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TEST REPORT
IEC 62423
Type F and type B residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs)

Report Number ..... :	2505B2332SHA-001
Date of issue ..... :	2025-06-19
Total number of pages ..... :	448
Name of Testing Laboratory preparing the Report ..... :	Intertek Testing Services (Shanghai FTZ) Co., Ltd. Building 86, No.1198, Qinzhou North Road, Shanghai, China
Applicant's name ..... :	ProJoy Electric Co., Ltd.
Address ..... :	No.90 Chunyao Rd. Xiangcheng District, Suzhou, Jiangsu, China
Test specification:	
Standard ..... :	IEC 62423:2009 used in conjunction with IEC 61009-1:2010, AMD1:2012, AMD2:2013 IEC 61009-2-1:1991 or IEC 61009-2-2:1991
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
TRF template used ..... :	IECEE OD-2020-F1:2020, Ed.1.3
Test Report Form No. ..... :	IEC62423E
Test Report Form(s) Originator .... :	OVE
Master TRF ..... :	Dated 2020-08-25

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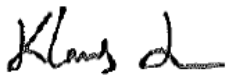
This report is not valid as a CB Test Report unless signed by an approved IECEE Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing NCB. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description .....:	Type B residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs)
Trade Mark .....:	PROJOY
Manufacturer.....:	ProJoy Electric Co., Ltd. No.90 Chunyao Rd. Xiangcheng District, Suzhou, Jiangsu,China
Model/Type reference .....:	PEM1LE-63
Ratings .....:	Un= 230 or 240V~ 2P(1P+N), 400 or 415V~ 4P(3P+N), 50/60Hz; In= 6, 10, 16, 20, 25, 32, 40, 50, 63A, B-, C- & D- type; I∆n= 30, 100, 300mA, type -B

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):

☒	**CB Testing Laboratory:**	Intertek Testing Services (Shanghai FTZ) Co., Ltd.	
Testing location/ address ..... :		Building 86, No.1198, Qinzhou North Road, Shanghai, China	
Tested by (name, function, signature) ..... :		Klaus Liu (Engineer)	
Approved by (name, function, signature) .. :		Allen Wang (Mandated 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) :			

List of Attachments (including a total number of pages in each attachment): Attachment for national differences of EN 62423-1, BS EN 62423-1 and EN 61009-1, BS EN 61009-1 (totally 129 pages): page 290 to 418. Appendix ZZ for differences of AS/NZS 61009.1 (totally 8 pages): page 419 to 426. Appendix photos of sample (totally 13 pages): page 436 to 448.	
Summary of testing:	
Tests performed (name of test and test clause):	**Testing location:** Intertek Testing Services (Shanghai FTZ) Co., Ltd. Building 86, No.1198, Qinzhou North Road, Shanghai, China

Tests performed (name and clause of test):		**Testing location:**
Marking	6	CBTL
General	8.1.1	CBTL
Mechanism	8.1.2	CBTL
Indelibility of marking	9.3	CBTL
Clearances and creepage distances	8.1.3	CBTL
Non-interchangeability	8.1.6	CBTL
Reliability of screws, current-carrying parts and connections.	9.4	CBTL
Reliability of terminals for external conductors	9.5	CBTL
Protection against electric shock	9.6	CBTL
Resistance to heat	9.14	CBTL
Resistance to abnormal heat and to fire	9.15	CBTL
Dielectric properties	9.7	CBTL
Temperature-rise	9.8	CBTL
Resistance of the insulation against an impulse voltages	9.20	CBTL
Reliability at 40℃	9.22.2	CBTL
Ageing of electronic components	9.23	CBTL
Mechanical and electrical endurance	9.10	CBTL
Performance at reduced short-circuit currents	9.12.11.2.1	CBTL
Verification after short-circuit test	9.12.12	CBTL
Short-circuit test for verifying the suitability of RCBOs for use in IT system	9.12.11.2.2	CBTL
Verification after short-circuit test	9.12.12	CBTL
Operating characteristics under residual current conditions	9.9.1	CBTL
Behavior in case of failure of the line voltage	9.17	N/A
Behaviour in case of surge currents	9.19	CBTL
Performance at $I_{\Delta m}$	9.12.13	CBTL
Test device	9.16	CBTL
Overcurrent operating characterictics	9.9.2	CBTL
Limiting value of overcurrent in case of a single-phase load through a 3-pole or 4-pole RCBO	9.18	N/A
Resistance to mechanical shock and impact	9.13	CBTL

Short-circuit performance at 1500A	9.12.11.3	CBTL
Verification after short-circuit test	9.12.12	CBTL
Performance at service short-circuit capacity	9.12.11.4b)	CBTL
Verification after short-circuit test	9.12.12	CBTL
Performance at rated short-circuit capacity	9.12.11.4c)	CBTL
Verification after short-circuit test	9.12.12	CBTL
Performance $I_{\Delta m}$	9.12.11.4d)*	CBTL
Verification after short-circuit test	9.12.12	CBTL
Reliability (Climatic tests)	9.22.1	CBTL
Verification of correct operation at low ambient air temperature of RCBO operating at temperatures between -25℃ and +40℃	9.Z1*	CBTL
Verification of the EMC	9.24	CBTL
Note: * No. of clause identified in EN61009-1		

Summary of compliance with National Differences

☒ The product fulfils the requirements of IEC 62423:2009 used in conjunction with IEC 61009-1:2010, AMD1:2012, AMD2:2013 and IEC 61009-2-2:1991.

☒ The product fulfils the requirements of EN 62423:2012+A11:2021+A12:2022 and BS EN 62423:2012+A12:2022.

☒ The product fulfils the requirements of EN 61009-1:2012+A1:2014+A2:2014+A11:2015+A12:2016+A13:2021 and BS EN 61009-1:2012+A13:2021.

☒ The product fulfils the requirements of AS/NZS 61009.1:2015+A1:2024.

Statement concerning the uncertainty of the measurement systems used for the tests

(may be required by the product standard or client)

☐ **Internal procedure used for type testing through which traceability of the measuring uncertainty has been established:**

Procedure number, issue date and title:

Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

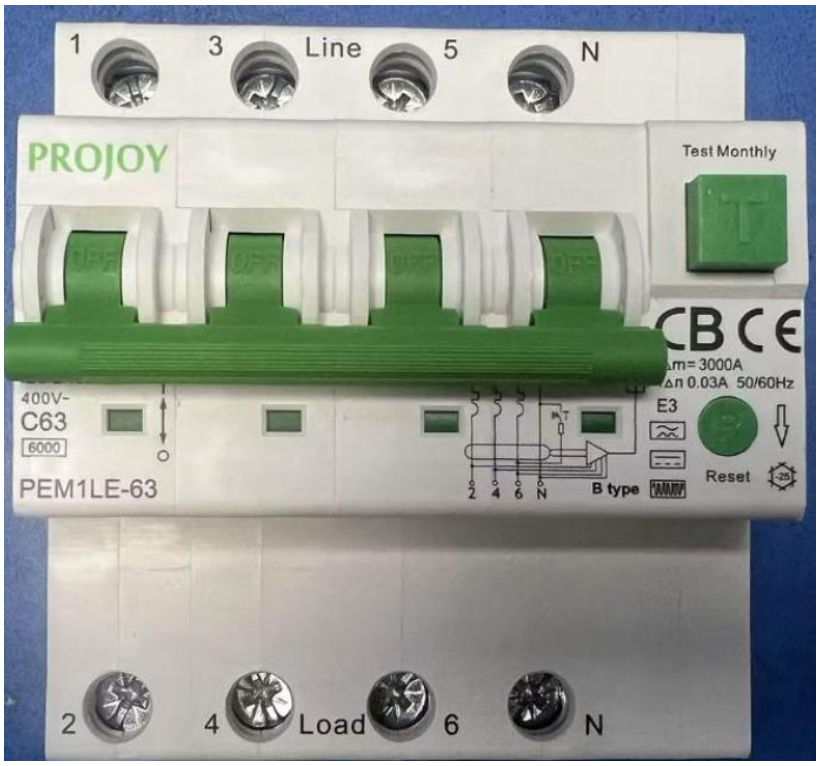
☒ **Statement not required by the standard used for type testing**

(Note: When IEC or ISO standard requires a statement concerning the uncertainty of the measurement systems used for tests, this should be reported above. The informative text in parenthesis should be delete in both cases after selecting the applicable option)

Copy of marking plate: PEM1LE-63, 10kA



Copy of marking plate: PEM1LE-63, 6kA



Note:
Rated voltage could be alternated to 240V for 2P(1P+N), 415 for 4P(3P+N).

Test item particulars ..... :	
Type of RCBO ..... :	
- type (A)/ B ..... :	Yes ~~/ No~~
- type (A)/ F..... :	~~Yes /~~ No
Time delay ..... :	~~with /~~ without
Method of operating ..... :	~~independent of /~~ dependent on the line voltage
Type of installation ..... :	fixed ~~/ mobile installation~~
Number of poles ..... :	~~single /~~ two ~~/ three~~ / four pole
Protection against external influences ..... :	~~enclosed /~~ unenclosed
Method of mounting ..... :	~~surface /~~ flush ~~/ panel board /~~ distribution board
Method of connection ..... :	Screw-in type
Instantaneous tripping current ..... :	B / C / D
Rated current (I_N)..... :	6, 10, 16, 20, 25, 32, 40, 50, 63A
Rated residual operating current ($I_{\Delta N}$) ..... :	30mA, 100mA, 300mA
Rated voltage (U_N)..... :	230 or 240V~ 2P(1P+N), 400 or 415V~ 4P(3P+N)
Rated impulse withstand voltage (U_{imp})..... :	4kV
Rated frequency (Hz) ..... :	50/60Hz
Rated short-circuit capacity (I_{CN}) ..... :	10000A, 6000A
Rated residual making and breaking capacity ($I_{\Delta M}$) :	3000A
Nature of supply ..... :	AC
Type of terminal ..... :	Terminals with stirrup
Classification of RCBOs functionally dependent on the line voltage: ..... :	
Opening automatically in case of failure of the line voltage ..... :	~~Yes / No~~
- reclosing automatically when the line voltage is restored ..... :	~~Yes / No~~
- not reclosing automatically when the line voltage is restored ..... :	~~Yes / No~~
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 / No~~
- not able to trip in a hazardous situation arising on failure of line voltage ..... :	Yes ~~/ No~~
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.....:	2022-08-23
Date (s) of performance of tests .....:	2022-08-23 to 2023-04-17

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.
Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.
This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.
This test report is based on the original CB test report 230201034SHA-001 & 230201034SHA-001 M1, issued on 2023-05-08 & 2024-10-15, CB certificate: SE-110983 & SE-110983M1, with below changes:

1. change the trade mark, applicant's information.

2. change the photos of samples.

After review, no additional tests should be performed.

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) ..... : 1.ProJoy Electric Co., Ltd.
No.90 Chunyao Rd. Xiangcheng District, Suzhou, Jiangsu Province, P.R.China

General product information:

Un= 230 or 240V~ 2P(1P+N), 400 or 415V~ 4P(3P+N), 50/60Hz;
In= 6, 10, 16, 20, 25, 32, 40, 50, 63A, B-, C- & D- type;
I∆n= 30, 100, 300mA, type -B;
Icn= 10000A, Ics= 7500A; Icn= Ics= 6000A; I∆m=3000A;
Energy limiting class 3 (only for Icn= 10000A, B- & C- type).

Number of tests for simplified test procedure, according to table A.3 and A.4 of IEC/EN 61009-1 and table D.1 of IEC/EN 62423

I_n (A)	$I_{\Delta n}$ (A)	Pole	Type	Test sequence and number of samples													
				A_1/A_2	B	C_1	C_2	D_0+D_1		E_0+E_1		F_0	F_1	F_2[c)]	G_0	G_1[c)]	EMC
63	0,03	1P+N	D	x	x	x	x	x		x		x	x	-	x	-	x[e)]
63	0,03	3P+N	D	x	x	x	x	x		x		x	x	x	x	x	x[e)]
63	0,03	1P+N	D	-	-	-	-	x	-	-	-	-	-	-	-	-	-
63	0,03	1P+N	D	-	-	-	-	x	-	-	-	-	-	-	-	-	-
6	0,3	1P+N	D	-	-	-	-	-	-	-	-	x	x	-	-	-	-
6	0,3	3P+N	D	-	-	-	-	-	-	-	-	x	x	-	-	x	-
50	0,03	1P+N	D	-	-	-	-	-	-	x	-	-	-	-	-	-	-
40	0,03	1P+N	D	-	-	-	-	-	-	x	-	-	-	-	-	-	-
32	0,03	1P+N	D	-	-	-	-	-	-	x	-	-	-	-	-	-	-
25	0,03	1P+N	D	-	-	-	-	-	-	x	-	-	-	-	-	-	-
20	0,03	1P+N	D	-	-	-	-	-	-	x	-	-	-	-	-	-	-
16	0,03	1P+N	D	-	-	-	-	-	-	x	-	-	-	-	-	-	-
10	0,03	1P+N	D	-	-	-	-	-	-	x	-	-	-	-	-	-	-
6	0,03	1P+N	D	-	-	-	-	-	-	x	-	-	-	-	-	-	-
63	0,03	1P+N	B	-	x[a)]	-	-	-	-	x[b)]	-	-	x[d)]	-	-	-	-
63	0,03	1P+N	C	-	-	-	-	-	-	x[b)]	-	-	x[d)]	-	-	-	-
50	0,03	1P+N	B/C	-	-	-	-	-	-	x[b)]	-	-	-	-	-	-	-
40	0,03	1P+N	B/C	-	-	-	-	-	-	x[b)]	-	-	x[d)]	-	-	-	-
32	0,03	1P+N	B/C	-	-	-	-	-	-	x[b)]	-	-	x[d)]	-	-	-	-
25	0,03	1P+N	B/C	-	-	-	-	-	-	x[b)]	-	-	-	-	-	-	-
20	0,03	1P+N	B/C	-	-	-	-	-	-	x[b)]	-	-	-	-	-	-	-
16	0,03	1P+N	B/C	-	-	-	-	-	-	x[b)]	-	-	x[d)]	-	-	-	-
10	0,03	1P+N	B/C	-	-	-	-	-	-	x[b)]	-	-	-	-	-	-	-
6	0,03	1P+N	B/C	-	-	-	-	-	-	x[b)]	-	-	-	-	-	-	-
63	0,03	3P+N	B	-	x[a)]	-	-	-	-	-	-	-	x[d)]	-	-	-	-
63	0,03	3P+N	C	-	-	-	-	-	-	-	-	-	x[d)]	-	-	-	-
40	0,03	3P+N	B/C	-	-	-	-	-	-	-	-	-	x[d)]	-	-	-	-
32	0,03	3P+N	B/C	-	-	-	-	-	-	-	-	-	x[d)]	-	-	-	-
16	0,03	3P+N	B/C	-	-	-	-	-	-	-	-	-	x[d)]	-	-	-	-

Note: a) For this sequence only the test of 9.8 is required according to Table A.4.
b) For this sequence only the test of 9.9.2.2 is required according to Table A.4.
c) Test sequence in EN 61009-1.
d) The sequence is for Energy limiting class 3 testing of EN61009-1 as well.
e) EMC see test No. 2506B1143SHA-001.
f) All test items are performed on rated voltage 240V and 415V except 0,85x230V and 1,1x240V for 1P+N and 0,85x400V and 1,1x415V for 3P+N,

Additional tests at ambient temperature-25~+55°C																	
I_n (A)	$I_{\Delta n}$ (A)	Pole	Type	Test sequence and number of samples													
				A_1/A_2	B	C_1	C_2	D_0+D_1		E_0+E_1		F_0	F_1	F_2[c)]	G_0	G_1[c)]	EMC
63	0,03	1P+N	D	-	x[j)]	-	-	x		-	-	-	-	-	-	-	-
63	0,1	1P+N	D	-	-	-	-	x	-	-	-	-	-	-	-	-	-
63	0,3	1P+N	D	-	-	-	-	x	-	-	-	-	-	-	-	-	-
63	0,03	3P+N	D	-	x[j)]	-	-	x		-	-	-	-	-	-	x	-
6	0,3	3P+N	D	-	-	-	-	-	-	-	-	-	-	-	-	x	-
Note: j) For this sequence only clauses 9.22.2 and 9.23 are required to test.																	

Additional tests at ambient temperature-25~+55°C as per clause of 62955:2018																	
I_n (A)	$I_{\Delta n}$ (A)	Pole	Type	Test sequence and number of samples													
				A_1/A_2	B	C_1	C_2	D_0+D_1		E_0+E_1		F_0	F_1	F_2[c)]	G_0	G_1[c)]	EMC
63	0,03	1P+N	D	-	-	-	-	x[k)]	-	-	-	-	-	-	-	-	-
63	0,03	3P+N	D	-	-	-	-	x[l)]	-	-	-	-	-	-	-	-	-
Note: k) For this sequence only clauses 9.9.2.1, 9.9.2.2, 9.9.2.3, 9.9.2.4, 9.9.2.5 and 9.9.2.6 are required to test. Note: l) For this sequence only clauses 9.9.2.1, 9.9.2.2, 9.9.2.3, 9.9.2.4, 9.9.2.5 and 9.9.2.7 are required to test.																	

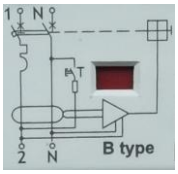
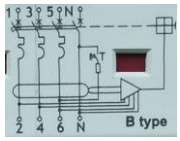
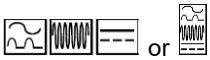
Number of tests for simplified test procedure, according to table A.3 and A.4 of IEC/EN 61009-1 and table D.1 of IEC/EN 62423														
I_n (A)	$I_{\Delta n}$ (A)	Pole	Type	Test sequence and number of samples										
				A_1/A_2	B	C_1	C_2	D_0+D_1		E_0+E_1	F_0	F_1	F_2[a)]	G_0	G_1[a)]	EMC
63	0,03	1P+N	D	-	-	-	-	x	-	-	-	-	-	-	-	-
63	0,1	1P+N	D	-	-	-	-	x	-	-	-	-	-	-	-	-
63	0,3	1P+N	D	-	-	-	-	x	-	-	-	-	-	-	-	-
63	0,03	3P+N	D	-	-	-	-	x	-	-	-	-	-	-	-	-
Additional tests at ambient temperature -25~+55°C														
I_n (A)	$I_{\Delta n}$ (A)	Pole	Type	Test sequence and number of samples										
				A_1/A_2	B	C_1	C_2	D_0+D_1		E_0+E_1	F_0	F_1	F_2[a)]	G_0	G_1[a)]	EMC
63	0,03	1P+N	D	-	-	-	-	x	-	-	-	-	-	-	-	-
63	0,1	1P+N	D	-	-	-	-	x	-	-	-	-	-	-	-	-
63	0,3	1P+N	D	-	-	-	-	x	-	-	-	-	-	-	-	-
63	0,03	3P+N	D	-	-	-	-	x	-	-	-	-	-	-	-	-

Note:

a) Test sequence in EN 61009-1.

b) Test sequence D0 was performed at 0,80x230=184V for 2P(1P+N) and 0,80x400V=320V for 4P(3P+N).

IEC 62423			
Clause	Requirement + Test	Result - Remark	Verdict

	TEST SEQUENCE "A_1": **1 sample: D63, $I_{\Delta n}$= 0,03A, 1P+N** **1 sample: D63, $I_{\Delta n}$= 0,03A, 3P+N**	**A_1-1** **1P+N**	**A_1-2** **3P+N**	--
6.	**MARKING (STANDARD MARKING)**			--
	RCBO marked with:			--
	a) Manufacturer's name or trademark .....:	PROJOY		P
	b) Type designation, catalogue number or serial number.....:	PEM1LE-63		P
	c) Rated voltage(s) (V).....:	230V~(240V~)	400V~(415V~)	P
	d) Rated current without symbol "A" preceded by symbol for instantaneous tripping.....:	D63		P
	e) Rated frequency .....:	50/60Hz		P
	f) Rated residual operating current .....:	30mA		P
	g) Settings of residual operating current.....:			N/A
	h) Rated short-circuit capacity, in amperes .....:	10000 in a rectangle		P
	j) Reference calibration temperature, if different from 30°C.....:			N/A
	k) Degree of protection .....:	IP20		P
	l) Position of use .....:			N/A
	m) Rated residual making and breaking capacity, if different from rated short-circuit capacity.....:	3000A		P
	n) Symbol S for type S.....:			N/A
	p) Operating means of test device by letter T.....:	T		P
	q) Wiring diagram .....:			P
	r) Operating characteristic in presence of residual currents with d.c. components			--
	- RCBOs of type B with the symbol  or			P
	- RCBOs of type F with the symbol   or 			N/A
	s) type D RCBOs, the max. instantaneous tripping current, if higher than 20 I_N.....:			N/A
	Marking on the RCBO itself or on nameplate or nameplates attached to the RCBO and located so that for small devices at least d), f), n), p) and r) (only for type A) is legible when the RCBO is installed	Marked on the RCBO front with a), b), c), d), e), f), h), p), q), r).		P

IEC 62423				
Clause	Requirement + Test	Result - Remark		Verdict
	The information under a), b), c), h), l), r) (only for type AC) and s) may be marked on the side or the back of the device and be visible only before the device is installed			N/A
	The information under q) may be on the inside of any cover which has to be removed in order to connect the supply wires			N/A
	Any remaining information given in the manufacturer's catalogues			P
	The suitability for isolation, which is provided by all circuit-breakers of this standard, may be indicated by the symbol on the device			P
	Degree of protection higher than IP20: Device comply, whichever the method of installation. If degree of protection is obtained only by a specific method of installation and/or with use of specific accessories this is specified in the manufacturer's literature	IP20		N/A
	Open position indicated by "**0**" and closed position by "|"	**O - I**		P
	The OFF push-button either be red and/or marked with "**0**"			N/A
	Supply and load terminals clearly marked, if necessary	Line: L1, Load: L2	Line: L1, L3, L5 Load: L2, L4, L6	P
	Terminals for neutral conductor N	N		P
	Terminal for protective conductor			N/A
	Marking indelible, easy legible and not on removable parts			P
	Labels not easy to remove and no curling. Test acc. to cl. 9.3: 15 s with water and 15 s with hexane	Marking made by impression		N/A
	For universal terminals (rigid-solid, rigid-stranded and flexible conductors:			N/A
	- no markings			N/A
	For non-universal terminals:			
	- 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 RCBO or if the space available is not sufficient, on the smallest package unit or in technical information			N/A

IEC 62423			
Clause	Requirement + Test	Result - Remark	Verdict
8.	**REQUIREMENTS FOR CONSTRUCTION AND OPERATION**		--
8.1	**Mechanical design**		
8.1.1	General		
	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 not possible without a tool. Not be possible to disable or inhibit the RCBO function by any means. NOTE In Australia, Germany, Denmark, Italy, the UK and Switzerland, multiple settings are not allowed.		N/A
	In case of an RCBO having multiple settings of residual operating current, the rating refers to the highest setting.		N/A
8.1.2	Mechanism		
	Moving contacts of all poles so mechanically coupled that all poles except switched neutral make and break substantially together		P
	Switched neutral of four-pole RCBOs do not close after and do not open before the other poles		N/A
	Neutral pole having adequate making and breaking capacity and RCBO with independent manual operation:		
	- all poles operate together including neutral pole		P
	Trip-free mechanism		P
	Possible to switch on and off by hand		P
	No intermediate position of the contacts		P
	RCBOs provide in the open position an isolating distance in accordance with the requirements necessary to satisfy the isolating function (see 8.3)		P
	Indication of the open and closed position of the main contacts provided by one or both of the following means:		
	- the position of the actuator (this being preferred)		P
	- a separate mechanical indicator		P
	If a separate mechanical indicator is used to indicate the position of the main contacts:		
	- red for the closed position (ON)		P
	- green for the opened position (OFF)		P
	Means of indication of the contact position reliable (Compliance is checked by inspection and by the test of 9.9.2.2)		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Actuator, front plate or cover can only be correctly fitted in a manner which ensures correct indication of the contact position (Compliance is checked by inspection and by the tests of 9.12.12.1 and 9.12.12.2)		P
	Means provided or specified by the manufacturer to lock the operating means in the open position: Locking only be possible when the main contacts are in the open position. (Compliance is checked by inspection, taking into account the instructions of the manufacturer)		N/A
	Operating means used for indication: When released, automatically take up the position of the moving contacts; Operating means have two rest positions except that for automatic opening a third distinct position may be provided, when necessary to reset before reclosing	Operation means have 2 rest positions, no third distinct position.	P
	Indicator light lit when the RCBO is in the closed position		N/A
	Indicator light not the only means to indicate the closed position		N/A
	Action of the mechanism not influenced by the position of enclosures or covers and independent of any removable part.		P
	If the cover is used as a guiding means for push-buttons, not possible to remove the buttons from the outside	TEST BUTTON	P
	Operating means securely fixed, not possible to remove them without a tool		P
	For "up-down" operating means the contacts are closed by the up movement.		P
9.11	**Test:**		
	- The RCBO is mounted and wired as in normal use.		P
	- Test circuit according to figure 4.		P
9.11.2	A residual current equal to 1,5 $I_{\Delta N}$ is passed by closing S_2, the RCBO having been closed and the operating means being held in the closed position. The RCBO trip.	$I_{\Delta N}$= 30mA, tested at 45mA	P
	Test repeated by moving the operating means slowly (1 s) to a position where the current starts to flow. Tripping occur without further movement.	Tripped 27ms / Tripped 31ms	P
8.1.3	Clearances and creepage distances (external parts) --> see “Clearances and creepage distances internal and external parts”		
8.1.4	Screws, current-carrying parts and connections		
8.1.4.1	Connections withstand mechanical stresses occurring in normal use.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Screws for mounting the RCBO are not of thread-cutting type.	DIN Rail mounting	N/A
	Screws and nuts which are operated when mounting and connecting		P
	Test according to cl. 9.4:		--
	- 10 times screw Ø (mm) / torque (Nm) .....:	Ø mm Nm	N/A
	- 5 times screw Ø (mm) / torque (Nm) .....:	Ø 4,9mm, 2,0Nm	P
8.1.4.2	Screws with a thread of insulating material operated when mounting the RCBO; correct introduction ensured.		N/A
8.1.4.3	Electrical connections contact pressure not transmitted through insulating material unless there is sufficient resilience in the metallic parts.		P
8.1.4.4	Current-carrying parts including parts intended for protective conductors, 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:		
	- copper		N/A
	- an alloy 58% copper for parts worked cold		P
	- an alloy 50% copper for other parts		N/A
	- other metal		N/A
	Ferrous alloys or suitably coated ferrous alloys, compliance to resistance to corrosion is checked by a test of resistance to rusting (see 9.25).		P
	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		P
8.1.5	Terminals for external conductors		
	Compliance is checked by inspection and by the tests as relevant for the type of connection:		P
	9.5 for screw-type terminals		P
	by specific tests for plug-in or bolt-on RCBOs 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		
	Test see cl. 9.5 Torque		--
	Ø (mm).....: Torque (Nm) ..... :	4,9mm / 2,0Nm	P
	Max. cross-section (mm²) .....:	25 mm²	P

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Clause	Requirement + Test	Result - Remark	Verdict
9.5	Test of reliability of screw-type terminals for external copper conductors		
9.5.1	Pull test:		
	Terminal suitable for all types of conductors: rigid (solid or stranded) and flexible, unless otherwise specified by the manufacturer		P
	Min. cross-section solid / stranded / flexible (mm²) .:	1/ 1,5/ 1 mm²	--
	Max. cross-section solid / stranded / flexible (mm²) :	6/ 25 / 16 mm²	--
	Torque 2/3 (Nm) .....:	1,33Nm	--
	Pull for 1 min solid / stranded / flexible (N) ....:	50 N for 1/1,5 mm² 60 N for 6 mm² 90 N for 16 mm² 100 N for 25 mm²	--
	During the test no noticeable move of conductor		P
9.5.2	Min. cross-section (mm²) .....:	1/ 1,5/ 1 mm²	--
	Max. cross-section (mm²) .....:	6/ 25 / 16 mm²	--
	Torque 2/3 (Nm) .....:	1,33Nm	--
	The conductor shows no damage		P
	Terminals not worked loose and no damage		P
9.5.3	Terminals fitted with the largest cross-section area specified in Table 8, for stranded and/or flexible copper conductor.		--
	Max. cross-section stranded (mm²) .....:	25,0 mm²	--
	Max. cross-section flexible (mm²) .....:	16,0 mm²	--
	Torque 2/3 (Nm) .....:	1,33Nm	--
	After the test no strand of conductor escaped outside		P
8.1.5.2	RCBOs provided with:		
	- terminals which allow the connection of copper conductors having nominal cross-sectional areas as shown in Table 8		P
Table 8	Rated current (A) / Range of nominal cross sections to be clamped* (mm²): 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~~	Solid conductors: 1,0mm² to 6,0mm² Stranded conductors: 1,5mm² to 25,0mm² flexible conductors: 1,0mm² to 16,0mm²	P

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Clause	Requirement + Test	Result - Remark	Verdict
	*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.	The terminal is designed for solid conductors of 1-6 mm².	--
	- 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.	Not for aluminium conductors	--
8.1.5.3	Means for clamping the conductors in the terminals do not serve to fix any other component. (See tests of sub-clause 9.5)		P
8.1.5.4	Terminals for $I_N \leq 32$ A allow the connection of conductors without special preparation.		P
8.1.5.5	Terminals have adequate mechanical strength and metric ISO thread or equivalent. (See tests of sub-clauses 9.4 and 9.5.1)		P
8.1.5.6	Clamping of conductor without undue damage to conductor. (See tests of sub-clause 9.5.2)		P
8.1.5.7	Clamping of conductor reliably and between metal surfaces. (See tests of sub-clauses 9.4 and 9.5.1)		P
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 sub-clause 9.5.3)		P
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 sub-clause 9.4)		P
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 in engagement with a metal thread and not be of the tapping screw type.		P
8.1.6	Non-interchangeability		
	Plug-in or screw-in RCBOs not replace-able, without aid of a tool, by another of the same make, but having a higher rated current.		N/A
8.2	**Protection against electric shock**		
	Live parts not accessible in normal use	No live parts are exposed, except for terminals.	P

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Clause	Requirement + Test	Result - Remark	Verdict
	RCBOs other than plug-in type: External parts, other than screws or other means for fixing covers, which are accessible in normal use made of insulating material or lined throughout with insulating material	All live parts are within an internal enclosure of insulating material.	P
	Linings	No linings provided.	
	- reliably fixed		N/A
	- adequate thickness and		N/A
	- mechanical strength		N/A
	Inlet openings for cables or conduits made of insulating material or be provided with bushings or similar devices of insulating material.		N/A
	Such devices		
	- reliably fixed		N/A
	- adequate mechanical strength		N/A
	Plug-in RCBOs: External parts other than screws or other means for fixing covers, which are accessible, made of insulating material	Not plug-in RCBO	N/A
	Metallic operating means insulated from live parts.		N/A
	Metal parts of 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.	Metal parts of the mechanism are not accessible.	P
	Possible to replace plug-in RCBOs easily with-out touching live parts.		N/A
	Lacquer or enamel not considered to provide adequate insulation.		N/A
9.6	**Test: Standard test finger**		
	Straight test finger with a force of 75 N for 1 min at 35°C ± 2°C		P
	Enclosures or covers not deformed to such an extent that live parts can be touched.		P
8.9	**Resistance to heat**		
	RCBO sufficiently resistant to heat		P
9.14.1	Test:		--
	- without removable covers ..... 1 h (100 ± 2) °C	100°C	P
	- removable covers ..... 1 h (70 ± 2) °C		N/A
	No change impairing further use and no flow of sealing compound that live parts are exposed		P
	No access to live parts even with test finger with a force not exceeding 5 N.		P

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Clause	Requirement + Test	Result - Remark		Verdict
	RCBO trip with a test current of 1,25 $I_{\Delta N}$	Tested at 37,5mA		--
	Break time not exceeding the value for $I_{\Delta N}$ in table 2 (ms) .....:	29ms	28ms	
9.2.4 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** RCBO trip with a test current of 2,5 I∆n with smooth direct current	33ms	29ms	P
	Marking still legible after test			P
9.14.2	Ball pressure test for external parts of insulating material necessary to retain current-carrying parts or parts of the protective circuit in position:			P
	- T = 125 ± 2°C	125°C		P
	After 1 h Ø of impression ≤ 2 mm	1,2mm(enclosure)		P
9.14.3	Ball pressure test for external parts of insulating material not necessary to retain current-carrying parts or parts of the protective circuit in position:			P
	☒ T = 70 ± 2°C	70°C		N/A
	☐ T = ____± 2°C (40°C + max. temperature rise of sub-clause 9.8)			
	Ø of impression ≤ 2 mm	1,2mm(handle)		P
8.1.3	Clearances and creepage distances (internal and external parts)			
	The minimum required clearances and creepage distances are based on the RCBO being designed for operating in an environment with pollution degree 2			P
	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.			P
	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 19 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

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Clause	Requirement + Test	Result - Remark	Verdict
	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}		--
	4kV (see table 5) 2,5kV(see table 5)	☒ ☐	--
	Minimum clearances (mm)	minimum clearances [mm]	--
	1. between live parts which are separated when the main contacts are in the open position .....:	4,3mm	P
	2. between live parts of different polarity .....:	>10,0mm	P
	3. between circuits supplied from different sources, one of which being PELV or SELV .....:		N/A
	4. between live parts and:		-
	- accessible surfaces of operating means .....:	>10,0mm	P
	- screws or other means for fixing covers which have to be removed when mounting the RCBO ....:		N/A
	- surface on which the RCBO is mounted .....:	>7,3mm	P
	- screws or other means for fixing the RCBO .....:		N/A
	- metal covers or boxes .....:		N/A
	- other accessible metal parts.....:		P
	- metal frames supporting flush-type RCBOs .....:	>10,0mm	P
	Creepage distances [mm] (see table 5)		
	Material group	IIIb ☐ IIIa ☒ II ☐ I ☐	--
	Minimum creepage distances (mm):	minimum creepage distances [mm]	--
	1. between live parts which are separated when the main contacts are in the open position .....:	7,6mm	P
	2. between live parts of different polarity .....:	>10,0mm	P
	3. between circuits supplied from different sources, one of which being PELV or SELV .....:		N/A
	4. between live parts and:		-
	- accessible surfaces of operating means .....:	>10,0mm	P
	- screws or other means for fixing covers which have to be removed when mounting the RCBO ....:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- surface on which the RCBO is mounted .....:	>7,6mm	P
	- screws or other means for fixing the RCBO .....:		N/A
	- metal covers or boxes .....:		N/A
	- other accessible metal parts.....:		P
	- metal frames supporting flush-type RCBOs .....:	>10,0mm	P
9.25	**Test of resistance to rusting:**		
	- 10 min immersed in a cold chemical degreaser such as methyl-chloroform or refined petrol		P
	- 10 min immersed in a 10% solution of chloride in water at 20°C±5°C		P
	- 10 min in a box containing air saturated with moisture at 20°C±5°C		P
	- 10 min at 100°C		P
	No sign of rust		P

	TEST SEQUENCE "A_2": **3 samples: D63, $I_{\Delta n}$= 0,03A, 1P+N** **3 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**	**A_2.1 A_2.2 A_2.3** **A_2.4 A_2.5 A_2.6**	--
8.10	**Resistance to abnormal heat and to fire**		
	External parts of insulating material are not liable to ignite and to spread fire under fault or overload conditions.		P
9.15	**Glow-wire test**		
	Test performed on a complete RCBO		P
	Test made on three samples, points of application being different from one sample to another		P
	- External parts of insulating material necessary to retain current-carrying parts or parts of the protective circuit in position .....:	T = 960 ± 15 °C Enclosure	P
	- All other external parts of insulating material .....:	T = 650 ± 10 °C Handle	P
	No visible flame and no sustained glowing	No flames (Handle)	P
	Flames and glowing extinguish within 30 s after removal	3,0s (Enclosure)	P
	No ignition of tissue paper or scorching of the pinewood board		P

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Clause	Requirement + Test	Result - Remark	Verdict
	TEST SEQUENCE "B": **3+1 samples: D63, $I_{\Delta n}$= 0,03A, 1P+N**	**B1 B2 B3**	--
8	**REQUIREMENTS FOR CONSTRUCTION AND OPERATION**		--
8.3	**Dielectric properties and isolating capability**		
	RCBOs have adequate dielectric properties		P
9.7	**Test of dielectric properties and isolating capability**		
9.7.7.4	Verification of resistance of the insulation of open contact and basic insulation against an impulse voltage in normal conditions		
	These tests are not preceded by the humidity treatment described in 9.7.1.		P
	The test is carried out on an RCBO 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 RCBO under test connected to the impulse generator.		P
	For RCBOs with incorporated surge arresters that cannot be disconnected, the shape of the impulses is adjusted without connection of the RCBO to the impulse generator.		P
	rated impulse withstand voltage [kV].....:	4	--
	see level of test laboratory [m] .....:	5	--
	test voltage (acc. Table 28) [kV].....:	6,2	--
9.7.7.4.2	RCBO in open position (contacts in open position)		
	The impulses are applied between:		
	the line terminals connected together and the load terminals connected together		P
9.7.7.4.3	RCBO in closed position		
	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 RCBO		P

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Clause	Requirement + Test	Result - Remark			Verdict
	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				
	A new RCBO sample is tested	**B-4**: D63/30mA			P
	Test only performed on RCBOs, 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 (V) .....:	1440V			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
	RCBO trip with a test current of 1,25 $I_{\Delta N}$.....:	**B4**			--
		32ms			P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1.				P
9.7.1	Resistance to humidity				
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.	No such parts			N/A
9.7.1.2	Test conditions: 48 h in humidity cabinet RH = 91% to 95% T = 20 to 30°C ± 1°C	25,3°C 93,6% RH 48 hrs			--
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:	B1 [MΩ]	B2 [MΩ]	B3 [MΩ]	--
	a) between the terminals which are electrically connected together when the RCBO is in the closed position.....≥ 2 MΩ	500MΩ	500MΩ	500MΩ	P
	b) between each pole and the others connected together (electronic components, connected between current path being disconnected)≥ 2 MΩ	500MΩ	500MΩ	500MΩ	P

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Clause	Requirement + Test	Result - Remark			Verdict
	c) between all poles connected together and the frame .....≥ 5 MΩ	500MΩ	500MΩ	500MΩ	P
	d) between metal parts of the mechanism and the frame .....≥ 5 MΩ				N/A
	e) between the frame and a metal foil in contact with the inner surface of the lining of insulating material.....≥ 5 MΩ				N/A
9.7.3	Dielectric strength of the main circuit measured with an AC voltage (45-65Hz) for 1 min:				--
	a) electronic components disconnected ..... 2000 V	OK	OK	OK	P
	b) electronic components disconnected ..... 2000 V	OK	OK	OK	P
	c) electronic components disconnected ..... 2000 V	OK	OK	OK	P
	d) electronic components disconnected ..... 2000 V				N/A
	e) electronic components disconnected ..... 2500 V				N/A
	No flashover or breakdown				P
9.7.4	Insulation resistance of auxiliary circuits measured with 500 V DC after 1 min:	B1 [MΩ]	B2 [MΩ]	B3 [MΩ]	--
	1) between all auxiliary circuits and the frame .....≥ 2 MΩ				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 .....≥ 2 MΩ				N/A
	Dielectric strength of auxiliary circuits measured with an AC voltage at rated frequency for 1 min:				--
	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			--
	1) between all auxiliary circuits and the frame				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				N/A
	No flashover or perforation				N/A
9.7.7.2	Verification of clearances with the impulse withstand voltage				

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Clause	Requirement + Test	Result - Remark	Verdict
	If the measurement of clearances of items 2 and 4 in Table 7 shows a reduction of the required length, this test applies.	Measurement of clearances does not show any reduced clearance, test 9.7.7.2 is not applied	N/A
	The test is carried out on an RCBO 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 1,2μs, and a time to half-value of 50μs		N/A
	The shape of the impulses is adjusted with the RCBO under test connected to the impulse generator.		N/A
	For RCBOs with incorporated surge arresters that cannot be disconnected, the shape of the impulses is adjusted without connection of the RCBO to the impulse generator.		N/A
	test performed with:		--
	- surge impedance of the test apparatus ≤500Ω 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].....:		--
	see level of test laboratory [m] .....:		--
	test voltage (acc. Table 19) [kV].....:		--
	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 RCBO		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)		N/A
	c) between all poles connected together and the frame		N/A
	d) between metal parts of the mechanism and the frame		N/A

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Clause	Requirement + Test						Result - Remark							Verdict
	e) between the frame and a metal foil in contact with the inner surface of the lining of insulating material													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													
	No insulation test, provided that no connection with accessible metal parts or with protective conductor or live parts exists.													P
9.7.6	Capability of control circuits connected to the main circuit of withstanding high DC voltages due to insulation measurements						**B1**			**B2**			**B3**	--
	RCBO 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.						600V 12mA			600V 12mA			600V 12mA	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, 500A **b)**	$I_{\Delta t}$ **c)**					--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times				--
			0,03	0,3	0,15	--	0,04	0,04	0,04					--
			>0,03	0,3	0,15	0,04	--	0,04	0,04					--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times				--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times				--
	a) value to be decided by the manufacturer for this test													--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.													--

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Clause	Requirement + Test	Result - Remark			Verdict
	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.				--
9.9.1.2.c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ .....:	38	37	38	P
	- 2 $I_{\Delta N}$ .....:	32	26	27	P
	- 5 $I_{\Delta N}$ or .....:	-	-	-	N/A
	- 0,25 A .....:	21	21	22	P
	- $I_{\Delta t}$ 630 A.....:	8	9	9	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				--
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ .....0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ .....0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ .....0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ .....0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
8.4	**Temperature rise**				
	Temperature rises do not exceed the limiting values stated in table 7.				P
	Cross-section (mm²) .....:	16mm²			--
9.8.1	Ambient air temperature (°C).....:	21,3°C			--
9.8.2	Test current I_N (A) .....: until steady state values are reached.	63A			--
	Four pole RCBOs:				
	Current passing through				
	- 3 phase poles (1)				P
	- neutral and adjacent pole (2)				P

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Clause	Requirement + Test	Result - Remark			Verdict
	Parts .....Temperature rise K	[K]	[K]	[K]	--
	Terminals for external connections.....65	55	55	55	P
	External parts liable to be touched during manual operation of the RCBO, including operating means of insulating material and metallic means for coupling insulated operating means of several poles 40	18	19	19	P
	External metallic parts of operating means 25	-	-	-	NA
	Other external parts, including that face of the RCBO in direct contact with the mounting surface ..... …60	47	45	44	P
8.16	**Reliability**				
	RCBOs operate reliably even after long service.				P
9.22.2	Test with 28 cycles at 40 ± 2°C				
	Cross-section (mm²) .....:	16mm²			--
	Torque $^2/_3$ (Nm) .....:	1,33Nm			--
	Test current I_N (A) .....:	63A			--
	- with current passing .....21 h	21h			P
	- without current.....3 h	3h			P
	For 4 pole RCBOs with 3 overcurrent protected poles only 3 poles loaded				N/A
	At the end of the last period of 21h,	[K]	[K]	[K]	--
	temperature rise of terminals not exceed 65K.....:	60	60	59	P
	After cool down the RCBO trip with a test current of 1,25 $I_{\Delta N}$	[ms]	[ms]	[ms]	--
	Break time not exceeding the value for $I_{\Delta N}$ in table 2 (ms) .....:	31	29	36	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1.				P
9.23	**Verification of ageing of electronic components**				
	168 h at 40 ± 2°C.....:	168h, 40°C			--
	Test current I_N (A) .....:	63A			--
	Cross-section (mm²) .....:	16mm²			--
	Electronic parts at 1,1 U_N (V).....:	264V			--
	After cool down:				P
	- electronic parts show no damage				P
	RCBO trip with a test current of 1,25 $I_{\Delta N}$	[ms]	[ms]	[ms]	--
	Break time not exceeding the value for $I_{\Delta N}$ in table 2 (ms) .....:	31	27	30	P

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Clause	Requirement + Test	Result - Remark			Verdict
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1				P
9.2.4 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** RCBO trip with a test current of 2,5 $I_{\Delta n}$ with smooth direct current	27ms	26ms	28ms	P

	TEST SEQUENCE "B": **3+1 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**	**B5**	**B6**	**B7**	--
8	**REQUIREMENTS FOR CONSTRUCTION AND OPERATION**				--
8.3	**Dielectric properties and isolating capability**				
	RCBOs have adequate dielectric properties				P
9.7	**Test of dielectric properties and isolating capability**				
9.7.7.4	Verification of resistance of the insulation of open contact and basic insulation against an impulse voltage in normal conditions				
	These tests are not preceded by the humidity treatment described in 9.7.1.				P
	The test is carried out on an RCBO 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 RCBO under test connected to the impulse generator.				P
	For RCBOs with incorporated surge arresters that cannot be disconnected, the shape of the impulses is adjusted without connection of the RCBO to the impulse generator.				P
	rated impulse withstand voltage [kV].....:	4			--
	see level of test laboratory [m] .....:	5			--
	test voltage (acc. Table 28) [kV].....:	6,2			--
9.7.7.4.2	RCBO in open position (contacts in open position)				
	The impulses are applied between:				
	the line terminals connected together and the load terminals connected together				P
9.7.7.4.3	RCBO in closed position				
	All components bridging the basic insulation disconnected				P

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Clause	Requirement + Test	Result - Remark	Verdict
	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 RCBO		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		
	A new RCBO sample is tested	**B-8**: D63/30mA	P
	Test only performed on RCBOs, 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 (V) .....:	1440V	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
	RCBO trip with a test current of 1,25 $I_{\Delta N}$.....:	**B8**	--
		34ms	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1.		P
9.7.1	Resistance to humidity		
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.	No such parts	N/A
9.7.1.2	Test conditions: 48 h in humidity cabinet RH = 91% to 95% T = 20 to 30°C ± 1°C	25,3°C 93,6% RH 48 hrs	--
9.7.1.4	The samples show no damage		P

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
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:	B5 [MΩ]	B6 [MΩ]	B7 [MΩ]	--
	a) between the terminals which are electrically connected together when the RCBO is in the closed position.....≥ 2 MΩ	500MΩ	500MΩ	500MΩ	P
	b) between each pole and the others connected together (electronic components, connected between current path being disconnected)≥ 2 MΩ	500MΩ	500MΩ	500MΩ	P
	c) between all poles connected together and the frame .....≥ 5 MΩ	500MΩ	500MΩ	500MΩ	P
	d) between metal parts of the mechanism and the frame .....≥ 5 MΩ				N/A
	e) between the frame and a metal foil in contact with the inner surface of the lining of insulating material.....≥ 5 MΩ				N/A
9.7.3	Dielectric strength of the main circuit measured with an AC voltage (45-65Hz) for 1 min:				--
	a) electronic components disconnected ..... 2000 V	OK	OK	OK	P
	b) electronic components disconnected ..... 2000 V	OK	OK	OK	P
	c) electronic components disconnected ..... 2000 V	OK	OK	OK	P
	d) electronic components disconnected ..... 2000 V				N/A
	e) electronic components disconnected ..... 2500 V				N/A
	No flashover or breakdown				P
9.7.4	Insulation resistance of auxiliary circuits measured with 500 V DC after 1 min:	B5 [MΩ]	B6 [MΩ]	B7 [MΩ]	--
	1) between all auxiliary circuits and the frame .....≥ 2 MΩ				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 .....≥ 2 MΩ				N/A
	Dielectric strength of auxiliary circuits measured with an AC voltage at rated frequency for 1 min:				--
	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			--
	1) between all auxiliary circuits and the frame				N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	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		N/A
	No flashover or perforation		N/A
9.7.7.2	Verification of clearances with the impulse withstand voltage		
	If the measurement of clearances of items 2 and 4 in Table 7 shows a reduction of the required length, this test applies.	Measurement of clearances does not show any reduced clearance, test 9.7.7.2 is not applied	N/A
	The test is carried out on an RCBO 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 1,2μs, and a time to half-value of 50μs		N/A
	The shape of the impulses is adjusted with the RCBO under test connected to the impulse generator.		N/A
	For RCBOs with incorporated surge arresters that cannot be disconnected, the shape of the impulses is adjusted without connection of the RCBO to the impulse generator.		N/A
	test performed with:		--
	- surge impedance of the test apparatus ≤500Ω 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].....:		--
	see level of test laboratory [m] .....:		--
	test voltage (acc. Table 19) [kV].....:		--
	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 RCBO		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

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Clause	Requirement + Test						Result - Remark				Verdict
	b) between each pole and the others connected together (electronic components, connected between current path being disconnected)										N/A
	c) between all poles connected together and the frame										N/A
	d) between metal parts of the mechanism and the frame										N/A
	e) between the frame and a metal foil in contact with the inner surface of the lining of insulating material										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										
	No insulation test, provided that no connection with accessible metal parts or with protective conductor or live parts exists.										P
9.7.6	Capability of control circuits connected to the main circuit of withstanding high DC voltages due to insulation measurements						**B5**	**B6**	**B7**		--
	RCBO 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.						600V 12mA	600V 12mA	600V 12mA		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, 500A **b)**	$I_{\Delta t}$ **c)**		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--

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Clause	Requirement + Test	Result - Remark			Verdict
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.				--
	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.				--
9.9.1.2.c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ .....:	37	36	35	P
	- 2 $I_{\Delta N}$ .....:	29	28	28	P
	- 5 $I_{\Delta N}$ or .....:	-	-	-	N/A
	- 0,25 A .....:	21	22	22	P
	- $I_{\Delta t}$ 630 A.....:	9	9	9	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				--
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ .....0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ .....0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ .....0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ .....0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
8.4	**Temperature rise**				
	Temperature rises do not exceed the limiting values stated in table 7.				P
	Cross-section (mm²) .....:	16mm²			--
9.8.1	Ambient air temperature (°C).....:	21,4°C			--
9.8.2	Test current I_N (A) .....: until steady state values are reached.	63A			--
	Four pole RCBOs:				

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Clause	Requirement + Test	Result - Remark			Verdict
	Current passing through				
	- 3 phase poles (1)				P
	- neutral and adjacent pole (2)				P
	Parts .....Temperature rise K	[K]	[K]	[K]	--
	Terminals for external connections.....65	59	61	60	P
	External parts liable to be touched during manual operation of the RCBO, including operating means of insulating material and metallic means for coupling insulated operating means of several poles 40	20	20	20	P
	External metallic parts of operating means 25	-	-	-	NA
	Other external parts, including that face of the RCBO in direct contact with the mounting surface ..... …60	47	47	48	P
8.16	**Reliability**				
	RCBOs operate reliably even after long service.				P
9.22.2	Test with 28 cycles at 40 ± 2°C				
	Cross-section (mm²) .....:	16mm²			--
	Torque $^2/_3$ (Nm) .....:	1,33Nm			--
	Test current I_N (A) .....:	63A			--
	- with current passing .....21 h	21h			P
	- without current.....3 h	3h			P
	For 4 pole RCBOs with 3 overcurrent protected poles only 3 poles loaded				N/A
	At the end of the last period of 21h,	[K]	[K]	[K]	--
	temperature rise of terminals not exceed 65K.....:	61	63	63	P
	After cool down the RCBO trip with a test current of 1,25 $I_{\Delta N}$	[ms]	[ms]	[ms]	--
	Break time not exceeding the value for $I_{\Delta N}$ in table 2 (ms) .....:	33	36	31	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1.				P
9.23	**Verification of ageing of electronic components**				
	168 h at 40 ± 2°C.....:	168h, 40°C			--
	Test current I_N (A) .....:	63A			--
	Cross-section (mm²) .....:	16mm²			--
	Electronic parts at 1,1 U_N (V).....:	457V			--
	After cool down:				P
	- electronic parts show no damage				P
	RCBO trip with a test current of 1,25 $I_{\Delta N}$	[ms]	[ms]	[ms]	--

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Clause	Requirement + Test	Result - Remark			Verdict
	Break time not exceeding the value for $I_{\Delta N}$ in table 2 (ms) .....:	26	34	31	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1				P
9.2.4 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** RCBO trip with a test current of 2,5 $I_{\Delta n}$ with smooth direct current	29ms	31ms	27ms	P

	TEST SEQUENCE "B": **3 samples: B63, $I_{\Delta n}$= 0,03A, 1P+N**	**B9**	**B10**	**B11**	--
8.4	**Temperature rise**				
	Temperature rises do not exceed the limiting values stated in table 7.				P
	Cross-section (mm²) .....:	16mm²			--
9.8.1	Ambient air temperature (°C).....:	21,5°C			--
9.8.2	Test current I_N (A) .....: until steady state values are reached.	63A			--
	Four pole RCBOs:				
	Current passing through				
	- 3 phase poles (1)				P
	- neutral and adjacent pole (2)				P
	Parts .....Temperature rise K	[K]	[K]	[K]	--
	Terminals for external connections.....65	54	54	55	P
	External parts liable to be touched during manual operation of the RCBO, including operating means of insulating material and metallic means for coupling insulated operating means of several poles 40	20	21	21	P
	External metallic parts of operating means 25	-	-	-	NA
	Other external parts, including that face of the RCBO in direct contact with the mounting surface ..... …60	44	44	43	P

	TEST SEQUENCE "B": **3 samples: B63, $I_{\Delta n}$= 0,03A, 3P+N**	**B12**	**B13**	**B14**	--
8.4	**Temperature rise**				
	Temperature rises do not exceed the limiting values stated in table 7.				P
	Cross-section (mm²) .....:	16mm²			--
9.8.1	Ambient air temperature (°C).....:	21,5°C			--

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Clause	Requirement + Test	Result - Remark			Verdict
9.8.2	Test current I_N (A) .....: until steady state values are reached.	63A			--
	Four pole RCBOs:				
	Current passing through				
	- 3 phase poles (1)				P
	- neutral and adjacent pole (2)				P
	Parts .....Temperature rise K	[K]	[K]	[K]	--
	Terminals for external connections.....65	61	60	60	P
	External parts liable to be touched during manual operation of the RCBO, including operating means of insulating material and metallic means for coupling insulated operating means of several poles 40	20	21	21	P
	External metallic parts of operating means 25	-	-	-	NA
	Other external parts, including that face of the RCBO in direct contact with the mounting surface ..... …60	46	46	46	P

	TEST SEQUENCE "B": **3 samples: D63, $I_{\Delta n}$= 0,03A, 1P+N**	**B15**	**B16**	**B17**	--
8.16	**Reliability**				
	RCBOs operate reliably even after long service.				P
9.22.2	Test with 28 cycles at 55 ± 2°C				
	Cross-section (mm²) .....:	16mm²			--
	Torque $^2/_3$ (Nm).....:	1,33Nm			--
	Test current I_N (A) .....:	63A			--
	- with current passing .....21 h	21h			P
	- without current.....3 h	3h			P
	For 4 pole RCBOs with 3 overcurrent protected poles only 3 poles loaded				N/A
	At the end of the last period of 21h,	[K]	[K]	[K]	--
	temperature rise of terminals not exceed 65K.....:	53	53	52	P
	After cool down the RCBO trip with a test current of 1,25 $I_{\Delta N}$	[ms]	[ms]	[ms]	--
	Break time not exceeding the value for $I_{\Delta N}$ in table 2 (ms) .....:	31	30	30	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1.				P
9.23	**Verification of ageing of electronic components**				
	168 h at 55 ± 2°C.....:	168h, 55°C			--

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Clause	Requirement + Test	Result - Remark			Verdict
	Test current I_N (A) .....:	63A			--
	Cross-section (mm²) .....:	16mm²			--
	Electronic parts at 1,1 U_N (V).....:	264V			--
	After cool down:				P
	- electronic parts show no damage				P
	RCBO trip with a test current of 1,25 $I_{\Delta N}$	[ms]	[ms]	[ms]	--
	Break time not exceeding the value for $I_{\Delta N}$ in table 2 (ms) .....:	30	31	31	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1				P
9.2.4 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** RCBO trip with a test current of 2,5 $I_{\Delta n}$ with smooth direct current	38ms	35ms	37ms	P

	TEST SEQUENCE "B": **3 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**	**B18**	**B19**	**B20**	--
8.16	**Reliability**				
	RCBOs operate reliably even after long service.				P
9.22.2	Test with 28 cycles at 55 ± 2°C				
	Cross-section (mm²) .....:	16mm²			--
	Torque $^2/_3$ (Nm).....:	1,33Nm			--
	Test current I_N (A) .....:	63A			--
	- with current passing .....21 h	21h			P
	- without current.....3 h	3h			P
	For 4 pole RCBOs with 3 overcurrent protected poles only 3 poles loaded				N/A
	At the end of the last period of 21h,	[K]	[K]	[K]	--
	temperature rise of terminals not exceed 65K.....:	56	57	56	P
	After cool down the RCBO trip with a test current of 1,25 $I_{\Delta N}$	[ms]	[ms]	[ms]	--
	Break time not exceeding the value for $I_{\Delta N}$ in table 2 (ms) .....:	39	37	39	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1.				P
9.23	**Verification of ageing of electronic components**				
	168 h at 55 ± 2°C.....:	168h, 55°C			--
	Test current I_N (A) .....:	63A			--
	Cross-section (mm²) .....:	16mm²			--

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	Electronic parts at 1,1 U_N (V).....:	457V			--
	After cool down:				P
	- electronic parts show no damage				P
	RCBO trip with a test current of 1,25 $I_{\Delta N}$	[ms]	[ms]	[ms]	--
	Break time not exceeding the value for $I_{\Delta N}$ in table 2 (ms).....:	41	38	39	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1				P
9.2.4 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** RCBO trip with a test current of 2,5 $I_{\Delta n}$ with smooth direct current	37ms	39ms	36ms	P

	TEST SEQUENCE "C": **3 samples: D63, $I_{\Delta n}$= 0,03A, 1P+N**	**C_1.1 C_1.2 C_1.3**	--
	Tests C_1		--
8	REQUIREMENTS FOR CONSTRUCTION AND OPERATION		--
8.6	Mechanical and electrical endurance		
	RCBOs capable of performing an adequate number of mechanical and electrical operations.		P
9.10	Verification of Mechanical and electrical endurance		
	Test:		--
	- $I_N \leq 25$ A.....2s ON / 13s OFF		N/A
	- $I_N > 25$ A.....2s ON / 28s OFF	I_N= 63A 2s ON/ 28s OFF	P
	2000 operating cycles	2000 cycles	--
	Test voltage U_N (V).....:	242V	--
	Test current I_N (A).....:	63,6A	--
	Cos phi = 0,85 - 0,9.....:	0,86	--
	Cross-section (mm²).....:	16 mm²	--
9.10.2	Test procedure		--
	$I_{\Delta N}$ > 0,01 A:	0,03A	
	- 1000 cycles manual operation	1000	P
	- 500 cycles test device	500	P
	- 500 cycles $I_{\Delta N}$	500	P
	$I_{\Delta N} \leq$ 0,01 A:		
	- 500 cycles manual operation		N/A
	- 750 cycles test device		N/A

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	- 750 cycles $I_{\Delta N}$				N/A
	Without load - manual operation				
	- $I_N \leq$ 25 A.....2000 cycles				N/A
	- $I_N >$ 25 A.....1000 cycles	I_N= 63A, 1000 cycles			P
9.10.3	After test:				--
	No undue wear, no damage, no loosening of connections, no seepage of sealing compound				P
9.9.1.2 c) 1)	RCBO trip with a test current of 1,25 $I_{\Delta N}$	27ms	24ms	27ms	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1.				P
	One test only is made without measurement of break time				P
	Dielectric strength test with 900 V AC for 1 min:				--
	a)				P
	b)				P
	c)				P
	d)				N/A
	e)				N/A
9.9.2.1	Test of time-current characteristic				
b)	Test current 2,55 I_N starting from cold..... :	2,55 I_N = 161A			--
	Opening time not less than 1 s or more than	[s]	[s]	[s]	--
	- 60 s (≤ 32 A)..... :	-	-	-	N/A
	- 120 s (> 32 A)..... :	17	16	17	P
9.2.4 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** RCBO trip with a test current of 2,5 $I_{\Delta n}$ with smooth direct current	23ms	27ms	26ms	P
9.12.11.2.1	Test at reduced short-circuit current ..... :	Figure 7			--
	Test current:				--
	- 500 A	641A, 256V			P
	- 10 I_N				N/A
	Power factor 0,93 - 0,98 ..... :	0,96			--
	Each overcurrent protected pole:				--
		[KA²s]	[KA²s]	[KA²s]	--
	Sequence: 6-0 and 3-CO ..... I^2t max.	392	500	481	P
	I_{peak} (A) max. value ..... :	907	907	908	--
	No permanent arcing				P

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	No flash-over between poles or between poles and frame				P
	No blowing of the fuse F				P
	No damage, polyethylene sheet shows no hole				P
9.12.12	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				P
9.12.12.1.a)	Leakage current across open contacts, according to 9.7.7.3, each pole is supplied at a voltage 1,1 times Un= 264V. The RCBO is in the open position	[µA]	[µA]	[µA]	--
	The leakage current not exceed 2 mA ..... :	2,76	3,85	3,52	P
9.12.12.1.b)	Dielectric strength test:				
	Test voltage:				--
	a) 1500 V				P
	b) 1500 V				P
	c) 1500 V				P
	d) 1500 V				N/A
	e) 2000 V				N/A
	During these tests, after the test has carried out under the conditions specified in 9.7.2 a), indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means show the closed position				P

	Tests C_2: **3 samples: D63, $I_{\Delta n}$= 0,03A, 1P+N**	**C_2.1**	**C_2.2**	**C_2.3**	--
9.12.11.2.2	Short circuit test on RCBOs for verifying their suitability for use in IT-systems				P
	figure..... :	Figure 8			--
	Test current:				--
	- 500A..... :				N/A
	- 1,2 times the upper limit of the standard range of instantaneous tripping (not exceeding 2500 A)..... :	1,54x10^{3}A			P
	Power factor 0,93-0,98 ..... :	0,95			P
	test voltage 105% of the rated phase to phase voltage ..... :	444V			P
	test voltage 105% of U_0 for the pole marked N, if any :	641A/256V			P
	Each pole of RCBO is subjected individually to a test in a circuit, the connection of which is shown in Figure 7.				P
		[KA²s]	[KA²s]	[KA²s]	--

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	Sequence: O-t-CO..... I²t max. L	14,0	11,8	18,5	P
	Sequence: O-t-CO..... I²t max. N	7,92	15,8	11,0	P
	I_{peak} (A) max. value ..... :	2,06x10³	2,03x10³	2,06x10³	--
	Sequence ..... :	O-t-CO			--
	Point of initiation of the O operation (protected poles): 0 ± 5° for the first tested pole, shifted by 30° for the other poles				P
	Point of initiation of the O operation (neutral pole): 60 ± 5°				P
	No flash-over between poles or between poles and frame				P
	No blowing of the fuse F				P
	No damage, polyethylene sheet shows no hole				P
	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				P
9.12.12.1.a)	Leakage current across open contacts, according to 9.7.7.3, each pole is supplied at a voltage 1,1 times Un= 264V. The RCBO is in the open position	[µA]	[µA]	[µA]	--
	The leakage current not exceed 2 mA ..... :	3,82	4,27	4,03	P
9.12.12.1.b)	Dielectric strength test:				
	Test voltage:				--
	a) 1500 V				P
	b) 1500 V				P
	c) 1500 V				P
	d) 1500 V				N/A
	e) 2000 V				N/A
	During these test, after the test has carried out under the conditions specified in 9.7.2 a), indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means show the closed position				P

	TEST SEQUENCE "C": **3 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**	**C_1.4 C_1.5 C_1.6**	--
	Tests C_1		--
8	REQUIREMENTS FOR CONSTRUCTION AND OPERATION		--
8.6	Mechanical and electrical endurance		
	RCBOs capable of performing an adequate number of mechanical and electrical operations.		P

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
9.10	Verification of Mechanical and electrical endurance				
	Test:				--
	- $I_N \leq 25$ A.....2s ON / 13s OFF				N/A
	- $I_N > 25$ A.....2s ON / 28s OFF	I_N= 63A 2s ON/ 28s OFF			P
	2000 operating cycles	2000 cycles			--
	Test voltage U_N (V).....:	418V			--
	Test current I_N (A).....:	63,6A			--
	Cos phi = 0,85 - 0,9.....:	0,87			--
	Cross-section (mm²).....:	16 mm²			--
9.10.2	Test procedure				--
	$I_{\Delta N}$ > 0,01 A:	0,03A			
	- 1000 cycles manual operation	1000			P
	- 500 cycles test device	500			P
	- 500 cycles $I_{\Delta N}$	500			P
	$I_{\Delta N} \leq$ 0,01 A:				
	- 500 cycles manual operation				N/A
	- 750 cycles test device				N/A
	- 750 cycles $I_{\Delta N}$				N/A
	Without load - manual operation				
	- $I_N \leq$ 25 A.....2000 cycles				N/A
	- $I_N >$ 25 A.....1000 cycles	I_N= 63A, 1000 cycles			P
9.10.3	After test:				--
	No undue wear, no damage, no loosening of connections, no seepage of sealing compound				P
9.9.1.2 c) 1)	RCBO trip with a test current of 1,25 $I_{\Delta N}$	23ms	26ms	26ms	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1.				P
	One test only is made without measurement of break time				P
	Dielectric strength test with 900 V AC for 1 min:				--
	a)				P
	b)				P
	c)				P
	d)				N/A
	e)				N/A

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
9.9.2.1	Test of time-current characteristic				
b)	Test current 2,55 I_N starting from cold..... :	2,55 I_N = 161A			--
	Opening time not less than 1 s or more than	[s]	[s]	[s]	--
	- 60 s (≤ 32 A)..... :	-	-	-	N/A
	- 120 s (> 32 A)..... :	21	20	19	P
9.2.4 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** RCBO trip with a test current of 2,5 $I_{\Delta n}$ with smooth direct current	31ms	26ms	32ms	P
9.12.11.2.1	Test at reduced short-circuit current ..... :	Figure 7			--
	Test current:				--
	- 500 A	641A, 256V			P
	- 10 I_N				N/A
	Power factor 0,93 - 0,98 ..... :	0,96			--
	Each overcurrent protected pole:				--
		[KA²s]	[KA²s]	[KA²s]	--
	Sequence: 6-0 and 3-CO ..... I²t max.	481	541	438	P
	I_{peak} (A) max. value ..... :	909	908	907	--
	No permanent arcing				P
	No flash-over between poles or between poles and frame				P
	No blowing of the fuse F				P
	No damage, polyethylene sheet shows no hole				P
9.12.12	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				P
9.12.12.1.a)	Leakage current across open contacts, according to 9.7.7.3, each pole is supplied at a voltage 1,1 times Un= 457V. The RCBO is in the open position	[µA]	[µA]	[µA]	--
	The leakage current not exceed 2 mA ..... :	4,82	4,82	4,34	P
9.12.12.1.b)	Dielectric strength test:				
	Test voltage:				--
	a) 1500 V				P
	b) 1500 V				P
	c) 1500 V				P
	d) 1500 V				N/A
	e) 2000 V				N/A

IEC 62423			
Clause	Requirement + Test	Result - Remark	Verdict
	During these tests, after the test has carried out under the conditions specified in 9.7.2 a), indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means show the closed position		P

	Tests C_2: **3 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**	**C_2-4 C_2-5 C_2-6**			--
9.12.11.2.2	Short circuit test on RCBOs for verifying their suitability for use in IT-systems				P
	figure.....:	Figure 8			--
	Test current:				--
	- 500A.....:				N/A
	- 1,2 times the upper limit of the standard range of instantaneous tripping (not exceeding 2500 A).....:	1,54x10^{3}A			P
	Power factor 0,93-0,98.....:	0,95			P
	test voltage 105% of the rated phase to phase voltage.....:	444V			P
	test voltage 105% of U_0 for the pole marked N, if any :	641A/256V			P
	Each pole of RCBO is subjected individually to a test in a circuit, the connection of which is shown in Figure 7.				P
		[KA²s]	[KA²s]	[KA²s]	--
	Sequence: O-t-CO.....I²t max. L	13,6	14,7	15,3	P
	Sequence: O-t-CO..... I²t max. N	8,01	11,7	11,1	P
	I_{peak} (A) max. value.....:	2,10x10^3	2,12x10^3	2,07x10^3	--
	Sequence.....:	O-t-CO			--
	Point of initiation of the O operation (protected poles): 0 ± 5° for the first tested pole, shifted by 30° for the other poles				P
	Point of initiation of the O operation (neutral pole): 60 ± 5°				P
	No flash-over between poles or between poles and frame				P
	No blowing of the fuse F				P
	No damage, polyethylene sheet shows no hole				P
	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				P
9.12.12.1.a)	Leakage current across open contacts, according to 9.7.7.3, each pole is supplied at a voltage 1,1 times Un= 457V. The RCBO is in the open position	[µA]	[µA]	[µA]	--

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Clause	Requirement + Test	Result - Remark			Verdict
	The leakage current not exceed 2 mA .....:	6,82	6,81	6,93	P
9.12.12.1.b)	Dielectric strength test:				
	Test voltage:				--
	a) 1500 V				P
	b) 1500 V				P
	c) 1500 V				P
	d) 1500 V				N/A
	e) 2000 V				N/A
	During these test, after the test has carried out under the conditions specified in 9.7.2 a), indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means show the closed position				P

	TEST SEQUENCE "D": **3 samples: D63, $I_{\Delta n}$= 0,03A, 1P+N**	**D1 D2 D3**	--
	Tests D_0		--
8	REQUIREMENTS FOR CONSTRUCTION AND OPERATION		--
8.5	Operating characteristics		
9.9	Verification of the operating characteristic		
9.9.1	RCBO installed as for normal use, test circuit according to figure 4		P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting		N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.	50/60Hz	P
	Tests performed with no load at 20 ± 5°C	21°C	P
9.9.1.4	For RCBOs functionally dependent on line voltage each test is made at:		
	- 1,1 U_N (V) and.....:	264V	P
	- 0,85 U_N (V).....:	195V	P

Table 2	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, 500A **b)**	$I_{\Delta t}$ **c)**		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--

IEC 62423											
Clause	Requirement + Test							Result - Remark			Verdict
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--
	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.										--
9.9.1.2	Tests for all RCBOs										P
a)	Verification of the correct operation in case of a steady increase of residual current:							[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$ (mA).....:							21,3-21,6	21,4-21,7	21,3-21,6	P
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed):							[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the specified limiting value (ms).....:							31-37	31-36	27-36	P
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):										
	Maximum break times at:							[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:							36	35	34	P
	- 2 $I_{\Delta N}$.....:							26	27	28	P
	- 5 $I_{\Delta N}$ or .....:							-	-	-	N/A
	- 0,25 A .....:							19	21	21	P
	- $I_{\Delta t}$ 630 A .....:							9	9	10	P
	No value exceeds the relevant specified limiting value										P
	Additional test for type S:										
	Minimum non-actuating time at:							[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s							-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s							-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s							-	-	-	N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A among the following list: 5A - 10A - 20A - 50A - 100A - 200A by closing S_2, (S_1 and RCBO in closed position):	[ms]	[ms]	[ms]	P
	- 5A	12	12	10	P
	- 10A	11	11	10	P
	- 20A	11	8	9	P
	- 50A	9	10	10	P
	- 100A	10	9	9	P
	- 200A	10	7	9	P
	- 500A	7	7	7	P
	No value exceeds the relevant specified limiting value				P
f) 1)	Tests repeated at -5°C:				
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	37	33	33	P
	- 2 $I_{\Delta N}$.....:	29	31	27	P
	- 5 $I_{\Delta N}$ or .....:	-	-	-	N/A
	- 0,25 A .....:	21	18	20	P
	- $I_{\Delta t}$ 630 A .....:	10	9	10	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
e)	Tests repeated, with the pole under test and one other pole of the RCBO loaded with rated current, current being established shortly before the test.	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	-no value exceeds the specified limiting value	36	36	34	P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_2, (S_1 and RCBO in closed position):				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$..... :	34	33	36	P
	- 2 $I_{\Delta N}$..... :	27	27	27	P
	- 5 $I_{\Delta N}$ or ..... :	-	-	-	N/A
	- 0,25 A ..... :	21	20	20	P
	- $I_{\Delta t}$ 630 A ..... :	9	9	9	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
f) 2)	Tests repeated with the RCBO loaded with rated current I_N at +40°C until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--

IEC 62423					
Clause	Requirement + Test		Result - Remark		Verdict
	- $I_{\Delta N}$ ..... :		34	31	34	P
	- 2 $I_{\Delta N}$ ..... :		28	27	27	P
	- 5 $I_{\Delta N}$ or ..... :		-	-	-	N/A
	- 0,25 A ..... :		18	21	21	P
	- $I_{\Delta t}$ 630 A ..... :		9	9	10	P
	No value exceeds the relevant specified limiting value					P
	Additional test for type S:					
	Minimum non-actuating time at:		[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s		-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s		-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s		-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s		-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2					N/A
	No tripping during tests					N/A
8.15	**Behaviour of RCBOs in case of earth fault currents comprising a DC component**					
9.9.1.3	Verification of the correct operation at residual currents with DC components					
	Type A residual current devices					
	RCBO installed as for normal use, test circuits according to figures 5 and 6					P
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.		50 and 60Hz			P
	For RCBOs functionally dependent on line voltage each test is made at					
	- 1,1 U_N ..... :		264V			P
	- 0,85 U_N ..... :		195V			P
a)	Verification of the correct operation in case of a continuous rise of the residual pulsating direct current (S_1, S_2 and RCBO closed)					
	Test acc. figure 5					--
	Angle α	Tripping current (A)				--
		Lower limit	Upper limit			--
	0°	0,35 $I_{\Delta N}$	1,4 $I_{\Delta N}$ or 2 $I_{\Delta N}$			--
	90°	0,25 $I_{\Delta N}$	(sub-clause 5.3.8)			--

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Clause	Requirement + Test						Result - Remark				Verdict
	135°	0,11 $I_{\Delta N}$									--
	Steady increase from zero to:						[mA]	[mA]	[mA]		--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s						$I_{\Delta N}$ = 30mA				P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s						$I_{\Delta N}$ = mA				N/A
	α = 0° +/- .....:						17,7	17,6	17,8		P
	α = 90° +/- .....:						17,6	17,6	17,5		P
	α = 135° +/- .....:						25,7	25,6	25,6		P
	No value exceeds the relevant specified limiting values										P
b)	Verification of the correct operation in case of suddenly appearing residual pulsating direct currents by closing S_2 (S_1 and RCBO in closed position)										
Table 3			Maximum values of break time and non-actuating time (s) for type A RCBOs in the event of half-wave pulsating residual currents (r.m.s. values) equal to								--
	Type	**I_N A**	**$I_{\Delta N}$ A**	**1,4 $I_{\Delta N}$**	**2 $I_{\Delta N}$**	**2,8 $I_{\Delta N}$**	**4 $I_{\Delta N}$**	**7 $I_{\Delta N}$**	**0,35 A**	**0,5 A**	--
	General	Any value	<0,03		0,3		0,15			0,05	--
		Any value	0,03	0,3		0,15			0,04		--
		Any value	>0,03	0,3		0,15		0,04			--
	S	≥ 25	>0,03	0,5		0,2		0,15			--
	a) This value shall be limited to the lower limit of the overcurrent instantaneous tripping ranges according to type B, C or D, as applicable.										--
	Test acc. figure 5										--
	Angle α .....:						α = 0°				--
	RCBOs with $I_{\Delta N}$ < 0,03 A						$I_{\Delta N}$ = mA				N/A
	Maximum break times at:						[ms]	[ms]	[ms]		--
	- 2 $I_{\Delta N}$ +/- .....:						-	-	-		N/A
	- 4 $I_{\Delta N}$ +/- .....:						-	-	-		N/A
	- 0,5 A +/- .....:						-	-	-		N/A
	- 350A or +/- .....:						-	-	-		N/A
	- $I_{\Delta t}$ ___ A +/- .....:						-	-	-		N/A
	RCBOs with $I_{\Delta N}$ = 0,03 A						$I_{\Delta N}$ = 0,03 A				P
	Maximum break times at:						[ms]	[ms]	[ms]		--
	- 1,4 $I_{\Delta N}$ +/- .....:						34	33	33		P
	- 2,8 $I_{\Delta N}$ +/- .....:						31	31	29		P
	- 0,35 A +/- .....:						9	10	10		P
	- 350A or +/- .....:						-	-	-		N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	- $I_{\Delta t}$ 630 A +/- .....:	7	7	7	P
	RCBOs with $I_{\Delta N}$ > 0,03 A				N/A
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 1,4 $I_{\Delta N}$ +/- .....:	-	-	-	N/A
	- 2,8 $I_{\Delta N}$ +/- .....:	-	-	-	N/A
	- 7 $I_{\Delta N}$ +/- .....:	-	-	-	N/A
	- 350A or +/- .....:	-	-	-	N/A
	- $I_{\Delta t}$ ___ A +/- .....:	-	-	-	N/A
	No value exceeds the specified limiting values				P
c)	Verification of the correct operation with the pole under test and one other pole loaded with rated current I_N	I_N = 63A			P
	Test acc. 9.9.1.3 a) repeated, pole under test an one other pole loaded with rated current				--
	Steady increase from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = 30mA			P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	α = 0° +/- .....:	17,4	17,6	17,6	P
	α = 90° +/- .....:	17,8	17,4	17,6	P
	α = 135° +/- .....:	25,8	25,7	26,1	P
	No value exceeds the relevant specified limiting values				P
d)	Verification of the correct operation in case of residual pulsating direct currents with α = 0° superimposed by smooth direct current of 0,006 A				
	Test acc. figure 6				--
	Steady increase of pulsating DC current from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s	$I_{\Delta N}$ = 30mA			P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	(I_1) α = 0° +/- .....: (I_0) 6mA DC +/- .....:	17,8	17,7	17,8	P
	No value exceeds the relevant specified limiting values				P
9.1.7 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A				
	Test acc. 9.9.1.3 d) but the smooth direct current of 0,006 A replaced by 0,01 A				

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Clause	Requirement + Test				Result - Remark	Verdict
	Verification of the correct operation in case of residual pulsating d.c. currents with angle α = 0° superimposed by smooth direct current of 0,01 A:					
	Steady increase of pulsating DC current from zero to:				[mA] [mA] [mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s					N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s					N/A
	(I_1) α = 0° +/- .....: (I_0) 10mA DC +/- .....:				- - -	N/A
9.1.2 addition acc. IEC 62423	Verification of the correct operation in case of steady increase of composite residual current					
	starting composite residual current:					
	Different frequency component values of test currents for calibration (RMS)			Composite starting current value (RMS)		
	$I_{at\ rated\ frequency}$	I_{1kHz}	$I_{F\ motor\ (10Hz)}$	I_{Δ}		
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$		
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA] [mA] [mA]	--
	tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$.....:				34,1-35,1 34,2-35,4 34,3-35,3	P
9.1.3 addition acc. IEC 62423	Verification of the correct operation in case of sudden appearance of composite residual current					
	composite residual current acc. 9.1.2					P
	S1 and RCBO in the closed position, residual current suddenly established by closing S2				[mA] [mA] [mA]	--
	RCBO trip with a test current of 7 $I_{\Delta n}$.....:				22 21 22	P
	max. break time:					
	- general type RCBOs: 40ms					P
	- S type RCBOs: 150ms					N/A
	Additional test for type S:					--
	- minimum non-actuating time at: 7 $I_{\Delta n}$; 0,05 s .....:					--
	No tripping during tests				- - -	N/A
9.2.1.7.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the correct operation in case of residual smooth direct current without load for ratings of $I_{\Delta n}$ not tested in D_1, test acc. figure 6b					
a)	Verification of the correct operation in case of a steady increase residual smooth direct current:					
	Test switch S_1 and S_2 and RCBO in closed position					P

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Clause	Requirement + Test	Result - Remark			Verdict
	- Steady increase from 0,2 $I_{\Delta N}$ to 2 $I_{\Delta N}$ within 30s	[mA]	[mA]	[mA]	--
	Tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA)..... :	31,9	32,1	31,9	P
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 2 $I_{\Delta N}$..... :	31	29	31	P
	- 4 $I_{\Delta N}$..... :	26	26	27	P
	- 10 $I_{\Delta N}$..... :	21	21	23	P
	No value exceeds the relevant specified limiting value				P

	Tests D_1				--
8	**REQUIREMENTS FOR CONSTRUCTION AND OPERATION**				--
8.12	**RCBOs functionally dependent on line voltage**				
	RCBOs functionally dependent on the line voltage operate correctly between 0,85 and 1,1 UN				
9.17	**Verification of the behaviour of RCBOs opening automatically in case of failure of the line voltage**				
9.17.1	Limiting value of the line voltage U_x				
	U_N applied to the line terminals and progressively lowered to attain zero within about 30s until automatic opening occurs	[V]	[V]	[V]	--
	All values less than 0,85 U_N ..... :	-	-	-	N/A
	Tripping test:				
	Test voltage (V)..... :	V			--
	Residual current $I_{\Delta N}$..... :	$I_{\Delta N}$ =A			--
	Time corresponding to value for $I_{\Delta N}$ in table 2	[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	Verification of automatic opening in case of failure of the line voltage				
	RCBO 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)	RCBOs opening without delay				N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	no value exceeds 0,5 s ..... :	-	-	-	N/A
b)	RCBOs opening with delay				N/A
	Values within the range indicated by manufacturer	to ms			N/A
9.17.3	Verification of the correct operation, in presence of a residual current, for RCBOs opening with delay in case of failure of the line voltage				
	RCBO connected according to figure 4 at U_N				N/A
	All phases but one switched off by means of S_3				N/A
9.9.1.2	During the delay: Off-load tests at 20 ± 5°C				--
a)	Verification of the correct operation in case of a steady increase of residual current:	[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s Tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$ (only if delay > 30s) ..... :	-	-	-	N/A
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the specified limiting value ..... :	-	-	-	N/A
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				N/A
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... :	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... :	-	-	-	N/A
	- 5 $I_{\Delta N}$ or ..... :	-	-	-	N/A
	- 0,25 A ..... :	-	-	-	N/A
	- $I_{\Delta t}$ _____ A ..... :	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A by closing S_2, (S_1 and RCBO in closed position):				
	- ____A (value 1 between 5A and 200A)..... :	-	-	-	N/A
	- ____A (value 1 between 5A and 200A)..... :	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
	Additional test for type S:				--
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.17.4	Verification of the correct operation of RCBOs with 3 or 4 current paths, neutral and one line terminal only being energized in turn				
	RCBO connected according to figure 4				N/A
9.9.1.2.c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				N/A
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$..... :	-	-	-	N/A
	- 2 $I_{\Delta N}$..... :	-	-	-	N/A
	- 5 $I_{\Delta N}$ or ..... :	-	-	-	N/A
	- 0,25 A ..... :	-	-	-	N/A
	- $I_{\Delta t}$ _____ A..... :	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
	Additional test for type S:				--
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
8.14	**Behaviour of RCBOs in case of current surges caused by impulse voltages**				
9.19.1	Current surge test for all RCBOs (0,5µs/100kHz ring wave test)				
	One pole of the RCBO submitted to 10 surge current applications, polarity inverted after every two applications				P
	Peak value..... :	200A +10/-0% or ~~(25A +10/-0% for $I_{\Delta N} \leq 10mA$)~~			--
	Virtual front time ..... :	0,5µs ± 30%			--

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Clause	Requirement + Test	Result - Remark			Verdict
	Period of following oscillatory wave ..... :	10µs ± 20%			--
	Each successive reverse peak..... :	60% of preceding peak			--
	No tripping during tests				P
		[ms]	[ms]	[ms]	--
	After the test the RCBO trip with a test current of $I_{\Delta N}$ (ms) ..... :	32	33	34	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1				P
	No value exceeds the relevant specified limiting value				P
9.19.2 9.1.5 addition acc. IEC 62423	Verification of behaviour at surge currents up to 3000A (8/20µs surge current test)				
	One pole of the RCBO chosen at random, submitted to 10 surge current applications, polarity inverted after every two applications				P
	Peak value..... :	3000A +10/-0%			--
	Virtual front time ..... :	0,8µs ± 20%			--
	Virtual time of half value ..... :	20µs ± 20%			--
	Peak of reverse current ..... :	less than 30 % of peak value			--
	No tripping during tests				P
		[ms]	[ms]	[ms]	--
	After the test the RCBO trip with a test current of $I_{\Delta N}$ (ms) ..... :	31	32	31	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1				P
	No value exceeds the relevant specified limiting value				P
9.1.6 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of behaviour in the case of inrush residual currents				
	Test acc. figure 2				N/A
	all switches and RCBO in closed position				N/A
	pulse with a peak current of 10 $I_{\Delta n}$ (mA)..... :				N/A
	Pulse on one pole chosen at random				N/A
	Six measurements: 3 times positive, 3 times negative				N/A
	Polarity changed after each test				N/A
	No tripping during test				N/A

IEC 62423						
Clause	Requirement + Test				Result - Remark	Verdict
9.1.4 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of the correct operation for four-pole Type F RCCDs powered on two poles only					
	Tests performed with a four-pole RCBO acc. 9.1.2, but only supplied between neutral terminal and one-phase terminal chosen at random without load					N/A
9.1.2 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of the correct operation in case of steady increase of composite residual current					
	starting composite residual current:					N/A
	Different frequency component values of test currents for calibration (RMS)			Composite starting current value (RMS)		N/A
	$I_{at\ rated\ frequency}$	I_{1kHz}	N/A	I_{Δ}		N/A
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$		N/A
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA] [mA] [mA]	--
	tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$.....:				- - -	N/A
9.2.3 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Correct operation for RCBOs powered on two poles					
	tests acc. 9.2.1.2 and 9.2.1.7.1					N/A
	RCBO only supplied between neutral terminal and one-phase terminal chosen at random for four-pole devices or					N/A
	RCBO only supplied between 2-phase terminals chosen at random for 3-pole devices					N/A
	Tests at rated frequency and without load					N/A
9.2.1.2 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the correct operation in case of residual sinusoidal alternating currents up to 1000 Hz					
a)	Test switch S_1 and S_2 and RCBO in closed position					N/A
	Test at 150Hz:					
	steady increase from max. 0,2 $I_{\Delta n}$ to 2,4 $I_{\Delta n}$ within 30s				[mA] [mA] [mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 2,4 $I_{\Delta n}$ (mA)					N/A
	Test at 400Hz:					
	steady increase from max. 0,2 $I_{\Delta n}$ to 6 $I_{\Delta n}$ within 30s				[mA] [mA] [mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 2,4 $I_{\Delta n}$ (mA)					N/A
	Test at 1000Hz:					
	steady increase from max. 0,2 $I_{\Delta n}$ to 14 $I_{\Delta n}$ within 30s				[mA] [mA] [mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 14 $I_{\Delta n}$ (mA)					N/A

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Clause	Requirement + Test	Result - Remark			Verdict
b)	S1 and RCBO in the closed position, residual current correspond to 1000Hz suddenly established by closing S2				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 14 $I_{\Delta N}$..... :				N/A
	max. break time:				
	- general type RCBOs: 0,3s				N/A
	- S type RCBOs: 0,5s				N/A
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- 14 $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
9.2.1.7.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the correct operation in case of residual smooth direct current without load for ratings of $I_{\Delta n}$ not tested in D_1, test acc. figure 6b				
a)	Verification of the correct operation in case of a steady increase residual smooth direct current:				
	Test switch S_1 and S_2 and RCBO in closed position				
	- Steady increase from 0,2 $I_{\Delta N}$ to 2 $I_{\Delta N}$ within 30s Tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$	[mA]	[mA]	[mA]	--
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				N/A
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 2 $I_{\Delta N}$..... :				N/A
	- 4 $I_{\Delta N}$..... :				N/A
	- 10 $I_{\Delta N}$..... :				N/A
	No value exceeds the relevant specified limiting value				N/A
9.2.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the operating characteristics at the reference temperature (20±5)°C				

IEC 62423, Table 1 -Type B RCBOs- Standard values of break time and non-actuating time for residual direct currents which result from rectifying circuits and for residual smooth direct current

	Type	I_N A	$I_{\Delta N}$ A	Standard values of break time and non-actuating at a residual current equal to					
				2 $I_{\Delta N}$	4 $I_{\Delta N}$	10 $I_{\Delta N}$	5A,10A,20A,50,100A,200A**a)**		
	General	Any value	General	0,3	0,15	0,04	0,04	Max. break times	
	S	≥ 25	>0,03	0,5	0,2	0,15	0,15	Max. break times	

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Clause	Requirement + Test						Result - Remark			Verdict
				0,13	0,06	0,05	0,04	Min. non-actuating times		
	For Type B RCBOs any value exceeding the lower limit of the overcurrent instantaneous tripping range are not tested									
	a) Tests only made during verification of the correct operation as mentioned in 9.2.1.5 b) acc. figure 6a and 9.2.1.6 b) acc. figure 6b									
9.2.1.1 addition acc. IEC 62423	General									
	Each test is made at 1,1 and 0,85 times the rated line voltage; voltage (V) .....:						264V/195V			
	Tests a rated frequency									
	For multiple settings of I∆n tests are made for each setting									
9.2.1.2 addition acc. IEC 62423	Verification of the correct operation in case of residual sinusoidal alternating currents up to 1000 Hz									
a)	Test switch S_1 and S_2 and RCBO in closed position									
	Test at 150Hz:									
	steady increase from max. 0,2 $I_{\Delta n}$ to 2,4 $I_{\Delta n}$ within 30s						[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 2,4 $I_{\Delta n}$ (mA)..:						31,1	31,2	31,3	P
	Test at 400Hz:									
	steady increase from max. 0,2 $I_{\Delta n}$ to 6 $I_{\Delta n}$ within 30s						[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 2,4 $I_{\Delta n}$ (mA)..:						61,3	61,4	61,4	P
	Test at 1000Hz:									
	steady increase from max. 0,2 $I_{\Delta n}$ to 14 $I_{\Delta n}$ within 30s						[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 14 $I_{\Delta n}$ (mA)...:						136	134	134	P
b)	S1 and RCBO in the closed position, residual current correspond to 1000Hz suddenly established by closing S2									
	Maximum break times at:						[ms]	[ms]	[ms]	--
	- 14 $I_{\Delta N}$.....:						16	17	15	P
	max. break time:									
	- general type RCBOs: 0,3s									P
	- S type RCBOs: 0,5s									N/A
	Additional test for type S:									
	Minimum non-actuating time at:									--
	- 14 $I_{\Delta N}$ ..... 0,13 s						-	-	-	N/A
9.2.1.3 addition acc. IEC 62423	Verification of the correct operation in the case of a residual alternating current superimposed on a residual smooth direct current									
	Test acc. figure 4									
	Test switch S_1 and S_2 and RCBO in closed position									

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Clause	Requirement + Test	Result - Remark			Verdict
	Residual smooth direct current applied through one pole chosen at random and adjusted to				
	- 0,4 $I_{\Delta n}$ or				P
	- 10 mA				N/A
	whichever is the higher value				
	Residual alternating current at rated frequency applied to another pole and:				
	steady increase from max. 0,2 $I_{\Delta n}$ to $I_{\Delta n}$ within 30 s	[mA]	[mA]	[mA]	--
	alternating tripping current ≤ $I_{\Delta n}$ (mA)..... :	21,7	21,8	21,8	P
	Test made twice at each position I and II of S_3				P
9.2.1.4 addition acc. IEC 62423	Verification of the correct operation in the case of a residual pulsating direct current superimposed on a residual smooth direct current				
	Test acc. figure 5				
	Test switch S_1 and S_2 and RCBO in closed position				
	Residual smooth direct current applied through one pole chosen at random and adjusted to				
	- 0,4 $I_{\Delta n}$ or				P
	- 10 mA				N/A
	whichever is the higher value				
	Residual pulsating direct current applied to another pole with a current delay angle of 0° and:				
	steady increase from max. 0,2 $I_{\Delta n}$ to 1,4 $I_{\Delta n}$ within 30 s (mA) for RCBOs with $I_{\Delta n}$>0,01 A				P
	steady increase from max. 0,2 $I_{\Delta n}$ to 2 $I_{\Delta n}$ within 30 s (mA) for RCBOs with $I_{\Delta n}$≤0,01 A				N/A
	RCBO tested twice at each position I and II of S_3 and S_4				P
		[mA]	[mA]	[mA]	--
	residual pulsating tripping current ≤ 1,4 $I_{\Delta n}$ (mA) for RCBOs with $I_{\Delta n}$>0,01 A (mA).....:	18,2-20,9	18,5-20,6	18,5-20,4	P
		[mA]	[mA]	[mA]	--
	residual pulsating tripping current ≤ 2 $I_{\Delta n}$ (mA) for RCBOs with $I_{\Delta n}$≤0,01 A (mA).....:	-	-	-	N/A
9.2.1.5 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from two phases				
	Test acc. figure 6a				
a)	Test switch S_1 and S_2 and RCBO in closed position				
	Residual pulsating direct current:				
	steady increase from max. 0,2 $I_{\Delta n}$ to 2 $I_{\Delta n}$ within 30 s	[mA]	[mA]	[mA]	--

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Clause	Requirement + Test	Result - Remark			Verdict
	tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA) .....:	19,6	20,1	20,1	P
b)	The test circuit being successively calibrated at any three values of residual current given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--
	RCBO connected at two-line terminals chosen at random				P
		[ms]	[ms]	[ms]	
	maximum break time at: $2I_{\Delta n}$ (value given in table 1) .....:	27	27	27	P
	maximum break time at: $4I_{\Delta n}$ (value given in table 1) .....:	23	24	21	P
	maximum break time at: $10I_{\Delta n}$ (value given in table 1) ....:	17	16	16	P
	maximum break time at: 5A (value given in table 1) .....:	18	18	17	P
	maximum break time at: 10A (value given in table 1) .....:	15	17	18	P
	maximum break time at: 20A (value given in table 1) .....:	15	17	17	P
	maximum break time at: 50A (value given in table 1) .....:	13	17	17	P
	maximum break time at: 100A (value given in table 1) ....:	14	13	13	P
	maximum break time at: 200A (value given in table 1) ....:	16	11	12	P
	maximum break time at: 500A (value given in table 1) ....:	9	9	8	P
	No value exceeds the relevant specified limiting value				P
9.2.1.6 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from three phases				
	Test acc. figure 6b				
a)	Test switch S1 and S2 and RCBO in closed position				
	Residual pulsating direct current:				
	steady increase from max. 0,2 $I_{\Delta n}$ to 2 $I_{\Delta n}$ within 30 s	[mA]	[mA]	[mA]	--
	tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA) .....:	-	-	-	N/A
b)	The test circuit being successively calibrated at 2 $I_{\Delta n}$ and any other two chosen values given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$.....:	-	-	-	N/A
	maximum break time at: ___A (value given in table 1) ....:	-	-	-	N/A
	maximum break time at: ___A (value given in table 1) ....:	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
9.2.1.7.1 addition acc. IEC 62423	Verification of the correct operation in case of residual smooth direct current without load, test acc. figure 6b				

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
a)	Verification of the correct operation in case of a steady increase residual smooth direct current:				--
	Test switch S_1 and S_2 and RCBO in closed position				
	steady increase from max. 0,2 $I_{\Delta n}$ to 2 $I_{\Delta n}$ within 30 s	[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA).....:	31,2	31,2	31,2	P
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				--
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$ .....:	27	27	27	P
	maximum break time at: 4 $I_{\Delta n}$ .....:	22	20	21	P
	maximum break time at: 10 $I_{\Delta n}$ .....:	16	15	17	P
	No value exceeds the relevant specified limiting value				P
9.2.1.7.2 addition acc. IEC 62423	Verification of the correct operation in case of residual smooth direct current with load, test acc. figure 6b				
	Verification of the correct operation in case of a steady increase residual smooth direct current:				--
	test current (A): In, until steady state conditions are reached	63A			P
	cross-sectional area (mm²) .....:	16 mm²			--
	steady increase from max. 0,2 $I_{\Delta n}$ to 2 $I_{\Delta n}$ within 30 s	[mA]	[mA]	[mA]	--
	tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA) .....:	31,2	30,9	30,9	P
9.2.2 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Tests at the temperature limits				
	tests acc. 9.2.1.5 b), 9.2.1.6 b) and 9.2.1.7.1 b) under the following conditions:				
	ambient temperature: -5°C, off load				P
	ambient temperature: +40°C RCBO previously loaded with rated current until steady state conditions are reached				P
9.2.1.5 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from two phases				
	Test acc. figure 6a				
	Tests repeated at a temperature of -5°C:				P
b)	The test circuit being successively calibrated at any three values of residual current given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--

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Clause	Requirement + Test	Result - Remark			Verdict
	RCBO connected at two-line terminals chosen at random				P
		[ms]	[ms]	[ms]	--
	maximum break time at: $2I_{\Delta n}$ (value given in table 1) .....:	27	26	27	P
	maximum break time at: $4I_{\Delta n}$ (value given in table 1) .....:	21	22	21	P
	maximum break time at: $10I_{\Delta n}$ (value given in table 1) ....:	16	18	17	P
	maximum break time at: 5A (value given in table 1) .....:	26	25	238	P
	maximum break time at: 10A (value given in table 1) .....:	21	22	21	P
	maximum break time at: 20A (value given in table 1) .....:	22	22	16	P
	maximum break time at: 50A (value given in table 1) .....:	16	16	15	P
	maximum break time at: 100A (value given in table 1) ....:	13	13	13	P
	maximum break time at: 200A (value given in table 1) ....:	12	11	12	P
	maximum break time at: 500A (value given in table 1) ....:	9	8	9	P
	No value exceeds the relevant specified limiting value				P
9.2.1.6 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from three phases				
	Test acc. figure 6b				
	Tests repeated at a temperature of -5 °C:				N/A
b)	The test circuit being successively calibrated at 2 $I_{\Delta n}$ and any other two chosen values given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$.....:	-	-	-	N/A
	maximum break time at: ___A (value given in table 1) ....:	-	-	-	N/A
	maximum break time at: ___A (value given in table 1) ....:	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
9.2.1.7.1 addition acc. IEC 62423	Verification of the correct operation in case of residual smooth direct current without load, test acc. figure 6b				
	Tests repeated at a temperature of -5 °C:				P
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				--
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$ .....:	27	23	25	P
	maximum break time at: 4 $I_{\Delta n}$ .....:	21	22	21	P
	maximum break time at: 10 $I_{\Delta n}$ .....:	17	15	16	P

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	No value exceeds the relevant specified limiting value				P
9.2.1.5 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from two phases				
	Test acc. figure 6a				
	Tests repeated at a temperature of +40 °C:				P
	test current (A).....: In, until steady state conditions are reached	63A			P
b)	The test circuit being successively calibrated at any three values of residual current given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--
	RCBO connected at two-line terminals chosen at random				P
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$ (value given in table 1).....:	26	27	24	P
	maximum break time at: 4 $I_{\Delta n}$ (value given in table 1).....:	21	19	21	P
	maximum break time at: 10 $I_{\Delta n}$ (value given in table 1)...:	16	17	14	P
	maximum break time at: 5A (value given in table 1).....:	24	26	27	P
	maximum break time at: 10A (value given in table 1).....:	19	21	21	P
	maximum break time at: 20A (value given in table 1).....:	17	18	17	P
	maximum break time at: 50A (value given in table 1).....:	14	15	17	P
	maximum break time at: 100A (value given in table 1)....:	15	24	21	P
	maximum break time at: 200A (value given in table 1)....:	13	15	17	P
	maximum break time at: 500A (value given in table 1)....:	11	10	10	P
	No value exceeds the relevant specified limiting value				P
9.2.1.6 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from three phases				
	Test acc. figure 6b				
	Tests repeated at a temperature of +40 °C:				N/A
	test current (A).....: In, until steady state conditions are reached				N/A
b)	The test circuit being successively calibrated at 2 $I_{\Delta n}$ and any other two chosen values given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$.....:	-	-	-	N/A
	maximum break time at: ___A (value given in table 1)....:	-	-	-	N/A

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	maximum break time at: ___A (value given in table 1) ....:	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
9.2.1.7.1 addition acc. IEC 62423	Verification of the correct operation in case of residual smooth direct current without load, test acc. figure 6b				
	Tests repeated at a temperature of +40 °C:				P
	test current (A).....: In, until steady state conditions are reached	63A			P
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				--
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$ .....:	24	24	26	P
	maximum break time at: 4 $I_{\Delta n}$ .....:	18	18	17	P
	maximum break time at: 10 $I_{\Delta n}$ .....:	14	15	12	P
	No value exceeds the relevant specified limiting value				P
9.12.13	Verification of the rated residual making and breaking capacity $I_{\Delta m}$				
	$I_{\Delta m}$ (A) .....:	3000A			--
	Test circuit according to figure .....:	Figure 7			--
	Cross-section (mm²).....:	25mm²			--
	Grid distance a (mm).....:	45mm			--
	Prospective current (A) .....:	3000A			--
	Prospective current obtained (A).....:	3,05x10³A, 256V			--
	Power factor .....:	0,85~0,90			--
	Power factor obtained .....:	0,88			--
	Sequence O-t-CO-t-CO	[KA²s]	[KA²s]	[KA²s]	--
	I²t max. .....:	21,6	17,2	16,6	P
	Phases which do not carry the short circuit current during this test connected to the supply voltage at the line terminals				P
	On each pole in turn excluding the switched neutral pole				P
	RCBOs functionally dependent on the line voltage supplied with rated voltage.				P
	No permanent arcing				P
	No flashover				P
	No blowing of fuse F				P
	No damage, polyethylene sheet shows no holes				P

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
9.12.13.2	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				
9.7.3	Dielectric strength test of the main circuit:				--
	2 U_N (V) for 1 min ..... :	$2U_N$ = 480V			--
	a)				P
	b)				P
	c)				P
	d)				N/A
	e)				N/A
	No flashover or breakdown				P
	Making and breaking I_N at U_N	63,6A/242V~			P
	RCBO trip with a test current of 1,25 $I_{\Delta N}$	[ms]	[ms]	[ms]	--
	Break time not exceeding the value for $I_{\Delta N}$ in table 2 (ms)..... :	34	29	31	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1.				P
	Additional tests for RCBOs functionally depending on line voltage if applicable:				P
9.17	**Verification of the behaviour of RCBOs opening automatically in case of failure of the line voltage**				
9.17.1	Limiting value of the line voltage U_x				
	U_N applied to the line terminals and progressively lowered to attain zero within about 30s until automatic opening occurs	[V]	[V]	[V]	--
	All values less than 0,85 U_N				N/A
	Tripping test:				N/A
	Test voltage (V)..... :	V			--
	Residual current $I_{\Delta N}$ (mA)..... :	$I_{\Delta N}$ = mA			--
	Time corresponding to value for $I_{\Delta N}$ in table 2	[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	Verification of automatic opening in case of failure of the line voltage				
	RCBO 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) RCBOs opening without delay				
	- no value exceeds 0,5 s..... :				N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	b) RCBOs opening with delay				
	values within the range indicated by manufacturer:	to ms			N/A
9.17.3	Verification of the correct operation, in presence of a residual current, for RCBOs opening with delay in case of failure of the line voltage				
	RCBO connected according to figure 4 at U_N				N/A
	All phases but one switched off by means of S_3				N/A
9.9.1.2	During the delay: Off-load tests at 20 ± 5°C				
a)	Verification of the correct operation in case of a steady increase of residual current:	[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s Tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$ (only if delay > 30s) .....:	-	-	-	N/A
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed):	[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the specified limiting value .....:	-	-	-	N/A
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	-	-	-	N/A
	- 2 $I_{\Delta N}$.....:	-	-	-	N/A
	- 5 $I_{\Delta N}$ or .....:	-	-	-	N/A
	- 0,25A .....:	-	-	-	N/A
	- $I_{\Delta t}$ _____ A .....:	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A by closing S_2, (S_1 and RCBO in closed position):				N/A
	- ____A (value 1 between 5A and 200A).....:	-	-	-	N/A
	- ____A (value 1 between 5A and 200A).....:	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
	Additional test for type S:				--
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2	-	-	-	N/A
	No tripping during tests				N/A
9.17.4	Verification of the correct operation of RCBOs with 3 or 4 current paths, neutral and one line terminal only being energized in turn				
	RCBO connected according to figure 4				N/A
9.9.1.2.c)	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	-	-	-	N/A
	- 2 $I_{\Delta N}$.....:	-	-	-	N/A
	- 5 $I_{\Delta N}$ or .....:	-	-	-	N/A
	- 0,25A .....:	-	-	-	N/A
	- $I_{\Delta t}$ _____ A .....:	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
	Additional test for type S:				N/A
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
8.11	**Test device**				
	RCBOs provided with a test device				P
	Ampere-turns produced when operating the test device do not exceed 2,5 times the ampere turns produced by $I_{\Delta N}$	Ampere-turns produced by test device: 47,3 milliampere-turns 2,5 times the Ampere-turns produced by $I_{\Delta n}$: 75 milliampere-turns			P
	Not possible to energize the circuit on the load side by operating the test device when the RCBO is in the open position				P

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Clause	Requirement + Test	Result - Remark	Verdict

9.16	**Verification of the operation of the test device at the limits of rated voltage**				
	a) RCBO at 0,85 U_N, test device actuated 25 times at intervals of 5s	195V~, 25 times			P
	b) Test a) repeated at 1,1 U_N	264V~, 25 times			P
	c) Test b) repeated, but only once, the operating means of the test device being held in the closed position for 30s	264V~, 1 time, 30s			P
	RCBO operated at each test				P
	No change impairing further use				P
9.2.4 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** RCBO trip with a test current of 2,5 $I_{\Delta n}$ with smooth direct current	[ms]	[ms]	[ms]	P
		22	24	20	P

	TEST SEQUENCE "D": **3 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**			**D4**	**D5**	**D6**					--
	Tests D_0										--
8	REQUIREMENTS FOR CONSTRUCTION AND OPERATION										--
8.5	Operating characteristics										
9.9	Verification of the operating characteristic										
9.9.1	RCBO installed as for normal use, test circuit according to figure 4										P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting										N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.										P 50/60Hz
	Tests performed with no load at 20 ± 5°C										P 21°C
9.9.1.4	For RCBOs functionally dependent on line voltage each test is made at:										
	- 1,1 U_N (V) and.....:										P 457V
	- 0,85 U_N (V).....:										P 340V
Table 2	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, 500A **b)**	$I_{\Delta t}$ **c)**		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--

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Clause	Requirement + Test						Result - Remark				Verdict
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--
	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.										--
9.9.1.2	Tests for all RCBOs										P
a)	Verification of the correct operation in case of a steady increase of residual current:						[mA]		[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$ (mA).....:						21,4-21,7		21,3-21,7	21,3-21,7	P
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed):						[ms]		[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the specified limiting value (ms).....:						27-34		27-34	26-32	P
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):										
	Maximum break times at:						[ms]		[ms]	[ms]	--
	- $I_{\Delta N}$.....:						37		34	34	P
	- 2 $I_{\Delta N}$.....:						28		28	27	P
	- 5 $I_{\Delta N}$ or .....:						-		-	-	N/A
	- 0,25 A .....:						19		21	21	P
	- $I_{\Delta t}$ 630 A .....:						8		9	9	P
	No value exceeds the relevant specified limiting value										P
	Additional test for type S:										
	Minimum non-actuating time at:						[ms]		[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s						-		-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s						-		-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s						-		-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s						-		-	-	N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A among the following list: 5A - 10A - 20A - 50A - 100A - 200A by closing S_2, (S_1 and RCBO in closed position):	[ms]	[ms]	[ms]	P
	- 5A	10	11	11	P
	- 10A	9	9	10	P
	- 20A	11	10	8	P
	- 50A	8	8	8	P
	- 100A	8	8	9	P
	- 200A	7	7	9	P
	- 500A	8	7	7	P
	No value exceeds the relevant specified limiting value				P
f) 1)	Tests repeated at -5°C:				
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	34	32	32	P
	- 2 $I_{\Delta N}$.....:	26	27	28	P
	- 5 $I_{\Delta N}$ or .....:	-	-	-	N/A
	- 0,25 A .....:	21	23	19	P
	- $I_{\Delta t}$ 630 A .....:	10	9	9	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	No tripping during tests				N/A
e)	Tests repeated, with the pole under test and one other pole of the RCBO loaded with rated current, current being established shortly before the test.	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	-no value exceeds the specified limiting value	34	34	34	P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_2, (S_1 and RCBO in closed position):				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$..... :	33	33	34	P
	- 2 $I_{\Delta N}$..... :	25	24	27	P
	- 5 $I_{\Delta N}$ or ..... :	-	-	-	N/A
	- 0,25 A ..... :	18	19	19	P
	- $I_{\Delta t}$ 630 A ..... :	8	9	8	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
f) 2)	Tests repeated with the RCBO loaded with rated current I_N at +40°C until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$..... :	33	34	32	P
	- 2 $I_{\Delta N}$..... :	25	27	24	P

IEC 62423					
Clause	Requirement + Test		Result - Remark		Verdict
	- 5 $I_{\Delta N}$ or ..... :		-	-	- N/A
	- 0,25 A ..... :		17	19	19 P
	- $I_{\Delta t}$ 630 A ..... :		9	9	10 P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:		[ms]	[ms]	[ms] --
	- $I_{\Delta N}$ ..... 0,13 s		-	-	- N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s		-	-	- N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s		-	-	- N/A
	- $I_{\Delta t}$ ..... 0,04 s		-	-	- N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
8.15	**Behaviour of RCBOs in case of earth fault currents comprising a DC component**				
9.9.1.3	Verification of the correct operation at residual currents with DC components				
	Type A residual current devices				
	RCBO installed as for normal use, test circuits according to figures 5 and 6				P
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.		50 and 60Hz		P
	For RCBOs functionally dependent on line voltage each test is made at				
	- 1,1 U_N..... :		457V		P
	- 0,85 U_N ..... :		340V		P
a)	Verification of the correct operation in case of a continuous rise of the residual pulsating direct current (S_1, S_2 and RCBO closed)				
	Test acc. figure 5				--
	Angle α	Tripping current (A)			--
		Lower limit	Upper limit		--
	0°	0,35 $I_{\Delta N}$	1,4 $I_{\Delta N}$ or 2 $I_{\Delta N}$		--
	90°	0,25 $I_{\Delta N}$	(sub-clause 5.3.8)		--
	135°	0,11 $I_{\Delta N}$			--
	Steady increase from zero to:		[mA]	[mA]	[mA] --

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Clause	Requirement + Test					Result - Remark					Verdict
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s					$I_{\Delta N}$ = 30mA					P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s					$I_{\Delta N}$ = mA					N/A
	α = 0° +/- .....:					17,7	17,8	17,7			P
	α = 90° +/- .....:					17,7	17,8	17,7			P
	α = 135° +/- .....:					25,9	26,0	26,1			P
	No value exceeds the relevant specified limiting values										P
b)	Verification of the correct operation in case of suddenly appearing residual pulsating direct currents by closing S_2 (S_1 and RCBO in closed position)										
Table 3				Maximum values of break time and non-actuating time (s) for type A RCBOs in the event of half-wave pulsating residual currents (r.m.s. values) equal to							--
	Type	**I_N A**	**$I_{\Delta N}$ A**	**1,4 $I_{\Delta N}$**	**2 $I_{\Delta N}$**	**2,8 $I_{\Delta N}$**	**4 $I_{\Delta N}$**	**7 $I_{\Delta N}$**	**0,35 A**	**0,5 A**	--
	General	Any value	<0,03		0,3		0,15			0,05	--
		Any value	0,03	0,3		0,15			0,04		--
		Any value	>0,03	0,3		0,15		0,04			--
	S	≥ 25	>0,03	0,5		0,2		0,15			--
	a) This value shall be limited to the lower limit of the overcurrent instantaneous tripping ranges according to type B, C or D, as applicable.										--
	Test acc. figure 5										--
	Angle α .....:						α = 0°				--
	RCBOs with $I_{\Delta N}$ < 0,03 A					$I_{\Delta N}$ = mA					N/A
	Maximum break times at:					[ms]	[ms]	[ms]			--
	- 2 $I_{\Delta N}$ +/- .....:					-	-	-			N/A
	- 4 $I_{\Delta N}$ +/- .....:					-	-	-			N/A
	- 0,5 A +/- .....:					-	-	-			N/A
	- 350A or +/- .....:					-	-	-			N/A
	- $I_{\Delta t}$ ___ A +/- .....:					-	-	-			N/A
	RCBOs with $I_{\Delta N}$ = 0,03 A					$I_{\Delta N}$ = 0,03 A					P
	Maximum break times at:					[ms]	[ms]	[ms]			--
	- 1,4 $I_{\Delta N}$ +/- .....:					37	37	36			P
	- 2,8 $I_{\Delta N}$ +/- .....:					26	26	25			P
	- 0,35 A +/- .....:					10	10	10			P
	- 350A or +/- .....:					-	-	-			N/A
	- $I_{\Delta t}$ 630 A +/- .....:					7	7	7			P
	RCBOs with $I_{\Delta N}$ > 0,03 A										N/A

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 1,4 $I_{\Delta N}$ +/- .....:	-	-	-	N/A
	- 2,8 $I_{\Delta N}$ +/- .....:	-	-	-	N/A
	- 7 $I_{\Delta N}$ +/- .....:	-	-	-	N/A
	- 350A or +/- .....:	-	-	-	N/A
	- $I_{\Delta t}$ ___ A +/- .....:	-	-	-	N/A
	No value exceeds the specified limiting values				P
c)	Verification of the correct operation with the pole under test and one other pole loaded with rated current I_N	I_N = 63A			P
	Test acc. 9.9.1.3 a) repeated, pole under test an one other pole loaded with rated current				--
	Steady increase from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = 30mA			P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	α = 0° +/- .....:	17,8	17,9	17,8	P
	α = 90° +/- .....:	17,8	18,1	18,2	P
	α = 135° +/- .....:	26,1	26,4	26,2	P
	No value exceeds the relevant specified limiting values				P
d)	Verification of the correct operation in case of residual pulsating direct currents with α = 0° superimposed by smooth direct current of 0,006 A				
	Test acc. figure 6				--
	Steady increase of pulsating DC current from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s	$I_{\Delta N}$ = 30mA			P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	(I_1) α = 0° +/- .....: (I_0) 6mA DC +/- .....:	18,1	18,0	18,2	P
	No value exceeds the relevant specified limiting values				P
9.1.7 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A				
	Test acc. 9.9.1.3 d) but the smooth direct current of 0,006 A replaced by 0,01 A				
	Verification of the correct operation in case of residual pulsating d.c. currents with angle α = 0° superimposed by smooth direct current of 0,01 A:				
	Steady increase of pulsating DC current from zero to:	[mA]	[mA]	[mA]	--

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Clause	Requirement + Test				Result - Remark	Verdict
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s					N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s					N/A
	(I_1) α = 0° +/- .....: (I_0) 10mA DC +/- .....:				- - -	N/A
9.1.2 addition acc. IEC 62423	Verification of the correct operation in case of steady increase of composite residual current					
	starting composite residual current:					
	Different frequency component values of test currents for calibration (RMS)			Composite starting current value (RMS)		
	$I_{at\ rated\ frequency}$	I_{1kHz}	$I_{F\ motor\ (10Hz)}$	I_{Δ}		
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$		
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA] [mA] [mA]	--
	tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$.....:				34,2-34,8 34,5-35,4 34,1-35,3	P
9.1.3 addition acc. IEC 62423	Verification of the correct operation in case of sudden appearance of composite residual current					
	composite residual current acc. 9.1.2					P
	S1 and RCBO in the closed position, residual current suddenly established by closing S2				[mA] [mA] [mA]	--
	RCBO trip with a test current of 7 $I_{\Delta n}$.....:				27 25 25	P
	max. break time:					
	- general type RCBOs: 40ms					P
	- S type RCBOs: 150ms					N/A
	Additional test for type S:					--
	- minimum non-actuating time at: 7 $I_{\Delta n}$; 0,05 s .....:					--
	No tripping during tests				- - -	N/A
9.2.1.7.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the correct operation in case of residual smooth direct current without load for ratings of $I_{\Delta n}$ not tested in D_1, test acc. figure 6b					
a)	Verification of the correct operation in case of a steady increase residual smooth direct current:					
	Test switch S_1 and S_2 and RCBO in closed position					P
	- Steady increase from 0,2 $I_{\Delta N}$ to 2 $I_{\Delta N}$ within 30s				[mA] [mA] [mA]	--
	Tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA).....:				31,7 31,6 31,7	P

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 2 $I_{\Delta N}$ ..... :	32	29	29	P
	- 4 $I_{\Delta N}$ ..... :	24	25	24	P
	- 10 $I_{\Delta N}$ ..... :	21	22	21	P
	No value exceeds the relevant specified limiting value				P
	Tests D_1				--
8	**REQUIREMENTS FOR CONSTRUCTION AND OPERATION**				--
8.12	**RCBOs functionally dependent on line voltage**				
	RCBOs functionally dependent on the line voltage operate correctly between 0,85 and 1,1 UN				
9.17	**Verification of the behaviour of RCBOs opening automatically in case of failure of the line voltage**				
9.17.1	Limiting value of the line voltage U_x				
	U_N applied to the line terminals and progressively lowered to attain zero within about 30s until automatic opening occurs	[V]	[V]	[V]	--
	All values less than 0,85 U_N ..... :	-	-	-	N/A
	Tripping test:				
	Test voltage (V)..... :	V			--
	Residual current $I_{\Delta N}$ ..... :	$I_{\Delta N}$ =A			--
	Time corresponding to value for $I_{\Delta N}$ in table 2	[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	Verification of automatic opening in case of failure of the line voltage				
	RCBO 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)	RCBOs opening without delay				N/A
	no value exceeds 0,5 s ..... :	-	-	-	N/A
b)	RCBOs opening with delay				N/A

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	Values within the range indicated by manufacturer	to ms			N/A
9.17.3	Verification of the correct operation, in presence of a residual current, for RCBOs opening with delay in case of failure of the line voltage				
	RCBO connected according to figure 4 at U_N				N/A
	All phases but one switched off by means of S_3				N/A
9.9.1.2	During the delay: Off-load tests at 20 ± 5°C				--
a)	Verification of the correct operation in case of a steady increase of residual current:	[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s Tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$ (only if delay > 30s) ..... :	-	-	-	N/A
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the specified limiting value ..... :	-	-	-	N/A
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				N/A
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... :	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... :	-	-	-	N/A
	- 5 $I_{\Delta N}$ or ..... :	-	-	-	N/A
	- 0,25 A ..... :	-	-	-	N/A
	- $I_{\Delta t}$ _____ A ..... :	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A by closing S_2, (S_1 and RCBO in closed position):				
	- ____A (value 1 between 5A and 200A)..... :	-	-	-	N/A
	- ____A (value 1 between 5A and 200A)..... :	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
	Additional test for type S:				--
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.17.4	Verification of the correct operation of RCBOs with 3 or 4 current paths, neutral and one line terminal only being energized in turn				
	RCBO connected according to figure 4				N/A
9.9.1.2.c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				N/A
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	-	-	-	N/A
	- 2 $I_{\Delta N}$.....:	-	-	-	N/A
	- 5 $I_{\Delta N}$ or .....:	-	-	-	N/A
	- 0,25 A .....:	-	-	-	N/A
	- $I_{\Delta t}$ _____ A.....:	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
	Additional test for type S:				--
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
8.14	**Behaviour of RCBOs in case of current surges caused by impulse voltages**				
9.19.1	Current surge test for all RCBOs (0,5µs/100kHz ring wave test)				
	One pole of the RCBO submitted to 10 surge current applications, polarity inverted after every two applications				P
	Peak value.....:	200A +10/-0% or ~~(25A +10/-0% for $I_{\Delta N} \leq 10mA$)~~			--
	Virtual front time .....:	0,5µs ± 30%			--
	Period of following oscillatory wave .....:	10µs ± 20%			--
	Each successive reverse peak.....:	60% of preceding peak			--

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	No tripping during tests				P
		[ms]	[ms]	[ms]	--
	After the test the RCBO trip with a test current of $I_{\Delta N}$ (ms) ..... :	34	36	29	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1				P
	No value exceeds the relevant specified limiting value				P
9.19.2 9.1.5 addition acc. IEC 62423	Verification of behaviour at surge currents up to 3000A (8/20µs surge current test)				
	One pole of the RCBO chosen at random, submitted to 10 surge current applications, polarity inverted after every two applications				P
	Peak value..... :	3000A +10/-0%			--
	Virtual front time ..... :	0,8µs ± 20%			--
	Virtual time of half value..... :	20µs ± 20%			--
	Peak of reverse current..... :	less than 30 % of peak value			--
	No tripping during tests				P
		[ms]	[ms]	[ms]	--
	After the test the RCBO trip with a test current of $I_{\Delta N}$ (ms) ..... :	32	31	32	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1				P
	No value exceeds the relevant specified limiting value				P
9.1.6 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of behaviour in the case of inrush residual currents				
	Test acc. figure 2				N/A
	all switches and RCBO in closed position				N/A
	pulse with a peak current of 10 $I_{\Delta n}$ (mA)..... :				N/A
	Pulse on one pole chosen at random				N/A
	Six measurements: 3 times positive, 3 times negative				N/A
	Polarity changed after each test				N/A
	No tripping during test				N/A
9.1.4 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of the correct operation for four-pole Type F RCCDs powered on two poles only				

IEC 62423						
Clause	Requirement + Test				Result - Remark	Verdict
	Tests performed with a four-pole RCBO acc. 9.1.2, but only supplied between neutral terminal and one-phase terminal chosen at random without load					N/A
9.1.2 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of the correct operation in case of steady increase of composite residual current					
	starting composite residual current:					N/A
	Different frequency component values of test currents for calibration (RMS)			Composite starting current value (RMS)		N/A
	$I_{at\ rated\ frequency}$	I_{1kHz}	N/A	I_{Δ}		N/A
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$		N/A
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA] [mA] [mA]	--
	tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$.....:				- - -	N/A
9.2.3 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Correct operation for RCBOs powered on two poles					
	tests acc. 9.2.1.2 and 9.2.1.7.1					P
	RCBO only supplied between neutral terminal and one-phase terminal chosen at random for four-pole devices or					P
	RCBO only supplied between 2-phase terminals chosen at random for 3-pole devices					N/A
	Tests at rated frequency and without load					P
9.2.1.2 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the correct operation in case of residual sinusoidal alternating currents up to 1000 Hz					
a)	Test switch S_1 and S_2 and RCBO in closed position					P
	Test at 150Hz:					
	steady increase from max. 0,2 $I_{\Delta n}$ to 2,4 $I_{\Delta n}$ within 30s				[mA] [mA] [mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 2,4 $I_{\Delta n}$ (mA)				31,2 31,3 31,0	P
	Test at 400Hz:					
	steady increase from max. 0,2 $I_{\Delta n}$ to 6 $I_{\Delta n}$ within 30s				[mA] [mA] [mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 2,4 $I_{\Delta n}$ (mA)				61,1 60,9 61,2	P
	Test at 1000Hz:					
	steady increase from max. 0,2 $I_{\Delta n}$ to 14 $I_{\Delta n}$ within 30s				[mA] [mA] [mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 14 $I_{\Delta n}$ (mA)				234 232 234	P
b)	S1 and RCBO in the closed position, residual current correspond to 1000Hz suddenly established by closing S2					
	Maximum break times at:				[ms] [ms] [ms]	--

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	- 14 $I_{\Delta N}$..... :	21	17	16	P
	max. break time:				
	- general type RCBOs: 0,3s				P
	- S type RCBOs: 0,5s				N/A
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- 14 $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
9.2.1.7.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the correct operation in case of residual smooth direct current without load for ratings of $I_{\Delta n}$ not tested in D_1, test acc. figure 6b				
a)	Verification of the correct operation in case of a steady increase residual smooth direct current:				
	Test switch S_1 and S_2 and RCBO in closed position				
	- Steady increase from 0,2 $I_{\Delta N}$ to 2 $I_{\Delta N}$ within 30s Tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$	[mA]	[mA]	[mA]	--
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random	30,8-31,3	30,9-31,5	30,5-31,3	P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 2 $I_{\Delta N}$..... :	27	27	28	P
	- 4 $I_{\Delta N}$..... :	24	24	24	P
	- 10 $I_{\Delta N}$..... :	17	18	19	P
	No value exceeds the relevant specified limiting value				P
9.2.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the operating characteristics at the reference temperature (20±5)°C				

IEC 62423, Table 1 -Type B RCBOs- Standard values of break time and non-actuating time for residual direct currents which result from rectifying circuits and for residual smooth direct current

	Type	I_N A	$I_{\Delta N}$ A	Standard values of break time and non-actuating at a residual current equal to					
				2 $I_{\Delta N}$	4 $I_{\Delta N}$	10 $I_{\Delta N}$	5A,10A,20A,50,100A,200A**a)**		
	General	Any value	General	0,3	0,15	0,04	0,04	Max. break times	
	S	≥ 25	>0,03	0,5	0,2	0,15	0,15	Max. break times	
				0,13	0,06	0,05	0,04	Min. non-actuating times	
	For Type B RCBOs any value exceeding the lower limit of the overcurrent instantaneous tripping range are not tested								

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	a) Tests only made during verification of the correct operation as mentioned in 9.2.1.5 b) acc. figure 6a and 9.2.1.6 b) acc. figure 6b				
9.2.1.1 addition acc. IEC 62423	General				
	Each test is made at 1,1 and 0,85 times the rated line voltage; voltage (V) ..... :	457V/340V			
	Tests a rated frequency				
	For multiple settings of I∆n tests are made for each setting				
9.2.1.2 addition acc. IEC 62423	Verification of the correct operation in case of residual sinusoidal alternating currents up to 1000 Hz				
a)	Test switch S_1 and S_2 and RCBO in closed position				
	Test at 150Hz:				
	steady increase from max. 0,2 $I_{\Delta n}$ to 2,4 $I_{\Delta n}$ within 30s	[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 2,4 $I_{\Delta n}$ (mA).. :	31,1	31,2	30,9	P
	Test at 400Hz:				
	steady increase from max. 0,2 $I_{\Delta n}$ to 6 $I_{\Delta n}$ within 30s	[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 2,4 $I_{\Delta n}$ (mA).. :	61,2	61,3	61,4	P
	Test at 1000Hz:				
	steady increase from max. 0,2 $I_{\Delta n}$ to 14 $I_{\Delta n}$ within 30s	[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 14 $I_{\Delta n}$ (mA)... :	136	133	134	P
b)	S1 and RCBO in the closed position, residual current correspond to 1000Hz suddenly established by closing S2				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 14 $I_{\Delta N}$..... :	16	15	15	P
	max. break time:				
	- general type RCBOs: 0,3s				P
	- S type RCBOs: 0,5s				N/A
	Additional test for type S:				
	Minimum non-actuating time at:				--
	- 14 $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
9.2.1.3 addition acc. IEC 62423	Verification of the correct operation in the case of a residual alternating current superimposed on a residual smooth direct current				
	Test acc. figure 4				
	Test switch S_1 and S_2 and RCBO in closed position				
	Residual smooth direct current applied through one pole chosen at random and adjusted to				
	- 0,4 $I_{\Delta n}$ or				P

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	- 10 mA				N/A
	whichever is the higher value				
	Residual alternating current at rated frequency applied to another pole and:				
	steady increase from max. 0,2 $I_{\Delta n}$ to $I_{\Delta n}$ within 30 s	[mA]	[mA]	[mA]	--
	alternating tripping current ≤ $I_{\Delta n}$ (mA)..... :	21,7	21,8	21,7	P
	Test made twice at each position I and II of S_3				P
9.2.1.4 addition acc. IEC 62423	Verification of the correct operation in the case of a residual pulsating direct current superimposed on a residual smooth direct current				
	Test acc. figure 5				
	Test switch S_1 and S_2 and RCBO in closed position				
	Residual smooth direct current applied through one pole chosen at random and adjusted to				
	- 0,4 $I_{\Delta n}$ or				P
	- 10 mA				N/A
	whichever is the higher value				
	Residual pulsating direct current applied to another pole with a current delay angle of 0° and:				
	steady increase from max. 0,2 $I_{\Delta n}$ to 1,4 $I_{\Delta n}$ within 30 s (mA) for RCBOs with $I_{\Delta n}$>0,01 A				P
	steady increase from max. 0,2 $I_{\Delta n}$ to 2 $I_{\Delta n}$ within 30 s (mA) for RCBOs with $I_{\Delta n}$≤0,01 A				N/A
	RCBO tested twice at each position I and II of S_3 and S_4				P
		[mA]	[mA]	[mA]	--
	residual pulsating tripping current ≤ 1,4 $I_{\Delta n}$ (mA) for RCBOs with $I_{\Delta n}$>0,01 A (mA).....:	18,1-20,5	18,2-20,4	18,3-20,5	P
		[mA]	[mA]	[mA]	--
	residual pulsating tripping current ≤ 2 $I_{\Delta n}$ (mA) for RCBOs with $I_{\Delta n}$≤0,01 A (mA).....:	-	-	-	N/A
9.2.1.5 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from two phases				
	Test acc. figure 6a				
a)	Test switch S_1 and S_2 and RCBO in closed position				
	Residual pulsating direct current:				
	steady increase from max. 0,2 $I_{\Delta n}$ to 2 $I_{\Delta n}$ within 30 s	[mA]	[mA]	[mA]	--
	tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA) .....:				N/A

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
b)	The test circuit being successively calibrated at any three values of residual current given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--
	RCBO connected at two-line terminals chosen at random				N/A
		[ms]	[ms]	[ms]	
	maximum break time at: $2I_{\Delta n}$ (value given in table 1) .....:				N/A
	maximum break time at: $4I_{\Delta n}$ (value given in table 1) .....:				N/A
	maximum break time at: $10I_{\Delta n}$ (value given in table 1) ....:				N/A
	maximum break time at: 5A (value given in table 1) .....:				N/A
	maximum break time at: 10A (value given in table 1) .....:				N/A
	maximum break time at: 20A (value given in table 1) .....:				N/A
	maximum break time at: 50A (value given in table 1) .....:				N/A
	maximum break time at: 100A (value given in table 1) ....:				N/A
	maximum break time at: 200A (value given in table 1) ....:				N/A
	maximum break time at: 500A (value given in table 1) ....:				N/A
	No value exceeds the relevant specified limiting value				N/A
9.2.1.6 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from three phases				
	Test acc. figure 6b				
a)	Test switch S1 and S2 and RCBO in closed position				
	Residual pulsating direct current:				
	steady increase from max. 0,2 $I_{\Delta n}$ to 2 $I_{\Delta n}$ within 30 s	[mA]	[mA]	[mA]	--
	tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA) .....:	19,3	19,8	19,4	P
b)	The test circuit being successively calibrated at 2 $I_{\Delta n}$ and any other two chosen values given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--
		[ms]	[ms]	[ms]	--
	maximum break time at: $2I_{\Delta n}$ (value given in table 1) .....:	25	24	27	P
	maximum break time at: $4I_{\Delta n}$ (value given in table 1) .....:	21	21	22	P
	maximum break time at: $10I_{\Delta n}$ (value given in table 1) ....:	16	17	16	P
	maximum break time at: 5A (value given in table 1) .....:	18	17	17	P
	maximum break time at: 10A (value given in table 1) .....:	17	17	16	P
	maximum break time at: 20A (value given in table 1) .....:	18	17	17	P
	maximum break time at: 50A (value given in table 1) .....:	17	17	18	P

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	maximum break time at: 100A (value given in table 1) ....:	17	15	17	P
	maximum break time at: 200A (value given in table 1) ....:	14	15	13	P
	maximum break time at: 500A (value given in table 1) ....:	10	9	11	P
	No value exceeds the relevant specified limiting value				P
9.2.1.7.1 addition acc. IEC 62423	Verification of the correct operation in case of residual smooth direct current without load, test acc. figure 6b				
a)	Verification of the correct operation in case of a steady increase residual smooth direct current:				--
	Test switch S_1 and S_2 and RCBO in closed position				
	steady increase from max. 0,2 $I_{\Delta n}$ to 2 $I_{\Delta n}$ within 30 s	[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA) .....:	30,4	30,4	30,5	P
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				--
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$ .....:	26	27	27	P
	maximum break time at: 4 $I_{\Delta n}$ .....:	22	22	23	P
	maximum break time at: 10 $I_{\Delta n}$ .....:	15	17	17	P
	No value exceeds the relevant specified limiting value				P
9.2.1.7.2 addition acc. IEC 62423	Verification of the correct operation in case of residual smooth direct current with load, test acc. figure 6b				
	Verification of the correct operation in case of a steady increase residual smooth direct current:				--
	test current (A): In, until steady state conditions are reached	63A			P
	cross-sectional area (mm²) .....:	16 mm²			--
	steady increase from max. 0,2 $I_{\Delta n}$ to 2 $I_{\Delta n}$ within 30 s	[mA]	[mA]	[mA]	--
	tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA) .....:	31,2	30,9	30,9	P
9.2.2 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Tests at the temperature limits				
	tests acc. 9.2.1.5 b), 9.2.1.6 b) and 9.2.1.7.1 b) under the following conditions:				
	ambient temperature: -5°C, off load				P
	ambient temperature: +40°C RCBO previously loaded with rated current until steady state conditions are reached				P

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
9.2.1.5 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from two phases				
	Test acc. figure 6a				
	Tests repeated at a temperature of -5°C:				P
b)	The test circuit being successively calibrated at any three values of residual current given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--
	RCBO connected at two-line terminals chosen at random				P
		[ms]	[ms]	[ms]	--
	maximum break time at: $2I_{\Delta n}$ (value given in table 1) .....:	27	27	24	P
	maximum break time at: $4I_{\Delta n}$ (value given in table 1) .....:	19	21	21	P
	maximum break time at: $10I_{\Delta n}$ (value given in table 1) ....:	11	13	12	P
	maximum break time at: 5A (value given in table 1) .....:	27	27	25	P
	maximum break time at: 10A (value given in table 1) .....:	21	19	21	P
	maximum break time at: 20A (value given in table 1) .....:	15	15	17	P
	maximum break time at: 50A (value given in table 1) .....:	17	16	16	P
	maximum break time at: 100A (value given in table 1) ....:	18	14	17	P
	maximum break time at: 200A (value given in table 1) ....:	13	12	12	P
	maximum break time at: 500A (value given in table 1) ....:	10	10	9	P
	No value exceeds the relevant specified limiting value				P
9.2.1.6 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from three phases				
	Test acc. figure 6b				
	Tests repeated at a temperature of -5 °C:				P
b)	The test circuit being successively calibrated at 2 $I_{\Delta n}$ and any other two chosen values given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--
		[ms]	[ms]	[ms]	--
	maximum break time at: $2I_{\Delta n}$ (value given in table 1) .....:	27	24	26	P
	maximum break time at: $4I_{\Delta n}$ (value given in table 1) .....:	21	21	26	P
	maximum break time at: $10I_{\Delta n}$ (value given in table 1) ....:	16	17	17	P
	maximum break time at: 5A (value given in table 1) .....:	14	16	17	P
	maximum break time at: 10A (value given in table 1) .....:	14	13	14	P
	maximum break time at: 20A (value given in table 1) .....:	24	20	20	P
	maximum break time at: 50A (value given in table 1) .....:	16	16	17	P

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	maximum break time at: 100A (value given in table 1) ....:	15	14	14	P
	maximum break time at: 200A (value given in table 1) ....:	14	17	14	P
	maximum break time at: 500A (value given in table 1) ....:	9	10	10	P
	No value exceeds the relevant specified limiting value				P
9.2.1.7.1 addition acc. IEC 62423	Verification of the correct operation in case of residual smooth direct current without load, test acc. figure 6b				
	Tests repeated at a temperature of -5 °C:				P
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				--
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$ .....:	24	27	24	P
	maximum break time at: 4 $I_{\Delta n}$ .....:	17	17	21	P
	maximum break time at: 10 $I_{\Delta n}$ .....:	14	14	15	P
	No value exceeds the relevant specified limiting value				P
9.2.1.5 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from two phases				
	Test acc. figure 6a				
	Tests repeated at a temperature of +40 °C:				P
	test current (A).....: In, until steady state conditions are reached	63A			P
b)	The test circuit being successively calibrated at any three values of residual current given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--
	RCBO connected at two-line terminals chosen at random				P
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$ (value given in table 1).....:	27	27	27	P
	maximum break time at: 4 $I_{\Delta n}$ (value given in table 1).....:	21	22	23	P
	maximum break time at: 10 $I_{\Delta n}$ (value given in table 1)...:	15	16	22	P
	maximum break time at: 5A (value given in table 1) .....:	24	26	27	P
	maximum break time at: 10A (value given in table 1) .....:	19	20	21	P
	maximum break time at: 20A (value given in table 1) .....:	17	18	17	P
	maximum break time at: 50A (value given in table 1) .....:	14	15	17	P
	maximum break time at: 100A (value given in table 1) ....:	15	24	21	P
	maximum break time at: 200A (value given in table 1) ....:	13	15	17	P

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Clause	Requirement + Test	Result - Remark			Verdict
	maximum break time at: 500A (value given in table 1) ....:	11	10	10	P
	No value exceeds the relevant specified limiting value				P
9.2.1.6 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from three phases				
	Test acc. figure 6b				
	Tests repeated at a temperature of +40 °C:				P
	test current (A).....: In, until steady state conditions are reached	63A			P
b)	The test circuit being successively calibrated at 2 $I_{\Delta n}$ and any other two chosen values given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$ (value given in table 1).....:	27	25	24	P
	maximum break time at: 4 $I_{\Delta n}$ (value given in table 1).....:	16	17	14	P
	maximum break time at: 10 $I_{\Delta n}$ (value given in table 1)...:	12	14	12	P
	maximum break time at: 5A (value given in table 1).....:	14	15	14	P
	maximum break time at: 10A (value given in table 1).....:	12	13	12	P
	maximum break time at: 20A (value given in table 1).....:	15	15	16	P
	maximum break time at: 50A (value given in table 1).....:	14	14	14	P
	maximum break time at: 100A (value given in table 1) ....:	14	14	15	P
	maximum break time at: 200A (value given in table 1) ....:	12	13	12	P
	maximum break time at: 500A (value given in table 1) ....:	10	11	9	P
	No value exceeds the relevant specified limiting value				N/A
9.2.1.7.1 addition acc. IEC 62423	Verification of the correct operation in case of residual smooth direct current without load, test acc. figure 6b				
	Tests repeated at a temperature of +40 °C:				P
	test current (A).....: In, until steady state conditions are reached	63A			P
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				--
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$ .....:	24	23	22	P
	maximum break time at: 4 $I_{\Delta n}$ .....:	21	17	17	P
	maximum break time at: 10 $I_{\Delta n}$ .....:	13	15	17	P

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Clause	Requirement + Test	Result - Remark			Verdict
	No value exceeds the relevant specified limiting value				P
9.12.13	Verification of the rated residual making and breaking capacity $I_{\Delta m}$				
	$I_{\Delta m}$ (A) ..... :	3000A			--
	Test circuit according to figure ..... :	Figure 7			--
	Cross-section (mm²)..... :	25mm²			--
	Grid distance a (mm)..... :	45mm			--
	Prospective current (A) ..... :	3000A			--
	Prospective current obtained (A)..... :	3,05x10³A, 256V			--
	Power factor ..... :	0,85~0,90			--
	Power factor obtained ..... :	0,88			--
	Sequence O-t-CO-t-CO	[KA²s]	[KA²s]	[KA²s]	--
	I²t max. ..... :	22,8	23,1	21,5	P
	Phases which do not carry the short circuit current during this test connected to the supply voltage at the line terminals				P
	On each pole in turn excluding the switched neutral pole				P
	RCBOs functionally dependent on the line voltage supplied with rated voltage.				P
	No permanent arcing				P
	No flashover				P
	No blowing of fuse F				P
	No damage, polyethylene sheet shows no holes				P
9.12.13.2	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				
9.7.3	Dielectric strength test of the main circuit:				--
	2 U_N (V) for 1 min ..... :	2U_N = 830V			--
	a)				P
	b)				P
	c)				P
	d)				N/A
	e)				N/A
	No flashover or breakdown				P
	Making and breaking I_N at U_N	63,6A/418V~			P
	RCBO trip with a test current of 1,25 $I_{\Delta N}$	[ms]	[ms]	[ms]	--
	Break time not exceeding the value for $I_{\Delta N}$ in table 2 (ms)..... :	31	34	29	P

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1.				P
	Additional tests for RCBOs functionally depending on line voltage if applicable:				P
9.17	**Verification of the behaviour of RCBOs opening automatically in case of failure of the line voltage**				
9.17.1	Limiting value of the line voltage U_x				
	U_N applied to the line terminals and progressively lowered to attain zero within about 30s until automatic opening occurs	[V]	[V]	[V]	--
	All values less than 0,85 U_N				N/A
	Tripping test:				N/A
	Test voltage (V)..... :	V			--
	Residual current $I_{\Delta N}$ (mA)..... :	$I_{\Delta N}$ = mA			--
	Time corresponding to value for $I_{\Delta N}$ in table 2	[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	Verification of automatic opening in case of failure of the line voltage				
	RCBO 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) RCBOs opening without delay				
	- no value exceeds 0,5 s..... :				N/A
	b) RCBOs opening with delay				
	values within the range indicated by manufacturer:	to ms			N/A
9.17.3	Verification of the correct operation, in presence of a residual current, for RCBOs opening with delay in case of failure of the line voltage				
	RCBO connected according to figure 4 at U_N				N/A
	All phases but one switched off by means of S_3				N/A
9.9.1.2	During the delay: Off-load tests at 20 ± 5°C				
a)	Verification of the correct operation in case of a steady increase of residual current:	[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s Tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$ (only if delay > 30s) .....:	-	-	-	N/A
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed):	[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the specified limiting value..... :	-	-	-	N/A

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	-	-	-	N/A
	- 2 $I_{\Delta N}$.....:	-	-	-	N/A
	- 5 $I_{\Delta N}$ or .....:	-	-	-	N/A
	- 0,25A .....:	-	-	-	N/A
	- $I_{\Delta t}$ _____ A.....:	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A by closing S_2, (S_1 and RCBO in closed position):				N/A
	- ____A (value 1 between 5A and 200A).....:	-	-	-	N/A
	- ____A (value 1 between 5A and 200A).....:	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
	Additional test for type S:				--
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2	-	-	-	N/A
	No tripping during tests				N/A
9.17.4	Verification of the correct operation of RCBOs with 3 or 4 current paths, neutral and one line terminal only being energized in turn				
	RCBO connected according to figure 4				P
9.9.1.2.c)	Maximum break times at: A-N	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	36	36	34	P
	- 2 $I_{\Delta N}$.....:	26	27	28	P
	- 5 $I_{\Delta N}$ or .....:	-	-	-	N/A
	- 0,25A .....:	19	21	20	P
	- $I_{\Delta t}$ 630 A.....:	9	10	9	P

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	No value exceeds the relevant specified limiting value				P
9.9.1.2.c)	Maximum break times at: B-N	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... :	34	34	34	P
	- 2 $I_{\Delta N}$ ..... :	27	26	27	P
	- 5 $I_{\Delta N}$ or ..... :	-	-	-	N/A
	- 0,25A ..... :	18	21	19	P
	- $I_{\Delta t}$ 630 A ..... :	9	9	9	P
	No value exceeds the relevant specified limiting value				P
9.9.1.2.c)	Maximum break times at: C-N	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... :	36	33	33	P
	- 2 $I_{\Delta N}$ ..... :	26	27	27	P
	- 5 $I_{\Delta N}$ or ..... :	-	-	-	N/A
	- 0,25A ..... :	18	21	20	P
	- $I_{\Delta t}$ 630 A ..... :	10	10	9	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
8.11	**Test device**				
	RCBOs provided with a test device				P
	Ampere-turns produced when operating the test device do not exceed 2,5 times the ampere turns produced by $I_{\Delta N}$	Ampere-turns produced by test device: 47,3 milliampere-turns 2,5 times the Ampere-turns produced by $I_{\Delta n}$: 75 milliampere-turns			P
	Not possible to energize the circuit on the load side by operating the test device when the RCBO is in the open position				P

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Clause	Requirement + Test	Result - Remark	Verdict

9.16	**Verification of the operation of the test device at the limits of rated voltage**				
	a) RCBO at 0,85 U_N, test device actuated 25 times at intervals of 5s	340V~, 25 times			P
	b) Test a) repeated at 1,1 U_N	457V~, 25 times			P
	c) Test b) repeated, but only once, the operating means of the test device being held in the closed position for 30s	457V~, 1 time, 30s			P
	RCBO operated at each test				P
	No change impairing further use				P
9.2.4 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** RCBO trip with a test current of 2,5 $I_{\Delta n}$ with smooth direct current	[ms]	[ms]	[ms]	P
		27	25	24	P

	TEST SEQUENCE "D": **3 samples: D63, $I_{\Delta n}$= 0,1A, 1P+N**			**D0-1**							--
	Tests D_0										--
8	REQUIREMENTS FOR CONSTRUCTION AND OPERATION										--
8.5	Operating characteristics										
9.9	Verification of the operating characteristic										
9.9.1	RCBO installed as for normal use, test circuit according to figure 4										P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting										N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.			50/60Hz							P
	Tests performed with no load at 20 ± 5°C			20,8°C							P
9.9.1.4	For RCBOs functionally dependent on line voltage each test is made at:										
	- 1,1 U_N (V) and.....:			264V							P
	- 0,85 U_N (V).....:			195V							P
Table 2	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, 500A **b)**	$I_{\Delta t}$ **c)**		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--

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Clause	Requirement + Test							Result - Remark			Verdict
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--
	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.										--
9.9.1.2	Tests for all RCBOs										P
a)	Verification of the correct operation in case of a steady increase of residual current:							[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$ (mA).....:							70,9-71,2			P
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed):							[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the specified limiting value (ms).....:							27-34			P
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):										
	Maximum break times at:							[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:							34			P
	- 2 $I_{\Delta N}$.....:							24			P
	- 5 $I_{\Delta N}$ or .....:							19			P
	- 0,25 A .....:							-			N/A
	- $I_{\Delta t}$ 630 A .....:							8			P
	No value exceeds the relevant specified limiting value										P
	Additional test for type S:										
	Minimum non-actuating time at:							[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s							-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s							-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s							-	-	-	N/A

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A among the following list: 5A - 10A - 20A - 50A - 100A - 200A by closing S_2, (S_1 and RCBO in closed position):	[ms]	[ms]	[ms]	P
	- 5A	11			P
	- 10A	9			P
	- 20A	9			P
	- 50A	8			P
	- 100A	8			P
	- 200A	7			P
	- 500A	6			P
	No value exceeds the relevant specified limiting value				P
f) 1)	Tests repeated at -5°C:				
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	32			P
	- 2 $I_{\Delta N}$.....:	26			P
	- 5 $I_{\Delta N}$ or .....:	18			P
	- 0,25 A .....:	-			N/A
	- $I_{\Delta t}$ 630 A .....:	9			P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
e)	Tests repeated, with the pole under test and one other pole of the RCBO loaded with rated current, current being established shortly before the test.	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	-no value exceeds the specified limiting value	33			P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_2, (S_1 and RCBO in closed position):				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$..... :	34			P
	- 2 $I_{\Delta N}$..... :	27			P
	- 5 $I_{\Delta N}$ or ..... :	17			P
	- 0,25 A ..... :	-			N/A
	- $I_{\Delta t}$ 630 A ..... :	9			P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
f) 2)	Tests repeated with the RCBO loaded with rated current I_N at +40°C until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--

IEC 62423					
Clause	Requirement + Test		Result - Remark		Verdict
	- $I_{\Delta N}$ ..... :		32		P
	- 2 $I_{\Delta N}$ ..... :		26		P
	- 5 $I_{\Delta N}$ or ..... :		18		P
	- 0,25 A ..... :		-		N/A
	- $I_{\Delta t}$ 630 A ..... :		8		P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:		[ms]	[ms] [ms]	--
	- $I_{\Delta N}$ ..... 0,13 s		-	- -	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s		-	- -	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s		-	- -	N/A
	- $I_{\Delta t}$ ..... 0,04 s		-	- -	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
8.15	**Behaviour of RCBOs in case of earth fault currents comprising a DC component**				
9.9.1.3	Verification of the correct operation at residual currents with DC components				
	Type A residual current devices				
	RCBO installed as for normal use, test circuits according to figures 5 and 6				P
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.		50 and 60Hz		P
	For RCBOs functionally dependent on line voltage each test is made at				
	- 1,1 U_N ..... :		264V		P
	- 0,85 U_N ..... :		195V		P
a)	Verification of the correct operation in case of a continuous rise of the residual pulsating direct current (S_1, S_2 and RCBO closed)				
	Test acc. figure 5				--
	Angle α	Tripping current (A)			--
		Lower limit	Upper limit		--
	0°	0,35 $I_{\Delta N}$	1,4 $I_{\Delta N}$ or 2 $I_{\Delta N}$		--
	90°	0,25 $I_{\Delta N}$	(sub-clause 5.3.8)		--

IEC 62423											
Clause	Requirement + Test						Result - Remark				Verdict
	135°	0,11 $I_{\Delta N}$									--
	Steady increase from zero to:						[mA]	[mA]	[mA]		--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s						$I_{\Delta N}$ = 100mA				P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s						$I_{\Delta N}$ = mA				N/A
	α = 0° +/- .....:						78,9				P
	α = 90° +/- .....:						80,2				P
	α = 135° +/- .....:						95,8				P
	No value exceeds the relevant specified limiting values										P
b)	Verification of the correct operation in case of suddenly appearing residual pulsating direct currents by closing S_2 (S_1 and RCBO in closed position)										
Table 3			Maximum values of break time and non-actuating time (s) for type A RCBOs in the event of half-wave pulsating residual currents (r.m.s. values) equal to								--
	Type	**I_N A**	**$I_{\Delta N}$ A**	**1,4 $I_{\Delta N}$**	**2 $I_{\Delta N}$**	**2,8 $I_{\Delta N}$**	**4 $I_{\Delta N}$**	**7 $I_{\Delta N}$**	**0,35 A**	**0,5 A**	--
	General	Any value	<0,03		0,3		0,15			0,05	--
		Any value	0,03	0,3		0,15			0,04		--
		Any value	>0,03	0,3		0,15		0,04			--
	S	≥ 25	>0,03	0,5		0,2		0,15			--
	a) This value shall be limited to the lower limit of the overcurrent instantaneous tripping ranges according to type B, C or D, as applicable.										--
	Test acc. figure 5										--
	Angle α .....:						α = 0°				--
	RCBOs with $I_{\Delta N}$ < 0,03 A						$I_{\Delta N}$ = mA				N/A
	Maximum break times at:						[ms]	[ms]	[ms]		--
	- 2 $I_{\Delta N}$ +/- .....:						-	-	-		N/A
	- 4 $I_{\Delta N}$ +/- .....:						-	-	-		N/A
	- 0,5 A +/- .....:						-	-	-		N/A
	- 350A or +/- .....:						-	-	-		N/A
	- $I_{\Delta t}$ ___ A +/- .....:						-	-	-		N/A
	RCBOs with $I_{\Delta N}$ = 0,03 A						$I_{\Delta N}$ = ___ A				N/A
	Maximum break times at:						[ms]	[ms]	[ms]		--
	- 1,4 $I_{\Delta N}$ +/- .....:						-	-	-		N/A
	- 2,8 $I_{\Delta N}$ +/- .....:						-	-	-		N/A
	- 0,35 A +/- .....:						-	-	-		N/A
	- 350A or +/- .....:						-	-	-		N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	- $I_{\Delta t}$ 630 A +/- .....:	-	-	-	N/A
	RCBOs with $I_{\Delta N}$ > 0,03 A				N/A
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 1,4 $I_{\Delta N}$ +/- .....:	30	-	-	P
	- 2,8 $I_{\Delta N}$ +/- .....:	26	-	-	P
	- 7 $I_{\Delta N}$ +/- .....:	9	-	-	P
	- 350A or +/- .....:	-	-	-	N/A
	- $I_{\Delta t}$ 630 A +/- .....:	7	-	-	P
	No value exceeds the specified limiting values				P
c)	Verification of the correct operation with the pole under test and one other pole loaded with rated current I_N	I_N = 63A			P
	Test acc. 9.9.1.3 a) repeated, pole under test an one other pole loaded with rated current				--
	Steady increase from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = 100mA			P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	α = 0° +/- .....:	79,4			P
	α = 90° +/- .....:	80,3			P
	α = 135° +/- .....:	92,2			P
	No value exceeds the relevant specified limiting values				P
d)	Verification of the correct operation in case of residual pulsating direct currents with α = 0° superimposed by smooth direct current of 0,006 A				
	Test acc. figure 6				--
	Steady increase of pulsating DC current from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s	$I_{\Delta N}$ = 100mA			P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	(I_1) α = 0° +/- .....: (I_0) 6mA DC +/- .....:	87,5			P
	No value exceeds the relevant specified limiting values				P
9.1.7 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A				
	Test acc. 9.9.1.3 d) but the smooth direct current of 0,006 A replaced by 0,01 A				

IEC 62423						
Clause	Requirement + Test				Result - Remark	Verdict
	Verification of the correct operation in case of residual pulsating d.c. currents with angle α = 0° superimposed by smooth direct current of 0,01 A:					
	Steady increase of pulsating DC current from zero to:				[mA] [mA] [mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s					N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s					N/A
	(I_1) α = 0° +/- .....: (I_0) 10mA DC +/- .....:				- - -	N/A
9.1.2 addition acc. IEC 62423	Verification of the correct operation in case of steady increase of composite residual current					
	starting composite residual current:					
	Different frequency component values of test currents for calibration (RMS)			Composite starting current value (RMS)		
	$I_{at\ rated\ frequency}$	I_{1kHz}	$I_{F\ motor\ (10Hz)}$	I_{Δ}		
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$		
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA] [mA] [mA]	--
	tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$.....:				94-97	P
9.1.3 addition acc. IEC 62423	Verification of the correct operation in case of sudden appearance of composite residual current					
	composite residual current acc. 9.1.2					P
	S1 and RCBO in the closed position, residual current suddenly established by closing S2				[ms] [ms] [ms]	--
	RCBO trip with a test current of 7 $I_{\Delta n}$.....:				24	P
	max. break time:					
	- general type RCBOs: 40ms					P
	- S type RCBOs: 150ms					N/A
	Additional test for type S:					--
	- minimum non-actuating time at: 7 $I_{\Delta n}$; 0,05 s .....:					--
	No tripping during tests				- - -	N/A
9.2.1.7.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the correct operation in case of residual smooth direct current without load for ratings of $I_{\Delta n}$ not tested in D_1, test acc. figure 6b					
a)	Verification of the correct operation in case of a steady increase residual smooth direct current:					
	Test switch S_1 and S_2 and RCBO in closed position					P

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	- Steady increase from 0,2 $I_{\Delta N}$ to 2 $I_{\Delta N}$ within 30s	[mA]	[mA]	[mA]	--
	Tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA)..... :	97			P
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 2 $I_{\Delta N}$..... :	27			P
	- 4 $I_{\Delta N}$..... :	25			P
	- 10 $I_{\Delta N}$..... :	14			P
	No value exceeds the relevant specified limiting value				P

	TEST SEQUENCE "D": **3 samples: D63, $I_{\Delta n}$= 0,3A, 1P+N**			**D0-2**							--
	Tests D_0										--
8	REQUIREMENTS FOR CONSTRUCTION AND OPERATION										--
8.5	Operating characteristics										
9.9	Verification of the operating characteristic										
9.9.1	RCBO installed as for normal use, test circuit according to figure 4										P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting										N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.			50/60Hz							P
	Tests performed with no load at 20 ± 5°C			20,8°C							P
9.9.1.4	For RCBOs functionally dependent on line voltage each test is made at:										
	- 1,1 U_N (V) and..... :			264V							P
	- 0,85 U_N (V)..... :			195V							P
Table 2	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, 500A **b)**	$I_{\Delta t}$ **c)**		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--

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Clause	Requirement + Test							Result - Remark			Verdict
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--
	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.										--
9.9.1.2	Tests for all RCBOs										P
a)	Verification of the correct operation in case of a steady increase of residual current:							[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$ (mA).....:							211-215			P
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed):							[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the specified limiting value (ms).....:							27-35			P
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):										
	Maximum break times at:							[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:							35			P
	- 2 $I_{\Delta N}$.....:							28			P
	- 5 $I_{\Delta N}$ or .....:							18			P
	- 0,25 A .....:							-			N/A
	- $I_{\Delta t}$ 630 A .....:							8			P
	No value exceeds the relevant specified limiting value										P
	Additional test for type S:										
	Minimum non-actuating time at:							[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s							-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s							-	-	-	N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A among the following list: 5A - 10A - 20A - 50A - 100A - 200A by closing S_2, (S_1 and RCBO in closed position):	[ms]	[ms]	[ms]	P
	- 5A	11			P
	- 10A	9			P
	- 20A	7			P
	- 50A	8			P
	- 100A	8			P
	- 200A	7			P
	- 500A	7			P
	No value exceeds the relevant specified limiting value				P
f) 1)	Tests repeated at -5°C:				
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	34			P
	- 2 $I_{\Delta N}$.....:	27			P
	- 5 $I_{\Delta N}$ or .....:	18			P
	- 0,25 A .....:	-			N/A
	- $I_{\Delta t}$ 630 A .....:	8			P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
e)	Tests repeated, with the pole under test and one other pole of the RCBO loaded with rated current, current being established shortly before the test.	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	-no value exceeds the specified limiting value	32			P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_2, (S_1 and RCBO in closed position):				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$..... :	32			P
	- 2 $I_{\Delta N}$..... :	26			P
	- 5 $I_{\Delta N}$ or ..... :	17			P
	- 0,25 A ..... :	-			N/A
	- $I_{\Delta t}$ 630 A ..... :	9			P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
f) 2)	Tests repeated with the RCBO loaded with rated current I_N at +40°C until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--

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Clause	Requirement + Test		Result - Remark		Verdict
	- $I_{\Delta N}$ ..... :		33		P
	- 2 $I_{\Delta N}$ ..... :		26		P
	- 5 $I_{\Delta N}$ or ..... :		19		P
	- 0,25 A ..... :		-		N/A
	- $I_{\Delta t}$ 630 A ..... :		8		P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:		[ms]	[ms] [ms]	--
	- $I_{\Delta N}$ ..... 0,13 s		-	- -	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s		-	- -	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s		-	- -	N/A
	- $I_{\Delta t}$ ..... 0,04 s		-	- -	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
8.15	**Behaviour of RCBOs in case of earth fault currents comprising a DC component**				
9.9.1.3	Verification of the correct operation at residual currents with DC components				
	Type A residual current devices				
	RCBO installed as for normal use, test circuits according to figures 5 and 6				P
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.		50 and 60Hz		P
	For RCBOs functionally dependent on line voltage each test is made at				
	- 1,1 U_N ..... :		264V		P
	- 0,85 U_N ..... :		195V		P
a)	Verification of the correct operation in case of a continuous rise of the residual pulsating direct current (S_1, S_2 and RCBO closed)				
	Test acc. figure 5				--
	Angle α	Tripping current (A)			--
		Lower limit	Upper limit		--
	0°	0,35 $I_{\Delta N}$	1,4 $I_{\Delta N}$ or 2 $I_{\Delta N}$		--
	90°	0,25 $I_{\Delta N}$	(sub-clause 5.3.8)		--

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Clause	Requirement + Test						Result - Remark				Verdict
	135°	0,11 $I_{\Delta N}$									--
	Steady increase from zero to:						[mA]	[mA]	[mA]		--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s						$I_{\Delta N}$ = 300mA				P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s						$I_{\Delta N}$ = mA				N/A
	α = 0° +/- .....:						237				P
	α = 90° +/- .....:						239				P
	α = 135° +/- .....:						276				P
	No value exceeds the relevant specified limiting values										P
b)	Verification of the correct operation in case of suddenly appearing residual pulsating direct currents by closing S_2 (S_1 and RCBO in closed position)										
Table 3			Maximum values of break time and non-actuating time (s) for type A RCBOs in the event of half-wave pulsating residual currents (r.m.s. values) equal to								--
	Type	**I_N A**	**$I_{\Delta N}$ A**	**1,4 $I_{\Delta N}$**	**2 $I_{\Delta N}$**	**2,8 $I_{\Delta N}$**	**4 $I_{\Delta N}$**	**7 $I_{\Delta N}$**	**0,35 A**	**0,5 A**	--
	General	Any value	<0,03		0,3		0,15			0,05	--
		Any value	0,03	0,3		0,15			0,04		--
		Any value	>0,03	0,3		0,15		0,04			--
	S	≥ 25	>0,03	0,5		0,2		0,15			--
	a) This value shall be limited to the lower limit of the overcurrent instantaneous tripping ranges according to type B, C or D, as applicable.										--
	Test acc. figure 5										--
	Angle α .....:						α = 0°				--
	RCBOs with $I_{\Delta N}$ < 0,03 A						$I_{\Delta N}$ = mA				N/A
	Maximum break times at:						[ms]	[ms]	[ms]		--
	- 2 $I_{\Delta N}$ +/- .....:						-	-	-		N/A
	- 4 $I_{\Delta N}$ +/- .....:						-	-	-		N/A
	- 0,5 A +/- .....:						-	-	-		N/A
	- 350A or +/- .....:						-	-	-		N/A
	- $I_{\Delta t}$ ___ A +/- .....:						-	-	-		N/A
	RCBOs with $I_{\Delta N}$ = 0,03 A						$I_{\Delta N}$ = ___ A				N/A
	Maximum break times at:						[ms]	[ms]	[ms]		--
	- 1,4 $I_{\Delta N}$ +/- .....:						-	-	-		N/A
	- 2,8 $I_{\Delta N}$ +/- .....:						-	-	-		N/A
	- 0,35 A +/- .....:						-	-	-		N/A
	- 350A or +/- .....:						-	-	-		N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	- $I_{\Delta t}$ 630 A +/- .....:	-	-	-	N/A
	RCBOs with $I_{\Delta N}$ > 0,03 A				N/A
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 1,4 $I_{\Delta N}$ +/- .....:	32	-	-	P
	- 2,8 $I_{\Delta N}$ +/- .....:	25	-	-	P
	- 7 $I_{\Delta N}$ +/- .....:	9	-	-	P
	- 350A or +/- .....:	-	-	-	N/A
	- $I_{\Delta t}$ 630 A +/- .....:	7	-	-	P
	No value exceeds the specified limiting values				P
c)	Verification of the correct operation with the pole under test and one other pole loaded with rated current I_N	I_N = 63A			P
	Test acc. 9.9.1.3 a) repeated, pole under test an one other pole loaded with rated current				--
	Steady increase from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = 300mA			P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	α = 0° +/- .....:	237			P
	α = 90° +/- .....:	238			P
	α = 135° +/- .....:	281			P
	No value exceeds the relevant specified limiting values				P
d)	Verification of the correct operation in case of residual pulsating direct currents with α = 0° superimposed by smooth direct current of 0,006 A				
	Test acc. figure 6				--
	Steady increase of pulsating DC current from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s	$I_{\Delta N}$ = 300mA			P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	(I_1) α = 0° +/- .....: (I_0) 6mA DC +/- .....:	249			P
	No value exceeds the relevant specified limiting values				P
9.1.7 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A				
	Test acc. 9.9.1.3 d) but the smooth direct current of 0,006 A replaced by 0,01 A				

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Clause	Requirement + Test				Result - Remark	Verdict
	Verification of the correct operation in case of residual pulsating d.c. currents with angle α = 0° superimposed by smooth direct current of 0,01 A:					
	Steady increase of pulsating DC current from zero to:				[mA] [mA] [mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s					N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s					N/A
	(I_1) α = 0° +/- .....: (I_0) 10mA DC +/- .....:				- - -	N/A
9.1.2 addition acc. IEC 62423	Verification of the correct operation in case of steady increase of composite residual current					
	starting composite residual current:					
	Different frequency component values of test currents for calibration (RMS)			Composite starting current value (RMS)		
	$I_{at\ rated\ frequency}$	I_{1kHz}	$I_{F\ motor\ (10Hz)}$	I_{Δ}		
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$		
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA] [mA] [mA]	--
	tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$.....:				275-289	P
9.1.3 addition acc. IEC 62423	Verification of the correct operation in case of sudden appearance of composite residual current					
	composite residual current acc. 9.1.2					P
	S1 and RCBO in the closed position, residual current suddenly established by closing S2				[ms] [ms] [ms]	--
	RCBO trip with a test current of 7 $I_{\Delta n}$.....:				21	P
	max. break time:					
	- general type RCBOs: 40ms					P
	- S type RCBOs: 150ms					N/A
	Additional test for type S:					--
	- minimum non-actuating time at: 7 $I_{\Delta n}$; 0,05 s .....:					--
	No tripping during tests				- - -	N/A
9.2.1.7.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the correct operation in case of residual smooth direct current without load for ratings of $I_{\Delta n}$ not tested in D_1, test acc. figure 6b					
a)	Verification of the correct operation in case of a steady increase residual smooth direct current:					
	Test switch S_1 and S_2 and RCBO in closed position					P

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	- Steady increase from 0,2 $I_{\Delta N}$ to 2 $I_{\Delta N}$ within 30s	[mA]	[mA]	[mA]	--
	Tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA)..... :	296			P
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 2 $I_{\Delta N}$..... :	27			P
	- 4 $I_{\Delta N}$..... :	17			P
	- 10 $I_{\Delta N}$..... :	12			P
	No value exceeds the relevant specified limiting value				P

	TEST SEQUENCE "D": **3 samples: D63, $I_{\Delta n}$= 0,03A, 1P+N**	**D7 D8 D9**	--
	Tests D_0		--
8	REQUIREMENTS FOR CONSTRUCTION AND OPERATION		--
8.5	Operating characteristics		
9.9	Verification of the operating characteristic		
9.9.1	RCBO installed as for normal use, test circuit according to figure 4		P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting		N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.	50/60Hz	P
	Tests performed with no load at 20 ± 5°C	20,1°C	P
9.9.1.4	For RCBOs functionally dependent on line voltage each test is made at:		
	- 1,1 U_N (V) and..... :	264V	P
	- 0,85 U_N (V)..... :	195V	P

Table 2	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, 500A **b)**	$I_{\Delta i}$ **c)**		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--

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Clause	Requirement + Test							Result - Remark			Verdict
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--
	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.										--
9.9.1.2	Tests for all RCBOs										P
a)	Verification of the correct operation in case of a steady increase of residual current:							[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$ (mA).....:							21,1-22,1	21,1-22,1	21,3-22,1	P
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed):							[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the specified limiting value (ms).....:							32-34	32-34	33-34	P
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):										
	Maximum break times at:							[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:							33	34	33	P
	- 2 $I_{\Delta N}$.....:							25	23	23	P
	- 5 $I_{\Delta N}$ or .....:							-	-	-	N/A
	- 0,25 A .....:							18	18	18	P
	- $I_{\Delta t}$ 630 A .....:							9	9	9	P
	No value exceeds the relevant specified limiting value										P
	Additional test for type S:										
	Minimum non-actuating time at:							[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s							-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s							-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s							-	-	-	N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A among the following list: 5A - 10A - 20A - 50A - 100A - 200A by closing S_2, (S_1 and RCBO in closed position):	[ms]	[ms]	[ms]	P
	- 5A	19	19	19	P
	- 10A	17	18	18	P
	- 20A	17	17	17	P
	- 50A	14	14	14	P
	- 100A	12	12	12	P
	- 200A	10	11	11	P
	- 500A	8	9	9	P
	No value exceeds the relevant specified limiting value				P
f) 1)	Tests repeated at -25°C:				
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	33	34	34	P
	- 2 $I_{\Delta N}$.....:	24	23	24	P
	- 5 $I_{\Delta N}$ or .....:	-	-	-	N/A
	- 0,25 A .....:	19	19	18	P
	- $I_{\Delta t}$ 630 A .....:	9	10	9	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
e)	Tests repeated, with the pole under test and one other pole of the RCBO loaded with rated current, current being established shortly before the test.	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	-no value exceeds the specified limiting value	34	34	34	P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_2, (S_1 and RCBO in closed position):				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$..... :	34	34	34	P
	- 2 $I_{\Delta N}$..... :	23	27	24	P
	- 5 $I_{\Delta N}$ or ..... :	-	-	-	N/A
	- 0,25 A ..... :	18	19	19	P
	- $I_{\Delta t}$ 630 A ..... :	9	9	9	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
f) 2)	Tests repeated with the RCBO loaded with rated current I_N at +55°C until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--

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Clause	Requirement + Test		Result - Remark		Verdict
	- $I_{\Delta N}$ ..... :		34	34	34	P
	- 2 $I_{\Delta N}$ ..... :		25	23	23	P
	- 5 $I_{\Delta N}$ or ..... :		-	-	-	N/A
	- 0,25 A ..... :		18	19	19	P
	- $I_{\Delta t}$ 630 A ..... :		9	10	10	P
	No value exceeds the relevant specified limiting value					P
	Additional test for type S:					
	Minimum non-actuating time at:		[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s		-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s		-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s		-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s		-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2					N/A
	No tripping during tests					N/A
8.15	**Behaviour of RCBOs in case of earth fault currents comprising a DC component**					
9.9.1.3	Verification of the correct operation at residual currents with DC components					
	Type A residual current devices					
	RCBO installed as for normal use, test circuits according to figures 5 and 6					P
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.		50 and 60Hz			P
	For RCBOs functionally dependent on line voltage each test is made at					
	- 1,1 U_N ..... :		264V			P
	- 0,85 U_N ..... :		195V			P
a)	Verification of the correct operation in case of a continuous rise of the residual pulsating direct current (S_1, S_2 and RCBO closed)					
	Test acc. figure 5					--
	Angle α	Tripping current (A)				--
		Lower limit	Upper limit			--
	0°	0,35 $I_{\Delta N}$	1,4 $I_{\Delta N}$ or 2 $I_{\Delta N}$			--
	90°	0,25 $I_{\Delta N}$	(sub-clause 5.3.8)			--

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Clause	Requirement + Test						Result - Remark				Verdict
	135°	0,11 $I_{\Delta N}$									--
	Steady increase from zero to:						[mA]	[mA]	[mA]		--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s						$I_{\Delta N}$ = 30mA				P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s						$I_{\Delta N}$ = mA				N/A
	α = 0° +/- .....:						18,5	18,7	18,6		P
	α = 90° +/- .....:						21,8	21,8	22,1		P
	α = 135° +/- .....:						30,9	30,5	30,5		P
	No value exceeds the relevant specified limiting values										P
b)	Verification of the correct operation in case of suddenly appearing residual pulsating direct currents by closing S_2 (S_1 and RCBO in closed position)										
Table 3			Maximum values of break time and non-actuating time (s) for type A RCBOs in the event of half-wave pulsating residual currents (r.m.s. values) equal to								--
	Type	**I_N A**	**$I_{\Delta N}$ A**	**1,4 $I_{\Delta N}$**	**2 $I_{\Delta N}$**	**2,8 $I_{\Delta N}$**	**4 $I_{\Delta N}$**	**7 $I_{\Delta N}$**	**0,35 A**	**0,5 A**	--
	General	Any value	<0,03		0,3		0,15			0,05	--
		Any value	0,03	0,3		0,15			0,04		--
		Any value	>0,03	0,3		0,15		0,04			--
	S	≥ 25	>0,03	0,5		0,2		0,15			--
	a) This value shall be limited to the lower limit of the overcurrent instantaneous tripping ranges according to type B, C or D, as applicable.										--
	Test acc. figure 5										--
	Angle α .....:						α = 0°				--
	RCBOs with $I_{\Delta N}$ < 0,03 A						$I_{\Delta N}$ = mA				N/A
	Maximum break times at:						[ms]	[ms]	[ms]		--
	- 2 $I_{\Delta N}$ +/- .....:						-	-	-		N/A
	- 4 $I_{\Delta N}$ +/- .....:						-	-	-		N/A
	- 0,5 A +/- .....:						-	-	-		N/A
	- 350A or +/- .....:						-	-	-		N/A
	- $I_{\Delta t}$ ___ A +/- .....:						-	-	-		N/A
	RCBOs with $I_{\Delta N}$ = 0,03 A						$I_{\Delta N}$ = 0,03 A				P
	Maximum break times at:						[ms]	[ms]	[ms]		--
	- 1,4 $I_{\Delta N}$ +/- .....:						33	32	32		P
	- 2,8 $I_{\Delta N}$ +/- .....:						29	28	28		P
	- 0,35 A +/- .....:						14	14	13		P
	- 350A or +/- .....:						-	-	-		N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	- $I_{\Delta t}$ 630 A +/- .....:	9	9	9	P
	RCBOs with $I_{\Delta N}$ > 0,03 A				N/A
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 1,4 $I_{\Delta N}$ +/- .....:	-	-	-	N/A
	- 2,8 $I_{\Delta N}$ +/- .....:	-	-	-	N/A
	- 7 $I_{\Delta N}$ +/- .....:	-	-	-	N/A
	- 350A or +/- .....:	-	-	-	N/A
	- $I_{\Delta t}$ ___ A +/- .....:	-	-	-	N/A
	No value exceeds the specified limiting values				P
c)	Verification of the correct operation with the pole under test and one other pole loaded with rated current I_N	I_N = 63A			P
	Test acc. 9.9.1.3 a) repeated, pole under test an one other pole loaded with rated current				--
	Steady increase from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = 30mA			P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	α = 0° +/- .....:	18,5	18,5	18,6	P
	α = 90° +/- .....:	21,6	21,6	21,4	P
	α = 135° +/- .....:	30,5	30,6	31,3	P
	No value exceeds the relevant specified limiting values				P
d)	Verification of the correct operation in case of residual pulsating direct currents with α = 0° superimposed by smooth direct current of 0,006 A				
	Test acc. figure 6				--
	Steady increase of pulsating DC current from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s	$I_{\Delta N}$ = 30mA			P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	(I_1) α = 0° +/- .....: (I_0) 6mA DC +/- .....:	14,8	14,5	14,7	P
	No value exceeds the relevant specified limiting values				P
9.1.7 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A				
	Test acc. 9.9.1.3 d) but the smooth direct current of 0,006 A replaced by 0,01 A				

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Clause	Requirement + Test				Result - Remark	Verdict
	Verification of the correct operation in case of residual pulsating d.c. currents with angle α = 0° superimposed by smooth direct current of 0,01 A:					
	Steady increase of pulsating DC current from zero to:				[mA] [mA] [mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s					N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s					N/A
	(I_1) α = 0° +/- .....: (I_0) 10mA DC +/- .....:				- - -	N/A
9.1.2 addition acc. IEC 62423	Verification of the correct operation in case of steady increase of composite residual current					
	starting composite residual current:					
	Different frequency component values of test currents for calibration (RMS)			Composite starting current value (RMS)		
	$I_{at\ rated\ frequency}$	I_{1kHz}	$I_{F\ motor\ (10Hz)}$	I_{Δ}		
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$		
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA] [mA] [mA]	--
	tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$.....:				36,8-38,5 38,1-38,5 36,3-37,9	P
9.1.3 addition acc. IEC 62423	Verification of the correct operation in case of sudden appearance of composite residual current					
	composite residual current acc. 9.1.2					P
	S1 and RCBO in the closed position, residual current suddenly established by closing S2				[mA] [mA] [mA]	--
	RCBO trip with a test current of 7 $I_{\Delta n}$.....:				22 25 23	P
	max. break time:					
	- general type RCBOs: 40ms					P
	- S type RCBOs: 150ms					N/A
	Additional test for type S:					--
	- minimum non-actuating time at: 7 $I_{\Delta n}$; 0,05 s .....:					--
	No tripping during tests				- - -	N/A
9.2.1.7.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the correct operation in case of residual smooth direct current without load for ratings of $I_{\Delta n}$ not tested in D_1, test acc. figure 6b					
a)	Verification of the correct operation in case of a steady increase residual smooth direct current:					
	Test switch S_1 and S_2 and RCBO in closed position					P

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	- Steady increase from 0,2 $I_{\Delta N}$ to 2 $I_{\Delta N}$ within 30s	[mA]	[mA]	[mA]	--
	Tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA)..... :	26,0	26,3	26,2	P
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 2 $I_{\Delta N}$..... :	29	29	29	P
	- 4 $I_{\Delta N}$..... :	23	23	23	P
	- 10 $I_{\Delta N}$..... :	19	19	19	P
	No value exceeds the relevant specified limiting value				P

	Tests D_1				--
8	**REQUIREMENTS FOR CONSTRUCTION AND OPERATION**				--
8.12	**RCBOs functionally dependent on line voltage**				
	RCBOs functionally dependent on the line voltage operate correctly between 0,85 and 1,1 UN				
9.17	**Verification of the behaviour of RCBOs opening automatically in case of failure of the line voltage**				
9.17.1	Limiting value of the line voltage U_x				
	U_N applied to the line terminals and progressively lowered to attain zero within about 30s until automatic opening occurs	[V]	[V]	[V]	--
	All values less than 0,85 U_N ..... :	-	-	-	N/A
	Tripping test:				
	Test voltage (V)..... :	V			--
	Residual current $I_{\Delta N}$..... :	$I_{\Delta N}$ =A			--
	Time corresponding to value for $I_{\Delta N}$ in table 2	[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	Verification of automatic opening in case of failure of the line voltage				
	RCBO 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)	RCBOs opening without delay				N/A

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	no value exceeds 0,5 s ..... :	-	-	-	N/A
b)	RCBOs opening with delay				N/A
	Values within the range indicated by manufacturer	to ms			N/A
9.17.3	Verification of the correct operation, in presence of a residual current, for RCBOs opening with delay in case of failure of the line voltage				
	RCBO connected according to figure 4 at U_N				N/A
	All phases but one switched off by means of S_3				N/A
9.9.1.2	During the delay: Off-load tests at 20 ± 5°C				--
a)	Verification of the correct operation in case of a steady increase of residual current:	[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s Tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$ (only if delay > 30s) ..... :	-	-	-	N/A
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the specified limiting value ..... :	-	-	-	N/A
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				N/A
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... :	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... :	-	-	-	N/A
	- 5 $I_{\Delta N}$ or ..... :	-	-	-	N/A
	- 0,25 A ..... :	-	-	-	N/A
	- $I_{\Delta t}$ _____ A ..... :	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A by closing S_2, (S_1 and RCBO in closed position):				
	- ____A (value 1 between 5A and 200A)..... :	-	-	-	N/A
	- ____A (value 1 between 5A and 200A)..... :	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
	Additional test for type S:				--
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.17.4	Verification of the correct operation of RCBOs with 3 or 4 current paths, neutral and one line terminal only being energized in turn				
	RCBO connected according to figure 4				N/A
9.9.1.2.c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				N/A
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$..... :	-	-	-	N/A
	- 2 $I_{\Delta N}$..... :	-	-	-	N/A
	- 5 $I_{\Delta N}$ or ..... :	-	-	-	N/A
	- 0,25 A ..... :	-	-	-	N/A
	- $I_{\Delta t}$ _____ A..... :	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
	Additional test for type S:				--
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
8.14	**Behaviour of RCBOs in case of current surges caused by impulse voltages**				
9.19.1	Current surge test for all RCBOs (0,5µs/100kHz ring wave test)				
	One pole of the RCBO submitted to 10 surge current applications, polarity inverted after every two applications				P
	Peak value..... :	200A +10/-0% or ~~(25A +10/-0% for $I_{\Delta N} \leq 10mA$)~~			--
	Virtual front time ..... :	0,5µs ± 30%			--

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	Period of following oscillatory wave ..... :	10µs ± 20%			--
	Each successive reverse peak..... :	60% of preceding peak			--
	No tripping during tests				P
		[ms]	[ms]	[ms]	--
	After the test the RCBO trip with a test current of $I_{\Delta N}$ (ms) ..... :	34	34	33	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1				P
	No value exceeds the relevant specified limiting value				P
9.19.2 9.1.5 addition acc. IEC 62423	Verification of behaviour at surge currents up to 3000A (8/20µs surge current test)				
	One pole of the RCBO chosen at random, submitted to 10 surge current applications, polarity inverted after every two applications				P
	Peak value..... :	3000A +10/-0%			--
	Virtual front time ..... :	0,8µs ± 20%			--
	Virtual time of half value ..... :	20µs ± 20%			--
	Peak of reverse current ..... :	less than 30 % of peak value			--
	No tripping during tests				P
		[ms]	[ms]	[ms]	--
	After the test the RCBO trip with a test current of $I_{\Delta N}$ (ms) ..... :	34	34	34	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1				P
	No value exceeds the relevant specified limiting value				P
9.1.6 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of behaviour in the case of inrush residual currents				
	Test acc. figure 2				N/A
	all switches and RCBO in closed position				N/A
	pulse with a peak current of 10 $I_{\Delta n}$ (mA)..... :				N/A
	Pulse on one pole chosen at random				N/A
	Six measurements: 3 times positive, 3 times negative				N/A
	Polarity changed after each test				N/A
	No tripping during test				N/A

IEC 62423						
Clause	Requirement + Test				Result - Remark	Verdict
9.1.4 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of the correct operation for four-pole Type F RCCDs powered on two poles only					
	Tests performed with a four-pole RCBO acc. 9.1.2, but only supplied between neutral terminal and one-phase terminal chosen at random without load					N/A
9.1.2 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of the correct operation in case of steady increase of composite residual current					
	starting composite residual current:					N/A
	Different frequency component values of test currents for calibration (RMS)			Composite starting current value (RMS)		N/A
	$I_{at\ rated\ frequency}$	I_{1kHz}	N/A	I_{Δ}		N/A
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$		N/A
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA] [mA] [mA]	--
	tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$.....:				- - -	N/A
9.2.3 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Correct operation for RCBOs powered on two poles					
	tests acc. 9.2.1.2 and 9.2.1.7.1					N/A
	RCBO only supplied between neutral terminal and one-phase terminal chosen at random for four-pole devices or					N/A
	RCBO only supplied between 2-phase terminals chosen at random for 3-pole devices					N/A
	Tests at rated frequency and without load					N/A
9.2.1.2 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the correct operation in case of residual sinusoidal alternating currents up to 1000 Hz					
a)	Test switch S_1 and S_2 and RCBO in closed position					N/A
	Test at 150Hz:					
	steady increase from max. 0,2 $I_{\Delta n}$ to 2,4 $I_{\Delta n}$ within 30s				[mA] [mA] [mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 2,4 $I_{\Delta n}$ (mA)					N/A
	Test at 400Hz:					
	steady increase from max. 0,2 $I_{\Delta n}$ to 6 $I_{\Delta n}$ within 30s				[mA] [mA] [mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 2,4 $I_{\Delta n}$ (mA)					N/A
	Test at 1000Hz:					
	steady increase from max. 0,2 $I_{\Delta n}$ to 14 $I_{\Delta n}$ within 30s				[mA] [mA] [mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 14 $I_{\Delta n}$ (mA)					N/A

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Clause	Requirement + Test	Result - Remark			Verdict
b)	S1 and RCBO in the closed position, residual current correspond to 1000Hz suddenly established by closing S2				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 14 $I_{\Delta N}$..... :				N/A
	max. break time:				
	- general type RCBOs: 0,3s				N/A
	- S type RCBOs: 0,5s				N/A
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- 14 $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
9.2.1.7.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the correct operation in case of residual smooth direct current without load for ratings of $I_{\Delta n}$ not tested in D_1, test acc. figure 6b				
a)	Verification of the correct operation in case of a steady increase residual smooth direct current:				
	Test switch S_1 and S_2 and RCBO in closed position				
	- Steady increase from 0,2 $I_{\Delta N}$ to 2 $I_{\Delta N}$ within 30s Tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$	[mA]	[mA]	[mA]	--
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				N/A
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 2 $I_{\Delta N}$..... :				N/A
	- 4 $I_{\Delta N}$..... :				N/A
	- 10 $I_{\Delta N}$..... :				N/A
	No value exceeds the relevant specified limiting value				N/A
9.2.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the operating characteristics at the reference temperature (20±5)°C				

IEC 62423, Table 1 -Type B RCBOs- Standard values of break time and non-actuating time for residual direct currents which result from rectifying circuits and for residual smooth direct current

	Type	I_N A	$I_{\Delta N}$ A	Standard values of break time and non-actuating at a residual current equal to					
				2 $I_{\Delta N}$	4 $I_{\Delta N}$	10 $I_{\Delta N}$	5A,10A,20A,50,100A,200A**a)**		
	General	Any value	General	0,3	0,15	0,04	0,04	Max. break times	
	S	≥ 25	>0,03	0,5	0,2	0,15	0,15	Max. break times	

IEC 62423										
Clause	Requirement + Test						Result - Remark			Verdict
				0,13	0,06	0,05	0,04	Min. non-actuating times		
	For Type B RCBOs any value exceeding the lower limit of the overcurrent instantaneous tripping range are not tested									
	a) Tests only made during verification of the correct operation as mentioned in 9.2.1.5 b) acc. figure 6a and 9.2.1.6 b) acc. figure 6b									
9.2.1.1 addition acc. IEC 62423	General									
	Each test is made at 1,1 and 0,85 times the rated line voltage; voltage (V) .....:						264V/195V			
	Tests a rated frequency									
	For multiple settings of I∆n tests are made for each setting									
9.2.1.2 addition acc. IEC 62423	Verification of the correct operation in case of residual sinusoidal alternating currents up to 1000 Hz									
a)	Test switch S_1 and S_2 and RCBO in closed position									
	Test at 150Hz:									
	steady increase from max. 0,2 $I_{\Delta n}$ to 2,4 $I_{\Delta n}$ within 30s						[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 2,4 $I_{\Delta n}$ (mA)..:						30,3	30,6	30,5	P
	Test at 400Hz:									
	steady increase from max. 0,2 $I_{\Delta n}$ to 6 $I_{\Delta n}$ within 30s						[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 2,4 $I_{\Delta n}$ (mA)..:						55,7	55,3	55,3	P
	Test at 1000Hz:									
	steady increase from max. 0,2 $I_{\Delta n}$ to 14 $I_{\Delta n}$ within 30s						[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 14 $I_{\Delta n}$ (mA)...:						135	135	135	P
b)	S1 and RCBO in the closed position, residual current correspond to 1000Hz suddenly established by closing S2									
	Maximum break times at:						[ms]	[ms]	[ms]	--
	- 14 $I_{\Delta N}$.....:						23	22	22	P
	max. break time:									
	- general type RCBOs: 0,3s									P
	- S type RCBOs: 0,5s									N/A
	Additional test for type S:									
	Minimum non-actuating time at:									--
	- 14 $I_{\Delta N}$ ..... 0,13 s						-	-	-	N/A
9.2.1.3 addition acc. IEC 62423	Verification of the correct operation in the case of a residual alternating current superimposed on a residual smooth direct current									
	Test acc. figure 4									
	Test switch S_1 and S_2 and RCBO in closed position									

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	Residual smooth direct current applied through one pole chosen at random and adjusted to				
	- 0,4 $I_{\Delta n}$ or				P
	- 10 mA				N/A
	whichever is the higher value				
	Residual alternating current at rated frequency applied to another pole and:				
	steady increase from max. 0,2 $I_{\Delta n}$ to $I_{\Delta n}$ within 30 s	[mA]	[mA]	[mA]	--
	alternating tripping current ≤ $I_{\Delta n}$ (mA)..... :	15,3	15,0	15,1	P
	Test made twice at each position I and II of S_3				P
9.2.1.4 addition acc. IEC 62423	Verification of the correct operation in the case of a residual pulsating direct current superimposed on a residual smooth direct current				
	Test acc. figure 5				
	Test switch S_1 and S_2 and RCBO in closed position				
	Residual smooth direct current applied through one pole chosen at random and adjusted to				
	- 0,4 $I_{\Delta n}$ or				P
	- 10 mA				N/A
	whichever is the higher value				
	Residual pulsating direct current applied to another pole with a current delay angle of 0° and:				
	steady increase from max. 0,2 $I_{\Delta n}$ to 1,4 $I_{\Delta n}$ within 30 s (mA) for RCBOs with $I_{\Delta n}$>0,01 A				P
	steady increase from max. 0,2 $I_{\Delta n}$ to 2 $I_{\Delta n}$ within 30 s (mA) for RCBOs with $I_{\Delta n}$≤0,01 A				N/A
	RCBO tested twice at each position I and II of S_3 and S_4				P
		[mA]	[mA]	[mA]	--
	residual pulsating tripping current ≤ 1,4 $I_{\Delta n}$ (mA) for RCBOs with $I_{\Delta n}$>0,01 A (mA).....:	21,7-23,6	21,8-23,1	21,6-23,5	P
		[mA]	[mA]	[mA]	--
	residual pulsating tripping current ≤ 2 $I_{\Delta n}$ (mA) for RCBOs with $I_{\Delta n}$≤0,01 A (mA).....:	-	-	-	N/A
9.2.1.5 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from two phases				
	Test acc. figure 6a				
a)	Test switch S_1 and S_2 and RCBO in closed position				
	Residual pulsating direct current:				
	steady increase from max. 0,2 $I_{\Delta n}$ to 2 $I_{\Delta n}$ within 30 s	[mA]	[mA]	[mA]	--

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Clause	Requirement + Test	Result - Remark			Verdict
	tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA) .....:	22,5	22,3	22,5	P
b)	The test circuit being successively calibrated at any three values of residual current given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--
	RCBO connected at two-line terminals chosen at random				P
		[ms]	[ms]	[ms]	
	maximum break time at: $2I_{\Delta n}$ (value given in table 1) .....:	28	27	29	P
	maximum break time at: $4I_{\Delta n}$ (value given in table 1) .....:	27	26	27	P
	maximum break time at: $10I_{\Delta n}$ (value given in table 1) ....:	24	24	24	P
	maximum break time at: 5A (value given in table 1) .....:	21	21	22	P
	maximum break time at: 10A (value given in table 1) .....:	20	19	19	P
	maximum break time at: 20A (value given in table 1) .....:	18	17	18	P
	maximum break time at: 50A (value given in table 1) .....:	15	16	16	P
	maximum break time at: 100A (value given in table 1) ....:	13	13	13	P
	maximum break time at: 200A (value given in table 1) ....:	10	11	11	P
	maximum break time at: 500A (value given in table 1) ....:	9	10	9	P
	No value exceeds the relevant specified limiting value				P
9.2.1.6 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from three phases				
	Test acc. figure 6b				
a)	Test switch S1 and S2 and RCBO in closed position				
	Residual pulsating direct current:				
	steady increase from max. 0,2 $I_{\Delta n}$ to 2 $I_{\Delta n}$ within 30 s	[mA]	[mA]	[mA]	--
	tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA) .....:	-	-	-	N/A
b)	The test circuit being successively calibrated at 2 $I_{\Delta n}$ and any other two chosen values given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$.....:	-	-	-	N/A
	maximum break time at: ___A (value given in table 1) ....:	-	-	-	N/A
	maximum break time at: ___A (value given in table 1) ....:	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
9.2.1.7.1 addition acc. IEC 62423	Verification of the correct operation in case of residual smooth direct current without load, test acc. figure 6b				

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
a)	Verification of the correct operation in case of a steady increase residual smooth direct current:				--
	Test switch S_1 and S_2 and RCBO in closed position				
	steady increase from max. 0,2 $I_{\Delta n}$ to 2 $I_{\Delta n}$ within 30 s	[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA).....:	31,2	31,2	31,2	P
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				--
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$ .....:	23	27	24	P
	maximum break time at: 4 $I_{\Delta n}$ .....:	18	19	18	P
	maximum break time at: 10 $I_{\Delta n}$ .....:	11	11	12	P
	No value exceeds the relevant specified limiting value				P
9.2.1.7.2 addition acc. IEC 62423	Verification of the correct operation in case of residual smooth direct current with load, test acc. figure 6b				
	Verification of the correct operation in case of a steady increase residual smooth direct current:				--
	test current (A): In, until steady state conditions are reached	63A			P
	cross-sectional area (mm²) .....:	16 mm²			--
	steady increase from max. 0,2 $I_{\Delta n}$ to 2 $I_{\Delta n}$ within 30 s	[mA]	[mA]	[mA]	--
	tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA) .....:	25,4	25,3	24,1	P
9.2.2 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Tests at the temperature limits				
	tests acc. 9.2.1.5 b), 9.2.1.6 b) and 9.2.1.7.1 b) under the following conditions:				
	ambient temperature: -25°C, off load				P
	ambient temperature: +55°C RCBO previously loaded with rated current until steady state conditions are reached				P
9.2.1.5 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from two phases				
	Test acc. figure 6a				
	Tests repeated at a temperature of -25°C:				P
b)	The test circuit being successively calibrated at any three values of residual current given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--

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Clause	Requirement + Test	Result - Remark			Verdict
	RCBO connected at two-line terminals chosen at random				P
		[ms]	[ms]	[ms]	--
	maximum break time at: $2I_{\Delta n}$ (value given in table 1) .....:	28	27	28	P
	maximum break time at: $4I_{\Delta n}$ (value given in table 1) .....:	27	26	27	P
	maximum break time at: $10I_{\Delta n}$ (value given in table 1) ....:	24	23	24	P
	maximum break time at: 5A (value given in table 1) .....:	22	21	21	P
	maximum break time at: 10A (value given in table 1) .....:	19	19	19	P
	maximum break time at: 20A (value given in table 1) .....:	18	18	18	P
	maximum break time at: 50A (value given in table 1) .....:	16	16	16	P
	maximum break time at: 100A (value given in table 1) ....:	15	14	14	P
	maximum break time at: 200A (value given in table 1) ....:	12	12	12	P
	maximum break time at: 500A (value given in table 1) ....:	9	8	8	P
	No value exceeds the relevant specified limiting value				P
9.2.1.6 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from three phases				
	Test acc. figure 6b				
	Tests repeated at a temperature of -25 °C:				N/A
b)	The test circuit being successively calibrated at 2 $I_{\Delta n}$ and any other two chosen values given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$.....:	-	-	-	N/A
	maximum break time at: ___A (value given in table 1) ....:	-	-	-	N/A
	maximum break time at: ___A (value given in table 1) ....:	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
9.2.1.7.1 addition acc. IEC 62423	Verification of the correct operation in case of residual smooth direct current without load, test acc. figure 6b				
	Tests repeated at a temperature of -25 °C:				P
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				--
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$ .....:	28	28	28	P
	maximum break time at: 4 $I_{\Delta n}$ .....:	24	24	23	P
	maximum break time at: 10 $I_{\Delta n}$ .....:	18	18	17	P

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	No value exceeds the relevant specified limiting value				P
9.2.1.5 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from two phases				
	Test acc. figure 6a				
	Tests repeated at a temperature of +55 °C:				P
	test current (A).....: In, until steady state conditions are reached	63A			P
b)	The test circuit being successively calibrated at any three values of residual current given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--
	RCBO connected at two-line terminals chosen at random				P
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$ (value given in table 1).....:	28	28	27	P
	maximum break time at: 4 $I_{\Delta n}$ (value given in table 1).....:	25	26	26	P
	maximum break time at: 10 $I_{\Delta n}$ (value given in table 1)...:	22	22	24	P
	maximum break time at: 5A (value given in table 1).....:	21	20	20	P
	maximum break time at: 10A (value given in table 1).....:	19	19	19	P
	maximum break time at: 20A (value given in table 1).....:	17	17	18	P
	maximum break time at: 50A (value given in table 1).....:	16	16	16	P
	maximum break time at: 100A (value given in table 1)....:	14	14	13	P
	maximum break time at: 200A (value given in table 1)....:	12	11	11	P
	maximum break time at: 500A (value given in table 1)....:	9	10	9	P
	No value exceeds the relevant specified limiting value				P
9.2.1.6 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from three phases				
	Test acc. figure 6b				
	Tests repeated at a temperature of +40 °C:				N/A
	test current (A).....: In, until steady state conditions are reached				N/A
b)	The test circuit being successively calibrated at 2 $I_{\Delta n}$ and any other two chosen values given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$.....:	-	-	-	N/A
	maximum break time at: ___A (value given in table 1)....:	-	-	-	N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	maximum break time at: ___A (value given in table 1) ....:	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
9.2.1.7.1 addition acc. IEC 62423	Verification of the correct operation in case of residual smooth direct current without load, test acc. figure 6b				
	Tests repeated at a temperature of +55 °C:				P
	test current (A).....: In, until steady state conditions are reached	63A			P
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				--
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$ .....:	28	28	27	P
	maximum break time at: 4 $I_{\Delta n}$ .....:	24	24	23	P
	maximum break time at: 10 $I_{\Delta n}$ .....:	19	19	19	P
	No value exceeds the relevant specified limiting value				P
9.12.13	Verification of the rated residual making and breaking capacity $I_{\Delta m}$				
	$I_{\Delta m}$ (A) .....:	3000A			--
	Test circuit according to figure .....:	Figure 7			--
	Cross-section (mm²).....:	25mm²			--
	Grid distance a (mm).....:	45mm			--
	Prospective current (A) .....:	3000A			--
	Prospective current obtained (A).....:	3,08x10³A, 256V			--
	Power factor .....:	0,85~0,90			--
	Power factor obtained .....:	0,88			--
	Sequence O-t-CO-t-CO	[KA²s]	[KA²s]	[KA²s]	--
	I²t max. .....:	15,0	52,1	14,6	P
	Phases which do not carry the short circuit current during this test connected to the supply voltage at the line terminals				P
	On each pole in turn excluding the switched neutral pole				P
	RCBOs functionally dependent on the line voltage supplied with rated voltage.				P
	No permanent arcing				P
	No flashover				P
	No blowing of fuse F				P
	No damage, polyethylene sheet shows no holes				P

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Clause	Requirement + Test	Result - Remark			Verdict
9.12.13.2	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				
9.7.3	Dielectric strength test of the main circuit:				--
	2 U_N (V) for 1 min ..... :	$2U_N$ = 480V			--
	a)				P
	b)				P
	c)				P
	d)				N/A
	e)				N/A
	No flashover or breakdown				P
	Making and breaking I_N at U_N	64,2A/242V~			P
	RCBO trip with a test current of 1,25 $I_{\Delta N}$	[ms]	[ms]	[ms]	--
	Break time not exceeding the value for $I_{\Delta N}$ in table 2 (ms)..... :	31	30	28	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1.				P
	Additional tests for RCBOs functionally depending on line voltage if applicable:				P
9.17	**Verification of the behaviour of RCBOs opening automatically in case of failure of the line voltage**				
9.17.1	Limiting value of the line voltage U_x				
	U_N applied to the line terminals and progressively lowered to attain zero within about 30s until automatic opening occurs	[V]	[V]	[V]	--
	All values less than 0,85 U_N				N/A
	Tripping test:				N/A
	Test voltage (V)..... :	V			--
	Residual current $I_{\Delta N}$ (mA)..... :	$I_{\Delta N}$ = mA			--
	Time corresponding to value for $I_{\Delta N}$ in table 2	[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	Verification of automatic opening in case of failure of the line voltage				
	RCBO 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) RCBOs opening without delay				
	- no value exceeds 0,5 s..... :				N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	b) RCBOs opening with delay				
	values within the range indicated by manufacturer:	to ms			N/A
9.17.3	Verification of the correct operation, in presence of a residual current, for RCBOs opening with delay in case of failure of the line voltage				
	RCBO connected according to figure 4 at U_N				N/A
	All phases but one switched off by means of S_3				N/A
9.9.1.2	During the delay: Off-load tests at 20 ± 5°C				
a)	Verification of the correct operation in case of a steady increase of residual current:	[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s Tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$ (only if delay > 30s) .....:	-	-	-	N/A
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed):	[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the specified limiting value .....:	-	-	-	N/A
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	-	-	-	N/A
	- 2 $I_{\Delta N}$.....:	-	-	-	N/A
	- 5 $I_{\Delta N}$ or .....:	-	-	-	N/A
	- 0,25A .....:	-	-	-	N/A
	- $I_{\Delta t}$ _____ A .....:	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A by closing S_2, (S_1 and RCBO in closed position):				N/A
	- ____A (value 1 between 5A and 200A).....:	-	-	-	N/A
	- ____A (value 1 between 5A and 200A).....:	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
	Additional test for type S:				--
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2	-	-	-	N/A
	No tripping during tests				N/A
9.17.4	Verification of the correct operation of RCBOs with 3 or 4 current paths, neutral and one line terminal only being energized in turn				
	RCBO connected according to figure 4				N/A
9.9.1.2.c)	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$..... :	-	-	-	N/A
	- 2 $I_{\Delta N}$..... :	-	-	-	N/A
	- 5 $I_{\Delta N}$ or ..... :	-	-	-	N/A
	- 0,25A ..... :	-	-	-	N/A
	- $I_{\Delta t}$ _____ A ..... :	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
	Additional test for type S:				N/A
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
8.11	**Test device**				
	RCBOs provided with a test device				P
	Ampere-turns produced when operating the test device do not exceed 2,5 times the ampere turns produced by $I_{\Delta N}$	Ampere-turns produced by test device: 47,2 milliampere-turns 2,5 times the Ampere-turns produced by $I_{\Delta n}$: 75 milliampere-turns			P
	Not possible to energize the circuit on the load side by operating the test device when the RCBO is in the open position				P

IEC 62423			
Clause	Requirement + Test	Result - Remark	Verdict

9.16	**Verification of the operation of the test device at the limits of rated voltage**				
	a) RCBO at 0,85 U_N, test device actuated 25 times at intervals of 5s	195V~, 25 times			P
	b) Test a) repeated at 1,1 U_N	264V~, 25 times			P
	c) Test b) repeated, but only once, the operating means of the test device being held in the closed position for 30s	264V~, 1 time, 30s			P
	RCBO operated at each test				P
	No change impairing further use				P
9.2.4 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** RCBO trip with a test current of 2,5 $I_{\Delta n}$ with smooth direct current	[ms]	[ms]	[ms]	P
		22	22	22	P

	TEST SEQUENCE "D": **3 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**	**D10**	**D11**	**D12**	--
	Tests D_0				--
8	REQUIREMENTS FOR CONSTRUCTION AND OPERATION				--
8.5	Operating characteristics				
9.9	Verification of the operating characteristic				
9.9.1	RCBO installed as for normal use, test circuit according to figure 4				P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting				N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.	50/60Hz			P
	Tests performed with no load at 20 ± 5°C	20,2°C			P
9.9.1.4	For RCBOs functionally dependent on line voltage each test is made at:				
	- 1,1 U_N (V) and.....:	457V			P
	- 0,85 U_N (V).....:	340V			P

Table 2	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, 500A **b)**	$I_{\Delta t}$ **c)**		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--

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Clause	Requirement + Test						Result - Remark				Verdict
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--
	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.										--
9.9.1.2	Tests for all RCBOs										P
a)	Verification of the correct operation in case of a steady increase of residual current:						[mA]		[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$ (mA).....:						21,9-22,6		21,7-22,4	21,6-22,3	P
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed):						[ms]		[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the specified limiting value (ms).....:						44-45		44-45	44-45	P
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):										
	Maximum break times at:						[ms]		[ms]	[ms]	--
	- $I_{\Delta N}$.....:						45		45	45	P
	- 2 $I_{\Delta N}$.....:						24		24	24	P
	- 5 $I_{\Delta N}$ or .....:						-		-	-	N/A
	- 0,25 A .....:						22		21	20	P
	- $I_{\Delta t}$ 630 A .....:						9		9	9	P
	No value exceeds the relevant specified limiting value										P
	Additional test for type S:										
	Minimum non-actuating time at:						[ms]		[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s						-		-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s						-		-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s						-		-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s						-		-	-	N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A among the following list: 5A - 10A - 20A - 50A - 100A - 200A by closing S_2, (S_1 and RCBO in closed position):	[ms]	[ms]	[ms]	P
	- 5A	19	19	19	P
	- 10A	18	18	19	P
	- 20A	17	17	17	P
	- 50A	16	16	15	P
	- 100A	14	14	14	P
	- 200A	12	11	12	P
	- 500A	8	9	9	P
	No value exceeds the relevant specified limiting value				P
f) 1)	Tests repeated at -25°C:				
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	45	44	45	P
	- 2 $I_{\Delta N}$.....:	24	24	24	P
	- 5 $I_{\Delta N}$ or .....:	-	-	-	N/A
	- 0,25 A .....:	20	20	20	P
	- $I_{\Delta t}$ 630 A .....:	9	9	9	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	No tripping during tests				N/A
e)	Tests repeated, with the pole under test and one other pole of the RCBO loaded with rated current, current being established shortly before the test.	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	-no value exceeds the specified limiting value	45	44	45	P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_2, (S_1 and RCBO in closed position):				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$..... :	45	45	45	P
	- 2 $I_{\Delta N}$..... :	23	24	24	P
	- 5 $I_{\Delta N}$ or ..... :	-	-	-	N/A
	- 0,25 A ..... :	21	21	21	P
	- $I_{\Delta t}$ 630 A ..... :	9	9	9	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
f) 2)	Tests repeated with the RCBO loaded with rated current I_N at +55°C until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$..... :	44	45	45	P
	- 2 $I_{\Delta N}$..... :	24	24	25	P

IEC 62423					
Clause	Requirement + Test		Result - Remark		Verdict
	- 5 $I_{\Delta N}$ or ..... :		-	-	- N/A
	- 0,25 A ..... :		20	20	19 P
	- $I_{\Delta t}$ 630 A ..... :		9	9	9 P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:		[ms]	[ms]	[ms] --
	- $I_{\Delta N}$ ..... 0,13 s		-	-	- N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s		-	-	- N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s		-	-	- N/A
	- $I_{\Delta t}$ ..... 0,04 s		-	-	- N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
8.15	**Behaviour of RCBOs in case of earth fault currents comprising a DC component**				
9.9.1.3	Verification of the correct operation at residual currents with DC components				
	Type A residual current devices				
	RCBO installed as for normal use, test circuits according to figures 5 and 6				P
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.		50 and 60Hz		P
	For RCBOs functionally dependent on line voltage each test is made at				
	- 1,1 U_N..... :		457V		P
	- 0,85 U_N ..... :		340V		P
a)	Verification of the correct operation in case of a continuous rise of the residual pulsating direct current (S_1, S_2 and RCBO closed)				
	Test acc. figure 5				--
	Angle α	Tripping current (A)			--
		Lower limit	Upper limit		--
	0°	0,35 $I_{\Delta N}$	1,4 $I_{\Delta N}$ or 2 $I_{\Delta N}$		--
	90°	0,25 $I_{\Delta N}$	(sub-clause 5.3.8)		--
	135°	0,11 $I_{\Delta N}$			--
	Steady increase from zero to:		[mA]	[mA]	[mA] --

IEC 62423											
Clause	Requirement + Test					Result - Remark					Verdict
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s					$I_{\Delta N}$ = 30mA					P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s					$I_{\Delta N}$ = mA					N/A
	α = 0° +/- .....:					21,8	22,1	22,1			P
	α = 90° +/- .....:					24,9	24,8	24,6			P
	α = 135° +/- .....:					31,7	32,5	32,2			P
	No value exceeds the relevant specified limiting values										P
b)	Verification of the correct operation in case of suddenly appearing residual pulsating direct currents by closing S_2 (S_1 and RCBO in closed position)										
Table 3				Maximum values of break time and non-actuating time (s) for type A RCBOs in the event of half-wave pulsating residual currents (r.m.s. values) equal to							--
	Type	**I_N A**	**$I_{\Delta N}$ A**	**1,4 $I_{\Delta N}$**	**2 $I_{\Delta N}$**	**2,8 $I_{\Delta N}$**	**4 $I_{\Delta N}$**	**7 $I_{\Delta N}$**	**0,35 A**	**0,5 A**	--
	General	Any value	<0,03		0,3		0,15			0,05	--
		Any value	0,03	0,3		0,15			0,04		--
		Any value	>0,03	0,3		0,15		0,04			--
	S	≥ 25	>0,03	0,5		0,2		0,15			--
	a) This value shall be limited to the lower limit of the overcurrent instantaneous tripping ranges according to type B, C or D, as applicable.										--
	Test acc. figure 5										--
	Angle α .....:					α = 0°					--
	RCBOs with $I_{\Delta N}$ < 0,03 A					$I_{\Delta N}$ = mA					N/A
	Maximum break times at:					[ms]	[ms]	[ms]			--
	- 2 $I_{\Delta N}$ +/- .....:					-	-	-			N/A
	- 4 $I_{\Delta N}$ +/- .....:					-	-	-			N/A
	- 0,5 A +/- .....:					-	-	-			N/A
	- 350A or +/- .....:					-	-	-			N/A
	- $I_{\Delta t}$ ___ A +/- .....:					-	-	-			N/A
	RCBOs with $I_{\Delta N}$ = 0,03 A					$I_{\Delta N}$ = 0,03 A					P
	Maximum break times at:					[ms]	[ms]	[ms]			--
	- 1,4 $I_{\Delta N}$ +/- .....:					40	39	38			P
	- 2,8 $I_{\Delta N}$ +/- .....:					39	38	38			P
	- 0,35 A +/- .....:					16	16	15			P
	- 350A or +/- .....:					-	-	-			N/A
	- $I_{\Delta t}$ 630 A +/- .....:					10	9	10			P
	RCBOs with $I_{\Delta N}$ > 0,03 A										N/A

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 1,4 $I_{\Delta N}$ +/- .....:	-	-	-	N/A
	- 2,8 $I_{\Delta N}$ +/- .....:	-	-	-	N/A
	- 7 $I_{\Delta N}$ +/- .....:	-	-	-	N/A
	- 350A or +/- .....:	-	-	-	N/A
	- $I_{\Delta t}$ ___ A +/- .....:	-	-	-	N/A
	No value exceeds the specified limiting values				P
c)	Verification of the correct operation with the pole under test and one other pole loaded with rated current I_N	I_N = 63A			P
	Test acc. 9.9.1.3 a) repeated, pole under test an one other pole loaded with rated current				--
	Steady increase from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = 30mA			P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	α = 0° +/- .....:	22,1	21,7	22,3	P
	α = 90° +/- .....:	24,6	24,4	24,2	P
	α = 135° +/- .....:	31,5	32,7	32,2	P
	No value exceeds the relevant specified limiting values				P
d)	Verification of the correct operation in case of residual pulsating direct currents with α = 0° superimposed by smooth direct current of 0,006 A				
	Test acc. figure 6				--
	Steady increase of pulsating DC current from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s	$I_{\Delta N}$ = 30mA			P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	(I_1) α = 0° +/- .....: (I_0) 6mA DC +/- .....:	18,5	18,5	18,6	P
	No value exceeds the relevant specified limiting values				P
9.1.7 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A				
	Test acc. 9.9.1.3 d) but the smooth direct current of 0,006 A replaced by 0,01 A				
	Verification of the correct operation in case of residual pulsating d.c. currents with angle α = 0° superimposed by smooth direct current of 0,01 A:				
	Steady increase of pulsating DC current from zero to:	[mA]	[mA]	[mA]	--

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Clause	Requirement + Test				Result - Remark	Verdict
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s					N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s					N/A
	(I_1) α = 0° +/- .....: (I_0) 10mA DC +/- .....:				- / - / -	N/A
9.1.2 addition acc. IEC 62423	Verification of the correct operation in case of steady increase of composite residual current					
	starting composite residual current:					
	Different frequency component values of test currents for calibration (RMS)			Composite starting current value (RMS)		
	$I_{at\ rated\ frequency}$	I_{1kHz}	$I_{F\ motor\ (10Hz)}$	I_{Δ}		
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$		
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA] / [mA] / [mA]	--
	tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$.....:				30,2-30,4 / 30,2-30,6 / 30,1-30,4	P
9.1.3 addition acc. IEC 62423	Verification of the correct operation in case of sudden appearance of composite residual current					
	composite residual current acc. 9.1.2					P
	S1 and RCBO in the closed position, residual current suddenly established by closing S2				[mA] / [mA] / [mA]	--
	RCBO trip with a test current of 7 $I_{\Delta n}$.....:				26 / 26 / 25	P
	max. break time:					
	- general type RCBOs: 40ms					P
	- S type RCBOs: 150ms					N/A
	Additional test for type S:					--
	- minimum non-actuating time at: 7 $I_{\Delta n}$; 0,05 s .....:					--
	No tripping during tests				- / - / -	N/A
9.2.1.7.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the correct operation in case of residual smooth direct current without load for ratings of $I_{\Delta n}$ not tested in D_1, test acc. figure 6b					
a)	Verification of the correct operation in case of a steady increase residual smooth direct current:					
	Test switch S_1 and S_2 and RCBO in closed position					P
	- Steady increase from 0,2 $I_{\Delta N}$ to 2 $I_{\Delta N}$ within 30s				[mA] / [mA] / [mA]	--
	Tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA).....:				30,6 / 30,3 / 30,3	P

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Clause	Requirement + Test	Result - Remark			Verdict
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 2 $I_{\Delta N}$ ..... :	30	29	29	P
	- 4 $I_{\Delta N}$ ..... :	28	28	28	P
	- 10 $I_{\Delta N}$ ..... :	22	21	22	P
	No value exceeds the relevant specified limiting value				P
	Tests D_1				--
8	**REQUIREMENTS FOR CONSTRUCTION AND OPERATION**				--
8.12	**RCBOs functionally dependent on line voltage**				
	RCBOs functionally dependent on the line voltage operate correctly between 0,85 and 1,1 UN				
9.17	**Verification of the behaviour of RCBOs opening automatically in case of failure of the line voltage**				
9.17.1	Limiting value of the line voltage U_x				
	U_N applied to the line terminals and progressively lowered to attain zero within about 30s until automatic opening occurs	[V]	[V]	[V]	--
	All values less than 0,85 U_N ..... :	-	-	-	N/A
	Tripping test:				
	Test voltage (V)..... :	V			--
	Residual current $I_{\Delta N}$ ..... :	$I_{\Delta N}$ =A			--
	Time corresponding to value for $I_{\Delta N}$ in table 2	[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	Verification of automatic opening in case of failure of the line voltage				
	RCBO 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)	RCBOs opening without delay				N/A
	no value exceeds 0,5 s ..... :	-	-	-	N/A
b)	RCBOs opening with delay				N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	Values within the range indicated by manufacturer	to ms			N/A
9.17.3	Verification of the correct operation, in presence of a residual current, for RCBOs opening with delay in case of failure of the line voltage				
	RCBO connected according to figure 4 at U_N				N/A
	All phases but one switched off by means of S_3				N/A
9.9.1.2	During the delay: Off-load tests at 20 ± 5°C				--
a)	Verification of the correct operation in case of a steady increase of residual current:	[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s Tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$ (only if delay > 30s) ..... :	-	-	-	N/A
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the specified limiting value ..... :	-	-	-	N/A
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				N/A
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... :	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... :	-	-	-	N/A
	- 5 $I_{\Delta N}$ or ..... :	-	-	-	N/A
	- 0,25 A ..... :	-	-	-	N/A
	- $I_{\Delta t}$ _____ A ..... :	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A by closing S_2, (S_1 and RCBO in closed position):				
	- ____A (value 1 between 5A and 200A)..... :	-	-	-	N/A
	- ____A (value 1 between 5A and 200A)..... :	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
	Additional test for type S:				--
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.17.4	Verification of the correct operation of RCBOs with 3 or 4 current paths, neutral and one line terminal only being energized in turn				
	RCBO connected according to figure 4				N/A
9.9.1.2.c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				N/A
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... :	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... :	-	-	-	N/A
	- 5 $I_{\Delta N}$ or ..... :	-	-	-	N/A
	- 0,25 A ..... :	-	-	-	N/A
	- $I_{\Delta t}$ _____ A ..... :	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
	Additional test for type S:				--
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
8.14	**Behaviour of RCBOs in case of current surges caused by impulse voltages**				
9.19.1	Current surge test for all RCBOs (0,5µs/100kHz ring wave test)				
	One pole of the RCBO submitted to 10 surge current applications, polarity inverted after every two applications				P
	Peak value..... :	200A +10/-0% or ~~(25A +10/-0% for $I_{\Delta N} \leq 10mA$)~~			--
	Virtual front time ..... :	0,5µs ± 30%			--
	Period of following oscillatory wave ..... :	10µs ± 20%			--
	Each successive reverse peak..... :	60% of preceding peak			--

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	No tripping during tests				P
		[ms]	[ms]	[ms]	--
	After the test the RCBO trip with a test current of $I_{\Delta N}$ (ms) ..... :	45	46	46	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1				P
	No value exceeds the relevant specified limiting value				P
9.19.2 9.1.5 addition acc. IEC 62423	Verification of behaviour at surge currents up to 3000A (8/20µs surge current test)				
	One pole of the RCBO chosen at random, submitted to 10 surge current applications, polarity inverted after every two applications				P
	Peak value..... :	3000A +10/-0%			--
	Virtual front time ..... :	0,8µs ± 20%			--
	Virtual time of half value..... :	20µs ± 20%			--
	Peak of reverse current..... :	less than 30 % of peak value			--
	No tripping during tests				P
		[ms]	[ms]	[ms]	--
	After the test the RCBO trip with a test current of $I_{\Delta N}$ (ms) ..... :	46	46	45	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1				P
	No value exceeds the relevant specified limiting value				P
9.1.6 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of behaviour in the case of inrush residual currents				
	Test acc. figure 2				N/A
	all switches and RCBO in closed position				N/A
	pulse with a peak current of 10 $I_{\Delta n}$ (mA)..... :				N/A
	Pulse on one pole chosen at random				N/A
	Six measurements: 3 times positive, 3 times negative				N/A
	Polarity changed after each test				N/A
	No tripping during test				N/A
9.1.4 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of the correct operation for four-pole Type F RCCDs powered on two poles only				

IEC 62423							
Clause	Requirement + Test				Result - Remark		Verdict
	Tests performed with a four-pole RCBO acc. 9.1.2, but only supplied between neutral terminal and one-phase terminal chosen at random without load						N/A
9.1.2 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of the correct operation in case of steady increase of composite residual current						
	starting composite residual current:						N/A
	Different frequency component values of test currents for calibration (RMS)			Composite starting current value (RMS)			N/A
	$I_{at\ rated\ frequency}$	I_{1kHz}	N/A	I_{Δ}			N/A
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$			N/A
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA]	[mA]	[mA] --
	tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$.....:				-	-	- N/A
9.2.3 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Correct operation for RCBOs powered on two poles						
	tests acc. 9.2.1.2 and 9.2.1.7.1						P
	RCBO only supplied between neutral terminal and one-phase terminal chosen at random for four-pole devices or						P
	RCBO only supplied between 2-phase terminals chosen at random for 3-pole devices						N/A
	Tests at rated frequency and without load						P
9.2.1.2 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the correct operation in case of residual sinusoidal alternating currents up to 1000 Hz						
a)	Test switch S_1 and S_2 and RCBO in closed position						P
	Test at 150Hz:						
	steady increase from max. 0,2 $I_{\Delta n}$ to 2,4 $I_{\Delta n}$ within 30s				[mA]	[mA]	[mA] --
	- tripping current between 0,5 $I_{\Delta n}$ and 2,4 $I_{\Delta n}$ (mA)				33,3	32,6	33,4 P
	Test at 400Hz:						
	steady increase from max. 0,2 $I_{\Delta n}$ to 6 $I_{\Delta n}$ within 30s				[mA]	[mA]	[mA] --
	- tripping current between 0,5 $I_{\Delta n}$ and 2,4 $I_{\Delta n}$ (mA)				61,4	63,4	62,7 P
	Test at 1000Hz:						
	steady increase from max. 0,2 $I_{\Delta n}$ to 14 $I_{\Delta n}$ within 30s				[mA]	[mA]	[mA] --
	- tripping current between 0,5 $I_{\Delta n}$ and 14 $I_{\Delta n}$ (mA)				134	135	134 P
b)	S1 and RCBO in the closed position, residual current correspond to 1000Hz suddenly established by closing S2						
	Maximum break times at:				[ms]	[ms]	[ms] --

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	- 14 $I_{\Delta N}$..... :	23	22	22	P
	max. break time:				
	- general type RCBOs: 0,3s				P
	- S type RCBOs: 0,5s				N/A
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- 14 $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
9.2.1.7.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the correct operation in case of residual smooth direct current without load for ratings of $I_{\Delta n}$ not tested in D_1, test acc. figure 6b				
a)	Verification of the correct operation in case of a steady increase residual smooth direct current:				
	Test switch S_1 and S_2 and RCBO in closed position				
	- Steady increase from 0,2 $I_{\Delta N}$ to 2 $I_{\Delta N}$ within 30s Tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$	[mA]	[mA]	[mA]	--
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random	18,5-30,6	18,2-30,7	17,9-30,7	P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 2 $I_{\Delta N}$..... :	29	30	29	P
	- 4 $I_{\Delta N}$..... :	29	28	27	P
	- 10 $I_{\Delta N}$..... :	21	21	21	P
	No value exceeds the relevant specified limiting value				P
9.2.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the operating characteristics at the reference temperature (20±5)°C				

IEC 62423, Table 1 -Type B RCBOs- Standard values of break time and non-actuating time for residual direct currents which result from rectifying circuits and for residual smooth direct current

	Type	I_N A	$I_{\Delta N}$ A	Standard values of break time and non-actuating at a residual current equal to					
				2 $I_{\Delta N}$	4 $I_{\Delta N}$	10 $I_{\Delta N}$	5A,10A,20A,50,100A,200A**a)**		
	General	Any value	General	0,3	0,15	0,04	0,04	Max. break times	
	S	≥ 25	>0,03	0,5	0,2	0,15	0,15	Max. break times	
				0,13	0,06	0,05	0,04	Min. non-actuating times	
	For Type B RCBOs any value exceeding the lower limit of the overcurrent instantaneous tripping range are not tested								

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Clause	Requirement + Test	Result - Remark			Verdict
	a) Tests only made during verification of the correct operation as mentioned in 9.2.1.5 b) acc. figure 6a and 9.2.1.6 b) acc. figure 6b				
9.2.1.1 addition acc. IEC 62423	General				
	Each test is made at 1,1 and 0,85 times the rated line voltage; voltage (V) ..... :	457V/340V			
	Tests a rated frequency				
	For multiple settings of IΔn tests are made for each setting				
9.2.1.2 addition acc. IEC 62423	Verification of the correct operation in case of residual sinusoidal alternating currents up to 1000 Hz				
a)	Test switch S_1 and S_2 and RCBO in closed position				
	Test at 150Hz:				
	steady increase from max. 0,2 $I_{\Delta n}$ to 2,4 $I_{\Delta n}$ within 30s	[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 2,4 $I_{\Delta n}$ (mA).. :	32,7	32,6	33,4	P
	Test at 400Hz:				
	steady increase from max. 0,2 $I_{\Delta n}$ to 6 $I_{\Delta n}$ within 30s	[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 2,4 $I_{\Delta n}$ (mA).. :	61,3	61,4	60,7	P
	Test at 1000Hz:				
	steady increase from max. 0,2 $I_{\Delta n}$ to 14 $I_{\Delta n}$ within 30s	[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 14 $I_{\Delta n}$ (mA)... :	134	134	134	P
b)	S1 and RCBO in the closed position, residual current correspond to 1000Hz suddenly established by closing S2				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 14 $I_{\Delta N}$..... :	23	23	22	P
	max. break time:				
	- general type RCBOs: 0,3s				P
	- S type RCBOs: 0,5s				N/A
	Additional test for type S:				
	Minimum non-actuating time at:				--
	- 14 $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
9.2.1.3 addition acc. IEC 62423	Verification of the correct operation in the case of a residual alternating current superimposed on a residual smooth direct current				
	Test acc. figure 4				
	Test switch S_1 and S_2 and RCBO in closed position				
	Residual smooth direct current applied through one pole chosen at random and adjusted to				
	- 0,4 $I_{\Delta n}$ or				P

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Clause	Requirement + Test	Result - Remark			Verdict
	- 10 mA				N/A
	whichever is the higher value				
	Residual alternating current at rated frequency applied to another pole and:				
	steady increase from max. 0,2 $I_{\Delta n}$ to $I_{\Delta n}$ within 30 s	[mA]	[mA]	[mA]	--
	alternating tripping current ≤ $I_{\Delta n}$ (mA)..... :	19,4	19,5	19,6	P
	Test made twice at each position I and II of S_3				P
9.2.1.4 addition acc. IEC 62423	Verification of the correct operation in the case of a residual pulsating direct current superimposed on a residual smooth direct current				
	Test acc. figure 5				
	Test switch S_1 and S_2 and RCBO in closed position				
	Residual smooth direct current applied through one pole chosen at random and adjusted to				
	- 0,4 $I_{\Delta n}$ or				P
	- 10 mA				N/A
	whichever is the higher value				
	Residual pulsating direct current applied to another pole with a current delay angle of 0° and:				
	steady increase from max. 0,2 $I_{\Delta n}$ to 1,4 $I_{\Delta n}$ within 30 s (mA) for RCBOs with $I_{\Delta n}$>0,01 A				P
	steady increase from max. 0,2 $I_{\Delta n}$ to 2 $I_{\Delta n}$ within 30 s (mA) for RCBOs with $I_{\Delta n}$≤0,01 A				N/A
	RCBO tested twice at each position I and II of S_3 and S_4				P
		[mA]	[mA]	[mA]	--
	residual pulsating tripping current ≤ 1,4 $I_{\Delta n}$ (mA) for RCBOs with $I_{\Delta n}$>0,01 A (mA).....:	22,4-29,5	21,8-28,4	21,9-28,9	P
		[mA]	[mA]	[mA]	--
	residual pulsating tripping current ≤ 2 $I_{\Delta n}$ (mA) for RCBOs with $I_{\Delta n}$≤0,01 A (mA).....:	-	-	-	N/A
9.2.1.5 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from two phases				
	Test acc. figure 6a				
a)	Test switch S_1 and S_2 and RCBO in closed position				
	Residual pulsating direct current:				
	steady increase from max. 0,2 $I_{\Delta n}$ to 2 $I_{\Delta n}$ within 30 s	[mA]	[mA]	[mA]	--
	tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA) .....:	25,6	25,3	25,6	P

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Clause	Requirement + Test	Result - Remark			Verdict
b)	The test circuit being successively calibrated at any three values of residual current given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--
	RCBO connected at two-line terminals chosen at random				P
		[ms]	[ms]	[ms]	
	maximum break time at: $2I_{\Delta n}$ (value given in table 1) .....:	35	35	35	P
	maximum break time at: $4I_{\Delta n}$ (value given in table 1) .....:	27	27	27	P
	maximum break time at: $10I_{\Delta n}$ (value given in table 1) ....:	24	23	24	P
	maximum break time at: 5A (value given in table 1) .....:	23	22	23	P
	maximum break time at: 10A (value given in table 1) .....:	20	20	20	P
	maximum break time at: 20A (value given in table 1) .....:	18	18	19	P
	maximum break time at: 50A (value given in table 1) .....:	17	17	18	P
	maximum break time at: 100A (value given in table 1) ....:	15	15	15	P
	maximum break time at: 200A (value given in table 1) ....:	12	11	11	P
	maximum break time at: 500A (value given in table 1) ....:	9	10	9	P
	No value exceeds the relevant specified limiting value				P
9.2.1.6 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from three phases				
	Test acc. figure 6b				
a)	Test switch S1 and S2 and RCBO in closed position				
	Residual pulsating direct current:				
	steady increase from max. 0,2 $I_{\Delta n}$ to 2 $I_{\Delta n}$ within 30 s	[mA]	[mA]	[mA]	--
	tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA) .....:	29,5	29,4	30,2	P
b)	The test circuit being successively calibrated at 2 $I_{\Delta n}$ and any other two chosen values given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--
		[ms]	[ms]	[ms]	--
	maximum break time at: $2I_{\Delta n}$ (value given in table 1) .....:	35	34	34	P
	maximum break time at: $4I_{\Delta n}$ (value given in table 1) .....:	30	31	30	P
	maximum break time at: $10I_{\Delta n}$ (value given in table 1) ....:	25	24	25	P
	maximum break time at: 5A (value given in table 1) .....:	23	23	22	P
	maximum break time at: 10A (value given in table 1) .....:	20	21	20	P
	maximum break time at: 20A (value given in table 1) .....:	19	19	19	P
	maximum break time at: 50A (value given in table 1) .....:	16	17	17	P

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Clause	Requirement + Test	Result - Remark			Verdict
	maximum break time at: 100A (value given in table 1) ....:	14	14	14	P
	maximum break time at: 200A (value given in table 1) ....:	11	11	12	P
	maximum break time at: 500A (value given in table 1) ....:	10	9	10	P
	No value exceeds the relevant specified limiting value				P
9.2.1.7.1 addition acc. IEC 62423	Verification of the correct operation in case of residual smooth direct current without load, test acc. figure 6b				
a)	Verification of the correct operation in case of a steady increase residual smooth direct current:				--
	Test switch S_1 and S_2 and RCBO in closed position				
	steady increase from max. 0,2 $I_{\Delta n}$ to 2 $I_{\Delta n}$ within 30 s	[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA) .....:	31,4	32,1	31,8	P
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				--
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$ .....:	34	32	29	P
	maximum break time at: 4 $I_{\Delta n}$ .....:	25	27	27	P
	maximum break time at: 10 $I_{\Delta n}$ .....:	21	22	20	P
	No value exceeds the relevant specified limiting value				P
9.2.1.7.2 addition acc. IEC 62423	Verification of the correct operation in case of residual smooth direct current with load, test acc. figure 6b				
	Verification of the correct operation in case of a steady increase residual smooth direct current:				--
	test current (A): In, until steady state conditions are reached	63A			P
	cross-sectional area (mm²) .....:	16 mm²			--
	steady increase from max. 0,2 $I_{\Delta n}$ to 2 $I_{\Delta n}$ within 30 s	[mA]	[mA]	[mA]	--
	tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA) .....:	30,4	30,5	30,7	P
9.2.2 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Tests at the temperature limits				
	tests acc. 9.2.1.5 b), 9.2.1.6 b) and 9.2.1.7.1 b) under the following conditions:				
	ambient temperature: -25°C, off load				P
	ambient temperature: +55°C RCBO previously loaded with rated current until steady state conditions are reached				P

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
9.2.1.5 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from two phases				
	Test acc. figure 6a				
	Tests repeated at a temperature of -25°C:				P
b)	The test circuit being successively calibrated at any three values of residual current given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--
	RCBO connected at two-line terminals chosen at random				P
		[ms]	[ms]	[ms]	--
	maximum break time at: $2I_{\Delta n}$ (value given in table 1) .....:	36	36	36	P
	maximum break time at: $4I_{\Delta n}$ (value given in table 1) .....:	26	27	26	P
	maximum break time at: $10I_{\Delta n}$ (value given in table 1) ....:	24	24	24	P
	maximum break time at: 5A (value given in table 1) .....:	23	23	23	P
	maximum break time at: 10A (value given in table 1) .....:	21	21	22	P
	maximum break time at: 20A (value given in table 1) .....:	20	20	20	P
	maximum break time at: 50A (value given in table 1) .....:	18	17	18	P
	maximum break time at: 100A (value given in table 1) ....:	17	17	17	P
	maximum break time at: 200A (value given in table 1) ....:	13	12	12	P
	maximum break time at: 500A (value given in table 1) ....:	11	10	9	P
	No value exceeds the relevant specified limiting value				P
9.2.1.6 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from three phases				
	Test acc. figure 6b				
	Tests repeated at a temperature of -25 °C:				P
b)	The test circuit being successively calibrated at 2 $I_{\Delta n}$ and any other two chosen values given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--
		[ms]	[ms]	[ms]	--
	maximum break time at: $2I_{\Delta n}$ (value given in table 1) .....:	34	34	33	P
	maximum break time at: $4I_{\Delta n}$ (value given in table 1) .....:	30	30	30	P
	maximum break time at: $10I_{\Delta n}$ (value given in table 1) ....:	25	23	23	P
	maximum break time at: 5A (value given in table 1) .....:	22	22	22	P
	maximum break time at: 10A (value given in table 1) .....:	22	21	22	P
	maximum break time at: 20A (value given in table 1) .....:	20	20	20	P
	maximum break time at: 50A (value given in table 1) .....:	19	19	19	P

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Clause	Requirement + Test	Result - Remark			Verdict
	maximum break time at: 100A (value given in table 1) ....:	17	17	17	P
	maximum break time at: 200A (value given in table 1) ....:	16	15	16	P
	maximum break time at: 500A (value given in table 1) ....:	11	10	12	P
	No value exceeds the relevant specified limiting value				P
9.2.1.7.1 addition acc. IEC 62423	Verification of the correct operation in case of residual smooth direct current without load, test acc. figure 6b				
	Tests repeated at a temperature of -25 °C:				P
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				--
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$ .....:	29	29	29	P
	maximum break time at: 4 $I_{\Delta n}$ .....:	28	28	27	P
	maximum break time at: 10 $I_{\Delta n}$ .....:	21	22	21	P
	No value exceeds the relevant specified limiting value				P
9.2.1.5 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from two phases				
	Test acc. figure 6a				
	Tests repeated at a temperature of +55 °C:				P
	test current (A).....: In, until steady state conditions are reached	63A			P
b)	The test circuit being successively calibrated at any three values of residual current given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--
	RCBO connected at two-line terminals chosen at random				P
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$ (value given in table 1).....:	36	36	36	P
	maximum break time at: 4 $I_{\Delta n}$ (value given in table 1).....:	27	27	27	P
	maximum break time at: 10 $I_{\Delta n}$ (value given in table 1)...:	25	25	24	P
	maximum break time at: 5A (value given in table 1) .....:	23	22	23	P
	maximum break time at: 10A (value given in table 1) .....:	21	21	21	P
	maximum break time at: 20A (value given in table 1) .....:	19	20	19	P
	maximum break time at: 50A (value given in table 1) .....:	18	18	18	P
	maximum break time at: 100A (value given in table 1) ....:	16	16	15	P
	maximum break time at: 200A (value given in table 1) ....:	13	12	12	P

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	maximum break time at: 500A (value given in table 1) ....:	11	10	10	P
	No value exceeds the relevant specified limiting value				P
9.2.1.6 addition acc. IEC 62423	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from three phases				
	Test acc. figure 6b				
	Tests repeated at a temperature of +55 °C:				P
	test current (A).....: In, until steady state conditions are reached	63A			P
b)	The test circuit being successively calibrated at 2 $I_{\Delta n}$ and any other two chosen values given in Table 1 taken at random, the test switch S_1 and the RCBO being in the closed position, residual current suddenly established by closing test switch S_2, S_3 in position I and II				--
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$ (value given in table 1).....:	35	36	36	P
	maximum break time at: 4 $I_{\Delta n}$ (value given in table 1).....:	29	30	30	P
	maximum break time at: 10 $I_{\Delta n}$ (value given in table 1)...:	25	25	24	P
	maximum break time at: 5A (value given in table 1).....:	22	22	22	P
	maximum break time at: 10A (value given in table 1).....:	21	20	21	P
	maximum break time at: 20A (value given in table 1).....:	17	17	17	P
	maximum break time at: 50A (value given in table 1).....:	16	16	15	P
	maximum break time at: 100A (value given in table 1) ....:	15	14	14	P
	maximum break time at: 200A (value given in table 1) ....:	13	12	13	P
	maximum break time at: 500A (value given in table 1) ....:	10	9	11	P
	No value exceeds the relevant specified limiting value				N/A
9.2.1.7.1 addition acc. IEC 62423	Verification of the correct operation in case of residual smooth direct current without load, test acc. figure 6b				
	Tests repeated at a temperature of +55 °C:				P
	test current (A).....: In, until steady state conditions are reached	63A			P
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				--
		[ms]	[ms]	[ms]	--
	maximum break time at: 2 $I_{\Delta n}$ .....:	30	29	30	P
	maximum break time at: 4 $I_{\Delta n}$ .....:	27	27	28	P
	maximum break time at: 10 $I_{\Delta n}$ .....:	21	22	21	P

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Clause	Requirement + Test	Result - Remark			Verdict
	No value exceeds the relevant specified limiting value				P
9.12.13	Verification of the rated residual making and breaking capacity $I_{\Delta m}$				
	$I_{\Delta m}$ (A) ..... :	3000A			--
	Test circuit according to figure ..... :	Figure 7			--
	Cross-section (mm²)..... :	25mm²			--
	Grid distance a (mm)..... :	45mm			--
	Prospective current (A) ..... :	3000A			--
	Prospective current obtained (A)..... :	3,08x10³A, 256V			--
	Power factor ..... :	0,85~0,90			--
	Power factor obtained ..... :	0,88			--
	Sequence O-t-CO-t-CO	[KA²s]	[KA²s]	[KA²s]	--
	I²t max. ..... :	15,7	15,1	15,8	P
	Phases which do not carry the short circuit current during this test connected to the supply voltage at the line terminals				P
	On each pole in turn excluding the switched neutral pole				P
	RCBOs functionally dependent on the line voltage supplied with rated voltage.				P
	No permanent arcing				P
	No flashover				P
	No blowing of fuse F				P
	No damage, polyethylene sheet shows no holes				P
9.12.13.2	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				
9.7.3	Dielectric strength test of the main circuit:				--
	2 U_N (V) for 1 min ..... :	2U_N = 830V			--
	a)				P
	b)				P
	c)				P
	d)				N/A
	e)				N/A
	No flashover or breakdown				P
	Making and breaking I_N at U_N	64,5A/419V~			P
	RCBO trip with a test current of 1,25 $I_{\Delta N}$	[ms]	[ms]	[ms]	--
	Break time not exceeding the value for $I_{\Delta N}$ in table 2 (ms)..... :	40	40	42	P

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Clause	Requirement + Test	Result - Remark			Verdict
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1.				P
	Additional tests for RCBOs functionally depending on line voltage if applicable:				P
9.17	**Verification of the behaviour of RCBOs opening automatically in case of failure of the line voltage**				
9.17.1	Limiting value of the line voltage U_x				
	U_N applied to the line terminals and progressively lowered to attain zero within about 30s until automatic opening occurs	[V]	[V]	[V]	--
	All values less than 0,85 U_N				N/A
	Tripping test:				N/A
	Test voltage (V)..... :	V			--
	Residual current $I_{\Delta N}$ (mA)..... :	$I_{\Delta N}$ = mA			--
	Time corresponding to value for $I_{\Delta N}$ in table 2	[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	Verification of automatic opening in case of failure of the line voltage				
	RCBO 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) RCBOs opening without delay				
	- no value exceeds 0,5 s..... :				N/A
	b) RCBOs opening with delay				
	values within the range indicated by manufacturer:	to ms			N/A
9.17.3	Verification of the correct operation, in presence of a residual current, for RCBOs opening with delay in case of failure of the line voltage				
	RCBO connected according to figure 4 at U_N				N/A
	All phases but one switched off by means of S_3				N/A
9.9.1.2	During the delay: Off-load tests at 20 ± 5°C				
a)	Verification of the correct operation in case of a steady increase of residual current:	[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s Tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$ (only if delay > 30s) .....:	-	-	-	N/A
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed):	[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the specified limiting value..... :	-	-	-	N/A

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Clause	Requirement + Test	Result - Remark			Verdict
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... :	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... :	-	-	-	N/A
	- 5 $I_{\Delta N}$ or ..... :	-	-	-	N/A
	- 0,25A ..... :	-	-	-	N/A
	- $I_{\Delta t}$ _____ A ..... :	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A by closing S_2, (S_1 and RCBO in closed position):				N/A
	- ____A (value 1 between 5A and 200A)..... :	-	-	-	N/A
	- ____A (value 1 between 5A and 200A)..... :	-	-	-	N/A
	No value exceeds the relevant specified limiting value				N/A
	Additional test for type S:				--
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2	-	-	-	N/A
	No tripping during tests				N/A
9.17.4	Verification of the correct operation of RCBOs with 3 or 4 current paths, neutral and one line terminal only being energized in turn				
	RCBO connected according to figure 4				P
9.9.1.2.c)	Maximum break times at: A-N	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... :	35	36	36	P
	- 2 $I_{\Delta N}$ ..... :	28	26	27	P
	- 5 $I_{\Delta N}$ or ..... :	-	-	-	N/A
	- 0,25A ..... :	23	22	20	P
	- $I_{\Delta t}$ 630 A ..... :	11	10	9	P

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Clause	Requirement + Test	Result - Remark			Verdict
	No value exceeds the relevant specified limiting value				P
9.9.1.2.c)	Maximum break times at: B-N	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... :	36	34	35	P
	- 2 $I_{\Delta N}$ ..... :	25	25	28	P
	- 5 $I_{\Delta N}$ or ..... :	-	-	-	N/A
	- 0,25A ..... :	21	23	20	P
	- $I_{\Delta t}$ 630 A ..... :	9	9	9	P
	No value exceeds the relevant specified limiting value				P
9.9.1.2.c)	Maximum break times at: C-N	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... :	35	34	35	P
	- 2 $I_{\Delta N}$ ..... :	26	28	25	P
	- 5 $I_{\Delta N}$ or ..... :	-	-	-	N/A
	- 0,25A ..... :	20	21	20	P
	- $I_{\Delta t}$ 630 A ..... :	9	10	9	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
8.11	**Test device**				
	RCBOs provided with a test device				P
	Ampere-turns produced when operating the test device do not exceed 2,5 times the ampere turns produced by $I_{\Delta N}$	Ampere-turns produced by test device: 47,3 milliampere-turns 2,5 times the Ampere-turns produced by $I_{\Delta n}$: 75 milliampere-turns			P
	Not possible to energize the circuit on the load side by operating the test device when the RCBO is in the open position				P

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Clause	Requirement + Test	Result - Remark	Verdict

9.16	**Verification of the operation of the test device at the limits of rated voltage**				
	a) RCBO at 0,85 U_N, test device actuated 25 times at intervals of 5s	340V~, 25 times			P
	b) Test a) repeated at 1,1 U_N	457V~, 25 times			P
	c) Test b) repeated, but only once, the operating means of the test device being held in the closed position for 30s	457V~, 1 time, 30s			P
	RCBO operated at each test				P
	No change impairing further use				P
9.2.4 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** RCBO trip with a test current of 2,5 $I_{\Delta n}$ with smooth direct current	[ms]	[ms]	[ms]	P
		30	31	31	P

	TEST SEQUENCE "D": **1 samples: D63, $I_{\Delta n}$= 0,1A, 1P+N** **1 samples: D63, $I_{\Delta n}$= 0,3A, 1P+N**	**D0-3**	**D0-4**		--
	Tests D_0				--
8	REQUIREMENTS FOR CONSTRUCTION AND OPERATION				--
8.5	Operating characteristics				
9.9	Verification of the operating characteristic				
9.9.1	RCBO installed as for normal use, test circuit according to figure 4				P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting				N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.	50/60Hz			P
	Tests performed with no load at 20 ± 5°C	20,8°C			P
9.9.1.4	For RCBOs functionally dependent on line voltage each test is made at:				
	- 1,1 U_N (V) and..... :	264V			P
	- 0,85 U_N (V)..... :	195V			P

Table 2	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, 500A **b)**	$I_{\Delta t}$ **c)**		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--

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Clause	Requirement + Test							Result - Remark			Verdict
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--
	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.										--
9.9.1.2	Tests for all RCBOs										P
a)	Verification of the correct operation in case of a steady increase of residual current:							[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$ (mA).....:							83,1-84,2	221-223		P
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed):							[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the specified limiting value (ms).....:							32-34	33-34		P
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):										
	Maximum break times at:							[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:							34	34		P
	- 2 $I_{\Delta N}$.....:							19	19		P
	- 5 $I_{\Delta N}$ or .....:							14	14		P
	- 0,25 A .....:							-	-		N/A
	- $I_{\Delta t}$ 630 A .....:							9	9		P
	No value exceeds the relevant specified limiting value										P
	Additional test for type S:										
	Minimum non-actuating time at:							[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s							-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s							-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s							-	-	-	N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A among the following list: 5A - 10A - 20A - 50A - 100A - 200A by closing S_2, (S_1 and RCBO in closed position):	[ms]	[ms]	[ms]	P
	- 5A	14	13		P
	- 10A	14	12		P
	- 20A	14	12		P
	- 50A	14	11		P
	- 100A	14	10		P
	- 200A	11	10		P
	- 500A	9	9		P
	No value exceeds the relevant specified limiting value				P
f) 1)	Tests repeated at -25°C:				
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	34	33		P
	- 2 $I_{\Delta N}$.....:	19	19		P
	- 5 $I_{\Delta N}$ or .....:	15	15		P
	- 0,25 A .....:	-	-		N/A
	- $I_{\Delta t}$ 630 A .....:	9	9		P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
e)	Tests repeated, with the pole under test and one other pole of the RCBO loaded with rated current, current being established shortly before the test.	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	-no value exceeds the specified limiting value	34	33		P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_2, (S_1 and RCBO in closed position):				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$..... :	35	34		P
	- 2 $I_{\Delta N}$..... :	19	19		P
	- 5 $I_{\Delta N}$ or ..... :	14	14		P
	- 0,25 A ..... :	-	-		N/A
	- $I_{\Delta t}$ 630 A ..... :	9	9		P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
f) 2)	Tests repeated with the RCBO loaded with rated current I_N at +55°C until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--

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Clause	Requirement + Test		Result - Remark		Verdict
	- $I_{\Delta N}$ ..... :		34	34	P
	- 2 $I_{\Delta N}$ ..... :		19	19	P
	- 5 $I_{\Delta N}$ or ..... :		14	15	P
	- 0,25 A ..... :		-	-	N/A
	- $I_{\Delta t}$ 630 A ..... :		9	9	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:		[ms]	[ms]	[ms]
	- $I_{\Delta N}$ ..... 0,13 s		-	-	-
	- 2 $I_{\Delta N}$ ..... 0,06 s		-	-	-
	- 5 $I_{\Delta N}$ ..... 0,05 s		-	-	-
	- $I_{\Delta t}$ ..... 0,04 s		-	-	-
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
8.15	**Behaviour of RCBOs in case of earth fault currents comprising a DC component**				
9.9.1.3	Verification of the correct operation at residual currents with DC components				
	Type A residual current devices				
	RCBO installed as for normal use, test circuits according to figures 5 and 6				P
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.		50 and 60Hz		P
	For RCBOs functionally dependent on line voltage each test is made at				
	- 1,1 U_N ..... :		264V		P
	- 0,85 U_N ..... :		195V		P
a)	Verification of the correct operation in case of a continuous rise of the residual pulsating direct current (S_1, S_2 and RCBO closed)				
	Test acc. figure 5				--
	Angle α	Tripping current (A)			--
		Lower limit	Upper limit		--
	0°	0,35 $I_{\Delta N}$	1,4 $I_{\Delta N}$ or 2 $I_{\Delta N}$		--
	90°	0,25 $I_{\Delta N}$	(sub-clause 5.3.8)		--

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Clause	Requirement + Test						Result - Remark				Verdict
	135°	0,11 $I_{\Delta N}$									--
	Steady increase from zero to:						[mA]	[mA]	[mA]		--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s						$I_{\Delta N}$ = 100mA, 300mA				P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s						$I_{\Delta N}$ = mA				N/A
	α = 0° +/- .....:						66,3	180			P
	α = 90° +/- .....:						73,4	187			P
	α = 135° +/- .....:						98,4	244			P
	No value exceeds the relevant specified limiting values										P
b)	Verification of the correct operation in case of suddenly appearing residual pulsating direct currents by closing S_2 (S_1 and RCBO in closed position)										
Table 3			Maximum values of break time and non-actuating time (s) for type A RCBOs in the event of half-wave pulsating residual currents (r.m.s. values) equal to								--
	Type	**I_N A**	**$I_{\Delta N}$ A**	**1,4 $I_{\Delta N}$**	**2 $I_{\Delta N}$**	**2,8 $I_{\Delta N}$**	**4 $I_{\Delta N}$**	**7 $I_{\Delta N}$**	**0,35 A**	**0,5 A**	--
	General	Any value	<0,03		0,3		0,15			0,05	--
		Any value	0,03	0,3		0,15			0,04		--
		Any value	>0,03	0,3		0,15		0,04			--
	S	≥ 25	>0,03	0,5		0,2		0,15			--
	a) This value shall be limited to the lower limit of the overcurrent instantaneous tripping ranges according to type B, C or D, as applicable.										--
	Test acc. figure 5										--
	Angle α .....:						α = 0°				--
	RCBOs with $I_{\Delta N}$ < 0,03 A						$I_{\Delta N}$ = mA				N/A
	Maximum break times at:						[ms]	[ms]	[ms]		--
	- 2 $I_{\Delta N}$ +/- .....:						-	-	-		N/A
	- 4 $I_{\Delta N}$ +/- .....:						-	-	-		N/A
	- 0,5 A +/- .....:						-	-	-		N/A
	- 350A or +/- .....:						-	-	-		N/A
	- $I_{\Delta t}$ ___ A +/- .....:						-	-	-		N/A
	RCBOs with $I_{\Delta N}$ = 0,03 A						$I_{\Delta N}$ = ___ A				N/A
	Maximum break times at:						[ms]	[ms]	[ms]		--
	- 1,4 $I_{\Delta N}$ +/- .....:						-	-	-		N/A
	- 2,8 $I_{\Delta N}$ +/- .....:						-	-	-		N/A
	- 0,35 A +/- .....:						-	-	-		N/A
	- 350A or +/- .....:						-	-	-		N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	- $I_{\Delta t}$ 630 A +/- .....:	-	-	-	N/A
	RCBOs with $I_{\Delta N}$ > 0,03 A				N/A
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 1,4 $I_{\Delta N}$ +/- .....:	29	16	-	P
	- 2,8 $I_{\Delta N}$ +/- .....:	25	14	-	P
	- 7 $I_{\Delta N}$ +/- .....:	14	13	-	P
	- 350A or +/- .....:	-	-	-	N/A
	- $I_{\Delta t}$ 630 A +/- .....:	10	9	-	P
	No value exceeds the specified limiting values				P
c)	Verification of the correct operation with the pole under test and one other pole loaded with rated current I_N	I_N = 63A			P
	Test acc. 9.9.1.3 a) repeated, pole under test an one other pole loaded with rated current				--
	Steady increase from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = 100mA, 300mA			P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	α = 0° +/- .....:	66,7	178		P
	α = 90° +/- .....:	73,2	186		P
	α = 135° +/- .....:	98,5	244		P
	No value exceeds the relevant specified limiting values				P
d)	Verification of the correct operation in case of residual pulsating direct currents with α = 0° superimposed by smooth direct current of 0,006 A				
	Test acc. figure 6				--
	Steady increase of pulsating DC current from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s	$I_{\Delta N}$ = 100mA, 300mA			P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	(I_1) α = 0° +/- .....: (I_0) 6mA DC +/- .....:	62,7	171		P
	No value exceeds the relevant specified limiting values				P
9.1.7 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A				
	Test acc. 9.9.1.3 d) but the smooth direct current of 0,006 A replaced by 0,01 A				

IEC 62423						
Clause	Requirement + Test				Result - Remark	Verdict
	Verification of the correct operation in case of residual pulsating d.c. currents with angle α = 0° superimposed by smooth direct current of 0,01 A:					
	Steady increase of pulsating DC current from zero to:				[mA] [mA] [mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s					N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s					N/A
	(I_1) α = 0° +/- .....: (I_0) 10mA DC +/- .....:				- - -	N/A
9.1.2 addition acc. IEC 62423	Verification of the correct operation in case of steady increase of composite residual current					
	starting composite residual current:					
	Different frequency component values of test currents for calibration (RMS)			Composite starting current value (RMS)		
	$I_{at\ rated\ frequency}$	I_{1kHz}	$I_{F\ motor\ (10Hz)}$	I_{Δ}		
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$		
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA] [mA] [mA]	--
	tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$.....:				123-126 307-309	P
9.1.3 addition acc. IEC 62423	Verification of the correct operation in case of sudden appearance of composite residual current					
	composite residual current acc. 9.1.2					P
	S1 and RCBO in the closed position, residual current suddenly established by closing S2				[ms] [ms] [ms]	--
	RCBO trip with a test current of 7 $I_{\Delta n}$.....:				14 17	P
	max. break time:					
	- general type RCBOs: 40ms					P
	- S type RCBOs: 150ms					N/A
	Additional test for type S:					--
	- minimum non-actuating time at: 7 $I_{\Delta n}$; 0,05 s .....:					--
	No tripping during tests				- - -	N/A
9.2.1.7.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the correct operation in case of residual smooth direct current without load for ratings of $I_{\Delta n}$ not tested in D_1, test acc. figure 6b					
a)	Verification of the correct operation in case of a steady increase residual smooth direct current:					
	Test switch S_1 and S_2 and RCBO in closed position					P

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Clause	Requirement + Test	Result - Remark			Verdict
	- Steady increase from 0,2 $I_{\Delta N}$ to 2 $I_{\Delta N}$ within 30s	[mA]	[mA]	[mA]	--
	Tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA)..... :	103	281		P
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 2 $I_{\Delta N}$..... :	27	21		P
	- 4 $I_{\Delta N}$..... :	18	15		P
	- 10 $I_{\Delta N}$..... :	16	14		P
	No value exceeds the relevant specified limiting value				P

	TEST SEQUENCE "D": **3 samples: D63, I∆n= 0,03A, 1P+N**			**D0-5**	**D0-6**	**D0-7**					--
	Tests D_0										--
8	REQUIREMENTS FOR CONSTRUCTION AND OPERATION										--
8.5	Operating characteristics										
9.9	Verification of the operating characteristic										
9.9.1	RCBO installed as for normal use, test circuit according to figure 4										P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting										N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.			50/60Hz							P
	Tests performed with no load at 20 ± 5°C			21°C							P
9.9.1.4	For RCBOs functionally dependent on line voltage each test is made at:										
	- 1,1 U_N (V) and..... :										N/A
	- 0,85 U_N (V)..... :										N/A
	- 0,80 U_N (V)..... :			184V							P
Table 2	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, 500A **b)**	$I_{\Delta t}$ **c)**		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--

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Clause	Requirement + Test							Result - Remark			Verdict
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--
	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.										--
9.9.1.2	Tests for all RCBOs										P
a)	Verification of the correct operation in case of a steady increase of residual current:							[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$ (mA).....:							22,5~23,8	22,4~24,0	22,7~23,7	P
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed):							[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the specified limiting value (ms).....:							55	51	53	P
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):										
	Maximum break times at:							[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:							47	55	53	P
	- 2 $I_{\Delta N}$.....:							45	45	45	P
	- 5 $I_{\Delta N}$ or .....:							32	31	33	P
	- 0,25 A .....:							-	-	-	N/A
	- $I_{\Delta t}$ 630 A .....:							20	16	15	P
	No value exceeds the relevant specified limiting value										P
	Additional test for type S:										
	Minimum non-actuating time at:							[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s										N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s										N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A among the following list: 5A - 10A - 20A - 50A - 100A - 200A by closing S_2, (S_1 and RCBO in closed position):	[ms]	[ms]	[ms]	P
	- 5A	16	13	15	P
	- 10A	10	11	12	P
	- 20A	10	15	12	P
	- 50A	14	12	15	P
	- 100A	12	11	12	P
	- 200A	13	17	13	P
	- 500A	15	14	11	P
	No value exceeds the relevant specified limiting value				P
f) 1)	Tests repeated at -5°C:				
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	55	53	51	P
	- 2 $I_{\Delta N}$.....:	45	44	43	P
	- 5 $I_{\Delta N}$ or .....:	29	30	31	P
	- 0,25 A .....:	-	-	-	N/A
	- $I_{\Delta t}$ 630 A .....:	20	21	19	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
e)	Tests repeated, with the pole under test and one other pole of the RCBO loaded with rated current, current being established shortly before the test.	I_N = 63A			P
	Cross-section (mm²).....:	16mm²			--
	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	-no value exceeds the specified limiting value	51	54	48	P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_2, (S_1 and RCBO in closed position):				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	55	49	53	P
	- 2 $I_{\Delta N}$.....:	42	45	54	P
	- 5 $I_{\Delta N}$ or .....:	31	30	29	P
	- 0,25 A .....:	-	-	-	N/A
	- $I_{\Delta t}$ 630 A .....:	16	14	15	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
f) 2)	Tests repeated with the RCBO loaded with rated current I_N at +40°C until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²).....:	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--

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Clause	Requirement + Test		Result - Remark		Verdict
	- $I_{\Delta N}$ ..... :		55	54	54	P
	- 2 $I_{\Delta N}$ ..... :		43	45	44	P
	- 5 $I_{\Delta N}$ or ..... :		31	30	29	P
	- 0,25 A ..... :		-	-	-	N/A
	- $I_{\Delta t}$ 630 A ..... :		20	17	18	P
	No value exceeds the relevant specified limiting value					P
	Additional test for type S:					
	Minimum non-actuating time at:		[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s					N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s					N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s					N/A
	- $I_{\Delta t}$ ..... 0,04 s					N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2					N/A
	No tripping during tests					N/A
8.15	**Behaviour of RCBOs in case of earth fault currents comprising a DC component**					
9.9.1.3	Verification of the correct operation at residual currents with DC components					
	Type A residual current devices					
	RCBO installed as for normal use, test circuits according to figures 5 and 6					P
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.		50 and 60Hz			P
	For RCBOs functionally dependent on line voltage each test is made at					
	- 1,1 U_N ..... :					N/A
	- 0,85 U_N ..... :					N/A
	- 0,80 U_N ..... :		184V			P
a)	Verification of the correct operation in case of a continuous rise of the residual pulsating direct current (S_1, S_2 and RCBO closed)					
	Test acc. figure 5					--
	Angle α	Tripping current (A)				--
		Lower limit	Upper limit			--
	0°	0,35 $I_{\Delta N}$	1,4 $I_{\Delta N}$ or 2 $I_{\Delta N}$			--

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Clause	Requirement + Test						Result - Remark				Verdict
	90°		0,25 $I_{\Delta N}$		(sub-clause 5.3.8)						--
	135°		0,11 $I_{\Delta N}$								--
	Steady increase from zero to:						[mA]	[mA]	[mA]		--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s						$I_{\Delta N}$ = 30mA				P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s						$I_{\Delta N}$ = mA				N/A
	α = 0° +/- .....:						20,6	20,7	20,6		P
	α = 90° +/- .....:						20,9	20,9	21,0		P
	α = 135° +/- .....:						27,5	27,6	27,5		P
	No value exceeds the relevant specified limiting values										P
b)	Verification of the correct operation in case of suddenly appearing residual pulsating direct currents by closing S_2 (S_1 and RCBO in closed position)										
Table 3				Maximum values of break time and non-actuating time (s) for type A RCBOs in the event of half-wave pulsating residual currents (r.m.s. values) equal to							--
	Type	**I_N A**	**$I_{\Delta N}$ A**	**1,4 $I_{\Delta N}$**	**2 $I_{\Delta N}$**	**2,8 $I_{\Delta N}$**	**4 $I_{\Delta N}$**	**7 $I_{\Delta N}$**	**0,35 A**	**0,5 A**	--
	General	Any value	<0,03		0,3		0,15			0,05	--
		Any value	0,03	0,3		0,15			0,04		--
		Any value	>0,03	0,3		0,15		0,04			--
	S	≥ 25	>0,03	0,5		0,2		0,15			--
	a) This value shall be limited to the lower limit of the overcurrent instantaneous tripping ranges according to type B, C or D, as applicable.										--
	Test acc. figure 5										--
	Angle α .....:						α = 0°				--
	RCBOs with $I_{\Delta N}$ < 0,03 A						$I_{\Delta N}$ = mA				N/A
	Maximum break times at:						[ms]	[ms]	[ms]		--
	- 2 $I_{\Delta N}$ +/- .....:										N/A
	- 4 $I_{\Delta N}$ +/- .....:										N/A
	- 0,5 A +/- .....:										N/A
	- 350A or +/- .....:										N/A
	- $I_{\Delta t}$ ___ A +/- .....:										N/A
	RCBOs with $I_{\Delta N}$ = 0,03 A						$I_{\Delta N}$ = 0,03 A				P
	Maximum break times at:						[ms]	[ms]	[ms]		--
	- 1,4 $I_{\Delta N}$ +/- .....:						32	35	32		P
	- 2,8 $I_{\Delta N}$ +/- .....:						26	26	24		P
	- 0,35 A +/- .....:						20	21	20		P

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Clause	Requirement + Test	Result - Remark			Verdict
	- 350A or +/- .....:	-	-	-	N/A
	- $I_{\Delta t}$ 630 A +/- .....:	15	16	15	P
	RCBOs with $I_{\Delta N}$ > 0,03 A				N/A
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 1,4 $I_{\Delta N}$ +/- .....:				N/A
	- 2,8 $I_{\Delta N}$ +/- .....:				N/A
	- 7 $I_{\Delta N}$ +/- .....:				N/A
	- 350A or +/- .....:				N/A
	- $I_{\Delta t}$ ___ A +/- .....:				N/A
	No value exceeds the specified limiting values				P
c)	Verification of the correct operation with the pole under test and one other pole loaded with rated current I_N	I_N = 63A			P
	Test acc. 9.9.1.3 a) repeated, pole under test an one other pole loaded with rated current				--
	Steady increase from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = 30mA			P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	α = 0° +/- .....:	20,6	20,6	20,7	P
	α = 90° +/- .....:	20,8	20,7	20,9	P
	α = 135° +/- .....:	27,8	27,6	27,8	P
	No value exceeds the relevant specified limiting values				P
d)	Verification of the correct operation in case of residual pulsating direct currents with α = 0° superimposed by smooth direct current of 0,006 A				
	Test acc. figure 6				--
	Steady increase of pulsating DC current from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s	$I_{\Delta N}$ = 30mA			P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	(I_1) α = 0° +/- .....: (I_0) 6mA DC +/- .....:	21,5	21,7	21,8	P
	No value exceeds the relevant specified limiting values				P
9.1.7 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A				
	Test acc. 9.9.1.3 d) but the smooth direct current of 0,006 A replaced by 0,01 A				

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Clause	Requirement + Test				Result - Remark	Verdict
	Verification of the correct operation in case of residual pulsating d.c. currents with angle α = 0° superimposed by smooth direct current of 0,01 A:					
	Steady increase of pulsating DC current from zero to:				[mA] [mA] [mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s					N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s					N/A
	(I_1) α = 0° +/- .....: (I_0) 10mA DC +/- .....:					N/A
9.1.2 addition acc. IEC 62423	Verification of the correct operation in case of steady increase of composite residual current					
	starting composite residual current:					
	Different frequency component values of test currents for calibration (RMS)			Composite starting current value (RMS)		
	$I_{at\ rated\ frequency}$	I_{1kHz}	$I_{F\ motor\ (10Hz)}$	I_{Δ}		
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$		
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA] [mA] [mA]	--
	tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$.....:				27,2~29,1 27,6~28,6 27,4~29,0	P
9.1.3 addition acc. IEC 62423	Verification of the correct operation in case of sudden appearance of composite residual current					
	composite residual current acc. 9.1.2					P
	S1 and RCBO in the closed position, residual current suddenly established by closing S2				[mA] [mA] [mA]	--
	RCBO trip with a test current of 7 $I_{\Delta n}$.....:				21 20 20	P
	max. break time:					
	- general type RCBOs: 40ms					P
	- S type RCBOs: 150ms					N/A
	Additional test for type S:					--
	- minimum non-actuating time at: 7 $I_{\Delta n}$; 0,05 s .....:					--
	No tripping during tests					P
9.2.1.7.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the correct operation in case of residual smooth direct current without load for ratings of $I_{\Delta n}$ not tested in D_1, test acc. figure 6b					
a)	Verification of the correct operation in case of a steady increase residual smooth direct current:					
	Test switch S_1 and S_2 and RCBO in closed position					P

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Clause	Requirement + Test	Result - Remark			Verdict
	- Steady increase from 0,2 $I_{\Delta N}$ to 2 $I_{\Delta N}$ within 30s	[mA]	[mA]	[mA]	--
	Tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA)..... :	31,1	30,9	31,4	P
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 2 $I_{\Delta N}$..... :	25	25	25	P
	- 4 $I_{\Delta N}$..... :	25	25	25	P
	- 10 $I_{\Delta N}$..... :	25	25	25	P
	No value exceeds the relevant specified limiting value				P

	TEST SEQUENCE "D": **3 samples: D63, I∆n= 0,03A, 3P+N**	**D0-8**	**D0-9**	**D0-10**	--
	Tests D_0				--
8	REQUIREMENTS FOR CONSTRUCTION AND OPERATION				--
8.5	Operating characteristics				
9.9	Verification of the operating characteristic				
9.9.1	RCBO installed as for normal use, test circuit according to figure 4				P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting				N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.	50/60Hz			P
	Tests performed with no load at 20 ± 5°C	21°C			P
9.9.1.4	For RCBOs functionally dependent on line voltage each test is made at:				
	- 1,1 U_N (V) and..... :				N/A
	- 0,85 U_N (V)..... :				N/A
	- 0,80 U_N (V)..... :	320V			P

Table 2	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, 500A **b)**	$I_{\Delta t}$ **c)**		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--

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Clause	Requirement + Test							Result - Remark			Verdict
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--
	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.										--
9.9.1.2	Tests for all RCBOs										P
a)	Verification of the correct operation in case of a steady increase of residual current:							[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$ (mA).....:							21,4~21,7	21,3~21,7	21,3~21,7	P
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed):							[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the specified limiting value (ms).....:							54	51	52	P
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):										
	Maximum break times at:							[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:							52	54	50	P
	- 2 $I_{\Delta N}$.....:							42	41	39	P
	- 5 $I_{\Delta N}$ or .....:							31	31	30	P
	- 0,25 A .....:							-	-	-	N/A
	- $I_{\Delta t}$ 630 A .....:							21	21	17	P
	No value exceeds the relevant specified limiting value										P
	Additional test for type S:										
	Minimum non-actuating time at:							[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s										N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s										N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A among the following list: 5A - 10A - 20A - 50A - 100A - 200A by closing S_2, (S_1 and RCBO in closed position):	[ms]	[ms]	[ms]	P
	- 5A	17	18	15	P
	- 10A	14	12	16	P
	- 20A	16	14	16	P
	- 50A	15	14	13	P
	- 100A	15	12	14	P
	- 200A	12	13	15	P
	- 500A	16	15	14	P
	No value exceeds the relevant specified limiting value				P
f) 1)	Tests repeated at -5°C:				
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	56	54	54	P
	- 2 $I_{\Delta N}$.....:	42	42	41	P
	- 5 $I_{\Delta N}$ or .....:	32	36	31	P
	- 0,25 A .....:	-	-	-	N/A
	- $I_{\Delta t}$ 630 A .....:	21	18	19	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
e)	Tests repeated, with the pole under test and one other pole of the RCBO loaded with rated current, current being established shortly before the test.	I_N = 63A			P
	Cross-section (mm²).....:	16mm²			--
	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	-no value exceeds the specified limiting value	55	52	51	P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_2, (S_1 and RCBO in closed position):				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	40	38	45	P
	- 2 $I_{\Delta N}$.....:	40	41	42	P
	- 5 $I_{\Delta N}$ or .....:	31	30	29	P
	- 0,25 A .....:	-	-	-	N/A
	- $I_{\Delta t}$ 630 A .....:	19	17	18	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
f) 2)	Tests repeated with the RCBO loaded with rated current I_N at +40°C until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²).....:	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--

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Clause	Requirement + Test		Result - Remark		Verdict
	- $I_{\Delta N}$ ..... :		55	55 48	P
	- 2 $I_{\Delta N}$ ..... :		42	44 43	P
	- 5 $I_{\Delta N}$ or ..... :		32	31 29	P
	- 0,25 A ..... :		-	- -	N/A
	- $I_{\Delta t}$ 630 A ..... :		20	19 17	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:		[ms]	[ms] [ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
8.15	**Behaviour of RCBOs in case of earth fault currents comprising a DC component**				
9.9.1.3	Verification of the correct operation at residual currents with DC components				
	Type A residual current devices				
	RCBO installed as for normal use, test circuits according to figures 5 and 6				P
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.		50 and 60Hz		P
	For RCBOs functionally dependent on line voltage each test is made at				
	- 1,1 U_N ..... :				N/A
	- 0,85 U_N ..... :				N/A
	- 0,80 U_N ..... :		320V		P
a)	Verification of the correct operation in case of a continuous rise of the residual pulsating direct current (S_1, S_2 and RCBO closed)				
	Test acc. figure 5				--
	Angle α	Tripping current (A)			--
		Lower limit	Upper limit		--
	0°	0,35 $I_{\Delta N}$	1,4 $I_{\Delta N}$ or 2 $I_{\Delta N}$		--

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Clause	Requirement + Test						Result - Remark				Verdict
	90°		0,25 $I_{\Delta N}$	(sub-clause 5.3.8)							--
	135°		0,11 $I_{\Delta N}$								--
	Steady increase from zero to:						[mA]	[mA]	[mA]		--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s						$I_{\Delta N}$ = 30mA				P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s						$I_{\Delta N}$ = mA				N/A
	α = 0° +/- .....:						20,5	20,9	21,0		P
	α = 90° +/- .....:						22,6	23,2	23,4		P
	α = 135° +/- .....:						36,2	35,7	35,9		P
	No value exceeds the relevant specified limiting values										P
b)	Verification of the correct operation in case of suddenly appearing residual pulsating direct currents by closing S_2 (S_1 and RCBO in closed position)										
Table 3				Maximum values of break time and non-actuating time (s) for type A RCBOs in the event of half-wave pulsating residual currents (r.m.s. values) equal to							--
	Type	**I_N A**	**$I_{\Delta N}$ A**	**1,4 $I_{\Delta N}$**	**2 $I_{\Delta N}$**	**2,8 $I_{\Delta N}$**	**4 $I_{\Delta N}$**	**7 $I_{\Delta N}$**	**0,35 A**	**0,5 A**	--
	General	Any value	<0,03		0,3		0,15			0,05	--
		Any value	0,03	0,3		0,15			0,04		--
		Any value	>0,03	0,3		0,15		0,04			--
	S	≥ 25	>0,03	0,5		0,2		0,15			--
	a) This value shall be limited to the lower limit of the overcurrent instantaneous tripping ranges according to type B, C or D, as applicable.										--
	Test acc. figure 5										--
	Angle α .....:						α = 0°				--
	RCBOs with $I_{\Delta N}$ < 0,03 A						$I_{\Delta N}$ = mA				N/A
	Maximum break times at:						[ms]	[ms]	[ms]		--
	- 2 $I_{\Delta N}$ +/- .....:										N/A
	- 4 $I_{\Delta N}$ +/- .....:										N/A
	- 0,5 A +/- .....:										N/A
	- 350A or +/- .....:										N/A
	- $I_{\Delta t}$ ___ A +/- .....:										N/A
	RCBOs with $I_{\Delta N}$ = 0,03 A						$I_{\Delta N}$ = 0,03 A				P
	Maximum break times at:						[ms]	[ms]	[ms]		--
	- 1,4 $I_{\Delta N}$ +/- .....:						29	30	35		P
	- 2,8 $I_{\Delta N}$ +/- .....:						28	25	27		P
	- 0,35 A +/- .....:						20	19	20		P

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Clause	Requirement + Test	Result - Remark			Verdict
	- 350A or +/- .....:	-	-	-	N/A
	- $I_{\Delta t}$ 630 A +/- .....:	18	15	14	P
	RCBOs with $I_{\Delta N}$ > 0,03 A				N/A
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 1,4 $I_{\Delta N}$ +/- .....:				N/A
	- 2,8 $I_{\Delta N}$ +/- .....:				N/A
	- 7 $I_{\Delta N}$ +/- .....:				N/A
	- 350A or +/- .....:				N/A
	- $I_{\Delta t}$ ___ A +/- .....:				N/A
	No value exceeds the specified limiting values				P
c)	Verification of the correct operation with the pole under test and one other pole loaded with rated current I_N	I_N = 63A			P
	Test acc. 9.9.1.3 a) repeated, pole under test an one other pole loaded with rated current				--
	Steady increase from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = 30mA			P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	α = 0° +/- .....:	21,4	21,3	21,3	P
	α = 90° +/- .....:	23,6	23,9	23,5	P
	α = 135° +/- .....:	36,4	36,4	36,2	P
	No value exceeds the relevant specified limiting values				P
d)	Verification of the correct operation in case of residual pulsating direct currents with α = 0° superimposed by smooth direct current of 0,006 A				
	Test acc. figure 6				--
	Steady increase of pulsating DC current from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s	$I_{\Delta N}$ = 30mA			P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	(I_1) α = 0° +/- .....: (I_0) 6mA DC +/- .....:	21,8	21,8	21,7	P
	No value exceeds the relevant specified limiting values				P
9.1.7 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A				
	Test acc. 9.9.1.3 d) but the smooth direct current of 0,006 A replaced by 0,01 A				

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Clause	Requirement + Test				Result - Remark	Verdict
	Verification of the correct operation in case of residual pulsating d.c. currents with angle α = 0° superimposed by smooth direct current of 0,01 A:					
	Steady increase of pulsating DC current from zero to:				[mA] [mA] [mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s					N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s					N/A
	(I_1) α = 0° +/- .....: (I_0) 10mA DC +/- .....:					N/A
9.1.2 addition acc. IEC 62423	Verification of the correct operation in case of steady increase of composite residual current					
	starting composite residual current:					
	Different frequency component values of test currents for calibration (RMS)			Composite starting current value (RMS)		
	$I_{at\ rated\ frequency}$	I_{1kHz}	$I_{F\ motor\ (10Hz)}$	I_{Δ}		
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$		
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA] [mA] [mA]	--
	tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$.....:				30,5~31,7 30,6~31,9 30,4~31,8	P
9.1.3 addition acc. IEC 62423	Verification of the correct operation in case of sudden appearance of composite residual current					
	composite residual current acc. 9.1.2					P
	S1 and RCBO in the closed position, residual current suddenly established by closing S2				[mA] [mA] [mA]	--
	RCBO trip with a test current of 7 $I_{\Delta n}$.....:				23 18 23	P
	max. break time:					
	- general type RCBOs: 40ms					P
	- S type RCBOs: 150ms					N/A
	Additional test for type S:					--
	- minimum non-actuating time at: 7 $I_{\Delta n}$; 0,05 s .....:					--
	No tripping during tests					P
9.2.1.7.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the correct operation in case of residual smooth direct current without load for ratings of $I_{\Delta n}$ not tested in D_1, test acc. figure 6b					
a)	Verification of the correct operation in case of a steady increase residual smooth direct current:					
	Test switch S_1 and S_2 and RCBO in closed position					P

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Clause	Requirement + Test	Result - Remark			Verdict
	- Steady increase from 0,2 $I_{\Delta N}$ to 2 $I_{\Delta N}$ within 30s	[mA]	[mA]	[mA]	--
	Tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA)..... :	30,6	30,9	30,9	P
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 2 $I_{\Delta N}$..... :	25	25	25	P
	- 4 $I_{\Delta N}$..... :	25	25	25	P
	- 10 $I_{\Delta N}$..... :	25	25	25	P
	No value exceeds the relevant specified limiting value				P

	TEST SEQUENCE "D": **2 samples: D63, I∆n= 0,1A & 0,3A, 1P+N**	**D0-11**	**D0-12**	--
	Tests D_0			--
8	REQUIREMENTS FOR CONSTRUCTION AND OPERATION			--
8.5	Operating characteristics			
9.9	Verification of the operating characteristic			
9.9.1	RCBO installed as for normal use, test circuit according to figure 4			P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting			N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.	50/60Hz		P
	Tests performed with no load at 20 ± 5°C	21°C		P
9.9.1.4	For RCBOs functionally dependent on line voltage each test is made at:			
	- 1,1 U_N (V) and..... :			N/A
	- 0,85 U_N (V)..... :			N/A
	- 0,80 U_N (V)..... :	184V		P

Table 2	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, 500A **b)**	$I_{\Delta t}$ **c)**		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--

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Clause	Requirement + Test							Result - Remark			Verdict
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--
	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.										--
9.9.1.2	Tests for all RCBOs										P
a)	Verification of the correct operation in case of a steady increase of residual current:							[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$ (mA).....:							79,8~81,2	224~231		P
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed):							[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the specified limiting value (ms).....:							56	41		P
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):										
	Maximum break times at:							[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:							54	42		P
	- 2 $I_{\Delta N}$.....:							42	36		P
	- 5 $I_{\Delta N}$ or .....:							32	32		P
	- 0,25 A .....:							-	-		N/A
	- $I_{\Delta t}$ 630 A .....:							18	18		P
	No value exceeds the relevant specified limiting value										P
	Additional test for type S:										
	Minimum non-actuating time at:							[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s										N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s										N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A among the following list: 5A - 10A - 20A - 50A - 100A - 200A by closing S_2, (S_1 and RCBO in closed position):	[ms]	[ms]	[ms]	P
	- 5A	13	13		P
	- 10A	10	15		P
	- 20A	12	15		P
	- 50A	12	15		P
	- 100A	14	10		P
	- 200A	13	13		P
	- 500A	14	16		P
	No value exceeds the relevant specified limiting value				P
f) 1)	Tests repeated at -5°C:				
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	54	46		P
	- 2 $I_{\Delta N}$.....:	43	35		P
	- 5 $I_{\Delta N}$ or .....:	30	31		P
	- 0,25 A .....:	-	-		N/A
	- $I_{\Delta t}$ 630 A .....:	21	25		P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
e)	Tests repeated, with the pole under test and one other pole of the RCBO loaded with rated current, current being established shortly before the test.	I_N = 63A			P
	Cross-section (mm²).....:	16mm²			--
	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	-no value exceeds the specified limiting value	52	42		P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_2, (S_1 and RCBO in closed position):				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	52	45		P
	- 2 $I_{\Delta N}$.....:	42	38		P
	- 5 $I_{\Delta N}$ or .....:	32	32		P
	- 0,25 A .....:	-	-		N/A
	- $I_{\Delta t}$ 630 A .....:	21	27		P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
f) 2)	Tests repeated with the RCBO loaded with rated current I_N at +40°C until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²).....:	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--

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Clause	Requirement + Test		Result - Remark		Verdict
	- $I_{\Delta N}$ ..... :		54	45	P
	- 2 $I_{\Delta N}$ ..... :		42	36	P
	- 5 $I_{\Delta N}$ or ..... :		29	29	P
	- 0,25 A ..... :		-	-	N/A
	- $I_{\Delta t}$ 630 A ..... :		20	19	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:		[ms]	[ms]	[ms]
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
8.15	**Behaviour of RCBOs in case of earth fault currents comprising a DC component**				
9.9.1.3	Verification of the correct operation at residual currents with DC components				
	Type A residual current devices				
	RCBO installed as for normal use, test circuits according to figures 5 and 6				P
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.		50 and 60Hz		P
	For RCBOs functionally dependent on line voltage each test is made at				
	- 1,1 U_N ..... :				N/A
	- 0,85 U_N ..... :				N/A
	- 0,80 U_N ..... :		184V		P
a)	Verification of the correct operation in case of a continuous rise of the residual pulsating direct current (S_1, S_2 and RCBO closed)				
	Test acc. figure 5				--
	Angle α	Tripping current (A)			--
		Lower limit	Upper limit		--
	0°	0,35 $I_{\Delta N}$	1,4 $I_{\Delta N}$ or 2 $I_{\Delta N}$		--

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Clause	Requirement + Test						Result - Remark				Verdict
	90°	0,25 $I_{\Delta N}$	(sub-clause 5.3.8)								--
	135°	0,11 $I_{\Delta N}$									--
	Steady increase from zero to:						[mA]	[mA]	[mA]		--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s						100mA	-	-		P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s						-	300mA	-		P
	α = 0° +/- .....:						65,4	201			P
	α = 90° +/- .....:						66,1	206			P
	α = 135° +/- .....:						80,5	261			P
	No value exceeds the relevant specified limiting values										P
b)	Verification of the correct operation in case of suddenly appearing residual pulsating direct currents by closing S_2 (S_1 and RCBO in closed position)										
Table 3			Maximum values of break time and non-actuating time (s) for type A RCBOs in the event of half-wave pulsating residual currents (r.m.s. values) equal to								--
	Type	**I_N A**	**$I_{\Delta N}$ A**	**1,4 $I_{\Delta N}$**	**2 $I_{\Delta N}$**	**2,8 $I_{\Delta N}$**	**4 $I_{\Delta N}$**	**7 $I_{\Delta N}$**	**0,35 A**	**0,5 A**	--
	General	Any value	<0,03		0,3		0,15			0,05	--
		Any value	0,03	0,3		0,15			0,04		--
		Any value	>0,03	0,3		0,15		0,04			--
	S	≥ 25	>0,03	0,5		0,2		0,15			--
	a) This value shall be limited to the lower limit of the overcurrent instantaneous tripping ranges according to type B, C or D, as applicable.										--
	Test acc. figure 5										--
	Angle α .....:						α = 0°				--
	RCBOs with $I_{\Delta N}$ < 0,03 A						$I_{\Delta N}$ = mA				N/A
	Maximum break times at:						[ms]	[ms]	[ms]		--
	- 2 $I_{\Delta N}$ +/- .....:										N/A
	- 4 $I_{\Delta N}$ +/- .....:										N/A
	- 0,5 A +/- .....:										N/A
	- 350A or +/- .....:										N/A
	- $I_{\Delta t}$ ___ A +/- .....:										N/A
	RCBOs with $I_{\Delta N}$ = 0,03 A						$I_{\Delta N}$ = ___ A				N/A
	Maximum break times at:						[ms]	[ms]	[ms]		--
	- 1,4 $I_{\Delta N}$ +/- .....:										N/A
	- 2,8 $I_{\Delta N}$ +/- .....:										N/A
	- 0,35 A +/- .....:										N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	- 350A or +/- .....:				N/A
	- $I_{\Delta t}$ 630 A +/- .....:				N/A
	RCBOs with $I_{\Delta N}$ > 0,03 A	100mA	300mA	-	P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 1,4 $I_{\Delta N}$ +/- .....:	49	37		P
	- 2,8 $I_{\Delta N}$ +/- .....:	29	29		P
	- 7 $I_{\Delta N}$ +/- .....:	20	24		P
	- 350A or +/- .....:	-	-		N/A
	- $I_{\Delta t}$ 630 A +/- .....:	18	19		P
	No value exceeds the specified limiting values				P
c)	Verification of the correct operation with the pole under test and one other pole loaded with rated current I_N	I_N = 63A			P
	Test acc. 9.9.1.3 a) repeated, pole under test an one other pole loaded with rated current				--
	Steady increase from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s	100mA	-	-	P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	-	300mA	-	P
	α = 0° +/- .....:	65,2	198		P
	α = 90° +/- .....:	65,1	204		P
	α = 135° +/- .....:	79,6	260		P
	No value exceeds the relevant specified limiting values				P
d)	Verification of the correct operation in case of residual pulsating direct currents with α = 0° superimposed by smooth direct current of 0,006 A				
	Test acc. figure 6				--
	Steady increase of pulsating DC current from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s	100mA	300mA	-	P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	(I_1) α = 0° +/- .....: (I_0) 6mA DC +/- .....:	65,5	204		P
	No value exceeds the relevant specified limiting values				P
9.1.7 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A				
	Test acc. 9.9.1.3 d) but the smooth direct current of 0,006 A replaced by 0,01 A				

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Clause	Requirement + Test				Result - Remark	Verdict
	Verification of the correct operation in case of residual pulsating d.c. currents with angle α = 0° superimposed by smooth direct current of 0,01 A:					
	Steady increase of pulsating DC current from zero to:				[mA] [mA] [mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s					N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s					N/A
	(I_1) α = 0° +/- .....: (I_0) 10mA DC +/- .....:				- - -	N/A
9.1.2 addition acc. IEC 62423	Verification of the correct operation in case of steady increase of composite residual current					
	starting composite residual current:					
	Different frequency component values of test currents for calibration (RMS)			Composite starting current value (RMS)		
	$I_{at\ rated\ frequency}$	I_{1kHz}	$I_{F\ motor\ (10Hz)}$	I_{Δ}		
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$		
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA] [mA] [mA]	--
	tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$.....:				99,1~101 285~297	P
9.1.3 addition acc. IEC 62423	Verification of the correct operation in case of sudden appearance of composite residual current					
	composite residual current acc. 9.1.2					P
	S1 and RCBO in the closed position, residual current suddenly established by closing S2				[ms] [ms] [ms]	--
	RCBO trip with a test current of 7 $I_{\Delta n}$.....:				24 19	P
	max. break time:					
	- general type RCBOs: 40ms					P
	- S type RCBOs: 150ms					N/A
	Additional test for type S:					--
	- minimum non-actuating time at: 7 $I_{\Delta n}$; 0,05 s .....:					--
	No tripping during tests					P
9.2.1.7.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the correct operation in case of residual smooth direct current without load for ratings of $I_{\Delta n}$ not tested in D_1, test acc. figure 6b					
a)	Verification of the correct operation in case of a steady increase residual smooth direct current:					
	Test switch S_1 and S_2 and RCBO in closed position					P

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Clause	Requirement + Test	Result - Remark			Verdict
	- Steady increase from 0,2 $I_{\Delta N}$ to 2 $I_{\Delta N}$ within 30s	[mA]	[mA]	[mA]	--
	Tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA)..... :	96,2	278		P
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 2 $I_{\Delta N}$..... :	25	25		P
	- 4 $I_{\Delta N}$..... :	26	25		P
	- 10 $I_{\Delta N}$..... :	25	25		P
	No value exceeds the relevant specified limiting value				P

	TEST SEQUENCE "D": **3 samples: D63, I∆n= 0,03A, 1P+N** **Ambient temperature -25~+55°C**	**D0-13**	**D0-14**	**D0-15**	--
	Tests D_0				--
8	REQUIREMENTS FOR CONSTRUCTION AND OPERATION				--
8.5	Operating characteristics				
9.9	Verification of the operating characteristic				
9.9.1	RCBO installed as for normal use, test circuit according to figure 4				P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting				N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.	50/60Hz			P
	Tests performed with no load at 20 ± 5°C	21°C			P
9.9.1.4	For RCBOs functionally dependent on line voltage each test is made at:				
	- 1,1 U_N (V) and..... :				N/A
	- 0,85 U_N (V)..... :				N/A
	- 0,80 U_N (V)..... :	184V			P

Table 2	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, 500A **b)**	$I_{\Delta t}$ **c)**		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break	--

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Clause	Requirement + Test						Result - Remark				Verdict
			0,03	0,3	0,15	--	0,04	0,04	0,04	times	--
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--
	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.										--
9.9.1.2	Tests for all RCBOs										P
a)	Verification of the correct operation in case of a steady increase of residual current:						[mA]		[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$ (mA).....:						22,6~23,2		22,7~23,1	22,4~23,2	P
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed):						[ms]		[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the specified limiting value (ms).....:						52		52	55	P
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):										
	Maximum break times at:						[ms]		[ms]	[ms]	--
	- $I_{\Delta N}$.....:						49		54	49	P
	- 2 $I_{\Delta N}$.....:						47		43	43	P
	- 5 $I_{\Delta N}$ or .....:						31		31	28	P
	- 0,25 A .....:						-		-	-	N/A
	- $I_{\Delta t}$ 630 A .....:						20		18	15	P
	No value exceeds the relevant specified limiting value										P
	Additional test for type S:										
	Minimum non-actuating time at:						[ms]		[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s										N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A among the following list: 5A - 10A - 20A - 50A - 100A - 200A by closing S_2, (S_1 and RCBO in closed position):	[ms]	[ms]	[ms]	P
	- 5A	17	16	16	P
	- 10A	15	16	13	P
	- 20A	15	15	13	P
	- 50A	12	15	12	P
	- 100A	16	15	14	P
	- 200A	13	15	12	P
	- 500A	15	18	13	P
	No value exceeds the relevant specified limiting value				P
f) 1)	Tests repeated at -5°C:	Tested at -25°C			
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	50	54	51	P
	- 2 $I_{\Delta N}$.....:	40	42	44	P
	- 5 $I_{\Delta N}$ or .....:	29	30	30	P
	- 0,25 A .....:	-	-	-	N/A
	- $I_{\Delta t}$ 630 A .....:	20	18	17	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
e)	Tests repeated, with the pole under test and one other pole of the RCBO loaded with rated current, current being established shortly before the test.	I_N = 63A			P
	Cross-section (mm²).....:	16mm²			--
	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	-no value exceeds the specified limiting value	55	50	50	P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_2, (S_1 and RCBO in closed position):				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	52	48	46	P
	- 2 $I_{\Delta N}$.....:	45	41	45	P
	- 5 $I_{\Delta N}$ or .....:	30	32	29	P
	- 0,25 A .....:	-	-	-	N/A
	- $I_{\Delta t}$ 630 A .....:	16	18	16	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
f) 2)	Tests repeated with the RCBO loaded with rated current I_N at +40°C until steady-state conditions are reached	I_N = 63A (tested at +55°C)			P
	Cross-section (mm²).....:	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--

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Clause	Requirement + Test		Result - Remark		Verdict
	- $I_{\Delta N}$ ..... :		54	55	51	P
	- 2 $I_{\Delta N}$ ..... :		43	41	45	P
	- 5 $I_{\Delta N}$ or ..... :		28	31	30	P
	- 0,25 A ..... :		-	-	-	N/A
	- $I_{\Delta t}$ 630 A ..... :		18	20	15	P
	No value exceeds the relevant specified limiting value					P
	Additional test for type S:					
	Minimum non-actuating time at:		[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s					N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s					N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s					N/A
	- $I_{\Delta t}$ ..... 0,04 s					N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2					N/A
	No tripping during tests					N/A
8.15	**Behaviour of RCBOs in case of earth fault currents comprising a DC component**					
9.9.1.3	Verification of the correct operation at residual currents with DC components					
	Type A residual current devices					
	RCBO installed as for normal use, test circuits according to figures 5 and 6					P
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.		50 and 60Hz			P
	For RCBOs functionally dependent on line voltage each test is made at					
	- 1,1 U_N ..... :					N/A
	- 0,85 U_N ..... :					N/A
	- 0,80 U_N ..... :		184V			P
a)	Verification of the correct operation in case of a continuous rise of the residual pulsating direct current (S_1, S_2 and RCBO closed)					
	Test acc. figure 5					--
	Angle α	Tripping current (A)				--
		Lower limit	Upper limit			--
	0°	0,35 $I_{\Delta N}$	1,4 $I_{\Delta N}$ or 2 $I_{\Delta N}$			--

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Clause	Requirement + Test						Result - Remark				Verdict
	90°		0,25 $I_{\Delta N}$		(sub-clause 5.3.8)						--
	135°		0,11 $I_{\Delta N}$								--
	Steady increase from zero to:						[mA]	[mA]	[mA]		--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s						$I_{\Delta N}$ = 30mA				P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s						$I_{\Delta N}$ = mA				N/A
	α = 0° +/- .....:						20,5	20,5	20,6		P
	α = 90° +/- .....:						20,8	20,8	20,8		P
	α = 135° +/- .....:						27,4	27,4	27,5		P
	No value exceeds the relevant specified limiting values										P
b)	Verification of the correct operation in case of suddenly appearing residual pulsating direct currents by closing S_2 (S_1 and RCBO in closed position)										
Table 3				Maximum values of break time and non-actuating time (s) for type A RCBOs in the event of half-wave pulsating residual currents (r.m.s. values) equal to							--
	Type	**I_N A**	**$I_{\Delta N}$ A**	**1,4 $I_{\Delta N}$**	**2 $I_{\Delta N}$**	**2,8 $I_{\Delta N}$**	**4 $I_{\Delta N}$**	**7 $I_{\Delta N}$**	**0,35 A**	**0,5 A**	--
	General	Any value	<0,03		0,3		0,15			0,05	--
		Any value	0,03	0,3		0,15			0,04		--
		Any value	>0,03	0,3		0,15		0,04			--
	S	≥ 25	>0,03	0,5		0,2		0,15			--
	a) This value shall be limited to the lower limit of the overcurrent instantaneous tripping ranges according to type B, C or D, as applicable.										--
	Test acc. figure 5										--
	Angle α .....:						α = 0°				--
	RCBOs with $I_{\Delta N}$ < 0,03 A						$I_{\Delta N}$ = mA				N/A
	Maximum break times at:						[ms]	[ms]	[ms]		--
	- 2 $I_{\Delta N}$ +/- .....:										N/A
	- 4 $I_{\Delta N}$ +/- .....:										N/A
	- 0,5 A +/- .....:										N/A
	- 350A or +/- .....:										N/A
	- $I_{\Delta t}$ ___ A +/- .....:										N/A
	RCBOs with $I_{\Delta N}$ = 0,03 A						$I_{\Delta N}$ = 0,03 A				P
	Maximum break times at:						[ms]	[ms]	[ms]		--
	- 1,4 $I_{\Delta N}$ +/- .....:						32	32	31		P
	- 2,8 $I_{\Delta N}$ +/- .....:						25	25	26		P
	- 0,35 A +/- .....:						20	18	16		P

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Clause	Requirement + Test	Result - Remark			Verdict
	- 350A or +/- .....:	-	-	-	N/A
	- $I_{\Delta t}$ 630 A +/- .....:	15	15	14	P
	RCBOs with $I_{\Delta N}$ > 0,03 A				N/A
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 1,4 $I_{\Delta N}$ +/- .....:				N/A
	- 2,8 $I_{\Delta N}$ +/- .....:				N/A
	- 7 $I_{\Delta N}$ +/- .....:				N/A
	- 350A or +/- .....:				N/A
	- $I_{\Delta t}$ ___ A +/- .....:				N/A
	No value exceeds the specified limiting values				P
c)	Verification of the correct operation with the pole under test and one other pole loaded with rated current I_N	I_N = 63A			P
	Test acc. 9.9.1.3 a) repeated, pole under test an one other pole loaded with rated current				--
	Steady increase from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = 30mA			P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	α = 0° +/- .....:	20,7	20,6	20,6	P
	α = 90° +/- .....:	20,8	20,8	20,8	P
	α = 135° +/- .....:	27,5	27,6	27,5	P
	No value exceeds the relevant specified limiting values				P
d)	Verification of the correct operation in case of residual pulsating direct currents with α = 0° superimposed by smooth direct current of 0,006 A				
	Test acc. figure 6				--
	Steady increase of pulsating DC current from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s	$I_{\Delta N}$ = 30mA			P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	(I_1) α = 0° +/- .....: (I_0) 6mA DC +/- .....:	20,9	21,0	21,3	P
	No value exceeds the relevant specified limiting values				P
9.1.7 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A				
	Test acc. 9.9.1.3 d) but the smooth direct current of 0,006 A replaced by 0,01 A				

IEC 62423						
Clause	Requirement + Test				Result - Remark	Verdict
	Verification of the correct operation in case of residual pulsating d.c. currents with angle α = 0° superimposed by smooth direct current of 0,01 A:					
	Steady increase of pulsating DC current from zero to:				[mA] [mA] [mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s					N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s					N/A
	(I_1) α = 0° +/- .....: (I_0) 10mA DC +/- .....:					N/A
9.1.2 addition acc. IEC 62423	Verification of the correct operation in case of steady increase of composite residual current					
	starting composite residual current:					
	Different frequency component values of test currents for calibration (RMS)			Composite starting current value (RMS)		
	$I_{at\ rated\ frequency}$	I_{1kHz}	$I_{F\ motor\ (10Hz)}$	I_{Δ}		
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$		
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA] [mA] [mA]	--
	tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$.....:				27,6~28,8 27,7~29,1 27,4~28,7	P
9.1.3 addition acc. IEC 62423	Verification of the correct operation in case of sudden appearance of composite residual current					
	composite residual current acc. 9.1.2					P
	S1 and RCBO in the closed position, residual current suddenly established by closing S2				[mA] [mA] [mA]	--
	RCBO trip with a test current of 7 $I_{\Delta n}$.....:				21 20 18	P
	max. break time:					
	- general type RCBOs: 40ms					P
	- S type RCBOs: 150ms					N/A
	Additional test for type S:					--
	- minimum non-actuating time at: 7 $I_{\Delta n}$; 0,05 s .....:					--
	No tripping during tests					P
9.2.1.7.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the correct operation in case of residual smooth direct current without load for ratings of $I_{\Delta n}$ not tested in D_1, test acc. figure 6b					
a)	Verification of the correct operation in case of a steady increase residual smooth direct current:					
	Test switch S_1 and S_2 and RCBO in closed position					P

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Clause	Requirement + Test	Result - Remark			Verdict
	- Steady increase from 0,2 $I_{\Delta N}$ to 2 $I_{\Delta N}$ within 30s	[mA]	[mA]	[mA]	--
	Tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA)..... :	30,7	30,5	30,8	P
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 2 $I_{\Delta N}$..... :	25	25	25	P
	- 4 $I_{\Delta N}$..... :	25	25	25	P
	- 10 $I_{\Delta N}$..... :	25	26	25	P
	No value exceeds the relevant specified limiting value				P

	TEST SEQUENCE "D": **3 samples: D63, I∆n= 0,03A, 3P+N** **Ambient temperature -25~+55°C**	**D0-16**	**D0-17**	**D0-18**	--
	Tests D_0				--
8	REQUIREMENTS FOR CONSTRUCTION AND OPERATION				--
8.5	Operating characteristics				
9.9	Verification of the operating characteristic				
9.9.1	RCBO installed as for normal use, test circuit according to figure 4				P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting				N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.	50/60Hz			P
	Tests performed with no load at 20 ± 5°C	21°C			P
9.9.1.4	For RCBOs functionally dependent on line voltage each test is made at:				
	- 1,1 U_N (V) and..... :				N/A
	- 0,85 U_N (V)..... :				N/A
	- 0,80 U_N (V)..... :	320V			P

Table 2	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, 500A **b)**	$I_{\Delta t}$ **c)**		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break	--

IEC 62423											
Clause	Requirement + Test						Result - Remark				Verdict
			0,03	0,3	0,15	--	0,04	0,04	0,04	times	--
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--
	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.										--
9.9.1.2	Tests for all RCBOs										P
a)	Verification of the correct operation in case of a steady increase of residual current:						[mA]	[mA]	[mA]		--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$ (mA).....:						21,9~22,6	21,7~22,4	21,6~22,3		P
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed):						[ms]	[ms]	[ms]		--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the specified limiting value (ms).....:						54	53	50		P
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):										
	Maximum break times at:						[ms]	[ms]	[ms]		--
	- $I_{\Delta N}$.....:						52	48	52		P
	- 2 $I_{\Delta N}$.....:						42	45	44		P
	- 5 $I_{\Delta N}$ or .....:						31	30	29		P
	- 0,25 A .....:						-	-	-		N/A
	- $I_{\Delta t}$ 630 A .....:						19	17	17		P
	No value exceeds the relevant specified limiting value										P
	Additional test for type S:										
	Minimum non-actuating time at:						[ms]	[ms]	[ms]		--
	- $I_{\Delta N}$ ..... 0,13 s										N/A

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A among the following list: 5A - 10A - 20A - 50A - 100A - 200A by closing S_2, (S_1 and RCBO in closed position):	[ms]	[ms]	[ms]	P
	- 5A	17	15	13	P
	- 10A	14	12	17	P
	- 20A	15	15	14	P
	- 50A	16	14	15	P
	- 100A	15	12	15	P
	- 200A	18	11	13	P
	- 500A	12	14	15	P
	No value exceeds the relevant specified limiting value				P
f) 1)	Tests repeated at -5°C:	Tested at -25°C			
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	59	55	54	P
	- 2 $I_{\Delta N}$.....:	40	43	45	P
	- 5 $I_{\Delta N}$ or .....:	30	34	29	P
	- 0,25 A .....:	-	-	-	N/A
	- $I_{\Delta t}$ 630 A .....:	18	16	20	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
e)	Tests repeated, with the pole under test and one other pole of the RCBO loaded with rated current, current being established shortly before the test.	I_N = 63A			P
	Cross-section (mm²).....:	16mm²			--
	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	-no value exceeds the specified limiting value	51	54	55	P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_2, (S_1 and RCBO in closed position):				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	50	52	55	P
	- 2 $I_{\Delta N}$.....:	40	42	43	P
	- 5 $I_{\Delta N}$ or .....:	32	27	28	P
	- 0,25 A .....:	-	-	-	N/A
	- $I_{\Delta t}$ 630 A .....:	19	17	16	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
f) 2)	Tests repeated with the RCBO loaded with rated current I_N at +40°C until steady-state conditions are reached	I_N = 63A (tested at +55°C)			P
	Cross-section (mm²).....:	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--

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Clause	Requirement + Test		Result - Remark		Verdict
	- $I_{\Delta N}$ ..... :		57	54 55	P
	- 2 $I_{\Delta N}$ ..... :		45	46 40	P
	- 5 $I_{\Delta N}$ or ..... :		31	30 28	P
	- 0,25 A ..... :		-	- -	N/A
	- $I_{\Delta t}$ 630 A ..... :		20	19 16	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:		[ms]	[ms] [ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
8.15	**Behaviour of RCBOs in case of earth fault currents comprising a DC component**				
9.9.1.3	Verification of the correct operation at residual currents with DC components				
	Type A residual current devices				
	RCBO installed as for normal use, test circuits according to figures 5 and 6				P
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.		50 and 60Hz		P
	For RCBOs functionally dependent on line voltage each test is made at				
	- 1,1 U_N ..... :				N/A
	- 0,85 U_N ..... :				N/A
	- 0,80 U_N ..... :		320V		P
a)	Verification of the correct operation in case of a continuous rise of the residual pulsating direct current (S_1, S_2 and RCBO closed)				
	Test acc. figure 5				--
	Angle α	Tripping current (A)			--
		Lower limit	Upper limit		--
	0°	0,35 $I_{\Delta N}$	1,4 $I_{\Delta N}$ or 2 $I_{\Delta N}$		--

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Clause	Requirement + Test						Result - Remark				Verdict
	90°		0,25 $I_{\Delta N}$	(sub-clause 5.3.8)							--
	135°		0,11 $I_{\Delta N}$								--
	Steady increase from zero to:						[mA]	[mA]	[mA]		--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s						$I_{\Delta N}$ = 30mA				P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s						$I_{\Delta N}$ = mA				N/A
	α = 0° +/- .....:						20,6	21,3	21,4		P
	α = 90° +/- .....:						23,2	23,4	23,3		P
	α = 135° +/- .....:						36,4	36,4	36,5		P
	No value exceeds the relevant specified limiting values										P
b)	Verification of the correct operation in case of suddenly appearing residual pulsating direct currents by closing S_2 (S_1 and RCBO in closed position)										
Table 3				Maximum values of break time and non-actuating time (s) for type A RCBOs in the event of half-wave pulsating residual currents (r.m.s. values) equal to							--
	Type	**I_N A**	**$I_{\Delta N}$ A**	**1,4 $I_{\Delta N}$**	**2 $I_{\Delta N}$**	**2,8 $I_{\Delta N}$**	**4 $I_{\Delta N}$**	**7 $I_{\Delta N}$**	**0,35 A**	**0,5 A**	--
	General	Any value	<0,03		0,3		0,15			0,05	--
		Any value	0,03	0,3		0,15			0,04		--
		Any value	>0,03	0,3		0,15		0,04			--
	S	≥ 25	>0,03	0,5		0,2		0,15			--
	a) This value shall be limited to the lower limit of the overcurrent instantaneous tripping ranges according to type B, C or D, as applicable.										--
	Test acc. figure 5										--
	Angle α .....:						α = 0°				--
	RCBOs with $I_{\Delta N}$ < 0,03 A						$I_{\Delta N}$ = mA				N/A
	Maximum break times at:						[ms]	[ms]	[ms]		--
	- 2 $I_{\Delta N}$ +/- .....:										N/A
	- 4 $I_{\Delta N}$ +/- .....:										N/A
	- 0,5 A +/- .....:										N/A
	- 350A or +/- .....:										N/A
	- $I_{\Delta t}$ ___ A +/- .....:										N/A
	RCBOs with $I_{\Delta N}$ = 0,03 A						$I_{\Delta N}$ = 0,03 A				P
	Maximum break times at:						[ms]	[ms]	[ms]		--
	- 1,4 $I_{\Delta N}$ +/- .....:						30	29	28		P
	- 2,8 $I_{\Delta N}$ +/- .....:						24	26	23		P
	- 0,35 A +/- .....:						20	22	19		P

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Clause	Requirement + Test	Result - Remark			Verdict
	- 350A or +/- .....:	-	-	-	N/A
	- $I_{\Delta t}$ 630 A +/- .....:	15	16	14	P
	RCBOs with $I_{\Delta N}$ > 0,03 A				N/A
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 1,4 $I_{\Delta N}$ +/- .....:				N/A
	- 2,8 $I_{\Delta N}$ +/- .....:				N/A
	- 7 $I_{\Delta N}$ +/- .....:				N/A
	- 350A or +/- .....:				N/A
	- $I_{\Delta t}$ ___ A +/- .....:				N/A
	No value exceeds the specified limiting values				P
c)	Verification of the correct operation with the pole under test and one other pole loaded with rated current I_N	I_N = 63A			P
	Test acc. 9.9.1.3 a) repeated, pole under test an one other pole loaded with rated current				--
	Steady increase from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = 30mA			P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	α = 0° +/- .....:	20,8	21,3	21,4	P
	α = 90° +/- .....:	22,9	23,2	23,4	P
	α = 135° +/- .....:	36,2	36,1	36,4	P
	No value exceeds the relevant specified limiting values				P
d)	Verification of the correct operation in case of residual pulsating direct currents with α = 0° superimposed by smooth direct current of 0,006 A				
	Test acc. figure 6				--
	Steady increase of pulsating DC current from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s	$I_{\Delta N}$ = 30mA			P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	(I_1) α = 0° +/- .....: (I_0) 6mA DC +/- .....:	21,2	21,4	21,5	P
	No value exceeds the relevant specified limiting values				P
9.1.7 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A				
	Test acc. 9.9.1.3 d) but the smooth direct current of 0,006 A replaced by 0,01 A				

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Clause	Requirement + Test				Result - Remark	Verdict
	Verification of the correct operation in case of residual pulsating d.c. currents with angle α = 0° superimposed by smooth direct current of 0,01 A:					
	Steady increase of pulsating DC current from zero to:				[mA] [mA] [mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s					N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s					N/A
	(I_1) α = 0° +/- .....: (I_0) 10mA DC +/- .....:					N/A
9.1.2 addition acc. IEC 62423	Verification of the correct operation in case of steady increase of composite residual current					
	starting composite residual current:					
	Different frequency component values of test currents for calibration (RMS)			Composite starting current value (RMS)		
	$I_{at\ rated\ frequency}$	I_{1kHz}	$I_{F\ motor\ (10Hz)}$	I_{Δ}		
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$		
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA] [mA] [mA]	--
	tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$.....:				30,7~32,2 30,5~31,9 30,7~32,1	P
9.1.3 addition acc. IEC 62423	Verification of the correct operation in case of sudden appearance of composite residual current					
	composite residual current acc. 9.1.2					P
	S1 and RCBO in the closed position, residual current suddenly established by closing S2				[mA] [mA] [mA]	--
	RCBO trip with a test current of 7 $I_{\Delta n}$.....:				19 22 17	P
	max. break time:					
	- general type RCBOs: 40ms					P
	- S type RCBOs: 150ms					N/A
	Additional test for type S:					--
	- minimum non-actuating time at: 7 $I_{\Delta n}$; 0,05 s .....:					--
	No tripping during tests					P
9.2.1.7.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the correct operation in case of residual smooth direct current without load for ratings of $I_{\Delta n}$ not tested in D_1, test acc. figure 6b					
a)	Verification of the correct operation in case of a steady increase residual smooth direct current:					
	Test switch S_1 and S_2 and RCBO in closed position					P

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Clause	Requirement + Test	Result - Remark			Verdict
	- Steady increase from 0,2 $I_{\Delta N}$ to 2 $I_{\Delta N}$ within 30s	[mA]	[mA]	[mA]	--
	Tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA)..... :	31,2	30,9	31,0	P
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 2 $I_{\Delta N}$..... :	25	25	25	P
	- 4 $I_{\Delta N}$..... :	25	26	25	P
	- 10 $I_{\Delta N}$..... :	25	25	25	P
	No value exceeds the relevant specified limiting value				P

	TEST SEQUENCE "D": **2 samples: D63, I∆n= 0,1A & 0,3A, 1P+N**	**D0-19**	**D0-20**	--
	Tests D_0			--
8	REQUIREMENTS FOR CONSTRUCTION AND OPERATION			--
8.5	Operating characteristics			
9.9	Verification of the operating characteristic			
9.9.1	RCBO installed as for normal use, test circuit according to figure 4			P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting			N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.	50/60Hz		P
	Tests performed with no load at 20 ± 5°C	21°C		P
9.9.1.4	For RCBOs functionally dependent on line voltage each test is made at:			
	- 1,1 U_N (V) and..... :			N/A
	- 0,85 U_N (V)..... :			N/A
	- 0,80 U_N (V)..... :	184V		P

Table 2	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, 500A **b)**	$I_{\Delta t}$ **c)**		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--

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Clause	Requirement + Test							Result - Remark			Verdict
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--
	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.										--
9.9.1.2	Tests for all RCBOs										P
a)	Verification of the correct operation in case of a steady increase of residual current:							[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$ (mA).....:							80,1~82,5	224~235		P
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed):							[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the specified limiting value (ms).....:							50	45		P
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):										
	Maximum break times at:							[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:							52	46		P
	- 2 $I_{\Delta N}$.....:							45	40		P
	- 5 $I_{\Delta N}$ or .....:							30	29		P
	- 0,25 A .....:							-	-		N/A
	- $I_{\Delta t}$ 630 A .....:							16	15		P
	No value exceeds the relevant specified limiting value										P
	Additional test for type S:										
	Minimum non-actuating time at:							[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s										N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s										N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A among the following list: 5A - 10A - 20A - 50A - 100A - 200A by closing S_2, (S_1 and RCBO in closed position):	[ms]	[ms]	[ms]	P
	- 5A	15	16		P
	- 10A	12	13		P
	- 20A	12	15		P
	- 50A	14	18		P
	- 100A	14	14		P
	- 200A	12	12		P
	- 500A	17	14		P
	No value exceeds the relevant specified limiting value				P
f) 1)	Tests repeated at -5°C:	Tested at -25°C			
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	54	54		P
	- 2 $I_{\Delta N}$.....:	41	39		P
	- 5 $I_{\Delta N}$ or .....:	31	31		P
	- 0,25 A .....:	-	-		N/A
	- $I_{\Delta t}$ 630 A .....:	19	19		P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
e)	Tests repeated, with the pole under test and one other pole of the RCBO loaded with rated current, current being established shortly before the test.	I_N = 63A			P
	Cross-section (mm²).....:	16mm²			--
	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	-no value exceeds the specified limiting value	50	49		P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_2, (S_1 and RCBO in closed position):				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$.....:	47	51		P
	- 2 $I_{\Delta N}$.....:	36	35		P
	- 5 $I_{\Delta N}$ or .....:	28	29		P
	- 0,25 A .....:	-	-		N/A
	- $I_{\Delta t}$ 630 A .....:	17	19		P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
f) 2)	Tests repeated with the RCBO loaded with rated current I_N at +40°C until steady-state conditions are reached	I_N = 63A (tested at +55°C)			P
	Cross-section (mm²).....:	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--

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Clause	Requirement + Test		Result - Remark		Verdict
	- $I_{\Delta N}$ ..... :		50	53	P
	- 2 $I_{\Delta N}$ ..... :		42	41	P
	- 5 $I_{\Delta N}$ or ..... :		28	29	P
	- 0,25 A ..... :		-	-	N/A
	- $I_{\Delta t}$ 630 A ..... :		19	20	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:		[ms]	[ms]	[ms]
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
8.15	**Behaviour of RCBOs in case of earth fault currents comprising a DC component**				
9.9.1.3	Verification of the correct operation at residual currents with DC components				
	Type A residual current devices				
	RCBO installed as for normal use, test circuits according to figures 5 and 6				P
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.		50 and 60Hz		P
	For RCBOs functionally dependent on line voltage each test is made at				
	- 1,1 U_N ..... :				N/A
	- 0,85 U_N ..... :				N/A
	- 0,80 U_N ..... :		184V		P
a)	Verification of the correct operation in case of a continuous rise of the residual pulsating direct current (S_1, S_2 and RCBO closed)				
	Test acc. figure 5				--
	Angle α	Tripping current (A)			--
		Lower limit	Upper limit		--
	0°	0,35 $I_{\Delta N}$	1,4 $I_{\Delta N}$ or 2 $I_{\Delta N}$		--

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Clause	Requirement + Test						Result - Remark				Verdict
	90°	0,25 $I_{\Delta N}$	(sub-clause 5.3.8)								--
	135°	0,11 $I_{\Delta N}$									--
	Steady increase from zero to:						[mA]	[mA]	[mA]		--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s						100mA	-	-		P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s						-	300mA	-		P
	α = 0° +/- .....:						64,5	195			P
	α = 90° +/- .....:						64,8	202			P
	α = 135° +/- .....:						79,5	258			P
	No value exceeds the relevant specified limiting values										P
b)	Verification of the correct operation in case of suddenly appearing residual pulsating direct currents by closing S_2 (S_1 and RCBO in closed position)										
Table 3				Maximum values of break time and non-actuating time (s) for type A RCBOs in the event of half-wave pulsating residual currents (r.m.s. values) equal to							--
	Type	**I_N A**	**$I_{\Delta N}$ A**	**1,4 $I_{\Delta N}$**	**2 $I_{\Delta N}$**	**2,8 $I_{\Delta N}$**	**4 $I_{\Delta N}$**	**7 $I_{\Delta N}$**	**0,35 A**	**0,5 A**	--
	General	Any value	<0,03		0,3		0,15			0,05	--
		Any value	0,03	0,3		0,15			0,04		--
		Any value	>0,03	0,3		0,15		0,04			--
	S	≥ 25	>0,03	0,5		0,2		0,15			--
	a) This value shall be limited to the lower limit of the overcurrent instantaneous tripping ranges according to type B, C or D, as applicable.										--
	Test acc. figure 5										--
	Angle α .....:						α = 0°				--
	RCBOs with $I_{\Delta N}$ < 0,03 A						$I_{\Delta N}$ = mA				N/A
	Maximum break times at:						[ms]	[ms]	[ms]		--
	- 2 $I_{\Delta N}$ +/- .....:										N/A
	- 4 $I_{\Delta N}$ +/- .....:										N/A
	- 0,5 A +/- .....:										N/A
	- 350A or +/- .....:										N/A
	- $I_{\Delta t}$ ___ A +/- .....:										N/A
	RCBOs with $I_{\Delta N}$ = 0,03 A						$I_{\Delta N}$ = ___ A				N/A
	Maximum break times at:						[ms]	[ms]	[ms]		--
	- 1,4 $I_{\Delta N}$ +/- .....:										N/A
	- 2,8 $I_{\Delta N}$ +/- .....:										N/A
	- 0,35 A +/- .....:										N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	- 350A or +/- .....:				N/A
	- $I_{\Delta t}$ 630 A +/- .....:				N/A
	RCBOs with $I_{\Delta N}$ > 0,03 A	100mA	300mA	-	P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 1,4 $I_{\Delta N}$ +/- .....:	31	34		P
	- 2,8 $I_{\Delta N}$ +/- .....:	24	25		P
	- 7 $I_{\Delta N}$ +/- .....:	18	19		P
	- 350A or +/- .....:	-	-		N/A
	- $I_{\Delta t}$ 630 A +/- .....:	13	14		P
	No value exceeds the specified limiting values				P
c)	Verification of the correct operation with the pole under test and one other pole loaded with rated current I_N	I_N = 63A			P
	Test acc. 9.9.1.3 a) repeated, pole under test an one other pole loaded with rated current				--
	Steady increase from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$ /30 A/s	100mA	-	-	P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	-	300mA	-	P
	α = 0° +/- .....:	64,5	197		P
	α = 90° +/- .....:	65,2	199		P
	α = 135° +/- .....:	79,6	257		P
	No value exceeds the relevant specified limiting values				P
d)	Verification of the correct operation in case of residual pulsating direct currents with α = 0° superimposed by smooth direct current of 0,006 A				
	Test acc. figure 6				--
	Steady increase of pulsating DC current from zero to:	[mA]	[mA]	[mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s	100mA	300mA	-	P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s	$I_{\Delta N}$ = mA			N/A
	(I_1) α = 0° +/- .....: (I_0) 6mA DC +/- .....:	82,1	242		P
	No value exceeds the relevant specified limiting values				P
9.1.7 addition acc. IEC 62423	**Only applicable for RCBOs of type F:** Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A				
	Test acc. 9.9.1.3 d) but the smooth direct current of 0,006 A replaced by 0,01 A				

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Clause	Requirement + Test				Result - Remark	Verdict
	Verification of the correct operation in case of residual pulsating d.c. currents with angle α = 0° superimposed by smooth direct current of 0,01 A:					
	Steady increase of pulsating DC current from zero to:				[mA] [mA] [mA]	--
	- 1,4 $I_{\Delta N}$ for $I_{\Delta N}$ > 0,01A with 1,4 $I_{\Delta N}$/30 A/s					N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s					N/A
	(I_1) α = 0° +/- .....: (I_0) 10mA DC +/- .....:				- - -	N/A
9.1.2 addition acc. IEC 62423	Verification of the correct operation in case of steady increase of composite residual current					
	starting composite residual current:					
	Different frequency component values of test currents for calibration (RMS)			Composite starting current value (RMS)		
	$I_{at\ rated\ frequency}$	I_{1kHz}	$I_{F\ motor\ (10Hz)}$	I_{Δ}		
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$		
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA] [mA] [mA]	--
	tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$.....:				99,2~102 282~287	P
9.1.3 addition acc. IEC 62423	Verification of the correct operation in case of sudden appearance of composite residual current					
	composite residual current acc. 9.1.2					P
	S1 and RCBO in the closed position, residual current suddenly established by closing S2				[ms] [ms] [ms]	--
	RCBO trip with a test current of 7 $I_{\Delta n}$.....:				19 18	P
	max. break time:					
	- general type RCBOs: 40ms					P
	- S type RCBOs: 150ms					N/A
	Additional test for type S:					--
	- minimum non-actuating time at: 7 $I_{\Delta n}$; 0,05 s .....:					--
	No tripping during tests					P
9.2.1.7.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the correct operation in case of residual smooth direct current without load for ratings of $I_{\Delta n}$ not tested in D_1, test acc. figure 6b					
a)	Verification of the correct operation in case of a steady increase residual smooth direct current:					
	Test switch S_1 and S_2 and RCBO in closed position					P

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Clause	Requirement + Test	Result - Remark			Verdict
	- Steady increase from 0,2 $I_{\Delta N}$ to 2 $I_{\Delta N}$ within 30s	[mA]	[mA]	[mA]	--
	Tripping current between 0,5 $I_{\Delta n}$ and 2 $I_{\Delta n}$ (mA) ..... :	96,3	275		P
b)	The test circuit being successively calibrated at each of the values of residual current specified in Table 1 (except 5A, 10A, 20A, 50A, 100A and 200A), the test switch S_1 and the RCBO being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I or II chosen at random				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 2 $I_{\Delta N}$ ..... :	25	25		P
	- 4 $I_{\Delta N}$ ..... :	26	25		P
	- 10 $I_{\Delta N}$ ..... :	25	25		P
	No value exceeds the relevant specified limiting value				P

	TEST SEQUENCE "E": **3 samples: D63, $I_{\Delta n}$= 0,03A, 1P+N**	**E1**	**E2**	**E3**	**--**
	Tests E_0				**--**
9.9	**Verification of the operating characteristics**				
9.9.2	Verification of the Operating characteristics under overcurrent conditions				
	I_N (A) ..... :	63A			--
	Cross-section (mm²) ..... :	16mm²			--
	Instantaneous tripping current (B / C / D) ..... :	D			--
9.9.2.1	Test of time-current characteristic				
a)	Test current 1,13 I_N starting from cold for ..... :	1,13I_N = 71,2A			--
	- 1 h ($I_N \leq$ 63 A)	>1h	>1h	>1h	P
	- 2 h ($I_N >$ 63 A)	-	-	-	N/A
	No tripping				P
	Then steadily increased within 5 s to 1,45 I_N ..... :	1,45I_N = 91,4A			--
	Tripping within	[min]	[min]	[min]	--
	- 1h ($\leq$ 63 A) ..... :	2min36s	3min09s	2min28s	P
	- 2h (> 63 A) ..... :	-	-	-	N/A
b)	Test current 2,55 I_N starting from cold ..... :	2,55I_N = 161A			--
	Opening time not less than 1 s or more than	[s]	[s]	[s]	--
	- 60 s ($\leq$ 32 A) ..... :	-	-	-	N/A
	- 120 s (> 32 A) ..... :	17	19	17	P
9.9.2.2	Test of instantaneous tripping:				

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Clause	Requirement + Test	Result - Remark			Verdict
a)	General test conditions				
	For the lower values of the test current of 9.9.2.2.b), 9.9.2.2.c) and 9.9.2.2.d) respectively the test is made once, at any convenient voltage				P
	For the upper value of the test current, the two following tests are carried out:				
	- At any convenient voltage, one opening operation on each combination of two poles connected in series. The tripping time is measured and be within the limits of Table 10. test results see b) or c) or d)				P
	- At rated voltage U_0 (phase to neutral) with a power factor between 0,95 and 1 separately on each protected pole of the RCBO The sequence of operation is: O-t-CO-t-CO-t-CO Interval time: > 3 min.				P
	The tripping time of the O operation is measured	[ms]	[ms]	[ms]	--
		9,27	9,22	9,26	P
	After each operation the indication means show the open position of the contacts				P
b)	☐ B				N/A
	Test current 3 I_N starting from cold..... :	3 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s..... :	-	-	-	N/A
	Test current 5 I_N starting from cold..... :	5 I_N = A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s ..... :	-	-	-	N/A
c)	☐ C				P
	Test current 5 I_N starting from cold..... :	5I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s..... :	-	-	-	N/A
	Test current 10 I_N starting from cold..... :	10I_N = A			--
		[ms]	[ms]	[ms]	--
	- Tripping time less than 0,1 s ..... :	-	-	-	N/A
d)	☒ D				N/A
	Test current 10 I_N starting from cold..... :	10 I_N = 630A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s..... :	1,12	0,89	1,26	P
	Test current 20 I_N starting from cold..... :	20 I_N = 1260A			--
		[ms]	[ms]	[ms]	--

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Clause	Requirement + Test	Result - Remark			Verdict
	- Tripping time less than 0,1 s ..... :	7,81	8,15	8,26	P
9.9.2.3	Test of effect of ambient temperature on the tripping characteristics:				
a)	Ambient temperature of (- 5 ± 2)°C..... :	-5°C			--
	Test current 1,13 I_N ..... :	1,13I_N = 71,2A			--
	- passed for 1 h	>1h	>1h	>1h	P
	- passed for 2 h	-	-	-	N/A
	Current is then steadily increased within 5s to 1,9 I_N..... :	1,9I_N = 120A			--
	Tripping:	[min]	[min]	[min]	--
	- 1 h..... :	47s	59s	48s	P
	- 2 h..... :	-	-	-	N/A
b)	Ambient temperature of (40 ± 2)°C..... :	40°C			--
	Test current I_N ..... :	I_N = +40A			--
	No tripping within				--
	- 1 h..... :	>1h	>1h	>1h	P
	- 2 h..... :	-	-	-	N/A

	Tests E_1		--
8	**REQUIREMENTS FOR CONSTRUCTION AND OPERATION**		--
8.8	**Resistance to mechanical shock and impact**		
	RCBOs have adequate mechanical behaviour so as to withstand stresses imposed during installation and use		P
9.13	**Verification to resistance to mechanical shock and impact**		
9.13.1	Mechanical shock		
9.13.1.2	Test procedure:		
	- 50 falls of 40 mm on one side		P
	- 50 falls on opposite side		P
	C turned through 90°		
	- 50 falls on one side		P
	- 50 falls on opposite side		P
	No opening of RCBO during test		P
9.13.2	Mechanical impact		
	- 9.13.2.2 for RCBOs intended to be mounted on a rail		P
	- 9.13.2.3 for plug-in type RCBOs		N/A
9.13.2.1	Impact test:		

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Clause	Requirement + Test	Result - Remark			Verdict
	10 blows from a height of 10 cm				P
	No damage				P
9.13.2.2	RCBOs for rail mounting:				
	- downward vertical force of 50 N for 1 min				P
	- upward vertical force of 50 N for 1 min				P
	RCBO not become loose during test and do not show any damage impairing its further use				P
9.13.2.3	RCBOs of plug-in type				
	Under consideration				--
9.12.11.3	Test at 1500 A:				
	Prospective current of 1500 A	1500A			--
	Cross-section (mm²)..... :	25mm²			--
	Grid distance a (mm)..... :	a = 35mm			--
	Power factor 0,93 – 0,98 ..... :	0,93 - 0,98			--
	Prospective current obtained ..... :	1,53×10³A, 256V			--
	Power factor ..... :	0,96			--
	Test circuit: ..... :	Figure 7			--
	I_{peak} (A) max. value ..... :	2,11x10³	2,08x10³	2,04x10³	--
	Sequence: 6-O and 3-CO	[KA²s]	[KA²s]	[KA²s]	--
	I²t max ..... :	14,4	14,4	9,85	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				P
	No permanent arcing				P
	No flash-over between poles or between poles and frame				P
	No blowing of fuse				P
	No damage, polyethylene sheet shows no holes				P
9.12.12	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				
9.12.12.1.a)	Leakage current across open contacts, according to 9.7.7.3, each pole is supplied at a voltage 1,1 times Un= 264V. The RCBO is in the open position	[µA]	[µA]	[µA]	--
	The leakage current not exceed 2 mA ..... :	4,89	5,48	6,21	P
9.12.12.1.b)	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				
	Dielectric strength test:				
	Test voltage:				--

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Clause	Requirement + Test	Result - Remark			Verdict
	a) 1500 V				P
	b) 1500 V				P
	c) 1500 V				P
	d) 1500 V				N/A
	e) 2000 V				N/A
	During these tests, after the test has carried out under the conditions specified in 9.7.2 a), indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means show the closed position				P
9.12.12.1	Test current equal to 0,85 times the conventional non-tripping current for ..... :	60,6A			--
	- 1h starting from cold	>1h	>1h	>1h	P
	- 2h	-	-	-	N/A
	Increasing the current within 5s to 1,1 times the conventional tripping current	101A			--
	- tripping within	[min]	[min]	[min]	--
	- 1h (≤ 63 A) ..... :	1min22s	1min39s	1min07s	P
	- 2h (> 63 A) ..... :	-	-	-	N/A

	TEST SEQUENCE "E": **3 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**	**E4**	**E5**	**E6**	**--**
	Tests E_0				**--**
9.9	**Verification of the operating characteristics**				
9.9.2	Verification of the Operating characteristics under overcurrent conditions				
	I_N (A) ..... :	63A			--
	Cross-section (mm²) ..... :	16mm²			--
	Instantaneous tripping current (B / C / D) ..... :	D			--
9.9.2.1	Test of time-current characteristic				
a)	Test current 1,13 I_N starting from cold for ..... :	1,13I_N = 71,2A			--
	- 1 h ($I_N \leq$ 63 A)	>1h	>1h	>1h	P
	- 2 h (I_N > 63 A)	-	-	-	N/A
	No tripping				P
	Then steadily increased within 5 s to 1,45 I_N ..... :	1,45I_N = 91,4A			--
	Tripping within	[min]	[min]	[min]	--
	- 1h (≤ 63 A) ..... :	3min29s	3min41s	2min44s	P
	- 2h (> 63 A) ..... :	-	-	-	N/A
b)	Test current 2,55 I_N starting from cold ..... :	2,55I_N = 161A			--

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Clause	Requirement + Test	Result - Remark			Verdict
	Opening time not less than 1 s or more than	[s]	[s]	[s]	--
	- 60 s (≤ 32 A) ..... :	-	-	-	N/A
	- 120 s (> 32 A) ..... :	19	20	19	P
9.9.2.2	Test of instantaneous tripping:				
a)	General test conditions				
	For the lower values of the test current of 9.9.2.2.b), 9.9.2.2.c) and 9.9.2.2.d) respectively the test is made once, at any convenient voltage				P
	For the upper value of the test current, the two following tests are carried out:				
	- At any convenient voltage, one opening operation on each combination of two poles connected in series. The tripping time is measured and be within the limits of Table 10. test results see b) or c) or d)				P
	- At rated voltage U_0 (phase to neutral) with a power factor between 0,95 and 1 separately on each protected pole of the RCBO The sequence of operation is: O-t-CO-t-CO-t-CO Interval time: > 3 min.				P
	The tripping time of the O operation is measured	[ms]	[ms]	[ms]	--
		9,24	9,17	9,14	P
	After each operation the indication means show the open position of the contacts				P
b)	☐ B				N/A
	Test current 3 I_N starting from cold..... :	3 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s..... :	-	-	-	N/A
	Test current 5 I_N starting from cold..... :	5 I_N = A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s ..... :	-	-	-	N/A
c)	☐ C				P
	Test current 5 I_N starting from cold..... :	5I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s..... :	-	-	-	N/A
	Test current 10 I_N starting from cold..... :	10I_N = A			--
		[ms]	[ms]	[ms]	--
	- Tripping time less than 0,1 s ..... :	-	-	-	N/A
d)	☒ D				N/A
	Test current 10 I_N starting from cold..... :	10 I_N = 630A			--

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Clause	Requirement + Test	Result - Remark			Verdict
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s ..... :	0,93	0,84	1,14	P
	Test current 20 I_N starting from cold..... :	20 I_N = 1260A			--
		[ms]	[ms]	[ms]	--
	- Tripping time less than 0,1 s ..... :	8,14	8,31	8,14	P
9.9.2.3	Test of effect of ambient temperature on the tripping characteristics:				
a)	Ambient temperature of (- 5 ± 2)°C..... :	-5°C			--
	Test current 1,13 I_N ..... :	1,13I_N = 71,2A			--
	- passed for 1 h	>1h	>1h	>1h	P
	- passed for 2 h	-	-	-	N/A
	Current is then steadily increased within 5s to 1,9 I_N..... :	1,9I_N = 120A			--
	Tripping:	[min]	[min]	[min]	--
	- 1 h..... :	1min07s	52s	50s	P
	- 2 h..... :	-	-	-	N/A
b)	Ambient temperature of (40 ± 2)°C ..... :	40°C			--
	Test current I_N ..... :	I_N = +40A			--
	No tripping within				--
	- 1 h..... :	>1h	>1h	>1h	P
	- 2 h..... :	-	-	-	N/A

	Tests E_1		--
8	**REQUIREMENTS FOR CONSTRUCTION AND OPERATION**		--
8.8	**Resistance to mechanical shock and impact**		
	RCBOs have adequate mechanical behaviour so as to withstand stresses imposed during installation and use		P
9.13	**Verification to resistance to mechanical shock and impact**		
9.13.1	Mechanical shock		
9.13.1.2	Test procedure:		
	- 50 falls of 40 mm on one side		P
	- 50 falls on opposite side		P
	C turned through 90°		
	- 50 falls on one side		P
	- 50 falls on opposite side		P
	No opening of RCBO during test		P

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Clause	Requirement + Test	Result - Remark			Verdict
9.13.2	Mechanical impact				
	- 9.13.2.2 for RCBOs intended to be mounted on a rail				P
	- 9.13.2.3 for plug-in type RCBOs				N/A
9.13.2.1	Impact test:				
	10 blows from a height of 10 cm				P
	No damage				P
9.13.2.2	RCBOs for rail mounting:				
	- downward vertical force of 50 N for 1 min				P
	- upward vertical force of 50 N for 1 min				P
	RCBO not become loose during test and do not show any damage impairing its further use				P
9.13.2.3	RCBOs of plug-in type				
	Under consideration				--
9.12.11.3	Test at 1500 A:				
	Prospective current of 1500 A	1500A			--
	Cross-section (mm²)..... :	25mm²			--
	Grid distance a (mm)..... :	a = 35mm			--
	Power factor 0,93 – 0,98 ..... :	0,93 - 0,98			--
	Prospective current obtained ..... :	1,52×10³A, 444V			--
	Power factor ..... :	0,96			--
	Test circuit: ..... :	Figure 7			--
	I_{peak} (A) max. value ..... :	2,10x10³	2,09x10³	2,10x10³	--
	Sequence: 6-O and 3-CO	[KA²s]	[KA²s]	[KA²s]	--
	I²t max ..... :	13,0	13,6	12,8	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				P
	No permanent arcing				P
	No flash-over between poles or between poles and frame				P
	No blowing of fuse				P
	No damage, polyethylene sheet shows no holes				P
9.12.12	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				
9.12.12.1.a)	Leakage current across open contacts, according to 9.7.7.3, each pole is supplied at a voltage 1,1 times Un= 457V. The RCBO is in the open position	[µA]	[µA]	[µA]	--
	The leakage current not exceed 2 mA ..... :	11,3	10,5	10,4	P

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Clause	Requirement + Test	Result - Remark			Verdict
9.12.12.1.b)	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				
	Dielectric strength test:				
	Test voltage:				--
	a) 1500 V				P
	b) 1500 V				P
	c) 1500 V				P
	d) 1500 V				N/A
	e) 2000 V				N/A
	During these tests, after the test has carried out under the conditions specified in 9.7.2 a), indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means show the closed position				P
9.12.12.1	Test current equal to 0,85 times the conventional non-tripping current for..... :	60,6A			--
	- 1h starting from cold	>1h	>1h	>1h	P
	- 2h	-	-	-	N/A
	Increasing the current within 5s to 1,1 times the conventional tripping current	101A			--
	- tripping within	[min]	[min]	[min]	--
	- 1h (≤ 63 A)..... :	55s	1min21s	57s	P
	- 2h (> 63 A)..... :	-	-	-	N/A

	TEST SEQUENCE "E" **3 sample: B6, C6 and D6, $I_{\Delta n}$= 0,03A, 1P+N**	**E_0-1** **B6**	**E_0-2** **C6**	**E_0-3** **D6**	
	Tests E0				
9.9	verification of the Operating characteristics				--
9.9.2	Verification of the Operating characteristics under overcurrent conditions				--
	I_N (A)..... :	6A			--
	Cross-section (mm²)..... :	1,0mm²			--
	Instantaneous tripping current (B / C / D) ..... :	B/C/D			--
9.9.2.1	Test of time-current characteristic	D6			P
a)	Test current 1,13 I_N starting from cold for ..... :	1,13 I_N = 6,78A			--
	- 1 h ($I_N \leq$ 63 A)	>1h			P
	- 2 h (I_N > 63 A)	-			N/A
	No tripping	Not trip			P

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Clause	Requirement + Test	Result - Remark	Verdict
	Then steadily increased within 5 s to 1,45 I_N ..... :	1,45 I_N = 8,70A	
	Tripping within	[min]	--
	- 1h (≤ 63 A)	1min49s	P
	- 2h (> 63 A)	-	N/A
b)	Test current 2,55 I_N starting from cold ..... :	2,55 I_N = 15,3A	--
	Opening time not less than 1 s or more than	[s]	
	- 60 s (≤ 32 A)	14	P
	- 120 s (> 32 A)	-	N/A
9.9.2.2	Test of instantaneous tripping:		
a)	General test conditions		
	For the lower values of the test current of 9.9.2.2.b), 9.9.2.2.c) and 9.9.2.2.d) respectively the test is made once, at any convenient voltage		P
	For the upper values of the test current the test is made at rated voltage U_N (phase to neutral) with a power factor between 0,95 and 1		P
	The sequence of operation is: O-t-CO-t-CO-t-CO Interval time: > 3 min.		P
	The tripping time of the O operation is measured	8,92ms / 8,92ms / 8,85ms	P
	After each operation the indication means shall show the open position of the contacts		P
b)	☒ B		
	Test current 3 I_N starting from cold..... :	3 I_N =18A	--
		[s]	--
	- Opening time not less than 0,1 s	4,89	P
	Test current 5 I_N starting from cold..... :	5 I_N = 30A	--
		[ms]	--
	- Tripping time less than 0,1 s	9,26	P
c)	☒ C		
	Test current 5 I_N starting from cold..... :	5 I_N = 30A	--
		[s]	--
	- Opening time not less than 0,1 s	2,19	P
	Test current 10 I_N starting from cold..... :	10 I_N = 60A	--
		[ms]	--
	- Tripping time less than 0,1 s	7,91	P
d)	☒ D		
	Test current 10 I_N starting from cold..... :	10 I_N = 60A	--
		[s]	--

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Clause	Requirement + Test	Result - Remark	Verdict
	- Opening time not less than 0,1 s	1,21	P
	Test current 20 I_N starting from cold..... :	20 I_N = 120A	
		[ms]	--
	- Tripping time less than 0,1 s	7,24	P
9.9.2.3	Test of effect of ambient temperature on the tripping characteristics:		
a)	Ambient temperature of (35 ± 2)K below the ambient air reference temperature..... :	-5°C	--
	Test current 1,13 I_N ..... :	1,13 I_N = 6,78A	--
	- passed for 1 h	>1h	P
	- passed for 2 h	-	N/A
	Current is then steadily increased within 5s to 1,9 I_N	1,9 I_N =11,4A	--
	Tripping:	[min]	--
	- 1 h	55s	P
	- 2 h	-	N/A
b)	Ambient temperature of (10 ± 2)K above the ambient air reference temperature..... :	+40°C	--
	Test current I_N	I_N =6A	--
	No tripping within		--
	- 1 h	>1h	P
	- 2 h	-	N/A

	TEST SEQUENCE "E" **3 samples: B10, C10 and D10, $I_{\Delta n}$= 0,03A, 1P+N**	**E_0-4 B10**	**E_0-5 C10**	**E_0-6 D10**	
	Tests E_0				--
9.9	verification of the Operating characteristics				--
9.9.2	Verification of the Operating characteristics under overcurrent conditions				--
	I_N (A)..... :	10A			--
	Cross-section (mm²)..... :	1,5mm²			--
	Instantaneous tripping current (B / C / D) ..... :	B/C/D			--
9.9.2.1	Test of time-current characteristic	D10			P
a)	Test current 1,13 I_N starting from cold for ..... :	1,13 I_N = 11,3A			--
	- 1 h ($I_N \leq$ 63 A)	>1h			P
	- 2 h (I_N > 63 A)	-			N/A
	No tripping	Not trip			P
	Then steadily increased within 5 s to 1,45 I_N ..... :	1,45 I_N = 14,5A			
	Tripping within	[min]			--

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Clause	Requirement + Test	Result - Remark	Verdict
	- 1h (≤ 63 A)	2min08s	P
	- 2h (> 63 A)	-	N/A
b)	Test current 2,55 I_N starting from cold ..... :	2,55 I_N = 25,5A	--
	Opening time not less than 1 s or more than	[s]	
	- 60 s (≤ 32 A)	16	P
	- 120 s (> 32 A)	-	N/A
9.9.2.2	Test of instantaneous tripping:		
a)	General test conditions		
	For the lower values of the test current of 9.9.2.2.b), 9.9.2.2.c) and 9.9.2.2.d) respectively the test is made once, at any convenient voltage		P
	For the upper values of the test current the test is made at rated voltage U_N (phase to neutral) with a power factor between 0,95 and 1		P
	The sequence of operation is: O-t-CO-t-CO-t-CO Interval time: > 3 min.		P
	The tripping time of the O operation is measured	8,55ms / 8,83ms / 8,81ms	P
	After each operation the indication means shall show the open position of the contacts		P
b)	☒ B		
	Test current 3 I_N starting from cold..... :	3 I_N = 30A	--
		[s]	--
	- Opening time not less than 0,1 s	5,38	P
	Test current 5 I_N starting from cold..... :	5 I_N = 50A	--
		[ms]	--
	- Tripping time less than 0,1 s	8,93	P
c)	☒ C		
	Test current 5 I_N starting from cold..... :	5 I_N = 50A	--
		[s]	--
	- Opening time not less than 0,1 s	2,46	P
	Test current 10 I_N starting from cold..... :	10 I_N = 100A	--
		[ms]	--
	- Tripping time less than 0,1 s	8,52	P
d)	☒ D		
	Test current 10 I_N starting from cold..... :	10 I_N = 100A	--
		[s]	--
	- Opening time not less than 0,1 s	0,92	P
	Test current 20 I_N starting from cold..... :	20 I_N = 200A	

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Clause	Requirement + Test	Result - Remark	Verdict
		[ms]	--
	- Tripping time less than 0,1 s	7,62	P
9.9.2.3	Test of effect of ambient temperature on the tripping characteristics:		
a)	Ambient temperature of (35 ± 2)K below the ambient air reference temperature..... :	-5°C	--
	Test current 1,13 I_N ..... :	1,13 I_N = 11,3A	--
	- passed for 1 h	>1h	P
	- passed for 2 h	-	N/A
	Current is then steadily increased within 5s to 1,9 I_N	1,9 I_N = 19,0A	--
	Tripping:	[min]	--
	- 1 h	1min09s	P
	- 2 h	-	N/A
b)	Ambient temperature of (10 ± 2)K above the ambient air reference temperature..... :	+40°C	--
	Test current I_N	I_N =10A	--
	No tripping within		--
	- 1 h	>1h	P
	- 2 h	-	N/A

	TEST SEQUENCE "E" **3samples: B16, C16 and D16, $I_{\Delta n}$= 0,03A, 1P+N**	**E_0-7 B16**	**E_0-8 C16**	**E_0-9 D16**	
	Tests E_0				--
9.9	***verification of the Operating characteristics***				--
9.9.2	Verification of the Operating characteristics under overcurrent conditions				--
	I_N (A)..... :	16A			--
	Cross-section (mm²)..... :	2,5mm²			--
	Instantaneous tripping current (B / C / D) ..... :	B/C/D			--
9.9.2.1	Test of time-current characteristic	D16			P
a)	Test current 1,13 I_N starting from cold for ..... :	1,13 I_N = 18,1A			--
	- 1 h ($I_N \leq$ 63 A)	>1h			P
	- 2 h ($I_N >$ 63 A)	-			N/A
	No tripping	Not trip			P
	Then steadily increased within 5 s to 1,45 I_N ..... :	1,45 I_N = 23,2A			
	Tripping within	[min]			--
	- 1h (≤ 63 A)	1min31s			P

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Clause	Requirement + Test	Result - Remark	Verdict
	- 2h (> 63 A)	-	N/A
b)	Test current 2,55 I_N starting from cold ..... :	2,55 I_N = 40,8A	--
	Opening time not less than 1 s or more than	[s]	
	- 60 s (≤ 32 A)	16	P
	- 120 s (> 32 A)	-	N/A
9.9.2.2	Test of instantaneous tripping:		
a)	General test conditions		
	For the lower values of the test current of 9.9.2.2.b), 9.9.2.2.c) and 9.9.2.2.d) respectively the test is made once, at any convenient voltage		P
	For the upper values of the test current the test is made at rated voltage U_N (phase to neutral) with a power factor between 0,95 and 1		P
	The sequence of operation is: O-t-CO-t-CO-t-CO Interval time: > 3 min.		P
	The tripping time of the O operation is measured	9,04ms / 8,84ms / 9,03ms	P
	After each operation the indication means shall show the open position of the contacts		P
b)	☒ B		
	Test current 3 I_N starting from cold..... :	3 I_N = 48A	--
		[s]	--
	- Opening time not less than 0,1 s	5,42	P
	Test current 5 I_N starting from cold..... :	5 I_N = 80A	--
		[ms]	--
	- Tripping time less than 0,1 s	9,11	P
c)	☒ C		
	Test current 5 I_N starting from cold..... :	5 I_N = 80A	--
		[s]	--
	- Opening time not less than 0,1 s	2,07	P
	Test current 10 I_N starting from cold..... :	10 I_N = 160A	--
		[ms]	--
	- Tripping time less than 0,1 s	8,24	P
d)	☒ D		
	Test current 10 I_N starting from cold..... :	10 I_N = 160A	--
		[s]	--
	- Opening time not less than 0,1 s	0,85	P
	Test current 20 I_N starting from cold..... :	20 I_N = 320A	
		[ms]	--

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Clause	Requirement + Test	Result - Remark	Verdict
	- Tripping time less than 0,1 s	8,13	P
9.9.2.3	Test of effect of ambient temperature on the tripping characteristics:		
a)	Ambient temperature of (35 ± 2)K below the ambient air reference temperature..... :	-5°C	--
	Test current 1,13 I_N ..... :	1,13 I_N = 18,1A	--
	- passed for 1 h	>1h	P
	- passed for 2 h	-	N/A
	Current is then steadily increased within 5s to 1,9 I_N	1,9 I_N =30,4A	--
	Tripping:	[min]	--
	- 1 h	51s	P
	- 2 h	-	N/A
b)	Ambient temperature of (10 ± 2)K above the ambient air reference temperature..... :	+40°C	--
	Test current I_N	I_N =16A	--
	No tripping within		--
	- 1 h	>1h	P
	- 2 h	-	N/A

	TEST SEQUENCE "E" **3 samples: B20, C20 and D20, $I_{\Delta n}$= 0,03A, 1P+N**	**E_0-10 B20**	**E_0-11 C20**	**E_0-12 D20**	
	Tests E_0				--
9.9	***verification of the Operating characteristics***				--
9.9.2	Verification of the Operating characteristics under overcurrent conditions				--
	I_N (A)..... :	20A			--
	Cross-section (mm²)..... :	2,5mm²			--
	Instantaneous tripping current (B / C / D) ..... :	B/C/D			--
9.9.2.1	Test of time-current characteristic	D20			P
a)	Test current 1,13 I_N starting from cold for ..... :	1,13 I_N = 22,6A			--
	- 1 h ($I_N \leq$ 63 A)	>1h			P
	- 2 h (I_N > 63 A)	-			N/A
	No tripping	Not trip			P
	Then steadily increased within 5 s to 1,45 I_N ..... :	1,45 I_N = 29,0A			
	Tripping within	[min]			--
	- 1h (≤ 63 A)	2min12s			P
	- 2h (> 63 A)	-			N/A
b)	Test current 2,55 I_N starting from cold ..... :	2,55 I_N = 51,0A			--

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Clause	Requirement + Test	Result - Remark	Verdict
	Opening time not less than 1 s or more than	[s]	
	- 60 s (≤ 32 A)	17	P
	- 120 s (> 32 A)	-	N/A
9.9.2.2	Test of instantaneous tripping:		
a)	General test conditions		
	For the lower values of the test current of 9.9.2.2.b), 9.9.2.2.c) and 9.9.2.2.d) respectively the test is made once, at any convenient voltage		P
	For the upper values of the test current the test is made at rated voltage U_N (phase to neutral) with a power factor between 0,95 and 1		P
	The sequence of operation is: O-t-CO-t-CO-t-CO Interval time: > 3 min.		P
	The tripping time of the O operation is measured	9,20ms / 8,89ms / 9,00ms	P
	After each operation the indication means shall show the open position of the contacts		P
b)	☒ B		
	Test current 3 I_N starting from cold..... :	3 I_N = 60A	--
		[s]	--
	- Opening time not less than 0,1 s	5,21	P
	Test current 5 I_N starting from cold..... :	5 I_N = 100A	--
		[ms]	--
	- Tripping time less than 0,1 s	7,55	P
c)	☒ C		
	Test current 5 I_N starting from cold..... :	5 I_N = 100A	--
		[s]	--
	- Opening time not less than 0,1 s	2,67	P
	Test current 10 I_N starting from cold..... :	10 I_N = 200A	--
		[ms]	--
	- Tripping time less than 0,1 s	7,63	P
d)	☒ D		
	Test current 10 I_N starting from cold..... :	10 I_N = 200A	--
		[s]	--
	- Opening time not less than 0,1 s	0,88	P
	Test current 20 I_N starting from cold..... :	20 I_N = 400 A	
		[ms]	--
	- Tripping time less than 0,1 s	8,14	P
9.9.2.3	Test of effect of ambient temperature on the tripping characteristics:		

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Clause	Requirement + Test	Result - Remark	Verdict
a)	Ambient temperature of (35 ± 2)K below the ambient air reference temperature..... :	-5°C	--
	Test current 1,13 I_N ..... :	1,13 I_N = 22,6A	--
	- passed for 1 h	>1h	P
	- passed for 2 h	-	N/A
	Current is then steadily increased within 5s to 1,9 I_N	1,9 I_N = 38,0A	--
	Tripping:	[min]	--
	- 1 h	54s	P
	- 2 h	-	N/A
b)	Ambient temperature of (10 ± 2)K above the ambient air reference temperature..... :	+40°C	--
	Test current I_N	I_N = 20A	--
	No tripping within		--
	- 1 h	>1h	P
	- 2 h	-	N/A

	TEST SEQUENCE "E" **3 samples: B25, C25 and D25, $I_{\Delta n}$= 0,03A, 1P+N**	**E_0-13 B25**	**E_0-14 C25**	**E_0-15 D25**	
	Tests E_0				--
9.9	***verification of the Operating characteristics***				--
9.9.2	Verification of the Operating characteristics under overcurrent conditions				--
	I_N (A)..... :	25A			--
	Cross-section (mm²)..... :	4,0mm²			--
	Instantaneous tripping current (B / C / D) ..... :	B/C/D			--
9.9.2.1	Test of time-current characteristic	D25			P
a)	Test current 1,13 I_N starting from cold for ..... :	1,13 I_N = 28,3A			--
	- 1 h ($I_N \leq$ 63 A)	>1h			P
	- 2 h ($I_N >$ 63 A)	-			N/A
	No tripping	Not trip			P
	Then steadily increased within 5 s to 1,45 I_N ..... :	1,45 I_N = 36,3A			
	Tripping within	[min]			--
	- 1h (≤ 63 A)	1min46s			P
	- 2h (> 63 A)	-			N/A
b)	Test current 2,55 I_N starting from cold ..... :	2,55 I_N = 63,8A			--
	Opening time not less than 1 s or more than	[s]			
	- 60 s (≤ 32 A)	19			P
	- 120 s (> 32 A)	-			N/A

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Clause	Requirement + Test	Result - Remark	Verdict
9.9.2.2	Test of instantaneous tripping:		
a)	General test conditions		
	For the lower values of the test current of 9.9.2.2.b), 9.9.2.2.c) and 9.9.2.2.d) respectively the test is made once, at any convenient voltage		P
	For the upper values of the test current the test is made at rated voltage U_N (phase to neutral) with a power factor between 0,95 and 1		P
	The sequence of operation is: O-t-CO-t-CO-t-CO Interval time: > 3 min.		P
	The tripping time of the O operation is measured	9,08ms 8,76ms 8,84ms	P
	After each operation the indication means shall show the open position of the contacts		P
b)	☒ B		
	Test current 3 I_N starting from cold..... :	3 I_N = 75A	--
		[s]	--
	- Opening time not less than 0,1 s	4,93	P
	Test current 5 I_N starting from cold..... :	5 I_N = 125A	--
		[ms]	--
	- Tripping time less than 0,1 s	8,24	P
c)	☒ C		
	Test current 5 I_N starting from cold..... :	5 I_N = 125A	--
		[s]	--
	- Opening time not less than 0,1 s	2,19	P
	Test current 10 I_N starting from cold..... :	10 I_N = 250A	--
		[ms]	--
	- Tripping time less than 0,1 s	8,45	P
d)	☒ D		
	Test current 10 I_N starting from cold..... :	10 I_N = 250A	--
		[s]	--
	- Opening time not less than 0,1 s	1,22	P
	Test current 20 I_N starting from cold..... :	20 I_N = 500A	
		[ms]	--
	- Tripping time less than 0,1 s	7,38	P
9.9.2.3	Test of effect of ambient temperature on the tripping characteristics:		
a)	Ambient temperature of (35 ± 2)K below the ambient air reference temperature..... :	-5°C	--
	Test current 1,13 I_N ..... :	1,13 I_N = 28,3A	--

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Clause	Requirement + Test	Result - Remark	Verdict
	- passed for 1 h	>1h	P
	- passed for 2 h	-	N/A
	Current is then steadily increased within 5s to 1,9 I_N	1,9 I_N = 47,5A	--
	Tripping:	[min]	--
	- 1 h	51s	P
	- 2 h	-	N/A
b)	Ambient temperature of (10 ± 2)K above the ambient air reference temperature..... :	+40°C	--
	Test current I_N	I_N = 25A	--
	No tripping within		--
	- 1 h	>1h	P
	- 2 h	-	N/A

	TEST SEQUENCE "E" 3 samples: B32, C32 and D32, $I_{\Delta n}$= 0,03A, 1P+N	**E_0-16 B32**	**E_0-17 C32**	**E_0-18 D32**	
	Tests E_0				--
9.9	***verification of the Operating characteristics***				--
9.9.2	Verification of the Operating characteristics under overcurrent conditions				--
	I_N (A).....:	32A			--
	Cross-section (mm²) .....:	6mm²			--
	Instantaneous tripping current (B / C / D) .....:	B/C/D			--
9.9.2.1	Test of time-current characteristic	D32			P
a)	Test current 1,13 I_N starting from cold for .....:	1,13 I_N = 36,2A			--
	- 1 h ($I_N \leq$ 63 A)	>1h			P
	- 2 h ($I_N >$ 63 A)	-			N/A
	No tripping				N/A
	Then steadily increased within 5 s to 1,45 I_N.....:	1,45 I_N = 46,4A			
	Tripping within	[min]			--
	- 1h (≤ 63 A)	2min39s			P
	- 2h (> 63 A)	-			N/A
b)	Test current 2,55 I_N starting from cold .....:	2,55 I_N = 81,6A			--
	Opening time not less than 1 s or more than	[s]			
	- 60 s (≤ 32 A)	17			P
	- 120 s (> 32 A)	-			N/A
9.9.2.2	Test of instantaneous tripping:				
a)	General test conditions				

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Clause	Requirement + Test	Result - Remark	Verdict
	For the lower values of the test current of 9.9.2.2.b), 9.9.2.2.c) and 9.9.2.2.d) respectively the test is made once, at any convenient voltage		P
	For the upper values of the test current the test is made at rated voltage U_N (phase to neutral) with a power factor between 0,95 and 1		P
	The sequence of operation is: O-t-CO-t-CO-t-CO Interval time: > 3 min.		P
	The tripping time of the O operation is measured	8,64ms 8,93ms 9,10ms	P
	After each operation the indication means shall show the open position of the contacts		P
b)	☒ B		
	Test current 3 I_N starting from cold .....:	3 I_N = 96A	--
		[s]	--
	- Opening time not less than 0,1 s	4,36	P
	Test current 5 I_N starting from cold .....:	5 I_N = 160A	--
		[ms]	--
	- Tripping time less than 0,1 s	8,03	P
c)	☒ C		
	Test current 5 I_N starting from cold .....:	5 I_N = 160A	--
		[s]	--
	- Opening time not less than 0,1 s	2,43	P
	Test current 10 I_N starting from cold .....:	10 I_N = 320A	--
		[ms]	--
	- Tripping time less than 0,1 s	7,89	P
d)	☒ D		
	Test current 10 I_N starting from cold .....:	10 I_N = 320A	--
		[s]	--
	- Opening time not less than 0,1 s	1,09	P
	Test current 20 I_N starting from cold .....:	20 I_N = 640A	
		[ms]	--
	- Tripping time less than 0,1 s	7,65	P
9.9.2.3	Test of effect of ambient temperature on the tripping characteristics:		
a)	Ambient temperature of (35 ± 2)K below the ambient air reference temperature ..... :	-5°C	--
	Test current 1,13 I_N .....:	1,13 I_N = 36,2A	--
	- passed for 1 h	>1h	P
	- passed for 2 h	-	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Current is then steadily increased within 5s to 1,9 I_N	1,9 I_N = 60,8A	--
	Tripping:	[min]	--
	- 1 h	1min12s	P
	- 2 h	-	N/A
b)	Ambient temperature of (10 ± 2)K above the ambient air reference temperature .....:	+40°C	--
	Test current I_N	I_N = 32A	--
	No tripping within		--
	- 1 h	>1h	P
	- 2 h	-	N/A

	TEST SEQUENCE "E" **3 samples: B40, C40 and D40, $I_{\Delta n}$= 0,03A, 1P+N**	**E_0-19 B40**	**E_0-20 C40**	**E_0-21 D40**	
	Tests E_0				--
9.9	***verification of the Operating characteristics***				--
9.9.2	Verification of the Operating characteristics under overcurrent conditions				--
	I_N (A).....:	40A			--
	Cross-section (mm²) .....:	10mm²			--
	Instantaneous tripping current (B / C / D) .....:	B/C/D			--
9.9.2.1	Test of time-current characteristic	D40			P
a)	Test current 1,13 I_N starting from cold for .....:	1,13 I_N = 45,2A			--
	- 1 h ($I_N \leq$ 63 A)	>1h			P
	- 2 h (I_N > 63 A)				N/A
	No tripping				N/A
	Then steadily increased within 5 s to 1,45 I_N.....:	1,45 I_N = 58,0A			
	Tripping within	[min]			--
	- 1h (≤ 63 A)	2min49s			P
	- 2h (> 63 A)				N/A
b)	Test current 2,55 I_N starting from cold .....:	2,55 I_N = 102A			--
	Opening time not less than 1 s or more than	[s]			
	- 60 s (≤ 32 A)				N/A
	- 120 s (> 32 A)	19			P
9.9.2.2	Test of instantaneous tripping:				
a)	General test conditions				
	For the lower values of the test current of 9.9.2.2.b), 9.9.2.2.c) and 9.9.2.2.d) respectively the test is made once, at any convenient voltage				P

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Clause	Requirement + Test	Result - Remark			Verdict
	For the upper values of the test current the test is made at rated voltage U_N (phase to neutral) with a power factor between 0,95 and 1				P
	The sequence of operation is: O-t-CO-t-CO-t-CO Interval time: > 3 min.				P
	The tripping time of the O operation is measured	8,80ms	9,07ms	9,01ms	P
	After each operation the indication means shall show the open position of the contacts				P
b)	☒ B				
	Test current 3 I_N starting from cold .....:	3 I_N = 120A			--
		[s]			--
	- Opening time not less than 0,1 s	4,67			P
	Test current 5 I_N starting from cold .....:	5 I_N =200A			--
		[ms]			--
	- Tripping time less than 0,1 s	8,91			P
c)	☒ C				
	Test current 5 I_N starting from cold .....:	5 I_N = 200A			--
		[s]			--
	- Opening time not less than 0,1 s	3,16			P
	Test current 10 I_N starting from cold .....:	10 I_N = 400A			--
		[ms]			--
	- Tripping time less than 0,1 s	8,19			P
d)	☒ D				
	Test current 10 I_N starting from cold .....:	10 I_N = 400A			--
		[s]			--
	- Opening time not less than 0,1 s	0,95			P
	Test current 20 I_N starting from cold .....:	20 I_N = 800A			
		[ms]			--
	- Tripping time less than 0,1 s	7,89			P
9.9.2.3	Test of effect of ambient temperature on the tripping characteristics:				
a)	Ambient temperature of (35 ± 2)K below the ambient air reference temperature ..... :	-5°C			--
	Test current 1,13 I_N .....:	1,13 I_N = 45,2 A			--
	- passed for 1 h	Not trip			P
	- passed for 2 h	-			N/A
	Current is then steadily increased within 5s to 1,9 I_N	1,9 I_N = 76 A			--
	Tripping:	[min]			--

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Clause	Requirement + Test	Result - Remark	Verdict
	- 1 h	56s	P
	- 2 h	-	N/A
b)	Ambient temperature of (10 ± 2)K above the ambient air reference temperature .....:	+40°C	--
	Test current I_N	I_N = 40A	--
	No tripping within		--
	- 1 h	>1h	P
	- 2 h	-	N/A

	TEST SEQUENCE "E" **3 samples: B50, C50 and D50, $I_{\Delta n}$= 0,03A, 1P+N**	**E_0-22 B50**	**E_0-23 C50**	**E_0-24 D50**	
	Tests E_0				--
9.9	***verification of the Operating characteristics***				--
9.9.2	Verification of the Operating characteristics under overcurrent conditions				--
	I_N (A) .....:	50A			--
	Cross-section (mm²).....:	10mm²			--
	Instantaneous tripping current (B / C / D).....:	B/C/D			--
9.9.2.1	Test of time-current characteristic	D50			P
a)	Test current 1,13 I_N starting from cold for .....:	1,13 I_N = 56,5A			--
	- 1 h ($I_N \leq$ 63 A)	>1h			P
	- 2 h (I_N > 63 A)				N/A
	No tripping				N/A
	Then steadily increased within 5 s to 1,45 I_N .....:	1,45 I_N = 72,5A			
	Tripping within	[min]			--
	- 1h (≤ 63 A)	3min02s			P
	- 2h (> 63 A)				N/A
b)	Test current 2,55 I_N starting from cold.....:	2,55 I_N = 128A			--
	Opening time not less than 1 s or more than	[s]			
	- 60 s (≤ 32 A)				N/A
	- 120 s (> 32 A)	20			P
9.9.2.2	Test of instantaneous tripping:				
a)	General test conditions				
	For the lower values of the test current of 9.9.2.2.b), 9.9.2.2.c) and 9.9.2.2.d) respectively the test is made once, at any convenient voltage				P
	For the upper values of the test current the test is made at rated voltage U_N (phase to neutral) with a power factor between 0,95 and 1				P

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Clause	Requirement + Test	Result - Remark	Verdict
	The sequence of operation is: O-t-CO-t-CO-t-CO Interval time: > 3 min.		P
	The tripping time of the O operation is measured	8,96ms 9,14ms 9,03ms	P
	After each operation the indication means shall show the open position of the contacts		P
b)	☒ B		
	Test current 3 I_N starting from cold.....:	3 I_N = 150A	--
		[s]	--
	- Opening time not less than 0,1 s	5,18	P
	Test current 5 I_N starting from cold.....:	5 I_N = 250A	--
		[ms]	--
	- Tripping time less than 0,1 s	7,94	P
c)	☒ C		
	Test current 5 I_N starting from cold.....:	5 I_N = 250A	--
		[s]	--
	- Opening time not less than 0,1 s	2,75	P
	Test current 10 I_N starting from cold.....:	10 I_N = 500A	--
		[ms]	--
	- Tripping time less than 0,1 s	7,92	P
d)	☒ D		
	Test current 10 I_N starting from cold.....:	10 I_N = 500A	--
		[s]	--
	- Opening time not less than 0,1 s	1,12	P
	Test current 20 I_N starting from cold.....:	20 I_N = 1000A	
		[ms]	--
	- Tripping time less than 0,1 s	7,61	P
9.9.2.3	Test of effect of ambient temperature on the tripping characteristics:		
a)	Ambient temperature of (35 ± 2)K below the ambient air reference temperature.....:	-5°C	--
	Test current 1,13 I_N.....:	1,13 I_N = 56,5 A	--
	- passed for 1 h	Not trip	P
	- passed for 2 h	-	N/A
	Current is then steadily increased within 5s to 1,9 I_N	1,9 I_N = 95 A	--
	Tripping:	[min]	--
	- 1 h	1min06s	P
	- 2 h	-	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
b)	Ambient temperature of (10 ± 2)K above the ambient air reference temperature ..... :	+40°C	--
	Test current I_N	I_N = 50 A	--
	No tripping within		--
	- 1 h	>1h	P
	- 2 h	-	N/A

	TEST SEQUENCE "E" **2 samples: B63, and C63, $I_{\Delta n}$= 0,03A, 1P+N**	**E_0-25 B63**	**E_0-26 C63**		
	Tests E_0				--
9.9	***verification of the Operating characteristics***				--
9.9.2	Verification of the Operating characteristics under overcurrent conditions				--
	I_N (A) ..... :	63A			--
	Cross-section (mm²) ..... :	16mm²			--
	Instantaneous tripping current (B / C / D)..... :	B/C			--
9.9.2.1	Test of time-current characteristic				N/A
a)	Test current 1,13 I_N starting from cold for ..... :	1,13 I_N = A			--
	- 1 h ($I_N \leq$ 63 A)	-			N/A
	- 2 h (I_N > 63 A)	-			N/A
	No tripping				N/A
	Then steadily increased within 5 s to 1,45 I_N ..... :	1,45 I_N = A			
	Tripping within	[min]			--
	- 1h (≤ 63 A)	-			N/A
	- 2h (> 63 A)	-			N/A
b)	Test current 2,55 I_N starting from cold..... :	2,55 I_N = A			--
	Opening time not less than 1 s or more than	[s]			
	- 60 s (≤ 32 A)	-			N/A
	- 120 s (> 32 A)	-			N/A
9.9.2.2	Test of instantaneous tripping:				
a)	General test conditions				
	For the lower values of the test current of 9.9.2.2.b), 9.9.2.2.c) and 9.9.2.2.d) respectively the test is made once, at any convenient voltage				N/A
	For the upper values of the test current the test is made at rated voltage U_N (phase to neutral) with a power factor between 0,95 and 1				N/A
	The sequence of operation is: O-t-CO-t-CO-t-CO Interval time: > 3 min.				N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	The tripping time of the O operation is measured	8,99ms 9,12ms	N/A
	After each operation the indication means shall show the open position of the contacts		N/A
b)	☒ B		
	Test current 3 I_N starting from cold.....:	3 I_N = 189A	--
		[s]	--
	- Opening time not less than 0,1 s	5,06	P
	Test current 5 I_N starting from cold.....:	5 I_N = 315A	--
		[ms]	--
	- Tripping time less than 0,1 s	8,16	P
c)	☒ C		
	Test current 5 I_N starting from cold.....:	5 I_N = 315 A	--
		[s]	--
	- Opening time not less than 0,1 s	2,91	P
	Test current 10 I_N starting from cold.....:	10 I_N = 630 A	--
		[ms]	--
	- Tripping time less than 0,1 s	8,34	P
d)	☐ D		
	Test current 10 I_N starting from cold.....:	10 I_N = A	--
		[s]	--
	- Opening time not less than 0,1 s	-	N/A
	Test current 20 I_N starting from cold.....:	20 I_N = A	
		[s]	--
	- Tripping time less than 0,1 s	-	N/A
9.9.2.3	Test of effect of ambient temperature on the tripping characteristics:		
a)	Ambient temperature of (35 ± 2)K below the ambient air reference temperature.....:	-5°C	--
	Test current 1,13 I_N.....:	1,13 I_N = A	--
	- passed for 1 h	-	N/A
	- passed for 2 h	-	N/A
	Current is then steadily increased within 5s to 1,9 I_N	1,9 I_N = A	--
	Tripping:	[min]	--
	- 1 h	-	N/A
	- 2 h	-	N/A
b)	Ambient temperature of (10 ± 2)K above the ambient air reference temperature.....:	40°C	--
	Test current I_N	I_N = A	--

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Clause	Requirement + Test	Result - Remark	Verdict
	No tripping within		--
	- 1 h	-	N/A
	- 2 h	-	N/A

	TEST SEQUENCE "F": **3 samples: D63, $I_{\Delta n}$= 0,03A, 1P+N**	**F_0-1 F_0-2 F_0-3**			--
	Tests F_0				--
9.12	**Short-circuits test**				--
9.12.11.4	Test above 1500 A				
b)	Test at service short-circuit capacity I_{cs}				
	Service short-circuit capacity (A) ..... :	7500A			--
	Figure ..... :	Figure 7			--
	Cross-section (mm²) ..... :	25mm²			--
	Grid distance a (mm) ..... :	35mm			--
	Prospective current (A) ..... :	7500A			--
	Prospective current obtained (A) ..... :	7,58x10³A, 256V			--
	Power factor ..... :	0,45~0,50			--
	Power factor obtained ..... :	0,48			--
	Sequence ..... :	O - O - CO			--
	I_{peak} (A) max. value ..... :	5,24x10³	5,61x10³	5,35x10³	--
	I²t max. ..... :	[KA²s]	[KA²s]	[KA²s]	--
		42,7	46,2	42,5	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				P
	No permanent arcing				P
	No flash-over between poles or between poles and frame				P
	No blowing of fuse				P
	No damage, polyethylene sheet shows no holes				P
9.12.12	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				
9.12.12.1.a)	Leakage current across open contacts, according to 9.7.7.3, each pole is supplied at a voltage 1,1 times Un= 264V. The RCBO is in the open position	[µA]	[µA]	[µA]	--
	The leakage current not exceed 2 mA ..... :	5,67	6,36	5,92	P
9.12.12.1.b)	Dielectric strength test:				
	Test voltage:				--
	a) 1500 V				P

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Clause	Requirement + Test	Result - Remark			Verdict
	b) 1500 V				P
	c) 1500 V				P
	d) 1500 V				N/A
	e) 2000 V				N/A
	During these test, after the test has carried out under the conditions specified in 9.7.2 a), indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means show the closed position				P
	Test current equal to 0,85 times the conventional non-tripping current for..... :	60,6A			--
	- 1h starting from cold	>1h	>1h	>1h	P
	- 2h	-	-	-	N/A
	Increasing the current within 5s to 1,1 times the conventional tripping current..... :	101A			--
	- tripping within	[min]	[min]	[min]	--
	- 1h (≤ 63 A)	1min50s	2min14s	1min26s	P
	- 2h (> 63 A)	-	-	-	N/A

	TEST SEQUENCE "F": **3 samples: D6, $I_{\Delta n}$= 0,03A, 1P+N**	**F_0-4**	**F_0-5**	**F_0-6**	--
	Tests F_0				--
9.12	**Short-circuits test**				--
9.12.11.4	Test above 1500 A				
b)	Test at service short-circuit capacity I_{cs}				
	Service short-circuit capacity (A) ..... :	7500A			--
	Figure ..... :	Figure 7			--
	Cross-section (mm²) ..... :	2,5mm²			--
	Grid distance a (mm) ..... :	35mm			--
	Prospective current (A) ..... :	7500A			--
	Prospective current obtained (A) ..... :	7,58x10³A, 256V			--
	Power factor ..... :	0,45~0,50			--
	Power factor obtained ..... :	0,47			--
	Sequence ..... :	O - O - CO			--
	I_{peak} (A) max. value..... :	2,69x10³	2,77x10³	2,83x10³	--
	I²t max. ..... :	[KA²s]	[KA²s]	[KA²s]	--
		13,3	14,5	16,3	P

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Clause	Requirement + Test	Result - Remark			Verdict
	RCBOs functionally dependent on the line voltage supplied with rated voltage				P
	No permanent arcing				P
	No flash-over between poles or between poles and frame				P
	No blowing of fuse				P
	No damage, polyethylene sheet shows no holes				P
9.12.12	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				
9.12.12.1.a)	Leakage current across open contacts, according to 9.7.7.3, each pole is supplied at a voltage 1,1 times Un= 264V. The RCBO is in the open position	[µA]	[µA]	[µA]	--
	The leakage current not exceed 2 mA ..... :	5,84	6,89	7,64	P
9.12.12.1.b)	Dielectric strength test:				
	Test voltage:				--
	a) 1500 V				P
	b) 1500 V				P
	c) 1500 V				P
	d) 1500 V				N/A
	e) 2000 V				N/A
	During these test, after the test has carried out under the conditions specified in 9.7.2 a), indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means show the closed position				P
	Test current equal to 0,85 times the conventional non-tripping current for..... :	5,78A			--
	- 1h starting from cold	>1h	>1h	>1h	P
	- 2h	-	-	-	N/A
	Increasing the current within 5s to 1,1 times the conventional tripping current..... :	9,58A			--
	- tripping within	[min]	[min]	[min]	--
	- 1h (≤ 63 A)	1min19s	55s	1min27s	P
	- 2h (> 63 A)	-	-	-	N/A

	TEST SEQUENCE "F": **3 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**	**F_0-7**	**F_0-8**	**F_0-9**	--
	Tests F_0				--

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
9.12	**Short-circuits test**				--
9.12.11.4	Test above 1500 A				
b)	Test at service short-circuit capacity I_{cs}				
	Service short-circuit capacity (A) ..... :	7500A			--
	Figure ..... :	Figure 7			--
	Cross-section (mm²) ..... :	25mm²			--
	Grid distance a (mm) ..... :	35mm			--
	Prospective current (A) ..... :	7500A			--
	Prospective current obtained (A) ..... :	7,58x10³A, 444V			--
	Power factor ..... :	0,45~0,50			--
	Power factor obtained ..... :	0,48			--
	Sequence ..... :	O - O - CO			--
	I_{peak} (A) max. value ..... :	5,70x10³	5,61x10³	5,66x10³	--
	I²t max. ..... :	[KA²s]	[KA²s]	[KA²s]	--
		82,2	86,7	81,4	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				P
	No permanent arcing				P
	No flash-over between poles or between poles and frame				P
	No blowing of fuse				P
	No damage, polyethylene sheet shows no holes				P
9.12.12	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				
9.12.12.1.a)	Leakage current across open contacts, according to 9.7.7.3, each pole is supplied at a voltage 1,1 times Un= 457V. The RCBO is in the open position	[µA]	[µA]	[µA]	--
	The leakage current not exceed 2 mA ..... :	10,5	9,38	11,3	P
9.12.12.1.b)	Dielectric strength test:				
	Test voltage:				--
	a) 1500 V				P
	b) 1500 V				P
	c) 1500 V				P
	d) 1500 V				N/A
	e) 2000 V				N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	During these test, after the test has carried out under the conditions specified in 9.7.2 a), indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means show the closed position				P
	Test current equal to 0,85 times the conventional non-tripping current for..... :	60,6A			--
	- 1h starting from cold	>1h	>1h	>1h	P
	- 2h	-	-	-	N/A
	Increasing the current within 5s to 1,1 times the conventional tripping current..... :	101A			--
	- tripping within	[min]	[min]	[min]	--
	- 1h (≤ 63 A)	57s	1min48s	2min11s	P
	- 2h (> 63 A)	-	-	-	N/A

	TEST SEQUENCE "F": **3 samples: D6, $I_{\Delta n}$= 0,03A, 3P+N**	**F_0-10**	**F_0-11**	**F_0-12**	--
	Tests F_0				--
9.12	**Short-circuits test**				--
9.12.11.4	Test above 1500 A				
b)	Test at service short-circuit capacity I_{cs}				
	Service short-circuit capacity (A) ..... :	7500A			--
	Figure ..... :	Figure 7			--
	Cross-section (mm²) ..... :	2,5mm²			--
	Grid distance a (mm) ..... :	35mm			--
	Prospective current (A) ..... :	7500A			--
	Prospective current obtained (A) ..... :	7,58x10³A, 444V			--
	Power factor ..... :	0,45~0,50			--
	Power factor obtained ..... :	0,47			--
	Sequence ..... :	O - O - CO			--
	I_{peak} (A) max. value ..... :	2,87x10³	2,92x10³	2,82x10³	--
	I²t max. ..... :	[KA²s]	[KA²s]	[KA²s]	--
		11,5	14,3	12,8	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				P
	No permanent arcing				P
	No flash-over between poles or between poles and frame				P
	No blowing of fuse				P

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Clause	Requirement + Test	Result - Remark			Verdict
	No damage, polyethylene sheet shows no holes				P
9.12.12	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				
9.12.12.1.a)	Leakage current across open contacts, according to 9.7.7.3, each pole is supplied at a voltage 1,1 times Un= 457V. The RCBO is in the open position	[µA]	[µA]	[µA]	--
	The leakage current not exceed 2 mA ..... :	12,5	10,5	10,3	P
9.12.12.1.b)	Dielectric strength test:				
	Test voltage:				--
	a) 1500 V				P
	b) 1500 V				P
	c) 1500 V				P
	d) 1500 V				N/A
	e) 2000 V				N/A
	During these test, after the test has carried out under the conditions specified in 9.7.2 a), indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means show the closed position				P
	Test current equal to 0,85 times the conventional non-tripping current for..... :	5,78A			--
	- 1h starting from cold	>1h	>1h	>1h	P
	- 2h	-	-	-	N/A
	Increasing the current within 5s to 1,1 times the conventional tripping current..... :	9,58A			--
	- tripping within	[min]	[min]	[min]	--
	- 1h (≤ 63 A)	1min48s	59s	2min08s	P
	- 2h (> 63 A)	-	-	-	N/A

	TEST SEQUENCE "F": **3 samples: D63, $I_{\Delta n}$= 0,03A, 1P+N**	**F_1.1**	**F_1.2**	**F_1.3**	--
	Tests F_1				**--**
9.12	**Short-circuits test**				--
9.12.11.4	Test above 1500 A				
c)	Test at rated short-circuit capacity I_{cn}				
	Rated short-circuit capacity (A)..... :	10kA			--
	Figure ..... :	Figure 7			--

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Clause	Requirement + Test	Result - Remark			Verdict
	Cross-section (mm²) ..... :	25mm²			--
	Grid distance a (mm) ..... :	35mm			--
	Prospective current (A) ..... :	10kA			--
	Prospective current obtained (A) ..... :	10,1x10³A, 256V			--
	Power factor ..... :	0,45~0,50			--
	Power factor obtained ..... :	0,47			--
	Sequence ..... :	O - CO			--
	I_{peak} (A) max. value ..... :	5,83x10³	6,30x10³	6,44x10³	--
		[KA²s]	[KA²s]	[KA²s]	--
	I²t max. ..... :	60,1	88,4	78,8	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				P
	No permanent arcing				P
	No flash-over between poles or between poles and frame				P
	No blowing of fuse				P
	No damage, polyethylene sheet shows no holes				P
9.12.12	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				
9.12.12.2.a)	Leakage current across open contacts, according to 9.7.7.3, each pole is supplied at a voltage 1,1 times Un= 264 V. The RCBO is in the open position	[µA]	[µA]	[µA]	--
	The leakage current not exceed 2 mA ..... :	7,63	8,55	8,63	P
9.12.12.2.b)	Dielectric strength test:				
	Test voltage:				--
	a) 900 V				P
	b) 900 V				P
	c) 900 V				P
	d) 900 V				N/A
	e) 900 V				N/A
	During these test, after the test has carried out under the conditions specified in 9.7.2 a), indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means show the closed position				P
9.12.12.2.c)	Test current 2,8 I_N ..... :	2,8 I_N = 177A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	-	-	-	N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	- 120 s	11	12	11	P

	TEST SEQUENCE "F": **3 samples: D6, $I_{\Delta n}$= 0,03A, 1P+N**	**F_1-4**	**F_1-5**	**F_1-6**	--
	Tests F_1				--
9.12	**Short-circuits test**				--
9.12.11.4	Test above 1500 A				
c)	Test at rated short-circuit capacity I_{cn}				
	Rated short-circuit capacity (A) ..... :	10kA			--
	Figure ..... :	Figure 7			--
	Cross-section (mm²) ..... :	2,5mm²			--
	Grid distance a (mm) ..... :	35mm			--
	Prospective current (A) ..... :	10kA			--
	Prospective current obtained (A) ..... :	10,1x10³A, 256V			--
	Power factor ..... :	0,45~0,50			--
	Power factor obtained ..... :	0,47			--
	Sequence ..... :	O - CO			--
	I_{peak} (A) max. value ..... :	2,09x10³	3,01x10³	3,29x10³	--
		[KA²s]	[KA²s]	[KA²s]	--
	I²t max. ..... :	4,77	9,60	11,7	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				P
	No permanent arcing				P
	No flash-over between poles or between poles and frame				P
	No blowing of fuse				P
	No damage, polyethylene sheet shows no holes				P
9.12.12	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				
9.12.12.2.a)	Leakage current across open contacts, according to 9.7.7.3, each pole is supplied at a voltage 1,1 times Un= 264 V. The RCBO is in the open position	[µA]	[µA]	[µA]	--
	The leakage current not exceed 2 mA ..... :	9,32	9,16	8,46	P
9.12.12.2.b)	Dielectric strength test:				
	Test voltage:				--
	a) 900 V				P
	b) 900 V				P

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Clause	Requirement + Test	Result - Remark			Verdict
	c) 900 V				P
	d) 900 V				N/A
	e) 900 V				N/A
	During these test, after the test has carried out under the conditions specified in 9.7.2 a), indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means show the closed position				P
9.12.12.2.c)	Test current 2,8 I_N ..... :	2,8 I_N = 16,8A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	9	11	9	P
	- 120 s	-	-	-	N/A

	TEST SEQUENCE "F": **3 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**	**F_1-7**	**F_1-8**	**F_1-9**	--
	Tests F_1				**--**
9.12	**Short-circuits test**				--
9.12.11.4	Test above 1500 A				
c)	Test at rated short-circuit capacity I_{cn}				
	Rated short-circuit capacity (A)..... :	10kA			--
	Figure ..... :	Figure 7			--
	Cross-section (mm²) ..... :	25mm²			--
	Grid distance a (mm) ..... :	35mm			--
	Prospective current (A) ..... :	10kA			--
	Prospective current obtained (A) ..... :	10,2x10³A, 444V			--
	Power factor ..... :	0,45~0,50			--
	Power factor obtained ..... :	0,48			--
	Sequence ..... :	O - CO			--
	I_{peak} (A) max. value..... :	6,39x10³	6,32x10³	6,71x10³	--
		[KA²s]	[KA²s]	[KA²s]	--
	I²t max. ..... :	79,0	61,9	76,3	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				P
	No permanent arcing				P
	No flash-over between poles or between poles and frame				P
	No blowing of fuse				P
	No damage, polyethylene sheet shows no holes				P

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
9.12.12	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				
9.12.12.2.a)	Leakage current across open contacts, according to 9.7.7.3, each pole is supplied at a voltage 1,1 times Un= 457 V. The RCBO is in the open position	[μA]	[μA]	[μA]	--
	The leakage current not exceed 2 mA ..... :	9,11	10,6	12,6	P
9.12.12.2.b)	Dielectric strength test:				
	Test voltage:				--
	a) 900 V				P
	b) 900 V				P
	c) 900 V				P
	d) 900 V				N/A
	e) 900 V				N/A
	During these test, after the test has carried out under the conditions specified in 9.7.2 a), indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means show the closed position				P
9.12.12.2.c)	Test current 2,8 I_N ..... :	2,8 I_N = 177A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	-	-	-	N/A
	- 120 s	10	9	19	P

	TEST SEQUENCE "F": **3 samples: D6, $I_{\Delta n}$= 0,03A, 3P+N**	**F_1-10 F_1-11 F_1-12**	--
	Tests F_1		**--**
9.12	**Short-circuits test**		--
9.12.11.4	Test above 1500 A		
c)	Test at rated short-circuit capacity I_{cn}		
	Rated short-circuit capacity (A)..... :	10kA	--
	Figure ..... :	Figure 7	--
	Cross-section (mm²) ..... :	2,5mm²	--
	Grid distance a (mm) ..... :	35mm	--
	Prospective current (A) ..... :	10kA	--
	Prospective current obtained (A) ..... :	10,2x10³A, 444V	--
	Power factor ..... :	0,45~0,50	--
	Power factor obtained ..... :	0,48	--

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Clause	Requirement + Test	Result - Remark			Verdict
	Sequence ..... :	O - CO			--
	I_{peak} (A) max. value ..... :	3,42x10^3	3,36x10^3	3,66x10^3	--
		[KA²s]	[KA²s]	[KA²s]	--
	I²t max. ..... :	13,9	12,3	15,8	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				P
	No permanent arcing				P
	No flash-over between poles or between poles and frame				P
	No blowing of fuse				P
	No damage, polyethylene sheet shows no holes				P
9.12.12	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				
9.12.12.2.a)	Leakage current across open contacts, according to 9.7.7.3, each pole is supplied at a voltage 1,1 times Un= 457 V. The RCBO is in the open position	[µA]	[µA]	[µA]	--
	The leakage current not exceed 2 mA ..... :	11,5	10,2	10,6	P
9.12.12.2.b)	Dielectric strength test:				
	Test voltage:				--
	a) 900 V				P
	b) 900 V				P
	c) 900 V				P
	d) 900 V				N/A
	e) 900 V				N/A
	During these test, after the test has carried out under the conditions specified in 9.7.2 a), indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means show the closed position				P
9.12.12.2.c)	Test current 2,8 I_N ..... :	2,8 I_N = 16,8A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	8	9	8	P
	- 120 s	-	-	-	N/A

	TEST SEQUENCE "F": **3 samples: C63, $I_{\Delta n}$= 0,03A, 1P+N**	**F_1-13**	**F_1-14**	**F_1-15**	--
	Tests F_1				**--**

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Clause	Requirement + Test	Result - Remark			Verdict
9.12	**Short-circuits test**				--
9.12.11.4	Test above 1500 A				
c)	Test at rated short-circuit capacity I_{cn}				
	Rated short-circuit capacity (A) ..... :	10kA			--
	Figure ..... :	Figure 7			--
	Cross-section (mm²) ..... :	25mm²			--
	Grid distance a (mm) ..... :	35mm			--
	Prospective current (A) ..... :	10kA			--
	Prospective current obtained (A) ..... :	10,1x10³A, 256V			--
	Power factor ..... :	0,45~0,50			--
	Power factor obtained ..... :	0,47			--
	Sequence ..... :	O - CO			--
	I_{peak} (A) max. value ..... :	5,72x10³	6,21x10³	6,21x10³	--
		[KA²s]	[KA²s]	[KA²s]	--
	I²t max.<100KA²s (for C32) ..... :	70,1	77,0	78,0	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				P
	No permanent arcing				P
	No flash-over between poles or between poles and frame				P
	No blowing of fuse				P
	No damage, polyethylene sheet shows no holes				P
9.12.12	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				
9.12.12.2.a)	Leakage current across open contacts, according to 9.7.7.3, each pole is supplied at a voltage 1,1 times Un= 264 V. The RCBO is in the open position	[µA]	[µA]	[µA]	--
	The leakage current not exceed 2 mA ..... :	8,64	7,85	9,39	P
9.12.12.2.b)	Dielectric strength test:				
	Test voltage:				--
	a) 900 V				P
	b) 900 V				P
	c) 900 V				P
	d) 900 V				N/A
	e) 900 V				N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	During these test, after the test has carried out under the conditions specified in 9.7.2 a), indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means show the closed position				P
9.12.12.2.c)	Test current 2,8 I_N ..... :	2,8 I_N = 177A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	-	-	-	N/A
	- 120 s	10	11	10	P

	TEST SEQUENCE "F": **3 samples: C16, $I_{\Delta n}$= 0,03A, 1P+N**	**F_1-16**	**F_1-17**	**F_1-18**	--
	Tests F_1				**--**
9.12	**Short-circuits test**				--
9.12.11.4	Test above 1500 A				
c)	Test at rated short-circuit capacity I_{cn}				
	Rated short-circuit capacity (A)..... :	10kA			--
	Figure ..... :	Figure 7			--
	Cross-section (mm²) ..... :	4,0mm²			--
	Grid distance a (mm) ..... :	35mm			--
	Prospective current (A) ..... :	10kA			--
	Prospective current obtained (A) ..... :	10,1x10³A, 256V			--
	Power factor ..... :	0,45~0,50			--
	Power factor obtained ..... :	0,47			--
	Sequence ..... :	O - CO			--
	I_{peak} (A) max. value..... :	4,31x10³	4,38x10³	4,32x10³	--
		[KA²s]	[KA²s]	[KA²s]	--
	I²t max.<80KA²s (for C16)..... :	36,0	36,5	34,5	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				P
	No permanent arcing				P
	No flash-over between poles or between poles and frame				P
	No blowing of fuse				P
	No damage, polyethylene sheet shows no holes				P
9.12.12	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				

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Clause	Requirement + Test	Result - Remark			Verdict
9.12.12.2.a)	Leakage current across open contacts, according to 9.7.7.3, each pole is supplied at a voltage 1,1 times Un= 264 V. The RCBO is in the open position	[µA]	[µA]	[µA]	--
	The leakage current not exceed 2 mA ..... :	9,31	8,58	10,3	P
9.12.12.2.b)	Dielectric strength test:				
	Test voltage:				--
	a) 900 V				P
	b) 900 V				P
	c) 900 V				P
	d) 900 V				N/A
	e) 900 V				N/A
	During these test, after the test has carried out under the conditions specified in 9.7.2 a), indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means show the closed position				P
9.12.12.2.c)	Test current 2,8 I_N ..... :	2,8 I_N = 44,8A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	9	8	9	P
	- 120 s	-	-	-	N/A

	TEST SEQUENCE "F": **3 samples: C63, $I_{\Delta n}$= 0,03A, 3P+N**	**F_1-19**	**F_1-20**	**F_1-21**	--
	Tests F_1				--
9.12	**Short-circuits test**				--
9.12.11.4	Test above 1500 A				
c)	Test at rated short-circuit capacity I_{cn}				
	Rated short-circuit capacity (A)..... :	10kA			--
	Figure ..... :	Figure 7			--
	Cross-section (mm²) ..... :	25mm²			--
	Grid distance a (mm) ..... :	35mm			--
	Prospective current (A) ..... :	10kA			--
	Prospective current obtained (A) ..... :	10,2x10³A, 444V			--
	Power factor ..... :	0,45~0,50			--
	Power factor obtained ..... :	0,48			--
	Sequence ..... :	O - CO			--
	I_{peak} (A) max. value ..... :	6,20x10³	6,13x10³	6,21x10³	--

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Clause	Requirement + Test	Result - Remark			Verdict
		[KA²s]	[KA²s]	[KA²s]	--
	I²t max.<90KA²s (for B32) ..... :	56,0	58,2	59,1	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				P
	No permanent arcing				P
	No flash-over between poles or between poles and frame				P
	No blowing of fuse				P
	No damage, polyethylene sheet shows no holes				P
9.12.12	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				
9.12.12.2.a)	Leakage current across open contacts, according to 9.7.7.3, each pole is supplied at a voltage 1,1 times Un= 457 V. The RCBO is in the open position	[µA]	[µA]	[µA]	--
	The leakage current not exceed 2 mA ..... :	10,4	11,3	10,6	P
9.12.12.2.b)	Dielectric strength test:				
	Test voltage:				--
	a) 900 V				P
	b) 900 V				P
	c) 900 V				P
	d) 900 V				N/A
	e) 900 V				N/A
	During these test, after the test has carried out under the conditions specified in 9.7.2 a), indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means show the closed position				P
9.12.12.2.c)	Test current 2,8 I_N ..... :	2,8 I_N = 177A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	-	-	-	N/A
	- 120 s	9	8	9	P

	TEST SEQUENCE "F": **3 samples: C16, $I_{\Delta n}$= 0,03A, 3P+N**	**F_1.22**	**F_1.23**	**F_1.24**	--
	Tests F_1				--
9.12	**Short-circuits test**				--
9.12.11.4	Test above 1500 A				
c)	Test at rated short-circuit capacity I_{cn}				

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	Rated short-circuit capacity (A) ..... :	10kA			--
	Figure ..... :	Figure 7			--
	Cross-section (mm²) ..... :	4,0mm²			--
	Grid distance a (mm) ..... :	35mm			--
	Prospective current (A) ..... :	10kA			--
	Prospective current obtained (A) ..... :	10,2x10³A, 444V			--
	Power factor ..... :	0,45~0,50			--
	Power factor obtained ..... :	0,48			--
	Sequence ..... :	O - CO			--
	I_{peak} (A) max. value ..... :	4,49x10³	4,57x10³	4,70x10³	--
		[KA²s]	[KA²s]	[KA²s]	--
	I²t max.<70KA²s (for B16) ..... :	44,0	29,1	39,5	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				P
	No permanent arcing				P
	No flash-over between poles or between poles and frame				P
	No blowing of fuse				P
	No damage, polyethylene sheet shows no holes				P
9.12.12	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				
9.12.12.2.a)	Leakage current across open contacts, according to 9.7.7.3, each pole is supplied at a voltage 1,1 times Un= 457 V. The RCBO is in the open position	[µA]	[µA]	[µA]	--
	The leakage current not exceed 2 mA ..... :	11,6	10,3	10,7	P
9.12.12.2.b)	Dielectric strength test:				
	Test voltage:				--
	a) 900 V				P
	b) 900 V				P
	c) 900 V				P
	d) 900 V				N/A
	e) 900 V				N/A
	During these test, after the test has carried out under the conditions specified in 9.7.2 a), indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means show the closed position				P
9.12.12.2.c)	Test current 2,8 I_N ..... :	2,8 I_N = 44,8A			--

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	10	8	10	P
	- 120 s	-	-	-	N/A

	TEST SEQUENCE "F": **3 samples: B63, $I_{\Delta n}$= 0,03A, 1P+N**	**F_1.25**	**F_1.26**	**F_1.27**	--
	Tests F_1				--
9.12	**Short-circuits test**				--
9.12.11.4	Test above 1500 A				
c)	Test at rated short-circuit capacity I_{cn}				
	Rated short-circuit capacity (A) ..... :	10kA			--
	Figure ..... :	Figure 7			--
	Cross-section (mm²) ..... :	25mm²			--
	Grid distance a (mm) ..... :	35mm			--
	Prospective current (A) ..... :	10kA			--
	Prospective current obtained (A) ..... :	10,1x10³A, 256V			--
	Power factor ..... :	0,45~0,50			--
	Power factor obtained ..... :	0,47			--
	Sequence ..... :	O - CO			--
	I_{peak} (A) max. value ..... :	6,12x10³	6,04x10³	6,18x10³	--
		[KA²s]	[KA²s]	[KA²s]	--
	I²t max.<100KA²s (for C32) ..... :	74,8	76,1	59,4	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				P
	No permanent arcing				P
	No flash-over between poles or between poles and frame				P
	No blowing of fuse				P
	No damage, polyethylene sheet shows no holes				P
9.12.12	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				
9.12.12.2.a)	Leakage current across open contacts, according to 9.7.7.3, each pole is supplied at a voltage 1,1 times Un= 264 V. The RCBO is in the open position	[µA]	[µA]	[µA]	--
	The leakage current not exceed 2 mA ..... :	7,89	8,57	10,6	P
9.12.12.2.b)	Dielectric strength test:				
	Test voltage:				--

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	a) 900 V				P
	b) 900 V				P
	c) 900 V				P
	d) 900 V				N/A
	e) 900 V				N/A
	During these test, after the test has carried out under the conditions specified in 9.7.2 a), indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means show the closed position				P
9.12.12.2.c)	Test current 2,8 I_N ..... :	2,8 I_N = 177A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	-	-	-	N/A
	- 120 s	9	11	9	P

	TEST SEQUENCE "F": **3 samples: B16, $I_{\Delta n}$= 0,03A, 1P+N**	**F_1-28**	**F_1-29**	**F_1-30**	--
	Tests F_1				--
9.12	**Short-circuits test**				--
9.12.11.4	Test above 1500 A				
c)	Test at rated short-circuit capacity I_{cn}				
	Rated short-circuit capacity (A)..... :	10kA			--
	Figure ..... :	Figure 7			--
	Cross-section (mm²) ..... :	4,0mm²			--
	Grid distance a (mm) ..... :	35mm			--
	Prospective current (A) ..... :	10kA			--
	Prospective current obtained (A) ..... :	10,1x10³A, 256V			--
	Power factor ..... :	0,45~0,50			--
	Power factor obtained ..... :	0,47			--
	Sequence ..... :	O - CO			--
	I_{peak} (A) max. value..... :	4,49x10³	4,23x10³	4,32x10³	--
		[KA²s]	[KA²s]	[KA²s]	--
	I²t max.<80KA²s (for C16)..... :	39,0	34,1	34,6	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				P
	No permanent arcing				P
	No flash-over between poles or between poles and frame				P

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	No blowing of fuse				P
	No damage, polyethylene sheet shows no holes				P
9.12.12	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				
9.12.12.2.a)	Leakage current across open contacts, according to 9.7.7.3, each pole is supplied at a voltage 1,1 times Un= 264 V. The RCBO is in the open position	[µA]	[µA]	[µA]	--
	The leakage current not exceed 2 mA ..... :	11,4	9,38	9,12	P
9.12.12.2.b)	Dielectric strength test:				
	Test voltage:				--
	a) 900 V				P
	b) 900 V				P
	c) 900 V				P
	d) 900 V				N/A
	e) 900 V				N/A
	During these test, after the test has carried out under the conditions specified in 9.7.2 a), indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means show the closed position				P
9.12.12.2.c)	Test current 2,8 I_N ..... :	2,8 I_N = 44,8A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	9	11	9	P
	- 120 s	-	-	-	N/A

	TEST SEQUENCE "F": **3 samples: B63, $I_{\Delta n}$= 0,03A, 3P+N**	**F_1.31 F_1.32 F_1.33**	--
	Tests F_1		**--**
9.12	**Short-circuits test**		--
9.12.11.4	Test above 1500 A		
c)	Test at rated short-circuit capacity I_{cn}		
	Rated short-circuit capacity (A)..... :	10kA	--
	Figure ..... :	Figure 7	--
	Cross-section (mm²) ..... :	25mm²	--
	Grid distance a (mm) ..... :	35mm	--
	Prospective current (A) ..... :	10kA	--
	Prospective current obtained (A) ..... :	10,2x10³A, 444V	--

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	Power factor ..... :	0,45~0,50			--
	Power factor obtained ..... :	0,48			--
	Sequence ..... :	O - CO			--
	I_{peak} (A) max. value ..... :	6,22x10^3	6,25x10^3	6,16x10^3	--
		[KA²s]	[KA²s]	[KA²s]	--
	I²t max.<90KA²s (for B32) ..... :	55,9	68,4	78,9	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				P
	No permanent arcing				P
	No flash-over between poles or between poles and frame				P
	No blowing of fuse				P
	No damage, polyethylene sheet shows no holes				P
9.12.12	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				
9.12.12.2.a)	Leakage current across open contacts, according to 9.7.7.3, each pole is supplied at a voltage 1,1 times Un= 457 V. The RCBO is in the open position	[µA]	[µA]	[µA]	--
	The leakage current not exceed 2 mA ..... :	11,3	10,9	10,7	P
9.12.12.2.b)	Dielectric strength test:				
	Test voltage:				--
	a) 900 V				P
	b) 900 V				P
	c) 900 V				P
	d) 900 V				N/A
	e) 900 V				N/A
	During these test, after the test has carried out under the conditions specified in 9.7.2 a), indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means show the closed position				P
9.12.12.2.c)	Test current 2,8 I_N ..... :	2,8 I_N = 177A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	-	-	-	N/A
	- 120 s	8	10	10	P

	TEST SEQUENCE "F": **3 samples: B16, $I_{\Delta n}$= 0,03A, 3P+N**	**F_1-34**	**F_1-35**	**F_1-36**	--

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	Tests F_1				--
9.12	**Short-circuits test**				--
9.12.11.4	Test above 1500 A				
c)	Test at rated short-circuit capacity I_{cn}				
	Rated short-circuit capacity (A) ..... :	10kA			--
	Figure ..... :	Figure 7			--
	Cross-section (mm²) ..... :	4,0mm²			--
	Grid distance a (mm) ..... :	35mm			--
	Prospective current (A) ..... :	10kA			--
	Prospective current obtained (A) ..... :	10,2x10³A, 444V			--
	Power factor ..... :	0,45~0,50			--
	Power factor obtained ..... :	0,48			--
	Sequence ..... :	O - CO			--
	I_{peak} (A) max. value ..... :	4,51x10³	4,56x10³	4,56x10³	--
		[KA²s]	[KA²s]	[KA²s]	--
	I²t max.<70KA²s (for B16) ..... :	42,1	35,7	29,8	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				P
	No permanent arcing				P
	No flash-over between poles or between poles and frame				P
	No blowing of fuse				P
	No damage, polyethylene sheet shows no holes				P
9.12.12	RCBO show no damage impairing their further use and capable without maintenance to withstand the following tests:				
9.12.12.2.a)	Leakage current across open contacts, according to 9.7.7.3, each pole is supplied at a voltage 1,1 times Un= 457 V. The RCBO is in the open position	[µA]	[µA]	[µA]	--
	The leakage current not exceed 2 mA ..... :	12,4	12,8	11,6	P
9.12.12.2.b)	Dielectric strength test:				
	Test voltage:				--
	a) 900 V				P
	b) 900 V				P
	c) 900 V				P
	d) 900 V				N/A
	e) 900 V				N/A

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
	During these test, after the test has carried out under the conditions specified in 9.7.2 a), indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means show the closed position				P
9.12.12.2.c)	Test current 2,8 I_N ..... :	2,8 I_N = 44,8A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	8	10	8	P
	- 120 s	-	-	-	N/A

	TEST SEQUENCE "G": **3 samples: D63, $I_{\Delta n}$= 0,03A, 1P+N**	**G_0.1**	**G_0.2**	**G_0.3**	--
9.22	**Verification of reliability**				
9.22.1	Climatic test				
	Based on IEC 60068-2-30 taking into account IEC 60068-3-4				P
	28 cycles				P
	Upper temperature 55°C ± 2°C				P
	Initial verification:	[ms]	[ms]	[ms]	--
	Maximum break time at $I_{\Delta N}$ (ms) ..... :	34	35	31	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1.				P
	No value exceeds the specified limiting value				P
	Additional test for type S:				
	Maximum non-actuating time at $I_{\Delta N}$				N/A
	No tripping				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	Climatic test:				--
	No tripping during 28 cycles				P
9.22.1.5	Final verification:				
	RCBO trip with a test current of 1,25 $I_{\Delta N}$ in the test chamber	[ms]	[ms]	[ms]	--
	Break time not exceeding the value for $I_{\Delta N}$ in table 2 (ms) ..... :	27	22	29	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1.				P

IEC 62423					
Clause	Requirement + Test	Result - Remark			Verdict
9.2.4 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** RCBO trip with a test current of 2,5 $I_{\Delta n}$ with smooth direct current	[ms]	[ms]	[ms]	P
		24	25	22	P

	TEST SEQUENCE "G": **3 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**	**G_0-4**	**G_0-5**	**G_0-6**	--
9.22	**Verification of reliability**				
9.22.1	Climatic test				
	Based on IEC 60068-2-30 taking into account IEC 60068-3-4				P
	28 cycles				P
	Upper temperature 55°C ± 2°C				P
	Initial verification:	[ms]	[ms]	[ms]	--
	Maximum break time at $I_{\Delta N}$ (ms) ..... :	35	34	36	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1.				P
	No value exceeds the specified limiting value				P
	Additional test for type S:				
	Maximum non-actuating time at $I_{\Delta N}$				N/A
	No tripping				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	Climatic test:				--
	No tripping during 28 cycles				P
9.22.1.5	Final verification:				
	RCBO trip with a test current of 1,25 $I_{\Delta N}$ in the test chamber	[ms]	[ms]	[ms]	--
	Break time not exceeding the value for $I_{\Delta N}$ in table 2 (ms) ..... :	31	34	27	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1.				P
9.2.4 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** RCBO trip with a test current of 2,5 $I_{\Delta n}$ with smooth direct current	[ms]	[ms]	[ms]	P
		23	26	24	P

IEC 62423			
Clause	Requirement + Test	Result - Remark	Verdict
	TEST SEQUENCE "H": **3 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**	**H1 H2 H3**	--
IEC 61543:			
Table 4-T1.1	Harmonics, interharmonics		
Table 4-T1.2	Signalling voltage		
Table 5-T2.3	Conducted unidirectional transients of the ms and μs time scale		
	Test results of test sequence H:		--
	see test report No. ..... :	2506B1143SHA-001	P
	Testing location / address ..... :	Intertek Testing Services (Shanghai FTZ) Co., Ltd.	P
		Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China	P

	TEST SEQUENCE "I": **3 samples: D63, $I_{\Delta n}$= 0,03A , 3P+N**	**I1 I2 I3**	--
IEC 61543:			
Table 5-T2.1	Conducted sine-wave voltages or currents		
Table 5-T2.5	Radiated high-frequency phenomena		
Table 5-T2.2	Fast transients (burst)		
	Test results of test sequence I:		--
	see test report No. ..... :	2506B1143SHA-001	P
	Testing location / address ..... :	Intertek Testing Services (Shanghai FTZ) Co., Ltd.	P
		Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China	P

	TEST SEQUENCE "J": **3 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**	**J1 J2 J3**	--
IEC 61543:			
Table 5-T2.6	Conducted common mode disturbances in the frequency range lower than 150 kHz		
Table 6-T3.1	Electrostatic discharges		
	Test results of test sequence J:		--
	see test report No. ..... :	2506B1143SHA-001	P
	Testing location / address ..... :	Intertek Testing Services (Shanghai FTZ) Co., Ltd.	P

IEC 62423			
Clause	Requirement + Test	Result - Remark	Verdict
		Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China	P

IEC 62423			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX B, ACC IEC 62423 (NORMATIVE)

Number of samples to be submitted and test sequences to be applied for verification of conformity for Type F RCBOs
Table B.1 - Test sequences

Test sequence		Clause or subclause acc. to IEC 61009-1	Additional tests acc. to IEC 62423	Test (or inspection)
A	A_1	6 8.1.1 8.1.2 9.3 8.1.3 8.1.6 9.11 9.4 9.5 9.6 9.14 8.1.3 9.25	6 No No No No No No No No No No No No	Marking General Mechanism Indelibility of marking Clearance and creepage distances (external parts only) Non-interchangeability 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	9.15	No	Resistance to abnormal heat and fire
B		9.7.7.4 9.7.7.5 a) 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	No No No No No No No No No No No No	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 Temperature-rise Reliability at 40°C Ageing of electronic components
C	C_1	9.10 9.12.11.2.1 (and 9.12.12)	No No	Mechanical and electrical endurance Performance at reduced short-circuit currents (Verification of the RCBO after short-circuit tests)
	C_2	9.12.11.2.2 (and 9.12.12)	No	Short-circuit test for verifying the suitability of RCBOs for use in IT systems (Verification of the RCBO after short-circuit tests)
D	D_0	9.9.1 --- ---	9.1.7 9.1.2 9.1.3	Operating characteristics under residual current conditions, Type A residual current devices Verification of the correct operation in case of steady increase of composite residual current Verification of the correct operation in case of sudden appearance of composite residual current
	D_1	9.17 9.19 --- --- 9.12.13 9.16	No 9.1.5 9.1.6 9.1.4 No No	Behaviour in case of failure of the line voltage Behaviour in case of surge currents Behaviour in the case of inrush residual currents Correct operation of RCBO powered on two poles only Performance at $I_{\Delta m}$ Test device
E	E_0	9.9.2	No	Overcurrent operating characteristics
	E_1	9.13 9.12.11.3 (and 9.12.12)	No No	Resistance to mechanical shock and impact Short-circuit performance at 1500 A
F	F_0	9.12.11.4 b) (and 9.12.12)	No	Performance at service short-circuit capacity
	F_1	9.12.11.4 c) (and 9.12.12.2)	No	Performance at rated short-circuit capacity
G		9.22.1	No	Reliability (climatic tests)
H a) b)		IEC 61543 Table 4-T1.1 IEC 61543 Table 4-T1.2 IEC 61543 Table 5-T2.3	No No No	Harmonics, inter harmonics Signalling voltages Conducted unidirectional transients of the ms and µs time scale
I		IEC 61543 Table 5-T2.1 IEC 61543 Table 5-T2.5 IEC 61543 Table 5-T2.2	No No No	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	No No	Conducted common mode disturbances in the frequency range lower than 150 kHz Electrostatic discharges

a) This test may be done on separate samples.

b) 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.

IEC 62423			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX D, ACC IEC 62423 (NORMATIVE)

Number of samples to be submitted and test sequences to be applied for verification of conformity for Type B RCBOs
Table D.1 - Test sequences

Test sequence		Clause or subclause acc. to IEC 61009-1	Additional tests acc. to IEC 62423	Test (or inspection)
A	A_1	6 8.1.1 8.1.2 9.3 8.1.3 8.1.6 9.11 9.4 9.5 9.6 9.14 8.1.3 9.25	6 No No No No No No No No No 9.2.4 No No	Marking General Mechanism Indelibility of marking Clearance and creepage distances (external parts only) Non-interchangeability Trip free mechanism Reliability of screws, current-carrying parts and connections Reliability of terminals for external conductors Protection against electric shock Verification of the RCBO after test sequence, Resistance to heat Clearances and creepage distances (internal parts) Resistance to rusting
	A_2	9.15	No	Resistance to abnormal heat and fire
B		9.7.7.4 9.7.7.5 a) 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 ---	No No No No No No No No No No No 9.2.4	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 Temperature-rise Reliability at 40°C Ageing of electronic components Verification of the RCBO after test sequence
C	C_1	9.10 --- 9.12.11.2.1 (and 9.12.12)	No 9.2.4 No	Mechanical and electrical endurance Verification of the RCBO after test sequence Performance at reduced short-circuit currents (Verification of the RCBO after short-circuit tests)
	C_2	9.12.11.2.2 (and 9.12.12)	No	Short-circuit test for verifying the suitability of RCBOs for use in IT systems (Verification of the RCBO after short-circuit tests)
D	D_0	9.9.1 --- --- ---	No 9.1.2 9.1.3 9.2.1.7.1	Operating characteristics under residual current conditions Verification of the correct operation in case of steady increase of composite residual current Verification of the correct operation in case of sudden appearance of composite residual current Verification of the correct operation in case of residual smooth direct current without load for ratings of $I_{\Delta n}$ not tested in D_1
	D_1	9.17 9.19 --- --- --- 9.12.13 9.16 ---	No 9.1.5 9.2.3 9.2.1 9.2.2 No No 9.2.4	Behaviour in case of failure of the line voltage Behaviour in case of surge currents Correct operation for RCBO powered on two poles only Type B residual current devices Tests at temperature limits Performance at $I_{\Delta m}$ Test device Verification of the RCBO after test sequence
E	E_0	9.9.2	No	Overcurrent operating characteristics
	E_1	9.13 9.12.11.3 (and 9.12.12)	No No	Resistance to mechanical shock and impact Short-circuit performance at 1500 A
F	F_0	9.12.11.4 b) (and 9.12.12)	No	Performance at service short-circuit capacity
	F_1	9.12.11.4 c) (and 9.12.12.2)	No	Performance at rated short-circuit capacity
G		9.22.1 ---	No 9.2.4	Reliability (climatic tests) Verification of the RCBO after test sequence
H a) b)		IEC 61543 Table 4-T1.1 IEC 61543 Table 4-T1.2 IEC 61543 Table 5-T2.3	No No No	Harmonics, inter harmonics Signalling voltages Conducted unidirectional transients of the ms and µs time scale
I		IEC 61543 Table 5-T2.1 IEC 61543 Table 5-T2.5 IEC 61543 Table 5-T2.2	No No No	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	No No	Conducted common mode disturbances in the frequency range lower than 150 kHz Electrostatic discharges

a) This test may be done on separate samples.

b) 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.

IEC 62423			
Clause	Requirement + Test	Result - Remark	Verdict

Table A.2, acc. IEC 61009-1 - Number of samples for full test procedure			
Test sequence	Number of samples	Minimum number of accepted samples (a) (b)	number of samples for repeated tests (c)
A_1	1	1	--
A_2	3	2	3
B	3	2	3
C_1	3	2 (d)	3
C_2	3	2 (d)	3
D	3	2 (d)	3
E	3	2 (d)	3
F_0	3	2 (d)	3
F_1	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) Except for test of 9.12.10, 9.12.11.2, 9.12.11.3, 9.12.11.4, 9.12.13 as appropriate, which all samples shall pass.

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

IEC 62423			
Clause	Requirement + Test	Result - Remark	Verdict

Table A.3, acc. IEC 61009-1 - 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) j)]	4-poles [e)]
A_1	1 max. rating I_N min. rating $I_{\Delta N}$	1 max. rating I_N min. rating $I_{\Delta N}$	1 max. rating I_N min. rating $I_{\Delta N}$
A_2	3 max. rating I_N min. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$
B	3 max. rating I_N min. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$
C	3 max. rating I_N min. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$
$D_0 + D_1$	3 max. rating I_N min. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$
D_0	1 for all other ratings of $I_{\Delta N}$ with max. I_N		
$E_0 + E_1$	3 max. rating I_N min. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$
E_0	1 [i)] for all other ratings of I_N with min. $I_{\Delta N}$		
F_0	3 max. rating I_N min. rating $I_{\Delta N}$ 3 min. rating I_N max. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$ 3 min. rating I_N max. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$ 3 min. rating I_N max. rating $I_{\Delta N}$
F_1	3 max. rating I_N min. rating $I_{\Delta N}$ 3 min. rating I_N max. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$ 3 min. rating I_N max. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$ 3 min. rating I_N max. rating $I_{\Delta N}$
G	3 max. rating I_N min. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$
H [k)]			3 [h)] samples of the same rating I_N chosen at random min. rating $I_{\Delta N}$
I			3 [h)] samples of the same rating I_N chosen at random min. rating $I_{\Delta N}$
J			3 [h)] samples of the same rating I_N chosen at random min. rating $I_{\Delta N}$

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 RCBOs are submitted, this column shall also apply to a set of samples with the smallest number of poles.
c) Also applicable to 1-pole RCBOs with uninterrupted neutral and 2-pole RCBOs with 1 protected pole.
d) Also applicable to 3-pole RCBOs with two protected poles
e) Also applicable to 3-pole RCBOs with uninterrupted neutral and 4-pole RCBOs with 3 protected poles.
f) This column is omitted when 4-pole RCBOs have been tested.
g) If only one value of $I_{\Delta N}$ is submitted, min. rating $I_{\Delta N}$ and max. rating $I_{\Delta N}$ are replaced by $I_{\Delta N}$.
h) Only the highest number of current paths.
i) For this sequence only the test of 9.9.2 is required.
j) If a 3-pole RCBO with 4 current paths and a 4-pole RCBO are submitted, then only the 4-pole RCBO is tested, with exception of the test of 9.8 of test sequence B for which both types are submitted to the test.
k) If the requirement to test max. rating I_N 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.

IEC 62423			
Clause	Requirement + Test	Result - Remark	Verdict

Table A.4, acc. IEC 61009-1 - Test sequences for RCBOs having different instantaneous tripping currents

RCBO type tested first	Test sequences for other RCBO types		
	B-type	C-type	D-type
B-type	---	$(E_0 + E_1) + F$	$(E_0 + E_1) + F$
C-type	E_0 a) + B a)	---	$(E_0 + E_1) + F$
D-type	E_0 a) + B a)	E_0 a) + B a) b)	---

a) For this sequence only the tests of 9.8 and 9.9.2.2 are required.

b) When certification is requested at the same time for B-type, C-type and D-type RCBOs having the same rated short-circuit capacity, only test sequence E0 is required if B-type and D-type samples have been tested.

Table A.5 - Test sequences for RCBOs 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 d) f)	4-pole e)
$D_0 + D_1$	1 max. rating I_N min. rating $I_{\Delta N}$	1 max. rating I_N min. rating $I_{\Delta N}$	1 max. rating I_N min. rating $I_{\Delta N}$
D_0	1 for all other ratings of $I_{\Delta N}$ with max. $I_{\Delta N}$		

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 RCBOs are submitted, this column shall also apply to a set of samples with the smallest number of poles.

c) Also applicable to 1-pole RCBOs with uninterrupted neutral and to 2-pole RCBOs with 1 protected pole.

d) Also applicable to 3-pole RCBOs with 2 protected poles

e) Also applicable to 3-pole RCBOs with uninterrupted neutral and to 4-pole RCBOs with 3 protected poles.

f) This column is omitted when 4-pole RCBOs have been tested.

IEC 62423			
Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX B (ACC. IEC 61009-1) DETERMINATION OF CLEARANCES AND CREEPAGE DISTANCES	--
B.1	General	
	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	
	If necessary, the manufacturer shall indicate the intended orientation of the equipment or component in order that creepage distances be 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	
	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	
	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	
	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.	N/A
	The methods of measuring creepage distances and clearances are indicated in Figure B.1. 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);	N/A
	- 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 2);	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

IEC 62423			
Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX C (ACC. IEC 61009-1) ARRANGEMENT FOR THE DETECTION OF THE EMISSION OF IONIZED GASES DURING SHORT-CIRCUIT TESTS	
	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.	P
	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	P
	– either the maximum projection of the operating means of a device without recess for the operating means;	P
	– 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.	P
	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.	P
	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.	P
	The grid circuit (see figure C.3) shall be connected to the points B and C (see figures 7 or 8, as applicable).	P
	The parameters for the grid circuit are as follows:	
	Resistor R': 1,5 Ω	P
	Copper wire F': length 50 mm, and diameter as required in 9.12.9.1.	P

IEC 62423			
Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX D (ACC. IEC 61009-1) 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 RCBO 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				
	A residual current is passed through each pole of the RCBO in turn. RCBO not trip at a current less than or equal to 0,5 $I_{\Delta N}$, but trip at $I_{\Delta N}$ within a specified time (see Table 2).	[ms]	[ms]	[ms]	--
					N/A
	Test current applied at least five times to each RCBO and 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 RCBO in the open position, between the terminals which are electrically connected together, when the RCBO is in the closed position				N/A
	b) for RCBOs not incorporating electronic components, with the RCBO in the closed position, between each pole in turn and the others connected together				N/A
	c) for RCBOs incorporating electronic components, with the RCBO 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 occur				N/A
D.4	Performance of the test device				
	With the RCBO in the closed position, and connected to a supply at the appropriate voltage, the test device, when operated, open the RCBO.				N/A
	Where the test device is intended to operate at more than one value of rated voltage, the test at the lowest value of rated voltage.				N/A

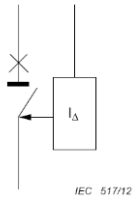
IEC 62423			
Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX E (ACC. IEC 61009-1) SPECIAL REQUIREMENTS FOR AUXILIARY CIRCUITS FOR SAFETY EXTRA-LOW VOLTAGE				--
8.1.3	Clearances and creepage distances				
	Live parts separated from circuits of higher voltage in accordance with IEC 60364-4-41 subclause 414.4.3				N/A
9.7.4	Insulation resistance and dielectric strength of auxiliary circuits				
	Under consideration				--

	ANNEX E (ACC. IEC 62423) ROUTINE TESTS FOR TYPE F AND TYPE B RCDS				--
E.1	An alternating residual current is passed through each pole of the Type F or Type B RCBO in turn. The RCBO shall not trip at a current less than or equal to 0,5 $I_{\Delta N}$, but it shall trip at $I_{\Delta N}$ within a specified time (see Table 1 of IEC 61009-1).	[ms]	[ms]	[ms]	--
					N/A
	The test current shall be applied at least five times on each sample and shall be applied at least twice on each pole.				N/A
	A residual smooth direct current is passed through one pole. The Type B RCCB or the Type B RCBO, as applicable, shall not trip at a current less than or equal to 0,5 $I_{\Delta N}$, but it shall trip at 2 $I_{\Delta N}$ within a specified time (see Table 1 of this standard).	[ms]	[ms]	[ms]	--
					N/A
	The test current shall be applied at least twice on each sample.				N/A
E.2	Electric strength test				
	Clause D.2 of IEC 61009-1 applies as applicable.				N/A
E.3	Performance of the test device				
	Clause D.3 of IEC 61009-1 applies as applicable.				N/A

	ANNEX F COORDINATION BETWEEN RCBOS AND SEPARATE FUSES ASSOCIATED IN THE SAME CIRCUIT	--
	The information given in Annex D of IEC 60898-1:2002 to ensure coordination between circuit-breakers and separate fuses associated in the same circuit may also be applicable to ensure coordination between RCBOs and separate fuses associated in the same circuit.	

IEC 62423			
Clause	Requirement + Test	Result - Remark	Verdict

G	**ANNEX G (ACC. IEC 61009-1) Additional requirements and tests for RCBOs consisting of a circuit-breaker and a residual current unit designed for assembly on site**		
G.4	**Marking and other product information**		
G.4.1	Manufacturers name or trademark		
	Circuit-breaker and r.c.-unit bear the same manufacturers name or trade mark		N/A
G.4.2	Marking		
G.4.2.1	Marking of the circuit-breaker:		
	Circuit-breakers comply with IEC 60898		N/A
G.4.2.2	Marking of the r.c.-unit:		
	R.c.-unit marked with items a), b), c), e), f), g), k), m), n), q) and if necessary l) according to clause 6		N/A
	Addition:		N/A
	- max. rated current of circuit-breaker for assembling		N/A
	- Symbol  		N/A
G.4.2.3	Marking of assembled circuit-breaker and r.c.-unit:		
	Not visible after assembly on r.c unit:		N/A
	- c)		N/A
	- max. rated current of circuit-breaker for assembling		N/A
	visible after assembly:		N/A
	- l) if applicable		N/A
G.4.3	Instructions for assembly and operation		
	Adequate instructions with the r.c. -unit provided		N/A
	Instructions cover at least:		N/A
	- reference to type(s) and catalogue-no, covering current and voltage ratings, number of poles, of circuit breakers for assembling		N/A
	- derating factors, if any		N/A
	- checking of operation		N/A
	- verification of tripping operation by use of test button		N/A

IEC 62423			
Clause	Requirement + Test	Result - Remark	Verdict
G.5	**Constructional requirements**		
G.5.1	General		
	possible to assemble the RCBO on site only		N/A
	device may be disassembled on site in accordance with the manufacturer's instructions		N/A
	Devices declared not suitable for disassembling; the disassembly leave permanent visible damage.		N/A
	Compliance is checked according to G.6.4		N/A
G.5.2	Degree of protection		
	Degree of protection of r.c.-unit not less than of circuit-breaker for assembling		N/A
G.5.3	Mechanical requirements		
	Design is such as to prevent incorrect assembly		N/A
	No loose parts for coupling the tripping mechanisms		N/A
	Fixing means are captive		N/A
G.5.4	Electrical compatibility		
	Not possible to assemble a circuit-breaker with a r.c.-unit		N/A
	- of lower rated voltage		N/A
	- of lower max. current		N/A
	Terminals of r.c.-unit able to clamp nominal cross-sections acc. to table IV of IEC 898 for rated currents of circuit-breakers to be assembled		N/A
	I_N (A) ..... :	A	N/A
	Cross section (mm²) ..... :	to mm²	N/A
	Electrical interconnections form part of the r.c.-unit		N/A
	Not possible to assemble a circuit-breaker with given rated short circuit capacity with a r.c.-unit such as to result in a lower short circuit performance		N/A
	Compliance is checked by inspection and manual test.		N/A
G.6	**Type tests and verifications**		
G.6.2	Test on r.c.-units		
	According to table 10:		N/A
	- 9.3 / 9.4 / 9.5/		N/A
	- 9.11 if applicable		N/A
	- 9.14 / 9.15		N/A
G.6.3	Tests on assembled circuit-breaker and r.c.-unit (rcbo)		

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Clause	Requirement + Test	Result - Remark	Verdict
	According to table 10 except:		N/A
	- 9.3 / 9.5 / 9.9.2.3 / 9.14 / 9.15 do not apply		N/A
	- 9.4 made on interconnections		N/A
	- 9.12 applies except of 9.12.11.3 unless I_{cn} = 1500 A and of 9.12.11.4 b)		N/A
	- Conventional non-tripping current 1,13 I_n replaced everywhere by I_n		N/A
G.6.4	Verification of marking and constructional requirements of RCBOs		
	Compliance with the requirements of G.4.1, G.4.2, G.4.3, G.5.1, G.5.2, G.5.3 and G.5.4 checked by inspection and manual test, as applicable.		N/A
	For devices declared suitable to be disassembled, compliance with the requirements of G.5.1 is checked by the following test to be performed at the beginning of test sequence D_0 in Table A.1.		N/A
	number of samples acc. D_0+D_1 in Table A.3.		N/A
	r.c. unit and compatible circuit-breakers as declared by the manufacturer assembled and disassembled five times. Then reassembled and used for the test of test sequence D_0. After each assembly the correct operation of the combination verified by using the test button. RCBO trip each time.		N/A

IEC 62423			
Clause	Requirement + Test	Result - Remark	Verdict

J	**ANNEX J (ACC. IEC 61009-1) Particular requirements for RCBOs with screwless type terminals for external copper conductors**		
J.1	**This annex applies to RCBOs within the scope of Clause 1, equipped with screwless terminals, for current not exceeding 20 A primarily suitable for connecting unprepared (see J.3.6) copper conductors of cross-section up to 4 mm².**		
J.6	**Marking and other product information**		N/A
	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 RCBO 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 provide information in 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		
	Connection or disconnection of conductors made:		
	- 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 disconnection an operation other than a pull on the conductor necessary (e.g. for push-wire terminals).		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Universal terminals accept rigid (solid or stranded) and flexible unprepared conductors.		N/A
	Non-universal terminals accept the types of conductors declared by the manufacturer.		N/A
	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		
	The dimensions of connectable conductors are given in Table J.1.		N/A
	Ability to connect these conductors checked by inspection and by the tests of J.9.1 and J.9.2.		N/A
J.8.3	Connectable cross-sectional areas		
	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		
	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
	Possible to securely clamp 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		
	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 made five times with:		N/A
	Min. cross-section (mm²) ..... :	mm²	--

IEC 62423			
Clause	Requirement + Test	Result - Remark	Verdict
	Max. cross-section (mm²) ..... :	mm²	--
	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		
	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	--
	Max. cross-section (mm²) ..... :	mm²	--
	After the test, no wire of the conductor escaped outside the terminal.		N/A
J.9.2	Tests of reliability of terminals for external conductors: mechanical strength		
	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	--
	Max. cross-section (mm²) ..... :	mm²	--
	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	--
	Pull for 1 min, max. cross-section (N)..... :	N	--
	During the test no noticeable move of conductor		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

J.9.3	Cycling test				
	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			--
	Test current I_N (A)..... :	A			--
	samples subjected to 192 temperature cycles				N/A
	Voltage drop after 192 cycles:				N/A
	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

IEC 62423			
Clause	Requirement + Test	Result - Remark	Verdict

K	**ANNEX K (ACC. IEC 61009-1)** **Particular requirements for RCBOs with flat quick-connect terminations**		
K.1	**This annex applies to RCBOs 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 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:		
	subclause 8.1.3 applies, the female connectors being fitted to the male tabs of the RCBO		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 made 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
	Dimensions of the male tab comply with those specified in Table K.3 and in figures K.2, K.3, K.4 and K.5		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

		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
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.				
		--	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				
	Test done on 10 terminals of RCBOs, mounted as in normal use when wiring takes place.				N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Axial push force, and successively the axial pull force gradually applied to the male tab integrated in the RCBO		N/A
	Push 96N		N/A
	Pull 88N		N/A
	No damage occurred to the tab or to the RCBO in which the tab is integrated.		N/A
	addition to 9.8.3:		
	Fine -wire thermocouples placed in such a way not to influence the contact or the connection area. An example of placement is shown in fig K.1		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

L	**ANNEX L (ACC. IEC 61009-1)** **Specific requirements for RCBOs with screw-type terminals for external untreated aluminium conductors and with aluminium screw-type terminals for use with copper or with aluminium conductors**		
L.6	**Marking and other product information**		
	In addition to clause 6 the following apply:		
	Terminal marking according table L.1, on the RCBO, 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 indicated on the RCBO	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:		
	RCBOs for connection of aluminium conductors provided with screw-type terminals allowing the connection of conductors having nominal cross-sections as shown in table L.2		N/A
	Terminals for the connection of aluminium conductors and terminals of aluminium for the connection of copper or aluminium conductors have mechanical strength adequate to withstand the tests of 9.4, with the test conductors tightened with the torque indicated in table 14, or with the torque specified by the manufacturer, not lower than that specified in table 14.		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:		
	Terminals 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:		

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Clause	Requirement + Test	Result - Remark		Verdict
	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 RCBO			N/A
L.9.2	Current cycling test			
	This test is carried out on separate terminals			N/A
L.9.2.3	Test arrangement			
	General arrangement of the samples 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
	Test carried out with conductors according to table L.5. Length of the test conductor from the point of entry to the screw-type terminal specimens to the equalizer 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			
	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 subsequently adjusted to raise the temperature of the reference conductor to 75°C			N/A
	At the end of the 25^{th} cycle the test current adjusted the last time and stable temperature 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:			
	- the temperature rise not exceed 110 K			N/A
	- the stability factor Sf 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

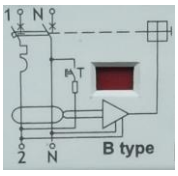
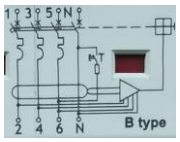
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Clause	Requirement + Test	Result - Remark		Verdict
	Terminal 3			N/A
	Terminal 4			N/A
	Terminal 5			N/A
	Terminal 6			N/A
	Terminal 7			N/A
	Terminal 8			N/A

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Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 62423 EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES (TYPE F AND TYPE B RESIDUAL CURRENT OPERATED CIRCUIT-BREAKERS WITH AND WITHOUT INTEGRAL OVERCURRENT PROTECTION FOR HOUSEHOLD AND SIMILAR USES)	
Differences according to.....:	EN 62423-1:2012 used in conjunction with EN 61009-1:2012+A1:2014+A2:2014+A11:2015+A12:2016 +A13:2021 ~~EN 61009-2-1:1994 + A11:1998~~ BS EN 62423-1:2012+A12:2022 used in conjunction with BS EN 61009-1:2012+A13:2021
Attachment Form No.....:	EU_GD_IEC62423B
Attachment Originator .....:	Intertek
Master Attachment.....:	Dated 2023-04
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	CENELEC COMMON MODIFICATIONS (EN)			
	GENERAL			--
9.12	Short circuit tests			--
9.12.3	Value of power frequency recovery voltage shall be equal to 110% of the rated voltage			--
9.12.4	Tolerances and test quantities			--
	voltage (including recovery voltage): 0, -5%			--

	TEST SEQUENCE "A" *replace the complete test sequences "A_1, A_2"* **1 Sample: D63, IΔn= 0,03A, 1P+N** **1 Sample: D63, IΔn= 0,03A, 3P+N**	**A_1-1**	**A_1-2**	--
6	**MARKING**			--
6.Z1	*STANDARD MARKING*			--
	Each RCBO shall be marked in a durable manner according to the following Table Z3.			P
	RCBO MARKED WITH:			--
a)	The manufacturer's name or trademark	PROJOY		P
b)	Type designation, catalogue number or serial number	PEM1LE-63		P
c)	Rated voltage(s) with the symbol ~	230V~(240V~)	400V~(415V~)	P
d)	Rated current without symbol "A", preceded by the symbol of overcurrent instantaneous tripping (B, C or D), for example B16	D63		P
e)	Rated frequency, if the RCBO is designed for	50/60Hz		P

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Clause	Requirement + Test	Result - Remark	Verdict
	frequencies other than 50Hz (see 5.3.5)		
f)	Rated residual operating current ($I_{\Delta n}$) in A or in mA	30mA	P
h)	Rated short circuit capacity, in amperes in a rectangle without symbol "A"	10000 in a rectangle	P
j)	Reference calibration temperature, if different from 30°C		N/A
k)	The degree of protection (only if different from IP20)	IP20	P
l)	The position of use (symbol according to IEC 60051), if necessary		N/A
m)	Rated residual making and breaking capacity ($I_{\Delta m}$), if different from rated short-circuit capacity (I_{cn})	3000A	P
n)	The symbol S (S in a square) for type S devices		N/A
o)	symbol of the method of operation according to Table Z1 of 4.1 if the RCBO is functionally dependent on the line voltage	E3	P
q)	Operating means of the test device, by the letter T	T	P
r)	Wiring diagram unless the correct mode of operation is evident	 	P
s)	Operating characteristic in presence of residual currents with d.c. components		--
	- RCBOs of type B with the symbol  or 		P
	- RCBOs of type F with the symbol   or 		N/A
t)	Energy limiting class (e.g. 3) in a square in accordance with Annex ZD if applied	Energy limiting class 3 (for B- &C-type)	N/A
u)	RCBOs according to 4 Z1 marked with the symbol (snowflake enclosing -25)		P
v)	Indication of the terminal for the neutral with "N"	N	P
w)	Additional marking of performance to other standards or additional requirements according to 6.Z2		N/A
	RCBO´s other than operated by means of push button, open position indicated by "0" and closed position by "|"	**O - I**	P
	Additional national symbols are allowed Provisionally the use of national indications only is allowed		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	These indication visible when RCBO is installed		
	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/A
	If necessary to distinguish between supply and load terminals they shall be clearly marked	Line: L1, Load: L2 / Line: L1, L3, L5 Load: L2, L4, L6	P
	Terminals for neutral circuit N	N	P
	Terminal for protective conductor		N/A
	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		N/A
	The suitability for isolation, which is provided by all circuit-breakers of this standard, may be indicated by the symbol on the device		P
	The base for plug-in RCBOs shall be marked with the following:		
	- rated current or maximum rated current		N/A
	- trade mark		N/A
	Marking indelible, easy legible and not on removable parts		P
	Labels not easy to remove and no curling. Test acc. to cl. 9.3: 15 s with water and 15 s with hexane		P
6.Z2	*ADDITIONAL MARKING*		--
	Additional marking to other standards (EN or IEC or other) or additional requirements are allowed under the following conditions:		
	- The RCBO shall comply with all the requirements of the additional standard.		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- 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*		--
8.1	*MECHANICAL DESIGN*		--
8.1.1	General		--
	Not possible to alter the operating characteristics by means of external interventions		P
	It shall not be possible to disable or inhibit the RCBO function by any means.		P
	In case of an RCBO having multiple settings of residual operating current, the rating refers to the highest setting.		N/A
8.1.2	Mechanism		--
	Moving contacts of all poles so mechanically coupled that all poles except switched neutral make and break substantially together		P
	Switched neutral of four-pole RCBOs shall not close after and shall not open before the other poles		N/A
	Neutral pole having adequate making and breaking capacity and RCBO with independent manual operation:		
	- all poles operate together including neutral pole		P
	Trip-free mechanism		P
	Possible to switch on and off by hand		
	No intermediate position of the contacts		P
	RCBOs shall provide in the open position an isolating distance in accordance with the requirements necessary to satisfy the isolating function (see 8.3)		P
	Indication of the open and closed position of the main contacts shall be provided by one or both of the following means:		
	- the position of the actuator (this being preferred)		P
	- a separate mechanical indicator		P
	If a separate mechanical indicator is used to indicate the position of the main contacts, this shall		

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Clause	Requirement + Test	Result - Remark	Verdict
	show the colour:		
	- red for the closed position (ON)		P
	- green for the opened position (OFF)		P
	The means of indication of the contact position shall be reliable (Compliance is checked by inspection and by the test of 9.9.2.2		P
	RCBOs 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 (Compliance is checked by inspection and by the tests of 9.12.12.1 and 9.12.12.2)		P
	When means are provided or specified by the manufacturer to lock the operating means in the open position, locking in that position shall only be possible when the main contacts are in the open position. (Compliance is checked by inspection , taking into account the instructions of the manufacturer)		N/A
	If operating means is used for indication it shall, when released, automatically take up the position to that of the moving contacts; operating means shall have two rest positions except that for automatic opening a third distinct position may be provided, when necessary to reset before reclosing	Operation means have 2 rest positions, no third distinct position.	P
	When an indicator light is used this shall be lit when the RCBO is in the closed position		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.		N/A
	If the cover is used as a guiding means for push-buttons, it shall not 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 are closed by the up movement.		P
9.11	Test:		--
	- The RCBO is mounted and wired as in normal use.		P
	- Test circuit according to figure 4.		P
9.11.2	A residual current equal to 1,5 $I_{\Delta N}$ is passed by closing S_2, the RCBO having been closed and the operating means being held in the closed position.	$I_{\Delta N}$= 30mA, tested at 45mA	P

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Clause	Requirement + Test	Result - Remark	Verdict

	The RCBO shall trip.			
	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.	Tripped 27ms	Tripped 31ms	P
8.1.3	Clearances and creepage distances (internal and external parts)			--
	The minimum required clearances and creepage distances are based on the RCBO being designed for operating in an environment with pollution degree 2			P
	Compliance is checked by inspection and/or by measurement and in addition for item 1 by the test of 9.7.7.1.			P
	However, the clearances of item 2 and 4 may be reduced provided that the tests at rated impulse voltage are withstood			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			P
	Clearances [mm] U_{imp} 4kV			--
		minimum clearances [mm]		--
	1. between live parts which are separated when the main contacts are in the open position	4,3mm		P
	2. between live parts of different polarity	>10,0mm		P
	3. between circuits supplied from different sources, one of which being PELV or SELV			N/A
	4. between live parts and:			--
	- accessible surfaces of operating means	>10,0mm		P
	- screws or other means for fixing covers which have to be removed when mounting the RCBO			N/A
	- surface on which the RCBO is mounted	>7,3mm		N/A
	- screws or other means for fixing the RCBO			N/A
	- metal covers or boxes			N/A
	- other accessible metal parts			N/A
	- metal frames supporting flush-type RCBOs	>10,0mm		P
	Creepage distances [mm] (see table 5)			--
	Material group	IIIb ☐ IIIa ☒ II ☐ I ☐		
		minimum creepage distances		--

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Clause	Requirement + Test	Result - Remark	Verdict
		[mm]	
	1. between live parts which are separated when the main contacts are in the open position	7,6mm	P
	2. between live parts of different polarity	>10,0mm	P
	3. between circuits supplied from different sources, one of which being PELV or SELV		N/A
	4. between live parts and:		-
	- accessible surfaces of operating means	>10,0mm	P
	- screws or other means for fixing covers which have to be removed when mounting the RCBO		N/A
	- surface on which the RCBO is mounted	>7,6mm	N/A
	- screws or other means for fixing the RCBO		N/A
	- metal covers or boxes		N/A
	- other accessible metal parts		N/A
	- metal frames supporting flush-type RCBOs	>10,0mm	P
8.1.4	Screws, current-carrying parts and connections		--
8.1.4.1	Connections withstand mechanical stresses occurring in normal use.		
	Screws for mounting the RCBO are not of thread-cutting type.		
	Screws and nuts which are operated when mounting and connecting		
9.4	Test according to cl. 9.4:		--
	- 10 times (screw Ø / torque Nm)	Ø mm Nm	N/A
	- 5 times (screw Ø / torque Nm)	Ø 4,9mm, 2,0Nm	P
acc. technical comment AT 7	Plug-in connections are tested by plugging the RCBO 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.		P
8.1.4.2	Screws with a thread of insulating material operated when mounting the RCBO; correct introduction ensured.		N/A
8.1.4.3	Electrical connections contact pressure not transmitted through insulating material unless there is sufficient resilience in the metallic parts.		P
8.1.4.4	Current carrying parts of		--
	- copper		N/A
	- an alloy 58% copper for parts worked cold		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- an alloy 50% copper for other parts		N/A
	- other metal		N/A
8.1.5	Terminals for external conductors		--
8.1.5.1	Terminals ensure the necessary contact pressure		--
	Compliance is checked by inspection and by the tests of 9.5 for screw-type terminals, by specific tests for plug-in or bolt-on RCBO's included in the standard, or by the tests of: Annex ZE or ZF, as relevant for the type of connection		P
	Annex ZE: RCBOs with screwless type terminals for external copper conductors		N/A
	Annex ZF: RCOBs with flat quick-connect terminations		N/A
	Torque		--
	Ø (mm) : Torque (Nm) :	4,9mm / 2,0Nm	P
	Max. cross-sect.: ____ mm²	25 mm²	P
9.5.1	Pull test:		--
	Min. cross-section (mm²)..... :	1/ 1,5/ 1 mm²	--
	Max. cross-section (mm²)..... :	6/ 25 / 16 mm²	--
	Torque 2/3 (Nm) ..... :	1,33Nm	--
	Pull (N) for 1 min ..... :	50 N for 1/1,5 mm² 60 N for 6 mm² 90 N for 16 mm² 100 N for 25 mm²	--
	During the test no noticeable move of conductor		P
9.5.2	Min. cross-section (mm²)..... :	1/ 1,5/ 1 mm²	--
	Max. cross-section (mm²)..... :	6/ 25 / 16 mm²	--
	Torque 2/3 (Nm) ..... :	1,33Nm	--
	The conductor shows no damage		P
	Terminals not worked loose and no damage		P
9.5.3	Nominal cross-sections from..... :	1 to 25mm²	--
	Number of strands..... :		--
	∅ of strands (mm) ..... :	0,67 to 2,14mm	--
	Torque 2/3 (Nm) ..... :	1,33Nm	--
	After the test no strand of conductor escaped outside		P
	Rated current (A) / Range of nominal cross sections to be clamped* (mm²)		--

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Clause	Requirement + Test	Result - Remark	Verdict

	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~~	1 to 25mm²	
	*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.		--
8.1.5.3	Means for clamping the conductors in the terminals do not serve to fix any other component. (See tests of sub-clause 9.5)		P
8.1.5.4	Terminals for $I_N \leq 32$ A allow the connection of conductors without special preparation.		P
8.1.5.5	Terminals have adequate mechanical strength and metric ISO thread or equivalent. (See tests of sub-clauses 9.4 and 9.5.1)		P
8.1.5.6	Clamping of conductor without undue damage to conductor. (See tests of sub-clause 9.5.2)		P
8.1.5.7	Clamping of conductor reliably and between metal surfaces. (See tests of sub-clauses 9.4 and 9.5.1)		P
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 sub-clause 9.5.3)		P
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 sub-clause 9.4)		P
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 not be of the tapping screw type.		P
8.1.Z1	Mechanical mounting of plug-in type RCBOs		
	The mechanical mounting of plug-in type RCBOs shall be reliable and have adequate stability		N/A

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8.1.Z1.1	Plug-in type RCBOs, the holding in position of which does not depend solely on their plug-in connection(s)		N/A
	Compliance of the mechanical mounting is checked by the relevant tests of 9.13		N/A
8.1.Z1.2	Plug-in type RCBOs, 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 9.13		N/A
8.1.6	Non-interchangeability		--
	Plug-in or screw-in RCBOs must not be replace-able, without aid of a tool, by another of the same make, but having a higher rated current.		N/A
8.2	*PROTECTION AGAINST ELECTRIC SHOCK*		--
	Live parts not accessible in normal use		P
	For RCBOs 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.		P
	Linings		
	- reliably fixed		N/A
	- adequate thickness and		N/A
	- 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.		
	Such devices		--
	- reliably fixed		P
	- adequate mechanical strength		P
	For plug-in RCBOs 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 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 RCBOs easily with-out touching live parts.		N/A
	Lacquer or enamel not considered to provide adequate insulation.		N/A

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9.6	Test: Standard test finger			--
	Straight test finger with a force of 75 N for 1 min at 35°C ± 2°C			P
	Enclosures or covers not deformed to such an extent that live parts can be touched.			P
8.9	*RESISTANCE TO HEAT*			--
	RCBO sufficiently resistant to heat			
9.14.1	Test:			--
	- without removable covers.....1 h (100 ± 2) °C	100°C		P
	- removable covers .....1 h (70 ± 2) °C			N/A
	No change impairing further use and no flow of sealing compound that live parts are exposed			P
	No access to live parts even with test finger with a force not exceeding 5 N.			P
	The RCBO shall trip with a test current of 1,25 $I_{\Delta N}$ - break time not exceeding the value for $I_{\Delta N}$ in table 2	29ms	28ms	P
9.2.4 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** The RCBO shall trip with a test current of 2,5 $I_{\Delta n}$ with smooth direct current maximum break time (ms).....:	33ms	29ms	P
	Marking still legible after test			P
9.14.2	Ball pressure test for external parts of insulating material necessary to retain current-carrying parts or parts of the protective circuit in position:			
	- T = 125 ± 2°C	125°C		P
	After 1 h Ø of impression ≤ 2 mm	1,2mm(enclosure)		P
9.14.3	Ball pressure test for external parts of insulating material not necessary to retain current-carrying parts or parts of the protective circuit in position:			
	☒ T = 70 ± 2°C	70°C		P
	☐ T = ____ ± 2°C (40°C + max. temperature rise of sub-clause 9.8)			N/A
	Ø of impression ≤ 2 mm	1,2mm(handle)		P
8.10	*RESISTANCE TO ABNORMAL HEAT AND TO FIRE*			--
	External parts of insulating material are not liable to ignite and to spread fire under fault or overload conditions.			P

	TEST SEQUENCE "A_2" **3 samples: D63, IΔn= 0,03A, 1P+N**	**A_2.1 A_2.2 A_2.3** **A_2.4 A_2.5 A_2.6**	

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	3 samples: D63, IΔn= 0,03A, 3P+N		
9.15	*GLOW-WIRE TEST*		--
	- External parts of insulating material necessary to retain current-carrying parts or parts of the protective circuit in position.....:	T = 960 ± 15 °C Enclosure	P
	- All other external parts of insulating material .....:	T = 650 ± 10 °C Handle	P
	No visible flame and no sustained glowing	No flames (Handle)	P
	Flames and glowing extinguish within 30 s after removal	3,0s (Enclosure)	P
	No ignition of tissue paper or scorching of the pinewood board		P

	TEST SEQUENCE "B" *replace the complete test sequence "B"* **3+1 samples: D63, $I_{\Delta n}$= 0,03A, 1P+N**	**B1**	**B2**	**B3**	--
8	requirements for construction and operation				--
8.3	*DIELECTRIC PROPERTIES AND ISOLATING CAPABILITY*				--
	RCBOs have adequate dielectric properties				P
9.7	*TEST OF DIELECTRIC PROPERTIES AND ISOLATING CAPABILITY*				--
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.				N/A
9.7.1.2	Test conditions: 48 h in humidity cabinet RH = 91% to 95% T = 20 to 30°C ± 1°C				--
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:	B1 [MΩ]	B2 [MΩ]	B3 [MΩ]	--
	a) between the terminals which are electrically connected together when the RCBO is in the closed position ..... ≥ 2 MΩ	500MΩ	500MΩ	500MΩ	P
	b) between each pole and the others connected together (electronic components, connected between poles being disconnected) ..... ≥ 2 MΩ	500MΩ	500MΩ	500MΩ	P
	c) with the RCBO in the closed position, between all poles connected together and the frame, including a metal foil or part in contact with the outer surface of the housing of insulating material but with the terminal areas kept completely free	500MΩ	500MΩ	500MΩ	P

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Clause	Requirement + Test	Result - Remark	Verdict

	in an appropriate manner to avoid flashover between terminals and the metal foil ..... ≥ 5 MΩ				
	d) between the frame and a metal foil in contact with the inner surface of the lining of insulating material ..... ≥ 5 MΩ				N/A
9.7.3	Dielectric strength of the main circuit measured with an AC voltage (45-65Hz) for 1 min:				--
	a) .....2000 V	OK	OK	OK	P
	b) (electronic components, connected between poles being disconnected) .....2000 V	OK	OK	OK	P
	c).....2000 V	OK	OK	OK	P
	e) .....2500 V				N/A
	No flashover or breakdown				P
9.7.4	Insulation resistance of auxiliary circuits measured with 500 V DC after 1 min:	B1 [MΩ]	B2 [MΩ]	B3 [MΩ]	--
	1) between all auxiliary circuits and the frame..... ≥ 2 MΩ				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..... ≥ 2 MΩ				N/A
	Dielectric strength of auxiliary circuits measured with an AC voltage at rated frequency for 1 min:				--
	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				--
	1) between all auxiliary circuits and the frame				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				N/A
	No flashover or perforation				N/A
9.7.5	Secondary circuit of detection transformers				--
	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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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						**B1**	**B2**	**B3**		--
	RCBO 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.						600V 12mA	600V 12mA	600V 12mA		P
9.9.1.2	Verification of the correct operation in case of sudden appearance of residual current by closing S_1										
	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, 500A[b)]	$I_{\Delta t}$[c)]		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--
	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable										--
9.9.1.2.c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):										P
	Maximum break times at:						[ms]	[ms]	[ms]		--

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Clause	Requirement + Test	Result - Remark	Verdict

	- $I_{\Delta N}$:	38	37	38	P
	- 2 $I_{\Delta N}$:	32	26	27	P
	- 5 $I_{\Delta N}$ or :	-	-	-	N/A
	- 0,25 A :	21	21	22	P
	- $I_{\Delta t}$ 630 A :	8	9	9	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
9.7.7	VERIFICATION OF IMPULSE WITHSTAND VOLTAGES (ACROSS CLEARANCES AND ACROSS SOLID INSULATION) AND OF LEAKAGE CURRENT ACROSS OPEN CONTACTS				
9.7.7.1	VERIFICATION OF IMPULSE WITHSTAND VOLTAGE ACROSS THE OPEN CONTACTS (SUITABILITY FOR ISOLATION)				
	The test is carried out on an RCBO 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 RCBO under test connected to the impulse generator.				P
	The test voltage is applied between the line terminals connected together and the load terminals connected together with the contacts in the open position				P
	Three positive impulses and three 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
	rated impulse withstand voltage [kV]:	4			--
	see level of test laboratory [m]	5			--
	test voltage (acc. Table 18) [kV]:	6,2			--

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Clause	Requirement + Test	Result - Remark	Verdict
	no disruptive discharges during the test		P
9.7.7.2	*VERIFICATION OF IMPULSE WITHSTAND VOLTAGE FOR THE PARTS NOT TESTED IN 9.7.7.1*		--
	The test is carried out on an RCBO fixed on a metal support		N/A
	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		N/A
	The shape of the impulses is adjusted with the RCBO under test connected to the impulse generator.		N/A
	A first series of tests is made applying the impulse voltage between the phase pole(s), connected together, and the neutral pole (or path) of the RCBO, as applicable.		N/A
	A second series of tests is made applying the impulse voltage between the metal support connected to the terminal(s) intended for the protective conductor(s), if any, and the phase pole(s) and the neutral pole (or path) connected together.		N/A
	In both cases three positive impulses and three negative impulses are applied, the interval between consecutive impulses being at least 1 s for impulses of the same polarity and at least 10 s for impulses of the opposite polarity.		N/A
	rated impulse withstand voltage [kV]:		--
	see level of test laboratory [m]		--
	test voltage (acc. Table 19) [kV]:		--
	no disruptive discharges during the test		N/A
9.7.7.3	*VERIFICATION OF LEAKAGE CURRENTS ACROSS OPEN CONTACTS (SUITABILITY FOR ISOLATION)*		--
	Each pole of RCBO having been submitted to the test of 9.12.11.2, or 9.12.11.3, or 9.12.11.4.a), or 9.12.11.4.b) or 9.12.11.4.c) is supplied at a voltage 1,1 times its rated operational voltage, the RCBO being in the open position		P
	The leakage current flowing across the open contacts is measured and shall not exceed 2mA		P
	No tripping during tests		P
8.4	TEMPERATURE RISE		--
	Temperature rises do not exceed the limiting values stated in table 7.		P
	Cross-section (mm²)	16mm²	--

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Clause	Requirement + Test	Result - Remark	Verdict

9.8.1	Ambient air temperature (°C)	21,3°C			--
9.8.2	Test current I_N (A) until steady state values are reached.	63A			--
	Four pole RCBOs:				
	Current passing through				
	- 3 phase poles (1)				N/A
	- neutral and adjacent pole (2)				N/A
	Parts ..... Temperature rise K	[K]	[K]	[K]	--
	Terminals for external connections 65	55	55	55	P
	External parts liable to be touched during manual operation of the RCBO, including operating means of insulating material and metallic means for coupling insulated operating means of several poles 40K	18	19	19	P
	External metallic parts of operating means 25K	-	-	-	NA
	Other external parts, including that face of the RCBO in direct contact with the mounting surface 60K	47	45	44	P
9.20	*VERIFICATION OF RESISTANCE OF THE INSULATION AGAINST AN IMPULSE VOLTAGE*				--
	RCBO fixed on metal support in closed position and wired as in normal use.				P
	Impulse voltage 1,2 / 50 µs with a peak value of:				--
	- 6 kV between the phase pole(s) connected together and the neutral pole or, in absence of the neutral pole, on one pole taken at random				P
	- 8 kV between the metal support connected to terminal(s) for the protective conductor(s) and all poles connected together				P
	No unintentional disruptive discharge				P
8.16	*RELIABILITY*				--
	RCBOs operate reliably even after long service.				P
9.22.2	Test with 28 cycles at 40 ± 2°C				--
	Cross-section (mm²) ..... :	16mm²			--
	Torque $^2/_3$ (Nm) ..... :	1,33Nm			--
	Test current I_N (A) ..... :	63A			--
	- with current passing ..... 21 h	21h			P
	- without current ..... 3 h	3h			P
	For 4 pole RCBOs with 3 overcurrent protected poles only 3 poles loaded				N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	At the end of the last period of 21 h with current passing the temperature rise of the terminals shall not exceed 65K	[K]	[K]	[K]	--
		60	60	59	P
	After cool down the RCBO shall trip with a test current of 1,25 $I_{\Delta N}$ - break time not exceeding the value for $I_{\Delta N}$ in table 2	[ms]	[ms]	[ms]	--
		31	29	36	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1.				P
9.23	*VERIFICATION OF AGEING*				--
	168 h at 40 ± 2°C .....:	168h, 40°C			--
	Test current I_N (A).....:	63A			--
	Cross-section (mm²).....:	16mm²			--
	Electronic parts at 1,1 U_N .....:	457V			--
	After cool down:				P
	- electronic parts show no damage				P
	The RCBO shall trip with a test current of 1,25 $I_{\Delta N}$ - break time not exceeding the value for $I_{\Delta N}$ in table 2	[ms]	[ms]	[ms]	--
		31	27	30	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1				P
9.2.4 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** The RCBO shall trip with a test current of 2,5 $I_{\Delta n}$ with smooth direct current	27ms	26ms	28ms	P

	TEST SEQUENCE "B" *replace the complete test sequence "B"* **3+1 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**	**B5**	**B6**	**B7**	--
8	requirements for construction and operation				--
8.3	*DIELECTRIC PROPERTIES AND ISOLATING CAPABILITY*				--
	RCBOs have adequate dielectric properties				P
9.7	*TEST OF DIELECTRIC PROPERTIES AND ISOLATING CAPABILITY*				--
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.				N/A
9.7.1.2	Test conditions:				--

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	48 h in humidity cabinet RH = 91% to 95% T = 20 to 30°C ± 1°C				
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:	B6 [MΩ]	B6 [MΩ]	B7 [MΩ]	--
	a) between the terminals which are electrically connected together when the RCBO is in the closed position ..... ≥ 2 MΩ	500MΩ	500MΩ	500MΩ	P
	b) between each pole and the others connected together (electronic components, connected between poles being disconnected) ..... ≥ 2 MΩ	500MΩ	500MΩ	500MΩ	P
	c) with the RCBO in the closed position, between all poles connected together and the frame, including a metal foil or part in contact with the outer surface of the housing of insulating material but with the terminal areas kept completely free in an appropriate manner to avoid flashover between terminals and the metal foil ..... ≥ 5 MΩ	500MΩ	500MΩ	500MΩ	P
	d) between the frame and a metal foil in contact with the inner surface of the lining of insulating material ..... ≥ 5 MΩ				N/A
9.7.3	Dielectric strength of the main circuit measured with an AC voltage (45-65Hz) for 1 min:				--
	a) .....2000 V	OK	OK	OK	P
	b) (electronic components, connected between poles being disconnected) .....2000 V	OK	OK	OK	P
	c).....2000 V	OK	OK	OK	P
	e) .....2500 V				N/A
	No flashover or breakdown				P
9.7.4	Insulation resistance of auxiliary circuits measured with 500 V DC after 1 min:	B6 [MΩ]	B6 [MΩ]	B7 [MΩ]	--
	1) between all auxiliary circuits and the frame ..... ≥ 2 MΩ				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 ..... ≥ 2 MΩ				N/A
	Dielectric strength of auxiliary circuits measured with an AC voltage at rated frequency for 1 min:				--
	Rated voltage of Test voltage (V)				--

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	auxiliary circuits (a.c. or d.c.) ≤ 30 600 > 30 ≤ 50 1000 > 50 ≤ 110 1500 > 110 ≤ 250 2000 > 250 ≤ 500 2500									V	
	1) between all auxiliary circuits and the frame										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										N/A
	No flashover or perforation										N/A
9.7.5	Secondary circuit of detection transformers										--
	No insulation test, provided that no connection with accessible metal parts or with protective conductor or live parts exists.										N/A
9.7.6	Capability of control circuits connected to the main circuit of withstanding high DC voltages due to insulation measurements									**B5** **B6** **B7**	--
	RCBO 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.									600V 12mA 600V 12mA 600V 12mA	P
9.9.1.2	Verification of the correct operation in case of sudden appearance of residual current by closing S_1										
	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, 500A[b)]	$I_{\Delta t}$[c)]		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--

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Clause	Requirement + Test	Result - Remark	Verdict

				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--
	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable										--
9.9.1.2.c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):										P
	Maximum break times at:							[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:							37	36	35	P
	- 2 $I_{\Delta N}$:							29	28	28	P
	- 5 $I_{\Delta N}$ or :							-	-	-	N/A
	- 0,25 A :							21	22	22	P
	- $I_{\Delta t}$ 630 A :							9	9	9	P
	No value exceeds the relevant specified limiting value										P
	Additional test for type S:										
	Minimum non-actuating time at:							[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s							-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s							-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s							-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s							-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2										N/A
9.7.7	VERIFICATION OF IMPULSE WITHSTAND VOLTAGES (ACROSS CLEARANCES AND ACROSS SOLID INSULATION) AND OF LEAKAGE CURRENT ACROSS OPEN CONTACTS										
9.7.7.1	VERIFICATION OF IMPULSE WITHSTAND VOLTAGE ACROSS THE OPEN CONTACTS (SUITABILITY FOR ISOLATION)										
	The test is carried out on an RCBO fixed on a metal support										P
	The impulses are given by a generator producing positive and negative impulses having a front time										P

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Clause	Requirement + Test	Result - Remark	Verdict
	of 1,2μs, and a time to half-value of 50μs		
	The shape of the impulses is adjusted with the RCBO under test connected to the impulse generator.		P
	The test voltage is applied between the line terminals connected together and the load terminals connected together with the contacts in the open position		P
	Three positive impulses and three 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
	rated impulse withstand voltage [kV]:	4	--
	see level of test laboratory [m]	5	--
	test voltage (acc. Table 18) [kV]:	6,2	--
	no disruptive discharges during the test		P
9.7.7.2	*VERIFICATION OF IMPULSE WITHSTAND VOLTAGE FOR THE PARTS NOT TESTED IN 9.7.7.1*		--
	The test is carried out on an RCBO fixed on a metal support		N/A
	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		N/A
	The shape of the impulses is adjusted with the RCBO under test connected to the impulse generator.		N/A
	A first series of tests is made applying the impulse voltage between the phase pole(s), connected together, and the neutral pole (or path) of the RCBO, as applicable.		N/A
	A second series of tests is made applying the impulse voltage between the metal support connected to the terminal(s) intended for the protective conductor(s), if any, and the phase pole(s) and the neutral pole (or path) connected together.		N/A
	In both cases three positive impulses and three negative impulses are applied, the interval between consecutive impulses being at least 1 s for impulses of the same polarity and at least 10 s for impulses of the opposite polarity.		N/A
	rated impulse withstand voltage [kV]:		--
	see level of test laboratory [m]		--

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	test voltage (acc. Table 19) [kV]:				--
	no disruptive discharges during the test				N/A
9.7.7.3	*VERIFICATION OF LEAKAGE CURRENTS ACROSS OPEN CONTACTS (SUITABILITY FOR ISOLATION)*				--
	Each pole of RCBO having been submitted to the test of 9.12.11.2, or 9.12.11.3, or 9.12.11.4.a), or 9.12.11.4.b) or 9.12.11.4.c) is supplied at a voltage 1,1 times its rated operational voltage, the RCBO being in the open position				P
	The leakage current flowing across the open contacts is measured and shall not exceed 2mA				P
	No tripping during tests				P
8.4	TEMPERATURE RISE				--
	Temperature rises do not exceed the limiting values stated in table 7.				P
	Cross-section (mm²)	16mm²			--
9.8.1	Ambient air temperature (°C)	21,4°C			--
9.8.2	Test current I_N (A) until steady state values are reached.	63A			--
	Four pole RCBOs:				
	Current passing through				
	- 3 phase poles (1)				N/A
	- neutral and adjacent pole (2)				N/A
	Parts ..... Temperature rise K	[K]	[K]	[K]	--
	Terminals for external connections 65	59	61	60	P
	External parts liable to be touched during manual operation of the RCBO, including operating means of insulating material and metallic means for coupling insulated operating means of several poles 40K	20	20	20	P
	External metallic parts of operating means 25K	-	-	-	NA
	Other external parts, including that face of the RCBO in direct contact with the mounting surface 60K	47	47	48	P
9.20	*VERIFICATION OF RESISTANCE OF THE INSULATION AGAINST AN IMPULSE VOLTAGE*				--
	RCBO fixed on metal support in closed position and wired as in normal use.				P
	Impulse voltage 1,2 / 50 µs with a peak value of:				--
	- 6 kV between the phase pole(s) connected together and the neutral pole or, in absence of the neutral pole, on one pole taken at random				P

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	- 8 kV between the metal support connected to terminal(s) for the protective conductor(s) and all poles connected together				P
	No unintentional disruptive discharge				P
8.16	*RELIABILITY*				--
	RCBOs operate reliably even after long service.				P
9.22.2	Test with 28 cycles at 40 ± 2°C				--
	Cross-section (mm²).....:	16mm²			--
	Torque 2/3 (Nm) .....:	1,33Nm			--
	Test current I_N (A).....:	63A			--
	- with current passing .....21 h	21h			P
	- without current .....3 h	3h			P
	For 4 pole RCBOs 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]	[K]	[K]	--
		61	63	63	P
	After cool down the RCBO shall trip with a test current of 1,25 $I_{\Delta N}$ - break time not exceeding the value for $I_{\Delta N}$ in table 2	[ms]	[ms]	[ms]	--
		33	36	31	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1.				P
9.23	*VERIFICATION OF AGEING*				--
	168 h at 40 ± 2°C .....:	168h, 40°C			--
	Test current I_N (A).....:	63A			--
	Cross-section (mm²).....:	16mm²			--
	Electronic parts at 1,1 U_N .....:	457V			--
	After cool down:				P
	- electronic parts show no damage				P
	The RCBO shall trip with a test current of 1,25 $I_{\Delta N}$ - break time not exceeding the value for $I_{\Delta N}$ in table 2	[ms]	[ms]	[ms]	--
		26	34	31	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1				P
9.2.4 addition	**Only applicable for RCBOs of type B:** The RCBO shall trip with a test current of 2,5 $I_{\Delta n}$	29ms	31ms	27ms	P

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acc. IEC 62423	with smooth direct current				

	TEST SEQUENCE "B" *replace the complete test sequence "B"* **3 samples: B63, $I_{\Delta n}$= 0,03A, 1P+N**	**B9**	**B10**	**B11**	--
8.4	**TEMPERATURE RISE**				--
	Temperature rises do not exceed the limiting values stated in table 7.				P
	Cross-section (mm²)	16mm²			--
9.8.1	Ambient air temperature (°C)	21,5°C			--
9.8.2	Test current I_N (A) until steady state values are reached.	63A			--
	Four pole RCBOs:				
	Current passing through				
	- 3 phase poles (1)				N/A
	- neutral and adjacent pole (2)				N/A
	Parts ..... Temperature rise K	[K]	[K]	[K]	--
	Terminals for external connections 65K	54	54	55	P
	External parts liable to be touched during manual operation of the RCBO, including operating means of insulating material and metallic means for coupling insulated operating means of several poles.....40K	20	21	21	P
	External metallic parts of operating means.....25K	-	-	-	NA
	Other external parts, including that face of the RCBO in direct contact with the mounting surface 60K	44	44	43	P

	TEST SEQUENCE "B" *replace the complete test sequence "B"* **3 samples: B63, $I_{\Delta n}$= 0,03A, 3P+N**	**B12**	**B13**	**B14**	--
8.4	**TEMPERATURE RISE**				--
	Temperature rises do not exceed the limiting values stated in table 7.				P
	Cross-section (mm²)	16mm²			--
9.8.1	Ambient air temperature (°C)	21,5°C			--
9.8.2	Test current I_N (A) until steady state values are reached.	63A			--
	Four pole RCBOs:				

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	Current passing through				
	- 3 phase poles (1)				N/A
	- neutral and adjacent pole (2)				N/A
	Parts ..... Temperature rise K	[K]	[K]	[K]	--
	Terminals for external connections 65K	61	60	60	P
	External parts liable to be touched during manual operation of the RCBO, including operating means of insulating material and metallic means for coupling insulated operating means of several poles.....40K	20	21	21	P
	External metallic parts of operating means.....25K	-	-	-	NA
	Other external parts, including that face of the RCBO in direct contact with the mounting surface 60K	46	46	46	P

	TEST SEQUENCE "C": **3 samples: D63, $I_{\Delta n}$= 0,03A, 1P+N**	**C_1.1 C_1.2 C_1.3**	--
	TESTS C_1		--
8	requirements for construction and operation		--
8.6	*MECHANICAL AND ELECTRICAL ENDURANCE*		--
	RCBOs 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
9.12.11.2	TEST AT REDUCED SHORT-CIRCUIT CURRENTS		--
9.12.11.2.1	Test on all RCBOs		
replace:	Each overcurrent protected pole of the RCBO is subjected separately to a test in a circuit the principle of connections of which is shown in Figure 11. Phases which do not carry the short circuit current during this test shall be connected to the supply voltage at the line terminals		P
add:	The measurement of the breaking time shall be carried out at every test and the values shall comply with the values of Table 2.		

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Clause	Requirement + Test	Result - Remark	Verdict

		[ms]	[ms]	[ms]	--
		27ms	24ms	27ms	P
9.12.12.1. b)	Dielectric strength test:				--
modify:	Test voltage:				--
	a) 1500 V				P
	b) 1500 V				P
	c) 1500 V				P
	d) 2000 V				N/A

	TEST SEQUENCE "C": **3 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**	**C_1.4 C_1.5 C_1.6**			--
	TESTS C_1				--
8	requirements for construction and operation				--
8.6	*MECHANICAL AND ELECTRICAL ENDURANCE*				--
	RCBOs 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
9.12.11.2	TEST AT REDUCED SHORT-CIRCUIT CURRENTS				--
9.12.11.2.1	Test on all RCBOs				
replace:	Each overcurrent protected pole of the RCBO is subjected separately to a test in a circuit the principle of connections of which is shown in Figure 11. Phases which do not carry the short circuit current during this test shall be connected to the supply voltage at the line terminals				P
add:	The measurement of the breaking time shall be carried out at every test and the values shall comply with the values of Table 2.				
		[ms]	[ms]	[ms]	--
		23ms	26ms	26ms	P

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Clause	Requirement + Test	Result - Remark	Verdict
9.12.12.1. b)	Dielectric strength test:		--
modify:	Test voltage:		--
	a) 1500 V		P
	b) 1500 V		P
	c) 1500 V		P
	d) 2000 V		N/A

	Tests C_2: **3 samples: D63, $I_{\Delta n}$= 0,03A, 1P+N**	**C_2-1 C_2-2 C_2-3**	--
9.12.11.2.2	*SHORT CIRCUIT TEST ON RCBOS FOR VERIFYING THEIR SUITABILITY FOR USE IN IT SYSTEMS*		P
modify:	test voltage 105% of 400V	444V	P
	test voltage 105% of 230V for the pole marked N, if any	256V	P
9.12.12.1. b)	Dielectric strength test:		--
	Test voltage:		--
	a) 1500 V		P
	b) 1500 V		P
	c) 1500 V		P
	d) 2000 V		N/A

	Tests C_2: **3 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**	**C_2-4 C_2-5 C_2-6**	--
9.12.11.2.2	*SHORT CIRCUIT TEST ON RCBOS FOR VERIFYING THEIR SUITABILITY FOR USE IN IT SYSTEMS*		P
modify:	test voltage 105% of 400V	444V	P
	test voltage 105% of 230V for the pole marked N, if any	256V	P
9.12.12.1. b)	Dielectric strength test:		--
	Test voltage:		--
	a) 1500 V		P
	b) 1500 V		P
	c) 1500 V		P

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	d) 2000 V		N/A

	TEST SEQUENCE "D" **replace the complete test sequence "D_0"** **3 samples: D63, $I_{\Delta n}$= 0,03A, 1P+N**						**D1 D2 D3**				--
	TEST D_0										--
8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*										--
8.5	*OPERATING CHARACTERISTICS*										--
9.9	*VERIFICATION OF THE OPERATING CHARACTERISTIC*										--
9.9.1	RCBO installed as for normal use, test circuit according to figure 4										P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting										N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency						50/60Hz				P
9.9.1.5	For RCBOs functionally dependent on line voltage each test is made at:										P
	- 1,1 U_N (V) and						264V				
	- 0,85 U_N (V)						195V				--
	Type	I_N A	$I_{\Delta N}$ A	Limiting values of break time and non-actuating time (s) for type AC and A RCBOs in event of alternating residual currents (r.m.s. values) equal to							--
				$I_{\Delta N}$	$2I_{\Delta N}$	$5I_{\Delta N}$	5 $I_{\Delta N}$ or 0,25A [a]	5A-200A, 500A [b]	$I_{\Delta t}$ [c]		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--

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	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.				--
9.9.1.2	Off-load tests at 20 ± 5°C				P
a)	Verification of the correct operation in case of a steady increase of residual current:	[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s Tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$	21,3-21,6	21,4-21,7	21,3-21,6	P
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the - specified limiting value	31-37	31-36	27-36	P
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	36	35	34	P
	- 2 $I_{\Delta N}$:	26	27	28	P
	- 5 $I_{\Delta N}$ or :	-	-	-	N/A
	- 0,25 A :	19	21	21	P
	- $I_{\Delta t}$ 630 A :	9	9	10	P
	No value exceeds the relevant specified limiting value				P
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A among the following list: 5A - 10A - 20A - 50A - 100A - 200A by closing S_2, (S_1 and RCBO in closed position):				P
	- 5A	12	12	10	P
	- 10A	11	11	10	P
	- 20A	11	8	9	P
	- 50A	9	10	10	P
	- 100A	10	9	9	P
	- 200A	10	7	9	P
	- 500A	7	7	7	P

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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 at:				--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.4.a)	Tests repeated at -5°C:				P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	37	33	33	P
	- 2 $I_{\Delta N}$:	29	31	27	P
	- 5 $I_{\Delta N}$ or :	-	-	-	N/A
	- 0,25 A :	21	18	20	P
	- $I_{\Delta t}$ 630 A :	10	9	10	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:				--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.3	Tests repeated with the RCBO loaded with rated current I_N until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--

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	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	-no value exceeds the specified limiting value	36	36	34	P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_2, (S_1 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	34	33	36	P
	- 2 $I_{\Delta N}$:	27	27	27	P
	- 5 $I_{\Delta N}$ or :	-	-	-	N/A
	- 0,25 A :	21	20	20	P
	- $I_{\Delta t}$ 630 A :	9	9	9	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.4.b)	Tests repeated with the RCBO loaded with rated current I_N at +40°C until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	34	31	34	P
	- 2 $I_{\Delta N}$:	28	27	27	P
	- 5 $I_{\Delta N}$ or :	-	-	-	N/A
	- 0,25 A :	18	21	21	P
	- $I_{\Delta t}$ 630 A :	9	9	10	P

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	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A

	TEST D_1			--
8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*			--
9.1.6 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of behaviour in the case of inrush residual currents			
	Test acc. figure 2			N/A
	all switches and RCBO in closed position			N/A
	pulse with a peak current of 10 $I_{\Delta n}$ ..... (mA):			N/A
	Pulse on one pole chosen at random			N/A
	Six measurements: 3 times positive, 3 times negative			N/A
	Polarity changed after each test			N/A
	No tripping during test			N/A
9.1.4 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation for four-pole Type F RCCDs powered on two poles only			
	Tests performed with a four-pole RCBO acc. 9.1.2, but only supplied between neutral terminal and one-phase terminal chosen at random without load			N/A
9.1.2 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation in case of steady increase of composite residual current			
	starting composite residual current:			
	Different frequency component values of test currents for calibration (RMS)	Composite starting current value (RMS)		

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	$I_{at\ rated\ frequency}$	I_{1kHz}	$I_{F\ motor\ (10Hz)}$	I_{Δ}				
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$				
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$ (mA):				34,1-35,1	34,2-35,4	34,3-35,3	P
9.2.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the operating characteristics at the reference temperature (20±5)°C							
9.2.1.1 addition acc. IEC 62423	General							
delete:	~~For multiple settings of $I_{\Delta n}$ tests are made for each setting~~							
9.2.1.2 addition acc. IEC 62423	Verification of the correct operation in case of residual sinusoidal alternating currents up to 1000 Hz							--
b) delete:	~~Additional test for type S:~~							
	~~- minimum non actuating time (ms) at: 14 $I_{\Delta n}$; 0,13 s :~~				~~D1~~	~~D2~~	~~D3~~	
9.1.7 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A							
	Test acc. 9.21.1.4 but the smooth direct current of 0,006 A replaced by 0,01 A							N/A
	Verification of the correct operation in case of residual pulsating d.c. currents with angle α = 0° superimposed by smooth direct current of 0,01 A:							
	- steady increase of pulsating d.c. current from zero to: 1,4 $I_{\Delta n}$ for $I_{\Delta n}$ > 0,01 A with 1,4 $I_{\Delta n}$ /30 A/s (mA)							N/A
	- steady increase of pulsating d.c. current from zero to: 2 $I_{\Delta n}$ for $I_{\Delta n} \leq$ 0,01 A with 2 $I_{\Delta n}$ /30 A/s (mA)							N/A
	- angle α = 0° (+/-) (+/- 10 mA) ..... :				D1	D2	D3	N/A
	No value exceeds the relevant specified limiting values							N/A
9.12.13	***DELETE***							--
8.11 replace by*:*	Test device							--
	RCBOs provided with a test device							*P*
	RCBOs with rated residual current of 30mA:							
	Ampere-turns produced when operating the test device do not exceed 1,66 times the ampere turns				Ampere-turns produced by test device: 47,3 milliampere-turns			P

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	produced by $I_{\Delta N}$	1,66 times ampere-turns produced by $I_{\Delta n}$: 49,8 milliampere -turns	
	RCBOs with rated residual current other than 30mA:		
	Ampere-turns produced when operating the test device do not exceed 2,5 times the ampere turns produced by $I_{\Delta N}$		N/A
	Not possible to energize the circuit on the load side by operating the test device when the RCBO is in the open position		P

	TEST SEQUENCE "D" **replace the complete test sequence "D_0"** **3 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**						**D4 D5 D6**				--
	TEST D_0										--
8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*										--
8.5	*OPERATING CHARACTERISTICS*										--
9.9	*VERIFICATION OF THE OPERATING CHARACTERISTIC*										--
9.9.1	RCBO installed as for normal use, test circuit according to figure 4										P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting										N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency						50/60Hz				P
9.9.1.5	For RCBOs functionally dependent on line voltage each test is made at:										P
	- 1,1 U_N (V) and						457V				
	- 0,85 U_N (V)						340V				--
	Type	I_N A	$I_{\Delta N}$ A	Limiting values of break time and non-actuating time (s) for type AC and A RCBOs in event of alternating residual currents (r.m.s. values) equal to							--
				$I_{\Delta N}$	$2I_{\Delta N}$	$5I_{\Delta N}$	5 $I_{\Delta N}$ or 0,25A [a]	5A-200A, 500A [b]	$I_{\Delta t}$ [c]		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--

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Clause	Requirement + Test	Result - Remark	Verdict

				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--
	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.										--
9.9.1.2	Off-load tests at 20 ± 5°C										P
a)	Verification of the correct operation in case of a steady increase of residual current:							[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s Tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$							21,4-21,7	21,3-21,7	21,3-21,7	P
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :							[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the - specified limiting value							27-34	27-34	26-32	P
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):										P
	Maximum break times at:							[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:							37	34	34	P
	- 2 $I_{\Delta N}$:							28	28	27	P
	- 5 $I_{\Delta N}$ or :							-	-	-	N/A
	- 0,25 A :							19	21	21	P
	- $I_{\Delta t}$ 630 A :							8	9	9	P
	No value exceeds the relevant specified limiting value										P
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A among the following list: 5A - 10A - 20A - 50A - 100A - 200A by closing S_2, (S_1 and RCBO in closed position):										P

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Clause	Requirement + Test	Result - Remark			Verdict
	- 5A	10	11	11	P
	- 10A	9	9	10	P
	- 20A	11	10	8	P
	- 50A	8	8	8	P
	- 100A	8	8	9	P
	- 200A	7	7	9	P
	- 500A	8	7	7	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:				--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.4.a)	Tests repeated at -5°C:				P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	34	32	32	P
	- 2 $I_{\Delta N}$:	26	27	28	P
	- 5 $I_{\Delta N}$ or :	-	-	-	N/A
	- 0,25 A :	21	23	19	P
	- $I_{\Delta t}$ 630 A :	10	9	9	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:				--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.3	Tests repeated with the RCBO loaded with rated current I_N until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	-no value exceeds the specified limiting value	34	34	34	P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_2, (S_1 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	33	33	34	P
	- 2 $I_{\Delta N}$:	25	24	27	P
	- 5 $I_{\Delta N}$ or :	-	-	-	N/A
	- 0,25 A :	18	19	19	P
	- $I_{\Delta t}$ 630 A :	8	9	8	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.4.b)	Tests repeated with the RCBO loaded with rated current I_N at +40°C until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--

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Clause	Requirement + Test	Result - Remark	Verdict

	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	33	34	32	P
	- 2 $I_{\Delta N}$:	25	27	24	P
	- 5 $I_{\Delta N}$ or :	-	-	-	N/A
	- 0,25 A :	17	19	19	P
	- $I_{\Delta t}$ 630 A :	9	9	10	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A

	TEST D_1		--
8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*		--
9.1.6 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of behaviour in the case of inrush residual currents		
	Test acc. figure 2		N/A
	all switches and RCBO in closed position		N/A
	pulse with a peak current of 10 $I_{\Delta n}$ ..... (mA):		N/A
	Pulse on one pole chosen at random		N/A
	Six measurements: 3 times positive, 3 times negative		N/A
	Polarity changed after each test		N/A
	No tripping during test		N/A
9.1.4 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation for four-pole Type F RCCDs powered on two poles only		

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Clause	Requirement + Test	Result - Remark	Verdict

	Tests performed with a four-pole RCBO acc. 9.1.2, but only supplied between neutral terminal and one-phase terminal chosen at random without load						N/A
9.1.2 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation in case of steady increase of composite residual current						
	starting composite residual current:						
	Different frequency component values of test currents for calibration (RMS)			Composite starting current value (RMS)			
	$I_{at\ rated\ frequency}$	I_{1kHz}	$I_{F\ motor\ (10Hz)}$	I_{Δ}			
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$			
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$ (mA):				34,2-34,8	34,5-35,4	34,1-35,3	P
9.2.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the operating characteristics at the reference temperature (20±5)°C						
9.2.1.1 addition acc. IEC 62423	General						
delete:	~~For multiple settings of $I_{\Delta n}$ tests are made for each setting~~						
9.2.1.2 addition acc. IEC 62423	Verification of the correct operation in case of residual sinusoidal alternating currents up to 1000 Hz						--
b) delete:	~~Additional test for type S:~~						
	~~- minimum non actuating time (ms) at: 14 $I_{\Delta n}$; 0,13 s :~~				~~D4~~	~~D5~~	~~D6~~	
9.1.7 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A						
	Test acc. 9.21.1.4 but the smooth direct current of 0,006 A replaced by 0,01 A						N/A
	Verification of the correct operation in case of residual pulsating d.c. currents with angle α = 0° superimposed by smooth direct current of 0,01 A:						
	- steady increase of pulsating d.c. current from zero to: 1,4 $I_{\Delta n}$ for $I_{\Delta n}$ > 0,01 A with 1,4 $I_{\Delta n}$ /30 A/s (mA)						N/A
	- steady increase of pulsating d.c. current from zero to: 2 $I_{\Delta n}$ for $I_{\Delta n} \leq$ 0,01 A with 2 $I_{\Delta n}$ /30 A/s (mA)						N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	- angle α = 0° (+/-) (+/- 10 mA) ..... :	D4	D5	D6	N/A
	No value exceeds the relevant specified limiting values				N/A
9.12.13	***DELETE***				--
8.11 replace by*:*	Test device				--
	RCBOs provided with a test device				*P*
	RCBOs with rated residual current of 30mA:				
	Ampere-turns produced when operating the test device do not exceed 1,66 times the ampere turns produced by $I_{\Delta N}$	Ampere-turns produced by test device: 47,3 milliampere-turns 1,66 times ampere-turns produced by $I_{\Delta n}$: 49,8 milliampere -turns			P
	RCBOs with rated residual current other than 30mA:				
	Ampere-turns produced when operating the test device do not exceed 2,5 times the ampere turns produced by $I_{\Delta N}$				N/A
	Not possible to energize the circuit on the load side by operating the test device when the RCBO is in the open position				P

	TEST SEQUENCE "D" **replace the complete test sequence "D_0"** **3 samples: D63, $I_{\Delta n}$= 0,03A, 1P+N**	**D7**	**D8**	**D9**	**--**
	TEST D_0				--
8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*				--
8.5	*OPERATING CHARACTERISTICS*				--
9.9	*VERIFICATION OF THE OPERATING CHARACTERISTIC*				--
9.9.1	RCBO installed as for normal use, test circuit according to figure 4				P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting				N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency	50/60Hz			P
9.9.1.5	For RCBOs functionally dependent on line voltage each test is made at:				P
	- 1,1 U_N (V) and	264V			
	- 0,85 U_N (V)	195V			--

	Type	I_N A	$I_{\Delta N}$ A	Limiting values of break time and non-actuating time (s) for type AC and A RCBOs in event of alternating residual currents (r.m.s. values) equal to	

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Clause	Requirement + Test	Result - Remark	Verdict

				$I_{\Delta N}$	$2I_{\Delta N}$	$5I_{\Delta N}$	5 $I_{\Delta N}$ or 0,25A [a]	5A-200A, 500A [b]	$I_{\Delta t}$ [c]		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--
	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.										--
9.9.1.2	Off-load tests at 20 ± 5°C										P
a)	Verification of the correct operation in case of a steady increase of residual current:							[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s Tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$							21,1-22,1	21,1-22,1	21,3-22,1	P
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :							[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the - specified limiting value							32-34	32-34	33-34	P
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):										P
	Maximum break times at:							[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:							33	34	33	P
	- 2 $I_{\Delta N}$:							25	23	23	P

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Clause	Requirement + Test	Result - Remark			Verdict
	- 5 $I_{\Delta N}$ or :	-	-	-	N/A
	- 0,25 A :	18	18	18	P
	- $I_{\Delta t}$ 630 A :	9	9	9	P
	No value exceeds the relevant specified limiting value				P
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A among the following list: 5A - 10A - 20A - 50A - 100A - 200A by closing S_2, (S_1 and RCBO in closed position):				P
	- 5A	19	19	19	P
	- 10A	17	18	18	P
	- 20A	17	17	17	P
	- 50A	14	14	14	P
	- 100A	12	12	12	P
	- 200A	10	11	11	P
	- 500A	8	9	9	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:				--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.4.a)	Tests repeated at -25°C:				P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	33	34	34	P
	- 2 $I_{\Delta N}$:	24	23	24	P
	- 5 $I_{\Delta N}$ or :	-	-	-	N/A
	- 0,25 A :	19	19	18	P

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Clause	Requirement + Test	Result - Remark	Verdict

	- $I_{\Delta t}$ 630 A :	9	10	9	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:				--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.3	Tests repeated with the RCBO loaded with rated current I_N until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	-no value exceeds the specified limiting value	34	34	34	P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_2, (S_1 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	34	34	34	P
	- 2 $I_{\Delta N}$:	23	27	24	P
	- 5 $I_{\Delta N}$ or :	-	-	-	N/A
	- 0,25 A :	18	19	19	P
	- $I_{\Delta t}$ 630 A :	9	9	9	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.4.b)	Tests repeated with the RCBO loaded with rated current I_N at +55°C until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	34	34	34	P
	- 2 $I_{\Delta N}$:	25	23	23	P
	- 5 $I_{\Delta N}$ or :	-	-	-	N/A
	- 0,25 A :	18	19	19	P
	- $I_{\Delta t}$ 630 A :	9	10	10	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A

	TEST D_1		--
8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*		--
9.1.6 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of behaviour in the case of inrush residual currents		
	Test acc. figure 2		N/A
	all switches and RCBO in closed position		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	pulse with a peak current of 10 $I_{\Delta n}$ ..... (mA):						N/A
	Pulse on one pole chosen at random						N/A
	Six measurements: 3 times positive, 3 times negative						N/A
	Polarity changed after each test						N/A
	No tripping during test						N/A
9.1.4 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation for four-pole Type F RCCDs powered on two poles only						
	Tests performed with a four-pole RCBO acc. 9.1.2, but only supplied between neutral terminal and one-phase terminal chosen at random without load						N/A
9.1.2 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation in case of steady increase of composite residual current						
	starting composite residual current:						
	Different frequency component values of test currents for calibration (RMS)			Composite starting current value (RMS)			
	$I_{at\ rated\ frequency}$	I_{1kHz}	$I_{F\ motor\ (10Hz)}$	I_{Δ}			
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$			
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA]	[mA]	[mA] --
	- tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$ (mA):				36,8-38,5	38,1-38,5	36,3-37,9 P
9.2.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the operating characteristics at the reference temperature (20±5)°C						
9.2.1.1 addition acc. IEC 62423	General						
delete:	~~For multiple settings of $I_{\Delta n}$ tests are made for each setting~~						
9.2.1.2 addition acc. IEC 62423	Verification of the correct operation in case of residual sinusoidal alternating currents up to 1000 Hz						--
b) delete:	~~Additional test for type S:~~						
	~~- minimum non actuating time (ms) at: 14 $I_{\Delta n}$; 0,13 s :~~				~~D7~~	~~D8~~	~~D9~~

IEC62423B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

9.1.7 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A				
	Test acc. 9.21.1.4 but the smooth direct current of 0,006 A replaced by 0,01 A				N/A
	Verification of the correct operation in case of residual pulsating d.c. currents with angle α = 0° superimposed by smooth direct current of 0,01 A:				
	- steady increase of pulsating d.c. current from zero to: 1,4 $I_{\Delta n}$ for $I_{\Delta n}$ > 0,01 A with 1,4 $I_{\Delta n}$ /30 A/s (mA)				N/A
	- steady increase of pulsating d.c. current from zero to: 2 $I_{\Delta n}$ for $I_{\Delta n} \leq$ 0,01 A with 2 $I_{\Delta n}$ /30 A/s (mA)				N/A
	- angle α = 0° (+/-) (+/- 10 mA) ..... :	D7	D8	D9	N/A
	No value exceeds the relevant specified limiting values				N/A
9.12.13	***DELETE***				--
8.11 replace by*:*	Test device				--
	RCBOs provided with a test device				*P*
	RCBOs with rated residual current of 30mA:				
	Ampere-turns produced when operating the test device do not exceed 1,66 times the ampere turns produced by $I_{\Delta N}$	Ampere-turns produced by test device: 47,2 milliampere-turns 1,66 times ampere-turns produced by $I_{\Delta n}$: 49,8 milliampere -turns			P
	RCBOs with rated residual current other than 30mA:				
	Ampere-turns produced when operating the test device do not exceed 2,5 times the ampere turns produced by $I_{\Delta N}$				N/A
	Not possible to energize the circuit on the load side by operating the test device when the RCBO is in the open position				P

	TEST SEQUENCE "D" **replace the complete test sequence "D_0"** **3 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**	**D10**	**D11**	**D12**	**--**
	TEST D_0				--
8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*				--
8.5	*OPERATING CHARACTERISTICS*				--
9.9	*VERIFICATION OF THE OPERATING CHARACTERISTIC*				--
9.9.1	RCBO installed as for normal use, test circuit according to figure 4				P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting				N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	RCBOs with more than one rated frequency, tests at the lowest and highest frequency						50/60Hz					P
9.9.1.5	For RCBOs functionally dependent on line voltage each test is made at:											P
	- 1,1 U_N (V) and						457V					
	- 0,85 U_N (V)						340V					--
	Type	I_N A	$I_{\Delta N}$ A	Limiting values of break time and non-actuating time (s) for type AC and A RCBOs in event of alternating residual currents (r.m.s. values) equal to								--
				$I_{\Delta N}$	$2I_{\Delta N}$	$5I_{\Delta N}$	5 $I_{\Delta N}$ or 0,25A [a]	5A-200A, 500A [b]	$I_{\Delta t}$ [c]			--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times		--
			0,03	0,3	0,15	--	0,04	0,04	0,04			--
			>0,03	0,3	0,15	0,04	--	0,04	0,04			--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times		--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times		--
	a) value to be decided by the manufacturer for this test											--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.											--
	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.											--
9.9.1.2	Off-load tests at 20 ± 5°C											P
a)	Verification of the correct operation in case of a steady increase of residual current:						[mA]		[mA]		[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s Tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$						21,9-22,6		21,7-22,4		21,6-22,3	P
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :						[ms]		[ms]		[ms]	--

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Clause	Requirement + Test	Result - Remark	Verdict

	- The RCBO closes on $I_{\Delta N}$, no value exceeds the - specified limiting value	44-45	44-45	44-45	P
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	45	45	45	P
	- 2 $I_{\Delta N}$:	24	24	24	P
	- 5 $I_{\Delta N}$ or :	-	-	-	N/A
	- 0,25 A :	22	21	20	P
	- $I_{\Delta t}$ 630 A :	9	9	9	P
	No value exceeds the relevant specified limiting value				P
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A among the following list: 5A - 10A - 20A - 50A - 100A - 200A by closing S_2, (S_1 and RCBO in closed position):				P
	- 5A	19	19	19	P
	- 10A	18	18	19	P
	- 20A	17	17	17	P
	- 50A	16	16	15	P
	- 100A	14	14	14	P
	- 200A	12	11	12	P
	- 500A	8	9	9	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:				--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.4.a)	Tests repeated at -25°C:				P

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Clause	Requirement + Test	Result - Remark			Verdict
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	45	44	45	P
	- 2 $I_{\Delta N}$:	24	24	24	P
	- 5 $I_{\Delta N}$ or :	-	-	-	N/A
	- 0,25 A :	20	20	20	P
	- $I_{\Delta t}$ 630 A :	9	9	9	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:				--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.3	Tests repeated with the RCBO loaded with rated current I_N until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	-no value exceeds the specified limiting value	45	44	45	P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_2, (S_1 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	45	45	45	P
	- 2 $I_{\Delta N}$:	23	24	24	P
	- 5 $I_{\Delta N}$ or :	-	-	-	N/A
	- 0,25 A :	21	21	21	P
	- $I_{\Delta t}$ 630 A :	9	9	9	P
	No value exceeds the relevant specified limiting value				P

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Clause	Requirement + Test	Result - Remark	Verdict

	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.4.b)	Tests repeated with the RCBO loaded with rated current I_N at +55°C until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	44	45	45	P
	- 2 $I_{\Delta N}$:	24	24	25	P
	- 5 $I_{\Delta N}$ or :	-	-	-	N/A
	- 0,25 A :	20	20	19	P
	- $I_{\Delta t}$ 630 A :	9	9	9	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A

	TEST D_1		--

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Clause	Requirement + Test	Result - Remark	Verdict

8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*						--
9.1.6 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of behaviour in the case of inrush residual currents						
	Test acc. figure 2						N/A
	all switches and RCBO in closed position						N/A
	pulse with a peak current of 10 $I_{\Delta n}$ ..... (mA):						N/A
	Pulse on one pole chosen at random						N/A
	Six measurements: 3 times positive, 3 times negative						N/A
	Polarity changed after each test						N/A
	No tripping during test						N/A
9.1.4 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation for four-pole Type F RCCDs powered on two poles only						
	Tests performed with a four-pole RCBO acc. 9.1.2, but only supplied between neutral terminal and one-phase terminal chosen at random without load						N/A
9.1.2 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation in case of steady increase of composite residual current						
	starting composite residual current:						
	Different frequency component values of test currents for calibration (RMS)			Composite starting current value (RMS)			
	$I_{at\ rated\ frequency}$	I_{1kHz}	$I_{F\ motor\ (10Hz)}$	I_{Δ}			
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$			
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA]	[mA]	[mA] --
	- tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$ (mA):				30,2-30,4	30,2-30,6	30,1-30,4 P
9.2.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the operating characteristics at the reference temperature (20±5)°C						
9.2.1.1 addition acc. IEC 62423	General						
delete:	~~For multiple settings of $I_{\Delta n}$ tests are made for each setting~~						

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Clause	Requirement + Test	Result - Remark	Verdict

9.2.1.2 addition acc. IEC 62423	Verification of the correct operation in case of residual sinusoidal alternating currents up to 1000 Hz				--
b) delete:	~~Additional test for type S:~~				
	~~- minimum non actuating time (ms) at: 14 $I_{\Delta n}$; 0,13 s :~~	~~D10~~	~~D11~~	~~D12~~	
9.1.7 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A				
	Test acc. 9.21.1.4 but the smooth direct current of 0,006 A replaced by 0,01 A				N/A
	Verification of the correct operation in case of residual pulsating d.c. currents with angle α = 0° superimposed by smooth direct current of 0,01 A:				
	- steady increase of pulsating d.c. current from zero to: 1,4 $I_{\Delta n}$ for $I_{\Delta n}$ > 0,01 A with 1,4 $I_{\Delta n}$ /30 A/s (mA)				N/A
	- steady increase of pulsating d.c. current from zero to: 2 $I_{\Delta n}$ for $I_{\Delta n} \leq$ 0,01 A with 2 $I_{\Delta n}$ /30 A/s (mA)				N/A
	- angle α = 0° (+/-) (+/- 10 mA) ..... :	D10	D11	D12	N/A
	No value exceeds the relevant specified limiting values				N/A
9.12.13	***DELETE***				--
8.11 replace by*:*	Test device				--
	RCBOs provided with a test device				*P*
	RCBOs with rated residual current of 30mA:				
	Ampere-turns produced when operating the test device do not exceed 1,66 times the ampere turns produced by $I_{\Delta N}$	Ampere-turns produced by test device: 47,3 milliampere-turns 1,66 times ampere-turns produced by $I_{\Delta n}$: 49,8 milliampere -turns			P
	RCBOs with rated residual current other than 30mA:				
	Ampere-turns produced when operating the test device do not exceed 2,5 times the ampere turns produced by $I_{\Delta N}$				N/A
	Not possible to energize the circuit on the load side by operating the test device when the RCBO is in the open position				P

	TEST SEQUENCE "D" replace the complete test sequence "D_0" 3 samples: D63, IΔn= 0,03A, 1P+N	**D0-5**	**D0-6**	**D0-7**	**--**
	TEST D_0				--

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Clause	Requirement + Test	Result - Remark	Verdict

8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*										--
8.5	*OPERATING CHARACTERISTICS*										--
9.9	*VERIFICATION OF THE OPERATING CHARACTERISTIC*										--
9.9.1	RCBO installed as for normal use, test circuit according to figure 4										P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting										N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency										P
9.9.1.5	For RCBOs functionally dependent on line voltage each test is made at:										P
	- 1,1 U_N (V) and:										N/A
	- 0,85 U_N (V):										N/A
	- 0,80 U_N (V):										P
	Type	I_N A	$I_{\Delta N}$ A	Limiting values of break time and non-actuating time (s) for type AC and A RCBOs in event of alternating residual currents (r.m.s. values) equal to							--
				$I_{\Delta N}$	$2I_{\Delta N}$	$5I_{\Delta N}$	5 $I_{\Delta N}$ or 0,25A [a]	5A-200A, 500A [b]	$I_{\Delta t}$ [c]		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--

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Clause	Requirement + Test	Result - Remark	Verdict

	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.				--
9.9.1.2	Off-load tests at 20 ± 5°C				P
a)	Verification of the correct operation in case of a steady increase of residual current:	[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s Tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$	22,5~23,8	22,4~24,0	22,7~23,7	P
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the - specified limiting value	55	51	53	P
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	47	55	53	P
	- 2 $I_{\Delta N}$:	45	45	45	P
	- 5 $I_{\Delta N}$ or :	32	31	33	P
	- 0,25 A :	-	-	-	N/A
	- $I_{\Delta t}$ 630 A :	20	16	15	P
	No value exceeds the relevant specified limiting value				P
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A among the following list: 5A - 10A - 20A - 50A - 100A - 200A by closing S_2, (S_1 and RCBO in closed position):				P
	- 5A	16	13	15	P
	- 10A	10	11	12	P
	- 20A	10	15	12	P
	- 50A	14	12	15	P
	- 100A	12	11	12	P
	- 200A	13	17	13	P
	- 500A	15	14	11	P

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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 at:				--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.4.a)	Tests repeated at -5°C:				P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	55	53	51	P
	- 2 $I_{\Delta N}$:	45	44	43	P
	- 5 $I_{\Delta N}$ or :	29	30	31	P
	- 0,25 A :	-	-	-	N/A
	- $I_{\Delta t}$ 630 A :	20	21	19	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:				--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.3	Tests repeated with the RCBO loaded with rated current I_N until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--

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Clause	Requirement + Test	Result - Remark	Verdict

	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	-no value exceeds the specified limiting value	51	54	48	P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_2, (S_1 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	55	49	53	P
	- 2 $I_{\Delta N}$:	42	45	54	P
	- 5 $I_{\Delta N}$ or :	31	30	29	P
	- 0,25 A :	-	-	-	N/A
	- $I_{\Delta t}$ 630 A :	16	14	15	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.4.b)	Tests repeated with the RCBO loaded with rated current I_N at +40°C until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	55	54	54	P
	- 2 $I_{\Delta N}$:	43	45	44	P
	- 5 $I_{\Delta N}$ or :	31	30	29	P
	- 0,25 A :	-	-	-	N/A
	- $I_{\Delta t}$ 630 A :	20	17	18	P

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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 at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A

	TEST D_1		--
8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*		--
9.1.6 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of behaviour in the case of inrush residual currents		
	Test acc. figure 2		N/A
	all switches and RCBO in closed position		N/A
	pulse with a peak current of 10 $I_{\Delta n}$ ..... (mA):		N/A
	Pulse on one pole chosen at random		N/A
	Six measurements: 3 times positive, 3 times negative		N/A
	Polarity changed after each test		N/A
	No tripping during test		N/A
9.1.4 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation for four-pole Type F RCCDs powered on two poles only		
	Tests performed with a four-pole RCBO acc. 9.1.2, but only supplied between neutral terminal and one-phase terminal chosen at random without load		N/A
9.1.2 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation in case of steady increase of composite residual current		
	starting composite residual current:		
	Different frequency component values of test currents for calibration (RMS) / Composite starting current value (RMS)		

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Clause	Requirement + Test	Result - Remark	Verdict

	$I_{at\ rated\ frequency}$	I_{1kHz}	$I_{F\ motor\ (10Hz)}$	I_{Δ}				
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$				
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$ (mA):				27,2~29,1	27,6~28,6	27,4~29,0	P
9.2.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the operating characteristics at the reference temperature (20±5)°C							
9.2.1.1 addition acc. IEC 62423	General							
delete:	~~For multiple settings of $I_{\Delta n}$ tests are made for each setting~~							
9.2.1.2 addition acc. IEC 62423	Verification of the correct operation in case of residual sinusoidal alternating currents up to 1000 Hz							--
b) delete:	~~Additional test for type S:~~							
	~~- minimum non actuating time (ms) at: 14 $I_{\Delta n}$; 0,13 s :~~							
9.1.7 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A							
	Test acc. 9.21.1.4 but the smooth direct current of 0,006 A replaced by 0,01 A							N/A
	Verification of the correct operation in case of residual pulsating d.c. currents with angle α = 0° superimposed by smooth direct current of 0,01 A:							
	- steady increase of pulsating d.c. current from zero to: 1,4 $I_{\Delta n}$ for $I_{\Delta n}$ > 0,01 A with 1,4 $I_{\Delta n}$ /30 A/s (mA)							N/A
	- steady increase of pulsating d.c. current from zero to: 2 $I_{\Delta n}$ for $I_{\Delta n} \leq$ 0,01 A with 2 $I_{\Delta n}$ /30 A/s (mA)							N/A
	- angle α = 0° (+/-) (+/- 10 mA) ..... :							N/A
	No value exceeds the relevant specified limiting values							N/A

	TEST SEQUENCE "D" **replace the complete test sequence "D_0"** **3 samples: D63, I∆n= 0,03A, 3P+N**	**D0-8**	**D0-9**	**D0-10**	**--**
	TEST D_0				--

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Clause	Requirement + Test	Result - Remark	Verdict

8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*										--
8.5	*OPERATING CHARACTERISTICS*										--
9.9	*VERIFICATION OF THE OPERATING CHARACTERISTIC*										--
9.9.1	RCBO installed as for normal use, test circuit according to figure 4										P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting										N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency										P
9.9.1.5	For RCBOs functionally dependent on line voltage each test is made at:										P
	- 1,1 U_N (V) and:										N/A
	- 0,85 U_N (V):										N/A
	- 0,80 U_N (V):										P
	Type	I_N A	$I_{\Delta N}$ A	Limiting values of break time and non-actuating time (s) for type AC and A RCBOs in event of alternating residual currents (r.m.s. values) equal to							--
				$I_{\Delta N}$	$2I_{\Delta N}$	$5I_{\Delta N}$	5 $I_{\Delta N}$ or 0,25A [a]	5A-200A, 500A [b]	$I_{\Delta t}$ [c]		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--

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Clause	Requirement + Test	Result - Remark	Verdict

	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.				--
9.9.1.2	Off-load tests at 20 ± 5°C				P
a)	Verification of the correct operation in case of a steady increase of residual current:	[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s Tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$	21,4~21,7	21,3~21,7	21,3~21,7	P
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the - specified limiting value	54	51	52	P
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	52	54	50	P
	- 2 $I_{\Delta N}$:	42	41	39	P
	- 5 $I_{\Delta N}$ or :	31	31	30	P
	- 0,25 A :	-	-	-	N/A
	- $I_{\Delta t}$ 630 A :	21	21	17	P
	No value exceeds the relevant specified limiting value				P
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A among the following list: 5A - 10A - 20A - 50A - 100A - 200A by closing S_2, (S_1 and RCBO in closed position):				P
	- 5A	17	18	15	P
	- 10A	14	12	16	P
	- 20A	16	14	16	P
	- 50A	15	14	13	P
	- 100A	15	12	14	P
	- 200A	12	13	15	P
	- 500A	16	15	14	P

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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 at:				--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.4.a)	Tests repeated at -5°C:				P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	56	54	54	P
	- 2 $I_{\Delta N}$:	42	42	41	P
	- 5 $I_{\Delta N}$ or :	32	36	31	P
	- 0,25 A :	-	-	-	N/A
	- $I_{\Delta t}$ 630 A :	21	18	19	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:				--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.3	Tests repeated with the RCBO loaded with rated current I_N until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--

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Clause	Requirement + Test	Result - Remark	Verdict

	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	-no value exceeds the specified limiting value	55	52	51	P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_2, (S_1 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	40	38	45	P
	- 2 $I_{\Delta N}$:	40	41	42	P
	- 5 $I_{\Delta N}$ or :	31	30	29	P
	- 0,25 A :	-	-	-	N/A
	- $I_{\Delta t}$ 630 A :	19	17	18	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.4.b)	Tests repeated with the RCBO loaded with rated current I_N at +40°C until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	55	55	48	P
	- 2 $I_{\Delta N}$:	42	44	43	P
	- 5 $I_{\Delta N}$ or :	32	31	29	P
	- 0,25 A :	-	-	-	N/A
	- $I_{\Delta t}$ 630 A :	20	19	17	P

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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 at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A

	TEST D_1		--
8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*		--
9.1.6 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of behaviour in the case of inrush residual currents		
	Test acc. figure 2		N/A
	all switches and RCBO in closed position		N/A
	pulse with a peak current of 10 $I_{\Delta n}$ ..... (mA):		N/A
	Pulse on one pole chosen at random		N/A
	Six measurements: 3 times positive, 3 times negative		N/A
	Polarity changed after each test		N/A
	No tripping during test		N/A
9.1.4 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation for four-pole Type F RCCDs powered on two poles only		
	Tests performed with a four-pole RCBO acc. 9.1.2, but only supplied between neutral terminal and one-phase terminal chosen at random without load		N/A
9.1.2 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation in case of steady increase of composite residual current		
	starting composite residual current:		
	Different frequency component values of test currents for calibration (RMS) / Composite starting current value (RMS)		

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Clause	Requirement + Test	Result - Remark	Verdict

	$I_{at\ rated\ frequency}$	I_{1kHz}	$I_{F\ motor\ (10Hz)}$	I_{Δ}				
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$				
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$ (mA):				30,5~31,7	30,6~31,9	30,4~31,8	P
9.2.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the operating characteristics at the reference temperature (20±5)°C							
9.2.1.1 addition acc. IEC 62423	General							
delete:	~~For multiple settings of $I_{\Delta n}$ tests are made for each setting~~							
9.2.1.2 addition acc. IEC 62423	Verification of the correct operation in case of residual sinusoidal alternating currents up to 1000 Hz							--
b) delete:	~~Additional test for type S:~~							
	~~- minimum non actuating time (ms) at: 14 $I_{\Delta n}$; 0,13 s :~~							
9.1.7 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A							
	Test acc. 9.21.1.4 but the smooth direct current of 0,006 A replaced by 0,01 A							N/A
	Verification of the correct operation in case of residual pulsating d.c. currents with angle α = 0° superimposed by smooth direct current of 0,01 A:							
	- steady increase of pulsating d.c. current from zero to: 1,4 $I_{\Delta n}$ for $I_{\Delta n}$ > 0,01 A with 1,4 $I_{\Delta n}$ /30 A/s (mA)							N/A
	- steady increase of pulsating d.c. current from zero to: 2 $I_{\Delta n}$ for $I_{\Delta n} \leq$ 0,01 A with 2 $I_{\Delta n}$ /30 A/s (mA)							N/A
	- angle α = 0° (+/-) (+/- 10 mA) ..... :							N/A
	No value exceeds the relevant specified limiting values							N/A

	TEST SEQUENCE "D" **replace the complete test sequence "D_0"** **2 samples: D63, I∆n= 0,1A & 0,3A, 1P+N**	**D0-11**	**D0-12**	**--**
	TEST D_0			--

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Clause	Requirement + Test	Result - Remark	Verdict

8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*										--
8.5	*OPERATING CHARACTERISTICS*										--
9.9	*VERIFICATION OF THE OPERATING CHARACTERISTIC*										--
9.9.1	RCBO installed as for normal use, test circuit according to figure 4										P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting										N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency										P
9.9.1.5	For RCBOs functionally dependent on line voltage each test is made at:										P
	- 1,1 U_N (V) and:										N/A
	- 0,85 U_N (V):										N/A
	- 0,80 U_N (V):										P
	Type	I_N A	$I_{\Delta N}$ A	Limiting values of break time and non-actuating time (s) for type AC and A RCBOs in event of alternating residual currents (r.m.s. values) equal to							--
				$I_{\Delta N}$	$2I_{\Delta N}$	$5I_{\Delta N}$	5 $I_{\Delta N}$ or 0,25A [a]	5A-200A, 500A [b]	$I_{\Delta t}$ [c]		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--

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Clause	Requirement + Test	Result - Remark	Verdict

	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.				--
9.9.1.2	Off-load tests at 20 ± 5°C				P
a)	Verification of the correct operation in case of a steady increase of residual current:	[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s Tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$	79,8~81,2	224~231		P
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the - specified limiting value	56	41		P
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	54	42		P
	- 2 $I_{\Delta N}$:	42	36		P
	- 5 $I_{\Delta N}$ or :	32	32		P
	- 0,25 A :	-	-		N/A
	- $I_{\Delta t}$ 630 A :	18	18		P
	No value exceeds the relevant specified limiting value				P
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A among the following list: 5A - 10A - 20A - 50A - 100A - 200A by closing S_2, (S_1 and RCBO in closed position):				P
	- 5A	13	13		P
	- 10A	10	15		P
	- 20A	12	15		P
	- 50A	12	15		P
	- 100A	14	10		P
	- 200A	13	13		P
	- 500A	14	16		P

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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 at:				--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.4.a)	Tests repeated at -5°C:				P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	54	46		P
	- 2 $I_{\Delta N}$:	43	35		P
	- 5 $I_{\Delta N}$ or :	30	31		P
	- 0,25 A :	-	-		N/A
	- $I_{\Delta t}$ 630 A :	21	25		P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:				--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.3	Tests repeated with the RCBO loaded with rated current I_N until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--

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Clause	Requirement + Test	Result - Remark	Verdict

	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	-no value exceeds the specified limiting value	52	42		P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_2, (S_1 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	52	45		P
	- 2 $I_{\Delta N}$:	42	38		P
	- 5 $I_{\Delta N}$ or :	32	32		P
	- 0,25 A :	-	-		N/A
	- $I_{\Delta t}$ 630 A :	21	27		P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.4.b)	Tests repeated with the RCBO loaded with rated current I_N at +40°C until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	54	45		P
	- 2 $I_{\Delta N}$:	42	36		P
	- 5 $I_{\Delta N}$ or :	29	29		P
	- 0,25 A :	-	-		N/A
	- $I_{\Delta t}$ 630 A :	20	19		P

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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 at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A

	TEST D_1		--
8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*		--
9.1.6 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of behaviour in the case of inrush residual currents		
	Test acc. figure 2		N/A
	all switches and RCBO in closed position		N/A
	pulse with a peak current of 10 $I_{\Delta n}$ ..... (mA):		N/A
	Pulse on one pole chosen at random		N/A
	Six measurements: 3 times positive, 3 times negative		N/A
	Polarity changed after each test		N/A
	No tripping during test		N/A
9.1.4 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation for four-pole Type F RCCDs powered on two poles only		
	Tests performed with a four-pole RCBO acc. 9.1.2, but only supplied between neutral terminal and one-phase terminal chosen at random without load		N/A
9.1.2 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation in case of steady increase of composite residual current		
	starting composite residual current:		
	Different frequency component values of test currents for calibration (RMS) / Composite starting current value (RMS)		

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Clause	Requirement + Test	Result - Remark	Verdict

	$I_{at\ rated\ frequency}$	I_{1kHz}	$I_{F\ motor\ (10Hz)}$	I_{Δ}				
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$				
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$ (mA):				99,1~101	285~297		P
9.2.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the operating characteristics at the reference temperature (20±5)°C							
9.2.1.1 addition acc. IEC 62423	General							
delete:	~~For multiple settings of $I_{\Delta n}$ tests are made for each setting~~							
9.2.1.2 addition acc. IEC 62423	Verification of the correct operation in case of residual sinusoidal alternating currents up to 1000 Hz							--
b) delete:	~~Additional test for type S:~~							
	~~- minimum non actuating time (ms) at: 14 $I_{\Delta n}$; 0,13 s :~~							
9.1.7 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A							
	Test acc. 9.21.1.4 but the smooth direct current of 0,006 A replaced by 0,01 A							N/A
	Verification of the correct operation in case of residual pulsating d.c. currents with angle α = 0° superimposed by smooth direct current of 0,01 A:							
	- steady increase of pulsating d.c. current from zero to: 1,4 $I_{\Delta n}$ for $I_{\Delta n}$ > 0,01 A with 1,4 $I_{\Delta n}$ /30 A/s (mA)							N/A
	- steady increase of pulsating d.c. current from zero to: 2 $I_{\Delta n}$ for $I_{\Delta n} \leq$ 0,01 A with 2 $I_{\Delta n}$ /30 A/s (mA)							N/A
	- angle α = 0° (+/-) (+/- 10 mA) ..... :							N/A
	No value exceeds the relevant specified limiting values							N/A

	TEST SEQUENCE "D" **replace the complete test sequence "D_0"** **3 samples: D63, I∆n= 0,03A, 1P+N** **Ambient temperature -25~+55°C**	**D0-13**	**D0-14**	**D0-15**	**--**
	TEST D_0				--

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Clause	Requirement + Test	Result - Remark	Verdict

8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*										--
8.5	*OPERATING CHARACTERISTICS*										--
9.9	*VERIFICATION OF THE OPERATING CHARACTERISTIC*										--
9.9.1	RCBO installed as for normal use, test circuit according to figure 4										P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting										N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency										P
9.9.1.5	For RCBOs functionally dependent on line voltage each test is made at:										P
	- 1,1 U_N (V) and:										N/A
	- 0,85 U_N (V):										N/A
	- 0,80 U_N (V):										P
	Type	I_N A	$I_{\Delta N}$ A	Limiting values of break time and non-actuating time (s) for type AC and A RCBOs in event of alternating residual currents (r.m.s. values) equal to							--
				$I_{\Delta N}$	$2I_{\Delta N}$	$5I_{\Delta N}$	5 $I_{\Delta N}$ or 0,25A [a]	5A-200A, 500A [b]	$I_{\Delta t}$ [c]		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--

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	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.				--
9.9.1.2	Off-load tests at 20 ± 5°C				P
a)	Verification of the correct operation in case of a steady increase of residual current:	[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s Tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$	22,6~23,2	22,7~23,1	22,4~23,2	P
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the - specified limiting value	52	52	55	P
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	49	54	49	P
	- 2 $I_{\Delta N}$:	47	43	43	P
	- 5 $I_{\Delta N}$ or :	31	31	28	P
	- 0,25 A :	-	-	-	N/A
	- $I_{\Delta t}$ 630 A :	20	18	15	P
	No value exceeds the relevant specified limiting value				P
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A among the following list: 5A - 10A - 20A - 50A - 100A - 200A by closing S_2, (S_1 and RCBO in closed position):				P
	- 5A	17	16	16	P
	- 10A	15	16	13	P
	- 20A	15	15	13	P
	- 50A	12	15	12	P
	- 100A	16	15	14	P
	- 200A	13	15	12	P
	- 500A	15	18	13	P

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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 at:				--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.4.a)	Tests repeated at -5°C:	Tested at -25°C			P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	50	54	51	P
	- 2 $I_{\Delta N}$:	40	42	44	P
	- 5 $I_{\Delta N}$ or :	29	30	30	P
	- 0,25 A :	-	-	-	N/A
	- $I_{\Delta t}$ 630 A :	20	18	17	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:				--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.3	Tests repeated with the RCBO loaded with rated current I_N until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--

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Clause	Requirement + Test	Result - Remark	Verdict

	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	-no value exceeds the specified limiting value	55	50	50	P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_2, (S_1 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	52	48	46	P
	- 2 $I_{\Delta N}$:	45	41	45	P
	- 5 $I_{\Delta N}$ or :	30	32	29	P
	- 0,25 A :	-	-	-	N/A
	- $I_{\Delta t}$ 630 A :	16	18	16	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.4.b)	Tests repeated with the RCBO loaded with rated current I_N at +40°C until steady-state conditions are reached	I_N = 63A (tested at +55°C)			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	54	55	51	P
	- 2 $I_{\Delta N}$:	43	41	45	P
	- 5 $I_{\Delta N}$ or :	28	31	30	P
	- 0,25 A :	-	-	-	N/A
	- $I_{\Delta t}$ 630 A :	18	20	15	P

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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 at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A

	TEST D_1		--
8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*		--
9.1.6 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of behaviour in the case of inrush residual currents		
	Test acc. figure 2		N/A
	all switches and RCBO in closed position		N/A
	pulse with a peak current of 10 $I_{\Delta n}$ ..... (mA):		N/A
	Pulse on one pole chosen at random		N/A
	Six measurements: 3 times positive, 3 times negative		N/A
	Polarity changed after each test		N/A
	No tripping during test		N/A
9.1.4 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation for four-pole Type F RCCDs powered on two poles only		
	Tests performed with a four-pole RCBO acc. 9.1.2, but only supplied between neutral terminal and one-phase terminal chosen at random without load		N/A
9.1.2 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation in case of steady increase of composite residual current		
	starting composite residual current:		
	Different frequency component values of test currents for calibration (RMS) / Composite starting current value (RMS)		

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Clause	Requirement + Test	Result - Remark	Verdict

	$I_{at\ rated\ frequency}$	I_{1kHz}	$I_{F\ motor\ (10Hz)}$	I_{Δ}				
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$				
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$ (mA):				27,6~28,8	27,7~29,1	27,4~28,7	P
9.2.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the operating characteristics at the reference temperature (20±5)°C							
9.2.1.1 addition acc. IEC 62423	General							
delete:	~~For multiple settings of $I_{\Delta n}$ tests are made for each setting~~							
9.2.1.2 addition acc. IEC 62423	Verification of the correct operation in case of residual sinusoidal alternating currents up to 1000 Hz							--
b) delete:	~~Additional test for type S:~~							
	~~- minimum non actuating time (ms) at: 14 $I_{\Delta n}$; 0,13 s :~~							
9.1.7 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A							
	Test acc. 9.21.1.4 but the smooth direct current of 0,006 A replaced by 0,01 A							N/A
	Verification of the correct operation in case of residual pulsating d.c. currents with angle α = 0° superimposed by smooth direct current of 0,01 A:							
	- steady increase of pulsating d.c. current from zero to: 1,4 $I_{\Delta n}$ for $I_{\Delta n}$ > 0,01 A with 1,4 $I_{\Delta n}$ /30 A/s (mA)							N/A
	- steady increase of pulsating d.c. current from zero to: 2 $I_{\Delta n}$ for $I_{\Delta n} \leq$ 0,01 A with 2 $I_{\Delta n}$ /30 A/s (mA)							N/A
	- angle α = 0° (+/-) (+/- 10 mA) ..... :							N/A
	No value exceeds the relevant specified limiting values							N/A

	TEST SEQUENCE "D" **replace the complete test sequence "D_0"** **3 samples: D63, I∆n= 0,03A, 3P+N** **Ambient temperature -25~+55°C**	**D0-16**	**D0-17**	**D0-18**	**--**
	TEST D_0				--

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Clause	Requirement + Test	Result - Remark	Verdict

8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*										--
8.5	*OPERATING CHARACTERISTICS*										--
9.9	*VERIFICATION OF THE OPERATING CHARACTERISTIC*										--
9.9.1	RCBO installed as for normal use, test circuit according to figure 4										P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting										N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency										P
9.9.1.5	For RCBOs functionally dependent on line voltage each test is made at:										P
	- 1,1 U_N (V) and:										N/A
	- 0,85 U_N (V):										N/A
	- 0,80 U_N (V):										P
	Type	I_N A	$I_{\Delta N}$ A	Limiting values of break time and non-actuating time (s) for type AC and A RCBOs in event of alternating residual currents (r.m.s. values) equal to							--
				$I_{\Delta N}$	$2I_{\Delta N}$	$5I_{\Delta N}$	5 $I_{\Delta N}$ or 0,25A [a]	5A-200A, 500A [b]	$I_{\Delta t}$ [c]		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--

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	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.				--
9.9.1.2	Off-load tests at 20 ± 5°C				P
a)	Verification of the correct operation in case of a steady increase of residual current:	[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s Tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$	21,9~22,6	21,7~22,4	21,6~22,3	P
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the - specified limiting value	54	53	50	P
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	52	48	52	P
	- 2 $I_{\Delta N}$:	42	45	44	P
	- 5 $I_{\Delta N}$ or :	31	30	29	P
	- 0,25 A :	-	-	-	N/A
	- $I_{\Delta t}$ 630 A :	19	17	17	P
	No value exceeds the relevant specified limiting value				P
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A among the following list: 5A - 10A - 20A - 50A - 100A - 200A by closing S_2, (S_1 and RCBO in closed position):				P
	- 5A	17	15	13	P
	- 10A	14	12	17	P
	- 20A	15	15	14	P
	- 50A	16	14	15	P
	- 100A	15	12	15	P
	- 200A	18	11	13	P
	- 500A	12	14	15	P

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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 at:				--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.4.a)	Tests repeated at -5°C:	Tested at -25°C			P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	59	55	54	P
	- 2 $I_{\Delta N}$:	40	43	45	P
	- 5 $I_{\Delta N}$ or :	30	34	29	P
	- 0,25 A :	-	-	-	N/A
	- $I_{\Delta t}$ 630 A :	18	16	20	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:				--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.3	Tests repeated with the RCBO loaded with rated current I_N until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--

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Clause	Requirement + Test	Result - Remark	Verdict

	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	-no value exceeds the specified limiting value	51	54	55	P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_2, (S_1 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	50	52	55	P
	- 2 $I_{\Delta N}$:	40	42	43	P
	- 5 $I_{\Delta N}$ or :	32	27	28	P
	- 0,25 A :	-	-	-	N/A
	- $I_{\Delta t}$ 630 A :	19	17	16	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.4.b)	Tests repeated with the RCBO loaded with rated current I_N at +40°C until steady-state conditions are reached	I_N = 63A (tested at +55°C)			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	57	54	55	P
	- 2 $I_{\Delta N}$:	45	46	40	P
	- 5 $I_{\Delta N}$ or :	31	30	28	P
	- 0,25 A :	-	-	-	N/A
	- $I_{\Delta t}$ 630 A :	20	19	16	P

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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 at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A

	TEST D_1		--
8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*		--
9.1.6 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of behaviour in the case of inrush residual currents		
	Test acc. figure 2		N/A
	all switches and RCBO in closed position		N/A
	pulse with a peak current of 10 $I_{\Delta n}$ ..... (mA):		N/A
	Pulse on one pole chosen at random		N/A
	Six measurements: 3 times positive, 3 times negative		N/A
	Polarity changed after each test		N/A
	No tripping during test		N/A
9.1.4 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation for four-pole Type F RCCDs powered on two poles only		
	Tests performed with a four-pole RCBO acc. 9.1.2, but only supplied between neutral terminal and one-phase terminal chosen at random without load		N/A
9.1.2 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation in case of steady increase of composite residual current		
	starting composite residual current:		
	Different frequency component values of test currents for calibration (RMS) / Composite starting current value (RMS)		

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Clause	Requirement + Test	Result - Remark	Verdict

	$I_{at\ rated\ frequency}$	I_{1kHz}	$I_{F\ motor\ (10Hz)}$	I_{Δ}				
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$				
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$ (mA):				30,7~32,2	30,5~31,9	30,7~32,1	P
9.2.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the operating characteristics at the reference temperature (20±5)°C							
9.2.1.1 addition acc. IEC 62423	General							
delete:	~~For multiple settings of $I_{\Delta n}$ tests are made for each setting~~							
9.2.1.2 addition acc. IEC 62423	Verification of the correct operation in case of residual sinusoidal alternating currents up to 1000 Hz							--
b) delete:	~~Additional test for type S:~~							
	~~- minimum non actuating time (ms) at: 14 $I_{\Delta n}$; 0,13 s :~~							
9.1.7 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A							
	Test acc. 9.21.1.4 but the smooth direct current of 0,006 A replaced by 0,01 A							N/A
	Verification of the correct operation in case of residual pulsating d.c. currents with angle α = 0° superimposed by smooth direct current of 0,01 A:							
	- steady increase of pulsating d.c. current from zero to: 1,4 $I_{\Delta n}$ for $I_{\Delta n}$ > 0,01 A with 1,4 $I_{\Delta n}$ /30 A/s (mA)							N/A
	- steady increase of pulsating d.c. current from zero to: 2 $I_{\Delta n}$ for $I_{\Delta n} \leq$ 0,01 A with 2 $I_{\Delta n}$ /30 A/s (mA)							N/A
	- angle α = 0° (+/-) (+/- 10 mA) ..... :							N/A
	No value exceeds the relevant specified limiting values							N/A

	TEST SEQUENCE "D" **replace the complete test sequence "D_0"** **2 samples: D63, I∆n= 0,1A & 0,3A, 1P+N**	**D0-19**	**D0-20**	**--**
	TEST D_0			--

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Clause	Requirement + Test	Result - Remark	Verdict

8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*										--
8.5	*OPERATING CHARACTERISTICS*										--
9.9	*VERIFICATION OF THE OPERATING CHARACTERISTIC*										--
9.9.1	RCBO installed as for normal use, test circuit according to figure 4										P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting										N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency										P
9.9.1.5	For RCBOs functionally dependent on line voltage each test is made at:										P
	- 1,1 U_N (V) and:										N/A
	- 0,85 U_N (V):										N/A
	- 0,80 U_N (V):										P
	Type	I_N A	$I_{\Delta N}$ A	Limiting values of break time and non-actuating time (s) for type AC and A RCBOs in event of alternating residual currents (r.m.s. values) equal to							--
				$I_{\Delta N}$	$2I_{\Delta N}$	$5I_{\Delta N}$	5 $I_{\Delta N}$ or 0,25A [a]	5A-200A, 500A [b]	$I_{\Delta t}$ [c]		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--

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	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.				--
9.9.1.2	Off-load tests at 20 ± 5°C				P
a)	Verification of the correct operation in case of a steady increase of residual current:	[mA]	[mA]	[mA]	--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s Tripping current between $I_{\Delta N0}$ and $I_{\Delta N}$	80,1~82,5	224~235		P
b)	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	- The RCBO closes on $I_{\Delta N}$, no value exceeds the - specified limiting value	50	45		P
c)	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	52	46		P
	- 2 $I_{\Delta N}$:	45	40		P
	- 5 $I_{\Delta N}$ or :	30	29		P
	- 0,25 A :	-	-		N/A
	- $I_{\Delta t}$ 630 A :	16	15		P
	No value exceeds the relevant specified limiting value				P
d)	Verification of the correct operation in case of sudden appearance of residual current between 5 $I_{\Delta N}$ and 500A among the following list: 5A - 10A - 20A - 50A - 100A - 200A by closing S_2, (S_1 and RCBO in closed position):				P
	- 5A	15	16		P
	- 10A	12	13		P
	- 20A	12	15		P
	- 50A	14	18		P
	- 100A	14	14		P
	- 200A	12	12		P
	- 500A	17	14		P

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	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:				--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.4.a)	Tests repeated at -5°C:	Tested at -25°C			P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	54	54		P
	- 2 $I_{\Delta N}$:	41	39		P
	- 5 $I_{\Delta N}$ or :	31	31		P
	- 0,25 A :	-	-		N/A
	- $I_{\Delta t}$ 630 A :	19	19		P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:				--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.3	Tests repeated with the RCBO loaded with rated current I_N until steady-state conditions are reached	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--

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Clause	Requirement + Test	Result - Remark	Verdict

	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	-no value exceeds the specified limiting value	50	49		P
	Verification of the correct operation in case of sudden appearance of residual current by closing S_2, (S_1 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	47	51		P
	- 2 $I_{\Delta N}$:	36	35		P
	- 5 $I_{\Delta N}$ or :	28	29		P
	- 0,25 A :	-	-		N/A
	- $I_{\Delta t}$ 630 A :	17	19		P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.1.4.b)	Tests repeated with the RCBO loaded with rated current I_N at +40°C until steady-state conditions are reached	I_N = 63A (tested at +55°C)			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$:	50	53		P
	- 2 $I_{\Delta N}$:	42	41		P
	- 5 $I_{\Delta N}$ or :	28	29		P
	- 0,25 A :	-	-		N/A
	- $I_{\Delta t}$ 630 A :	19	20		P

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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 at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s				N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s				N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s				N/A
	- $I_{\Delta t}$ ..... 0,04 s				N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A

	TEST D_1		--
8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*		--
9.1.6 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of behaviour in the case of inrush residual currents		
	Test acc. figure 2		N/A
	all switches and RCBO in closed position		N/A
	pulse with a peak current of 10 $I_{\Delta n}$ ..... (mA):		N/A
	Pulse on one pole chosen at random		N/A
	Six measurements: 3 times positive, 3 times negative		N/A
	Polarity changed after each test		N/A
	No tripping during test		N/A
9.1.4 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation for four-pole Type F RCCDs powered on two poles only		
	Tests performed with a four-pole RCBO acc. 9.1.2, but only supplied between neutral terminal and one-phase terminal chosen at random without load		N/A
9.1.2 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation in case of steady increase of composite residual current		
	starting composite residual current:		
	Different frequency component values of test currents for calibration (RMS) / Composite starting current value (RMS)		

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Clause	Requirement + Test	Result - Remark	Verdict

	$I_{at\ rated\ frequency}$	I_{1kHz}	$I_{F\ motor\ (10Hz)}$	I_{Δ}				
	0,138 $I_{\Delta N}$	0,138 $I_{\Delta N}$	0,035 $I_{\Delta N}$	0,2 $I_{\Delta N}$				
	S1, S2 and RCBO in the closed position, residual current steady increase, starting from a value not higher than the starting composite value to attain the upper limit of residual operating current (1,4 $I_{\Delta N}$) within 30 s				[mA]	[mA]	[mA]	--
	- tripping current between 0,5 $I_{\Delta N}$ and 1,4 $I_{\Delta n}$ (mA):				99,2~102	282~287		P
9.2.1 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** Verification of the operating characteristics at the reference temperature (20±5)°C							
9.2.1.1 addition acc. IEC 62423	General							
delete:	~~For multiple settings of $I_{\Delta n}$ tests are made for each setting~~							
9.2.1.2 addition acc. IEC 62423	Verification of the correct operation in case of residual sinusoidal alternating currents up to 1000 Hz							--
b) delete:	~~Additional test for type S:~~							
	~~- minimum non actuating time (ms) at: 14 $I_{\Delta n}$; 0,13 s :~~							
9.1.7 addition acc. IEC 62423	**Applicable for RCBOs of type B and F:** Verification of the correct operation in case of residual pulsating direct currents in presence of a standing smooth direct current of 0,01 A							
	Test acc. 9.21.1.4 but the smooth direct current of 0,006 A replaced by 0,01 A							N/A
	Verification of the correct operation in case of residual pulsating d.c. currents with angle α = 0° superimposed by smooth direct current of 0,01 A:							
	- steady increase of pulsating d.c. current from zero to: 1,4 $I_{\Delta n}$ for $I_{\Delta n}$ > 0,01 A with 1,4 $I_{\Delta n}$ /30 A/s (mA)							N/A
	- steady increase of pulsating d.c. current from zero to: 2 $I_{\Delta n}$ for $I_{\Delta n} \leq$ 0,01 A with 2 $I_{\Delta n}$ /30 A/s (mA)							N/A
	- angle α = 0° (+/-) (+/- 10 mA) ..... :							N/A
	No value exceeds the relevant specified limiting values							N/A

	TEST SEQUENCE "E": **3 samples: D63, $I_{\Delta n}$= 0,03A, 1P+N**	**E1 E2 E3**	--
	Tests E_0		--
9.9	***VERIFICATION OF THE OPERATING CHARACTERISTICS***		--
9.9.2.2 b)	☐ B		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

modify:	Test current 3 I_N starting from cold.....:	3 I_N = A			--
	Opening time:	[s]	[s]	[s]	--
	- 0,1 < t < 45s (I_N≤32A)	-	-	-	N/A
	- 0,1 < t < 90s (I_N>32A)	-	-	-	N/A
	Test current 5 I_N starting from cold.....:	5 I_N = A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s	-	-	-	N/A
c)	☐ C				P
	Test current 5 I_N starting from cold.....:	5I_N = A			--
	Opening time:	[s]	[s]	[s]	--
	- 0,1 < t < 15s (I_N≤32A)	-	-	-	N/A
	- 0,1 < t < 30s (I_N>32A)	-	-	-	N/A
	Test current 10 I_N starting from cold.....:	10I_N = A			--
		[ms]	[ms]	[ms]	--
	- Tripping time less than 0,1 s	-	-	-	N/A
d)	☒ D				P
	Test current 10 I_N starting from cold.....:	10 I_N = 630A			--
	Opening time:	[s]	[s]	[s]	--
	0,1 < t < 4s**) (I_N≤32A) **) for I_N≤10A, t< 8s is permitted	-	-	-	N/A
	- 0,1 < t < 8s (I_N>32A)	1,12	0,89	1,26	P
	Test current 20 I_N starting from cold.....:	20 I_N = A			--
		[ms]	[ms]	[ms]	--
	- Tripping time less than 0,1 s	7,81	8,15	8,26	P
add: 9.9.2.Z1	TEST OF EFFECT OF SINGLE PHASE LOADING ON THE OVER-CURRENT TRIPPING CHARACTERISTIC OF RCBO WITH THREE OR FOUR CURRENT PATH				--
	The test does not apply to RCBOs obtained by assembly of an adaptable residual current unit on a circuit-breaker.				N/A
	RCBOs with three or four current paths are loaded on 2 current paths.				N/A
	Where a switched neutral pole exists, the test circuit shall include the neutral pole.				N/A
	Except for the neutral pole if applicable, the test is carried out on different poles for each sample.				N/A
	Test current 1,2 times the conventional tripping current, starting from cold				N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	Tripping:	[min]	[min]	[min]	--
	- 1 h	-	-	-	N/A
	- 2 h	-	-	-	N/A

	Tests E_1		**--**
9.13 replace by:	*MECHANICAL STRESSES* (REPLACE THE TITLE BY)		--
9.13.2 replace by:	Resistance to mechanical stresses and impact *(replace the title by)*		--
	- 9.13.2.2 for RCBOs intended to be mounted on a rail and for all types of plug-in RCBOs designed for surface mounting		P
	- 9.13.2.3 for plug-in type RCBOs, the holding in position of which depends solely on their connections		N/A
9.13.2.2 add:	Plug-in RCBOs designed for surface mounting are mounted complete with the appropriate means for the plug-in connection but without cables being connected and without any cover-plate		
	- downward vertical force of 50 N for 1 min		N/A
	- upward vertical force of 50 N for 1 min		N/A
	RCBO shall not become loose during test and shall not show any damage impairing its further use		N/A
9.13.2.3 replace by:	RCBOs of plug-in type *(replace the note by)*		N/A
	Plug-in type RCBOs, the holding in position of which depends solely on their connections, are mounted, complete with the appropriate plug-in base but without cables being connected and without any cover-plate, on a vertical rigid wall		N/A
	A force of 20N is applied to the RCBO portion at a point equidistant between the plug-in connections, without jerks for 1 min		N/A
	During this test the RCBO portion shall not become loose and shall not move from the base portion and after the test both portions shall show no damage impairing their further use		N/A
9.12.11.3	Test at 1500 A:		
9.12.12.1. b) replace by:	The RCBO shall show no damage impairing their further use an shall be capable without maintenance to withstand the following tests:		--
	Dielectric strength test:		--

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Clause	Requirement + Test	Result - Remark	Verdict

	Test voltage:		--
	a) 1500 V		P
	b) 1500 V		P
	c) 1500 V		P
	d) 2000 V		N/A

	TEST SEQUENCE "E": **3 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**	**E4**	**E5**	**E6**	--
	Tests E_0				--
9.9	***VERIFICATION OF THE OPERATING CHARACTERISTICS***				--
9.9.2.2 b)	☐ B				N/A
modify:	Test current 3 I_N starting from cold.....:	3 I_N =	A		--
	Opening time:	[s]	[s]	[s]	--
	- 0,1 < t < 45s (I_N≤32A)	-	-	-	N/A
	- 0,1 < t < 90s (I_N>32A)	-	-	-	N/A
	Test current 5 I_N starting from cold.....:	5 I_N =	A		--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s	-	-	-	N/A
c)	☐ C				P
	Test current 5 I_N starting from cold.....:	5I_N =	A		--
	Opening time:	[s]	[s]	[s]	--
	- 0,1 < t < 15s (I_N≤32A)	-	-	-	N/A
	- 0,1 < t < 30s (I_N>32A)	-	-	-	N/A
	Test current 10 I_N starting from cold.....:	10I_N =	A		--
		[ms]	[ms]	[ms]	--
	- Tripping time less than 0,1 s	-	-	-	N/A
d)	☒ D				P
	Test current 10 I_N starting from cold.....:	10 I_N = 630A			--
	Opening time:	[s]	[s]	[s]	--
	0,1 < t < 4s**) (I_N≤32A) **) for I_N≤10A, t< 8s is permitted	-	-	-	N/A
	- 0,1 < t < 8s (I_N>32A)	0,93	0,84	1,14	P
	Test current 20 I_N starting from cold.....:	20 I_N =	A		--
		[ms]	[ms]	[ms]	--
	- Tripping time less than 0,1 s	8,14	8,31	8,14	P

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Clause	Requirement + Test	Result - Remark	Verdict

add: 9.9.2.Z1	TEST OF EFFECT OF SINGLE PHASE LOADING ON THE OVER-CURRENT TRIPPING CHARACTERISTIC OF RCBO WITH THREE OR FOUR CURRENT PATH				--
	The test does not apply to RCBOs obtained by assembly of an adaptable residual current unit on a circuit-breaker.				N/A
	RCBOs with three or four current paths are loaded on 2 current paths.				N/A
	Where a switched neutral pole exists, the test circuit shall include the neutral pole.				N/A
	Except for the neutral pole if applicable, the test is carried out on different poles for each sample.				N/A
	Test current 1,2 times the conventional tripping current, starting from cold				N/A
	Tripping:	[min]	[min]	[min]	--
	- 1 h	-	-	-	N/A
	- 2 h	-	-	-	N/A

	Tests E_1		**--**
9.13 replace by:	*MECHANICAL STRESSES* (REPLACE THE TITLE BY)		--
9.13.2 replace by:	Resistance to mechanical stresses and impact *(replace the title by)*		--
	- 9.13.2.2 for RCBOs intended to be mounted on a rail and for all types of plug-in RCBOs designed for surface mounting		P
	- 9.13.2.3 for plug-in type RCBOs, the holding in position of which depends solely on their connections		N/A
9.13.2.2 add:	Plug-in RCBOs designed for surface mounting are mounted complete with the appropriate means for the plug-in connection but without cables being connected and without any cover-plate		
	- downward vertical force of 50 N for 1 min		N/A
	- upward vertical force of 50 N for 1 min		N/A
	RCBO shall not become loose during test and shall not show any damage impairing its further use		N/A
9.13.2.3 replace by:	RCBOs of plug-in type *(replace the note by)*		N/A
	Plug-in type RCBOs, the holding in position of which depends solely on their connections, are		N/A

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	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 20N is applied to the RCBO portion at a point equidistant between the plug-in connections, without jerks for 1 min		N/A
	During this test the RCBO portion shall not become loose and shall not move from the base portion and after the test both portions shall show no damage impairing their further use		N/A
9.12.11.3	Test at 1500 A:		
9.12.12.1. b) replace by:	The RCBO shall show no damage impairing their further use an shall be capable without maintenance to withstand the following tests:		--
	Dielectric strength test:		--
	Test voltage:		--
	a) 1500 V		P
	b) 1500 V		P
	c) 1500 V		P
	d) 2000 V		N/A

	TEST SEQUENCE "E" **3 sample: B6, C6 and D6, $I_{\Delta n}$= 0,03A, 1P+N**	**E_0-1** **B6**	**E_0-2** **C6**	**E_0-3** **D6**	--
	Tests E_0				--
9.9	***VERIFICATION OF THE OPERATING CHARACTERISTICS***				--
9.9.2.2 b)	☒ B				P
modify:	Test current 3 I_N starting from cold.....:	3 I_N = 18A			--
	Opening time:	[s]	[s]	[s]	--
	- 0,1 < t < 45s (I_N≤32A)	4,89	-	-	P
	- 0,1 < t < 90s (I_N>32A)	-	-	-	N/A
	Test current 5 I_N starting from cold.....:	5 I_N = 30A			--
		[ms]	[s]	[s]	--
	- Tripping time less than 0,1 s	9,26	-	-	P
c)	☒ C				P
	Test current 5 I_N starting from cold.....:	5I_N = 30A			--
	Opening time:	[s]	[s]	[s]	--
	- 0,1 < t < 15s (I_N≤32A)	-	2,19	-	P
	- 0,1 < t < 30s (I_N>32A)		-	-	N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	Test current 10 I_N starting from cold.....:	10I_N = 60A			--
		[ms]	[ms]	[ms]	--
	- Tripping time less than 0,1 s	-	7,91	-	P
d)	☒ D				P
	Test current 10 I_N starting from cold.....:	10 I_N = 60A			--
	Opening time:	[s]	[s]	[s]	--
	0,1 < t < 4s**) (I_N≤32A) **) for I_N≤10A, t< 8s is permitted	-	-	1,21	P
	- 0,1 < t < 8s (I_N>32A)	-	-	-	N/A
	Test current 20 I_N starting from cold.....:	20 I_N = 120A			--
		[s]	[s]	[ms]	--
	- Tripping time less than 0,1 s	-	-	7,24	P

	TEST SEQUENCE "E" 3 samples: B10, C10 and D10, $I_{\Delta n}$= 0,03A, 1P+N	**E_0-4 B10**	**E_0-5 C10**	**E_0-6 D10**	--
	Tests E_0				--
9.9	***VERIFICATION OF THE OPERATING CHARACTERISTICS***				--
9.9.2.2 b)	☒ B				P
modify:	Test current 3 I_N starting from cold.....:	3 I_N = 30A			--
	Opening time:	[s]	[s]	[s]	--
	- 0,1 < t < 45s (I_N≤32A)	5,38	-	-	P
	- 0,1 < t < 90s (I_N>32A)	-	-	-	N/A
	Test current 5 I_N starting from cold.....:	5 I_N = 50A			--
		[ms]	[s]	[s]	--
	- Tripping time less than 0,1 s	8,93	-	-	P
c)	☒ C				P
	Test current 5 I_N starting from cold.....:	5I_N = 50A			--
	Opening time:	[s]	[s]	[s]	--
	- 0,1 < t < 15s (I_N≤32A)	-	2,46	-	P
	- 0,1 < t < 30s (I_N>32A)	-	-	-	N/A
	Test current 10 I_N starting from cold.....:	10I_N = 100A			--
		[ms]	[ms]	[ms]	--
	- Tripping time less than 0,1 s	-	8,52	-	P
d)	☒ D				N/A
	Test current 10 I_N starting from cold.....:	10 I_N = 100A			--
	Opening time:	[s]	[s]	[s]	--

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Clause	Requirement + Test	Result - Remark			Verdict
	0,1 < t < 4s**) (I_N≤32A) **) for I_N≤10A, t< 8s is permitted	-	-	0,92	P
	- 0,1 < t < 8s (I_N>32A)	-	-	-	N/A
	Test current 20 I_N starting from cold.....:	20 I_N = 200A			--
		[s]	[s]	[ms]	--
	- Tripping time less than 0,1 s	-	-	7,62	P

	TEST SEQUENCE "E" 3samples: B16, C16 and D16, $I_{\Delta n}$= 0,03A, 1P+N	**E_0-7 B16**	**E_0-8 C16**	**E_0-9 D16**	--
	Tests E_0				--
9.9	***VERIFICATION OF THE OPERATING CHARACTERISTICS***				--
9.9.2.2 b)	☒ B				P
modify:	Test current 3 I_N starting from cold.....:	3 I_N = 48A			--
	Opening time:	[s]	[s]	[s]	--
	- 0,1 < t < 45s (I_N≤32A)	5,42	-	-	P
	- 0,1 < t < 90s (I_N>32A)	-	-	-	N/A
	Test current 5 I_N starting from cold.....:	5 I_N = 80A			--
		[ms]	[s]	[s]	--
	- Tripping time less than 0,1 s	9,11	-	-	P
c)	☒ C				P
	Test current 5 I_N starting from cold.....:	5I_N = 80A			--
	Opening time:	[s]	[s]	[s]	--
	- 0,1 < t < 15s (I_N≤32A)	-	2,07	-	P
	- 0,1 < t < 30s (I_N>32A)	-	-	-	N/A
	Test current 10 I_N starting from cold.....:	10I_N = 160A			--
		[ms]	[ms]	[ms]	--
	- Tripping time less than 0,1 s	-	8,24	-	P
d)	☒ D				N/A
	Test current 10 I_N starting from cold.....:	10 I_N = 160 A			--
	Opening time:	[s]	[s]	[s]	--
	0,1 < t < 4s**) (I_N≤32A) **) for I_N≤10A, t< 8s is permitted	-	-	0,85	P
	- 0,1 < t < 8s (I_N>32A)	-	-	-	N/A
	Test current 20 I_N starting from cold.....:	20 I_N = 320 A			--
		[s]	[s]	[ms]	--

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Clause	Requirement + Test	Result - Remark	Verdict

	- Tripping time less than 0,1 s	-	-	8,13	P

	TEST SEQUENCE "E" **3 samples: B20, C20 and D20, $I_{\Delta n}$= 0,03A, 1P+N**	**E_0-10 B20**	**E_0-11 C20**	**E_0-12 D20**	--
	Tests E_0				--
9.9	***VERIFICATION OF THE OPERATING CHARACTERISTICS***				--
9.9.2.2 b)	☒ B				P
modify:	Test current 3 I_N starting from cold.....:	3 I_N = 60A			--
	Opening time:	[s]	[s]	[s]	--
	- 0,1 < t < 45s (I_N≤32A)	5,21	-	-	P
	- 0,1 < t < 90s (I_N>32A)	-	-	-	N/A
	Test current 5 I_N starting from cold.....:	5 I_N = 100A			--
		[ms]	[s]	[s]	--
	- Tripping time less than 0,1 s	7,55	-	-	P
c)	☒ C				P
	Test current 5 I_N starting from cold.....:	5I_N = 100A			--
	Opening time:	[s]	[s]	[s]	--
	- 0,1 < t < 15s (I_N≤32A)	-	2,67	-	P
	- 0,1 < t < 30s (I_N>32A)	-	-	-	N/A
	Test current 10 I_N starting from cold.....:	10I_N = 200A			--
		[ms]	[ms]	[ms]	--
	- Tripping time less than 0,1 s	-	7,63	-	P
d)	☒ D				N/A
	Test current 10 I_N starting from cold.....:	10 I_N = 200A			--
	Opening time:	[s]	[s]	[s]	--
	0,1 < t < 4s**) (I_N≤32A) **) for I_N≤10A, t< 8s is permitted	-	-	0,88	P
	- 0,1 < t < 8s (I_N>32A)	-	-	-	N/A
	Test current 20 I_N starting from cold.....:	20 I_N = 400 A			--
		[s]	[s]	[ms]	--
	- Tripping time less than 0,1 s	-	-	8,14	P

	TEST SEQUENCE "E" **3 samples: B25, C25 and D25, $I_{\Delta n}$= 0,03A, 1P+N**	**E_0-13 B25**	**E_0-14 C25**	**E_0-15 D25**	--
	Tests E_0				--

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Clause	Requirement + Test	Result - Remark	Verdict

9.9	***VERIFICATION OF THE OPERATING CHARACTERISTICS***				--
9.9.2.2 b)	☒ B				P
modify:	Test current 3 I_N starting from cold.....:	3 I_N = 75A			--
	Opening time:	[s]	[s]	[s]	--
	- 0,1 < t < 45s (I_N≤32A)	4,93	-	-	P
	- 0,1 < t < 90s (I_N>32A)	-	-	-	N/A
	Test current 5 I_N starting from cold.....:	5 I_N = 125A			--
		[ms]	[s]	[s]	--
	- Tripping time less than 0,1 s	8,24	-	-	P
c)	☒ C				P
	Test current 5 I_N starting from cold.....:	5I_N = 125A			--
	Opening time:	[s]	[s]	[s]	--
	- 0,1 < t < 15s (I_N≤32A)	-	2,19	-	P
	- 0,1 < t < 30s (I_N>32A)	-	-	-	N/A
	Test current 10 I_N starting from cold.....:	10I_N = 250A			--
		[ms]	[ms]	[ms]	--
	- Tripping time less than 0,1 s	-	8,45	-	P
d)	☒ D				N/A
	Test current 10 I_N starting from cold.....:	10 I_N = 250 A			--
	Opening time:	[s]	[s]	[s]	--
	0,1 < t < 4s**) (I_N≤32A) **) for I_N≤10A, t< 8s is permitted	-	-	1,22	P
	- 0,1 < t < 8s (I_N>32A)	-	-	-	N/A
	Test current 20 I_N starting from cold.....:	20 I_N = 500 A			--
		[s]	[s]	[ms]	--
	- Tripping time less than 0,1 s	-	-	7,38	P

	TEST SEQUENCE "E" **3 samples: B32, C32 and D32, $I_{\Delta n}$= 0,03A, 1P+N**	**E_0-16 B32**	**E_0-17 C32**	**E_0-18 D32**	--
	Tests E_0				--
9.9	***VERIFICATION OF THE OPERATING CHARACTERISTICS***				--
9.9.2.2 b)	☒ B				P
modify:	Test current 3 I_N starting from cold.....:	3 I_N = 96A			--
	Opening time:	[s]	[s]	[s]	--
	- 0,1 < t < 45s (I_N≤32A)	4,36	-	-	P
	- 0,1 < t < 90s (I_N>32A)	-	-	-	N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	Test current 5 I_N starting from cold.....:	5 I_N = 160A			--
		[ms]	[s]	[s]	--
	- Tripping time less than 0,1 s	8,03	-	-	P
c)	☒ C				P
	Test current 5 I_N starting from cold.....:	5I_N = 160A			--
	Opening time:	[s]	[s]	[s]	--
	- 0,1 < t < 15s (I_N≤32A)	-	2,43	-	P
	- 0,1 < t < 30s (I_N>32A)	-	-	-	N/A
	Test current 10 I_N starting from cold.....:	10I_N = 320A			--
		[ms]	[ms]	[ms]	--
	- Tripping time less than 0,1 s	-	7,89	-	P
d)	☒ D				N/A
	Test current 10 I_N starting from cold.....:	10 I_N = 320A			--
	Opening time:	[s]	[s]	[s]	--
	0,1 < t < 4s**) (I_N≤32A) **) for I_N≤10A, t< 8s is permitted	-	-	1,09	P
	- 0,1 < t < 8s (I_N>32A)	-	-	-	N/A
	Test current 20 I_N starting from cold.....:	20 I_N = 640A			--
		[s]	[s]	[ms]	--
	- Tripping time less than 0,1 s	-	-	7,65	P

	TEST SEQUENCE "E" **3 samples: B40, C40 and D40, $I_{\Delta n}$= 0,03A, 1P+N**	**E_0-19 B40**	**E_0-20 C40**	**E_0-21 D40**	--
	Tests E_0				--
9.9	***VERIFICATION OF THE OPERATING CHARACTERISTICS***				--
9.9.2.2 b)	☒ B				P
modify:	Test current 3 I_N starting from cold.....:	3 I_N = 120A			--
	Opening time:	[s]	[s]	[s]	--
	- 0,1 < t < 45s (I_N≤32A)	-	-	-	N/A
	- 0,1 < t < 90s (I_N>32A)	4,67	-	-	P
	Test current 5 I_N starting from cold.....:	5 I_N = 200A			--
		[ms]	[s]	[s]	--
	- Tripping time less than 0,1 s	8,91	-	-	P
c)	☒ C				P
	Test current 5 I_N starting from cold.....:	5 I_N = 200 A			--
	Opening time:	[s]	[s]	[s]	--

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Clause	Requirement + Test	Result - Remark			Verdict
	- 0,1 < t < 15s (I_N≤32A)	-	-	-	N/A
	- 0,1 < t < 30s (I_N>32A)	-	3,16	-	P
	Test current 10 I_N starting from cold.....:	10 I_N = 400 A			--
		[ms]	[ms]	[ms]	--
	- Tripping time less than 0,1 s	-	8,19	-	P
d)	☒ D				N/A
	Test current 10 I_N starting from cold.....:	10 I_N = 400 A			--
	Opening time:	[s]	[s]	[s]	--
	0,1 < t < 4s**) (I_N≤32A) **) for I_N≤10A, t< 8s is permitted	-	-	-	N/A
	- 0,1 < t < 8s (I_N>32A)	-	-	0,95	P
	Test current 20 I_N starting from cold.....:	20 I_N = 800 A			--
		[s]	[s]	[ms]	--
	- Tripping time less than 0,1 s	-	-	7,89	P

	TEST SEQUENCE "E" 3 samples: B50, C50 and D50, $I_{\Delta n}$= 0,03A, 1P+N	**E_0-22 B50**	**E_0-23 C50**	**E_0-24 D50**	--
	Tests E_0				--
9.9	***VERIFICATION OF THE OPERATING CHARACTERISTICS***				--
9.9.2.2 b)	☒ B				P
modify:	Test current 3 I_N starting from cold.....:	3 I_N = 150A			--
	Opening time:	[s]	[s]	[s]	--
	- 0,1 < t < 45s (I_N≤32A)	-	-	-	N/A
	- 0,1 < t < 90s (I_N>32A)	5,18	-	-	P
	Test current 5 I_N starting from cold.....:	5 I_N = 250A			--
		[ms]	[s]	[s]	--
	- Tripping time less than 0,1 s	7,94	-	-	P
c)	☒ C				P
	Test current 5 I_N starting from cold.....:	5 I_N = 250 A			--
	Opening time:	[s]	[s]	[s]	--
	- 0,1 < t < 15s (I_N≤32A)	-	-	-	N/A
	- 0,1 < t < 30s (I_N>32A)	-	2,75	-	P
	Test current 10 I_N starting from cold.....:	10 I_N = 500 A			--
		[ms]	[ms]	[ms]	--
	- Tripping time less than 0,1 s	-	7,92	-	P
d)	☒ D				N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	Test current 10 I_N starting from cold.....:	10 I_N = 500 A			--
	Opening time:	[s]	[s]	[s]	--
	0,1 < t < 4s**) (I_N≤32A) **) for I_N≤10A, t< 8s is permitted	-	-	-	N/A
	- 0,1 < t < 8s (I_N>32A)	-	-	1,12	P
	Test current 20 I_N starting from cold.....:	20 I_N = 1000 A			--
		[s]	[s]	[ms]	--
	- Tripping time less than 0,1 s	-	-	7,61	P

	TEST SEQUENCE "E" 2 samples: B63, and C63, $I_{\Delta n}$= 0,03A, 1P+N	**E_0-25 B63**	**E_0-26 C63**		--
	Tests E_0				--
9.9	***VERIFICATION OF THE OPERATING CHARACTERISTICS***				--
9.9.2.2 b)	☒ B				P
modify:	Test current 3 I_N starting from cold.....:	3 I_N = 189A			--
	Opening time:	[s]	[s]	[s]	--
	- 0,1 < t < 45s (I_N≤32A)	-	-	-	N/A
	- 0,1 < t < 90s (I_N>32A)	5,06	-	-	P
	Test current 5 I_N starting from cold.....:	5 I_N = 315A			--
		[ms]	[s]	[s]	--
	- Tripping time less than 0,1 s	8,16	-	-	P
c)	☒ C				P
	Test current 5 I_N starting from cold.....:	5 I_N = 315 A			--
	Opening time:	[s]	[s]	[s]	--
	- 0,1 < t < 15s (I_N≤32A)	-	-	-	N/A
	- 0,1 < t < 30s (I_N>32A)	-	2,91	-	P
	Test current 10 I_N starting from cold.....:	10 I_N = 630 A			--
		[ms]	[ms]	[ms]	--
	- Tripping time less than 0,1 s	-	8,34	-	P
d)	☐ D				N/A
	Test current 10 I_N starting from cold.....:	10 I_N = A			--
	Opening time:	[s]	[s]	[s]	--
	0,1 < t < 4s**) (I_N≤32A) **) for I_N≤10A, t< 8s is permitted	-	-	-	N/A
	- 0,1 < t < 8s (I_N>32A)	-	-	-	N/A
	Test current 20 I_N starting from cold.....:	20 I_N = A			--

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Clause	Requirement + Test	Result - Remark	Verdict

		[ms]	[ms]	[ms]	--
	- Tripping time less than 0,1 s	-	-	-	N/A

	TEST SEQUENCE "F": **3 samples: D63, $I_{\Delta n}$= 0,03A, 1P+N**	**F_0.1 F_0.2 F_0.3**	**--**
	Tests F_0		**--**
9.12	*SHORT-CIRCUITS TEST*		--
9.12.11.4 b)	Test above 1500 A		
9.12.12.1.b) replace by:	Dielectric strength test:		--
	Test voltage:		--
	a) 1500 V		P
	b) 1500 V		P
	c) 1500 V		P
	d) 2000 V		N/A

	TEST SEQUENCE "F": **3 samples: D6, $I_{\Delta n}$= 0,03A, 1P+N**	**F_0.4 F_0.5 F_0.6**	**--**
	Tests F_0		**--**
9.12	*SHORT-CIRCUITS TEST*		--
9.12.11.4 b)	Test above 1500 A		
9.12.12.1.b) replace by:	Dielectric strength test:		--
	Test voltage:		--
	a) 1500 V		P
	b) 1500 V		P
	c) 1500 V		P
	d) 2000 V		N/A

	TEST SEQUENCE "F": **3 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**	**F_0.7 F_0.8 F_0.9**	**--**
	Tests F_0		**--**
9.12	*SHORT-CIRCUITS TEST*		--
9.12.11.4 b)	Test above 1500 A		
9.12.12.1.b) replace by:	Dielectric strength test:		--
	Test voltage:		--

IEC62423B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	a) 1500 V		P
	b) 1500 V		P
	c) 1500 V		P
	d) 2000 V		N/A
	TEST SEQUENCE "F": **3 samples: D6, $I_{\Delta n}$= 0,03A, 3P+N**	**F_0.10 F_0.11 F_0.12**	--
	Tests F_0		--
9.12	*SHORT-CIRCUITS TEST*		--
9.12.11.4 b)	Test above 1500 A		
9.12.12.1.b) replace by:	Dielectric strength test:		--
	Test voltage:		--
	a) 1500 V		P
	b) 1500 V		P
	c) 1500 V		P
	d) 2000 V		N/A
	TEST SEQUENCE "F": **3 samples: D63, $I_{\Delta n}$= 0,03A, 1P+N**	**F_1.1 F_1.2 F_1.3**	--
	Tests F_1		--
9.12	**SHORT-CIRCUITS TEST**		--
9.12.11.4 c)	Test above 1500 A		
9.12.12.2.b) replace by:	Dielectric strength test:		--
	Test voltage:		--
	a) 900 V		P
	b) 900 V		P
	c) 900 V		P
	d) 900 V		N/A
	TEST SEQUENCE "F": **3 samples: D6, $I_{\Delta n}$= 0,03A, 1P+N**	**F_1.4 F_1.5 F_1.6**	--
	Tests F_1		--
9.12	**SHORT-CIRCUITS TEST**		--
9.12.11.4 c)	Test above 1500 A		

IEC62423B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
9.12.12.2.b) replace by:	Dielectric strength test:		--
	Test voltage:		--
	a) 900 V		P
	b) 900 V		P
	c) 900 V		P
	d) 900 V		N/A

	TEST SEQUENCE "F": **3 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**	**F_1.7 F_1.8 F_1.9**	--
	Tests F_1		--
9.12	**SHORT-CIRCUITS TEST**		--
9.12.11.4 c)	Test above 1500 A		
9.12.12.2.b) replace by:	Dielectric strength test:		--
	Test voltage:		--
	a) 900 V		P
	b) 900 V		P
	c) 900 V		P
	d) 900 V		N/A

	TEST SEQUENCE "F": **3 samples: D6, $I_{\Delta n}$= 0,03A, 3P+N**	**F_1.10 F_1.11 F_1.12**	--
	Tests F_1		--
9.12	**SHORT-CIRCUITS TEST**		--
9.12.11.4 c)	Test above 1500 A		
9.12.12.2.b) replace by:	Dielectric strength test:		--
	Test voltage:		--
	a) 900 V		P
	b) 900 V		P
	c) 900 V		P
	d) 900 V		N/A

	TEST SEQUENCE "F": **3 samples: C63, $I_{\Delta n}$= 0,03A, 1P+N**	**F_1.13 F_1.14 F_1.15**	--
	Tests F_1		--

IEC62423B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
9.12	**SHORT-CIRCUITS TEST**		**--**
9.12.11.4 c)	Test above 1500 A		
9.12.12.2.b) replace by:	Dielectric strength test:		--
	Test voltage:		--
	a) 900 V		P
	b) 900 V		P
	c) 900 V		P
	d) 900 V		N/A

	TEST SEQUENCE "F": **3 samples: C16, $I_{\Delta n}$= 0,03A, 1P+N**	**F_1.16 F_1.17 F_1.18**	**--**
	Tests F_1		**--**
9.12	**SHORT-CIRCUITS TEST**		**--**
9.12.11.4 c)	Test above 1500 A		
9.12.12.2.b) replace by:	Dielectric strength test:		--
	Test voltage:		--
	a) 900 V		P
	b) 900 V		P
	c) 900 V		P
	d) 900 V		N/A

	TEST SEQUENCE "F": **3 samples: C63, $I_{\Delta n}$= 0,03A, 3P+N**	**F_1.19 F_1.20 F_1.21**	**--**
	Tests F_1		**--**
9.12	**SHORT-CIRCUITS TEST**		**--**
9.12.11.4 c)	Test above 1500 A		
9.12.12.2.b) replace by:	Dielectric strength test:		--
	Test voltage:		--
	a) 900 V		P
	b) 900 V		P
	c) 900 V		P
	d) 900 V		N/A

	TEST SEQUENCE "F":	**F_1.22 F_1.23 F_1.24**	**--**

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Clause	Requirement + Test	Result - Remark	Verdict
	3 samples: C16, $I_{\Delta n}$= 0,03A, 3P+N		
	Tests F_1		--
9.12	**SHORT-CIRCUITS TEST**		--
9.12.11.4 c)	Test above 1500 A		
9.12.12.2.b) replace by:	Dielectric strength test:		--
	Test voltage:		--
	a) 900 V		P
	b) 900 V		P
	c) 900 V		P
	d) 900 V		N/A
	TEST SEQUENCE "F": **3 samples: B63, $I_{\Delta n}$= 0,03A, 1P+N**	**F_1.25 F_1.26 F_1.27**	--
	Tests F_1		--
9.12	**SHORT-CIRCUITS TEST**		--
9.12.11.4 c)	Test above 1500 A		
9.12.12.2.b) replace by:	Dielectric strength test:		--
	Test voltage:		--
	a) 900 V		P
	b) 900 V		P
	c) 900 V		P
	d) 900 V		N/A
	TEST SEQUENCE "F": **3 samples: B16, $I_{\Delta n}$= 0,03A, 1P+N**	**F_1.28 F_1.29 F_1.30**	--
	Tests F_1		--
9.12	**SHORT-CIRCUITS TEST**		--
9.12.11.4 c)	Test above 1500 A		
9.12.12.2.b) replace by:	Dielectric strength test:		--
	Test voltage:		--
	a) 900 V		P
	b) 900 V		P
	c) 900 V		P

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	d) 900 V		N/A

	TEST SEQUENCE "F": **3 samples: B63, $I_{\Delta n}$= 0,03A, 3P+N**	**F_1.31 F_1.32 F_1.33**	--
	Tests F_1		--
9.12	**SHORT-CIRCUITS TEST**		--
9.12.11.4 c)	Test above 1500 A		
9.12.12.2.b) replace by:	Dielectric strength test:		--
	Test voltage:		--
	a) 900 V		P
	b) 900 V		P
	c) 900 V		P
	d) 900 V		N/A

	TEST SEQUENCE "F": **3 samples: B16, $I_{\Delta n}$= 0,03A, 3P+N**	**F_1.34 F_1.35 F_1.36**	--
	Tests F_1		--
9.12	**SHORT-CIRCUITS TEST**		--
9.12.11.4 c)	Test above 1500 A		
9.12.12.2.b) replace by:	Dielectric strength test:		--
	Test voltage:		--
	a) 900 V		P
	b) 900 V		P
	c) 900 V		P
	d) 900 V		N/A

	TEST SEQUENCE "F": **3 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**	**F_2.1 F_2.2 F_2.3**	
	Tests F_2 *(add the new test sequence)*		
9.12	*SHORT-CIRCUITS TEST*		--
add: 9.12.11.4 d)	Test above 1500 A		
	Test at residual making and breaking capacity $I_{\Delta m}$		P
	Verification of the rated residual making and	3000A	--

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	breaking capacity $I_{\Delta m}$ (A) ..... :				
	Test circuit according to figure ..... :	Figure 7			--
	Cross-section (mm²)..... :	25mm²			--
	Grid distance a (mm)..... :	35mm			--
	Prospective current (A) ..... :	3000A			--
	Prospective current obtained (A)..... :	3,05x10³A			--
	Power factor ..... :	0,75-0,80			--
	Power factor obtained ..... :	0,88			--
	I_{peak} (A) max. value ..... :	3,22x10³	3,48x10³	3,57x10³	--
	I²t max. sequence O-t-CO ..... :	[KA²s]	[KA²s]	[KA²s]	--
		22,4	20,9	21,3	P
	One pole taken at random which shall not be the switched neutral pole or the overcurrent unprotected pole				P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				P
	Phases which do not carry the short circuit current during this test shall be connected to the supply voltage at the line terminals				P
	No permanent arcing				P
	No flash-over				P
	No blowing of fuse F				P
	No damage, polyethylene sheet shows no holes				P
9.12.12	The RCBO shall show no damage impairing their further use an shall be capable without maintenance to withstand the following tests:				
9.12.12.2. a)	Leakage current across open contacts, according to 9.7.7.3, each pole is supplied at a voltage 1,1 times Un= 457V. The RCBO is in the open position	[µA]	[µA]	[µA]	--
	The leakage current shall not exceed 2 mA	7,93	9,82	9,24	P
9.12.12.2. b)	Dielectric strength test of the main circuit for 1 min.				
	Test voltage:				
	a) 900 V				P
	b) 900 V				P
	c) 900 V				P
	d) 900 V				N/A
	During these test, after the test has carried out under the conditions specified in 9.7.2 a), it shall be verified that the indicating means show the open				P

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	position and during the test carried out under the conditions specified in 9.7.2 b) the indication means shall show the closed position				
	No flash-over or break down				P
9.12.12.2. c)	Test current 2,8 I_N	2,8I_N = 177A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	-	-	-	N/A
	- 120 s	9	10	9	P
9.12.12.Z1	The RCBO shall trip with a test current of 1,25 $I_{\Delta N}$ - break time not exceeding the value for $I_{\Delta N}$ in table 2	[ms]	[ms]	[ms]	--
		31	30	31	P

modify:	**TEST SEQUENCE "G":** **3 samples: D63, $I_{\Delta n}$= 0,03A, 1P+N**	**G_0-1 G_0-2 G_0-3**	--
9.22	*VERIFICATION OF RELIABILITY*		
9.22.1	Climatic test		

modify:	**TEST SEQUENCE "G":** **3 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**	**G_0-4 G_0-5 G_0-6**	--
9.22	*VERIFICATION OF RELIABILITY*		
9.22.1	Climatic test		

	TEST SEQUENCE "G_1" **(add the new test sequence)** **3 samples: D63, $I_{\Delta n}$= 0,03A, 1P+N**	**G_1-1 G_1-2 G_1-3**	--
8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*		--
add: 8.Z1	*BEHAVIOUR OF RCBOS AT LOW AMBIENT AIR TEMPERATURE*		--
	RCBOs for use between -25°C and +40°C operate reliably at low ambient air temperature		
add: 9.Z1	*VERIFICATION OF THE CORRECT OPERATION AT LOW AMBIENT AIR TEMPERATURE FOR RCBOS FOR USE AT TEMPERATURES BETWEEN -25° C AND +40° C*		--
	RCBOs mounted in enclosure with degree of protection IP 55 and connected for normal use		P
	RCBOs in a test chamber at +23°C ± 2°C and rH 90% ± 3%		P
	RCBOs in ON-position without load		P

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	Five test cycles performed acc. to figure Z6				P
	No tripping during cycles				P
	At the end of last 6 h period at -25°C an a.c. residual				P
	current is passed through one pole (see figure 4a)				
	- general type:	[ms]	[ms]	[ms]	--
	break time at 1,25 $I_{\Delta N}$ not exceeding the value for $I_{\Delta N}$ in table 2	32	29	34	P
	- S-type:	[ms]	[ms]	[ms]	--
	break time at 2,5 $I_{\Delta N}$ not exceeding the value for 2 $I_{\Delta N}$ in table 2	-	-	-	N/A
	Additionally for RCBOs of type A:				
	Break time with pulsating d.c. residual currents of				
	- 1,25 $I_{\Delta N}$ (general type)				P
	- 2,5 $I_{\Delta N}$ (S-type)				N/A
	Multiplied by:	[ms]	[ms]	[ms]	--
	1,4 for $I_{\Delta N}$ > 0,01 A	27	26	24	P
	2 for $I_{\Delta N} \leq$ 0,01 A	-	-	-	N/A
	at α = 0°el (test circuit figure 4b)				P
9.2.4 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** The RCBO shall trip with a test current of 2,5 $I_{\Delta n}$ with smooth direct current (ms)	[ms]	[ms]	[ms]	
		21	26	23	P
	After test possible to switch on the RCBO without presence of residual current				P

	TEST SEQUENCE "G_1" **(add the new test sequence)** **3 samples: D6, $I_{\Delta n}$= 0,3A, 3P+N**	**G_1.4 G_1.5 G_1.6**	--
8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*		--
add: 8.Z1	*BEHAVIOUR OF RCBOS AT LOW AMBIENT AIR TEMPERATURE*		--
	RCBOs for use between -25°C and +40°C operate reliably at low ambient air temperature		
add: 9.Z1	*VERIFICATION OF THE CORRECT OPERATION AT LOW AMBIENT AIR TEMPERATURE FOR RCBOS FOR USE AT TEMPERATURES BETWEEN -25° C AND +40° C*		--
	RCBOs mounted in enclosure with degree of protection IP 55 and connected for normal use		P

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Clause	Requirement + Test	Result - Remark	Verdict

	RCBOs in a test chamber at +23°C ± 2°C and rH 90% ± 3%				P
	RCBOs in ON-position without load				P
	Five test cycles performed acc. to figure Z6				P
	No tripping during cycles				P
	At the end of last 6 h period at -25°C an a.c. residual				P
	current is passed through one pole (see figure 4a)				
	- general type:	[ms]	[ms]	[ms]	--
	break time at 1,25 $I_{\Delta N}$ not exceeding the value for $I_{\Delta N}$ in table 2	35	34	32	P
	- S-type:	[ms]	[ms]	[ms]	--
	break time at 2,5 $I_{\Delta N}$ not exceeding the value for 2 $I_{\Delta N}$ in table 2	-	-	-	N/A
	Additionally for RCBOs of type A:				
	Break time with pulsating d.c. residual currents of				
	- 1,25 $I_{\Delta N}$ (general type)				P
	- 2,5 $I_{\Delta N}$ (S-type)				N/A
	Multiplied by:	[ms]	[ms]	[ms]	--
	1,4 for $I_{\Delta N}$ > 0,01 A	31	27	27	P
	2 for $I_{\Delta N} \leq$ 0,01 A	-	-	-	N/A
	at α = 0°el (test circuit figure 4b)				P
9.2.4 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** The RCBO shall trip with a test current of 2,5 $I_{\Delta n}$ with smooth direct current (ms)	[ms]	[ms]	[ms]	
		24	27	23	P
	After test possible to switch on the RCBO without presence of residual current				P

	TEST SEQUENCE "G_1" (add the new test sequence) 3 samples: D63, $I_{\Delta n}$= 0,03A, 1P+N	**G_1.7 G_1.8 G_1.9**	--
8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*		--
add: 8.Z1	*BEHAVIOUR OF RCBOS AT LOW AMBIENT AIR TEMPERATURE*		--
	RCBOs for use between -25°C and +55°C operate reliably at low ambient air temperature		

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Clause	Requirement + Test	Result - Remark	Verdict

add: 9.Z1	*VERIFICATION OF THE CORRECT OPERATION AT LOW AMBIENT AIR TEMPERATURE FOR RCBOS FOR USE AT TEMPERATURES BETWEEN -25° C AND +55° C*				--
	RCBOs mounted in enclosure with degree of protection IP 55 and connected for normal use				P
	RCBOs in a test chamber at +55°C ± 2°C and rH 90% ± 3%				P
	RCBOs in ON-position without load				P
	Five test cycles performed acc. to figure Z6				P
	No tripping during cycles				P
	At the end of last 6 h period at -25°C an a.c. residual				P
	current is passed through one pole (see figure 4a)				
	- general type:	[ms]	[ms]	[ms]	--
	break time at 1,25 $I_{\Delta N}$ not exceeding the value for $I_{\Delta N}$ in table 2	38	38	38	P
	- S-type:	[ms]	[ms]	[ms]	--
	break time at 2,5 $I_{\Delta N}$ not exceeding the value for 2 $I_{\Delta N}$ in table 2	-	-	-	N/A
	Additionally for RCBOs of type A:				
	Break time with pulsating d.c. residual currents of				
	- 1,25 $I_{\Delta N}$ (general type)				P
	- 2,5 $I_{\Delta N}$ (S-type)				N/A
	Multiplied by:	[ms]	[ms]	[ms]	--
	1,4 for $I_{\Delta N}$ > 0,01 A	37	35	37	P
	2 for $I_{\Delta N} \leq$ 0,01 A	-	-	-	N/A
	at α = 0°el (test circuit figure 4b)				P
9.2.4 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** The RCBO shall trip with a test current of 2,5 $I_{\Delta n}$ with smooth direct current (ms)	[ms]	[ms]	[ms]	
		36	37	37	P
	After test possible to switch on the RCBO without presence of residual current				P

	TEST SEQUENCE "G_1" (add the new test sequence) 3 samples: D6, $I_{\Delta n}$= 0,3A, 3P+N	**G_1.10**	**G_1.11**	**G_1.12**	--

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Clause	Requirement + Test	Result - Remark	Verdict

8	*REQUIREMENTS FOR CONSTRUCTION AND OPERATION*				--
add: 8.Z1	*BEHAVIOUR OF RCBOS AT LOW AMBIENT AIR TEMPERATURE*				--
	RCBOs for use between -25°C and +55°C operate reliably at low ambient air temperature				
add: 9.Z1	*VERIFICATION OF THE CORRECT OPERATION AT LOW AMBIENT AIR TEMPERATURE FOR RCBOS FOR USE AT TEMPERATURES BETWEEN -25° C AND +55° C*				--
	RCBOs mounted in enclosure with degree of protection IP 55 and connected for normal use				P
	RCBOs in a test chamber at +55°C ± 2°C and rH 90% ± 3%				P
	RCBOs in ON-position without load				P
	Five test cycles performed acc. to figure Z6				P
	No tripping during cycles				P
	At the end of last 6 h period at -25°C an a.c. residual				P
	current is passed through one pole (see figure 4a)				
	- general type:	[ms]	[ms]	[ms]	--
	break time at 1,25 $I_{\Delta N}$ not exceeding the value for $I_{\Delta N}$ in table 2	27	25	27	P
	- S-type:	[ms]	[ms]	[ms]	--
	break time at 2,5 $I_{\Delta N}$ not exceeding the value for 2 $I_{\Delta N}$ in table 2	-	-	-	N/A
	Additionally for RCBOs of type A:				
	Break time with pulsating d.c. residual currents of				
	- 1,25 $I_{\Delta N}$ (general type)				P
	- 2,5 $I_{\Delta N}$ (S-type)				N/A
	Multiplied by:	[ms]	[ms]	[ms]	--
	1,4 for $I_{\Delta N}$ > 0,01 A	14	15	14	P
	2 for $I_{\Delta N} \leq$ 0,01 A	-	-	-	N/A
	at α = 0°el (test circuit figure 4b)				P
9.2.4 addition acc. IEC 62423	**Only applicable for RCBOs of type B:** The RCBO shall trip with a test current of 2,5 $I_{\Delta n}$ with smooth direct current (ms)	[ms]	[ms]	[ms]	
		21	21	24	P
	After test possible to switch on the RCBO without presence of residual current				P

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		6 8.1.1 8.1.2 9.3 8.1.3 8.1.6 9.11 9.4 9.5 9.6 9.14 8.1.3 9.15	Marking General Mechanism Indelibility of marking Clearance and creepage distances (external parts only) Non-interchangeability 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 abnormal heat and to fire
B		9.7 9.8 9.20 9.22.2 9.23	Dielectric properties Temperature-rise Resistance of insulation against an impulse voltage Reliability at 40°C Ageing of electronic components
C	C_1	9.10 9.12.11.2.1 (and 9.12.12)	Mechanical and electrical endurance Performance at reduced short-circuit currents (Verification of RCBO after short-circuit test)
	C_2	9.12.11.2.2 (and 9.12.12)	Short-circuit test for verifying the suitability of RCBOs for use in IT systems (Verification of the RCBO after short-circuit tests)
D	D_0	9.9.1	Operating characteristics under residual current conditions
	D_1	9.17 9.19 9.21 9.16	Behaviour in case of failure of the line voltage Behaviour in case of surge currents D.C. components Test device
E	E_0	9.9.2	Overcurrent operating characteristics
	E_1	9.13 9.12.11.3 (and 9.12.12)	Resistance to mechanical stresses Short-circuit performance at 1500 A (Verification of RCBO after short-circuit test)
F	F_0	9.12.11.4 b) (and 9.12.12)	Performance at service short-circuit capacity (Verification of RCBO after short-circuit test)
	F_1	9.12.11.4 c) (and 9.12.12.2)	Performance at rated short-circuit capacity (Verification of RCBO after short-circuit test)
	F_2	9.12.11.4 d) (and 9.12.12.2)	Performance at $I_{\Delta M}$ (Verification of RCBO after short-circuit test)
G_0		9.22.1	Reliability (climatic tests)
G_1		9.Z.1	Verification of correct operation at low ambient air temperature of RCBOs operating at temperatures between -25°C and +40°C
H [a)]		IEC 61543 Table 4-T1.1 IEC 61543 Table 4-	Harmonics, interharmonics Signalling voltage Conducted unidirectional transients of the ms and μs time scale

	T1.2 IEC 61543 Table 5-T2.3	
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
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.		

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replace table A.2 by:

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

Test sequence	Number of samples	Minimum number of samples which shall pass the test (a) (b)	Maximum number of samples for repeated tests (c)
A	1+3 (f)	1+3 (f)	--
B	3	2	3
C_1	3	2 (d)	3
C_2	3	2 (d)	3
D	3	2 (d)	3
E	3	2 (d)	3
F_0	3	2 (d)	3
F_1	3	2 (d)	3
F_2	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) Except for test of 9.12.10, 9.12.11.2, 9.12.11.3, 9.12.11.4 as appropriate, which all samples shall pass.

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

f) Test 9.15 shall apply to 3 additional new samples.

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 [f) j)]	4-poles [e)]
A	1 max. rating I_N min. rating $I_{\Delta N}$	1 max. rating I_N min. rating $I_{\Delta N}$	1 max. rating I_N min. rating $I_{\Delta N}$
B	3 max. rating I_N min. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$
C_1	3 max. rating I_N min. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$
C_2	for 2 protected poles 2 max. rating I_N min. rating $I_{\Delta N}$ for one protected pole 3 max. rating I_N min. rating $I_{\Delta N}$	1 max. rating I_N min. rating $I_{\Delta N}$	1 max. rating I_N min. rating $I_{\Delta N}$
$D_0 + D_1$	3 max. rating I_N min. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$
D_0	1 for all other ratings of $I_{\Delta N}$ with max. I_N		
$E_0 + E_1$	3 max. rating I_N min. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$
E_0	1 [i)] for all other ratings of I_N with min. $I_{\Delta N}$		
F_0	3 max. rating I_N min. rating $I_{\Delta N}$ 3 min. rating I_N max. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$ 3 min. rating I_N max. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$ 3 min. rating I_N max. rating $I_{\Delta N}$
F_1	3 max. rating I_N min. rating $I_{\Delta N}$ 3 min. rating I_N max. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$ 3 min. rating I_N max. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$ 3 min. rating I_N max. rating $I_{\Delta N}$
F_2	3 [h)] max. rating I_N min. rating $I_{\Delta N}$	3 [h)] max. rating I_N min. rating $I_{\Delta N}$	3 [h)] max. rating I_N min. rating $I_{\Delta N}$
G_0	3 max. rating I_N min. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$
G_1 [h)]	3 max. rating I_N min. rating $I_{\Delta N}$ 3 min. rating I_N max. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$ 3 min. rating I_N max. rating $I_{\Delta N}$	3 max. rating I_N min. rating $I_{\Delta N}$ 3 min. rating I_N max. rating $I_{\Delta N}$
H			3 [h)] samples of the same rating I_N chosen at random min. rating $I_{\Delta N}$
I			3 [h)] samples of the same rating I_N chosen at random min. rating $I_{\Delta N}$

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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)]
J	3 [h)] samples of the same rating I_N chosen at random min. rating $I_{\Delta N}$

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 and/or 4-pole RCBOs are submitted, this column shall also apply to a set of samples with the smallest number of poles.
c) Also applicable to 2-pole RCBOs with 1 protected pole.
d) Void
e) Also applicable to 4-pole RCBOs with 3 protected poles.
f) This column is omitted when 4-pole RCBOs have been tested.
g) If only one value of $I_{\Delta N}$ is submitted, min. rating $I_{\Delta N}$ and max. rating $I_{\Delta N}$ are replaced by $I_{\Delta N}$.
h) Only the highest number of current poles.
i) For this sequence only the test of 9.9.2 is required.
j) If a 4-pole RCBO with 3 protected poles and a 4-pole RCBO are submitted, then only the 4-pole RCBO is tested,
with exception of the test of 9.8 of test sequence B for which both types are submitted to the test.

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replace table A.5 by:

Table A.5 - Test sequences for RCBOs 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 [f]	4-pole [e]
$D_0 + D_1$	1 max. rating I_N min. rating $I_{\Delta N}$	1 max. rating I_N min. rating $I_{\Delta N}$	1 max. rating I_N min. rating $I_{\Delta N}$
D_0	1 for all other ratings of $I_{\Delta N}$ with max. $I_{\Delta N}$		

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 and/or 4-pole RCBOs are submitted, this column shall also apply to a set of samples with the smallest number of poles.

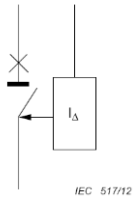
c) Also applicable to 2-pole RCBOs with 1 protected pole.

d) Void

e) Also applicable to 4-pole RCBOs with 3 protected poles.

f) This column is omitted when 4-pole RCBOs have been tested.

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Clause	Requirement + Test	Result - Remark	Verdict
	ANNEX E **SPECIAL REQUIREMENTS FOR AUXILIARY CIRCUITS FOR SAFETY EXTRA-LOW VOLTAGE*)**		--
add: (additional)	*) For auxiliary contact units assembled or to be assembled separately to RCBO, see EN 62019		--
	replace ANNEX F by:		
F	**ANNEX F (INFORMATIVE)** **CO-ORDINATION UNDER SHORT CIRCUIT CONDITIONS BETWEEN A RCBO AND ANOTHER SHORT CIRCUIT PROTECTIVE DEVICE (SCPD) ASSOCIATED IN THE SAME CIRCUIT**		--
	The information given in Annex D of IEC 60898-1:2002 to ensure coordination between circuit-breakers and separate fuses associated in the same circuit may also be applicable to ensure coordination between RCBOs and separate fuses associated in the same circuit.		

IEC62423B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	replace Annex G by:		
G	**ANNEX G** **Additional requirements and tests for RCBOs consisting of a circuit-breaker and a residual current unit designed for assembly on site**		
G.3	*MARKING AND OTHER PRODUCT INFORMATION*		--
G.3.1	*MANUFACTURERS NAME OR TRADEMARK*		--
	Circuit-breaker and r.c.-unit bear the same manufacturers name or trade mark		N/A
G.3.2	*MARKING*		--
G.3.2.1	Marking of the circuit-breaker:		--
	Circuit-breakers comply with IEC 60898		N/A
G.3.2.2	Marking of the r.c.-unit:		--
	R.c.-unit marked with items a), b), c), e), f), n), q) and if necessary l) according to clause 6		N/A
	Addition:		N/A
	- max. rated current of circuit-breaker for assembling		N/A
	- Symbol  		N/A
G.3.2.3	Marking of assembled circuit-breaker and r.c.-unit:		--
	Not visible after assembly on r.c unit:		N/A
	- c)		N/A
	- max. rated current of circuit-breaker for assembling		N/A
	visible after assembly:		N/A
	- l) if applicable		N/A
G.3.3	*INSTRUCTIONS FOR ASSEMBLY AND OPERATION*		--
	Adequate instructions with the r.c. -unit provided		N/A
	Instructions shall cover at least:		N/A
	- reference to type(s) and catalogue-no, covering current and voltage ratings, number of poles, of circuit breakers for assembling		N/A
	- checking of operation		N/A

IEC62423B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	- verification of tripping operation by use of test button		N/A
G.4	Constructional requirements		--
G.4.1	*GENERAL*		--
	possible to assemble the RCBO on site only		N/A
	device may be disassembled on site in accordance with the manufacturer's instructions		N/A
	For devices declared not suitable for disassembling, the disassembly shall leave permanent visible damage.		N/A
	Compliance is checked according to G.5.4		N/A
G.4.2	*DEGREE OF PROTECTION*		--
	Degree of protection of r.c.-unit not less than of circuit-breaker for assembling		N/A
G.4.3	*MECHANICAL REQUIREMENTS*		--
	Design is such as to prevent incorrect assembly		N/A
	No loose parts for coupling the tripping mechanisms		N/A
	Fixing means are captive		N/A
G.4.4	*ELECTRICAL COMPATIBILITY*		--
	Not possible to assemble a circuit-breaker with a r.c.-unit		N/A
	- of lower rated voltage		N/A
	- of lower max. current		N/A
	Terminals of r.c.-unit able to clamp nominal cross-sections acc. to table IV of IEC 898 for rated currents of circuit-breakers to be assembled		N/A
	I_N (A) ..... :	A	N/A
	Cross section (mm²) ..... :	to mm²	N/A
	Electrical interconnections form part of the r.c.-unit		N/A
	Not possible to assemble a circuit-breaker with given rated short circuit capacity with a r.c.-unit such as to result in a lower short circuit performance		N/A
	Compliance is checked by inspection and manual test.		N/A
G.5	TYPE TESTS AND VERIFICATIONS		--
G.5.2	*TEST ON R.C.-UNITS*		--
	According to table 10:		N/A
	- 9.3 / 9.4 / 9.5/		N/A

IEC62423B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	- 9.14 / 9.15		N/A
G.5.3	*TESTS ON ASSEMBLED CIRCUIT-BREAKER AND R.C.-UNIT (RCBO)*		--
	According to table 10 except:		N/A
	- 9.3 / 9.5 / 9.9.2.3 / 9.14 / 9.15 do not apply		N/A
	- 9.4 made on interconnections		N/A
	- 9.12 applies except of 9.12.11.3 unless I_{cn} = 1500 A and of 9.12.11.4 b)		N/A
	- Conventional non-tripping current 1,13 I_n replaced everywhere by I_n		N/A
G.5.4	VERIFICATION OF MARKING AND CONSTRUCTIONAL REQUIREMENTS OF RCBOS		
	Compliance with the requirements of G.3.1, G.3.2, G.3.3, G.4.1, G.4.2, G.4.3 and G.4.4 shall be checked by inspection and manual test, as applicable.		N/A
	For devices declared suitable to be disassembled, compliance with the requirements of G.4.1 is checked by the following test to be performed at the beginning of test sequence D0 in Table A.1.		N/A
	number of samples acc. D0+D1 in Table A.3.		N/A
	The r.c. unit and compatible circuit-breakers as declared by the manufacturer have to be assembled and disassembled five times. The r.c. unit and the compatible circuit breaker are then reassembled and used for the test of test sequence D0. After each assembly the correct operation of the combination shall be verified by using the test button. The RCBO shall trip each time.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

ZB	**ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)**		
Germany	The use of RCBOs of type AC is not permitted		
Netherlands			
3.2	**Residual current devices for which tripping is ensured as for type A according to EN 61008-1 or EN 61009-1, as applicable, and in addition for the following residual currents:**		
3.2.1	Type B residual current devices 3 or 4 poles		N/A
3.2.2	Type B residual current device 2 poles		N/A
9.1.7	**Verification of the correct operation of 2 pole type B RCDs in case of residual direct currents when protecting a single phase inverter circuit connected to the supply**		
	RCD connected as in Figure 1		N/A
9.1.7.1	**Slowly rising residual pulsating current**		
	Circuit connected to the line terminals, RCD and test switch S1 closed		N/A
	I1 and I2 = 0,2*IΔ2		N/A
	I1 increased to 0,3 times the value of the IΔ smooth for IΔ2 followed by increasing the half wave pulsating I2 to 0,3 times the value given for IΔ2		N/A
	Subsequently currents increased to 0,4 – 0,5 – 0,6 etc. of the IΔ2 value		N/A
	RCD no trip before the current reaches the IΔ1 value and trip before the current exceeds the IΔ2	D1 – D2 – D3 -	N/A
9.1.7.2	**Suddenly appearing residual pulsating current**		
	Calibration of the circuit		N/A
	S is first closed, S1 then closed and IΔ flow		N/A
	Break time is measured	D1 – D2 – D3 -	N/A
9.3	2 pole B type trip within 0,3 s with the composite residual test current IΔ2	D1 – D2 – D3 -	N/A
	3 and 4 pole B type trip with 2,5 IΔn with smooth direct current	D1 – D2 – D3 -	N/A

IEC62423B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

ZC	**ANNEX ZC, NATIONAL DEVIATIONS (EN)**	N/A
Austria	Table Z1 is not valid in Austria	N/A

ZD	**ANNEX ZD**	
	Classification of RCBOs Type B and C up to and including 63A into energy limiting classes	
	RCBOs of B-type and C-type up to and including 63A, shall be classified into energy limiting classes 1 or 3 in accordance with tables ZD.1 or ZD.2, as applicable, and be marked with the number of the energy limiting class in a square adjoining the symbol given in t) of clause 6. This classification shall not be applied to RCBOs type D and to RCBOs with rated current higher than 63A.	P
	Table ZD.1 - Permissible I^2t (let-through) values for RCBOs type B with rated current up to and including 63A	P

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

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

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

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

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Clause	Requirement + Test	Result - Remark	Verdict

ZE	**ANNEX ZE** **Particular requirements for RCBOs with screwless type terminals for external copper conductors**		
	Annex ZE is identical with annex J of IEC 61009-1:2012 (Edition 3.1) except numbering of subclauses and:		
ZE.6 *replace:*	*MARKING AND OTHER PRODUCT INFORMATION*		--
	In addition to Clause 6, the following requirements apply:		N/A
	An appropriate marking indicating the length of insulation to be removed before insertion of the conductor into the terminal shall be shown on the RCBO.		N/A
	The manufacturer shall also provide information, in his literature, on the maximum number of conductors which may be clamped.		N/A

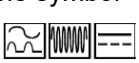
ZF	**ANNEX ZF** **Particular requirements for RCBOs with flat quick-connect terminations**	
	Annex ZF is identical with annex K of IEC 61009-1:2012 (Edition 3.1) except ***NUMBERING OF SUBCLAUSES***	--

IEC62423B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

Table Z3 – Requirements for marking

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

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Clause	Requirement + Test	Result - Remark	Verdict

		Marking on the RCBO itself			Product information in the catalogue
r)	Wiring diagram unless the correct mode of operation is evident		X	X	
s)	- RCBOs of type F with the symbol  or - RCBOs of type B with the symbol  or 	X	X		
t)	Energy limiting class (e.g. 3) in a square in accordance with Annex ZD if applied (***)		X *)		
u)	RCBOs according to 4 Z1 marked with the symbol (snowflake enclosing -25)		X		
v)	Indication of the terminal for the neutral with "N"		X		
w)	Additional marking of performance to other standards or additional requirements according to 6.Z2		X		

*) I_{cn} and the energy limiting class, if applied, shall be on the device and combined together
**) It is recommended to advise the user to test the device regularly
***) If annex ZD is not applicable to the device, I^2t characteristics shall be available on request

AS/NZS 61009.1			
Clause	Requirement + Test	Result - Remark	Verdict

	APPENDIX ZZ	
	AS/NZS 61009.1-2015 VARIATIONS TO IEC 61009-1 ED.3.3 (2013) FOR APPLICATION IN AUSTRALIA AND NEW ZEALAND	

ZZ1	INTRODUCTION		--
	This Appendix provides variations between this Standard and IEC 61009-1, Ed. 3.2 (2013). These variations form the Australian/New Zealand variations for the purposes of the IECEE CB Scheme for recognition of testing to standards for safety of electrical equipment and will be published in the IECEE CB bulletin.		--
ZZ2	VARIATIONS		--
	Introduction		--
	Delete existing text and replace following:		--
	This part includes definitions, requirements and tests covering all types of RCBOs.		
3.3	Add the following definition		--
3.3.23	RCBO type 1		--
	A type A RCBO with a maximum rated residual current of ≤ 0,01 A which complies with the requirements for type 1 in Table 2.1 and Table 3.1.		N/A
4.4	Delete Clause 4.4 and replace with the following:		--
	According to the possibility of adjusting the residual operating current – RCBO with a single value of rated residual operating current	RCBO with a single value of rated residual operating current	P
5.2.3	Delete Clause 5.2.3 and replace with the following:		
	Rated residual operating current ($I_{\Delta n}$)		--
	The value of residual operating current (see 3.2.4), assigned to the RCBO by the manufacturer, at which the RCBO shall operate under specified conditions.		P
	RCBOs shall have a single fixed value of rated residual operating current.		P
5.3.1	After the Note insert the following:		--
	The marking of the rated voltage, or rated voltage range, of single phase circuit breakers shall cover 240 V for Australia and 230 V for New Zealand, and for multiphase circuit-breakers, 415 V for Australia and 400 V for New Zealand.	240V~(1P+N), 415V~(3P+N) for Australia and 230V~(1P+N), 400V~(3P+N) for New Zealand.	P
5.3.3	RCBOs with a rated residual current of ≤0,01A shall be type 1 and comply with type 1 and type A characteristics requirements in Table 2.1 and Table 3.1.		N/A
	Exception - If an RCBO with a rated residual current of ≤ 0,01A is not type 1, but is of the 'general' type in Table 2 and Table 3, then it shall be marked in accordance with 6(f).		N/A

AS/NZS 61009.1			
Clause	Requirement + Test	Result - Remark	Verdict

Table 2	Add the following new Table 2										--
	Table 2 – Limiting values of break time and non-actuating time(s) for type AC and A RCBOs alternating residual currents (r.m.s. values)										--
	Limiting values of break time and non-actuating time(s) for type AC and A RCBOs in event of alternating residual currents (r.m.s. values) equal to										--
	Type	I_N A	$I_{\Delta N}$ A	$I_{\Delta N}$	2 $I_{\Delta N}$	5 $I_{\Delta N}$	5 $I_{\Delta N}$ or 0,25A **a)**	5A-200A, 500A **b)**	$I_{\Delta t}$ **c)**		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Maximum break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S		>0,03	0,5	0,2	0,15	--	0,15	0,15	Maximum non-actuating times	--
			>0,03	0,13	0,06	0,05	--	0,04	0,04		--
	a) value to be decided by the manufacturer for this test.										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but In any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--
	c) The test is made with a current IΔt equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.2(e) and 9.9.1.2(f) (2) the current IΔt is established so that the vector sum IΔt + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.										--
Table 2.1	Add the following new Table 2.1										--
	Table 2.1 – Limiting values of break time(s) RCBOs alternating residual currents (r.m.s. values) for type 1 RCBO										--
	Limiting values of break time and non-actuating time(s) for type 1 RCBOs in event of alternating residual currents (r.m.s. values) equal to										--
	Type	I_N A	$I_{\Delta N}$ A	$I_{\Delta N}$	2 $I_{\Delta N}$	5 $I_{\Delta N}$	5 $I_{\Delta N}$ or 0,25A **a)**	5A-200A, 500A **b)**	$I_{\Delta t}$ **c)**		--
	General	Any value	≤0,01	0,04	0,04	--	0,04	0,04	0,04	Maximum break times	--
	a) value to be decided by the manufacturer for this test.										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but In any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--
	c) The test is made with a current IΔt equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.2(e) and 9.9.1.2(f) (2) the current IΔt is established so that the vector sum IΔt + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.										--
Table 3	Add the following new Table 3.1.										--
	Table 3.1 – Maximum values of break time for half-wave pulsating residual currents (r.m.s. values) for type 1 RCBOs										--

AS/NZS 61009.1			
Clause	Requirement + Test	Result - Remark	Verdict

	Maximum values of break time(s) for type 1 RCCBs in event of half-wave pulsating residual currents (r.m.s. values) equal to											--
	Type	In	IΔn	1,4IΔn	2 IΔn	2,8 IΔn	4 IΔn	7 IΔn	0,35A	0,5A	350A[a]	--
	1	Any	≤ 0,01		0,04		0,04			0,04	0,04	--
	a This value shall be limited to the lower limits of the overcurrent installation tripping ranges according to type B, C or D, as applicable.											--
6	Delete item a) and replace with the following:											--
a)	name, registered trade name, or mark of the manufacturer, or of the responsible vendor;							PROJOY				P
c)	Add the following Note after item c):											--
	NOTE Refer to 5.3.1 for specific requirements.											--
f)	Add the following sentence to item f):											--
	If an RCBO has a rating of ≤ 0,01A and is of the general type, and not Type 1, it shall be marked as 'GENERAL TYPE, NOT FOR PATIENT AREAS'.											N/A
g)	Delete item g).											--
8.1.1	General											
	The residual current detection and the residual current release shall be located between the incoming and outgoing terminals of the RCBO.											P
	RCBOs shall have a single fixed value of rated residual operating current.											P
	It shall not be possible to disable or inhibit the RCBO function by any means.											P
8.1.4.4	Add the following new last paragraph:											--
	Compliance is checked by inspection and, if necessary, by chemical analysis.											P
8.11	Add the following Note to paragraph 5:											--
	NOTE 1: Verification of the protective conductor for a live voltage is by inspection of the RCCB circuit diagram and in case of doubt a test of the voltage on any connection to a PE.											--
	Add the following Note to paragraph 6:											--
	NOTE 2: Verification of load side for energization is by inspection of the RCCB circuit diagram, and in case of doubt a test of the voltage on the load terminals.											--
9.9.1.2	Delete Item d) and replace with the following:											--
	d) Verification of the correct operation in case of sudden appearance of residual currents between 5 IΔn and 500 A											--

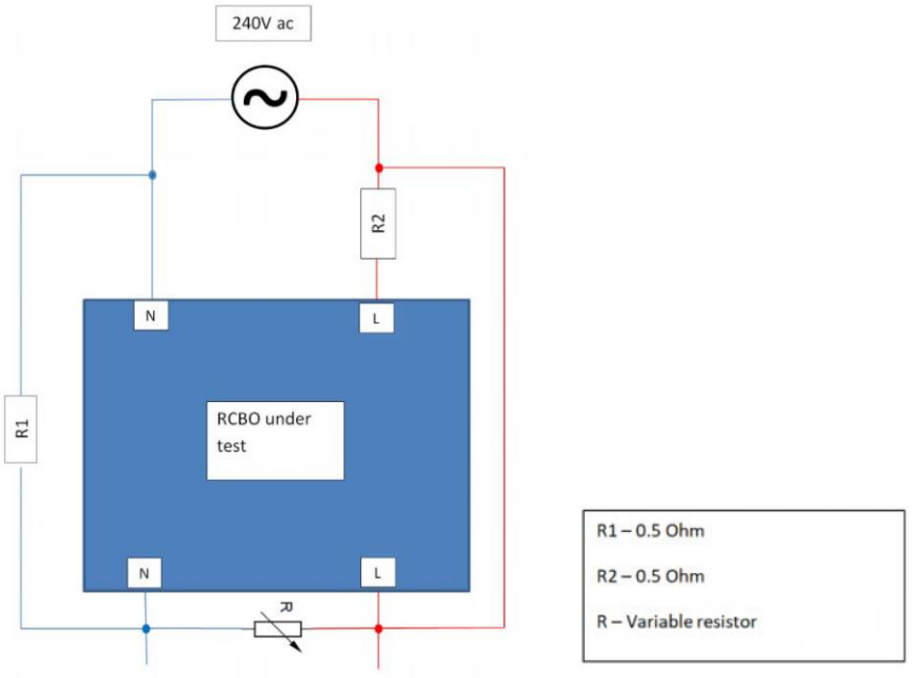
AS/NZS 61009.1			
Clause	Requirement + Test	Result - Remark	Verdict
	The test circuit is calibrated successively to the following values of the residual current 5 A, 10 A, 20 A, 50 A, 100 A, 200 A and 500 A in the closed position, the residual current is suddenly established by closing the test switch S2.		P
	The RCBO shall trip during each test. The break time shall not exceed the times given in Tables 2 and 2.1.		P
	The test is made once for each value of residual current on one pole only, taken at random.		P
9.22.1.3 b)	Replace the existing item 1) with the following:		--
	1) The RCBO in the closed position, mounted, wired and energised as for normal use, is introduced into the chamber.		P
	Note: it is permissible to energy only those parts required for the operation of the RCD.		--
D2	Delete existing text and replace with the following:		--
D2.1	Verification of residual current operation		--
	A residual current is passed through each pole of the RCBO in turn. The RCBO shall not trip at a current less than or equal to 0.5IΔn, but it shall trip at IΔn within a specified time (see Tables 2 and 2.1).		N/A
	The test current shall be applied at least five times to each RCBO and shall be applied at least twice to each pole.		N/A
D2.2	Verification of the time-current characteristic		--
	A current of any convenient value between the conventional tripping current in Table 10 [test b)] and the lower value of the range of instantaneous tripping of Table 10 (row d) (according to the tripping characteristic of the circuit-breaker: B, C or D) is passed separately through each protected pole, starting from cold.		P
	The RCBO shall trip within a time corresponding to a point, selected by the manufacturer, situated between the limiting times of the tripping characteristic.		P
D2.3	Verification of the instantaneous tripping		--
	Each RCBO shall perform the tests of instantaneous tripping of 9.9.2.2, at the upper value of the test current, according to the type: B (5In), C (10In) or D (20In) as shown in Table 10 [test e)].		P
	The test is carried out once on each protected pole at any convenient voltage.		P

AS/NZS 61009.1			
Clause	Requirement + Test	Result - Remark	Verdict
	The RCBO shall trip in a time less than the limit in Table 10 (0.1 s).		P
	AS/NZS 61009.1-2015 **Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs), Part 1: General rules** **(IEC 61009-1, Ed. 3.2 (2013) MOD)**		--
	Summary This Amendment applies to the following element: Clause ZZ2		--
	Amendment Details AS/NZS 61009.1:2015 is amended as follows. The amendments should be inserted in the locations as instructed.		--
ZZ2	1. After modification to Introduction, add the following:		--
Cl 1	1. Delete NOTE 8		--
	2. After the last paragraph, add the following: For portable RCBOs, refer to AS/NZS 3190. This standard only applies to RCBOs for fixed installation and fixed wiring		P
	2. Delete modification to Clause 5.3.1 and replace with the following:		--
Cl 5.3.1	After the Note, add the following: The marking of the rated voltage for single-phase RCBOs shall be 110V or 230V or 240V or 230/240V. The marking of the rated voltage for multi-phase RCBOs shall be 190V or 400V or 415V or 400/415V		P
	3. After modification 4 of Clause 6, add the following:		--
	5. After the last paragraph of Clause 6, add the following: For RCBOs that have a rated voltage marking of 110V or 190V, the following statement shall be included in the manufacturer's literature: "This device is for use in speciality applications such as mining. It is not intended to be used in domestic installations."		N/A
	4. After modification to Clause 9.9.1.2, add the following:		--
Cl 9.9.1.4	After the first sentence, add the following: For test purposes:		--
	(a) For single phase RCBOs, if marked with a rated voltage of “230V”, “240V” or “230/240V” test - (i) at 0,8 x 230V; and (ii) at 1,1 x 240V		P
	(b) For multi-phase RCBOs, if marked with a rated voltage of “400V”, “415V” or “400/415V” test - (i) at 0,8 x 400V; and (ii) at 1,1 x 415V		P

AS/NZS 61009.1			
Clause	Requirement + Test	Result - Remark	Verdict
	(c) If marked with voltages other than the above, then test - (i) at 0,8 x the lowest marked voltage; and (ii) at 1,1 x the highest marked voltage		N/A

AS/NZS 61009.1			
Clause	Requirement + Test	Result - Remark	Verdict

	ADDITIONAL TESTING AND VERIFICATION REQUIREMENTS FOR RCBOS - ESV RCBO VERSION 4.0 - 1 JULY 2019	--

Testing	RCBOs are classified as level 3 in-scope electrical equipment and are required to be certified and registered before they are offered for supply. In addition to these requirements the following tests shall also be conducted and the results verified.	
Test Setup	In the circuit diagram below resistor values R1 and R2 is 0.5 ohm each and need to be of the appropriate power rating so that they are not damaged during the testing. The variable resistor R value range is selected so that adequate residual current is passed through the circuit to trip the RCBO under test.	P
Test Method		P
1	The RCBO in the closed position is to be set up as per the circuit diagram below to have 240V applied on both L and N terminals. The link between the terminals shall be as short as practicable. The variable resistor R value is reduced so that adequate residual current is passed through the circuit until the RCBO trips. This current is applied for 60 seconds.	P
2	If the RCBO can be reset, the RCBO is setup as per test (1), however the variable resistor is disconnected from the circuit. The RCBO is closed and the test button is pressed and released.	P
3	If the RCBO can be reset, step 2 is repeated but the test button is held down for 10 seconds.	P
4	If the RCBO trips then step 2 is repeated.	P
	Test circuit diagram: 	--

AS/NZS 61009.1			
Clause	Requirement + Test	Result - Remark	Verdict

Verification requirements	After these tests a verification of the operating characteristics under residual current conditions of the RCBOs is to be performed by the test set out in clause 9.9.1.2 a), of AS/NZS 61009:2015. The RCBO is required to comply with clause 9.9.1.2 a), of AS/NZS 61009:2015, any damage to the test button or its circuits is ignored.				P
9.9.1.2 a)	Verification of correct operation in case of a steady increase of residual current: **- 1 sample: D63, I∆n= 0,03A, 1P+N**				--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s Tripping current between	[mA]	[mA]	[mA]	--
	Us= 184V	23,0	22,7	22,5	P
		22,7	22,8		
	Us= 264V	23,3	22,8	23,2	P
		22,9	22,8		
	All five measured values shall be situated between $I_{\Delta N0}$ and $I_{\Delta N}$				P
9.9.1.2 a)	Verification of correct operation in case of a steady increase of residual current: **- 1 sample: D63, I∆n= 0,03A, 3P+N**				--
	- Steady increase from 0,2 $I_{\Delta N}$ to $I_{\Delta N}$ within 30s Tripping current between	[mA]	[mA]	[mA]	--
	Us= 320V	24,5	24,1	24,0	P
		24,1	24,4		
	Us= 457V	23,8	24,2	24,2	P
		23,9	24,0		
	All five measured values shall be situated between $I_{\Delta N0}$ and $I_{\Delta N}$				P

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Clause	Requirement + Test	Result - Remark	Verdict

	TEST SEQUENCE "D": **3 samples: D63, $I_{\Delta n}$= 0,03A, 1P+N**					**D13**	**D14**	**D15**			--
	Tests D_0										--
8	REQUIREMENTS FOR CONSTRUCTION AND OPERATION										--
8.5	Operating characteristics										
9.9	Verification of the operating characteristic										
9.9.1	RCBO installed as for normal use, test circuit according to figure 4										P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting										N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.					50/60Hz					P
	Tests performed with no load at 20 ± 5°C					21°C					P
9.9.1.4	For RCBOs functionally dependent on line voltage each test is made at:										
	- 1,1 U_N (V) and.....:					264V					P
	- 0,85 U_N (V).....:					195V					P
Table 1	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, 500A **b)**	$I_{\Delta t}$ **c)**		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--
	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.										--

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Clause	Requirement + Test	Result - Remark	Verdict

	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.				--
9.9.2.1 addition acc. IEC 62955	Verification of the correct operation in case of a steady increase of smooth DC residual current:				
	Off-load tests made at a temperature of 20 ± 5°C	20,7°C			--
	- Steady increase from 2mA to 6mA DC within 30s(mA).....:	[mA]	[mA]	[mA]	--
	- tripping current between 3 mA and 6 mA DC (mA).....:	4,4	4,3	4,3	P
9.9.2.2	Verification of the correct operation at closing on residual current				P
	maximum break time at:	[ms]	[ms]	[ms]	--
	- the RCCB closes on $I_{\Delta N}$: no value exceeds the specified limiting value of Table 1 (ms).....	49	48	47	P
9.9.2.3 addition acc. IEC 62955	The test circuit being successively calibrated at each of the values of residual current specified in Table 1, the test switch S_2 and the RDC-DD being in the closed position, the test voltage is suddenly established by closing the test switch S_1				
	- maximum break time (ms) at: 6mA DC	49	47	47	P
	- maximum break time (ms) at: 60mA DC	18	18	18	P
	- maximum break time (ms) at: 200mA DC	10	9	9	P
	No value exceeds the relevant specified limiting value				P
9.9.2.5 addition acc. IEC 62955	a) Tests repeated at a temperature of -5°C	Tested at -25°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				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- maximum break time (ms) at: 6mA DC	47	46	46	P
	- maximum break time (ms) at: 60mA DC	18	18	19	P
	- maximum break time (ms) at: 200mA DC	9	9	10	N/A
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--

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Clause	Requirement + Test	Result - Remark			Verdict
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.2.4 addition acc. IEC 62955	Tests repeated, with the pole under test and one other pole of the RCBO loaded with rated current, current being established shortly before the test.	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	- the RDC-DD closes on 6 mA DC: no value exceeds the specified limiting value of Table 1 (ms) ..... :	46	47	47	P
	-no value exceeds the specified limiting value				P
	the test switch S2 and the RDC-DD being in the closed position, the test voltage is suddenly established by closing the test switch S1:				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- maximum break time (ms) at: 6mA DC	46	47	47	P
	- maximum break time (ms) at: 60mA DC	19	19	19	P
	- maximum break time (ms) at: 200mA DC	10	10	10	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.2.5	b) Tests repeated with the RCCB loaded with rated current:				

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Clause	Requirement + Test	Result - Remark	Verdict

	Tests repeated with the RCBO loaded with rated current I_N at +40°C until steady-state conditions are reached	I_N = 63A, tested at +55°C			P
	Cross-section (mm²).....:	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- maximum break time (ms) at: 6mA DC.....	46	46	46	P
	- maximum break time (ms) at: 60mA DC.....	19	19	18	P
	- maximum break time (ms) at: 200mA DC.....	9	9	10	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
(9.9.2.6) addition acc. IEC 62955	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from two phases				
	Test acc. figure 4				
	Test switch S_1 and S_2 and RDC-DD in closed position				P
	Residual pulsating direct current:				P
	For RCBOs functionally dependent on line voltage each test is made at	195V/264V			
	- steady increase from max. 2 mA to 7 mA DC within 30 s (mA) ..... . :	[mA]	[mA]	[mA]	P
	- tripping current between 3.5 mA and 7 mA DC ...I:	4,6	4,7	4,7	P
	- tripping current between 3.5 mA and 7 mA DC ...II:	5,6	5,8	5,6	P
b)	The test circuit being successively calibrated at current values of 60 mA and 200 mA, the test switch S_1 and the RDC-DD being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I and II				

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Clause	Requirement + Test	Result - Remark	Verdict

	RDC-DD connected at two-line terminals chosen at random				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- maximum break time (ms) at: 60mA DC..... I	25	24	23	P
	- maximum break time (ms) at: 200mA DC..... II	8	8	8	P
	- maximum break time (ms) at: 60mA DC..... I	23	24	23	P
	- maximum break time (ms) at: 200mA DC..... II	4	4	4	P
	No value exceeds the relevant specified limiting values				P

	TEST SEQUENCE "D": **3 samples: D63, $I_{\Delta n}$= 0,03A, 3P+N**					**D16**	**D17**	**D18**			--
	Tests D_0										--
8	REQUIREMENTS FOR CONSTRUCTION AND OPERATION										--
8.5	Operating characteristics										
9.9	Verification of the operating characteristic										
9.9.1	RCBO installed as for normal use, test circuit according to figure 4										P
	For multiple settings of $I_{\Delta N}$ tests are made for each setting										N/A
	RCBOs with more than one rated frequency, tests at the lowest and highest frequency, except for test in 9.9.1.2 e), test at only one frequency.					50/60Hz					P
	Tests performed with no load at 20 ± 5°C					21°C					P
9.9.1.4	For RCBOs functionally dependent on line voltage each test is made at:										
	- 1,1 U_N (V) and..... :					457V					P
	- 0,85 U_N (V)..... :					340V					P
Table 1	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, 500A **b)**	$I_{\Delta t}$ **c)**		--
	General	Any value	<0,03	0,3	0,15	--	0,04	0,04	0,04	Max. break times	--
			0,03	0,3	0,15	--	0,04	0,04	0,04		--
			>0,03	0,3	0,15	0,04	--	0,04	0,04		--
	S	≥ 25	>0,03	0,5	0,2	0,15	--	0,15	0,15	Max. break times	--
				0,13	0,06	0,05	--	0,04	0,04	Min. non-actuating times	--
	a) value to be decided by the manufacturer for this test										--

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Clause	Requirement + Test	Result - Remark	Verdict

	b) The test are only made during verification of the correct operation as mentioned in 9.9.1.2 d) but in any case values exceeding the lower limit of the overcurrent instantaneous tripping range are not tested.				--
	c) The test is made with a current $I_{\Delta t}$ equal to the lower limit of the overcurrent instantaneous tripping range according to type B, C or D, as applicable. For the tests of 9.9.1.3 and 9.9.1.4 b), the current $I_{\Delta t}$ is established so that the vector sum $I_{\Delta t}$ + In is equal to the lower limit of the overcurrent instantaneous tripping range, according to type B, C or D, as applicable.				--
9.9.2	Off-load tests made at a temperature of 20 ± 5°C	20,7°C			
9.9.2.1 addition acc. IEC 62955	Verification of the correct operation in case of a steady increase of smooth DC residual current:				
	- Steady increase from 2mA to 6mA DC within 30s(mA).....:	[mA]	[mA]	[mA]	--
	- tripping current between 3 mA and 6 mA DC (mA).....:	4,9	4,8	4,5	P
9.9.2.2	Verification of the correct operation at closing on residual current				P
	maximum break time at:	[ms]	[ms]	[ms]	--
	- the RCCB closes on $I_{\Delta N}$: no value exceeds the specified limiting value of Table 1 (ms).....	53	52	52	P
9.9.2.3 addition acc. IEC 62955	The test circuit being successively calibrated at each of the values of residual current specified in Table 2, the test switch S_2 and the RDC-DD being in the closed position, the test voltage is suddenly established by closing the test switch S_1				
	- maximum break time (ms) at: 6mA DC	53	53	53	P
	- maximum break time (ms) at: 60mA DC	21	21	21	P
	- maximum break time (ms) at: 200mA DC	10	9	11	P
	No value exceeds the relevant specified limiting value				P
9.9.2.5 addition acc. IEC 62955	a) Tests repeated at a temperature of -5°C	Tested at -25°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				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- maximum break time (ms) at: 6mA DC	53	56	56	P
	- maximum break time (ms) at: 60mA DC	21	21	21	P
	- maximum break time (ms) at: 200mA DC	10	10	10	N/A

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Clause	Requirement + Test	Result - Remark	Verdict

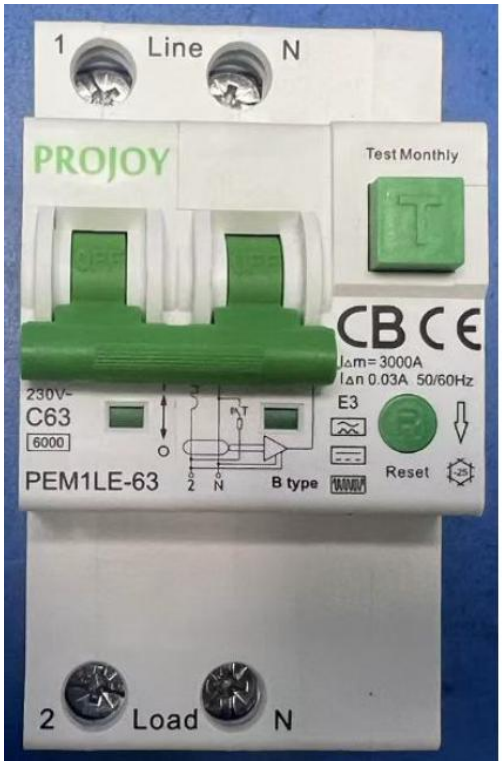
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.2.4 addition acc. IEC 62955	Tests repeated, with the pole under test and one other pole of the RCBO loaded with rated current, current being established shortly before the test.	I_N = 63A			P
	Cross-section (mm²)..... :	16mm²			--
	Verification of the correct operation at closing on residual current (S_1 and S_2 closed) :	[ms]	[ms]	[ms]	--
	- the RDC-DD closes on 6 mA DC: no value exceeds the specified limiting value of Table 2 (ms) ..... :	52	52	53	P
	-no value exceeds the specified limiting value				P
	the test switch S2 and the RDC-DD being in the closed position, the test voltage is suddenly established by closing the test switch S1:				
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- maximum break time (ms) at: 6mA DC	52	53	53	P
	- maximum break time (ms) at: 60mA DC	21	21	22	P
	- maximum break time (ms) at: 200mA DC	10	10	10	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A

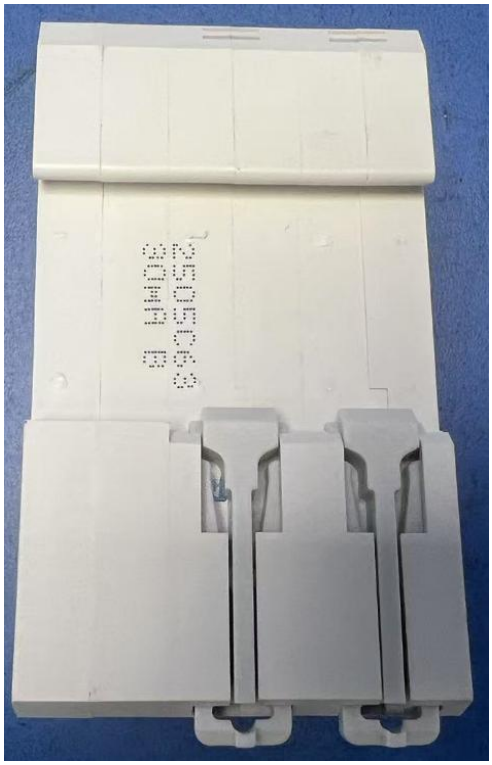
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Clause	Requirement + Test	Result - Remark	Verdict

	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.2.5	b) Tests repeated with the RCCB loaded with rated current:				
	Tests repeated with the RCBO loaded with rated current I_N at +40°C until steady-state conditions are reached	I_N = 63A, tested at +55°C			P
	Cross-section (mm²).....:	16mm²			--
	Verification of the correct operation in case of sudden appearance of residual current by closing S_1, (S_2 and RCBO in closed position):				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- maximum break time (ms) at: 6mA DC.....	53	52	54	P
	- maximum break time (ms) at: 60mA DC.....	22	22	21	P
	- maximum break time (ms) at: 200mA DC.....	10	10	10	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				
	Minimum non-actuating time at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ ..... 0,13 s	-	-	-	N/A
	- 2 $I_{\Delta N}$ ..... 0,06 s	-	-	-	N/A
	- 5 $I_{\Delta N}$ ..... 0,05 s	-	-	-	N/A
	- $I_{\Delta t}$ ..... 0,04 s	-	-	-	N/A
	The test switch S_1 and the RCBO being in the closed position, the test voltage is suddenly established by closing the test switch S_2 for min. non-operating times acc. table 2				N/A
	No tripping during tests				N/A
9.9.2.7 addition acc. IEC 62955	Verification of the correct operation in case of a residual direct currents which may result from rectifying circuits supplied from three phases				
	Test acc. figure 5				
	Test switch S_1 and S_2 and RDC-DD in closed position				P
	Residual pulsating direct current:				P
	For RCBOs functionally dependent on line voltage each test is made at	340V/457V			
	- steady increase from max. 2 mA to 7 mA DC within 30 s (mA) ..... . :	[mA]	[mA]	[mA]	P

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Clause	Requirement + Test	Result - Remark			Verdict
	- tripping current between 3.5 mA and 7 mA DC ...I:	5,7	5,7	5,8	P
	- tripping current between 3.5 mA and 7 mA DC ...II:	4,1	3,9	3,8	P
b)	The test circuit being successively calibrated at current values of 60 mA and 200 mA, the test switch S_1 and the RDC-DD being in the closed position, residual current suddenly establish by closing test switch S_2, S_3 in position I and II				
	RDC-DD connected at two-line terminals chosen at random				--
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- maximum break time (ms) at: 60mA DC..... I	26	26	26	P
	- maximum break time (ms) at: 200mA DC..... II	10	10	10	P
	- maximum break time (ms) at: 60mA DC..... I	31	32	33	P
	- maximum break time (ms) at: 200mA DC..... II	9	9	9	P
	No value exceeds the relevant specified limiting values				P

Photos of sample: 1P+N, PEM1LE-63, 6kA





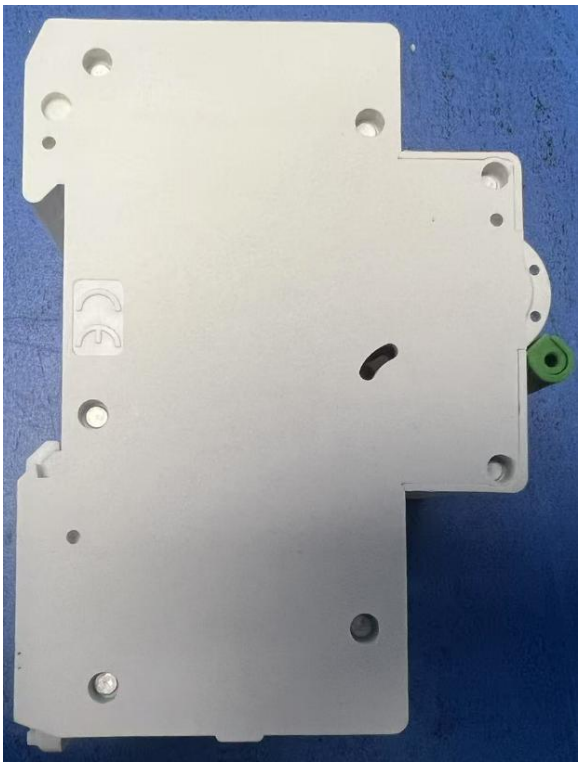
Photos of sample: 1P+N, PEM1LE-63, 6kA



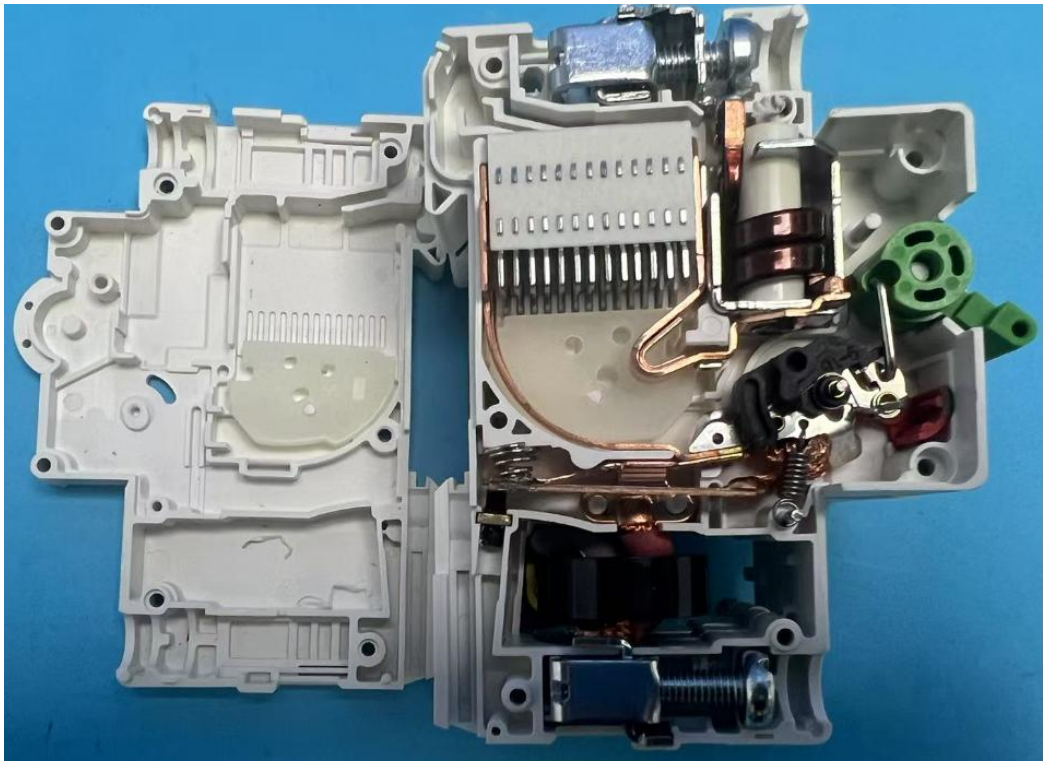


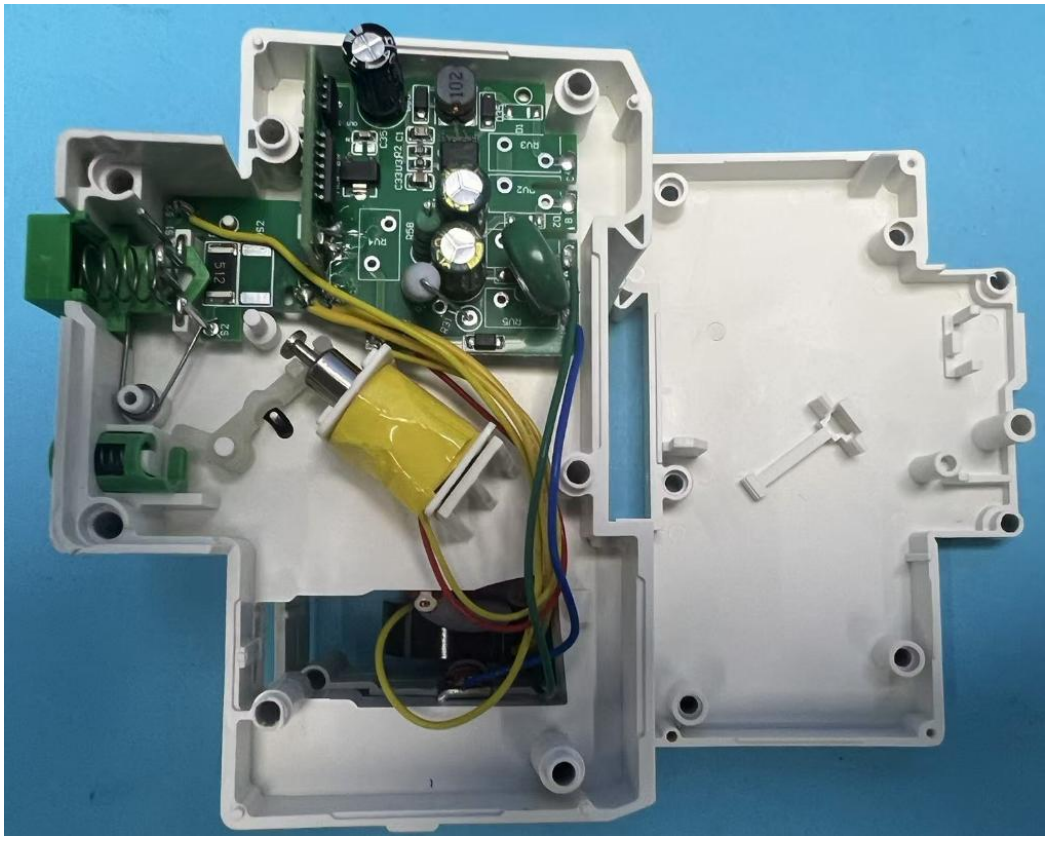
Photos of sample: 1P+N, PEM1LE-63, 6kA



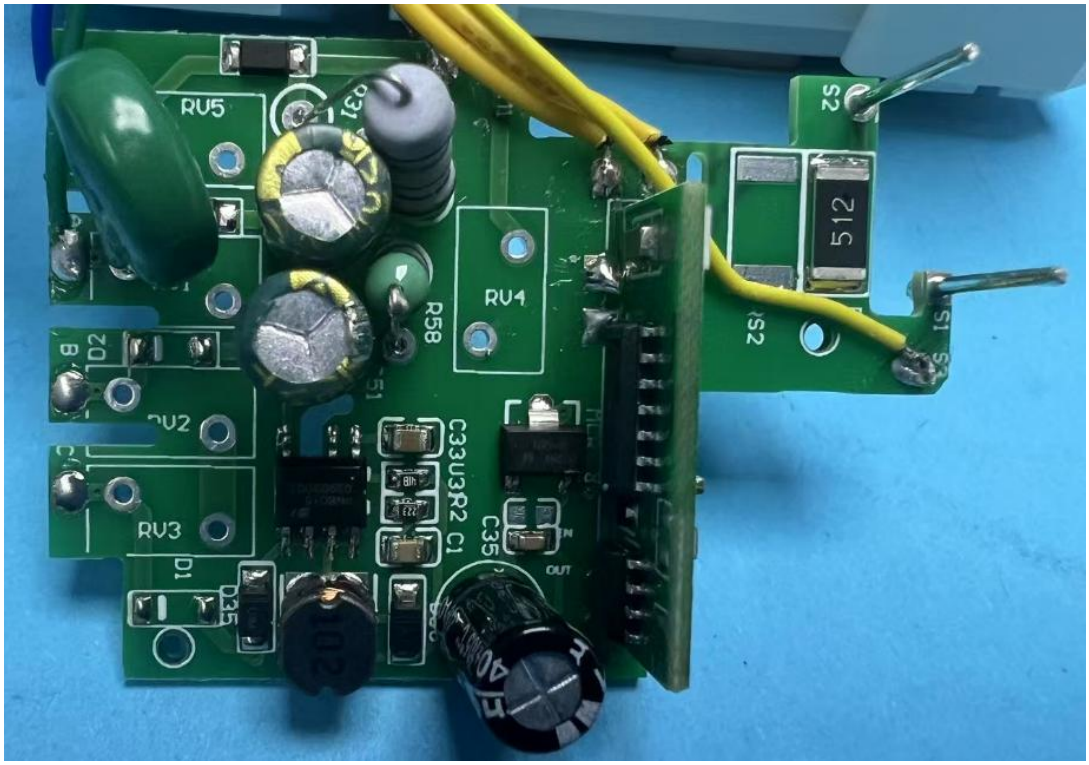


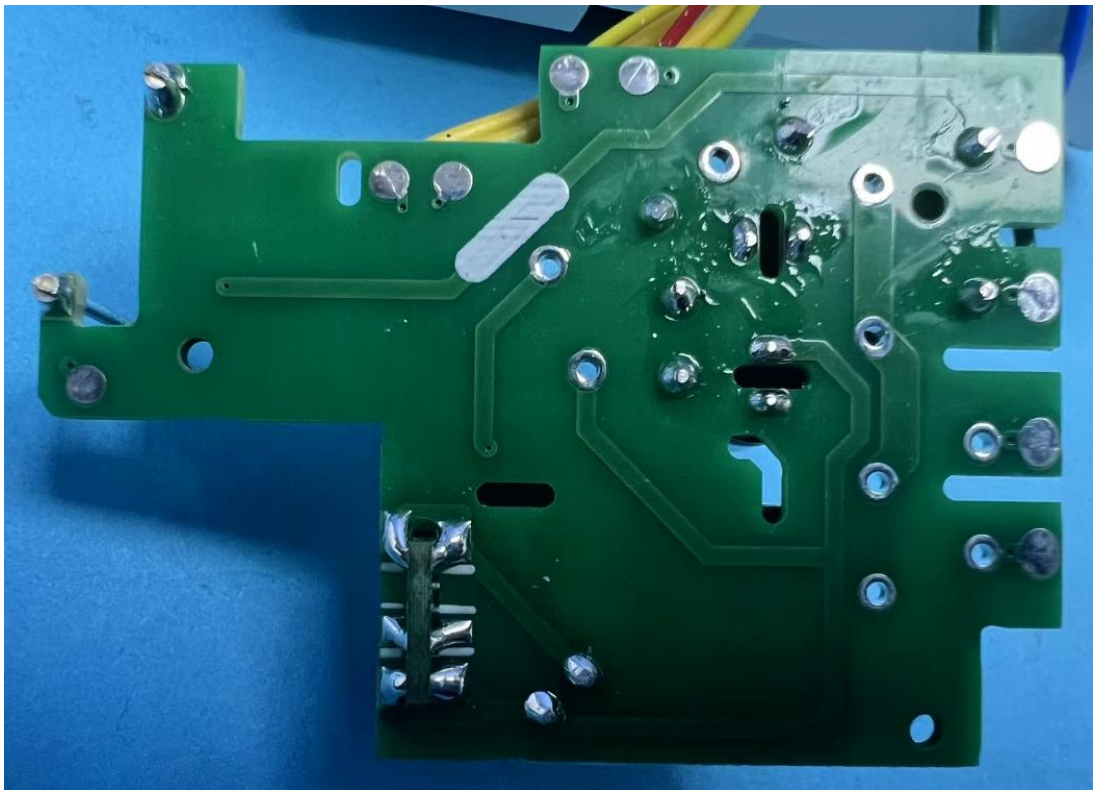
Photos of sample: 1P+N, PEM1LE-63, 6kA



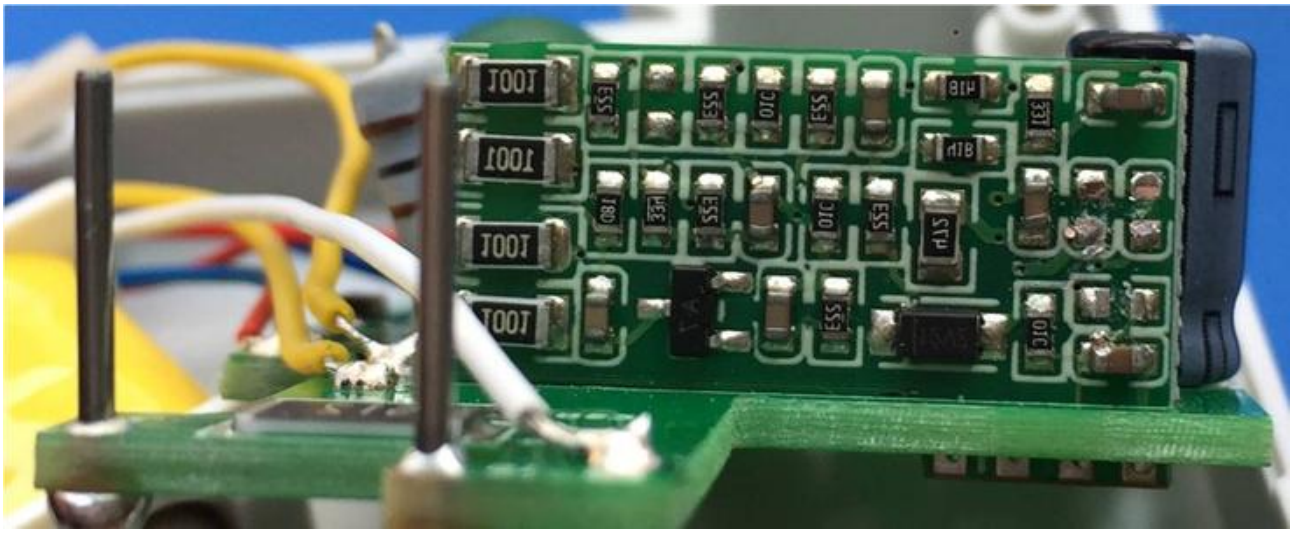


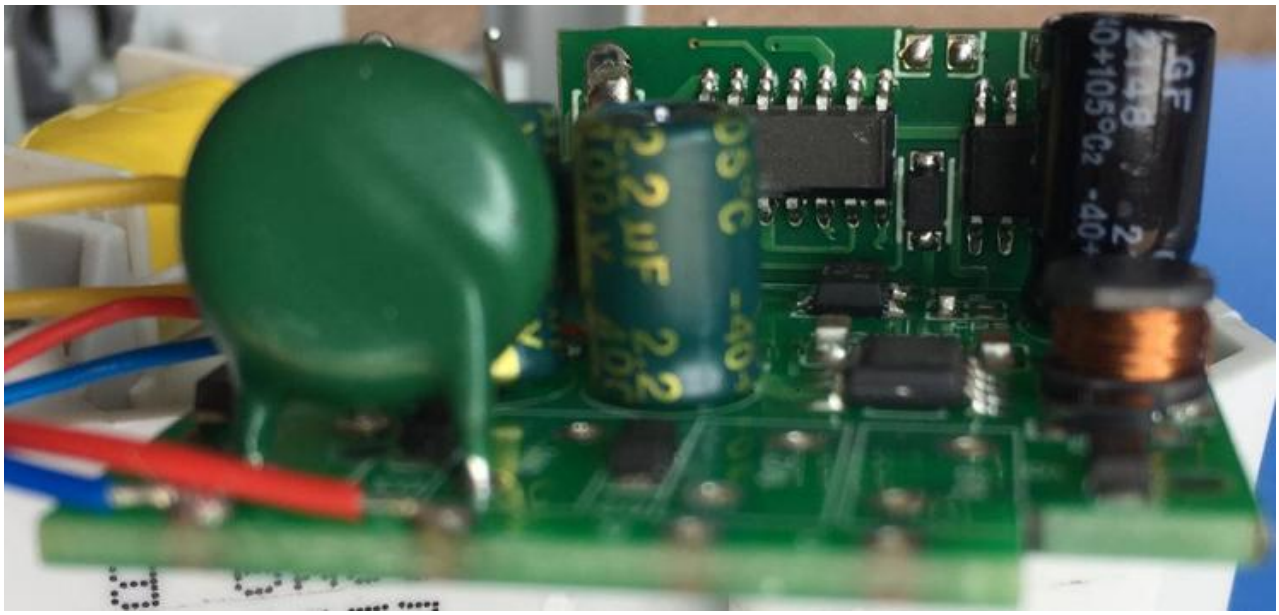
Photos of sample: PCB, 1P+N, PEM1LE-63, 6kA



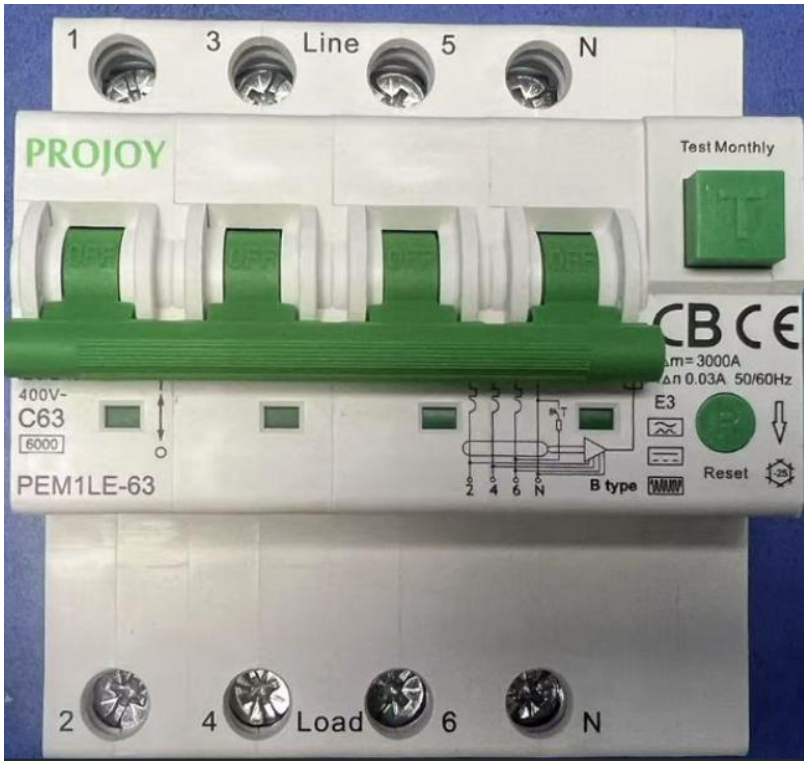


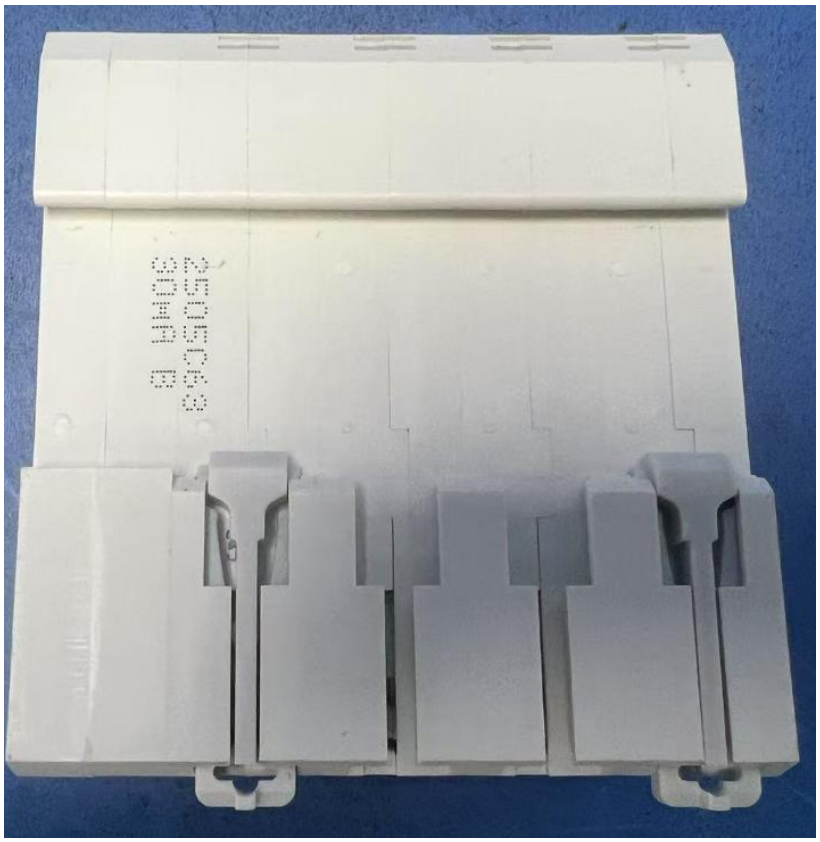
Photos of sample: PCB, 1P+N, PEM1LE-63, 6kA





Photos of sample: 3P+N, PEM1LE-63, 6kA



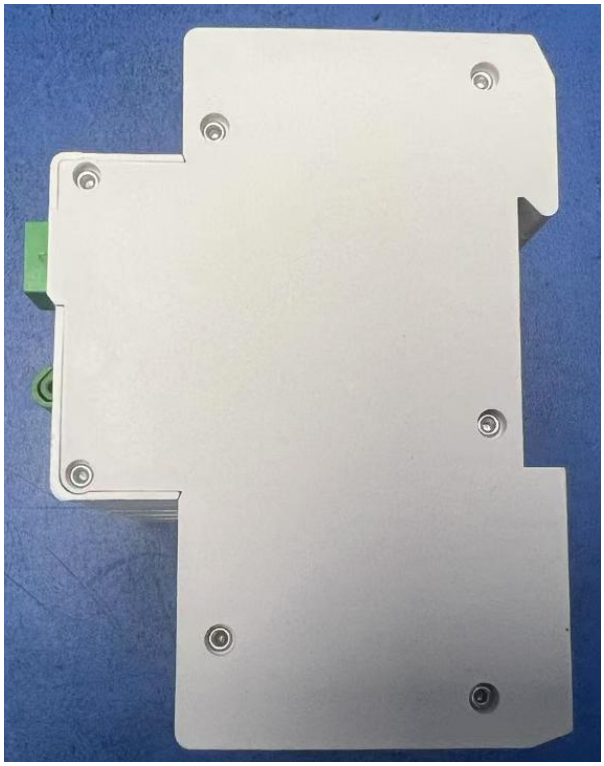


Photos of sample: 3P+N, PEM1LE-63, 6kA



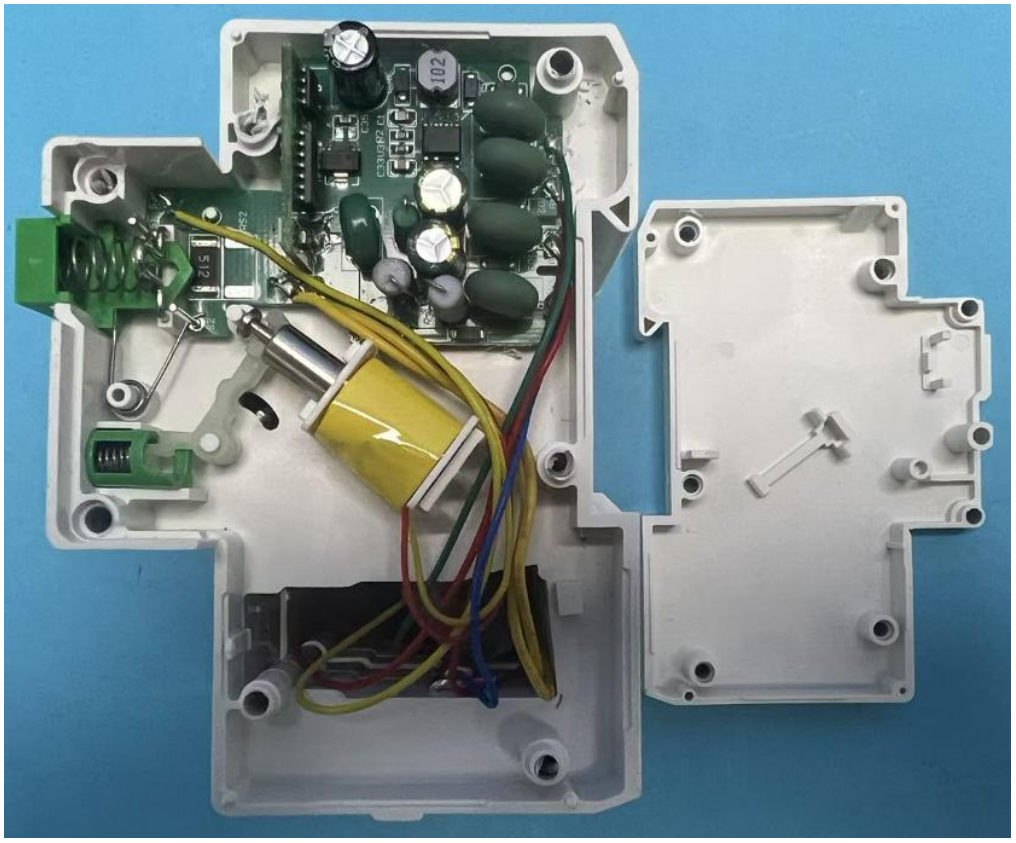


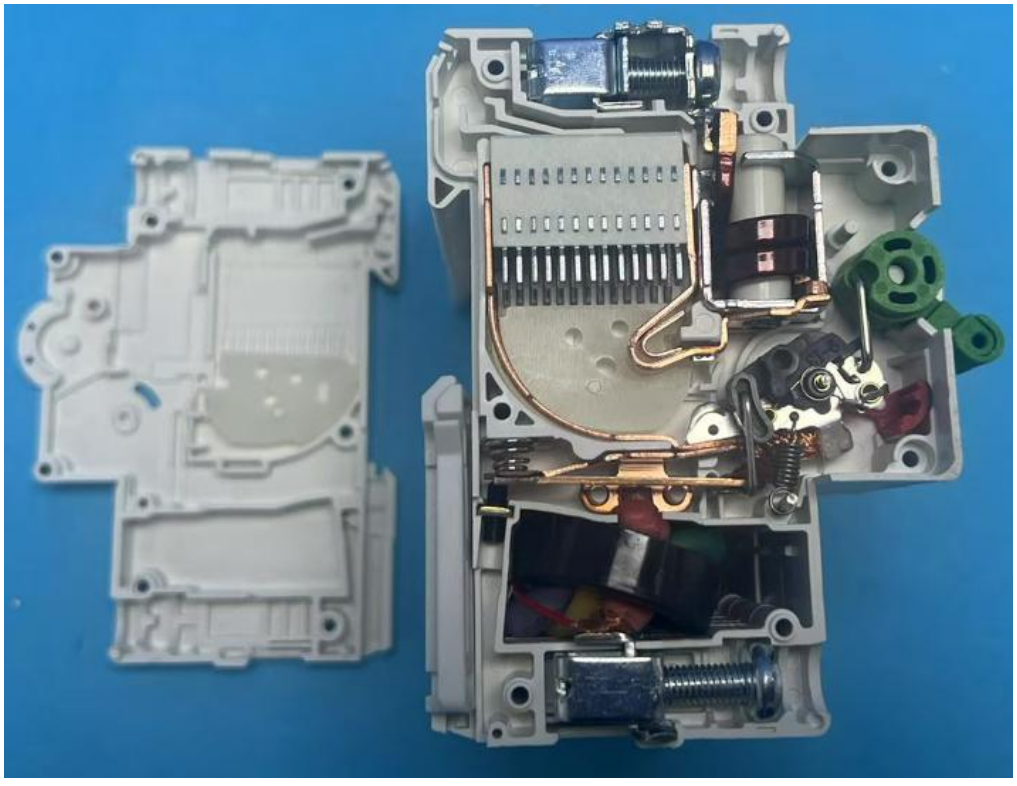
Photos of sample: 3P+N, PEM1LE-63, 6kA



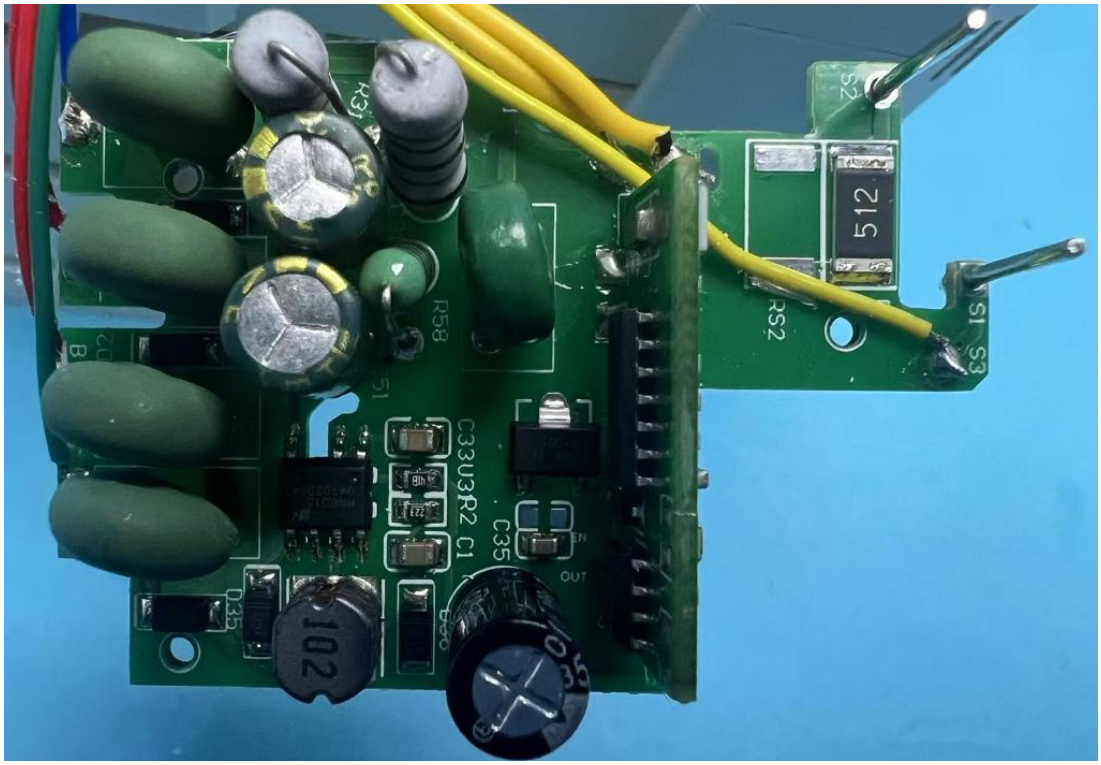


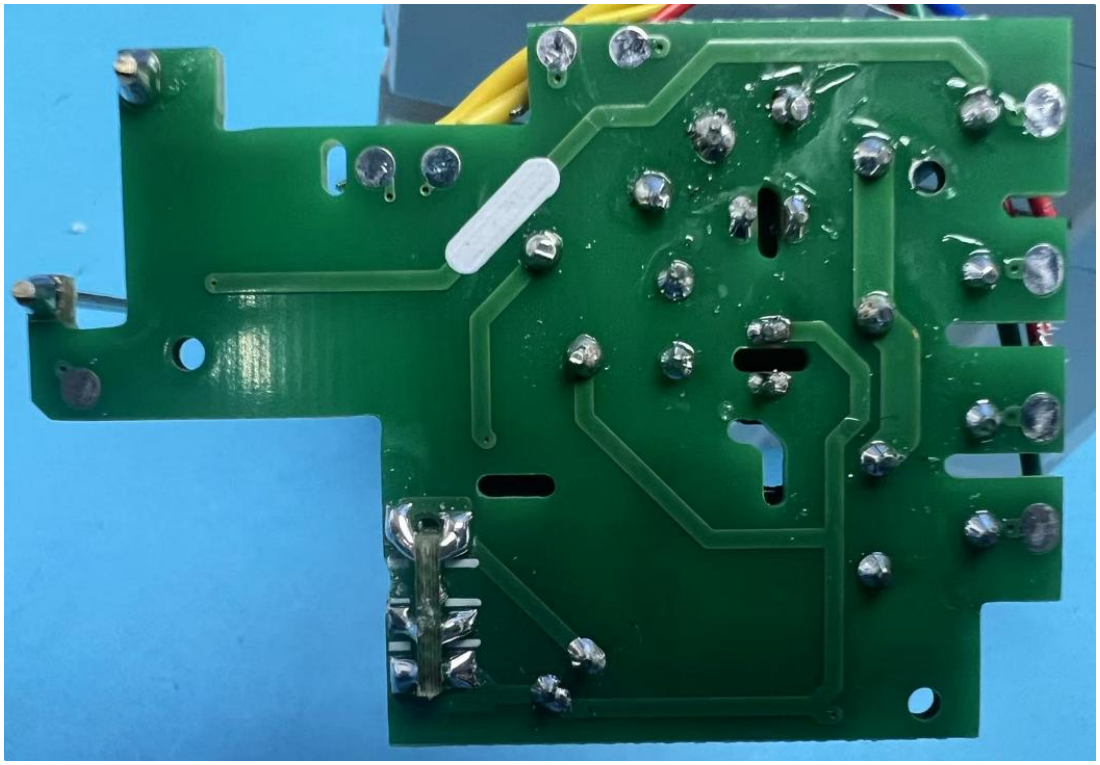
Photos of sample: 3P+N, PEM1LE-63, 6kA



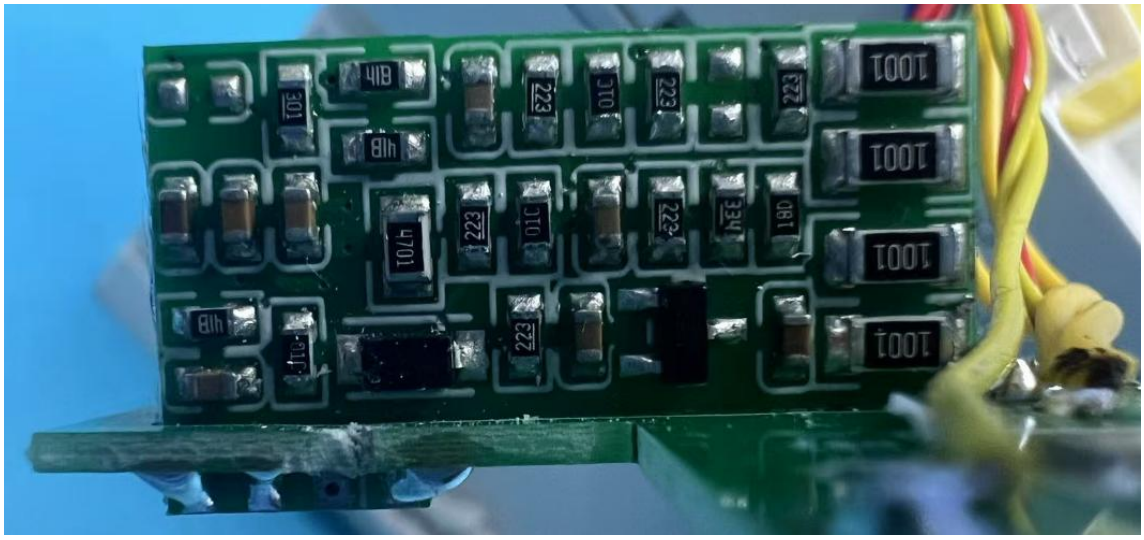


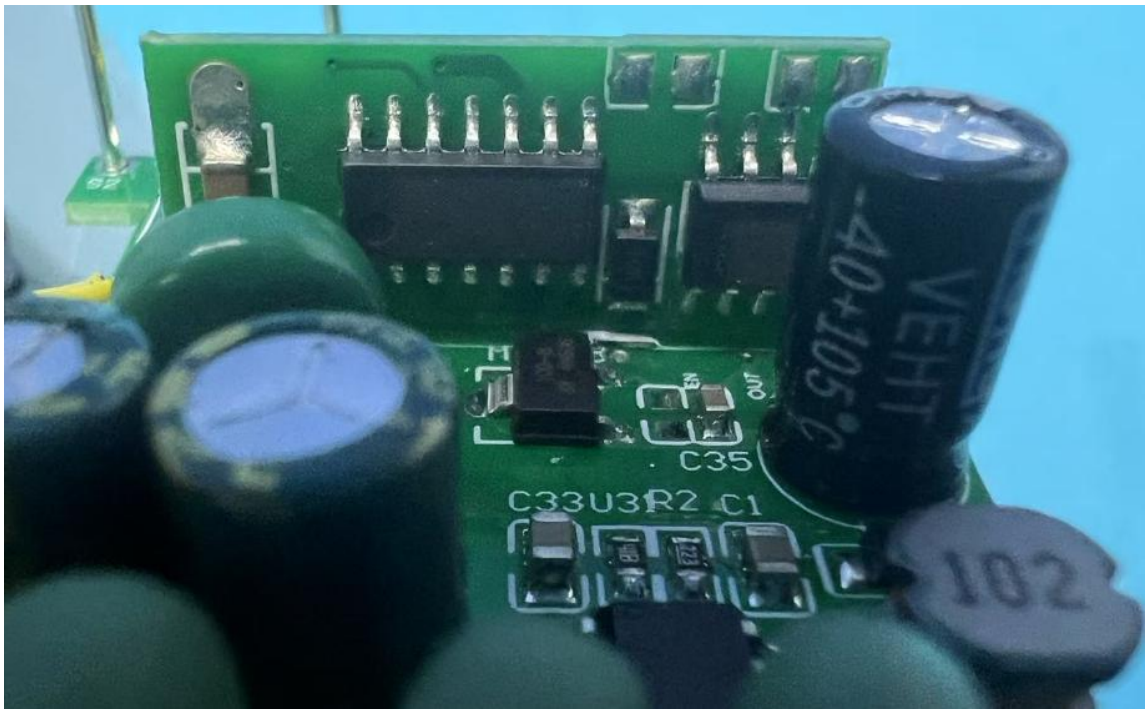
Photos of sample: PCB, 3P+N, PEM1LE-63, 6kA





Photos of sample: PCB, 3P+N, PEM1LE-63, 6kA





Photos of sample: 1P+N, PEM1LE-63, 10kA

