Prüfbericht - Produkte
Test Report - Products

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Prüfbericht-Nr.: *Test report no.:*	**CN217PTC 001**	**Auftrags-Nr.:** *Order no.*:	**244265324**	Seite 1 von 1 *Page 1 of* ***1***
Kunden-Referenz-Nr.: *Client reference no.:*	**2028398**	**Auftragsdatum:** *Order date:*	2020-08-19	
Auftraggeber: *Client:*	**MAXGE ELECTRIC TECHNOLOGY CO.,LTD.** NO.299 EAST CHANGHONG ROAD DEQING ECONOMIC ZONE, WUKANG DEQING 313200 Zhejiang, P.R. China			
Prüfgegenstand: *Test item:*	**RCBOs**			
Bezeichnung / Typ-Nr.: *Identification / Type no.:*	EPBR-63M, EPBR-63H; SGBR-63M, SGBR -63H			
Auftrags-Inhalt: *Order content*:	**Type test**			
Prüfgrundlage: *Test specification:*	**EN 61009-1:2012+A1+A2+A11+A12**			
Wareneingangsdatum: *Date of sample receipt:*	2020-10-11			
Prüfmuster-Nr.: *Test sample no:*	**244265324#1 to #37**			
Prüfzeitraum: *Testing period:*	2020-10-11 to 2020-11-24			
Ort der Prüfung: *Place of testing:*	The Low Voltage Apparatus Laboratory of Zhejiang Testing & Inspection Institute for Mechanical and Electrical Products Quality (ZTME)			
Prüflaboratorium: *Testing laboratory:*	same as above			
Prüfergebnis*: *Test result*:*	Pass			

geprüft von: *reviewed by:*

Datum: *Date:* 2021-02-05

Signed by: Ding Ye

Stellung / *Position:* Project Engineer

genehmigt von: *authorized by:*

Ausstelldatum: *Issue date:* 2021-02-05

Signed by: Wencai Zhang

Stellung / *Position:* Technical Certifier

Sonstiges / *Other:*

This report was based on TRF IEC61009-1F (IEC 61009-1:2010+A1+A2). European group differences and national difference were considered.

Attachment 1: CB license HU-003361(1 page)

Attachment 2: CB report CN21S7NW 001 (227 pages)

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
** Legend:*	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

V05

Ref. Certif. No.

HU-003361

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE) CB SCHEME

CB TEST CERTIFICATE

Product	RCBOs
Name and address of the applicant	MAXGE ELECTRIC TECHNOLOGY CO., LTD. NO. 299 EAST CHANGHONG ROAD DEQING ECONOMIC ZONE, WUKANG, DEQING, 313200 Zhejiang, P.R. China
Name and address of the manufacturer	MAXGE ELECTRIC TECHNOLOGY CO., LTD. NO. 299 EAST CHANGHONG ROAD DEQING ECONOMIC ZONE, WUKANG, DEQING, 313200 Zhejiang, P.R. China
Name and address of the factory	MAXGE ELECTRIC TECHNOLOGY CO., LTD. NO. 299 EAST CHANGHONG ROAD DEQING ECONOMIC ZONE, WUKANG, DEQING, 313200 Zhejiang, P.R. China
Ratings and principal characteristics	Ue= 230/240V ~(2P/1P+N); 50/60Hz; In=6/10A/13/16/20/25/32/40/45/50/63A(B/C-type); type A or type AC; IΔn=10/30/100/300mA; IΔm=2000A; Ics=Icn=6kA(with "M"); Ics=7,5kA;Icn=10kA(with "H")(Class 3)
Trademark (if any)	MAXGE
Customer's Testing Facility (CTF) Stage used	N/A
Model / Type Ref.	EPBR-63M ; EPBR-63H ; SGBR-63M ; SGBR-63H ;
Additional information (if necessary may also be reported on page 2)	Detailed information refer to test report CN21S7NW 001.
A sample of the product was tested and found to be in conformity with	IEC 61009-1:2010+A1+A2 IEC 61009-2-2:1991 See Test Report for National Differences
As shown in the Test Report Ref. No. which forms part of this Certificate	CN21S7NW 001

This CB Test Certificate is issued by the National Certification Body

TÜVRheinland®

TÜV Rheinland InterCert Kft., MEEI Division
H-1143 Budapest, Gizella út 51-57., Hungary
Web:www.tuv.com

Date: 2021-03-22

Signature: Wencai Zhang

10/0861 CB 06/20v9 rk

Test Report issued under the responsibility of:

TÜVRheinland®

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

Report Number. ..... :	**CN21S7NW 001**
Date of issue ..... :	2020.12.13
Total number of pages ..... :	227
Applicant's name ..... :	**MAXGE ELECTRIC TECHNOLOGY CO.,LTD**
Address ..... :	NO.299 EAST CHANGHONG ROAD DEQING ECONOMIC ZONE, WUKANG DEQING 313200 Zhejiang, P.R. China
Test specification:	
Standard ..... :	IEC 61009-1:2010, AMD1:2012, AMD2:2013 used in conjunction with ~~IEC 61009-2-1:1991 or~~ IEC 61009-2-2:1991
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC61009_1F
Test Report Form(s) Originator .... :	OVE
Master TRF ..... :	Dated 2019-10-15

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

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

General disclaimer:

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

Test item description..... :	**RCBOs**
Trade Mark..... :	MAXGE
Manufacturer ..... :	**MAXGE ELECTRIC TECHNOLOGY CO.,LTD**
Model/Type reference..... :	EPBR-63M, EPBR-63H SGBR-63M, SGBR -63H
Ratings..... :	Ue = 230/240V ~ (2P); 50/60Hz; In = 6A, 10A, 13A, 16A, 20A, 25A, 32A, 40A, 50A, 63A; (General type) Behaviour in presence of d.c component: type A or type AC IΔn= 10mA, 30mA, 100mA, 300mA, General type; IΔm= 2000A; Ics=Icn=6kA for EPBR-63M, SGBR-63M Ics=7,5 kA; Icn=10kA for EPBR-63H, SGBR-63H (Class 3)

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**CB Testing Laboratory:**	**The Low Voltage Apparatus Laboratory of Zhejiang Testing & Inspection Institute for Mechanical and Electrical Products Quality (ZTME)**	
Testing location/ address ..... :		**No 125 Miaohouwang Road Binjiang District Hangzhou, Zhejiang CHINA**	
Tested by (name, function, signature) ..... :		Cai Yizhou(Tester)	Cai Yizhou
Approved by (name, function, signature) .. :		Du Liang(Reviewer)	Du Liang
☐	**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 1: Measuring equipment list (ZTME) – 2 pages
Attachment 2: Photo documentation – 5 pages

Summary of testing:

The model EPBR-63H are family RCBO of the same fundamental design. According to table A.3 of Annex A, following ratings products were subject relevant test accordingly.
All the tests were done on model EPBR-63H.
Sample allocation and test items according to IEC 61009-1 and EN 61009-1 see the table below:

Test sample Rating				Test sequence															
In	Pole	IΔn	Type	A_1	A_2	B	C_1	C_2	D_0+D_1	D_0	E_0+E_1	E_0	F_0	F_1	F_2	G_0	G_1	H	I	J
C63	1P+N	10mA	AC	1	3	3	3	3	3	-	3	-	3	3	3	3	3	3	3	3
C63	1P+N	30mA	AC						-	1	-	-	-	-	-	-	-	-	-	-
C63	1P+N	100mA	AC	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
C63	1P+N	300mA	AC	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
C63	1P+N	10mA	A	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
C63	1P+N	30mA	A	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
C63	1P+N	100mA	A	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
C63	1P+N	300mA	A	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
C50	1P+N	30mA	AC	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
C40	1P+N	10mA	AC	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
C32	1P+N	10mA	AC	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
C40	1P+N	10mA	AC	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
C32	1P+N	10mA	AC	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
C25	1P+N	10mA	AC	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
C20	1P+N	10mA	AC	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
C16	1P+N	10mA	AC	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
C13	1P+N	10mA	AC	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
C10	1P+N	10mA	AC	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
C6	1P+N	10mA	AC	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
C6	1P+N	300mA	AC	-	-	-	-	-	-	-	-	-	3	3	-	-	3	-	-	-
C40	1P+N	10mA	AC	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-
C32	1P+N	10mA	AC	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-
C16	1P+N	10mA	AC	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-
B63	1P+N	10mA	AC	-	-	3[a)]	-	-	-	-	-	1	-	-	-	-	-	-	-	-
B50	1P+N	10mA	AC	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
B45	1P+N	10mA	AC	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
B40	1P+N	10mA	AC	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
B32	1P+N	10mA	AC	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
B25	1P+N	10mA	AC	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
B16	1P+N	10mA	AC	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
B13	1P+N	10mA	AC	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
B6	1P+N	10mA	AC	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
C40	1P+N	10mA	AC	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-
C32	1P+N	10mA	AC	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-

C16	1P+N	10mA	AC	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-
C40	1P+N	10mA	AC	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-
B40	1P+N	10mA	AC	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-
B32	1P+N	10mA	AC	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-
B16	1P+N	10mA	AC	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-

Note:

C-type RCBOs type-tested first
B-type RCBOs – sequence E_0(only test clause 9.9.2.2)+ sequence B(only test clause 9.8)
Type AC RCBOs type-tested first
Type A RCBO – sequence D_0

Tests performed (name of test and test clause):

Test sequence A (A_1+A_2):

C63/1P+N/10mA/Type AC page 12

Test sequence B:

C63/1P+N/10mA/Type AC page 23
B63/1P+N/10mA/Type AC page 30

Remark: for model of B type, only temperature rise test.

Test sequence C(C_1+C_2):

C63/1P+N/10mA/Type AC page 32

Test sequence D_0+D_1:

C63/1P+N/10mA/Type AC page 36
C63/1P+N/10mA/Type A page 51

Test sequence D_0:

C63/1P+N/30mA/Type AC page 66
C63/1P+N/30mA/Type A page 73
C63/1P+N/100mA/Type AC page 81
C63/1P+N/100mA/Type A page 88
C63/1P+N/300mA/Type AC page 96
C63/1P+N/300mA/Type A page 104

Test sequence E_0+E_1:

C63/1P+N/10mA/Type AC page 112

Test sequence E_0:

C50/1P+N /10mA/Type AC page 142
C40/1P+N /10mA/Type AC page 119
C32/1P+N /10mA/Type AC page 121
C25/1P+N /10mA/Type AC page 123
C20/1P+N /10mA/Type AC page 125
C16/1P+N /10mA/Type AC page 127
C13/1P+N /10mA/Type AC page 129
C10/1P+N /10mA/Type AC page 131
C6/1P+N /10mA/Type AC page 133

B63/1P+N /30mA/Type AC page 135
B50/1P+N /30mA/Type AC page 137
B40/1P+N /30mA/Type AC page 138
B32/1P+N /30mA/Type AC page 139
B25/1P+N /30mA/Type AC page 141

Testing location:

The Low Voltage Apparatus Laboratory of Zhejiang Testing & Inspection Institute for Mechanical and Electrical Products Quality (ZTME)

No 125 Miaohouwang Road Binjiang District Hangzhou Zhejiang CHINA

B20/1P+N /30mA/Type AC	page 142	
B16/1P+N /30mA/Type AC	page 143	
B13/1P+N /30mA/Type AC	page 144	
B10/1P+N /30mA/Type AC	page 146	
B6/1P+N /10mA/Type AC	page 147	
Test sequence F_0+F_1:		
C63/1P+N/10mA/Type AC/ General type	page 148	
C6/1P+N/300mA/Type AC/ General type	page 148	
Test sequence G(G_0):		
C63/1P+N/10mA/Type AC/ General type	page 154	
Test sequence H:		
C63/1P+N/10mA/Type AC	page 155	
Test sequence I:		
C63/1P+N/10mA/Type AC	page 157	
Test sequence J:		
C63/1P+N/30mA/Type AC	page 159	

Summary of compliance with National Differences:

EU Group Differences

☒ **The product fulfils the requirements of EN 61009-1: 2012+A1+A2+A11+A12**
(insert standard number and edition and delete the text in parenthesis, leave it blank or delete the whole sentence, if not applicable)

For the Energy limiting class of this product is Class 3, when Icn=10,0kA.
So additional tests of test sequence E1were performed with Circuit-breakers of B-type and C-type according to Annex ZD of EN 61009-1:2012+A1+A2+A11+A12, and the permissible I^2t values refer to table ZD.1 and table ZD.2 below.

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

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

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

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

Test sample	Permissible I^2t
C63, 2P	145 kA^2s
C40, 2P	120 kA^2s
C32, 2P	100 kA^2s
C16, 2P	80 kA^2s
B63, 2P	135 kA^2s
B40, 2P	108 kA^2s
B32, 2P	90 kA^2s
B16, 2P	70 kA^2s

Tests performed (name of test and test clause):

EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES

Test sequence A-F(F_0+F_1), G(G_0) page 183

Test sequence F_1(for class 3)

C63/1P+N/10mA/Type AC page 194
C40/1P+N/10mA/Type AC page 195
C32/1P+N/10mA/Type AC page 197
C16/1P+N/10mA/Type AC page 198
B63/1P+N/10mA/Type AC page 199
B40/1P+N/10mA/Type AC page 201
B 32/1P+N/10mA/Type AC page 202
B 16/1P+N/10mA/Type AC page 203

Test sequence F_2:

C63/1P+N/10mA/Type AC/ General type page 205

Test sequence G_1:

C63/1P+N/10mA/Type AC/ General type page 207
C6/1P+N/300mA/Type AC/ General type page 208

Testing location:

The Low Voltage Apparatus Laboratory of Zhejiang Testing & Inspection Institute for Mechanical and Electrical Products Quality (ZTME)

No 125 Miaohouwang Road Binjiang District Hangzhou Zhejiang CHINA

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:**

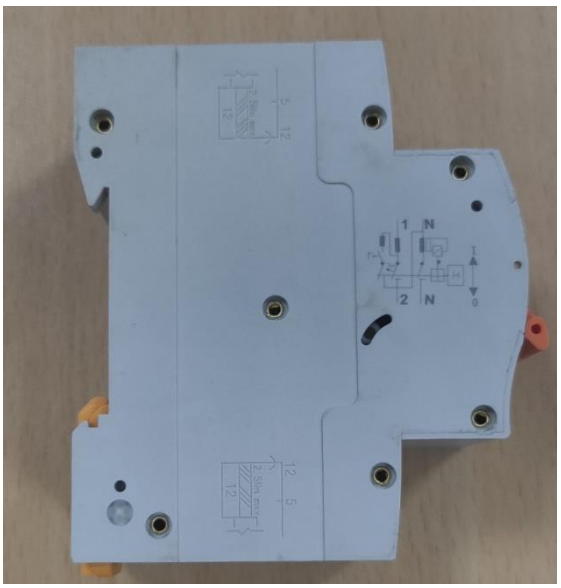
Procedure number, issue date and title:

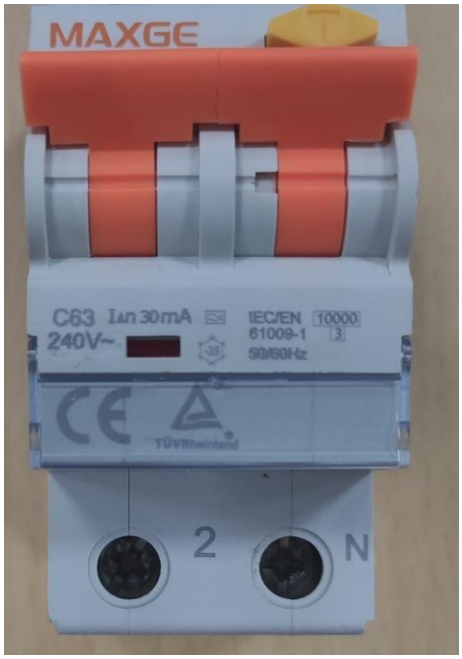
Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

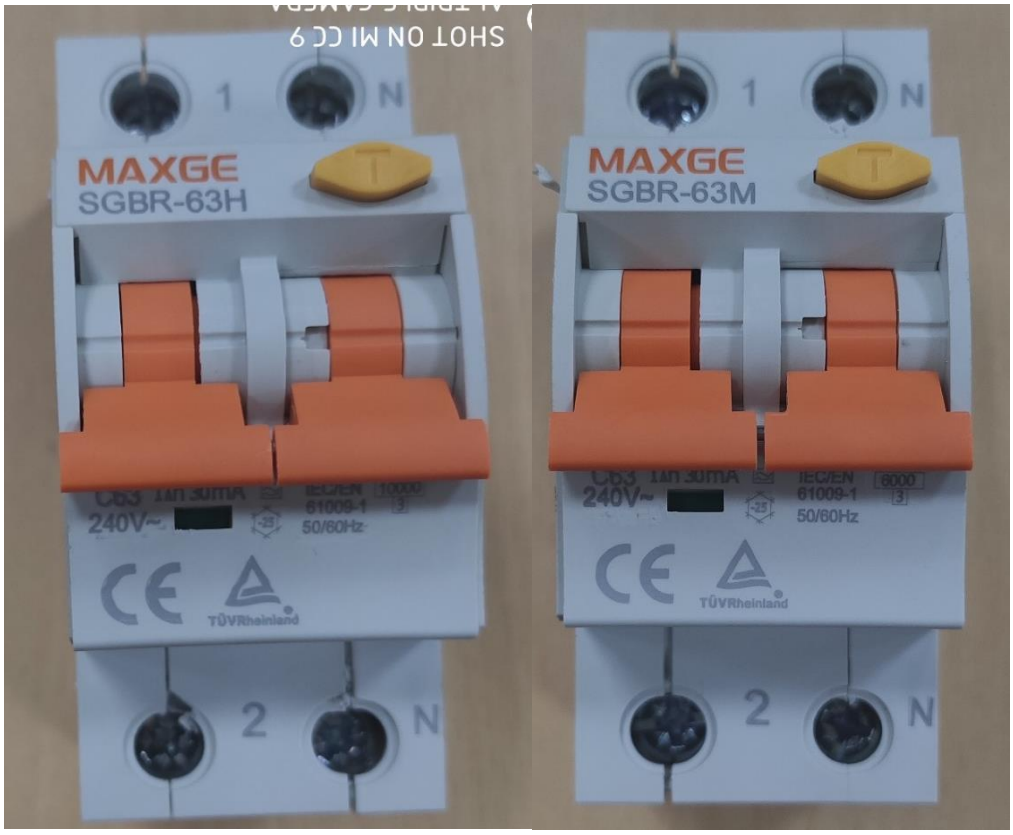
☒ **Statement not required by the standard used for type testing**

(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




MAXGE
C63 IΔn 30mA
240V~
IEC/EN 61009-1
50/60Hz
TÜVRheinland
2
N


1
N
MAXGE
SGBR-63H
MAXGE
SGBR-63M
240V~
IEC/EN 61009-1
50/60Hz
TÜVRheinland
2
N

Test item particulars ..... :	
Type of RCBO ..... :	AC / A
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 ..... :	not associated with the mechanical mounting
Instantaneous tripping current ..... :	B / C / ~~D~~
Rated current (I_N)..... :	6/10/13/16/20/25/32/40/50/63 A
Rated residual operating current ($I_{\Delta N}$) ..... :	10mA, 30 mA, 100mA, 300mA, General type;
Rated voltage (U_N)..... :	230/240V ~ (2P); 50/60Hz;
Rated impulse withstand voltage (U_{imp})..... :	4,0 kV
Rated frequency (Hz) ..... :	50 Hz
Rated short-circuit capacity (I_{CN}) ..... :	6000 A or 10000A
Rated residual making and breaking capacity ($I_{\Delta}M$) :	2000A
Nature of supply ..... :	a.c.
Type of terminal ..... :	Pillar terminal
Classification of RCBOs functionally dependent on the line voltage: ..... :	Yes
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 ..... :	Yes /~~ No~~
- 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..... :	11.10.2020
Date (s) of performance of tests ..... :	11.10.2020~24.11.2020

General remarks:

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 testing laboratory.
"(see Enclosure #)" refers to additional information appended to the report.
"(see appended table)" refers to a table appended to the report.

Throughout this report a ☒ comma / ☐ point is used as the decimal separator.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....:

☐ **Yes**

☒ **Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) ..... : **MAXGE ELECTRIC TECHNOLOGY CO.,LTD**

NO.299 EAST CHANGHONG ROAD DEQING ECONOMIC ZONE, WUKANG DEQING 313200 Zhejiang, P.R. China

General product information:

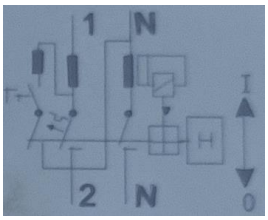
Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs)

Type designation: EPBR-63M, EPBR-63H; SGBR-63M, SGBR-63H
Rated electrical data: Functionally Dependent of Line Voltage
Ue = 230/240V ~ (2P); 50/60Hz;
(RCBO with interrupted neutral)
In = 6A, 10A, 13A, 16A, 20A, 25A, 32A, 40A, 45A, 50A, 63A;
Instantaneous Tripping : B/ C-type
Behaviour in presence of d.c component: type A or type AC
IΔn: 10mA, 30 mA, 100mA, 300mA,
IΔm: 2000A;
Ics=Icn=6kA for EPBR-63M, SGBR-63M;
Ics=7,5 kA; Icn=10kA for EPBR-63H, SGBR-63H,
I^2t characteristic (energy limit class): Class 3 for Icn=10kA

Main constructional parameter:

This series product was combined together by a MCB and a residual current release. EPBR-63M has the same electrical construction as model EPBR-63H except the lower rated short-circuit capacity
1: there is a zero –sequence Current Transformer
2: there is electronic residual current release.
3:overcurrent release was thermal magnetic release
Model EPBR-63M has the same electrical construction with model EPBR-63H except rated short circuit capacity.
SGBR-63M and SGBR-63H have the same electrical construction with models EPBR-63M and EPBR-63H except the enclosure shape.

IEC 61009-1			
Clause	Requirement + Test	Result - Remark	Verdict

	TEST SEQUENCE "A_1"	C63/1P+N/10mA/Type AC	--
6.	MARKING (STANDARD MARKING)		--
	RCBO MARKED WITH:		--
	a) Manufacturer's name or trade mark.....:	MAXGE	P
	b) Type designation, catalogue number or serial number .....:	EPBR-63H	P
	c) Rated voltage(s) (V) .....:	240V ~	P
	d) Rated current without symbol "A" preceded by symbol for instantaneous tripping .....:	C63	P
	e) Rated frequency.....:	50/60 Hz	P
	f) Rated residual operating current .....:	10 mA	P
	g) Settings of residual operating current .....:		N/A
	h) Rated short-circuit capacity, in amperes.....:	10000 A	P
	j) Reference calibration temperature, if different from 30°C .....:	30°C	P
	k) Degree of protection.....:	IP20 after installation	P
	l) Position of use.....:		N/A
	m) Rated residual making and breaking capacity, if different from rated short-circuit capacity.....:	2000A	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 AC with the symbol ..... ⏦		P
	- RCBOs of type A with the symbol..... ⏦		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		P

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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	All information visible after install	P
	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 not marked shall be 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
	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
	Open position indicated by "**0**" and closed position by "|"	O, I	P
	For push-buttons the OFF push-button shall either be red and/or marked with "**0**"	ON, OFF	P
	If necessary to distinguish between supply and load terminals they shall be clearly marked	L, N	P
	Terminals for neutral conductor 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		P
	For universal terminals (rigid-solid, rigid-stranded and flexible conductors:		P
	- no markings		P
	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		P

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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 shall not be possible without a tool. It shall 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.		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:		P
	- 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 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:		P
	- 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 show the colour:		P
	- red for the closed position (ON)		P
	- green for the opened position (OFF)		P

IEC 61009-1			
Clause	Requirement + Test	Result - Remark	Verdict
	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		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.		P
	If the cover is used as a guiding means for push-buttons, it shall not possible to remove the buttons from the outside		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.	On DIN rail	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 shall trip.	1,5 $I_{\Delta N}$ = 15 mA	P

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Clause	Requirement + Test	Result - Remark	Verdict
	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.		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
	Screws for mounting the RCBO are not of thread-cutting type.		P
	Screws and nuts which are operated when mounting and connecting		N/A
	Test according to cl. 9.4:		--
	- 10 times (screw Ø / torque Nm)	Ø mm Nm	N/A
	- 5 times (screw Ø / torque Nm)	Ø 4,86 mm 2,0 Nm	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, if any, shall be made of a metal having, under the conditions occurring in the equipment, mechanical strength, electrical conductivity and resistance to corrosion adequate for their intended use. Examples below:		--
	- copper		N/A
	- an alloy 58% copper for parts worked cold	contact	P
	- an alloy 50% copper for other parts		N/A
	- other metal	Zn plated steel (Terminal)	P
	In case of using ferrous alloys or suitably coated ferrous alloys, compliance to resistance to corrosion is checked by a test of resistance to rusting (see 9.25).		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

IEC 61009-1			
Clause	Requirement + Test	Result - Remark	Verdict
	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 4,8 mm 2,0 Nm		P
	Ø mm Nm		N/A
	Ø mm Nm		N/A
	Max. cross-sect.: 16 mm²		P
9.5	Test of reliability of screw-type terminals for external copper conductors		P
9.5.1	Pull test:		--
	Terminal shall be 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).....:	1,0 mm² / 1,5 mm² / 1,0 mm²	--
	Max. cross-section solid / stranded / flexible (mm²).....:	25 mm² / 25 mm² / 16 mm²	--
	Torque $^2/_3$ (Nm) .....:	1,33 Nm	--
	Pull for 1 min solid / stranded / flexible (N) ..:	100N / 100N / 90N	--
	During the test no noticeable move of conductor		P
9.5.2	Min. cross-section (mm²).....:	1,0 mm²	--
	Max. cross-section (mm²).....:	25 mm²	--
	Torque $^2/_3$ (Nm) .....:	1,33 Nm	--
	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.	1,0 to 25 mm²	P
	Max. cross-section stranded (mm²) .....:	25 mm²	P
	Max. cross-section flexible (mm²) .....:	16 mm²	P
	Torque $^2/_3$ (Nm) .....:	1,33 Nm	--
	After the test no strand of conductor escaped outside		P
8.1.5.2	RCBOs shall be provided with:		--

IEC 61009-1			
Clause	Requirement + Test	Result - Remark	Verdict
	- terminals which shall 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	1,0 to 25 mm² for rigid and stranded 1,0 to 16 mm² for flexible	P
	*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.		--
	- or terminals for external untreated aluminium conductors and with aluminium screw-type terminals for use with copper or with aluminium conductors according to Annex L.		
8.1.5.3	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

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Clause	Requirement + Test	Result - Remark	Verdict
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.		P
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
8.1.6	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.		P
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.		N/A
	Such devices		--
	- reliably fixed		N/A
	- adequate mechanical strength		N/A
	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.		P
	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.		P
	Possible to replace plug-in RCBOs easily with-out touching live parts.		N/A
	Lacquer or enamel not considered to provide adequate insulation.		P
9.6	Test: Standard test finger		
	Straight test finger with a force of 75 N for 1 min at 35°C ± 2°C		P

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Clause	Requirement + Test	Result - Remark	Verdict
	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		--
	- removable covers ..... 1 h (70 ± 2) °C		P
	No change impairing further use and no flow of sealing compound that live parts are exposed		N/A
	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		P
		1,25 $I_{\Delta N}$ = 12,5 mA Trip time: 16 ms < 100 ms	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:	Enclosure	P
	- T = 125 ± 2°C	125 °C	P
	After 1 h Ø of impression ≤ 2 mm	1,08 mm	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:		N/A
	☐ T = 70 ± 2°C		N/A
	☐ T = _____ ± 2°C (40°C + max. temperature rise of sub-clause 9.8)		N/A
	Ø of impression ≤ 2 mm		N/A
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

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Clause	Requirement + Test	Result - Remark	Verdict
	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.		P
	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:		P
	- Tests according to 9.7.2 to 9.7.6 as applicable		P
	- 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)		P
	If measurement does not show any reduced clearance, test 9.7.7.2 is not applied		P
	Compliance for item 3, checked by measurement		P
	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		P
	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 (see table 5) **2,5kV(see table 5)**	☒ ☐	--
		minimum clearances [mm]	--
	1. between live parts which are separated when the main contacts are in the open position	measurement: 5,02 required: 4,0	P
	2. between live parts of different polarity	measurement: 9,74 required: 3,0	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	measurement: 31,08 required: 3,0	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	measurement: 17,76 required: 3,0	P
	- screws or other means for fixing the RCBO		N/A
	- metal covers or boxes		N/A
	- other accessible metal parts	measurement: 23,7 required: 3,0	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- metal frames supporting flush-type RCBOs	measurement: 14,5 required: 3,0	P
	Creepage distances [mm] (see table 5)		--
	Material group	IIIb ☐ IIIa ☒ II ☐ I ☐	P
		minimum creepage distances [mm]	--
	1. between live parts which are separated when the main contacts are in the open position	measurement: 20,07 required: 4,0	P
	2. between live parts of different polarity		N/A
	3. between circuits supplied from different sources, one of which being PELV or SELV		N/A
	4. between live parts and:		--
	- accessible surfaces of operating means	measurement: 37,04 required: 4,0	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	measurement: 20,14 required: 4,0	P
	- 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		N/A
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 ammonium 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"	**A_2 1 A_2 2 A_2 3**	--

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Clause	Requirement + Test	Result - Remark	Verdict
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	P
	- All other external parts of insulating material .....:	T = 650 ± 10 °C	N/A
	No visible flame and no sustained glowing		
	Flames and glowing extinguish within 30 s after removal		P
	No ignition of tissue paper or scorching of the pinewood board	29 s (enclosure)	P
			P

	TEST SEQUENCE "B" C63/1P+N/10mA/Type AC	**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		P
	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

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Clause	Requirement + Test	Result - Remark	Verdict

	rated impulse withstand voltage [kV]:	4,0 kV			--
	see level of test laboratory [m]	5			--
	test voltage (acc. Table 28) [kV]:	6,2 kV			--
9.7.7.4.2	RCBO in open position (contacts in open position)				P
	The impulses are applied between:				P
	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
	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				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	1450V			P
	The voltage is applied during 5s between the phase pole(s) and the neutral pole (or path) connected together and the metal support connected to the terminal(s) intended for the prospective conductor(s), if any				P
	after test, no component bridging the basic insulation should show a visible alteration.				P
	Then, the equipment is connected to the mains acc. manufacturer's instruction				P
	The RCBO shall trip with a test current of 1,25 $I_{\Delta N}$	[ms]			--
		26ms	30ms	27ms	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
9.7.1	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.				P
9.7.1.2	Test conditions: 48 h in humidity cabinet RH = 91% to 95% T = 20 to 30°C ± 1°C	48 h 92,6…94,2 % 21,2…22,1 °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	> 5	> 5	> 5	P
	b) between each pole and the others connected together (electronic components, connected between current path being disconnected) ....≥ 2 MΩ	> 5	> 5	> 5	P
	c) between all poles connected together and the frame.....≥ 5 MΩ	> 5	> 5	> 5	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:	50 Hz, 1 min			--
	a) electronic components disconnected..... 2000 V	2000 V	2000 V	2000 V	P
	b) electronic components disconnected..... 2000 V	2000 V	2000 V	2000 V	P
	c) electronic components disconnected..... 2000 V	2000 V	2000 V	2000 V	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

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Clause	Requirement + Test	Result - Remark	Verdict
	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		--
	If the measurement of clearances of items 2 and 4 in Table 7 shows a reduction of the required length, this test applies.		P
	The test is carried out on an RCBO fixed on a metal support and being in the closed position		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
	test performed with:		--
	- surge impedance of the test apparatus ≤500Ω and surge protective devices disconnected before testing or		P
	- hybrid generator with an surge impedance of 2 Ω and surge protective devices not disconnected before testing		P
	rated impulse withstand voltage [kV]:	4,0 kV	--
	see level of test laboratory [m]	5	--
	test voltage (acc. Table 19) [kV]:	6,2 kV	--

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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
	A third series of tests is made applying the impulse voltage between (and not tested during the two first sequences described here above):		P
	b) between each pole and the others connected together (electronic components, connected between current path being disconnected)		P
	c) between all poles connected together and the frame		P
	d) between metal parts of the mechanism and the frame		P
	e) between the frame and a metal foil in contact with the inner surface of the lining of insulating material		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
9.7.5	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		--
	RCBO fixed on metal support in closed position with all control circuits connected as in service.		N/A
	Open test voltage 600 V +25 / -0 V Maximum ripple 5% Short-circuit current 12 mA +2 / -0 mA Applied for 1 min between each pole and the other poles connected together to the frame.		P

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)**	
									--

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Clause	Requirement + Test	Result - Remark	Verdict

	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.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]	--
	- $I_{\Delta N}$	34	33	32	P
	- 2 $I_{\Delta N}$	24	23	21	P
	- 5 $I_{\Delta N}$ or	21	20	21	P
	- 0,25 A	--	--	--	N/A
	- $I_{\Delta t}$ 315 A	15	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
	- 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
8.4	TEMPERATURE RISE				--
	Temperature rises do not exceed the limiting values stated in table 7.				P
	Cross-section (mm²)	16 mm²			--
9.8.1	Ambient air temperature (°C)	21,2 °C			--
9.8.2	Test current I_N (A) until steady state values are reached.	63 A			--
	Four pole RCBOs:				N/A
	Current passing through				N/A
	- 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	N: 57,1 L: 56,7	N: 54,9 L: 55,7	N: 55,1 L: 54,6	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	10,8	11,0	14,2	P
	External metallic parts of operating means.....25				N/A
	Other external parts, including that face of the RCBO in direct contact with the mounting surface.....60	33,3	26,1	34,4	P
	Other external parts, including that face of the RCBO in direct contact with the mounting surface.....60	15,2	16,2	17,7	P
8.16	RELIABILITY				--
	RCBOs operate reliably even after long service.				P
9.22.2	Test with 28 cycles at 40 ± 2°C	40,0…40,2°C, humidity: 65 %			--
	Cross-section (mm²).....:	16mm²			--
	Torque $^2/_3$ (Nm) .....:	1,33 Nm			--
	Test current I_N (A).....:	63 A			--
	- with current passing .....21 h	21 h			P
	- without current .....3 h	3 h			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]	--
	N	56,7	54,9	55,1	P
	L	57,1	55,7	54,6	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]	--
		28	26	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 40 ± 2°C .....:	40,0…40,2°C			--
	Test current I_N (A).....:	63 A			--
	Cross-section (mm²).....:	16 mm²			--
	Electronic parts at 1,1 U_N .....:	253 V			--
	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	29	27	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1				P

	TEST SEQUENCE "B" B63/1P+N/10mA/Type AC	**B1**	**B2**	**B3**	--
8.4	TEMPERATURE RISE				--
	Temperature rises do not exceed the limiting values stated in table 7.				P
	Cross-section (mm²)	16 mm²			--
9.8.1	Ambient air temperature (°C)	21,2 °C			--
9.8.2	Test current I_N (A) until steady state values are reached.	63 A			--
	Four pole RCBOs:				N/A
	Current passing through				N/A
	- 3 phase poles (1)				N/A
	- neutral and adjacent pole (2)				N/A
	Parts .....Temperature rise K	[K]	[K]	[K]	--

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Clause	Requirement + Test	Result - Remark	Verdict

	Terminals for external connections..... 65				P
	1	59,4	51,7	52,7	P
	2	58,9	50,8	53,0	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	10,4	10,0	12,2	P
	External metallic parts of operating means 25				N/A
	Other external parts, including that face of the RCBO in direct contact with the mounting surface.....60	32,4	28,1	27,9	P
	Other external parts, including that face of the RCBO in direct contact with the mounting surface..... 60	13,7	13,7	12,3	P

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Clause	Requirement + Test	Result - Remark	Verdict

	TEST SEQUENCE "C" C63/1P+N/10mA/Type AC	**C_1 1**	**C_1 2**	**C_1 3**	--
	Tests C_1				P
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	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	63 A			P
	2000 operating cycles				--
	Test voltage U_N (V)..... :	240 V			--
	Test current I_N (A)..... :	63,2A			--
	Cos phi = 0,85 - 0,9..... :	0,87			--
	Cross-section (mm^2)..... :	16 mm^2			--
9.10.2	Test procedure				--
	$I_{\Delta N}$ > 0,01 A:				N/A
	- 1000 cycles manual operation				N/A
	- 500 cycles test device				N/A
	- 500 cycles $I_{\Delta N}$				N/A
	$I_{\Delta N} \leq$ 0,01 A:	$I_{\Delta N}$ 0,01 A			--
	- 500 cycles manual operation				P
	- 750 cycles test device				P
	- 750 cycles $I_{\Delta N}$				P
	Without load - manual operation				--
	- $I_N \leq$ 25 A..... 2000 cycles				N/A
	- $I_N >$ 25 A..... 1000 cycles				P
9.10.3	After test:				--
	No undue wear, no damage, no loosening of connections, no seepage of sealing compound				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]	--
		35	34	35	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1.				P

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Clause	Requirement + Test	Result - Remark	Verdict

	Dielectric strength test with 900 V AC for 1 min:				--
	a)	900 V, 1min, 100 mA			P
	b)	900 V, 1min, 100 mA			P
	c)	900 V, 1min, 100 mA			P
	d)				N/A
	e)				N/A
	2,55 I_N through all poles:	160A			
		[s]	[s]	[s]	--
	- Opening time ≥ 1s but ≤ 60 s for I_N ≤ 32 A				N/A
	- Opening time ≥ 1s but ≤ 120 s for I_N > 32 A	17,1	22,4	15,5	P
9.12.11.2.1	Test at reduced short-circuit current ..... :	Figure 7			--
	Test current:	635 A (245V a.c.)			--
	- 500 A				N/A
	- 10 I_N				P
	Power factor 0,93 - 0,98 ..... :	0,94			--
	Each overcurrent protected pole:				--
		[KA²s]	[KA²s]	[KA²s]	--
	Sequence: 6-0 and 3-CO ..... I²t max.	4,09	3,56	3,77	P
	I_{peak} (A) max. value ..... :	868A			--
	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	The RCBO shall show no damage impairing their further use an shall be 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.= 264 V. The RCBO is in the open position	[mA]	[mA]	[mA]	--
	The leakage current shall not exceed 2 mA	< 0,01	< 0,01	< 0,01	P
9.12.12.1.b)	Dielectric strength test:				--
	Test voltage:				--
	a) 1500 V	1500 V, 1 min, 100 mA			P
	b) 1500 V	1500 V, 1 min, 100 mA			P
	c) 1500 V	1500 V, 1 min, 100 mA			P
	d) 1500 V				N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	e) 2000 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 position and during the test carried out under the conditions specified in 9.7.2 b) the indication means shall show the closed position				P
	Tests C_2	**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				
	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)	756			P
	Power factor 0,93-0,98:	0,97			P
	test voltage 105% of the rated phase to phase voltage	V			N/A
	test voltage 105% of U_0 for the pole marked N, if any	422 V			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.	4,59	4,46	4,02	P
	I_{peak} (A) max. value ..... :	1,03kA			--
	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	0,4°	30°	61°	P
	Point of initiation of the O operation (neutral pole): 60 ± 5°				N/A
	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
	The RCBO shall show no damage impairing their further use an shall be 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.= 253 V. The RCBO is in the open position	[mA]	[mA]	[mA]	--

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Clause	Requirement + Test	Result - Remark			Verdict
	The leakage current shall not exceed 2 mA	< 0,01	< 0,01	< 0,01	P
9.12.12.1.b)	Dielectric strength test:				--
	Test voltage:				--
	a) 1500 V	1500 V, 1 min, 100 mA			P
	b) 1500 V	1500 V, 1 min, 100 mA			P
	c) 1500 V	1500 V, 1 min, 100 mA			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), it shall be verified that the indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means shall show the closed position				P

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Clause	Requirement + Test	Result - Remark	Verdict

	TEST SEQUENCE "D" C63/1P+N/10mA/Type AC REMARK: All the sample was tested under 50/60Hz. All the data was the max data during the test under 50/60Hz						**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, except for test in 9.9.1.2 e),test at only one frequency.										P
	Tests performed with no load at 20 ± 5°C										P
9.9.1.4	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)						196V				--
Table 2	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							--
				$I_{\Delta N}$	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	--
		Any value	0,03	0,3	0,15	--	0,04	0,04	0,04		--
		Any value	>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	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 $I_{\Delta N}$				P
	0,85Un	7,19	7,18	7,18	--
	1,1Un	7.20	7,19	7,19	--
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				P
	0,85Un	27	28	28	
	1,1Un	28	29	28	
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]	--
	- $I_{\Delta N}$ **0,85Un**	33	32	35	P
	1,1Un	34	29	27	P
	- 2 $I_{\Delta N}$ **0,85Un**	25	23	23	P
	1,1Un	23	22	24	P
	- 5 $I_{\Delta N}$ or **0,85Un**	21	24	23	P
	1,1Un	20	25	22	P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	16	14	14	P
	1,1Un	15	12	12	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	Minimum non-actuating time at:				--
	- $I_{\Delta N}$ .....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				P
	No tripping during tests				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):				
	- 5 A (value 1 between 5A and 500A) **0,85Un**	20	19	20	P
	1,1Un	21	19	20	
	- 10 A (value 6 between 5A and 500A) **0,85Un**	18	22	19	P
	1,1Un	20	20	18	
	No value exceeds the relevant specified limiting value				P
f) 1)	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]	--
	- $I_{\Delta N}$ **0,85Un**	31	34	33	P
	1,1Un	32	32	32	
	- 2 $I_{\Delta N}$ **0,85Un**	24	23	23	P
	1,1Un	25	24	22	
	- 5 $I_{\Delta N}$ or **0,85Un**	18	18	19	P
	1,1Un	19	18	20	
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	15	13	13	P
	1,1Un	13	14	12	
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	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				P
	No tripping during tests				P
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 **0,85Un**	28	33	34	P
	1,1Un	29	22	28	
	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:				--
	- $I_{\Delta N}$ **0,85Un**	33	32	30	P
	1,1Un	34	35	29	
	- 2 $I_{\Delta N}$ **0,85Un**	25	24	22	P
	1,1Un	26	23	23	
	- 5 $I_{\Delta N}$ or **0,85Un**	22	21	19	P
	1,1Un	19	20	20	
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	15	14	16	P
	1,1Un	14	15	14	
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A

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	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				P
	No tripping during tests				P
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]	--
	- $I_{\Delta N}$ **0,85Un**	33	35	35	P
	1,1Un	34	32	34	
	- 2 $I_{\Delta N}$ **0,85Un**	26	24	25	P
	1,1Un	24	23	24	
	- 5 $I_{\Delta N}$ or **0,85Un**	18	20	19	P
	1,1Un	20	18	17	
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	14	12	13	P
	1,1Un	13	15	12	
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	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

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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					P
	No tripping during tests					P
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					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.					N/A
	For RCBOs functionally dependent on line voltage each test is made at					N/A
	- 1,1 U_N ..... :	V				--
	- 0,85 U_N ..... :	V				--
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)					N/A
	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 $I_{\Delta N}$ (sub-clause 5.3.8)			--
	90°	0,25 $I_{\Delta N}$				--
	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					N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s					N/A
	α = 0° +/-					N/A
	α = 90° +/-					N/A
	α = 135° +/-					N/A
	No value exceeds the relevant specified limiting values					N/A
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)					N/A

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Table 3	Type	I_N A	$I_{\Delta N}$ A	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								--
				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	350A **a)**	--
	General	Any value	<0,03		0,3		0,15			0,05	0,04	--
		Any value	0,03	0,3		0,15			0,04		0,04	--
		Any value	>0,03	0,3		0,15		0,04			0,04	--
	S	≥ 25	>0,03	0,5		0,2		0,15			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 $I_{\Delta N}$ < 30mA				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 $I_{\Delta N}$ = 30mA				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
	- $I_{\Delta t}$ ___ A +/-				N/A
	RCBOs with $I_{\Delta N}$ > 30mA				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				N/A
c)	Verification of the correct operation with the pole under test and one other pole loaded with rated current I_N	I_N = A			N/A

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	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				N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s				N/A
	α = 0° +/-				N/A
	α = 90° +/-				N/A
	α = 135° +/-				N/A
	No value exceeds the relevant specified limiting values				N/A
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				N/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				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) 6mA DC +/-				N/A
	No value exceeds the relevant specified limiting values				N/A
	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:				N/A
	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]	--

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	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
	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

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Clause	Requirement + Test	Result - Remark	Verdict

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:				--
	- $I_{\Delta N}$ .....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				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):				
	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:				--
	- $I_{\Delta N}$ .....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
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			--
	No tripping during tests				P
	After the test the RCBO shall trip with a test current of $I_{\Delta N}$	[ms]	[ms]	[ms]	--
		31	27	27	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1				P
	No value exceed the relevant specified limiting value				P
9.19.2	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			--
9.19.2.2	Test results for S-type RCBOs: No tripping during tests				N/A
9.19.2.3	Test results for RCBOs of the general type: During the test the RCBO may trip. After any tripping, the RCBO shall be re-closed				P
	No tripping during tests				P
	After the test the RCBO shall trip with a test current of $I_{\Delta N}$	[ms]	[ms]	[ms]	--
		35	33	34	P

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	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1				P
	No value exceed the relevant specified limiting value				P
9.12.13	Verification of the rated residual making and breaking capacity $I_{\Delta m}$				P
	$I_{\Delta m}$ (A) ..... :	2000 A			--
	Test circuit according to figure ..... :	Figure 9			--
	Cross-section (mm²) ..... :	16 mm²			--
	Grid distance a (mm) ..... :	35 mm			--
	Prospective current (A) ..... :	2000 A			--
	Prospective current obtained (A) ..... :	2050 A			--
	Power factor ..... :	0,85…0,90			--
	Power factor obtained ..... :	0,86			--
	I²t max sequence O-t-CO-t-CO	[KA²s]	[KA²s]	[KA²s]	--
		20,6	16,3	25,9	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
	On each pole in turn excluding the switched neutral pole				P
	RCBOs functionally dependent on the line voltage supplied with rated voltage.				N/A
	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	The RCBO shall show no damage impairing their further use an shall be capable without maintenance to withstand the following tests:				P
9.7.3	Dielectric strength test of the main circuit:				--
	2 U_N (V) for 1 min ..... :	2 U_N = 480 V			--
	a)	480 V, 1 min, 100 mA			P
	b)	480 V, 1 min, 100 mA			P
	c)	480 V, 1 min, 100 mA			P
	d)				N/A
	e)				N/A
	No flashover or breakdown				P
	Making and breaking I_N at U_N	240 V			P

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	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]	--
		20	23	21	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:				N/A
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				N/A
	U_N applied to the line terminals and progressively lowered to attain zero within about 30s until automatic opening occurs	[V]	[V]	[V]	--
	All values less than 0,85 U_N				N/A
	Tripping test:				N/A
	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:				N/A
	a) RCBOs opening without delay				N/A
	- 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				N/A
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

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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
	- 0,25A				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				N/A
	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

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Clause	Requirement + Test	Result - Remark	Verdict

	- 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:				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 (measured) 44,3mA-turns; 44,3mA-turns; 44,3mA-turns; not exceed 2,5 x 30 mA-1 turn 75 mA-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
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	Test voltage: 196 V			P
	b) Test a) repeated at 1,1 U_N	Test voltage: 256 V			P
	c) Test b) repeated, but only once, the operating means of the test device being held in the closed position for 30s				P
	RCBO operated at each test				P
	No change impairing further use				P

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	TEST SEQUENCE "D" C63/1P+N/10mA/Type A REMARK: All the sampl e was tested under 50/60Hz. All the data was the max data during the test under 50/60Hz						**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, except for test in 9.9.1.2 e),test at only one frequency.										P
	Tests performed with no load at 20 ± 5°C										P
9.9.1.4	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)						196V				--
Table 2	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							--
				$I_{\Delta N}$	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	--
		Any value	0,03	0,3	0,15	--	0,04	0,04	0,04		--
		Any value	>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	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 $I_{\Delta N}$				P
	0,85Un	7,20	7,15	7,18	--
	1,1Un	7,15	7,17	7,19	--
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				P
	0,85Un	26	28	28	
	1,1Un	27	27	26	
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]	--
	- $I_{\Delta N}$ **0,85Un**	29	33	31	P
	1,1Un	32	30	31	P
	- 2 $I_{\Delta N}$ **0,85Un**	25	27	27	P
	1,1Un	25	22	23	P
	- 5 $I_{\Delta N}$ or **0,85Un**	24	24	20	P
	1,1Un	21	22	18	P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	16	14	19	P
	1,1Un	15	12	16	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	Minimum non-actuating time at:				--
	- $I_{\Delta N}$ .....0,13 s				N/A

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	- 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				P
	No tripping during tests				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):				
	- 5 A (value 1 between 5A and 500A) **0,85Un**	18	13	14	P
	1,1Un	16	17	17	
	- 10 A (value 6 between 5A and 500A) **0,85Un**	14	11	12	P
	1,1Un	13	12	14	
	No value exceeds the relevant specified limiting value				P
f) 1)	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]	--
	- $I_{\Delta N}$ **0,85Un**	31	34	32	P
	1,1Un	32	32	30	P
	- 2 $I_{\Delta N}$ **0,85Un**	23	22	21	P
	1,1Un	24	20	20	P
	- 5 $I_{\Delta N}$ or **0,85Un**	20	21	19	P
	1,1Un	22	21	22	P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	20	19	18	P
	1,1Un	18	20	18	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A

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	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				P
	No tripping during tests				P
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 **0,85Un**	29	31	32	P
	1,1Un	33	30	31	
	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:				--
	- $I_{\Delta N}$ **0,85Un**	28	27	23	P
	1,1Un	24	23	22	P
	- 2 $I_{\Delta N}$ **0,85Un**	24	23	23	P
	1,1Un	21	20	19	P
	- 5 $I_{\Delta N}$ or **0,85Un**	19	21	20	P
	1,1Un	20	19	22	P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	17	18	20	P
	1,1Un	16	20	21	P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A

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	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				P
	No tripping during tests				P
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]	--
	- $I_{\Delta N}$ **0,85Un**	33	34	31	P
	1,1Un	30	29	31	P
	- 2 $I_{\Delta N}$ **0,85Un**	24	25	24	P
	1,1Un	19	21	23	
	- 5 $I_{\Delta N}$ or **0,85Un**	20	21	21	P
	1,1Un	20	21	19	
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	18	20	20	P
	1,1Un	19	17	19	
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	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

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	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					P
	No tripping during tests					P
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.					N/A
	For RCBOs functionally dependent on line voltage each test is made at					P
	- 1,1 U_N.....:	264V				--
	- 0,85 U_N .....:	196V				--
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)					P
	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 $I_{\Delta N}$ (sub-clause 5.3.8)			--
	90°	0,25 $I_{\Delta N}$				--
	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			1,4 mA/s		P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s					N/A
	α = 0° +/-			7,82	7,82	7,83 P
	α = 90° +/-			6,95	6,97	6,58 P
	α = 135° +/-			7,56	7,56	7,59 P
	No value exceeds the relevant specified limiting values					N/A
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)					P

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Table 3	Type	I_N A	$I_{\Delta N}$ A	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								--
				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	350A **a)**	--
	General	Any value	<0,03		0,3		0,15			0,05	0,04	--
		Any value	0,03	0,3		0,15			0,04		0,04	--
		Any value	>0,03	0,3		0,15		0,04			0,04	--
	S	≥ 25	>0,03	0,5		0,2		0,15			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 .....:											--
	RCBOs with $I_{\Delta N}$ < 30mA											N/A
	Maximum break times at:											--
	- 2 $I_{\Delta N}$ +/-											P
	- 4 $I_{\Delta N}$ +/-											P
	- 0,5 A +/-											P
	- 350A or +/-											P
	- $I_{\Delta t}$ ___ A +/-											N/A
	RCBOs with $I_{\Delta N}$ = 30mA											P
	Maximum break times at:											--
	- 1,4 $I_{\Delta N}$ +/-											N/A
	- 2,8 $I_{\Delta N}$ +/-											N/A
	- 0,35 A +/-											N/A
	- 350A or +/-											N/A
	- $I_{\Delta t}$ ___ A +/-											N/A
	RCBOs with $I_{\Delta N}$ > 30mA											N/A
	Maximum break times at:											--
	- 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											N/A
c)	Verification of the correct operation with the pole under test and one other pole loaded with rated current I_N											P

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	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				P
	- 2 $I_{\Delta N}$ for $I_{\Delta N}$ ≤ 0,01 A with 2 $I_{\Delta N}$ /30 A/s				N/A
	α = 0° +/-	7,91	7,90	7,92	P
	α = 90° +/-	6,81	6,81	6,82	P
	α = 135° +/-	7,54	7,55	7,57	P
	No value exceeds the relevant specified limiting values				N/A
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				P
	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				P
	- 2 $I_{\Delta N}$ for $I_{\Delta N}$ ≤ 0,01 A with 2 $I_{\Delta N}$ /30 A/s				P
	(I_1) α = 0° +/- (I_0) 6mA DC +/-				P
	No value exceeds the relevant specified limiting values				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:				N/A
	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]	--

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	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
	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

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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:				--
	- $I_{\Delta N}$ ..... 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				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):				
	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:				--
	- $I_{\Delta N}$ ..... 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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	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			--
	No tripping during tests				P
	After the test the RCBO shall trip with a test current of $I_{\Delta N}$	[ms]	[ms]	[ms]	--
		31	27	27	P
	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1				P
	No value exceed the relevant specified limiting value				P
9.19.2	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			--
9.19.2.2	Test results for S-type RCBOs: No tripping during tests				N/A
9.19.2.3	Test results for RCBOs of the general type: During the test the RCBO may trip. After any tripping, the RCBO shall be re-closed				P
	No tripping during tests				P
	After the test the RCBO shall trip with a test current of $I_{\Delta N}$	[ms]	[ms]	[ms]	--
		35	333	34	P

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	Test switch S_2 and RCBO in the closed position, test voltage established by closing the test switch S_1				P
	No value exceed the relevant specified limiting value				P
9.12.13	Verification of the rated residual making and breaking capacity $I_{\Delta m}$				P
	$I_{\Delta m}$ (A) .....:	2000 A			--
	Test circuit according to figure .....:	Figure 9			--
	Cross-section (mm²).....:	16 mm²			--
	Grid distance a (mm).....:	35 mm			--
	Prospective current (A).....:	2000 A			--
	Prospective current obtained (A).....:	2050 A			--
	Power factor .....:	0,85…0,90			--
	Power factor obtained .....:	0,86			--
	I²t max sequence O-t-CO-t-CO	[KA²s]	[KA²s]	[KA²s]	--
		2,16	2,09	2,33	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
	On each pole in turn excluding the switched neutral pole				P
	RCBOs functionally dependent on the line voltage supplied with rated voltage.				N/A
	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	The RCBO shall show no damage impairing their further use an shall be capable without maintenance to withstand the following tests:				P
9.7.3	Dielectric strength test of the main circuit:				--
	2 U_N (V) for 1 min .....:	2 U_N = 480 V			--
	a)	480 V, 1 min, 100 mA			P
	b)	480 V, 1 min, 100 mA			P
	c)	480 V, 1 min, 100 mA			P
	d)				N/A
	e)				N/A
	No flashover or breakdown				P
	Making and breaking I_N at U_N	240 V			P

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	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]	--
		18	20	21	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:				N/A
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				N/A
	U_N applied to the line terminals and progressively lowered to attain zero within about 30s until automatic opening occurs	[V]	[V]	[V]	--
	All values less than 0,85 U_N				N/A
	Tripping test:				N/A
	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:				N/A
	a) RCBOs opening without delay				N/A
	- 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				N/A
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

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Clause	Requirement + Test	Result - Remark	Verdict

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
	- 0,25A				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				N/A
	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

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	- 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:				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 (measured) 21,6mA-turns; 21,4mA-turns; 21,8mA-turns; not exceed 2,5 x 10 mA-1 turn 25 mA-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
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	Test voltage: 196 V			P
	b) Test a) repeated at 1,1 U_N	Test voltage: 256 V			P
	c) Test b) repeated, but only once, the operating means of the test device being held in the closed position for 30s				P
	RCBO operated at each test				P
	No change impairing further use				P

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Clause	Requirement + Test	Result - Remark	Verdict

	TEST SEQUENCE "D" C63/1P+N/30mA/Type AC REMARK: All the sample was tested under 50/60Hz. All the data was the max data during the test under 50/60Hz	**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, except for test in 9.9.1.2 e),test at only one frequency.		P
	Tests performed with no load at 20 ± 5°C		P
9.9.1.4	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)	196V	--

Table 2	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							--
				$I_{\Delta N}$	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	--
		Any value	0,03	0,3	0,15	--	0,04	0,04	0,04		--
		Any value	>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	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 $I_{\Delta N}$				P
	0,85Un	21,9			--
	1,1Un	21,8			--
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				P
	0,85Un	29			P
	1,1Un	28			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]	--
	- $I_{\Delta N}$ **0,85Un**	25			P
	1,1Un	26			P
	- 2 $I_{\Delta N}$ **0,85Un**	29			P
	1,1Un	28			P
	- 5 $I_{\Delta N}$ or **0,85Un**	17			P
	1,1Un	18			P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	16			P
	1,1Un	14			P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	Minimum non-actuating time at:				--
	- $I_{\Delta N}$ .....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				P
	No tripping during tests				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):				
	- 5 A (value 1 between 5A and 500A) **0,85Un**	20			P
	1,1Un	23			
	- 200 A (value 6 between 5A and 500A) **0,85Un**	20			P
	1,1Un	21			
	No value exceeds the relevant specified limiting value				P
f) 1)	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]	--
	- $I_{\Delta N}$ **0,85Un**	30			P
	1,1Un	27			
	- 2 $I_{\Delta N}$ **0,85Un**	28			P
	1,1Un	29			
	- 5 $I_{\Delta N}$ or **0,85Un**	17			P
	1,1Un	18			
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	15			P
	1,1Un	13			
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	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				P
	No tripping during tests				P
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 **0,85Un**	28			P
	1,1Un	30			
	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:				--
	- $I_{\Delta N}$ **0,85Un**	27			P
	1,1Un	28			
	- 2 $I_{\Delta N}$ **0,85Un**	29			P
	1,1Un	31			
	- 5 $I_{\Delta N}$ or **0,85Un**	17			P
	1,1Un	16			
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	13			P
	1,1Un	15			
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	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				P
	No tripping during tests				P
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]	--
	- $I_{\Delta N}$ **0,85Un**	29			P
	1,1Un	30			
	- 2 $I_{\Delta N}$ **0,85Un**	31			P
	1,1Un	27			
	- 5 $I_{\Delta N}$ or **0,85Un**	19			P
	1,1Un	17			
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	15			P
	1,1Un	16			
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	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

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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		P
	No tripping during tests		P
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		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.		N/A
	For RCBOs functionally dependent on line voltage each test is made at		N/A
	- 1,1 U_N ..... :	V	--
	- 0,85 U_N ..... :	V	--
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)		N/A
	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 $I_{\Delta N}$ (sub-clause 5.3.8)		--
	90° / 0,25 $I_{\Delta N}$		--
	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		N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s		N/A
	α = 0° +/-		N/A
	α = 90° +/-		N/A
	α = 135° +/-		N/A
	No value exceeds the relevant specified limiting values		N/A
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)		N/A

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Table 3	Type	I_N A	$I_{\Delta N}$ A	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								--
				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	350A **a)**	--
	General	Any value	<0,03		0,3		0,15			0,05	0,04	--
		Any value	0,03	0,3		0,15			0,04		0,04	--
		Any value	>0,03	0,3		0,15		0,04			0,04	--
	S	≥ 25	>0,03	0,5		0,2		0,15			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 $I_{\Delta N}$ < 30mA				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 $I_{\Delta N}$ = 30mA				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
	- $I_{\Delta t}$ ___ A +/-				N/A
	RCBOs with $I_{\Delta N}$ > 30mA				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				N/A
c)	Verification of the correct operation with the pole under test and one other pole loaded with rated current I_N	I_N = A			N/A

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	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				N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s				N/A
	α = 0° +/-				N/A
	α = 90° +/-				N/A
	α = 135° +/-				N/A
	No value exceeds the relevant specified limiting values				N/A
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				N/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				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) 6mA DC +/-				N/A
	No value exceeds the relevant specified limiting values				N/A

	TEST SEQUENCE "D" C63/1P+N/30mA/Type A REMARK: All the sample was tested under 50/60Hz. All the data was the max data during the test under 50/60Hz	**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, except for test in 9.9.1.2 e),test at only one frequency.		P

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	Tests performed with no load at 20 ± 5°C										P
9.9.1.4	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)						196V				--
Table 2	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							--
				$I_{\Delta N}$	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	--
		Any value	0,03	0,3	0,15	--	0,04	0,04	0,04		--
		Any value	>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 $I_{\Delta N}$										P
	0,85Un						22,2				--
	1,1Un						21,9				--
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										P

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Clause	Requirement + Test	Result - Remark			Verdict
	0,85Un	24			
	1,1Un	28			
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]	--
	- $I_{\Delta N}$ **0,85Un**	25			P
	1,1Un	25			P
	- 2 $I_{\Delta N}$ **0,85Un**	25			P
	1,1Un	25			P
	- 5 $I_{\Delta N}$ or **0,85Un**	27			P
	1,1Un	21			P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	19			P
	1,1Un	18			P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	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				P
	No tripping during tests				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):				
	- 5 A (value 1 between 5A and 500A) **0,85Un**	18			P
	1,1Un	16			
	- 200 A (value 6 between 5A and 500A) **0,85Un**	14			P

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	1,1Un	13			
	No value exceeds the relevant specified limiting value				P
f) 1)	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]	--
	- $I_{\Delta N}$ **0,85Un**	23			P
	1,1Un	20			P
	- 2 $I_{\Delta N}$ **0,85Un**	23			P
	1,1Un	24			P
	- 5 $I_{\Delta N}$ or **0,85Un**	20			P
	1,1Un	22			P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	20			P
	1,1Un	18			P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	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				P
	No tripping during tests				P
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]	--

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Clause	Requirement + Test	Result - Remark			Verdict
	-no value exceeds the specified limiting value **0,85Un**	40			P
	1,1Un	41			
	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:				--
	- $I_{\Delta N}$ **0,85Un**	28			P
	1,1Un	24			P
	- 2 $I_{\Delta N}$ **0,85Un**	24			P
	1,1Un	21			P
	- 5 $I_{\Delta N}$ or **0,85Un**	19			P
	1,1Un	20			P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	17			P
	1,1Un	16			P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	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				P
	No tripping during tests				P
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

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Clause	Requirement + Test	Result - Remark	Verdict

	Maximum break times at:	[ms]	[ms]	[ms]	--
	- $I_{\Delta N}$ **0,85Un**	28			P
	1,1Un	25			
	- 2 $I_{\Delta N}$ **0,85Un**	24			P
	1,1Un	19			
	- 5 $I_{\Delta N}$ or **0,85Un**	20			P
	1,1Un	20			
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	18			P
	1,1Un	19			
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	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				P
	No tripping during tests				P
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.				N/A
	For RCBOs functionally dependent on line voltage each test is made at				P
	- 1,1 U_N.....:	264V			--

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Clause	Requirement + Test	Result - Remark	Verdict

	- 0,85 U_N .....:						196V					--
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)											P
	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 $I_{\Delta N}$ (sub-clause 5.3.8)									--
	90°	0,25 $I_{\Delta N}$										--
	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						1,4 mA/s					P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s											N/A
	α = 0° +/-						22,1					P
	α = 90° +/-						22,4					P
	α = 135° +/-						24,7					P
	No value exceeds the relevant specified limiting values											N/A
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)											P
Table 3	Type	I_N A	$I_{\Delta N}$ A	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								--
				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	350A **a)**	--
	General	Any value	<0,03		0,3		0,15			0,05	0,04	--
		Any value	0,03	0,3		0,15			0,04		0,04	--
		Any value	>0,03	0,3		0,15		0,04			0,04	--
	S	≥ 25	>0,03	0,5		0,2		0,15			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 $I_{\Delta N}$ < 30mA											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

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Clause	Requirement + Test	Result - Remark			Verdict
	- 350A or +/-				N/A
	- $I_{\Delta t}$ ___ A +/-				N/A
	RCBOs with $I_{\Delta N}$ = 30mA				P
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 1,4 $I_{\Delta N}$ +/-	29			P
	- 2,8 $I_{\Delta N}$ +/-	22			P
	- 0,35 A +/-	19			P
	- 350A or +/-	14			P
	- $I_{\Delta t}$ ___ A +/-				N/A
	RCBOs with $I_{\Delta N}$ > 30mA				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				N/A
c)	Verification of the correct operation with the pole under test and one other pole loaded with rated current I_N	I_N =63 A			N/A
	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				P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s				N/A
	α = 0° +/-	22,2			P
	α = 90° +/-	22,5			P
	α = 135° +/-	24,7			P
	No value exceeds the relevant specified limiting values				N/A
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				P
	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				P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s				N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	(I_1) α = 0° +/- (I_0) 6mA DC +/-		P
	No value exceeds the relevant specified limiting values		P

	TEST SEQUENCE "D" C63/1P+N/100mA/type AC REMARK: All the sample was tested under 50/60Hz. All the data was the max data during the test under 50/60Hz						**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, except for test in 9.9.1.2 e),test at only one frequency.										P
	Tests performed with no load at 20 ± 5°C										P
9.9.1.4	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)						196V				--
Table 2	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							--
				$I_{\Delta N}$	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	--
		Any value	0,03	0,3	0,15	--	0,04	0,04	0,04		--
		Any value	>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	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 $I_{\Delta N}$				P
	0,85Un	84,7			--
	1,1Un	84,6			--
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				P
	0,85Un	161			P
	1,1Un	164			
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]	--
	- $I_{\Delta N}$ **0,85Un**	149			P
	1,1Un	151			P
	- 2 $I_{\Delta N}$ **0,85Un**	64			P
	1,1Un	74			P
	- 5 $I_{\Delta N}$ or **0,85Un**	59			P
	1,1Un	68			P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	58			P
	1,1Un	57			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:				N/A
	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
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):				
	- 5 A (value 1 between 5A and 500A) **0,85Un**	53			P
	1,1Un	56			
	- 200 A (value 6 between 5A and 500A) **0,85Un**	54			P
	1,1Un	61			
	No value exceeds the relevant specified limiting value				P
f) 1)	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]	--
	- $I_{\Delta N}$ **0,85Un**	155			P
	1,1Un	153			P
	- 2 $I_{\Delta N}$ **0,85Un**	75			P
	1,1Un	67			P
	- 5 $I_{\Delta N}$ or **0,85Un**	55			P
	1,1Un	57			P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	53			P

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Clause	Requirement + Test	Result - Remark	Verdict

	1,1Un	58			P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				P
	Minimum non-actuating time at:				--
	- $I_{\Delta N}$ .....0,13 s				P
	- 2 $I_{\Delta N}$ .....0,06 s				P
	- 5 $I_{\Delta N}$ .....0,05 s				P
	- $I_{\Delta t}$ .....0,04 s				P
	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				P
	No tripping during tests				P
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 **0,85Un**	162			P
	1,1Un	162			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:				--
	- $I_{\Delta N}$ **0,85Un**	155			P
	1,1Un	161			P
	- 2 $I_{\Delta N}$ **0,85Un**	71			P
	1,1Un	74			P
	- 5 $I_{\Delta N}$ or **0,85Un**	58			P
	1,1Un	61			P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	53			P

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Clause	Requirement + Test	Result - Remark	Verdict

	1,1Un	53			P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	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
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]	--
	- $I_{\Delta N}$ **0,85Un**	163			P
	1,1Un	161			P
	- 2 $I_{\Delta N}$ **0,85Un**	69			P
	1,1Un	76			P
	- 5 $I_{\Delta N}$ or **0,85Un**	62			P
	1,1Un	59			P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	55			P
	1,1Un	56			P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	Minimum non-actuating time at:				--
	- $I_{\Delta N}$ .....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
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.	All the tests were tested under 50/60Hz, and the electrical data was the max. Number.			P
	For RCBOs functionally dependent on line voltage each test is made at				N/A
	- 1,1 U_N ..... :	264V			--
	- 0,85 U_N ..... :	196V			--
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)				P
	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 $I_{\Delta N}$ (sub-clause 5.3.8)		--
	90°	0,25 $I_{\Delta N}$			--
	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				P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s				P
	α = 0° +/-		95,6		P
	α = 90° +/-		87,2		P
	α = 135° +/-		96,1		P
	No value exceeds the relevant specified limiting values				P

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Clause	Requirement + Test	Result - Remark	Verdict

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)											P
Table 3	Type	I_N A	$I_{\Delta N}$ A	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								--
				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	350A **a)**	--
	General	Any value	<0,03		0,3		0,15			0,05	0,04	--
		Any value	0,03	0,3		0,15			0,04		0,04	--
		Any value	>0,03	0,3		0,15		0,04			0,04	--
	S	≥ 25	>0,03	0,5		0,2		0,15			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 $I_{\Delta N}$ < 30mA											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 $I_{\Delta N}$ = 30mA											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
	- $I_{\Delta t}$ ___ A +/-											N/A
	RCBOs with $I_{\Delta N}$ > 30mA											P
	Maximum break times at:								[ms]	[ms]	[ms]	--
	- 1,4 $I_{\Delta N}$ +/-								203			P
	- 2,8 $I_{\Delta N}$ +/-								90			P
	- 7 $I_{\Delta N}$ +/-								104			P
	- 350A or +/-								91			P
	- $I_{\Delta t}$ ___ A +/-											N/A
	No value exceeds the specified limiting values											P

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Clause	Requirement + Test	Result - Remark	Verdict

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				N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s				N/A
	α = 0° +/-				N/A
	α = 90° +/-				N/A
	α = 135° +/-				N/A
	No value exceeds the relevant specified limiting values				N/A
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				P
	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				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) 6mA DC +/-				N/A
	No value exceeds the relevant specified limiting values				P

	TEST SEQUENCE "D" C63/1P+N/100mA/Type A	**D1**	--
	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, except for test in 9.9.1.2 e),test at only one frequency.		P
	Tests performed with no load at 20 ± 5°C		P

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Clause	Requirement + Test	Result - Remark	Verdict

9.9.1.4	For RCBOs functionally dependent on line voltage each test is made at:										P
	- 1,1 U_N (V) and						253V				--
	- 0,85 U_N (V)						196V				--
Table 2	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							--
				$I_{\Delta N}$	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	--
		Any value	0,03	0,3	0,15	--	0,04	0,04	0,04		--
		Any value	>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 $I_{\Delta N}$										P
	0,85Un						81,3				P
	1,1Un						81,9				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				P
	0,85Un	48			P
	1,1Un	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]	--
	- $I_{\Delta N}$ **0,85Un**	40			P
	1,1Un	35			P
	- 2 $I_{\Delta N}$ **0,85Un**	34			P
	1,1Un	30			P
	- 5 $I_{\Delta N}$ or **0,85Un**	26			P
	1,1Un	25			P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	16			P
	1,1Un	17			P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	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				P
	No tripping during tests				P

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Clause	Requirement + Test	Result - Remark	Verdict

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):				
	- 10 A (value 1 between 5A and 500A)				P
	0,85Un	16			P
	1,1Un	12			P
	- 50 A (value 6 between 5A and 500A)				P
	0,85Un	16			P
	1,1Un	12			P
	No value exceeds the relevant specified limiting value				P
f) 1)	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]	--
	- $I_{\Delta N}$ **0,85Un**	37			P
	1,1Un	36			P
	- 2 $I_{\Delta N}$ **0,85Un**	31			P
	1,1Un	27			P
	- 5 $I_{\Delta N}$ or **0,85Un**	26			P
	1,1Un	24			P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	18			P
	1,1Un	19			P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	Minimum non-actuating time at:				--
	- $I_{\Delta N}$ .....0,13 s				N/A
	- 2 $I_{\Delta N}$ .....0,06 s				N/A

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	- 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				P
	No tripping during tests				P
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				P
	0,85Un	48			P
	1,1Un	45			
	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:				--
	- $I_{\Delta N}$ **0,85Un**	40			P
	1,1Un	32			
	- 2 $I_{\Delta N}$ **0,85Un**	36			P
	1,1Un	34			P
	- 5 $I_{\Delta N}$ or **0,85Un**	26			P
	1,1Un	22			P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	16			P
	1,1Un	18			P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	Minimum non-actuating time at:				--
	- $I_{\Delta N}$ .....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				P
	No tripping during tests				P
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]	--
	- $I_{\Delta N}$ **0,85Un**	42			P
	1,1Un	38			P
	- 2 $I_{\Delta N}$ **0,85Un**	30			P
	1,1Un	29			P
	- 5 $I_{\Delta N}$ or **0,85Un**	26			P
	1,1Un	24			P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	16			P
	1,1Un	15			P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	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

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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					P
	No tripping during tests					P
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.					N/A
	For RCBOs functionally dependent on line voltage each test is made at					P
	- 1,1 U_N .....:	264V				--
	- 0,85 U_N .....:	196V				--
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)					P
	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 $I_{\Delta N}$ (sub-clause 5.3.8)			--
	90°	0,25 $I_{\Delta N}$				--
	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					N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s					P
	α = 0° +/-			79,5		P
	α = 90° +/-			71,5		P
	α = 135° +/-			85,3		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)					P

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Clause	Requirement + Test	Result - Remark	Verdict

Table 3	Type	I_N A	$I_{\Delta N}$ A	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								--
				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	350 A **a)**	--
	General	Any value	<0,03		0,3		0,15			0,05	0,04	--
		Any value	0,03	0,3		0,15			0,04		0,04	--
		Any value	>0,03	0,3		0,15		0,04			0,04	--
	S	≥ 25	>0,03	0,5		0,2		0,15			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 $I_{\Delta N}$ < 30mA											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 $I_{\Delta N}$ = 30mA											P
	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
	- $I_{\Delta t}$ ___ A +/-											N/A
	RCBOs with $I_{\Delta N}$ > 30mA											N/A
	Maximum break times at:								[ms]	[ms]	[ms]	--
	- 1,4 $I_{\Delta N}$ +/-								32			P
	- 2,8 $I_{\Delta N}$ +/-								16			P
	- 7 $I_{\Delta N}$ +/-								14			P
	- 350A or +/-								11			P
	- $I_{\Delta t}$ ___ 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

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	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				P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s				N/A
	α = 0° +/-	78,4			P
	α = 90° +/-	76,5			P
	α = 135° +/-	80,3			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				P
	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				N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s				P
	(I_1) α = 0° +/- (I_0) 6mA DC +/-				P
	No value exceeds the relevant specified limiting values				P

	TEST SEQUENCE "D" C63/1P+N/300mA/Type AC	**D1**	--
	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, except for test in 9.9.1.2 e),test at only one frequency.		P
	Tests performed with no load at 20 ± 5°C		P

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Clause	Requirement + Test	Result - Remark	Verdict

9.9.1.4	For RCBOs functionally dependent on line voltage each test is made at:										P
	- 1,1 U_N (V) and						253V				--
	- 0,85 U_N (V)						196V				--
Table 2	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							--
				$I_{\Delta N}$	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	--
		Any value	0,03	0,3	0,15	--	0,04	0,04	0,04		--
		Any value	>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 $I_{\Delta N}$										P
	0,85Un						218				P
	1,1Un						223				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				--
	0,85Un	36			P
	1,1Un	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]	--
	- $I_{\Delta N}$ **0,85Un**	35			P
	1,1Un	31			P
	- 2 $I_{\Delta N}$ **0,85Un**	29			P
	1,1Un	30			P
	- 5 $I_{\Delta N}$ or **0,85Un**	27			P
	1,1Un	25			P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	17			P
	1,1Un	15			P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	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				P
	No tripping during tests				P

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Clause	Requirement + Test	Result - Remark	Verdict

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
	- 5 A (value 1 between 5A and 500A)				P
	0,85Un	15			P
	1,1Un	14			P
	- 10 A (value 6 between 5A and 500A)				P
	0,85Un	11			P
	1,1Un	14			P
	No value exceeds the relevant specified limiting value				P
f) 1)	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]	--
	- $I_{\Delta N}$				P
	0,85Un	34			
	1,1Un	32			
	- 2 $I_{\Delta N}$				P
	0,85Un	31			
	1,1Un	30			P
	- 5 $I_{\Delta N}$ or				P
	0,85Un	25			
	1,1Un	16			P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A				P
	0,85Un	18			
	1,1Un	19			P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	Minimum non-actuating time at:				--
	- $I_{\Delta N}$ .....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				P
	No tripping during tests				P
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				P
	0,85Un **1,1Un**	36 35			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:				--
	- $I_{\Delta N}$ **0,85Un**	29			P
	1,1Un	32			
	- 2 $I_{\Delta N}$ **0,85Un**	26			P
	1,1Un	27			P
	- 5 $I_{\Delta N}$ or **0,85Un**	28			P
	1,1Un	22			P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	16			P
	1,1Un	18			
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	Minimum non-actuating time at:				--

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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				P
	No tripping during tests				P
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]	--
	- $I_{\Delta N}$ **0,85Un**	30			P
	1,1Un	31			P
	- 2 $I_{\Delta N}$ **0,85Un**	25			P
	1,1Un	26			P
	- 5 $I_{\Delta N}$ or **0,85Un**	24			P
	1,1Un	25			P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	18			P
	1,1Un	17			P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	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

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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		P
	No tripping during tests		P
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		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.		N/A
	For RCBOs functionally dependent on line voltage each test is made at		N/A
	- 1,1 U_N .....:		--
	- 0,85 U_N .....:		--
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)		N/A
	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 $I_{\Delta N}$ (sub-clause 5.3.8)			--
	90°	0,25 $I_{\Delta N}$				--
	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					N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s					N/A
	α = 0° +/-					N/A
	α = 90° +/-					N/A
	α = 135° +/-					N/A
	No value exceeds the relevant specified limiting values					N/A
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)					N/A

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Table 3	Type	I_N A	$I_{\Delta N}$ A	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								--
				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	350 A **a)**	--
	General	Any value	<0,03		0,3		0,15			0,05	0,04	--
		Any value	0,03	0,3		0,15			0,04		0,04	--
		Any value	>0,03	0,3		0,15		0,04			0,04	--
	S	≥ 25	>0,03	0,5		0,2		0,15			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 $I_{\Delta N}$ < 30mA											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 $I_{\Delta N}$ = 30mA											P
	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
	- $I_{\Delta t}$ ___ A +/-											N/A
	RCBOs with $I_{\Delta N}$ > 30mA											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											N/A
c)	Verification of the correct operation with the pole under test and one other pole loaded with rated current I_N								I_N = 63A			N/A

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	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				N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N}$ ≤ 0,01 A with 2 $I_{\Delta N}$ /30 A/s				N/A
	α = 0° +/-				N/A
	α = 90° +/-				N/A
	α = 135° +/-				N/A
	No value exceeds the relevant specified limiting values				N/A
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				N/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				N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N}$ ≤ 0,01 A with 2 $I_{\Delta N}$ /30 A/s				N/A
	(I_1) α = 0° +/- (I_0) 6mA DC +/-				N/A
	No value exceeds the relevant specified limiting values				N/A

	TEST SEQUENCE "D" C63/1P+N/300mA/Type A	**D1**	--
	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, except for test in 9.9.1.2 e),test at only one frequency.		P
	Tests performed with no load at 20 ± 5°C		P
9.9.1.4	For RCBOs functionally dependent on line voltage each test is made at:		P

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Clause	Requirement + Test	Result - Remark	Verdict

	- 1,1 U_N (V) and						253V				--
	- 0,85 U_N (V)						196V				--
Table 2	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							--
				$I_{\Delta N}$	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	--
		Any value	0,03	0,3	0,15	--	0,04	0,04	0,04		--
		Any value	>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 $I_{\Delta N}$										P
	0,85Un						231				P
	1,1Un						236				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										P
	0,85Un						45				P

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Clause	Requirement + Test	Result - Remark	Verdict

	1,1Un	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]	--
	- $I_{\Delta N}$ **0,85Un**	40			P
	1,1Un	45			P
	- 2 $I_{\Delta N}$ **0,85Un**	28			P
	1,1Un	30			P
	- 5 $I_{\Delta N}$ or **0,85Un**	26			P
	1,1Un	25			P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	16			P
	1,1Un	16			P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	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				P
	No tripping during tests				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):				
	- 10 A (value 1 between 5A and 500A)				P
	0,85Un	14			P

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Clause	Requirement + Test	Result - Remark			Verdict
	1,1Un	12			P
	- 50 A (value 6 between 5A and 500A)				P
	0,85Un	11			P
	1,1Un	12			P
	No value exceeds the relevant specified limiting value				P
f) 1)	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]	--
	- $I_{\Delta N}$ **0,85Un**	37			P
	1,1Un	36			P
	- 2 $I_{\Delta N}$ **0,85Un**	28			P
	1,1Un	27			P
	- 5 $I_{\Delta N}$ or **0,85Un**	26			P
	1,1Un	26			P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	18			P
	1,1Un	19			P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	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				P
	No tripping during tests				P

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Clause	Requirement + Test	Result - Remark	Verdict

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				P
	0,85Un	45			P
	1,1Un	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:				--
	- $I_{\Delta N}$ **0,85Un**	40			P
	1,1Un	38			
	- 2 $I_{\Delta N}$ **0,85Un**	28			P
	1,1Un	24			P
	- 5 $I_{\Delta N}$ or **0,85Un**	26			P
	1,1Un	24			P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	16			P
	1,1Un	18			P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	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				P

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Clause	Requirement + Test	Result - Remark	Verdict

	No tripping during tests				P
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]	--
	- $I_{\Delta N}$ **0,85Un**	36			P
	1,1Un	38			P
	- 2 $I_{\Delta N}$ **0,85Un**	27			P
	1,1Un	29			P
	- 5 $I_{\Delta N}$ or **0,85Un**	23			P
	1,1Un	24			P
	- 0,25 A				N/A
	- $I_{\Delta t}$ 200 A **0,85Un**	17			P
	1,1Un	15			P
	No value exceeds the relevant specified limiting value				P
	Additional test for type S:				N/A
	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				P
	No tripping during tests				P
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				--

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Clause	Requirement + Test	Result - Remark	Verdict

	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.											N/A
	For RCBOs functionally dependent on line voltage each test is made at											P
	- 1,1 U_N .....:								264V			--
	- 0,85 U_N .....:								196V			--
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)											P
	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 $I_{\Delta N}$ (sub-clause 5.3.8)									--
	90°	0,25 $I_{\Delta N}$										--
	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											N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s											P
	α = 0° +/-								248			P
	α = 90° +/-								213			P
	α = 135° +/-								236			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)											P
Table 3	Type	I_N A	$I_{\Delta N}$ A	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								--
				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	350 A **a)**	--
	General	Any value	<0,03		0,3		0,15			0,05	0,04	--
		Any value	0,03	0,3		0,15			0,04		0,04	--
		Any value	>0,03	0,3		0,15		0,04			0,04	--
	S	≥ 25	>0,03	0,5		0,2		0,15			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											--

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Clause	Requirement + Test	Result - Remark	Verdict

	Angle α.....:	α = 0°			--
	RCBOs with $I_{\Delta N}$ < 30mA				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 $I_{\Delta N}$ = 30mA				P
	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
	- $I_{\Delta t}$ ___ A +/-				N/A
	RCBOs with $I_{\Delta N}$ > 30mA				N/A
	Maximum break times at:	[ms]	[ms]	[ms]	--
	- 1,4 $I_{\Delta N}$ +/-	29			P
	- 2,8 $I_{\Delta N}$ +/-	29			P
	- 7 $I_{\Delta N}$ +/-	27			P
	- 350A or +/-	28			P
	- $I_{\Delta t}$ ___ 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				P
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s				N/A
	α = 0° +/-	249			P
	α = 90° +/-	214			P
	α = 135° +/-	236			P
	No value exceeds the relevant specified limiting values				P

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Clause	Requirement + Test	Result - Remark	Verdict

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				P
	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				N/A
	- 2 $I_{\Delta N}$ for $I_{\Delta N} \leq$ 0,01 A with 2 $I_{\Delta N}$ /30 A/s				P
	(I_1) α = 0° +/- (I_0) 6mA DC +/-				P
	No value exceeds the relevant specified limiting values				P

	TEST SEQUENCE "E" C63/1P+N/10mA/Type AC	**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)..... :	63 A	--
	Cross-section (mm²) ..... :	16 mm²	--
	Instantaneous tripping current (B / C / D) ..... :	C	--
9.9.2.1	Test of time-current characteristic		P
a)	Test current 1,13 I_N starting from cold for ..... :	1,13 I_N = 71,2 A	--

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	- 1 h ($I_N \leq 63$ A)				P
	- 2 h ($I_N > 63$ A)				N/A
	No tripping				P
	Then steadily increased within 5 s to 1,45 I_N ..... :	1,45 I_N = 91,2 A			P
	Tripping within	[min]	[min]	[min]	--
	- 1h (< 63 A)	31,6s	72s	59,2s	P
	- 2h (> 63 A)				N/A
b)	Test current 2,55 I_N starting from cold ..... :	2,55 I_N = 161 A			--
	Opening time not less than 1 s or more than	[s]	[s]	[s]	P
	- 60 s (≤ 32 A)				N/A
	- 120 s (> 32 A)	11,9	15,6	17,1	P
9.9.2.2	Test of instantaneous tripping:				P
a)	General test conditions				P
	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:				P
	- At any convenient voltage, one opening operation on each combination of two poles connected in series . The tripping time is measured and shall 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	[s]	[s]	[s]	--
		9,45ms	8,63ms	9,11ms	P
	After each operation the indication means shall 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

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Clause	Requirement + Test	Result - Remark	Verdict

	Test current 5 I_N starting from cold ..... :	5 I_N = 315 A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				P
	Test current 10 I_N starting from cold ..... :	10 I_N = 630 A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s	9,45ms	8,63ms	9,11ms	P
d)	☐ D				N/A
	Test current 10 I_N starting from cold ..... :	10 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 20 I_N starting from cold ..... :	20 I_N = A			
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				N/A
9.9.2.3	Test of effect of ambient temperature on the tripping characteristics:				P
a)	Ambient temperature of (- 5 ± 2)°C..... :	- 5 °C			--
	Test current 1,13 I_N ..... :				--
	- passed for 1 h				N/A
	- passed for 2 h				P
	Current is then steadily increased within 5s to 1,9 I_N				--
	Tripping:	[min]	[min]	[min]	--
	- 1 h	1min09s	1min48s	1min22s	P
	- 2 h				N/A
b)	Ambient temperature of (40 ± 2)°C..... :	40 °C			--
	Test current I_N				--
	No tripping within				--
	- 1 h	OK	OK	OK	P
	- 2 h				N/A

	Tests E_1		--
8	REQUIREMENTS FOR CONSTRUCTION AND OPERATION		--
8.8	RESISTANCE TO MECHANICAL SHOCK AND IMPACT		--
	RCBO' shall have adequate mechanical behaviour so as to withstand stresses imposed during installation and use		P

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Clause	Requirement + Test	Result - Remark	Verdict

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°				P
	- 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:				P
	10 blows from a height of 10 cm				--
	No damage				P
9.13.2.2	RCBOs for rail mounting:				P
	- downward vertical force of 50 N for 1 min				P
	- upward vertical force of 50 N for 1 min				P
	RCBO shall not become loose during test and shall not show any damage impairing its further use				P
9.13.2.3	RCBOs of plug-in type				N/A
	Under consideration				--
9.12.11.3	Test at 1500 A:				P
	Prospective current of 1500 A				P
	Cross-section (mm²).....:	25 mm²			--
	Grid distance a (mm).....:	a = 40 mm			--
	Power factor 0,93 – 0,98 .....:	0,93…0,98			--
	Prospective current obtained.....:	1520 A			--
	Power factor .....:	Obtain: 0,94			--
	Test circuit: .....:	Figure 9			--
	I_{peak} (A) max. value .....:	2,02 kA	2,04 kA	2,01 kA	--
	Sequence: 6-O and 3-CO I²t max	[KA²s]	[KA²s]	[KA²s]	--
		13,1	14,5	14,3	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				P
	No permanent arcing				P

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	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	The RCBO shall show no damage impairing their further use an shall be 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.= 264 V. The RCBO is in the open position	[mA]	[mA]	[mA]	--
	The leakage current shall not exceed 2 mA	< 0,01	< 0,01	< 0,01	P
9.12.12.1.b)	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	1500 V, 1 min, 100 mA			P
	b) 1500 V	1500 V, 1 min, 100 mA			P
	c) 1500 V	1500 V, 1 min, 100 mA			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), it shall be verified that the indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means shall show the closed position				P
9.12.12.1	Test current equal to 0,85 times the conventional non-tripping current for:	76,8 A			--
	- 1h starting from cold				P
	- 2h				N/A
	Increasing the current within 5s to 1,1 times the conventional tripping current	128 A			
	- tripping within	[min]	[min]	[min]	--
	- 1h (< 63 A)	2min36s	2min19s	2min23s	P
	- 2h (> 63 A)				N/A

	TEST SEQUENCE "E" C50/1P+N/10mA/Type AC	**E1 E2 E3**	--
	Tests E_0		--

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Clause	Requirement + Test	Result - Remark	Verdict

9.9	VERIFICATION OF THE OPERATING CHARACTERISTICS				--
9.9.2	Verification of the Operating characteristics under overcurrent conditions				--
	I_N (A)..... :	50 A			--
	Cross-section (mm²) ..... :	10 mm²			--
	Instantaneous tripping current (B / C / D) ..... :	C			--
9.9.2.1	Test of time-current characteristic				N/A
a)	Test current 1,13 IN starting from cold for :				--
	- 1 h (IN ≤ 63 A)				N/A
	- 2 h (IN > 63 A)				N/A
	No tripping				N/A
	Then steadily increased within 5 s to 1,45 IN :				N/A
	Tripping within	[min]	[min]	[min]	--
	- 1h (< 63 A)				N/A
	- 2h (> 63 A)				N/A
b)	Test current 2,55 I_N starting from cold ..... :				--
	Opening time not less than 1 s or more than	[s]	[s]	[s]	N/A
	- 60 s (≤ 32 A)				N/A
	- 120 s (> 32 A)				N/A
9.9.2.2	Test of instantaneous tripping:				P
a)	General test conditions				P
	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:				P
	- At any convenient voltage, one opening operation on each combination of two poles connected in series . The tripping time is measured and shall 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	[s]	[s]	[s]	--
		10,3ms			P
	After each operation the indication means shall show the open position of the contacts				P
b)	☐ B				N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	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 ..... :	5 I_N = 250 A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s	3,36			P
	Test current 10 I_N starting from cold ..... :	10 I_N = 500 A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s	9,21ms			P
d)	☐ D				N/A
	Test current 10 I_N starting from cold ..... :	10 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 20 I_N starting from cold ..... :	20 I_N = A			
		[s]	[s]	[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 (- 5 ± 2)°C..... :	- 5 °C			--
	Test current 1,13 I_N ..... :				--
	- passed for 1 h				N/A
	- passed for 2 h				N/A
	Current is then steadily increased within 5s to 1,9 I_N				--
	Tripping:	[min]	[min]	[min]	--
	- 1 h				N/A
	- 2 h				N/A
b)	Ambient temperature of (40 ± 2)°C..... :	40 °C			--
	Test current I_N				--
	No tripping within				--
	- 1 h				N/A
	- 2 h				N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	TEST SEQUENCE "E" C40/1P+N/10mA/Type AC	**E1**			--
	Tests E_0				--
9.9	VERIFICATION OF THE OPERATING CHARACTERISTICS				--
9.9.2	Verification of the Operating characteristics under overcurrent conditions				--
	I_N (A) ..... :	40 A			--
	Cross-section (mm²)..... :	10 mm²			--
	Instantaneous tripping current (B / C / D) ..... :	C			--
9.9.2.1	Test of time-current characteristic				P
a)	Test current 1,13 I_N starting from cold for ..... :				--
	- 1 h ($I_N \leq 63$ A)				P
	- 2 h ($I_N > 63$ A)				N/A
	No tripping				N/A
	Then steadily increased within 5 s to 1,45 I_N ..... :				P
	Tripping within	[min]	[min]	[min]	--
	- 1h (< 63 A)	56,7s			P
	- 2h (> 63 A)				N/A
b)	Test current 2,55 I_N starting from cold..... :				--
	Opening time not less than 1 s or more than	[s]	[s]	[s]	P
	- 60 s (≤ 32 A)				N/A
	- 120 s (> 32 A)	14,8s			P
9.9.2.2	Test of instantaneous tripping:				P
a)	General test conditions				P
	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:				P
	- At any convenient voltage, one opening operation on each combination of two poles connected in series . The tripping time is measured and shall 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

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Clause	Requirement + Test	Result - Remark			Verdict
	The tripping time of the O operation is measured	[s]	[s]	[s]	--
		10,1ms			P
	After each operation the indication means shall 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.....:	5 I_N = 200 A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s	13,5			P
	Test current 10 I_N starting from cold.....:	10 I_N = 400A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s	8,66ms			P
d)	☐ D				N/A
	Test current 10 I_N starting from cold.....:	10 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 20 I_N starting from cold.....:	20 I_N = A			
		[s]	[s]	[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 (- 5 ± 2)°C .....:				--
	Test current 1,13 I_N.....:				--
	- passed for 1 h				P
	- passed for 2 h				N/A
	Current is then steadily increased within 5s to 1,9 I_N				--
	Tripping:	[min]	[min]	[min]	--
	- 1 h	1min38s			P
	- 2 h				N/A
b)	Ambient temperature of (40 ± 2)°C .....:				--
	Test current I_N				--

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Clause	Requirement + Test	Result - Remark	Verdict

	No tripping within				--
	- 1 h	OK	OK	OK	P
	- 2 h				N/A

	TEST SEQUENCE "E" C32/1P+N/10mA/Type AC	**E1**			--
	Tests E_0				--
9.9	VERIFICATION OF THE OPERATING CHARACTERISTICS				--
9.9.2	Verification of the Operating characteristics under overcurrent conditions				--
	I_N (A) .....:	32 A			--
	Cross-section (mm²) .....:	6 mm²			--
	Instantaneous tripping current (B / C / D) .....:	C			--
9.9.2.1	Test of time-current characteristic				P
a)	Test current 1,13 I_N starting from cold for .....:				--
	- 1 h ($I_N \leq 63$ A)				P
	- 2 h ($I_N > 63$ A)				N/A
	No tripping				P
	Then steadily increased within 5 s to 1,45 I_N .....:				P
	Tripping within	[min]	[min]	[min]	--
	- 1h (< 63 A)	1min11s			P
	- 2h (> 63 A)				N/A
b)	Test current 2,55 I_N starting from cold .....:				--
	Opening time not less than 1 s or more than	[s]	[s]	[s]	P
	- 60 s (≤ 32 A)	17,4s			P
	- 120 s (> 32 A)				N/A
9.9.2.2	Test of instantaneous tripping:				P
a)	General test conditions				P
	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:				P
	- At any convenient voltage, one opening operation on each combination of two poles connected in series . The tripping time is measured and shall be within the limits of Table 10. test results see b) or c) or d)				P

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Clause	Requirement + Test	Result - Remark	Verdict

	- 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	[s]	[s]	[s]	--
		9,41ms			P
	After each operation the indication means shall 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 .....:	5 I_N = 160 A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s	13,8			P
	Test current 10 I_N starting from cold .....:	10 I_N = 320 A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s	9,98ms			P
d)	☐ D				N/A
	Test current 10 I_N starting from cold .....:	10 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 20 I_N starting from cold .....:	20 I_N = A			
		[s]	[s]	[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 (- 5 ± 2)°C .....:				--
	Test current 1,13 I_N .....:				--
	- passed for 1 h				P
	- passed for 2 h				N/A
	Current is then steadily increased within 5s to 1,9 I_N				--

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Clause	Requirement + Test	Result - Remark	Verdict

	Tripping:	[min]	[min]	[min]	--
	- 1 h	1min13s			P
	- 2 h				N/A
b)	Ambient temperature of (40 ± 2)°C.....:				--
	Test current I_N				--
	No tripping within				--
	- 1 h	OK			P
	- 2 h				N/A

	TEST SEQUENCE "E" C25/1P+N/10mA/Type AC	**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) .....:	25 A			--
	Cross-section (mm²) .....:	4 mm²			--
	Instantaneous tripping current (B / C / D) .....:	C			--
9.9.2.1	Test of time-current characteristic				P
a)	Test current 1,13 I_N starting from cold for.....:				--
	- 1 h ($I_N \leq 63$ A)				P
	- 2 h ($I_N > 63$ A)				N/A
	No tripping				P
	Then steadily increased within 5 s to 1,45 I_N.....:				P
	Tripping within	[min]	[min]	[min]	--
	- 1h (< 63 A)	59,4			P
	- 2h (> 63 A)				N/A
b)	Test current 2,55 I_N starting from cold .....:				--
	Opening time not less than 1 s or more than	[s]	[s]	[s]	P
	- 60 s (≤ 32 A)	16,6			P
	- 120 s (> 32 A)				N/A
9.9.2.2	Test of instantaneous tripping:				P
a)	General test conditions				P
	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:				P

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	- At any convenient voltage, one opening operation on each combination of two poles connected in series . The tripping time is measured and shall 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	[s]	[s]	[s]	--
		10,1ms			P
	After each operation the indication means shall 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 .....:	5 I_N = 125 A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s	13,2			P
	Test current 10 I_N starting from cold .....:	10 I_N = 250 A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s	10,7ms			P
d)	☐ D				N/A
	Test current 10 I_N starting from cold .....:	10 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 20 I_N starting from cold .....:	20 I_N = A			
		[s]	[s]	[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 (- 5 ± 2)°C .....:				--
	Test current 1,13 I_N.....:				--

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	- passed for 1 h				P
	- passed for 2 h				N/A
	Current is then steadily increased within 5s to 1,9 I_N				--
	Tripping:	[min]	[min]	[min]	--
	- 1 h	1min31s			P
	- 2 h				N/A
b)	Ambient temperature of (40 ± 2)°C.....:				--
	Test current I_N				--
	No tripping within				--
	- 1 h				P
	- 2 h				N/A

	TEST SEQUENCE "E" C20/1P+N/10mA/Type AC	**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) .....:	20 A			--
	Cross-section (mm²) .....:	2,5 mm²			--
	Instantaneous tripping current (B / C / D) .....:	C			--
9.9.2.1	Test of time-current characteristic				P
a)	Test current 1,13 I_N starting from cold for.....:				--
	- 1 h ($I_N \leq 63$ A)				P
	- 2 h ($I_N > 63$ A)				N/A
	No tripping				P
	Then steadily increased within 5 s to 1,45 I_N.....:				P
	Tripping within	[min]	[min]	[min]	--
	- 1h (< 63 A)	1min04s			P
	- 2h (> 63 A)				N/A
b)	Test current 2,55 I_N starting from cold .....:				--
	Opening time not less than 1 s or more than	[s]	[s]	[s]	P
	- 60 s (≤ 32 A)	19,6s			P
	- 120 s (> 32 A)				N/A
9.9.2.2	Test of instantaneous tripping:				P
a)	General test conditions				P

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	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:				P
	- At any convenient voltage, one opening operation on each combination of two poles connected in series . The tripping time is measured and shall 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	[s]	[s]	[s]	--
		9,37ms			P
	After each operation the indication means shall 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 .....:	5 I_N = 100 A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s	9,1			P
	Test current 10 I_N starting from cold .....:	10 I_N = 202 A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s	10,1ms			P
d)	☐ D				N/A
	Test current 10 I_N starting from cold .....:	10 I_N =	A		--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 20 I_N starting from cold .....:	20 I_N =	A		
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				N/A

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9.9.2.3	Test of effect of ambient temperature on the tripping characteristics:				
a)	Ambient temperature of (- 5 ± 2)°C .....:				--
	Test current 1,13 I_N.....:				--
	- passed for 1 h				P
	- passed for 2 h				N/A
	Current is then steadily increased within 5s to 1,9 I_N				--
	Tripping:	[min]	[min]	[min]	--
	- 1 h	1min16s			P
	- 2 h				N/A
b)	Ambient temperature of (40 ± 2)°C.....:				--
	Test current I_N				--
	No tripping within				--
	- 1 h				P
	- 2 h				N/A

	TEST SEQUENCE "E" C16/1P+N/10mA/Type AC	**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)..... :	16 A			--
	Cross-section (mm²) ..... :	2,5 mm²			--
	Instantaneous tripping current (B / C / D) ..... :	C			--
9.9.2.1	Test of time-current characteristic				P
a)	Test current 1,13 I_N starting from cold for ..... :				--
	- 1 h ($I_N \leq 63$ A)				P
	- 2 h ($I_N > 63$ A)				N/A
	No tripping				P
	Then steadily increased within 5 s to 1,45 I_N ..... :				P
	Tripping within	[min]	[min]	[min]	--
	- 1h (< 63 A)	1min48s			P
	- 2h (> 63 A)				N/A
b)	Test current 2,55 I_N starting from cold ..... :				--
	Opening time not less than 1 s or more than	[s]	[s]	[s]	P
	- 60 s (≤ 32 A)	18,9s			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:				P
a)	General test conditions				P
	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:				P
	- At any convenient voltage, one opening operation on each combination of two poles connected in series . The tripping time is measured and shall 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	[s]	[s]	[s]	--
		8,11ms			P
	After each operation the indication means shall 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 ..... :	5 I_N = 80 A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s	11,3			P
	Test current 10 I_N starting from cold ..... :	10 I_N = 161 A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s	8,46ms			P
d)	☐ D				N/A
	Test current 10 I_N starting from cold ..... :	10 I_N =	A		--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 20 I_N starting from cold ..... :	20 I_N =	A		

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Clause	Requirement + Test	Result - Remark	Verdict

		[s]	[s]	[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 (- 5 ± 2)°C..... :				--
	Test current 1,13 I_N ..... :				--
	- passed for 1 h				P
	- passed for 2 h				N/A
	Current is then steadily increased within 5s to 1,9 I_N				--
	Tripping:	[min]	[min]	[min]	--
	- 1 h	1min16s			P
	- 2 h				N/A
b)	Ambient temperature of (40 ± 2)°C..... :				--
	Test current I_N				--
	No tripping within				--
	- 1 h	OK			P
	- 2 h				N/A

	TEST SEQUENCE "E" C13/1P+N/10mA/Type AC	**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)..... :	16 A			--
	Cross-section (mm²) ..... :	1,5 mm²			--
	Instantaneous tripping current (B / C / D) ..... :	C			--
9.9.2.1	Test of time-current characteristic				P
a)	Test current 1,13 I_N starting from cold for ..... :				--
	- 1 h ($I_N \leq$ 63 A)				P
	- 2 h ($I_N >$ 63 A)				N/A
	No tripping				P
	Then steadily increased within 5 s to 1,45 I_N ..... :				P
	Tripping within	[min]	[min]	[min]	--
	- 1h (< 63 A)	1min51s			P
	- 2h (> 63 A)				N/A
b)	Test current 2,55 I_N starting from cold ..... :				--
	Opening time not less than 1 s or more than	[s]	[s]	[s]	P

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Clause	Requirement + Test	Result - Remark	Verdict

	- 60 s (≤ 32 A)	19,6s			P
	- 120 s (> 32 A)				N/A
9.9.2.2	Test of instantaneous tripping:				P
a)	General test conditions				P
	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:				P
	- At any convenient voltage, one opening operation on each combination of two poles connected in series . The tripping time is measured and shall 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	[s]	[s]	[s]	--
		9,97ms			P
	After each operation the indication means shall 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 ..... :	5 I_N = 80 A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s	10,3			P
	Test current 10 I_N starting from cold ..... :	10 I_N = 161 A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s	10,8ms			P
d)	☐ D				N/A
	Test current 10 I_N starting from cold ..... :	10 I_N = A			--

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Clause	Requirement + Test	Result - Remark	Verdict

		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 20 I_N starting from cold ..... :	20 I_N = A			
		[s]	[s]	[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 (- 5 ± 2)°C..... :				--
	Test current 1,13 I_N ..... :				--
	- passed for 1 h				P
	- passed for 2 h				N/A
	Current is then steadily increased within 5s to 1,9 I_N				--
	Tripping:	[min]	[min]	[min]	--
	- 1 h	1min24s			P
	- 2 h				N/A
b)	Ambient temperature of (40 ± 2)°C..... :				--
	Test current I_N				--
	No tripping within				--
	- 1 h	OK			P
	- 2 h				N/A

	TEST SEQUENCE "E" C10/1P+N/10mA/Type AC	**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)..... :	10 A			--
	Cross-section (mm²) ..... :	1,5 mm²			--
	Instantaneous tripping current (B / C / D) ..... :	C			--
9.9.2.1	Test of time-current characteristic				P
a)	Test current 1,13 I_N starting from cold for ..... :				--
	- 1 h ($I_N \leq 63$ A)				P
	- 2 h ($I_N > 63$ A)				N/A
	No tripping				P
	Then steadily increased within 5 s to 1,45 I_N ..... :				P
	Tripping within	[min]	[min]	[min]	--

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Clause	Requirement + Test	Result - Remark			Verdict
	- 1h (< 63 A)	1min37s			P
	- 2h (> 63 A)				N/A
b)	Test current 2,55 I_N starting from cold ..... :				--
	Opening time not less than 1 s or more than	[s]	[s]	[s]	P
	- 60 s (≤ 32 A)	19,1s			P
	- 120 s (> 32 A)				N/A
9.9.2.2	Test of instantaneous tripping:				P
a)	General test conditions				P
	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:				P
	- At any convenient voltage, one opening operation on each combination of two poles connected in series . The tripping time is measured and shall 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	[s]	[s]	[s]	--
		9,97 ms			P
	After each operation the indication means shall 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 ..... :	5 I_N = 50 A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s	2,97			P
	Test current 10 I_N starting from cold ..... :	10 I_N = 100 A			--
		[s]	[s]	[s]	--

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Clause	Requirement + Test	Result - Remark	Verdict

	- Tripping time less than 0,1 s	9,34 ms			P
d)	☐ D				N/A
	Test current 10 I_N starting from cold ..... :	10 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 20 I_N starting from cold ..... :	20 I_N = A			
		[s]	[s]	[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 (- 5 ± 2)°C..... :				--
	Test current 1,13 I_N ..... :				--
	- passed for 1 h				P
	- passed for 2 h				N/A
	Current is then steadily increased within 5s to 1,9 I_N				--
	Tripping:	[min]	[min]	[min]	--
	- 1 h	1min12s			P
	- 2 h				N/A
b)	Ambient temperature of (40 ± 2)°C..... :				--
	Test current I_N				--
	No tripping within				--
	- 1 h				N/A
	- 2 h				N/A

	TEST SEQUENCE "E" C6/1P+N/10mA/Type AC	**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) ..... :	6 A	--
	Cross-section (mm²)..... :	1,0 mm²	--
	Instantaneous tripping current (B / C / D) ..... :	C	--
9.9.2.1	Test of time-current characteristic		P
a)	Test current 1,13 I_N starting from cold for ..... :		--
	- 1 h ($I_N \leq 63$ A)		P
	- 2 h ($I_N > 63$ A)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	No tripping				N/A
	Then steadily increased within 5 s to 1,45 I_N ..... :				N/A
	Tripping within	[min]	[min]	[min]	--
	- 1h (< 63 A)	1min49s			P
	- 2h (> 63 A)				N/A
b)	Test current 2,55 I_N starting from cold..... :				--
	Opening time not less than 1 s or more than	[s]	[s]	[s]	P
	- 60 s (≤ 32 A)	20,1			P
	- 120 s (> 32 A)				N/A
9.9.2.2	Test of instantaneous tripping:				P
a)	General test conditions				P
	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:				P
	- At any convenient voltage, one opening operation on each combination of two poles connected in series . The tripping time is measured and shall 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	[s]	[s]	[s]	--
		9,41ms			P
	After each operation the indication means shall 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..... :	5 I_N = 30 A			--
		[s]	[s]	[s]	--

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Clause	Requirement + Test	Result - Remark			Verdict
	- Opening time not less than 0,1 s	4,7			P
	Test current 10 I_N starting from cold..... :	10 I_N = 60 A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s	10,1ms			P
d)	☐ D				N/A
	Test current 10 I_N starting from cold..... :	10 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 20 I_N starting from cold..... :	20 I_N = A			
		[s]	[s]	[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 (- 5 ± 2)°C..... :				--
	Test current 1,13 I_N ..... :				--
	- passed for 1 h				P
	- passed for 2 h				N/A
	Current is then steadily increased within 5s to 1,9 I_N				--
	Tripping:	[min]	[min]	[min]	--
	- 1 h	1min02s			P
	- 2 h				N/A
b)	Ambient temperature of (40 ± 2)°C..... :				--
	Test current I_N				--
	No tripping within				--
	- 1 h	OK			P
	- 2 h				N/A

	TEST SEQUENCE "E" B63/1P+N/10mA/Type AC	**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)..... :	63 A	--
	Cross-section (mm²)..... :	16 mm²	--
	Instantaneous tripping current (B / C / D) ..... :	B	--
9.9.2.2	Test of instantaneous tripping:		P
a)	General test conditions		P

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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 value of the test current, the two following tests are carried out:				P
	- At any convenient voltage, one opening operation on each combination of two poles connected in series . The tripping time is measured and shall 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	[s]	[s]	[s]	--
		12,9ms			P
	After each operation the indication means shall show the open position of the contacts				P
b)	☒ B				P
	Test current 3 I_N starting from cold..... :	3 I_N = 189 A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s	19,2			P
	Test current 5 I_N starting from cold..... :	5 I_N = 315 A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s	13,8ms			P
c)	☐ C				N/A
	Test current 5 I_N starting from cold..... :	5 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 10 I_N starting from cold..... :	10 I_N = A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				N/A
d)	☐ D				N/A
	Test current 10 I_N starting from cold..... :	10 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 20 I_N starting from cold..... :	20 I_N = A			
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	TEST SEQUENCE "E" B50/1P+N/10mA/Type AC	**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) ..... :	50 A			--
	Cross-section (mm²)..... :	10 mm²			--
	Instantaneous tripping current (B / C / D) ..... :	B			--
9.9.2.2	Test of instantaneous tripping:				P
a)	General test conditions				P
	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:				P
	- At any convenient voltage, one opening operation on each combination of two poles connected in series . The tripping time is measured and shall 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	[s]	[s]	[s]	--
		12,8ms			P
	After each operation the indication means shall show the open position of the contacts				P
b)	☒ B				P
	Test current 3 I_N starting from cold..... :	3 I_N = 150 A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s	17,2			P
	Test current 5 I_N starting from cold..... :	5 I_N = 250 A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s	14,8ms			P
c)	☐ C				N/A
	Test current 5 I_N starting from cold..... :	5 I_N = A			--
		[s]	[s]	[s]	--

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Clause	Requirement + Test	Result - Remark	Verdict

	- Opening time not less than 0,1 s				N/A
	Test current 10 I_N starting from cold..... :	10 I_N = A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				N/A
d)	☐ D				N/A
	Test current 10 I_N starting from cold..... :	10 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 20 I_N starting from cold..... :	20 I_N = A			
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				N/A

	TEST SEQUENCE "E" B40/1P+N/10mA/Type AC	**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) ..... :	40 A			--
	Cross-section (mm²)..... :	10 mm²			--
	Instantaneous tripping current (B / C / D)..... :	B			--
9.9.2.2	Test of instantaneous tripping:				P
a)	General test conditions				P
	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:				P
	- At any convenient voltage, one opening operation on each combination of two poles connected in series . The tripping time is measured and shall 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	[s]	[s]	[s]	--
		13,2ms			P

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Clause	Requirement + Test	Result - Remark	Verdict

	After each operation the indication means shall show the open position of the contacts				P
b)	☒ B				P
	Test current 3 I_N starting from cold.....:	3 I_N = 121 A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s	11,2			P
	Test current 5 I_N starting from cold.....:	5 I_N = 201 A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s	14,4ms			P
c)	☐ C				N/A
	Test current 5 I_N starting from cold.....:	5 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 10 I_N starting from cold.....:	10 I_N = A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				N/A
d)	☐ D				N/A
	Test current 10 I_N starting from cold.....:	10 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 20 I_N starting from cold.....:	20 I_N = A			
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				N/A

	TEST SEQUENCE "E" B32/1P+N/10mA/Type AC	**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) .....:	50 A	--
	Cross-section (mm²).....:	6 mm²	--
	Instantaneous tripping current (B / C / D).....:	B	--
9.9.2.2	Test of instantaneous tripping:		P
a)	General test conditions		P
	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 value of the test current, the two following tests are carried out:				P
	- At any convenient voltage, one opening operation on each combination of two poles connected in series . The tripping time is measured and shall 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	[s]	[s]	[s]	--
		13,6ms			P
	After each operation the indication means shall show the open position of the contacts				P
b)	☒ B				P
	Test current 3 I_N starting from cold.....:	3 I_N = 96 A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s	9,84			P
	Test current 5 I_N starting from cold.....:	5 I_N = 160 A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s	15,1ms			P
c)	☐ C				N/A
	Test current 5 I_N starting from cold.....:	5 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 10 I_N starting from cold.....:	10 I_N = A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				N/A
d)	☐ D				N/A
	Test current 10 I_N starting from cold.....:	10 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 20 I_N starting from cold.....:	20 I_N = A			
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	TEST SEQUENCE "E" B25/1P+N/10mA/Type AC	**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)..... :	25 A			--
	Cross-section (mm²) ..... :	4 mm²			--
	Instantaneous tripping current (B / C / D) ..... :	B			--
9.9.2.2	Test of instantaneous tripping:				P
a)	General test conditions				P
	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:				P
	- At any convenient voltage, one opening operation on each combination of two poles connected in series . The tripping time is measured and shall 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	[s]	[s]	[s]	--
		12,1ms			P
	After each operation the indication means shall show the open position of the contacts				P
b)	☒ B				P
	Test current 3 I_N starting from cold ..... :	3 I_N = 75 A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s	9,26			P
	Test current 5 I_N starting from cold ..... :	5 I_N = 126 A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s	14,7ms			P
c)	☐ C				N/A
	Test current 5 I_N starting from cold ..... :	5 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	Test current 10 I_N starting from cold ..... :	10 I_N = A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				N/A
d)	☐ D				N/A
	Test current 10 I_N starting from cold ..... :	10 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 20 I_N starting from cold ..... :	20 I_N = A			
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				N/A

	TEST SEQUENCE "E" B20/1P+N/10mA/Type AC	**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) ..... :	20 A			--
	Cross-section (mm²) ..... :	2,5 mm²			--
	Instantaneous tripping current (B / C / D) ..... :	B			--
9.9.2.2	Test of instantaneous tripping:				P
a)	General test conditions				P
	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:				P
	- At any convenient voltage, one opening operation on each combination of two poles connected in series . The tripping time is measured and shall 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	[s]	[s]	[s]	--
		14,7ms			P
	After each operation the indication means shall show the open position of the contacts				P

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Clause	Requirement + Test	Result - Remark	Verdict

b)	☒ B				P
	Test current 3 I_N starting from cold.....:	3 I_N = 60 A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s	8,56			P
	Test current 5 I_N starting from cold.....:	5 I_N = 101 A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s	15,3ms			P
c)	☐ C				N/A
	Test current 5 I_N starting from cold.....:	5 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 10 I_N starting from cold.....:	10 I_N = A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				N/A
d)	☐ D				N/A
	Test current 10 I_N starting from cold.....:	10 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 20 I_N starting from cold.....:	20 I_N = A			
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				N/A

	TEST SEQUENCE "E" B16/1P+N/10mA/Type AC	**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) .....:	16 A	--
	Cross-section (mm^2) .....:	2,5 mm^2	--
	Instantaneous tripping current (B / C / D) .....:	B	--
9.9.2.2	Test of instantaneous tripping:		P
a)	General test conditions		P
	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:		P

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Clause	Requirement + Test	Result - Remark	Verdict

	- At any convenient voltage, one opening operation on each combination of two poles connected in series . The tripping time is measured and shall 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	[s]	[s]	[s]	--
		13,7ms			P
	After each operation the indication means shall show the open position of the contacts				P
b)	☒ B				P
	Test current 3 I_N starting from cold .....:	3 I_N = 48 A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s	7,69			P
	Test current 5 I_N starting from cold .....:	5 I_N = 81 A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s	14,8ms			P
c)	☐ C				N/A
	Test current 5 I_N starting from cold .....:	5 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 10 I_N starting from cold .....:	10 I_N = A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				N/A
d)	☐ D				N/A
	Test current 10 I_N starting from cold .....:	10 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 20 I_N starting from cold .....:	20 I_N = A			
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				N/A

	TEST SEQUENCE "E" B13/1P+N/10mA/Type AC	**E1 E2 E3**	--
	Tests E_0		--

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Clause	Requirement + Test	Result - Remark	Verdict

9.9	VERIFICATION OF THE OPERATING CHARACTERISTICS				--
9.9.2	Verification of the Operating characteristics under overcurrent conditions				--
	I_N (A) .....:	13 A			--
	Cross-section (mm²) .....:	1,5 mm²			--
	Instantaneous tripping current (B / C / D) .....:	B			--
9.9.2.2	Test of instantaneous tripping:				P
a)	General test conditions				P
	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:				P
	- At any convenient voltage, one opening operation on each combination of two poles connected in series . The tripping time is measured and shall 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	[s]	[s]	[s]	--
		12,8ms			P
	After each operation the indication means shall show the open position of the contacts				P
b)	☒ B				P
	Test current 3 I_N starting from cold .....:	3 I_N = 39 A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s	8,64			P
	Test current 5 I_N starting from cold .....:	5 I_N = 65 A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s	14,6ms			P
c)	☐ C				N/A
	Test current 5 I_N starting from cold .....:	5 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 10 I_N starting from cold .....:	10 I_N = A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				N/A

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Clause	Requirement + Test	Result - Remark	Verdict

d)	☐ D				N/A
	Test current 10 I_N starting from cold .....:	10 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 20 I_N starting from cold .....:	20 I_N = A			
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				N/A

	TEST SEQUENCE "E" B10/1P+N/10mA/Type AC	**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) .....:	10 A			--
	Cross-section (mm²) .....:	1,5 mm²			--
	Instantaneous tripping current (B / C / D) .....:	B			--
9.9.2.2	Test of instantaneous tripping:				P
a)	General test conditions				P
	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:				P
	- At any convenient voltage, one opening operation on each combination of two poles connected in series . The tripping time is measured and shall 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	[s]	[s]	[s]	--
		13,6ms			P
	After each operation the indication means shall show the open position of the contacts				P
b)	☒ B				P
	Test current 3 I_N starting from cold .....:	3 I_N = 30 A			--

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Clause	Requirement + Test	Result - Remark			Verdict
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s	8,64			P
	Test current 5 I_N starting from cold .....:	5 I_N = 50 A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s	15,6ms			P
c)	☐ C				N/A
	Test current 5 I_N starting from cold .....:	5 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 10 I_N starting from cold .....:	10 I_N = A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				N/A
d)	☐ D				N/A
	Test current 10 I_N starting from cold .....:	10 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 20 I_N starting from cold .....:	20 I_N = A			
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				N/A

	TEST SEQUENCE "E" B6/1P+N/10mA/Type AC	**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) ..... :	6 A	--
	Cross-section (mm²) ..... :	1,0 mm²	--
	Instantaneous tripping current (B / C / D) ..... :	B	--
9.9.2.2	Test of instantaneous tripping:		P
a)	General test conditions		P
	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:		P

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Clause	Requirement + Test	Result - Remark	Verdict

	- At any convenient voltage, one opening operation on each combination of two poles connected in series . The tripping time is measured and shall 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	[s]	[s]	[s]	--
		13,1ms			P
	After each operation the indication means shall show the open position of the contacts				P
b)	☒ B				P
	Test current 3 I_N starting from cold..... :	3 I_N = 18 A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s	7,49			P
	Test current 5 I_N starting from cold..... :	5 I_N = 30 A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s	14,9ms			P
c)	☐ C				N/A
	Test current 5 I_N starting from cold..... :	5 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 10 I_N starting from cold..... :	10 I_N = A			--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				N/A
d)	☐ D				N/A
	Test current 10 I_N starting from cold..... :	10 I_N = A			--
		[s]	[s]	[s]	--
	- Opening time not less than 0,1 s				N/A
	Test current 20 I_N starting from cold..... :	20 I_N = A			
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				N/A

	TEST SEQUENCE "F" C63/1P+N/10mA/Type AC	**F1 F2 F3**	--
	Tests F_0		--

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Clause	Requirement + Test	Result - Remark	Verdict

9.12	SHORT-CIRCUITS TEST				--
9.12.11.4	Test above 1500 A				P
b)	Test at service short-circuit capacity I_{cs}				P
	Service short-circuit capacity (A) ..... :	7,5 kA			--
	Figure ..... :	figure 9			--
	Cross-section (mm²)..... :	16 mm²			--
	Grid distance a (mm)..... :	50 mm			--
	Prospective current (A) ..... :	7,5 kA			--
	Prospective current obtained (A) ..... :	7,57 kA			--
	Power factor ..... :	0,45…0,50			--
	Power factor obtained ..... :	0,48			--
	Sequence ..... :	O – O - CO			--
	I_{peak} (A) max. value ..... :	4,29 kA	4,11 kA	4,30 kA	--
	I²t max. ..... :	[KA²s]	[KA²s]	[KA²s]	--
		40,1	30,0	30,8	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				N/A
	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	The RCBO shall show no damage impairing their further use an shall be 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	[mA]	[mA]	[mA]	--
	The leakage current shall not exceed 2 mA	< 0,01	< 0,01	< 0,01	P
9.12.12.1.b)	Dielectric strength test:				--
	Test voltage:				--
	a) 1500 V	1500 V, 1 min, 100 mA			P
	b) 1500 V	1500 V, 1 min, 100 mA			P
	c) 1500 V	1500 V, 1 min, 100 mA			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), it shall be verified that the indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means shall show the closed position				P
	Test current equal to 0,85 times the conventional non-tripping current for:	60,6A			--
	- 1h starting from cold				P
	- 2h				N/A
	Increasing the current within 5s to 1,1 times the conventional tripping current	101 A			
	- tripping within	[min]	[min]	[min]	--
	- 1h (< 63 A)	1min49s	2min13s	2min33s	P
	- 2h (> 63 A)				N/A

	Tests F_1				--
9.12	SHORT-CIRCUITS TEST				--
9.12.11.4	Test above 1500 A				P
c)	Test at rated short-circuit capacity I_{cn}				P
	Rated short-circuit capacity (A) ..... :	10kA			--
	Figure ..... :				--
	Cross-section (mm²)..... :	25mm^2			--
	Grid distance a (mm)..... :	45mm			--
	Prospective current (A) ..... :	10kA			--
	Prospective current obtained (A) ..... :	10,1kA			--
	Power factor ..... :	0,45-0,50			--
	Power factor obtained ..... :	0,48			--
	Sequence ..... :	O-t-CO			--
	I_{peak} (A) max. value ..... :	4,2kA 6,11kA 5,99kA			--
	I²t max. ..... :	[KA²s]	[KA²s]	[KA²s]	--
		85,8	78	70,2	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				N/A
	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

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Clause	Requirement + Test	Result - Remark	Verdict

9.12.12	The RCBO shall show no damage impairing their further use an shall be capable without maintenance to withstand the following tests:				P
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.= _____ V. The RCBO is in the open position	[mA]	[mA]	[mA]	--
	The leakage current shall not exceed 2 mA	<0,01	<0,01	<0,01	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				P
	e) 900 V				P
	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 position and during the test carried out under the conditions specified in 9.7.2 b) the indication means shall show the closed position				P
9.12.12.2.c)	Test current 2,8 I_N ..... :	177A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	11,3	12,2	12,7	P
	- 120 s				N/A

	TEST SEQUENCE "F" C6/1P+N/10mA/Type AC	**F1 F2 F3**	--
	Tests F_0		--
9.12	Short-circuits test		--
9.12.11.4	Test above 1500 A		P
b)	Test at service short-circuit capacity I_{cs}		P
	Service short-circuit capacity (A).....:	7,5 kA	--
	Figure.....:	figure 9	--
	Cross-section (mm²).....:	1 mm²	--
	Grid distance a (mm).....:	45 mm	--
	Prospective current (A).....:	7,5 kA	--
	Prospective current obtained (A).....:	7,57 kA	--
	Power factor .....:	0,45…0,50	--

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Clause	Requirement + Test	Result - Remark			Verdict
	Power factor obtained.....:	0,48			--
	Sequence.....:	O – O - CO			--
	I_{peak} (A) max. value .....:	2,68kA	2,83 kA	2,88 kA	--
	I^2t max.....:	[A^2s]	[A^2s]	[A^2s]	--
		11,3	11,5	11,8	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				N/A
	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	The RCBO shall show no damage impairing their further use an shall be 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.= 264 V. The RCBO is in the open position	[mA]	[mA]	[mA]	--
	The leakage current shall not exceed 2 mA	< 0,01	< 0,01	< 0,01	P
9.12.12.1.b)	Dielectric strength test:				--
	Test voltage:				--
	a) 1500 V	1500 V, 1 min, 100 mA			P
	b) 1500 V	1500 V, 1 min, 100 mA			P
	c) 1500 V	1500 V, 1 min, 100 mA			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), it shall be verified that the indicating means show the open position and during the test carried out under the conditions specified in 9.7.2 b) the indication means shall show the closed position				P
	Test current equal to 0,85 times the conventional non-tripping current for:	6,0 A			--
	- 1h starting from cold				P
	- 2h				N/A
	Increasing the current within 5s to 1,1 times the conventional tripping current	9,6 A			
	- tripping within	[min]	[min]	[min]	--
	- 1h (< 63 A)	3min04s	2min16s	2min18s	P
	- 2h (> 63 A)				N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	Tests F_1				--
9.12	SHORT-CIRCUITS TEST				--
9.12.11.4	Test above 1500 A				N/A
c)	Test at rated short-circuit capacity I_{cn}				P
	Rated short-circuit capacity (A) .....:	10kA			--
	Figure.....:				--
	Cross-section (mm^2).....:	$1mm^2$			--
	Grid distance a (mm).....:	45mm			--
	Prospective current (A).....:	10kA			--
	Prospective current obtained (A).....:	10,2kA			--
	Power factor .....:	0,45-0,50			--
	Power factor obtained.....:	0,48			--
	Sequence.....:	O-t CO			--
	I_{peak} (A) max. value .....:	2,2kA	2,63kA	3,23kA	--
	I^2t max.....:	[KA^2s]	[KA^2s]	[KA^2s]	--
		8,07	12,4	14,1	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				N/A
	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	The RCBO shall show no damage impairing their further use an shall be capable without maintenance to withstand the following tests:				P
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	[mA]	[mA]	[mA]	--
	The leakage current shall not exceed 2 mA	<0,01	<0,01	<0,01	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				P

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Clause	Requirement + Test	Result - Remark	Verdict

	e) 900 V				P
	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 position and during the test carried out under the conditions specified in 9.7.2 b) the indication means shall show the closed position				P
9.12.12.2.c)	Test current 2,8 I_N.....:	16,8			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	11,3	12,3	10,3	P
	- 120 s				N/A

	TEST SEQUENCE "G" C63/1P+N/10mA/Type AC	**G1**	**G2**	**G3**	
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	55°C			P
	Initial verification:	[ms]	[ms]	[ms]	--
	Maximum break time at $I_{\Delta N}$	41	37	35	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:				N/A
	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:				P
	The RCBO shall trip with a test current of 1,25 $I_{\Delta N}$ in the test chamber - break time not exceeding the value for $I_{\Delta N}$ in table 2	[ms]	[ms]	[ms]	--
	37,5 mA	23	22	25	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

	TEST SEQUENCE "H" C63/1P+N/10mA/Type AC	**H1**	**H2**	**H3**	--
IEC 61543:					
Table 4-T1.1	Harmonics, interharmonics				N/A
Table 4-T1.2	Signalling voltage				N/A
Table 5-T2.3	Conducted unidirectional transients of the ms and μs time scale				P
	Test results of test sequence H:				--
	see test report No. .....:	See below			P
	Testing location / address.....:	The Low Voltage Apparatus Laboratory of Zhejiang Testing & Inspection Institute for Mechanical and Electrical Products Quality (ZTME) No 125 Miaohouwang Road Binjiang District Hangzhou Zhejiang CHINA			P
Table 4-T.1.1	Harmonics, inter harmonics	No requirements1)			N/A
Table 4-T.1.2	Signaling voltages	Under consideration			N/A
Table 5-T.2.3	Voltage surges 1,2/50μs – 4 kV peak (IEC 61000-4-5)				
	Differential mode (generator Z = 2 Ohm) on each possible combination				
	Test:				
	- peak voltage (kV) .....:	4kV, 2kV			
	- number of impulse (n.). .....:	4×(10+ and 10-)			
	- polarity of impulse (+/-) .....:	Positive and negative			
	No tripping during the tests	No trip	No trip	No trip	P
	Condition after the tests:	closed			
	RCCB shall trip with a test current of $I_{\Delta n}$ (ms)	36	35	34	P
	Common mode (generator Z = 12 Ohm) between the earthing terminal, the frame of the device and the other terminals connected together				
	Test:				
	- peak voltage (kV) .....:	5kV			
	- number of impulse (n.) .....:	4×(10+ and 10-)			
	- polarity of impulse (+/-) .....:	Positive and negative			
	No tripping during the tests	No trip	No trip	No trip	P
	Condition after the tests:	closed			

IEC 61009-1					
Clause	Requirement + Test	Result - Remark			Verdict
	RCCB shall trip with a test current of $I_{\Delta n}$ (ms)	24	24	24	P

IEC 61009-1			
Clause	Requirement + Test	Result - Remark	Verdict

	TEST SEQUENCE "I" C63/1P+N/10mA/Type AC	**I1**	**I2**	**I3**	--
IEC 61543:					
Table 5-T2.1	Conducted sine-wave voltages or currents				P
Table 5-T2.5	Radiated high-frequency phenomena				P
Table 5-T2.2	Fast transients (burst)				P
	Test results of test sequence I:				--
	see test report No. ..... :	See below			P
	Testing location / address ..... :	The Low Voltage Apparatus Laboratory of Zhejiang Testing & Inspection Institute for Mechanical and Electrical Products Quality (ZTME) No 125 Miaohouwang Road Binjiang District Hangzhou Zhejiang CHINA			P
Table 5-T.2.1	Conducted sine-wave form voltages or currents (IEC 61000-4-6)				P
	- frequency range (MHz) ..... :	0,150 …80,0			P
	- modulation. ..... :	1 kHz, 80 %; AM			P
	- RF voltage (V/m) ..... :	3			P
	- step size ..... :	1 %			P
	- dwell time (s) ..... :	1			P
	- test current 0,3 × $I_{\Delta n}$ (mA) ..... :	9 mA			P
	No tripping during the tests ..... :	No trip	No trip	No trip	P
	- test current 1,25 × $I_{\Delta n}$ (mA) ..... :	37,5 mA			P
	Tripping during the tests.....	Trip	Trip	Trip	P
Table 5-T.2.5	Radiated radio-frequency disturbances (IEC 61000-4-3)				P
	- frequency range (MHz) ..... :	80,0…1000			P
	- modulation. ..... :	1 kHz, 80 %; AM			P
	- RF voltage (V/m) ..... :	3			P
	- step size ..... :	1 %			P
	- dwell time (s) ..... :	1			P
	- test current 0,3 × IΔn (mA)..... :	9 mA			P
	No tripping during the tests ..... :	No trip	No trip	No trip	P
	- test current 1,25 × $I_{\Delta n}$ (mA) ..... :	37,5 mA			P
	Tripping during the tests.....	38s	52s	24s	P

IEC 61009-1			
Clause	Requirement + Test	Result - Remark	Verdict

Table 5-T.2.2	Electrical fast transient burst (IEC 61000-4-4)				P
	Common mode level				P
	- applying bursts for a time (min.).....	2			P
	- application on each pole of the supply connection peak voltage (kV)	4			P
	- polarity of impulse (+/-)	Positive and negative			P
	No tripping during the tests	No trip	No trip	No trip	P
	- application on each pole of the output connection peak voltage (kV)				P
	- polarity of impulses (+/-)	Positive and negative			P
	No tripping during the tests ..... :	No trip	No trip	No trip	P
	Condition after the tests:	closed			
	RCCB shall trip with a test current of $I_{\Delta n}$ (ms) ..... :	23s	23s	24s	P

IEC 61009-1			
Clause	Requirement + Test	Result - Remark	Verdict

	TEST SEQUENCE "J" C63/1P+N/10mA/Type AC	**J1**	**J2**	**J3**	--
IEC 61543:					
Table 5-T2.6	Conducted common mode disturbances in the frequency range lower than 150 kHz				P
Table 6-T3.1	Electrostatic discharges				P
	Test results of test sequence J:				--
	see test report No. .....:	See below			P
	Testing location / address .....:	The Low Voltage Apparatus Laboratory of Zhejiang Testing & Inspection Institute for Mechanical and Electrical Products Quality (ZTME) No 125 Miaohouwang Road Binjiang District Hangzhou Zhejiang CHINA			P
Table 5-T.2.6	Conducted common mode disturbances in the frequency range lower than 150 kHz				P
	- frequency range (MHz) .....:	1kHz…150kHz			P
	- test current 0,3 × $I_{\Delta n}$ (mA) .....:	9 mA			P
	No tripping during the tests	No trip	No trip	No trip	P
	- frequency range (MHz) .....:	J1: 1, 1, 5, 21 101 kHz J2: 4, 4, 21, 43, 109kHz J3:1, 3, 27, 35, 115kHz			P
	- test current 1,25 × $I_{\Delta n}$ (mA) .....:	37,5 mA			P
	Tripping during the tests.....	Trip	Trip	Trip	P
Table 6-T3.1	Electrostatic discharges	P			
	Level .....:				P
	10 discharges in air applied on isolating surfaces ..:	Lever, test buttom			P
	- interval between application (s) .....:	1			P
	- peak voltage (kV) .....:	8			P
	- polarity (+/-) .....:	Positive and negative			P
	Tripping during the tests (allowed) .....:	No Trip	No Trip	No Trip	P
	10 discharges applied on conducting surfaces	Mounting rail			P
	- interval between application (s) .....:	1			P
	- peak voltage (kV) .....:	6			P
	- polarity (+/-) .....:	Positive and negative			P
	Tripping during the tests (allowed) .....:	No Trip	No Trip	No Trip	P
	10 discharges applied on coupling plane	Vertical / horizon			P
	- interval between application (s) .....:	1			P
	- peak voltage (kV) .....:	6			P

IEC 61009-1					
Clause	Requirement + Test	Result - Remark			Verdict
	- polarity (+/-) ..... :	Positive and negative			P
	Tripping during the tests (allowed) ..... :	No Trip	No Trip	No Trip	P
	RCCB shall trip with a test current of IΔn (ms) ..... :	24	24	24	P

IEC 61009-1			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX A (NORMATIVE)			
Test sequence and number of samples to be submitted for certification purposes Table A.1 - Test sequences			
Test sequence		Clause or subclause	Test (or inspection)
A	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	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	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	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)	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)	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 9.12.13 9.16	Behaviour in case of failure of the line voltage Behaviour in case of surge currents Performance at $I_{\Delta m}$ 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 shock and impact Short-circuit performance at 1500 A
F	F_0	9.12.11.4 b) (and 9.12.12)	Performance at service short-circuit capacity
	F_1	9.12.11.4 c) (and 9.12.12.2)	Performance at rated short-circuit capacity
G		9.22.1	Reliability (climatic tests)
H a) b)		IEC 61543 Table 4-T1.1 IEC 61543 Table 4-T1.2 IEC 61543 Table 5-T2.3	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	Conducted sine-wave voltages or currents Radiated electromagnetic field Fast transients (burst)
J		IEC 61543 Table 5-T2.6 IEC 61543 Table 6-T3.1	Conducted common mode disturbances in the frequency range lower than 150 kHz Electrostatic discharges
a) 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 61009-1			
Clause	Requirement + Test	Result - Remark	Verdict

Table A.2 - 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 61009-1			
Clause	Requirement + Test	Result - Remark	Verdict

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

Test sequence	Number of samples according to the number of poles [a) g)]		
	2-poles [b) c)]	3-poles [d) f) 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 61009-1			
Clause	Requirement + Test	Result - Remark	Verdict

Table A.4 - 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 61009-1			
Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX B **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.	N/A
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.	N/A
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.	N/A
	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.	N/A
	The following assumptions are made:	N/A
	- 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);	N/A
	- 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.	N/A

IEC 61009-1			
Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX C 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.	N/A
	When required (i.e. during "O" operations), a clear polyethylene sheet (0,05 ± 0,01) mm thick, of a size at least 50 mm larger, in each direction, than the overall dimensions of the front face of the device but not less than 200 mm × 200 mm, is fixed and reasonably stretched in a frame, placed at a distance of 10 mm from	N/A
	– either the maximum projection of the operating means of a device without recess for the operating means;	N/A
	– or the rim of a recess for the operating means of a device with recess for the operating means.	N/A
	The sheet should have the following physical properties: Density at 23 °C: 0,92 ± 0,05 g/cm³ Melting-point: 110 °C – 120 °C.	N/A
	When required, a barrier of insulating material, at least 2 mm thick, is placed, as shown in figure C.1, between the arc vent and the polyethylene sheet to prevent damage of the sheet due to hot particles emitted from the arc vent.	N/A
	When required, a grid (or grids) according to figure C.2 is (are) placed at a distance of "a" mm from each arc vent side of the device.	N/A
	The grid circuit (see figure C.3) shall be connected to the points B and C (see figures 7 or 8, as applicable).	N/A
	The parameters for the grid circuit are as follows:	N/A
	Resistor R': 1,5 Ω	N/A
	Copper wire F': length 50 mm, and diameter as required in 9.12.9.1.	N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX D ROUTINE TESTS				--
D.1	General				--
	The tests specified in this standard are intended to reveal, as far as safety is concerned, unacceptable variations in material or manufacture.				N/A
	In general, further tests have to be made to ensure that every 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. 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 2).	[ms]	[ms]	[ms]	N/A
					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
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 shall 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, shall open the RCBO.				N/A
	Where the test device is intended to operate at more than one value of rated voltage, the test shall be made at the lowest value of rated voltage.				N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX E **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 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.	N/A

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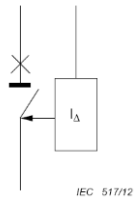
Clause	Requirement + Test	Result - Remark	Verdict

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.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 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
	- derating factors, if any		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- checking of operation		N/A
	- verification of tripping operation by use of test button		N/A
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
	For devices declared not suitable for disassembling, the disassembly shall 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		--

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Clause	Requirement + Test	Result - Remark	Verdict

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)		--
	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 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.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
	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 D_0. 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

J	**ANNEX J** **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 mm^2.		--
J.6	Marking and other product information		--
	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 shall provide information in his literature, on the maximum number of conductors which may be clamped.		N/A
J.8	Standard conditions for operating in service and for installation		--
	clause 8 applies with the following modifications: in 8.1.5, only 8.1.5.1, 8.1.5.2, 8.1.5.3, 8.1.5.6 and 8.1.5.7 apply		N/A
	Compliance is checked by inspection and by the tests of J.9.1 and J.9.2 of this annex, instead of 9.4 and 9.5.		N/A
J.8.1	Connection or disconnection of conductors		--
	The connection or disconnection of conductors shall be made:		N/A
	- by the use of a general purpose tool or by a convenient device integral with the terminal to open it and to assist the insertion or the withdrawal of the conductors (e.g. for universal terminals)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- or, for rigid conductors by simple insertion. For the disconnection of the conductors an operation other than a pull on the conductor shall be necessary (e.g. for push-wire terminals).		N/A
	Universal terminals shall accept rigid (solid or stranded) and flexible unprepared conductors.		N/A
	Non-universal terminals shall accept the types of conductors declared by the manufacturer.		N/A
	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
	The ability to connect these conductors shall be checked by inspection and by the tests of J.9.1 and J.9.2.		N/A
J.8.3	Connectable cross-sectional areas		--
	nominal cross-sections to be clamped acc. table J.2		N/A
	compliance checked by inspection and tests of J.9.1 and J.9.2.		N/A
J.8.5	Design and construction of terminals		N/A
	terminals so designed and constructed that:		--
	- each conductor clamped individually		N/A
	- during operation of connection or disconnection the conductors can be connected or disconnected either at the same time or separately		N/A
	- inadequate insertion of the conductor is avoided		N/A
	It shall be possible to clamp securely any number of conductors up to the maximum provided for		N/A
	compliance checked by inspection and tests of J.9.1 and J.9.2.		N/A
J.8.6	Resistance to ageing		--
	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		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	three terminals of poles of new samples, with copper conductors of the rated cross sectional area in accordance with Table J.2, types of conductors in accordance with J.8.1.		N/A
	The connection and subsequent disconnection shall be made five times with:		N/A
	Min. cross-section (mm²) .....:	mm²	N/A
	Max. cross-section (mm²) .....:	mm²	N/A
	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	N/A
	Max. cross-section (mm²) .....:	mm²	N/A
	After the test, no wire of the conductor shall have escaped outside the terminal.		N/A
J.9.2	Tests of reliability of terminals for external conductors: mechanical strength		--

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Clause	Requirement + Test	Result - Remark	Verdict

	three terminals of poles of new samples fitted with new conductors of the type and of the minimum and maximum cross-sectional areas acc. Table J.2.				N/A
	Min. cross-section (mm²) .....:	mm²			N/A
	Max. cross-section (mm²) .....:	mm²			N/A
	wires of stranded rigid conductors and flexible conductors reshaped and wires of flexible conductors twisted to consolidate the ends.				N/A
	Pull for 1 min, min. cross-section (N).....:	N			N/A
	Pull for 1 min, max. cross-section (N).....:	N			N/A
	During the test no noticeable move of conductor				N/A
J.9.3	Cycling test				--
	Universal, rigid conductors - 3 samples Universal, flexible conductors - 3 samples				N/A
	Non-universal, solid conductors - 3 samples				N/A
	Non-universal, rigid (solid) stranded conductors - 3 samples Non-universal, rigid (stranded) stranded conductors - 3 samples				N/A
	Non-universal, flexible conductors - 3 samples				N/A
	Cross-section (mm²) .....:	mm²			N/A
	Test current I_N (A) .....:	A			N/A
	samples subjected to 192 temperature cycles				N/A
	Voltage drop after 192 cycles:				--
	voltage drop, measured at each terminal, at the end of the 192nd cycle, exceeded not the smaller of the two following values:				N/A
	– 22,5 mV				N/A
	– 1,5 times the value measured after the 24th cycle				N/A
		sample 1	sample 2	sample 3	--
		[mV]	[mV]	[mV]	--
	- rigid solid conductors.....:				N/A
	- rigid stranded conductors.....:				N/A
	- flexible conductors.....:				N/A
	Voltage drop after 24th cycle:				--
		sample 1	sample 2	sample 3	--
		[mV]	[mV]	[mV]	--
	- rigid solid conductors.....:				N/A
	- rigid stranded conductors.....:				N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	- flexible conductors.....:				N/A
	after this test: no changes evidently impairing further use, such as cracks, deformations or the like.				N/A

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Clause	Requirement + Test	Result - Remark	Verdict

K	**ANNEX K 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 shall be given in the manufacturers' instructions:				N/A
	l) manufacturer´s name or trade mark				N/A
	m) type reference				N/A
	n) information on cross-sections of conductors and colour code of insulated female connectors (see Table K.1)				N/A
	o) the use of only silver or tin-plated copper alloys				N/A
K.8	Requirements for construction and operation				--
	Clause 8 applies, with the following exceptions:				N/A
	subclause 8.1.3 applies, the female connectors being fitted to the male tabs of the RCBO				N/A
	replace the contents of 8.1.5 by the following:				N/A
K.8.2	Terminals for external conductors				--
K.8.2.1	Male tabs and female connectors shall be of a metal having mechanical strength, electrical conductivity and resistance to corrosion adequate for their intended use.				N/A
K.8.2.2	The nominal width of the male tab is 6,3 mm and the thickness 0,8 mm, applicable to rated currents up to and including 16 A. NOTE 1:The use for rated currents up to and including 20 A is accepted in BE, FR, IT, PT, ES and US				N/A
	The dimensions of the male tab shall comply with those specified in Table K.3 and in figures K.2, K.3, K.4 and K.5				N/A
		Dimensions of tabs according Table K.3		Measured in mm	--
		Minimum [mm]	Maximum [mm]		--
A	Dimple	0,7	1,0		N/A
	Hole	0,5	1,0		N/A

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

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

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Clause	Requirement + Test	Result - Remark	Verdict

L	**ANNEX L** **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:		N/A
	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 shall be 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:		--
	For connection of aluminium conductors, RCBOs shall be 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 shall 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, which shall never be 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 shall allow the conductors to be connected without special preparation		N/A
	Compliance is checked by inspection and by the tests of L.9		N/A
L.9	Tests		--

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Clause	Requirement + Test	Result - Remark	Verdict
	Clause 9 applies with the following modifications/additions:		N/A
	For the tests which are influenced by the material of the terminal and the type of conductor that can be connected, the test conditions of table L.3 are applied		N/A
	Additionally the test of L.9.2 is carried out on terminals separated from the 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		--
	The general arrangement of the samples shall be as shown in figure L.1		N/A
	90 % of torque stated by the manufacturer or selected in table 10 used for the specimens	torque: Nm	N/A
	The test is carried out with conductors according to table L.5. The length of the test conductor from the point of entry to the screw-type terminal specimens to the equalizer shall be as in table L.6	cross-section: mm^2 minimum conductor length: mm	N/A
	Cross section of equalizer not greater than that given in table L.7	max. cross-section: mm^2	N/A
L.9.2.5	Test method and acceptance criteria		--
	Test loop subjected to 500 cycles of 1h current-on and 1h current-off, starting at an a.c. current value of 1,12 times the test current value determined in table L.8	test current: A	N/A
	Near the end of each current-on period of the first 24 cycles, the current shall subsequently be adjusted to raise the temperature of the reference conductor to 75°C		N/A
	At the end of the 25^{th} cycle the test current shall be adjusted the last time and the stable temperature shall be recorded as the first measurement. No further adjustment of test current for the remainder of the test		N/A
	Temperatures recorded for at least one cycle of each working day, and after approximately 25, 50, 75, 100, 125, 175, 225, 275, 350, 425 and 500 cycles		N/A
	For each screw-type terminal:		N/A
	- the temperature rise shall not exceed 110 K		N/A
	- the stability factor Sf shall not exceed ± 10 °C		N/A
	ambient air temperature: °C		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

		max. temperature rise [K]	max. stability factor Sf [°C]	--
	Terminal 1			N/A
	Terminal 2			N/A
	Terminal 3			N/A
	Terminal 4			N/A
	Terminal 5			N/A
	Terminal 6			N/A
	Terminal 7			N/A
	Terminal 8			N/A

IEC61009_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

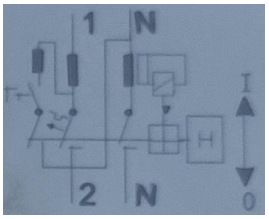
ATTACHMENT TO TEST REPORT IEC 61009-1
EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES

Residual current operated circuit-breakers with integral overcurrent protection for household and similar uses (RCBOs)

Differences according to ..... :	EN 61009-1:2012+A1:2014+A2:2014+A11:2015+A12:2016 used in conjunction with EN 61009-2-1:1994 + A11:1998
Attachment Form No. ..... :	EU_GD_IEC61009_1F
Attachment Originator..... :	ÖVE
Master Attachment..... :	Dated 2020-05-08

	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_1"	**A-1**	--
6	**MARKING**		--
6.Z1	*The text of clause 6 becomes 6.Z, replace the whole subclause* 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	See marking plate	P
b)	Type designation, catalogue number or serial number	EPBR-63H	P
c)	Rated voltage(s) with the symbol ~	~	P
d)	Rated current without symbol "A", preceded by the symbol of overcurrent instantaneous tripping (B, C or D), for example B16		P
e)	Rated frequency, if the RCBO is designed for frequencies other than 50Hz (see 5.3.5)		N/A

IEC61009_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
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"		P
j)	Reference calibration temperature, if different from 30°C	30°C	N/A
k)	The degree of protection (only if different from IP20)		N/A
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})	$I_{\Delta m}$ 2000A	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		N/A
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 AC with the symbol		P
	- RCBOs of type A with the symbol		P
t)	Energy limiting class (e.g. 3) in a square in accordance with Annex ZD if applied		N/A
u)	RCBOs according to 4 Z1 2 marked with the symbol (snowflake enclosing -25)	-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		P
	Open position indicated by "0" and closed position by "|"		N/A
	For push-buttons the OFF push-button shall either be red and/or marked with "O"		P
	If necessary to distinguish between supply and load terminals they shall be clearly marked		P
	Terminals for neutral circuit N		P
	Terminal for protective conductor		P

IEC61009_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	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:		N/A
	- 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
add: 6.Z2	ADDITIONAL MARKING		--
	Additional marking to other standards (EN or IEC or other) or additional requirements are allowed under the following conditions:		N/A
	- The RCBO shall comply with all the requirements of the additional standard.		N/A
	- 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.		N/A
	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.		N/A
8.	REQUIREMENTS FOR CONSTRUCTION AND OPERATION		--
8.1	MECHANICAL DESIGN		--
8.1.2	Mechanism		--
modify:	Modify Note 1 by “Note 1: deleted”.		--
8.1.5	Terminals for external conductors		P
add: *8.1.5.1*	In this standard, only terminals for copper conductors are considered		P
9.14.1 *replace by:*	After the test: The RCCB shall trip with a test current of 1,25 $I_{\Delta N}$ - break time not exceeding the value for $I_{\Delta N}$ in table 1	ms	P

IEC61009_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

add: 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
add: 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
add: 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

	TEST SEQUENCE "B"	**B-1**	**B-2**	**B-3**	--
9.7.7.5	Verification of the behaviour of components bridging the basic insulation				--
replace by:	After the test: The RCCB shall trip with a test current of 1,25 $I_{\Delta N}$ - break time not exceeding the value for $I_{\Delta N}$ in table 1	ms			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:	B-1 [MΩ]	B-2 [MΩ]	B-3 [MΩ]	--
replace by:	c) with the RCBO in the closed position, between all poles connected together and the frame, including a metal foil or part in contact with the outer surface of the housing of insulating material but with the terminal areas kept completely free in an appropriate manner to avoid flashover between terminals and the metal foil; .....≥ 5 MΩ	> 500	> 500	> 500	P
delete:	~~d) between metal parts of the mechanism and the frame.....≥ 5 MΩ~~	***delete item d) acc. EN61009-1***			N/A
replace by:	d) between the frame and a metal foil in contact with the inner surface of the lining of insulating material .....≥ 5 MΩ	***Rename item e) as item d).***			N/A
9.7.3	Dielectric strength of the main circuit measured with an AC voltage (45-65Hz) for 1 min:				--
replace by:	c) .....2000 V	2000 V	2000 V	2000 V	P
delete:	~~d) .....2000 V~~	***delete item d) acc. EN61009-1***			N/A
replace by:	d) .....2500 V	***Rename item e) as item d).***			N/A
9.22.2	Test with 28 cycles at 40 ± 2°C				--

IEC61009_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
replace by:	After the test: The RCCB shall trip with a test current of 1,25 IΔN - break time not exceeding the value for IΔN in table 1	ms	P
9.23	VERIFICATION OF AGEING OF ELECTRONIC COMPONENTS		--
replace by:	After the test: The RCCB shall trip with a test current of 1,25 IΔN - break time not exceeding the value for IΔN in table 1	ms	P

IEC61009_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

	TEST SEQUENCE "C"	**C-1 C-2 C-3**	--
	TEST C_1		--
9.10.3 *replace by:*	One test only is made one pole taken at random, with measurement of the break time: the latter shall not exceed the value specified in Table 2 at I∆n.		--
9.10.3 modify	After test:		--
replace by:	c)	900 V, 1min, 100 mA	P
delete:	~~d)~~	***delete item d) acc. EN61009-1***	N/A
replace by:	d)	***Rename item e) as item d).***	N/A
9.12.12.1.b)	Dielectric strength test:		--
	Test voltage:		--
replace by:	c) 1500 V	1500 V, 1 min, 100 mA	P
delete:	~~d) 1500 V~~	***delete item d) acc. EN61009-1***	N/A
replace by:	d) 2000 V	***Rename item e) as item d).***	N/A
	TEST "C_2"		P
9.12.11.2.2 modify	SHORT CIRCUIT TEST ON RCBOS FOR VERIFYING THEIR SUITABILITY FOR USE IN IT SYSTEMS		P
9.12.12.1.b)	Dielectric strength test:		--
	Test voltage:		--
replace by:	c) 1500 V	1500 V, 1 min, 100 mA	P
delete:	~~d) 1500 V~~	***delete item d) acc. EN61009-1***	N/A
replace by:	d) 2000 V	***Rename item e) as item d).***	N/A

IEC61009_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

	TEST SEQUENCE "D"	**D_1-1**	**D_1-2**	**D_1-3**	--
	TEST D_1				N/A
9.17	VERIFICATION OF THE BEHAVIOUR OF RCBOS OPENING AUTOMATICALLY IN CASE OF FAILURE OF THE LINE VOLTAGE				--
9.17.1 replace by:	Limiting value of the line voltage U_x				N/A
replace by	All values less than 0,7 U_N				N/A
	Tripping test:				N/A
	Test voltage (V) ..... :	V			--
	Residual current 1,25.$I_{\Delta N}$ ..... :	1,25.$I_{\Delta N}$ = 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 replace by:	Verification of behaviour in case of failure of the line voltage				N/A
a)	RCBOs opening without delay				N/A
	- no value exceeds 0,5 s				N/A
add:	- no tripping shall occur if the voltage is switched off for a time not exceeding 0,03 s				N/A
b)	RCBOs opening with delay				N/A
	Values within the range indicated by manufacturer	to		ms	N/A
add:	RCBOs classified 4.1.2.1b): switch off at U_N				N/A
add:	Voltage off and on at the line side:				N/A
add:	No automatically closing				N/A
9.17.4 replace by:	Verification of the correct operation of RCBOs with 3 or 4 poles, neutral and one line terminal only being energized in turn *(replace the title by)*				N/A
9.12.13	**DELET**				
8.11 replace by:	Test device				--
	RCBOs provided with a test device				P
	-for RCBOs with rated residual current of 30 mA				P
	Ampere-turns produced when operating the test device do not exceed 1,66 times the ampere turns produced by $I_{\Delta N}$	Ampere-turns (measured) 42,9mA-turns; not exceed 1,66 x 30 mA - 1 turn 49,8 mA-turns			P
	-for RCBOs with rated residual current other than 30 mA				N/A

IEC61009_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
	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

IEC61009_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

	TEST SEQUENCE "E"	**E-1**	**E-2**	**E-3**	--
	Tests E_0				--
9.9	VERIFICATION OF THE OPERATING CHARACTERISTICS				--
9.9.2.2 b)	☒ B				P
	Test current 3 I_N starting from cold.....:	3 I_N =	A		--
	Opening time:	[s]	[s]	[s]	--
	- 0,1 < t < 45s (I_N≤32A)				P
	- 0,1 < t < 90s (I_N>32A)				P
	Test current 5 I_N starting from cold.....:	5 I_N =	A		--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				P
c)	☒ C				P
	Test current 5 I_N starting from cold.....:	5 I_N =	A		--
	Opening time:	[s]	[s]	[s]	--
	- 0,1 < t < 15s (I_N≤32A)				P
	- 0,1 < t < 30s (I_N>32A)				P
	Test current 10 I_N starting from cold.....:	10 I_N =	A		--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				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		--
		[s]	[s]	[s]	--
	- Tripping time less than 0,1 s				N/A
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				--
	Single phase loading of RCBO with more than 2 current paths shall not have a significant effect on the overcurrent tripping characteristic.				N/A
	The test does not apply to RCBOs obtained by assembly of an adaptable residual current unit on a circuit-breaker.				N/A

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Clause	Requirement + Test	Result - Remark			Verdict
	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 replace by:	RCBOs designed to be mounted on a rail are mounted as for normal use on a rail rigidly fixed on a vertical rigid wall, but without cables being connected and without any cover or cover plate				P
	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				N/A
	- downward vertical force of 50 N for 1 min				P
	- upward vertical force of 50 N for 1 min				P
	RCBO shall not become loose during test and shall not show any damage impairing its further use				P
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

IEC61009_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
9.12.11.3 replace by:	Test at 1500 A:		
9.12.12.1.b)	Dielectric strength test:		--
	Test voltage:		--
replace by:	c) 1500 V	1500 V, 1 min, 100 mA	P
delete:	~~d) 1500 V~~	***delete item d) acc. EN61009-1***	N/A
replace by:	d) 2000 V	***Rename item e) as item d).***	N/A

IEC61009_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

	TEST SEQUENCE "F"	**F_0-1 F_0-2 F_0-3**	--
	Tests F_0		--
9.12	SHORT-CIRCUITS TEST		--
9.12.11.4 b) replace by:	Test above 1500 A		P
9.12.12.1.b)	Dielectric strength test:		--
	Test voltage:		--
replace by:	c) 1500 V	1500 V, 1 min, 100 mA	P
delete:	~~d) 1500 V~~	***delete item d) acc. EN61009-1***	N/A
replace by:	d) 2000 V	***Rename item e) as item d).***	N/A

	Tests F_1		--
9.12	SHORT-CIRCUITS TEST		--
9.12.11.4 c) replace by:	Test above 1500 A		N/A
9.12.12.2.b)	Dielectric strength test:		--
replace by:	c) 1500 V	1500 V, 1 min, 100 mA	N/A
delete:	d) 1500 V	delete item d) acc. EN61009-1	N/A
replace by:	d) 2000 V	Rename item e) as item d).	N/A

	Tests F_1 C63, 10mA, Class 3, when Icn=10,0kA.				--
9.12	SHORT-CIRCUITS TEST				--
9.12.11.4	Test above 1500 A				P
c)	Test at rated short-circuit capacity I_{cn}				P
	Rated short-circuit capacity (A) ..... :	10kA			--
	Figure ..... :				--
	Cross-section (mm²)..... :	25mm²			--
	Grid distance a (mm)..... :	45mm			--
	Prospective current (A) ..... :	10kA			--
	Prospective current obtained (A) ..... :	10,1kA			--
	Power factor ..... :	0,45-0,50			--
	Power factor obtained ..... :	0,48			--
	Sequence ..... :	O-t-CO			--
	I_{peak} (A) max. value ..... :	3,57kA	4,67kA	4,76kA	--
	I²t max. ..... :	[KA²s]	[KA²s]	[KA²s]	--
	C63, 2P <145 kA²s	63,8	73,6	72,5	P

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Clause	Requirement + Test	Result - Remark	Verdict

	RCBOs functionally dependent on the line voltage supplied with rated voltage				N/A
	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	The RCBO shall show no damage impairing their further use an shall be capable without maintenance to withstand the following tests:				P
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	[mA]	[mA]	[mA]	--
	The leakage current shall not exceed 2 mA	<0,01	<0,01	<0,01	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				P
	e) 900 V				P
	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 position and during the test carried out under the conditions specified in 9.7.2 b) the indication means shall show the closed position				P
9.12.12.2.c)	Test current 2,8 I_N ..... :	177A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	OK	12,2	12,7	P
	- 120 s				N/A

	Tests F_1 C40, 10mA, Class 3, when Icn=10,0kA		--
9.12	SHORT-CIRCUITS TEST		--
9.12.11.4	Test above 1500 A		P
c)	Test at rated short-circuit capacity I_{cn}		P
	Rated short-circuit capacity (A) ..... :	10kA	--

IEC61009_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

	Figure ..... :	9			--
	Cross-section (mm²)..... :	16mm²			--
	Grid distance a (mm)..... :	45mm			--
	Prospective current (A) ..... :	10kA			--
	Prospective current obtained (A) ..... :	10,1kA			--
	Power factor ..... :	0,45-0,50			--
	Power factor obtained ..... :	0,48			--
	Sequence ..... :	O-t-CO			--
	I_{peak} (A) max. value ..... :	4,23kA	4,38kA	3,72kA	--
	I²t max. ..... :	[KA²s]	[KA²s]	[KA²s]	--
	C40, 2P <120 kA²s	53,4	51,4	50,1	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				N/A
	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	The RCBO shall show no damage impairing their further use an shall be capable without maintenance to withstand the following tests:				P
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	[mA]	[mA]	[mA]	--
	The leakage current shall not exceed 2 mA	<0,01	<0,01	<0,01	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				P
	e) 900 V				P
	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 position and during the test carried out under the conditions specified in 9.7.2 b) the indication means shall show the closed position				P
9.12.12.2.c)	Test current 2,8 I_N ..... :	112A			--

IEC61009_1F - ATTACHMENT					
Clause	Requirement + Test	Result - Remark			Verdict
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	OK	OK	OK	P
	- 120 s				N/A
	Tests F_1 C32, 10mA, Class 3, when Icn=10,0kA				--
9.12	SHORT-CIRCUITS TEST				--
9.12.11.4	Test above 1500 A				P
c)	Test at rated short-circuit capacity I_{cn}				P
	Rated short-circuit capacity (A) ..... :	10kA			--
	Figure ..... :				--
	Cross-section (mm²)..... :	10mm²			--
	Grid distance a (mm)..... :	45mm			--
	Prospective current (A) ..... :	10kA			--
	Prospective current obtained (A) ..... :	10,1kA			--
	Power factor ..... :	0,45-0,50			--
	Power factor obtained ..... :	0,48			--
	Sequence ..... :	O-t-CO			--
	I_{peak} (A) max. value ..... :	3,09kA 3,36kA 3,64kA			--
	I²t max. ..... :	[KA²s]	[KA²s]	[KA²s]	--
	C32, 2P <100 kA²s	35,9	44,2	43,7	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				N/A
	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	The RCBO shall show no damage impairing their further use an shall be capable without maintenance to withstand the following tests:				P
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	[mA]	[mA]	[mA]	--
	The leakage current shall not exceed 2 mA	<0,01	<0,01	<0,01	P
9.12.12.2.b)	Dielectric strength test:				--
	Test voltage:				--

IEC61009_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

	a) 900 V				P
	b) 900 V				P
	c) 900 V				P
	d) 900 V				P
	e) 900 V				P
	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 position and during the test carried out under the conditions specified in 9.7.2 b) the indication means shall show the closed position				P
9.12.12.2.c)	Test current 2,8 I_N ..... :	89,6A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	OK	OK	OK	P
	- 120 s				N/A

	Tests F_1 C16, 10mA, Class 3, when Icn=10,0kA				--
9.12	SHORT-CIRCUITS TEST				--
9.12.11.4	Test above 1500 A				P
c)	Test at rated short-circuit capacity I_{cn}				P
	Rated short-circuit capacity (A) ..... :	10kA			--
	Figure ..... :				--
	Cross-section (mm²)..... :	10mm^2			--
	Grid distance a (mm)..... :	45mm			--
	Prospective current (A) ..... :	10kA			--
	Prospective current obtained (A) ..... :	10,1kA			--
	Power factor ..... :	0,45-0,50			--
	Power factor obtained ..... :	0,48			--
	Sequence ..... :	O-t-CO			--
	I_{peak} (A) max. value ..... :	3,18kA 3,02kA 3,37kA			--
	I²t max. ..... :	[KA²s]	[KA²s]	[KA²s]	--
	C16, 2P <80 kA^{2}s	30,8	30,5	31,7	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				N/A
	No permanent arcing				P

IEC61009_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

	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	The RCBO shall show no damage impairing their further use an shall be capable without maintenance to withstand the following tests:				P
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	[mA]	[mA]	[mA]	--
	The leakage current shall not exceed 2 mA	<0,01	<0,01	<0,01	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				P
	e) 900 V				P
	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 position and during the test carried out under the conditions specified in 9.7.2 b) the indication means shall show the closed position				P
9.12.12.2.c)	Test current 2,8 I_N ..... :	36,4A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	OK	OK	OK	P
	- 120 s				N/A

	Tests F_1 B63, 10mA, Class 3, when Icn=10,0kA.		--
9.12	SHORT-CIRCUITS TEST		--
9.12.11.4	Test above 1500 A		P
c)	Test at rated short-circuit capacity I_{cn}		P
	Rated short-circuit capacity (A) ..... :	10kA	--
	Figure ..... :		--
	Cross-section (mm^2)..... :	25mm^2	--
	Grid distance a (mm)..... :	45mm	--

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Clause	Requirement + Test	Result - Remark	Verdict

	Prospective current (A) ..... :	10kA			--
	Prospective current obtained (A) ..... :	10,1kA			--
	Power factor ..... :	0,45-0,50			--
	Power factor obtained ..... :	0,48			--
	Sequence ..... :	O-t-CO			--
	I_{peak} (A) max. value ..... :	3,85kA 4,3kA 4,66kA			--
	I^2t max. ..... :	[KA²s]	[KA²s]	[KA²s]	--
	B63, 2P <135 kA²s	54,5	74,7	68,7	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				N/A
	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	The RCBO shall show no damage impairing their further use an shall be capable without maintenance to withstand the following tests:				P
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	[mA]	[mA]	[mA]	--
	The leakage current shall not exceed 2 mA	<0,01	<0,01	<0,01	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				P
	e) 900 V				P
	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 position and during the test carried out under the conditions specified in 9.7.2 b) the indication means shall show the closed position				P
9.12.12.2.c)	Test current 2,8 I_N ..... :	177A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	OK	OK	OK	P
	- 120 s				N/A

IEC61009_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

	Tests F_1 B40, 10mA, Class 3, when Icn=10,0kA				--
9.12	SHORT-CIRCUITS TEST				--
9.12.11.4	Test above 1500 A				P
c)	Test at rated short-circuit capacity I_{cn}				P
	Rated short-circuit capacity (A) ..... :	10kA			--
	Figure ..... :				--
	Cross-section (mm^2)..... :	16mm^2			--
	Grid distance a (mm)..... :	45mm			--
	Prospective current (A) ..... :	10kA			--
	Prospective current obtained (A) ..... :	10,1kA			--
	Power factor ..... :	0,45-0,50			--
	Power factor obtained ..... :	0,48			--
	Sequence ..... :	O-t-CO			--
	I_{peak} (A) max. value ..... :	3,34kA	3,64kA	4,19kA	--
	I^2t max. ..... :	[KA^2s]	[KA^2s]	[KA^2s]	--
	B40, 2P <108 kA^2s	40,4	46,7	51	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				N/A
	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	The RCBO shall show no damage impairing their further use an shall be capable without maintenance to withstand the following tests:				P
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	[mA]	[mA]	[mA]	--
	The leakage current shall not exceed 2 mA	<0,01	<0,01	<0,01	P
9.12.12.2.b)	Dielectric strength test:				--
	Test voltage:				--
	a) 900 V				P
	b) 900 V				P

IEC61009_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

	c) 900 V				P
	d) 900 V				P
	e) 900 V				P
	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 position and during the test carried out under the conditions specified in 9.7.2 b) the indication means shall show the closed position				P
9.12.12.2.c)	Test current 2,8 I_N ..... :	112A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	OK	OK	OK	P
	- 120 s				N/A

	Tests F_1 B32, 10mA, Class 3, when Icn=10,0kA				--
9.12	SHORT-CIRCUITS TEST				--
9.12.11.4	Test above 1500 A				P
c)	Test at rated short-circuit capacity I_{cn}				P
	Rated short-circuit capacity (A) ..... :	10kA			--
	Figure ..... :				--
	Cross-section (mm²)..... :	10mm²			--
	Grid distance a (mm)..... :	45mm			--
	Prospective current (A) ..... :	10kA			--
	Prospective current obtained (A) ..... :	10,1kA			--
	Power factor ..... :	0,45-0,50			--
	Power factor obtained ..... :	0,48			--
	Sequence ..... :	O-t-CO			--
	I_{peak} (A) max. value ..... :	2,65kA	3,49kA	4,3kA	--
	I^2t max. ..... :	[KA²s]	[KA²s]	[KA²s]	--
	B32, 2P <90 kA²s	35	47,5	56,3	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				N/A
	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

IEC61009_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

9.12.12	The RCBO shall show no damage impairing their further use an shall be capable without maintenance to withstand the following tests:				P
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	[mA]	[mA]	[mA]	--
	The leakage current shall not exceed 2 mA	<0,01	<0,01	<0,01	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				P
	e) 900 V				P
	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 position and during the test carried out under the conditions specified in 9.7.2 b) the indication means shall show the closed position				P
9.12.12.2.c)	Test current 2,8 I_N ..... :	89,6A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	OK	OK	OK	P
	- 120 s				N/A

	Tests F_1 B16, 10mA, Class 3, when Icn=10,0kA		--
9.12	SHORT-CIRCUITS TEST		--
9.12.11.4	Test above 1500 A		P
c)	Test at rated short-circuit capacity I_{cn}		P
	Rated short-circuit capacity (A) ..... :	10kA	--
	Figure ..... :		--
	Cross-section (mm^2)..... :	10mm^2	--
	Grid distance a (mm)..... :	45mm	--
	Prospective current (A) ..... :	10kA	--
	Prospective current obtained (A) ..... :	10,1kA	--
	Power factor ..... :	0,45-0,50	--

IEC61009_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

	Power factor obtained ..... :	0,48			--
	Sequence ..... :	O-t-CO			--
	I_{peak} (A) max. value ..... :	2,57kA 3,26kA 3,51kA			--
	I^2t max. ..... :	[KA^2s]	[KA^2s]	[KA^2s]	--
	B16, 2P <70 kA^2s	19,8	24,5	26,1	P
	RCBOs functionally dependent on the line voltage supplied with rated voltage				N/A
	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	The RCBO shall show no damage impairing their further use an shall be capable without maintenance to withstand the following tests:				P
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	[mA]	[mA]	[mA]	--
	The leakage current shall not exceed 2 mA	<0,01	<0,01	<0,01	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				P
	e) 900 V				P
	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 position and during the test carried out under the conditions specified in 9.7.2 b) the indication means shall show the closed position				P
9.12.12.2.c)	Test current 2,8 I_N ..... :	36,4A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	OK	OK	OK	P
	- 120 s				N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	Tests F_2 *(add the new test sequence)* C63/1P+N/type AC/10mA	**F_2-1**	**F_2-2**	**F_2-3**	--
9.12	SHORT-CIRCUITS TEST				--
add: 9.12.11.4 d)	Test above 1500 A				P
	Test at residual making and breaking capacity $I_{\Delta m}$				P
	Verification of the rated residual making and breaking capacity $I_{\Delta m}$ (A) .....:	2000 A			--
	Test circuit according to figure.....:	Figure 9			--
	Cross-section (mm²).....:	16 mm²			--
	Grid distance a (mm).....:	45 mm			--
	Prospective current (A).....:	2000 A			--
	Prospective current obtained (A).....:	2040 A			--
	Power factor .....:	0,85…0,90			--
	Power factor obtained.....:	0,86			--
	I_{peak} (A) max. value .....:	2,48kA	2,36kA	2,50kA	--
	I^2t max. sequence O-t-CO .....:	[KA²s]	[KA²s]	[KA²s]	--
		15,9	13,7	16,2	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.= 264 V. The RCBO is in the open position	[mA]	[mA]	[mA]	--

IEC61009_1F - ATTACHMENT					
Clause	Requirement + Test	Result - Remark			Verdict
	The leakage current shall not exceed 2 mA	< 0,01	< 0,01	< 0,01	P
9.12.12.2.b)	Dielectric strength test of the main circuit for 1 min.				
	Test voltage:				
	a) 900 V	900 V, 1 min, 100 mA			P
	b) 900 V	900 V, 1 min, 100 mA			P
	c) 900 V	900 V, 1 min, 100 mA			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 position and during the test carried out under the conditions specified in 9.7.2 b) the indication means shall show the closed position				P
	No flash-over or break down				P
9.12.12.2.c)	Test current 2,8 I_N	2,8 I_N = 175 A			--
	Tripping within > 0,1 s up to	[s]	[s]	[s]	--
	- 60 s	13	11	26	P
	- 120 s				N/A
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]	--
		24	27	26	P

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Clause	Requirement + Test	Result - Remark	Verdict

	TEST SEQUENCE "G_1" **(add the new test sequence)** C63/1P+N/10m A/Type AC	**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				P
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
	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 current is passed through one pole (see figure 4a)				P
	- general type:	[ms]	[ms]	[ms]	--
	break time at 1,25 $I_{\Delta N}$ not exceeding the value for 1,25$I_{\Delta N}$ in table 2	33	24	18	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:				N/A
	Break time with pulsating d.c. residual currents of				N/A
	- 1,25 $I_{\Delta N}$ (general type)				N/A
	- 2,5 $I_{\Delta N}$ (S-type)				N/A
	Multiplied by:	[ms]	[ms]	[ms]	--
	1,4 for $I_{\Delta N}$ > 0,01 A				N/A
	2 for $I_{\Delta N} \leq$ 0,01 A				N/A
	at α = 0°el (test circuit figure 4b)				N/A
	After test possible to switch on the RCBO without presence of residual current				N/A

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Clause	Requirement + Test	Result - Remark	Verdict

	TEST SEQUENCE "G_1" **(add the new test sequence)** D6/1P+N/300m A/Type AC	**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				P
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
	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 current is passed through one pole (see figure 4a)				P
	- general type:	[ms]	[ms]	[ms]	--
	break time at 1,25 $I_{\Delta N}$ not exceeding the value for 1,25$I_{\Delta N}$ in table 2	26	24	24	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:				N/A
	Break time with pulsating d.c. residual currents of				N/A
	- 1,25 $I_{\Delta N}$ (general type)				N/A
	- 2,5 $I_{\Delta N}$ (S-type)				N/A
	Multiplied by:	[ms]	[ms]	[ms]	--
	1,4 for $I_{\Delta N}$ > 0,01 A				N/A
	2 for $I_{\Delta N} \leq$ 0,01 A				N/A
	at α = 0°el (test circuit figure 4b)				N/A
	After test possible to switch on the RCBO without presence of residual current				N/A

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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	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	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	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	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)	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)	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 9.16	Behaviour in case of failure of the line voltage Behaviour in case of surge currents 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 shock and impact Short-circuit performance at 1500 A
F	F_0	9.12.11.4 b) (and 9.12.12)	Performance at service short-circuit capacity
	F_1	9.12.11.4 c) (and 9.12.12.2)	Performance at rated short-circuit capacity
	F_2	9.12.11.4 d) (and 9.12.12.2)	Performance at IΔm
G	G_0	9.22.1	Reliability (climatic tests)
	G_1	9.Z1	Verification of correct operation at low ambient air temperature of RCBOs operating at temperatures between -25°C and +40°C
H b)		IEC 61543 Table 4-T1.1 IEC 61543 Table 4-T1.2 IEC 61543 Table 5-T2.3	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	Conducted sine-wave voltages or currents Radiated electromagnetic field Fast transients (burst)
J		IEC 61543 Table 5-T2.6 IEC 61543 Table 6-T3.1	Conducted common mode disturbances in the frequency range lower than 150 kHz Electrostatic discharges

a) This test may be done on separate samples.

b) For device 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 - Number of samples for full test procedure			
Test sequence	Number of samples	Minimum number of samples which shall pass the test	Maximum 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
F_2	3	2 (d)	3
G_0	3	2	3
G_1	3	2 (d)	3
H (e)	3	2	3
I (e)	3	2	3
J (e)	3	2	3

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 and 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.

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replace table A.1 by - 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 $I_{\Delta N}$
C1	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 $I_{\Delta N}$
C2	for 2 protected poles 2max. rating In min. rating I∆n for one protected pole 3max. rating In min. rating I∆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 $I_{\Delta N}$
F2	3 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 [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.

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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 In and minimum rating $I_{\Delta N}$ does not cover all the possible range of RCBOs, the minimum $I_{\Delta N}$ shall in any case be chosen for the test

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replace table A.4 by - 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 sequence B, only the tests of 9.8 shall be performed on 3-samples of maximum rating In with minimum rating $I_{\Delta N}$. For sequence E_0 , only test 9.9.2.2 shall be performed on one samples of all ratings In with minimum rating $I_{\Delta N}$.

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.

replace table A.5 by - 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	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_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.

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

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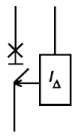
Clause	Requirement + Test	Result - Remark	Verdict
	replace ANNEX E by:		
	ANNEX E **SPECIAL REQUIREMENTS FOR AUXILIARY CIRCUITS FOR SAFETY EXTRA-LOW VOLTAGE*)**		--
add: (additional)	*) For auxiliary contact units assembled or to be assembled separately to RCBO, see EN 62019		--
	replace ANNEX F by:		
	ANNEX F **(INFORMATIVE)** **CO-ORDINATION UNDER SHORT CIRCUIT CONDITIONS BETWEEN A RCBO AND ANOTHER SHORT CIRCUIT PROTECTIVE DEVICE (SCPD) ASSOCIATED IN THE SAME CIRCUIT**		--

IEC61009_1F - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
G	**ANNEX G** **Additional requirements and tests for RCBOs consisting of a circuit-breaker and a residual current unit designed for assembly on site**		N/A
G.3	MARKING AND OTHER PRODUCT INFORMATION		--
G.3.2.2 replace by:	MARKING OF THE R.C. UNIT		
	The r.c. unit shall be marked with the following items, with reference to Clause 6 of this standard:		N/A
	a), b), c), e), f), n), q) and, if necessary, l).		N/A
	In addition the r.c. unit shall be marked with		N/A
	– the maximum rated current of the circuit-breaker with which it may be assembled (e.g. 63 A max.)		N/A
	– the symbol		N/A
G.3.3 replace by:	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
	- method of assembly		N/A
	- checking of operation		N/A
	- verification of tripping operation by use of test button		N/A
G.4	CONSTRUCTIONAL REQUIREMENTS		--
G.4.1 replace by	GENERAL		--
	The design shall be such that it shall be possible to assemble the RCBO on site.		N/A
	Design may be such that the device may be disassembled on sit in accordance with the manufacturer's instructions.		N/A
	For devices declared not suitable for is assembling, the disassembly shall leave permanent visible damage.		N/A
	Compliance is checked according to G.5.4		N/A
G.5	TYPE TESTS AND VERIFICATIONS		--

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Clause	Requirement + Test	Result - Remark	Verdict

G.5.2 replace by	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.5.3 replace by	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 replace by	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 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.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
	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 D_0. 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

	ANNEX ZB		**P**
	EN 61009-1 **Special national conditions**		**P**
	For the countries in which the relevant special national conditions apply these provisions are normative, for other countries they are informative.		P
Germany	Only the use of RCCBs of type A is allowed		N/A
Ireland	EN 61009-1 (referred to as Part 1) is applicable with the modifications given immediately below:		P
	For RCBOs functionally dependant on line voltage IEC 61009-2-2 applies in conjunction with Part 1.		P
	In Ireland, where neutrals are reliably at earth potential, RCBOs with unswitched neutral current paths are permitted for use in accordance with The National Rules For Electrical Installations. The requirements of these types of devices are given in the original text of IEC 61009-1.		P
Switzerland	In Switzerland, the use of RCBOs of type AC is not permitted		N/A
United Kingdom	In the United Kingdom, where neutrals are reliably at earth potential, RCBOs with un-switched neutral current paths are permitted.		P
	The requirements of these types of devices are given in the original text of IEC 61009-1		P

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Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX ZD	P
	EN 61009-1 **Classification of RCBOs Type B and C up to and including 63A into energy limiting classes**	P
	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 63 A	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 63 A (*)

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

	The maximum I2t values measured during the test of Icn (test sequence F0 or F1 as applicable), in accordance with 9.12.11.4 serve as reference values for the lassification.	P
	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.	P

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Clause	Requirement + Test	Result - Remark	Verdict
	If these current ratings are not included in the samples submitted to test sequences F0 or F1 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 I2t value of the proposed energy limiting class in ccordance with tables ZD.1 and ZD.2.		N/A
	If RCBOs rated 40 A are submitted with the range of RCBOs with rating exceeding 16 A and their measured I2t 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.		N/A
	If RCBOs rated 50 A or 63 A are submitted with the range of RCBOs with rating exceeding 32 A and their measured I2t 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		N/A

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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 [a]		
j)	Reference calibration temperature, if different from 30°C				X
k)	The degree of protection (only if different from IP20)				X
l)	The position of use (symbol according to 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 [b]	X			
r)	Wiring diagram unless the correct mode of operation is evident		X	X	
s)	Operating characteristic in presence of residual currents with d.c. components - RCBOs of type AC with the symbol ⏦ - RCBOs of type A with the symbol ⏦	X	X		
t)	Energy limiting class (e.g. 3) in a square in accordance with Annex ZD if applied [c]		X [a]		
u)	RCBOs according to 4 Z1 2 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		

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

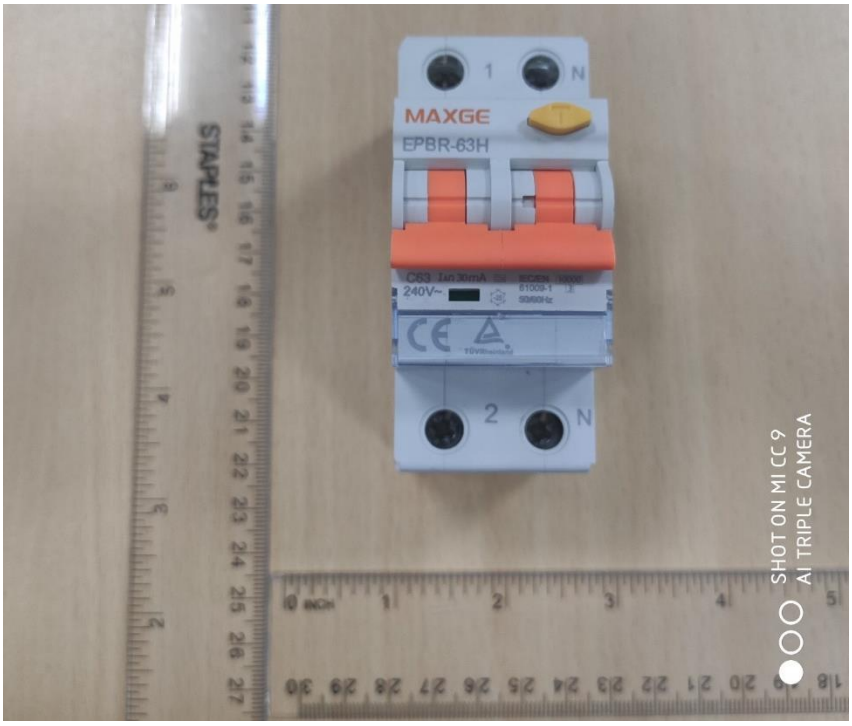
Attachment 1

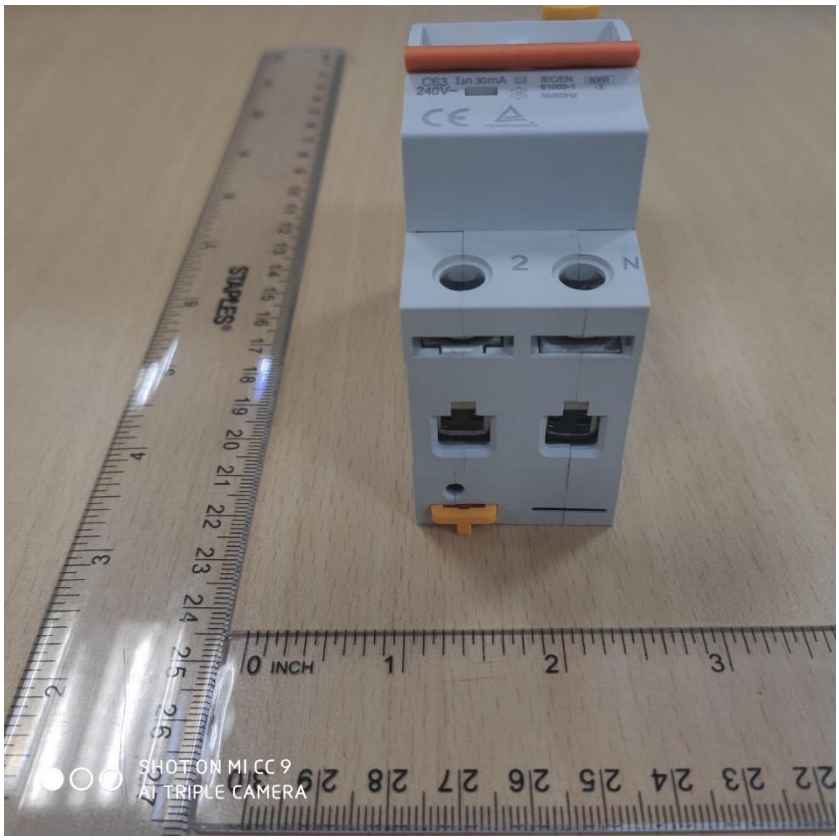
Measuring equipment list (Test location: The Low Voltage Apparatus Laboratory of Zhejiang Testing & Inspection Institute for Mechanical and Electrical Products Quality (ZTME)):

Measuring equipment	Type	Inventory / Serial No.	Next Calibration
Digital Thermometer	XMZW-101A	SB-I-C002	2021-12-22
Thermometer	-	SB-I-C004	2021-06-07
Thermometer	-	SB-I-C007	2021-06-07
Digital Thermometer	HC-02	SB-I-C015	2021-05-05
Digital Thermometer	HC-02	SB-I-C017	2021-05-05
Digital Thermometer	HC-02	SB-I-C018	2021-05-05
Digital Timer	DTM-3	SB-I-D002	2021-08-06
Digital Timer	JD-2II	SB-I-D004	2021-03-30
Caliper	-	SB-I-E003	2021-12-01
Amplifying lens	PEAK2016-L	SB-I-E004	2021-12-09
Tubular Force meter	LTZ-5	SB-I-F003	2021-06-11
Tubular Force meter	LTZ-10	SB-I-F005	2021-11-29
Digital push and pull force meter	HF-500	SB-I-F006	2021-06-11
Current transformer	HL55	SB-I-M003	2021-06-07
Current transformer	HL55	SB-I-M004	2021-06-07
Current transformer	HL55	SB-I-M005	2021-06-07
Current transformer	HL55	SB-I-M006	2021-06-07
Current transformer	HL23-1	SB-I-M010	2021-07-27
Insulation resistance meter	VG2679	SB-I-N010	2021-11-29
Electrical performance platform	AQ-1	SB-I-S002	2021-07-14
Glow-wire tester	GW-A	SB-I-S010	2021-07-09
Single phase electrical parameter meter	GDW1200A	SB-I-S013	2021-09-16
High-low heating cabinet	WGD4025	SB-I-S014	2021-07-09
Climatic chamber	SR-110A	SB-I-S015	2021-07-15
Electrical parameter meter	GDW305B	SB-I-S018	2021-11-29
Torque screw driver	NQ-2	SB-I-S021	2021-09-19
Torque screw driver	NQ-4	SB-I-S022	2021-09-19
DC Dielectric strength tester	ZH-1	SB-I-S023	2021-09-16
Impulse voltage tester	GZ-2	SB-I-S024	2021-03-29
Impulse current tester	GZ-8	SB-I-S029	2021-04-16
Residual current characteristic tester	IDB-3	SB-I-S030	2021-11-17

Measuring equipment	Type	Inventory / Serial No.	Next Calibration
Impulse voltage tester	GC-20	SB-I-S035	2021-03-29
Equipment for ball pressure test	SH9104	SB-I-S031	2021-07-26
Test finger	0-75N	SB-I-S033	2021-11-29
Digital acquisition	sigma90-8 JJ systems	SB-I-S034	2021-12-16
Digital acquisition / switch unit	34970A	SB-I-S040	2021-09-20
Digital acquisition	Genesis	SB-I-S041	2021-11-30
Switch for phase selector	XZB	SB-I-T030	2021-07-05
Oscilloscope	EDU5022S	SB-I-X007	2021-12-02
Endurance control unit	XJT-SY	SB-I-Y006	2021-10-09
Touch current tester	7630	SB-II-S045	2021-07-27
Climatic chamber	ESL-10KA	SB-III-S011	2021-11-08
electrical parameter meter	GDW305B	SB-I-S019	2021-09-16
Temperature-humidity recorder	HC-02	SB-ⅩⅢ-C001	2021-07-21
Temperature-humidity recorder	HC-02	SB-ⅩⅢ-C002	2021-07-21
Electrostatic discharges generator	NSG437	SB-ⅩⅢ-R001	2021-11-13
Radio-frequency disturbances Testing system	NSG3060 (FTM3425-60)	SB-ⅩⅢ-R002	2021-11-13
Radio-frequency disturbances Testing system (Surge)	NSG3060 (CWM3650)	SB-ⅩⅢ-R003	2021-11-13
Three-phase supply coupling network	CDN3063	SB-ⅩⅢ-R005	2021-11-13
Radio-frequency disturbances Testing system	NSG4070-75	SB-ⅩⅢ-R008	2021-11-13
Attenuator	ATN6075	SB-ⅩⅢ-R009	2021-11-13
Current intensity Meter	CIP9136A	SB-ⅩⅢ-R010	2021-11-13
Field intensity Meter	FL7006	SB-ⅩⅢ-R033	2021-11-19
Radio Power Amplify	CBA 1G-250	SB-ⅩⅢ-R036	2021-11-19
Signal generator	SMB 63A	SB-ⅩⅢ-R040	2021-11-14
EMS Antenna	HL046	SB-ⅩⅢ-R042	2021-11-29

Attachment 2

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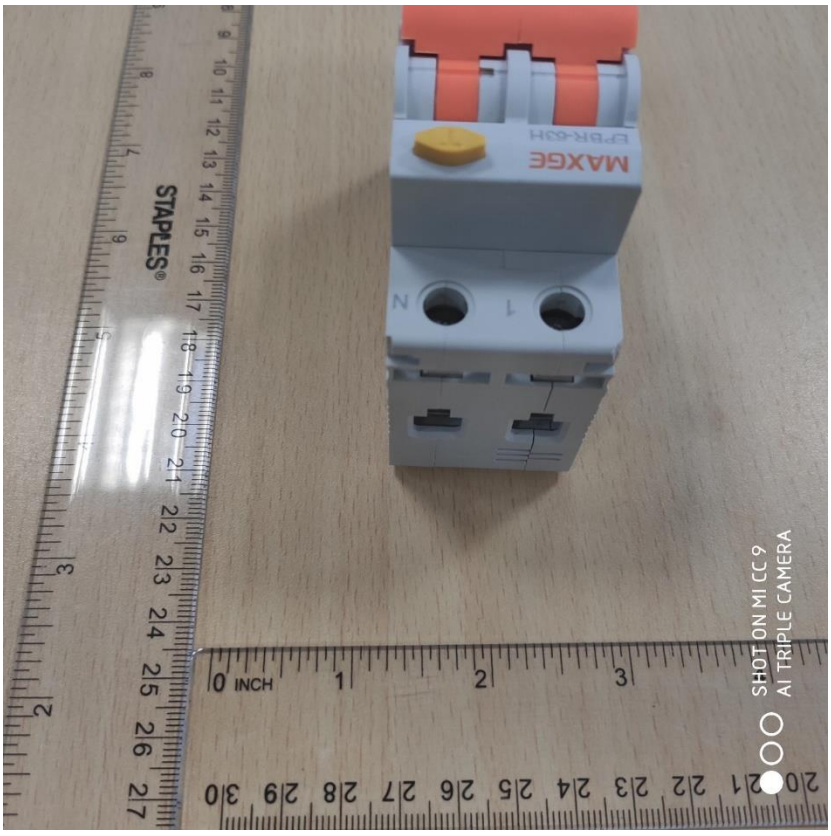
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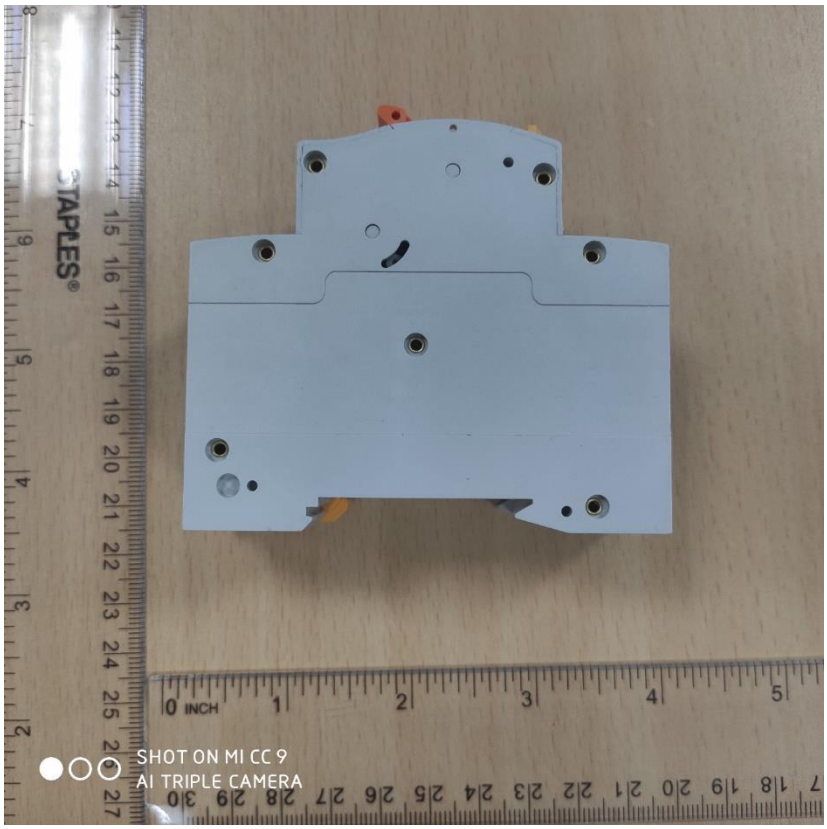
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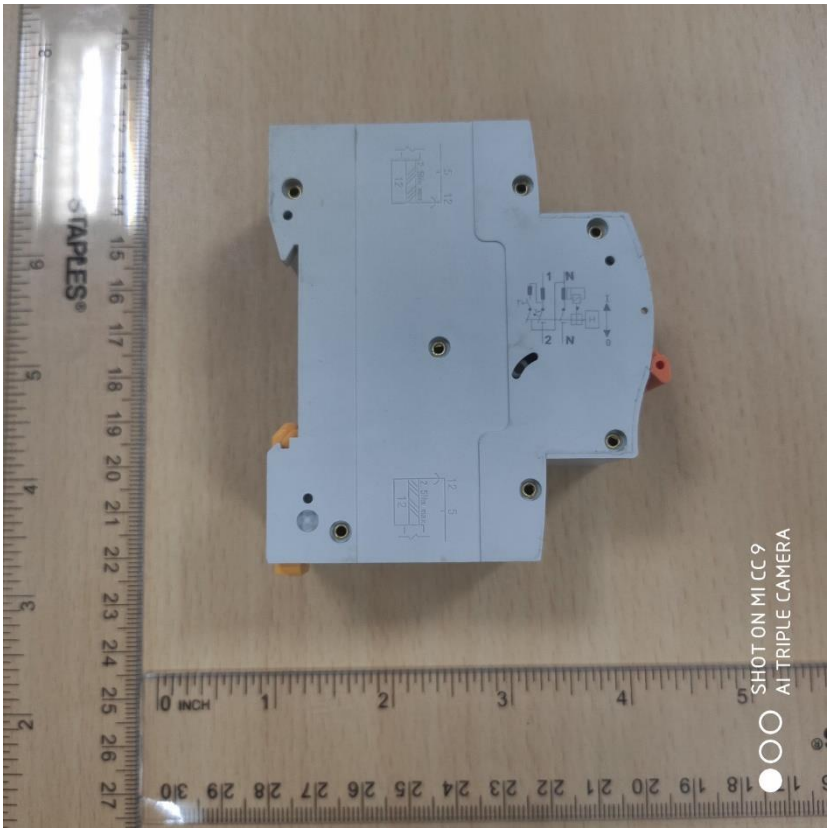
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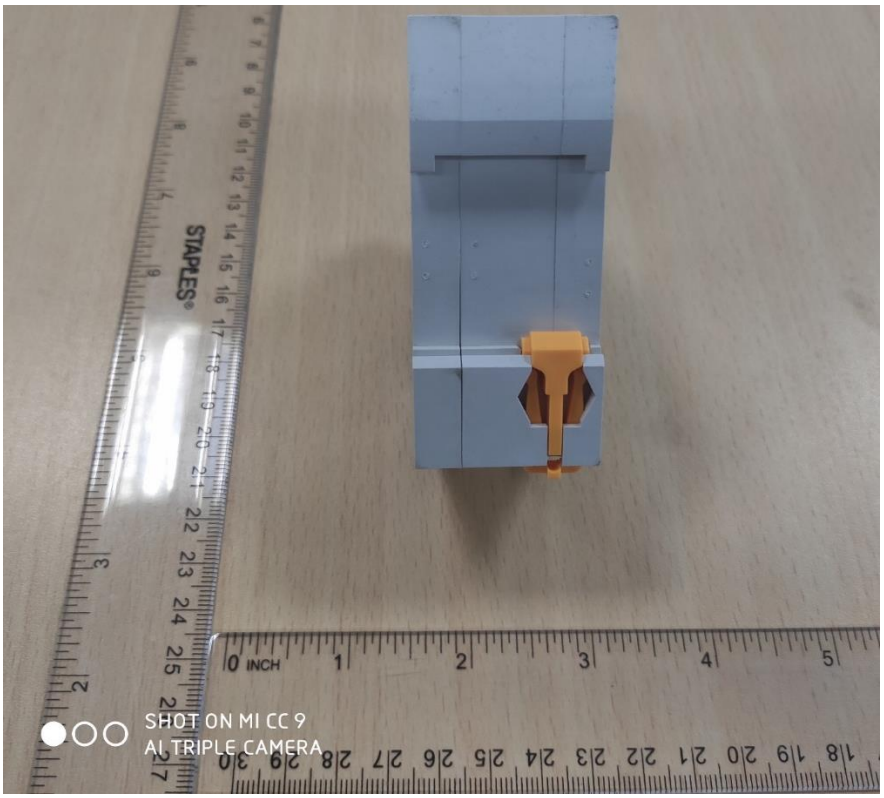
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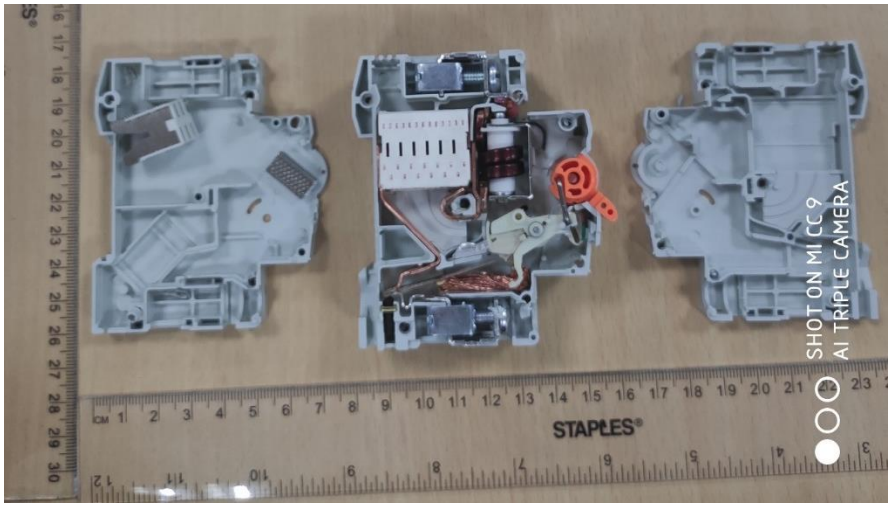
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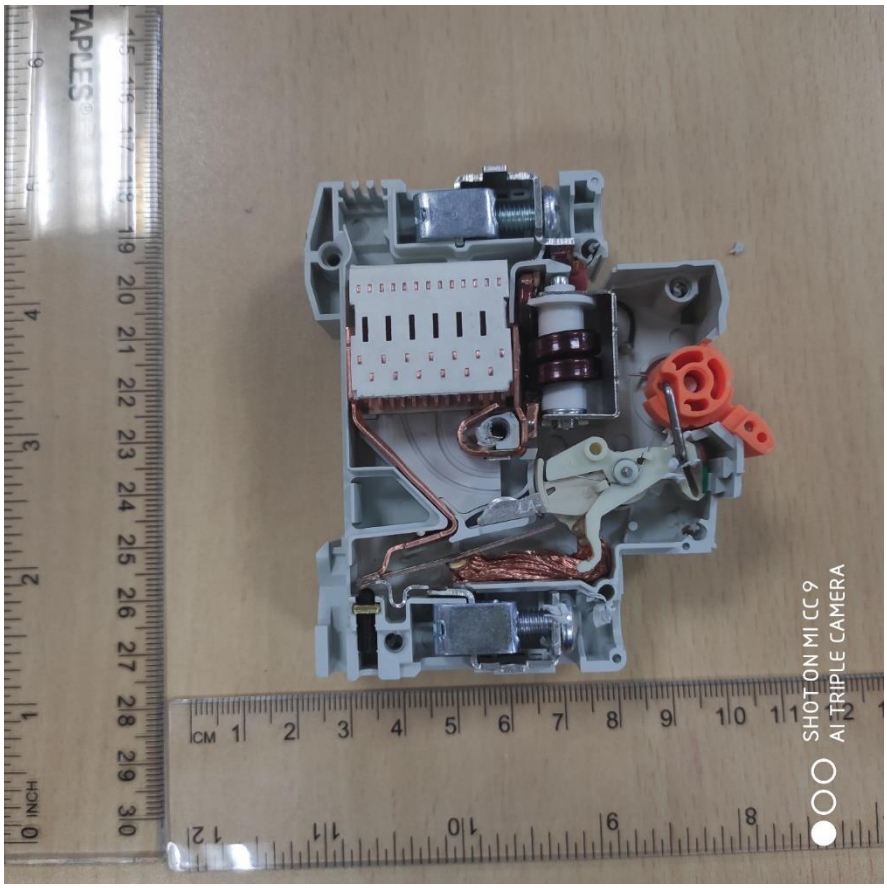
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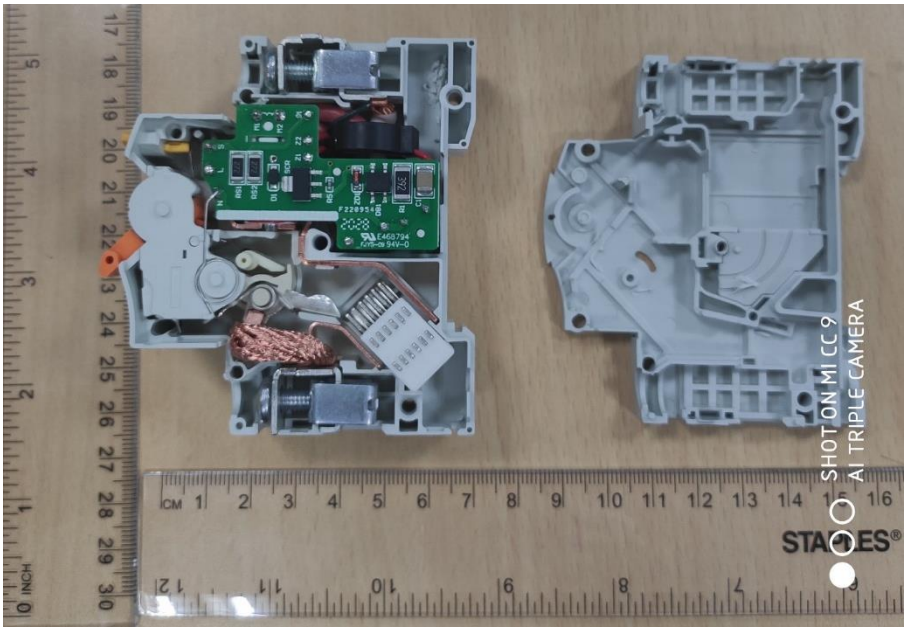
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