RCBOs rated 32 A.
If RCBOs rated 50 A or 63 A are submitted with the range of RCBOs with rating exceeding 32 A and their measured I^2t values are lower than those indicated in Tables ZD.1 or ZD.2 for rating 40 A, no relevant test is necessary for the RCBOs rated 40 A

Clause	Common modification
Annexes	Add a new annex **Annex ZXX** (Informative) **List of clauses that require retesting** Based on EN 61009-1:2004 + A11:2008 + A12:2009 + A13: 2009 + A14:2012, the following tests and/or requirements have been technically modified and may require retesting or inspection as applicable: – Marking 6.Z2, line t of Table Z.3 (including the comparison of already measured i²t values with new Tables ZD.1 and ZD.2) – 9.9.1 Verification of the operating characteristic under residual current conditions (only for RCBOs having more than one rated frequency) – 9.21 Verification of the correct operation at residual currents with d.c. components (only for RCBOs having more than one rated frequency) – 9.12.11.2.2 Short-circuit test on RCBOs for verifying their suitability for use in IT system – Sequences F_0 or F_1 (for the new Annex ZD)
Annex ZE	Add the following Annex ZE : see at the end of this document
Annex ZF	Add the following Annex ZF : see at the end of this document
Biblio-graphy	Modify bibliography by: **Bibliography** EN 60364-4-41:2007, *Low-voltage electrical installations – Part 4-41: Protection for safety - Protection against electric shock (IEC 60364-4-41:2005, modified)* EN 60364-4-43:2010, *Low-voltage electrical installations – Part 4-43: Protection for safety - Protection against overcurrent (IEC 60364-4-43:2008, modified)* EN 60695-2-10:2001, *Fire hazard testing -- Part 2-10: Glowing/hot-wire based test methods - Glow-wire apparatus and common test procedure (IEC 60695-2-10:2000)* EN 60947-1:2007, *Low-voltage switchgear and controlgear – Part 1: General rules (IEC 60947-1:2007)* EN 60947-2, *Low-voltage switchgear and controlgear – Part 2: Circuit-breakers (IEC 60947-2)* EN 60998-1:2004, *Connecting devices for low voltage circuits for household and similar purposes – Part 1: General requirements (IEC 60998-1:2002, modified)* EN 60998-2-2:2004, *Connecting devices for low-voltage circuits for household and similar purposes – Part 2-2: Particular requirements for connecting devices as separate entities with screwless-type clamping units (IEC 60998-2-2:2002, modified)* EN 60999 (series), *Connecting devices – Electrical copper conductors – Safety requirements for screw-type and screwless-type clamping units (IEC 60999, series)* EN 61008-1, *Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs) – Part 1: General rules (IEC 61008-1)* EN 61210:1995, *Connecting devices – Flat quick-connect terminations for electrical copper conductors – Safety requirements (IEC 61210:1993, modififed)* IEC 60038, *IEC standard voltages* IEC 60050-101:1998, *International Electrotechnical Vocabulary – Part 101:*

Clause	Common modification
	Mathematics IEC 60050-441:1984, *International Electrotechnical Vocabulary. Switchgear, controlgear and fuses* IEC/TR 60755:2008, *General requirements for residual current operated protective devices* IEC 60760:1989, *Flat, quick-connect termination* IEC 60884-1, *Plugs and socket-outlets for household and similar purposes – Part 1: General requirements* *ASTM D785-08, Standard Test method for Rockwell Hardness of Plastics and Electrical Insulating Materials* ASTM B172-01a, *Standard Specification for Rope-Lay-Stranded Copper Conductors Having Bunch-Stranded Members, for Electrical Conductors* ICEA S-19-81 / NEMA WC3, *Rubber-Insulated Wire and Cable* ICEA S-66-524 / NEMA WC7, *Cross-Linked-Thermosetting-Polyethylene Insulated Wire and Cable* ICEA S-68-516 / NEMA WC8, *Ethylene-Propylene-Rubber Insulated Wire and Cable*

Table Z3 – Requirements for marking

Marking and other product information		Marking on the RCBO itself			Product information in the catalogue
	Each RCBO shall be marked in a durable manner with all or, for small apparatus, part of the following data: **The minimum requirements are indicated by the symbol "X"**	**If, for small devices the space available does not allow all the data to be marked, at least the following information shall be marked and visible when the device is installed.**	**The following information may be marked on the side or on the back of the device and be visible only before the device is installed..**	**Alternatively the following information may be on the inside of any cover which has to be removed in order to connect the supply wires.**	**Any remaining information not marked shall be given in the manufacturer's catalogues.**
a)	the manufacturer's name or trademark;		X		
b)	type designation, catalogue number or serial number;		X		
c)	rated voltage(s) with the symbol ~;		X		
d)	rated current without symbol "A", preceded by the symbol of overcurrent instantaneous tripping (B, C or D), for example B16;	X			
e)	rated frequency, if the RCBO is designed frequencies other than 50 Hz (see 5.3.5);		X		
f)	rated residual operating current ($I_{\Delta n}$)in A or in mA;	X			
g)	deleted				
h)	rated short circuit capacity, in amperes in a rectangle without symbol "A";		X [a]		
j)	reference calibration temperature, if different from 30 °C				X
k)	the degree of protection (only if different from IP20);				X
l)	the position of use (symbol according to EN 60051), if necessary;		X		
m)	rated residual making and breaking capacity ($I_{\Delta m}$), if different from rated short-circuit capacity (I_{cn})				X
n)	the symbol S (S in a square) for type S devices;	X			
o)	symbol of the method of operation according to Table Z1 of 4.1 if the RCBO is functionally dependent on the line voltage;		X	X	
q)	operating means of the test device, by the letter T [b];	X			
r)	wiring diagram unless the correct mode of operation is evident;		X	X	

s)	operating characteristic in presence of residual currents with d.c. components - RCBOs of type AC with the symbol 		X		
	- RCBOs of type A with the symbol 	X			
t)	energy limiting class (e.g. 3) in a square in accordance with Annex ZD as applicable [c]		X [a]		
u)	RCBOs according to 4.Z1 shall be marked with the symbol  : (the value -25 included in the snow flake symbol according to figure 0027 of ISO 7000) if relevant;		X		
v)	Indication of the terminal for the neutral with "N"		X		
w)	Additional marking of performance to other standards or additional requirements according to 6.Z.2		X		

[a] I_{cn} and the energy limiting class shall be on the device and combined together

[b] It is recommended to advise the user to test the device regularly.

[c] If Annex ZD is not applicable to the device, I^2t characteristics shall be available on request.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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.

Publication	Year	Title	EN/HD	Year
CISPR 14-1 + corr. January	2005 2009	Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission	EN 55014-1	2006
IEC 60051	Series	Direct acting indicating analogue electrical measuring instruments and their accessories	EN 60051	Series
IEC 60060-1 + corr. March + corr. March	1989 1990 1992	High-voltage test techniques - Part 1: General definitions and test requirements	HD 588.1 S1 [1)]	1991
IEC 60060-2	1994	High-voltage test techniques - Part 2: Measuring systems	EN 60060-2 [2)]	1994
IEC 60068-2-30	2005	Environmental testing - Part 2-30: Tests - Test Db: Damp heat, cyclic (12 h + 12 h cycle)	EN 60068-2-30	2005
IEC 60068-3-4	2001	Environmental testing - Part 3-4: Supporting documentation and guidance - Damp heat tests	EN 60068-3-4	2002
IEC 60112 + corr. October + corr. June	2003 2003 2003	Method for the determination of the proof and the comparative tracking indices of solid insulating materials	EN 60112	2003
IEC 60228	2004	Conductors of insulated cables	EN 60228 + corr. May	2005 2005
IEC 60364	Series	Low-voltage electrical installations	HD 60364	Series
IEC 60417	Data-base	Graphical symbols for use on equipment	-	-
IEC 60364-5-52	2001	Electrical installations of buildings - Part 5-52: Selection and erection of electrical equipment - Wiring systems	-	-
IEC 60364-5-53	2001	Electrical installations of buildings - Part 5-53: Selection and erection of electrical equipment - Isolation, switching and control	-	-
IEC 60529	-	Degrees of protection provided by enclosures (IP Code)	-	-
IEC 60664-1	2007	Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests	EN 60664-1	2007

[1)] HD 588.1 S1 is superseded by EN 60060-1:2010, which is based on IEC 60060-1:2010.
[2)] EN 60060-2 is superseded by EN 60060-2:2011, which is based on IEC 60060-2:2010.

Publication	Year	Title	EN/HD	Year
IEC 60898-1 (mod)	2002	Electrical accessories - Circuit breakers for overcurrent protection for household and similar installations - Part 1: Circuit-breakers for a.c. operation	EN 60898-1 + corr. February + A11 + A12	2003 2004 2005 2008
IEC 61009	Series	Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBO's)	EN 61009	Series
IEC 61543	1995	Residual current-operated protective devices (RCDs) for household and similar use - Electromagnetic compatibility	EN 61543 + corr. December + A12	1995 1997 2005
ISO 7000	1989	Graphical symbols for use on equipment - Index and synopsis	-	-

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 / Harmonization Document.

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
General	**Germany**
	In Germany the use of RCBOs of type AC is not permitted.

Annex ZC
(informative)

A-deviations

A-deviation: National deviation due to regulations, the alteration of which is for the time being outside the competence of the CENELEC member.

This European Standard falls under Directive 2004/108/EC.

NOTE (from CEN/CENELEC IR Part 2:2011 , 2.17) Where standards fall under EC Directives, it is the view of the Commission of the European Communities (OJ No C 59, 1982-03-09) that the effect of the decision of the Court of Justice in case 815/79 Cremonini/Vrankovich (European Court Reports 1980, p. 3583) is that compliance with A-deviations is no longer mandatory and that the free movement of products complying with such a standard should not be restricted except under the safeguard procedure provided for in the relevant Directive.

A-deviations in an EFTA-country are valid instead of the relevant provisions of the European Standard in that country until they have been removed.

Clause	Deviation
	Austria
	Regulations for electrical low voltage installations, statutory order BGBl. II/223/2010, issued 12. July 2010.
4.1	The content of the note of IEC 61009-1 Ed. 3 remains with the adaption to national reference: “The selection of the various types is made according to the requirements of OVE/ONORM E 8001-1:2010.”
4.1	Table Z1 is not valid in Austria.

Introduction of Annexes ZE and ZF:

Annex ZE
(normative)

Particular requirements for RCBOs with screwless type terminals for external copper conductors

ZE.1 Scope

This annex applies to RCBOs within the scope of clause 1, equipped with screwless terminals, for current not exceeding 20 A primarily suitable for connecting unprepared (see ZE.3.6) copper conductors of cross-section up to 4 mm^2.

In this annex, screwless terminals are referred to as terminals and copper conductors are referred to as conductors.

ZE.2 Void

ZE.3 Definitions

As a complement to clause 3, the following definitions apply:

ZE.3.1
clamping units
parts of the terminal necessary for mechanical clamping and the electrical connection of the conductors including the parts which are necessary to ensure correct contact pressure

ZE.3.2
screwless-type terminal
terminal for the connection and subsequent disconnection obtained directly or indirectly by means of springs, wedges or the like

Note 1 to entry: Examples are given in Figure J 2 .

ZE.3.3
universal terminal
terminal for the connection and disconnection of all types of conductors (rigid and flexible)

Note 1 to entry: In the following countries only universal screwless type terminals are accepted: AT, BE, CN, DK, DE, ES, FR, IT, PT, SE and CH.

ZE.3.4
non-universal terminal
terminal for the connection and disconnection of a certain kind of conductor only (e.g. rigid-solid conductors only or rigid-[solid or stranded] conductors only)

ZE.3.5
push-wire terminal
non-universal terminal in which the connection is made by pushing-in rigid (solid or stranded) conductors

ZE.3.6
unprepared conductor
conductor which has been cut and the insulation of which has been removed over a certain length for insertion into a terminal