TEST REPORT

IEC 61008-1

Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs)

Part 1: General rules

Report Number.....:	64.105.21.30939.01 Attachment no.1
Date of issue .....:	2022-01-07
Total number of pages .....:	104
Name of Testing Laboratory preparing the Report .....:	TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch 5F, Communication Building, 163 Pingyun Rd, Huangpu West Ave., 510656 Guangzhou, People's Republic of China
Applicant's name .....:	Autel New Energy Co.,Ltd.
Address .....:	Room 101, Building B2, Zhiyuan, No.1001 Xueyuan Avenue, Changyuan Community, Taoyuan Road, Nanshan District, Shenzhen, 518055, China
Test specification:	
Standard.....:	IEC 61008-1:2010 (Third Edition) +A1:2012 +A2:2013 used in conjunction with IEC 61008-2-1:1990 (First Edition)
Test procedure.....:	Test report
Non-standard test method……..:	N/A
Test Report Form No. .....:	IEC61008_1H
Test Report Form(s) Originator....:	OVE
Master TRF.....:	Dated 2015-11

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
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Test item description.....:	Residual direct current detecting device	
Trade Mark .....:	Autel	
Manufacturer.....:	Same as applicant	
Model/Type reference.....:	RDC-PD of Maxi C-SE AC W22–C5–4G-B	
Ratings .....:	32A, 230/400V~ 50/60Hz Detail information of product see “general product information”	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
☒ **Testing Laboratory:**	TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch	
Testing location/ address.....:	5F, Communication Building, 163 Pingyun Rd, Huangpu West Ave., 510656 Guangzhou, People’s Republic of China	
☒ **Associated Testing Laboratory:**	-	
Testing location/ address.....:	-	
Tested by (name, function, signature) .....:	**Guihua Yuan (Project handler)**	
Approved by (name, function, signature)..:	**Martin Ma (project reviewer)**	
☐ **Testing procedure: CTF Stage 1:**	-	
Testing location/ address.....:	-	
Tested by (name, function, signature) .....:	-	-
Approved by (name, function, signature)..:	-	-
☐ **Testing procedure: CTF Stage 2:**	-	
Testing location/ address.....:	-	
Tested by (name + signature) .....:	-	-
Witnessed by (name, function, signature).:	-	-
Approved by (name, function, signature)..:	-	-
☐ **Testing procedure: CTF Stage 3:**	-	
☐ **Testing procedure: CTF Stage 4:**	-	
Testing location/ address.....:	-	
Tested by (name, function, signature) .....:	-	-
Witnessed by (name, function, signature).:	-	-
Approved by (name, function, signature)..:	-	-
Supervised by (name, function, signature) .....:	-	-

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List of Attachments (including a total number of pages in each attachment):

See Attachment no.2 of 64.105.21.30939.01 for details.

Summary of testing:

Tests performed (name of test and test clause):

This report as the attachment of the main report for RCD type A function, just considered EN 61008-1/EN 61008-2-1 concerning RDC-PD integrated in RCCB function.

The test results in this report are positive.

Detail information of tests, as below:

6	Marking
8.1.1	General
8.1.2	Mechanism
9.6	Protection against electric shock
9.7	Dielectric properties
9.8	Temperature-rise
9.9	Residual operating characteristics
9.10	Mechanical and electrical endurance
9.17	Behaviour of RCCBs in case of failure of the line voltage
9.18	Non-operating current under overcurrent conditions
9.19	Unwanted tripping Behaviour in case of surge currents
9.23	Ageing of electronic components

EMC part wasn't considered in this test report.

Testing location:

Autel New Energy Co.,Ltd.

Room 101, Building B2, Zhiyuan, No.1001 Xueyuan Avenue, Changyuan Community, Taoyuan Road, Nanshan District, Shenzhen, 518055, China

Summary of compliance with National Differences (List of countries addressed):

List of countries addressed:

EN deviation between EN 61008-1:2012+A1:2014+A2:2014 +A11:2015 used in conjunction with

EN 61008-2-1:1994 + A11:1998 and IEC 61008-1:2010 +A1:2012 +A2:2013 used in conjunction with IEC 61008-2-1:1990 can refer to this test report from page 82-104.

Copy of marking plate

See main report for details

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Test item particulars:	RDC-PD
Classification of RCCBs functionally dependent on the line voltage:	Yes
Opening automatically in case of failure of the line voltage:	
- reclosing automatically when the line voltage is restored:	N/A
- not reclosing automatically when the line voltage is restored:	Yes
Not opening automatically in case of failure of the line voltage:	
- able to trip in a hazardous situation arising on failure of line voltage:	Yes
- not able to trip in a hazardous situation arising on failure of line voltage:	N/A
Type of RCCB:	
- type AC:	No
- type A:	Yes
- independent of the line voltage:	N/A
- dependent on the line voltage:	Yes
- without time delay:	Yes
- with time delay: type S:	No
- enclosed:	No
- unenclosed:	Yes, integral part of the charging system
- IP number:	IP00
- for fixed installation:	Yes
- for mobile installation:	No
Number of poles:	3P+N+PE
Ambient air temperature (°C):	-5 °C and +40 °C
Method of mounting:	Fixed
Method of connection:	Screw type
Rated residual operating current (A):	30mA
Rated current (A):	32A
Rated voltage (V):	230V/400V ~
Rated impulse withstands voltage (U_{imp}):	4000V
Nature of supply:	~
Rated frequency (Hz):	50Hz
Rated making and breaking capacity (A):	500A
Rated residual making and breaking capacity (A):	500A
Rated conditional short-circuit current (A):	1000A
Rated conditional residual short-circuit current (A):	1500A
Type of terminal:	Screw-type terminals

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Possible test case verdicts:	
- test case does not apply to the test object ..... :	N/A
- test object does meet the requirement..... :	P (Pass)
- test object does not meet the requirement ..... :	F (Fail)
Testing ..... :	
Date of receipt of test item ..... :	2021-11-25
Date (s) of performance of tests ..... :	2021-11-25 to 2022-01-07
General remarks:	
"(see Enclosure #)" refers to additional information appended to the report. "(see appended table)" refers to a table appended to the report. **Throughout this report a ☐ comma / ☒ point is used as the decimal separator.**	
Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....:	☐ Yes ☒ Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies).....:	Autel Intelligent Technology Corp.,Ltd. Guangming Branch 6F, West Wing and 7F&6F, East Wing, Building 2, and 6F of Electronical Building, Yanxiang Industrial Zone, Gaoxin Rd, Dongzhou Community of Guangming New District, Shenzhen, 518000, China
General product information: RDC-PD of Maxi C-SE AC W22–C5–4G-B is an integral part of the charging system. The rating of RDC-PD, Un=230V/400V, 50/60 Hz, 32A, IΔn=30mA, IΔdc=6mA, Im=500A, I△m=500A, Inc=1000A, IΔc=1500A.	

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IEC 61008-1			
Clause	Requirement + Test	Result - Remark	Verdict
	TEST SEQUENCE A_1 (1 sample)		**P**
6.	**MARKING**		**P**
	a) manufacturer's name or trademark .....:	Autel	P
	b) type designation, catalogue number or serial number .....:	RDC-PD of Maxi C-SE AC W22–C5–4G-B	P
	c) rated voltage(s) (V) .....:	230V/400V	P
	d) rated frequency (Hz) .....:	50/60Hz	P
	e) rated current (A) .....:	32A	P
	f) rated residual operating current (A) .....:	30mA	P
	g) settings of residual operating current for RCCBs with multiple residual operating current settings;		N/A
	h) rated making and breaking capacity (A) .....:	500A	P
	j) degree of protection .....:	IP00, Integrated in the charge station	P
	k) position of use .....:	Integrated in the charge station	P
	l) rated residual making and breaking capacity (A) .....:	500A	P
	m) symbol S for type S		N/A
	n) symbol of the method of operation .....:		P
	o) operating means of test device .....:	Integrated in the charge station system, and evaluated in end-use standard	P
	p) wiring diagram .....:		P
	q) operating characteristic .....:	Evaluated in end-use standard	P
	Marking on the RCCB itself or on nameplate or nameplates attached to the RCCB and located so that for small devices at least e), f), o) and q) (only for type A) are legible when the RCCB is installed:	Evaluated in end-use standard	P
	Joule integral withstand capacity (A^2s) .....:	See main report for details	N/A
	Peak current withstand capacity (A) .....:	See main report for details	N/A
	Time delay when opening in case of failure of the line voltage (s) .....:		N/A
	Open position indicated by "0" and closed position by "I" .....:		N/A
	For push-buttons the OFF push-button shall either be red or marked with "0" .....:		N/A

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IEC 61008-1			
Clause	Requirement + Test	Result - Remark	Verdict
	If necessary to distinguish between supply and load terminals they shall be clearly marked .....:		P
	Terminals for neutral conductor marked by "N"		P
	Terminals for protective conductor marked by [symbol IEC 417-5019 a]		P
	Marking indelible, easy legible and not on removable parts	Evaluated in end-use standard	N/A
9.3	Test: 15 s with water, 15 s with hexane		N/A
	For universal terminals (rigid-solid, rigid-stranded and flexible conductors:		N/A
	- no markings		N/A
	For non-universal terminals:		N/A
	- terminals for rigid-solid conductors only, marked by the letters “s” or “sol”		N/A
	- terminals for rigid (solid and stranded) conductors only, marked by the letter “r”		N/A
	marking on the RCCB or if the space available is not sufficient, on the smallest package unit or in technical information		N/A
8.	**REQUIREMENTS FOR CONSTRUCTION AND OPERATION**		**P**
8.1.1	**General**		——
	Residual current detection is located between the incoming and outgoing terminals		P
	Not possible to alter the operating characteristics by means of external interventions other than those specifically intended for changing the setting of the residual operating current		P
	Changing from one setting to another shall not be possible without a tool		N/A
	In case of an RCCB having multiple settings of residual operating current the rating refers to the highest setting		N/A
8.1.2	**Mechanism**		P
	Moving contacts of all poles so mechanically coupled that all poles except the switched neutral, make and break substantially together	Electrically coupled to a separate switching device	——
	Switched neutral opens after and closes before other poles		P
	Compliance is checked by inspection and by manual tests, using any appropriate means (e.g.: indicator lights, oscilloscope, etc.)		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Trip-free mechanism		P
9.15	Test: the RCCB is mounted and wired as in normal use	See the report 64.105.21.30160.01 for details	N/A
	- test circuit according to fig. 4a		N/A
	- a residual current equal to 1,5 I_{Dn} is passed by closing S2, the RCCB having been closed and the operating means being held in the closed position. The RCCB shall trip		N/A
	- test repeated by moving the operating means slowly (1 s) to a position where the current starts to flow. Tripping shall occur without further movement		N/A
8.1.2	Possible to switch on and off by hand		N/A
	No intermediate positions of the contacts		P
	In the open position isolation distance in accordance with the requirements necessary to satisfy the isolating function	According to RDC-PD of IEC 62955, the isolation distance is 3.0mm, the actual isolation distance is 3.2mm	P
	Indication of the open and closed position of the main contacts shall be provided by one or both of the following means:	Equipped in end-product	N/A
	- the position of the actuator (this being preferred)		N/A
	- a separate mechanical indicator		N/A
	If a separate mechanical indicator is used, this shall show the colour red for the closed position and the colour green for the open position		N/A
	means of indication of the contact position shall be reliable -checked by inspection and by the tests of 9.15	Evaluated in end-use standard	N/A
	RCCBs shall be designed so that the actuator, front plate or cover can only be correctly fitted in a manner which ensures correct indication of the contact position -checked by inspection and by the tests of 9.11	Equipped in end-product	N/A
	When means are provided or specified by the manufacturer to lock the operating means in the open position: locking only possible when the main contacts are in the open position		N/A

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IEC 61008-1			
Clause	Requirement + Test	Result - Remark	Verdict
	If the operating means is used for indication, it shall, when released, automatically take up the position to that of the moving contacts; the operating means shall have two distinct rest positions except that for automatic opening a third distinct position may be provided, when necessary to reset before reclosing		N/A
	For RCCBs functionally dependent on line voltage, reclosing automatically when the line voltage is restored after failure, the operating means shall remain in the ON position and the contacts shall reclose automatically unless the operating means has been placed in the OFF position		P
	When an indicator light is used this shall be lit when the RCCB is in the closed position	Equipped in end-product	N/A
	The indicator light shall not be the only means to indicate the closed position		N/A
	The action of the mechanism shall not be influenced by the position of enclosures or covers and shall be independent of any removable part.		P
	If the cover is used as a guiding means for push-buttons, it shall not be possible to remove the buttons from the outside		N/A
	Operating means securely fixed; not possible to remove them without a tool		P
	For "up-down" operating means the contacts shall be closed by the up movement		N/A
8.1.4	Screws, current-carrying parts and connections	See the report 64.105.21.30160.01 for details	P
8.1.4.1	Connections withstand mechanical stresses occurring in normal use		N/A
	Screws for mounting the RCCB are not of thread-cutting type		N/A
9.4	**Screws and nuts which are operated when mounting and connecting comply with the test of 9.4**		N/A
	Torque test:		——
	- torque (Nm); 5/10 times; diameter (mm) .....:	See the report 64.105.21.30160.01 for details	N/A
	- torque (Nm); 5/10 times; diameter (mm) .....:		N/A
	- torque (Nm); 5/10 times; diameter (mm) .....:		N/A
8.1.4.2	Screws with a thread of insulating material operated when mounting the RCCB: correct introduction ensured		N/A

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IEC 61008-1			
Clause	Requirement + Test	Result - Remark	Verdict
8.1.4.3	Electrical connections: contact pressure not transmitted through insulating material unless there is sufficient resilience in the metallic parts		N/A
8.1.4.4	Current-carrying parts including parts intended for protective conductors, if any, shall be made of a metal having, under the conditions occurring in the equipment, mechanical strength, electrical conductivity and resistance to corrosion adequate for their intended use. Examples below:		N/A
	- copper		N/A
	- an alloy 58% copper for parts worked cold		N/A
	- an alloy 50% copper for other parts		N/A
	- other metal		N/A
	In case of using ferrous alloys or suitably coated ferrous alloys, compliance to resistance to corrosion is checked by a test of resistance to rusting (see 9.25).		N/A
	The requirements of this subclause do not apply to: contacts, magnetic circuits, heater elements, bimetals, shunts, parts of electronic devices or to screws, nuts, washers, clamping plates, similar parts of terminals and parts of the test circuit		N/A
8.1.5	Terminals for external conductors	See the report 64.105.21.30160.01 for details	N/A
	Compliance is checked by inspection and by the tests as relevant for the type of connection:		N/A
	9.5 for screw-type terminals		N/A
	by specific tests for plug-in or bolt-on RCCBs included in the standard		N/A
	by the tests of Annexes J, K or L		N/A
8.1.5.1	Terminals ensure the necessary contact pressure		N/A
9.5	**Torque test:**		N/A
	- torque (Nm); diameter (mm) .....:		N/A
	- max. cross-sectional area (mm²) .....:		¾
9.5.1	Pull test:		N/A
	Terminal shall be suitable for all types of conductors: rigid (solid or stranded) and flexible, unless otherwise specified by the manufacturer**.**		¾
	Min. cross-section solid / stranded /flexible (mm²):		¾
	Max. cross-section solid /stranded /flexible (mm²):		¾

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Clause	Requirement + Test	Result - Remark	Verdict
	Torque $^2/_3$ (Nm).....		¾
	Pull for 1 min solid / stranded / flexible (N):		N/A
	During the test no noticeable move of conductor		N/A
9.5.2	Torque test:		N/A
	- torque (2/3) (Nm) .....:		¾
	- min. cross-sectional area (mm²) .....:		¾
	- max. cross-sectional area (mm²) .....:		¾
	The conductor shows no damage		N/A
	Terminals have not worked loose and no damage		N/A
9.5.3	Terminals fitted with the largest cross-section area specified in Table 6, for stranded and/or flexible copper conductor.		¾
	Max. cross-section stranded (mm²).....		¾
	Max. cross-section flexible (mm²).....		¾
	Torque $^2/_3$ (Nm).....		¾
	After the test no strand of conductor escaped outside		N/A
8.1.5.2	RCCBs shall be provided with:		¾
	- terminals which shall allow the connection of copper conductors having nominal cross-sectional areas as shown in Table 6		N/A
	Rated current (A) / Range of nominal cross sections to be clamped* (mm²)		N/A

Rated current (A)	Rigid (solid or stranded) conductors	Flexible conductors
£ 13	1 to 2,5	1 to 2,5
> 13 £ 16	1 to 4	1 to 4
> 16 £ 25	1,5 to 6	1,5 to 6
> 25 £ 32	2,5 to 10	2,5 to 6
> 32 £ 50	4 to 16	4 to 10
> 50 £ 80	10 to 25	10 to 16
> 80 £ 100	16 to 35	16 to 25
> 100 £ 125	24 to 50	25 to 35

	*It is required that, for current ratings up to and including 50 A, terminals be designed to clamp solid conductors as well as rigid stranded conductors. Nevertheless, it is permitted that terminals for conductors having cross-sections from 1 mm² up to 6 mm² be designed to clamp solid conductors only.		N/A

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	- or terminals for external untreated aluminium conductors and with aluminium screw-type terminals for use with copper or with aluminium conductors according to Annex L.		N/A
8.1.5.3	Means for clamping the conductors in the terminals do not serve to fix any other component (see tests of 9.5)		N/A
8.1.5.4	Terminals for In £ 32 A allow the connection of conductors without special preparation		N/A
8.1.5.5	Terminals shall have adequate mechanical strength and metric ISO thread or equivalent (see tests of 9.4 and 9.5.1)		N/A
8.1.5.6	Clamping of conductor without undue damage to conductor (see tests of 9.5.2)		N/A
8.1.5.7	Clamping of conductor reliably and between metal surfaces (see tests of 9.4 and 9.5.1)		N/A
8.1.5.8	Terminals so designed or positioned that no conductor can slip out while the clamping screws or nuts are tightened (see tests of 9.5.3.)		N/A
8.1.5.9	Terminals so fixed or located that they do not work loose when the clamping screws or nuts are tightened or loosened (see tests of 9.4)		N/A
8.1.5.10	Clamping screws or nuts of terminals for the protective conductors adequately secured against accidental loosening and not possible to unclamp without a tool		N/A
8.1.5.11	Screws and nuts of terminals for external conductors shall be in engagement with a metal thread and the screws shall not be of the tapping screw type		N/A
8.2	**Protection against electric shock**		N/A
	Live parts not accessible in normal use	RDC-PD integrated in the charger Maxi C-SE AC W22–C5–4G-B), to be assessed in end-use product	N/A
	For RCCBs other than plug-in type, external parts, other than screws or other means for fixing covers, which are accessible in normal use shall be of insulating material or be lined throughout with insulating material		N/A
	Lining reliably fixed		N/A
	Lining has adequate thickness and mechanical strength		N/A
	Inlet openings for cables or conduits shall be of insulating material or be provided with bushings or similar devices of insulating material		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Such devices shall be reliably fixed		N/A
	Such devices shall have adequate mechanical strength		N/A
	For plug-in RCCBs, external parts, other than screws or other means for fixing covers, which are accessible, shall be of insulating material		N/A
	Metallic operating means insulated from live parts		N/A
	Metal parts of the mechanism not accessible, insulated from accessible metal parts, from metal frames (for flush-type), from screws or other means for fixing the base and from metal plates		N/A
	Possible to replace plug-in RCCBs easily without touching live parts		N/A
	Lacquer or enamel not considered to provide adequate insulation		N/A
9.6	**Test: verify with test finger, 1 min with a force of 75 N**		N/A
	Enclosures or covers not deformed to such an extent that live parts can be touched		N/A
8.9	**Resistance to heat**		P
	RCCB sufficiently resistant to heat		P
9.13.1	Test: 1 h; test temperature (°C): (100 ± 2) °C for not removable covers or (70 ± 2)°C for removable covers .....:	100 °C / 70 °C	P
	No change impairing further use and no flow of sealing compound so that live parts are exposed		P
	No access to live parts even if the test finger is applied with a force not exceeding 5 N		P
	The RCCB shall trip with a test current of 1,25 I_{Dn} (mA) .....:	37.5 mA	P
	Marking still legible after test		P
9.13.2	Ball-pressure test for external parts of insulating material (parts retaining live parts in position); test temperature: 125 °C ± 2°C for 1 h; diameter of impression (mm): £ 2 mm .....:	See the report 64.105.21.30160.01 for details	N/A
9.13.3	Ball-pressure test for external parts of insulating material (parts not retaining live parts in position); test temperature (°C): (70 ± 2)°C or (40 ± 2) °C + max. temperature rise of 9.8; diameter of impression (mm): £ 2 mm .....:	See the report 64.105.21.30160.01 for details	N/A
8.1.3	Clearances and creepage distances (internal and external parts)		¾

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IEC 61008-1			
Clause	Requirement + Test	Result - Remark	Verdict
	The minimum required clearances and creepage distances are based on the RCCB being designed for operating in an environment with pollution degree 2	See the report 64.105.21.30160.01 for details	N/A
	Compliance for item 1 in is checked by measurement and by the test of 9.7.7.4.1 and 9.7.7.4.2. The test is carried out with samples not submitted to the humidity treatment described in 9.7.1.		N/A
	The clearances of items 2 and 4 (except accessible surface after installation) may be reduced provided that the measured clearances are not shorter than the minimum allowed in IEC 60664-1 for homogenous field conditions.		N/A
	In this case, after the humidity treatment in 9.7.1, compliance for item 2 and 4 and arrangements of 9.7.2 items b), c), d) and e) is checked:		N/A
	- Tests according to 9.7.2 to 9.7.6 as applicable		N/A
	- Test according to 9.7.7.2 with test voltages acc. Table 16 with test arrangements of 9.7.2 items b), c), d), e)		N/A
	If measurement does not show any reduced clearance, test 9.7.7.2 is not applied		N/A
	Compliance for item 3, checked by measurement		N/A
	Parts of PCBs connected to the live parts protected against pollution by the use of a type 2 protection according to IEC 60664-3 are exempt from this verification		N/A
	The insulating materials are classified into Material Groups on the basis of their comparative tracking index (CTI) acc. to IEC 60664-1 and measured according to IEC 60112		N/A
	Clearances [mm] U_{imp}		¾
	4kV (see table 5) **2,5kV(see table 5)**	☒ ☐	¾
		Minimum clearances (see table 5)	¾
	1. between live parts which are separated when the main contacts are in the open position		N/A
	2. between live parts of different polarity		N/A
	3. between circuits supplied from different sources, one of which being PELV or SELV		N/A
	4. between live parts and:		¾
	- accessible surfaces of operating means		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- screws or other means for fixing covers which have to be removed when mounting the RCCB		N/A
	- surface on which the RCCB is mounted		N/A
	- screws or other means for fixing the RCCB		N/A
	- metal covers or boxes		N/A
	- other accessible metal parts		N/A
	- metal frames supporting flush-type RCCBs		N/A
	Minimum creepage distances (see table 5)		¾
	Material group	IIIb ☐ IIIa ☒ II ☐ I ☐	N/A
		minimum creepage distances [mm]	¾
	1. between live parts which are separated when the main contacts are in the open position		N/A
	2. between live parts of different polarity		N/A
	3. between circuits supplied from different sources, one of which being PELV or SELV		N/A
	4. between live parts and:		¾
	- accessible surfaces of operating means		N/A
	- screws or other means for fixing covers which have to be removed when mounting the RCCB		N/A
	- surface on which the RCCB is mounted		N/A
	- screws or other means for fixing the RCCB		N/A
	- metal covers or boxes		N/A
	- other accessible metal parts		N/A
	- metal frames supporting flush-type RCCBs		N/A
9.25	**Test of resistance to rusting:**	See the report 64.105.21.30160.01 for details	¾
	- 10 min immersed in a cold chemical degreaser such as methyl-chloroform or refined petrol		N/A
	- 10 min immersed in a 10% solution of ammonium chloride in water at 20°C±5°C		N/A
	- 10 min in a box containing air saturated with moisture at 20°C±5°C		N/A
	- 10 min at 100°C		N/A
	No sign of rust		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	TEST SEQUENCE A_2 (3 samples)		N/A
8.10	**Resistance to abnormal heat and fire**		N/A
	External parts of insulating material shall not be liable to ignite and to spread fire under fault or overload conditions	See the report 64.105.21.30160.01 for details	N/A
9.14	**Glow wire test**		N/A
	Test performed on a complete RCCB		N/A
	Glow-wire test: (960 + 15) °C for external parts of insulating material retaining current-carrying parts or parts of the protective circuit in position		N/A
	Glow-wire test: (650 + 10) °C for all other external parts insulating material		N/A
	No visible flames, no sustained glowing, or		N/A
	flames and glowing extinguish within 30 s after removal .....:		N/A
	No ignition of tissue paper or scorching of the pinewood board		N/A

	TEST SEQUENCE B (3 samples)		P
	requirements for construction and operation		**P**
8.3	Dielectric properties and isolating capability		P
	RCCBs have adequate dielectric properties		P
9.7	Test of dielectric properties and isolating capability		¾
9.7.7.4	Verification of resistance of the insulation of open contact and basic insulation against an impulse voltage in normal conditions		P
	These tests are not preceded by the humidity treatment described in 9.7.1.		P
	The test is carried out on an RCCB fixed on a metal support		P
	The impulses are given by a generator producing positive and negative impulses having a front time of 1,2µs, and a time to half-value of 50µs		P
	The shape of the impulses is adjusted with the RCCB under test connected to the impulse generator.		P
	For RCCBs with incorporated surge arresters that cannot be disconnected, the shape of the impulses is adjusted without connection of the RCCB to the impulse generator.		N/A

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IEC 61008-1			
Clause	Requirement + Test	Result - Remark	Verdict
	rated impulse withstand voltage [kV]:	6kV	¾
	see level of test laboratory [m]	Sea level	¾
	test voltage (acc. Table 22) [kV]:	6.2kV	¾
9.7.7.4.2	RCCB in open position (contacts in open position)		P
	The impulses are applied between:		¾
	the line terminals connected together and the load terminals connected together		P
9.7.7.4.3	RCCB in closed position		P
	All components bridging the basic insulation disconnected		P
	A first series of tests is made applying the impulse voltage between the phase pole(s) and the neutral pole (or path) connected together and the metal support connected to the terminal(s) intended for the protective conductor(s), if any		P
	A second series of tests is made applying the impulse voltage between the phase pole(s), connected together, and the neutral pole (or path) of the RCCB		P
	Five positive impulses and five negative impulses are applied, the interval between consecutive impulses being at least 1 s for impulses of the same polarity and being at least 10 s for impulses of the opposite polarity.		P
	no disruptive discharges during the test		P
9.7.7.5	**Verification Of The Behaviour Of Components Bridging The Basic Insulation**		**P**
	A new RCCB sample is tested		P
	Test only performed on RCCBs, where components bridging the basic insulation have been disconnected during the impulse voltage test of 9.7.7.4.3		P
	test voltage 1200V+U_0	1600V	P
	The voltage is applied during 5s between the phase pole(s) and the neutral pole (or path) connected together and the metal support connected to the terminal(s) intended for the prospective conductor(s), if any		P
	after test, no component bridging the basic insulation should show a visible alteration.		P
	Then, the equipment is connected to the mains acc. manufacturer's instruction		P
	The RCCB shall trip with a test current of 1,25 I_{DN}		P

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IEC 61008-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Test switch S_2 and RCCB in the closed position, test voltage established by closing the test switch S_1.		P
9.7.1	**Resistance To Humidity**		P
9.7.1.1	Parts which can be removed without a tool are removed, spring lids kept open, inlet openings are left open and if knock-outs one is opened.		P
9.7.1.2	Test conditions: 48 h in humidity cabinet RH = 91% to 95% T = 20 to 30°C ± 1°C		P
9.7.1.4	The samples show no damage		P
9.7.2	Insulation resistance of the main circuit measured between 30 and 60 min after this treatment with 500 V DC after 5 s:		¾
	a) between the terminals which are electrically connected together when the RCCB is in the closed position ³ 2 MW	B1: >500MΩ B2: >500MΩ B3: >500MΩ	P
	b) between each pole and the others connected together (electronic components, connected between current path being disconnected) ³ 2 MW	B1: >500MΩ B2: >500MΩ B3: >500MΩ	P
	c) with the RCCB in the closed position, between all poles connected together and the frame, including a metal foil in contact with the outer surface of the housing of insulation material but with the terminal area kept free ³ 5 MW	B1: >500MΩ B2: >500MΩ B3: >500MΩ	P
	d) between metal parts of the mechanism and the frame ³ 5 MW	B1 - B2 - B3 -	N/A
	e) between the frame and a metal foil in contact with the inner surface of the lining of insulating material ³ 5 MW	B1 - B2 - B3 -	N/A
9.7.3	Dielectric strength of the main circuit measured with an AC voltage (45-65Hz) for 1 min:		¾
	a) electronic components disconnected 2000 V		P
	b) electronic components disconnected 2000 V		P
	c) electronic components disconnected 2000 V		P
	d) electronic components disconnected 2000 V		N/A
	e) electronic components disconnected 2500 V		N/A
	No flashover or breakdown		P

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IEC 61008-1			
Clause	Requirement + Test	Result - Remark	Verdict
9.7.4	Insulation resistance of auxiliary circuits measured with 500 V DC after 1 min:		¾
	1) between all auxiliary circuits and the frame (MW)……..³ 2 MW	B1 - B2 - B3 -	N/A
	2) between each part of the auxiliary circuits which might be isolated from the other parts and the whole of the other parts connected together (MW)……..³ 2 MW	B1 - B2 - B3 -	N/A
	Dielectric strength of auxiliary circuits measured with an AC voltage at rated frequency for 1 min:		¾
	Rated voltage of auxiliary circuits (a.c. or d.c.) — Test voltage (V) £ 30 — 600 > 30 £ 50 — 1000 > 50 £ 110 — 1500 > 110 £ 250 — 2000 > 250 £ 500 — 2500	V	¾
	1) between all auxiliary circuits and the frame	B1 - B2 - B3 -	N/A
	2) between each part of the auxiliary circuits which might be isolated from the other parts and the whole of the other parts connected together	B1 - B2 - B3 -	N/A
	No flashover or perforation		N/A
9.7.7.2	Verification of clearances with the impulse withstand voltage		N/A
	If the measurement of clearances of items 2 and 4 in Table 5 shows a reduction of the required length, this test applies.		N/A
	The test is carried out on an RCCB fixed on a metal support and being in the closed position		N/A
	The impulses are given by a generator producing positive and negative impulses having a front time of 1,2ms, and a time to half-value of 50ms		N/A
	The shape of the impulses is adjusted with the RCCB under test connected to the impulse generator.		N/A
	For RCCBs with incorporated surge arresters that cannot be disconnected, the shape of the impulses is adjusted without connection of the RCCB to the impulse generator.		N/A
	test performed with:		¾

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Clause	Requirement + Test	Result - Remark	Verdict
	- surge impedance of the test apparatus £500W and surge protective devices disconnected before testing or		N/A
	- hybrid generator with an surge impedance of 2 Ω and surge protective devices not disconnected before testing		N/A
	rated impulse withstand voltage [kV]:		¾
	see level of test laboratory [m]		¾
	test voltage (acc. Table 16) [kV]:		¾
	A first series of tests is made applying the impulse voltage between the phase pole(s) and the neutral pole (or path) connected together and the metal support connected to the terminal(s) intended for the protective conductor(s), if any		N/A
	A second series of tests is made applying the impulse voltage between the phase pole(s), connected together, and the neutral pole (or path) of the RCCB		N/A
	A third series of tests is made applying the impulse voltage between (and not tested during the two first sequences described here above):		N/A
	b) between each pole and the others connected together (electronic components, connected between current path being disconnected)	B1 - B2 - B3 -	N/A
	c) between all poles connected together and the frame	B1 - B2 - B3 -	N/A
	d) between metal parts of the mechanism and the frame	B1 - B2 - B3 -	N/A
	e) between the frame and a metal foil in contact with the inner surface of the lining of insulating material	B1 - B2 - B3 -	N/A
	Five positive impulses and five negative impulses are applied, the interval between consecutive impulses being at least 1 s for impulses of the same polarity and being at least 10 s for impulses of the opposite polarity.		N/A
	no disruptive discharges during the test		N/A
9.7.5	Secondary circuit of detection transformers		N/A
	No insulation test, provided that no connection with accessible metal parts or with protective conductor or live parts exists.		N/A

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IEC 61008-1			
Clause	Requirement + Test	Result - Remark	Verdict
9.7.6	Capability of control circuits connected to the main circuit of withstanding high DC voltages due to insulation measurements		P
	RCCB fixed on metal support in closed position with all control circuits connected as in service.		P
	Open test voltage 600 V +25 / -0 V Maximum ripple 5% Short-circuit current 12 mA +2 / -0 mA Applied for 1 min between each pole and the other poles connected together to the frame.		P
	After this treatment, the RDC-DD shall be capable of performing satisfactorily the tests specified in 9.9.2.3.		P
8.4	**Temperature rise**		**P**
	Temperature rises do not exceed the limiting values stated in table 7.	See main report for details	N/A
	Cross-section (mm²)		N/A
9.8.1	Ambient air temperature (°C)		N/A
9.8.2	Test current I_N (A) until steady state values are reached.		N/A
	Four pole RCCBs:		N/A
	Current passing through		N/A
	- 3 phase poles (1)		N/A
	- neutral and adjacent pole (2)		N/A
	Parts ……...Temperature rise K		N/A
	Terminals for external connections (K) ……..65	B1 – B2 – B3 –	N/A
	External parts liable to be touched during manual operation of the RCCB, including operating means of insulating material and metallic means for coupling insulated operating means of several poles (K)…… 40	B1 – B2 – B3 –	N/A
	External metallic parts of operating means (K)..25	B1 – B2 – B3 –	N/A
	Other external parts, including that face of the RCCB in direct contact with the mounting surface (K)……..60	B1 – B2 – B3 –	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
8.16	**Reliability**		N/A
	RCCBs operate reliably even after long service.	See the report 64.105.21.30160.01 for details	N/A
9.22.2	Test with 28 cycles at 40 ± 2°C		¾
	Cross-section (mm²):		¾
	Torque $^2/_3$ (Nm):		¾
	Test current I_N (A):		¾
	- with current passing .....21 h		N/A
	- without current.....3 h		N/A
	For 4 pole RCCBs with 3 overcurrent protected poles only 3 poles loaded		N/A
	At the end of the last period of 21 h with current passing the temperature rise of the terminals shall not exceed 65K (K)	B1 – B2 – B3 –	N/A
	After cool down the RCCB shall trip with a test current of 1,25 I_{DN}, One test only is made on one pole taken at random without measurement of break time.		N/A
	Test switch S_2 and RCCB in the closed position, test voltage established by closing the test switch S_1.		N/A
9.23	**Verification of ageing of electronic components**		P
	168 h at 40 ± 2°C.....:	40°C	P
	Test current In (A).....:	32A	P
	Cross-section (mm²) .....:	6mm²	P
	Electronic parts at 1,1 Un.....:	253/440V	P
	After cool down:		P
	- electronic parts show no damage		P
	Under the conditions of tests specified in 9.9.2.3, the RCCB shall trip with a test current of 1,25 IΔn. One test only is made on one pole taken at random without measurement of break time.		P
	Test switch S_2 and RCCB in the closed position, test voltage established by closing the test switch S_1		P

	TEST SEQUENCE C (3 samples)	P
8.6	**Mechanical and electrical endurance**	P

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Clause	Requirement + Test	Result - Remark	Verdict
	RCCBs shall be capable of performing an adequate number of mechanical and electrical operations		P
9.10	**Test is made:**		¾
	- In £ 25 A; 2 s on; 13 s off .....:		N/A
	- In > 25 A; 2 s on; 28 s off .....:	32A	P
	Number of operating cycles: 2000		P
	Test voltage Un (V); test current In (A); cos phi 0,85-0,9 .....:	230/400V, 32A, 0.85	¾
	Cross-sectional area (mm²) .....:	6 mm²	¾
	RCCBs having I_{Dn} > 0,010 A tested at:		
	- 1000 cycles for manual operation .....:	30mA, 1000 cycles	P
	- 500 cycles by using the test device .....:	30mA, 500 cycles	P
	- 500 cycles at a current of I_{Dn} .....:	30mA, 500 cycles	P
	RCCBs having I_{Dn} £ 0,010 A tested at:		P
	- 500 cycles for manual operation .....:		P
	- 750 cycles by using the test device .....:		P
	- 750 cycles at a current of I_{Dn} .....:		P
	Test is made without load using manual operation:		P
	- In £ 25 A; 2000 cycles .....:		N/A
	- In > 25 A; 1000 cycles .....:	32A; 1000 cycles	P
	After the test:		¾
	- no undue wear		P
	- no damage		P
	- no loosening of connections		P
	- no seepage of sealing compound		N/A
	The RCCB shall trip with a test current of 1,25 I_{Dn} (mA)		P
	Dielectric strength test at a voltage of 900 V a.c. for 1 min:		P
	a) .....:	900V	P
	b) .....:	900V	P
	c) .....:	900V	P
	d) .....:		N/A
	e) .....:		N/A

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IEC 61008-1												
Clause	Requirement + Test					Result - Remark						Verdict
	TEST SEQUENCE D (3 samples)											**P**
	Tests "D0"											**P**
8.5	**Operating characteristics**											P
	For multiple settings of I_{Dn} tests are made for each setting											N/A
9.9.1	RCCB installed as for normal use, test circuit according to fig. 4											P
9.9.4	For RCCBs functionally dependent on line voltage, each test is made at 1,1 and 0,85 times the rated line voltage; voltage (V) .....:						195.5V/340V-253V/440V					P
	Type	I_N A	$I_{\Delta N}$ A	Standard values of break time and non-actuating time at a residual current equal to								——
				$I_{\Delta N}$	2 $I_{\Delta N}$	5 $I_{\Delta N}$	5 $I_{\Delta N}$ or 0,25A **a)**	5A-200A, **b)**	500A			——
	General	Any value	<0.03	0.3	0.15	--	0.04	0.04	0.04	Max. break times		N/A
			0.03	0.3	0.15	--	0.04	0.04	0.04			P
			>0.03	0.3	0.15	0.04	--	0.04	0.04			N/A
	S	³ 25	>0.03	0.5	0.2	0.15	--	0.15	0.15	Max. break times		N/A
				0.13	0.06	0.05	--	0.04	0.04	Min. non-actuating times		N/A
	a) value to be decided by the manufacturer for this test						5 $I_{\Delta N}$					P
	b) The test are only made during verification of the correct operation as mentioned in 9.9.2.4											--
Test voltage: 0.85Un= 195.5V/340V												
9.9.2	Off-load tests made at a temperature of 20 ± 5 °C											P
9.9.2.1	Verification of the correct operation in case of a steady increase residual current:											P
	- steady increase from 0,2 I_{Dn} to I_{Dn} within 30 s											P
	- tripping current between I_{Dno} and I_{Dn} (mA) .....:						# D1	23.3	23.4	23.3	23.4	23.4 P
							# D2	23.5	23.5	23.5	23.4	23.4
							# D3	23.5	23.5	23.4	23.4	23.4
9.9.2.2	Verification of the correct operation at closing on residual current											P
	- the RCCB closes on I_{Dn}: no value exceeds the specified limiting value of Table 1 (ms)											P

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Clause	Requirement + Test	Result - Remark						Verdict
9.9.2.3	The test circuit being successively calibrated at each of the values of residual current specified in Table 1, the test switch S2 and the RCCB being in the closed position, the test voltage is suddenly established by closing the test switch S1							P
	- maximum break time (ms) at: I_{Dn} .....:	# D1	21.0	22.7	21.0	25.1	22.0	P
		# D2	22.0	22.0	22.1	21.8	24.2	
		# D3	24.8	21.3	22.1	22.1	25.0	
	- maximum break time (ms) at: 2_{Dn} .....:	# D1	18.2	18.9	20.5	20.9	19.4	P
		# D2	19.1	20.7	18.8	20.4	18.1	
		# D3	20.7	21.2	18.0	20.8	16.0	
	- maximum break time (ms) at: 5_{Dn} .....:	# D1	14.7	18.7	12.0	17.7	13.2	P
		# D2	16.6	13.8	17.1	18.7	13.2	
		# D3	14.1	17.8	18.0	13.5	13.1	
	- maximum break time (ms) at: 5 A (if applicable) .....:	# D1	15.1	15.5	12.5	13.9	13.9	P
		# D2	17.5	18.8	16.5	13.0	12.0	
		# D3	18.5	13.3	11.5	14.5	13.3	
	- maximum break time (ms) at: 500 A .....:	# D1	16.3	17.6	27.3	11.5	15.3	P
		# D2	10.0	17.5	16.0	13.3	9.8	
		# D3	11.8	10.0	10.0	15.8	16.3	
	No value exceeds the relevant specified limiting value							P
9.9.2.4	Verification of the correct operation in case of sudden appearance of residual current of values between 5 I_{Dn} and 500A, (among the following list: 5A, 10A, 20A, 50A, 100A, 200A):							P
	The test switch S1 and the RCCB being in the closed position, the residual current is suddenly established by closing the test switch S2							P
	- maximum break time (ms) at: ___50___A (value 1 between 5A and 200A) .....:	IΔn	107A	55A	90A	100A	126A	P
		# D1	17.5	10.0	14.8	15.0	11.7	
		# D2	18.8	11.0	13.3	11.5	12.3	
		# D3	16.5	13.8	15.2	11.0	8.8	
	No value exceeds the relevant specified limiting value							P
	Additional test for type S:							N/A
	- minimum non-actuating time (ms) at: I_{Dn}; 0,13 s :	D1 -						N/A
		D2 -						
		D3 -						

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Clause	Requirement + Test	Result - Remark						Verdict
	- minimum non-actuating time (ms) at: 2 I_{Dn}; 0,06 s .....:	D1 -						N/A
		D2 -						
		D3 -						
	- minimum non-actuating time (ms) at: 5 I_{Dn}; 0,05 s .....:	D1 -						N/A
		D2 -						
		D3 -						
	- minimum non-actuating time (ms) at: 500 A; 0,04 s .....:	D1 -						N/A
		D2 -						
		D3 -						
	No tripping during tests							N/A
9.9.2.6	a) Tests repeated at a temperature of -5 °C:							
	The test circuit being successively calibrated at each of the values of residual current specified in Table 1, the test switch S2 and the RCCB being in the closed position, the test voltage is suddenly established by closing the test switch S1							P
	- maximum break time (ms) at: I_{Dn} .....:	# D1	21.6	21.1	21.9	25.6	22.4	P
		# D2	22.6	25.4	22.7	22.3	22.0	
		# D3	25.5	25.5	21.8	22.0	21.1	
	- maximum break time (ms) at: 2 I_{Dn} .....:	# D1	18.9	19.7	21.3	21.4	21.1	P
		# D2	21.7	21.7	21.7	21.7	17.4	
		# D3	20.9	15.7	21.0	18.3	17.1	
	- maximum break time (ms) at: 5 I_{Dn} .....:	# D1	17.9	17.5	13.2	15.5	19.3	P
		# D2	14.7	19.2	17.2	18.9	18.5	
		# D3	18.4	13.2	16.0	13.3	19.3	
	- maximum break time (ms) at: 5A-200A, 5 A .....:	# D1	12.5	11.3	11.0	11.0	14.3	P
		# D2	15.3	11.5	13.0	10.8	11.0	
		# D3	11.0	11.0	10.3	10.3	11.0	
	- maximum break time (ms) at: 500 A .....:	# D1	12.8	12.8	12.8	12.8	14.8	P
		# D2	11.0	12.0	12.3	10.3	17.3	
		# D3	19.5	15.8	10.5	10.5	10.5	
	No value exceeds the relevant specified limiting value							P
	Additional test for type S:							N/A
	- minimum non-actuating time (ms) at: I_{Dn}: 0,13 s :	D1 -						N/A
		D2 -						
		D3 -						

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Clause	Requirement + Test	Result - Remark						Verdict
	- minimum non-actuating time (ms) at: 2 I_{Dn}; 0,06 s .....:	D1 -						N/A
		D2 -						
		D3 -						
	- minimum non-actuating time (ms) at: 5 I_{Dn}; 0,05 s .....:	D1 -						N/A
		D2 -						
		D3 -						
	- minimum non-actuating time (ms) at: 500 A; 0,04 s .....:	D1 -						N/A
		D2 -						
		D3 -						
	No tripping during the tests							N/A
9.9.2.5	Tests repeated with the RCCB loaded with rated current:							P
	- test current (A): In, the pole under test and one other pole loaded with rated current, the current being established shortly before the test ..... :	32A						——
	- cross-sectional area (mm^2) ..... :	6mm^2						——
	- the RCCB closes on I_{Dn}: no value exceeds the specified limiting value of Table 1 (ms) ..... :	# D1	23.0	23.0	23.2	22.8	22.8	P
		# D2	24.2	24.1	23.9	23.5	23.8	
		# D3	23.5	23.4	23.4	23.5	23.0	
	The switch S1 and the RCCB are in closed position. The residual current is established by closing S2 :							——
	- maximum break time (ms) at: I_{Dn} ..... :	# D1	25.0	21.1	21.5	21.2	23.6	P
		# D2	23.5	22.2	21.9	21.6	21.6	
		# D3	23.0	21.3	25.5	21.9	25.2	
	- maximum break time (ms) at: 2 I_{Dn} ..... :	# D1	15.9	20.8	16.3	18.8	22.1	P
		# D2	20.8	20.9	17.4	21.1	21.1	
		# D3	16.7	16.5	19.8	21.7	19.9	
	- maximum break time (ms) at: 5 I_{Dn} ..... :	# D1	13.4	13.8	20.3	18.3	19.2	P
		# D2	12.8	18.1	16.5	19.0	19.4	
		# D3	16.7	16.3	12.9	15.3	16.9	
	- maximum break time (ms) at: 5 A (if applicable) ..... :	# D1	16.0	12.9	14.6	14.1	12.2	P
		# D2	15.1	15.1	15.1	14.4	13.2	
		# D3	14.0	15.0	9.9	13.2	10.9	
	- maximum break time (ms) at: 500 A ..... :	# D1	17.0	16.5	13.5	13.7	19.1	P
		# D2	12.3	12.8	9.8	18.2	13.1	
		# D3	13.3	9.3	19.8	12.0	12.3	

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Clause	Requirement + Test	Result - Remark						Verdict
	No value exceeds the relevant specified limiting value							P
	Additional test for type S:							——
	- minimum non-actuating time (ms) at: I_{Dn}; 0,13 s :	D1 - D2 - D3 -						N/A
	- minimum non-actuating time (ms) at: 2 I_{Dn}; 0,06 s ..... :	D1 - D2 - D3 -						N/A
	- minimum non-actuating time (ms) at: 5 I_{Dn}; 0,05 s ..... :	D1 - D2 - D3 -						N/A
	- minimum non-actuating time (ms) at: 500 A; 0,04 s ..... :	D1 - D2 - D3 -						N/A
	No tripping during the tests							N/A
9.9.2.6	b) Tests repeated with the RCCB loaded with rated current:							P
	- test current (A): In at a temperature of +40 °C: until steady state conditions are reached .....:	32A						¾
	- cross-sectional area (mm²) .....:	6 mm²						¾
	The test circuit being successively calibrated at each of the values of residual current specified in Table 1, the test switch S2 and the RCCB being in the closed position, the test voltage is suddenly established by closing the test switch S1							P
	- maximum break time (ms) at: I_{Dn} .....:	# D1	22.0	21.6	21.6	21.8	22.0	P
		# D2	26.3	22.0	26.0	21.7	25.3	
		# D3	23.1	22.0	22.8	22.8	26.1	
	- maximum break time (ms) at: 2 I_{Dn} .....:	# D1	21.3	15.9	20.8	21.1	20.8	P
		# D2	21.4	21.4	15.9	17.1	20.8	
		# D3	16.8	15.6	21.7	19.4	16.6	
	- maximum break time (ms) at: 5 I_{Dn} .....:	# D1	13.4	16.6	19.3	13.1	20.3	P
		# D2	14.0	17.7	17.8	12.2	18.2	
		# D3	13.5	16.0	14.4	12.9	14.9	
	- maximum break time (ms) at: 5A-200A, 5 A .....:	# D1	17.3	10.5	10.8	10.5	11.0	P
		# D2	11.0	11.0	12.0	11.3	10.5	
		# D3	10.5	10.3	11.0	10.5	11.0	
	- maximum break time (ms) at: 500 A .....:	# D1	13.5	11.8	10.0	11.0	11.8	P

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Clause	Requirement + Test	Result - Remark						Verdict
		# D2	10.8	10.0	12.5	11.3	11.3	
		# D3	10.8	10.8	11.8	11.3	11.3	
	No value exceeds the relevant specified limiting value							P
	Additional test for type S:							N/A
	- minimum non-actuating time (ms) at: I_{Dn}; 0,13 s :	D1 - D2 - D3 -						N/A
	- minimum non-actuating time (ms) at: 2 I_{Dn} for 0,06 s .....:	D1 - D2 - D3 -						N/A
	- minimum non-actuating time (ms) at: 5 I_{Dn}; 0,05 s .....:	D1 - D2 - D3 -						N/A
	- minimum non-actuating time (ms) at: 500 A; 0,04 s .....:	D1 - D2 - D3 -						N/A
	No tripping during the tests							N/A
Test voltage: 1.1Un= 253V/440V								
9.9.2	Off-load tests made at a temperature of 20 ± 5 °C							P
9.9.2.1	Verification of the correct operation in case of a steady increase residual current:							P
	- steady increase from 0,2 I_{Dn} to I_{Dn} within 30 s							P
	- tripping current between I_{Dno} and I_{Dn} (mA) .....:	# D1	23.3	23.3	23.3	23.3	23.3	P
		# D2	23.5	23.3	23.5	23.4	23.4	
		# D3	23.5	23.4	23.4	23.5	23.5	
9.9.2.2	Verification of the correct operation at closing on residual current							P
	- the RCCB closes on I_{Dn}: no value exceeds the specified limiting value of Table 1 (ms)							P
9.9.2.3	The test circuit being successively calibrated at each of the values of residual current specified in Table 1, the test switch S2 and the RCCB being in the closed position, the test voltage is suddenly established by closing the test switch S1							P
	- maximum break time (ms) at: I_{Dn} .....:	# D1	23.2	22.9	21.6	21.3	20.7	P
		# D2	23.5	22.1	22.8	25.3	24.1	
		# D3	21.1	21.5	22.0	23.6	21.0	
	- maximum break time (ms) at: 2_{Dn} .....:	# D1	16.6	19.6	17.2	16.8	18.9	P
		# D2	17.0	19.5	15.9	20.4	20.4	

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Clause	Requirement + Test	Result - Remark						Verdict
		# D3	21.0	20.6	17.8	20.3	20.8	
	- maximum break time (ms) at: 5_{Dn} .....:	# D1	16.5	18.9	15.0	14.3	19.5	P
		# D2	13.6	18.9	15.5	18.6	19.5	
		# D3	14.1	16.8	16.1	18.6	19.0	
	- maximum break time (ms) at: 5 A (if applicable) .....:	# D1	12.3	6.1	13.5	13.8	9.1	P
		# D2	12.6	17.8	13.9	16.3	11.7	
		# D3	12.3	8.8	14.8	9.6	21.3	
	- maximum break time (ms) at: 500 A .....:	# D1	12.5	14.0	9.3	13.5	10.8	P
		# D2	14.5	15.5	18.0	11.8	17.5	
		# D3	12.0	19.5	13.5	14.5	17.8	
	No value exceeds the relevant specified limiting value							P
9.9.2.4	Verification of the correct operation in case of sudden appearance of residual current of values between 5 I_{Dn} and 500A, (among the following list: 5A, 10A, 20A, 50A, 100A, 200A):							P
	The test switch S1 and the RCCB being in the closed position, the residual current is suddenly established by closing the test switch S2							P
	- maximum break time (ms) at: ___50___A (value 1 between 5A and 200A) .....:	IΔn:	124A	130A	103A	104A	113A	P
		# D1	10.3	12.3	11.0	11.3	17.8	
		# D2	11.0	13.5	11.0	10.8	14.8	
		# D3	10.8	13.8	14.3	12.8	21.3	
	No value exceeds the relevant specified limiting value							P
	Additional test for type S:							N/A
	- minimum non-actuating time (ms) at: I_{Dn}; 0,13 s :	D1 - D2 - D3 -						N/A
	- minimum non-actuating time (ms) at: 2 I_{Dn}; 0,06 s .....:	D1 - D2 - D3 -						N/A
	- minimum non-actuating time (ms) at: 5 I_{Dn}; 0,05 s .....:	D1 - D2 - D3 -						N/A
	- minimum non-actuating time (ms) at: 500 A; 0,04 s .....:	D1 - D2 - D3 -						N/A
	No tripping during tests							N/A

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Clause	Requirement + Test	Result - Remark						Verdict
9.9.2.6	a) Tests repeated at a temperature of -5 °C:							
	The test circuit being successively calibrated at each of the values of residual current specified in Table 1, the test switch S2 and the RCCB being in the closed position, the test voltage is suddenly established by closing the test switch S1							P
	- maximum break time (ms) at: I_{Dn} .....:	# D1	25.7	21.7	21.3	21.8	25.4	P
		# D2	21.6	22.5	24.4	22.6	21.7	
		# D3	25.3	21.3	24.2	21.5	21.8	
	- maximum break time (ms) at: 2 I_{Dn} .....:	# D1	21.1	21.6	17.1	21.3	20.9	P
		# D2	20.6	17.1	20.8	22.0	21.6	
		# D3	20.8	21.2	21.6	16.5	21.0	
	- maximum break time (ms) at: 5 I_{Dn} .....:	# D1	10.7	16.6	14.6	17.1	19.9	P
		# D2	13.7	19.1	13.0	13.1	17.5	
		# D3	18.7	16.3	17.1	12.0	19.3	
	- maximum break time (ms) at: 5A-200A, 5 A .....:	# D1	10.3	11.0	10.8	10.0	10.8	P
		# D2	11.8	14.3	11.3	10.3	16.3	
		# D3	10.8	10.5	11.0	11.5	11.0	
	- maximum break time (ms) at: 500 A .....:	# D1	17.3	17.3	13.0	10.8	12.0	P
		# D2	12.0	19.0	12.8	12.3	12.3	
		# D3	16.8	18.5	12.0	10.8	13.0	
	No value exceeds the relevant specified limiting value							P
	Additional test for type S:							N/A
	- minimum non-actuating time (ms) at: I_{Dn}: 0,13 s :	D1 -						N/A
		D2 -						
		D3 -						
	- minimum non-actuating time (ms) at: 2 I_{Dn}; 0,06 s .....:	D1 -						N/A
		D2 -						
		D3 -						
	- minimum non-actuating time (ms) at: 5 I_{Dn}; 0,05 s .....:	D1 -						N/A
		D2 -						
		D3 -						
	- minimum non-actuating time (ms) at: 500 A; 0,04 s .....:	D1 -						N/A
		D2 -						
		D3 -						
	No tripping during the tests							N/A
9.9.2.5	Tests repeated with the RCCB loaded with rated current:							P

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Clause	Requirement + Test	Result - Remark						Verdict
	- test current (A): In, the pole under test and one other pole loaded with rated current, the current being established shortly before the test ..... :	32A						——
	- cross-sectional area (mm^2) ..... :	$6mm^2$						——
	- the RCCB closes on I_{Dn}: no value exceeds the specified limiting value of Table 1 (ms) ..... :	# D1	23.4	23.5	23.5	23.4	23.5	P
		# D2	23.2	23.6	23.2	24.0	22.6	
		# D3	23.6	23.5	23.1	23.2	23.6	
	The switch S1 and the RCCB are in closed position. The residual current is established by closing S2 :							——
	- maximum break time (ms) at: I_{Dn} ..... :	# D1	22.0	20.9	24.6	24.6	21.9	P
		# D2	21.7	21.8	21.4	23.0	21.5	
		# D3	24.7	24.8	23.2	23.6	22.1	
	- maximum break time (ms) at: 2 I_{Dn} ..... :	# D1	18.8	21.9	21.6	20.8	19.3	P
		# D2	21.2	21.6	17.3	16.6	21.3	
		# D3	21.0	18.2	21.5	21.9	20.8	
	- maximum break time (ms) at: 5 I_{Dn} ..... :	# D1	12.9	12.7	18.7	16.7	15.5	P
		# D2	19.9	15.5	17.5	14.8	13.5	
		# D3	14.5	14.9	14.2	15.4	17.9	
	- maximum break time (ms) at: 5 A (if applicable) ..... :	# D1	14.5	9.8	10.5	13.8	10.0	P
		# D2	14.3	18.8	18.8	18.0	10.3	
		# D3	10.3	10.3	15.0	12.5	17.5	
	- maximum break time (ms) at: 500 A ..... :	# D1	11.0	13.0	12.5	13.0	14.0	P
		# D2	13.3	12.0	15.3	12.5	10.0	
		# D3	12.5	13.0	12.3	13.5	12.8	
	No value exceeds the relevant specified limiting value							P
	Additional test for type S:							——
	- minimum non-actuating time (ms) at: I_{Dn}; 0,13 s :	D1 -						N/A
		D2 -						
		D3 -						
	- minimum non-actuating time (ms) at: 2 I_{Dn}; 0,06 s ..... :	D1 -						N/A
		D2 -						
		D3 -						
	- minimum non-actuating time (ms) at: 5 I_{Dn}; 0,05 s ..... :	D1 -						N/A
		D2 -						
		D3 -						

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	- minimum non-actuating time (ms) at: 500 A; 0,04 s ..... :	D1 - D2 - D3 -						N/A
	No tripping during the tests							N/A
9.9.2.6	b) Tests repeated with the RCCB loaded with rated current:							P
	- test current (A): In at a temperature of +40 °C: until steady state conditions are reached .....:	32A						——
	- cross-sectional area (mm²) .....:	6 mm²						——
	The test circuit being successively calibrated at each of the values of residual current specified in Table 1, the test switch S2 and the RCCB being in the closed position, the test voltage is suddenly established by closing the test switch S1							P
	- maximum break time (ms) at: I_{Dn} .....:	# D1	25.1	22.4	21.7	22.9	21.8	P
		# D2	22.8	22.2	21.8	22.2	25.1	
		# D3	26.5	22.6	22.2	26.6	22.7	
	- maximum break time (ms) at: 2 I_{Dn} .....:	# D1	16.7	21.1	16.8	21.2	16.1	P
		# D2	16.4	21.2	18.0	18.5	21.3	
		# D3	22.8	20.9	21.7	20.5	15.8	
	- maximum break time (ms) at: 5 I_{Dn} .....:	# D1	15.4	13.8	13.4	17.1	13.5	P
		# D2	17.0	19.7	13.3	13.7	20.2	
		# D3	15.1	16.3	15.6	14.4	14.1	
	- maximum break time (ms) at: 5A-200A, 5 A .....:	# D1	11.3	11.3	18.3	10.5	10.5	P
		# D2	10.5	12.3	11.5	11.0	19.3	
		# D3	10.5	10.5	10.8	10.8	10.8	
	- maximum break time (ms) at: 500 A .....:	# D1	11.3	10.3	12.8	11.0	12.5	P
		# D2	10.5	11.8	11.8	12.0	12.5	
		# D3	11.3	10.5	10.0	12.3	12.3	
	No value exceeds the relevant specified limiting value							P
	Additional test for type S:							N/A
	- minimum non-actuating time (ms) at: I_{Dn}; 0,13 s :	D1 - D2 - D3 -						N/A
	- minimum non-actuating time (ms) at: 2 I_{Dn} for 0,06 s .....:	D1 - D2 - D3 -						N/A

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	- minimum non-actuating time (ms) at: 5 I_{Dn}; 0,05 s .....:	D1 - D2 - D3 -	N/A
	- minimum non-actuating time (ms) at: 500 A; 0,04 s .....:	D1 - D2 - D3 -	N/A
	No tripping during the tests		N/A

8.15	**Behaviour of RCCBs in case of earth fault currents comprising a d.c. component**							P
9.9.3	Additional verification of correct operation at residual currents with d.c. components for RCCBs type A							P
9.9.3.1	RCCB installed as for normal use, test circuits according to fig. 5 and 6							P
9.9.4	For RCCBs functionally dependent on line voltage, each test is made at 1,1 and 0,85 times the rated line voltage; voltage (V) .....:	195.5V/340V-253V/440V						P
9.9.3.1	Verification of the correct operation in case of a continuous rise of the residual pulsating direct current (see Table 20):							——
	- steady increase from zero to: 1,4 I_{Dn} for I_{Dn} > 0,01 A with 1,4 I_{Dn} /30 A/s (mA)							P
	- steady increase from zero to: 2 I_{Dn} for I_{Dn} £ 0,01 A with 2 I_{Dn} /30 A/s (mA)							N/A
		# D1		# D2		# D3		——
		+	-	+	-	+	-	——
	- angle a = 0° (+/-) .....:	15.6	15.4	15.5	17.0	15.0	15.8	P
		15.6	15.4	15.4	17.0	15.0	15.8	
	- angle a = 90° (+/-) .....:	21.3	20.9	21.1	23.5	20.5	21.7	P
		21.6	21.3	21.3	23.0	20.8	21.7	
	- angle a = 135° (+/-) .....:	24.7	23.8	23.2	24.4	23.9	24.5	P
		24.3	24.4	23.2	23.2	23.1	24.1	
	No value exceeds the relevant specified limiting values							P
9.9.3.2	Verification of the correct operation in case of suddenly appearing residual pulsating direct currents by closing S2 (angle a = 0°)							P
	RCCBs with I_{Dn} < 0,03 A:							N/A
	- maximum break time (ms) at: 2 I_{Dn} (+/-) .....:							N/A
	- maximum break time (ms) at: 4 I_{Dn} (+/-) .....:							N/A

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Clause	Requirement + Test	Result - Remark							Verdict
	- maximum break time (ms) at: 0,5 A rms (+/-) ...:								N/A
	- maximum break time (ms) at: 350 A rms (+/-) ..:								N/A
	RCCBs with I_{Dn} = 0,03 A:								P
		# D1		# D2		# D3			——
		+	-	+	-	+	-		——
	- maximum break time (ms) at: 1,4 I_{Dn} (+/-) .....:	22.8	27.8	22.9	31.1	27.3	36.1		P
		19.2	32.7	19.8	17.6	25.3	28.6		
	- maximum break time (ms) at: 2,8 I_{Dn} (+/-) .....:	22.7	34.0	22.4	17.8	26.4	28.4		P
		19.1	28.0	19.3	31.0	26.8	34.9		
	- maximum break time (ms) at: 0,35 A rms (+/-) .:	19.8	25.9	27.5	32.9	27.4	32.0		P
		22.6	17.5	21.6	26.9	17.5	27.9		
	- maximum break time (ms) at: 350 A rms (+/-) ..:	10.8	10.5	10.8	10.5	10.5	10.3		P
		10.8	10.5	10.3	10.0	10.5	10.3		
	RCCBs with I_{Dn} > 0,03 A:								N/A
	- maximum break time (ms) at: 1,4 I_{Dn} (+/-) .....:	D1 - D2 - D3 -							N/A
	- maximum break time (ms) at: 2,8 I_{Dn} (+/-) .....:	D1 - D2 - D3 -							N/A
	- maximum break time (ms) at: 7 I_{Dn} (+/-) .....:	D1 - D2 - D3 -							N/A
	- maximum break time (ms) at: 350 A rms (+/-) ..:	D1 - D2 - D3 -							N/A
	No value exceeds the relevant specified limiting value								N/A
9.9.3.3	Verification of the correct operation with the pole under test and one other pole loaded with rated current								P
	- test current (A): In .....:	32A							——
	- steady increase from zero to: 1,4 I_{Dn} for I_{Dn} > 0,01 A with 1,4 I_{Dn} /30 A/s (mA)	30mA							P
	- steady increase from zero to: 2 I_{Dn} for I_{Dn} £ 0,01 A with 2 I_{Dn} /30 A/s (mA)								N/A

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		# D1		# D2		# D3		——				
		+	-	+	-	+	-	——				
	- angle a = 0° (+/-) .....:	15.3	15.8	15.8	16.6	15.2	15.7	P				
		15.4	15.8	15.7	16.6	15.2	15.7					
	- angle a = 90° (+/-) .....:	21.2	21.8	21.3	22.8	20.3	21.5	P				
		21.1	21.6	21.4	22.5	20.5	21.6					
	- angle a = 135° (+/-) .....:	24.4	24.6	23.4	24.4	23.7	24.4	P				
		24.3	24.0	22.9	23.3	23.7	24.5					
	No value exceeds the relevant specified limiting values							P				
9.9.3.4	Verification of the correct operation in case of residual pulsating d.c. currents with angle a = 0° superimposed by smooth direct current of 0,006 A:							P				
	- steady increase of pulsating d.c. current from zero to: 1,4 I_{Dn} for I_{Dn} > 0,01 A with 1,4 I_{Dn} /30 A/s (mA)							P				
	- steady increase of pulsating d.c. current from zero to: 2 I_{Dn} for I_{Dn} £ 0,01 A with 2 I_{Dn} /30 A/s (mA)							N/A				
	- angle a = 0° (+/-) (+/- 6 mA) .....:	# D1		# D2		# D3		P				
		+	-	+	-	+	-					
		0.1	0.1	0.1	0.1	0.1	0.1					
		0.1	0.1	0.1	0.1	0.1	0.1					
	No value exceeds the relevant specified limiting values							P				

	Tests "D1"							**P**
8.12	**RCCBs functionally dependent on line voltage**							P
	RCCBs functionally dependent on the line voltage, shall operate correctly between 0,85 and 1,1 times their rated voltage; voltage (V) ..... :	195.5V/340V-253V/440V						P
	Multipole RCCBs shall have all current paths supplied from the phases and neutral, if any							P
9.17	**Verification of the behaviour of RCCBs opening automatically in case of failure of the line voltage**							P
9.17.1	Limiting value of the line voltage (Ux):							P
	- rated voltage applied to the line terminals and progressively lowered to attain zero within about 30 s until automatic opening occurs; voltage (V) :	#D1	89.8	89.8	89.8	89.9	89.8	P
		#D2	90.0	89.9	90.0	90.0	89.9	
		#D3	89.9	89.8	89.8	89.8	89.8	

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Clause	Requirement + Test	Result - Remark						Verdict
	- all values less than 0,85 times the rated voltage (V) ..... :	D1 – 89.8 D2 – 90.0 D3 – 89.8						P
	- tripping test at test voltage (V) with I_{Dn} and operating according to Table 1 (ms) ..... :	#D1	21.8	23.1	21.6	25.7	21.6	P
		#D2	22.5	22.6	25.8	21.9	23.1	
		#D3	21.5	22.4	25.2	25.3	25.4	
	No value exceeds the specified limiting values							P
	Not possible to close the apparatus by manual operating means below Ux							P
9.17.2	Verification of behaviour in case of failure of the line voltage							P
	RCCB supplied with rated voltage, and the line voltage then switched off							P
	Time (ms) interval between switching off and opening of the main contacts ..... :	#D1	0.80	0.80	0.20	1.00	0.20	P
		#D2	0.50	0.16	0.24	0.70	0.16	
		#D3	0.20	0.20	0.24	0.12	0.60	
	a) RCCBs opening without delay: no value exceeds 0,5 s							P
	b) RCCBs opening with delay: max. and min. values within the range indicated by the manufacturer							N/A
9.17.3	Verification of the correct operation, in presence of a residual current, for RCCBs opening with delay in case of failure of the line voltage							N/A
	RCCB connected according to fig. 4 at the rated voltage (Un) ..... :							N/A
	All phases but one switched off by means of S3							N/A
	During the delay: test of 9.9.2:							N/A
9.9.2.1	- steady increase from 0,2 I_{Dn} to I_{Dn} within 30 s (mA) ..... :	D1 - D2 - D3 -						N/A
	- tripping current between I_{Dno} and I_{Dn} (mA) ..... :	D1 - D2 - D3 -						N/A
	The RCCB closes on I_{Dn}: no value exceeds the specified limiting value of Table 1 (ms) ..... :	D1 - D2 - D3 -						N/A
9.9.2.3	The test circuit being successively calibrated at each of the values of residual current specified in Table 1, the test switch S2 and the RCCB being in the closed position, the test voltage is suddenly established by closing the test switch S1							N/A

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Clause	Requirement + Test	Result - Remark						Verdict
	- maximum break time (ms) at: I_{Dn} ..... :	D1 - D2 - D3 -						N/A
	- maximum break time (ms) at: 2 I_{Dn} ..... :	D1 - D2 - D3 -						N/A
	- maximum break time (ms) at: 5 I_{Dn} ..... :	D1 - D2 - D3 -						N/A
	- maximum break time (ms) at: 0,25 A (if applicable) ..... :	D1 - D2 - D3 -						N/A
	- maximum break time (ms) at: 500 A ..... :	D1 - D2 - D3 -						N/A
	No value exceeds the relevant specified limiting value							N/A
	Additional test for type S:							N/A
	- minimum non-actuating time (ms) at: I_{Dn}; 0,13 s ..... :	D1 - D2 - D3 -						N/A
	- minimum non-actuating time (ms) at: 2 I_{Dn}; 0,06 s ..... :	D1 - D2 - D3 -						N/A
	- minimum non-actuating time (ms) at: 5 I_{Dn}; 0,05 s ..... :	D1 - D2 - D3 -						N/A
	- minimum non-actuating time (ms) at: 500 A; 0,04 s ..... :	D1 - D2 - D3 -						N/A
	No tripping during tests							N/A
9.17.4	Verification of the correct operation of RCCBs with 3 or 4 current paths, neutral and one line terminal only being energized in turn:							P
	RCCB connected according to fig. 4							P
9.9.2.3	The test circuit being successively calibrated at each of the values of residual current specified in Table 1, the test switch S2 and the RCCB being in the closed position, the test voltage is suddenly established by closing the test switch S1							P
	- maximum break time (ms) at: I_{Dn} ..... :	#D1	26.0	22.5	21.9	21.0	21.7	P
		#D2	21.9	21.6	22.0	22.0	22.1	
		#D3	21.5	23.6	22.5	22.1	25.8	

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Clause	Requirement + Test	Result - Remark						Verdict
	- maximum break time (ms) at: 2 I_{Dn} ..... :	#D1	17.0	21.1	20.8	15.9	21.6	P
		#D2	19.4	18.6	21.5	20.7	18.4	
		#D3	19.9	21.5	18.0	21.2	21.2	
	- maximum break time (ms) at: 5 I_{Dn} ..... :	#D1	14.4	13.7	14.1	12.6	19.0	P
		#D2	18.4	18.5	19.2	13.3	19.8	
		#D3	16.5	15.8	18.6	15.0	17.5	
	- maximum break time (ms) at: 0,25 A (if applicable) ..... :	#D1	14.3	13.1	14.0	14.0	14.4	P
		#D2	14.3	14.3	14.4	13.5	14.2	
		#D3	13.5	14.5	14.1	9.3	13.7	
	- maximum break time (ms) at: 500 A ..... :	#D1	12.3	18.0	11.3	12.3	12.0	P
		#D2	11.0	12.3	14.3	17.8	10.8	
		#D3	12.0	17.3	19.5	10.5	10.5	
	No value exceeds the relevant specified limiting value							P
	Additional test for type S:							N/A
	- minimum non-actuating time (ms) at: I_{Dn}; 0,13 s ..... :	D1 - D2 - D3 -						N/A
	- minimum non-actuating time (ms) at: 2 I_{Dn}; 0,06 s ..... :	D1 - D2 - D3 -						N/A
	- minimum non-actuating time (ms) at: 5 I_{Dn}; 0,05 s ..... :	D1 - D2 - D3 -						N/A
	- minimum non-actuating time (ms) at: 500 A; 0,04 s ..... :	D1 - D2 - D3 -						N/A
	No tripping during tests							N/A
9.17.5	Verification of the reclosing function of automatically reclosing RCCBs (under consideration)							N/A

8.14	**Behaviour of RCCBs in case of current surges caused by impulse voltages**		**P**
9.19	**Verification of behaviour of RCCBs in case of current surges caused by impulse voltages**		**P**
9.19.1	Current surge test for all RCCBs (0,5µs/100kHz ring wave test)		P
	One pole of the RCCB is submitted to 10 applications of a surge current according to the following requirements:		P
	- peak value: 200 A + 10/0%		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- virtual front time: 0,5 ms ± 30%		P
	- period of the following oscillatory wave: 10 ms ± 20%		P
	- each successive reverse peak: about 60% of the preceding peak		P
	The polarity shall be inverted after every two applications		P
	The interval between two consecutive applications shall be about 30 s		P
	During the test the RCCB shall not trip		P
9.19.2	Verification of behaviour at surge currents up to 3000A (8/20µs surge current)		P
9.19.2.1	Test conditions		P
	One pole of the RCCB is submitted to 10 applications of a surge current according to the following requirements:		P
	Peak value: 3000A +10/-0%		P
	Virtual front time: 0,8µs ± 20%		P
	Virtual time of half value: 20µs ± 20%		P
	Peak of reverse current: less than 30 % of peak value		P
	The polarity shall be inverted after every two applications		P
	The interval between two consecutive applications shall be about 30 s		P
9.19.2.2	S-type: During the test the RCCB shall not trip	D1 - D2 - D3 -	N/A
	- break time (ms) at I_{Dn} ..... :	D1 - D2 - D3 -	N/A
9.19.2.3	General type: During the test the RCCB may trip. After any tripping the RCCB shall be re-closed		P
	- break time (ms) at IDn ..... :	D1 – 21.4 ms D2 – 24.7 ms D3 – 21.8 ms	P
9.11.2.3	Verification of the rated residual making and breaking capacity (A): I_{Dm} ..... :	See 64.105.21.30160.01 for details	¾
	Test circuit according to figure ..... :		¾
	Point of test circuit which is directly earthed ..... :		¾

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Clause	Requirement + Test	Result - Remark	Verdict
	Grid distance "a" (mm) ..... :		¾
	Prospective current (A) ..... :		¾
	Prospective current obtained (A) ..... :		¾
	Power factor ..... :		¾
	Power factor obtained ..... :		
	Point of initiation: 45° ± 5°		N/A
	Test sequence: O-t-CO-t-CO on each pole in turn excluding the switched neutral pole		N/A
	During tests no endangering of operator, no permanent arcing, no flashover and no melting of fuse F		N/A
	After the tests no damage impairing further use		N/A
9.7.7.3	The leakage current flowing across the open contacts is measured at 1,1 Un and shall not exceed 2mA (mA)		N/A
9.7.3	Dielectric strength test of the main circuit at test voltage 2 Un for 1 min:		N/A
	a) ..... :	500V	N/A
	b) ..... :	500V	N/A
	c) ..... :	500V	N/A
	d) ..... :		N/A
	e) ..... :		N/A
	No flashover or breakdown		N/A
	Making and breaking In at Un		N/A
	The RCCB shall trip with a test current of 1,25 I_{Dn} (mA)		N/A
	The polyethylene sheet shows no holes		N/A
9.17	**Verification of the behaviour of RCCBs opening automatically in case of failure of the line voltage**		N/A
9.17.1	Limiting value of the line voltage (Ux):		N/A
	- rated voltage applied to the line terminals and progressively lowered to attain zero within about 30 s until automatic opening occurs; voltage (V) :	D1 - D2 - D3 -	N/A
	- all values less than 0,85 times the rated voltage (V)		N/A
	- tripping test at test voltage (V) with I_{Dn} and operating according to Table 1 (ms) ..... :	D1 - D2 - D3 -	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	No value exceeds the specified limiting values		N/A
	Not possible to close the apparatus by manual operating means below Ux .....:	D1 - D2 - D3 -	N/A
9.17.2	Verification of behaviour in case of failure of the line voltage		N/A
	RCCB supplied with rated voltage, and the line voltage then switched off		N/A
	Time (ms) interval between switching off and opening of the main contacts .....:	D1 - D2 - D3 -	N/A
	a) RCCBs opening without delay: no value exceeds 0,5 s		N/A
	b) RCCBs opening with delay: max. and min. values within the range indicated by the manufacturer		N/A
9.17.3	Verification of the correct operation, in presence of a residual current, for RCCBs opening with delay in case of failure of the line voltage		N/A
	RCCB connected according to fig. 4 at the rated voltage (Un) .....:		N/A
	All phases but one switched off by means of S3		N/A
	During the delay: test of 9.9.2:		N/A
9.9.2.1	- steady increase from 0,2 I_{Dn} to I_{Dn} within 30 s (mA) .....:	D1 - D2 - D3 -	N/A
	- tripping current between I_{Dno} and I_{Dn} (mA) .....:	D1 - D2 - D3 -	N/A
	The RCCB closes on I_{Dn}: no value exceeds the specified limiting value of Table 1 (ms) .....:	D1 - D2 - D3 -	N/A
9.9.2.3	The test circuit being successively calibrated at each of the values of residual current specified in Table 1, the test switch S2 and the RCCB being in the closed position, the test voltage is suddenly established by closing the test switch S1		N/A
	- maximum break time (ms) at: I_{Dn} .....:	D1 - D2 - D3 -	N/A
	- maximum break time (ms) at: 2 I_{Dn} .....:	D1 - D2 - D3 -	N/A

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	- maximum break time (ms) at: 5 I_{Dn} .....:	D1 - D2 - D3 -						N/A
	- maximum break time (ms) at: 0,25 A (if applicable) .....:	D1 - D2 - D3 -						N/A
	- maximum break time (ms) at: 500 A .....:	D1 - D2 - D3 -						N/A
	No value exceeds the relevant specified limiting value							N/A
	Additional test for type S:							N/A
	- minimum non-actuating time (ms) at: I_{Dn}; 0,13 s :	D1 - D2 - D3 -						N/A
	- minimum non-actuating time (ms) at: 2 I_{Dn}; 0,06 s .....:	D1 - D2 - D3 -						N/A
	- minimum non-actuating time (ms) at: 5 I_{Dn}; 0,05 s .....:	D1 - D2 - D3 -						N/A
	- minimum non-actuating time (ms) at: 500 A; 0,04 s .....:	D1 - D2 - D3 -						N/A
	No tripping during tests							N/A
9.17.4	Verification of the correct operation of RCCBs with 3 or 4 current paths, neutral and one line terminal only being energized in turn:							P
	RCCB connected according to fig. 4							P
9.9.2.3	The test circuit being successively calibrated at each of the values of residual current specified in Table 1, the test switch S2 and the RCCB being in the closed position, the test voltage is suddenly established by closing the test switch S1							P
	- maximum break time (ms) at: I_{Dn} .....:	#D1	26.0	22.5	21.9	21.0	21.7	P
		#D2	21.9	21.6	22.0	22.0	22.1	
		#D3	21.5	23.6	22.5	22.1	25.8	
	- maximum break time (ms) at: 2 I_{Dn} .....:	#D1	17.0	21.1	20.8	15.9	21.6	P
		#D2	19.4	18.6	21.5	20.7	18.4	
		#D3	19.9	21.5	18.0	21.2	21.2	
	- maximum break time (ms) at: 5 I_{Dn} .....:	#D1	14.4	13.7	14.1	12.6	19.0	P
		#D2	18.4	18.5	19.2	13.3	19.8	

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		#D3	16.5	15.8	18.6	15.0	17.5	
	- maximum break time (ms) at: 0,25 A (if applicable) ..... :	#D1	14.3	13.1	14.0	14.0	14.4	P
		#D2	14.3	14.3	14.4	13.5	14.2	
		#D3	13.5	14.5	14.1	9.3	13.7	
	- maximum break time (ms) at: 500 A ..... :	#D1	12.3	18.0	11.3	12.3	12.0	P
		#D2	11.0	12.3	14.3	17.8	10.8	
		#D3	12.0	17.3	19.5	10.5	10.5	
	No value exceeds the relevant specified limiting value							P
	Additional test for type S:							N/A
	- minimum non-actuating time (ms) at: I_{Dn}; 0,13 s :	D1 - D2 - D3 -						N/A
	- minimum non-actuating time (ms) at: 2 I_{Dn}; 0,06 s ..... :	D1 - D2 - D3 -						N/A
	- minimum non-actuating time (ms) at: 5 I_{Dn}; 0,05 s ..... :	D1 - D2 - D3 -						N/A
	- minimum non-actuating time (ms) at: 500 A; 0,04 s ..... :	D1 - D2 - D3 -						N/A
	No tripping during tests							N/A
9.17.5	Verification of the reclosing function of automatically reclosing RCCBs (under consideration)							N/A
8.11	**Test device**	See the report 64.105.21.30160.01 for detail						N/A
	RCCBs shall be provided with a test device							N/A
	Ampere-turns produced when operating the test device do not exceed 2,5 times the ampere-turns produced by I_{Dn}							N/A
	Not possible to energize the circuit on the load side by operating the test device when the RCCB is in the open position							N/A
9.16	**Verification of the operation of the test device at the limits of rated voltage:**							N/A
	a) RCCB at 0,85 times the rated voltage, test device actuated 25 times at intervals of 5 s							N/A
	b) test a) repeated at 1,1 times the rated voltage :							N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	c) test b) repeated, but only once, the operating means of the test device being held in the closed position for 30 s		N/A
	RCCB operated at each test		N/A
	No change impairing further use		N/A
8.8	**Resistance to mechanical shock and impact**		N/A
	RCCBs shall have adequate mechanical behaviour so as to withstand the stresses imposed during installation and use	See the report 64.105.21.30160.01 for detail	N/A
9.12.1.2	Mechanical shock		N/A
	Mechanical shock: 50 falls of 40 mm on one side; 50 falls on opposite side C turned through 90°; 50 falls on one side; 50 falls on opposite side		N/A
	No opening of RCCB during the test		N/A
9.12.2	Mechanical impact		P
9.12.2.1	Impact test (10 blows, height 10 cm): no damage		P
9.12.2.2	RCCBs for rail mounting downward vertical force of 50 N for 1 min, upward vertical force of 50 N for 1 min		N/A
	RCCB shall not become loose during test and no damage impairing its further use		N/A
9.12.2.3	RCCBs of plug-in type (under consideration)		N/A
8.13	**Behaviour of RCCBs in case of overcurrents in the main circuit**		P
	RCCBs shall not operate under specified conditions of overcurrent		P
9.18.1	Verification of the limiting value of overcurrent in case of a load through a RCCB with two poles		N/A
	RCCB connected as for normal use with a load equal to (A): 6 In switched on using a two-pole test switch for 1 s ..... :		N/A
	Test repeated three times with an interval of at least 1 min ..... :		N/A
	The RCCB shall not open ..... :		N/A
	RCCBs functionally dependent on the line voltage at rated voltage (Un) ..... :		N/A
9.18.2	Verification of the limiting value of overcurrent in case of a single phase load through a three-pole or four-pole RCCB		P
	RCCB connected according to fig. 22		P
	Test current (A): 6 In closed by S1 for 1 s ..... :	192A	¾

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Clause	Requirement + Test	Result - Remark	Verdict
	Test repeated three times for each possible combination of current paths with an interval of at least 1 min		P
	The RCCB shall not open		P
	RCCBs functionally dependent on the line voltage at rated voltage	230/400V	P

	Tests "D2"		**N/A**
9.11.2.3c)	Verification of suitability in IT system: .....:		¾
	Test circuit according to figure .....:		¾
	Point of test circuit which is directly earthed .....:		¾
	Grid distance "a" (mm) .....:		¾
	Test voltage 105% of rated phase to neutral voltage for the pole exclusively for the neutral		
	Test voltage 105% of rated phase to phase voltage for the other poles		
	Prospective current - 500A or - 10 I_n (A) ...:		
	Prospective current (A) .....:		¾
	Prospective current obtained (A) .....:		¾
	Power factor .....:		¾
	Power factor obtained .....:		¾
	Point of initiation: 0 ± 5° for the first tested pole, shifted by 30° for the other poles		N/A
	Test sequence: O-t-CO on each pole in turn		N/A
	During tests no endangering of operator, no permanent arcing, no flashover and no melting of fuse F		N/A
	After the tests no damage impairing further use		N/A
9.7.7.3	The leakage current flowing across the open contacts is measured at 1,1 Un and shall not exceed 2mA (mA)		N/A
9.7.3	Dielectric strength test of the main circuit at test voltage 2 Un for 1 min:		N/A
	a) .....:	500V	N/A
	b) .....:	500V	N/A
	c) .....:	500V	N/A
	d) .....:		N/A
	e) .....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	No flashover or breakdown .....:		N/A
	Making and breaking In at Un .....:		N/A
	The RCCB shall trip with a test current of 1,25 I_{Dn} (mA)		N/A
	The polyethylene sheet shows no holes		N/A
9.17	**Verification of the behaviour of RCCBs opening automatically in case of failure of the line voltage**		N/A
9.17.1	Limiting value of the line voltage (Ux):		N/A
	- rated voltage applied to the line terminals and progressively lowered to attain zero within about 30 s until automatic opening occurs; voltage (V) :		N/A
	- all values less than 0,85 times the rated voltage (V) .....:		N/A
	- tripping test at test voltage (V) with I_{Dn} and operating according to Table 1 (ms) .....:		N/A
	No value exceeds the specified limiting values		N/A
	Not possible to close the apparatus by manual operating means below Ux		N/A
9.17.2	Verification of behaviour in case of failure of the line voltage		N/A
	RCCB supplied with rated voltage, and the line voltage then switched off		N/A
	Time (ms) interval between switching off and opening of the main contacts .....:	D1 - D2 - D3 -	N/A
	a) RCCBs opening without delay: no value exceeds 0,5 s		N/A
	b) RCCBs opening with delay: max. and min. values within the range indicated by the manufacturer		N/A
9.17.3	Verification of the correct operation, in presence of a residual current, for RCCBs opening with delay in case of failure of the line voltage		N/A
	RCCB connected according to fig. 4 at the rated voltage (Un) .....:		N/A
	All phases but one switched off by means of S3		N/A
	During the delay: test of 9.9.2:		N/A
9.9.2.1	- steady increase from 0,2 I_{Dn} to I_{Dn} within 30 s (mA) .....:	D1 - D2 - D3 -	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- tripping current between I_{Dno} and I_{Dn} (mA) .....:	D1 - D2 - D3 -	N/A
	The RCCB closes on I_{Dn}: no value exceeds the specified limiting value of Table 1 (ms) .....:	D1 - D2 - D3 -	N/A
9.9.2.3	The test circuit being successively calibrated at each of the values of residual current specified in Table 1, the test switch S2 and the RCCB being in the closed position, the test voltage is suddenly established by closing the test switch S1		N/A
	- maximum break time (ms) at: I_{Dn} .....:	D1 - D2 - D3 -	N/A
	- maximum break time (ms) at: 2 I_{Dn} .....:	D1 - D2 - D3 -	N/A
	- maximum break time (ms) at: 5 I_{Dn} .....:	D1 - D2 - D3 -	N/A
	- maximum break time (ms) at: 0,25 A (if applicable) .....:	D1 - D2 - D3 -	N/A
	- maximum break time (ms) at: 500 A .....:	D1 - D2 - D3 -	N/A
	No value exceeds the relevant specified limiting value		N/A
	Additional test for type S:		N/A
	- minimum non-actuating time (ms) at: I_{Dn}; 0,13 s :	D1 - D2 - D3 -	N/A
	- minimum non-actuating time (ms) at: 2 I_{Dn}; 0,06 s .....:	D1 - D2 - D3 -	N/A
	- minimum non-actuating time (ms) at: 5 I_{Dn}; 0,05 s .....:	D1 - D2 - D3 -	N/A
	- minimum non-actuating time (ms) at: 500 A; 0,04 s .....:	D1 - D2 - D3 -	N/A
	No tripping during tests		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
9.17.4	Verification of the correct operation of RCCBs with 3 or 4 current paths, neutral and one line terminal only being energized in turn:		N/A
	RCCB connected according to fig. 4		N/A
9.9.2.3	The test circuit being successively calibrated at each of the values of residual current specified in Table 1, the test switch S2 and the RCCB being in the closed position, the test voltage is suddenly established by closing the test switch S1		N/A
	- maximum break time (ms) at: I_{Dn} .....:	D1 - D2 - D3 -	N/A
	- maximum break time (ms) at: 2 I_{Dn} .....:	D1 - D2 - D3 -	N/A
	- maximum break time (ms) at: 5 I_{Dn} .....:	D1 - D2 - D3 -	N/A
	- maximum break time (ms) at: 0,25 A (if applicable) .....:	D1 - D2 - D3 -	N/A
	- maximum break time (ms) at: 500 A .....:	D1 - D2 - D3 -	N/A
	No value exceeds the relevant specified limiting value		N/A
	Additional test for type S:		N/A
	- minimum non-actuating time (ms) at: I_{Dn}; 0,13 s :	D1 - D2 - D3 -	N/A
	- minimum non-actuating time (ms) at: 2 I_{Dn}; 0,06 s .....:	D1 - D2 - D3 -	N/A
	- minimum non-actuating time (ms) at: 5 I_{Dn}; 0,05 s .....:	D1 - D2 - D3 -	N/A
	- minimum non-actuating time (ms) at: 500 A; 0,04 s .....:	D1 - D2 - D3 -	N/A
	No tripping during tests		N/A

	TEST SEQUENCE E (3 samples)	

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IEC 61008-1			
Clause	Requirement + Test	Result - Remark	Verdict
8.7	**Performance at short-circuit currents**		**P**
9.11.2.4	a) Verification of the coordination between the RCCB and the SCPD		P
	Verification of the coordination at the rated conditional short-circuit current (A): Inc .....:	See the report 64.105.21.30160.01 for detail	¾
	Test circuit according to figure .....:		¾
	Point of test circuit which is directly earthed .....:		¾
	Grid distance "a" (mm) .....:		¾
	Silver wire diameter (mm) or fuse .....:		¾
	Prospective current (A) .....:		¾
	Prospective current obtained (A) .....:		¾
	Power factor .....:		¾
	Power factor obtained .....:		¾
	Point of initiation: 45° ± 5°		N/A
	Verification of I^2t (kA^2s) and Ip (kA) prior to testing ((≥1x ≤1,1x values of table 15), RCCB replaced by a connection having negligible impedance		N/A
	Test sequence: O-t-CO		N/A
	I^2t (kA^2s); Ip (kA) .....:		N/A
	During tests no endangering of operator, no permanent arcing, no flashover and no melting of fuse F		N/A
	After the tests no damage impairing further use		N/A
9.7.7.3	The leakage current flowing across the open contacts is measured at 1,1 Un and shall not exceed 2mA (mA)		N/A
9.7.3	Dielectric strength test of the main circuit at test voltage of 2 Un for 1 min:		N/A
	a) .....:	500V	N/A
	b) .....:	500V	N/A
	c) .....:	500V	N/A
	d) .....:		N/A
	e) .....:		N/A
	No flashover or breakdown		N/A
	Making and breaking In at Un		N/A
	The RCCB shall trip with a test current of 1,25 I_{Dn}		N/A
	The polyethylene sheet shows no holes		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
9.17	**Verification of the behaviour of RCCBs opening automatically in case of failure of the line voltage**		N/A
9.17.1	Limiting value of the line voltage (Ux):		N/A
	- rated voltage applied to the line terminals and progressively lowered to attain zero within about 30 s until automatic opening occurs; voltage (V) :	E1 - E2 - E3 -	N/A
	- all values less than 0,85 times the rated voltage (V)		N/A
	- tripping test at test voltage (V) with I_{Dn} and operating according to Table 1 (ms) .....:	E1 - E2 - E3 -	N/A
	No value exceeds the specified limiting values		N/A
	Not possible to close the apparatus by manual operating means below Ux		N/A
9.17.2	Verification of behaviour in case of failure of the line voltage		N/A
	RCCB supplied with rated voltage, and the line voltage then switched off		N/A
	Time (ms) interval between switching off and opening of the main contacts .....:	E1 - E2 - E3 -	N/A
	a) RCCBs opening without delay: no value exceeds 0,5 s		N/A
	b) RCCBs opening with delay: max. and min. values within the range indicated by the manufacturer		N/A
9.17.3	Verification of the correct operation, in presence of a residual current, for RCCBs opening with delay in case of failure of the line voltage		N/A
	RCCB connected according to fig. 4 at the rated voltage (Un) .....:		N/A
	All phases but one switched off by means of S3		N/A
	During the delay: test of 9.9.2:		N/A
9.9.2.1	- steady increase from 0,2 I_{Dn} to I_{Dn} within 30 s (mA) .....:	E1 - E2 - E3 -	N/A
	- tripping current between I_{Dno} and I_{Dn} (mA) .....:	E1 - E2 - E3 -	N/A
	The RCCB closes on I_{Dn}: no value exceeds the specified limiting value of Table 1 (ms) .....:	E1 - E2 - E3 -	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
9.9.2.3	The test circuit being successively calibrated at each of the values of residual current specified in Table 1, the test switch S2 and the RCCB being in the closed position, the test voltage is suddenly established by closing the test switch S1		N/A
	- maximum break time (ms) at: I_{Dn} .....:	E1 - E2 - E3 -	N/A
	- maximum break time (ms) at: 2 I_{Dn} .....:	E1 - E2 - E3 -	N/A
	- maximum break time (ms) at: 5 I_{Dn} .....:	E1 - E2 - E3 -	N/A
	- maximum break time (ms) at: 0,25 A (if applicable) .....:	E1 - E2 - E3 -	N/A
	- maximum break time (ms) at: 500 A .....:	E1 - E2 - E3 -	N/A
	No value exceeds the relevant specified limiting value		N/A
	Additional test for type S:		N/A
	- minimum non-actuating time (ms) at: I_{Dn}; 0,13 s :	E1 - E2 - E3 -	N/A
	- minimum non-actuating time (ms) at: 2 I_{Dn}; 0,06 s .....:	E1 - E2 - E3 -	N/A
	- minimum non-actuating time (ms) at: 5 I_{Dn}; 0,05 s .....:	E1 - E2 - E3 -	N/A
	- minimum non-actuating time (ms) at: 500 A; 0,04 s .....:	E1 - E2 - E3 -	N/A
	No tripping during tests		N/A
9.17.4	Verification of the correct operation of RCCBs with 3 or 4 current paths, neutral and one line terminal only being energized in turn:		N/A
	RCCB connected according to fig. 4		N/A
9.9.2.3	The test circuit being successively calibrated at each of the values of residual current specified in Table 1, the test switch S2 and the RCCB being in the closed position, the test voltage is suddenly established by closing the test switch S1		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- maximum break time (ms) at: I_{Dn} .....:	E1 - E2 - E3 -	N/A
	- maximum break time (ms) at: 2 I_{Dn} .....:	E1 - E2 - E3 -	N/A
	- maximum break time (ms) at: 5 I_{Dn} .....:	E1 - E2 - E3 -	N/A
	- maximum break time (ms) at: 0,25 A (if applicable) .....:	E1 - E2 - E3 -	N/A
	- maximum break time (ms) at: 500 A .....:	E1 - E2 - E3 -	N/A
	No value exceeds the relevant specified limiting value		N/A
	Additional test for type S:		N/A
	- minimum non-actuating time (ms) at: I_{Dn}; 0,13 s :	E1 - E2 - E3 -	N/A
	- minimum non-actuating time (ms) at: 2 I_{Dn}; 0,06 s .....:	E1 - E2 - E3 -	N/A
	- minimum non-actuating time (ms) at: 5 I_{Dn}; 0,05 s .....:	E1 - E2 - E3 -	N/A
	- minimum non-actuating time (ms) at: 500 A; 0,04 s .....:	E1 - E2 - E3 -	N/A
	No tripping during tests		N/A
9.17.5	Verification of the reclosing function of automatically reclosing RCCBs (under consideration)		N/A
9.11.2.2	Verification of the rated making and breaking capacity (A): Im .....:	See the report 64.105.21.30160.01 for detail	¾
	Test circuit according to figure .....:		¾
	Residual operating current (A): 10 I_{Dn} .....:		¾
	Point of test circuit which is directly earthed .....:		¾
	Grid distance "a" (mm) .....:		¾

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Clause	Requirement + Test	Result - Remark	Verdict
	Prospective current (A) .....:		¾
	Prospective current obtained (A) .....:		¾
	Power factor .....:		¾
	Power factor obtained .....:		¾
	Point of initiation: 45° ± 5°		N/A
	Test sequence: CO-t-CO-t-CO		N/A
	During tests no endangering of operator, no permanent arcing, no flashover and no melting of fuse F		N/A
	After the tests no damage impairing further use		N/A
9.7.7.3	The leakage current flowing across the open contacts is measured at 1,1 Un and shall not exceed 2mA (mA)	E1 – E2 – E3 –	N/A
9.7.3	Dielectric strength test of the main circuit at test voltage of 2 Un for 1 min:		N/A
	a) .....:	500V	N/A
	b) .....:	500V	N/A
	c) .....:	500V	N/A
	d) .....:		N/A
	e) .....:		N/A
	No flashover or breakdown		N/A
	Making and breaking In at Un		N/A
	The RCCB shall trip with a test current of 1,25 I_{Dn} (ms)		N/A
	The polyethylene sheet shows no holes		N/A
9.17	**Verification of the behaviour of RCCBs opening automatically in case of failure of the line voltage**		N/A
9.17.1	Limiting value of the line voltage (Ux):		N/A
	- rated voltage applied to the line terminals and progressively lowered to attain zero within about 30 s until automatic opening occurs; voltage (V) :	E1 - E2 - E3 -	N/A
	- all values less than 0,85 times the rated voltage (V) .....:		N/A
	- tripping test at test voltage (V) with I_{Dn} and operating according to Table 1 (ms) .....:	E1 - E2 - E3 -	N/A
	No value exceeds the specified limiting values		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Not possible to close the apparatus by manual operating means below Ux		N/A
9.17.2	Verification of behaviour in case of failure of the line voltage		N/A
	RCCB supplied with rated voltage, and the line voltage then switched off		N/A
	Time (ms) interval between switching off and opening of the main contacts .....:	E1 - E2 - E3 -	N/A
	a) RCCBs opening without delay: no value exceeds 0,5 s		N/A
	b) RCCBs opening with delay: max. and min. values within the range indicated by the manufacturer		N/A
9.17.3	Verification of the correct operation, in presence of a residual current, for RCCBs opening with delay in case of failure of the line voltage		N/A
	RCCB connected according to fig. 4 at the rated voltage (Un) .....:		N/A
	All phases but one switched off by means of S3		N/A
	During the delay: test of 9.9.2:		N/A
9.9.2.1	- steady increase from 0,2 I_{Dn} to I_{Dn} within 30 s (mA) .....:	E1 - E2 - E3 -	N/A
	- tripping current between I_{Dno} and I_{Dn} (mA) .....:	E1 - E2 - E3 -	N/A
	The RCCB closes on I_{Dn}: no value exceeds the specified limiting value of Table 1 (ms) .....:	E1 - E2 - E3 -	N/A
9.9.2.3	The test circuit being successively calibrated at each of the values of residual current specified in Table 1, the test switch S2 and the RCCB being in the closed position, the test voltage is suddenly established by closing the test switch S1		N/A
	- maximum break time (ms) at: I_{Dn} .....:	E1 - E2 - E3 -	N/A
	- maximum break time (ms) at: 2 I_{Dn} .....:	E1 - E2 - E3 -	N/A
	- maximum break time (ms) at: 5 I_{Dn} .....:	E1 - E2 - E3 -	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- maximum break time (ms) at: 0,25 A (if applicable) .....:	E1 - E2 - E3 -	N/A
	- maximum break time (ms) at: 500 A .....:	E1 - E2 - E3 -	N/A
	No value exceeds the relevant specified limiting value		N/A
	Additional test for type S:		N/A
	- minimum non-actuating time (ms) at: I_{Dn}; 0,13 s :	E1 - E2 - E3 -	N/A
	- minimum non-actuating time (ms) at: 2 I_{Dn}; 0,06 s .....:	E1 - E2 - E3 -	N/A
	- minimum non-actuating time (ms) at: 5 I_{Dn}; 0,05 s .....:	E1 - E2 - E3 -	N/A
	- minimum non-actuating time (ms) at: 500 A; 0,04 s .....:	E1 - E2 - E3 -	N/A
	No tripping during tests		N/A
9.17.4	Verification of the correct operation of RCCBs with 3 or 4 current paths, neutral and one line terminal only being energized in turn:		N/A
	RCCB connected according to fig. 4		N/A
9.9.2.3	The test circuit being successively calibrated at each of the values of residual current specified in Table 1, the test switch S2 and the RCCB being in the closed position, the test voltage is suddenly established by closing the test switch S1		N/A
	- maximum break time (ms) at: I_{Dn} .....:	E1 - E2 - E3 -	N/A
	- maximum break time (ms) at: 2 I_{Dn} .....:	E1 - E2 - E3 -	N/A
	- maximum break time (ms) at: 5 I_{Dn} .....:	E1 - E2 - E3 -	N/A
	- maximum break time (ms) at: 0,25 A (if applicable) .....:	E1 - E2 - E3 -	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- maximum break time (ms) at: 500 A .....:	E1 - E2 - E3 -	N/A
	No value exceeds the relevant specified limiting value		N/A
	Additional test for type S:		N/A
	- minimum non-actuating time (ms) at: I_{Dn}; 0,13 s :	E1 - E2 - E3 -	N/A
	- minimum non-actuating time (ms) at: 2 I_{Dn}; 0,06 s .....:	E1 - E2 - E3 -	N/A
	- minimum non-actuating time (ms) at: 5 I_{Dn}; 0,05 s .....:	E1 - E2 - E3 -	N/A
	- minimum non-actuating time (ms) at: 500 A; 0,04 s .....:	E1 - E2 - E3 -	N/A
	No tripping during tests		N/A
9.17.5	Verification of the reclosing function of automatically reclosing RCCBs (under consideration)		N/A

	TEST SEQUENCE F (3 samples)		
8.7	**Performance at short-circuit currents**		**P**
9.11.2.4	Verification of the coordination between the RCCB and the SCPD		P
	b) Verification of the coordination at the rated making and breaking capacity (A): Im .....:	See the report 64.105.21.30160.01 for detail	¾
	Test circuit according to figure .....:		¾
	Point of test circuit which is directly earthed .....:		¾
	Grid distance "a" (mm) .....:		¾
	Silver wire diameter (mm) or fuse .....:		¾
	Prospective current (A) .....:		¾
	Prospective current obtained (A) .....:		¾
	Power factor .....:		¾
	Power factor obtained .....:		¾
	Point of initiation: 45° ± 5°		N/A
	Test sequence: O-t-CO-t-CO		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	During tests no endangering of operator, no permanent arcing, no flashover and no melting of fuse F		N/A
	After the tests no damage impairing further use		N/A
9.7.7.3	The leakage current flowing across the open contacts is measured at 1,1 Un and shall not exceed 2mA (mA)	F1 – F2 – F3 –	N/A
9.7.3	Dielectric strength test of the main circuit at test voltage of 2 Un for 1 min:		N/A
	a) .....:	500V	N/A
	b) .....:	500V	N/A
	c) .....:	500V	N/A
	d) .....:		N/A
	e) .....:		N/A
	No flashover or breakdown		N/A
	Making and breaking In at Un		N/A
	The RCCB shall trip with a test current of 1,25 I_{Dn} (mA)		N/A
	The polyethylene sheet shows no holes		N/A
9.17	**Verification of the behaviour of RCCBs opening automatically in case of failure of the line voltage**		N/A
9.17.1	Limiting value of the line voltage (Ux):		N/A
	- rated voltage applied to the line terminals and progressively lowered to attain zero within about 30 s until automatic opening occurs; voltage (V) :	F1 - F2 - F3 -	N/A
	- all values less than 0,85 times the rated voltage (V) .....:		N/A
	- tripping test at test voltage (V) with I_{Dn} and operating according to Table 1 (ms) .....:	F1 - F2 - F3 -	
	No value exceeds the specified limiting values		N/A
	Not possible to close the apparatus by manual operating means below Ux		N/A
9.17.2	Verification of behaviour in case of failure of the line voltage		N/A
	RCCB supplied with rated voltage, and the line voltage then switched off		N/A
	Time (ms) interval between switching off and opening of the main contacts .....:	F1 - F2 - F3 -	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	a) RCCBs opening without delay: no value exceeds 0,5 s		N/A
	b) RCCBs opening with delay: max. and min. values within the range indicated by the manufacturer		N/A
9.17.3	Verification of the correct operation, in presence of a residual current, for RCCBs opening with delay in case of failure of the line voltage		N/A
	RCCB connected according to fig. 4 at the rated voltage (Un) .....:		N/A
	All phases but one switched off by means of S3		N/A
	During the delay: test of 9.9.2:		N/A
9.9.2.1	- steady increase from 0,2 I_{Dn} to I_{Dn} within 30 s (mA) .....:	F1 - F2 - F3 -	N/A
	- tripping current between I_{Dno} and I_{Dn} (mA) .....:	F1 - F2 - F3 -	N/A
	The RCCB closes on I_{Dn}: no value exceeds the specified limiting value of Table 1 (ms) .....:	F1 - F2 - F3 -	N/A
9.9.2.3	The test circuit being successively calibrated at each of the values of residual current specified in Table 1, the test switch S2 and the RCCB being in the closed position, the test voltage is suddenly established by closing the test switch S1		N/A
	- maximum break time (ms) at: I_{Dn} .....:	F1 - F2 - F3 -	N/A
	- maximum break time (ms) at: 2 I_{Dn} .....:	F1 - F2 - F3 -	N/A
	- maximum break time (ms) at: 5 I_{Dn} .....:	F1 - F2 - F3 -	N/A
	- maximum break time (ms) at: 0,25 A (if applicable) .....:	F1 - F2 - F3 -	N/A
	- maximum break time (ms) at: 500 A .....:	F1 - F2 - F3 -	N/A
	No value exceeds the relevant specified limiting value		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Additional test for type S:		N/A
	- minimum non-actuating time (ms) at: I_{Dn}; 0,13 s :	F1 - F2 - F3 -	N/A
	- minimum non-actuating time (ms) at: 2 I_{Dn}; 0,06 s .....:	F1 - F2 - F3 -	N/A
	- minimum non-actuating time (ms) at: 5 I_{Dn}; 0,05 s .....:	F1 - F2 - F3 -	N/A
	- minimum non-actuating time (ms) at: 500 A; 0,04 s .....:	F1 - F2 - F3 -	N/A
	No tripping during tests		N/A
9.17.4	Verification of the correct operation of RCCBs with 3 or 4 current paths, neutral and one line terminal only being energized in turn:		N/A
	RCCB connected according to fig. 4		
9.9.2.3	The test circuit being successively calibrated at each of the values of residual current specified in Table 1, the test switch S2 and the RCCB being in the closed position, the test voltage is suddenly established by closing the test switch S1		N/A
	- maximum break time (ms) at: I_{Dn} .....:	F1 - F2 - F3 -	N/A
	- maximum break time (ms) at: 2 I_{Dn} .....:	F1 - F2 - F3 -	N/A
	- maximum break time (ms) at: 5 I_{Dn} .....:	F1 - F2 - F3 -	N/A
	- maximum break time (ms) at: 0,25 A (if applicable) .....:	F1 - F2 - F3 -	N/A
	- maximum break time (ms) at: 500 A .....:	F1 - F2 - F3 -	N/A
	No value exceeds the relevant specified limiting value		N/A
	Additional test for type S:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- minimum non-actuating time (ms) at: I_{Dn}; 0,13 s :	F1 - F2 - F3 -	N/A
	- minimum non-actuating time (ms) at: 2 I_{Dn}; 0,06 s .....:	F1 - F2 - F3 -	N/A
	- minimum non-actuating time (ms) at: 5 I_{Dn}; 0,05 s .....:	F1 - F2 - F3 -	N/A
	- minimum non-actuating time (ms) at: 500 A; 0,04 s .....:	F1 - F2 - F3 -	N/A
	No tripping during tests		N/A
9.17.5	Verification of the reclosing function of automatically reclosing RCCBs (under consideration)		N/A
9.11.2.4	c) Verification of the coordination at the rated conditional residual short-circuit current (A): IDc :	See the report 64.105.21.30160.01 for detail	¾
	Test circuit according to figure .....:		¾
	Point of test circuit which is directly earthed .....:		¾
	Grid distance "a" (mm) .....:		¾
	Silver wire diameter (mm) or fuse .....:		¾
	Prospective current (A) .....:		¾
	Prospective current obtained (A) .....:		¾
	Power factor .....:		¾
	Power factor obtained .....:		¾
	Point of initiation: 45° ± 5°		N/A
	Verification of I^2t (kA^2s) and Ip (kA) prior to testing (≥1x ≤1,1x values of table 15), RCCB replaced by a connection having negligible impedance		N/A
	Test sequence: O-t-CO-t-CO		N/A
	I^2t (kA^2s); Ip (kA) .....:	F1 – F2 – F3 –	N/A
	During tests no endangering of operator, no permanent arcing, no flashover and no melting of fuse F		N/A
	After the tests no damage impairing further use		N/A

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IEC 61008-1			
Clause	Requirement + Test	Result - Remark	Verdict
9.7.7.3	The leakage current flowing across the open contacts is measured at 1,1 Un and shall not exceed 2mA (mA)	F1 – F2 – F3 –	N/A
9.7.3	Dielectric strength test of the main circuit at test voltage of 2 Un for 1 min:		N/A
	a) .....:	500V	N/A
	b) .....:	500V	N/A
	c) .....:	500V	N/A
	d) .....:		N/A
	e) .....:		N/A
	No flashover or breakdown		N/A
	Making and breaking In at Un		N/A
	The RCCB shall trip with a test current of 1,25 I_{Dn}		N/A
	The polyethylene sheet shows no holes		N/A
9.17	**Verification of the behaviour of RCCBs opening automatically in case of failure of the line voltage**		N/A
9.17.1	Limiting value of the line voltage (Ux):		N/A
	- rated voltage applied to the line terminals and progressively lowered to attain zero within about 30 s until automatic opening occurs; voltage (V) :	F1 - F2 - F3 -	N/A
	- all values less than 0,85 times the rated voltage (V)		N/A
	- tripping test at test voltage (V) with I_{Dn} and operating according to Table 1 (ms) .....:	F1 - F2 - F3 -	N/A
	No value exceeds the specified limiting values		N/A
	Not possible to close the apparatus by manual operating means below Ux		N/A
9.17.2	Verification of behaviour in case of failure of the line voltage		N/A
	RCCB supplied with rated voltage, and the line voltage then switched off		N/A
	Time (ms) interval between switching off and opening of the main contacts .....:	F1 - F2 - F3 -	N/A
	a) RCCBs opening without delay: no value exceeds 0,5 s		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	b) RCCBs opening with delay: max. and min. values within the range indicated by the manufacturer		N/A
9.17.3	Verification of the correct operation, in presence of a residual current, for RCCBs opening with delay in case of failure of the line voltage		N/A
	RCCB connected according to fig. 4 at the rated voltage (Un) .....:		N/A
	All phases but one switched off by means of S3		N/A
	During the delay: test of 9.9.2:		N/A
9.9.2.1	- steady increase from 0,2 I_{Dn} to I_{Dn} within 30 s (mA) .....:	F1 - F2 - F3 -	N/A
	- tripping current between I_{Dno} and I_{Dn} (mA) .....:	F1 - F2 - F3 -	N/A
	The RCCB closes on I_{Dn}: no value exceeds the specified limiting value of Table 1 (ms) .....:	F1 - F2 - F3 -	N/A
9.9.2.3	The test circuit being successively calibrated at each of the values of residual current specified in Table 1, the test switch S2 and the RCCB being in the closed position, the test voltage is suddenly established by closing the test switch S1		N/A
	- maximum break time (ms) at: I_{Dn} .....:	F1 - F2 - F3 -	N/A
	- maximum break time (ms) at: 2 I_{Dn} .....:	F1 - F2 - F3 -	N/A
	- maximum break time (ms) at: 5 I_{Dn} .....:	F1 - F2 - F3 -	N/A
	- maximum break time (ms) at: 0,25 A (if applicable) .....:	F1 - F2 - F3 -	N/A
	- maximum break time (ms) at: 500 A .....:	F1 - F2 - F3 -	N/A
	No value exceeds the relevant specified limiting value		N/A
	Additional test for type S:		N/A

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IEC 61008-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- minimum non-actuating time (ms) at: I_{Dn}; 0,13 s :	F1 - F2 - F3 -	N/A
	- minimum non-actuating time (ms) at: 2 I_{Dn}; 0,06 s .....:	F1 - F2 - F3 -	N/A
	- minimum non-actuating time (ms) at: 5 I_{Dn}; 0,05 s .....:	F1 - F2 - F3 -	N/A
	- minimum non-actuating time (ms) at: 500 A; 0,04 s .....:	F1 - F2 - F3 -	N/A
	No tripping during tests		N/A
9.17.4	Verification of the correct operation of RCCBs with 3 or 4 current paths, neutral and one line terminal only being energized in turn:		N/A
	RCCB connected according to fig. 4		N/A
9.9.2.3	The test circuit being successively calibrated at each of the values of residual current specified in Table 1, the test switch S2 and the RCCB being in the closed position, the test voltage is suddenly established by closing the test switch S1		N/A
	- maximum break time (ms) at: I_{Dn} .....:	F1 - F2 - F3 -	N/A
	- maximum break time (ms) at: 2 I_{Dn} .....:	F1 - F2 - F3 -	N/A
	- maximum break time (ms) at: 5 I_{Dn} .....:	F1 - F2 - F3 -	N/A
	- maximum break time (ms) at: 0,25 A (if applicable) .....:	F1 - F2 - F3 -	N/A
	- maximum break time (ms) at: 500 A .....:	F1 - F2 - F3 -	N/A
	No value exceeds the relevant specified limiting value		N/A
	Additional test for type S:		N/A
	- minimum non-actuating time (ms) at: I_{Dn}; 0,13 s :	F1 - F2 - F3 -	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- minimum non-actuating time (ms) at: 2 I_{Dn}; 0,06 s .....:	F1 - F2 - F3 -	N/A
	- minimum non-actuating time (ms) at: 5 I_{Dn}; 0,05 s .....:	F1 - F2 - F3 -	N/A
	- minimum non-actuating time (ms) at: 500 A; 0,04 s .....:	F1 - F2 - F3 -	N/A
	No tripping during tests		N/A
9.17.5	Verification of the reclosing function of automatically reclosing RCCBs (under consideration)		N/A

	TEST SEQUENCE G (3 samples)		
9.22	**Verification of reliability**		**P**
9.22.1	Climatic test based on Clause 4 of IEC 60068-2-3:2000 and IEC 60068-3-4:		N/A
	- number of cycles: 28	See the report 64.105.21.30160.01 for detail	N/A
	- test temperature: upper temperature 55 °C ± 2 °C		N/A
	Initial verification:		N/A
9.9.2.3	- maximum break time at I_{Dn} (ms) .....:	See clause 9.9.2.3	N/A
	No value exceeds the specified limiting value		N/A
	Additional test for type S:		N/A
	- minimum non-actuating time (ms) at: I_{Dn}; 0,13 s :	G1 - G2 - G3 -	N/A
	No tripping during tests		N/A
	Climatic test: no tripping during 28 cycles test		N/A
	Final verification: the RCCB shall trip with a test current of 1,25 I_{Dn} (mA)		N/A

	TEST SEQUENCE H (3 samples)		N/A
IEC 61543:			N/A
table4-T1.1	Harmonics, interharmonics		N/A

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IEC 61008-1			
Clause	Requirement + Test	Result - Remark	Verdict
table4-T1.2	Signalling voltage		N/A
table5-T2.3	Conducted unidirectional transients of the ms and µs time scale		N/A
	Test results of test sequence H:		N/A
	see test report No. :		N/A
	Testing location / address .....:		N/A

	TEST SEQUENCE I (3 samples)		**N/A**
IEC 61543:			N/A
table5-T2.1	Conducted sine-wave voltages or currents		N/A
table5-T2.5	Radiated high-frequency phenomena		N/A
table5-T2.2	Fast transients (burst)		N/A
	Test results of test sequence I:		N/A
	see test report No. :		N/A
	Testing location / address .....:		N/A

	TEST SEQUENCE J (3 samples)		N/A
IEC 61543:			N/A
table5-T2.6	Conducted common mode disturbances in the frequency range lower than 150 kHz		N/A
table6-T3.1	Electrostatic discharges		N/A
	Test results of test sequence J:		N/A
	see test report No. :		N/A
	Testing location / address .....:		N/A

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IEC 61008-1			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX A (NORMATIVE)

Test sequence and number of samples to be submitted for certification purposes
Table A.1 - Test sequences

Test sequence		Clause or subclause	Test (or inspection)
A_1		6 8.1.1 8.1.2 9.3 8.1.3 9.15 9.4 9.5 9.6 9.13 8.1.3 9.25	Marking General Mechanism Indelibility of marking Clearance and creepage distances (external parts only) Trip free mechanism Reliability of screws, current-carrying parts and connections Reliability of terminals for external conductors Protection against electric shock Resistance to heat Clearances and creepage distances (internal parts) Resistance to rusting
A_2		9.14	Resistance to abnormal heat and to fire
B		9.7.7.4 9.7.7.5 [b)] 9.7.1 9.7.2 9.7.3 9.7.4 9.7.7.2 9.7.5 9.7.6 9.8 9.22.2 9.23	Resistance of the insulation of open contacts and basic insulation against an impulse voltage in normal conditions Verification of the behaviour of components bridging the basic insulation Resistance to humidity Insulation resistance of the main circuit Dielectric strength of the main circuit Insulation resistance an dielectric strength of auxiliary circuits Verification of clearances with the impulse withstand voltage Secondary circuit of detection transformers Capability of control circuits connected to the main circuits etc. Temperature-rise Reliability at 40°C Ageing of electronic components
C		9.10	Mechanical and electrical endurance
D	D_0	9.9	Residual operating characteristics
	D_1	9.17 9.19 9.11.2.3 a)b) 9.16 9.12 9.18	Behaviour in case of failure of the line voltage Unwanted tripping Behaviour in case of surge currents Performance at I_{Dm} Test device Resistance to mechanical shock and impact Non-operating current under overcurrent conditions
	D_2	9.11.2.3 c)	Verification of the suitability of RCCBs for use in IT-systems
E		9.11.2.4 a)	Coordination at I_{nc}
		9.11.2.2	Performance at I_m
F		9.11.2.4 b)	Coordination at I_m

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Clause	Requirement + Test	Result - Remark	Verdict
	9.11.2.4 c)	Coordination at I_{Dc}	
G	9.22.1	Reliability (climatic tests)	
H [a)]	IEC 61543 Table 4 - T1.1 IEC 61543 Table 4 - T1.2 IEC 61543 Table 5 - T2.3	Harmonics, interharmonics Signalling voltage Surges	
I	IEC 61543 Table 5 - T2.1 IEC 61543 Table 5 - T2.5 IEC 61543 Table 5 - T2.2	Conducted sine-wave voltages or currents Radiated electromagnetic field Fast transients (burst)	
J	IEC 61543 Table 5 - T2.6 IEC 61543 Table 6 - T3.1	Conducted common mode disturbances in the frequency range lower than 150 kHz Electrostatic discharges	
a) For devices containing a continuously operating oscillator, the test of CISPR 14-1 shall be carried out on the samples prior to the tests of this sequence. b) This test may be done on separate samples.			

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IEC 61008-1			
Clause	Requirement + Test	Result - Remark	Verdict

Table A.2 - Number of samples for full test procedure

Test sequence [a]	Number of samples	Minimum number of accepted samples [b]	Maximum number of samples for repeated tests [c]
A_1	1	1	--
A_2	3	2	3
B	3	2	3
C	3	2	3
D	3	2 [d]	3
D_2	3	3	3
E	3	2 [d]	3
F	3	2 [d]	3
G	3	2	3
H [e]	3	2	3
I [e]	3	2	3
J [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) All samples shall meet the requirements in 9.9.2.1, 9.9.2.2, 9.9.2.3, 9.9.2.4, 9.9.2.5 and 9.11.2.3, as appropriate. In addition, permanent arcing or flashover between poles or between poles and frame shall not occur in any sample during tests of 9.11.2.2, 9.11.2.4 a), 9.11.2.4 b) or 9.11.2.4 c).

e) At the manufacturer's request, the same set of samples may be subjected to more than one of these test sequences.

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IEC 61008-1			
Clause	Requirement + Test	Result - Remark	Verdict

Table A.3 - Number of samples for simplified test procedure

Test sequence	Number of samples according to the number of poles [a) g)]		
	2-poles [b) c)]	3-poles [d) f) i)]	4-poles [e)]
A_1	1 max. rating I_N min. rating I_{DN}	1 max. rating I_N min. rating I_{DN}	1 max. rating I_N min. rating I_{DN}
A_2	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}
B	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}
C	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}
$D_0 + D_1$	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}
D_0	1 for all other ratings of I_{DN}		
D_2	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}
E	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}
F	3 max. rating I_N min. rating I_{DN} 3 min. rating I_N max. rating I_{DN}	3 max. rating I_N min. rating I_{DN} 3 min. rating I_N max. rating I_{DN}	3 max. rating I_N min. rating I_{DN} 3 min. rating I_N max. rating I_{DN}
G [j)]	3 max. rating I_N min. rating I_{DN} 3 min. rating I_N max. rating I_{DN}	3 max. rating I_N min. rating I_{DN} 3 min. rating I_N max. rating I_{DN}	3 max. rating I_N min. rating I_{DN} 3 min. rating I_N max. rating I_{DN}
H			3 [h)] samples of the same rating I_N chosen at random min. rating I_{DN}
I			3 [h)] samples of the same rating I_N chosen at random min. rating I_{DN}
J			3 [h)] samples of the same rating I_N chosen at random min. rating I_{DN}

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

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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) Also applicable to 1-pole RCCBs with uninterrupted neutral and 2-pole RCCBs with 1 protected pole.
d) Also applicable to 3-pole RCCBs with two protected poles
e) Also applicable to 3-pole RCCBs with uninterrupted neutral and 4-pole RCCBs with 3 protected poles.
f) This column is omitted when 4-pole RCCBs have been tested.
g) If only one value of I_{DN} is submitted, min. rating I_{DN} and max. rating I_{DN} are replaced by I_{DN}.
h) Only the highest number of current paths.
i) If a 3-pole RCCB with 4 current paths and a 4-pole RCCB are submitted, then only the 4-pole RCCB is tested,
with exception of the test of 9.8 of test sequence B for which both types are submitted to the test.
j) if the requirement to test max. rating In and minimum rating $I_{\Delta N}$ does not cover all the possible range of RCBOs, the minimum
$I_{\Delta N}$ shall in any case be chosen for the test.

Table A.4 - Test sequences for RCCBs of different classification according to 4.6

Test sequence	Number of samples according to the number of poles [a]		
	2-pole [b) c)]	3-pole [e)]	4-pole [d)]
$D_0 + D_1$	1 max. rating I_N min. rating I_{DN}	1 max. rating I_N min. rating I_{DN}	1 max. rating I_N min. rating I_{DN}
D_0	1 for all other ratings of I_{DN} with max. I_{DN}		

a) If a test is to be repeated according to the minimum performance criteria of clause 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) Also applicable to 1-pole RCCBs with uninterrupted neutral.

d) Also applicable to 3-pole RCCBs with uninterrupted neutral.

e) This column is omitted when 4-pole RCCBs are being tested.

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Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX B DETERMINATION OF CLEARANCES AND CREEPAGE DISTANCES	P
B.1	**General**	P
	In determining clearances and creepage distances, it is recommended that the following points should be considered.	P
B.2	**Orientation and location of a creepage distance**	P
	If necessary, the manufacturer shall indicate the intended orientation of the equipment or component in order that creepage distances are not adversely affected by the accumulation of pollution for which they were not designed.	P
B.3	**Creepage distances where more than one material is used**	N/A
	A creepage distance may be split in several portions of different materials and/or have different pollution degrees if one of the creepage distances is dimensioned to withstand the total voltage or if the total distance is dimensioned according to the material having the lowest CTI.	N/A
B.4	**Creepage distances split by floating conductive part**	N/A
	A creepage distance may be split into several parts, made with insulation material having the same CTI, including or separated by floating conductors as long as the sum of the distances across each individual part is equal or greater than the creepage distance required if the floating part did not exist. The minimum distance X for each individual part of the creepage distance is given in IEC 60664-1:2007, 6.2 (see also Example 11 in Figure B.1).	N/A
B.5	**Measurement of creepage distances and clearances**	P
	In determining creepage distances according to IEC 60664-1, the dimension *X*, specified in the following examples, has a minimum value of 1,0 mm for pollution degree 2.	P
	If the associated clearance is less than 3 mm, the minimum dimension *X* may be reduced to one third of this clearance.	P
	The methods of measuring creepage distances and clearances are indicated in Example 1 to 11. These cases do not differentiate between gaps and grooves or between types of insulation.	P
	The following assumptions are made:	-
	- any recess is assumed to be bridged with an insulating link having a length equal to the specified width *X* and being placed in the most unfavourable position (see Example 3);	P
	- where the distance across a groove is equal to or larger than the specified width *X*, the creepage distance is measured along the contours of the groove (see Example 3);	P
	- creepage distances and clearances measured between parts which can assume different positions in relation to each other, are measured when these parts are in their most unfavourable position.	P

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Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX C **ARRANGEMENT FOR THE DETECTION OF THE EMISSION OF IONIZED GASES DURING SHORT-CIRCUIT TESTS**	**N/A**
	The device under test is mounted as shown in figure C.1, which may require adapting to the specific design of the device, and in accordance with the manufacturer's instructions.	N/A
	When required (i.e. during "O" operations), a clear polyethylene sheet (0,05 ± 0,01) mm thick, of a size at least 50 mm larger, in each direction, than the overall dimensions of the front face of the device but not less than 200 mm × 200 mm, is fixed and reasonably stretched in a frame, placed at a distance of 10 mm from	N/A
	– either the maximum projection of the operating means of a device without recess for the operating means;	N/A
	– or the rim of a recess for the operating means of a device with recess for the operating means.	N/A
	The sheet should have the following physical properties: Density at 23 °C: 0,92 ± 0,05 g/cm³ Melting-point: 110 °C – 120 °C.	N/A
	When required, a barrier of insulating material, at least 2 mm thick, is placed, as shown in figure C.1, between the arc vent and the polyethylene sheet to prevent damage of the sheet due to hot particles emitted from the arc vent.	N/A
	When required, a grid (or grids) according to figure C.2 is (are) placed at a distance of "a" mm from each arc vent side of the device.	N/A
	The grid circuit (see figure C.3) shall be connected to the points B and C (see figures 7 or 8, as applicable).	N/A
	The parameters for the grid circuit are as follows:	N/A
	Resistor R': 1,5 Ω	N/A
	Copper wire F': length 50 mm, and diameter in accordance with 9.11.2.1 f 1).	N/A

	ANNEX D **ROUTINE TESTS**		--
D.1	**General**		--
	The tests specified in this standard are intended to reveal, as far as safety is concerned, unacceptable variations in material or manufacture.		N/A
	In general, further tests have to be made to ensure that every RCCB conforms with the samples that withstood the tests of this standard, according to the experience gained by the manufacturer.		N/A
D.2	**Tripping test**		--

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Clause	Requirement + Test	Result - Remark			Verdict
	A residual current is passed through each pole of the RCCB in turn. The RCCB shall not trip at a current less than or equal to 0,5 I_{DN}, but it shall trip at I_{DN} within a specified time (see Table 1).	[ms]	[ms]	[ms]	N/A
					N/A
	The test current shall be applied at least five times to each RCCB and shall be applied at least twice to each pole.				N/A
D.3	**Electric strength test**				--
	A voltage of substantially sine-wave form of 1 500 V having a frequency of 50 Hz/60 Hz is applied for 1 s as follows:				N/A
	a) with the RCCB in the open position, between each pair of terminals which are electrically connected together when the RCCB is in closed position				N/A
	b) for RCCBs not incorporating electronic components, with the RCCB in the closed position, between each pole in turn and the others connected together				N/A
	c) for RCCBs incorporating electronic components, with the RCCB in the open position, either between all incoming terminals of poles in turn or between all outgoing terminals of poles in turn, depending on the position of the electronic components.				N/A
	No flashover or breakdown shall occur				N/A
D.4	**Performance of the test device**				--
	With the RCCB in the closed position, and connected to a supply at the appropriate voltage, the test device, when operated, shall open the RCCB.				N/A
	Where the test device is intended to operate at more than one value of rated voltage, the test shall be made at the lowest value of rated voltage.				

J	**ANNEX J** **Particular requirements for RCCBs with screwless type terminals for external copper conductors**	N/A
J.1	**THIS ANNEX APPLIES TO RCCBS WITHIN THE SCOPE OF CLAUSE 1, EQUIPPED WITH SCREWLESS TERMINALS, FOR CURRENT NOT EXCEEDING 20 A PRIMARILY SUITABLE FOR CONNECTING UNPREPARED (SEE J.3.6) COPPER CONDUCTORS OF CROSS-SECTION UP TO 4 MM^2.**	--
J.6	**Marking and other product information**	--

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Clause	Requirement + Test	Result - Remark	Verdict
	in addition to clause 6:		N/A
	universal terminals:		N/A
	no markings		N/A
	non-universal terminals:		N/A
	terminals for rigid-solid conductors marked by “sol”		N/A
	terminals for rigid (solid and stranded) conductors marked by “r”		N/A
	terminals for flexible conductors marked by “f”		N/A
	Marking on the RCCB or		N/A
	if the space available is not sufficient on the smallest package unit or in technical information		N/A
	Marking indicating the length of insulation to be removed before insertion of the conductor into the terminal shown on the RCBO		N/A
	Manufacturer shall provide information in his literature, on the maximum number of conductors which may be clamped.		N/A
J.8	**Standard conditions for operating in service and for installation**		--
	clause 8 applies with the following modifications: in 8.1.5, only 8.1.5.1, 8.1.5.2, 8.1.5.3, 8.1.5.6 and 8.1.5.7 apply		N/A
	Compliance is checked by inspection and by the tests of J.9.1 and J.9.2 of this annex, instead of 9.4 and 9.5.		N/A
J.8.1	Connection or disconnection of conductors		N/A
	The connection or disconnection of conductors shall be made:		N/A
	- by the use of a general purpose tool or by a convenient device integral with the terminal to open it and to assist the insertion or the withdrawal of the conductors (e.g. for universal terminals)		N/A
	- or, for rigid conductors by simple insertion. For the disconnection of the conductors an operation other than a pull on the conductor shall be necessary (e.g. for push-wire terminals).		N/A
	Universal terminals shall accept rigid (solid or stranded) and flexible unprepared conductors.		N/A
	Non-universal terminals shall accept the types of conductors declared by the manufacturer.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Compliance is checked by inspection and by the tests of J.9.1 and J.9.2.		N/A
J.8.2	Dimensions of connectable conductors		N/A
	The dimensions of connectable conductors are given in Table J.1.		N/A
	The ability to connect these conductors shall be checked by inspection and by the tests of J.9.1 and J.9.2.		N/A
J.8.3	Connectable cross-sectional areas		N/A
	nominal cross-sections to be clamped acc. table J.2		N/A
	compliance checked by inspection and tests of J.9.1 and J.9.2.		N/A
J.8.5	Design and construction of terminals		N/A
	terminals so designed and constructed that:		--
	- each conductor clamped individually		N/A
	- during operation of connection or disconnection the conductors can be connected or disconnected either at the same time or separately		N/A
	- inadequate insertion of the conductor is avoided		N/A
	It shall be possible to clamp securely any number of conductors up to the maximum provided for		N/A
	compliance checked by inspection and tests of J.9.1 and J.9.2.		N/A
J.8.6	Resistance to ageing		N/A
	compliance checked by the test of J.9.3.		N/A
J.9	**Tests**		--
	Clause 9 applies, by replacing 9.4 and 9.5 by the following tests		N/A
J.9.1	Test of reliability of screwless terminals		--
J.9.1.1	Reliability of screwless system		
	three terminals of poles of new samples, with copper conductors of the rated cross sectional area in accordance with Table J.2, types of conductors in accordance with J.8.1.		N/A
	The connection and subsequent disconnection shall be made five times with:		N/A
	Min. cross-section (mm²) ..... :	mm²	N/A
	Max. cross-section (mm²) ..... :	mm²	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	new conductors used each time, except for the fifth time, when the conductor used for the fourth insertion is clamped at the same place. Before insertion into the terminal, wires of stranded rigid conductors re-shaped and wires of flexible conductors twisted to consolidate the ends.		N/A
	After each insertion, the conductor being inserted rotated 90 ° along its axis at the level of the clamped section and subsequently disconnected.		N/A
	After tests, the terminal not damaged in such a way as to impair its further use.		N/A
J.9.1.2	Test of reliability of connection		N/A
	three terminals of poles of new samples, with copper conductors of the rated cross sectional area in accordance with Table J.2, types of conductors in accordance with J.8.1.		N/A
	Before insertion into the terminal, wires of stranded rigid conductors and flexible conductors reshaped and wires of flexible conductors twisted to consolidate the ends.		N/A
	possible to fit the conductor into the terminal without undue force in the case of universal terminals and with the force necessary by hand in the case of push-wire terminals.		N/A
	conductor pushed as far as possible into the terminal or inserted so that adequate connection is obvious.		N/A
	Min. cross-section (mm²) ..... :	mm²	N/A
	Max. cross-section (mm²) ..... :	mm²	N/A
	After the test, no wire of the conductor shall have escaped outside the terminal.		N/A
J.9.2	Tests of reliability of terminals for external conductors: mechanical strength		N/A
	three terminals of poles of new samples fitted with new conductors of the type and of the minimum and maximum cross-sectional areas acc. Table J.2.		N/A
	Min. cross-section (mm²) ..... :	mm²	N/A
	Max. cross-section (mm²) ..... :	mm²	N/A
	wires of stranded rigid conductors and flexible conductors reshaped and wires of flexible conductors twisted to consolidate the ends.		N/A
	Pull for 1 min, min. cross-section (N) ..... :	N	N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	Pull for 1 min, max. cross-section (N) ..... :	N			N/A
	During the test no noticeable move of conductor				N/A
J.9.3	Cycling test				N/A
	Universal, rigid conductors - 3 samples Universal, flexible conductors - 3 samples				N/A
	Non-universal, solid conductors - 3 samples				N/A
	Non-universal, rigid (solid) stranded conductors - 3 samples Non-universal, rigid (stranded) stranded conductors - 3 samples				N/A
	Non-universal, flexible conductors - 3 samples				N/A
	Cross-section (mm²) ..... :	mm²			N/A
	Test current I_N (A) ..... :	A			N/A
	samples subjected to 192 temperature cycles				N/A
	Voltage drop after 192 cycles:				--
	voltage drop, measured at each terminal, at the end of the 192nd cycle, exceeded not the smaller of the two following values:				N/A
	– 22,5 mV				N/A
	– 1,5 times the value measured after the 24th cycle				N/A
		sample 1	sample 2	sample 3	--
		[mV]	[mV]	[mV]	--
	- rigid solid conductors ..... :				N/A
	- rigid stranded conductors ..... :				N/A
	- flexible conductors ..... :				N/A
	Voltage drop after 24th cycle:				--
		sample 1	sample 2	sample 3	--
		[mV]	[mV]	[mV]	--
	- rigid solid conductors ..... :				N/A
	- rigid stranded conductors ..... :				N/A
	- flexible conductors ..... :				N/A
	after this test: no changes evidently impairing further use, such as cracks, deformations or the like.				N/A

K	**ANNEX K** **Particular requirements for RCCBs with flat quick-connect terminations**	N/A

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IEC 61008-1					
Clause	Requirement + Test			Result - Remark	Verdict
K.1	**This annex applies to RCCBs within the scope of Clause 1, equipped with flat quick-connect terminations consisting of a male tab (see K.3.2) with nominal width 6,3 mm and thickness0,8 mm, to be used with a mating female connector for connecting electrical copper conductors according to the manufacturer's instructions, for rated currents up to and including 16 A.**				--
K.6	**Marking and other product information**				--
	in addition to clause 6, addition after the lettered item k):				--
	Information regarding the female connector acc. to IEC 61210 and type of conductor to be used shall be given in the manufacturers' instructions:				N/A
	l) manufacturer´s name or trade mark				N/A
	m) type reference				N/A
	n) information on cross-sections of conductors and colour code of insulated female connectors (see Table K.1)				N/A
	o) the use of only silver or tin-plated copper alloys				N/A
K.8	**Requirements for construction and operation**				--
	Clause 8 applies, with the following exceptions:				N/A
	subclause 8.1.3 applies, the female connectors being fitted to the male tabs of the RCCB				N/A
	replace the contents of 8.1.5 by the following:				N/A
K.8.2	Terminals for external conductors				N/A
K.8.2.1	Male tabs and female connectors shall be of a metal having mechanical strength, electrical conductivity and resistance to corrosion adequate for their intended use.				N/A
K.8.2.2	The nominal width of the male tab is 6,3 mm and the thickness 0,8 mm, applicable to rated currents up to and including 16 A. NOTE 1: The use for rated currents up to and including 20 A is accepted in BE, FR, IT, PT, ES and US				N/A
	The dimensions of the male tab shall comply with those specified in Table K.3 and in figures K.2, K.3, K.4 and K.5				N/A
		Dimensions of tabs according Table K.3		Measured in mm	--
		Minimum [mm]	Maximum [mm]		--
A	Dimple	0,7	1,0		N/A
	Hole	0,5	1,0		N/A

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Clause	Requirement + Test			Result - Remark			Verdict
B	Dimple	7,8 min					N/A
	Hole	7,8 min					N/A
C	Dimple	0,77	0,84				N/A
	Hole	0,77	0,84				N/A
D	Dimple	6,20	6,40				N/A
	Hole	6,20	6,40				N/A
E	Dimple	3,6	4,1				N/A
	Hole	4,3	4,7				N/A
F	Dimple	1,6	2,0				N/A
	Hole	1,6	2,0				N/A
J	Dimple	8°	12°				N/A
	Hole	8°	12°				N/A
M	Dimple	2,2	2,5				N/A
	Hole	---	---				---
N	Dimple	1,8	2,0				N/A
	Hole	---	---				---
P	Dimple	0,7	1,8				N/A
	Hole	0,7	1,8				N/A
Q	Dimple	8,9 min	---				N/A
	Hole	8,9 min	---				N/A
	Dimensions of the female connector which may be fitted-on are given in Figure K.6 and in Table K.4.						N/A
				--	request acc. table K.3	measured value	--
				B_3 max	7,8mm		N/A
				L_2 max	3,5mm		N/A
K.9	**Tests**						--
	clause 9 applies with the following modifications:						N/A
	replace the contents of 9.5 by the following text:						N/A
K.9.1	Mechanical overload-force						N/A
	Test done on 10 terminals of RCCBs, mounted as in normal use when wiring takes place.						N/A
	Axial push force, and successively the axial pull force gradually applied to the male tab integrated in the RCCB						N/A
	Push 96N						N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Pull 88N		N/A
	No damage occurred to the tab or to the RCCB in which the tab is integrated.		N/A
	addition to 9.8.3:		N/A
	Fine -wire thermocouples shall be placed in such a way as not to influence the contact or the connection area. An example of placement is shown in fig K.1		N/A

L	**ANNEX L** **Specific requirements for RCCBs with screw-type terminals for external untreated aluminium conductors and with aluminium screw-type terminals for use with copper or with aluminium conductors**		N/A
L.6	**Marking and other product information**		--
	In addition to clause 6 the following apply:		N/A
	Terminal marking according table L.1, on the RCCB, near the terminals		N/A
	Conductor types accepted:		N/A
	Copper only	☐ None	N/A
	Aluminium only	☐ "Al"	N/A
	Aluminium and copper	☐ "Al/Cu"	N/A
	Other information concerning the number of conductors, screw torque (if different from table 10) and cross-section shall be indicated on the RCCB	Nm mm²	N/A
L.7	**Standard conditions for operation in service**		--
	Clause 7 applies		N/A
L.8	**Constructional requirements**		--
	Clause 8 applies with the following exceptions:		N/A
8.1.5.2	add the following text at the end of 8.1.5.2:		N/A
	For connection of aluminium conductors, RCCBs shall be provided with screw-type terminals allowing the connection of conductors having nominal cross-sections as shown in table L.2		N/A

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IEC 61008-1			
Clause	Requirement + Test	Result - Remark	Verdict
	Terminals for the connection of aluminium conductors and terminals of aluminium for the connection of copper or aluminium conductors shall have mechanical strength adequate to withstand the tests of 9.4, with the test conductors tightened with the torque indicated in table 11, or with the torque specified by the manufacturer, which shall never be lower than that specified in table 11.		N/A
	Compliance is checked by inspection, by measurement and by fitting in turn one conductor of the smallest and one of the largest cross-section areas as specified		N/A
8.1.5.4	replace the text of 8.1.5.4 by the following:		N/A
	Terminals shall allow the conductors to be connected without special preparation		N/A
	Compliance is checked by inspection and by the tests of L.9		N/A
L.9	**Tests**		--
	Clause 9 applies with the following modifications/additions:		N/A
	For the tests which are influenced by the material of the terminal and the type of conductor that can be connected, the test conditions of table L.3 are applied		N/A
	Additionally the test of L.9.2 is carried out on terminals separated from the RCCB		N/A
L.9.2	Current cycling test		N/A
	This test is carried out on separate terminals		N/A
L.9.2.3	Test arrangement		N/A
	The general arrangement of the samples shall be as shown in figure L.1		N/A
	90 % of torque stated by the manufacturer or selected in table 10 used for the specimens	torque: Nm	N/A
	The test is carried out with conductors according to table L.5. The length of the test conductor from the point of entry to the screw-type terminal specimens to the equalizer shall be as in table L.6	cross-section: mm^2 minimum conductor length: mm	N/A
	Cross section of equalizer not greater than that given in table L.7	max. cross-section: mm^2	N/A
L.9.2.5	Test method and acceptance criteria		N/A

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IEC 61008-1				
Clause	Requirement + Test	Result - Remark		Verdict
	Test loop subjected to 500 cycles of 1h current-on and 1h current-off, starting at an a.c. current value of 1,12 times the test current value determined in table L.8	test current: A		N/A
	Near the end of each current-on period of the first 24 cycles, the current shall subsequently be adjusted to raise the temperature of the reference conductor to 75°C			N/A
	At the end of the 25th cycle the test current shall be adjusted the last time and the stable temperature shall be recorded as the first measurement. No further adjustment of test current for the remainder of the test			N/A
	Temperatures recorded for at least one cycle of each working day, and after approximately 25, 50, 75, 100, 125, 175, 225, 275, 350, 425 and 500 cycles			N/A
	For each screw-type terminal:			N/A
	- the temperature rise shall not exceed 110 K			N/A
	- the stability factor Sf shall not exceed ± 10 °C			N/A
	ambient air temperature: °C			N/A
		max. temperature rise [K]	max. stability factor Sf [°C]	--
	Terminal 1			N/A
	Terminal 2			N/A
	Terminal 3			N/A
	Terminal 4			N/A
	Terminal 5			N/A
	Terminal 6			N/A
	Terminal 7			N/A
	Terminal 8			N/A

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IEC61008_1H - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 61008-1
EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES

Residual current operated circuit-breakers without integral overcurrent protection for household and similar uses (RCCBs)

Differences according to .....: EN 61008-1:2012+A1:2014+A2:2014 used in conjunction with EN 61008-2-1:1994 + A11:1998

Attachment Form No.....: EU_GD_IEC61008_1H

Attachment Originator.....: OVE

Master Attachment.....: Dated 2015-11

	CENELEC COMMON MODIFICATIONS (EN)		P
	GENERAL		--
9.11	Short circuit tests		P
9.11.2.1 d)	Value of power frequency recovery voltage shall be equal to 110% of the rated voltage	See test report 64.105.21.30160.01 for details	P
9.11.2.1 b)	Tolerances and test quantities		P
	voltage (including recovery voltage): 0, -5%		P
	TEST SEQUENCE "A_1"		P
6	***MARKING (REPLACE CLAUSE 6 BY)***		P
6.Z1	**Standard marking**	See test report 64.105.21.30160.01 for details	P
	Each RCCB shall be marked in a durable manner according to the following Table Z3.		P
	RCCB MARKED WITH:		--
a)	The manufacturer's name or trademark	See part 1	P
b)	Type designation, catalogue number or serial number	See part 1	P
c)	Rated voltage(s) with the symbol ~		P
d)	Rated frequency, if the RCCB is designed for frequencies other than 50Hz		P
e)	rated current		P
f)	Rated residual operating current (I_{Dn}) in A or in mA		P
h) *)	Rated making and breaking capacity (I_m)		P
j)	The degree of protection (only if different from	See part 1	P

IEC61008_1H - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	IP20)		
k)	The position of use, if necessary		P
l) *)	Rated residual making and breaking capacity (I_{Dm}), if different from rated short-circuit capacity (I_m)		N/A
m)	The symbol S (S in a square) for type S devices		N/A
n)	symbol of the method of operation according to Table Z1 of 4.1 if the RCCB is functionally dependent on the line voltage		N/A
o)	Operating means of the test device, by the letter T (It is recommended to advise the user to test the device regularly)		P
p)	Wiring diagram unless the correct mode of operation is evident		P
r)	Operating characteristic in presence of residual currents with d.c. components		--
	- RCCBs of type AC with the symbol 		N/A
	- RCCBs of type A with the symbol 		P
s)	RCCBs according to 4 Z2 marked with the symbol (snowflake enclosing -25)		N/A
t)	Indication of the terminal for the neutral with "N"		P
u)	Additional marking of performance to other standards or additional requirements according to 6.Z2		P
	*) I_{DM} and I_m (if different of I_{DM}) may be anywhere on the device or in the catalogue but shall be together.		P
	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 this shall be specified in the manufacturers literature		P
	The manufacturer shall state the Joule integral I^2t and the peak current I_p withstand capability of the RCCB. Where this are not stated, minimum values as given in table 15 apply.		P
	RCCB classified acc. 4.1.2.1: Time delay when opening in case of failure of the line voltage (s) :		N/A
	RCCB´s other than operated by means of push button, open position indicated by "0" and closed position by "I"		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Additional national symbols are allowed Provisionally the use of national indications only is allowed These indication visible when RCCB is installed		N/A
	For push-buttons the OFF push-button shall either be red and/or marked with "O"		N/A
	RED shall not be uses for any other push-button		N/A
	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.		N/A
	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.		N/AVV
	If necessary to distinguish between supply and load terminals they shall be clearly marked		P
	Terminals for neutral circuit N		P
	Terminal for protective conductor		P
	The suitability for isolation, which is provided by all RCCBs of this standard, may be indicated by the symbol on the device		P
	The base for plug-in RCCBs shall be marked with the following:		N/A
	- rated current or maximum rated current		P
	- trade mark		P
	Marking indelible, easy legible and not on removable parts	Evaluated in end-use standard	P
	Labels not easy to remove and no curling. Test acc. to cl. 9.3: 15 s with water and 15 s with hexane	Moulding	N/A
	For universal terminals (rigid-solid, rigid-stranded and flexible conductors:		N/A
	- no markings		N/A
	For non-universal terminals:		N/A
	- terminals for rigid-solid conductors only, marked by the letters “s” or “sol”		N/A
	- terminals for rigid (solid and stranded) conductors only, marked by the letter “r”		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	marking on the RCCB or if the space available is not sufficient, on the smallest package unit or in technical information		P
6.Z2	ADDITIONAL MARKING		--
	Additional marking to other standards (EN or IEC or other) or additional requirements are allowed under the following conditions:		P
	- The RCCB shall comply with all the requirements of the additional standard.		P
	- The relevant standards 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.Z.1.		P
	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.		P
8.	**REQUIREMENTS FOR CONSTRUCTION AND OPERATION**		**P**
8.1	**Mechanical design**		P
8.1.1	General		--
modify	Not possible to alter the operating characteristics by means of external interventions		P
8.1.2	Mechanism		P
	The means of indication of the contact position shall be reliable (Compliance is checked by inspection and by the test of 9.9 and 9.15		P
delete	~~For RCCBs functionally dependent on line voltage, reclosing automatically when the line voltage is restored after failure, the operating means shall remain in the ON position and the contacts shall reclose automatically unless the operating means has been placed in the OFF position~~		--
9.4 *add*	Plug-in connections are tested by plugging the RCCB in and pulling it out five times.		N/A
	After the test the connection shall not have become loose nor shall their electrical function be impaired.		N/A
8.1.5	Terminals for external conductors		P
8.1.5.1	Terminals ensure the necessary contact pressure		P
modify	In this standard, only terminals for copper conductors are considered		P
	Compliance is checked by inspection and by the tests as relevant for the type of connection:		P

IEC61008_1H - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	9.5 for screw-type terminals		P
	by specific tests for plug-in or bolt-on RCCBs included in the standard		N/A
	by the tests of Annexes J or K	Screw type	N/A
8.1.5.2 *delete*	~~- or terminals for external untreated aluminium conductors and with aluminium screw-type terminals for use with copper or with aluminium conductors according to Annex L.~~		-
8.1.Z1*add*	Non-interchangeability		N/A
	For RCCBs intended to be mounted on bases forming a unit therewith (plug-in type or screw-in type) it shall not be possible, without the aid of a tool, to replace a RCCB when mounted and wired as for normal use by another of the same make having a higher rated current. Compliance is checked by inspection.		N/A
8.1.Z2 *add*	Mechanical mounting of plug-in type RCCBs		N/A
	The mechanical mounting of plug-in type RCCBs, the holding in position of which does not depend solely on their plug-in connection(s), shall be reliable and have adequate stability.		N/A
8.1.Z2.1 *add*	Plug-in type RCCBs, the holding in position of which does not depend solely on their plug-in connection(s)		N/A
8.1.Z2.2 *add*	Plug-in type RCCBs, the holding in position of which depends solely on their plug-in connection(s)		N/A
	Compliance of the mechanical mounting is checked by the relevant tests of 9.12.		N/A
	TEST SEQUENCE "'A_2"		P
9.14	**Glow-wire test**		P
add	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).		P

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Clause	Requirement + Test	Result - Remark	Verdict

	TEST SEQUENCE "B"	**B1 B2 B3**			P
8	**REQUIREMENTS FOR CONSTRUCTION AND OPERATION**				P
8.3	**Dielectric properties and isolating capability**				P
	RCCBs have adequate dielectric properties				P
9.7 *modify*	**Test of dielectric properties and isolating capability**				P
9.7.7.4.1 *modify*	rated impulse withstand voltage [kV]:	4 kV			P
	see level of test laboratory [m]				P
	test voltage (acc. Table 22, *modified*) [kV]:	6,2 kV			P
9.7.7.4.3 *modify*	A first series of tests is made applying the impulse voltage between the phase pole(s) and the neutral pole (~~or path~~) connected together and the metal support connected to the terminal(s) intended for the protective conductor(s), if any				P
	A second series of tests is made applying the impulse voltage between the phase pole(s), connected together, and the neutral pole (~~or path~~) of the RCCB				P
9.7.2 *modify*	Insulation resistance of the main circuit measured between 30 and 60 min after this treatment with 500 V DC after 5 s:	B1 [MW]	B2 [MW]	B3 [MW]	--
	a) between the terminals which are electrically connected together when the RCCB is in the closed position.....[3] 2 MW	>500	>500	>500	P
	b) between each pole and the others connected together (electronic components, connected between poles being disconnected).....[3] 2 MW	>500	>500	>500	P
	c) with the RCCB in the closed position, between all poles connected together and the frame, including a metal foil in contact with the outer surface of the housing of insulation material but with the terminal area kept free.....[3] 5 MW	>500	>500	>500	P
	d) between the frame and a metal foil in contact with the inner surface of the lining of insulating material .....[3] 5 MW				N/A
9.7.3 *modify*	Dielectric strength of the main circuit measured with an AC voltage (45-65Hz) for 1 min:				--
	a) .....2000 V	2000 V	2000 V	2000 V	P
	b) (electronic components, connected between poles being disconnected) .....2000 V	2000 V	2000 V	2000 V	P
	c) .....2000 V	2000 V	2000 V	2000 V	P
	d) .....2500 V				N/A

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IEC61008_1H - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	No flashover or breakdown		P
9.7.7.2 *modify*	delete in table 16 the line beginning with “2,5” rated impulse withstand voltage [kV]:	4kV	P
	sea level of test laboratory [m]	Same as sea level	P
	test voltage (acc. Table 16) [kV]:	6,2 kV	P
	A first series of tests is made applying the impulse voltage between the phase pole(s) and the neutral pole ~~(or path)~~ connected together and the metal support connected to the terminal(s) intended for the protective conductor(s), if any		P
	A second series of tests is made applying the impulse voltage between the phase pole(s), connected together, and the neutral pole ~~(or path)~~ of the RCCB		P
9.23 *modify*	VERIFICATION OF AGEING		--
	TEST SEQUENCE "C"	**C1 C2 C3**	P
	TESTS C_1		--
8	**REQUIREMENTS FOR CONSTRUCTION AND OPERATION**		P
8.6	**Mechanical and electrical endurance**		P
	RCCBs shall be capable of performing an adequate number of mechanical and electrical operations.		P
9.10.3 modify:	After test:		--
	a)		P
	b)		P
	c)		P
	d)		N/A
	TEST SEQUENCE "D"	**D1 D2 D3**	P
	TEST D_0		P
9.9.1 *delete:*	~~For multiple settings of I_{Dn} tests are made for each setting~~		N/A
	TEST D_1		**P**

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IEC61008_1H - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

8	**REQUIREMENTS FOR CONSTRUCTION AND OPERATION**				--
8.12	**RCCBs functionally dependent on line voltage**				P
	RCCBs functionally dependent on the line voltage operate correctly between 0,85 and 1,1 un				P
9.17	**Verification of the behaviour of RCCBs opening automatically in case of failure of the line voltage**				P
9.17.1 replace by:	Limiting value of the line voltage U_x				P
	U_N applied to the line terminals and progressively lowered to attain zero within about 30s until automatic opening occurs	[V]	[V]	[V]	N/A
					N/A
	All values less than 0,7 U_N				N/A
	Tripping test:				N/A
	Test voltage (V)..... :	V			N/A
	Residual current 1,25.I_{DN}..... :	1,25.I_{DN} = A			N/A
	Time corresponding to value for I_{DN} in table 1	[ms]	[ms]	[ms]	N/A
	No value exceeds the specified limiting values				N/A
	Not possible to close the apparatus by manual operating means below U_x				N/A
9.17.2 replace by:	Verification of behaviour in case of failure of the line voltage				N/A
	RCCB supplied with U_N and line voltage, then switched off				N/A
	Time interval between switching off and opening of the main contacts:	[ms]	[ms]	[ms]	--
a)	RCCBs opening without delay				N/A
	- no value exceeds 0,5 s				N/A
	- no tripping shall occur if the voltage is switched off for a time not exceeding 0,03 s				N/A
b)	RCCBs opening with delay				N/A
	Values within the range indicated by manufacturer	to		ms	N/A
	RCCBs classified 4.1.2.1b): switch off at U_N				N/A
	Voltage off and on at the line side:				N/A
	No automatically closing				N/A

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Clause	Requirement + Test	Result - Remark	Verdict
9.17.4 replace by:	Verification of the correct operation of RCCBs with 3 or 4 poles, in presence of a residual current, the neutral and one line terminal only being energized *(replace the title by)*		P
9.11.2.3	Verification of the rated residual making and breaking capacity (A): I_{Dm} ..... :		N/A
9.7.3 *modify*	Dielectric strength test of the main circuit at test voltage 2 Un for 1 min:		N/A
	a) ..... :		N/A
	b) ..... :		N/A
	c) ..... :		N/A
	d) ..... :		N/A
	No flashover or breakdown ..... :		N/A
8.11 replace by:	**Test device**		P
	RCCBs provided with a test device		P
	RCCBs with rated residual current of 30mA:		P
	Ampere-turns produced when operating the test device do not exceed 1,66 times the ampere turns produced by I_{DN}		P
	RCCBs with rated residual current other than 30mA:		P
	Ampere-turns produced when operating the test device do not exceed 2,5 times the ampere turns produced by I_{DN}		P
	Not possible to energize the circuit on the load side by operating the test device when the RCCB is in the open position		P
9.12.2	Mechanical impact		N/A
	test acc. 9.12.2.1 for all types, in addition by the tests of:		N/A
	- 9.12.2.2 for RCCBs intended to be mounted on a rail and for all types of plug-in RCCBs designed for surface mounting;		N/A
	- 9.12.2.3 for plug-in type RCCBs, the holding in position of which depends solely on their connections.		N/A
9.12.2.2 *replace by:*	RCCBs for rail mounting downward vertical force of 50 N for 1 min, upward vertical force of 50 N for 1 min		N/A
	Plug-in RCCBs designed for surface mounting are mounted complete with the appropriate means for the plug-in connection but without cables being		N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	connected and without any cover-plate.				
	RCCB shall not become loose during test and no damage impairing its further use				N/A
9.12.2.3 *replace by:*	Plug-in type RCCBs, 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 RCCB portion at a point equidistant between the plug-in connections, without jerks for 1 min (see Figure Z4).				N/A
9.11.2.3c)	**Tests "D2"**				N/A
modify:	Test voltage 110% of rated phase to neutral voltage for the pole exclusively for the neutral				N/A
9.7.3	Dielectric strength test of the main circuit at test voltage of 2 Un for 1 min:				N/A
	a) ..... :	500V			N/A
	b) ..... :	500V			N/A
	c) ..... :	500V			N/A
	d) ..... :				N/A
	No flashover or breakdown				N/A
	TEST SEQUENCE E (3 samples)				P
9.11.2.4a)	Verification of the coordination at the rated conditional short-circuit current (A): Inc	See 64.105.21.30160.01 for details			P
modify:	After the tests no damage impairing further use				N/A
9.7.3	Dielectric strength test of the main circuit at test voltage of 2 Un for 1 min:				N/A
	a) ..... :	500V			N/A
	b) ..... :	500V			N/A
	c) ..... :	500V			N/A
	d) ..... :				N/A
	No flashover or breakdown				N/A
9.17	**Verification of the behaviour of RCCBs opening automatically in case of failure of the line voltage**				N/A
9.17.1 replace by:	Limiting value of the line voltage U_x				N/A
	U_N applied to the line terminals and progressively lowered to attain zero within about 30s until automatic opening occurs	[V]	[V]	[V]	N/A
					N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	All values less than 0,7 U_N				N/A
	Tripping test:				N/A
	Test voltage (V)..... :	V			--
	Residual current 1,25.I_{DN} ..... :	1,25.I_{DN} = A			--
	Time corresponding to value for I_{DN} in table 1	[ms]	[ms]	[ms]	--
	No value exceeds the specified limiting values				N/A
	Not possible to close the apparatus by manual operating means below U_x				N/A
9.17.2 replace by:	Verification of behaviour in case of failure of the line voltage				N/A
	RCCB supplied with U_N and line voltage, then switched off				N/A
	Time interval between switching off and opening of the main contacts:	[ms]	[ms]	[ms]	--
a)	RCCBs opening without delay				N/A
	- no value exceeds 0,5 s				N/A
	- no tripping shall occur if the voltage is switched off for a time not exceeding 0,03 s				N/A
b)	RCCBs opening with delay				N/A
	Values within the range indicated by manufacturer	to		ms	N/A
	RCCBs classified 4.1.2.1b): switch off at U_N				N/A
	Voltage off and on at the line side:				N/A
	No automatically closing				N/A
9.17.4 replace by:	Verification of the correct operation of RCCBs with 3 or 4 poles, in presence of a residual current, the neutral and one line terminal only being energized *(replace the title by)*				N/A
9.11.2.2	Verification of the rated making and breaking capacity (A): Im ..... :				N/A
modify:	After the tests no damage impairing further use				N/A
9.7.3	Dielectric strength test of the main circuit at test voltage of 2 Un for 1 min:				N/A
	a) ..... :	500V			N/A
	b) ..... :	500V			N/A
	c) ..... :	500V			N/A
	d) ..... :				N/A
	No flashover or breakdown				N/A

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IEC61008_1H - ATTACHMENT					
Clause	Requirement + Test	Result - Remark			Verdict
9.17	**Verification of the behaviour of RCCBs opening automatically in case of failure of the line voltage**				N/A
9.17.1 replace by:	Limiting value of the line voltage U_x				N/A
	U_N applied to the line terminals and progressively lowered to attain zero within about 30s until automatic opening occurs	[V]	[V]	[V]	N/A
					N/A
	All values less than 0,7 U_N				N/A
	Tripping test:				N/A
	Test voltage (V)..... :	V			N/A
	Residual current 1,25.I_{DN}..... :	1,25.I_{DN} = A			N/A
	Time corresponding to value for I_{DN} in table 1	[ms]	[ms]	[ms]	N/A
	No value exceeds the specified limiting values				N/A
	Not possible to close the apparatus by manual operating means below U_x				N/A
9.17.2 replace by:	Verification of behaviour in case of failure of the line voltage				N/A
	RCCB supplied with U_N and line voltage, then switched off				N/A
	Time interval between switching off and opening of the main contacts:	[ms]	[ms]	[ms]	N/A
a)	RCCBs opening without delay				N/A
	- no value exceeds 0,5 s				N/A
	- no tripping shall occur if the voltage is switched off for a time not exceeding 0,03 s				N/A
b)	RCCBs opening with delay				N/A
	Values within the range indicated by manufacturer	to	ms		N/A
	RCCBs classified 4.1.2.1b): switch off at U_N				N/A
	Voltage off and on at the line side:				N/A
	No automatically closing				N/A
9.17.4 replace by:	Verification of the correct operation of RCCBs with 3 or 4 poles, in presence of a residual current, the neutral and one line terminal only being energized *(replace the title by)*				N/A
	TEST SEQUENCE F (3 samples)				P
9.11.2.4b)	Verification of the coordination at the rated making and breaking capacity (A): Im ..... :	See 64.105.21.30160.01 for details			P

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IEC61008_1H - ATTACHMENT					
Clause	Requirement + Test	Result - Remark			Verdict
modify:	After the tests no damage impairing further use				N/A
9.7.3	Dielectric strength test of the main circuit at test voltage of 2 Un for 1 min:				N/A
	a) ..... :	500V			N/A
	b) ..... :	500V			N/A
	c) ..... :	500V			N/A
	d) ..... :				N/A
	No flashover or breakdown				N/A
9.17	**Verification of the behaviour of RCCBs opening automatically in case of failure of the line voltage**				N/A
9.17.1 replace by:	Limiting value of the line voltage U_x				N/A
	U_N applied to the line terminals and progressively lowered to attain zero within about 30s until automatic opening occurs	[V]	[V]	[V]	N/A
					N/A
	All values less than 0,7 U_N				N/A
	Tripping test:				N/A
	Test voltage (V)..... :	V			N/A
	Residual current 1,25.I_{DN} ..... :	1,25.I_{DN} = A			N/A
	Time corresponding to value for I_{DN} in table 1	[ms]	[ms]	[ms]	N/A
	No value exceeds the specified limiting values				N/A
	Not possible to close the apparatus by manual operating means below U_x				N/A
9.17.2 replace by:	Verification of behaviour in case of failure of the line voltage				N/A
	RCCB supplied with U_N and line voltage, then switched off				N/A
	Time interval between switching off and opening of the main contacts:	[ms]	[ms]	[ms]	N/A
a)	RCCBs opening without delay				N/A
	- no value exceeds 0,5 s				N/A
	- no tripping shall occur if the voltage is switched off for a time not exceeding 0,03 s				N/A
b)	RCCBs opening with delay				N/A
	Values within the range indicated by manufacturer	to		ms	N/A

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IEC61008_1H - ATTACHMENT					
Clause	Requirement + Test	Result - Remark			Verdict
	RCCBs classified 4.1.2.1b): switch off at U_N				N/A
	Voltage off and on at the line side:				N/A
	No automatically closing				N/A
9.17.4 replace by:	Verification of the correct operation of RCCBs with 3 or 4 poles, in presence of a residual current, the neutral and one line terminal only being energized *(replace the title by)*				N/A
9.11.2.4c)	Verification of the coordination at the rated conditional residual short-circuit current (A): IDc :				N/A
modify:	After the tests no damage impairing further use				N/A
9.7.3	Dielectric strength test of the main circuit at test voltage of 2 Un for 1 min:				N/A
	a) ..... :	500V			N/A
	b) ..... :	500V			N/A
	c) ..... :	500V			N/A
	d) ..... :				N/A
	No flashover or breakdown ..... :				N/A
9.17	**Verification of the behaviour of RCCBs opening automatically in case of failure of the line voltage**				N/A
9.17.1 replace by:	Limiting value of the line voltage U_x				N/A
	U_N applied to the line terminals and progressively lowered to attain zero within about 30s until automatic opening occurs	[V]	[V]	[V]	N/A
					N/A
	All values less than 0,7 U_N				N/A
	Tripping test:				N/A
	Test voltage (V)..... :	V			N/A
	Residual current 1,25.I_{DN}..... :	1,25.I_{DN} = A			N/A
	Time corresponding to value for I_{DN} in table 1	[ms]	[ms]	[ms]	N/A
	No value exceeds the specified limiting values				N/A
	Not possible to close the apparatus by manual operating means below U_x				N/A
9.17.2 replace by:	Verification of behaviour in case of failure of the line voltage				N/A
	RCCB supplied with U_N and line voltage, then switched off				N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	Time interval between switching off and opening of the main contacts:	[ms]	[ms]	[ms]	N/A
a)	RCCBs opening without delay				N/A
	- no value exceeds 0,5 s				N/A
	- no tripping shall occur if the voltage is switched off for a time not exceeding 0,03 s				N/A
b)	RCCBs opening with delay				N/A
	Values within the range indicated by manufacturer	to		ms	N/A
	RCCBs classified 4.1.2.1b): switch off at U_N				N/A
	Voltage off and on at the line side:				N/A
	No automatically closing				N/A
9.17.4 replace by:	Verification of the correct operation of RCCBs with 3 or 4 poles, in presence of a residual current, the neutral and one line terminal only being energized *(replace the title by)*				N/A
modify:	**TEST SEQUENCE "G_0"**	**G_01 G_02 G_03**			
9.22	**Verification of reliability**				N/A
9.22.1	Climatic test	See 64.105.21.30160.01 for details			N/A
	TEST SEQUENCE "G_1" (add the new test sequence)	**G_11 G_12 G_13**			
8	**REQUIREMENTS FOR CONSTRUCTION AND OPERATION**				P
add: 8.Z1	**Behaviour of RCCBs at low ambient air temperature**				--
	RCCBs for use between -25°C and +40°C operate reliably at low ambient air temperature	-5°C			N/A
add: 9.Z1	**Verification of the correct operation at low ambient air temperature for RCCBs for use at temperatures between -25° C and +40° C**				--
	RCCBs mounted in enclosure with degree of protection IP 55 and connected for normal use				N/A
	RCCBs in a test chamber at +23°C ± 2°C and rH 90% ± 3%				N/A
	RCCBs in ON-position without load				N/A
	Five test cycles performed acc. to figure Z6				N/A
	No tripping during cycles				N/A
	At the end of last 6 h period at -25°C an a.c. residual current is passed through one pole (see				N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	figure 4a)				
	- general type:	[ms]	[ms]	[ms]	--
	break time at 1,25 I_{DN} not exceeding the value for I_{DN} in table 1				N/A
	- S-type:	[ms]	[ms]	[ms]	N/A
	break time at 2,5 I_{DN} not exceeding the value for 2 I_{DN} in table 1				N/A
	Additionally for RCCBs of type A:				N/A
	Break time with pulsating d.c. residual currents of				N/A
	- 1,25 I_{DN} (general type)				N/A
	- 2,5 I_{DN} (S-type)				N/A
	Multiplied by:	[ms]	[ms]	[ms]	--
	1,4 for I_{DN} > 0,01 A				N/A
	2 for I_{DN} £ 0,01 A				N/A
	at a = 0°el (test circuit figure 4b)				N/A
	After test possible to switch on the RCCB without presence of residual current				N/A

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Clause	Requirement + Test	Result - Remark	Verdict

replace table A.1 by:

ANNEX A (NORMATIVE)

Test sequence and number of samples to be submitted for certification purposes
Table A.1 - Test sequences

Test sequence	Clause or subclause	Test (or inspection)
A_1	6 8.1.1 8.1.2 9.3 8.1.3 9.15 9.4 9.5 9.6 9.13 8.1.3 9.25	Marking General Mechanism Indelibility of marking Clearance and creepage distances (external parts only) Trip free mechanism Reliability of screws, current-carrying parts and connections Reliability of terminals for external conductors Protection against electric shock Resistance to heat Clearances and creepage distances (internal parts) Resistance to rusting
A_2	9.14	Resistance to abnormal heat and to fire
B	9.7.7.4 9.7.7.5 b) 9.7.1 9.7.2 9.7.3 9.7.4 9.7.7.2 9.7.5 9.7.6 9.8 9.22.2 9.23	Resistance of the insulation of open contacts and basic insulation against an impulse voltage in normal conditions Verification of the behaviour of components bridging the basic insulation Resistance to humidity Insulation resistance of the main circuit Dielectric strength of the main circuit Insulation resistance an dielectric strength of auxiliary circuits Verification of clearances with the impulse withstand voltage Secondary circuit of detection transformers Capability of control circuits connected to the main circuits etc. Temperature-rise Reliability at 40°C Ageing of electronic components
C	9.10	Mechanical and electrical endurance
D D_0	9.9	Residual operating characteristics
D_1	9.17 9.19 9.11.2.3 a)b) 9.16 9.12 9.18	Behaviour in case of failure of the line voltage Unwanted tripping Behaviour in case of surge currents Performance at I_{Dm} Test device Resistance to mechanical shock and impact Non-operating current under overcurrent conditions
D_2	9.11.2.3 c)	Verification of the suitability of RCCBs for use in IT-systems
E	9.11.2.4 a)	Coordination at I_{nc}
	9.11.2.2	Performance at I_m
F	9.11.2.4 b)	Coordination at I_m
	9.11.2.4 c)	Coordination at I_{Dc}
G_0	9.22.1	Reliability (climatic tests)
G_1	9.Z1	Verification of correct operation at low Ambient air temperature of RCCBs for use of -25°C to +40°C
H a)	IEC 61543 Table 4 -T1.1 IEC 61543 Table 4 -T1.2 IEC 61543 Table 5 -T2.3	Harmonics, interharmonics Signalling voltage Surges
I	IEC 61543 Table 5 -T2.1 IEC 61543 Table 5 -T2.5 IEC 61543 Table 5 -T2.2	Conducted sine-wave voltages or currents Radiated high-frequency phenomena Fast transients (burst)
J	IEC 61543 Table 5 - T2.6 IEC 61543 Table 6 -T3.1	Conducted common mode disturbances in the frequency range lower than 150 kHz Electrostatic discharges

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IEC61008_1H - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

a) For devices containing a continuously operating oscillator, the test of CISPR 14-1 shall be carried out on the samples prior to the tests of this sequence.
b) This test may be done on separate samples.

replace table A.2 by:

Table A.2 - Number of samples for full test procedure

Test sequence a	Number of samples	Minimum number of accepted samples b	Maximum number of samples for repeated tests c
A	1+3 [f]	1+3 [f]	--
B	3	2	3
C	3	2	3
D	3	2 [d]	3
D_2	3	3	3
E	3	2 [d]	3
F	3	2 [d]	3
G_0	3	2	3
G_1	3	2	3
H [e]	3	2	3
I [e]	3	2	3
J [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) All samples shall meet the requirements in 9.9.2.1, 9.9.2.2, 9.9.2.3, 9.9.2.4, 9.9.2.5 and 9.11.2.3, as appropriate. In addition, permanent arcing or flashover between poles or between poles and frame shall not occur in any sample during tests of 9.11.2.2, 9.11.2.4 a), 9.11.2.4 b) or 9.11.2.4 c).

e) At the manufacturer's request, the same set of samples may be subjected to more than one of these test sequences.

f) Test 9.14 shall applied to 3 additional new samples

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Clause	Requirement + Test	Result - Remark	Verdict

replace table A.3 by:

Table A.3 - Number of samples for simplified test procedure

Test sequence	Number of samples according to the number of poles a) g)		
	2-poles b) c)	3-poles d) f) i)	4-poles e)
A_1 j)	1 max. rating I_N min. rating I_{DN}	1 max. rating I_N min. rating I_{DN}	1 max. rating I_N min. rating I_{DN}
A_2	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}
B	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}
C	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}
$D_0 + D_1$	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}
D_0	1 for all other ratings of I_{DN}		
D_2	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}
E	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}
F	3 max. rating I_N min. rating I_{DN} 3 min. rating I_N max. rating I_{DN}	3 max. rating I_N min. rating I_{DN} 3 min. rating I_N max. rating I_{DN}	3 max. rating I_N min. rating I_{DN} 3 min. rating I_N max. rating I_{DN}
G_0 j1)	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}	3 max. rating I_N min. rating I_{DN}
G_1 h)	3 max. rating I_N min. rating I_{DN} 3 min. rating I_N max. rating I_{DN}	3 max. rating I_N min. rating I_{DN} 3 min. rating I_N max. rating I_{DN}	3 max. rating I_N min. rating I_{DN} 3 min. rating I_N max. rating I_{DN}
H			3 h) samples of the same rating I_N chosen at random min. rating I_{DN}
I			3 h) samples of the same rating I_N chosen at random min. rating I_{DN}
J			3 h) samples of the same rating I_N chosen at random min. rating I_{DN}

a) If a test is to be repeated according to the minimum performance criteria of clause 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) deleted
d) deleted
e) deleted
f) This column is omitted when 4-pole RCCBs have been tested.
g) If only one value of I_{DN} is submitted, min. rating I_{DN} and max. rating I_{DN} are replaced by I_{DN}.
h) Only the highest number of pole.
i) deleted
j) Three additional samples of the minimum number of poles, with ratings I_n and I_{DN} chosen at random, shall be used for the test of 9.14.
j1) if the requirement to test max. rating In and minimum rating $I_{\Delta N}$ does not cover all the possible range of RCBOs, the minimum $I_{\Delta N}$ shall in any case be chosen for the test.

IEC61008_1H - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	ANNEX J **Particular requirements for RCCBs with screwless type terminals for external copper conductors**		N/A
J.1 *modify:*	This annex applies to RCCBs within the scope of Clause 1, equipped with universal screwless terminals, for current not exceeding 20 A primarily suitable for connecting unprepared (see J.3.6) copper conductors of cross-section up to 4 mm^2.		N/A
			N/A
J.6 *modify:*	**Marking**		N/A
	non-universal terminals (if accepted by Special National Conditions):		N/A
	terminals for rigid-solid conductors marked by “sol”		N/A
	terminals for rigid (solid and stranded) conductors marked by “r”		N/A
	terminals for flexible conductors marked by “f”		N/A
	ANNEX K **Particular requirements for RCCBs with flat quick-connect terminations**		N/A
K.8.2.2 *modify:*	The nominal width of the male tab is 6,3 mm and the thickness 0,8 mm, applicable to rated currents up to and including 16 A. ~~NOTE 1:The use for rated currents up to and including 20 A is accepted in BE, FR, IT, PT, ES and US~~		N/A
	ANNEX L **Specific requirements for RCCBs with screw-type terminals for external untreated aluminium conductors and with aluminium screw-type terminals for use with copper or with aluminium conductors**		N/A
	DELETE ANNEX L		N/A
	ANNEX ZB **Special national conditions**		N/A
Germany	The use of RCCBs of type AC is not permitted		N/A
	ANNEX ZC **A-deviation**		N/A
Austria	subclause 4.1, Table Z1 is not valid in Austria		N/A

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TABLE Z3 – REQUIREMENTS FOR MARKING

		Marking on the RCCB itself			Product information in the catalogue
	Each RCCB 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 frequency, if the RCCB is designed for frequencies other than 50Hz		X		
e)	rated current	X			
f)	Rated residual operating current (I_{Dn}) in A or in mA	X			
h)	rated making and breaking capacity (I_m)				X (*)
j)	The degree of protection (only if different from IP20)				X
k)	The position of use, if necessary		X		
l)	Rated residual making and breaking capacity (I_{Dm}), if different from rated short-circuit capacity (I_m)				X (*)
m)	The symbol S (S in a square) for type S devices	X			
n)	symbol of the method of operation according to Table Z1 of 4.1 if the RCCB is functionally dependent on the line voltage		X	X	
o)	Operating means of the test device, by the letter T (**)	X			
p)	Wiring diagram unless the correct mode of operation is evident		X	X	
r)	Operating characteristic in presence of residual currents with d.c. components				
	- RCCBs of type AC with the symbol 		X		
	- RCCBs of type A with the symbol 	X			
s)	RCCBs according to 4 Z2 marked with the symbol (snowflake enclosing -25)		X		
t)	Indication of the terminal for the neutral with "N"		X		
u)	Additional marking of performance to other standards or additional requirements according to 6.Z2		X		

*) I_{Dm} and I_m (if different of I_{Dm}) may be anywhere on the device or in the catalogue but shall be together

**) It is recommended to advise the user to test the device regularly

==End of report==

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